2015

Weed Control Guidelines FOR **Mississippi**

Mississippi State University Extension Service
Mississippi Agricultural and Forestry Experiment Station

If you wish to receive copies of the 2016 *Weed Control Guidelines for Mississippi,* complete and return the form below to

2016 *Weed Control Guidelines for Mississippi*
c/o John D. Byrd, Jr., Weed Specialist
Dept. of Plant and Soil Sciences
Box 9555
Mississippi State, MS 39762-9555

Copies may not be available if not ordered in advance.

Please send me ____ copies (at $10.00 each) of the publication, 2016 Weed Control Guidelines for Mississippi. Enclose check with order payable to Mississippi State University Extension Service and designate it 2016 Weed Control Guidelines.

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CONTRIBUTING GROUPS

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1. Agricultural Research Service, U.S. Department of Agriculture
2. Bureau of Plant Industry, Mississippi Department of Agriculture and Commerce
3. Mississippi Agricultural and Forestry Experiment Station
4. Mississippi State University Extension Service
5. Mississippi State University Forest and Wildlife Research Center

This publication is for the direction and guidance of agricultural workers. Specific and less technical information for various crops may be obtained at county offices of the Mississippi State University Extension Service.

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Particular attention has been taken to ascertain that all herbicide treatments in this report are registered with the EPA for use in the manner described. Registrations for specific practices are frequently modified or deleted, often making it impossible for practices suggested in this report to remain current throughout the calendar year. Therefore, the manufacturer's label should be read and observed to prevent misuse of a herbicide. Some herbicide treatments or practices included herein are provided for through Special Local Need Registrations, Section 24(c). Use directions may be in the form of supplemental labeling, which must be in possession of the user at the time of use. Supplemental labeling for these special uses may be obtained from the dealer or registrant. It is not intended or proposed that any practice suggested in this guide be in violation of existing registration or manufacturer's label.

Precautions

All agricultural chemicals should be handled with care. The manufacturer's label on the container includes precautions for safe handling, which should always be observed. When material is spilled on the body, it should be washed off immediately. In no case, should spray tips be placed to the lips to blow out trash. Many of the materials are flammable and should be handled accordingly.

Aerial application of dicamba, picloram, 2,4-D, and other phenoxy or hormone-type herbicides is regulated by law in Mississippi. 2,4-D, dicamba, and/or MCPA may not be applied by fixed-wing aircraft between April 1 and September 30. 2,4-D and/or MCPA shall not be applied in any form to rice by helicopter between April 1 and September 30, except with special spray equipment and under certain conditions. Before aerial applications of such materials are made, operators should contact the Bureau of Plant Industry, Mississippi Department of Agriculture and Commerce, Mississippi State, Mississippi, relative to compliance with this law and the regulations promulgated thereunder.

Clean spray tanks after the final application of a pesticide and before the application of another pesticide. Failure to clean the spray tank can result in severe crop injury or illegal residues in the harvested commodity. Most pesticide residues can be cleaned from the spray tank using household ammonia. Use clean water to rinse the inside of the spray tank. Use enough water to flush the spray boom hoses and spray tips.

Fill the spray tank with clean water; add enough ammonia to make a 1 percent solution (1 gallon ammonia per 100 gallons water). The ammonia used for cleaning should contain 3 percent active ingredient. Agitate the ammonia solution through the spray equipment and flush the hoses, booms, and nozzles for at least 15 minutes. When possible, allow sprayer to sit with this solution overnight before draining. Fill the tanks with clean water, agitate the water, and flush the boom with clean water for 5 minutes. Whenever possible, locate mix-load sites and equipment clean-up sites at least 100 feet from any surface water or from direct links to groundwater.

It is best not to use the same spraying equipment for applying both phenoxy-type herbicides, (2,4-D, etc.) and other pesticides unless the crop has good tolerance. Herbicides such as 2,4-D can be satisfactorily cleaned out of sprayers, but some risk still exists when spraying sensitive broadleaf crops.

Injury to fish, birds, honey bees, and mammals may be avoided in these ways:

1. Prevent drift of herbicides to wooded areas occupied by wildlife, drift to land areas not intended for treatments, and drift to bodies of water.
2. Prevent runoff or washoff by rain from treated areas to bodies of water through judicious timing of application.
3. Do not make applications too often or in excessive dosages.
4. Do not apply highly toxic herbicides.
5. Prevent carelessness.
6. Avoid treating extensive areas of water with approved aquatic herbicides in one operation, since the decaying vegetation that would result might deplete oxygen content of the water to the point of causing fish kills.
7. Comply with all restrictions specified on the pesticide label in the Endangered Species Act.

Herbicide Safety

Herbicides should always be handled in such a way that the possibility of harm to nontarget organisms (including man), either through contamination of food and water or by contact, is kept to a minimum. All users should be trained in the proper handling of herbicides and in following the precautions below:

1. Know the material being applied; READ THE CONTAINER LABEL AND UNDERSTAND THE DIRECTIONS for preparing and applying the herbicide, and FOLLOW THE DIRECTIONS.
2. Wear protective clothing specified on the pesticide label and avoid prolonged exposure to herbicides. Special care should be exercised to prevent inhalation and contamination of the skin when handling concentrates (use respirators, goggles, impermeable aprons, and gloves as specified on the label).
3. Avoid contamination of foods or drinking water of man and animals.
4. When herbicide contamination of the body occurs, wash the affected area quickly and thoroughly with soap and water. Wash with soap routinely after each day of spraying.
5. Keep spray equipment clean and in good condition.
6. STORE HERBICIDES IN PROPERLY LABELED CONTAINERS OUT OF REACH OF CHILDREN AND ANIMALS.
7. Dispose of empty containers safely (See Container Disposal Section).
8. **KNOW THE EMERGENCY MEASURES FOR TREATING ACCIDENTAL POISONING.** When illness arises due to a possible overexposure to a herbicide, contact your local physician. **Physicians and other medical authorities may obtain information on the toxicity of herbicides from the Poison Control Center, University Medical Center, Jackson, MS, telephone 1-800-222-1222.**
9. If herbicides get into the eyes, flush the eyes with plenty of water for 15 minutes and call a physician.
10. If a herbicide is swallowed, apply the first-aid treatment printed on the label of the container and call a physician.

Mixing and Handling Herbicides

1. Mix and prepare herbicides in the open or in a well-ventilated place. When handled in close quarters, highly toxic herbicides may cause poisoning through inhalation. Certain volatile herbicides may cause fires or explosions.
2. Open herbicide containers carefully to prevent billowing of dusts or splashing of liquids.
3. Pour herbicides carefully to avoid spills. Triple or pressure rinse empty containers and use the rinse water to fill the spray tank.
4. Use special containers — drums or pails — for mixing herbicides; never use food or beverage containers.
5. Never use your mouth to siphon a herbicide from a container.
6. Do not mix herbicides in concentrations higher than those recommended and measure accurately. This will help ensure application of correct and safe dosages.
7. Avoid spilling concentrates on the skin or clothes, and keep them away from the eyes, mouth, and nose. If a herbicide is spilled, wash it off with soap and water and change contaminated clothing immediately. Launder contaminated clothing before wearing it again. Launder contaminated clothing separately. Do not launder with family wash.
8. Always wear rubber gloves when handling concentrates. Rinse the gloves with water before removing them; do not turn gloves inside out when removing.
9. To safely mix and prepare some herbicides, it is necessary to wear a respiratory device and protective clothing. The container label will indicate if these precautions are needed.
10. Do not smoke, eat, or drink when handling herbicides.

Applying Herbicides

1. Wear the protective clothing prescribed on the container label when applying a herbicide.
2. Do not apply dosages greater than those recommended on the container label.
3. Time your applications to prevent illegal herbicide residues on food, feed, or forage crops; allow the prescribed number of days' interval between the last herbicide application and harvest or grazing.
4. Guard against drift of herbicides onto nearby crops, pastures, or grazing livestock, or onto streams, ponds, lakes, other fish-bearing waters, or other sensitive areas. Do not spray when environmental conditions favor drift. Use of the correct nozzle size, which maximizes the largest droplet size, will aid in minimizing spray drift.
5. Guard against runoff of herbicides into water supply sources. Do not mix or/apply herbicides near dug wells, cisterns, or any other water sources into which they may run or be washed by rain. Do not clean application equipment, dump unwanted herbicides, or dispose of empty containers near these places.
6. When applying spray or dust, work into the breeze or at a right-angle to it; thus, the herbicide will be blown away from instead of onto you.
7. Do not smoke, eat, or drink while applying herbicides.
8. Be careful not to rub eyes or mouth with your hands during applications.
9. If you should feel ill while applying herbicides, stop work at once and get medical attention.
10. At the end of a day's work, bathe and change all clothing. Launder the clothing before wearing it again. Launder contaminated clothing separately, not with family wash.
11. Rubber shoes may be cleaned with soap and water. It is impossible to efficiently decontaminate leather shoes. If your shoes have become heavily contaminated with herbicide, do not wear them again. Dispose of contaminated footwear properly.

Worker Protection Standard

1. Agricultural, forestry, nursery, and greenhouse users are affected by the Worker Protection Standard.
2. Requirements for Worker Protection Standard must be followed when they appear on the pesticide label. This includes providing personal protective equipment, observing restricted-entry intervals (REI), and notifying workers about areas where applications are taking place or where REI's are in effect. Notification may be oral or with signs posted at field entrances or both if required by the label.
3. Generic provisions of providing a decontamination facility, worker training, monitoring of handlers, cleaning, inspection, and maintenance of personal protective equipment, and notification of applications are required.
4. Training for noncertified pesticide handlers and applicators can be provided by: (1) a currently certified restricted-use pesticide applicator, (2) a person currently designated as a trainer of certified applicators or handlers by State, Federal, or Tribal agency having jurisdiction, or (3) a person having completed a "Pesticide Safety Train-The-Trainer" program approved by the State, Federal, or Tribal agency having jurisdiction. Reinforcement training about the specific pesticide being used should be conducted at the time the pesticide is to be handled or applied.
5. The employer must display at a central location information about each application, the name, telephone number, and address of the nearest emergency medical facility, and a WPS pesticide safety poster developed by EPA or an equivalent poster. He must also provide transportation to an emergency medical facility for the employee thought to have been poisoned or injured and supply the treating medical personnel any requested information from the product label. A description of the way the pesticide was used and the circumstances of the worker's exposure to the pesticide must also be given.

Suggestions for Disposal of Excess Pesticides and Pesticide Containers

Owners of excess pesticides should first exhaust the two following avenues before undertaking final disposal:

1. Use the pesticide for the purposes originally intended at the prescribed rate, providing these uses are currently legal.
2. Return pesticide to the manufacturer or distributor.

Recommended Procedures for Disposal of Excess Pesticides

The best way to dispose of excess pesticides is to apply the pesticide according to the label. Cancelled or suspended pesticides are classified as hazardous waste and must be disposed of at a hazardous waste facility. For information on disposal, contact:

Suggestions for Disposal of Excess Pesticides and Pesticide Containers (continued)

Mississippi Department of Environmental Quality
Bureau of Pollution Control
Division of Hazardous Waste Management
P. O. Box 10385
Jackson, MS 39289
Telephone (601) 961-5171

Recommended Procedures for Disposal of Pesticide Containers and Residues

Containers
Dispose of pesticide containers according to instructions on the pesticide label. As a general rule, (1) containers which held liquid pesticides should be triple or pressure rinsed and either offered for recycling or reconditioning, or disposed of in a permitted solid waste facility. (2) Containers which held dry materials should be completely emptied, triple or pressure rinsed if appropriate, and then either offered for recycling, reconditioning, or disposed of in a permitted solid waste facility.

Mississippi State University Extension Service has a pesticide container (plastic only) recycling program. **Contact your county Extension office to schedule a date to drop off empty pesticide containers for recycling.**

Pesticide Residues
Rinsate from pesticide containers and spray equipment should be added to the spray or mix-tank as diluent and sprayed back on the field.

Open burning of pesticide containers is not permissible under Mississippi law.

Recommended Procedures and Criteria for Storage of Pesticides and Pesticide Containers
Temporary storage of highly toxic or moderately toxic pesticides for the period immediately prior to, and of the quantity required for a single application, may be undertaken by the user at isolated sites and facilities where flooding is unlikely, where provisions are made to prevent unauthorized entry, and where separation from water systems and buildings is sufficient to prevent contamination by runoff, percolation, or wind-blown particles or vapors.

General Instructions for Use of Abbreviated Guides

1. Preplant and preemergence herbicide rates are generally related to soil texture and organic matter content. Some herbicides are suggested in these guidelines for a wide range of soil types (sandy to clays); whereas, others are suggested for only a few soil types. The soil organic matter content further defines use rates. Some times low contents prevent use, but generally, rates increase with increasing organic matter content.
2. If a single rate is recommended for a herbicide, use the recommended rate for all soil types and weed conditions described.
3. If a range of rates (2 to 4 lb for example) is recommended, select a rate from within the range in accordance with the size and condition of crop and weeds. For example, the lowest recommended rate of diuron plus surfactant should be used to control a very scattered infestation of newly emerged crabgrass in 6-inch cotton. In cotton more than 10 inches tall, the highest rate should be used if the problem consists mainly of crabgrass 2-3 inches tall and thickly spaced in the row.
4. If a range of rates (2 to 3 to 4 lb for example) is recommended for soil-applied herbicides, the specific rate should be chosen in accordance with soil texture and organic matter content of the soil. First, use the lower range for soils in the sandy textural class and the higher range for loams, clay loams, or, where recommended, for clays. Second, within either the low or high range select the specific rate in accordance with the organic matter content of the soil. Use the lower side of the range where organic matter is low and the higher side of the range where organic matter is high. Although exact knowledge concerning the organic matter content of soils is generally not available, there are several rough guides that can be used. Soils high in organic matter tend to darker and more easily cultivated than similar soils low in organic matter. Plants grown in high organic soils suffer less from drought than plants grown in similar soils with low organic matter. Soils of the Midsouth with less than one percent organic matter should be considered low in organic matter while those with 1.5 percent should be considered high in organic matter for purposes of herbicide use.

FACTORS TO CONVERT BROADCAST RATE/A TO A BAND RATE AT VARIOUS BAND AND ROW WIDTHS.

Band width inches	Row Spacing — Inches							
	20	24	28	30	32	36	38	40
6	0.3	0.25	0.21	0.20	0.19	0.17	0.16	0.15
8	0.4	0.33	0.29	0.27	0.25	0.22	0.21	0.20
10	0.5	0.42	0.36	0.33	0.31	0.28	0.26	0.25
12	0.6	0.50	0.43	0.40	0.37	0.33	0.31	0.30
14	0.7	0.58	0.50	0.47	0.44	0.39	0.37	0.35
16	0.8	0.67	0.57	0.53	0.50	0.44	0.42	0.40
18	0.9	0.75	0.64	0.60	0.56	0.50	0.47	0.45
20	1.0	0.93	0.71	0.67	0.62	0.56	0.53	0.50

How to Convert: Find the factor for row spacing and band width and multiply this by the broadcast rate.

For Example: The broadcast rate is 1.0 lb/acre, row spacing is 30 inches and band width is 10 inches—multiply .33 by 1.0 to get 0.33 lb/acre on a 10-inch band.

Caution - Noxious Weeds

The Mississippi Department of Agriculture and Commerce has the authority (under Section 69-25-1 through 69-25-47, Laws of Mississippi 1974) to regulate noxious weeds. A noxious weed is a plant species or classified group of plants declared by the Bureau of Plant Industry to be a public nuisance or to be especially injurious to the environment, to agricultural and horticultural production, or to wildlife, and which should be controlled and the dissemination of which prevented. The Mississippi Noxious Weed List and Quarantine information can be found in the regulation "Plant Diseases, Insects and Weeds" on the Bureau of Plant Industry Web site (www.mdac.state.ms.us → "Agency Information" → "Laws & Regulations" → "Bureau of Plant Industry").

MISSISSIPPI NOXIOUS WEEDS

Common Name	Scientific Name	Habitat
Benghal Dayflower	*Commelina benghalensis*	terrestrial
Brazilian Santintail	*Imperata braziliensis*	terrestrial
Chinese Tallow Tree	*Sapium sebiferum(Triadica sebifera)*	terrestrial
Cogongrass	*Imperata cylindrica*	terrestrial
Giant Salvinia	*Salvinia molesta*	aquatic
Hydrilla	*Hydrilla verticillata*	aquatic
Itchgrass	*Rottboellia cochinchinensis*	terrestrial
Kudzu	*Pueraria montana var. lobata*	terrestrial
Tropical Soda Apple	*Solanum viarum*	terrestrial

Also, the Mississippi Department of Agriculture and Commerce has the authority under the Mississippi Aquaculture Act of 1998 (Section 79-22-9, Laws of Mississippi 1974) to regulate the cultivation and marketing of certain aquatic products. In the "Guidelines for Aquaculture Activities" regulation, the department further defined permitting requirements for the importation, selling, possessing, or transporting of species that are detrimental to the state's native resources. The Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) and the Department of Marine Resources may advise MDAC in issuing cultivation and marketing permits (Section 49-7-80, Laws of Mississippi 1974). MDWFP determined the following species to be detrimental to the state's native resources. **Sales and distribution of the following species are prohibited in Mississippi**. The list of prohibited aquatic plants for sale and distribution can be found in the regulation "Guidelines for Aquaculture Activities" on the Bureau of Regulatory Services Web site (www.mdac.state.ms.us → "Agency Information" → "Laws & Regulations" → "Bureau of Regulatory Services").

AQUATIC PLANTS PROHIBITED FOR SALE AND DISTRIBUTION IN MISSISSIPPI

Common Name	Scientific Name	Habitat
Hydrilla (Florida Elodea)	*Hydrilla verticillata*	aquatic
Egeria (African Elodea)	*Egeria densa*	aquatic
Water Hyacinth	*Eichhornia crassipes*	aquatic
Rooted Hyacinth	*Eichhornia azurea*	aquatic
Eurasian Watermilfoil	*Myriophyllum spicatum*	aquatic
Water Lettuce	*Pistia stratiotes*	aquatic
Paperpark (Melaleuca)	*Melaleuca quinquenervia*	aquatic or wetland

A list of federal noxious weeds is available on the USDA Noxious Weeds Programs Web site (www.aphis.usda.gov/plant_health/plant_pest_info/weeds/). This list includes species or species groups that are not currently in the United States and present a real threat to agricultural, forest, urban, and natural areas. The list also includes species that are major weed problems elsewhere in the world and which currently have limited distributions in the United States. **Movement of any federal noxious weed, including seed and other propagules, into the United States and across state lines is prohibited**. See the Computer Aids section in this publication for additional Web sites about non-native invasive weeds.

FEDERAL NOXIOUS WEEDS OCCURRING IN ADJACENT STATES

Common Name	Scientific Name	Habitat	States
Duck-lettuce	*Ottelia alismoides*	aquatic	Louisiana
Cattail Grass	*Setaria pallide*	terrestrial	Louisiana
Fringed Dodder	*Cuscuta suaveolens*	terrestrial	Alabama
Kodomillet	*Paspalum scrobiculatum*	terrestrial	Alabama
Turkey Berry	*Solanum torvum*	terrestrial	Alabama

GLYPHOSATE PRODUCTS, FORMULATIONS, AND RATE CONVERSIONS

Product[1,2]	Manufacturer or distributor	Active ingredient Concentration (lb)[3] Acid (a.e.)	Salt (a.i.)	Surfactant recommended[4]	Amount (oz/A) of product to apply according to rate required and glyphosate formulation					
					lb ae/A =	0.375	0.56	0.75	1.125	1.5
					lb ai/A (3 lb ae/4 lb ai) =	0.5	0.75	1.0	1.5	2.0
					lb ai/A (4 lb ae/5.4 lb ai) =	0.5	0.75	1.0	1.5	2.0
Accord Concentrate[$]	Dow AgroSciences	4	5.4	Yes*		12	18	24	36	48
Accord SP[$]	Dow AgroSciences	3	4	No		16	24	32	48	64
Aqua Star[$]	Albaugh (Agri Star)	4	5.4	Yes		12	18	24	36	48
Aqua Neat[$]	Cerexagi (Riverdale)	4	5.4	Yes		12	18	24	36	48
Aquamaster[$]	Monsanto	4	5.4	Yes		12	18	24	36	48
Buccaneer	Tenkoz	3	4	Yes*		16	24	32	48	64
Buccaneer Plus*	Tenkoz	3	4	Yes*		16	24	32	48	64
ClearOut 41	Chemical Prod. Tech.	3	4	Yes		16	24	32	48	64
ClearOut 41 Plus*	Chemical Prod. Tech.	3	4	Yes*		16	24	32	48	64
ClearOut Pro Plus	Chemical Prod. Tech.	3	4	No		16	24	32	48	64
Cornerstone*	Agriliance	3	4	Yes*		16	24	32	48	64
Cornerstone Plus*	Agriliance	3	4	Yes*		16	24	32	48	64
Credit*	Nufarm	3	4	Yes*		16	24	32	48	64
Credit Extra*	Nufarm	3	4	No		16	24	32	48	64
Credit Duo*	Nufarm	3	3.97	Yes*		16	24	32	48	64
Credit Duo Extra*	Nufarm	3	3.97	No		16	24	32	48	64
Eagre[$]	Griffin	4	5.4	Yes		12	18	24	36	48
Foresters[$]	Riverdale	4	5.4	Yes*		12	18	24	36	48
Gly Star Plus*	Albaugh (Agri Star)	3	4	No		16	24	32	48	64
Gly Star Pro*	Albaugh (Agri Star)	3	4	No		16	24	32	48	64
Gly Star 5*	Albaugh (Agri Star)	4	5.4	Yes		12	18	24	36	48
Gly Star Original*	Albaugh (Agri Star)	3	4	Yes*		16	24	32	48	64
Gly-Flo	Micro-Flo	3	4	Yes*		16	24	32	48	64
Glyfos*	Cheminova	3	4	Yes*		16	24	32	48	64
Glyphos X-tra*	Cheminova	3	4	No		16	24	32	48	64
Glyfos Aquatic[$]	Cheminova	4	5.4	Yes		12	18	24	36	48
Glyfos Pro[$]	Cheminova	3	4	No		16	24	32	48	64
Glyphomax*	Dow AgroSciences	3	4	Yes*		16	24	32	48	64
Glyphomax Plus*	Dow AgroSciences	3	4	No		16	24	32	48	64
Glyphosate*	DuPont	3	4	Yes*		16	24	32	48	64
Glyphosate original*	Griffin	3	4	Yes*		16	24	32	48	64
Glyphosate VMF[$]	DuPont	4	5.4	Yes		12	18	24	36	48
Glyphosate 4*	Farmsaver.com	3	4	Yes		16	24	32	48	64
Glypro[$]	Dow AgroSciences	4	5.4	Yes		12	18	24	36	48
Glypro Plus[$]	Dow AgroSciences	3	4	No		16	24	32	48	64

(continued)

GLYPHOSATE PRODUCTS, FORMULATIONS, AND RATE CONVERSIONS *(continued)*

Product[1,2]	Manufacturer or distributor	Active ingredient Concentration (lb)[3] Acid (a.e.)	Salt (a.i.)	Surfactant recommended[4]	Amount (oz/A) of product to apply according to rate required and glyphosate formulation					
					lb ae/A =	0.375	0.56	0.75	1.125	1.5
					lb ai/A (3 lb ae/4 lb ai) =	0.5	0.75	1.0	1.5	2.0
					lb ai/A (4 lb ae/5.4 lb ai) =	0.5	0.75	1.0	1.5	2.0
Honcho	Monsanto	3	4	Yes*		16	24	32	48	64
Honcho Plus*	Monsanto	3	4	Yes*		16	24	32	48	64
Kleenup Pro[$]	United Hort. Supply	3	4	Yes*		16	24	32	48	64
Mad Dog*	AGSCO	3	4	Yes*		16	24	32	48	64
Mirage	Platte	3	4	Yes*		16	24	32	48	64
Mirage Plus*	Platte	3	4	Yes*		16	24	32	48	64
Polado L	Monsanto	4	5.4	Yes		12	18	24	36	48
Rattler	Helena	3	4	Yes*		16	24	32	48	64
Rattler Plus	Helena	3	4	Yes*		16	24	32	48	64
Razor[$]	Riverdale	3	4	Yes*		16	24	32	48	64
Razor Pro[$]	Riverdale	3	4	No		16	24	32	48	64
Rodeo[$]	Dow AgroSciences	4	5.4	Yes		12	18	24	36	48
Roundup Original RT	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Original	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Original II*	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Original II CA*	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Custom*	Monsanto	4	5.4	Yes		12	18	24	36	48
Roundup Ultra Max*	Monsanto	3.7	5	No		13	19	26	40	52
Roundup Pro[$]	Monsanto	3	4	No		16	24	32	48	64
Roundup Pro Concentrate[$]	Monsanto	3.7	5	No		13	19	26	40	52
Roundup UltraDry*	Monsanto	64.9%	71.4%	No		10	14	19	29	38
Roundup ProDry[$]	Monsanto	64.9%	71.4%	No		10	14	19	29	38
Roundup WeatherMax*	Monsanto	4.5	5.5	No		11	16	21	32	42
Silhouette	Agriliance	3	4	Yes*		16	24	32	48	64
Touchdown CF	Syngenta	3	3.6	No		16	24	32	48	64
Touchdown Pro[$]	Syngenta	3	3.6	No		16	24	32	48	64
Touchdown 5	Syngenta	3.4	5	No		14	21	28	42	56
Touchdown*	Syngenta	3	3.6	No		16	24	32	48	64

[1] Glyphosate products marked with "*" can be applied over-the-top of "Roundup Ready" crops. Please refer to glyphosate product label for specific restrictions.

[2] Glyphosate products marked with "$" are labeled for noncrop (aquatic, forestry, industrial, pasture, and/or turf) use only.

[3] Like many other herbicides, the glyphosate molecule is formulated as a salt. The weight of the active ingredient (a.i.) varies, depending on the chemical elements used to form that salt. The salt portion of the active ingredient does not contribute to actual weed control. Because the weight of the salt used in the different glyphosate formulations varies, a better measure among glyphosate products is the comparison of the actual amount of glyphosate, i.e. acid equivalent (a.e.). The a.e. rate measurement allows one to compare the actual glyphosate rate among the different salt formulations. The a.e. measurement is the only true method to compare glyphosate rates among the different salt formulations.

[4] Some formulations of glyphosate "*" contain some surfactant; however, additional surfactant is required with certain spray volumes. See product label for specific surfactant rates and uses.

PREPLANT WEED CONTROL OF WINTER ANNUAL WEEDS

Successful conservation tillage systems begin with good preplant weed-control programs. The steps for achieving a successful weed-control program are problem diagnosis, method evaluation, program selection, and program implementation. The diagnosis phase is probably the most important step when using these tillage systems. Without proper identification, unsuccessful weed control programs may be implemented, and, in some cases, complete crop loss could occur. Producers have few options to correct ineffective weed-control programs after planting and crop emergence.

More new and different weeds will occur in stale seedbed or no-till cropping systems than in conventional tillage systems. Many of these winter and early emerging spring and summer annuals are difficult to identify in early growth stages, and they become difficult to control by the time they are easily identifiable. Ideally, producers should know what species are present before using a herbicide, although a herbicide such as paraquat or glyphosate can control many plants that are not identified correctly. However, some species require special attention because they are not easily controlled by glyphosate or paraquat.

Producers using conventional tillage systems must become aware of key species that require specialized herbicide programs to avoid unsatisfactory or catastrophic results. Although not a complete list, the most commonly encountered species in the mid-South are shown in the table on the following page. The most difficult to control species in our geographic area are annual ryegrass, cutleaf eveningprimrose, curly dock, horseweed, Pennsylvania smartweed, and swinecress. The following table also shows the expected response of these and other species to commonly used herbicides and herbicide combinations. Weed responses in the table on the following page were compiled from a variety of sources and offer a relative comparison of control provided by different herbicides and combination. Some data should be considered preliminary data and were recorded as field observations without replicated field trials to verify their accuracy. In addition, the ratings provided may be lower than those expected with rates labeled for specific weeds. Overall, they reflect observations made over a wide variety of growing conditions, weed growth stages, and soil types. All of these are factors that affect herbicide performance. Therefore, use these expected responses as guidelines only and always refer to the herbicide label.

Few accurate generalizations can be made with regard to preplant weed control; however, the following may provide some insight to the data contained on the following page: (1) glyphosate and 2,4-D are most effective on small, actively growing weeds; (2) paraquat is most active on weeds that are either very young or have reached reproductive stages; (3) the addition of tank-mixture partners to glyphosate, with perhaps the exceptions of Goal, Harmony extra, and 2,4-D, tends to substantially antagonize (reduce) glyphosate's activity on grasses; (4) the addition of tank-mixture partners, particularly photosynthetic inhibitors, greatly enhances paraquat's performance.

ESTIMATED LEVELS OF PREPLANT FOLIAR WEED CONTROL NORMALLY EXPECTED

Herbicides	Annual bluegrass	Bittercress	Buttercup	Carolina geranium	Chickweed	Eveningprimrose	Henbit	Prostrate knotweed	Shephardspurse	Wildlettuce	Virginia pepperweed	Vetch	Little Barley	Horseweed	Curly dock (seedling)	Curly dock (mature)	Ryegrass	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass	Seedling Johnsongrass	Cocklebur	Entireleaf morningglory	Pitted morningglory	Smallflower morningglory	P. smartweed	Hemp sesbania	Prickly sida	Spurred anoda	Pigweed	Sicklepod	Cutleaf groundcherry	Common ragweed	Red rice	Upright spurge	Cheat	Groundsel	Fall panicum	Rhizome Johnsongrass	Annual sedge	Purple nutsedge	Lambsquarters	Soil activity
Preplant – PPF*																																											
Sencor	9	10	9	7	10	6	8	6	9	8	6	6	10	5	5	-	6	7	8	7	7	8	7	7	7	7	8	9	8	8	8	7	7	8	4	4	-	-	-	-	-	-	yes
Scepter	3	8	9	5	9	5	7	5	9	7	-	4	3	4	3	-	2	2	3	3	3	6	10	5	6	7	7	0	3	2	10	5	3	8	2	2	-	-	-	-	-	-	-	yes
Goal 2XL/Delta Goal	9	10	9	8	8	4	9	9	9	9	8	7	-	6	9	-	5	-	-	-	-	-	8	8	9	9	8	9	9	8	9	-	-	-	-	9	7	7	-	-	-	-	-	yes
2,4-D	0	8	9	7	8	10	5	8	8	9	9	9	0	8	8	7	0	0	0	0	0	0	8	10	10	9	8	8	8	9	9	8	9	-	0	-	0	10	0	0	0	0	-	no
Clarity	0	9	9	8	9	8	9	8	9	9	9	9	0	8	9	7	0	0	1	1	1	0	10	9	9	9	9	9	8	9	8	8	9	9	0	9	0	8	0	0	0	0	8	no
Harmony Extra	0	9	9	8	8	8	7	-	9	9	9	9	0	6	10	9	0	0	0	0	0	0	8	7	8	8	-	6	4	-	8	4	-	-	0	-	0	-	0	0	-	-	9	no
Caparol/Cotton Pro	-	9	9	7	10	7	8	6	8	9	7	6	6	7	8	-	-	-	-	-	-	-	7	7	9	9	7	8	7	7	9	-	-	-	-	-	-	-	-	-	-	-	-	yes
Paraquat	10	10	10	7	10	7	9	6	9	7	7	8	8	8	7	4	8	9	9	9	8	9	6	5	5	7	6	6	6	8	9	9	7	8	7	8	9	9	-	-	-	-	-	no
Paraquat + Sencor	10	10	10	8	10	8	9	6	9	8	8	8	10	8	6	-	9	9	9	9	8	9	7	7	7	7	8	9	8	8	9	9	7	8	7	8	-	-	-	-	-	-	-	yes
Paraquat + Harmony Extra	9	10	10	10	10	8	9	-	10	-	5	9	10	7	9	7	5	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-	no
Paraquat + Delta Goal/ Goal 2XL	10	10	10	10	10	7	9	-	10	-	5	9	10	8	7	5	6	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	9	-	9	-	-	-	-	-	-	yes
Paraquat + Clarity	10	10	10	9	10	9	8	-	9	-	7	10	9	9	9	7	6	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-	no
Paraquat + 2,4-D	10	10	10	9	10	10	9	-	9	-	8	10	9	9	9	8	6	-	-	-	-	-	-	-	-	-	10	-	8	-	-	-	-	-	-	-	10	-	-	-	-	-	-	no
Glufosinate	6	-	-	8	10	7	6	-	-	-	9	8	7	9	-	6	8	8	8	8	8	9	10	10	10	9	8	8	7	-	8	7	-	-	-	-	-	-	-	-	-	-	-	no
Glyphosate	10	10	9	7	10	6	7	7	10	8	8	5	10	8	8	6	8	10	10	10	9	10	8	7	8	8	7	6	7	6	10	8	9	9	8	10	10	9	9	9	10	5	-	no
Glyphosate + 2,4-D	10	10	10	9	10	10	8	-	10	10	9	10	10	9	10	8	7	-	-	-	-	-	9	9	9	9	8	8	8	8	10	8	9	-	-	10	-	10	-	-	-	-	-	-	no
Glyphosate + Goal 2XL/ Delta Goal	10	10	10	8	10	7	9	-	10	-	10	7	10	8	8	7	8	9	9	9	8	9	8	9	9	9	8	10	9	9	10	8	9	9	-	10		9	8	8	-	-	-	yes
Glyphosate + Clarity	10	10	10	9	10	9	10	-	10	-	9	9	10	9	10	8	8	-	-	-	-	-	-	-	-	-	10	9	8	-	-	-	-	-	-	-	10	-	-	-	-	-	-	no
Glyphosate + Canopy XL	10	10	10	8	10	9	9	-	9	-	-	-	10	8	10	9	8	10	10	10	9	10	9	9	9	9	9	7	8	-	10	8	-	-	9	-	10	9	9	9	-	-	-	yes
Glyphosate + Harmony Extra	10	10	10	8	10	7	9	-	10	9	10	9	10	8	10	9	7	10	10	10	9	10	8	8	9	9	10	7	-	-	10	8	-	-	-	-	10	10	9	9	-	-	9	no
Glyphosate + Harmony GT	10	10	10	8	10	7	9	-	9	8	8	-	10	8	10	9	8	10	10	10	9	10	8	8	8	8	8	6	7	-	10	8	9	9	9	9	10	9	9	9	-	-	9	no
Glyphosate + Valor	10	10	10	8	10	9	9	-	9	-	-	-	10	8	-		9	10	10	10	9	10	8	8	8	8	9	-	-	-	10	8	9	9	9	10	10	9	9	9	-	-	-	yes

*Plus adjuvant if required according to label instructions.

HERBICIDE-RESISTANT WEEDS

Weed resistance is defined by the Weed Science Society of America as the inherited ability of a plant to survive and reproduce after exposure to a dose of herbicide normally lethal to the wild type. In a plant, resistance may be naturally occurring or induced by such techniques as genetic engineering or selection of variants produced by tissue culture or mutagenesis. Repeated application(s) of the same herbicide or a different herbicide with similar mode of action on the same field growing season after growing season has contributed to the widespread occurrence of resistance to herbicides in several weed species around the world, in the U.S., and in Mississippi (see list below). Weed management programs must not be solely dependent on herbicides in order to be economically sustainable in the long term. In general, a combination of the following strategies is recommended:

(1) Use residual herbicides;

(2) Practice crop rotation;

(3) Rotate herbicides with different modes of action;

(4) Tank-mix herbicides with different modes of action at full recommended rates;

(5) Avoid sequential applications of the same herbicide continually;

(6) Utilize tillage, cultivation, and other cultural practices wherever and whenever feasible;

(7) Clean equipment thoroughly before and after each use; and

(8) Control weeds postharvest to reduce soil seedbank.

HERBICIDE-RESISTANT WEEDS IN MISSISSIPPI

Weed	Herbicide
Annual bluegrass	atrazine, simazine
Barnyardgrass/Junglerice	bispyribac, cyhalofop, fenoxaprop, imazamox, imazethapyr, penoxsulam, propanil, quinclorac
Common cocklebur	MSMA, DSMA, imazaquin, imazethapyr
Common ragweed	glyphosate
Goosegrass	DSMA, glyphosate, MSMA, pendimethalin, trifluralin
Horseweed (mare's-tail)	glyphosate, paraquat
Italian ryegrass	diclofop, glyphosate, imazapic, imazapyr, mesosulfuron, metsulfuron, pyroxsulam, sulfometuron
Johnsongrass	fenoxaprop, fluazifop, glyphosate, pendimethalin, quizalofop, trifluralin
Palmer amaranth	glyphosate, pyrithiobac
Pigweed species	sulfometuron
Rice flatsedge	halosulfuron, imazethapyr
Spiny amaranth	glyphosate
Tall waterhemp	glyphosate

Management Options for Herbicide-Resistant Weeds

These are suggested options for managing herbicide-resistant weeds in the major agronomic crops of Mississippi. These are not the only options, but they have proven effective at managing herbicide-resistant weeds in Mississippi. See the overall herbicide resistance summary in this section for details on existing herbicide-resistant weeds in Mississippi. **NOTE: Consult individual crop sections in this publication or product labels for specific information on application rates, timings of application, preplant intervals, and crop rotation restrictions.**

Weed	Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Barnyardgrass (ALS-resistant)	Rice	propanil	3–6 lb ai/A, depending on barnyardgrass size	Postemergence to barnyardgrass with less than four leaves	Add crop oil concentrate at 1% v/v if using an SC propanil formulation. Sequential applications may be needed for complete control. Add Command, pendimethalin, or quinclorac for residual control after application.
Barnyardgrass (ALS-resistant)	Rice	quinclorac	0.25–0.5 lb ai/A, depending on barnyardgrass size	Preemergence or postemergence until 40 days before harvest	Add crop oil concentrate at 1 quart per acre for postemergence applications. Apply with Command or pendimethalin for additional residual control. Apply with propanil, Ricestar HT, or Clincher SF for additional postemergence control. **This treatment may be applied postflood, but this should be considered emergency salvage treatment.**
Barnyardgrass (ALS-resistant)	Rice	RiceBeaux	4 qt/A	Postemergence to barnyardgrass with one to three leaves	Soil should be moist at time of application and not allowed to crack after application. RiceBeaux works best as a component of a barnyardgrass program including preemergence and postemergence applications of other herbicides.
Barnyardgrass (ALS-, propanil- and, quinclorac-resistant)	Rice	Clincher SF	15 oz/A	Postemergence from one-leaf rice to early tillering stage to barnyardgrass with less than four leaves	Soil moisture is critical for good activity. Flush the field before application if soil is dry. Weed foliage must not be covered with water at time of application. Add Command or pendimethalin for residual control after application. Add crop oil concentrate or methylated seed oil (MSO) at 1 quart per acre. **This treatment may be applied postflood, but this should be considered emergency salvage treatment.**
Barnyardgrass (ALS-, propanil- and, quinclorac-resistant)	Rice	Command	0.8–1.6 pt/A, depending on soil texture	Preemergence after planting but before rice emergence; postemergence to rice with one to two leaves	Use the higher rate on heavier-textured soils. Command provides no postemergence control. Apply with glyphosate if barnyardgrass is emerged at preemergence application. Apply with Clincher SF or Ricestar HT if barnyardgrass is emerged at postemergence application.
Barnyardgrass (ALS-,propanil- and, quinclorac-resistant)	Rice	pendimethalin	Formulation and soil texture dependent	Delayed pre-emergence after rice seed have imbibed water for germination	Use the higher rate on heavier-textured soils. Pendimethalin provides no postemergence control. Include Clincher SF or Ricestar HT to control emerged barnyardgrass.
Barnyardgrass (ALS-,propanil- and, quinclorac-resistant)	Rice	Ricestar HT	24 oz/A	Postemergence from two-leaf rice to early tillering stage and to barnyardgrass with less than four leaves	Soil moisture is critical for good activity. Flush the field before application if soil is dry. Weed foliage must not be covered with water at time of application. Add Command or pendimethalin for residual control after application.
Barnyardgrass (propanil- and quinclorac-resistant)	Rice	Beyond	5–6 oz/A	Postemergence from four-leaf rice until 14 days after panicle initiation on Clearfield varieties; from four-leaf rice to panicle initiation on Clearfield hybrids	**Use on Clearfield rice varieties and hybrids only.** Add crop oil concentrate at 1 quart per acre. Beyond may be substituted for the second application of Newpath, but two applications are required before flooding. **This treatment may be applied postflood, but this should be considered emergency salvage treatment.**
Barnyardgrass (propanil- and quinclorac-resistant)	Rice	Clearpath	0.5 lb/A	Preplant incorporated, preemergence, or postemergence until one-leaf rice	**Use on Clearfield rice varieties and hybrids only.** Add crop oil concentrate at 1 quart per acre. Clearpath must be followed by an application of Newpath or Beyond before flooding.

Weed	Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Barnyardgrass (propanil- and quinclorac-resistant)	Rice	Grasp	2–2.8 oz/A, depending on application timing	Postemergence until 60 days before harvest	Add crop oil concentrate or methylated seed oil (MSO) at 1 quart per acre. Add Command or pendimethalin for residual control after application. **This treatment may be applied postflood, but this should be considered emergency salvage treatment.**
Barnyardgrass (propanil- and quinclorac-resistant)	Rice	Newpath	4–6 oz/A	Preplant incorporated, preemergence, or postemergence until flooding	**Use on Clearfield rice varieties and hybrids only.** Add crop oil concentrate at 1 quart per acre. Applications made preplant incorporated, preemergence, or to one- to two-leaf rice should be followed by a second application of Newpath or Beyond before flooding.
Barnyardgrass (propanil- and quinclorac-resistant)	Rice	Regiment	0.4–0.67 oz/A, depending on barnyardgrass size	Postemergence from three-leaf rice to 0.5-inch internode elongation	See the Regiment label for a list of adjuvants approved by Valent. Add Command or pendimethalin for residual control after application. **This treatment may be applied postflood, but this should be considered emergency salvage treatment.**
Goosegrass (glyphosate-resistant)	Cotton, soybean	clethodim	0.07–0.125 lb ai/A	Postemergence to goosegrass with 2–6 inches of lateral growth	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Goosegrass (glyphosate-resistant)	Cotton, soybean	Fusilade DX	8 oz/A	Postemergence to goosegrass less than 5 inches with less than six leaves	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Goosegrass (glyphosate-resistant)	Cotton, soybean	quizalofop	0.048–0.055 lb ai/A	Postemergence to goosegrass with 2–6 inches of lateral growth	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Goosegrass (glyphosate-resistant)	Cotton, soybean	sethoxydim	0.188 lb ai/A	Postemergence to goosegrass less than 6 inches	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Horseweed (glyphosate- and paraquat-resistant)	Corn, cotton, rice, soybean	2,4-D	Formulation dependent	Postemergence during fall to spring burndown	Apply alone or with residual herbicide listed in this section. 2,4-D provides no residual horseweed control. It is often applied with glyphosate or glyphosate plus residual herbicide in a spring burndown program.
	Corn			Postemergence to **corn only** less than 8 inches	Postemergence applications of 2,4-D may cause injury such as lodging, bending, and brittle stalks.
Horseweed (glyphosate- and paraquat-resistant)	Corn	atrazine	1.5–2.5 lb ai/A	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Atrazine may be applied with glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control before corn emergence. Add crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Horseweed (glyphosate- and paraquat-resistant)	Soybean	Canopy	4–6 oz/A	Preemergence during fall to spring burndown up to planting	Apply before horseweed emerges. Add 2,4-D or dicamba to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Horseweed (glyphosate- and paraquat-resistant)	Soybean	Canopy EX	2 oz/A	Preemergence during fall to spring burndown up to 7 days before planting	Apply before horseweed emerges. Add 2,4-D or dicamba to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Horseweed (glyphosate- and paraquat-resistant)	Corn, cotton, soybean	dicamba	Formulation dependent	Postemergence during fall to spring burndown	Apply alone or with residual product listed in this section. Dicamba provides no residual horseweed control. It is often applied with glyphosate or glyphosate plus residual herbicide in a spring burndown program.
	Corn			Postemergence to **corn only** less than 36 inches	Do not add crop oil concentrate to dicamba applied after corn emergence to avoid injury.

Weed	Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Horseweed (glyphosate- and paraquat-resistant)	Cotton	diuron	0.5–1.6 lb ai/A, depending on soil texture	Preemergence during fall to spring burndown	Apply before horseweed emerges. Add 2,4-D, dicamba, or Liberty 280 to control emerged horseweed. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba. A postemergence application will likely be required for spring-emerged horseweed.
Horseweed (glyphosate- and paraquat-resistant)	Soybean	Envive	3 oz/A	Preemergence during fall to spring burndown up to planting	Apply before horseweed emerges. Add 2,4-D or dicamba to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Horseweed (glyphosate- and paraquat-resistant)	Cotton	Envoke	0.15 oz/A	Preemergence during fall to spring burndown but 3 months before planting	Apply before horseweed emerges. Add 2,4-D, dicamba, or Liberty 280 to control emerged horseweed. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Horseweed (glyphosate- and paraquat-resistant)	Corn, soybean	Fierce	3–3.75 oz/A	Preemergence during fall to spring burndown	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Horseweed (glyphosate- and paraquat-resistant)	Soybean	FirstRate or FirstRate or FirstRate + glyphosate	0.75 oz/A 0.3–0.6 oz/A 0.3–0.6 oz/A + formulation dependent	Preemergence during fall to spring burndown but before soybean emergence Preemergence or postemergence up to 50% flowering soybean Preemergence or postemergence up to 50% flowering soybean	Apply before horseweed emerges. Add 2,4-D, dicamba, or Liberty 280 to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant. FirstRate may be applied postemergence to soybean and horseweed at 0.3 ounce per acre. A second application of 0.3 ounce may be applied 10 to 14 days later to control regrowth and provide longer residual activity. A single application of 0.6 ounce per acre may be applied under high weed pressure. Do not exceed 1.05 ounces per acre in a single season. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required. However, improved control has been observed when an additional adjuvant is used in the preloaded glyphosate formulation.
Horseweed (glyphosate- and paraquat-resistant)	Soybean	Gangster	2.4 oz/A (2 oz Valor + 0.4 oz FirstRate); sold as a co-pack	Preemergence during fall to spring burndown but before soybean emergence	Apply before horseweed emerges. Add 2,4-D, dicamba, or Liberty 280 to control emerged horseweed. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Horseweed (glyphosate- and paraquat-resistant)	Rice	Grasp	2.3 oz/A	Postemergence to horseweed less than 6 inches	Add crop oil concentrate or methylated seed oil (MSO) at 1 quart per acre. Grasp will not completely control horseweed until after flooding.
Horseweed (glyphosate- and paraquat-resistant)	Corn	Halex GT + atrazine	3.6–4 pt/A + 1.5 lb ai/A	Postemergence until corn reaches 12 inches	Add nonionic surfactant at 0.25% v/v.
Horseweed (glyphosate- and paraquat-resistant)	Corn	Lexar EZ	2.25–3 qt/A, depending on soil texture	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Add glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control before corn emergence. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Horseweed (glyphosate- and paraquat-resistant)	Corn, cotton, rice, soybean	Liberty 280	22–36 oz/A 22–43 oz/A, depending on crop	Postemergence during fall to spring burndown but before crop emergence Postemergence; see individual crop sections for specific application timings	Liberty 280 is often applied at planting as a salvage treatment. Control is dependent on size and age of horseweed, spray coverage, and air temperature. Daytime temperatures should be at least 70°F at application and for 3 to 4 days after application. **Use only on Liberty Link crops.** Sequential applications should be made 10 to 14 days apart.
Horseweed (glyphosate- and paraquat-resistant)	Rice	propanil plus quinclorac	4 lb ai/A plus 0.375 lb ai/A	Postemergence to horseweed less than 6 inches	Add crop oil concentrate at 1% v/v if using an SC propanil formulation. Propanil plus quinclorac will not completely control horseweed until after flooding.

Weed	Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Horseweed (glyphosate- and paraquat-resistant)	Soybean	Python	1–1.33 oz/A	Preemergence up to 30 days before planting but before soybean emergence	Apply before horseweed emerges. Add 2,4-D, dicamba, or Liberty 280 to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Horseweed (glyphosate- and paraquat-resistant)	Corn, cotton, rice, soybean	Sharpen	1–3 oz/A, depending on crop and soil texture	Preemergence or postemergence during fall to spring burndown	Horseweed should be less than 4 to 6 inches in height or diameter, depending on rate. Add glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control. Add methylated seed oil (MSO) at 1% v/v. and ammonium sulfate at 1% to 2% v/v.
Horseweed (glyphosate- and paraquat-resistant)	Soybean	Synchrony XP or Synchrony XP + glyphosate	1.125 oz/A 1.125 oz/A + formulation dependent	Preemergence to early postemergence Preemergence to early postemergence	**This treatment is for use on STS soybean varieties only when applying 1.125 ounces per acre postemergence.** Control with Synchrony XP may be incomplete or inconsistent. **This treatment is for use on STS soybean varieties only when applying 1.125 ounces per acre postemergence.** If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required. However, improved control has been observed when additional adjuvant is used in the preloaded glyphosate formulation.
Horseweed (glyphosate- and paraquat-resistant)	Corn, cotton, rice, soybean	Valor SX	2 oz/A	Preemergence during fall to spring burndown	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Horseweed (glyphosate- and paraquat-resistant)	Soybean	Valor XLT	3 oz/A	Preemergence during fall to spring burndown but before soybean emergence	Apply before horseweed emerges. Add 2,4-D or dicamba to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Italian ryegrass (glyphosate- and ALS-resistant)	Corn, soybean	Boundary	2 pt/A	Preemergence from mid-October to mid-November	Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Italian ryegrass (glyphosate- and ALS-resistant)	Corn, cotton, soybean, rice	clethodim	0.094–0.125 lb ai/A	Postemergence from late January to early February to Italian ryegrass less than 6 inches	Multiple applications of clethodim are not recommended. Daytime temperatures should be at least 60°F at application and for at least 3 to 4 days after application. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. Sequential application of paraquat will be required if no fall residual was applied.
Italian ryegrass (glyphosate- and ALS-resistant)	Rice	Command	2 pt/A	Preemergence from mid-October to mid-November	Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Italian ryegrass (glyphosate- and ALS-resistant)	Corn, cotton, soybean	metolachlor or s-metolachlor	1.27–1.58 lb ai/A, depending on soil texture	Preemergence from mid-October to mid-November	Use the higher rate on heavier-textured soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Italian ryegrass (glyphosate- and ALS-resistant)	Corn, cotton, soybean, rice	paraquat	0.75–1 lb ai/A	Postemergence from mid-February to early-March to Italian ryegrass less than 12–14 inches	Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Avoid application with air induction nozzles. Apply with PSII herbicide to improve postemergence control. For spring burndown, paraquat should be applied 2 to 4 weeks after clethodim if no fall residual was applied.
Italian ryegrass (glyphosate- and ALS-resistant)	Cotton, soybean	trifluralin	0.75–1 lb ai/A	Preemergence from mid-October to mid-November	Use the higher rate on heavier-textured soils. Incorporate 1 to 2 inches deep immediately after application for best results. A 30% loss can occur if incorporation is delayed 24 hours.

Weed	Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Italian ryegrass (glyphosate- and ALS-resistant)	Corn, cotton, soybean	Zidua	2–4 oz/A, depending on soil texture	Preemergence from mid-October to mid-November	Use the higher rate on heavier-textured soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Italian ryegrass (ALS- and ACCase-resistant)	Wheat	Axial XL	16.4 oz/A	Postemergence to wheat from two-leaf to preboot and to Italian ryegrass from one-leaf to two-tiller	Only one application is allowed per growing season. Do not mix with other postemergence herbicides, such as Harmony Extra or 2,4-D.
Italian ryegrass (ALS- and ACCase-resistant)	Wheat	Axiom	5–10 oz/A	Early postemergence from wheat germination up to two-leaf stage but before weed emergence	This product contains metribuzin. Some wheat varieties are sensitive to metribuzin.
Italian ryegrass (ALS- and ACCase-resistant)	Wheat	metribuzin	0.094–0.125 lb ai/A	Postemergence after wheat has reached two-leaf stage until jointing	Some wheat varieties are sensitive to metribuzin. Metribuzin rate depends on wheat growth stage. Multiple applications are allowed per season, but a minimum of 21 days between applications is required.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	2,4-D	Formulation dependent	Postemergence to corn less than 8 inches	Postemergence applications of 2,4-D may cause some injury, such as lodging, bending, and brittleness. Stalks remain brittle for 5 to 7 days after application, during which time they are susceptible to breaking.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	Anthem ATZ	1.75–3 pt/A	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Add glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control before corn emergence. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	Armezon or Impact + atrazine	0.75 oz/A + 0.5–1 lb ai/A	Postemergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add ammonium sulfate and 1% methylated seed oil. Add glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	atrazine	1.5–2.5 lb ai/A	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Add glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control before corn emergence. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	atrazine + acetochlor	Formulation dependent	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Add glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	atrazine + metolachlor or s-metolachlor	Formulation dependent	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Add glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids.
Palmer amaranth (glyphosate- and ALS-resistant)	Soybean	Authority MTZ	8–18 oz/A	Preplant or preemergence but before soybean emergence	Injury may occur if rain falls soon after crop emergence, especially on sand or silt-loam soils. Authority MTZ provides only residual control, and control is dependent on herbicide activation and level of infestation.
Palmer amaranth (glyphosate- and ALS-resistant)	Soybean	Authority XL	3–8 oz/A	Preplant or preemergence but before soybean emergence	Injury may occur if rain falls soon after crop emergence, especially on sand or silt-loam soils. Authority XL provides only residual control, and control is dependent on herbicide activation and level of infestation.

Weed	Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	Callisto plus atrazine	3 oz/A + 0.5–1 lb ai/A	Postemergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids. Add crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Palmer amaranth (glyphosate- and ALS-resistant)	Soybean	Canopy	4–6 oz/A	Preplant or preemergence but before soybean emergence	Injury may occur if rain falls soon after crop emergence, especially on sand or silt-loam soils. Canopy provides only residual control, and control is dependent on herbicide activation and level of infestation.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	Capreno + atrazine	3 oz/A + 0.5–1 lb ai/A	Postemergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids. Add crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	Corvus + atrazine	5.6 oz/A + 0.5–1 lb ai/A	Preplant, preemergence, or early postemergence from 14 days before planting until V2 corn stage	Add glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control before corn emergence. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	dicamba	Formulation dependent	Postemergence to corn less than 36 inches and to Palmer amaranth less than 4 inches	Do not add crop oil concentrate to dicamba applied after crop emergence as crop injury may result. Dicamba may be applied with glyphosate to improve grass and broadleaf weed control.
Palmer amaranth (glyphosate- and ALS-resistant)	Cotton	diuron	0.8 lb ai/A	Post-directed when cotton is at least 12 inches tall and after last cultivation	Apply with glyphosate and MSMA (1 pound of active ingredient per acre) to improve control of emerged Palmer amaranth and other weeds. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate and/or MSMA formulations not preloaded with an adjuvant.
Palmer amaranth (glyphosate- and ALS-resistant)	Soybean	Envive	3 oz/A	Preplant or preemergence but before soybean emergence	Injury may occur if rain falls soon after crop emergence, especially on sand or silt-loam soils. Envive provides only residual control, and control is dependent on herbicide activation and level of infestation.
Palmer amaranth (glyphosate- and ALS-resistant)	Soybean	Fierce	3–3.75 oz/A	Preplant or preemergence but before soybean emergence	Injury may occur if rain falls soon after crop emergence, especially on sand or silt-loam soils. Fierce provides only residual control, and control is dependent on herbicide activation and level of infestation.
Palmer amaranth (glyphosate- and ALS-resistant)	Soybean	Flexstar GT	3.5–5 pt/A	Postemergence until 45 days before soybean harvest	Rate applied depends on weed size. Marginal control can be expected when Palmer amaranth exceeds the six-leaf growth stage. Spray coverage is critical; apply in at least 15 gallons of water per acre.
Palmer amaranth (glyphosate- and ALS-resistant)	Cotton	fluometuron	1–2 lb ai/A, depending on soil texture	Preplant or preemergence but before cotton emergence	Use the higher rate on heavier-textured soils. Fluometuron provides only residual control, and control is dependent on herbicide activation and level of infestation. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Palmer amaranth (glyphosate- and ALS-resistant)	Cotton	fomesafen	0.25 lb ai/A	**Preplant after at least 0.5 inch of rain on medium- or fine-textured soils;** preemergence on coarse-textured soils	Apply with paraquat at 0.5 pound of active ingredient per acre if Palmer amaranth is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. An at-planting application of residual herbicide will be required for in-season Palmer amaranth control if beds are disturbed before planting.
				Post-directed when cotton has at least 4 inches of bark and after last cultivation	Application should be directed at the bottom 2 inches of cotton. Apply with glyphosate and MSMA (1 pound of active ingredient per acre) to improve postemergence control. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate and/or MSMA formulations not preloaded with an adjuvant.

Weed	Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Palmer amaranth (glyphosate- and ALS-resistant)	Soybean	Gangster	2.4 oz/A (2 oz Valor + 0.4 oz FirstRate); sold as a co-pack	Preplant or preemergence but before soybean emergence	Injury may occur if rain falls soon after crop emergence, especially on sand or silt-loam soils. Gangster provides only residual control, and control is dependent on herbicide activation and level of infestation.
Palmer amaranth (glyphosate- and ALS-resistant)	Cotton	Gramoxone SL	2 pt/A	Postemergence as late-season salvage application **under hooded sprayer**	**Apply by directing spray between rows using a hooded sprayer to prevent contact with cotton foliage.** Spray volume is critical. Gramoxone SL should be applied in at least 15 gallons of water and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Apply with diuron to improve postemergence Palmer amaranth activity and provide residual control.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	Guardsman Max	2.5–4 pt/A, depending on soil texture	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Add glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	Halex GT + atrazine	3.6–4 pt/A + 1.5 lb ai/A	Postemergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add nonionic surfactant at 0.25% v/v.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	Laudis + atrazine	3 oz/A + 0.5–1 lb ai/A	Postemergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids. Add methylated seed oil at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn	Lexar EZ	2.25–3 qt/A, depending on soil texture	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Add glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids. Add methylated seed oil at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn, cotton, soybean	Liberty 280	22–43 oz/A, depending on crop	Postemergence; see individual crop sections for specific application timings	Use only on LibertyLink crops. Sequential applications should be made 10 to 14 days apart. Apply in at least 10 gallons of water. Avoid application with air induction nozzles. Add residual herbicide in the first application for residual control.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn, cotton, soybean	metolachlor or s-metolachlor	Formulation dependent	Preemergence or postemergence; see individual crop sections for specific application timings	This herbicide only provides residual control and does not control emerged weeds. Residual control is dependent on activation of herbicide and level of weed infestation. Apply with glyphosate or Sequence (premixture of glyphosate and s-metolachlor) alone.
Palmer amaranth (glyphosate- and ALS-resistant)	Corn, cotton, soybean	pendimethalin	Formulation and soil texture dependent	Preemergence or postemergence; see individual crop sections for specific application timings	Use the higher rate on heavier-textured soils. The herbicide only provides residual control and does not control emerged weeds. Residual control is dependent on activation of herbicide and level of weed infestation. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre during preemergence application if Palmer amaranth is emerged at application.
Palmer amaranth (glyphosate- and ALS-resistant)	Soybean	Prefix or Prefix + glyphosate	2 pt/A 2 pt/A + formulation dependent	Preplant or preemergence but before soybean emergence Postemergence when soybean has one to two trifoliate leaves	Injury may occur if rainfall occurs soon after crop emergence, especially on sand or silt loam soils. Prefix provides primarily residual control, which is dependent on herbicide activation and level of infestation. Prefix provides partial control of emerged Palmer amaranth, with level of control dependent on weed size (no more than four leaves).
Palmer amaranth (glyphosate- and ALS-resistant)	Cotton	prometryn	0.5 lb ai/A	Post-directed once or twice after cotton is 3 inches tall	Avoid contact with cotton foliage. Prometryn provides some residual control in addition to controlling emerged weeds. Apply with MSMA at 1 pound of active ingredient per acre to improve control of emerged Palmer amaranth.

Weed	Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Palmer amaranth (glyphosate- and ALS-resistant)	Cotton, soybean	trifluralin	0.5–0.75 lb ai/A	Preplant incorporated; in-season control optimized with applications immediately before planting	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Incorporate 1 to 2 inches deep immediately after application for best results. A 30% loss can occur if incorporation is delayed 24 hours.
Palmer amaranth (glyphosate- and ALS-resistant)	Cotton, soybean	Valor SX	2 oz/A	See individual crop sections for specific application timings	Valor SX provides only residual control, and control is dependent on herbicide activation and level of infestation.
Palmer amaranth (glyphosate- and ALS-resistant)	Soybean	Valor XLT	3 oz/A	Preplant or preemergence but before soybean emergence	Injury may occur if rain falls soon after crop emergence, especially on sand or silt-loam soils. Valor XLT provides only residual control, and control is dependent on herbicide activation and level of infestation.
Rhizome johnsongrass (glyphosate-resistant)	Cotton, soybean	clethodim	0.094–0.25 lb ai/A 0.07–0.188 lb ai/A	Postemergence to emerged johnsongrass	Apply to johnsongrass before it reaches 25 inches. Reduced level of control can be expected on larger johnsongrass. Apply a sequential application if needed, but apply to johnsongrass no larger than 18 inches. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Rhizome johnsongrass (glyphosate-resistant)	Cotton, soybean	Fusilade DX	12 oz/A followed by 8 oz/A to control regrowth	Postemergence to johnsongrass less than 18 inches with 12 oz/A and less than 12 inches for sequential application	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Rhizome johnsongrass (glyphosate-resistant)	Corn	nicosulfuron	Dependent on formulation and johnsongrass size at application	Postemergence to johnsongrass from 12 to 18 inches	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Rhizome johnsongrass (glyphosate-resistant)	Cotton, soybean	quizalofop	0.0688 lb ai/A for single application followed by 0.048 lb ai/A to control regrowth	Postemergence to johnsongrass from 10–24 inches and from 6–10 inches for sequential application	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Rhizome johnsongrass (glyphosate-resistant)	Cotton, soybean	sethoxydim	0.188 lb ai/A followed by 0.188 lb ai/A to control regrowth	Postemergence to johnsongrass less than 20 inches with 24 oz/A rate and less than 10 inches with sequential application	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Rice flatsedge (ALS-resistant)	Rice	Basagran	1.5–2 pt/A, depending on rice flatsedge size	Postemergence to emerged rice flatsedge and at least 24 hours before flooding	Add crop oil concentrate at 1% v/v. Do not apply to submerged weeds. The addition of propanil may improve rice flatsedge control. A sequential application may be utilized, but the total Basagran rate should not exceed 4 pints per acre in a single season.
Rice flatsedge (ALS-resistant)	Rice	propanil	3–6 lb ai/A, depending on rice flatsedge size	Postemergence to emerged rice flatsedge	Add crop oil concentrate at 1% v/v if using an SC propanil formulation. Sequential applications may be needed for complete control. The addition of Basagran may improve rice flatsedge control.
Rice flatsedge (ALS-resistant)	Rice	RiceBeaux	4 qt/A	Postemergence to emerged rice flatsedge	Soil should be moist at the time of application and not allowed to crack after application. Sequential applications with Basagran and/or propanil may be needed for complete control.

HERBICIDE MODE OF ACTION

HRAC group	Site of action	Chemical family	Active ingredient	WSSA group
A	Inhibition of acetyl CoA carboxylase (ACCase)	Aryloxyphenoxy-propionate "FOPs"	clodinafop-propargyl cyhalofop-butyl diclofop-methyl fenoxaprop-P-ethyl fluazifop-P-butyl	1
		Cyclohexanedione "DIMs"	clethodim sethoxydim tralkoxydim	
		Phenylpyrazoline "DEN"	pinoxaden	
B	Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS)	Sulfonylurea	chlorimuron-ethyl chlorsulfuron foramsulfuron halosulfuron-methyl iodosulfuron mesosulfuron metsulfuron-methyl nicosulfuron orthosulfamuron primisulfuron-methyl prosulfuron rimsulfuron sulfosulfuron thifensulfuron-methyl tribenuron-methyl trifloxysulfuron	2
		Imidazolinone	imazapic imazamox imazapyr imazaquin imazethapyr	
		Triazolopyrimidine	cloransulam-methyl diclosulam florasulam flumetsulam penoxsulam pyroxsulam	
		Pyrimidinyl(thio)benzoate	bispyribac-Na pyrithiobac-Na	
C1	Inhibition of photosynthesis at photosystem II	Triazine	atrazine prometon propazine simazine	5
		Triazinone	hexazinone metribuzin	
		Uracil	bromacil terbacil	

HRAC group	Site of action	Chemical family	Active ingredient	WSSA group
C2	Inhibition of photosynthesis at photosystem II	Urea	diuron fluometuron (see F3) linuron siduron tebuthiuron	7
		Amide	propanil	
C3	Inhibition of photosynthesis at photosystem II	Nitrile	bromoxynil	6
		Benzothiadiazinone	bentazon	
D	Photosystem-I-electron diversion	Bipyridylium	diquat paraquat	22
E	Inhibition of protoporphyrinogen oxidase (PPO)	Diphenylether	acifluorfen-Na fomesafen lactofen oxyfluorfen	14
		N-phenylphthalimide	flumioxazin flumiclorac-pentyl	
		Thiadiazole	fluthiacet-methyl	
		Oxadiazole	oxadiazon	
		Triazolinone	carfentrazone-ethyl sulfentrazone	
F1	Bleaching: Inhibition of carotenoid biosynthesis at the phytoene desaturase step (PDS)	Pyridazinone	norflurazon	12
		Other	fluridone	
F2	Bleaching: Inhibition of 4-hydroxyphenyl-pyruvate-dioxygenase (4-HPPD)	Triketone	mesotrione	27
		Isoxazole	isoxaflutole	
F3	Bleaching: Inhibition of carotenoid biosynthesis (unknown target)	Isoxazolidinone	clomazone	13
		Urea	fluometuron (see C2)	
G	Inhibition of EPSP synthase	Glycine	glyphosate	9
H	Inhibition of glutamine synthetase	Phosphinic acid	glufosinate-ammonium	10
I	Inhibition of DHP (dihydropteroate) synthase	Carbamate	asulam	18
K1	Microtubule assembly inhibition	Dinitroaniline	benefin ethalfluralin oryzalin pendimethalin trifluralin	3
		Pyridine	dithiopyr thiazopyr	
		Benzamide	propyzamide = pronamide	
		Benzoic acid	DCPA = chlorthal-dimethyl	

HRAC group	Site of action	Chemical family	Active ingredient	WSSA group
K3	Inhibition of VLCFAs (see Remarks) (Inhibition of cell division)	Chloroacetamide	acetochlor alachlor butachlor dimethanamid metolachlor	15
		Isoxazoline	pyroxasulfone	
		Acetamide	napropamide	
		Oxyacetamide	flufenacet	
L	Inhibition of cell wall (cellulose) synthesis	Nitrile	dichlobenil	20
		Benzamide	isoxaben	21
N	Inhibition of lipid synthesis (not ACCase inhibition)	Thiocarbamate	EPTC thiobencarb	8
		Phosphorodithioate	bensulide	
		Benzofuran	ethofumesate	
O	Action like indole acetic acid (synthetic auxins)	Phenoxy-carboxylic-acid	2,4-D 2,4-DB MCPA	4
		Benzoic acid	dicamba	
		Pyridine carboxylic acid	clopyralid fluroxypyr picloram triclopyr	
		Quinoline carboxylic acid	quinclorac	
P	Inhibition of auxin transport	Phthalamate	naptalam	19
		Semicarbazone	diflufenzopyr	
Z	Unknown herbicide mode of action	Organoarsenical	DSMA MSMA	17
		Other	dazomet fosamine metam oleic acid pelargonic acid	

ROTATIONAL CROP RESTRICTIONS

Many herbicides used in various crops have planting restrictions. When considering a rotational crop, the following table will help you choose the proper herbicide for the current year. If a rotational crop is planted within the interval stated, or before the interval has expired, unacceptable injury to the rotational crop can occur.

	Rotation Interval[1]						
Herbicides	**Corn**	**Cotton**	**Grain sorghum**	**Rice**	**Soybeans**	**Wheat**	**Other grains**
2,4-D	none	3 m	7 d	1 m	15 d	7 d	1 m
Acetochlor	none	ns	ns	2 y	ns	4 m	ns
Aim	none	none	none	none	none	none	none
Anthem	none	1.5 y	1.5 y	1.5 y	none	1.5 y	1.5 y
Anthem ATZ	none	1.5 y	1.5 y	1.5 y	1.5 y	1.5 y	1.5 y
Armezon/Impact	none	9 m	9 m	3 m	9 m	3 m	3 m
Atrazine[2]	none	ns	none	2 y	ns[3]	1 y	1 y[4]
Authority MTZ	4 m	1 y	1 y	10 m	none	4 m	4 m
Authority XL — pH ≤ 7	10 m	1 y	10 m	10 m	none	4 m	4 m
Authority XL — pH > 7	1.5 y	1.5 y	1.5 y	1.5 y	none	4 m	4 m
Axial XL	3 m	3 m	3 m	3 m	3 m	none	3 m
Axiom	none	8 m	1 y	1 y	none	7 d	1 y
Basagran	none	none	none	none	none	none	none
Beyond	8.5 m	9 m	9 m	9 m[5]	none	3 m	9 m
Bolero	6 m	6 m	6 m	none	6 m	6 m	6 m
Boundary	4 m	1 y	1 y	8 m	none	4.5 m	8 to 12 m
Broadhead	1 y	1 y	1 y	none	1 y	1 y	1 y
Callisto	none	10 m	none	1.5 y	10 m	4 m	4 m
Canopy EX	7 m	8 m	9 m	9 m	none	3 m	3 m
Canopy — pH ≤ 7	9 m[6]	10 m	10 m	10 m	none	4 m	4 m
Canopy — pH > 7 (>3 oz/A)	1.5 y	1.5 y	1.5 y	1.5 y	none	4 m	4 m
Capreno	none	10 m	10 m[7]	10 m	10 m	4 m	1.5 y
Classic	9 m[8]	9 m	9 m	9 m	none	3 m	3 m
Clearpath[5]	10 m	1.5 y	1.5 y	1.5 y[9]	10 m	10 m	10 m[10]
Clethodim	1 m	none	1 m	1 m	none	1 m	1 m
Clincher SF	3 m	3 m	3 m	none	3 m	3 m	3 m
Cobra	none	none	none	none	none	none	none
Command	9 m	none[11]	9 m	9 m	none	1 y[12]	1 y
Corvus	none	9 m	17 m[13]	9 m	9 m	4 m	17 m[13]
Dicamba[14]	none	21 d	15 d	15 d	15 d	15 d	15 d
Diuron							
PRE, banded	none	none	none	4 m	4 m	4 m	4 m
PRE, broadcast	none	none	none	6 m	6 m	6 m	6 m
POE	none	none	none	1 y	1 y	1 y	1 y
Duet	2 m	2 m	2 m	none	2 m	2 m	2 m
Enlite	9 m	9 m	9 m	9 m	none	4 m	4 m
Envive — pH ≤ 7	10 m	10 m	10 m	9 m	none	4 m	4 m
Envive — pH > 7	1.5 y	2.5 y	1.5 y	10 to 18 m	none	4 m	4 m
Envoke	7 m	7 m	7 m	7 m	7 m	3 m	1.5 y
Fierce	1 m[15]	4 m	1.5 y	1.5 y	none	4 m	1.5 y
Finesse Cereal & Fallow	18 m	18 m	18 m	18 m	6 to 18 m	none	10 m
FirstRate	9 m	9 m	9 m	9 m	none	3 m	9 to 30 m
Firstshot	14 d	14 d	14 d	none	7 d	none	none[16]
Fluometuron	8 m	none	9 m	9 m	9 m	3 m	1 y
Fomesafen	10 m	none[17]	10 m	10 m	none	4 m	4 m[18]

	Rotation Interval[1]						
Herbicides	**Corn**	**Cotton**	**Grain sorghum**	**Rice**	**Soybeans**	**Wheat**	**Other grains**
Fusilade DX	2 m	none	2 m	2 m	none	2 m	2 m
Gangster	9 m	9 m	9 m	9 m	none	3 m	9 to 18 m
Glyphosate	none	none	none	none	none	none	none
Goal 2XL	10 m	2 m	10 m	10 m	2 m	10 m	10 m
Grandstand	4 m	4 m	4 m	21 d	4 m	4 m	4 m
Grasp	3 m	3 m	3 m	none	3 m	3 m	3 m
Grasp Xtra	3 m	3 m	3 m	none	3 m	3 m	3 m
Guardsman Max	11 m	ns	ns	2 y	ns[3]	1 y	1 y[19]
Halex GT	none	10 m	none	1.5 y	10 m	4 m	4 m
Harmony Extra	14 d	14 d	14 d	none	14 d	none	2 m[20]
Laudis	none	10 m	10 m	10 m	8 m	4 m	4 m
League	1 y	8 m	1 y	none	1 y	1 y	2 y
Lexar EZ	none	spring	spring	1.5 y	spring	spring	spring
Layby Pro[21]	4 m	4 m	8 m	1 y	8 m	1 y	1 y
Liberty 280	none	none	6 m	none	none	2 m	2 m
Linuron	none	4 m	none	1 y	none	4 m	4 m[22]
Londax	4 m	4 m	4 m	none	4 m	4 m	4 m
Marksman[2]	none	ns	none	ns	ns[3]	10 m	10 m
Metolachlor/S-metolachlor	none	none	spring[23]	spring	none	4.5 m	spring
Metribuzin	4 m	8 m	1 y	8 m	none	4 m	8 m[24]
MSMA	none	none	none	none[25]	none	none	none[26]
Newpath[5]	8.5 m	1.5 y	1.5 y	1.5 y[9]	none	4 m	1.5 y[27]
Nicosulfuron	none	10 m	10 to 18 m[28]	10 to 18 m	15 d	4 m	4 m[29]
Obey	10 m	10 m	10 m	none	10 m	10 m	10 m
Outlook	none	ns	ns	ns	none	4 m	4 m
Paraquat	none	none	none	none	none	none	none
Pendimethalin	none	none	10 to 12 m	none	none	4 m[30]	ns[30]
Permit	1 m	4 m	2 m	none	9 m	2 m	2 m
Permit Plus	1 m	4 m	2 m	none	2 m	2 m	2 m
Prefix	10 m	1 m	10 m	10 m	none	4.5 m	4.5 m
Prometryn	ns	none	ns	ns	ns	ns[31]	ns[31]
Propanil	2 m	2 m	2 m	none	2 m	2 m	2 m
Python	none	1.5 y	1 y	6 m	none	4 m	4 to 18 m
Quinclorac	10 m	10 m	none	none	10 m	none	10 m
Quizalofop	4 m	none	4 m	4 m	none	4 m	4 m
Realm Q	none	10 m	10 m	1.5 y	10 m	4 m	1.5 y
Regiment	ns	ns	ns	none	ns	ns	none
Ricestar HT	1 m	1 m	1 m	none	1 m	4 m	4 m
Scepter	9.5 m[32]	1.5 y	11 m	spring	none	4 m	1.5 y
Sequence	none	none	none	spring	none	4.5 m	4.5 m
Sethoxydim	1 m	none	1 m	1 m	none	1 m	1 m
Sharpen[33]	none	1.5 to 9 m	0 to 1 m	0 to 4 m	0 to 6 m	none	none
Solicam DF	2 y	1 m	2 y	2 y	1.5 m	2 y	2 y
Sonic	10 m	12 to 18 m	1 y	10 m	none	4 m	2.5 y
Spartan Charge	4 to 12 m	12 to 18 m	10 to 18 m	10 m	none	4 m	1 y
Status	7 d	4 m	4 m	4 m	4 m	4 m	4 m
Staple LX	10 m[34]	none	2 y	9 m	10 m	4 m	10 m[35]
Storm	3 m	3 m	3 m	none	none	1 m	1 m
Strada	3 m	6 m	12 m	none	6 m	3 m	3 m

	Rotation Interval[1]						
Herbicides	**Corn**	**Cotton**	**Grain sorghum**	**Rice**	**Soybeans**	**Wheat**	**Other grains**
Strada PRO	3 m	6 m	36 m	none	9 m	3 m	3 m
Strada XT2	11 m	11 m	11 m	none	11 m	11 m	11 m
Suprend	7 m	7 m	7 m	7 m	7 m	3 m	1.5 y
Realm Q	none	10 m	10 m	1.5 y	10 m	4 m	1.5 y
Trifluralin	1 y	none	1 y	1 y	none	1 y	1 y
Ultra Blazer	3 m	3 m	3m	none	none	1 m	1 m
Valor[36]	1 m	1 m	1 m	1 m	none	1 m	3–8 m
Valor XLT — pH ≤ 7	10 m	10 m	10 m	9 m	none	4 m	4 m
Valor XLT — pH > 7	1.5 y	2.5 y	1.5 y	1.5 y	none	4 m	4 m
Verdict	none	ns	ns	ns	ns	4 m	4 m
Warrant	ns	ns	ns	ns	none	4 m	ns
Zidua	none	4 m	1.5 y	10 to 18 m[37]	none	4 m	11 m

[1] d = days after application; m = months after application; y = years after application; spring = spring following application; and ns = next season. PRE = preemergence application and POE = postemergence application.

[2] If applied after June 10, injury may occur if you rotate to any crop other than corn or grain sorghum the year after application.

[3] Injury may occur to soybeans planted in soils with a calcareous surface layer.

[4] Do not plant spring-seeded small grains the year after application, or injury may occur.

[5] For Newpath use rates greater than 8 ounces per acre per season up to 12 ounces per acre per season, only soybean may be planted the following year.

[6] Fields may be recropped to field corn after 9 months if Canopy rate does not exceed 6 ounces per acre.

[7] Increase the rotational interval for grain sorghum to 18 months if pH is 7.5 or greater or if Capreno rate exceeded 3 ounces per acre.

[8] The rotation interval is only 8 months if soil pH is less than 6.8.

[9] Clearfield rice may be planted any time after application of Beyond, Clearpath, or Newpath.

[10] The rotation interval for oats is 18 months.

[11] Do not plant cotton unless disulfoton or phorate organophosphate insecticide is applied in-furrow with the seed at a minimum of 0.75 pounds of active ingredient per acre.

[12] Wheat may be planted for a cover crop at any time, but it cannot be grazed or harvested for food or feed if planted less than 9 months after treatment.

[13] Increase the rotation interval to 24 months if pH is 7.5 or greater.

[14] Rotation restrictions are for the use rate of 8 ounces per acre. At least 1 inch of rainfall or overheard irrigation is required before waiting interval begins.

[15] The rotation interval may be decreased to 7 days for minimum and no-till corn if the Fierce rate does not exceed 3 ounces per acre.

[16] Barley, triticale, and oats can be replanted immediately. Other grains require 45 days before planting.

[17] At least 0.5 inch of rainfall or overhead irrigation must occur before planting cotton.

[18] Oats may be planted 18 months after application.

[19] Do not plant spring-seeded small grains the year after application, or injury may occur.

[20] Barley or oats may be replanted immediately. Other grains require 60 days before planting.

[21] Rotation restrictions for Layby Pro are based on application rates of 0.61 to 1 pound of active ingredient per acre of diuron.

[22] Only barley, oats, rye, and wheat may be replanted.

[23] Replant only with Concept-treated or Screen-treated seed.

[24] Barley may be planted 4 months after application.

[25] MSMA can cause straighthead in rice. Use caution when growing rice after cotton.

[26] Barley, oats, and rye may be replanted after 4 months.

[27] The rotation interval is 4 months for rye and 9.5 months for barley.

[28] Grain sorghum or rice may be planted 10 months after nicosulfuron application on soils with pH of no more than 7.5 or 6.5, respectively. If soil pH is greater than 7.5 or 6.5, do not plant grain sorghum or rice, respectively, for 18 months.

[29] Winter wheat and barley may be planted 4 months after nicosulfuron application. Oats may be planted 8 months after nicosulfuron application.

[30] Do not plant wheat or barley until next season if rhizome johnsongrass or red rice control or itchgrass suppression rates are applied.

[31] Wheat or small-grain crops may be planted for a cover crop the fall after prometryn application, but they may not be harvested for feed or food.

[32] Field corn may be planted in the spring of the year after a single application unless extreme drought conditions develop (less than 10 inches of rainfall or irrigation are received within 6 months after the date of application).

[33] Rotation restrictions are rate dependent. Consult the label for more information.

[34] Corn may be planted 10 months after Staple LX application was made in cotton, providing that the total amount of Staple LX from all applications does not exceed 3.8 fluid ounces per acre. No additional soil mixing is required beyond that normally performed for a production system.

[35] In addition to the 10-month interval, a successful field bioassay must be conducted. This requires a test strip of the rotational crop be grown to maturity.

[36] This applies to applications of 2 ounces per acre or less; additionally, 1 inch of rainfall or irrigation must occur between application and planting.

[37] Rotation restrictions are dependent on the rate of Zidua used. Consult the label for more information.

COTTON

Better control of a wide spectrum of weeds, including grasses and broadleaf weeds, can be obtained using two herbicides: one applied preplant incorporated and the other applied preemergence at rates specified on the label. A complete weed control program also requires timely applications of herbicides postemergence while weeds are small.

Follow fungicide recommendations whenever preemergence herbicides are used in cotton. Plant seed at least 0.5 inch deep and cover well with soil. If replanting is necessary, do not re-treat with any herbicide.

Substituted urea herbicides such as diuron and fluometuron used in combination with organophosphate systemic insecticides at planting may injure cotton.

ESTIMATED LEVELS OF PREPLANT FOLIAR WEED CONTROL NORMALLY EXPECTED

Herbicides	Annual Bluegrass	Bittercress	Buttercup	Carolina Geranium	Chickweed	Cheat	Eveningprimrose	Groundsel	Henbit	Prostrate Knotweed	Shepherdspurse	Wildlettuce	Virginia Pepperweed	Vetch	Little Barley/Car. Foxtail	Horseweed[2]	Curly Dock (seedling)	Italian Ryegrass[3]	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass[4]	Seedling Johnsongrass	Cocklebur	Entireleaf Morng	Pitted Morng	Smallflower Morng	P. Smartweed	Hemp Sesbania	Prickly Sida	Spurred Anoda	Palmer Amaranth[5]	Sicklepod	Cutleaf Groundcherry	Common Ragweed	Red Rice	Upright Spurge	Soil Activity
Preplant - Foliar[1]																																					
Dicamba	0	**8**	**9**	**8**	**8**	0	**10**	**-**	7	**8**	**8**	**9**	**9**	**9**	0	**9**	**9**	0	0	1	1	1	0	**9**	**9**	**9**	**9**	**9**	**9**	**8**	**9**	**9**	**9**	**9**	**9**	0	**9**	yes
Firstshot	0	**9**	**9**	**8**	**8**	0	**8**	**-**	7	-	**9**	**9**	**9**	**9**	0	6	**10**	0	0	0	0	0	0	**8**	7	**8**	**8**	-	6	4	-	6	4	-	-	0	-	yes
Fomesafen	0	-	-	-	-	0	-	-	-	-	-	-	-	-	0	3	-	0	4	3	4	4	4	7	5	7	5	7	4	**8**	1	9	7	**8**	7	2	-	yes
Glyphosate	**10**	**10**	**9**	7	**10**	**9**	6	**9**	7	7	**10**	**8**	**8**	5	**10**	**8**	6	6	**10**	**10**	**10**	**8**	**9**	**8**	7	**8**	**8**	7	6	7	5	**9**	**8**	**9**	**9**	**8**	**9**	no
Glyphosate + 2,4-D	**10**	**10**	**10**	**9**	**10**	**10**	**9**	-	**8**	**10**	**9**	**10**	**10**	**9**	**9**	**8**	**9**	6	**10**	**10**	**10**	**8**	**9**	**9**	**9**	**8**	**8**	**8**	**8**	**10**	**8**	**9**	**9**	**9**	**10**	**8**	**9**	yes
Glyphosate + Aim	**10**	**10**	**10**	**9**	**10**	**10**	**9**	**9**	**9**	**10**	**10**	**10**	**10**	5	**10**	**9**	**9**	5	**10**	**10**	**10**	**8**	**9**	**9**	**9**	**9**	**8**	**9**	**9**	**8**	**8**	**9**	**8**	**10**	**9**	**8**	**9**	no
Glyphosate + dicamba	**10**	**10**	**10**	**9**	**10**	**10**	**9**	-	**9**	**10**	**9**	**10**	**10**	**9**	**9**	**9**	**9**	6	**10**	**10**	**10**	**8**	**9**	**9**	**9**	**8**	**8**	**8**	**8**	**9**	**9**	**9**	**9**	**9**	**10**	**8**	**9**	yes
Glyphosate + dicamba + 2,4-D	**10**	**10**	**10**	**9**	**10**	**10**	**9**	-	**10**	**10**	**9**	**10**	**10**	**9**	**9**	**9**	**9**	6	**10**	**10**	**10**	**8**	**9**	**9**	**9**	**8**	**8**	**8**	**8**	**10**	**9**	**9**	**9**	**9**	**10**	**8**	**9**	yes
Glyphosate + Sharpen	**10**	**10**	**9**	7	**10**	**9**	7	-	7	7	**10**	**9**	**8**	5	**10**	**9**	**9**	6	**10**	**10**	**10**	**9**	**10**	**8**	7	**8**	**8**	**8**	7	7	6	**10**	**8**	**9**	**9**	**8**	**10**	yes
Glyphosate + Valor SX	**10**	**10**	**10**	**8**	**10**	-	**8**	-	**9**	-	**9**	-	-	-	**10**	**8**	-	4	**10**	**10**	**10**	**9**	**10**	**8**	**8**	**8**	**8**	**9**	-	-	-	**9**	**8**	**9**	**9**	**9**	**10**	yes
Goal 2XL	**9**	**10**	**9**	**8**	**8**	7	4	7	**9**	**9**	**9**	**9**	**8**	7	-	6	**9**	5	-	-	-	-	-	**8**	**8**	**9**	**9**	**8**	**9**	**9**	**8**	**9**	-	-	-	-	**9**	yes
Liberty 280	6	-	-	**8**	**10**	-	7	-	6	-	-	-	**9**	**8**	7	**9**	6	6	**8**	**8**	**8**	5	**9**	**10**	**10**	**10**	**9**	**8**	**8**	7	-	**8**	7	-	-	-	-	no
Paraquat	**10**	**10**	**10**	7	**10**	**8**	7	**9**	**9**	6	**9**	7	7	**8**	**8**	6	**8**	**8**	**9**	**9**	**9**	**8**	**9**	6	7	7	7	5	6	6	**8**	**9**	**9**	7	**8**	7	**8**	no
Prometryn	-	**9**	**9**	7	**10**	**-**	7	-	**8**	6	**8**	**9**	7	6	6	7	**8**	-	-	-	-	-	-	7	7	**9**	**9**	7	**8**	7	7	**9**	-	-		-	-	yes

[1]Plus approved adjuvant according to label instructions.

[2]Horseweed resistance to Group 9 (glyphosate) and Group 22 (paraquat) herbicides is prevalent across Mississippi.

[3]Italian ryegrass resistance to Group 2 (Envoke, Firstshot, Staple) and Group 9 (glyphosate) herbicides is prevalent across Mississippi.

[4]Goosegrass resistance to Group 9 (glyphosate) herbicides has been identified in Mississippi.

[5]Palmer amaranth resistance to Group 2 (Envoke, Firstshot, Staple) and Group 9 (glyphosate) herbicides is prevalent across Mississippi.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

ESTIMATED LEVELS OF WEED CONTROL NORMALLY EXPECTED[1]

Herbicides[2]	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Goosegrass[3]	Johnsongrass-rhizome[4]	Johnsongrass-seedling[4]	Fall panicum	Annual sedge	Nutsedge – purple	Nutsedge – yellow	Annual morningglory	Cocklebur	Hemp sesbania	Honeyvine milkweed	Nodding spurge	Palmer, spiny amaranth, tall waterhemp[5]	Pigweed, smooth, redroot	Prickly sida	Purslane	Sicklepod	Smartweed	Spurred anoda	Velvetleaf	Crop tolerance
Preplant[6]																									
Fomesafen	4	0	3	4	4	0	4	-	7	3	7	4	7	3	0	2	**9**	**9**	7	7	4	-	1	1	G
Pendimethalin	**9**	0	**9**	**9**	**9**	5	**9**	**9**	0	0	0	3	0	0	0	1	7	**8**	0	**9**	1	2	0	0	G
Trifluralin	**9**	0	**9**	**9**	**9**	6	**9**	**9**	0	0	0	3	0	0	0	1	**8**	**8**	0	**9**	1	2	0	0	G
Preemergence[6]																									
Command	**9**	-	**9**	**9**	**9**	3	**9**	**8**	-	-	-	2	6	4	-	**8**	2	2	**9**	**9**	0	**8**	**9**	**10**	F
Diuron	7	0	**8**	**8**	**8**	0	6	**8**	**9**	0	0	7	4	4	0	6	**9**	**9**	6	**9**	5	7	2	7	F
Fluometuron	7	0	**8**	**9**	**8**	0	6	7	**9**	0	0	7	**8**	6	0	3	**8**	**8**	**9**	**9**	6	7	3	6	G
Solicam DF	**8**	2	**8**	**9**	**8**	2	7	7	**9**	4	4	5	3	3	0	7	7	7	**9**	**9**	4	6	**8**	7	G
Staple LX[7]	5	-	5	5	5	2	5	-	-	-	-	**8**	4	4	-	**9**	6	**8**	**9**	-	6	7	**9**	**8**	G
Postemergence directed																									
Aim	0	0	0	0	0	0	0	0	0	0	0	**8**	7	6	0	7	6	6	6	-	4	-	-	**10**	G
MSMA	7	0	**8**	**8**	4	5	**8**	7	6	6	6	3	**9**	2	1	0	5	6	2	3	3	1	0	0	G
Cobra	3	0	3	3	3	2	3	3	2	-	2	6	**8**	-	5	**8**	**8**	**8**	**8**	**8**	-	7	7	**8**	G
+ MSMA	**8**	0	**8**	**8**	**8**	5	**9**	7	6	6	6	**9**	**9**	7	5	**8**	**9**	**9**	**8**	**9**	5	7	7	**8**	F
Fluometuron	6	-	6	6	6	-	6	6	-	1	1	7	5	4	-	-	6	6	5	-	-	-	-	-	G
+ MSMA	**8**	0	**9**	**9**	**8**	5	**8**	**8**	**8**	6	6	**8**	**9**	5	2	4	**9**	**9**	7	6	**8**	4	3	6	F
Goal 2XL	4	0	4	4	4	2	4	4	2	2	2	**9**	**8**	-	2	7	7	7	**8**	**9**	-	**9**	-	**8**	G
+ MSMA	**8**	0	**8**	**8**	**8**	5	**9**	7	6	6	6	**9**	**9**	7	2	7	**9**	**9**	**8**	**9**	**8**	**9**	5	**8**	F
Linex	5	0	5	5	5	2	5	5	4	0	0	**8**	7	**8**	2	6	7	7	**8**	**8**	7	4	5	6	G
+ MSMA	**8**	0	**9**	**9**	**8**	5	**9**	**8**	**8**	6	6	**9**	**9**	7	2	6	**9**	**9**	**9**	**8**	**8**	4	5	7	G
Prometryn	7	-	7	7	7	-	7	7	-	1	1	**8**	6	6	-	-	7	7	7	-	-	-	-	-	G
+ MSMA	**8**	0	**9**	**9**	**8**	5	**9**	**8**	**8**	6	6	**8**	**9**	6	2	5	**9**	**9**	**8**	**8**	**8**	4	5	7	F
Suprend	**8**	-	**8**	**8**	7	0	7	7	-	1	1	**9**	**9**	**9**	-	7	7	**8**	**8**	**8**	**9**	7	7	7	G
Postemergence over-the-top																									
Clethodim	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**8**	0	0	0	0	0	0	0	0	0	**9**	0	0	0	0	0	0	E
Envoke[7]	2	0	2	2	2	5	7	-	**9**	7	**8**	**9**	**9**	**9**	-	-	7	**8**	2	-	**9**	-	-	**9**	F
Fusilade	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
Glyphosate	**8**	5	**9**	**9**	**8**	7	**9**	**8**	**9**	7	6	6	**8**	6	3	-	**9**	**9**	**8**	6	7	**9**	**8**	7	G
Liberty 280	**8**	-	**8**	**8**	5	2	**8**	-	-	4	4	**9**	**8**	**9**	-	-	**8**	**8**	7	-	**8**	**8**	**9**	7	E
Quizalofop	**8**	**9**	**9**	**8**	**8**	**9**	**9**	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
Sequence	**9**	6	**9**	**9**	**8**	**8**	**9**	**9**	**10**	**8**	7	**8**	**8**	6	4	**9**	**9**	**9**	7	**9**	**8**	7	**9**	7	G
Sethoxydim	**9**	**8**	**9**	**9**	**9**	**8**	**9**	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
S-metolachlor/metolachlor[8]	**8**	0	**8**	**8**	**8**	0	**8**	-	7	5	7	0	2	0	-	6	**8**	**9**	2	-	2	-	0	0	G
Staple LX[7]	0	0	0	0	0	3	6	0	-	5	5	**9**	7	**9**	-	7	6	7	7	6	5	**9**	**9**	**9**	G
Warrant[8]	**8**	0	**8**	**8**	**8**	0	**8**	-	7	5	7	0	2	0	0	6	**8**	**8**	2	-	2	-	0	2	-
Layby – preemergence activity																									
Command	**9**	-	**9**	**9**	**9**	3	**9**	**8**	-	-	-	5	6	4	-	**8**	2	2	**9**	**9**	0	**8**	**9**	**10**	F
Diuron	5	0	5	6	5	2	5	5	4	0	0	7	4	4	1	4	**9**	**9**	4	5	**8**	3	3	3	G
+ MSMA	**8**	0	**9**	**9**	**8**	5	**9**	**8**	**8**	6	6	**8**	**9**	5	2	4	**9**	**9**	7	7	**8**	4	4	4	F
Layby Pro	6	0	6	6	6	1	6	6	0	0	0	7	5	5	0	5	7	**8**	6	7	**8**	5	4	5	G
Linex	6	0	6	6	6	1	5	6	0	0	0	6	4	4	0	6	7	7	6	**8**	4	6	2	5	G
Valor SX	**8**	0	4	4	4	2	4	4	4	4	4	**8**	**9**	-	-	**8**	**8**	**8**	**10**	**8**	**9**	**8**	**8**	**8**	F

[1]Rating scale: 0-3, none to slight; 4-6, fair; 7-8, good; 9-10, excellent; Ratings assume the herbicides are applied in the manner suggested in the guidelines and according to the label under optimum growing conditions. Crop tolerance rating scale: E - excellent; G - good; F - fair.
[2]See Glossary for trade names.
[3]Goosegrass resistance to Group 9 (glyphosate) herbicides has been identified in Mississippi.
[4]Johnsongrass resistance to Group 1 (Assure II, clethodim, Fusilade, Poast Plus), Group 3 (pendimethalin, trifluralin), and Group 9 (glyphosate) herbicides has been identified in Mississippi.
[5]Palmer amaranth, spiny amaranth, and tall waterhemp resistance to Group 9 (glyphosate) herbicides is prevalent across Mississippi. Palmer amaranth resistance to Group 2 (Envoke, Staple) herbicides is also common.
[6]Overlay (PPI + PRE) treatment will control a broader spectrum of weeds, but effectiveness on any given species will be no better than the highest rating for the best herbicide in the specific combination selected.
[7]Resistance to ALS or Group 2 (Envoke, Staple) herbicides has been documented in several weed species in Mississippi. Control of weeds with ALS resistance will be reduced with Envoke and Staple LX. Please see Herbicide-Resistant Weeds section for a list of herbicide-resistant weeds.
[8]Dual Magnum and Warrant will not control emerged weed species. Control ratings given are for residual control of species listed.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks

Postharvest/Fallowbed/Preplant Foliar

Postharvest/fallowbed or preplant foliar herbicide applications are designed to provide residual control of winter annuals or burndown of existing vegetation. **Applications can be made during or after fall tillage, up to various time intervals prior to planting, depending on which herbicide is used.** Fall application of residual herbicides can reduce the need for spring tillage or spring burndown herbicides. However, exceeding maximum use rates in any 1 year is possible with certain herbicides. Also, fall application of most herbicides eliminates the possibility of fall cover crops becoming properly established. See pages 24 and 25 for expected levels of control for various weeds.

glyphosate at 0.37 to 0.77 lb ae/A + carfentrazone at 0.032 lb/A	See glyphosate tables on pages 5–6 for rates + Aim 2 EC — 2 oz/A	After weed emergence up to planting.	Annual grasses and broadleaf weeds.	See *Special Instructions and Remarks* for glyphosate. Make applications to actively growing weeds up to 4 inches in height.
dicamba at 0.188 to 0.25 lb/A	4 lb/gal formulation — 6 to 8 oz/A	21 days before planting.	Cutleaf eveningprimrose, horseweed, buttercup species, clovers, Pennsylvania smartweed, and other winter annual weeds.	Consult the label to determine rates for weeds and growth stages. Include NIS at 0.25% v/v. If applied in the spring following a fall application the total amount applied cannot exceed 2 pounds of active ingredient per acre. The field must receive at least 1 inch of rainfall or overhead irrigation, and 21 days must pass before planting cotton.
flumioxazin at 0.064 lb/A	Valor SX 51 WDG — 2 oz/A	14 to 30 days depending on application rate and tillage system.	Residual control of most broadleaf weeds and suppression of annual grass weeds.	A spray-grade nitrogen (2 to 2.5 pounds per acre of AMS or 1 to 2 quarts per acre of 28 or 32% UAN) source can be added to spray mixture along with COC, methylated seed oil, or nonionic surfactant. Nitrogen addition should not replace spray adjuvant. When applying with a glyphosate formulation preformulated with a spray adjuvant, an additional spray adjuvant is not required.
fomesafen at 0.25 to 0.375 lb/A	2 lb/gal formulation — 1 to 1.5 pt/A	Before planting and after 0.5 inch of rainfall.	Control or suppression of broadleaf, and sedge weeds. Good to excellent control of prickly sida, pigweed, and yellow nutsedge.	Use a minimum of 10 gallons per acre spray volume. Rainfall within 7 days of application is necessary for activation. Some cotton injury can occur if rain falls during or soon after cotton emergence. Do not apply more than 1.5 pints per acre during the growing season. At least 0.5 inch of rainfall must occur before planting on medium- or fine-textured soils.
glyphosate at 0.37 to 0.75 lb ae/A	See glyphosate table on pages 5-6 for rates.	After weed emergence up to 3 to 7 days before planting.	Consult label for complete list of weeds controlled.	**Refer to glyphosate formulation table on page 5 for surfactant/adjuvant recommendation for specific glyphosate formulation.** Use the higher rate for larger weeds or heavy infestations. If tillage is intended after treatment, wait at least 3 days (7 days for rhizome johnsongrass). **Avoid drift to nearby crops or areas not intended to be treated.**
norflurazon at 1 to 2 lb/A	Solicam 80 DF — 1.25 to 2.5 lb/A	Surface applied in fall after final disking or bed formation.	Annual bluegrass, chickweed, bittercress. Poor control of henbit and Carolina geranium.	Do not exceed broadcast rates of 1.25 pounds per acre for light soils, 1.9 pounds per acre on medium soils, or 2.5 pounds per acre on heavy soils in any 1 year.

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
paraquat at 0.625 to 1 lb/A	2 lb/gal formulation — 2.5 to 4 pt/A; 3 lb/gal formulation — 1.67 to 2.67 pt/A	For burndown of existing vegetation before planting, but before weeds are 6 inches tall.	Top kill of most annual and perennial weeds and grasses. Perennials will regrow.	Add 0.25% v/v NIS or 1% v/v COC. Minimum application volume of 10 gallons per acre by ground and 5 gallons per acre by air. Paraquat is nonselective, so avoid spray drift onto desirable vegetation. Use the low rate on weeds under 2 inches tall.
pendimethalin at 0.75 to 1 to 1.5 lb/A	Prowl H_2O 3.8 CS — 1.5 to 2 to 3 pt/A or 3.3 EC formulation — 1.8 to 2.4 to 3.6 pt/A	After Oct. 18 up to 15 days prior to planting.	Most winter annuals and other small-seeded annuals.	Incorporate within 7 days of application if rainfall does not occur. **Do not** apply to wet soils or soils subject to prolonged flooding.
prometryn at 0.75 to 1 lb/A	4 lb/gal formulation — 1.5 to 2 pt/A	Nov. 1 up to 14 days prior to planting.	Residual control of most winter annuals and postemergence control of small (less than 2 inches) existing vegetation.	Add COC at 1 pint per acre. Use the high rate for early applications and the low rate for applications nearer to planting. If weeds are larger than 2 inches, addition of paraquat or glyphosate may improve control.
oxyfluorfen at 0.25 to 0.5 lb/A	Goal 2 XL — 1 to 2 pt/A in a minimum of 20 gal water by ground	Early fall up to 7 days prior to planting.	Residual control of most winter annuals, especially henbit. Postemergence control of henbit, common groundsel, and shepherdspurse up to 4-leaf stage with the addition of suitable surfactant.	Use the lower rate for short residual (late winter, early spring) application. Use the higher rate for long residual (fall, early winter) applications. **Soil must be tilled to depth of 2 inches** before planting unless treatment is 30 days or more prior to planting and unless at least three rainfalls of 0.25 inch or more have fallen since the application.
thifensulfuron + tribenuron at 0.25 to 0.4 oz/A	FirstShot 50 SG — 0.5 to 0.8 oz/A	After weed emergence but 14 days prior to planting.	Postemergence control of broadleaf winter weeds such as curlydock, chickweed, henbit, and buttercup.	Add NIS at 0.25% v/v or COC at 1% v/v. Apply to young, actively growing weeds. Allow 1 to 3 weeks after application for full control.
trifloxysulfuron at 0.075 oz/A	Envoke 75 DF — 0.1 oz/A	Minimum of 90 days before planting.	Excellent control of many broadleaf weed species, including henbit and horseweed.	Add NIS at 0.25% v/v. If weeds are emerged at application, addition of glyphosate or paraquat may improve control. Do not exceed a total of 0.4 ounce per acre of Envoke from all applications in one season.
trifluralin at 1 to 1.25 lb/A	4 lb/gal formulation — 2 to 2.5 pt/A	Apply and incorporate any time between Oct. 15 and Dec. 31. May be left flat or bedded.	Annual bluegrass, chickweed, henbit, and other winter annuals.	**Do not** apply to wet soils or soils subject to prolonged flooding.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Preplant Incorporated				
norflurazon at 1 to 2 lb/A	Solicam 80 DF — 1.25 to 2.5 lb/A depending on soil texture.	Within 30 days of planting.	Most annual grasses and small-seeded broadleaf weeds. Good to excellent control of prickly sida and good control of spurred anoda.	Incorporate no deeper than 2 to 3 inches after beds have been reduced for planting. Do not use where johnsongrass or morningglory is a major problem. The application also may be split with half the rate preplant incorporated and the other half applied on the surface after planting.
pendimethalin at 0.48 to 1.9 lb/A	Prowl H_2O 3.8 CS — 1 to 4 pt/A or 3.3 EC formulation — 1.2 to 4.6 pt/A	Preplant incorporated — up to 60 days before planting; Preplant surface — up to 15 days before planting.	Residual control of most annual grasses and small-seeded broadleaf weeds, such as purslane and pigweed.	Use 1 to 2 pints per acre on coarse-textured soils (conventional or reduced tillage systems) and 2 pints per acre on coarse-textured soils under no-till systems. Use 2 pints per acre on medium-textured soils for conventional or reduced tillage and 3 pints per acre in no-till. Use 3 pints per acre on fine-textured soils in conventional or reduced tillage and 4 pints per acre in no-till. Incorporate 1 to 2 inches deep immediately after application for best results.
trifluralin at 0.5 to 0.75 to 1 lb/A	4 lb/gal formulation — 1 to 1.5 to 2 pt or 5 lb/gal formulation— 0.8 to 1.2 to 1.6 pt in 5 gal water by air or 10 gal water by ground	Any time after Jan. 1 to immediately before planting.	Most annual grasses and some small-seeded broadleaf weeds, such as pigweed and purslane.	Incorporate 1 to 2 inches deep immediately after application for best results. A 30% loss can occur if incorporation is delayed 24 hours.
Preemergence				
Preemergence herbicide applications should be made after planting but before weed or crop emergence. Avoid planting cotton seed less than 0.5 inch deep to avoid excessive injury during periods of heavy rainfall. Substituted-urea herbicides such as fluometuron or diuron may interact when used in combination with organophosphate insecticides at planting, resulting in cotton injury.				
clomazone at 0.5 to 1 lb/A	Command 3 ME — 1.33 to 2.67 pt/A	At planting.	Annual grasses and many small-seeded broadleaf weeds, except pigweed. Addition of fluometuron **improves morningglory and cocklebur control.**	**Use an organophosphate insecticide, in-furrow, to prevent cotton injury!** These insecticides may, however, cause injury when used with fluometuron or diuron. **Do not apply** during periods of high winds in excess of 10 mph and/or expected heavy rainfall.
diuron at 0.5 to 1.0 to 1.6 lb/A	4 lb/gal liquid formulation — 1 to 2 to 3.2 pt in 10 to 20 gal water	At planting.	Most annual grasses and small-seeded broadleaf weeds. Fair to good control of prickly sida and morningglory.	If stand failure occurs, cotton may be replanted through the treated band with minimum disturbance of the treated soil. In a single season, do not exceed 0.8 pound of active ingredient on loamy sand, 1.2 pounds on sandy loam, 1.6 pounds on clay loam, or 2.2 pounds on clay. Rebed only after thorough tillage.
fluometuron at 0.75 to 1.5 to 2 lb/A	4 lb/gal formulation — 0.75 to 1.5 to 2 qt	At planting.	Most annual grasses and small-seeded broadleaf weeds. Good to excellent control of prickly sida and morningglory.	If stand failure occurs, cotton may be replanted through the treated band with minimum disturbance of the treated soil. Rebed only after thorough tillage.

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
norflurazon at 1 to 1.5 to 2 lb/A	Solicam 80 DF — 1.25 to1.9 to 2.5 lb in 10 to 20 gal water	At planting.	Most annual grasses and small-seeded broadleaf weeds. Good to excellent control of prickly sida, and good control of spurred anoda.	If stand failure occurs, cotton, soybeans, or peanuts may be replanted through the treated band with minimum disturbance of the treated soil, or the area may be reworked. Rebed only after thorough tillage. Norflurazon also may be applied preplant incorporated or as a split application with half preplant incorporated and the other half preemergence.
pendimethalin at 0.5 to 0.75 to 1 lb/A	Prowl H_2O 3.8 CS — 1 to 1.5 to 2 pt/A or 3.3 EC formulation — 1.2 to 1.8 to 2.4 pt/A	Within 2 days after planting	Most grasses from seed and some small-seeded broadleaf weeds, such as pigweed and purslane.	Rainfall or overhead irrigation is needed within 7 days for activity. Seedling diseases, cold weather, excessive moisture, shallow or deep planting, low or high soil pH, high soil salt concentration, or drought can weaken seedlings and increase the possibilty of crop damage.
pyrithiobac at 0.0325 to 0.0525 lb/A	Staple LX 3.2 SL — 1.3 to 2.1 oz/A	At planting.	Spurge and prickly sida.	Do not use on coarse soils such as sands or loamy sands.

Postemergence — directed

Many of the suggested postemergence treatments include MSMA with another herbicide for broader spectrum weed control. Costs can be reduced by omitting the MSMA where nutsedge, cocklebur, or grasses are not a problem. When omitting MSMA in the spray mixture, be sure to add surfactant.

Use of the arsenical herbicides (MSMA) is limited to two applications whether used alone or in combination with other herbicides. **DO NOT APPLY MSMA AFTER FIRST BLOOM.** A number of instances of MSMA resistance in common cocklebur have been documented throughout Mississippi. See page 9 for more information.

3-inch cotton or larger

MSMA at 2 lb/A	MSMA — 2.7 pt of a 6 lb/gal formulation in 20 gal water	Apply once or twice after the smallest cotton reaches a height of 3 inches.	Most annual grasses, susceptible cocklebur, and some other annual broadleaf weeds. Nutsedge and small johnsongrass plants will be topkilled.	**Do not apply after first bloom.** Addition of fluometuron or prometryn will broaden spectrum of weeds controlled. This treatment is more effective during hot, dry periods than in cool, wet periods. Add NIS at 0.25% v/v unless the formulation contains surfactant.
fluometuron at 0.8 lb/A (or MSMA, see above)	4 lb/gal formulation — 0.8 qt in 20 gal water	Apply once or twice when cotton is 3 to 6 inches tall.	Annual grasses and most seedling broadleaf weeds.	Add NIS at 0.25% v/v. This treatment is relatively safe on young cotton and also provides residual preemergence weed control.
prometryn at 0.5 lb/A (or plus MSMA)	4 lb/gal formulation — 1 pt in 20 gal water	Apply once or twice after cotton is 3 inches tall.	Most seedling broadleaf weeds including prickly sida if sprayed before 2 inches tall. Addition of MSMA improves grass control.	Add NIS at 0.25% v/v. **Do not** apply at the 3-inch stage if cotton is stressed. Provides some residual preemergence control in addition to killing emerged weeds.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
6-inch cotton or larger (in addition to herbicides listed for smaller cotton)				
carfentrazone at 0.012 to 0.024 lb/A	Aim 2 EC — 0.8 to 1.6 oz/A	Cotton should be at least 6 inches tall with 5 to 6 nodes.	Morningglories, pigweed, and velvetleaf.	Use a COC at 1% v/v. Applications to cotton shorter than 6 inches must be made with hooded or shielded sprayer equipment to completely avoid contact with cotton plants. **Coverage is essential for good control.** For control of additional broadleaf weeds and grasses, Aim herbicide may be tank mixed with other herbicides registered for use in cotton. Do not apply more than 3.2 ounces of 2EC total per season by postdirected and layby applications.
diuron at 0.2 to 0.5 lb/A (or plus MSMA, see page 29)	80 DF formulation — 0.25 to 0.62 lb or 4 L formulation 0.4 to 1 pt in 20 gal water	Apply once or twice after cotton is 6 inches tall.	Most seedling broadleaf weeds. Addition of MSMA improves grass control.	Add NIS at 0.25% v/v. Apply as directed spray. Diuron plus MSMA provides better weed control under a wide range of growing conditions than either herbicide alone.
fomesafen at 0.25 to 0.375 lb ai/A	2 lb/gal formulation — 1 to 1.5 pt/A in a minimum of 10 gal water	Cotton must be at least 6 inches tall.	Control or suppression of broadleaf, grass, and sedge weeds. Good to excellent control of morningglory, pigweed, common ragweed, hemp sesbania, and Pennsylvania smartweed.	Add 1% v/v COC or NIS at 0.25% v/v. Apply as a directed spray to cotton at least 6 inches tall. Use shielded or hooded applications on 6- to 12-inch cotton. Contact with cotton foliage can cause significant injury. Do not apply with liquid nitrogen. Do not apply within 70 days of cotton harvest. Do not apply more than 1.5 pints per acre per season.
lactofen at 0.2 lb/A (or plus MSMA, see page 29)	Cobra 2 EC — 0.8 pt in 20 gal water	Apply once or twice after cotton is 6 inches tall.	Most small broadleaf weeds. Addition of MSMA improves grass control.	Add 0.5 to 1 pint per acre COC for cotton 6 to 8 inches tall or 1 to 2 pints per acre for cotton taller than 12 inches. For best results, spray weeds before 3-inch height. Height differential between cotton and weeds is important since good spray coverage on the weeds is necessary for control.
linuron 0.5 to 0.75 lb/A	Linex 4L — 1 to 1.5 pt/A	When cotton is at least 8 inches tall and weeds are not over 2 inches tall.	Annual grass and broadleaf species.	Linex 4L should be applied as a directed spray with nozzles adjusted to minimize contact to cotton. NIS may be added at 0.25% v/v if emerged weeds are present. If a second application is needed, use the same rate and apply 1 week or more after first treatment.
linuron + diuron 0.25 + 0.25 to 0.375 + 0.375 lb/A	Layby Pro 4L — 1 to 1.5 pt/A	When cotton is 6 to 8 inches tall.	Annual grass and broadleaf weeds.	Apply as a directed spray. Use the lower rate on 6-inch cotton and the higher rate on 8-inch cotton or taller. For control of emerged weeds, add a nonionic surfactant at 0.5% v/v or a COC at 1% v/v. Do not use a COC on cotton that is less than 12 inches in height.
pyroxasulfone	Zidua — 0.75 to 2.1 oz/A	5-leaf to bloom.	Residual control of selected broadleaf and grass weeds.	If weeds are present at the time of application, tank-mixes or sequential applications may be required. Zidua may be tank-mixed with Prowl H_2O, Sharpen, glyphosate, or glufosinate.
oxyfluorfen at 0.25 or 0.5 lb/A (or plus MSMA, see page 29)	Goal 2 XL — 1 or 2 pt/A in 20 gal water	After cotton is 6 inches tall and before weeds have more than 4 true leaves.	Most seedling broadleaf weeds including prickly sida, morningglory, and hemp sesbania. Addition of MSMA improves grass control.	Add NIS at 0.25% v/v. Good spray coverage on the weeds is essential for control. Oxyfluorfen is most effective under optimum growing conditions. Use the higher rate on larger weeds or under drought conditions.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
prometryn + trifloxysulfuron 0.8 to 1.2 lb/A + 0.007 to 0.0105 oz/A	Suprend 80 DF — 1 to 1.5 lb/A	When cotton is at least 6 inches tall.	Controls morningglories, velvetleaf, smooth pigweed, tall waterhemp, sicklepod, cocklebur, and hemp sesbania.	**A nonionic surfactant** at 0.25% v/v or 1% v/v of COC should be used with Suprend. For best results, apply to weeds less than 6 inches in height. Do not apply within 60 days of harvest. Do not exceed a total of 2.7 pounds per acre of Suprend per season. Application of Suprend to soils with pH higher than 7.5 may increase the potential for rotational crop injury. **Unacceptable cotton injury may occur** if you tank-mix Suprend with malathion, profenofos (Curacron) or emamectin-benzoate-containing insecticides (Denim), acephate, Bidrin, Capture, or Karate.
Postemergence — Over-the-top				
acetochlor at 0.94 to 1.5 lb/A	Warrant 3 CS — 1.25 to 2 qt/A, depending on soil texture	Postemergence to crop but preemergence to weeds	Grasses and small-seeded broadleaves	This treatment will not provide postemergence control of emerged weeds. Applications must be made before first bloom.
clethodim at 0.0625 to 0.125 lb/A	1EC — 12 to 16 fl oz/A 2EC — 6 to 8 fl oz/A Add 1 qt/A COC.	Actively growing grasses up to 60 days before harvest. See table below.	Annual and perennial grasses.	Apply over the top or semi-directed to cover grasses. Adjust spray volume and pressure to ensure thorough coverage of grass. **Do not apply** within 1 hour of anticipated rainfall. **Do not apply** to stressed grasses. **Do not cultivate** within 7 days of application.
MSMA at 0.75 to 1 lb/A	6 lb/gal formulation — 1 to 1.3 pt/A in 10 to 20 gal/A water	When cotton is 3 to 6 inches tall. Do not apply after first square or when cotton is more than 6 inches tall.	Excellent control of susceptible cocklebur and small annual grasses. Poor control of hemp sesbania and prickly sida.	Add NIS at 0.25% v/v unless formulation contains surfactant. **Use as a salvage treatment only.** Possible burning and reddish color of foliage may appear. May delay cotton maturity. **Do not** tank mix with other herbicides. Apply only to healthy cotton under favorable growing conditions.
fluometuron at 0.5 to 1 lb/A	4 lb/gal formulation — 1 to 2 pt/A	After cotton reaches 3 inches.	A wide spectrum of annual weed seedlings controlled or suppressed to allow more effective directed sprays later.	Add NIS at 0.25% v/v. **Use as a salvage treatment only. Crop injury may occur.** Apply only to healthy cotton under favorable growing conditions. Use the higher rate on vigorously growing cotton and bigger weeds.
fluazifop at 0.094 to 0.188 lb/A	Fusilade DX 2 EC— 0.375 to 0.75 pt in a minimum of 5 gal water by air or ground equipment.	Apply to actively growing grasses. See table below.	Most annual grasses, rhizome johnsongrass, and bermudagrass. See table below.	Add either a COC at 1% or NIS. For annual grasses, re-treat if needed for late emerging grasses. **Do not** apply more than 48 ounces per acre per season. **Do not** apply after boll set or within 90 days of harvest.

Kind of grass	Size (in)	Rate lb ai/A	Rate oz/A
Seedling johnsongrass	2-8 tall	0.094	6
Goosegrass	2-4 tall	0.125	8
Barnyard and crabgrass	1-2 tall	0.188	12
Broadleaf signalgrass	2-4 tall	0.188	12
Rhizome johnsongrass	8-18 tall	0.188	12
2nd application	6-12 tall	0.125	8
Bermudagrass	4-8 runners	0.188	12
2nd application	4-8 runners	0.125	8

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
metolachlor at 0.75 to 1.33 lb/A or s-metolachlor at 0.48 to 1.27 lb/A	8 lb/gal formulation or Dual Magnum 7.62 EC — 0.5 to 1.33 pt/A	Apply when cotton is 3 to 12 inches tall.	Preemergence control of annual grasses and small-seeded broadleaf weeds.	This treatment will not provide postemergence control of emerged species. Do not apply within 100 days of harvest.
pendimethalin at 0.26 to 0.53 lb/A	Prowl H2O 3.8 CS — 1.1 to 3.2 pt/A or 3.3 EC formulation — 1.2 to 3.6 pt/A	Before weed emergence.	Preemergence control of annual grasses and small-seeded broadleaf weeds.	This treatment will not provide postemergence control of emerged species. When tank-mixed with Roundup PowerMax or Roundup WeatherMax, AMS is required.
pyrithiobac at 0.065 to 0.095 lb/A	Staple LX 3.2 SL — 2.6 to 3.8 oz/A	From 1-true-leaf cotton up to 60 days before harvest; after weed emergence up to 1- to 4-inch weeds, except sicklepod and prickly sida.	Excellent postemergence control of most broadleaf weeds. Poor grass control.	Add NIS at 0.25% v/v. **Optimum control depends upon** proper timing, thorough coverage of weed foliage, and a well-designed preemergence program. **Do not tank mix** with insecticides containing malathion. Do not tank mix with Dual as a postemergence treatment. Do not exceed 3.8 ounces per acre in a single application or 5.1 ounces per acre per season. Do not apply within 60 days of harvest.
pyrithiobac + glyphosate 0.0325 to 0.095 lb ai/A + 0.77 lb ae/A	Staple LX 3.2 SL — 1.3 to 3.8 oz/A plus glyphosate formulation as shown in table on page 5	May be applied over the top of Roundup Ready Flex until 60 days before harvest.	Excellent postemergence control of most broadleaf, grass, and sedge weeds.	**See the previous instructions for pyrithiobac and glyphosate.**
quizalofop at 0.0313 to 0.0625 lb/A	0.88 EC formulation	Apply to actively growing grasses any time prior to 80 days before harvest. See table below.	Annual and perennial grasses; excellent control of johnsongrass.	Add COC at 1% v/v or NIS at 0.25% v/v. Use crop oil at 0.5% v/v for aerial application. **Do not apply** using crop-origin (vegetable) oils as an adjuvant or carrier. **Do not apply** more than 18 fluid per ounces per season. **Do not apply** within 24 hours of a postemergence broadleaf herbicide. **Do not** cultivate within 7 days of application.

Kind of grass	Weed height (in)	Rate (fl oz/A)
Seedling johnsongrass	2-8	5
Volunteer corn	8-18	5
Most annual grasses	2-6	7
Barnyard grass	2-6	8
Broadleaf signalgrass	2-6	8
Crabgrass	2-6	8
Red rice	1-4	9
Rhizome johnsongrass	10-24	10
2nd application	6-10	7
Bermudgrass	3	10
2nd application	3	7

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
sethoxydim at 0.19 to 0.28 lb/A	1 lb EC formulation — 1.5 to 2.25 pt/A	Apply to actively growing grasses. See table below.	Most annual grasses, seedling and rhizome johnsongrass, and bermudagrass.	Add COC at 1 quart per acre with aerial and ground applications. If more annual grasses emerge after the first application, then additional applications can be made. A second application can be made to control regrowth of johnsongrass and bermudagrass. **Do not** apply within 40 days of harvest.

Kind of grass	Size (in)	Rate ai/A	Rate pt/A
Crabgrass and goosegrass	up to 6 tall	0.19	1.5
Other annual grasses including seedling johnsongrass	up to 8 tall	0.19	1.5
Rhizome johnsongrass*	15-20 tall	0.19	1.5
2nd application	6-10 tall	0.19	1.5
Bermudagrass	plant diameter		
	6 or less	0.28	2.25
2nd application	regrowth 1-4 long	0.19	1.5

*If spray volume is more than 10 gallons per acre, increase the rate on johnsongrass at first application to 2.25 pt/A.

trifloxysulfuron at 0.08 to 0.11 oz/A	Envoke 75 DG — 0.1 to 0.15 oz/A	When cotton has reached a minimum of 5 true leaves.	Morningglories, sicklepod, pigweed, and nutsedge.	Envoke may cause temporary yellowing or stunting of cotton plants, but they usually recover quickly. **A NIS should be added to the spray solution at 0.25% v/v.** Envoke may be tank mixed with other products when applied as a post-directed spray (See label for specifics). **Do not tank mix with insecticides containing malathion, profenofos, or emamectin-benzoate or unacceptable injury may occur.**

Cultivation—use so that the soil moved by it will not interfere with subsequent use of postemergence herbicides. Cultivation will not normally detract from the control obtained from previously applied herbicides, but frequently will offer an economical means of extending or completing control established by herbicides. Deep cultivation (more than 2 inches) usually is not necessary and may damage the crop.

Glytol/Liberty Link or Widestrike Varieties Only

glufosinate at 0.4 to 0.78 lb/A	Liberty 280 2.34 SL — 22 to 29 oz/A. Single application rate can be as high as 43 oz/A.	Apply to tolerant cotton from emergence to early-bloom. Weeds should not exceed 3 to 6 inches.	Excellent control of cocklebur, hemp sesbania, and morningglory species. Good control of sicklepod and some pigweed species.	Ground application should be applied in a minimum of 15 gallons of spray mix. Do not apply more than 72 to 87 fluid ounces per acre in a single growing season. The maximum total application rate is dependant upon whether Liberty 280 SL was applied at burndown, as well as the application rate at that time. Do not apply within 70 days of harvest. Avoid use of air induction spray tips, as reduced control is likely.
S-metolachlor + glyphosate acid at 0.94 to 1.33 lb/A + 0.53 lb/A	Dual Magnum 7.62 EC + Liberty 280 SL	Make applications before bloom.	Postemergence control of most annual and perennial broadleaf species, as well as smaller grasses. Preemergence control of annual grasses and small-seeded broadleaf weeds.	Do not apply within 100 days of harvest.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Roundup-Ready Flex or Glytol + Liberty Link Varieties				
glyphosate at 0.375 to 1.12 lb ae/A	See glyphosate table on pages 5-6 for rates.	After weed emergence. May be applied to **Roundup Ready Flex Cotton** until 7 days prior to harvest.	Postemergence control of most annual broadleaf and grass weeds. A well-designed residual herbicide program is recommended for optimum control and resistance management.	Do not apply at rates above 32 fluid ounces per acre. **In-crop application rates above 22 fluid ounces per acre** made alone or with the addition of other crop chemical products containing surfactant may cause a crop response including leaf speckling or leaf necrosis. From cracking until 60% open bolls, up to 4 quarts may be applied. The maximum allowed from 60% open bolls until 7 days prior to harvest is 44 fluid ounces per acre. The maximum allowed per year, including preplant burndown applications, is not to exceed 5.3 quarts per acre.
s-metolachlor + glyphosate acid at 0.94 to 1.33 lb/A + 0.70 to 0.98 lb/A	Sequence 5.25 F — 2.5 to 3.5 pt/A	Make postemergence applications from 3-inch to 12-inch cotton.	Postemergence control of most annual broadleaf and grass weeds. Preemergence control of annual grasses and small-seeded broadleaf weeds.	Do not exceed 2.5 pints of Sequence per acre in a single application. Do not exceed 3.5 pints per acre in a season. Do not apply within 100 days of harvest.
Spot Treatment				
clethodim	1EC — 12 to 16 fl oz/A 2EC — 6 to 8 fl oz/A	Apply to actively growing grasses up to 60 days before harvest.	Annual and perennial grasses.	Include 1% COC when applying clethodim alone. Spray to wet foliage but not to point of runoff.
fluazifop	Fusilade DX 2 EC—1% + 0.25% surfactant or 1% crop oil concentrate. See table below.	Apply to all actively growing grasses.	Johnsongrass and bermudagrass.	Apply to 8- to 18-inch johnsongrass or bermudagrass up to 3 inches tall before runners are 8 inches long. Spray grass to wet all foliage but not to the point of runoff. **Do not** apply more than 48 ounces per acre per season. **Do not** apply after boll set or within 90 days of harvest.
glyphosate spray	glyphosate — 1% solution in water for most weeds, including johnsongrass. Increase to 2% solution for harder-to-control perennials, such as bermudagrass.	Spray to wet foliage of weeds before cotton bolls open.	Johnsongrass, bermudagrass, trumpetcreeper, and most other emerged annual and perennial weeds.	Treatment is most effective on large, actively growing weeds. Conventional cotton sprayed with herbicide solution will be severely injured or killed. Repeat treatments may be necessary to control weeds regenerating from underground parts or seed. See the label for details.

	Amount of			Fusilade DX
Spray mix	Surfactant (0.25%)	or	Oil Conc. (1%)	
1 gal	0.5 oz	or	1.5 oz	0.75 oz
100 gal	1 pt	or	8 pt	8 pt

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
quizalofop	0.88 EC formulation — 0.375% +1% v/v crop oil concentrate or 0.25% v/v nonionic surfactant	Apply to actively growing grasses up to 80 days before harvest.	Annual and perennial grasses.	Treat plants on a spray-to-wet basis insuring good coverage.
sethoxydim	1 EC formulation — 1.5% + 1% crop oil concentrate. See table below. **Amount of** Spray mix / Oil conc. (1%) 1 gal / 1.28 oz 100 gal / 8 pt	See table below.	Bermudagrass and johnsongrass. **Amount of Poast Plus** Herbicide conc. (1.5%) 1.9 oz 12 pt	Mix as shown in table below. Spray grass to wet all foliage but not to the point of runoff. Spray actively growing foliage when johnsongrass is 15 to 20 inches tall and bermudagrass plants do not exceed 6 inches in diameter. **Do not** apply within 40 days of harvest.

Layby

carfentrazone at 0.012 to 0.024 lb/A	Aim 2 EC — 0.8 to 1.6 oz/A	Apply when cotton is at least 12 inches tall with sufficient bark development.	Morninglories, pigweed, and velvetleaf.	Use a COC at 1% v/v. **Coverage is essential** for good control. For control of additional broadleaf weeds and grasses, Aim herbicide may be tank mixed with other herbicides registered for use in cotton. Do not apply more than 3.2 ounces of 2EC total per season by postdirected and layby applications.
clomazone at 0.75 to 1 lb/A	Command 3ME — 2 to 2.67 pt/A	Command 3ME may be applied as a postemergence directed spray at layby when cotton has at least 8 nodes.	Residual control of annual grasses and several broadleaf weeds.	Command may be applied alone, or as a tank-mix combination. **Severe bleaching will occur** to those cotton leaves sprayed with Command. **Do not spray** Command over the top of cotton. The use of an organophosphate insecticide is not required when Command is applied as a layby treatment after cotton plants have at least eight nodes. **Do not apply Command** within 65 days of harvest. Do not apply Command 3ME herbicide as a layby treatment if the product has already been applied as a planting time application. Do not apply more than 1 pound of active ingredient per acre.
diuron at 0.5 to 1 to 1.2 lb/A	4 lb/gal formulation — 1 to 2 to 2.4 pt in 20 gal water	Apply when cotton is at least 12 inches tall.	Most late-emerging annual grasses and small-seeded broadleaf weeds will be controlled if rain occurs within 10 days after treatment.	Add NIS at 0.25% v/v. Apply broadcast spray as indicated. Omit surfactant if no emerged weeds are present attime of treatment.
flumioxazin at 1.02 oz/A	Valor SX 51 WDG — 2 oz/A	When cotton is at least 16 inches tall. Apply to 2- to 4-inch emerged weeds.	Provides contact control of cocklebur and morninglories. Provides residual control of morninglories, tall waterhemp, hemp sesbania, and various annual grass species.	**Severe crop injury may result** if application is made to green or unbarked stem. Do not apply more than 2 ounces of Valor per acre per application, and do not exceed 4 ounces of Valor during a single growing season. Use a NIS at 0.25% v/v. **Do not use** a COC, methylated seed oils, organo-silicant surfactants, or products containing these ingredients as severe crop injury may occur. Layby application may be made once cotton is at least 16 inches tall.

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
fomesafen at 0.25 to 0.375 lb/A	2 lb/gal formulation — 1 to 1.5 pt/A in a minimum of 10 gal water.	When plants have at least 4 inches of brown bark.	Control or suppression of broadleaf, grass, and sedge weeds. Good to excellent control of morningglory, pigweed, common ragweed, hemp sesbania, and Pennsylvania smartweed.	Add 1% v/v COC or NIS at 0.25% v/v. Apply directed to the base of cotton plants with at least 4 inches of brown bark, avoiding contact with any nonbarked portions. Adjust nozzles to provide complete coverage of weeds. Do not apply with liquid nitrogen. Do not apply within 70 days of cotton harvest. Do not apply more than 1.5 pints per acre per season.
linuron at 1 to 1.5 lb/A	Linex 4L — 2 to 3 pt/A	Apply when cotton is at least 20 inches tall and weeds are not over 2 inches tall.	Most late-emerging annual grasses and small-seeded broadleaf weeds will be controlled if rain occurs within 10 days after treatment.	Apply as a directed spray with nozzles adjusted to minimize contact to cotton. Omit surfactant if no emerged weeds are present at time of treatment. Where the weed problem is light, apply a half rate after the cotton is 12 inches tall and re-treat only if necessary.
linuron + diuron at 0.8 + 0.8 to 1.2 + 1.2 lb/A	Layby Pro 4L — 1.6 to 2.4 pt/A	Apply layby to cotton at least 15 inches tall and weeds no more than 4 inches tall.	Annual grass and broadleaf weeds.	For control of emerged weeds, add a NIS at 0.5% v/v or a COC at 1% v/v.
pendimethalin at 0.5 to 1.5 lb/A	Prowl H_2O 3.8 CS — 1.1 to 3.2 pt/A or 3.3 EC formulation — 1.2 to 3.6 pt/A	After last normal cultivation (layby).	Most annual grasses and small-seeded broadleaf weeds such as pigweed and purslane.	Apply to the soil between rows as a directed spray following the last normal cultivation. Destroy existing weeds prior to application. **Avoid spray contact** to nonwoody portion of cotton stems and foliage or serious crop injury may occur. Apply at least 60 days before harvest.
pyroxasulfone	Zidua — 0.75 to 2.1 oz/A	5-leaf to bloom.	Residual control of selected broadleaf and grass weeds.	If weeds are present at the time of application, tank-mixes or sequential applications may be required. Zidua may be tank-mixed with Prowl H_2O, Sharpen, glyphosate, or glufosinate.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Alternative weed management techniques				
Hooded sprayers — Use of nonselective herbicides applied with hooded sprayers to avoid contact with the crop may be desirable for weed control in row middles, especially in no-till or conservation tillage systems. Addition of a residual-type herbicide will extend weed control and may negate the need for a layby application made to 12-inch tall or greater cotton.				
flumioxazin at 0.064 lb/A	Valor SX 51 WDG — 2 oz/A	Valor may be applied with a hooded or shielded sprayer after cotton is at least 6 inches tall.	Provides some post-emergence activity on emerged weeds. Provides excellent residual control of most broadleaf weeds and suppression of annual grass weeds.	**Use only hooded sprayer equipment** designed to minimize exposure of the spray to cotton foliage. Hoods must be operated on the ground or skidding along the ground to minimize spray contact with desirable vegetation. Refer to flumioxazin under the *Preplant Foliar* subsection previously in the cotton section for information on spray adjuvant requirements. Do not apply more than 4 ounces per acre in any growing season. Do not make sequential applications within 30 days. Do not apply within 60 days of harvest.
glufosinate at 0.4 to 0.78 lb/A	Liberty 280 2.34 SL — 22 to 43 oz/A	Ignite 280 SL may be applied from emergence through early bloom using a hooded sprayer.	Annual grasses and broadleaf weeds, especially morningglory.	**Use only hooded sprayer equipment** designed to minimize exposure of the spray to cotton foliage when applying to cotton varieties **not tolerant to Liberty 280 SL.** Hoods must be operated on the ground or skidding along the ground to minimize spray contact with desirable vegetation. Make up to three applications per season. A single application up to 43 ounces per acre can be made. Total seasonal application must not exceed 72 to 87 ounces per acre. Do not harvest cotton within 70 days of the last application of Liberty 280 SL.
paraquat at 0.312 to 0.625 lb/A	Gramoxone 2 SL — 1.25 to 2.5 pt/A	Apply to 6-inch tall cotton.	Annual grasses and broadleaf weeds less than 6 inches tall.	Include 0.5% v/v NIS or 1% v/v COC **Use a hooded sprayer ONLY.** Keep the bottom edge of the hood in contact with the soil surface. **Avoid crop contact with spray solution.** Avoid use of spray tips that produce fine spray droplets. (**State Label**). **Other formulations of paraquat are NOT labeled for hooded sprayer applications.**

SOYBEANS

Canopy closure. Adapted cultivars that rapidly develop a full canopy can be an effective weed control practice. As a general rule of thumb, later-maturing and later-planted soybeans tend to develop fuller canopies. Additionally, determinate varieties (generally MG V and later) tend to canopy better than indeterminate varieties (generally MG IV and earlier) that are often used in conjunction with the Early Soybean Production System (ESPS). Soybeans planted extremely early during cool and wet growing conditions tend to be short, and canopy closure is difficult to achieve. Narrowing row spacings can aid in canopy closure and weed control, especially with early-planted indeterminate varieties. In situations where 38- to 40-inch row spacings are utilized, planting two rows on top of a bed (twin rows) rather than a single row will improve canopy closure and often improve yields.

Weed resurgence. Weed resurgence is a major problem in early-maturing soybeans. Soybeans planted using the ESPS are generally harvested in August and early September. As soybeans senesce and light reaches the soil, weeds begin to emerge and can greatly reduce harvest efficiency at harvest, often resulting in yield loss. Strategies to manage weed resurgence include (1) using preemergence herbicides or adding residual herbicides to postemergence applications, (2) using layby applications in wide-row soybeans and in wheel tracks, and (3) using harvest aids prior to harvest. Postharvest herbicide applications also may be useful in no-till fields to prevent weeds from going to seed after harvest.

No-till or reduced-till systems. It is often desirable to kill existing vegetation with herbicides and not till the soil prior to planting soybeans. The nonselective herbicides glyphosate, glufosinate, and paraquat are generally very effective for this. The PRE herbicides Canopy, Scepter, Metribuzin, Valor, Firstrate, Python, and others have POE and PRE activity and can be a useful component in "burndown" programs to expand the weed control spectrum and provide soil residual activity up to planting and sometimes beyond. Early burndown programs that include residual herbicides have proven efficacious and economical when used in conjunction with the ESPS. It is often beneficial to combine two or more herbicides for control of a wide variety of emerged weeds. Dicamba and 2,4-D are often added to nonselective herbicides to improve control of weeds like cutleaf eveningprimrose and glyphosate-resistant horseweed.

Select rates and tank mix partners carefully. In some cases, PRE/POE herbicides are often slightly antagonistic with glyphosate; increased glyphosate rates should be used in this situation. This is especially true with difficult-to-control weed species and in situations where contact/burning-type herbicides are mixed with the systemic herbicide glyphosate. Large weeds and heavy pressure may make it necessary to apply two treatments. In some cases, this can be achieved by applying glyphosate or paraquat prior to planting and follow at or after planting with a second PRE/POE herbicide. The objective is to achieve burndown prior to crop emergence. Herbicide labels provide additional information and should be consulted prior to any application.

ESTIMATED LEVELS OF PREPLANT FOLIAR WEED CONTROL NORMALLY EXPECTED

Herbicides	Annual bluegrass	Bittercress	Buttercup	Carolina geranium	Chickweed	Eveningprimrose	Henbit	Prostrate knotweed	Shepherdspurse	Wildlettuce	Virginia pepperweed	Vetch	Little barley	Horseweed	Curly dock (mature)	Italian Ryegrass	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass	Seedling Johnsongrass	Cocklebur	Entireleaf morng.	Pitted morng.	Smallflower morng.	P. Smartweed	Hemp sesbania	Prickly sida	Spurred anoda	Pigweed	Sicklepod	Cutleaf groundcherry	Common ragweed	Red rice	Upright spurge	Soil activity
2,4-D	0	**8**	**9**	7	**8**	**10**	5	**8**	**8**	**9**	**9**	**9**	0	**8**	7	0	0	0	0	0	0	**8**	**10**	**10**	**9**	**8**	**8**	**8**	**9**	**9**	**8**	**9**	-	0	-	yes
Dicamba	0	**8**	**9**	**8**	**8**	**10**	7	**8**	**8**	**9**	**9**	**9**	0	**9**	**9**	0	0	0	0	0	0	**9**	**10**	**10**	**9**	**8**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	0	**9**	yes
Firstshot	0	**9**	**9**	**8**	**8**	**8**	7	-	**9**	**9**	**9**	**9**	0	6	**9**	0	0	0	0	0	0	**8**	7	**8**	**8**	-	6	4	-	6	4	-	-	0	-	no
Goal 2XL	**9**	**10**	**9**	**8**	**8**	4	**9**	**9**	**9**	**9**	**8**	7	-	6	-	5	-	-	-	-	-	**8**	**8**	**9**	**9**	**8**	**9**	**9**	**8**	**9**	-	-	-	-	**9**	yes
Glyphosate	**10**	**10**	**9**	7	**10**	6	7	7	**10**	**8**	**8**	5	**10**	**8**	6	6	**10**	**10**	**10**	**9**	**10**	**8**	7	**8**	**8**	7	6	7	6	**10**	**8**	**9**	**9**	**8**	**10**	no
Glyphosate + 2,4-D	**10**	**10**	**10**	**9**	**10**	**9**	**8**	-	**10**	**10**	**9**	5	**10**	**9**	**8**	7	**9**	**9**	**10**	**9**	**9**	**10**	**9**	**9**	**9**	**8**	**8**	**8**	**8**	**10**	**8**	**9**	**9**	**8**	**10**	yes
Glyphosate + Canopy EX	**9**	**9**	**8**	7	**8**	7	**8**	-	**8**	-	-	**8**	**8**	7	**8**	6	**9**	**9**	**10**	**9**	**10**	**8**	**8**	**9**	**9**	7	**8**	**8**	**9**	**8**	**8**	**8**	**9**	**9**	**9**	yes
Glyphosate + Dicamba	**10**	**10**	**10**	**9**	**10**	**8**	**8**	-	**10**	**10**	**9**	**9**	**10**	**8**	**8**	7	**9**	**9**	**10**	**9**	**9**	**10**	**9**	**9**	**9**	**8**	**9**	**8**	**8**	**9**	**8**	**9**	**9**	**8**	**10**	yes
Glyphosate + Envive	**10**	**10**	**10**	**8**	**10**	**8**	**9**	-	**9**	-	-	-	**10**	**9**	-	**9**	**10**	**10**	**10**	**9**	**10**	**8**	**8**	**8**	**8**	**9**	-	-	-	**10**	**8**	**9**	**9**	**9**	**10**	yes
Glyphosate + Firstshot SG	**10**	**10**	**10**	**8**	**10**	7	**9**	-	**10**	**9**	**10**	**9**	**10**	**8**	**9**	7	**10**	**10**	**10**	**9**	**10**	**8**	**8**	**9**	**9**	**10**	7	-	-	**10**	**8**	-	-	-	-	no
Glyphosate + Goal 2XL	**10**	**10**	**10**	**8**	**10**	7	**9**	-	**10**	-	**10**	7	**10**	**8**	7	**8**	**9**	**9**	**9**	**8**	**9**	**8**	**9**	**9**	**9**	**8**	**10**	**9**	**9**	**10**	**8**	**9**	**9**	-	**10**	yes
Glyphosate + Sharpen	**10**	**10**	**9**	7	**10**	7	7	7	**10**	**9**	**8**	5	**10**	**9**	6	6	**10**	**10**	**10**	**9**	**10**	**8**	7	**8**	**8**	**8**	**8**	7	6	**10**	**8**	**9**	**9**	**8**	**10**	yes
Glyphosate + Synchrony XP	**10**	**10**	**9**	**8**	**9**	**8**	**8**	-	**9**	**9**	**9**	**9**	**10**	**8**	**9**	7	**10**	**10**	**10**	**9**	**10**	**9**	**8**	**8**	**9**	**9**	7	7	-	**9**	7	**8**	**9**	**8**	**9**	yes
Glyphosate + Valor SX	**10**	**10**	**10**	**8**	**10**	**8**	**9**	-	**9**	-	-	-	**10**	**8**	-	**9**	**10**	**10**	**10**	**9**	**10**	**8**	**8**	**8**	**8**	**9**	-	-	-	**10**	**8**	**9**	**9**	**9**	**10**	yes
Liberty	6	-	-	**8**	**10**	7	6	-	-	-	**9**	**8**	7	**9**	-	6	**8**	**8**	**8**	**8**	**8**	**9**	**10**	**10**	**9**	**8**	**8**	7	-	**8**	7	-	-	-	-	no
Metribuzin	**9**	**10**	**9**	7	**10**	6	**8**	6	**9**	**8**	6	6	**10**	5	-	6	7	**8**	7	7	**8**	7	7	7	7	**8**	**9**	**8**	**8**	**8**	7	7	**8**	4	4	yes
Paraquat	**10**	**10**	**10**	7	**10**	7	**9**	6	**9**	7	7	**8**	**8**	6	4	**8**	**9**	**9**	**9**	**8**	**9**	6	5	5	7	6	6	6	**8**	**9**	**9**	7	**8**	7	**8**	no
Paraquat + 2,4-D	**10**	**10**	**10**	**9**	**10**	**10**	**9**	-	**9**	-	**8**	**10**	**9**	**9**	**8**	6	-	-	-	-	-	-	-	-	-	**10**	-	**8**	-	**9**	-	-	-	-	-	yes
Paraquat + Goal 2XL	**10**	**10**	**10**	**10**	**10**	7	**9**	-	**10**	-	5	**9**	**10**	**8**	5	6	-	-	-	-	-	-	-	-	-	7	-	-	-	**10**	-	-	-	-	**9**	yes
Paraquat + Metribuzin	**10**	**10**	**10**	**8**	**10**	**8**	**9**	6	**9**	**8**	**8**	**8**	**10**	**9**	-	**9**	**9**	**9**	**9**	**8**	**9**	7	7	7	7	**8**	**9**	**8**	**8**	**9**	**9**	7	**8**	7	**8**	yes

*Plus adjuvant if required according to label instructions.

ESTIMATED LEVELS OF WEED CONTROL NORMALLY EXPECTED WITH SOYBEAN HERBICIDES[1]

Herbicides / Weeds	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass	Seedling johnsongrass	Rhizome johnsongrass	Fall panicum	Cocklebur	Entireleaf morningglory	Pitted morningglory	Palmleaf morningglory	Smallflower morningglory	Purple moonflower	Purslane	P. smartweed	Hemp sesbania	Prickly sida	Spurred anoda	Pigweed, smooth, redroot	Palmer, spiny amaranth, tall waterhemp	Balloonvine	Sicklepod	Cutleaf groundcherry	Common ragweed	Yellow nutsedge	Annual sedge	Velvetleaf	Jimsonweed	Red rice	Spurge	Hophornbeam copperleaf	Showy crotolaria	Wild poinsettia	Vol. RR corn	Crop tolerance *(G = Good, F = Fair)*
PPI-Preplant Incorporated[2]																																		
Pendimethalin or Trifluralin	**9**	**9**	**9**	**9**	**9**	3	**9**	0	2	2	2	2	1	**9**	2	0	0	0	**8**	7	1	4	-	-	**8**	**9**	4	5	**9**	-	-	3	-	-	G
Pendimethalin-2X or Trifluralin-2X	**10**	**10**	**10**	**10**	**9**	7	**9**	0	4	4	4	4	3	**10**	2	1	2	0	**9**	**8**	0	3	1	4	0	4	3	4	**8**	3	0	0	0	-	G
Preplant or Preemergence																																			
Authority MTZ	6	6	6	5	4	0	6	7	**9**	**9**	**9**	**9**	-	**8**	**9**	**8**	**8**	-	**9**	**9**	-	7	-	**8**	7	7	**8**	**8**	-	**8**	**9**	-	**9**	-	F
Authority XL	6	6	6	5	5	2	6	**9**	**9**	**9**	**9**	**9**	-	**8**	**9**	5	4	-	**9**	**9**	-	6	-	**8**	**9**	**9**	**9**	**8**	4	**8**	**9**	-	**9**	-	F
Boundary	**8**	**8**	**8**	**8**	6	0	**8**	5	3	7	7	**8**	5	**9**	**9**	**9**	**9**	**9**	**9**	**8**	**9**	7	**9**	**9**	7	**9**	**8**	**8**	**9**	**9**	**9**	6	6	-	**F**
Canopy DF	7	6	7	7	7	3	7	**9**	**8**	**8**	**8**	**9**	6	**10**	**9**	**9**	**9**	**9**	**9**	**8**	**8**	7	**9**	**9**	5	**9**	**9**	**8**	**8**	**9**	**8**	-	**8**	-	F
Canopy EX	**8**	**8**	7	7	6	2	7	**8**	**8**	**8**	**8**	**8**	-	**8**	**9**	**9**	7	-	**8**	**8**	-	-	-	**8**	**8**	**8**	7	5	**8**	**8**	-	**8**	0	-	G
Command	**9**	**9**	**9**	**9**	**9**	3	**8**	6	4	7	6	6	3	**9**	**8**	4	**9**	**9**	4	0	5	0	0	5	-	-	**10**	**8**	7	**8**	**8**	3	**9**	-	G
Envive	6	5	6	5	5	0	6	**9**	**9**	**9**	**9**	6	**9**	**9**	**8**	**8**	**8**	**9**	**9**	**9**	7	7	5	**9**	7	**8**	5	**8**	7	**8**	**9**	**9**	-	-	F
Fierce	7	7	7	6	5	3	7	3	7	7	5	7	7	8	**8**	**8**	**9**	**8**	**9**	**8**	7	7	7	7	5	7	**8**	**8**	**8**	**9**	**8**	-	**9**	2	F
Fomesafen	4	3	4	4	4	0	-	7	5	**8**	6	5	4	7	7	4	**8**	1	**8**	**8**	**-**	**7**	**8**	**7**	**7**	**1**	**-**	**4**	**3**	**-**	**-**	**-**	**6**	-	G
Intimidator	**8**	**8**	**8**	**8**	6	0	**8**	5	3	7	7	**8**	5	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	7	**9**	**9**	7	**9**	**8**	**8**	**9**	**9**	**9**	6	6	-	F
Gangster	5	5	5	5	5	0	6	0	**8**	**8**	**8**	7	**9**	**8**	**9**	**9**	**8**	**8**	**8**	**8**	**9**	7	7	**8**	7	5	**9**	**8**	**8**	6	**9**	**9**	-	-	F
Metolachlor/S-metolachlor	**8**	**8**	**9**	**9**	6	0	**9**	0	0	0	0	0	0	**9**	4	0	4	0	**9**	7	1	2	6	6	**9**	3	4	**8**	3	5	2	3	-	-	G
Metribuzin	**8**	6	**8**	7	5	0	7	6	2	7	2	**8**	6	**9**	**9**	**9**	**9**	**9**	**9**	7	**9**	**8**	**9**	**9**	2	**9**	**8**	**8**	4	**9**	**9**	7	7	-	F
Outlook	**8**	**8**	**9**	**9**	6	0	**9**	0	0	0	0	0	0	**9**	4	0	4	0	**9**	6	1	3	4	**9**	5	5	4	3	4	**8**	3	5	-	-	G
Pendimethalin	**9**	**9**	**9**	**9**	**9**	3	**9**	0	2	2	2	2	1	**9**	2	0	4	0	**8**	6	0	2	0	3	0	3	2	3	4	2	0	0	0	-	G
Prefix	**9**	**8**	**9**	**9**	7	0	3	5	5	5	5	4	**9**	6	4	7	4	**9**	**8**	**9**	-	5	**9**	**9**	**9**	4	6	**8**	**9**	**9**	6	4	-	-	G
Python	0	0	0	0	0	0	0	**8**	5	7	7	**8**	-	**9**	**9**	0	**9**	**9**	**9**	6	3	7	**9**	**8**	-	-	**9**	-	0	**9**	7	3	6	-	G
Scepter	7	7	7	5	7	2	5	**9**	6	**8**	**8**	**8**	5	**9**	**9**	0	**9**	7	**10**	6	**5**	5	-	7	4	**9**	6	**8**	5	6	7	-	7	-	G
Solicam	**8**	**8**	**9**	**8**	7	2	7	4	4	5	5	4	4	**9**	5	4	**8**	7	**8**	7	-	5	-	-	4	**9**	7	-	-	**8**	-	-	-	-	F
Sonic	5	5	5	5	5	0	5	7	**8**	**9**	**8**	7	7	**9**	**9**	-	7	**8**	**9**	7	-	-	**8**	**8**	7	**9**	**8**	**8**	-	**8**	**8**	-	7	6	G
Valor SX	5	5	5	5	5	0	6	0	**8**	**8**	**8**	6	**9**	6	**9**	**9**	**8**	**8**	**8**	**8**	7	7	5	**9**	7	**8**	5	**8**	7	**8**	**9**	**9**	-	-	F
Valor XLT	6	5	6	5	5	0	6	**9**	**9**	**9**	**9**	6	**9**	**9**	**8**	**8**	**8**	**9**	**9**	**9**	7	7	5	**9**	**8**	**8**	5	**9**	**9**	6	**9**	**9**	-	-	F
Warrant	**8**	**8**	7	7	5	3	**9**	0	0	0	0	0	0	**9**	4	0	5	2	**8**	6	-	3	**9**	5	7	**8**	3	4	**8**	3	-	3	3	-	G
Zidua	**9**	**9**	**9**	**8**	7	4	**8**	3	6	6	6	6	-	**9**	**8**	6	**8**	-	**9**	**9**	-	7	-	5	4	-	7	7	**9**	**9**	**8**	-	-	0	G
Postemergence-OT																																			
Assure II	**9**	**9**	**9**	**8**	**9**	**9**	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	**8**	G
Basagran	0	0	0	0	0	0	0	**9**	2	6	7	**9**	3	7	**9**	4	**8**	**8**	5	4	**8**	0	6	**9**	6	**8**	**9**	**8**	-	0	0	0	7	-	G
Basagran + 2,4-DB	0	0	0	0	0	0	0	**9**	5	**8**	**9**	**9**	5	7	**9**	5	**8**	**8**	5	4	**8**	0	6	**9**	6	**8**	**9**	**8**	-	0	0	0	6	-	F
Classic	0	0	0	0	0	0	0	**10**	**9**	**8**	**9**	**8**	**9**	5	**9**	**8**	2	4	**10**	6	5	7	-	**8**	6	**8**	**8**	**9**	0	0	4	-	**8**	-	G
Clethodim	**9**	**9**	**9**	**9**	**9**	**8**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	7	G
Cobra	4	4	4	4	3	2	3	**8**	**8**	**9**	**8**	**8**	**9**	**9**	6	**9**	**8**	6	**9**	**8**	**9**	5	**9**	**8**	3	6	**8**	**9**	0	**8**	**8**	**9**	**8**	-	F
First Rate	0	0	0	0	0	0	0	**9**	**8**	**9**	**8**	**9**	-	-	-	3	2	-	2	2	-	7	-	**8**	6	**8**	7	-	**9**	0	4	4	-	-	-	G
Fomesafen	3	3	3	3	3	3	2	**8**	**8**	**9**	**8**	**8**	**9**	**8**	7	**9**	2	2	**9**	**8**	**8**	3	**9**	**8**	6	7	-	**9**	0	5	**8**	**9**	**8**	-	G
Fusilade DX	**8**	**8**	**8**	**9**	**9**	**9**	**8**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	**8**	G
Fusion	**8**	**8**	**8**	**9**	**9**	**9**	**8**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	-	G
Glyphosate[3]	**9**	**9**	**9**	**8**	**10**	**9**	**9**	**10**	7	**8**	**8**	**9**	**8**	**8**	**8**	7	7	7	**9**	**8**	**8**	**8**	**9**	**9**	7	**9**	7	**8**	**8**	**8**	**8**	**8**	**9**	-	G
Liberty[4]	7	7	7	5	7	6	7	9	9	9	9	8	-	6	9	8	7	7	8	7	9	8	6	9	4	4	7	8	7	8	8	-	-	9	G
Permit Plus[5]	0	0	0	0	0	0	0	**8**	-	-	-	-	-	-	**8**	**9**	-	-	-	-	-	-	-	**8**	**9**	**9**	**8**	-	0	-	-	-	-	0	G
Poast Plus	**8**	**9**	**9**	**9**	**9**	7	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	G
Prefix	3	3	3	3	3	3	2	**8**	**8**	**9**	**8**	**8**	**9**	**8**	7	**9**	2	2	**9**	**8**	**8**	**9**	**8**	6	7	-	**9**	0	5	**8**	**9**	**8**	6	-	G
Scepter	2	2	3	3	6	5	5	**10**	5	6	6	7	5	**9**	7	2	3	2	**10**	6	0	3	-	6	5	7	3	0	2	3	3	0	7	-	G
Storm	3	4	3	3	3	0	2	**9**	**8**	**9**	**9**	**9**	7	**8**	**8**	**9**	7	7	**8**	**7**	**8**	2	**9**	**9**	6	**8**	**8**	**8**	0	6	7	**9**	6	-	G
Sequence	**9**	**9**	**9**	**8**	**10**	**9**	**9**	**10**	7	**8**	**8**	**9**	**8**	**8**	**8**	7	7	7	**9**	**9**	**8**	**8**	**9**	**9**	**7**	**9**	**7**	**8**	**8**	**8**	**8**	**8**	**9**	-	G
Synchrony XP[5]	**8**	**8**	**8**	7	6	0	**9**	**9**	**9**	**9**	**9**	**9**	7	**8**	**8**	**8**	6	-	**8**	**8**	-	-	0	-	7	**8**	**8**	7	-	**8**	7	-	0	-	G
Ultra Blazer	3	4	3	3	3	2	2	5	**8**	**9**	**9**	**8**	**9**	**8**	7	**9**	1	2	**8**	7	**8**	3	**9**	**8**	3	5	-	**8**	2	7	**8**	**9**	7	-	G
Ultra Blazer + 2,4-DB	3	4	3	3	3	2	2	7	**8**	**9**	**9**	**8**	**9**	**8**	7	**9**	1	-	**8**	7	**8**	3	**9**	**8**	-	-	-	**8**	2	7	**8**	**9**	**8**	-	F
Postemergence-Directed																																			
2,4-DB	0	0	0	0	0	0	0	**9**	**9**	**9**	**9**	**9**	**9**	3	0	3	3	2	2	2	1	0	0	1	0	-	3	4	0	0	2	-	3	-	G
Linex/Lorox	7	7	**8**	7	7	0	7	7	**8**	**8**	**8**	**8**	7	**8**	7	**8**	**8**	**8**	**8**	**8**	**8**	7	**8**	**8**	-	-	6	7	6	7	7	-	7	-	G
Linex/Lorox + 2,4-DB	7	7	**8**	7	7	0	7	**9**	**10**	**9**	**9**	**10**	**9**	**9**	7	**8**	**8**	**8**	**9**	**9**	**9**	**9**	**10**	**9**	2	-	7	**8**	6	7	**9**	-	**8**	-	G
Metribuzin	7		**8**	7	7	0	-	**8**	7	7	7	7	7	-	7	7	**8**	**8**	**8**	**8**	**8**	**8**	7	7	0	-	**8**	-	**8**	4	-	-	5	-	G
Metribuzin + 2,4-DB	7	7	**8**	7	7	0	-	**9**	**9**	**9**	**9**	**9**	**8**	3	7	7	**8**	**8**	**8**	**8**	**9**	**9**	**8**	**8**	0	-	**8**	7	**8**	4	**8**	-	7	-	G
Paraquat[6]	**9**	**9**	**9**	**8**	**8**	0	**8**	4	5	4	6	7	4	**8**	5	1	4	3	**8**	**8**	2	**8**	7	**8**	3	-	6	7	**9**	5	7	-	**8**	-	G

[1] Rating scale: 0 - 3 none to slight; 4 - 6 fair; 7 - 8 good; 9 - 10 excellent. Ratings assume the herbicides are applied in the manner suggested in the guidelines and according to the label under optimum growing conditions.

[2] An overlay treatment with the preemergence herbicides will control a broader spectrum of weeds, but the effectiveness on any given species may be no better than the highest rating for the best herbicide in the specific combination selected.

[3] Roundup Ready® soybean cultivars only.

[4] Liberty Link soybean cultivars only.

[5] STS soybean cultivars only.

[6] Two applications.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Preplant — Foliar (PPF)				
dicamba at 0.25 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 gal water by ground or 5 gal water by air.	Preplant up to 14 days before planting. (See specific instructions.)	Horseweed, clovers, and several other winter and summer annual, biennial, and perennial broadleaf weeds.	A minimum accumulation of 1 inch of rainfall or overhead irrigation, followed by a 15-day waiting interval, is required before planting soybean. Do not apply this product near emerged soybean.
Fallow cultivation	Use several fallow cultivations over a 4- to 6-week period.	Preplant.	Johnsongrass and emerged annual weeds.	Disk-harrow appears more effective than field cultivator when used alone for johnsongrass control. Alternate use of the two implements is equally effective as disking alone and will be more economical. More effective in dry weather than during wet periods.
2,4-D at 0.5 to 1 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	14 to 30 days before planting. Rainfall before planting is recommended.	Several winter and summer annual, biennial, and perennial broadleaf weeds.	Use in combination with glyphosate, glufosinate, or paraquat to improve weed control spectrum. Ester formulations are usually more effective than amine formulations in controlling curly dock and wild garlic. As a general rule, apply esters when temperatures are less than 60° and amines when more than 60°. Follow Bureau of Plant Industry regulations for phenoxy herbicides.
glyphosate at 0.77 to 1.5 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	Preplant up to crop emergence.	Several winter and summer annual, biennial, and perennial broadleaf weeds.	Use of flood-jets is not suggested. If tillage is intended after treatment, wait at least 3 days (7 days for perennial weeds) after application. **Avoid drift to nontarget species or areas.** Do not use with galvanized (zinc-coated) spray equipment.
flumioxazin at 0.032 to 0.08	Valor SX — 1 to 2.5 oz in 15 gal of water by ground. Always add crop oil concentrate or methylated seed oil at 1qt/A or an 80% active nonionic surfactant at 0.25% (v/v). Additional adjuvant may not be required when tank mixing with products that have been formulated with a suitable adjuvant.	Early preplant to preemergence.	Several summer and winter annual weeds. Improved control of cutleaf eveningprimrose when tank mixed with glyphosate.	Use with herbicides like glyphosate, paraquat, or 2,4-D to broaden weed control spectrum. Do not apply more than 3 ounces of Valor SX per season. **Injury may occur if Valor SX is used in the same field where flufenacet, alachlor, metolachlor/S-metolachlor, or dimethenamid-P will be used preemergence.** Valor SX at 2 ounces per acre or more will provide residual control of several weeds.
flumioxazin + chlorimuron ethyl + thifensulfuron methyl at 0.0456 + 0.0144 + 0.0045 to 0.073 + 0.023 + 0.0073 lb	Envive — 2.5 to 4 oz in 10 to 20 gallons of water by ground equipment.	Early preplant to preemergence.	Several summer and winter annual broadleaf weeds.	Envive may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. Do not apply preemergence to coarse soils or to Black Belt soils with a pH greater than 7. Do not apply more than 4 ounces per season.
flumioxazin + chlorimuron ethyl + thifensulfuron methyl at 0.0634 + 0.005 + 0.0154 lb	Enlite — 2.8 oz in 10 to 20 gallons of water by ground equipment.	Early preplant to preemergence.	Several summer and winter annual broadleaf weeds.	Enlite may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. Do not apply more than 2.8 ounces per season.

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
oxyfluorfen at 0.25 to 0.5 lb	Goal 2XL — 1 to 2 pt in 10 to 20 gal water by ground or 5 to 10 gal water by air. Always include 0.25% to 0.5% v/v of an 80% active nonionic surfactant.	Preplant up to 60 days before planting. (See specific instructions.)	Several winter and summer annual weeds.	Use in combination with glyphosate, paraquat, and/or 2,4-D to improve weed control spectrum. Soybean may be planted within 7 days after application if significant rainfall has occurred and the soil has been tilled to incorporate the treatment to a depth of at least 2.5 inches.
paraquat at 0.625 to 1 lb	2 lb/gal formulation — 2.5 to 4 pt; 3 lb/gal formulation — 1.67 to 2.67 pt. Apply in a minimum of 10 gal by ground or 5 gal by air. Add 1 to 2 pt/100 gal spray nonionic surfactant.	Before soybeans emerge.	Most small emerged annual weeds.	Paraquat is nonselective; avoid spray drift onto desirable vegetation. May be tank mixed with most preemergence herbicides. **Do not (1) apply under windy conditions; or (2) graze or feed treated forage to livestock.**
chlorimuron + tribenuron at 0.0156 + 0.0046 lb to 0.0312 + 0.0094 lb	Canopy EX — 1.1 to 2.2 oz in 10 to 20 gallons of water by ground equipment. Add 0.25% nonionic surfactant or 1% v/v crop oil concentrate.	Early preplant to preemergence.	Several summer and winter annual weeds.	Canopy EX may be tank-mixed with glyphosate, paraquat, or 2,4-D to broaden weed control spectrum. Do not apply to Black Belt soils with a pH greater than 7 or a history of nutrient deficiency. Higher rates can be used to control larger weeds or to provide extended residual control.
saflufenacil at 0.0223 to 0.0446 lb	Sharpen — 1 to 1.5 oz in 10 to 20 gal of water by ground. Always add 1% v/v methylated seed oil (MSO). Addition of AMS at 1–2% w/v water recommended.	Early preplant to preemergence. 14-day preplant interval required for 1.5 oz/A use rate.	Horseweed and many other broadleaf weeds. Use lower rate for 1- to 2-inch horseweed. Use higher rate for 3- to 4-inch horseweed.	Sharpen can be tank-mixed with glyphosate, glufosinate, or paraquat to improve control of other emerged weeds. Do not apply more than 4 ounces per year. Do not apply after soybean emergence or severe injury may occur. Do not apply to soils classified as coarse or having less than 2% organic matter.
thifensulfuron + tribenuron at 0.13 + 0.13 oz to 0.2 + 0.2 oz	Firstshot 50 SG — 0.5 to 0.8 oz in 10 to 20 gal water by ground or in 3 to 5 gal by air. Always add an NIS at 0.25% v/v or 1% v/v of a crop oil concentrate.	Up to 7 days before planting.	Several winter and summer annual as well as perennial broadleaf weeds. Especially good on wild garlic and curly dock.	Sequential applications may be made as long as total amount applied during a single preplant season does not exceed 1 ounce per acre. Allow at least 30 days between applications. The single application rate can be as high as 0.8 ounce per acre. When applied on light-textured soils, such as sandy loam, sandy, or silt loam soils, extend the time to planting by an additional 7 days. It can be applied with glyphosate or paraquat as a burndown treatment, with the Firstshot improving control of broadleaf weeds and volunteer Roundup Ready soybean.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Preplant - Incorporated				
pendimethalin or trifluralin at 0.5 to 0.75 to 1.0 lb	Prowl H_2O 3.8 CS — 1 to 1.5 to 2 pt; or Prowl 3.3 EC — 1.2 to 1.8 to 2.4 pt or trifluralin 4L — 1 to 1.5 to 2 pt or trifluralin 5 — 0.8 to 1.2 to 1.6 pt in 10 to 20 gal water.	pendimethalin — 60 days; trifluralin — several weeks to immediately before planting in spring.	Most annual grasses and some small-seeded annual broadleaf weeds such as pigweeds and purslane.	Incorporate 1 to 2 inches deep. Immediate incorporation is strongly recommended. The following losses can occur if incorporation is delayed 24 hours: pendimethalin - 15% and trifluralin - 30%. If stand failure occurs, replant soybeans, but do not re-treat. Pendimethalin — increase rate by 0.5 pint on medium-textured soils and 1 pt on fine-textured soils if heavy weed populations are anticipated.
Preplant or Preemergence				
clomazone at 1.0 to 1.25 lb	Command 3ME — 2.6 to 3.3 pt in 10 to 20 gal water by ground. Select rates according to soil type and anticipated weed pressure.	At planting.	Most annual grasses, prickly sida, Pennsylvania smartweed, purslane, spotted spurge, velvetleaf, and wild poinsettia.	**Do not** (1) apply within 1,500 feet of towns or subdivisions, or commercial vegetables, greenhouses, or nurseries; (2) graze or feed forage, hay, or straw from treated fields to livestock; (3) apply with aerial equipment. Use caution to minimize spray drift as offsite movement can cause foliar whitening or yellowing of plants.
cloransulam-methyl at 0.032 to 0.039 lb	Firstrate — 0.6 to 0.75 oz/A in 10 gal or more water.	For best results, apply within 2 weeks of planting for preplant applications and within 2 days after planting for PRE applications.	Horseweed, morningglory, prickly sida, cocklebur, jimsonweed, pigweed, common ragweed, giant ragweed, smartweed, sunflower, velvetleaf.	At least 0.5 inches rainfall needed for incorporation. Apply with glyphosate or other nonselective herbicides to remove any existing vegetation. Can be applied with other PRE herbicides to broaden weed control spectrum. Firstrate can be applied 15 to 30 days preplant. Available in a co-pack with Valor SX called **Gangster**.
dimethenamid-P at 0.47 to 0.98 lb	Outlook — 10 to 21 oz in 2 or more gallons of water to obtain ground coverage.	0 to 14 days before planting.	Most annual grasses including broadleaf signalgrass and red rice, and small-seeded broadleaf weeds.	Poor control of most large-seeded broadleaf weeds. See label for tank mixtures. May cause temporary growth suppression of soybeans with high rainfall and water-saturated soil. Do not use more than 21 ounces of Outlook per season.
flumetsulam at 0.80 to 1.06 oz	Python 80WDG — 1.0 to 1.33 oz in 10 to 40 gal by ground equipment.	Preemergence.	Broadleaf weeds.	**Do not** (1) apply more than 1.4 ounces of Python WDG in a year; (2) exceed 0.07 lb flumetsulam per year; (3) apply to soils with a pH of 7.8 or higher; (4) aerially apply.
flumioxazin at 0.063 to 0.096 lb	Valor SX — 2 to 3 oz/A in 10 to 30 gal water by ground or 7 to 10 gal water by air. Add crop oil concentrate or methylated seed oil at 1 qt/A or nonionic surfactant at 0.25% v/v if emerged weeds are present at planting.	Preplant to preemergence.	Prickly sida, morningglory, pigweeds, horseweed, and several other small-seeded summer annual, winter annual, and biennial broadleaf weeds.	Can be mixed with glyphosate, paraquat, or glufosinate to kill weeds present at time of application. Limited annual grass control. Soybean injury has been observed under extended cool and wet growing conditions following planting. Injury may also occur if incorporating rainfall occurs as seedlings are cracking. To reduce the likelihood of injury, use Valor SX as a preplant herbicide and allow rainfall to occur before planting. Soybean plants injured with Valor SX usually recover with no yield loss, but some delay in maturity may occur. Do not apply more than 3 ounces of Valor per season. **Injury may occur if Valor SX is used in the same field where flufenacet, alachlor, metolachlor/S-metolachlor, or dimethenamid-P will be used.** Can be mixed with a variety of other herbicides to broaden weed control spectrum.

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
flumioxazin + chlorimuron at 0.06 + 0.02 lb	Valor XLT – 3 oz in at least 10 gal by ground and 3 to 5 gal by air. Add crop oil concentrate or methylated seed oil at 1 qt/A or nonionic surfactant at 0.25% v/v if emerged weeds are present at planting.	Preplant to preemergence.	Prickly sida, morningglories, pigweeds, horseweed, and several other small-seeded summer annuals, winter annuals, and biennial broadleaf weeds.	For more information, see the *Special Instructions and Remarks* column for other products that contain Valor SX in this section. Valor XLT has increased morningglory, annual grass, cocklebur, and sicklepod control and longer residual control of glyphosate-resistant horseweed (a.k.a. marestail).
flumioxazin + pyroxasulfone at 0.063 + 0.08 to 0.079 + 0.1 lb	Fierce — 3 to 3.75 oz in 10 or more gallons of water by ground.	Preplant to preemergence but before crop emergence.	Prickly sida, morningglory, pigweed, crabgrass, barnyardgrass, and many other grass and broadleaf species.	Fierce can be mixed with glyphosate, paraquat, or glufosinate to kill weeds present at time of application. For more information, see the *Special Instructions and Remarks* column for other products that contain Valor SX in this section. Do not apply more than 3.75 ounces of Fierce per season.
flumioxazin + cloransulam at 0.06 + 0.02 lb	Gangster — Copack of Valor SX and FirstRate applied at 2.4 oz/A results in 2 oz/A of Valor SX and 0.4 oz/A of FirstRate. Add crop oil concentrate or methylated seed oil at 1 qt/A or nonionic surfactant at 0.25% v/v if emerged weeds are present at planting.	Early preplant to preemergence.	Prickly sida, morningglory, pigweeds, horseweed, and several other small-seeded summer annual, winter annual, and biennial broadleaf weeds. Provides longer residual control of horseweed (a.k.a. marestail) when used in a fall or spring burndown program than Valor SX alone.	Gangster can be mixed with glyphosate, paraquat, or glufosinate to kill weeds present at application. For more information, see the *Special Instructions and Remarks* column for other products that contain Valor SX in this section. Gangster can be mixed with a variety of other herbicides to broaden weed control spectrum. Gangster has increased morningglory and horseweed control and longer residual control of glyphosate-resistant horseweed (a.k.a. marestail).
flumioxazin + chlorimuron ethyl + thifensulfuron methyl at 0.0456 + 0.0144 + 0.0045 to 0.073 + 0.023 + 0.0073 lb	Envive — 2.5 to 4 oz in 10 to 20 gallons of water by ground equipment.	Early preplant to preemergence.	Several summer and winter annual broadleaf weeds.	Envive may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. Do not apply preemergence to coarse soils or to Black For more information, see the *Special Instructions and Remarks* column for other products that contain Valor SX in this section. Belt soils with a pH greater than 7. Do not apply more than 4 ounces per season.
flumioxazin + chlorimuron ethyl + thifensulfuron methyl at 0.0634 + 0.005 + 0.0154 lb	Enlite — 2.8 oz in 10 to 20 gallons of water by ground equipment.	Early preplant to preemergence.	Several summer and winter annual broadleaf weeds.	Enlite may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. For more information, see the *Special Instructions and Remarks* column for other products that contain Valor SX in this section. Do not apply more than 2.8 ounces per season.
fomesafen at 0.25 to 0.375 lb	Fomesafen — 1 to 1.5 pt	Preemergence.	Most small-seeded broadleaf weeds, especially pigweeds and prickly sida.	**Do not** exceed 1.5 pints per acre per season. Sufficient weed control depends on adequate rainfall after application to activate the herbicide. Temporary injury or leaf burn to soybean can result if rainfall occurs soon after crop emergence; new soybean growth emerging after rainfall will have a normal appearance.
imazaquin at 0.125 lb	Scepter 70DG — 2.86 oz in 10 to 20 gal water by ground equipment. **In no-till** or **doublecrop behind wheat,** use at least 20 gal water plus 0.25% (v/v) nonionic surfactant and apply with ground equipment.	Preemergence.	Cocklebur, pitted, palmleaf and smallflower morningglory, pigweeds, prickly sida, smartweed, and common ragweed.	If sufficient rainfall is not received within 7 days after application, use a rotary hoe to control emerged weeds. Internode shortening of soybean plants may occur, but this has not affected yields. Scepter may be applied in combination with a grass or broadleaf herbicide registered for preemergence application or following a grass herbicide registered for PPI application in soybeans. **Do not** (1) apply more than 0.25 pound of active ingredient per acre of Scepter per growing season; (2) graze or feed treated soybean forage, hay, or straw to livestock. **Avoid drift** to nontarget species or areas.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
metolachlor at 1.5 to 2.5 lb or S-metolachlor at 0.95 to 1.6 lb	metolachlor/S-metolachlor — 1.5 to 2.5 pt/1 to 1.66 pt. **See table below.**	Preemergence.	Most annual grasses and pigweed.	If stand failure occurs, **do not** re-treat unless replanting is in the middles. Rainfall is required for optimum control.

Pt with Organic Matter Up to 3%*

Soil Texture	Metolachlor	*S*-metolachlor
Coarse — sandy to sandy loam	1.5 to 2.0	1.00 to 1.33
Medium — loam to silt loam	2.0 to 2.5	1.33 to 1.67
Fine — sandy clay loam to clay	2.0 to 2.5	1.33 to 1.66

*Use the lower rate for soils with organic matter less than 1% and the higher rate for soils with organic matter greater than 1%.

S-metolachlor + fomesafen at 1.09 + 0.24 lb	Prefix 5.29EC — 2 pt in 10 or more gal by ground or 3 to 5 gal by air.	Preplant to preemergence.	Annual grasses and broadleaves. Excellent on pigweeds.	A maximum of 3 pints per acre can be applied within a single cropping season (includes preemergence and postemergence timings). Injury can occur if Prefix is applied at soybean cracking or after soybean emergence if rainfall occurs after soybean emergence.
S-metolachlor + metribuzin at 0.79 + 0.19 to 1.64 + 0.39 lb	Boundary — 1.2 to 2.5 pt in 10 or more gallons of water by ground.	Preplant to preemergence.	Barnyardgrass, crabgrass, pigweed, prickly sida, hemp sesbania, and many other grass and broadleaf species.	Injury may occur (1) on soils with calcareous surface or pH 7.5 and above, (2) to certain soybean varieties (see label for list), (3) on soil with less than 0.5% organic matter, (4) when soybeans are planted less than 1.5 inches deep, and (5) when heavy rains follow application, especially in poorly drained areas where water may stand several days. Do not use Boundary rates above 1.5 pints per acre on soils above pH 7.0. Do not use on sands with less than 0.5% organic matter.
S-metolachlor + metribuzin + fomesafen at 0.84 + 0.09 + 0.17 to 1.9 + 0.42 + 0.375 lb	Intimidator — 2 to 4.48 pt in 10 or more gallons water by ground.	Preplant to preemergence.	Barnyardgrass, crabgrass, pigweed, prickly sida, hemp sesbania, sicklepod, and many other grass and broadleaf weeds.	Do not exceed 4.48 pints of Intimidator per acre per season. This product contains fomesafen, which is a component of Reflex/Rhythm/Flexstar/Prefix. Do not exceed a cumulative total of 0.375 pound of fomesafen per acre per year.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
metribuzin at 0.25 to 0.625 lb	Metribuzin — apply in 10 to 40 gal water. **See table below.**	At planting.	Hemp sesbania, prickly sida, early sicklepod, and most annual grasses and small-seeded broadleaf weeds.	**Crop injury may occur on soils having a calcareous surface area or pH 7.5 or above.** Soybean stand reductions may occur when heavy rainfall immediately follows application. **Do not apply to fields subject to water standing following heavy rainfall or to fields planted to sensitive varieties.** Plant soybean seed at least 1.5 inches deep. For sicklepod, use the high side of the soil type rate range given in the table.

0.5% Organic Matter or Greater*

		Metribuzin				
Soil texture		**4L**	**75DF**		**4L**	**75DF**
		(pt)	(lb)		(pt)	(lb)
Coarse	Loamy sand, sandy loam	0.50	0.33	to	0.75	0.50
Medium	Loam, silty loam, silt	0.75	0.50	to	1.00	0.67
Fine	Silty clay loam, clay loam, clay	1.00	0.67	to	1.25	0.83

*Do not use on sand or on any soil with less than 0.5% organic matter; use the higher rates on soils with higher organic matter.

metribuzin + chlorimuron at 2.57 + 0.43 to 3.86 + 0.64 oz	Canopy DF — 4 to 6 oz/A. Apply in 15 gal water by ground. Add 0.25% v/v NIS or 1% v/v COC if vegetation is present at time of application.	From 0 to 45 days before planting.	Cocklebur, hemp sesbania, prickly sida, annual morningglory, early-emerging sicklepod, smartweed, ragweed, spotted spurge, and most small-seeded broadleaf weeds.	Do not apply more than 3 ounces per acre on soil with pH> 7.0. Do not apply to Black Belt soils with pH >7.0 or history of nutrient deficiency. Do not apply to field planted to metribuzin-sensitive soybean cultivars (See Metribuzin label or consult Extension representatives or variety trial publications for sensitive varieties). Do not apply on soils with a calcareous surface layer or pH>7.5. Tank-mix with Paraquat or Glyphosate in a burndown situation to improve overall weed control and provide residual control of broadleaf and grass weeds.
norflurazon at 0.48 to 2 lb	Solicam — 0.6 to 2.5 lb in 10 to 20 gal water or 0.95 to 1.25 lb in 10 to 20 gal water preplant incorporated and surface preemergence.	At planting **or ½ rate** preplant incorporated within 30 days of planting **plus** ½ rate at planting.	Most annual grasses, small-seeded broadleaf weeds and prickly sida.	**Do not apply to sand, loamy sand or sandy loam soil.** If stand failure occurs, cotton, soybeans or peanuts may be planted through the treated band with minimum disturbance of the treated soil or the area may be reworked. Rebedding without disturbing the treated area should not be done. **At least ½-inch rainfall within 2 weeks after preemergence application is needed for control.**
pendimethalin at 0.5 to 0.75 to 1.0 lb	Prowl H_2O 3.8 CS — 1 to 1.5 to 2 pt; or Prowl 3.3 EC — 1.2 to 1.8 to 2.4 pt.	Within 2 days after planting	Most grasses from seed and some small-seeded broadleaf weeds such as pigweed and purslane.	Rainfall or overhead irrigation is needed within 7 days for activity. Seedling diseases, cold weather, excessive moisture, shallow or deep planting, low or high soil pH, high soil salt concentration or drought can weaken seedlings and increase the possibilty of crop damage.
sulfentrazone + cloransulam-methyl at 0.25 + 0.032 to 0.31 + 0.04 lb	Sonic — 6.45 to 8 oz in 10 or more gallons of water by ground.	Preplant to preemergence.	Yellow nutsedge, pigweeds, prickly sida, morningglory, common ragweed, horseweed, and many other broadleaf species.	Sonic can be mixed with glyphosate, paraquat, or glufosinate to kill weeds present at time of application. Do not apply more than 8 ounces per season.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
sulfentrazone + carfentrazone-ethyl at 0.14 + 0.016 to 0.21 lb + 0.023 lb	Spartan Charge — 5.75 to 8.5 fl oz in at 10 gal water by ground.	Preplant to preemergence.	Residual activity on nutsedge. Controls pigweed, morningglory, and many other summer annual broadleaf species.	Do not apply more than 8.5 fluid ounces per acre per 12-month period. Soybean chlorosis and stunting may occur at pH 7.5 and above, as well as under cold and wet growing conditions. Do not use on soils classified as sand, which have less than 1% organic matter.
sulfentrazone + metribuzin at 0.09 + 0.135 to 0.2 + 0.3 lb/A	Authority MTZ — 8 to 18 oz in 10 gal of water by ground	Preplant to preemergence.	Provides some postemergence activity on emerged weeds. Provides excellent residual control of most annual broadleaf weeds, including pigweed, morningglory, and prickly sida.	Authority MTZ can be mixed with glyphosate, glufosinate, or paraquat to improve control of emerged weeds. Do not apply more than 33 ounces per year. Do not apply after soybean emergence or severe injury may occur. Do not apply to soils classified as coarse or having less than 1% organic matter.
sulfentrazone + chlorimuron ethyl at 0.12 + 0.015 to 0.3+ 0.04 lb/A	Authority XL — 3 to 8 oz in 10 gal of water by ground	Preplant to preemergence.	Provides excellent residual control of most annual broadleaf weeds, including pigweed, morningglory, and prickly sida.	Authority XL can be mixed with glyphosate, glufosinate, or paraquat to improve control of emerged weeds. Do not apply more than 9.6 ounces per year. Do not apply after soybean emergence or severe injury may occur. Do not apply to Black Belt soils with a pH of more than 6.8 or history of nutrient deficiency.
pyroxasulfone at 0.08 to 0.18 lb	Zidua — 1.5 to 3.5 oz in 10 or more gallons of water by ground.	Preplant to preemergence.	Pigweeds, Italian ryegrass, crabgrass, barnyardgrass, red rice, prickly sida, velvetleaf, and many other grass and broadleaf species.	Zidua can be mixed with glyphosate, paraquat, or glufosinate to kill weeds present at time of application. Do not apply more than 2.1 ounces on coarse soils or more than 3.5 ounces on all other soils per cropping season.
Postemergence				
Cultivation. Use so that the soil moved will not interfere with subsequent use of postemergence treatment. Cultivation will not normally detract from the control obtained from previously applied herbicides, but will frequently offer an economical means of extending or completing control established by chemicals when weeds emerge in the treated drill. However, cultivation within 7 days before or after a postemergence herbicide application may reduce control from that treatment. Deep cultivation (more than 2 inches) is usually not necessary and may damage the crop.			
Early Postemergence				
acetochlor at 0.9375 to 1.5 lb	Warrant — 1.25 to 2 qt in 10 to 20 gallons of water by ground equipment.	Soybean emergence to R2. Optimum when soybeans are V2-V3.	Residual activity on annual grasses and pigweed. Will not control emerged weeds.	Warrant should be applied postemergence to soybean but before weed seedling emergence. It may be tank-mixed with glyphosate in Roundup Ready soybean. Do not apply more than 4 quarts per season.
acifluorfen at 0.25 to 0.375 to 0.50 lb, or at 0.375 to 0.50 + 0.03 lb 2,4-DB.	Ultra Blazer 2L — 1 to 1.5 to 2 pt in 5 to 10 gal water by air or in 20 to 40 gal water by ground.	According to weed growth stage.	Hemp sesbania, morningglory species, groundcherry species, and pigweeds less than 2 inches tall.	**Do not apply** to soybeans and weeds under stress conditions, within 50 days of harvest (60 days for the 2,4-DB tank mix), or more than 4 pints per acre per growing season. The 2,4-DB tank mixture will cause soybean foliage damage and may reduce yields. **Do not** use (1) the 5-gallon aerial spray volume except for late-season control of hemp sesbania; (2) crop oil concentrate with the 2,4-DB mix.

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
acifluorfen + bentazon at 0.75 lb	Storm 4S (1.33 lb ai acifluorfen + 2.67 lb ai bentazon) — 1.5 pt in 20 gal or more water by ground or 5 gal or more water by aerial equipment with either 0.25% (v/v) nonionic surfactant or 1 qt crop oil concentrate for ground applications or 1 pt crop oil concentrate for aerial applications.	To small, actively growing weeds.	Annual broadleaf weeds.	**Do not** (1) apply more than 1.5 pints per application; (2) exceed 3 pints per season; (3) apply by air if sensitive crops, such as cotton or ornamentals are less than 200 feet down wind; (4) apply sequential treatments of Storm or Ultra Blazer less than 15 days after the initial treatments; (5) use treated plants for food or forage; (6) apply within 50 days before harvest.
bentazon at 0.75 to 1.0 lb, or at 0.75 to 1.0 lb + 0.03 lb 2,4-DB	Basagran — 1.5 to 2 pt in 5 to 10 gal of water by air or in 20 gal of water by ground.	Early post-emergence.	Cocklebur and 2- to 3-inch prickly sida and smartweed. 2,4-DB mix will improve morningglory control.	Add 2 ounces of a 2-pound-per-gallon formulation of 2,4-DB plus 1.5 to 2 pints of Basagran. Apply in 20 gallons of water with ground-application equipment. **Do not apply more than a total of 4 pints per acre in one season,** within 65 days of harvest (60 days for the 2,4-DB mix), under drought stress conditions or if soybean fields are flooded. Injury may result when applying Basagran and surfactant to soybeans less than 6 inches tall. The 2,4-DB mix will cause soybean foliage injury and may reduce yields. **Do not** add surfactant to the 2,4-DB mix. For added control of pigweed and morningglory species, 1 pint of Ultra Blazer plus surfactant may be added to Basagran. For added control of hemp sesbania, 0.5 to 1 pint of Ultra Blazer plus surfactant may be added to Basagran.
chlorimuron at 0.0078 to 0.0104 to 0.0117 lb	Classic 25DF — 0.5 to 0.67 to 0.75 oz. Add 0.25% (v/v) of a **nonionic surfactant** in 10 to 20 gal water by ground equipment or in 3 or more gal water by aerial equipment.	To actively growing weeds **(See table below)** after soybeans have one trifoliolate leaf until 60 days before maturity. A second application may be applied 14 to 21 days later if needed, but **do not exceed a total of 1.5 oz Classic per season.**	**See table below.** For entireleaf and ivyleaf morningglory, giant ragweed, and sicklepod, make two applications 14 days apart for optimum control.	**Do not use** on soybeans grown on Black Belt soils having a pH greater than 7.0 or a history of iron chlorosis. Soybeans may be stunted, particularly from the two sequential applications. A second application may be applied 14 to 21 days later if needed. However, do not exceed a total of 1.5 ounces of Classic per season. Cultivation 7 to 14 days **after treatment** will improve control. **Avoid drift** to nontarget species or areas. **Clean sprayer** according to label directions before using to spray other crops.

	Classic		
Target Weeds	**1/2 oz**	**2/3 oz**	**3/4 oz**
	(maximum height, inches at application)		
Cocklebur	6	8	12
Hemp sesbania	4	5	6
Morninglories[1]	2	3	4
Sicklepod	2	3	4
Smartweeds			
ladysthumb	2	3	4
Pennsylvania	2	3	4
Ragweeds			
common	2	3	4
giant	-	-	6
Pigweeds	3	3	4
Wild poinsettia	-	2	4

[1]1 to 2 oz 2,4-DB may be added per label for improved control.

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
clethodim at 0.0625 to 0.125 lb	1 EC formulation — 12 to 16 oz or 2 EC formulation — 6 to 8 oz. Apply in 10 to 30 gal water by ground equipment or a minimum of 3 gal water by air. Always add 1 qt crop oil concentrate.	Apply to actively growing grasses.	Most annual grasses, johnsongrass, and bermudagrass.	Apply over-the-top or as a semi-directed spray to cover grasses. **Do not apply** (1) more than 32 ounces per acre per season, (2) if rainfall is expected within 1 hour, or (3) to stressed plants. See Clethodim label for sequential and tank mix instructions with broadleaf herbicides.
cloransulam at 0.25 oz	FirstRate — 0.3 oz in 10 to 20 gal water with 1.2% crop oil concentrate or 0.25% nonionic surfactant.	To actively growing weeds with no more than 2 to 8 leaves, depending on species.	Common cocklebur, morningglory species, ragweed, sicklepod	**Do not** (1) apply through irrigation system; (2) make more than two applications per season.
flumetsulam at 0.1 oz	Python 80WDG — 0.125 oz in 10 to 20 gal water by ground or 5 gal by air. Add 1% crop oil concentrate or 0.25% nonionic surfactant if applied with glyphosate formulation not preloaded with a surfactant.	Apply when soybean is in 1–5 trifoliate growth stage. Do not apply to soybean with more than 5 trifoliate leaves.	Prickly sida no more than 2 inches tall.	Do not apply to soybean with more than five trifoliates. Do not apply more than two applications postemergence to soybean, and applications must be separated by at least 14 days. If Python is applied preemergence and postemergence, the cumulative rate cannot exceed 0.11 ounce of flumetsulam per acre per season.
fomesafen at 0.25 to 0.375/0.24 to 0.35 lb	Fomesafen — 1 to 1.5 pt. Add 0.25% (v/v) nonionic surfactant in 10 to 20 gal water by ground equipment.	To actively growing weeds.	Hemp sesbania, morningglory species, Pennsylvania smartweed, and pigweed species.	May cause temporary soybean leaf bronzing, crinkling, and/or spotting. Apply in front of cultivator plows if applying in conjunction with cultivation. Rainfall received within 4 hours of application may reduce control. **Do not** (1) apply more than 1.5 pints per acre per growing season; (2) apply to drought-stressed weeds or soybeans under stress from drought, hail damage or other types of injury; or (3) graze treated areas (to include rotational crops) or harvest for forage or hay. **Avoid** conditions conducive to drift to non-target species or areas.
S-metolachlor at 0.9375 to 1.5 lb	Dual Magnum — 1 to 1.33 pt in 10 to 20 gallons of water by ground equipment.	Soybean emergence to V3.	Annual grasses and pigweed.	Dual Magnum should be applied postemergence to soybean but before weed seedling emergence. It may be tank-mixed with glyphosate in Roundup Ready soybean and with Liberty in LibertyLink soybean. Do not apply more than 1.33 pints per season as a postemergence treatment.

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
S-metolachlor + fomesafen at 1.09 + 0.24 lb	Prefix 5.29EC — 2 pt in 10 or more gal by ground or 3 to 5 gal by air.	Apply when soybean is in 1–3 trifoliate growth stage.	Controls annual and broadleaf weeds. Good on morningglory, pigweed, hemp sesbania, and Pennsylvania smartweed.	Weed size and rate applied can significantly affect weed control. Application should be made to weeds no larger than 3- to 4-leaf growth stage for most weeds. Injury can occur if soybean is stressed or if rain falls soon after application when soybean plants are very small. Prefix can be tank-mixed with preloaded glyphosate that contains an adjuvant. If it is tank-mixed with glyphosate not containing an adjuvant, be sure to add 0.25% v/v nonionic surfactant. Do not add crop oil concentrate, as severe soybean injury can occur.
fluazifop-P at 0.0938 to 0.25 lb	Fusilade DX 2E — 6 to 8 to 12 to 16 oz. **See table below.** Apply in a minimum of 5 gal water. Always add a crop oil concentrate at 1% or a nonionic surfactant at 0.25% (v/v).	Apply to actively growing grasses. **See table below.**	Most annual grasses, seedling and rhizome johnsongrass, bermudagrass, volunteer grain sorghum, and red rice.	Apply over-the-top or as a semi-directed spray to cover the grasses. **Do not apply** (1) more than 32 ounces per acre per season, (2) after first bloom, or (3) if rainfall is expected within 1 hour after application. See Fusilade DX label for sequential and tank mix applications.

Grass	Growth stage (inches)	Fusilade DX (oz)
Volunteer grain sorghum	6 to 12	6
Goosegrass and volunteer cereals	2 to 4	8
Johnsongrass (seedling)	2 to 8	6
Other annual grasses	1 to 4	12
Red rice	0.5 to 1	16
Rhizome johnsongrass	8 to 18	12
regrowth	6 to 12	8
Bermudagrass	4 to 8 stolons	12
regrowth	4 to 8 stolons	8

imazaquin at 0.0625 or 0.125 lb	Scepter 70DG — 1.43 to 2.86 oz in at least 20 gal water by ground equipment and add 0.25% (v/v) nonionic surfactant or crop oil concentrate according to label.	To actively growing weeds up to 12 inches in height, depending on target species.	The lower rate is recommended for cocklebur up to 9 leaves. Use the higher rate on cocklebur up to 12 inches tall, wild poinsettia, and sicklepod.	For effective **sicklepod** control with Scepter, first apply Scepter as a PPI or PRE treatment, then apply the POST treatment before weeds exceed the 1 to 2 true leaf growth stage. Apply the POST treatment at least 90 days before soybean harvest. **Do not** (1) apply more than 0.25 pound of active ingredient per acre of Scepter per growing season, (2) tank mix Scepter with postemergence grass herbicides, (3) graze or feed treated soybean forage, hay or straw to livestock.
lactofen at 0.2 lb	Cobra 2E — 12.5 oz **plus** 0.125% (v/v) nonionic surfactant, or 0.5 to 1 pt crop oil concentrate in 20 to 30 gal water by ground equipment. Aircraft: Apply in a minimum of 5 gal water plus 1 qt COC.	After weeds emerge but preferably before soybeans exceed three trifoliolate leaves.	Hemp sesbania, morningglory species, prickly sida, common ragweed, and pigweed species.	Apply over-the-top or as a directed spray to cover the weeds at the sizes listed in the table below. Temporary leaf speckling, burn, and/or crinkling of soybean leaves present at time of application will occur. **Do not** (1) cultivate 5 days prior to application or while spraying; (2) apply more than once per growing season not later than 90 days before harvest; (3) apply when conditions do not promote active growth of weeds and soybeans; or (4) graze or feed forage, hay, or straw from treated fields. **Avoid drift to nontarget areas.**

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
sethoxydim at 0.1875 to 0.2813 to 0.375 lb	Poast Plus 1.0E — 24 to 36 to 48 oz. Apply in 5 to 10 gal water by air or 5 to 20 gal water by ground. add 1 qt crop oil concentrate for aerial and ground applications. **See table below.**	Apply to actively growing grasses.	Most annual grasses, seedling and rhizome johnsongrass, bermudagrass, and red rice.	Soybeans at all stages of growth are tolerant to sethoxydim. **Do not apply** (1) to grasses under drought stress or herbicide injury; (2) if rainfall is expected within one hour after appli-cation; (3) within 90 days of harvest; (4) more than a total of 7.5 pints per acre of Poast Plus in one season. Basagran at the labeled use rate according to weed growth stage may be applied as a tank mix with Poast Plus but the above Poast Plus rates must be increased 50%.

Grass	Growth Stage (inches)	Poast Plus (oz)
Goosegrass and Crabgrass	up to 6	24
Other annual grasses and seedling johnsongrass	up to 8	24
Rhizome johnsongrass	15 to 20	24
regrowth	6 to 10	24
Bermudagrass	stolons up to 6	36
regrowth	stolons 1 to 4	24
Red rice	up to 4	48

quizalofop-P at 0.0344 to 0.0688 lb	Assure II 0.88EC — 5,7,8,9, or 10 oz. Add 0.25% (v/v) nonionic surfactant or 1% (v/v) of a crop oil concentrate in 10 to 20 gal water by ground or 0.5% (v/v) crop oil concentrate in 3 to 5 gal water by aerial equipment. **See table below.**	To actively growing before soybean pod set, and/or 80 days before soybean harvest.	**See table below.**	**Do not apply** (1) with crop origin crop oil concentrates; (2) more than 1.25 pints (20 ounces) per season; (3) to drought-stressed grasses; or (4) if rain is expected within 1 hour after application. **Do not** (1) graze treated fields or harvest for forage or hay; (2) cultivate 7 days before or after application or control may be unsatisfactory; or (3) use tank-mixes with Basagran or Classic for grass control except as specified on the label.

Target Grasses	Growth Stage (inches)	Assure II or Matador (oz)
Volunteer corn	6-30	5-8
Volunteer grain sorghum	6-12	5
Johnsongrass (seedling)	2-8	5
Fall panicum, field sandbur, goosegrass, volunteer wheat	2-6	7
Red rice	1-4	9
Other annual grasses	2-6	8
Johnsongrass (rhizome)	10-24	5*
— regrowth	6-10	5*
Bermudagrass	6 (runners)	10
— regrowth	6 (runners)	7

* Apply in sequence for effective control. Otherwise apply 10 oz to 10-in. rhizome johnsongrass and follow with 7-oz/A to 6-in. regrowth if needed.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Liberty Link Varieties Only				
glufosinate at 0.4 to 0.66 lb	Liberty 280 SL — 22 to 36 fl oz in at least 15 gal water by ground or 10 gal water by air. Coverage is essential.	Apply to actively growing weeds from the time of crop emergence to just before bloom.	Many summer annual grass and broadleaf species. Excellent control of horseweed and morningglory. Apply to 2- to 3-inch pigweed.	**FOR USE ONLY IN LIBERTY-LINK SOYBEAN CULTIVARS.** Do not apply more than 65 fluid ounces per acre of Liberty to soybean in a single growing season. Sequential applications should be made 10–14 days apart to improve control of larger weeds. A single application use rate can be as high as 36 fluid ounces per acre. Apply when temperatures are warm, as colder weather may reduce activity. Do not use nozzles and pressure that result in coarse spray droplets.
Roundup-Ready Varieties Only				
glyphosate at 0.75 to 1.5 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	From soybean emergence (cracking) through flowering (R2 growth stage).	Annual and perennial grass and broadleaf weeds. Glyphosate-resistant weeds are prevalent throughout Mississippi. See Herbicide Resistant Weed section for additional control options.	**FOR USE ONLY IN ROUNDUP-READY SOYBEAN CULTIVARS.** Do not apply more than 2.25 pounds (ae) per acre of glyphosate to soybean in a single growing season. Sequential applications should be made 10–14 days apart to improve control of larger weeds.
glyphosate + s-metolachlor 1.6 to 2.3 lb	Sequence — 2.5 to 3.5 pt in at least 10 gal of water by ground and 5 gal by air. AMS at 8.5 to 15 lb per 100 gal of water is recommended.	From soybean emergence (cracking) through 3rd trifoliate.	Postemergence control of weeds normally controlled by glyphosate. Residual control of small-seeded grasses and broadleaf weeds.	**FOR USE ONLY IN ROUNDUP-READY SOYBEAN CULTIVARS.** Rainfall is required for residual activation. Do not apply more than 3.5 pints per acre. Expect poor control of large-seeded grasses like browntop millet and Texas panicum.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Sulfonylurea-Tolerant Soybean (STS) Varieties Only				
chlorimuron + thifensulfuron at 0.0066 to 0.02 lb	Synchrony XP 28.4DG — 0.375 to 1.125 oz in 10 to 20 gal water by ground or 5 gal by air. Add 1% crop oil concentrate or 0.25% nonionic surfactant if applied without a glyphosate formulation not preloaded with a surfactant.	Apply to 1- to 4-inch weeds that are actively growing. Apply to soybean any time before soybean emergence up to 60 days before soybean harvest.	Controls many broadleaf weeds including hemp sesbania, morningglory, yellow nutsedge, small pigweeds, and small sicklepod.	**Apply only to STS/Roundup Ready Varieties.** The 1- to 1.125-ounce rates provide some residual control of certain small-seeded broadleaf weeds.
halosufuron-methyl + thifensulfuron-methyl at 0.031 + 0.0036 lb	Permit Plus — 0.75 oz. Always add a minimum of 0.25% (v/v) nonionic surfactant or 1% (v/v) crop oil concentrate. AMS at 8.5 to 17 lb per 100 gal of water is recommended. Apply in 10 gal of water by ground or 5 gal of water by air.	Apply between the V1 and R2 soybean growth stages.	Yellow nutsedge, purpled nutsedge, hemp sesbania, common ragweed, velvetleaf, and other broadleaf species.	**Apply only to STS/Roundup Ready Varieties.** Permit Plus may be tank-mixed with glyphosate on Roundup Ready varieties to improve weed control. Only one application of Permit Plus is allowed per season.
Directed Sprays/Hooded Sprayers				
2,4-DB at 0.20 lb	2,4-DB — 0.9 pt of a 1.75 lb/gal formulation or 0.8 pt of a 2 lb/gal formulation in 10 to 20 gal water.	Apply to cocklebur plants no more than 3 inches tall. **Do not apply** before soybeans are 8 inches tall.	Cocklebur. Partial control or stunting of small pigweed and morningglory.	Apply once or twice as a semi-directed spray when soybeans are 8 to 12 inches tall with sprays directed to contact no more than the lower one-third of the soybean stems. Precise application is essential to prevent soybean injury. **Do not** apply if soybeans are under drought stress. Avoid spray pressures in excess of 40 psi. **Do not add surfactant to spray mixtures.**
linuron at 0.5 to 1.0 lb	1 to 2 lb 50DG or 1 to 2 pt 4L in 20 gal of water. Add 2 qt nonionic surfactant to each 100 gal spray mix.	Before weeds are 2 inches tall. **Do not** apply before soybeans are 12 inches tall.	Most annual grasses and broadleaf weeds if young and actively growing. Best control if weeds are no taller than 2 inches.	Apply only single application as directed spray at base of crop plants striking the soybean plants no higher than 2-3 inches above the ground. **Do not** exceed 25 psi nozzle pressure or apply under windy conditions. **Do not graze** or feed straw or forage to livestock.
linuron + 2,4-DB at 0.5 + 0.20 lb	1 lb 50DG or 1 pt 4L + 0.8 pt of a 2 lb/gal or 0.9 pt of a 1.75 lb/gal 2,4-DB formulation in 20 gal water. Nonionic surfactant at 1 to 2 qt per 100 gal of spray mix may be added but crop injury may be increased.	When soybeans are at least 8 inches tall and before weeds are 2 inches tall.	Most annual grasses, cocklebur, morningglory, hemp sesbania, sicklepod and prickly sida.	Apply as directed spray to contact no more than the lower one-third of the soybean stem. **Do not** exceed 25 psi nozzle pressure or apply under windy conditions. **Do not** apply when soybeans are under drought stress or on soils with less than 1/2% organic matter. A second application may be used if needed but must be made before 60 days of harvest.

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
metribuzin at 0.25 to 0.50 lb	Metribuzin — 0.5 to 1 pt or 75% DF — 0.33 to 0.67 lb in 10 to 20 gal water. Add 1 qt nonionic surfactant/100 gal spray mix.	After soybeans are at least 8 inches tall and before broadleaf weeds are 3 inches tall; before grasses are 1 inch tall.	Most broadleaf weeds less than 3 inches tall except morningglory. Most annual grasses less than 1 inch tall. For hemp sesbania and prickly sida, use 0.375 to 0.5 lb ai/A.	Apply as a directed spray at the base of the soybean plants spraying no more than the lower 1/4 to 1/3 of the soybean plants. Soybean leaves contacted by the spray will be killed. **Do not** (1) exceed 30 psi nozzle pressure or apply under coditions that favor drift; (2) graze or feed forage; (3) apply to sensitive varieties. Injury may occur if two applications of 0.5 pound of active ingredient per acre are applied in soybean fields subject to flooding.
metribuzin + 2,4-DB at 0.25 to 0.5 + 0.2 lb	Metribuzin — 0.5 to 1 pt or **75% DF** — 0.33 to 0.67 lb + 0.8 pt of a 2 lb/gal or 0.9 pt of a 1.75 lb/gal 2,4-DB formulation. Nonionic surfactant may be added to the mix, but crop injury may increase.	When soybeans are at least 8 inches tall and before broadleaf weeds are 3 inches tall; before grasses are 1 inch tall.	Same as above for metribuzin plus redroot pigweed, cocklebur, sicklepod, and morningglory up to 3 inches.	Apply as a directed spray at the base of the soybean plants spraying no more than the lower 1/4 to 1/3 of the soybean plants. Soybean leaves contacted by the spray will be killed. Keep spray pressure below 30 psi to prevent "fogging" of spray solution. **Do not apply** under conditions that favor drift or to sensitive varieties. **Do not** graze or feed forage. Injury may occur if two applications of 0.5 pound of active ingredient per acre are made to soybean fields subject to flooding.
S-metolachlor + metribuzin at 0.85 + 0.2 to 1.31 + 0.31 lb	Boundary –1.3 to 2 pt in 10 or more gallons of water.	Postemergence directed application to crop or under a hooded middle sprayer. Do not allow spray to contact more than the lower 1/4 to 1/3 of soybean plants.	Barnyardgrass, crabgrass, pigweed, prickly sida, hemp sesbania, sicklepod, and many other grass and broadleaf weeds. Will not effectively control emerged weeds	Boundary may be tank-mixed with other herbicides labeled for directed or hooded applications to improve control of emerged weeds. Do not exceed 3.9 pints of Boundary per acre per season.
paraquat at 0.07 to 0.13 lb	Paraquat — 4.5 to 8 fl oz in a minimum of 10 gal water by ground. Add nonionic surfactant according to label directions.	When soybeans are at least 8 inches tall and before grasses are 4 inches tall and pigweed is 3 inches tall.	Most grasses from seed, pigweeds, purslane.	Use low rate for weeds less than 2 inches in height and the higher rate for weeds greater than 2 inches. Soybeans less than 8 inches will be injured or killed. Adjust nozzles to spray the lower 3 inches of the soybean plants. **Do not** exceed 30 psi to avoid driftand minimize foliage burn (spotting). **Do not** apply more than twice. The second application should follow the first by 7 to 14 days.
Midseason Cocklebur Control				
2,4-DB at 0.20 lb	2,4-DB — 0.8 pt of a 2 lb/gal formulation or 0.9 pt of a 1.75 lb/gal formulation in 10 to 20 gal water.	7 to 10 days before soybean bloom until mid-bloom.	Cocklebur.	Apply as broadcast overhead spray after cocklebur plants have elongated and are as tall as soybean plants. 2,4-DB usually causes soybean injury but injury symptoms (pronounced stem curvature, drooping leaves) generally disappear within one week after treatment. Injury is usually more severe if 2,4-DB is applied to soybeans thinly infested with cockleburs. **Do not apply** to drought-stressed soybeans. **Do not add surfactant to spray mixtures.**

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Spot Spraying				
clethodim	Clethodim — 0.25% in water by volume plus 1% crop oil concentrate. (Example — 1 pt Clethodim + 4 pt crop oil concentrate per 50 gal water.)	To actively growing foliage.	Johnsongrass, bermudagrass, and annual grasses.	Spray to wet foliage but not to point of runoff.
fluazifop-P	Fusilade DX 2E — 0.5% + 0.25% surfactant or 1% crop oil concentrate by volume. (Example — 1 qt Fusilade + 1 pt surfactant or 4 pt crop oil concentrate per 50 gal water).	Apply to all actively growing foliage of 12- to 18-inch johnsongrass.	Johnsongrass, bermudagrass, and emerged annual grasses.	Wet foliage thoroughly, but not to point of runoff. Make the last application before soybean bloom. Use paraffinic/vegetable crop oil concentrates that contain 15-20% surfactant. If a surfactant is used in lieu of the crop oil concentrate, use only nonionic surfactants that contain at least 75% surface active agent.
quizalofop-P	Assure II 0.88EC — 0.375% plus 0.25% nonionic surfactant or 1% crop oil concentrate in water by volume (Example — 1.5 pt Assure II + 1 pt surfactant or 4 pt crop oil concentrate in 50 gal water).	To actively growing foliage of 10-16-inch johnsongrass or 6-inch bermudagrass runners, but before soybean pod set and/or within 80 days of soybean harvest.	Johnsongrass, bermudagrass, and other emerged annual grass species.	Spray to cover and wet foliage, but not to point of runoff. Use 80% active nonionic surfactants or paraffinic oil base crop oil concentrate with at least 15% emulsifier/surfactant.
sethoxydim	Poast Plus 1.0E — 1.5% + 1.0% crop oil concentrate by volume (Example — Use 6 pt Poast Plus + 4 pt crop oil concentrate per 50 gal of water).	Apply to all actively grow ing foliage of 15-inch johnsongrass.	Johnsongrass, bermudagrass, and emerged annual grasses	Spray to wet foliage thoroughly, but not to point of runoff. **Do not** apply within 90 days of harvest.
glyphosate	glyphosate — 1% (4 pt of a 3 lb ae/gal formulation in 50 gal water) for annual weeds, or a 2% (8 pt of a 3 lb ae/gal formulation in 50 gal water) solution for perennial weeds.	Anytime after johnsongrass reaches 12 inches in height but before soybean pods set.	Johnsongrass, bermudagrass, and most other emerged annual and perennial weeds.	Use high rate mix for bermudagrass. Spray to wet foliage of johnsongrass stems or other undersirable vegetation. Non-Roundup Ready soybeans in the treated area will be killed. Keep drift to a minimum. **Do not** apply if soybeans are setting pods.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Preharvest				
carfentrazone-ethyl at 0.016 to 0.023 lb	Aim — 1 to 1.5 oz in at least 10 gal of water by ground and 5 gal by air. Add 1 qt of nonionic surfactant or 1 to 2 gal of a crop oil concentrate per 100 gal of water.	As a harvest aid when soybeans are mature and fully developed with 50% natural defoliation and the remaining leaves are yellow.	Morningglory desiccation.	Do not apply more than 1.5 ounces per acre per season. Do not apply within 3 days of harvest. Aim may be tank-mixed with glyphosate to improve control of grasses and other weeds.
glyphosate at 0.75 to 3.5 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	Preharvest but after all pods have lost all green color.	Most annual grasses, johnsongrass, and some broadleaf weeds.	Do not apply more than 3.5 pounds (ae) per acre for preharvest applications. Do not apply more than 1.5 pounds (ae) of glyphosate per acre by air. Allow a minimum of 7 days between application and harvest. Use rates greater than 1.5 pounds ae would be beneficial for perennial weed control.
paraquat at 0.125 to 0.25 lb	Paraquat — 8 to 16 oz in at least 10 gal water by ground or in at least 5 gal water by air. Add 1 qt nonionic surfactant per 100 gal spray.	As a harvest aid when soybeans are mature — beans are fully developed with at least ½ of leaves dropped and remaining leaves turning yellow.	Foliage of most weeds that receive good spray coverage will be desiccated.	Drought-stressed weeds will not be desiccated. Immature soybeans will be injured and yields reduced. **Do not** apply within 15 days of harvest. **Do not** pasture livestock within 15 days of treatment and remove livestock from treated fields within 30 days before slaughter. **Interval between application and soybean harvest is a minimum of 15 days.**
paraquat at 0.25 lb + sodium chlorate at 3 lb	Paraquat — 8 to 16 oz plus 2 qt sodium chlorate (6 lb/gal) in at least 10 gal water or in 5 gal water by air. Add 1 qt nonionic surfactant per 100 gal spray.	As a harvest aid when soybeans are mature — beans are fully developed with at least one-half of leaves dropped and remaining leaves turning yellow.	Foliage of most weeds that receive good spray coverage will be desiccated.	Drought-stressed weeds will not be desiccated. Immature soybeans will be injured and yields reduced. **Do not** apply within 15 days of harvest. **Do not** graze treated fields or feed treated bean foliage and fodder. **Interval between application and soybean harvest is a minimum of 15 days.**
saflufenacil at 0.022 to 0.044 lb	Sharpen — 1 to 2 fl oz in at least 10 gal water by ground or 5 gal water by air. Use of a MSO plus AMS is recommended for optimum desiccation.	Apply as a harvest aid to soybeans that have reached physiological maturity.	Foliage of most broadleaf weeds that receive good spray coverage will be dessicated.	Apply to indeterminant varieties with at least 65% brown pods and 70% defoliation or when seed moisture is 30% or less. Apply to determinant varieties when seed are fully developed with greater than 50% defoliation and remaining leaves are yellowing. Do not apply more than 2 fluid ounces per acre as a harvest aid per cropping season. Do not apply within 3 days of harvest.
sodium chlorate at 6 lb	2 qt of a 6 lb/gal or 1 gal of a 3 lb/gal formulation in 20 to 40 gal water by ground or in 7 to 10 gal water by air.	Apply as a harvest aid to soybeans ready to harvest; but 7 to 10 days before harvest.	Foliage of most weeds that receive good spray coverage will be desiccated.	Drought-stressed weeds will not be desiccated. Immature soybeans will be injured and yields reduced. **Do not** graze treated fields or feed treated bean foliage and fodder.

CORN

ESTIMATED LEVELS OF WEED CONTROL NORMALLY EXPECTED[1]

Herbicides	Barnyardgrass	Crabgrass	Broadleaf signalgrass	Fall panicum	Goosegrass[2]	Johnsongrass rhizome	Johnsongrass seedling	Italian Ryegrass[3]	Annual sedge	Purple nutsedge	Cocklebur	Horseweed[4]	Lambsquarter	Morningglory	Hemp sesbania	Pigweed, smooth, redroot	Palmer, spiny amaranth, tall waterhemp[5]	Prickly sida (teaweed)	Sicklepod
Preplant																			
Aim	0	0	0	0	0	0	0	0	0	0	7	4	*	**9**	**9**	**8**	7	7	3
Dicamba	1	1	1	1	1	0	0	0	3	1	**9**	*	**9**	**9**	**9**	**8**	**8**	**8**	**8**
Fierce	**9**	**9**	**8**	**8**	**8**	3	**9**	**9**	*	3	5	**9**	**9**	7	**8**	**9**	**9**	**8**	7
Glyphosate	**9**	**9**	**9**	**9**	**8**	4	**9**	6	**9**	7	**8**	**9**	**9**	7	6	**9**	**9**	**7**	**8**
2,4-D	2	0	0	2	1	0	0	0	4	2	**8**	**8**	**9**	**9**	**8**	**8**	**8**	**8**	**8**
Paraquat	**8**	**8**	**8**	**8**	**8**	3	**8**	7	**9**	0	**9**	5	**9**	6	6	**9**	**9**	6	**8**
Preemergence																			
Anthem	**9**	**9**	**8**	**8**	**9**	4	7	**9**	*	0	2	6	4	7	3	**9**	**9**	7	*
Anthem ATZ	**9**	**9**	**8**	**8**	**9**	4	7	**9**	4	2	**9**	7	**9**	**8**	7	**9**	**9**	**8**	**8**
Atrazine	6	7	5	4	6	0	4	*	4	2	**9**	*	**9**	**8**	7	**9**	**9**	**8**	**8**
Bicep II Magnum, Harness Xtra, or Keystone NXT	**8**	**9**	**8**	**9**	**9**	0	7	**8**	7	3	**8**	*	**9**	**8**	6	**9**	**9**	**8**	6
Corvus	**9**	**9**	**8**	**8**	**9**	*	*	*	*	*	5	*	**8**	7	**9**	**9**	*	*	*
Guardsman Max	**9**	**9**	7	**9**	**9**	0	6	**8**	7	3	**8**	*	**9**	**8**	6	**9**	**9**	**8**	6
Lexar EZ	**9**	**9**	**8**	**9**	**9**	2	**8**	7	**8**	7	**10**	**8**	**9**	**9**	**8**	**9**	**9**	**9**	**8**
Pendimethalin	**8**	**8**	6	**8**	**8**	4	7	5	0	0	**8**	0	*	6	0	**8**	7	0	0
Sharpen	1	1	1	1	1	*	1	1	*	*	6	**8**	7	6	6	**9**	**9**	7	5
Simazine	6	**8**	5	6	7	0	4	*	2	0	**9**	3	**9**	7	*	**9**	**9**	**9**	**8**
Verdict	**8**	**8**	6	*	**8**	*	*	*	*	*	6	**8**	7	6	6	**9**	**9**	7	5
Zidua	**9**	**9**	**8**	**8**	**9**	4	6	**9**	*	*	*	6	4	7	3	**9**	**9**	7	*
Postemergence Over-the-top																			
2,4-D	1	0	0	2	1	0	0	0	4	2	**8**	**8**	**9**	**9**	**8**	**8**	**8**	**8**	**8**
Armezon or Impact	7	**8**	6	6	7	4	7	0	0	0	**9**	*	**9**	7	7	**9**	**8**	**9**	6
Atrazine + oil	6	**8**	7	5	6	0	3	*	6	2	**9**	*	**9**	**8**	7	**9**	**9**	**9**	**8**
Atrazine + Dual II Magnum[7]	6	6	5	4	6	0	4	*	5	2	**8**	*	**8**	**8**	6	**8**	**8**	7	**8**
Basagran	0	0	0	0	1	0	0	0	6	2	**9**	*	0	3	4	3	3	**8**	1
Callisto	7	**9**	7	7	*	0	0	*	*	*	**8**	*	**9**	**9**	*	**9**	**9**	**9**	5
Capreno	**8**	**8**	**8**	*	*	5	7	*	*	*	**8**	*	**9**	**8**	*	**9**	**9**	7	7
Dicamba	1	1	1	1	1	0	0	0	3	1	**9**	**8**	**9**	**9**	**9**	**8**	**8**	**8**	**8**
Dicamba + 2,4-D	1	1	1	0	1	0	0	0	3	1	**9**	**8**	**8**	**8**	**8**	**8**	**8**	7	7
Glyphosate (RR only)	**9**	**9**	**9**	**9**	**9**	7	**9**	6	**9**	7	**8**	**9**	**9**	7	6	**9**	**9**	7	**8**
Halex GT (RR only)	**9**	**9**	**9**	**9**	**9**	**9**	**9**	6	**8**	**8**	**10**	7	**8**	**8**	**8**	**9**	**9**	**9**	**9**
Laudis	7	**8**	**8**	*	7	5	6	*	*	*	**8**	*	**9**	**8**	*	**9**	**9**	7	7
Lexar EZ	7	**9**	**9**	**8**	**9**	2	**8**	7	**8**	7	**10**	**8**	**9**	**9**	**8**	**9**	**9**	**9**	**8**
Liberty 280 (LLink only)	**8**	**9**	**8**	**9**	5	7	**8**	6	**8**	4	**9**	**8**	*	**9**	**9**	**8**	**8**	**9**	**9**
Nicosulfuron[7]	**8**	5	**8**	7	*	**8**	**9**	6	3	*	5	*	5	6	7	**8**	6	4	5
Permit	2	2	2	2	2	1	2	*	**9**	**8**	**9**	5	5	6	**8**	**8**	6	7	5
Realm Q	**8**	**8**	7	**8**	**8**	7	**9**	4	**8**	6	**9**	*	**8**	**8**	*	**8**	**8**	**9**	7
Status	3	3	4	4	3	0	5	0	0	0	**9**	**8**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
Postemergence - Directed																			
Linex/Lorox	**9**	**8**	**8**	**8**	7	0	6	*	5	2	7	*	**9**	**8**	**8**	**8**	**8**	**8**	**8**
Paraquat	**8**	**8**	**8**	**8**	**8**	3	**8**	7	**9**	0	7	5	**9**	6	6	**9**	**9**	6	**8**
Preharvest																			
2,4-D	0	0	0	2	1	0	0	0	4	2	**9**	*	**9**	**9**	**9**	**9**	**9**	**8**	**8**
Glyphosate	**8**	**9**	**9**	**9**	**8**	**8**	**9**	**9**	**9**	7	**9**	**8**	**9**	**8**	6	**9**	**9**	**8**	**9**
Aim	1	0	0	0	0	0	0	0	0	0	6	*	7	**8**	**8**	**8**	**8**	*	0

[1]Rating scale: 0-3, none to slight; 4-6, fair; 7-8, good; 9-10, excellent. Ratings assume the herbicides are applied in the manner suggested in the guidelines and according to the label under optimum growing conditions.

[2]Goosegrass resistance to Group 9 (glyphosate) herbicides has been identified in Mississippi.

[3]Italian ryegrass resistance to Group 2 (Accent, Resolve Q, and Steadfast) and Group 9 (glyphosate) herbicides is prevalent across Mississippi.

[4]Horseweed resistance to Group 9 (glyphosate) herbicides is prevalent across Mississippi.

[5]Palmer amaranth, spiny amaranth, and tall waterhemp resistance to Group 9 (glyphosate) herbicides is prevalent across Mississippi. Palmer amaranth resistance to Group 2 (Accent, Resolve Q, Steadfast, and Permit) herbicides is also common.

[6]Tank mix rating not premix.

[7]Resistance to ALS or Group 2 (Accent, Resolve Q, Steadfast) herbicides has been documented in several weed species in Mississippi. Control of weeds with ALS resistance will be reduced with Accent, Resolve Q, and Steadfast. Please see Herbicide-resistant Weeds section for a list of herbicide-resistant weeds.

*Data not available

See vegetable section for sweet corn recommendations.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preplant Foliar				
carfentrazone at 0.032 lb/A	Aim 2 EC — 2 oz/A	After weed emergence up to planting.	Broadleaf weeds up to 4 inches tall.	Apply with glyphosate or paraquat to increase weed spectrum.
dicamba at 0.25 lb/A	4 lb/gal formulation — 0.5 pt/A	Preplant for vegetation knockdown.	Broadleaf weeds.	Reduced tillage production systems only.
glyphosate at 0.37 to 1.25 lb/A	See table on pages 5-6 for glyphosate rates.	Preplant for vegetation knockdown.	Horseweed, barnyardgrass, johnsongrass, and other weeds.	Consult label to determine rates for weeds and growth stages and to determine if a surfactant is needed.
flumioxazin + pyroxasulfone — 0.143 lb/A	Fierce 76 WDG — 3 oz/A	30 days before planting.	Annual grasses and small-seeded broadleaf weeds.	For field corn, use up to 30 days before planting only on no-till or minimum tillage fields where the previous year's residue has not been incorporated. Apply with glyphosate or paraquat if weeds are emerged at the time of application. **Do not** use on popcorn, sweet corn, or corn grown for seed.
paraquat — 0.5 to 1 lb/A	2 lb/gal formulation — 2 to 4 pt/A; 3 lb/gal formulation — 1.33 to 2.67 pt/A	Preplant or preemergence.	Annual and perennial grasses and broadleaf weeds.	Use the lower rates on weeds 1–3 inches tall and the higher rates on weeds 4–6 inches tall. Avoid off-site movement to emerged vegetation. Add nonionic surfactant at 0.5% v/v or crop oil concentrate at 1% v/v.
2,4-D at 0.475 to 0.95 lb/A	3.8 lb/gal — 1 to 2 pt/A or 5.7 lb/gal — 0.67 to 1.3 pt/A	7-14 days before planting.	Broadleaf weeds.	**Do not** use on sandy soils.
Preemergence				
acetochlor at 0.8 to 2.4 lb/A	7 lb/gal formulation — 1 to 2.75 pt/A	Up to 30 days before planting, preplant incorporated, or preemergence	Annual grasses, many small-seeded broadleaf weeds, and yellow nutsedge.	Use higher rates on reduced or no-till systems. **Do not** use on sweet corn. **Do not** apply by air or when environmental conditions favor off-target movement. If stand failure occurs, replant corn but do not make a second application of Surpass or Harness.
acetochlor at 1.1 to 2 lb/A + atrazine at 1 to 1.5 lb/A	Various formulations (See label for rate of specific products)	At planting or before crop or weed emergence.	Annual grasses and broadleaf weeds.	See *Special Instructions and Remarks* for acetochlor and atrazine. **Do not** use on sweet corn.
atrazine at 2 lb/A	4 lb/gal – 2 qt/A or 90 DF – 2.2 lb/A	At planting.	Most small-seeded annual weeds and grasses. Broadleaf signalgrass control poor.	Atrazine is a restricted use pesticide. Do not exceed 2.5 pounds of active ingredient per acre per year. See label for additional restrictions.
atrazine at 1 to 1.3 to 1.6 lb/A + s-metolachlor at 0.8 to 1 to 1.6 lb/A	Various formulations (See label for rate of specific products)	At planting.	Most small-seeded annual grasses and broadleaf weeds, including broadleaf signalgrass.	Apply broadcast or on band behind press wheel before corn emerges. See atrazine preemergence for restrictions.

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
dicamba at 0.25 lb/A	4 lb/gal formulation — 0.5 pt/A	At planting.	Broadleaf weeds.	Apply only to medium- or fine-textured soils that contain 2% or greater organic matter. **Do not** apply to coarse-textured soils after crop emergence.
dimethenamid at 0.6 to 0.8 lb/A	Outlook 6 EC — 12 to 18 oz/A	At planting.	Most small-seeded annual grasses and broadleaf weeds.	This treatment provides poor control of most large-seeded broadleaf weeds. See label for tank mixtures.
dimethenamid at 0.5 to 0.8 lb/A + atrazine at 1 to 1.7 lb/A	Guardsman Max 5 L — 2.5 to 4 pt/A **Soil texture[1] / Guardsman rate (pt/A)** Coarse: 2.5 - 3 Medium or Fine: 3 - 4 [1]Rates given are for soils with less than 3% organic matter.	At planting.	Many annual grasses, broadleaf weeds, yellow nutsedge, and rice flatsedge.	If used in a no-till system with heavy residue, or if soil organic matter content is more than 3%, increase the rate by 0.5 pint per acre. **Do not** exceed 4.6 pints per acre per season.
dimethenamid at 0.39 to 0.7 lb/A + saflufenacil at 0.045 to 0.08 lb/A	Verdict 5.67 EC — 10 to 18 oz/A	Preplant, preplant incorporated, or preemergence.	Annual grasses and broadleaf weeds.	Use lower rates on coarse soils. Do not apply after corn emerges or severe crop injury will occur. Do not apply where at-planting application of an organophosphate or carbamate insecticide is planned. Do not apply more than 25 ounces per acre per year.
isoxaflutole + thiencarbazone-methyl at 0.115 lb/A	Corvus 2.63 SC — 5.6 oz/A	Preplant, preplant incorporated, preemergence, or early postemergence from spiking to V2 corn stage.	Annual grasses and broadleaf weeds.	**Decrease the rate to 3.33 ounces per acre on coarse-textured soils with less than 2% organic matter.** To avoid reduced crop stand or injury, plant corn seed at least 1.5 inches deep and completely cover it with soil and furrow firm. Do not apply more than one application per 365 days.
mesotrione + atrazine + s-metolachlor at 0.126 to 0.168 lb/A + 1 to 1.3 lb/A + 1 to 1.3 lb/A	Lexar EZ 3.7 SC — 2.25 to 3 qt/A	Preemergence.	Annual grasses and broadleaf weeds.	**Do not** apply postemergence within 7 days of any organophosphate or carbamate insecticide application. Research indicates that split applications with 2 quarts per acre applied preemergence and 1 quart per acre applied postemergence with glyphosate or Liberty 280 is effective for control of glyphosate-resistant Palmer amaranth.
S-metolachlor or metolachlor + safener at 0.8 to 1.6 lb/A	Various formulations (See label for rate of specific products)	At planting.	Most annual grasses and small-seeded broadleaf weeds. Partial control of seedling johnsongrass.	For soils with 3% or more organic matter, increase rate by 0.5 pint per acre. This treatment provides poor control of most large-seeded broadleaf weeds.
pendimethalin at 0.75 to 1.5 lb/A	Prowl H_2O 3.8 CS — 1.6 to 3.2 pt/A or 3.3 EC formulation — 1.8 to 3.6 pt/A	At planting.	Most small-seeded annual weeds and grasses.	See label for tank mixtures. This treatment provides poor control of broadleaf signalgrass and most large-seeded broadleaf weeds.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
pyroxasulfone at 0.08 to 0.21 lb/A	Zidua 85 WG — 1.5 to 4 oz/A **(See table below)**	Preplant, preplant incorporated, or preemergence.	Annual grasses and small-seeded broadleaf weeds.	Do not apply more than 2.75 ounces per acre per year on coarse soils. Do not apply more than 5 ounces per acre per year on medium or fine soils. **Weed control will be optimized when applications are made to seedbeds free of residue.**

	Zidua rate (oz/A)		
Soil Texture	**Preplant**	**Preplant incorporated**	**Preemergence**
Coarse	1.50 to 2.75	1.50 to 2.75	1.50 to 2.75
Medium	2.00 to 3.00	2.00 to 3.00	2.00 to 3.00
Fine	2.50 to 4.00	2.50 to 4.00	2.50 to 4.00

pyroxasulfone + fluthiacet-methyl at 0.118 to 0.186 lb/A	Anthem 2.15 SE — 7 to 11 oz/A	Preplant up to 45 days before planting, preplant incorporated, or preemergence.	Annual grasses and small-seeded broadleaf weeds.	Use the lower rate on coarse-textured soils. Apply with Aim, 2,4-D, dicamba, glyphosate, Liberty 280, or paraquat to increase postemergence weed control. **Weed control will be optimized when applications are made to seedbeds free of residue.**
pyroxasulfone + fluthiacet-methyl + atrazine at 0.985 to 1.689 lb/A	Anthem ATZ 4.5 SE — 1.75 to 3 pt/A	Preplant up to 45 days before planting, preplant incorporated, or preemergence.	Annual grasses and broadleaf weeds.	**Atrazine is a restricted-use pesticide.** See *Special Instructions and Remarks* for atrazine. Use the lower rate on coarse-textured soils. Apply with Aim, 2,4-D, dicamba, glyphosate, Liberty 280, or paraquat to increase postemergence weed control. **Weed control will be optimized when applications are made to seedbeds free of residue.**
saflufenacil at 0.045 to 0.067 lb/A	Sharpen 2.85 SC — 2 to 3 oz/A	Preplant, preplant incorporated, or preemergence.	Broadleaf weeds. **Does not control grasses.**	Use lower rates on coarse soils. Sharpen should be applied in mixtures with Prowl H_2O, Outlook, Harness, or similar products for residual control of annual grasses. **Do not apply** after corn emerges or severe crop injury will occur. **Do not apply** where at-planting application of an organophosphate or carbamate insecticide is planned. **Do not apply** more than 6 ounces per acre per year.
simazine at 2 to 3 lb/A	4 L — 4 to 8 pt/A or 90 DF — 2.2 to 4.4 lb/A	Preplant or preemergence.	Most annual grasses and small-seeded broadleaf weeds.	Till soil in fall to minimize carryover potential to rotational crops.
Postemergence Over-the-top				
2,4-D at 0.24 to 0.72 lb/A	2,4-D amine — 0.5 to 1.5 pt/A of 3.8 lb/gal	See special instructions.	Broadleaf weeds.	**Direct spray below whorl of corn plants taller than 8 inches.**
atrazine at 2 lb/A + crop oil concentrate	4 L — 4 to 8 pt/A or 90 DF — 2.2 to 4.4 lb/A + 1 qt/A crop oil concentrate	Before weeds reach 1.5 inches tall and before corn exceeds 12 inches.	Annual grasses and broadleaf weeds.	**Atrazine is a restricted-use pesticide.** This treatment may be applied over the top as an early postemergence treatment to corn less than 12 inches tall. **Do not** exceed 2.5 pounds of active ingredient per acre per year. **Do not** apply when corn is under stress from cold or excess rain. Application with insecticides, liquid fertilizers, or other materials is not recommended due to compatibility problems or crop injury.
atrazine at 1 to 1.3 to 1.6 lb/A + metolachlor at 0.8 to 1 to 1.6 lb/A	Various formulations (See label for rate of specific products)	Before weeds and grasses reach 1.5 inches tall and before corn exceeds 12 inches.	Most annual weeds and grasses.	**Atrazine is a restricted-use pesticide.** See *Special Instructions and Remarks* for atrazine. Apply with glyphosate or Liberty 280 to increase postemergence weed control.

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
bentazon at 0.75 to 1 lb/A	Basagran 4 L — 1.5 to 2 pt/A	Apply early post to rapidly growing cocklebur with 2 to 10 leaves.	Cocklebur, small prickly sida, smartweed, and ragweed; suppresses yellow nutsedge.	Use the low rate for small cocklebur and the high rate for 6- to 10-leaf cocklebur. Control may be poor if applied under drought conditions. Rainfall within 8 hours may reduce efficacy. One repeat application may be made.
carfentrazone 0.008 lb/A	Aim 2 EC — 0.5 oz/A	Apply from 30 days before planting up to V8 corn stage. Weeds should be less than 4 inches.	Morningglories and pigweeds.	For seed production fields, apply post directed only using drop nozzles. Do not apply more than 1.9 ounces per acre of Aim 2EC (0.031 pound of active ingredient per acre) per season. Use a nonioninc surfactant at 0.25% v/v. Under dry conditions, a crop oil concentrate (COC) may improve weed control. The use of COC may increase crop injury.
dicamba at 0.25 to 0.5 lb/A	4 lb/gal formulation — 0.5 to 1 pt/A	Before corn is 36 inches tall or until 15 days before tassels emerge.	Most broadleaf weeds.	May be applied overhead. **Do not** apply to sweet corn or popcorn. **Do not** make more than one application per season. Use the high rate before corn reaches 8 inches tall or exceeds the 5-leaf stage. Use the low rate if corn is greater than 8 inches tall.
dicamba + diflufenzopyr at 0.175 to 0.35 lb/A	Status 56 WG — 5 to 10 oz/A	Postemergence to corn from 4 to 36 inches tall or until 15 days before tassels emerge.	Most broadleaf weeds.	**Avoid off-site movement to soybean.** Do not exceed 12.5 ounces per acre per season. Apply with glyphosate or Liberty 280 to increase weed spectrum. Mixtures with growth regulator herbicides such as 2,4-D or emulsifiable concentrate formulations of chloroacetamide herbicides such as Dual II Magnum, Harness, or Outlook are not recommended.
dicamba at 0.125 to 0.25 lb/A + 2,4-D at 0.25 to 0.50 lb/A	dicamba 4 lb/gal — 0.25 to 0.5 pt/A + 2,4-D 4 lb/gal — 0.5 to 1 pt/A	See special instructions.	Most broadleaf weeds.	May be applied overhead before corn is 8 inches high. Use drop nozzles to direct spray to lower parts of the corn plant if taller than 8 inches.
For Use Only on Liberty Link Hybrids				
glufosinate at 0.4 lb/A	Liberty 280 2.34 SL — 22 oz/A	From corn emergence until corn is 24 inches or V7 growth stage	Most annual grasses and broadleaf weeds.	**Do not** apply when wind causes drift to desirable vegetation. **Do not** apply more than two applications per year. Sequential applications should be at least 10–14 days apart. **Do not** exceed 44 ounces per growing season. **Do not** apply within 70 days of harvest. **Do not** add surfactant, and **do not** use nitrogen solutions as spray carriers.
For Use Only on Roundup Ready 2 Hybrids				
glyphosate 0.56 to 0.75 lb/A	See glyphosate table on pages 5-6 for rates.	Apply over the top up to the V8 stage or until corn reaches 30 inches, whichever comes first.	Postemergence control of most annual broadleaf and grass weeds, including johnsongrass.	The use of a residual herbicide in the weed control program is usually necessary to obtain optimum control. Single in-crop applications must not exceed 32 ounces per acre (3ae) or 22 ounces per acre (4.5 ae). Sequential applications may be made, but do not exceed a total of 64 ounces per acre (3 ae) or 44 ounces per acre (4.5ae) per season over the top. Allow a minimum of 10 days between applications. Avoid planting hybrids with little or no tolerance to the stunt virus complex in areas heavily infested with johnsongrass. This treatment may be tank mixed with atrazine (up to 12-inch-tall corn) for residual control. See label for other tank mixes. Avoid spraying under conditions that favor drift. Consult the label for restrictions.

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
halosulfuron at 0.032 to 0.063 lb/A	Permit 75 WG — 0.67 to 1.33 oz/A. Add 0.25% nonionic surfactant or 1% crop oil concentrate.	Anytime between spike and layby, but at least 30 days before harvest.	Nutsedge, cocklebur, and pigweed.	This treatment may be applied with liquid fertilizer, but fertilizer should not be the total carrier because injury may occur. **Do not** make more than two applications per season or exceed 2.67 ounces per acre per season.
mesotrione at 0.094 lb/A + atrazine at 0.5 to 1 lb/A	Callisto 4L — 3 oz/A + atrazine 4 L — 1 to 2 pt/A. Add 0.25% nonionic surfactant.	Apply over the top of corn up to 12 inches tall.	Morningglories, cocklebur, pigweeds, and several other broadleaf species.	**Atrazine is a restricted-use pesticide.** See *Special Instructions and Remarks* for atrazine. It may be tank-mixed with glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids. Severe corn injury may occur if any organophosphate or carbamate insecticide is applied within 7 days before or after Callisto. Do not use methylated seed oil or methylated seed oil blends. Without atrazine, Callisto may be applied to corn up to 30 inches tall.
mesotrione + atrazine + s-metolachlor at 0.126 to 0.168 lb/A + 1 to 1.3 lb/A + 1 to 1.3 lb/A	Lexar EZ 3.7 SC — 2.25 to 3 qt/A. Add 0.25% nonionic surfactant.	Preemergence or early postemergence until corn is 12 inches tall.	Most broadleaf weeds and annual grasses.	Do not apply postemergence within 7 days of any organophosphate or carbamate insecticide application. It may be tank-mixed with glyphosate or Liberty 280 to improve postemergence control.
mesotrione + glyphosate + s-metolachlor at 0.094 to 0.1 lb/A + 0.094 to 0.1 lb/A + 0.094 to 0.1 lb/A	Halex GT 4.4 L — 3.6 to 4 pt/A. Add 0.25% nonionic surfactant.	Early postemergence until corn is 12 inches tall.	Most broadleaf weeds and annual grasses.	Do not apply postemergence within 7 days of any organophosphate or carbamate insecticide application. It may be tank-mixed with atrazine to improve broadleaf weed control.
nicosulfuron at 0.03 lb/A	Various formulations (See label for rate of specific products). Add 0.25% nonionic surfactant or 1% crop oil concentrate.	Apply from V2 to V6 growth stage.	Johnsongrass and other annual weeds.	Applications at later stages should be made with drop nozzles. **Do not** apply when corn or weeds are drought-stressed. **Do not** apply to corn treated with Counter or soil- or foliar-applied organophosphate insecticides. Consult the label for other restrictions and precautions.
nicosulfuron + rimsulfuron at 0.023 + 0.012 lb/A	Steadfast 75 WG — 0.75 oz/A	Postemergence to corn up to 20 inches tall and with up to 6 leaf collars.	Annual grass and broadleaf weeds.	Applications of Steadfast must include either a crop oil concentrate or a nonionic surfactant. In addition, an ammonium nitrogen fertilizer must be used unless specifically prohibited by tank mix partner labeling. Do not make more than one application of Steadfast per cropping season. **Do not apply** to field corn grown for seed, to popcorn, or to sweet corn. **Do not use Steadfast** in the same year as Counter 15G, Counter 20CR, Dyfonate, Lorsban, and Thimet. **See label** for other insecticide and application restrictions.
pyroxasulfone + fluthiacet-methyl at 0.101 to 0.202 lb/A	Anthem 2.15 SE — 6 to 12 oz/A. Add 0.25% nonionic surfactant or 1% crop oil concentrate.	Postemergence until the V4 stage.	Annual grasses and small-seeded broadleaf weeds.	Use the lower rate on coarse-textured soils. For heavy weed densities and longer residual, use the higher labeled rate. Apply with glyphosate or Liberty 280 to increase postemergence weed control.

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
pyroxasulfone + fluthiacet-methyl + atrazine at 0.985 to 1.689 lb/A	Anthem ATZ 4.5 SE — 1.75 to 3 pt/A. Add 0.25% nonionic surfactant or 1% crop oil concentrate.	Postemergence until the V4 stage.	Annual grasses and broadleaf weeds.	**Atrazine is a restricted-use pesticide.** See *Special Instructions and Remarks* for atrazine. Use the lower rate on coarse-textured soils. For heavy weed densities and longer residual, use the higher labeled rate. Apply with glyphosate or Liberty 280 to increase postemergence weed control.
rimsulfuron + mesotrione at 0.098 lb/A	Realm Q 39 SG — 4 oz/A. Add 0.25% nonionic surfactant or 1% crop oil concentrate.	Postemergence until the V7 stage or until corn is 20 inches.	Annual grasses and broadleaf weeds.	Apply with glyphosate or Liberty 280 to increase postemergence weed control. **Do not** apply to corn treated with Counter or soil- or foliar-applied organophosphate insecticides. Crop injury may occur afterwards if there is a prolonged period of cold weather and/or in conjunction with wet soils.
tembotrione at 0.082 lb/A + atrazine at 0.5 to 1 lb/A	Laudis 3.5 SC — 3 oz/A + atrazine 4 L — 1 to 2 pt/A. Add 1% methylated seed oil and ammonium sulfate at 1.5 lb/A.	From corn emergence until corn is 12 inches tall.	Annual grasses and broadleaf weeds.	**Atrazine is a restricted-use pesticide.** See *Special Instructions and Remarks* for atrazine. It may be tank-mixed with glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids. Without atrazine, Laudis may be applied up to the eight-leaf collar stage.
tembotrione at 0.067 lb/A + thiencarbazone-methyl at 0.013 lb/A	Capreno 3.45 SC — 3 oz/A. Add 1% crop oil concentrate and ammonium sulfate at 1.5 lb/A.	Apply from V1 to V5 growth stages.	Annual grasses and broadleaf weeds.	It may be tank-mixed with glyphosate or Liberty 280 and atrazine. Do not exceed 6 ounces per acre per growing season.
topramezone at 0.164 lb/A + atrazine 0.5 to 1 lb/A	Armezon 2.8 SL or Impact 2.8 SC — 0.75 oz/A + atrazine 4L — 1 to 2 pt/A. Add ammonium sulfate and 1% methylated seed oil.	From corn emergence until corn is 12 inches tall.	Annual grasses and broadleaf weeds.	**Atrazine is a restricted-use pesticide.** See *Special Instructions and Remarks* for atrazine. It may be tank-mixed with glyphosate or Liberty 280 to improve postemergence control in tolerant hybrids. NOTE: Without atrazine, Armezon or Impact may be applied after corn reaches 12 inches. Addition of acetochlor or s-metolachlor can extend residual weed control.
Postemergence - Directed				
linuron at 0.63 to 1.5 lb/A	50 DF — 1.25 to 3 lb or 4 lb/gal — 1.25 to 3 pt. Add 0.5% surfactant.	When corn is at least 15 inches tall and before weeds are 5 inches tall.	Most annual broadleaf weeds and grasses.	Apply as a directed spray to cover weeds. **Do not** use on loamy sand or sand. May be applied in N solutions. Use the low rate when weeds are less than 2 inches tall and on light soils. Use the high rates on weeds up to 5 inches or on heavy soils.
For use under hooded sprayers				
paraquat at 0.25 to 0.47 lb/A	2 lb/gal formulation — 1 to 1.88 pt/A; 3 lb/gal formulation — 0.67 to 1.25 pt/A	Apply to 6-inch-tall corn **using hooded sprayer ONLY.**	Annual grasses and broadleaf weeds less than 6 inches tall.	Keep the bottom of the hood in contact with soil surface. Avoid crop contact with spray solution. Avoid use of spray tips that produce fine spray droplets. Include nonionic surfactant at 0.25% v/v. Best results are achieved when tank-mixed with other residual broadleaf herbicides. Consult label for specific tank mixes.

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preharvest				
2,4-D at 0.5 to 1 lb/A	2.4-D amine — 1 to 2 pt/A of 4 lb ai/gal	After corn is in dent or hard dough stage.	Most broadleafs.	Apply to cornfields where broadleaf weeds such as morningglory, cocklebur, and sicklepod make harvesting difficult. Wait 5 to 7 days before harvesting.
carfentrazone at 0.031 lb/A	Aim 2 EC — 2 oz/A. Add 1% crop oil concentrate.	After corn grain is physiologically mature and at least 3 days before grain harvest.	Morninglories, pigweeds, and hemp sesbania.	Spray volume must be sufficient to provide complete coverage of undesired foliage. A minimum of 10 gallons per acre is suggested for ground application and 5 gallons per acre for aerial application.
sodium chlorate at 6 lb/A	Sodium chlorate — 2 gal of 3 lb/gal formulation	After corn is in dent or hard dough stage.	Most grasses.	Apply to cornfield where grasses such as johnsongrass make harvesting difficult. Apply at least 14 days before anticipated harvest date on clear days when temperatures are expected to go above 70 °F. **Do not** graze treated fields or feed fodder, forage, or residual seeds within 14 days of application.
glyphosate at 0.37 to 1.25 lb ae/A	See table on pages 5-6 for glyphosate rates.	After grain reaches 35% moisture or less and kernel black layer has formed, but 7 days before harvest.	Johnsongrass and other annual weeds.	**Do not** exceed 1 quart per acre by aerial or 3 quarts per acre by ground equipment. **Do not** apply to corn grown for seed.

RICE

WEED RESPONSE RATINGS FOR RICE HERBICIDES[1]

	Amazon Sprangletop	Ammania (Redstem)	Barnyardgrass[2]	Bearded Sprangletop	Broadleaf Signalgrass	Crabgrass	Dayflower	Ducksalad	Eclipta	Fall Panicum	Flatsedges	Gooseweed	Hemp Sesbania (coffeebean)	Morningglory	Northern Jointvetch	Nutsedge	Palmer Amaranth[3]	Smartweed	Spikerush	Texasweed (2-3 leaf)	Red Rice	Volunteer Glyphosate-Resistant Soybean[4]	Glyphosate-Resistant Horseweed[5]
Clearfield Rice System																							
Beyond	5	**8**	**8**	5	**9**	-	6	2	6	7	**8**	-	3	**8**	3	-	6	5	-	5	**9**	0	-
Clearpath	6	**8**	**9**	6	**9**	**9**	6	6	**8**	6	**9**	0	7	**8**	7	**8**	5	6	-	7	**8**	-	-
Newpath (2 applications)	6	**8**	**9**	**8**	**9**	**9**	5	7	0	**9**	**9**	5	0	7	0	**8**	6	7	**9**	5	**9**	0	-
Preemergence/ Delayed Pre																							
Bolero delayed pre	7	7	**8**	7	4	**7**	**8**	7	**8**	7	7	6	4	4	5	4	-	5	7	5	0	-	-
Command pre	**8**	0	**9**	**8**	**9**	**9**	0	0	0	**9**	0	0	2	3	3	0	0	2	0	0	0	0	-
League pre	0	7	0	0	0	0	7	**8**	**8**	0	**9**	-	**8**	6	7	**8**	5	-	-	**8**	0	0	-
Obey pre	**8**	0	**9**	**8**	**9**	**9**	5	2	**8**	**9**	5	3	6	7	7	0	0	2	0	0	0	-	-
Pendimethalin delayed pre	**8**	1	**9**	7	**8**	**8**	0	4	0	**8**	0	0	0	0	0	0	7	2	0	0	0	0	-
Quinclorac pre	0	0	**9**	0	**9**	**9**	5	2	**8**	**8**	5	3	6	7	7	0	0	0	-	-	0	-	-
Quinclorac + Bolero delayed pre	**8**	7	**9**	**8**	**9**	**9**	7	7	**9**	**9**	**8**	5	**8**	**8**	**8**	0	-	5	7	-	0	-	-
Quinclorac + Pendimethalin delayed pre	**8**	3	**9**	**8**	**9**	**9**	3	0	**8**	**9**	5	3	6	**8**	7	0	7	2	-	-	0	-	-
Sharpen pre	0	-	0	0	0	0	-	-	-	0	0	-	7	**8**	-	0	**9**	**8**	-	7	0	4	**8**
Postemergence (Before Flood)																							
Aim	0	6	0	0	0	0	7	5	7	0	0	-	**9**	**9**	7	0	7	**9**	0	6	0	2	-
Basagran	0	**8**	0	0	0	0	**9**	7	7	0	**8**	7	3	3	3	7	2	7	**8**	5	0	0	-
Clincher SF	**8**	0	**8**	**9**	**9**	6	0	0	0	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0
Grandstand	0	**8**	0	0	0	0	6	4	**9**	0	6	5	**9**	**9**	**8**	0	**8**	6	5	**8**	0	**9**	6
Grasp	0	7	**8**	0	0	0	**8**	**9**	**8**	2	**9**	-	**8**	5	**8**	3	6	7	**8**	6	0	**9**	**8**
Grasp Xtra	0	7	**8**	0	0	0	**9**	**9**	**9**	2	**9**	-	**9**	**8**	**9**	3	**8**	7	**8**	**8**	0	**9**	**8**
League	0	**8**	0	0	0	0	**8**	7	**8**	0	**8**	-	**9**	**8**	**8**	**8**	5	7	-	**8**	0	**8**	-
Londax	0	**8**	0	0	0	0	**8**	**9**	**8**	0	**8**	**9**	4	0	7	6	5	6	**8**	5	0	-	-
Permit	0	0	0	0	0	0	**8**	4	5	0	**8**	-	**8**	4	7	**9**	6	4	-	6	0	**8**	6
Permit Plus	0	**9**	0	0	0	0	**8**	7	**9**	0	**8**	-	**9**	7	7	**8**	6	**8**	-	7	0	**8**	6
Propanil	5	6	**9**	4	**9**	7	5	7	**8**	**8**	**9**	5	**9**	5	5	4	**8**	6	**9**	6	0	**8**	1
Propanil + Basagran	5	**9**	**9**	4	**9**	7	**9**	7	**9**	**9**	**9**	7	**9**	5	**9**	6	**8**	**8**	**9**	6	0	**8**	1
Propanil + Bolero (or RiceBeaux)	**9**	**8**	**9**	**9**	**9**	7	**8**	**8**	**9**	**9**	**9**	6	**9**	6	5	5	**8**	6	**9**	7	0	**8**	2
Propanil + Grandstand	5	**9**	**9**	4	**9**	7	5	7	**9**	**9**	**8**	**8**	**9**	**9**	**9**	5	**9**	7	**9**	**8**	0	**9**	6
Propanil + Londax (or Duet)	5	**9**	**9**	4	**9**	7	**8**	7	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**8**	**8**	**8**	**9**	7	0	**8**	-
Propanil + quinclorac	5	6	**9**	4	**9**	7	5	6	**8**	**9**	**9**	5	**9**	**8**	**9**	5	**8**	5	**9**	6	0	**8**	**8**
Quinclorac	0	3	**9**	0	**9**	7	3	3	**9**	6	5	-	**8**	**8**	**8**	0	3	0	-	3	0	2	6
Quinclorac + Aim (or Broadhead)	0	7	**9**	0	**9**	7	7	5	**9**	6	5	-	**9**	**9**	**8**	0	**8**	**8**	-	6	0	2	6
Regiment	2	6	**9**	2	3	0	**8**	**9**	7	0	**8**	0	**8**	6	7	0	6	**9**	-	**8**	0	**9**	5
Ricestar HT	**8**	0	**9**	**9**	**9**	**8**	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharpen	0	6	0	0	0	0	5	4	5	0	0	-	**9**	**9**	**8**	0	9	**8**	0	**8**	0	6	**8**
Storm	2	**9**	3	2	3	3	7	**8**	7	2	**8**	-	**9**	**8**	6	7	7	**8**	-	**8**	0	0	-
Strada	0	**8**	0	0	0	0	7	6	**8**	0	**9**	-	**9**	7	**9**	7	5	6	-	6	0	**8**	5
Strada PRO	0	**8**	0	0	0	0	**8**	7	**8**	0	**9**	-	**9**	7	**9**	**9**	6	6	-	6	0	**8**	6
Strada XT[2]	0	**8**	**9**	0	**9**	7	7	6	**9**	6	**9**	-	**9**	**8**	**9**	7	5	6	-	6	0	**8**	6
Postemergence (After Flood)																							
Grandstand	0	**9**	0	0	0	0	-	3	**8**	0	5	**9**	**8**	-	-	-	6	4	7	4	0	-	-
Propanil	0	4	4	0	4	4	0	3	4	4	5	0	**8**	0	0	3	7	5	7	4	0	-	-
Propanil + Grandstand	0	**9**	2	0	2	2	4	5	6	2	6	7	**9**	**8**	**8**	2	6	4	**9**	4	0	-	-
Ultra Blazer	0	0	0	0	0	0	0	0	0	0	0	0	**9**	**8**	6	0	6	0	0	4	0	0	-
2,4-D	0	**9**	0	0	0	0	**9**	**9**	**9**	0	**8**	6	**9**	**9**	5	5	4	6	**8**	3	0	-	-

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary.

[2]Barnyardgrass resistance to Group 2 (Beyond, Grasp, Newpath, Regiment), Group 7 (propanil), and Group 26 (quinclorac) herbicides has been identified in Mississippi.

[3]Control ratings apply for herbicide applications made to Palmer amaranth 2 to 3 inches tall. Palmer amaranth resistance to Group 2 herbicides (Beyond, Grasp, League, Londax, Newpath, Permit, Permit Plus, Regiment, and Strada) is prevalent across Mississippi.

[4]Control ratings do not apply to sulfonylurea-tolerant soybean (STS).

[5]Control ratings apply only to glyphosate-resistant horseweed emerging in the spring. Lower control can be expected for glyphosate-resistant horseweed emerging in the fall.

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preplant				
flumioxazin — 0.51 to 1.02 lb/A	Valor 51 WDG — 1 to 2 oz/A	30 days preplant	Will enhance control of cutleaf evening primrose, henbit, Carolina geranium, and wild mustard **when applied in a burndown program with glyphosate, paraquat, or 2,4-D**	**Used in a burndown program** at 2 ounces per acre will provide residual control of horseweed, henbit, chickweed, and dandelion.
glyphosate — 1 to 1.5 lb/A	See glyphosate table on pages 5-6 for rates.	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	Apply to actively growing weeds less than 6 inches tall. Use higher rate for weeds more than 6 inches tall. Apply up to 5 pounds of active ingredient per acre for control of perennial weeds. See labels for specific weeds. Glyphosate may be tank-mixed with soil-applied herbicides for residual activity.
glyphosate + clomazone — 1 to 1.5 lb/A + 0.3 to 0.6 lb/A	See glyphosate table on pages 5-6 for rates + Command 3 ME — 0.8 to 1.6 pt/A	Up to 14 days before planting	Annual and perennial grasses and broadleaf weeds plus residual control of annual grasses	See *Special Instructions and Remarks* for glyphosate and clomazone. The field must be free of standing water at the time of application. Antagonism may occur in some situations. Use the full rate of glyphosate. Sequential postemergence grass herbicide application will be needed.
halosulfuron – 0.031 to 0.062 lb/A	Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	Preplant or preemergence	Yellow nutsedge, annual weeds	Avoid off-site movement to soybean. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. Application is safe to rice when soil pH is less than 8.0. Do not make more than one preplant/preemergence application per growing season.
halosulfuron + thifensulfuron — 0.024 + 0.0028 lb/A	Permit Plus 75 WG — 0.75 oz/A	Preplant or preemergence	Pennsylvania smartweed, yellow nutsedge, and annual weeds	Avoid off-site movement to soybean. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. Application is safe to rice when soil pH is less than 8.0. Do not make more than one preplant/preemergence application per growing season.
paraquat — 0.5 to 1 lb/A	2 lb/gal formulation — 2 to 4 pt/A; 3 lb/gal formulation — 1.33 to 2.67 pt/A	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds. Use lower rates on weeds 1-3 inches tall and higher rates on weeds 4-6 inches tall.	Avoid off-site movement to emerged vegetation. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Command at 0.8-1.6 pints per acre may be added for residual control of grasses.
saflufenacil — 0.022 to 0.044 lb/A	Sharpen 2.85 SC — 1 to 2 oz/A	Preplant or preemergence	Horseweed and other broadleaf weeds	Target weeds should be less than 4 inches in height or diameter. Sharpen may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. **Add methylated seed oil at 1% v/v plus ammonium sulfate for postemergence activity.**
thifensulfuron + tribenuron — 0.016 to 0.025 lb/A	Firstshot 50 SG — 0.5 to 0.8 oz/A	Preplant or preemergence	Winter annual and some perennial broadleaf weeds, including curly dock and Pennsylvania smartweed	Apply to actively growing weeds. May be mixed with other preplant herbicides to broaden weed spectrum. Extend time from application to planting to 7 days when Firstshot is used on light-textured soil (sand, sandy loam) or when Firstshot is used on high pH soils (>7.9).
thiobencarb — 4 lb/A	Bolero 8 EC— 4 pt/A	Preplant/preflood **(Water-seeded rice only)**	Barnyardgrass, sprangletop, and aquatic weeds	Prepare seedbed for **water seeding** with levees constructed. Destroy all vegetation prior to Bolero application. Apply Bolero and establish flood immediately. **Wait 3 days after flood establishment before seeding.**
2,4-D amine — 0.5 to 1 lb/A	Various formulations — 1 to 2 pt/A	During winter and early spring at least 30 days prior to planting	Annual and perennial broadleaf weeds	Do not apply by air after March 31. Do not apply more than 2.5 pints per growing season.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Clearfield Rice System				
imazethapyr — 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A	Preplant-incorporated. **Sequential application to 3- to 5-leaf rice required.**	Red rice and annual grasses; also controls yellow nutsedge	**Use on Clearfield rice varieties and hybrids only.** Flush for activation if rainfall does not occur within a few days of planting. This application must be followed by one postemergence application of Newpath or Beyond. **Avoid off-site movement of Newpath onto conventional rice varieties.**
imazethapyr — 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A	Preemergence. **Sequential application to 3- to 5-leaf rice required.**	Red rice and annual grasses; also controls flatsedges and yellow nutsedge	**Use on Clearfield rice varieties and hybrids only.** Flush for activation if rainfall does not occur within a few days of planting. This application must be followed by one postemergence application of Newpath or Beyond. **Avoid off-site movement of Newpath onto conventional rice varieties.**
imazethapyr — 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A	3-leaf through 5-leaf rice before flooding	Red rice and annual grasses; also controls flatsedges and yellow nutsedge	**Use on Clearfield rice varieties and hybrids only.** Tank-mixing with other herbicides will be required for control of broadleaf weeds, including hemp sesbania, northern jointvetch, and eclipta. This application must be preceded by one preplant-incorporated or preemergence application of Newpath. **Avoid off-site movement of Newpath onto conventional rice varieties.** Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.
imazethapyr — 0.063 to 0.094 lb/A followed by imazethapyr — 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A followed by Newpath 2 AS — 4 to 6 oz/A	First postemergence application at spike to 1-leaf rice followed by second postemergence application approximately 14 days later	Red rice and annual grasses; also controls flatsedges and yellow nutsedge	**Use on Clearfield rice varieties and hybrids only.** A soil-applied herbicide such as Command should be used in the first Newpath application for sprangletop control and to aid in residual control of annual grasses. Tank-mixing with other herbicides will be required for control of broadleaf weeds, including hemp sesbania, northern jointvetch, and eclipta. **Avoid off-site movement of Newpath onto conventional rice varieties.** Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.
imazethapyr + quinclorac — 0.063 + 0.312 lb/A followed by imazethapyr — 0.063 to 0.094 lb/A	Clearpath 75 DF — 0.5 lb/A followed by Newpath 2 AS — 4 to 6 oz/A	Preplant-incorporated, preemergence, or postemergence from spike to 1-leaf rice followed by a postemergence application of Newpath approximately 14 days later	Red rice and annual grasses; also controls eclipta, flatsedges, morningglory, and yellow nutsedge. Improved control of some grasses and broadleaf weeds over Newpath alone.	**Use on Clearfield rice varieties and hybrids only.** Tank-mixing with other herbicides will be required for control of broadleaf weeds, including hemp sesbania, northern jointvetch, and eclipta. **Avoid off-site movement of Newpath onto conventional rice varieties.** Clearpath at 0.5 pound per acre provides 4 ounces of Newpath and 0.4 pound of Facet. Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre. See *General Instructions and Remarks for Quinclorac.*
imazamox — 0.039 to 0.047 lb/A	Beyond 1 AS — 5 to 6 oz/A	**After at least one application of Newpath or Clearpath.** Apply from 4-leaf rice until 14 days after panicle initiation on Clearfield varieties and from 4-leaf rice to panicle initiation on Clearfield hybrids.	Barnyardgrass, broadleaf signalgrass, fall panicum, morningglory, and red rice	**Use on Clearfield rice varieties and hybrids only.** Beyond may be substituted for the second application of Newpath, but two applications are required before flooding. Some Clearfield hybrids are less tolerant to Beyond than others. An emergency salvage application of Beyond may be applied for late-season suppression of red rice, but the rate should not exceed 10 ounces in a single growing season. **Avoid off-site movement of Beyond onto conventional rice varieties.** Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.

Preemergence/Delayed Pre

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
clomazone — 0.3 to 0.6 lb/A	Command 3 ME — 0.8 to 1.6 pt/A	Preemergence	Barnyardgrass, broadleaf signalgrass, crabgrass, fall panicum, and sprangletop	Command may be applied from planting to rice emergence but before weed emergence. Do not apply to recently land-formed fields. If grasses emerge after application, rainfall or flushing may be needed for activation or reactivation. **Caution: follow label when tank-mixing.**
clomazone + quinclorac — 0.3 to 0.5 lb/A + 0.3 to 0.5 lb/A	Command 3 ME — 0.8 to 1.33 pt/A + 75 DF — 0.4 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 68) or Obey 2.5 ZC — 32 to 52 oz/A	Preemergence or delayed preemergence	Barnyardgrass, broadleaf signalgrass, crabgrass, fall panicum, sprangletop, and eclipta	See *Special Instructions and Remarks* for Command and quinclorac. If grasses emerge after application, rainfall or flushing will be required for activation or reactivation of the herbicide.
glyphosate — 1 to 1.5 lb/A + clomazone — 0.3 to 0.6 lb/A	See glyphosate table on pages 5-6 for rates + Command 3 ME — 0.8 to 1.6 pt/A	From planting to rice emergence. **Do not apply if rice is beginning to emerge.**	Annual and perennial grasses and broadleaf weeds plus residual control of annual grasses	See *Special Instructions and Remarks* for glyphosate and Command. The field must be free of standing water at application. Antagonism may occur in some situations. **Use the full rate of glyphosate.** Sequential postemergence grass herbicide application will be needed.
glyphosate + pendimethalin — 1 to 1.5 lb/A + 0.75 to 1 lb/A	See glyphosate table on pages 5-6 for rates + Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Winter annual weeds and residual grass control	See *Special Instructions and Remarks* for glyphosate alone and for pendimethalin.
imazosulfuron — 0.19 to 0.3 lb/A	League 75 WG — 4 to 6 oz/A	Preemergence	Annual grasses except sprangletop; also controls eclipta, hemp sesbania, jointvetch, and morningglory	**Rice injury may occur if League is applied at more than 3.2 ounces per acre on clay soil with a pH greater than 8.** Yield reductions have not been observed. Soybean may not be planted for 12 months after League application. **A half-mile buffer to emerged non-STS soybean is required for aerial applications.**
orthosulfamuron + quinclorac — 0.041 to 0.063 + 0.244 + 0.375 lb/A	Strada XT[2] 70 WG — 6.5 to 10 oz/A	Preemergence or delayed preemergence	Hemp sesbania, Texasweed, rice flatsedge, and yellow nutsedge	Do not use on sand or loamy sand soils. See *General Instructions and Remarks* for Quinclorac.
pendimethalin — 0.75 to 1 lb/A	Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Annual grasses, including barnyardgrass, broadleaf signalgrass, and sprangletop	Apply after rice seed has absorbed water and germinated and after the soil has been previously sealed by at least 1 inch of rainfall or irrigation (flush). If the soil has not been sealed, apply when 80% of germinated seeds have the radicle at least 0.5 inch long. Under some conditions, use of gibberellic-acid-treated seed, heavy rainfall, or flushing after application may result in herbicide injury.

Command 3ME Herbicide Applied Alone
RATES AND WEEDS CONTROLLED

Soil Texture	Broadcast Rates Per Acre*
Coarse (light) Soils: (sand, loamy sand, sandy loam)	Do not use
Medium Soils: (loam, silt, silt loam, sandy clay, sandy clay loam)	0.8 to 1.125 pt/A (0.3 to 0.4 lb ai)
Fine (heavy) Soils: (silty clay, clay loam, silty clay loam, clay)	1.33 to 1.6 pt/A (0.5 to 0.6 lb ai)

*Select lower to higher rates based on lighter to heavier soils

Rice, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
quinclorac — 0.25 to 0.5 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table below)	Preemergence or delayed preemergence	Annual grasses except sprangletop; also controls eclipta	**Do not** use on sand or loamy sand soils. See *General Instructions and Remarks for Quinclorac*. Rice seed exposed to the spray may be severely injured.
quinclorac + pendimethalin — 0.25 to 0.5 lb/A + 0.75 to 1 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table below) + Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Annual grasses, including sprangletop; Also controls eclipta	See *Special Instructions and Remarks* for pendimethalin. See *General Instructions and Remarks for Quinclorac*. Rice seed exposed to the spray may be severely injured.
quinclorac + thiobencarb — 0.25 to 0.5 lb/A + 3 to 4 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table below) + Bolero 8 EC — 3 to 4 pt/A	Preemergence or delayed preemergence	Annual grasses, including sprangletop; Also controls eclipta	See *General Instructions and Remarks for Quinclorac*. Rice seed exposed to the spray may be severely injured. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury.
thiobencarb — 4 lb/A	Bolero 8 EC — 4 pt/A	Delayed preemergence (1 to 5 days before rice and weed emergence)	Barnyardgrass, sprangletop, and aquatic weeds	Seedbed should be sealed by rain or flushing. **Do not** allow soil to crack after application. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury.
thiobencarb + pendimethalin — 4 lb/A + 0.75 to 1 lb/A	Bolero 8 EC — 4 pt/A + Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A	Delayed preemergence (1 to 5 days before rice and weed emergence)	Barnyardgrass, broadleaf signalgrass, sprangletop, and aquatic weeds	See *Special Instructions and Remarks* for pendimethalin. Seedbed should be sealed by rain or flushing. **Do not** allow soil to crack after application. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury.

GENERAL INSTRUCTIONS AND REMARKS FOR QUINCLORAC. See table below for soil type restrictions. Quinclorac on soil requires water for activation. For preemergence application, apply to moist soil or apply to dry soil and flush the field within 3 to 5 days. For postemergence application, flush 3 to 14 days after application or when new grass/weeds have emerged and are less than 1 inch tall.

1. DO NOT apply more than 0.67 pound per acre of 75 DF formulation, 1 pint per acre of 4 L formulation per season, or 42 ounces per acre of 1.5 L formulation.
2. DO NOT use on soil that does not have good water-holding capacity.
3. DO NOT use quinclorac in tank mixes other than those listed on product labels or supplemental labels.
4. DO NOT allow quinclorac to drift onto sensitive crops such as cotton, soybeans, corn, or vegetables.
5. DO NOT plant any crop other than rice for a period of 309 days following quinclorac application.
6. DO NOT use quinclorac on precision-cut fields until the second rice crop.

Preemergence Application for Drill-Seeded Rice

Soil texture	75 DF rate	4 L rate	1.5 L rate
sand, loamy sand	Do not use	Do not use	Do not use
sandy loam	0.33–0.44 lb/A	0.5–0.67 pt/A	21–28 oz/A
loam, silt loam, silt, sandy clay loam	0.44–0.5 lb/A	0.67–0.75 pt/A	28–32 oz/A
silty clay loam, clay loam, sandy clay, silty clay, clay	0.5–0.67 lb/A	0.75–1 pt/A	32–42 oz/A

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Postemergence (Before Flood)				
acifluorfen + bentazon — 0.25 to 0.5 lb/A + 0.25 to 0.5 lb/A	Storm 4 L — 1.5 pt/A	After rice tillering to boot	Dayflower, flatsedges, hemp sesbania, morningglory, redstem, smartweed, and yellow nutsedge	Add a nonionic surfactant at 0.25% v/v.
bentazon — 0.75 to 1 lb/A	Basagran 4 L — 1.5 to 2 pt/A or Basagran 5 L — 1.2 to 1.6 pt/A	At least 24 hours before flooding. On flooded fields, lower flood to expose weed foliage.	Dayflower, flatsedges, smartweed, redstem, and yellow nutsedge	Apply early to actively growing weeds. Do not apply to submerged weeds. Do not apply more than 2 pounds per acre per season. Tank-mix with propanil to increase weed spectrum. Add a nonphytotoxic crop oil concentrate at 1.25% v/v.
bispyribac-sodium — 0.02 to 0.033 lb/A	Regiment 80 WP — 0.4 to 0.67 oz/A	3-leaf rice to 0.5-inch internode elongation	Barnyardgrass, junglerice, johnsongrass, hemp sesbania, duckSalad, and Pennsylvania smartweed	See Regiment label for a list of adjuvants approved by Valent. Apply in at least 10 gallons per acre and do not exceed 1.06 ounces per year. Avoid off-site movement to soybean. It provides little or no control of sprangletop. Medium-grain varieties may be more sensitive to Regiment under stressed conditions.
carfentrazone — 0.025 to 0.05 lb/A	Aim 2 EC — 1.6 to 3.2 oz/A	2-leaf rice or larger and weeds up to 4 inches tall	Cocklebur, hemp sesbania, morningglory, and smartweed	Do not apply more than 8.6 ounces per season. If flood is lowered, return to normal 24 hours following treatment. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v. Avoid applications from flag leaf emergence through harvest-aid application.
carfentrazone + halosulfuron — 0.025 to 0.05 lb/A + 0.032 to 0.063 lb/A	Aim 2 EC — 1.6 to 3.2 oz/A + Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	After rice reaches 2-leaf stage	Flatsedges, hemp sesbania, morningglory, smartweed (1- to 2-leaf), and yellow nutsedge	See *Special Instructions and Remarks* for Aim and Permit/Halomax. Add nonionic surfactant at 0.25% v/v.
carfentrazone + quinclorac — 0.015 to 0.03 + 0.19 to 0.375 lb/A	Aim 2 EC — 1 to 2 oz/A + 75 DF — 0.25 to 0.5 lb/A or equivalent rate of liquid formulation (See table on page 68); Broadhead 70 DF — 6 to 12 oz/A	Preplant, preemergence, or between the 2-leaf rice stage and permanent flood	Barnyardgrass, morningglory, hemp sesbania, and other grass and broadleaf weeds	See *Special Instructions and Remarks* for Aim. See *General Instructions and Remarks for Quinclorac*. Add nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
clomazone 0.3 to 0.6 lb/A	Command 3 ME — 0.8 to 1.6 pt/A	1- to 2-leaf rice.	Residual control of annual grasses	For control of existing grass weeds present at time of application, include a postemergence grass herbicide such as Clincher SF, propanil, quinclorac, or Ricestar HT.
clomazone + quinclorac — 0.3 to 0.5 lb/A + 0.3 to 0.5 lb/A	Command 3 ME — 0.8 to 1.33 pt/A + 75 DF — 0.4 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 68) or Obey 2.5 ZC — 32 to 52 oz/A	1- to 5-leaf rice	Residual control of annual grasses; 1- to 2-leaf barnyardgrass, broadleaf signalgrass, hemp sesbania, and eclipta; controls 2- to 6-leaf morningglory	Tank-mix with other herbicides, such as Newpath or propanil, to broaden spectrum. Add a nonphytotoxic crop oil concentrate at 1 quart per acre to maximize weed control. See *Special Instructions and Remarks* for Command and quinclorac.
cyhalofop-butyl — 0.25 to 0.28 lb/A	Clincher SF 2.38 EC — 13.5 to 15 oz/A	1-leaf rice up to 60 days before harvest.	Barnyardgrass, broadleaf signalgrass, fall panicum, seedling johnsongrass, sprangletop (13.5 oz up to 4-leaf grass)	Apply at least 10 gallons per acre by air or ground. A nonphytoxic crop oil concentrate or methylated seed oil must be used at 1 quart per acre. Soil moisture is critical for good activity. Tank-mixing with broadleaf or sedge herbicides can result in loss of grass control. **Do not exceed 25 ounces per acre per year.**

Rice Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
fenoxaprop + safener — 0.077 to 0.1088 lb/A	Ricestar HT 0.58 EC — 17 to 24 oz/A	1-leaf rice to tillering but before panicle initiation	Barnyardgrass, sprangletop, broadleaf signalgrass, johnsongrass (seedling), and fall panicum	**Do not** apply within 48 hours of an application of methyl parathion. Soil moisture is critical for good activity. Tank-mix only with approved herbicides on Ricestar HT label.
halosulfuron — 0.032 to 0.063 lb/A	Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	Prior to rice emergence until after flooding	1- to 6-inch yellow or purple nutsedge, 0.67 oz/A; 6-to 12-inch sedges, 1-1.33 oz/A	Do not appy within 48 days of harvest. Avoid off-site movement to soybeans. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
halosulfuron + thifensulfuron — 0.024 + 0.0028 lb/A	Permit Plus 75 WG — 0.75 oz/A	Before rice emergence until 48 days before harvest	Pennsylvania smartweed, yellow nutsedge, and annual weeds	Do not apply within 48 days of harvest. Avoid off-site movement to soybean. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. Do not exceed 1.5 ounces per acre in a season.
imazosulfuron — 0.15 to 0.19 lb/A	League 75 WDG — 3.2 to 4 oz/A	2-leaf rice but before 2-inch internode elongation	Hemp sesbania, morningglory, and annual weeds	See League label for a list of adjuvants and tank mixtures approved by Valent. Soybeans may not be planted for 12 months after League application. **A half-mile buffer to emerged non-STS soybeans is required for aerial applications.**
orthosulfamuron — 0.053 to 0.065 lb/A	Strada 50 WG — 1.7 to 2.1 oz/A	Early post-emergence to 0.5 inch internode elongation	Flatsedges, hemp sesbania, and northern jointvetch	Tank-mix with other herbicides such as Command, Newpath, or propanil to broaden spectrum. See label for surfactant requirements.
orthosulfamuron + halosulfuron — 0.055 to 0.066 + 0.016 + 0.019 lb/A	Strada PRO 54 WG — 2.08 to 2.5 oz/A	Early post-emergence to 0.5-inch internode elongation	Hemp sesbania, northern jointvetch, rice flatsedge, yellow nutsedge	Tank-mix with other herbicides such as Command, Newpath, or propanil to broaden spectrum. See label for surfactant requirements. Only one application is allowed per year.
orthosulfamuron + quinclorac — 0.041 to 0.063 + 0.244 + 0.375 lb/A	Strada XT[2] 70 WG — 6.5 to 10 oz/A	Early post-emergence to 0.5-inch internode elongation	Barnyardgrass, broadleaf signalgrass, hemp sesbania, morningglory, northern jointvetch, and rice flatsedge	See the label for surfactant requirements. Only one application is allowed per year. See *General Instructions and Remarks for Quinclorac.*
penoxsulam — 0.031 to 0.036 lb/A	Grasp 2 SC — 2 to 2.3 oz/A	Emergence to 60 days before harvest	Up to 7-leaf eclipta, hemp sesbania, northern jointvetch, and flatsedges; up to 4-leaf ducksalad and barnyardgrass	Little to no control of sprangletop, broadleaf signalgrass, and fall panicum. May cause stunting and root pruning, especially if higher than labeled rates are applied. **Avoid use on high pH soils (>7.8).** Add a nonphytotoxic crop oil concentrate or methylated seed oil adjuvant at 1 quart per acre.
penoxsulam + triclopyr lb/A — 0.031 to 0.043 lb/A + 0.19 to 0.26 lb/A	Grasp Xtra 1.74 SC — 16 to 22 oz/A	2- to 3-leaf rice to 0.5-inch internode elongation	Barnyardgrass and broadleaf weeds	Add nonphytotoxic crop oil concentrate or methylated seed oil at 1 quart per acre. Grasp Xtra may cause stunting and root pruning, especially if higher-than-labeled rates are applied. **Rice injury can be severe if soil pH is greater than 7.8.** Delay flood for 72 hours after application.

Rice Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
propanil — 3 to 6 lb/A	3 to 6 qt/A of 4 lb/gal formulation in 10 gal water for aerial application and 15 to 20 gal water for ground application	1- to 4-leaf barnyardgrass	Barnyardgrass and other grasses and broadleaf weeds	See *General Instructions and Remarks for Propanil*. If grass is in the 4- to 5-leaf stage, apply 4 to 5 pounds of active ingredient per acre. To prevent reinfestation, flood 1 or 2 days after application. Weed foliage must not be covered with water at time of application. Consult label concerning adjuvant use.
propanil — 6 to 8 lb/A (For split application where flooding is delayed)	Total 6 to 8 qt/A of 4 lb/gal formulation in two applications	3 to 4 lb/A when weeds are in 1- to 3-leaf stage and second 3 to 4 lb/A treatment when needed	Barnyardgrass, sprangletop, and other grasses and broadleaf weeds	See *General Instructions and Remarks for Propanil*. Flood 1 or 2 days after final application. This treatment may not give satisfactory control of sprangletop species. Weed foliage must not be covered with water at time of application. Consult label concerning adjuvant use.
propanil + bensulfuron — 3 to 5 lb/A + 0.038 to 0.063 lb/A	propanil — 3 to 5 qt/A of 4 lb/gal formulation + Londax 60 DF — 0.75 to 1 oz/A or Duet 4.03 F — 3 to 5 qt/A	1 to 7 days before flood	Many grass and broadleaf weeds and yellow nutsedge	See *General Instructions and Remarks for Propanil*. For best results, maintain flood and keep water as static as possible. Consult the label concerning use of surfactants. For increased control of nutsedge, add Permit at 0.25 to 0.33 ounce per acre.
propanil + halosulfuron — 3 to 4 lb/A + 0.032 to 0.063 lb/A	propanil — 3 to 4 qt/A of 4 lb/gal formulation + Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	Apply to emerged weeds.	Eclipta, flatsedges, hemp sesbania, northern jointvetch, morningglory, and yellow nutsedge	See *General Instructions and Remarks for Propanil.* See *Special Instructions and Remarks* for Permit/Halomax.
propanil + triclopyr — 3 to 4 lb/A + 0.125 to 0.25 lb/A	propanil — 3 to 4 qt/A of 4 lb/gal formulation + Grandstand 3 SL — 0.5 to 0.67 pt/A	After rice reaches the 2-leaf stage and before weeds exceed 6 inches. Use no more than 0.5 pt/A before 4-leaf rice and up to 0.67 pt/A after 4-leaf stage.	Barnyardgrass, morningglory, hemp sesbania, northern jointvetch, eclipta, and redstem	See *General Instructions and Remarks for Propanil*. See *Special Instructions and Remarks* for Grandstand. Flood should be delayed for 72 hours after application.

GENERAL INSTRUCTIONS AND REMARKS FOR PROPANIL: For aerial application, apply 10 gallons of spray mixture and avoid drift to susceptible crops. Complete spray coverage is necessary. Weeds should be growing actively at treatment time. Rice plants may show yellowing after treatment; however, plants recover quickly. **Do not** exceed 6 pounds per acre per application or 8 pounds per acre per season. **Do not** apply when rain is expected within 6 hours or during periods when daily maximum temperatures are below 75 °F, or above 100 °F. Application during high temperatures may result in excessive rice injury. **DO NOT** use in spray equipment that has contained organophosphate insecticides unless the equipment has been cleaned thoroughly, and **DO NOT** apply these insecticides within 14 days before or after applying propanil.

Rice, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
propanil + pendimethalin — 3 to 4 lb/A + 0.75 to 1 lb/A	Propanil — 3 to 4 qt/A of 4 lb/gal formulation + Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A in 10 gal water for aerial application	After rice emerges and barnyardgrass is in 1- to 3-leaf stage	Postemergence control of barnyardgrass and other grasses and broadleaf weeds; residual control of barnyardgrass and other grasses.	See *General Instructions and Remarks for Propanil*. The seedbed should be firm and free of large clods, trash, and surface water at time of application. Fields should be flushed if adequate rainfall does not occur within 7 days. **Do not** make more than one application of pendimethalin per season.
quinclorac — 0.25 to 0.5 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 68)	Early postemergence	1- to 2-leaf barnyardgrass, broadleaf signalgrass, hemp sesbania, and eclipta; controls 2- to 6-leaf morningglory.	Add a nonphytotoxic crop oil concentrate at 1 quart per acre to maximize weed control. Does not control sprangletop. See *General Instructions and Remarks for Quinclorac*.
quinclorac + acifluorfen — 0.25 to 0.5 lb/A + 0.125 to 0.25 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 68) + Ultra Blazer 2 L — 0.5 to 1 pt/A	After rice reaches 3-leaf stage	Grasses and broadleaf weeds	Add a nonionic surfactant at 0.25% v/v. See label for mixing instructions. See *General Instructions and Remarks for Quinclorac*.
quinclorac + acifluorfen + bentazon — 0.25 to 0.5 lb/A + 0.75 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 68) + Storm 4 L — 1.5 pt/A	After rice reaches 3-leaf stage	Grasses and broadleaf weeds	Add a nonionic surfactant at 0.25% v/v. See label for mixing instructions. See *General Instructions and Remarks for Quinclorac*. See *General Instructions and Remarks for Storm.*
quinclorac + fenoxaprop + safener — 0.25 to 0.5 lb/A + 0.077 to 0.1088 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 68) + Ricestar HT 0.58 EC — 17 to 24 oz/A	Apply to small, actively growing weeds	Grasses and broadleaf weeds, including eclipta hemp sesbania, and morningglory	See *General Instructions and Remarks for Quinclorac*. See *Special Instructions and Remarks* for Ricestar HT. Soil moisture is critical for good activity. Rainfall or flush will be required for residual grass control from quinclorac after application.
quinclorac + propanil — 0.25 to 0.5 lb/A + 3 to 5 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 68) + propanil — 3 to 5 qt/A of 4 lb/gal formulation	Early postemergence	Grasses and broadleaf weeds	See label for instructions on mixing and use of adjuvants. See *General Instructions and Remarks* for quinclorac and propanil.
saflufenacil — 0.0223 lb/A	Sharpen 2.85 SC — 1 oz/A	3-leaf to 0.5-inch internode elongation	Hemp sesbania, morningglory, Palmer amaranth	Do not apply to rice in the spiking to 1-leaf stage. Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre. Do not use methylated seed oil or nonionic surfactant in postemergence applications. Sequential applications are allowed, but do not apply more than 2 ounces per acre per season after rice emergence. Do not mix with emulsifiable concentrate herbicides.
triclopyr — 0.25 to 0.375 lb/A	Grandstand 3 SL — 0.67 to 1 pt/A	3-leaf to 0.5-inch internode elongation	Hemp sesbania, eclipta, morningglory, northern jointvetch, and redstem	Flood must be delayed 72 hours to prevent rice injury for applications made prior to flood. If flood is lowered for application, do not expose the crown of rice plants and wait 48 hours before raising the flood level. Add a nonionic surfactant at 0.25% or nonphytotoxic crop oil concentrate at 1% v/v. Do not use on precision-cut land until the second rice crop.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
triclopyr + halosulfuron — 0.25 to 0.375 lb/A + 0.032 to 0.063 lb/A	Grandstand 3 SL — 0.67 to 1 pt/A + Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	3-leaf to 0.5-inch internode elongation	Flatsedges, hemp sesbania, morningglory, northern jointvetch, and yellow nutsedge	See *Special Instructions and Remarks* for Grandstand and Permit/Halomax. Add nonionic surfactant at 0.25% v/v.
thiobencarb + propanil — 3 to 4 lb/A + 3 to 4 lb/A	Bolero 8 EC — 3 to 4 pt/A + propanil — 3 to 4 qt/A of 4 lb/gal formulation or RiceBeaux 6 EC — 4 qt/A	Early postemergence. Grass in 1- to 3-leaf stage, aquatics less than 0.5 inch tall, and broadleaf weeds less than 2 inches tall.	Grass and broadleaf weeds	See *General Instructions and Remarks for Propanil*. Soil should be moist at the time of application and not allowed to crack after application. Do not apply to stressed rice. RiceBeaux at 4 quarts per acre provides 3 pints of Bolero and 3 quarts of propanil per acre.
Postemergence (After Flood)				
acifluorfen — 0.125 to 0.25 lb/A	Ultra Blazer 2 L — 0.5 to 1 pt/A in 5 to 10 gal water	Apply to actively growing sesbania before it flowers. Apply to rice prior to early boot stage.	Hemp sesbania	Add a nonionic surfactant at 0.25% v/v. Do not mix Ultra Blazer with oils, drift control agents, liquid fertilizers or other pesticides. See label for other restrictions.
bensulfuron — 0.038 to 0.06 lb/A	Londax 60 DF — 1 to 1.6 oz/A in 10 gal water for aerial application	Apply to flooded field preemergence or very early postemergence to submerged weeds.	Aquatic weeds	Apply after flood but before weeds reach 3-leaf stage. Hold water static for at least 7 days after application. Add nonphytotoxic crop oil concentrate at 1% v/v or nonionic surfactant at 0.25% v/v.
bispyribac-sodium 0.034 lb/A	Regiment 80 WP — 0.67 oz/A	Postflood but before 0.5-inch internode elongation	Barnyardgrass, junglerice (4 tiller up to booting)	See label for list of adjuvants approved by Valent. **Avoid off-site movement to soybeans.**
cyhalofop-butyl 0.25 to 0.28 lb/A	Clincher SF 2.38 EC — 13.5 to 15 oz/A	Postflood	Annual grasses	Tank-mixing with broadleaf or sedge herbicides can result in loss of grass control. **Do not exceed 25 ounces per acre per year.** Add a nonphytotoxic crop oil concentrate or methylated seed oil at 1 quart per acre.
halosulfuron — 0.47 to 0.63 lb/A	Permit or Halomax 75 WG — 1 to 1.33 oz/A	Postflood to 48 days before harvest	Hemp sesbania, jointvetch, flatsedge	Avoid off-site movement to soybean. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. Do not apply more than 1.3 ounces per acre in a season.
orthosulfamuron — 0.065 lb/A	Strada 50 WG — 2.1 oz/A	Postflood before 0.5-inch internode elongation	Hemp sesbania and northern jointvetch	See the label for surfactant requirements. This product is used to prevent black seed production by hemp sesbania and northern jointvetch.

Rice, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
orthosulfamuron + halosulfuron — 0.066 + 0.019 lb/A	Strada PRO 54 WG — 2.5 oz/A	Postflood before 0.5-inch internode elongation	Hemp sesbania and northern jointvetch	See the label for surfactant requirements. This product is used to prevent black seed production by hemp sesbania and northern jointvetch.
orthosulfamuron + quinclorac — 0.041 to 0.063 + 0.244 + 0.375 lb/A	Strada XT[2] 70 WG — 6.5 to 10 oz/A	Early postemergence to 0.5-inch internode elongation	Barnyardgrass, broadleaf signalgrass, hemp sesbania, morningglory, and northern jointvetch	See the label for surfactant requirements. Only one application is allowed per year. See *General Instructions and Remarks* for Quinclorac. Do not apply on precision-cut land until the second rice crop.
penoxsulam — 0.036 to 0.044 lb/A	Grasp 2 SC — 2.3 to 2.8 oz/A	Postflood to 60 days before harvest but before heading if targeting barnyardgrass	Barnyardgrass (prior to heading), hemp sesbania, jointvetch, and ducksalad	**Emergency salvage treatment.** Regrowth of treated weeds may occur. Add a nonphytotoxic crop oil concentrate or methylated seed oil adjuvant at 1 quart per acre.
propanil + triclopyr — 2 to 3 lb/A + 0.25 to 0.38 lb/A	propanil — 2 to 3 qt/A of 4 lb/gal formulation + Grandstand 3 SL — 0.67 to 1 pt/A	Postflood before 0.5-inch internode elongation	Broadleaf weeds, including hemp sesbania less than 5 feet tall	See *General Instructions and Remarks for Propanil*. See *Special Instructions and Remarks* for Grandstand. Consult propanil label concerning adjuvant use. Floodwater should cover the soil surface and root area of treated plants.
2,4-D amine 1 to 1.5 lb/A	Various formulations — 2 to 3 pt/A	Late tillering stage but before 0.5-inch internode elongation	Hemp sesbania, redstem, ducksalad, gooseweed, smartweed, spikerush, water hyacinth, morningglory, and dayflower	Follow Division of Plant Industry regulations for phenoxy herbicides. Add 1 pint of surfactant to each 50 gallons of spray mix. Fields should have shallow flood at time of treatment. Do not apply nitrogen within 5- to 21-day period before treatment. Use extreme caution to prevent drift to susceptible crops.

Preharvest

carfentrazone — 0.025 lb/A	Aim 2 EC — 1.5 oz/A	Rice moisture content is ≤25%	Morningglory	Aim labeling requires application at least 3 days before harvest.
Sodium chlorate at 4.5 lb/A	1.5 gal of a 3 lb/gal formulation in 10 gal spray solution per acre	Apply 7 days before harvest	Desiccation of weeds and "down" rice	Allow 7 days between application and harvest.

RED RICE CONTROL. Steps should be taken to prevent the introduction of this weed into rice fields. These steps include use of rice seed free of red rice, cleaning equipment before entering uninfested fields, and hand roguing of light infestations. Where severe infestations occur, several cycles of a 2-year soybean or a 1-year sorghum/1-year soybean rotation with rice are suggested. During the years out of rice, strive for 100% red rice control. Use a combination of preemergence and postemergence herbicides recommended for the control of red rice (see soybean section). A combination of shallow spring and fall disking in conjunction with clod disruption also should be used to reduce the soil reserves of red rice by stimulating germination and destroying germinated seed. When rice is planted, an early-season variety should be used. It should be planted late to allow for additional spring tillage and seeded at a rate that allows a good competitive stand. The early-season varieties mature earlier, thereby limiting the amount of red rice that shatters before harvesting as well as extending the time interval for additional fall tillage.

SORGHUM

(Forage, Grain)

ESTIMATED WEED CONTROL RATINGS OF HERBICIDES

Ratings 0-3 4-6 7-8 9-10	Expected Control slight fair good excellent	Application Method	Crabgrass	Goosegrass	Signalgrass	Seedling johnsongrass	Fall panicum	Pigweed	Cocklebur	Morningglory	Prickly sida	Sicklepod	Hemp sesbania	Lambsquarter	Crop Tolerance
2,4-D		post	0	1	0	0	2	9	9	9	8	8	9	9	F
atrazine		post	7	5	6	3	4	8	9	8	8	7	6	8	G
atrazine		pre	9	6	5	4	4	9	9	8	8	8	7	9	F
atrazine + oil		post	8	6	7	3	5	9	9	8	9	8	7	9	F
bentazon**		post	0	0	0	0	0	5	9	2-9	8	0	4	7	G
Bicep*		pre	9	9	8	8	8	9	6	6	8	6	6	9	G
Dual*		pre	9	9	7	8	9	8	0	0	4	5	2	6	G
Facet		post	7	-	8	0	6	3	-	8	-	-	8	-	G
Facet + atrazine		post	8	5	8	0	6	8	9	9	8	7	9	8	G
linuron		post	8	7	8	6	8	8	7	8	8	8	8	9	F
Outlook		pre	9	9	9	7	8	9	0	6	6	-	-	8	G
paraquat***		post	8	8	8	8	8	8	5	5	6	9	2	7	F
Peak		post	0	0	0	0	0	9	9	8	9	8	8	8	G
Permit		post	3	3	3	3	3	8	9	5	7	4	4	5	G

*Sorghum seed must be treated with seed protectant to prevent damage from alachlor, metolachlor (Dual, Bicep) or dimethenamid - P (Outlook)

**Control of morningglory varies among species.

***Small weeds

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preplant/Preemergence				
paraquat at 0.5 to 1 lb/A	Several formulations. Consult label for specific use rates. Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant.	Before sorghum emerges.	Most small emerged annual weeds.	Use higher rates as weed size increases. Do not make more than two applications.
glyphosate at 0.375 to 1.5 lb/A ae	See glyphosate table on pages 5-6 for rates.	Preplant for vegetation knockdown.	Consult label for list of weeds controlled.	Refer to the glyphosate formulation table on page 5 for surfactant/adjuvant recommendations for specific glyphosate formulations.
saflufenacil at 0.02 to 0.04 lb	2.85 lb/gal - Sharpen — 1 to 2 oz with 5 gal or more by ground or 3 or more gal by air. Add MSO adjuvant 1% v/v + AMS at 1% to 2% v/v. Consult label.	Preplant or preemergence check label.	Small, actively growing broadleaf weeds and preemergence activity on broadleaf weeds. Consult label for specific weeds.	Rainfall is required to activate this herbicide. Do not apply to emerged sorghum. Consult label for crop rotational intervals and Sharpen tank-mix partners. The use of Sharpen with Gramoxone at high temperatures may result in reduced Sharpen activity.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
acetochlor at 1.35 to 2.5 lb + atrazine at 0.67 to 1.24 lb/A	4.04 lb/gal - Degree Xtra — 2 to 3.7 qt/A in 10 gal or more by ground.	Preemergence at planting.	Annual grasses and broadleaf weeds. Consult label for specific weeds.	**Apply only to grain sorghum planted with seed treated with a seed protectant or safener.** Rates should be based on soil texture and tolerance of sorghum hybrid. Consult label for crop rotation restriction and soil texture rate. Do not exceed 2.5 pounds per acre of atrazine per year. For grain sorghum forage use, allow a 60-day preharvest interval.
metolachlor at 1.5 to 2 to 2.5 lb/A or 0.95 to 1.43 to 1.59 lb/A	Dual Magnum 7.62 or Dual II Magnum 7.64 lb/gal 1 to 1.5 to 1.67 pt in 10 gal or more water by ground or 2 gal or more water by air. See table (page 3) to calculate band rate.	At planting.	Most annual grasses and small-seeded broadleaf weeds.	Apply only when the sorghum seed has been properly treated with Concep or Screen seed protectant. See label for rotation restrictions.
s-metolachlor at 1.31 lb + atrazine at 1.31 lb + mesotrione at 0.168 lb/A	3.66 lb/gal - Lexar EZ — 3 qt in 10 gal or more by ground application.	At planting or up to 21 days before planting.	Most annual grasses and broadleaf weeds.	**Sorghum seed must be treated with Concept III safener before planting.** Base use rate on soil texture (consult label). Applying Lexar more than 7 days before planting reduces risk of crop injury. A split application of 50% applied 7 to 21 days before planting and 50% applied preemergence may be used. Do not apply more than 3 quarts per growing season. If weeds are present at application, add NIS (0.25% v/v) or COC (1% v/v) and spray grade UAN (2.5%) or AMS (8.5 pounds per 100 gallons). Do not apply to sandy soils (sand, sandy loam, or loamy sandy). Do not apply to emerged sorghum. Do not use in production of forage sorghum, sudangrass, sorghum-sudangrass hybrids, or dual-purpose sorghum.
metolachlor at 1.5 to 2 or 0.95 to 1.43 + atrazine at 1.2 to 1.6 lb/A	Dual Magnum 7.62 or Dual II Magnum 7.64 lb/gal at 0.95 to 1.43 pt + atrazine at 1.2 to 1.6 qt of 4L formulation or 1.5 to 2.5 lb of 80% WP formulation or 1.3 to 2.2 lb of 90% WDG in a minimum of 10 gal water. See table (page 3) to calculate band rate.	At planting.	Most annual grasses and broadleaf weeds.	Use with sorghum seed properly treated with Concep or Screen seed protectant. Do not use on sand, loamy sand, or sandy loam. On medium to fine-textured soils with 1% to 1.5% organic matter, use low rate; above 1.5% organic matter, use high rate. Do not use on any soil with less than 1% organic matter.
atrazine at 1.6 lb/A	3.2 pt of a 4 lb/gal or 2 lb of 80% wettable powder or 1.78 lb of 90% WDG in a minimum of 10 gal of water for ground application and 3 gal for aerial application. See table (page 3) to calculate band rate.	At planting.	Most annual grasses (except signalgrass) and broadleaf weeds.	Do not use on sand, loamy sand, or sandy loam or any soil with less than 1% organic matter. On soil containing 1% to 1.5% organic matter, use low rate; on soil with over 1.5% organic matter, use high rate. Do not plant crops other than corn or sorghum until the year after treatment. If treatment is made after June 10 crops other than corn or sorghum should not be planted the following year. Do not graze or feed forage from treated areas for 21 days following application. Thorough soil tillage after harvest minimizes the possibility for crop injury the following year. Do not exceed 2 pounds of active ingredient per acre per year.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
dimethenamid - P at 0.75 to 0.94 lb/A	Outlook 6EC — 16 to 20 oz in 2 or more gal by air or 5 or more gal by ground.	At planting.	Annual grasses and small-seeded annual broadleaf weeds.	**Do not use on forage sorghum.** Apply only to sorghum planted with seed treated with a chloroacetamide herbicide safener. See label for tank-mix applications and for restrictions.
Postemergence				
acetochlor at 1.35 to 2.5 lb + atrazine at 0.67 to 1.24 lb/A	4.04 lb/gal - Degree Xtra — 2 to 3.7 qt in 10 gal or more by ground.	Postemergence — surface apply before crop exceeds 11 inches.	Annual grasses and broadleaf weeds.	Check the label for appropriate rates based on soil texture and organic matter. Do not exceed 2.5 pounds per acre of atrazine per year. For grain sorghum forage use, allow a 60-day preharvest interval. Check the label for crop rotation restrictions.
2,4-D amine at 0.3 to 0.5 lb/A; 2, 4-D acid at 0.1 to 1 lb/A	2,4-D amine — 0.66 to 1 pt of 3.8 lb/gal formulation; 2,4-D acid at 0.5 to 4.5 pt of 1.74 lb/gal formulation.	**Consult label for sorghum application growth stage, rate, time, and application method.**	Small broadleaf weeds.	Do not treat during boot, flower, or dough stage. One application per season. Do not feed or harvest within 30 days of application.
atrazine at 2 lb/A	atrazine — 4 pt of a 4 lb/gal or 2.5 lb of 80% WP or 2.22 lb of 90% WDG in a minimum of 10 gal of water for ground application and 3 gal for aerial application. See table (page 3) to calculate band rate.	After sorghum is completely emerged but before 12 inches tall and before weeds are over 1.5 inches tall.	Most annual grasses and broadleaf weeds.	Do not exceed 2 pounds of active ingredient per acre per year. Do not use on sand or sandy loam soils. Do not use when sorghum is under stress or crop is wet and succulent from recent rainfall. Do not graze or feed forage for 21 days after application. If applied after June 10, do not plant with crops other than corn or sorghum the following year. See label for restrictions.
atrazine at 1.2 lb/A + crop oil concentrate	atrazine — 2.4 pt of a 4 lb/gal or 1.5 lb of an 80% WP or 1.3 lb of 90% WDG + 1 qt crop oil concentrate in a minimum of 10 gal water per acre by ground. See table (page 3) to calculate band rate.	Sorghum 4 to 12 inches tall.	Same as atrazine at 2 lb/A.	Same as atrazine at 2 pounds per acre. Be sure oil is not contaminated or crop injury may result. Do not exceed 2 pounds of active ingredient per acre per year. See label for restrictions.
linuron at 0.5 to 1 lb/A	1 to 2 pt Linex 4L. Add 2 pt surfactant to each 50 gal spray. Apply in 20 to 30 gal water per acre. See table (page 3) to calculate band rates.	Apply a single application as a directed spray to 12- to 15-inch sorghum. Apply when weeds are 2 to 4 inches tall.	Most annual grasses and broadleaf weeds that are actively growing and are 2 to 4 inches tall.	Use shields and/or gauge wheels to accurately direct the spray to the base of the sorghum. Keep spray off the upper leaves and whorl of sorghum. Use the low rate on small sorghum and 2-inch weeds. Use the high rate for large sorghum and 2- to 4-inch weeds. Keep spray pressure low to prevent injury to sorghum. Do not graze or feed plants to livestock within 3 months after application. Do not apply within 15 days of harvest.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
bentazon at 0.75 to 1 lb/A	1.2 to 1.6 pt Basagran 5L in 20 gal water over- the-top or directed spray.	After sorghum has completely emerged but before boot.	Cocklebur, small prickly sida, smartweed, and ragweed.	Particularly useful where 2,4-D cannot be used because of nearby sensitive crops. Use low rate for 2- to 6-leaf cocklebur and stage when weeds are small and actively growing and high rate for 6- to 10-leaf cocklebur and other broadleaf weeds. Control may be poor if applied under drought stress. Rainfall within 4 hours after application may reduce effectiveness. Crop oil concentrate or surfactant may be used in accordance with label.
halosulfuron at 0.032 lb/A	Permit 75DF — 0.67 oz in 10 or more gal/A spray solution. Add 1 pt surfactant or 4 pt crop oil for each 50 gal spray.	Postemergence — 2-leaf to head emergence.	Annual broadleaf weeds and nutsedge suppression.	See the label for tank mixture with atrazine, Banvel, or 2,4-D and for restrictions.
halosulfuron + dicamba at 0.03125 to 0.04688 lb/A + 0.138 to 0.206 lb/A	Yukon WSG — 4 to 6 oz in 10 gal or more by ground or 5 to 15 gal by air. Add NIS at 0.25% to 0.5% v/v or COC at 1% v/v.	Postemergence — 2-leaf to 15-inch-tall grain sorghum (milo). Use drop nozzles if sorghum is taller than 8 inches.	Small broadleaf weeds. With ALS-resistant weeds, reduced control may occur.	Best performance is obtained when applied to 3- to 5-leaf sorghum and weeds are small. Apply as a single application with the total application rate not to exceed 6 ounces per season. Do not graze or feed treated sorghum forage or silage for 30 days after treatment. Do not apply to sorghum for seed production. Consult the label for tank-mix partners and crop rotation restrictions. If stress conditions occur after application, temporary stature reduction may occur.
prosulfuron at 0.43 or 0.57 lb/A	Peak 57 WDG 0.75 or 1 oz in a minimum of 2 gal of water by air or 10 gal by ground. Add 1 pt nonionic surfactant for each 50 gal spray mix.	Over the top when sorghum is 5 to 30 inches tall.	Most annual broadleaf weeds.	**DO NOT USE ON FORAGE SORGHUM.** See label for rate to use on weed height. Improved weed coverage with directed/semi-directed application to sorghum 20 inches or taller. See label for tank mixtures with atrazine, dicamba, or 2,4-D using 0.5 or 0.75 ounce per acre. See label for restrictions. Plant only STS soybeans the year following application; apply only the low rate if cotton will be planted the year following application; allow 10 months between application and planting for both cotton and soybeans.
pyrasulfotole + bromoxynil at 0.031 + 0.175 to 0.039 + 0.219 lb/A	Huskie — 12.8 to 16 oz/A in 10 gal or more water by ground or 5 gal by air. Add 0.25% V/V NIS + 1 lb/A AMS. Minimum 5 gal by air.	Postemergence — apply from 3-leaf stage up to 30-inch and/or before flag-leaf emergence	Tall waterhemp, palmer pigweed, redroot pigweed, and other broadleaf weeds.	Do not apply more than 36 ounces per acre per year. Forage sorghum may be cut or grazed 7 days after application, but do not cut for hay within 30 days after application. **Aerial** or chemigation is **prohibited**. **Check label** for tank-mix or aerial application instructions. Use 80- to 110-degree flat fan nozzles and spray pressure that delivers medium spray droplets. Do not use flood-jet nozzles or air-induction nozzles. In denser canopies or large weeds, use at a volume of 15 gallons per acre. **Unacceptable** crop response may occur if Huskie is applied where acreage has been treated previously with a mesotrione (products such as Lumax or Lexar).
quinclorac + atrazine at 0.34 to 0.5 lb/A + 0.5 to 1 lb/A	Facet L — 22 to 32 oz/A + atrazine (0.5 to 1 lb ai/A) in 10 gal or more water by ground. Add 2 pt of crop oil concentrate or methylated seed oil per acre.	Postemergence before sorghum exceeds 12 inches and weeds are less than 2 inches.	Barnyardgrass, foxtail sp., broadleaf signalgrass, morningglory, hemp sesbania, and other grass and broadleaf species.	Tank-mixing Facet L with atrazine should improve annual grass control. Annual grass should be less than 2 inches tall for effective control. **Do not use liquid fertilizer** as a carrier or apply more than 64 ounces of Facet L per acre per year.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
For Use Under Hooded Sprayer				
paraquat at 0.25 to 0.50 lb/A	Several formulations. Consult label for rates. Apply in 10 gal or more water plus 2 pt nonionic surfactant per 100 gal mix.	After sorghum is 12 inches tall.	Small annual grasses and weeds.	**For hooded or shielded sprayers:** To avoid excessive crop injury, use a hooded or shielded sprayer with skids or wheels on the spray boom. Apply by directing sprayer between the rows and use the hooded or shielded sprayer to prevent spray contact with the plant. **Without hooded or shielded sprayers:** Do not exceed 30 psi. Use precision direct spray application equipment adjusted so no more than the lower 3 inches of each plant is sprayed. Some crop injury will occur. Do not spray during windy conditions.
carfentrazone at 0.008 to 0.016 lb/A	2 EC AIM — 0.5 to 1 oz/A in at least 10 gal/A water. Add nonionic surfactant at 2 pt per 100 gal mix.	See special instructions.	Morningglories, pigweed, waterhemp, and velvetleaf.	Apply AIM to row middles of emerged crop with a **hooded sprayer**. Hooded sprayers must be designed, adjusted, and operated in such a manner as to totally enclose the spray pattern and prevent any spray deposition to the green stem tissue or foliage of the crop. Base the application rate on weed size. See the label.
At Harvest for Weeds				
carfentrazone at 0.016 to 0.031 lb/A	Aim 2 EC — 1 to 2 oz/A. Apply in at least 10 gal water by ground or 5 gal water by air. Add 1% v/v crop oil concentrate.	After grain is fully mature, when black layer has formed and kernels hard.	Morningglory and other broadleaf weed desiccation.	Do not apply within three days of harvest.
glyphosate at 0.75 to 1.5 lb/A ae	See table on pages 5-6 for glyphosate rates.	After grain reaches 30% moisture or less and kernel black layer has formed; at least 7 days before harvest.	Johnsongrass, other susceptible weeds, and desiccation of green vegetation.	Allow a minimum of 7 days before harvest or grazing.
sodium chlorate at 6 lb/A	1 gal of 6 lb/gal or 2 gal of 3 lb/gal in 15 to 20 gal water by ground or 5 gal by air. Add 2 pt surfactant per 50 gal mix for aerial and 1 pt surfactant per 50 gal mix for ground application.	After sorghum grain has 25% or less moisture.	Grasses.	Apply on a bright sunny day when air temperature is above 85 degrees and relative humidity is below 65%. Broadleaf weeds may be defoliated but there will be little desiccation.

SMALL GRAINS

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preplant/Preemergence				
paraquat at 0.5 to 0.75 lb/A	Paraquat — 32 to 64 oz/A in a minimum of 10 gal by ground or 5 gal by air. Add NIS at 1 to 2 pt per 100 gal.	Before small grains (wheat, barley, oats, rye, and triticale) emerge.	Most small, emerged annual weeds and volunteer corn.	Apply as a broadcast spray. Use 32 ounces when applying to 1- to 3-inch weeds and 64 ounces to 6-inch or larger weeds. Do not apply under windy conditions or graze or feed treated forage to livestock.
glyphosate at 0.375 to 1.5 lb ae	See glyphosate table on pages 5-6 for rates.	Preplant for vegetation knockdown.	Consult label for list of weeds controlled.	Refer to the glyphosate formulation table on page 5 for surfactant/adjuvant recommendations for specific glyphosate formulations.
saflufenacil at 0.02 to 0.04 lb/A	2.85 lb/gal - Sharpen — 1 to 2 oz. in 5 or more gal by ground or 3 or more gal by air. Add MSO at 1% v/v (1 gal per 100 gal) plus AMS at 8.5 to 17 lb per 100 gal.	Preplant or preemergence check label.	Small, actively growing broadleaf weeds and preemergence activity on broadleaf weeds. Consult label for specific weeds.	Rainfall is required to activate this herbicide as a preemergence treatment. Use only with drill-planting method. Do not apply to emerged small grain. Broad-spectrum burndown control of grasses or broadleaf weeds usually requires a tank-mix partner with Sharpen. Consult the label for crop rotational intervals and Sharpen tank-mix partners. Small grain forage or hay can be fed or grazed 30 days after application.
Preplant/Preemergence — Wheat or Barley				
chlorsulfuron + metsulfuron at 0.008 to 0.020 + 0.0016 + 0.0039 lb/A	Finesse cereal and fallow — 0.2 to 0.5 oz/A.	Apply before or after planting but before wheat emerges.	Broadleaf weeds, annual bluegrass, volunteer corn, and non-ALS resistant ryegrasss.	Finesse cereal and fallow should not be used on soils with a pH above 7.9. Minimum rotational cropping interval for STS soybeans is 6 months; non-STS soybeans, corn, sorghum, and cotton require 18 months. The 0.5 ounce per acre rate is necessary for volunteer corn, annual bluegrass, and ryegrass activity. Annual bluegrass and ryegrass activity may be improved with a sequential application of metribuzin. Wheat seed planted less than 1 inch deep (broadcast seeding) are more susceptible to crop injury.
Delayed Preemergence to Early Postemergence — Wheat				
pyroxasufone at 0.05 to 0.08 lb/A	Zidua — 1 to 1.5 oz/A.	Apply after wheat seeds have germinated and have shoots longer than 0.5 inch, up until the 4th tiller stage.	Italian ryegrass, annual bluegrass, and many annual weeds.	Wheat must be planted with a drill to ensure complete seed coverage and sufficient seeding depth (0.5 to 1.5 inches) to minimize crop injury. Crop residue covering more than 25% of the soil surface may reduce herbicide effectiveness. **This herbicide** will not control germinated or emerged weeds.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Postemergence **—** *Wheat, Oats, Barley, or Rye*				
2,4-D amine at 0.48 to 0.96 lb/A; LV esters at 0.21 to 0.5 lb/A; or 2,4-D acid formulation at 0.21 to 0.7 lb/A	2,4-D amine — 1 to 2 pt of 3.8 lb/gal formulation; 2,4-D acid — 1 to 3.25 pt/A of 1.74 lb/gal formulation; LV esters — 0.5 to 1 pt/A of 4 lb/gal formulation; 6 to 13 oz/A of 4.7 lb/gal acid formulation.	After wheat is fully tillered, until stem elongation begins — Feekes Stages 3 to 5 (usually 4- to 8-inch-tall wheat). **Check the labels for rates and application stage.**	Wild mustards, vetch, buttercup, and pepperweed. Poor control of wild garlic, henbit, and curly dock.	Apply to emerged and actively growing weeds. This treatment may be applied in combination with liquid nitrogen fertilizer. Oats are less tolerant of 2,4-D than wheat. Do not apply when grains are in boot to dough stage.
dicamba + 2,4-D at 0.125 + 0.50 lb/A	Dicamba — 0.25 pt. plus 1 pt (4 lb/gal formulation) of 2,4-D amine or low-volatile ester in 5 gal water for air and in 10 to 20 gal water for ground application. Add 1 pt surfactant for each 50 gal spray mix.	Same as above.	Same as above. Garlic and/or onions.	Same as above. The low-volatile ester formulation should be used where wild garlic and/or onions are a problem. See the label for injury precautions and grazing restrictions for lactating dairy cows.
2,4-D acid + dicamba acid at 0.13 + 0.3 lb/A	Latigo at 1 pt/A of 1.8 lb/gal dicamba acid + 2.4 lb/gal 2,4-D acid formulation.	Same as above.	Same as above.	**Consult label for application instructions, injury precautions, and grazing restrictions.**
Early Postemergence **—** *Wheat, Barley, Rye or Triticale*				
pyrasulfotole + bromoxynil at 0.027 + 0.15 to 0.036 + 0.205 lb/A	Huskie — 11 to 15 oz/A at a minimum application spray volume of 10 gal by ground or 5 gal by air.	Apply to actively growing crops from 1 leaf up to flag leaf and young actively growing weeds.	Actively growing young winter broadleaf weeds.	**Check the label** for weeds that are controlled and those that are only partially controlled. Use 80- to 110-degree flat fan nozzles that deliver medium spray droplets and 50-mesh or larger screens. Do not use flood-jet or cone nozzles. Check the label for aerial application instructions.
Postemergence **—** *Wheat*				
chlorsulfuron + flucarbazone at 0.027 to 0.040 lb/A	Finesse Grass & Broadleaf — 0.6 to 0.9 oz/A. Add 0.25% nonionic surfactant, unless liquid N comprises at least 50% of the spray volume.	After wheat has 2 leaves but before jointing. After weed emergence.	Many annual broadleaf and grass weed species.	Finesse grass and broadleaf should not be used on soils with a pH above 7.9. The minimum rotational cropping interval for STS soybeans is 6 months under any soil pH; all field corn with soil pH 7.5 or lower can be recropped at 14 months. Unless a crop rotation interval is specified, a field bioassay must be completed (see label for specific directions). Treated wheat fields may be grazed at any time. Note: for best results, apply 5 to 7 days before grazing.
flufenacet + metribuzin at 0.136 to 0.34 + 0.034 to 0.085 lb/A	Axiom DF — 4 to 10 oz/A depending upon soil texture.	After wheat has emerged from spiking to 2-leaf stage.	Many annual broadleaf weeds, annual bluegrass, and ryegrass.	Wheat seed must be planted 1 to 2 inches deep (generally best achieved by drill-planting, rather than broadcast seeding methods). Axiom must be applied preemergence to weeds. Apply as a broadcast spray by ground equipment at 10 or more gal per acre. Do not add COC or other oil-based adjuvants with tank mixtures. Do not allow animal grazing for 30 days after application.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
mesosulfuron-methyl at 0.013 lb/A	Osprey - 4.75 oz/A in at least 10 gal/A of water by ground or 5 gal/A of water by air.	From wheat emergence through jointing. Ryegrass control normally best with fall application.	Annual ryegrass, annual bluegrass.	For best ryegrass control, apply on 1-leaf- to 2-tiller-stage ryegrass, when it is actively growing. Application of Osprey must include one of these two suggested adjuvant systems: (1) a high-quality MSO with 10% emulsifier or greater at a rate of 1.3 to 1.5 pints of MSO per acre; or (2) a nonionic surfactant at 0.5% v/v, plus either AMS (1.5 to 3 pounds per acre) or UAN (1–2 quarts per acre). Wheat injury may occur if topdress nitrogen is applied within 14 days of Osprey application. Do not apply within 30 days of forage harvest or within 60 days of hay, grain, and straw harvest.
metribuzin at 0.094 to 0.141 lb/A	Sencor DF 75% — 2 to 3 oz/A.	During the fall when wheat is actively growing and has at least 2 leaves and 1-inch secondary roots.	Annual bluegrass and annual broadleaf species.	Crop tolerance to Sencor may vary depending upon variety and wheat health and root development. Wheat seed planted less than 1 inch deep (broadcast seeding) are more susceptible to crop injury. Do not use on soils with less than 0.75% organic matter. Do not use COC or any adjuvant containing vegetable or petroleum oils. Do not apply in combination with fluid fertilizer.
pendimethalin at 0.71 to 1.43 lb/A	Prowl H2O — 1.5 to 3 pt/A. Rate is dependent upon soil texture. Apply no more than 2 pt/A on coarse-textured soils; 2 to 3 pt/A may be used on fine-textured (clay) soils.	After wheat is in the 1-leaf stage but before the flag leaf is visible. **Must be applied before weed emergence.**	Ryegrass and other small-seeded annual grasses and broadleafs.	Wheat seed should be planted at least 0.5 to 1 inch deep to avoid crop injury. Thus, application should generally be restricted to drill-planted wheat, seeded deeper than the specified depth. To control emerged weeds, Prowl H2O may be tank-mixed with postemergence herbicides registered for use in wheat. Prowl H2O will only provide residual weed control. Plant residue may inhibit weed control, so only use in prepared (tilled) seedbeds. Do not apply Prowl H2O within 11 days of wheat harvest for forage, 28 days for hay harvest, and 60 days for grain or straw harvest.
pyroxsulam HL at 0.26 lb/A	13% — PowerFlex HL at 2 oz/A in 10 gal or more by ground, or 5 gal or more by air. Add 0.25% nonionic surfactant with at least 80% active ingredient.	Apply in the fall or spring from 3-leaf to joint stage of actively growing wheat. Apply when grass weeds are at the 2-leaf to 2-tiller stage and before broadleaf weeds are taller than 2 inches or 2 inches in diameter.	Ryegrass and many annual grass and broadleaf weed species.	Do not tank-mix with dicamba or amine formulations of 2,4-D, MCPA, or organophosphate insecticides. Do not apply organophosphate products for 5 days before or 5 days after application. Do not use on wheat varieties sensitive to ALS herbicides. **Consult label for specific instructions on crop rotation restrictions, tank mix compatibility, tank cleanout, application with liquid N fertilizer, and harvest and grazing intervals.**

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Postemergence **—** *Wheat and Barley*				
pinoxaden at 0.053 lb/A	Axial XL — 16.4 oz/A. Surfactant is included.	Apply from 2-leaf to pre-boot stage wheat. Apply to 1-leaf to 2-tiller stage ryegrass.	Ryegrass and oats.	Additional surfactant is not required. For best control, apply to small, actively growing ryegrass. Axial XL may be mixed in a spray solution containing up to 50% nitrogen fertilizer. Only one application is allowed per crop season. Do not graze or harvest forage for hay for 30 days after application. Do not harvest for grain or straw for livestock feed within 60 days of application.
Postemergence **—** *Wheat, Oats, Rye*				
prosulfuron at 0.0178 lb/A	Peak 57 WDG — 0.5 oz/A in a minimum of 2 gal of water by air or 10 gal by ground. Add 1 pt nonionic surfactant for each 50 gal spray mix.	Over-the-top to wheat or oats from 3-leaf to internode elongation.	Most winter annual broadleafs, garlic.	See label for rate to use on weed height. See label for tank mixtures with dicamba. See label for restrictions. **Do not** plant cotton or non-STS soybeans for 10 months after application. Do not graze or feed forage for 30 days after application. Do not harvest for grain and silage for 60 and 40 days after application, respectively.
Postemergence **—** *Wheat, Oats, Triticale, or Barley*				
thifensulfuron + tribenuron at 0.014 to 0.028 lb/A	Harmony Extra SG with TotalSol — 0.45 to 0.9 oz/A. On oats, use 0.45 to 0.6 oz/A. Add 0.25% nonionic surfactant unless liquid N comprises at least 50% of the spray volume.	After the crop is in the 2-leaf stage but before the flag leaf is visible.	Winter annual broadleafs, wild garlic, and curly dock.	Apply to actively growing annual broadleaf weeds less than 4 inches tall or wide. For wild garlic control, use 0.75 to 0.9 ounces per acre when weeds are less than 12 inches tall with 2 to 4 inches of new growth. Wild garlic subjected to cold weather or stress will be more difficult to control. Two applications may be made per crop season provided the total amount does not exceed 1.5 ounces per acre. Allow at least 7 days between application and grazing or feeding forage to livestock, 30 days for feeding hay to livestock, and 45 days for grain harvest.
Preharvest **—** *Wheat*				
carfentrazone at 0.016 to 0.032 lb/A	Aim 2EC — 1 to 2 oz/A at a minimum application spray volume of 10 gal by ground or 5 gal by air. Add 1 qt of nonionic surfactant or 1 to 2 gal of a crop oil concentrate (COC) per 100 gal of water.	Apply after wheat has reached physiological maturity (30% grain moisture) and at least 3 days before harvest.	Desiccation of broadleaf weeds, such as morningglories and pigweeds.	Thorough spray coverage is essential for satisfactory performance. Do not apply more than 2 ounces per acre per season. Aim 2EC may be tank-mixed with glyphosate to improve control of grasses and other weeds.
glyphosate at 0.37 to 0.75 lb/A	Several formulations. Consult label for specific use rates. Apply in 10 gal water or more by ground and 3 to 10 gal water by air.	After wheat has 30% or less moisture and at least 7 days before harvest.	Annual broadleaf and grass weeds, johnsongrass, marestail.	**Do not** use on wheat grown for seed. Avoid drift to nearby crops that are not Roundup resistant.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preharvest — *Wheat, Barley, or Triticale*				
saflufenacil at 0.022 to 0.044 lb	Sharpen — 1 to 2 oz/A at a minimum application spray volume of 10 gal by ground or 5 gal by air. Use of MSO + AMS is recommended.	Apply after wheat has reached physiological maturity (30% grain moisture) and at least 3 days before harvest.	Desiccation of susceptible broadleaf weeds.	**Do not apply** on labeled crops grown for seed production. Thorough spray coverage is essential for satisfactory performance. Allow up to 7 days for optimum desiccation, depending upon environmental conditions. Sharpen may be tank-mixed with glyphosate to improve control of grasses and other weeds.

PEANUTS

Cultivation is often justified as a supplement to chemical weed control. However, haphazard cultivation that disturbs the developing pegs or throws soil on the plant will reduce yield and quality. Southern blight (stem rot, *Sclerotium rolfsii*) is often more severe following such practices. Precision cultivation is recommended using flat sweeps set to run shallow in the middle. The use of fenders or shields to prevent soil movement onto the plants is a good practice. Rolling cultivators also can be used effectively, but gangs should be set for minimum soil shifting. Positive depth and lateral control of all cultivating equipment is recommended.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Preplant				
ethalfluralin	Sonalan 3EC — 1.5 to 3 pt in 10 to 20 gal water	Up to 3 weeks prior to planting.	Most annual grasses and many small-seeded annual broadleafs.	Mix uniformly with the top 2- to 3-inch depth soon after application. Bedding must not expose untreated soil. Use low rate for coarse soils and high rate for clay soils.
glyphosate at 0.375 to 1.5 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	Preplant to before crop emergence. Severe crop injury may result for applications made to emerging plants.	Several winter and summer annual, biennial, and perennial broadleaf weeds.	Use of flood-jets is not suggested. If tillage is intended after treatment, wait at least 3 days (7 days for perennial weeds) after application. **Avoid drift to nontarget species or areas**. Do not use with galvanized (zinc-coated) spray equipment.
paraquat at 0.5 to 1 lb/A	Several formulations. Consult label for specific use rates. Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant.	Preplant up to planting. (See specific instructions.)	Various winter and summer annual weeds.	Use higher rates as weed size increases. Do not make more than two applications.
Preplant or Preemergence				
diclosulan at 0.024	Strongarm 84 WG — 0.45 oz in 10 to 20 gal water	For preplant incorporation, apply to a seedbed that is relatively free of clods. For optimum results, apply Strongarm just before planting, before germination of weeds, and before emergence of the crop.	Provides general broadleaf weed control.	Incorporate into the top 1 to 3 inches of the final seedbed, using equipment that thoroughly mixes the soil. If surface-applied, at least 0.25-0.5 inches of supplemental moisture is needed to move Stongarm into the soil where weed germination occurs. Tank mix with grass herbicide. It offers poor control of sicklepod. Nutsedge control has been variable and inconsistent. Seed label for complete rotation restrictions: cotton=10 months; corn=18 months (10 months-IR hybrids); and soybeans=0 months.
imazethapyr at 0.063 lb/A	Pursuit — 4 fl oz (may be split 2 oz ppi or pre + 2 oz post). Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant	Preplant incorporated, preemergence, or split with post application.	Several broadleaf weeds and annual grasses, and yellow and purple nutsedge suppression.	Do not apply more than 4 fluid ounces per acre per season. Do not graze or feed treated forage to livestock. **Rotation restrictions:** cotton and sorghum — 18 months; small grains — 4 months.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
metolachlor at 2 to 2.5 lb/A	Dual Magnum — 1.6 to 2 pt in 10 to 20 gal water	For **preplant incorporation,** apply within 14 days of plant ing. For **preemergence** (surface application), apply at planting or after but before emergence of weeds or crop.	Most annual grasses, yellow nutsedge, and pigweed.	Incorporation should place the herbicide no deeper than 2 inches. If a dry period follows surface application, a shallow incorporation may be beneficial before peanuts emerge. Rainfall is required to activate surface-applied herbicides. Optimum control is obtained when rainfall occurs within 10 days after application.
acetochlor at 0.94 to 1.5 lb/A	Warrant — 1.25 to 2 qt	May be applied preplant, preemergence, or early postemergence.	Most annual grasses and annual broadleaf weeds including carpetweed, pigweed, purslane, Florida pusley, lambsquarters, nightshade, and waterhemp.	Preplant treatments must have cultivation or 0.5 to 0.75 inch of precipitation or overhead irrigation to move herbicide into the weed germination zone. Do not apply more than 4 quarts (3 pounds) per acre per season. Do not exceed three applications per season. Allow at least 7 days between sequential applications. Do not feed peanut hay or graze livestock within 90 days of application. Apply before weeds emerge, as this product will not control emerged weeds. Warrant may also be applied early postemergence at the listed rates before flowering. Warrant may be used in combination with other products to increase the weed control spectrum and for control of emerged weeds at the time of application.
pendimethalin at 1 lb/A	Several formulations. Consult label for specific use rates. Apply in at least 10 gal water by ground or 5 gal water by air.	60 days preplant up to 2 days after planting. (See specific instructions.)	Most annual grasses and some small-seeded broadleaf weeds such as pigweed and purslane.	Incorporate 1 to 2 inches deep. To prevent decreased pegging, adequate incorporation via equipment, overhead irrigation, or rainfall must occur within 48 hours of application.
sulfentrazone + carfentrazone at 0.074 + 0.008 to 0.17 + 0.02 lb/A	Spartan Charge — 3 to 7 fl oz. Apply in at least 10 gal water by ground or 5 gal water by air.	Preplant and preemergence up to 3 days after planting. (See specific instructions.)	Residual activity on nutsedge. Controls pigweed and morningglory, as well as many other summer annual broadleaf species.	Do not apply more than 7 fluid ounces per acre per 12-month period. Peanut chlorosis and stunting may occur at pH 7.0 and above, as well as under cold and wet growing conditions. Do not use on soils classified as sand, which have less than 1% organic matter. Do not irrigate when peanuts are cracking.
Preemergence				
alachlor at 2 lb/A	Lasso 4EC — 2 qt in 10 to 20 gal water by ground	At planting or after but before emergence of weeds or crop.	Most annual grasses and small-seeded broadleaf weeds such as pigweed.	Rainfall is required to activate the herbicide; optimum control is obtained when rainfall occurs within 10 days after application. **Rates up to 4 pounds of active ingredient may be used for hard-to-control weeds as specified on the label; e.g., yellow nutsedge. See label for restrictions.**
Because of the potential for above tolerance levels of alachlor metabolites, certain peanut buyers may require certification of peanuts grown without Lasso. Peanut producers should consult with buyers prior to using Lasso.				
flumioxazin 0.096 lb/A	Valor 51WDG 3 oz in 15 to 20 gal water	Apply immediately after planting, but no later than 2 days after planting.	Small-seeded broadleafs such as pigweed, teaweed, eclipta, horseweed, Florida beggarweed, and tropic croton. Valor will not control annual/perennial grasses, sicklepod, nutsedge, and cocklebur.	Apply immediately after planting but no later than 2 days after planting. **Do not** irrigate when peanuts are cracking. Rainfall or irrigation at cracking will cause temporary crop injury that should not result in reduced yields if applied according to the label. Agitation within the spray tank should continue until spray solution has been applied. Product should be applied within 6 hours of mixing.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Overlays and Tank Mix Combinations For a broad spectrum of grasses and broadleaf weeds, use of a combination of herbicides may provide greater control than single materials. This may be accomplished through tank mixtures or overlays of a preemergence over a preplant herbicide. Where overlays or combinations are used, they should be applied according to the prescribed rate and manner indicated on the respective labels.				
Postemergence				
2,4-DB at 0.2 - 0.4 lb/A	0.9 to 1.75 pt of a 1.75 lb/gal formulation or 0.8 to 1.6 pt of a 2 lb/gal formulation in 10 to 20 gal water	Two to 12 weeks after planting. Do not apply within 30 days of harvest.	Cocklebur, annual morningglory, common ragweed, and sicklepod.	**Do not** make more than two applications per season. **Do not** apply to peanuts within 30 days of harvest. **Do not** feed treated vines or peanut hay to livestock. **Do not** apply to peanuts if suffering from lack of water.
	Check individual 2,4-DB labels for different use rates and restrictions.			
acifluorfen at 0.125 to 0.5 lb/A	Ultra Blazer 2L — 0.5 to 2 pt in 5 to 10 gal water by aerial or 20 gal water by ground equipment. Select rate based on table. Add 1 to 4 pt **nonionic surfactant** per 100 gal of spray mixture as per label.	When seedling weeds are in 2- to 4-leaf stage.	See Rate Table.	**Do not apply** to crop or weeds under stress from weather, pests or other herbicides. **Do not apply** within 75 days of harvest. **Do not apply** more than 2 pints per acre during the growing season. Rainfall received within 6 hours of application may reduce control. Avoid drift to other crops such as cotton. Apply at 40 to 60 psi to thoroughly cover weeds. **Do not use** treated plants for feed or forage.

Ultra Blazer Rate Table

Hemp sesbania	0.5-1.0 pt	Common ragweed	1.5 pt
Showy Crotolaria	1.0 pt	Cocklebur	2.0 pt
Purple moonflower	1.5 pt	Copperleaf, hophornbeam	2.0 pt
Pitted Morningglory	1.5 pt	Groundcherry, cutleaf	2.0 pt
Redroot pigweed	1.5 pt	Other morningglories	
Smooth pigweed	1.5 pt	than above	2.0 pt

bentazon at 0.5 to 0.75 to 1 lb/A	Basagran 4E — 1 to 1.5 to 2 pt in 20 gal of water	Early postemergence while weeds are small and actively growing. Use medium to high rate for 6- to 10-inch cocklebur and 3- to 4-inch prickly sida. Late Cocklebur Rescue Treatment: apply 1.5 pints per acre to cocklebur before blooming up to 24 inches tall and repeat in 10 to 14 days. Only partial control may be obtained.	Several broadleaf weeds including cocklebur and prickly sida. Little or no control of most morningglory species at these rates.	Thorough weed coverage is essential. For band applications, use at least two nozzles per row and preferably three nozzles. Use a minimum of 40 psi pressure. **Do not apply** if peanuts show prior herbicide damage or during periods of drought or cold weather stress. **Do not apply** more than 2 quarts per acre per season and **do not feed** treated peanut forage to livestock. Peanut hay may be fed.
bentazon + acifluorfen 0.75 lb/A	Storm 4EC — 1.5 pt in 20 gal by ground. 10 gal minimum by air. Add 1 pt of **crop oil concentrate** per acre. However, 0.125% **nonionic surfactant** per 100 gal may be substituted.	From cracking through two expanded trifoliate leaves.	Several broadleaf weeds including cocklebur, prickly sida, sesbania, and pigweed.	**Do not apply** Storm to peanuts that have been subject to stress conditions. **Do not apply** more than a total of 1.5 pints of Storm within 75 days of peanut harvest.

Peanuts, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
carfentrazone-ethyl	Aim EC — Up to 2 fl oz/A	Apply more than 7 days before harvest.	Troublesome weeds present at harvest.	**Do not** apply more than 2 ounces per acre as a harvest aid. Only rotate field to a carfentrazone-ethyl-registered crop.
clethodim at 0.094 to 0.125	Several formulations — 6 to 8 oz + 1 qt crop oil concentrate in 10 to 20 gal water	Use the low rate for small (< 4 inches tall) annual grasses and high rate for larger annual or perennial grasses or in heavy populations of annual grasses.	Most annual and perennial grasses.	Apply over the top of actively growing grasses. **Do not** apply (1) within 40 days of harvest, (2) more than 32 ounces per acre per season, (3) if rainfall is expected within 1 hour, or (4) to stressed plants.
diclosulan at 0.024	Strongarm 84 WG — 0.45 oz in 10 to 20 gal water	Apply up to 28 days after planting.	Tropical Spiderwort (*Commelina benghalensis*)	**Strongarm has a 24C label for control of tropical spiderwort in peanuts.** Apply when tropical spiderwort plants are small. Larger plants will be stunted, but will rarely die. Strongarm applied postemergence is also excellent on common ragweed, cocklebur, eclipta, bristly starbur, and wild radish, among other weeds.
imazapic at 0.5 to 1 lb/A	Cadre — 4 fl oz. Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant.	At crack to within 90 days of harvest.	Sicklepod, morningglories, pigweed, Florida beggarweed, common cocklebur and nutsedges.	Shallow cultivation may improve control of some species. Rainfall within 3 hours of application may reduce control. **Rotation restrictions:** cotton and sorghum — 18 months; small grains — 4 months.
imazethapyr at 0.063 lb/A	Pursuit — 4 fl oz (may be split 2 oz ppi or pre + 2 oz post). Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant	At crack or postemergence.	Several broadleaf weeds and annual grasses, and yellow and purple nutsedge suppression.	Do not apply more than 4 fluid ounces per acre per season. Do not graze or feed treated forage to livestock. **Rotation restrictions:** cotton and sorghum — 18 months; small grains — 4 months.
lactofen at 0.195 lb/A	Cobra 2EC — 12.5 oz	Apply after peanuts reach the 6-true-leaf stage.	Provides good control of pigweeds, morningglories, ragweed, copperleaf, wild poinsettia, and eclipta.	Use COC at 1% v/v. Preharvest interval is 90 days.
paraquat at 0.125 lb/A	Several formulations (3 lb/gal) — 5.4 fl oz Several formulations (2 lb/gal) — 8 fl oz	Apply at cracking or early postemergence up to 14 days after ground cracking. After that time, use in combination with Basagran or Storm.	Provides effective control of sicklepod, Florida beggarweed, Texas panicum, and many other problem weeds. When used alone, paraquat is not effective on smallflower morningglory, prickly sida, wild radish, or tropic croton.	Peanut foliage injury is usually temporary. Conditions of high humidity, wet foliage, and/or wet soils result in greater foliage burn. Thrips injury retards crop recovery.

Peanuts Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
paraquat + bentazon 0.127 lb/A + 0.25 to 0.5 lb/A	Several paraquat formulations. Consult label for specific use rates. Basagran 0.5 pt to 1 pt. Apply in 20 gal water by ground. Add 0.125% v/v 80% active nonionic surfactant.	From cracking through 28 days after ground crack.	Small, emerged annual grasses and many broadleaf weeds.	**Do not apply** after flower initiation. **Do not make more than two applications per crop.** One pint of Basagran is needed for nutsedge control. Use 0.5 pint of Basagran if it is added only as a safener.
sethoxydim at 0.18 to 0.38 lb/A	Poast Plus 1E — 1.5 to 3 pt in 5 to 10 gal water by air or 5 to 20 gal water by ground. Always add a **crop oil concentrate** at 1 qt/A.	Apply to actively growing grasses.	Most annual grasses, seedling and rhizome johnsongrass, bermudagrass, and red rice.	Peanuts at all stages of growth are tolerant. Apply over the top of peanuts or as a semi-directed spray to the grasses. **Do not apply** (1) to grasses under drought stress or herbicide injury; (2) if rainfall is expected within one hour after application; (3) within 40 days of harvest.

Grass	Growth Stage (inches)	Poast (oz/A)
Goosegrass and crabgrass	up to 6	24
Other annual grasses and seedling johnsongrass	up to 8	24
Rhizome johnsongrass	15 to 20	24
regrowth	6 to 12	24
Bermudagrass	stolons up to 6	36
regrowth	stolons 1 to 4	24
Red rice	up to 4	48

Rope Wick

paraquat 0.2 to 0.25 lb/A	Gramoxone SL 2.0 — mix 1 part Gramoxone to 1–1.5 parts water for a 40–50% solution. Add 0.25% v/v 80% active nonionic surfactant (2 pt/100 gal finished volume). Calibrate to apply up to 2 pt/A of herbicide-water mixture.	Apply when height differential is achieved between target weeds and peanut canopy. Position applicator at least 6 inches above peanut canopy.	Controls or suppresses glyphosate-resistant Palmer amaranth pigweed; prevents or minimizes seed production.	Apply through a recirculating rope or carpet roller wicking applicator. Set to avoid dripping onto peanut canopy. Use low ground speed (less than 5 mph) for best wipe coverage and weed control. If possible, treat in the late afternoon or early evening to enhance control of large weeds. **NOTE (State Label 24c)**

Restrictions

- Do not apply more than 1 pint per acre of Gramoxone SL2 in a single application.
- Do not exceed 1 quart per acre of Gramoxone SL2 for the entire growing season.
- Do not apply less than 30 days before harvest.
- Do not allow livestock to graze a treated area.
- Do not feed plants from a treated field to livestock.

FORAGE CROPS

MSMA is not labeled, and is therefore illegal, to apply to bermudagrass or other forage grasses grown for livestock consumption.

REPLANTING RESTRICTIONS FOR FORAGES ***(See product labels for crops not listed.)***[1]

	Legumes		Pasture Grasses			
Product	Alfalfa	Clover	Bahia	Bermuda	Fescue	Rye
2,4-D+Dicamba+Metsulfuron at 0.25 oz/A plus 1 pt/A	4 m	4 m	-	4 m	4 m	4 m
2,4-D+Picloram	1 y	1 y	3 w	3 w	3 w	3 w
2,4-D+Triclopyr	3 w	3 w	3 w	3 w	3 w	3 w
Chaparral	bioassay	bioassay	ns	ns	fall	ns
Cimarron Plus at 0.25 oz/A	4 m	4 m	-	4 m	4 m	4 m
Dicamba (per pint applied per acre)	120 d	120 d	30 d	30 d	30 d	30 d
Diuron	2 y	2 y	2 y	2 y	2 y	2 y
Glyphosate	1 w	1 w	1 w	1 w	1 w	1 w
Grazon Next	bioassay	bioassay	-	-	-	-
Imazapyr	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Lineage Clearstand	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Metsulfuron	bioassay	bioassay	ns	ns	fall	fall
Milestone	bioassay	bioassay	-	-	-	-
Maverick/Outrider	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Overdrive	30 d	30 d	30 d	30 d	30 d	30 d
Paraquat	0 d	0 d	0 d	0 d	0 d	0 d
Pastora	12 m	12 m	-	4 m	-	4 m
Pasturegard	1 m	1 m	3 w	3 w[2]	3 w	3 w
Pursuit	4 m	4 m	40 m	40 m	40 m	4 m
Redeem R&P	bioassay	bioassay	14 d	14 d	14 d	14 d
Triclopyr	3 w	3 w	3 w	3 w	3 w	3 w
Surmount	bioassay	bioassay	12 m	12 m	12 m	12 m
Telar	bioassay	bioassay	bioassay	bioassay	bioassay	bioassay
Velpar	2 y	2 y	2 y	2 y	2 y	2 y

[1]D, m, w, and y following numbers in this table indicate days, months, weeks, and years, respectively.
[2]Interval applies to seeded bermudagrass cultivars.

WEED RESPONSE RATINGS FOR FORAGE HERBICIDES

Herbicides / Weeds	Bahiagrass	Bitterweed	Blackberry	Bulrush	Bullthistle	Buttercup	Chickweed	Cogongrass	Common Ragweed	Crabgrass	Curly Dock	Dogfennel	Eastern Red Cedar	Foxtail	Goldenrod	Groundsel	Henbit	Horsenettle	Horseweed	Johnsongrass	Lanceleaf Ragweed	Little Barley	Mullein	Multiflora Rose	Nutsedge	Osage Orange	Red Sorrel	Smartweed	Smooth Pigweed	Smutgrass	Tall Fescue	Tropical soda apple	Vaseygrass	Wild Garlic
Preemergence																																		
Diuron	N	H	N	-	N	H	H	N	H	H	N	N	-	H	N	N	H	N	H	N	N	H	N	N	N	N	R	H	H	N	N	N	N	N
Postemergence																																		
2,4-D amine	N	H	N	H	H	H	N	N	H	N	R	N	R	N	R	N	R	N	R	N	R	N	N	N	N	R*	N	R	R	N	N	N	N	N
2,4-D ester	N	H	N	R	H	H	R	N	H	N	R	N	R	N	R	N	R	N	R	N	R	N	N	R	N	R	N	R	R	N	N	N	N	R
2,4-DB	N	R	N	-	R	R	R	N	R	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	R	N	N	N	N	N
2,4-D+Dicamba	N	H	R	H	H	H	H	N	H	N	H	H	H	N	H	N	H	R	H	N	H	N	R	R	N	N	R	H	H	N	N	N	N	R
2,4-D+Picloram	N	H	R	H	H	H	R	N	R	N	H	H	H	N	H	R	R	R	H	N	R	N	R	R	N	H	H	H	H	N	N	R	N	R
2,4-D+Triclopyr	N	H	R	-	H	H	R	N	H	N	H	R	R	N	H	N	R	R	H	N	R	N	N	R	N	N	R	H	H	N	N	N	N	N
Buctril	N	N	N	-	N	R	R	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	R	R	N	N	N	N	N	N
Chaparral	N	N	H	N	R	H	R	N	R	N	R	N	R	N	H	-	R	R	R	N	R	N	N	R	N	-	R	R	H	N	N	H	N	R
Cimarron Max	H	H	H	R	H	H	H	N	H	N	H	H	H	N	H	H	H	R	H	N	H	N	H	H	N	N	H	H	H	N	R	N	N	H
Dicamba	N	H	R	N	H	H	H	N	H	N	H	H	R	N	H	N	H	R	H	N	R	N	N	R	N	R	H	H	H	N	N	N	N	N
Diuron	N	N	N	N	N	N	N	N	N	R	N	N	N	R	N	N	N	N	N	N	R	R	N	N	N	N	N	N	N	N	N	N	N	N
Glyphosate	H	R	R	R	N	R	R	R	R	R	R	R	R	R	N	N	N	N	R	R	N	R	N	R	N	N	R	R	R	R	H	R	R	H
Grazon Next	N	R	R	-	R	R	R	-	R	N	R	N	-	N	R	N	R	R	R	N	R	N	-	N	N	N	N	-	-	N	N	N	N	N
Imazapyr	N	N	N	N	N	R	R	R	R	N	N	R	N	R	N	N	R	N	N	R	R	R	R	R	R	N	R	R	R	N	R	N	R	N
Maverick/Outrider	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	H	N	N	N	N	R	N	N	N	N	N	N	N	N	N
Metsulfuron	H	H	R	N	R	H	H	N	N	N	H	N	R	N	N	H	H	N	R	N	N	N	H	R	N	N	H	H	H	N	N	N	N	H
Milestone	N	R	N	N	R	R	-	N	R	N	R	N	N	N	-	-	R	R	R	N	R	N	-	N	N	N	-	R	-	N	N	H	N	N
Overdrive	N	R	N	N	R	H	R	N	R	N	R	R	N	N	R	N	R	N	R	N	R	N	N	N	N	N	R	R	R	N	N	N	N	R
Paraquat	N	N	N	N	N	H	H	N	R	N	N	N	N	H	N	N	H	N	N	-	N	H	N	N	-	N	N	N	N	N	H	N	-	H
Pastora	R	-	R	N	N	H	R	N	-	N	-	-	N	R	-	-	R	R	R	R	-	-	-	N	N	-	-	-	-	-	-	N	R	-
PastureGard	R	R	H	N	R	R	R	N	R	N	H	R	R	N	R	R	R	R	R	N	R	N	R	H	N	H	R	R	R	N	R	H	N	R
Pursuit	-	-	-	N	N	N	-	H	N	R	N	N	N	N	-	-	N	-	-	R	R	R	-	-	N	R	N	-	H	N	N	N	N	N
Redeem R+P	N	H	N	N	H	H	H	N	H	N	H	H	R	N	H	R	H	R	R	N	H	N	R	N	N	N	R	H	R	N	N	N	N	H
Sethoxydim	N	N	N	N	N	N	N	N	N	R	N	N	N	R	N	N	N	N	N	N	N	R	N	N	N	N	N	N	N	R	N	N	N	N
Surmount	N	H	H	N	H	H	R	N	R	N	H	H	H	N	H	R	R	H	H	N	R	N	R	H	N	H	H	H	H	N	N	R	N	R
Telar	N	N	N	N	R	N	R	N	N	N	R	N	N	N	N	R	R	N	R	N	N	N	N	N	N	N	N	N	R	N	N	N	N	N
Triclopyr	R	R	H	N	R	R	R	N	R	N	H	R	R	N	R	R	R	R	R	N	R	N	R	H	N	H	R	R	R	N	R	H	N	R
Velpar	N	N	R	N	N	R	R	N	N	N	N	N	H	N	N	N	R	N	N	N	N	N	N	H	N	R	N	N	N	H	N	N	N	N

H = Highly recommended R = Recommended N = Not recommended *Cut surface treatment

Product	Dairy Animals				Meat Animals		Slaughter
	Lactating		Nonlactating				
	Grazing	Haying	Grazing	Haying	Grazing	Haying	
	(days)						
2,4-D amine[3]	7	30	7	30	0	30	3
2,4-D ester[3]	7	30	7	30	7	30	3
2,4-D + Dicamba	7	37	0	37	0	37	30
2,4-D + Picloram	7	30	0	30	0	30	3
2,4-D + Dicamba + Metsulfuron	7	37	0	37	0	37	30
Buctril							
spring treatment	30	30	30	30	30	30	-
fall/winter treatment	60	60	60	60	60	60	-
Butyrac							
established alfalfa	30	30	30	30	30	30	-
seedling alfalfa, clover	60	60	60	60	60	60	-
Chaparral	0	0	0	0	0	0	-
Clethodim	15	15	15	15	15	15	-
Cimarron Plus	0	0	0	0	0	0	–
Dicamba							
1/2 qt/A or less	7	37	0	0	0	0	30
1-2 qt/A	40	70	0	0	0	0	30
2,4-D + Triclopyr							
2 gal or less/A	14	NS[1]	0	7	0	7	3
2-4 gal/A	NS	NS	14[2]	14	14[2]	14	3
Diuron	70	70	70	70	70	70	-
Glyphosate							
legumes							
preplant, preemerge, at-plant <44 oz/A	0	0	0	0	0	0	-
>44 oz/A	56	56	56	56	56	56	-
alfalfa preharvest	1.5	1.5	1.5	1.5	1.5	1.5	-
spot treatment (<10% total acres)	14	14	14	14	14	14	-
renovation < 44 oz	1.5	1.5	1.5	1.5	1.5	1.5	-
renovation > 44 oz	56	56	56	56	56	56	-
grass pastures							
preplant, preemerge, renovation	56	56	56	56	56	56	-
spot or wiper treatment	14	14	14	14	14	14	-
Grazon Next	0	7	0	7	0	7	-
Imazapyr	0	7	0	7	0	7	-
Journey	0	7	0	7	0	7	-
Lineage Clearstand	0	7	0	7	0	7	–
Metribuzin	28	28	28	28	28	28	-
Metsulfuron	0	0	0	0	0	0	-
Milestone	0	0	0	0	0	0	-
Maverick/Outrider	0	14	0	14	0	14	-
Overdrive	0	0	0	0	0	0	-
Paraquat							
alfalfa/clover							
dormant/clover	-	60	-	60	-	60	-
between cuttings	30	30	30	30	30	30	-
bermudagrass, dormant	-	40	-	40	-	40	-
Pastora	0	0	0	0	0	0	0
PastureGard	NS	14	0	14	0	14	3
Pursuit	30	30	30	30	30	30	30
Prowl	45	60	45	60	45	60	-
Redeem R+P	14	NS	0	7	0	7	3
Sharpen	0	0	0	0	0	0	-
Sethoxydim	7	20	7	20	7	20	-
Surmount	14	7	0	7	0	7	3
Triclopyr							
2 qt or less/A	14	NS	0	7	0	7	3
2-4 qt/A	NS	NS	14[2]	14	14[2]	14	3
4-6 qt/A	NS	NS	14[2]	NS	14[2]	NS	3
Telar	0	0	0	0	0	0	-
Velpar	0	38	0	38	0	38	-

[1]NS indicates next season.
[2]If the area treated is less than 25 percent of grazing area, there is no restriction for nonlactating or meat animals.
[3]Restrictions vary among manufactured products. Refer to particular product label for specific restrictions.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Consult labels for approved adjuvants.

Herbicide use may require some waiting period before haying or grazing — SEE ABOVE.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preemergence				
Bermudagrass, at planting				
diuron at 0.8 to 2.4 lb/A	80 WP at 1 to 3 lb, or 4L at 1.6 to 4.8 pt/A in 25 gal water.	At sprigging.	Many annuals including signalgrass and some seedling perennials.	May temporarily burn emerged bermuda and permanently injure Alicia. For control of small emerged weeds, use low rate plus surfactant. SEE PAGE 92.
Sorghum-sudan hybrids				
atrazine at 1.6 lb/A	1.8 lb 90DF or 2 lb 80WP or 3.2 pt 4L in 25 gal water.	Sorghum should be completely germinated and emerged and weeds not more than 1.5 inches high.	Annual grass and broadleaf weeds.	**Do not** use on sand or loamy sand. May injure winter annuals that follow high rates.
Postemergence				
Alfalfa seedling				
bromoxynil at 0.25 to 0.37 lb/A	Buctril at 1 to 1.5 pt/A.	Fall or spring when majority of alfalfa has a minimum of 4 trifoliate leaves.	Annual broadleaf weeds.	**Do not** add surfactant or crop oil unless specifically recommended. SEE PAGE 92.
Alfalfa only				
clethodim at 0.094 to 0.125 lb/A	6 to 8 oz/A (2 lb/gal formulation) in up to 20 gal water with 1 qt/A crop oil concentrate.	To actively growing annual or perennial grasses.	Most grasses.	Do not apply more than 32 ounces per acre to alfalfa. Do not apply a broadleaf herbicide within 1 day before or after application.
Alfalfa, Clover, seedling and established				
imazethapyr at 0.05-0.09 lb/A	Pursuit at 3 to 6 oz/A with 0.25% nonionic surfactant or 1 qt/A crop oil concentrate and 1-2 qt/A liquid N fertilizer or 2.5 lb/A spray grade ammonium sulfate.	Seedling legumes with at least 2 fully expanded trifoliate leaves or established, dormant or semi-dormant alfalfa or between cuttings.	Broadleaf weeds and certain grasses.	**Do not** exceed 6 ounces per acre per year. **Do not** apply during the last year of the stand. **Do no**t feed, graze, or harvest alfalfa within 30 days of application. In the event of stand failure, **do not** reseed alfalfa within 4 months after application. This treatment will suppress growth of grasses, such as fescue, ryegrass, and small grains seeded with legumes.
sethoxydim at 0.19 to 0.47 lb/A	1 to 1.25 pt/A (1.5 lb/gal formulation) in up to 20 gal water at 40-60 psi by ground. Add 2 pt/A oil concentrate.	To actively growing grasses.	Most grasses.	Apply no more than 5 pints per acre in one season. SEE PAGE 92.
Alfalfa, established				
metribuzin at 0.38 to 0.75 lb/A	0.5 to 1 lb/A (75 DF) or 0.8 to 1.5 pt/A (4 lb/gal formulation) in 20 to 40 gal water.	Winter dormant established	Chickweed, henbit and other winter annuals.	Apply only to winter dormant alfalfa no earlier than 12 months after seedling. SEE PAGE 92.
paraquat at 0.28 lb/A	0.75 pt/A (3 lb/gal formulation) or 2.2 pt/A (2 lb/gal formulation) in 20 to 40 gal water.	After cuttings.	Annual grasses and broadleaf weeds.	Apply to stands at least 1 year old and within 5 days after cutting. Add 1 quart of nonionic surfactant per 100 gallons of spray solution. SEE PAGE 92.

Forage Crops, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
Grass pastures, established				
2,4-D at 0.5 to 1 lb/A	1 to 2 pt/A (4 lb/gal formulation) in 10 to 20 gal water.	To actively growing weeds.	Buttercup, bitter weed, woolly croton, and others, except dogfennel, horsenettle, and smartweed.	**Do not** treat during long droughts and to **annual legumes** until after seed production. SEE PAGE 92.
2,4-D LV ester at 0.5 to 1 lb/A	1 to 2 pt/A (4 lb/gal formulation) in 10 to 20 gal water.	November to March when crop is well established, weeds are young, but before flowering of weeds.	Mustard, turnips, dock, buttercup, and others.	Apply during a clear, warm, sunny period when weeds are young and tender. May injure young, tender ryegrass. Add 0.5 to 1 quart of surfactant per 100 gallons of spray solution for improved control especially when applied during cool weather. SEE PAGE 92.
2,4-D at 0.38 to 1.4 lb/A plus dicamba at 0.12 to 0.5 lb/A	1 to 4 pt/A (3.87 lb/gal formulation) in 20 to 40 gal water.	When weeds are young and actively growing.	Most broadleaf weeds and some hard-to-control weeds, such as dogfennel and smartweed.	Weeds should be less than 10 inches tall for lower rates. Same precautions as for dicamba alone. Clipping large weeds not dead in 2 to 3 weeks will improve control. SEE PAGE 92.
2,4-D at 0.24 to 2 lb/A plus picloram at 0.06 to 0.54 lb/A	1 to 8 pt/A or 1 to 2% solution (2.54 lb/gal formulation) in 20 to 40 gal water.	When weeds are actively growing and not stressed.	Most broadleaf weeds and some hard-to-control weeds, such as dogfennel, horsenettle, and woody brush.	Use lower rates early in the season when weeds are very small. Use higher rates for larger annual weeds or established perennials or woody brush. SEE PAGE 92.
aminopyralid at 0.06 to 0.11 lb/A	Milestone at 4 to 7 oz/A in 20 gal water with 0.25% v/v nonionic surfactant.	To actively growing broadleaf weeds.	Tropical soda apple, others.	Milestone will severely damage legumes. Do not plant legumes until successful field bioassay proves concentrations will not damage crop. Manure and urine from animals grazed on treated sites or fed treated hay within the last 3 days will injure legume or broadleaf plants. Manure should not be used in areas where sensitive broadleaf plants will be placed.
aminopyralid at 0.06 to 0.11 lb/A + 2,4-D at 0.5 to 0.9 lb/A	Grazon Next at 1.5 to 2.6 pt/A in 20 gal water with 0.25% v/v nonionic surfactant.	To actively growing weeds.	Broadleaf weeds.	Grazon Next will severely damage legumes. Do not plant legumes in treated areas until field bioassay proves herbicide residues will not damage crop. Manure and urine from animals grazed on treated sites or fed treated hay within the last 3 days will injure legumes or damage broadleaf plants. Manure should not be used in areas sensitive broadleaf plants will be placed.
aminopyralid at 0.04 to 0.13 lb/A plus Metsulfuron at 0.006 to 0.02 lb/A	Chaparral at 1 to 3.3 oz/A for broadcast or 2.5 to 3.3 oz/100 gal for spot treatments	Use lower rate for young, annual weeds and higher rate for older or perennial weeds.	Broadleaf weeds.	Treatments will severely injure legumes, bahiagrass, or fescue. Use nonionic surfactant at 1 quart per 100 gallons of spray; however, applications to tall fescue should not exceed 1 pint per 100 gallons. Do not rotate to any crop within 1 year after treatment. Do not plant forage legumes until bioassay verifies residues will not injure crop. Do not seed ryegrass within 4 months after application. Do not use treated plants or manure around desirable broadleaf plants. Do not move animals from treated fields onto fields with legumes without first moving into untreated field for 3 days.
chlorsulfuron at 0.01 to 0.06 lb/A	Telar at 0.25 to 1.33 oz/A.	Apply to young, actively growing annual weeds and while biennial or perennial weeds are still in rosette.	Annual and some biennial and perennials.	Make only one application per season. Do not exceed 1.3 ounces per acre per season. Add 1 to 2 quarts nonionic surfactant per 100 gallons of spray.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
dicamba at 0.25 to 2 lb/A	0.5 to 2 pt/A for broadcast or 25 to 50% solution in oil for individual stem or cut stump treatments (2.67 lb/gal formulation).	When weeds are actively growing for foliar treatments or prior to active spring growth for stem applications with oil.	Most broadleaf weeds and small brush.	**Do not** broadcast spray more than 1 quart per acre in one season. **Do not** exceed 1 pint per acre on small grains grown for pasture. SEE PAGE 92.
diflufenzopyr at 0.005 to 0.01 lb/A plus dicamba at 0.015 to 0.03 lb/A	Overdrive at 4 to 8 fl oz/A.	Apply to young, actively growing weeds.	Annual and perennial broadleaf weeds.	Use low rate for annuals, high rate for biennials and perennials. Add 1 quart of nonionic surfactant per 100 gallons of spray or 1.5 to 2 pints per acre of methylated seed oil. Do not exceed 8 ounces per acre per season. Do not plant any rotational crop within 30 days of application. Do not apply to small grains grown for grazing. SEE PAGE 92.
imazapyr at 0.03 to 0.75 lb/A	2 to 48 oz/A spot broadcast or 0.5 to 5% solution for handgun spot treatment (2 lb/gal formulation) with 0.25% v/v nonionic surfactant.	To actively growing weeds and woody species as foliar spray or to dormant trees and brush as injection, hack and squirt, or cut stump treatment.	Several annual and perennial grasses and broadleaf weeds plus vines and undesirable woody plants.	Do not treat more than 10% of the area grazed or cut for hay. Treatments will damage desirable forage species. Do not apply more than 48 ounces per acre per year.
imazapyr + metsulfuron at 0.03 to 0.4 + 0.005 to 0.06 lb/A	Lineage Clearstand at 0.8 to 10 oz in 20 gal water plus 0.25% nonionic surfactant (v/v).	To actively growing weeds and brush as foliar spray or to dormant trees and brush as injection, hack and squirt, or cut stump treatment.	Annual and perennial grasses and broadleaf weeds and brush.	Do not exceed 10 ounces per acre per year. Do not treat more than 10% of the area grazed or cut for hay. Treatments will damage desirable forage species.
pendimethalin at 0.8 to 3.5 lb/A	Prowl H_2O at 1.1 to 4.2 qt/A in 20 to 40 gal water.	Apply to dormant warm-season forage grasses only.	Annual grasses and small-seeded broadleaf weeds, such as spiny amaranth, bitterweed, and spurge.	Do not harvest hay less than 60 days or graze less than 45 days after application. Do not apply if surface water is on field. Do not apply more than 4.2 quarts per acre per season.
picloram at 0.44 to 0.89 lb/A plus fluroxypyr at 0.36 to 0.72 lb/A	Surmount at 3 to 6 pt/A or 0.5 to 2% solution for spot treatment.	Apply to actively growing weeds.	Many broadleaf weeds and hard-to-control perennial weeds and woody plants.	Use lower rate for small annual weeds, higher rates for larger annuals or established perennials. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray. SEE PAGE 92.
saflufenacil at 0.02 to 0.08 lb/A	Sharpen at 1 to 4 oz in 20 gal water with 1% methylated seed oil (MSO). Add AMS at 1 to 2% w/v for applications to dormant forage grasses.	Before weeds exceed 3- to 6-inch height.	Broadleaf weeds	Do not exceed 1 ounce per acre per application when applied to actively growing bermudagrass or apply to actively growing bahiagrass, buffalograss, or switchgrass. Do not apply more than 6 ounces per acre per season. Do not apply to annual grass forages, alfalfa, or clovers.

Forage Crops, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
triclopyr at 0.25 to 2 lb/A	1 to 4 pt/A broadcast, 1 to 1.5% solution for spot spraying weeds, or 20 to 33% solution with oil for dormant woody stem (4 lb/gal formulation).	When weeds are actively growing for broadcast or spot sprays or before bud break for applications with oils to woody stems.	Broadleaf weeds and woody vines, shrubs, and trees.	Add 1 to 2 quarts nonionic surfactant per 100 gallons with broadcast sprays. SEE PAGE 92.
triclopyr at 0.42 to 1.1 lb/A + clopyralid at 0.14 to 0.38 lb/A	Redeem R&P at 1.5 to 4 pt/A	To actively growing grasses.	Broadleaf weeds.	Use lower rates for weeds such as bitter sneezeweed, ragweed, thistle, marshelder, and croton; higher rates for spiny pigweed, horsenetle, and dogfennel.
triclopyr at 0.38 to 1.5 lb/A plus fluroxypyr at 0.125 to 0.5 lb/A	PastureGard at 2 to 8 pt/A for broadcast applications, or 1 to 2% solution for spot treatment, or 50:50 mix with oil and 10% penetrant for individual woody stem or cut stump treatment.	Apply foliar treatments to weeds that are actively growing and not stressed, and mixtures with oils to dormant stems.	Broadleaf annual and perennial weeds, including tropical soda apple, or woody perennials, such as vines, brambles, shrubs, and trees.	Use low rates for small annual weeds, higher rates for large annuals or perennials. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray for applications. SEE PAGE 92.
triclopyr at 0.25 to 1 lb/A + 2,4-D at 0.5 to 2 lb/A	1 to 4 qt/A or 1 to 1.5% solution with water for broadcast or 1 to 4% solution with oil (3 lb/gal formulation) for dormant woody stems.	When weeds are actively growing for broadcast applications or just before breaking dormancy for woody stem treatments.	Annual and perennial broadleaf weeds and some woody vines and shrubs.	Adding 1 to 2 quarts of nonionic surfactant per 100 gallons of spray may enhance control. Do not reseed pastures within 3 weeks after treatment. Do not exceed 4 quarts per acre per season. Do not apply to newly seeded grasses until after tillering. SEE PAGE 92.
Bermuda and Bahiagrass, established				
hexazinone 0.69 to 1.13 lb/A	Velpar L 2.75 to 4.5 pt/A.	To actively growing smutgrass from May to October 15.	Smutgrass and many broadleaf weeds.	**Do not** apply near the root system of desirable woody plants such as oak trees. Apply with 1 quart of surfactant per 100 gallons of water. SEE PAGE 92.
sulfosulfuron at 0.06 to 0.09 lb/A	Maverick/Outrider at 1.3 to 2 oz in 20 gal water with 0.25% nonionic surfactant (v/v).	To actively growing weeds.	Johnsongrass, sedges, ryegrass, mustards, and buttercup.	Sequential applications can be made no sooner than 40 days after the previous treatment. Do not exceed 2.66 ounces per acre per year.
Bermudagrass, established				
imazapic + glyphosate at 0.06 to 0.19 + 0.1 to 0.4 lb/A	Journey at 10 to 32 oz/A broadcast or as 0.625 to 13% solution for spot treatments.	To actively growing weeds	Vaseygrass, Johnsongrass, crabgrass, signalgrass, barnyardgrass, sandbur, and nutsedge	Methylated seed oil is preferred over nonionic surfactant. Use 1.5 to 2 pints per acre for broadcast or 1% for spot applications. Do not apply during transition from dormant to active growth. Do not apply to 'World Feeder,' Tifton 85, or hybrid bermudagrass. Do not exceed 21 ounces per acre on Coastal bermudagrass. Do not apply within 30 days of aeration. Bermudagrass growth will likely be suppressed 30 days.
metsulfuron methyl 0.0038 to 0.015 lb/A	Metsulfuron at 0.1 to 0.4 oz/A in a minimum of 10 gal/A or 1 oz/100 gal for spot applications.	To actively growing weeds. For bahiagrass control, use 0.3 oz after green-up and before seedhead formation.	Pensacola bahia, wild garlic, buttercup, bitter sneezeweed, pig- weed, and woolly croton.	Add 0.5 to 1 quart of nonionic per 100 gallons of spray solution surfactant. Will not control Argentine bahiagrass. **Do not apply to Bahiagrass pastures.** Following Cimmarron applications at 0.1 to 0.3 ounce per acre, red, white, or sweet clover, bermudagrass, ryegrass, or tall fescue can be planted after 4 months; wheat after 1 month; barley or oats after 10 months. Do not apply more than 1.67 ounce per acre per season. Do not use on soils with pH above 7.9.

Forage Crops, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
metsulfuron + 2,4-D + dicamba 0.004 to 0.011 + 0.36 to 0.72 to 1.4 + 0.125 to 0.25 to 0.5	Cimarron Max 0.1 to 0.3 oz/A Part A + 1 to 2 to 4 pt/A Part B	To actively growing weeds	Bahiagrass, woolly croton, bitter sneezeweed, vetch, dock, garlic dogfennel, marestail, blackberry, multiflora rose, and many other annual and perennial weeds	Add 1 quart of nonionic surfactant per 100 gallons of finished spray solution. Does not control 'Argentine' bahiagrass. Do not apply more than 1.67 ounces of Part A per acre per season.
nicosulfuron at 0.35 to 0.53 lb/A + metsulfuron methyl at 0.009 to 0.014 lb/A	Pastora at 1 to 1.5 oz/A with 0.25% nonionic surfactant (v/v)	To actively growing annual grassy weeds less than 2 inches tall, annual broadleaf weeds less than 4 inches tall, and some perennial weeds.	Johnsongrass, vaseygrass, ryegrass, and many broadleaf weeds	Crop oil concentrate at 1% (v/v) may increase weed control but may also increase potential for bermudagrass injury. Bermudagrass must be established for at least one season before application.
Bermudagrass, dormant				
paraquat at 0.25 to 0.5 lb/A	1 to 2 pt/A (2 lb/gal formulation), 0.8 to 1.6 pt/A (2.5 lb/gal formulation), or 0.6 to 1.3 pt/A (3 lb/gal formulation) in 20 to 40 gal water with 0.25% v/v nonionic surfactant.	Mid-March.	Emerged annual broadleaf weeds and grasses in dormant bermuda.	Add 1 quart of nonionic surfactant per 100 gallons of spray solution. Must be applied prior to seed head emergence for satisfactory control of little barley. SEE PAGE 92.
Bermudagrass and Bahiagrass, sod suppression				
paraquat at 0.25 to 0.5 lb/A	1 to 2 pt/A (2 lb/gal formulation), 0.8 to 1.6 pt/A (2.5 lb/gal formulation), or 0.6 to 1.3 pt/A (3 lb/gal formulation) in 20 to 40 gal water with 0.25% v/v nonionic surfactant.	Early fall to sods not exceeding 3 inches in height.	Supresses summer grass while winter annuals establish.	Add 1 quart of nonionic surfactant per 100 gallons of spray. SEE PAGE 92.
Endophyte-Infested Tall Fescue Destruction				
paraquat 0.25 to 0.5 lb/A	1 to 2 pt/A (2 lb/gal formulation), 0.8 to 1.6 pt/A (2.5 lb/gal formulation), or 0.6 to 1.3 pt/A (3 lb/gal formulation) in 20 to 40 gal water with 0.25% v/v nonionic surfactant followed by a second application 10 to 21 days later at the same rate.	When fescue is actively growing.	Endophyte-infected fescue and annuals.	Add 0.5 or 1 quart of nonionic surfactant per 100 gallons of spray solution. If new growth appears within 10-14 days, make a second application. Do not exceed 3 pints per acre. SEE PAGE 92.
glyphosate at 0.75 lb/A	Glyphosate 4/5 lb/gal at 2/1.2 pt in 3 to 10 gal water plus 0.5 to 1% surfactant	When fescue is actively growing in the fall and plants are 6 to 12 inches tall.	Endophyte-infected fescue and other annual plants.	A sequential application of 1 pint plus surfactant will improve long-term control. SEE PAGE 92.

TURF GUIDELINES

TURFGRASS TOLERANCE TO HERBICIDES

Herbicide	Common Bermuda	Hybrid Bermuda	Centipede	St. Augustine	Zoysia
2,4-D	Yes	Yes	Yes	S	Yes
2,4-D + 2,4-DP	Yes	Yes	Yes	S	Yes
2,4-D + dicamba	Yes	Yes	Yes	S	Yes
2,4-D + MCPP	Yes	Yes	Yes	S	Yes
2,4-D + MCPP + dicamba	Yes	Yes	Yes	Y/N[1]	Yes
2,4-D + MCPP + dicamba + carfentrazone	Yes	Yes	Y/N	Y/N	Yes
2,4-D + clopyralid + dicamba	Yes	Yes	No	No	Yes
asulam	-	Yes	-	Yes	-
atrazine	Yes	Y/N	Yes	Yes	Yes
benefin	Yes	Yes	Yes	Yes	Yes
benefin + oryzalin	Yes	Yes	Yes	Yes	Yes
bensulide	Yes	Yes	Yes	Yes	Yes
bentazon	Yes	Yes	Yes	Yes	Yes
bromoxynil	Yes	Yes	-	Yes	Yes
bentazon + atrazine	Yes	Yes	Yes	Yes	Yes
carfentrazone	Yes	-	Yes	Yes	Yes
chlorsulfuron	Yes	Yes	-	-	-
clopyralid	Yes	Yes	Yes	Yes	Yes
clopyralid + triclopyr	Yes	Yes	-	-	-
dicamba	Yes	Yes	Yes	Yes	Yes
diclofop	Yes	Yes	-	-	-
dithiopyr	Yes	Yes	Yes	Yes	Yes
DCPA	Yes	Yes	Yes	Yes	Yes
fenarimol	Yes	Yes	-	-	-
fenoxaprop	S	S	S	S	Yes
flazasulfuron	Yes	Yes	Y/N	S	Yes
fluazifop	S	S	S	S	Yes
foramsulfuron	Yes	Yes	-	-	-
halosulfuron	Yes	Yes	Yes	Yes	Yes
imazaquin	Yes	Yes	Yes	Yes	Yes
isoxaben	Yes	Yes	Yes	Yes	Yes
MCPP	Yes	Yes	Yes	Yes	Yes
mesotrione	S	S	Yes	Y/N	S
metolachlor	Yes	Yes	Yes	-	Yes
metribuzin	Yes	Yes	-	-	-
metsulfuron	Yes	Yes	Yes	Yes	Yes
MSMA	Yes	Yes	S	S	Yes
MSMA + metribuzin	Yes	Yes	-	-	-
oryzalin	Yes	Yes	No	Yes	Yes
oxadiazon	Yes	Yes	Yes	Yes	Yes
pendimethalin	Yes	Yes	Yes	Yes	Yes
pronamide	Yes	Yes	Yes	Yes	Yes
prodiamine	Yes	Yes	Yes	Yes	Yes
quinclorac	Yes	Y/N	S	S	Yes
quinclorac + sulfentrazone	Yes	Yes	S	S	Yes
rimsulfuron	Yes	Yes	-	-	-
sethoxydim	S	S	Yes	S	S
simazine	Yes	Yes	Yes	Yes	Yes
sulfentrazone	Yes	Yes	Yes	Y/N	Y/N
sulfosulfuron	Yes	Yes	Yes	Yes	Yes
trifloxysulfuron	Yes	Yes	-	-	Yes

[1] Use only products with a 0.5 : 1 : 0.1 ratio of 2,4-D: MCPP: and dicamba on St. Augustinegrass

S Indicates susceptible, herbicide known to severely damage or kill turfgrass.

Yes Indicates tolerant when applied according to label directions.

Y/N Indicates intermediate, use with caution, or at reduced rates. Consult label for product use instructions and restrictions prior to considering use.

- Indicates not labeled or data not available.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

ESTIMATED PREEMERGENCE CONTROL

Weeds	atrazine	benefin	bensulide	benefin + oryzalin	benefin + trifluralin	dithiopyr	fenarimol	isoxaben	metolachlor	oryzalin	oxadiazon	oxadiazon + prodiamine	pendimethalin	prodiamine	pronamide	simazine
annual bluegrass	G	G	G	G	G	E	E	N	-	E	G	-	E	E	E	E
bahiagrass	-	G	G	G	-	-	-	-	-	G	G	-	G	-	-	-
buttercup	N	N	N	N	-	-	N	-	-	N	F	-	N	-	-	N
carpetweed	-	G	G	G	-	-	N	F	-	G	E	-	N	-	-	E
chamberbitter	G	-	-	-	-	-	-	G	-	-	G	-	-	G	-	G
chickweed	E	N	F	F	G	-	N	E	-	G	F	-	G	-	F	E
clovers	G	N	N	N	-	-	N	G	-	N	N	-	N	-	-	F
crabgrass	F	G	E	E	G	E	N	N	G	E	G	E	E	E	-	F
dallisgrass	-	G	G	G	-	-	N	N	-	G	-	-	G	-	-	-
dandelion	-	N	N	N	-	-	N	G	-	N	N	-	N	-	-	F
dichondra	E	N	N	N	-	-	N	-	-	N	N	-	N	-	-	N
Florida betony	E	N	N	N	-	-	N	-	-	N	N	-	N	-	-	-
Florida pusley	E	N	F	F	-	-	N	F	-	N	-	-	N	-	-	G
goosegrass	F	F	F	F	G	G	N	-	-	G	E	E	G	E	-	N
ground ivy	N	N	N	N	-	-	N	-	-	N	G	-	N	-	-	G
henbit	-	N	N	N	-	-	N	G	-	N	G	-	N	-	-	E
knotweed	G	N	F	F	G	-	N	G	-	F	-	-	N	-	-	G
lawnburweed	G	N	N	N	-	-	N	-	-	N	F	-	N	-	-	E
lespedeza	G	N	N	N	-	-	N	-	-	N	-	-	N	-	-	F
pennywort	-	N	N	N	-	-	N	G	-	N	-	-	N	-	-	N
plantain	-	N	N	N	-	-	N	G	-	N	N	-	N	-	-	F
prostate spurge	-	N	N	N	-	-	N	F	-	N	G	-	F	-	-	G
sandbur	F	G	G	G	-	-	N	-	-	G	G	-	G	-	N	-
sherpherdspurse	-	N	N	N	-	-	N	E	-	N	G	-	N	-	-	E
speedwell	E	N	N	N	-	-	N	G	-	N	G	-	N	-	-	F
Virginia buttonweed	-	N	N	N	-	-	N	-	-	N	G	-	N	-	-	G
wood sorrel	G	N	N	N	-	-	N	G	-	F	G	-	F	-	-	G

E = Excellent, G = Good, F = Fair, N = No control, - = Data not available

ESTIMATED POSTEMERGENCE CONTROL

Weeds	asulam	atrazine	bentazon	chlorsulfuron	clopyralid	clopyralid + triclopyr	2,4-D	2,4-D + mecoprop	2,4-D + dicamba	2,4-D + mecoprop + dicamba	2,4-D + mecoprop + dicamba + carfentrazone	diclofop	dicamba	diquat	foramsulfuron	fenoxaprop	flazasulfuron	fluazifop	glyphosate	halosulfuron	imazaquin	mecoprop	mesotrione	metribuzin	metsulfuron	MSMA	MSMA + metribuzin	pronamide	quinclorac	rimsulfuron	sethoxydim	simazine	sulfentrazone	sulfosulfuron	trifloxysulfuron
annual bluegrass	-	E	N	N	N	N	N	N	N	N	N	-	N	G	E	N	F	-	E	N	N	N	N	G	N	N	N	E	-	E	F	E	N	G	E
bahiagrass	-	N	-	-	N	N	N	N	N	N	N	N	N	-	N	G	-	-	E	N	N	N	-	N	E	F	F	N	-	-	G	N	N	N	F
buttercup	-	N	-	-	-	G	F	G	G	E	E	N	E	F	-	N	-	N	E	-	-	F	-	G	-	N	N	-	-	-	N	N	-	-	-
carpetweed	-	E	-	-	N	-	G	G	G	G	G	N	G	N	-	N	-	N	E	-	-	F	Y	N	N	N	G	-	-	-	N	E	-	-	-
chamberbitter	-	G	-	F	-	-	-	-	-	-	-	-	-	-	-	-	F	N	-	-	N	-	-	-	G	-	-	-	-	-	-	G	-	N	F
chickweed	G	E	-	-	-	E	F	G	G	E	E	N	E	G	-	N	E	N	E	-	G	G	-	G	G	N	N	F	-	G	N	E	-	E	E
clovers	-	G	-	N	E	E	N	G	E	E	E	N	E	P	N	N	G	N	E	-	N	E	-	N	G	N	N	-	-	-	N	G	F	N	G
crabgrass	G	F	N	-	N	N	N	N	N	N	N	-	N	N	-	E	G	G	E	-	-	N	G	N	N	E	E	N	G	N	G	F	-	N	-
dallisgrass	N	N	N	-	N	N	N	N	N	N	N	N	N	N	F	N	P	-	E	N	N	N	N	N	N	E	E	-	-	N	F	N	N	N	-
dandelion	-	F	-	G	-	E	E	E	E	E	E	N	G	N	N	N	F	N	E	N	F	F	-	N	G	N	N	-	-	-	N	F	-	F	E
dichondra	-	N	-	-	-	-	F	G	G	G	-	N	G	N	-	N	P	N	E	-	-	-	-	N	N	N	N	-	-	-	N	N	-	-	-
Florida betony	-	N	N	N	-	G	N	-	G	G	G	N	G	N	-	N	-	N	E	N	N	-	-	N	E	-	N	-	-	-	N	-	-	-	-
Florida pusley	-	N	-	-	-	-	N	N	-	-	-	N	-	N	-	N	-	N	E	-	-	N	-	-	G	N	N	-	-	-	N	N	-	-	-
goosegrass	F	N	N	-	N	N	N	N	N	N	N	E	N	N	G	G	P	-	E	-	-	N	G	N	N	F	E	N	-	N	F	N	G	N	-
ground ivy	-	G	-	-	-	-	G	-	-	-	-	N	-	N	-	N	-	N	E	-	-	-	-	G	G	N	G	-	-	-	N	N	-	-	-
henbit	-	E	-	-	-	E	F	G	G	E	E	N	E	G	E	N	E	N	E	-	F	F	-	G	G	N	N	-	-	E	N	E	-	E	E
knotweed	-	G	-	-	G	-	F	G	G	G	-	N	E	N	-	N	-	N	E	-	-	G	-	N	E	N	N	-	-	-	N	G	-	-	N
kyllinga	-	-	-	N	N	N	N	N	N	N	N	N	N	-	N	N	-	N	E	F	F	N	-	-	N	-	-	-	-	-	N	N	E	E	G
lawnburweed	-	E	-	E	-	-	F	F	G	G	G	N	G	G	N	N	E	N	E	N	E	-	-	G	E	N	N	N	-	G	N	E	-	E	E
lespedeza	-	F	-	-	-	-	F	G	G	G	G	N	E	N	-	N	-	N	E	-	-	G	-	N	G	N	F	-	-	-	N	F	-	-	-
nutsedge, purple	N	N	N	-	N	N	N	N	N	N	N	N	N	N	-	N	F	N	G	E	E	N	-	N	N	F	F	N	-	-	N	N	G	E	E
nutsedge, yellow	N	N	E	-	N	N	N	N	N	-	N	N	N	N	-	N	F	N	G	E	E	N	-	N	N	F	F	N	-	-	N	N	G	E	E
path rush	-	-	-	N	-	-	G	-	-	G	-	-	N	-	-	N	P	N	E	-	N	-	-	-	N	-		-	-	-	-	-	-	N	-
pennywort	-	F	-	-	-	G	F	-	-	F	-	N	-	N	-	N	P	N	E	-	F	-	-	-	G	F	E	-	-	-	N	N	-	-	-
plantain	-	F	-	-	G	F	E	G	G	G	E	N	F	N	-	N	-	N	E	-	-	F	-	N	G	N	N	-	-	-	N	F	-	-	-
prostrate spurge	-	G	-	-	N	E	N	F	G	G	G	N	F	N	-	N	-	N	E	-	-	N	-	N	G	N	N	-	-	-	N	G	-	-	-
ryegrass	-	-	-	E	N	-	N	N	N	N	N	-	N	-	E	N	E	-	E	N	N	N	N	-	E	N	-	E	-	E	-	E	N	N	E
sandbur	-	-	-	-	N	N	N	N	N	N	N	-	N	N	N	-	-	-	E	-	-	N	-	N	N	G	E	N	-	-	F	-	-	-	-
shepherdspurse	-	E	-	-	-	-	G	G	G	G	G	N	G	G	-	N	-	N	E	-	-	F	-	G	G	N	N	-	-	-	N	E	-	-	-
speedwell	-	-	-	-	G	-	N	F	F	F	F	N	N	G	-	N	P	N	E	-	N	N	-	N	N	N	N	-	-	-	N	-	-	N	-
tall fescue	N	N	N	F	N	N	N	N	N	N	N	N	N	N	-	-	G	N	G	N	N	N	N	N	N	N	N	N	-	-	F	N	N	F	G
torpedograss	N	N	N	-	N	N	N	N	N	N	N	N	N	N	N	-	P	N	N	N	N	N	-	N	N	N	N	N	G	-	N	N	-	N	G
tufted lovegrass	-	N	-	N	N	N	N	N	N	N	N	N	N	-	N	G	P	G	E	N	N	N	E	N	N	N	N	-	N	N	N	N	G	N	N
Virginia buttonweed	-	N	-	G	-	F	N	F	G	G	G	N	F	N	-	N	P	N	E	-	N	N	-	N	F	N	N	-	-	-	N	N	-	N	-
wild garlic	-	N	-	-	N	F	F	F	F	F	F	N	F	N	F	N	P	N	G	-	E	N	-	N	F	N	N	N	-	E	N	N	F	N	E
wood sorrel	-	G	-	-	-	-	N	N	F	F	F	N	G	N	-	N	F	N	E	-	F	F	-	N	G	N	N	-	-	-	N	G	-	-	-

E = Excellent, G = Good, F = Fair, N = No control, - = Data not available

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
Preplant — *new lawns or other turf areas*					
methyl bromide	10 - 20 lb		435 - 870	Seed, vegetative structures of perennial weeds, nematodes and fungi	Apply when soil temperatures are above 60 ºF and before planting and soil is moist but not saturated with water. Spade or plow soil about 8-10 inches. Release chemical under a gas proof cover. **CAUTION: Deadly Gas**. Plant in soil 2-4 days after treatment. Follow label directions. **Additional Comments** **Restricted Use Pesticide**
metham	0.9 - 1.72 gal of 4.62 lb/gal	37.5 - 75 gal/A of 4.26 lb/gal	159 - 319	Dormant weed seed	Mix with water and apply uniformly to plowed soil. Water adequately after applying to seal the soil, and maintain soil moisture for next few days per label instructions, if a gas-proof cover is not used. Till 5-7 days after treating on sandy soil or 14 days on clay soil. Soil temperature should be above 60 ºF. Soil should be moist at the time of application. Although a gas-proof cover such as plastic is not required, efficacy is generally increased with one.
glyphosate	4.5 - 8.8 tbsp of 3 lb ae/gal 3.2 - 5.5 tbsp of 4 lb ae/gal 1.5 - 0.75 oz of 64.9% dry formulation	3 - 5 qt/A of 3 lb ae/gal 2.2 - 3.7 qt/A of 4 lb ae/gal 67 - 112 oz of 64% DF See table on pages 5-6 for other formulations	2.25 - 3.75 lb ae/A	Most annuals and perennials including bermudagrass	Turfgrass renovation. Follow label specification. **Do not** mow or till for 7 days after treatment. Turfgrass may be established as soon as control is accomplished. Consult label to determine if surfactant is needed.
diquat	0.5 - 0.75 fl oz of 2 lb/gal	16 - 32 fl oz/A of 2 lb/gal	0.25 - 0.5	Most annuals	Turfgrass renovation. Same as glyphosate. Use 0.25% v/v nonionic surfactant.
dazomet	8 lb of a 99G formulation	350 lb of a 99G formulation	347	Annual weeds and reduction of root-propagated weeds such as bermudagrass and sedges	Follow the label for tillage and water requirements both pre- and postapplication. Use lettuce seed bioassay to determine if it is safe to plant or sprig after application. For use on golf greens and tees.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
Preemergence — *lawns and general turf*					
Apply only to established warm-season turfgrasses. Most preemergence herbicides may not be applied during the establishment year. Consult labels for restrictions.					
Apply in sufficient water to insure uniform coverage.					
Apply before weeds emerge. Most preemergence herbicides have no postemergence activity.					
Irrigate with a minimum of 0.5 inch of water following application to activate.					
atrazine	0.75 - 1.5 fl oz of 4 lb/gal 0.4 - 0.8 oz of 90 WDG 3.74 - 5 lb of 20-0-20 containing 0.9% atrazine 3 lb of 35-0-0 containing 0.8% atrazine	1 to 2 qt/A or 4 lb/gal or 1.1 to 2.2 lb/A of 90%	1 - 2	Annual bluegrass, henbit, chickweeds, clovers, lawnburweed, and other broadleaf weeds	Apply after Oct. 1 for control of winter weeds or in late winter to control summer weeds. Use lower rate for annual bluegrass control and on hybrid bermudagrass. **Do not** make more than two applications per year. **Do not** use around trees and ornamentals. **Do not** use in areas overseeded with cool-season turfgrasses or in areas where water may move from treated areas to areas overseeded with cool season turfgrasses.
benefin	3 lb of 2.5 G	120 lb/A of 2.5 G	3	Crabgrass, annual bluegrass, and other grassy weeds	Apply March 1 for summer weed control. For winter weed control, apply in August or September. Follow directions on label. **Do not** use on golf-putting greens.
benefin + oryzalin	3.4 lb of 2G	150 lb/A of 2 G	3	Annual grasses including goosegrass	**Do not** use on golf greens.
benefin + trifluralin	6 - 8 lb of 0.86% on fertilizer or 2.25 - 3.50 lb of 2G	100 - 150 lb/A of 2 G	2 - 3	Annual grasses and some small seeded broadleaves	**Do not** use on golf greens.
bensulide	7 - 10 lb of 2 G	600 - 750 lb/A of 2 G	12 - 15	Crabgrass, annual bluegrass, and other grassy weeds	Same as benefin. If used on golf putting greens, apply at least 120 days before overseeding. Some root pruning can be expected.
DCPA	5.1 oz of 75 WP	14 lb/A of 75 WP	10.5	Crabgrass, annual bluegrass, creeping speedwell, and spurges	Early spring applications may be made to new turfgrass seedlings after the grasses have exhibited a uniform greening of the newly sprouted grass, preferably when 1 to 2 inches in height.
dithiopyr	1.5 fl oz of 1 lb/gal product or 0.35 oz of 40 WSP	2 qt/A of 1 EC 0.95 lb/A of 40 WSP	0.5 (EC) 0.38 (WSP)	Annual grasses	May be used early postemergence for crabgrass prior to tillering. Consult label for use directions and precautions.
fenarimol	4-6 fl oz of 1 lb/gal	1.36 - 2.04 gal/A of 1 lb/gal	1.36 - 2.04	Annual bluegrass	Use on bermudagrass greens to be overseeded with perennial ryegrass (two or three application sequence with the last application 2 weeks prior to overseeding). Consult label for timing restrictions for overseeded bentgrass and Poa trivialis.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
isoxaben	0.25 - 0.5 oz	0.66 - 1.33 lb/A of 75 DF	0.5 - 1	Annual broadleaf weeds	**Do not** apply to golf course greens or tees.
metolachlor	1-2 oz of 7.62 EC	1.3 to 2.6 pt/A of 2.62 EC	1.2 - 2.4	Yellow nutsedge	Apply before March 1.
oryzalin	1.1 + 1.1 fl oz of 4 lb/gal or 1 + 1 oz 75 WSP	1.5 + 1.5 qt/A of 4 lb/gal	1.5 + 1.5	Annual grasses including goosegrass	**Do not** use on golf greens. Make sequential application 8 weeks after initial application.
oxadiazon	2.5 - 4.5 lb of 2G	100 to 200 lb/A of 2 G	2 - 4	Goosegrass, crabgrass, and some small-seeded broadleaf weeds	**Do not** use on centipedegrass. **Do not** apply to golf greens. **Do not** apply to wet turfgrass.
oxadiazon + prodiamine	4.5 lb of 1.2 G on 38-0-0 fertilizer	200 lb/A of 1.2 G	2.4	Crabgrass, goosegrass, and some broadleaf weeds	**Do not** apply to wet foliage. Contains slow-release fertilizer.
pendimethalin	3 lb of 2 G or 2.5 lb of 2.45 G or 1.75 oz of 60 WDG or 2.7 fl oz of 3.3 lb/gal or 2.3 fl oz of 3.8 CS	150 lb/A of 2 G or 122 lb/A of 2.45 G or 5 lb/A of 60 WDG or 0.9 gal/A of 3.3 EC or 6.3 pt of 3.8 CS	1.5 - 3	Crabgrass, goosegrass, other grasses, and some small-seeded broadleaf weeds	Certain formulations or mixtures containing pendimethalin may be used on bermudagrass greens. Consult label for specific information. Also consult the label for residential and sod farm turfgrass, which is lower than the use rate for commercial turf.
prodiamine	0.36 - 0.83 oz of 65 WG or 0.5 - 1.1 fl oz of 4 FL	1 - 2.3 lb/A of 65 WDG or 21 - 48 fl oz/A of 4 FL	0.65 - 1.5	Annual grasses	Sequential applications may be needed, especially if goosegrass is the target weed. **Do not** make more than two applications per year, and do not apply more than 1.5 pounds of active ingredient per acre per year.
pronamide	0.367 oz of 50 WSP	1 lb/A of 50 WSP	0.5	Annual bluegrass	May also be used postemergence.
simazine	0.75 - 1.5 fl oz of 4 lb/gal	1 - 2 qt/A of 4 lb/gal	1 - 2	Annual bluegrass, henbit, chickweed, lawnburweed, and other grass and broadleaf weeds	Apply after Oct. 1 for control of winter weeds or during late winter to control summer weeds. Use lower rate for annual bluegrass control and on hybrid bermudagrass. **Do not** make more than two applications per year. **Do not** use around trees and ornamentals. **Do not** use in areas overseeded with cool-season turfgrasses or in areas where water may move from treated areas to areas overseeded with cool-season turfgrasses. May also be used postemergence (uptake only through soil, irrigate following application to activate).

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
Postemergence					
Use postemergence herbicides when weeds are actively growing, preferably when weeds are in the seedling stage.					
Apply postemergence herbicides in sufficient carrier (water) to provide good coverage, usually 25 – 30 gallons per acre.					
A nonionic surfactant may enhance control. Consult labels to determine if surfactant should be used.					
Appy when temperatures are sufficient for active growth of weeds. For MSMA and other arsenicals, temperature should be above 80 ºF. For phenoxy herbicides (2,4-D, etc) temperatures above 70 ºF are desirable. Always consult the product label for temperature requirements for maximum efficacy.					
2,4-D (amine) Bermudagrass Centipedegrass Zoysiagrass	1.5 tbsp of 4 lb/gal	1 qt/A or 4 lb/gal	1	Dandelion, dock, plantain, certain clovers, wild garlic, VA buttonweed, other broadleaf weeds	Apply when weeds are young and actively growing. Repeat applications may be necessary. Use low pressure (25 psi) and avoid spray drift onto susceptible flowers and shrubs. Use 0.5 lb on 'Tifgreen' and 'Tifdwarf' bermudagrass.
2,4-D + dicamba Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	5 tbsp of 1.25 + 0.125 lb/gal	0.8 gal/A of 1.25 + 0.125 lb/gal	1.0 + 0.1	Many broadleaf weeds	Consult product label for turfgrass tolerance. Labeling varies. **Do not** use more than 0.5 pound ae per acre of 2,4-D per application in St. Augustinegrass. **Do not** use within drip line of trees or shrubs. **Do not** use more than a total of 1.5 pounds of 2,4-D + dicamba having a ratio 8:1 to 10:1. See 2,4-D and dicamba for additional comments.
2,4-D + mecoprop Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	3 tbsp of 0.88 + 0.88 lb/gal	0.56 gal/A of 0.88 to 0.88 lb/gal	0.5 + 0.5	Spurges, clovers, and other broadleaf weeds	Observe precautions for 2,4-D. Consult product label for turfgrass tolerance. **Labeling varies. Do not** use more than 0.5 pound ae per acre of 2,4-D per application in St. Augustinegrass. **Do not** exceed total of 1.5 pounds of this combination per acre.
2, 4-D + mecoprop + dicamba Bermudagrass Centipedegrass Zoysiagrass	1.2 - 1.5 fl oz of 2.03 + 1.08 + 0.21 lb/gal	3 - 4 pt/A	1 + 0.5 + 0.1	Broad spectrum of broadleaf weeds	Many three-way products of this type **[1 : 0.5 : 0.1 ratio of 2,4-D : mecoprop : dicamba]** are available. Labeling varies; most are labeled for use on bermudagrass and zoysiagrass. Few are labeled for use on St. Augustinegrass, and then only at reduced rates. Few with this ratio are labeled for use in centipedegrass. **Consult product labels for specific labeling, including restrictions. Do not** use within drip lines of trees or shrubs. Observe precautions for each component part.

Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
2,4-D + mecoprop + dicamba Bermudagrass Centipedegrass Zoysiagrass St.Augustinegrass	0.4 - 0.56 fl oz of 1.5 + 2.77 + 0.31 lb/gal	1 - 1.5 pt/A	0.28 + 0.52 + 0.05	Broad spectrum of broadleaf weeds	A few three-way products of this type **[0.5 : 1 : 0.1 ratio of 2,4-D: mecoprop : dicamba]** are available. Although many of these products may be used on all warm-season turfgrasses, they are targeted for use in St. Augustinegrass.
2,4-D + MCPP + dicamba + carfentrazone Bermudagrass Zoysiagrass	0.75 - 1.5 fl oz of 0.05 + 1.53 + 0.48 + 0.14 lb/gal	2 - 4 pt	0.025 + 0.75 + 0.24 + 0.07	Broad spectrum of broadleaf weeds	**Do not** use on St. Augustinegrass or centipedegrass. Consult label for restrictions. Do not use within drip lines of trees or shrubs. Do not apply when temperatures exceed 90 ºF.
2,4-D + MCPP + dicamba + carfentrazone St. Augustinegrass Centipedegrass Bermudagrass Zoysiagrass	0.75 - 1.8 fl oz of 0.04 + 0.52 + 0.2 + 0.05 lb/gal	2 - 5 pt	0.025 + 0.325 + 0.125 + 0.031	Broad spectrum of broadleaf weeds	**Do not** use more than 4 pints per acre except on common bermudagrass. Consult label for restrictions. Do not use within drip lines of trees or shrubs. Do not apply when temperatures exceed 90 ºF.
2,4-D + clopyralid + dicamba Bermudagrass Zoysiagrass	0.72 - 1.1 fl oz of 3 - 0.375 + 0.375 lb/gal	2 - 3 pt/A	1.25 + 0.14 + 0.14	Broad spectrum of broadleaf weeds	**Do not** use on centipedegrass or St. Augustinegrass. Not labeled for use on sod farms.
asulam St. Augustinegrass Tifway Bermudagrass	3 - 4 tbsp of 3.34 lb/gal	5 pt/A	2	Crabgrass	Sod production use only. **Do not** apply to St Augustinegrass under stress or freshly mowed. **Do not** make more than one application per year.
atrazine + bentazon Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.66 - 0.88 fl oz of 2.5 + 2.5 lb/gal	1.8 - 2.4 pt/A	0.56 + 0.56 - 0.75 + 0.75	Annual and perennial broadleaf weeds and yellow nutsedge	Perennial weeds and sedges require two applications 7-10 days apart. Apply with crop oil concentrate at 2 pints per acre. Apply no earlier than 10 days after sprigging or plugging. Some discoloration and slowing of growth may occur on newly sprigged turfgrasses.
bentazon Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.75 fl oz of 4 lb/gal	2 pt/A	1	Yellow nutsedge	Apply to actively growing yellow nutsedge at 10- to 14-day intervals, but no more than three applications per season. **Do not** mow for 3-5 days after application. Will not control purple nutsedge. **Do not** use on golf greens.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
bromoxynil Bermudagrass Zoysiagrass St. Augustinegrass Perennial ryegrass	0.375 to 0.75 fl oz of 2 lb/gal	1 - 2 pt	0.25 - 0.5	Broadleaf weeds	For use only on established and newly seeded grasses grown for seed or sod and nonresidential turfgrasses. **Do not** apply with backpack or hand-held equipment.
carfentrazone Bermudagrass Bahiagrass Zoysiagrass St. Augustinegrass Centipedegrass	0.012 - 0.048 fl oz of 1.9 lb/gal	0.55 - 2.1 fl oz	0.008 - 0.03	Broadleaf weeds	Works best as an addition to other herbicides such as 2,4-D, dicamba, dichloroprop, or other auxin type herbicides or combinations. Provides a faster burndown of weeds.
carfentrazone Bermudagrass Bentgrass	0.154 fl oz	6.7 fl oz	0.099	Silvery thread moss	Apply twice 2 weeks apart. Use a surfactant at 1 quart per 100 gallons. Repeated applications can be made but not to exceed 0.40 pound of active ingredient per acre. It is labeled for bermudagrass and bentgrass greens.
chlorsulfuron Bermudagrass Zoysiagrass St. Augustinegrass Centipedegrass	0.05 - 0.25 oz	(1 - 5.33 oz/A of 75 DF)	0.08 - 0.24	Tall fescue, perennial ryegrass, chickweed, henbit, and many other broadleaf and grassy weeds	Not for use on sod farms. **Do not** apply in the root zones of desirable trees or shrubs or where runoff may flow into agricultural land.
clopyralid Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.1 - 0.5 fl oz of 3 lb/gal	0.25 - 1.33 pt/A	0.09 - 0.45	Clovers, black medic, and other broadleaf weeds	Can cause injury to desirable legumes and composite species. Consult label for tank-mixing with other postemergence herbicides for broadleaf weed control.
clopyralid + triclopyr Bermudagrass	0.37 – 0.74 fl oz of 0.75 + 2.25 lb/gal	1 - 2 pt/A	0.09 + 0.29	Wild violet, common lespedeza, and other broadleaf weeds	**Do not** use on golf tees or greens. **Do not** use more than 4 pints per acre per year. **Do not** allow contact with desirable trees or shrubs. Mow newly seeded turf two or three times prior to first application. Additional applications should not be made less than 4 weeks apart.
dicamba Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.75 tbsp of 4 lb/gal	0.5 pt/A	0.25	Many broadleaf weeds	**Do not** use within dripline of shrubs or trees. Roots take up the chemical from the soil and some species are damaged. Good for use on golf greens and tees.

Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
diclofop Bermudagrass	0.75 - 1 fl oz of 3 lb/gal	32 - 43 fl oz/A	0.75 - 1	Goosegrass	Bermudagrass on golf courses only. May be used on bermudagrass golf greens. Apply postemergence to actively growing goosegrass with four or fewer leaves in a spray volume of 30 to 60 gallons per acre. **Do not** apply to stressed grasses. Activity may be increased on larger goosegrass if applied with a 0.25%, by-volume, nonionic surfactant. **Do not** tank mix with other herbicides, make applications to newly established turfgrass with stolons less than 4 inches, or overseed areas for 3 months following application. **RESTRICTED USE PESTICIDE.**
diquat Dormant Bermudagrass or Zoysiagrass turf only	0.5 - 0.75 fl oz of 2 lb/gal	1 - 2 pt/A	0.25 - 0.5	Winter annual broadleaf and grassy weeds	Bermudagrass or zoysiagrass must be dormant or injury will occur.
flazasulfuron Bermudagrass Zoysiagrass Centipedegrass	0.035 - 0.07 oz of 25 DF	1.5 - 3 oz of 25 DF	0.023 - 0.047	Annual and perennial ryegrass, 2- to 3-leaf crabgrass, tall fescue, clovers, and other broadleaf weeds	Repeat applications are necessary for control of crabgrass. Use 0.5 ounce per acre for transition from overseeded perennial ryegrass or roughstalk bluegrass. Flazasulfuron is not for use on golf course greens or residential turfgrasses. Use nonionic surfactant at the rate of 1 quart per 100 gallons.
fenoxaprop Zoysiagrass	0.64 fl oz of 0.57 lb/gal	28 fl oz/A	0.125	Crabgrass, goosegrass	Zoysiagrass only. **Do not** apply to bermudagrass or other warm-season turfgrasses. Consult label for recommended rate according to weed stage at application. **Do not** mow within 24 hours after application.
fluazifop-p-butyl Zoysiagrass Tall fescue	0.07 - 0.14 oz of 2 lb/gal	3 - 6 oz of 2 lb/gal	0.047 - 0.093	Bermudagrass suppression and control of some annual grasses	Higher rates can cause discoloration. Avoid summer applications. Repeat applications can be made every 28-30 days. Use nonionic surfactant at the rate of 1 quart per 100 gallons. Not for use on residential lawns. Do not use more than 4 ounces per acre on zoysiagrass.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
fluroxypyr Bermudagrass Centipedegrass Zoysiagrass St. Augustinegrass	0.25 - 0.5 fl oz of 1.5 lb/gal	11 - 21 fl oz/A of 1.5 lb/gal	0.25 - 0.5	Annual and perennial broadleaf weeds	Do not use on golf greens or tees. Do not use within drip lines of trees and shrubs. Do not apply more than 0.66 pint per acre to bermudagrass or St. Augustinegrass.
foramsulfuron Bermudagrass Zoysiagrass (consult label for tolerant varieties)	0.2 - 0.6 fl oz of 0.19 lb/gal	8.8 - 26.2 fl oz	0.013 - 0.039	Annual bluegrass, ryegrass, and Poa trivialis	**Do not** use more than 0.4 fluid ounce per 1,000 square feet to remove ryegrass or other overseeding grass from bermudagrass. **Do not** use more than 1.25 ounce per 1,000 square feet per year. **Do not** allow traffic on the treated area until completely dry. May be used up to 2 weeks prior to overseeding with perennial ryegrass.
halosulfuron Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.03 oz of 75 DF	1.33 oz/A	0.062	Purple and yellow nutsedge Green kyllinga (suppression)	**Do not** use on golf-putting greens. Apply after nutsedge has reached 3- to 8-leaf growth stage. Use 0.5%, by-volume, nonionic surfactant for broadcast applications. A second treatment may be needed 6 to 10 weeks after the initial application. **Do not** make more than two applications with a total use rate not to exceed 0.125 pound per acre per year. **Do not** mow turf for 2 days before or 2 days after application. **Do not** apply to centipedegrass prior to tillering.
imazaquin Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.5 - 1 fl oz of 1.5 lb/gal or 0.13 - 0.26 oz of 70 DG	21 - 42 fl oz/A of 1.5 lb/gal or 5.7 - 11.4 oz/A of 70 DG	0.25 - 0.5	Purple nutsedge, yellow nutsedge, other sedges, and wild garlic	Apply when weeds are actively growing. May be tank mixed with MSMA when used in bermudagrass and zoysiagrass. **Do not** use on golf greens.
mecoprop Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	3 - 5 tbsp of 2 lb/gal	2 - 3.5 qt/A	1 - 1.75	Clovers, spurges	May be used on golf greens. Acts slower than 2,4-D.
mesotrione Centipedegrass St. Augustinegrass Tall fescue Perennial ryegass	0.09 - 0.18 oz of 4 lb/gal	4 - 8 oz of 4 lb/gal	0.125 - 0.25	tufted lovegrass, crabgrass, goosegrass, broadleaf weeds	Apply to St. Augustine on sod farms only. May require second application for control of some annual grasses. Use surfactant at the rate of 1 quart per 100 gallons.

Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
metribuzin Bermudagrass	0.2 - 0.25 oz of 75 DF or 0.5 - 1 tbsp of 4 lb/gal	8 - 10.6 oz/A of 75 DF	0.37 - 0.5	Many winter annual broadleaf weeds	Use on dormant bermudagrass only. See below for tank-mix with MSMA for goosegrass control. Follow all label precautions.
metsulfuron Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.006 - 0.023 oz of 60 DF	0.25 - 1 oz/A of 60 DF	0.009 - 0.04	Bahiagrass and many winter and summer broadleaf and grassy weeds, and for removal of overseeded perennial ryegrass	'Meyer' and 'Emerald' zoysiagrass only. **Do not** apply more than 0.5 ounce per acre to centipedegrass. Some discoloration to turfgrasses may occur. Use of a surfactant at 1 quart per 100 gallons of solution will increase performance, but it may also increase chlorosis of turfgrasses.
MSMA Bermudagrass Zoysiagrass	1 - 2 fl oz of 6 lb/gal	1.3 - 2.6 qt/A of 6 lb/gal	2 - 4	Crabgrass, dallisgrass	Repeat applications at 7- to 10-day intervals are necessary. Best results are obtained when adequate soil moisture is present. Apply only when temperatures are above 80 ºF. **Do not** use on newly established turfs until turfgrasses are well established. Read the product label for restrictions.
MSMA + metribuzin (Tank mix) Bermudagrass	1 fl oz/A of 6 lb/gal + 0.9 g of 75 DF	1.3 qt/A of 6 lb/gal + 1.33 oz/A of 75 DF	2 + 0.0625	Goosegrass	Use only on bermudagrass turf on golf course fairways and commercial sod farms. Add 0.25% by volume of an agricultural grade surfactant. Repeat application in 7-10 days and delay mowing 3 days following each application for maximum control. Read the product label for restrictions.
pronamide Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.36 - 0.73 oz of 50 WSP	1 lb/A of 50 WSP	0.5 -1.5	Annual bluegrass	Apply November to February, best before January, and apply 0.5 to 1 inch of water immediately after application. **Do not** apply chemical to overseeded turf. **Do not** apply where lateral water movement may carry chemical to overseeded turf. **Do not** apply a wetting agent within 14 days before or after application.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
quinclorac Bermudagrass Zoysiagrass	0.367 oz of 75 DF or 1.45 fl oz of 1.5 lb/gal liquid	1 lb of 75 DF or 64 fl oz/A of 1.5 lb/gal liquid	0.75	2- to 3-leaf crabgrass and many broadleaf weeds	Use methylated seed oil at 1.5 pints per acre. Some injury to turfgrasses may occur. More than one application may be needed to control crabgrass. Adding pendimethalin with the first applications will increase crabgrass control. Do not apply in the root zone of ornamentals or to golf course collars or tees.
	0.245 + 0.245 + 0.245 oz of 75 DF or 1 + 1 + 1 fl oz of 1.5 lb/gal liquid	0.67 + 0.67 + 0.67 lb of 75 DF or 43 + 43 + 43 fl oz of 1.5 lb/gal liquid	0.5 + 0.5 + 0.5	Torpedograss suppression	Best control of torpedograss can be achieved with 0.5 pound of active ingredient per acre applied three times at 2- to 3-week intervals. Use with methylated seed oil at 1.5 pints per acre.
quinclorac + MCPP + dicamba Bermudagrass Zoysiagrass	1.45 fl oz	64 fl oz	1.225	2- to 3-leaf crabgrass, torpedograss suppression, and many broadleaf weeds	Use methylated seed oil at 1.5 pints per acre. Some injury to turfgrasses may occur. More than one application may be needed to control crabgrass. Adding pendimethalin with the first applications will increase crabgrass control. Do not apply in the root zone of ornamentals or to golf course collars or tees.
quinclorac + sulfentrazone Bermudagrass Zoysiagrass	0.367 - 0.735 oz of 75 DF	16 - 32 oz of 75 DF	0.75 to 1.5	2- to 3-leaf crabgrass, torpedograss suppression, many broadleaf weeds, kyllinga, and some sedges	Good spray coverage is recommended for control of sedges. Use of surfactant is not recommended.
rimsulfuron Bermudagrass	0.6 g	1 - 2 oz/A of 25 DF	0.0156 - 0.0312	Annual bluegrass, overseeded perennial ryegrass, and broadleaf weeds	For use in non-overseeded bermudagrass, including sod farms, golf courses, professionally managed college and professional sports fields, and industrial and commercial lawns. Not for use in residental lawns. Lateral movement may occur and injure overseeded grasses downslope from the treated area. Use lower rate for removing overseeded perennial ryegrass. May be applied up to 2 weeks prior to overseeding perennial ryegrass.
sethoxydim Centipedegrass	0.5 - 0.75 fl oz of 1 lb/gal	23 - 36 fl oz/A of 1 lb/gal	0.18 - 0.28	Crabgrass and other annual grasses	Use in centipedegrass only. Apply no sooner than 3 weeks after greenup. **Do not** mow within 7 days before or after application. **Do not** apply to seedling centipedegrass until new stolons are 3 inches long. **Do not** exceed 3 pints per acre per season. Professional applicators only.

Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
simazine Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.75 - 1.5 fl oz of 4 lb/gal	1 - 2 qt/A of 4 lb/gal	1 -2	Annual bluegrass, henbit, chickweed, lawnburweed, and other grass and broadleaf weeds	Uptake only through soil. Irrigate following application to activate.
sulfentrazone Bermudagrass St. Augustinegrass Centipedegrass Zoysiagrass Bahiagrass	0.09 - 0.27 oz of 4 lb/gal	4 - 12 oz of 4 lb/gal	0.125 - 0.375	sedges, kyllinga, and broadleaf weeds	Apply to established grasses or after two mowings on newly seeded or sodded turf that has an established root system. Do not add surfactant. Not for use on golf course greens or tees.
sulfosulfuron Bermudagrass St. Augustine Centipedegrass Zoysiagrass	0.5 g of 75WG	0.75 - 2 oz of 75WG	0.035 - 0.094	Sedges, kyllinga, annual bluegrass, lawnburweed, and other winter annuals	Apply no sooner than 7 days prior to overseeding perennial ryegrass. Use nonionic surfactant at the rate of 1 quart per 100 gallons. May be applied to commercial or residential turf. **Do not** apply to greens.
sulfentrazone + prodiamine Bermudagrass Centipedegrass Zoysiagrass	0.413 - 0.551 fl oz	18 - 36 fl oz	0.57 - 1.125	Annual grasses	For preemergence and early postemergence of annual grasses such as crabgrass. Do not exceed 1.125 pounds of active ingredient per year. Do not apply to greens or tees. Do not exceed 24 fluid ounces per acre on Centipedegrass or Zoysiagrass.
trifloxysulfuron Bermudagrass Zoysiagrass	0.008 - 0.013 oz of 75 WG	0.33 - 0.56 oz/A	0.015 - 0.026	Annual bluegrass, ryegrass, nutsedges, kyllinga, broadleaf weeds, and torpedograss suppression	Use low rate to remove overseeded perennial ryegrass and Poa trivialis to aid in spring transition of bermudagrass. Use surfactant at a rate of 1 quart per 100 gallons. **Do not** use more than 1.7 ounces per acre per year. **Do not** allow traffic on the treated area until completely dry. May be used up to 3 weeks prior to overseeding perennial ryegrass.
		0.1 - 0.3 oz/A		Overseeded perennial ryegrass and roughstalk bluegrass	

IMPROVED RIGHTS-OF-WAY/INDUSTRIAL

Oust Precautions —

1. Avoid applying during rainy periods or when soils are water saturated.
2. Do not apply on newly planted areas. Spray only on good stands that are in their third year of growth.
3. Do not spray when ground is frozen.
4. Do not spray near irrigation canals, ditches, etc.
5. Do not spray areas that will be planted to crops or apply where lateral water movement from treated areas to crop areas may occur.
6. Spring or summer applications of Oust may cause "brownout" and/or bermudagrass kill. Public complaints may result.

Situation and Application Timing	Herbicide	Rate/A	Comments
FALL			
Sept. 15 to Oct. 1	pendimethalin	2 - 4 lb ai/A	Apply in areas to control Italian ryegrass resistant to ALS-inhibiting herbicides. Applications should be made as late as possible during September before emergence.
	prodiamine	0.75 - 1 lb ai/A	Apply in areas to control Italian ryegrass resistant to ALS-inhibiting herbicides. Applications should be made as late as possible during September before emergence.
LATE FALL			
October to December	2,4-D	1 - 2 lb ae/A	This treatment is for control of emerged broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
	aminopyralid	7 fl oz	This treatment is for winter broadleaf control. Add 1 quart of surfactant per 100 gallons of spray solution.
	aminocyclopyrachlor + chlorsulfuron	4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period. Can be used on bermudagrass and bahiagrass roadsides.
	aminocyclopyrachlor + metsulfuron	4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period. Do not use on bahiagrass roadsides.
	clopyralid	0.25 - 1.33 pt	This treatment is for control of broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
	dicamba	0.5 - 1 lb ai/A	This treatment is for control of emerged broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
	diflufenzopyr + dicamba	4 - 8 oz/A	This treatment is for control of broadleaf weeds. Add 1 quart of surfactant per 100 gallons of spray.
	diuron	2 - 3 lb ai/A	Diuron controls Italian ryegrass (which is resistant to Oust) and some other winter annuals.
	glyphosate	0.375 - 0.75 lb ae/A	Applications can be made using 16 fluid ounces per acre of a 4# glyphosate during October while bermudagrass is actively growing. Once bermudagrass is completely dormant, rates can be increased to 32 fluid ounces per acre using a 4# glyphosate.
	glyphosate + 2,4-D	48 - 64 fl oz	This treatment provides broadleaf and grass control. The low rate should be used until bermudagrass is dormant.
	sulfometuron	1 - 2 oz	Do not add surfactant. Sulfometuron controls winter annuals and fescue and suppresses early summer annuals. Fall applications, compared with later applications, permit earlier spring greenup of bermudagrass and reduce chance of injury to nearby crops. Do not spray areas that will be planted to crops.
	triclopyr	0.33 - 1.5 lb ae/A	This treatment is for control of emerged broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.

Situation and Application Timing	Herbicide	Rate/A	Comments
WINTER			
January to March	aminopyralid	7 fl oz	For broadleaf control. Add 1 quart of surfactant per 100 gallons of spray solution.
	aminocyclopyralid + chlorsulfuron	4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period.
	aminocyclopyralid + metsulfuron	4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period. Do not use on bahiagrass roadsides.
	chlorsulfuron 75 DF	0.5 to 1 oz/A	For broadleaf weed control. Add 1 of quart of surfactant per 100 gallons of spray. Can be used in bermudagrass and bahiagrass.
	diflufenzopyr + dicamba	4 - 8 oz/A	For broadleaf weed control. Add 1 quart surfactant per 100 gallons of spray.
	glyphosate + 2,4-D	48 - 64 fl oz	Controls winter annuals, tall fescue, and some weeds that may be tolerant to Oust. Apply Campaign before bermudagrass greenup initiates in the spring or injury may result.
	glyphosate	0.56 - 0.75 lb ae/A	Controls winter annuals, tall fecue, and some weeds that may be tolerant to Oust. Will control annual ryegrass, which has developed resistance to Oust. Apply glyphosate before bermudagrass greenup initiates in the spring or injury may result. Consult the label to determine if surfactant is needed.
January to Feb. 15	imazapic 2L	8 - 12 fl oz	Imazapic 2L controls tall fescue, Italian ryegrass, and winter annuals. Avoid applying Plateau after bermudagrass initiates greenup.Bahiagrass should be completely dormant or injury will occur. Do not exceed 12 ounces per acre in 1 year. See the label for recommended additive.
	sulfometuron 75 DF	0.5 oz	Controls winter annuals and provides tall fescue suppression. Less likely to cause delay in bermudagrass greenup than March-April treatment.
SPRING			
March and April	aminopyralid	7 fl oz	For broadleaf control. Add 1 quart of surfactant per 100 gallons of spray solution.
	diflufenzopyr + dicamba	4 - 8 oz/A	For broadleaf weed control. Add 1 quart of surfactant per 100 gallons of spray. Apply in early spring prior to emergence of susceptible crops.
	sulfometuron 75 DF	0.5 oz	Add 0.5% v/v surfactant. Begin application to actively growing weeds in late winter to early spring. Controls a wide variety of winter and spring annuals, including bedstraw and corn speedwell and suppresses tall fescue. When 0.5 ounce of Oust is used, less delay in bermudagrass greenup will likely be observed. If brownout or delay in bermudagrass greenup is not acceptable, refer to the fall Oust application.
	triclopyr 2,4-D dicamba clopyralid	0.33 - 1.5 lb ae/A 1 - 2 lb ae/A 0.5 - 1 lb ai/A 0.25 - 1.33 pt	Apply to cover weeds using 30 to 50 gallons of spray per acre. Add 2 quarts of surfactant to each 100 gallons of spray per acre. Apply in early spring prior to emergence of susceptible crops. Controls emerged broadleaf weeds.
Tall fescue seedhead suppression	sulfometuron 75 DF	0.25 oz	Apply before seedheads emerge in spring. Add 2,4-D and/or dicamba (Banvel 720) plus 1 quart per acre surfactant to improve broadleaf control. **Do not** add surfactant with Oust alone. Does not control tall fescue.

Situation and Application Timing	Herbicide	Rate/A	Comments
SUMMER			
Bermudagrass release			The following treatments can follow spring or fall Oust applications if needed or may be used alone.
Annual weed and grass control plus Johnsongrass	Nicosulfuron + metsulfuron	1.25 - 1.5 oz	This treatment controls annual and perennial grasses, including rhizome johnsonrass, itchgrass, and bahiagrass. It also provides suppression of vaseygrass and foxtails. Use 0.25% v/v nonionic surfactant or 1% v/v crop oil concentrate (COC). Use of COC may increase chances of bermudagrass injury. The treatment will control many broadleaves, as well, such as pigweeds and wooly croton. Do not use on bahiagrass or fescue.
Annual weeds and johnsongrass	sulfometuron 75 DF	0.5 - 1 oz	Use low rate to control most annuals and high rate where johnsongrass is a problem. Poor control of vaseygrass, broomsedge, and dallisgrass.
Annual weeds and johnsongrass	imazapic	8 - 12 fl oz	Controls johnsongrass, crabgrass, common ragweed, and provides suppression of bahiagrass and other weeds. Do not exceed 12 ounces per acre in one year. See label for recommended additive.
late spring to summer	MSMA — 6 lb/gal or 6.6 lb/gal	3.3 - 4 pt or 3 - 3.6 pt	Same as above. Use on well-established bermudagrass to control most weed species including johnsongrass. Add surfactant as above.
late spring to summer	glyphosate	0.28 - 0.375 lb ae/gal	Use on well-established bermudagrass to suppress johnsongrass and control annual and perennial grass weeds, such as crabgrass, knotroot foxtail, tall fescue, and dallisgrass. Some discoloration of bermudagrass may occur. Consult the label to determine if surfactant is needed.
Johnsongrass	sulfosulfuron 75 DF	1.33 oz	For johnsongrass control in bermudagrass and bahiagrass highway rights-of-way and similar areas. Highly selective for johnsongrass control with little or no jnjury to these turfgrasses. Consult label for other weeds controlled.
Bahiagrass seedhead suppression	sulfometuron 75 DF	0.5 oz	Apply before seedheads emerge in spring or soon after mowing in summer. Add 2,4-D and/or dicamba (Banvel 720) plus 1 quart per acre of surfactant to improve broadleaf control. **Do not** add surfactant with Oust alone. Does not control bahiagrass.
	imazapic 2L	2 - 3 fl oz	Provides only seedhead suppression of bahiagrass. Do not expect weed control. Raise mowing height to leave adequate existing foliage since new growth will be suppressed.
	glyphosate	0.14 - 0.18 lb ae/A	Apply before seedheads emerge in spring or soon after mowing in summer. Will provide approximately 45 days of vegetative growth and seedhead suppression. Consult the label to determine if surfactant is needed.
Broomsedge suppression	(See above — SUMMER Bermudagrass Release — annuals and many perennials).		
Hemp sesbania control	Linuron 4L	0.5 lb ai/A 1 pt	Add 2 quarts of surfactant per 100 gallons of spray. Apply 40 to 50 gallons of spray per acre to ensure good coverage of emerged sesbania.
	metsulfuron	0.5 to 1 oz/A	Add 1 quart of surfactant per 100 gallons of spray. **DO NOT** use in bahiagrass.

VEGETABLE CROPS

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
SPECIAL PRECAUTION: *Many vegetable crops, especially cucumbers, are sensitive to residual herbicides like substituted ureas and traizines. Use care following these chemicals with susceptible crops for up to one year.*				
Beans — lima and snap				
bentazon *Basagran 4 SL*	0.5 to 1 lb ai 1 to 2 pt	Cocklebur, yellow nutsedge, and velvetleaf.	After beans have 1 to 2 expanded trifoliate leaves.	Sequential applications 7 to 10 days apart may be needed for control. Do not apply more than 2 quarts per acre per season or within 30 days of harvest. Do not use crop oil concentrate with applications on snap or pole beans.
metolachlor *Dual Magnum* *Dual Magnum II*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporate or at planting.	If preplant incorporated, in- corporate in top 2 inches of soil within 14 days before planting.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals, top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray mix.
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest of dry or 15 days of harvest of succulent beans.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	Before planting.	Apply and incorporate before planting.
Beans — lima only				
imazethapyr *Pursuit 2EC*	0.023 to 0.047 lb ai 1.5 to 3 oz	Annual broadleafs and grasses.	Preplant incorporated or after planting.	Pursuit DG may be tank-mixed with grass herbicides.
Beans — snap only				
clomazone *Command 3ME*	0.15 to 0.25 lb ai 0.4 to 0.67 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before or after seeding but before crop emergence	Place seed below treated zone. Use lower rates on coarse soil, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vege-table production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Immediately after planting.	Erratic control of pigweed. Thorough agitation required.
quizalofop *Assure II*	0.04 to 0.08 lb ai 6 to 12 oz	Annual and perennial grasses.	After grasses emerge.	Add 1 quart crop oil concentrate per 100 gallons. Do not apply within 15 days of harvest.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Cantaloupe and Watermelon				
bensulide *Prefar*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Immediately before planting.	Apply and incorporate before planting. Has 18 months restriction for crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Emerged annual and perennial grasses.	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 14 days of harvest.
clomazone *Command 3ME*	0.15 to 0.25 lb ai 0.4 to 0.67 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before or after seeding but before crop emergence.	**Watermelon only.** Place seed below treated zone. Use lower rates on coarse soil, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Temporary yellowing may occur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Apply when vines have 4-5 true leaves.	Apply to weed-free soil. Thorough agitation required.
ethalfluralin *Curbit* 3 lb/gal	1.125 to 1.68 lb ai 3 to 4.5 pt	Grasses and small-seeded broadleaf weeds.	Immediately after planting.	**Do not** incorporate prior to planting. **Do not apply any later than 2 days after planting. Do not apply under mulch.**
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses, plus some broadleaf weeds.	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplating. Use low rates on coarse, middle rate on medium, and high rate on fine textured soils. **Do not** incorporate, apply under plastic mulch or crop covers, broadcast over transplants, or make more than one application per season.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
halosulfuron *Sandea*	0.38 to 0.56 oz ai 0.5 to 0.75 oz	Purple nutsedge, pigweed, ragweed, smartweed plus others.	Pre.	**Cantaloupe, honeydew, and crenshaw melons only**. Direct seeded without plastic mulch, apply after planting but before cracking. If used with plastic mulch, apply after final bed shaping but before laying plastic. Do not seed into treated areas less than 7 days after laying plastic. If transplanting without plastic mulch, do not transplant into treated areas within 7 days after application. If transplanting with plastic mulch, apply Sandea after final bed shaping but before laying plastic. Do not transplant within 7 days after application.
	0.38 to 0.56 oz ai 0.5 to 0.75 oz		Post.	**Cantaloupe, honeydew, and crenshaw melons only**. Direct seeded bareground or with plastic mulch, apply after crop has 3 to 5 true leaves but before flowering. Postemergence applications to transplants should not be made less than 14 days after transplanting. For best results on nutsedge, a sequential application may be needed.
	0.38 to 0.75 oz ai 0.5 to 1 oz		Row middles only.	**Watermelons or melons above**. Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month-period. Do not apply overtop of plastic mulch or to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints crop oil concentrate per acre. **Do not** apply within 14 days of harvest.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	3- to 4-true leaf stage.	Apply as a directed spray be-tween rows and incorporate.
Cole Crops – broccoli, cabbage, and cauliflower				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 30 days of harvest.
clomazone *Command 3ME*	0.25 to 0.5 lb ai 0.67 to 1.3 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	After transplanting.	**Cabbage only.** Place transplant roots below treated zone. Use lower rates on coarse soils, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
clopyralid *Stinger 3 EC* *Spur*	0.09 to 0.187 lb ai 0.25 to 0.5 pt 0.25 to 0.5 pt	Emerged broadleaf weeds.	Post.	Clopyralid will control most legume weeds. **Do not** apply within 30 days of harvest. **See the label for rotational restrictions.**
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	At seeding or transplanting.	Apply to weed-free soil. Thorough agitation required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
oxyfluorfen *Goal*	0.25 to 0.5 lb ai 1.25 to 2.5 pt	Small-seeded annual broadleaf.	After soil preparation prior to transplanting.	Severe crop response may result if transplants are under stress.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	**Do not** apply within 30 days of harvest.
trifluralin *Treflan 4EC*	0.5 to 1 lb ai 1 to 2 pt	Grasses.	Prior to planting.	Apply and incorporate before planting.
Cucumber				
bensulide *Prefar 4E*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Immediately before planting.	Apply and incorporate before planting. Has 18 month restriction for crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses.	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 14 days of harvest.
clomazone *Command 3ME*	0.15 to 0.38 lb ai 0.4 to 1 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before or after seeding but before crop emergence.	Place seed below treated zone. Use lower rates on coarse soils, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Apply when vines have 4-5 true leaves.	Apply to weed-free soil. Thorough agitation required.
ethalfluralin *Curbit* 3 lb/gal	1.125 to 1.68 lb ai 3 to 4.5 pt	Grasses and small-seeded broadleaf weeds.	Immediately after planting.	**Do not** incorporate prior to planting. **Do not** apply any later than 2 days after planting. **Do not** apply under mulch.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses plus some broadleaf weeds.	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplanting. Use low rate on coarse, middle rate on medium, and high rate on fine textured soils. **Do not** incorporate. **Do not** broadcast over transplants. **Do not** apply within 45 days of harvest. **Do not** apply more than once per season. **Do not** apply under plastic mulch or crop covers.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.56 oz ai 0.5 to 0.75 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others.	Pre.	Direct seeded without plastic mulch, apply after planting but before cracking. If used with plastic mulch, apply after final bed shaping but before laying plastic. Do not seed into treated areas less than 7 days after laying plastic. If transplanting without plastic mulch, do not transplant into treated areas within 7 days after application. If transplanting with plastic mulch, apply Sandea after final bed shaping but before laying plastic. Do not transplant within 7 days after application.
			Post.	Direct seeded bareground or with plastic mulch, apply after crop has 3 to 5 true leaves but before flowering. Postemergence applications to transplants should not be made less than 14 days after transplanting. For best results on nutsedge, a sequential application may be needed.
	0.38 to 0.75 oz ai 0.5 to 1 oz		Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. Do not apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 14 days of harvest.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Greens — collard, kale, mustard, and turnip				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not harvest within 14 days of harvesting greens or within 30 days of root harvest.
clopyralid *Stinger 3 EC* *Spur*	0.09 to 0.187 lb ai 0.25 to 0.5 pt 0.25 to 0.5 pt	Emerged broadleaf weeds.	Post.	Clopyralid will control most legume weeds. **Do not** apply within 30 days of harvesting collards, kale, mustard, and turnip roots. Do not apply within 15 days of harvesting turnip greens. **See the label for rotational restrictions.**
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Immediately after planting.	Apply to weed-free soil. Thorough agitation is required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred). Use only for kale and mustard.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Use only for collards and turnips. Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Annual and perennial grasses.	After grass emergence.	**Do not** apply to turnips. Use 2 pints of crop oil concentrate per acre. Mustard can be harvested after 14 days; wait 30 days for all other brassica crops.
trifluralin *Treflan 4E*C	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	Before planting.	**Do not** use on turnip greens except for processing greens.
Okra				
carfentrazone *Aim 2EC*	0.008 to 0.025 lb ai 0.5 to 1.6 oz	Wide spectrum of broadleaf weeds (2 to 4 inches).	Hooded sprayer.	Add either crop oil concentrate at 1% or nonionic surfactant at 0.25%. Coverage is essential. Hooded sprayer must totally enclose spray pattern to prevent crop damage.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	Before planting.	Apply and incorporate before planting.
Onion				
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 10 lb	Germinating grasses, purslane, wild verbana, chickweed.	At seeding, transplanting, and/or layby.	Apply to weed-free soil. Thorough agitation required.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Emerged annual and perennial grasses.	Post.	**Dry bulb only.** Use nonionic surfactant at 0.25% v/v. Do not apply within 45 days of harvest.
flumioxazin *Chateau WDG*	0.032 to 0.064 lb ai 1 to 2 oz	Small-seeded, annual broadleaf weeds.	Post-transplant, before weed emergence.	**Apply to dry bulbs only.** Flumioxazin can be applied at the 2- to 6-leaf stage if onions are transplanted and at the 3- to 6-leaf stage if direct-seeded. **Do not** exceed 3 ounces per year. **Do not** include a surfactant. Do not apply within 45 days of harvest.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
oxyfluorfen *Goal* 1.6 lb/gal	0.12 to 0.5 lb ai 0.6 to 2.5 pt	Broadleaf weeds.	When onions have at least 2 true leaves.	Multiple treatments may be applied. **Do not** exceed 0.5 pound (2.5 pints) per acre per year. Use only on dry bulb onions.
pendimethalin *Prowl H_2O*	0.5 to 1.5 lb ai 1 to 3.2 pt	Annual grasses and some small-seeded broadleaf weeds.	Apply preemergence as a broadcast treatment when onions have 2 to 9 true leaves.	**Do not** apply to green, bunching onions or leeks. Do not incorporate or injury will occur. Do not exceed 3.6 pints per acre per season or apply within 45 days of harvest.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest.
trifluralin *Treflan 4EC*	0.375 to 0.62 lb ai 0.75 to 1.25 pt	Grasses, pigweed, purslane.	Up to 60 days before harvest.	Postplant as directed. Spray between rows.
Pepper				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 20 days of harvest.
clomazone *Command 3ME*	0.5 to 1 lb ai 0.67 to 2.67 pt	Annual grasses and some broadleaf weeds.	Soil application prior to seeding or transplanting.	All peppers (including bell, hot, pimento, and sweet, except banana). Some varieties may be injured. Seeds or transplants should be placed below the treated barrier. If stand failure occurs, peppers may be replanted, but do not make a second application. **Do not** exceed 2 pints per acre per season. **Do not** graze, harvest for food, or feed cover crops planted less than 9 months following Command application. **Do not** apply within 1,500 feet of towns, subdivisions, commercial subdivisions, commercial vegetable or fruit production, commercial nurseries, or greenhouses.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	4 to 6 weeks after transplanting or direct seeded plants at 4 to 6 inches height.	Apply to weed-free soil. Thorough agitation required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.75 lb ai 0.5 to 1 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others	Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. **Do not** apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. **Do not** apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each l00 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 20 days of harvest.
trifluralin *Treflan 4EC*	0.5 to 1 lb ai 1 to 2 pt	Grasses, pigweed, purslane.	Before transplanting.	Apply and incorporate before transplanting.
Potatoes, Irish				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 30 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	At planting or up to 9 weeks after planting.	Apply to weed-free soil. Thorough agitation required.
EPTC *Eptam-7E*	3 lb ai 3.5 pt	Grasses, pigweed, nutsedge (stunts swinecress).	Preplant, postplant, postemergence.	See label for specific use in structions. **Do not** let EPTC come in contact with seed piece.
flumioxazin *Chateau SW 51%*	0.047 lb ai 1.5 oz	Several broadleaf weeds.	After hilling, preemergence to weeds.	A minimum of 2 inches of soil must cover vegetative portion of potato plant or crop injury may occur.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
linuron *Lorox 50DF*	0.5 to 1 lb ai 1 to 2 lb	Annual grasses and broadleaf weeds.	Pre.	Apply before crop emergence. Plant seed at least 2 inches deep. Use lower rates on coarse textured soils, higher rates on medium or fine textured soils. Add 0.5% by volume nonionic surfactant if emerged weeds are present.
metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Pre- or postplant incorporated or preemergence after final drag off.	Cool, wet conditions after application may delay maturity and/or reduce yield of Superior and other early- maturing varieties.
metribuzin 4 lb/gal or 75% DF	0.5 to 1 lb ai 1 to 2 pt or 0.67 to 1.33 lb	Most small-seeded annuals.	After planting and before crop emergence or after crop emergence for certain white-skinned varieties.	Use lower rates on sandy soil. **Do not** use postemergence on early-maturing, smooth-skinned white or red varieties. **Do not** plant treated area to crop other than potatoes for 1 year after treatment. **Do not** plant sensitive crops such as onions, cole crops, or cucurbit during the growing season following application of metribuzin.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
pendimethalin *Prowl H_2O*	0.5 to 1.5 lb ai 1 to 3.2 pt	Annual grasses and some small-seeded broadleaf weeds.	After planting but before potatoes and weeds emerge.	Incorporation not required if adequate rainfall or irrigation for crop and weed emergence occurs within 7 days.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
rimsulfuron *Matrix DF 25%*	0.016 lb ai 1 oz	Several broadleaf weeds and select grasses.	After hilling to clean newly prepared seedbed, pre-emergence to weeds.	Needs rainfall for activation within 5 days. Do not apply within 60 days of harvest. Read the label for crop rotational guidelines.
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest.
Pumpkin				
bensulide *Prefar 4E*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Before planting.	Incorporate 1 to 2 inches deep. Has 18 months restriction on crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Add crop oil concentrate at 1% by volume of finished spray. Do not exceed 8 ounces per acre per application or 32 ounces per acre per season. Do not apply within 14 days of harvest.
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses plus some broadleaf weeds	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplating. Use low rate on coarse, middle rate on medium, and high rate on fine-textured soils. **Do not** incorporate. **Do not** broadcast over transplants. **Do not** apply within 45 days of harvest. **Do not** apply more than once per season. **Do not** apply under plastic mulch or crop covers.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.75 oz ai 0.5 to 1 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others	Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. Do not apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 14 days of harvest.
S-metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.27 lb ai 1 to 1.33 pt 1 to 1.33 pt	Small-seeded, annual broadleaf weeds, grasses, and nutsedge.	Pre.	Apply between rows and/or hills. **Do not** apply within 30 days of harvest.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Southern peas				
bentazon *Basagran* 4 lb/gal	0.75 to 1 lb ai 1.5 to 2 pt	Cocklebur.	Postemergence after at least three nodes have developed on peas.	Some yellowing, bronzing or speckling of leaves may occur. **Do not** apply more than 1 pound per acre of bentazon in one season. Use low rate for 2- to 6-leaf-stage cocklebur and high rate for 6- to 10-leaf-stage cocklebur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Immediately after planting.	Apply to weed-free soil. Thorough agitation required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
imazethapyr *Pursuit 2EC*	0.023 to 0.047 lb ai 1.5 to 3 oz	Annual broadleafs and grasses.	Preplant incorporated or at planting.	Pursuit DG may be tank-mixed with a registered grass herbicide.
metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporate or at planting.	If preplant incorporated, incorporate in top 2 inches of soil within 14 days before planting.
pendimethalin *Prowl H_2O*	0.5 to 1.5 lb ai 1 to 3.2 pt	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporated up to 60 days before planting.	**Do not** apply preemergence to southern peas as injury may occur. If stand failure occurs, any crop registered for Prowl 3.3EC preplant incorporated may be replanted, but do not work soil deeper than herbicide incorporation zone.
quizalofop *Assure II 0.88 EC*	0.04 to 0.08 lb ai 6 to 16 oz	Emerged annual and perennial grasses.	Post.	Do not apply within 30 days of harvest. Add 1 gallon of crop oil concentrate or 1 quart of nonionic surfactant per 100 gallons of spray mix. Crop oil concentrate may cause leaf speckling under hot and humid conditions.
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest of dry or 15 days of harvest of succulent peas.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	1 to 3 weeks before planting.	Apply and incorporate before planting.
Squash				
bensulide *Prefar 4E*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Before planting.	Apply and incorporate before planting. Has 18-month restriction on crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 14 days of harvest.
clomazone *Command 3ME*	0.25 to 0.5 lb ai 0.67 to 1.33 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before seeding or just before transplanting or to row middles between plastic covered rows.	Place seed below treated zone. Use lower rates on coarse soils, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	When plants have 4-5 true leaves.	Apply to weed-free soil. Thorough agitation is required.
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses plus some broadleaf weeds.	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplanting. Use low rate on coarse, middle rate on medium, and high rate on fine-textured soils. **Do not** incorporate. **Do not** broadcast over transplants. **Do not** apply within 45 days of harvest. **Do not** apply more than once per season. **Do not** apply under plastic mulch or crop covers.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.75 oz ai 0.5 to 1 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others.	Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. Do not apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 14 days of harvest.
Sweet corn				
atrazine 4L 90% DF	2 lb ai 2 qt 2.2 lb	Annual grasses, pig weed, purslane, morningglory.	Immediately after planting.	Atrazine gives better results where soil moisture is not limited. Provides poor control of signalgrass.
bentazon *Basagran 4 lb/gal*	0.75 to 1 lb ai 1.5 to 2 pt	Cocklebur, tall morningglory, and other broadleaf weeds.	Postemergence, as directerd spray, after corn is at least 12 inches tall.	**Do not** apply overtop or injury may occur. Do not apply within 3 weeks before tasseling. Add 2 pints of nonionic surfactant per 100 gallons of spray.
carfentrazone *Aim*	0.008 lb ai 0.33 oz	Cocklebur, ragweed, pigweed, smartweed, and prickly sida.	Preplant.	Sweet corn can be treated anytime between 30 days before planting until corn has eight collars. Apply to postemerged weeds only. Add 1 quart of nonionic surfactant per 100 gallons of spray solution.
dimethenamid *Outlook*	0.75 to 1.5 lb ai 1 to 2 pt	Annual grasses and small-seeded, broadleaf weeds.	Immediately after planting.	May be tank mixed with atrazine.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
dimethenamid + atrazine *Guardsman*	0.7 to 1.3 + 0.8 to 1.5 lb ai 2.5 to 4.5 pt	Annual grasses and broadleaf weeds.	Soil applied before or after planting or early postemergence.	**Do not** harvest within 50 days after treatment. Do not exceed 2.5 pounds of active ingredient atrazine total per acre per year. Do not apply over the top of corn in liquid fertilizer as injury may occur. Do not apply over the top of corn more than 8 inches tall.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Permit*	0.5 oz ai 0.67 oz	Nutsedge, cocklebur, pigweed, ragweed, and smartweed.	Post.	Apply over the top or with drop nozzles anytime between spike and layby. All cultivars have not been tested for tolerance. Check with seed supplier for tolerance. Do not apply to 'Jubilee' sweet corn. Do not make more than two applications per year or exceed 0.67 ounce per application. **Do not** apply to sweet corn previously treated with a soil applied organophosphate insecticide or apply an organophosphate insecticide within 7 days before or 3 days following Sempra application. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution.
metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporate or at planting.	If preplant incorporated, in-corporate in top 2 inches of soil within 14 days before planting.
metolachlor + atrazine *Bicep II or Bicep II Magnum*	0.95 to 1.91 lb ai + 1 to 2 lb ai 1.5 to 3 qt 1.3 to 2.6 qt	Annual grasses and broadleaf weeds.	Soil applied before or after planting or postemergence broadcast or directed spray.	**Do not** exceed 2.4 quarts as soil-applied treatment if soils contain less than 3% organic matter. Do not exceed 2.5 pounds of active ingredient atrazine total per acre per year. Do not apply over the top of corn in liquid fertilzer as injury may occur. Do not graze or feed treated forage within 30 days after application. Do not apply over the top of corn more than 8 inches tall.
nicosulfuron *Accent 75 DF*	0.5 oz ai 0.67 oz	Johnsongrass and other annual weeds.	Postemergence, after sweet corn emergence up to 12-inch sweet corn or up to and including five leaf collars.	For corn 12 to 18 inches, apply with drop nozzles. **Do not** apply to sweet corn taller than 18 inches or with six or more leaf collars. **Do not** exceed one application per year. Some sweet corn varieties may be less tolerant than others
pendimethalin *Prowl H_2O* atrazine (several) 4L or 90DF	0.5 to 1.5 lb ai 1 to 3.2 pt 2 lb ai 2 qt or 2.2 lb	Annual grasses and broadleaf weeds.	Early postemergence from spike to 4-leaf corn but before weeds exceed 1 inch tall.	**Do not** apply (1) Prowl 3.3EC alone or with other products, (2) preplant incorporated, (3) Prowl H_2O + atrazine in liquid fertilizer.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Sweet potato				
carfentrazone-ethyl *Aim EC*	0.031 lb ai 2 oz	Emerged weeds.	At least 7 days preplant—burndown.	Applications must include a nonionic surfactant (2 pints per 100 gallons) or crop oil concentrate (1 to 2 gallons per 100 gallons).
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses.	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 30 days of harvest.
clomazone *Command 3 ME*	0.48 to 1.25 lb ai 1.33 to 3.33 pt	Annual grasses and certain broadleaf weeds.	Immediately prior to or after transplanting.	**Do not** apply within 95 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, and chickweed.	At transplanting or up to 6 weeks after transplating.	Apply to weed-free soil. Thorough agitation is required.
fluazifop Fusilade DX	0.094 to 0.25 lb ai 6 to 16 oz	Grasses.	After grass emergence.	Add either crop oil concentrate at 1% or nonionic surfactant at 0.25%. Do not harvest within 55 days of application.
flumioxazin *Valor SX*	0.032 to 0.08 lb ai 1 to 2.5 oz	Certain broadleaf weeds.	2 to 5 days prior to transplanting.	**Do not** apply over the top of sweet potatoes. Do not use greenhouse-grown transplants. Tank-mix with Command only if applied pretransplant.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
metolachlor *Dual Magnum 7.62 EC*	0.95 to 1 lb ai 1 to 1.33 pt	Annual and yellow nutsedge, annual grasses, and some broadleaf weeds.	Posttransplant to slips and preemergence to weeds.	Use only on field-grown 'Beauregard' transplants. There is a risk of injury to transplants if heavy rainfall occurs shortly after application. Do not apply so that the herbicide is allowed to be concentrated over the transplant row. Do not incorporate after application. Do not apply in irrigation water. Make only one application to sweet potatoes per growing season. **NOTE (State Label 24c)**
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest.
Tomato				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses.	After grasses emerge.	Use nonionic surfactant at 0.25% v/v. Do not apply within 20 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, and chickweed.	4-6 weeks after transplanting or direct-seeded plants at 4 to 6 inches height.	Apply to weed-free soil. Thorough agitation is required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
halosulfuron *Sandea 75 DF*	0.024 to 0.036 lb ai 0.5 to 0.75 oz	Nutsedges and some broadleaf weeds.	Pre.	Use on transplant tomatoes only. Apply under plastic mulch for nutsedge suppression. Sandea is more effective when applied to emerged nutsedges. Wait at least 7 days before transplanting into treated areas.
	0.024 to 0.036 lb ai 0.5 to 0.75 oz		Post.	Use on transplant tomatoes only. Apply to transplants that are established and actively growing. Do not apply sooner than 14 days after transplanting.
	0.38 to 0.768 oz ai 0.5 to 1 oz		Apply in row middles before vining on emerged 4- to 8-inch nutsedges.	Use on transplant and direct-seeded tomatoes. Avoid contact with tomato foliage or minimize deposition on plastic mulch. Do not exceed 2 ounces per acre per 12-month period. Do not apply to tomatoes treated with a soil-applied organophosphate insecticide. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
metolachlor *Dual Magnum 7.62 EC*	0.95 to 1.91 lb ai 1 to 2 pt	Annual grasses and some broadleaf weeds.	Preplant post-directed.	In plasticulture, apply to preformed beds prior to applying plastic mulch. Postdirect to transplants after first settling rain or irrigation event.
metribuzin 4 lb/gal or 75% DF	0.5 to 1 lb ai 1 to 2 pt or 0.67 to 1.33 lb	Most small-seeded annuals.	Postemergence when tomatoes have 5 to 6 leaves and before weeds are more than 1 inch tall.	Apply specified dosage in single or multiple applications in a minimum of 20 gallons of water and 14 days between applications. **Do not** treat seeded or transplanted tomatoes until plants have reached the 5- to 6-leaf stage or until transplants have recovered from transplant shock and new growth is evident. **Do not** apply within 3 days after periods of cool, wet, or cloudy weather or crop injury will occur. **Do not** apply within 24 hours of other pesticide applications.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
rimsulfuron *Matrix DF 25%*	0.016 to 0.031 lb ai 1 to 2 oz	Several broadleaf weeds and select grasses.	Postdirected to young, actively growing weeds (less than 1 inch).	Add nonionic surfactant at 0.25% v/v. For residual control, this treatment needs rainfall for activation within 5 days. Do not apply within 45 days of harvest. Read the label for crop rotational guidelines.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 20 days of harvest.
trifloxysulfuron *Envoke 75%*	0.004 to 0.009 lb ai 0.10 to 0.20 oz	Yellow nutsedge, cocklebur, morningglory, and several other broadleaf weeds.	Wait 2 weeks after transplanting before application. Post-directed to young, actively growing weeds. Tomato plants should be large enough to avoid spray contact with growing point.	This treatment is only for transplanted tomatoes grown in plastic. Add nonionic surfactant at 0.25% v/v. Do not apply if treated with a soil-applied organophosphate (OP) insecticide, and wait 21 days before or 7 days after foliar OP treatment. Do not apply within 45 days of harvest. Read the label for crop rotational guidelines. **NOTE (State Label 24c).**
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, and purslane.	Before transplanting.	Incorporate 1 to 1.5 inches.

ORNAMENTAL CROPS

Many manufacturers' labels list tolerant herbaceous and woody ornamentals species by common name. This listing may apply to one species or all species within a genus. This information is believed to be correct according to the manufacturer's label at the time this publication was prepared. However, species may be added to or deleted from labels at any time. ALWAYS CHECK THE LABEL AT THE TIME OF USE to make sure the herbicide is labeled for the species on which you intend to use it.

Always check label for specific precautions and application directions. Proceed cautiously and limit acreage treated until you have gained firsthand experience in the use of herbicides.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
BULBS, CORMS, TUBERS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species. Do not** apply peat moss before treating with Betasan. For use on tulips and narcissus only.
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clethodim	0.01–0.04 oz of 2 lb/gal formulation or 0.02–0.08 oz of 0.94 lb/gal formulation + NIS at 0.25% v/v	0.09–0.5	Apply only to actively growing grasses at recommended weed heights.	Grassy weeds.	**Consult the label for a listing of tolerant species.**
clopyralid	0.01–0.05 oz Clean Slate	0.09–0.5	Actively growing weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Do not apply this product in a tank mix to woody ornamental plants.
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G 0.75–1.5 of	Dimethenamid-P + 1–2 of Pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS	Broadcast — 0.25–0.5	Succulent, actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species**. Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant	0.25-0.375	Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
napropamide	0.3–0.44 oz Devrinol 50-DF Ornamental	4–6	Preemergence.	Preemergence control of certain annual broadleaf weeds and annual grasses.	Consult the label for a listing of tolerant species. Apply to freshly weeded soil before weeds germinate or during the fall and winter. Devrinol can be applied to newly planted container stock after the soil has settled from first watering, field-grown nursery stock, dichondra, and established plants. Devrinol needs mechanical incorporation (such as a power tiller) or irrigation or natural moisture within 2–3 days for optimum results.
oryzalin	0.05 - 0.1 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to gladiolus bulbs larger than l inch in diameter.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** In the spring, **do no**t apply to tulip plants that have emerged to a height greater than 0.75 inch. Deep plow prior to planting any crop after this use.
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
trifluralin	1.8 lb Treflan 5G	4.0	After plants become established.	Grassy weeds.	**Consult label for list of tolerant crops for Treflan 5G.** Gladioli corms less than 1 inch in diameter may be injured by preplant applications of Treflan G.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
HERBACEOUS ANNUAL FLOWERING PLANTS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species. Do not** apply peat moss before treating with Betasan.
bentazon	0.055–0.075 oz Basagran® T/O + 0.075 oz Oil Concentrate	0.75–1	See label for most effective application timing for various weeds.	Broadleaf weeds and sedges.	Consult the label for a listing of tolerant species. Apply Basagran T/O around landscape and ornamental trees, shrubs, flowers, and other plants as a directed spray away from the foliage of desired plants, unless otherwise directed. Injury may occur when applying Basagran T/O as a directed spray under the tree line or over the roots of sycamore and rhododendron. Do not apply if the risk of injury to these plants is not acceptable.
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clethodim	0.01–0.04 oz of 2 lb/gal formulation or 0.02–0.08 oz of 0.94 lb/gal formulation + NIS at 0.25% v/v	0.09–0.5	Apply only to actively growing grasses at recommended weed heights.	Grassy weeds.	**Consult the label for a listing of tolerant species.**
clopyralid	0.01–0.05 oz Clean Slate	0.09–0.5	Actively growing weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Do not apply this product in a tank mix to woody ornamental plants.
DCPA	1/2 lb 5G	10-15	After establishment.	Germinating grass and certain broadleaf weeds.	**Consult recent labels for complete listing of tolerant crop species.** Apply to clean soil after transplanting or following establishment. **Do not** incorporate more than 2 inches. **Do not** use on button pink, carnation, pansy, phlox, sweet william, or alternanthera.
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species**.
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G	0.75–1.5 of Dimethenamid-P + 1–2 of Pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS	Broadcast — 0.25–0.5	Succulent, actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	Consult the label for a listing of tolerant species. Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
EPTC	1/2 lb 2.3G	5	Post plant after growth of crop plants is 3-5 inches high or 2 weeks after transplanting.	Certain annual weeds and nutsedge.	**Consult recent label for complete listing of tolerant crop species.** Crop species tolerance varies with formulation. Incorporate thoroughly in top 2 inches of soil if plant is 3-5 inches tall or 2 weeks af ter transplanting. Beds must be clean at time of treatment.
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant		Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply until after soil around plant roots has settled. Apply to weed-free soil. Needs 0.5-inch of water to activate within 21 days.
napropamide	0.3–0.44 oz Devrinol 50-DF Ornamental	4–6	Preemergence.	Preemergence control of certain annual broadleaf weeds and annual grasses.	**Consult the label for a listing of tolerant species.** Apply to freshly weeded soil before weeds germinate or during the fall and winter. Devrinol can be applied to newly planted container stock after the soil has settled from first watering, field-grown nursery stock, dichondra, and established plants. Devrinol needs mechanical incorporation (such as a power tiller) or irrigation or natural moisture within 2–3 days for optimum results.
oryzalin	0.15 - 0.3 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species.** A 0.5 - inch rain or equivalent is necessary to activate or may be shallowly cultivated to 1-2 inches. **Do not** use on soils containing more than 3% organic matter.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Deep plow prior to planting any crop after this use.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
sethoxydim	0.08 fl oz Vantage	0.28	Apply to actively growing grasses before they exceed the recommended growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Not intended for domestic use, except by professional applicators. Slight leaf speckling has been observed on a few species with no reduction in vigor or growth.
trifluralin	1.8 lb Treflan 5G	4.0	After plants become established.	Grassy weeds.	**Consult label for list of tolerant crops for Treflan 5G.** Use lower rates on light soils and heavier rates on heavy soils. Use lower rates if physically incorporated and higher rates if applied to the surface and watered in.
HERBACEOUS PERENNIAL FLOWERING PLANTS AND PERENNIAL GROUNDCOVERS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species.** Do not apply peat moss before treating with Betasan.
bentazon	0.055–0.075 oz Basagran® T/O + 0.075 oz Oil Concentrate	0.75–1	See label for most effective application timing for various weeds.	Broadleaf weeds and sedges.	**Consult the label for a listing of tolerant species.** Apply Basagran T/O around landscape and ornamental trees, shrubs, flowers, and other plants as a directed spray away from the foliage of desired plants, unless otherwise directed. Injury may occur when applying Basagran T/O as a directed spray under the tree line or over the roots of sycamore and rhododendron. Do not apply if the risk of injury to these plants is not acceptable.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clethodim	0.01–0.04 oz of 2 lb/gal formulation or 0.02–0.08 oz of 0.94 lb/gal formulation + NIS at 0.25% v/v	0.09–0.5	Apply only to actively growing grasses at recommended weed heights.	Grassy weeds.	**Consult the label for a listing of tolerant species.**
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G	0.75–1.5 of Dimethenamid-P + 1–2 of Pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS	Broadcast — 0.25–0.5	Succulent, actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species.** Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
EPTC	1/2 lb 2.3G	5	Post plant after growth of crop plants is 3-5 inches high or 2 weeks after transplanting.	Certain annual weeds and nutsedge.	**Consult recent label for complete listing of tolerant crop species.** Crop species tolerance varies with formulation. Incorporate thoroughly in top 2 inches of soil if plant is 3-5 inches tall or 2 weeks after transplanting. Beds must be clean at time of treatment.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant		Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species.** Apply after soil around plant roots has settled.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
isoxaben + trifluralin	0.23-0.46 lb Snapshot 2.5 TG	0.5-1 + 2-4	Late summer to early fall or in early spring prior to germina tion of target weeds or post cultivation.	Certain broadleaf weeds and annual grasses.	**Consult label for listing of tolerant groundcover species.** Optimum weed control when activated within 3 days of application with irrigation or rainfall. May also be activated with cultivation equipment capable of uniformly mixing the herbicide into the upper 1-2 inches of soil. Failure to activate within 3 days of application may result in erratic control of annual grasses.
metolachlor	2 tbsp Pennant 7.8E/gal water. Spray to wet plant- ing area.	2-4	Apply before weeds emerge or after removal of existing weeds.	Grassy weeds and some broadleaf weeds.	**See label for complete listing of tolerant species.** Direct spray towards the base of established ornamentals transplanted a minimum of 10 days. **Do not** use on ornamental perennial monocots.
napropamide	0.3–0.44 oz Devrinol 50-DF Ornamental	4–6	Preemergence.	Preemergence control of certain annual broadleaf weeds and annual grasses.	**Consult the label for a listing of tolerant species.** Apply to freshly weeded soil before weeds germinate or during the fall and winter. Devrinol can be applied to newly planted container stock after the soil has settled from first watering, field-grown nursery stock, dichondra, and established plants. Devrinol needs mechanical incorporation (such as a power tiller) or irrigation or natural moisture within 2–3 days for optimum results.
oxyfluorfen + oryzalin	3.7 oz Rout Ornamental Herbicide	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing tolerant species. Do not** apply to wet foliage or whorl-leaved plants. **Do not** use in greenhouses. **Do not** incorporate physically. Water is necessary to activate this product. **Do not** use on bedding plants.
oxyfluorfen + pendimethalin	3.7 oz Ornamental Herbicide II	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants. **Do not** use in green houses. **Do not** incorporate physically. Water is necessary to activate this product. **Do not** use on bedding plants, **Do not** apply when extreme cold (< 35 °F) is expected.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
oxyfluorfen, prodiamine	0.23 lb Biathlon	Oxyfluorfen — 2 Prodiamine — 0.75	Before weed germination.	Broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** Apply Biathlon when at least 0.5 inch of irrigation or rainfall is expected within 24 hours after application. For best results, use in established beds or on soil surfaces left undisturbed during the period when weed control is desired.
oryzalin	0.15 - 0.3 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species.** A 0.5-inch rain or equivalent is necessary to activate. May be shallowly cultivated (1-2 inches). **Do not** use on soils containing more than 3% organic matter.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Deep plow prior to planting any crop after this use. **Do not** apply to ornamental plantings where the likelihood of runoff onto lawn areas containing cool-season turfgrass species exists as severe injury or death may occur. Over-application may result in crop injury or excessive soil residue.
oxadiazon	0.45 lb of Ronstar G	4	Before weed seed germination.	Annual broadleaf and grass weeds.	**Consult label for listing of tolerant species.** Apply any time during year. Irrigation following treatment improves activity. **Do not** apply to wet foliage. **Do not** incorporate physically, but apply before rainfall or irrigate to activate. **Do not** disturb the soil surface by cultivation after treatment. **Do not** apply under conditions in which granules will collect on leaves or in rosettes of plants such as yucca and liriope.
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
pendimethalin	0.01 to 0.02 oz Pendulum WDG or 0.17 to 0.23 lb Pendulum 2G	1.5 to 3	Fall or spring before weed emergence.	Annual grasses and broadleaf weeds.	**Consult label for complete listing of tolerant crop species.** Apply to established plantings only. Apply to weed-free soil and irrigate. Over-application in cool, wet soils can increase injury.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
sethoxydim	0.08 fl oz Vantage	0.28	Apply to actively growing grasses before they exceed recommended growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Not intended for domestic use, except by professional applicators. Very slight leaf speckling has been observed on a few species with no reduction in vigor or growth.
simazine + metolachlor	0.05-0.07 oz + 0.07-0.11 oz Princep 4L + Pennant 7.8E or 1.4-2.8 oz Derby 5G	0.8-1 + 2-3	10 days after transplant.	Annual grasses and broadleaf weeds.	**Liriope only.** Apply before weeds emerge or after existing weeds are removed. Use high rates on fine-textured soils and low rate on coarse-textured soils where light infestations of broadleaf weeds are expected. Prolonged wet soil conditions after the herbicide is applied will reduce the length of weed control.
sulfosulfuron	0.003 oz Certainty	0.06	Actively growing weeds.	Selective control of annual and perennial grass, broadleaf, and sedge weeds.	**Consult the label for a listing of tolerant species.** This product is for use in woody ornamentals, perennial groundcovers, and warm-season ornamental grasses. Best results are obtained when weeds are not disturbed by mowing for at least 2 days before and after application.
trifluralin	0.18 lb Treflan 5G	4.0	After plants become established.	Annual grasses and some broadleaf weeds.	**Consult label for list of tolerant crops**. Use lower rates on light soils and heavier rates on heavy soils. Use lower rates if physically incorporated and higher rates if applied to the surface and watered in.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
ORNAMENTAL GRASSES					
bentazon	0.055–0.075 oz Basagran® T/O + 0.075 oz Oil Concentrate	0.75–1	See label for most effective application timing for various weeds.	Broadleaf weeds and sedges.	**Consult the label for a listing of tolerant species.** Apply Basagran T/O around landscape and ornamental trees, shrubs, flowers, and other plants as a directed spray away from the foliage of desired plants, unless otherwise directed. Injury may occur when applying Basagran T/O as a directed spray under the tree line or over the roots of sycamore and rhododendron. Do not apply if the risk of injury to these plants is not acceptable.
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clopyralid	0.01–0.05 oz Clean Slate	0.09–0.5	Actively growing weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Do not apply this product in a tank mix to woody ornamental plants.
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G	0.75–1.5 of Dimethenamid-P + 1–2 of Pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS	Broadcast — 0.25–0.5	Succulent, actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species.** Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species.** Do not apply until after soil around plant roots has settled.
isoxaben + trifluralin	0.23-0.46 lb Snapshot 2.5 TG	0.5-1 + 2-4	Late summer to early fall or in early spring prior to germination of target weeds or post cultivation.	Certain broadleaf weeds and annual grasses.	**Consult label for listing of tolerant groundcover species.** Optimum weed control when activated within 3 days of application with irrigation or rainfall. May also be activated with cultivation equipment capable of uniformly mixing the herbicide into the upper 1-2 inches of soil. Failure to activate within 3 days of application may result in erratic control of annual grasses.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
metolachlor	2 tbsp Dual Magnum 7.8E/gal water. Spray to wet planting area.	2-4	Apply before weeds emerge or after removal of existing weeds.	Grassy weeds and some broadleaf weeds.	See label for complete listing of tolerant species. Direct spray towards the base of established ornamentals transplanted a minimum of 10 days.
oxyfluorfen + pendimethalin	3.7 oz Ornamental Herbicide II	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants.
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.
pendimethalin	0.01 to 0.02 oz Pendulum WDG or 0.17 to 0.23 lb Pendulum 2G	1.5 to 3	Fall or spring before weed emergence.	Annual grasses and certain broadleaf weeds.	**Consult recent label for complete listing of tolerant crop species.** Apply to established plantings only. Apply to weed-free soil and irrigate. Over-application in cool, wet soils can increase injury.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
sulfosulfuron	0.003 oz Certainty	0.06	Actively growing weeds.	Selective control of annual and perennial grass, broadleaf, and sedge weeds.	**Consult the label for a listing of tolerant species.** This product is for use in woody ornamentals, perennial groundcovers, and warm-season ornamental grasses. Best results are obtained when weeds are not disturbed by mowing for at least 2 days before and after application.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
WOODY ORNAMENTAL PLANTS					
alachlor	0.15 oz Intrro or Micro-Tech	0.5	Apply as a directed spray after transplanting or to established plantings before weed emergence.	Annual grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This treatment is for use on juniper and yew. Repeat applications may be required for sustained weed control. DO NOT exceed two applications or a total of 4 quarts per year. DO NOT retreat within 21 days. Applications during periods when the temperature exceeds 90°F may cause injury to ornamentals.
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species**. **Do not** apply peat moss before treating with Betasan. For landscape and field use.
bentazon	0.055–0.075 oz Basagran® T/O + 0.075 oz Oil Concentrate	0.75–1	See label for most effective application timing for various weeds.	Broadleaf weeds and sedges.	**Consult the label for a listing of tolerant species.** Apply Basagran T/O around landscape and ornamental trees, shrubs, flowers, and other plants as a directed spray away from the foliage of desired plants, unless otherwise directed. Injury may occur when applying Basagran T/O as a directed spray under the tree line or over the roots of sycamore and rhododendron. Do not apply if the risk of injury to these plants is not acceptable.
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clethodim	0.01–0.04 oz of 2 lb/gal formulation or 0.02–0.08 oz of 0.94 lb/gal formulation + NIS at 0.25% v/v	0.09–0.5	Apply only to actively growing grasses at recommended weed heights.	Grassy weeds.	**Consult the label for a listing of tolerant species.**
clopyralid	0.01–0.05 oz Clean Slate	0.09–0.5	Actively growing weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Do not apply this product in a tank mix to woody ornamental plants.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
DCPA	1/2 lb 5G	10-15	After establishment.	Germinating grass and certain broadleaf weeds.	**Consult recent labels for complete listing of tolerant crop species.** Apply to clean soil after transplanting or following establishment. **Do not** incorporate more than 2 inches.
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G	0.75–1.5 of Dimethenamid-P + 1–2 of Pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dichlobenil	0.23 to 1.14 lb Casoron 4G	4 to 20	4 weeks after transplanting in early spring and fall.	Annual and perennial weeds.	**Consult recent label for complete listing of tolerant crop species.** Apply only to a well prepared weed-free soil before seeds of annual weeds germinate or after cultivation to remove all growing weeds. **Do not** apply until 4 weeks after transplanting. **Do not** use in seed beds, transplant or cutting beds, or in greenhouses. **Do not** use on extremely sandy soils. Shallow incorporation or sprinkler irrigation immediately after application is recommended. This product is effective only during cool seasons in Mississippi (air temperature < 70 °F).
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS	Broadcast — 0.25–0.5	Succulent, actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species.** Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
EPTC	1/2 lb 2.3G	5	Post plant after growth of crop plants is 3- to 5-inches high or 2 weeks ater transplanting.	Certain annual weeds and nutsedge.	**Consult recent label for complete listing of tolerant crop species.** Crop species tolerance varies with formulation. Must be incorporated thoroughly in top 2 inches of soil growth if plant is 3-5 inches tall or 2 weeks after transplant. Beds must be clean at time of treatment.
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant	0.25-0.375	Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species**. Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
flumioxazin	0.35 lb of BroadStar or 0.02–0.03 fl oz of SureGuard	BroadStar — 0.38 or SureGuard — 0.25–0.38	For preemergence, see label for appropriate timing for various crops and sites. For postemergence, apply to actively growing weeds.	Annual broadleaf and grassy weeds.	Consult the label for a listing of tolerant species. Postemergence treatments are most effective when applied under sunny conditions at temperatures above 65°F. Use these herbicides in containerized and field-grown (in-ground) woody, ornamental shrubs and trees, groundcovers, and nonbearing fruit and nut trees grown in nurseries. BroadStar should not be applied in residential or commercial landscapes. SureGuard may be used in landscapes.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
Glyphosate, prodiamine	0.3–0.58 fl oz of ProDeuce	Glyphosate — 4–8 Prodiamine — .75–1.5	For best results, apply during warm, sunny weather (above 60°F).	Preemergence — broadleaf and grass weeds. Postemergence — Nonselective weed control.	**Consult the label for a listing of tolerant species.** DO NOT spray on desirable plants. Use around the base or in mulched beds of WELL-ESTABLISHED (at least 6 months old) plants, shrubs, or trees. DO NOT apply in an area that will be planted or seeded for 6 months after application when applying at the rate of 3 fluid ounces per 1,000 square feet or for 12 months after application when applying at the rate of 5.75 fluid ounces per 1,000 square feet.
halosulfuron	Spot Spray — 0.03 oz + NIS per gallon to treat 1,000 sq ft Broadcast — 0.002–0.003 oz + NIS	0.03–0.06	For postemergence control, apply when nutsedge has reached the 3- to 8-leaf stage of growth. A second treatment may be required 6–10 weeks after the first.	Controls purple nutsedge, yellow nutsedge, and horsetail. Suppresses Kyllinga spp.	**Consult the label for a listing of tolerant species.** This product may be applied at recommended rates as a post-directed spray around any established woody ornamental species in landscaped areas. For transplanted woody ornamentals, allow 3 months after transplanting before applying this product. Avoid contact with leaves of desirable plants since foliar injury, discoloration, or death may result.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
imazaquin	0.45 to 0.6 tsp Image	0.5	Apply to established ornamentals.	Broadleaf weeds, wild garlic, onion, and sedges.	**Consult label for listing of tolerant species.** Add 0.25% nonionic surfactant to spray mix**. Do not** apply to container-grown plants.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species**. **Do not** apply until after soil around plant roots has settled. Apply to weed-free soil. Needs 0.5-inch of water to activate within 21 days. For field and container use. Some liners are also registered.
isoxaben + trifluralin	0.23-0.46 lb Snapshot 2.5 TG	0.5-1 + 2-4	Late summer to early fall or in early spring prior to germination of target weeds or post cultivation.	Certain broadleaf weeds and annual grasses.	**Consult label for listing of tolerant groundcover species.** Optimum weed control when activated within 3 days of application with irrigation or rainfall. May also be activated with cultivation equipment capable of uniformily mixing the herbicide into the upper 1-2 inches of soil. Failure to activate within 3 days of application may result in erratic control of annual grasses. **Do not** apply to nursery seedbeds or transplant beds, unrooted liners or cuttings planted in pots for the first time, pots less than 4 inches wide, or newly transplanted ornamentals. **Do not** apply over 600 lb per acre per year.
metolachlor	2 tbsp Dual Magnum 7.8E /gal water. Spray to wet planting area.	2-4	Apply before weeds emerge or after removal of existing weeds.	Grassy weeds and some broadleaf weeds.	**See label for complete listing of tolerant species.** Direct spray towards the base of established ornamentals transplanted a minimum of 10 days. For field use only.
metolachlor + simazine	0.09-0.18 lb Derby 5G	2-4	Apply prior to weed emergence.	Grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Do not apply until soil has settled around plant roots. If applied to wet foliage, apply overhead irrigation to remove herbicide granules.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
napropamide	0.3–0.44 oz Devrinol 50-DF Ornamental	4–6	Preemergence.	Preemergence control of certain annual broadleaf weeds and annual grasses.	**Consult the label for a listing of tolerant species.** Apply to freshly weeded soil before weeds germinate or during the fall and winter. Devrinol can be applied to newly planted container stock after the soil has settled from first watering, field-grown nursery stock, dichondra, and established plants. Devrinol needs mechanical incorporation (such as a power tiller) or irrigation or natural moisture within 2–3 days for optimum results.
naptalam	0.6–1.2 fl oz Alanap-L	4–8	Preemergence and early growth of weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Alanap-L may be used for broadleaf weed control in woody nursery-stock transplants or established plants. Direct spray to strike nursery stock no more than 2–3 inches above the soil line. Avoid application to nursery plant foliage. Do not use on herbaceous plants.
oryzalin	0.15 - 0.3 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species.** A 0.5-inch rain or equivalent is necessary to activate or may be shallowly cultivated to 1-2 inches. Do not use on soils containing more than 3% organic matter. Landscape use only.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Deep plow prior to planting any crop after this use. For field and container use. Registered on selected liners.
oxadiazon	0.45 lb of Ronstar G	4	Before weed seed germination.	Annual broadleaf and grassy weeds.	**Consult label for complete listing of tolerant species.** Apply anytime during year. Irrigation following treatment improves activity. **Do not** apply to wet foliage. **Do not** incorporate phsically, but apply before rainfall or irrigate to activate. **Do not** disturb the soil surface by cultivation after treatment. **Do not** apply under conditions in which granules will collect on leaves or in rosettes of plants such as yucca and liriope.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
oxadiazon + prodiamine	0.45 lb of RegalStar G	1 lb + 0.2 lb	Before weed seed germination.	Annual broadleaf and grassy weeds.	**Consult label for listing of tolerant species.** No more than two applications per year are recommended.
oxyfluorfen	0.18-0.37 oz Goal 2E	1-2	Preemergence or postemergence.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Use 0.25% nonionic surfactant if weeds are present.
oxyfluorfen + oryzalin	3.7 oz Rout Ornamental Herbicide	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants. **Do not** use in greenhouses. **Do not** incorporate physically. Water is necessary to activate this product. **Do not** use on bedding plants. For container and field use.
oxyfluorfen + oxadiazon	0.22 lb Regal O-O	2 + 1 lb	Before weed seed germination.	Annual broadleaf and grassy weeds.	**Consult label for listing of tolerant crops.** Excellent activity for bittercress.
oxyfluorfen + pendimethalin	3.7 oz Ornamental Herbicide II 2 + 1	After transplants	become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants.
paraquat	0.09–0.15 fl oz of 2 lb/gal formulation or 0.06–0.12 fl oz of 2.5 lb/gal formulation or 0.06–0.1 fl oz of 3 lb/gal formulation	5–8	Small, emerged weeds.	Nonselective weed control.	This treatment is for use on shade and ornamental trees. Weeds 1–6 inches in height are the easiest to control. Larger weeds may be more difficult to control. When weeds have been grazed or mowed, allow them to regrow to a height of 2–4 inches before spraying, if possible. DO NOT allow spray to contact fruit, foliage, or green stems of desirable plants. Use a shield or wrap plants when spraying around young trees or vines. DO NOT apply more than five sprays per year.
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
oxyfluorfen, prodiamine	0.23 lb Biathlon	Oxyfluorfen — 2 Prodiamine — 0.75	Before weed germination.	Broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** Apply Biathlon when at least 0.5 inch of irrigation or rainfall is expected within 24 hours after application. For best results, use in established beds or on soil surfaces left undisturbed during the period when weed control is desired.
pronamide	0.07-0.15 oz Kerb 50W	1-2	Late fall prior to weed emergence.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Apply to established plantings only.
sethoxydim	0.08 fl oz Vantage	0.28	Apply to actively growing grasses before they exceed the recommended growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Not intended for domestic use, except by professional applicators. Slight leaf speckling has been seen on a few species with no reduction in vigor or growth.
simazine	0.9-3.8 oz Princep 4G	25-100	Apply early spring after first year of establishment.	Most annual broadleaf weeds and some annual grasses.	**Consult label for list of tolerant crops.** For use on conifers only.
sulfosulfuron	0.003 oz Certainty	0.06	Actively growing weeds.	Selective control of annual and perennial grass, broadleaf, and sedge weeds.	Consult the label for a listing of tolerant species. This product is for use in woody ornamentals, perennial groundcovers, and warm-season ornamental grasses. Best results are obtained when weeds are not disturbed by mowing for at least 2 days before and after application.
trifluralin	1.8 lb Treflan 5G	4.0	After plants become established.	Grassy weeds.	**Consult label for list of tolerant crops for Treflan 5G.** Use lower rates on light soils and heavier rates on heavy soils. Use lower rates if physically incorporated and higher rates if applied to the surface and watered in.
trifluralin, isoxaben, oxyfluorfen	0.23–0.46 lb Showcase	Trifluralin — 2–4 Isoxaben — 0.25–0.5 Oxyfluorfen — 0.25–0.5	Preemergence.	Preemergence control of certain broadleaf weeds and annual grasses.	**Consult the label for a listing of tolerant species.** Showcase needs to be activated within 3 days. A single rainfall or sprinkler irrigation of 0.5 inch or more or flood irrigation is required for activation. Repeat applications at 0.35 or 0.46 pound per 100 square feet should not be made sooner than 60 days after a previous application of Showcase.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Time of application	Weeds controlled	Special instructions and remarks
CHRISTMAS TREES				
Preplanting				
trifluralin 0.5 to 1.0 lb	Treflan 4E — 1 to 2 pt	Preplant incorporated and post plant.	Most annual grasses and a few small-seeded broadleafs.	For Scotch, loblolly, white pine, and red cedar. Apply to weed-free soil and incorporate immediately. Applications may be made to establish plantings by setting incorporating tools to throw treated soil around the plants.
Preemergence				
hexazinone 1.0 to 1.7 lb	Velpar L — 4-7 pt per acre.	Do not use in 2- to 5- year-old plantations.	Pre- and post-emergence control of many annual grasses.	See label for tree varieties cleared. Velpar L can be applied over the top or as a direct spray. **Do no**t add surfactant if applied over the top of trees. Use directed sprays if applied after bud break and add 1 quart surfactant per 100 gal spray to improve postemergence activity. If multiple applications are used for postemergence control, use 2 to 4 pints each application.
metolachlor 2.0 to 3.9 lb/A	Pennant Liquid Herbicide — 7.8 lb/gal 2 to 4 qt/A	Before weeds emerge.	Annual grasses and yellow nutsedge.	Apply in 10 or more gallons water prior to emergence of weeds but after soil has settled around the transplant. Cultivate or control emerged weeds with postemergence herbicides. A second application may be needed to provide control for an extended period. Use 2 pints for coarse textured, low organic matter soils and the 4-pint rate for high organic clay soils or where yellow nutsedge is a problem.
napropamide 4.0 to 6.0 lb/A	Devrinol 50WP — 8 to 12 lb	Postplant, established, before weed germination.	Most annual grasses and a few small-seeded broadleafs.	Apply over the top of newly planted or as a directed spray to establish plantings. Apply any time of year but make application to weed-free soil. Rainfall, irrigation, or mechanical incorporation 1 to 2 inches deep ensures control. Often provides season-long control of annual grasses and many small-seeded broadleaf weeds.
oryzalin 2 to 4 lb	Surflan 4 lb/gal WP — 4 to 6 pt in 20 to 40 gal water	Late winter or early spring before weeds germinate.	Annual grasses and a few small-seeded broadleafs.	For short-season control apply lower rates. Increase rates for longer control. May be applied over the top of trees. Use after trees are planted and soil is settled. If low rates are used, one additional treatment in the late spring or early summer will likely be needed.
oxyfluorfen 1.0 to 2.0 lb/A	Goal 2XL 1.6E — 4.0 to 8 pt	Postplant.	Pre and postemergence control of small annual grasses and broadleafs.	For many conifer species. Apply after transplanting while trees are still dormant. Add 0.25% surfactant if weeds have emerged. Generally 5 pt/acre rate provides acceptable control, but heavy weed pressure (many small weeds or larger weeds) may require the higher rates. Ground application only.
pendimethalin 2 to 4 lb/A	Stomp — 4 lb/gal 2 to 4 qt/A	Before weed seeds germinate.	Certain annual grasses and broadleafs.	Apply in 20 gallons water to established plantings. May be applied over the top of trees. It will not control emerged weeds. Rainfall or irrigation must be applied to initiate control. Use the low rate for short-term control and the high rate for long-term control.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Time of application	Weeds controlled	Special instructions and remarks
simazine 2.0 to 4.0 lb/A	4L - 2 to 4 qt Princep 5G — 50 to 100 lb	Spring or fall before weed germination.	Annual grasses and broadleafs.	For red cedar and white pine. Remove weed growth before applying or kill using postemergence herbicide. Trees must be 3 years old.
Postemergence				
clethodim	Prism — 17 to 34 oz in 5 to 40 gal of spray solu tion. Use 0.25% v/v nonionic surfactant.	When grass is 1-18 in. high (follow table on label).	Most grasses.	**Do not** apply directly to water or to areas where runoff is likely to occur.
fluazifop-butyl 0.1-0.2 a.i. lb/A	Fusilade DX — 8 to 16 oz in 10-40 gal water. Add 1 qt nonionic surfactant or 4 qt crop oil concentrate per 100 gal spray.	When grass is between 1-6 inches tall.	Most grasses.	**Do not** tank mix Fusilade with other herbicides. Check label for labelled species.
glyphosate 0.75 to 3.7 lb ae	glyphosate — 1.0 to 5.0 qt 3 lb ae/gal formulation in 10 to 40 gal water.	Anytime weeds are actively growing.	Most vegetation covered.	Apply to undesirable vegetation in 20 to 40 gallons water. Use low rate for small annual weeds and high rate for perennials. For annual weeds less than 6 in tall in small areas mix 1 to 2 fl oz per gallon or for annual weeds mor than 6 in tall or perennial weeds, mix 2 to 3 fl oz per gallon and spray lightly to cover. Delay plantings and cultivations for at least 5 days for best weed control. When spraying adjacent to small desirable plants, use a shield to prevent spray from from contacting the green part of plants. Repeat as needed to maintain control.
hexazinone 0.90 to 1.8	See preemergence section.			
paraquat 0.5 to 1.0	1.33 to 2.5 pt of 1.5 lb/gal formulation	When weeds are 1 to 6 inches tall.	Most annuals; top kill of perennials.	Add 1 quart of nonionic surfactant to each 100 gallons spray. Apply as directed spray to prevent contact of spray with green stems or foliage. Keep pressure low. **Do not** spray when windy.
sulfometuron-methyl	See preemergence section.			

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
PERIPHERAL AND NONCROP AREAS					
glyphosate	1% (v/v) - 1.3 fl oz or 2.6 tbsp 3 lb ae/gal water 2% (v/v) - 2.6 fl oz or 5.2 tbsp 3 lb ae/gal water	1-3	While weeds are actively growing.	Most annual and perennial weeds less than 6 in tall. Annual weeds over 6 in tall and perennial weeds.	**Avoid contact with desirable vegetation. Do not** spray green bark or foliage of any desirable vegetation. For optimal controlof perennial weeds apply during seed production or 2 to 4 weeks before frost.
paraquat	0.07 - 0.11 oz Gramoxone Max 2.5EC	0.56-0.94	Anytime to foliage of weeds only.	All vegetation contacted.	Apply for full coverage of weeds. Best results are obtained when weeds are young and succulent. Repeat application as needed. The addition of nonionic surfactant (0.5-1 pint per 100 gallons spray solution) is recommended. **Use in NONCROP AREAS**. Prevent contact with desirable vegetation. **Use protective clothing when applying paraquat.**
gluphosanate-ammonium	0.15-0.4 oz of Finale® (11.3%), depending on weed and stage of growth (see label)	0.21-0.37	While weeds are actively growing.	Most annual and perennial weeds.	Avoid contact with desirable vegetation. Spray to wet foliage. **Do not enter or allow entry of maintenance workers into treated areas during the restricted-entry interval (rei) of 12 hours. Wear personal protective equipment (ppe) indicated on label.**
diquat	4 tsp Reward® plus 1 tsp 75% nonionic surfactant per gallon	1.0	Apply to young weeds since control decreases as weeds mature.	Most above-ground grasses and broadleaf weeds.	Apply for full coverage and thorough weed contact. Retreatment may be necessary to control grasses and established weeds. Avoid spray contact with foliage of food crops or ornamental plants. **Do not enter or allow entry of maintenance workers into treated areas, or allow contact with treated vegetation wet with spray, dew or rain, without appropriate protective clothing until spray has dried.**

FRUIT AND NUT CROPS

SUGGESTED USES OF HERBICIDES ON FRUIT AND NUT CROPS

Herbicide	Apple	Blackberry	Blueberry	Grape	Peach	Pecan	Strawberry
2,4-D	Yes[1, 2]	No	No	No	No	No	No
Bentazon[3]	Yes	Yes	Yes	Yes	No	No	No
Carfentrazone	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clethodim	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes
Clopyrolid	No	No	No	No	Yes	Yes	Yes[4]
Dazomet	No	No	No	No	No	No	Yes
DCPA	No	No	No	No	No	No	Yes[7]
Dichlobenil	Yes[1,5]	Yes[2]	Yes[4]	Yes[4]	No	No	No
Diquat[3]	No	Yes	Yes	Yes	Yes	Yes	No
Diuron	Yes[1]	No	Yes[1]	Yes[6]	Yes[6]	Yes[6]	No
Fluazifop[3]	Yes[1]	Yes	Yes	Yes	Yes	Yes	Yes[7]
Flumioxazin	Yes	No	Yes[8]	Yes[8]	Yes[8]	Yes	Yes[9]
Fluroxypyr	Yes[2, 10]	No	No	No	No	No	No
Glufosinate	Yes[1]	No	Yes	Yes	No	Yes	No
Glyphosate	Yes	Yes	Yes	Yes	Yes[11]	Yes	Yes
Halosulfuron	Yes[1]	No	Yes[1]	No	No	Yes[1]	No
Hexazinone	No	No	Yes[6]	No	No	No	No
Indaziflam	Yes[6]	No	No	Yes	Yes	Yes	No
Isoxaben[7]	No	Yes	Yes	Yes	Yes	Yes	No
Mesotrione	No	No	Yes	No	No	No	No
Methyl Bromide	No	No	No	No	No	No	Yes
Napropamide	No	Yes	Yes	Yes	No	Yes	Yes
Norflurazon	Yes[1, 5]	Yes[1]	Yes[12]	Yes[11]	Yes[12]	Yes[12]	No
Oryzalin	Yes	Yes	Yes	Yes	Yes	Yes	No
Oxyfluorfen	Yes[13]	No	No	Yes[6]	Yes	Yes	Yes
Paraquat	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pendimethalin	Yes[7]	No	No	Yes	Yes	Yes	No
Pronamide	No	No	Yes	Yes	Yes	No	No
Rimsulfuron[1]	Yes	No	No	Yes	Yes	Yes	No
Sethoxydim	Yes[2]	Yes	Yes	Yes	Yes	Yes	Yes
Simazine	Yes	Yes	Yes	Yes	Yes[6]	Yes[11]	No
Terbacil	Yes[6]	Yes[1]	Yes[1]	No	Yes[14]	No	No

[1]Apply to orchards at least 1 year old.
[2]Do not apply within 14 days of harvest.
[3]Do not apply to crops that will bear harvestable fruit within 12 months.
[4]Do not apply within 30 days of harvest.
[5]Do not apply earlier than 4 weeks after transplanting.
[6]Apply to plants established 3 years or more.
[7]Apply to nonbearing crops only.
[8]Do not apply less than 2 months before transplanting.
[9]Must be applied a minimum of 30 days before transplant.
[10]Do not apply to trees less than 4 years old.
[11]Apply to plants established at least 2 years.
[12]Apply to plants at least 6 months old.
[13]Do not apply when foliage or fruit are present.
[14]Do not apply within 60 days of harvest.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
2,4-D Formula 40 3.8 lb/gal	0.5-1 lb ai 1-2.1 pt	Apple	After last picking.	Most broadleaf weeds.	Use in established plantings after last picking. **Do not** apply unless possible injury to crop is acceptable. **Do not** apply to bare ground.
benefin + oryzalin XL 2G	2.5 lb ai 150 lb 2G	Nonbearing Blackberry Blueberry Grape Peach Pecan	Before weeds germinate.	Many annual grasses and small seeded broadleaf weeds.	Rainfall or irrigation critical for acceptable weed control. Emerged weeds must be controlled before application. Do not apply within 1 year of harvest. Do not re-enter treated sites within 12 hours after application.
bentazon Basagran 4SL	0.75-1 lb ai 1.5 to 2 pt	Nonbearing Apple Blackberry (at or before planting only) Blueberry Grape	Apply only as a DIRECTED spray when weeds are actively growing. Keep spray off green foliage and stems.	Many broadleaf weeds, including coffee senna, dayflower, smartweed, prickly sida, sesbania, wild mustard, wild poinsettia, and yellow nutsedge.	Do not apply within 1 year of harvest. Adding crop oil concentrate at 1 quart per acre improves control of certain weeds. Do not apply to stressed plants or injury may occur. Do not exceed 2 pints per acre per application or total application of 4 pints per acre per year. Do not graze animals in treated fields or use hay from treated fields for animal feed or bedding. Basagran is only available to use via supplemental label.
carfentrazone-ethyl Aim EC	0.5-2 oz/A 0.008-0.031 lb ai	Apple Blackberry Blueberry Grape Peach Pecan Strawberry	When weeds are actively growing.	Most broadleaf weeds.	Use a minimum of 20 gallons of spray per broadcast acre. A nonionic surfactant or crop oil concentrate is required. Apply as a directed spray.
clethodim 2 lb/gal Select Max 1 lb/gal	0.09-0.13 lb ai 6-8 oz 12-16 oz	Strawberry Nonbearing Apple Blackberry Blueberry Grape Peach Pecan	Apply only as a DIRECTED spray with nonionic surfactant at the rate of 1 qt per 100 gal spray.	Annual and perennial grasses.	Sequential applications to strawberry should not be made less than 14 days apart. Do not apply within 4 days of strawberry harvest. Do not apply to other fruit or nut crops within 1 year of harvest. Do not exceed 8 ounces per acre per application or 32 ounces per acre per year. Do not apply if rainfall is expected within 1 hour after treatment.
clopyralid Stinger 3 lb/gal	5.3 fl oz 0.124 lb ai	Strawberry Peach Pecan	Postemergence.	Broadleaf weeds.	Do not use surfactant. Do not tank-mix with other herbicides. Do not apply within 30 days of harvest. Make one to two applications per year not to exceed 10.6 fluid ounces per acre per year. Make only one application in the spring. Minor leaf cupping may occur.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
dazomet Basamid 99 GR	350 lb 347 lb ai	Strawberry	Preplant (plastic culture).	All weeds.	Apply at soil temperatures of 54–64°F. Do not apply to soil temperatures below 43°F and above 103°F. After application, seal the soil by watering or by tarp. Aerate soil by cultivation 7 to 12 days after application.
DCPA Dacthal 75% WP	8-12 lb 6-9 lb ai	Strawberry	Before weed emergence.	Annual grasses and some small-seeded broadleaf weeds.	Apply no more than 9 lb a.i/A for establishment plantings nor 10.5 lb a.i/A to established plantings. **Do not** apply after first bloom. Rainfall or irrigation following applications improves weed control.
dichlobenil 4% G 50% WP Casoran CS	4-6 lb ai 100-150 lb 8-12 lb 1.4-2.8 gal 1.4-2.8 lb ai	Apple Blackberry Blueberry Grape	Preemergence in late winter to early spring after plants established at least 4 weeks.	Many annual and perennial grasses and broadleafs.	Apply as directed spray be fore weed seed germinate. Use low rate for annuals if application is followed by more than 0.5-inch of water. Use high rate for perennials or if incorporation is poor.
diquat Reglone	0.25-0.5 lb ai 1.5-2 qt	Nonbearing Blackberry Blueberry Grape Peach Pecan	Apply only as a DIRECTED spray with nonionic surfactant at the rate of 1 qt per 100 gal spray.	Small broadleaf and grassy weeds.	Do not apply within 1 year of harvest. Do not allow spray to contact green foliage, stems, or fruit. Do not graze treated sites.
diuron Diuron 80 WDG 4 lb/gal Direx or Diuron 4L 4 lb/gal	Check label for rates.	Peach Pecan	Preemergent in spring or early summer. Add 0.5% surfactant if weeds have emerged.	Annual grasses and broadleaf weeds.	Apples must be established at least 1 year, and peaches and pecans must be established at least 3 years. Do not apply on soils containing less than 1% organic matter. Do not use on sand, loamy sand, or gravelly soils.
diuron Karmex, Diuron 80DF Direx 4L + terbacil Sinbar 80WDG	1-2 lb 1.6-3.2 pt + 1 lb ai 0.8-1.6 lb ai + 0.8 lb ai	Apple	Preemergence.	Broad-spectrum weed control.	Use only under apple trees established in the orchard at least 2 years. Apply in spring or after harvest in the fall before weeds emerge or to weeds less than 2 inches tall. Do not use on trees grafted on full-dwarf rootstocks.
indaziflam Alion	1.67 lb/gal at 5 fl oz	Apple Grape Peach Pecan	Preemergence.	Broad-spectrum weed control.	Use only on well-established plants (varies by crop). Avoid direct or indirect spray contact with crop foliage, green bark, roots, or fruit, as it may cause localized crop injury or death. Only trunks with callused, mature brown bark may be sprayed.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
fluazifop Fusilade DX	0.25-0.37 lb ai 8-16 oz	Nonbearing: Apple Blackberry Blueberry Grape Peach Pecan Strawberry	Warm weather when grasses are actively growing.	Grasses.	Apply to cover young actively growing annual and perennial grasses at least one hour before rain. **Do not** mix with other pesticides or apply to grasses injured by previous herbicide applications. Apply using 2 pt crop oil concentrate or 1/2 pint surfactant in 25 gallons spray.
flumioxazin Chateau 51 WDG	0.09-0.38 lb ai 3-12 oz	Apple Blueberry (highbush) Grape Peach Pecan Strawberry	Before weeds emerge. Mix with other herbicides if weeds are present.	Annual grasses and broadleaf weeds.	Prevent spray contact with trees established less than 1 year or blueberries established less than 2 years. Do not apply to newly planted crops before soil has settled. Do not allow spray to contact strawberry foliage, and do not apply after fruit set. Apply after final harvest up to bud break to crops other than strawberry. Do not apply within 60 days of harvest for apple, grape, peach, and pecan; do not apply within or 21 days for strawberry. Annual treatments should not exceed 3 ounces per acre for strawberry, 12 ounces per acre for blueberry, or 24 ounces per acre for other crops.
fluroxypyr Starane Ultra Comet 1.5	0.35-0.7 lb ai 0.7-1.4 pt 0.66-2.66 pt	Apple	While weeds are small and actively growing.	Broadleaf weeds.	Do not apply during bloom or within 14 days of harvest. Do not apply more than once per year; applications should not exceed 1.4 pints per acre annually. Do not use on trees less than 4 years old.
glufosinate ammonium Rely 200	0.75-1.5 lb ai 48–96 oz/A	Apple Grape Blueberry Pecan	Apply low rate if weeds are less than 6 in. tall or high rate if weeds are 6 in. or more tall. Apply 2.4 fl oz/gal for spot treatment.	Broadleaf, grasses, and sedges.	Avoid contact with foliage or green tissue of desirable vegetation. Do not harvest within 14 days after application. Do not apply to apples planted less than 1 year. Do not exceed 12 qt/A/year in berries.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
glyphosate	0.75 - 2.25 lb ae 1% (v/v) - 1.3 fl oz or 2.6 tbsp 3 lb ae/gal water or 1 gal 3 lb ae/100 gal water 2% (v/v) - 2.6 fl oz or 5.2 tbsp 3 lb ae/gal water or 2 gal 3 lb ae/100 gal water	Apple Blackberry Blueberry Grape Peach Pecan Strawberry	When weeds are actively growing.	Most annual weeds less than 6 in tall. Most annual weeds over 6 in tall and perennial weeds.	Apply as a directed spray, avoiding contact with foliage, green stems or open wounds of crop. In peach orchards, apply to trees at least 2 years old with shielded sprayer that prevents contact with any part of trees. Do not apply within 90 days after first bloom. For optimal control of perennial weeds, apply during seed production or 2 to 4 weeks before frost.
halosulfuron Sandea 75WDG	0.024-0.063 lb ai 0.5-1.33 oz	Apple Blueberry Pecan	While weeds are actively growing.	Sedges and some broadleaf weeds.	Do not apply to trees established less than 1 year. Do not exceed 2 ounces per acre per year or allow spray solution to contact trunk, stem, or foliage. Allow 45 days between sequential applications to blueberry. Add 0.25% by volume nonionic surfactant.
hexazinone Velpar L	1-2 4-8 pt	Blueberry (highbush)	In spring before lower leaves expand.	Grasses and broadleaf weeds.	Do not apply to plants established less than 3 years. Avoid drift onto foliage to minimize injury. Do not apply to flooded fields. Do not apply within 90 days of harvest.
isoxaben Gallery 75 DF	0.5-1 lb ai 0.6-1.3 lb	Nonbearing: Blackberry Blueberry Grape Peach Pecan	Preemergence in late fall or early summer.	Broadleaf weeds.	**Do not** apply before soil around plant roots has firmed. **Do not** apply to plants that will bear harvestable fruit within 12 months.
mesotrione Callisto	Up to 6 oz/A	Blueberries	Preemergent prebloom.	Most broadleaf weeds.	Two 3-oz/A applications may be used, but make no more than two applications per year. Using a crop oil is recommended. Do not apply after the onset of bloom. Apply as a directed spray
methyl bromide	See label	Strawberry	Preplant (plastic culture). Preemergence (matted row).	All weeds.	Inject into the soil 4 to 6 inches deep and cover with black plastic immediately. Soil moisture should be near field capacity, and soil temperature should be at least 50°F at the treatment depth. Allow at least 2 weeks before planting.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
napropamide Devrinol 50% DF	2-4 lb ai 4-8 lb	Blackberry Blueberry Grape Pecan Strawberry	Preemergent before weed emergence.	Annual grasses and small-seeded broadleaf weeds.	Rainfall or irrigation within 24 hours of application is necessary for weed control. Application may be made immediately after planting and once each year following. Application to strawberry should be delayed until the desired number of daughter plants are established. **Do not** apply from bloom to harvest.
norflurazon Solicam 80% DF	2-4 lb ai 2.5-5 lb	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring before weeds emerge. Use when plants are dormant, before weeds emerge.	Annuals.	Avoid contact with leaves and fruit. Use lower rates on lighter soils and higher rates on heavier soils. One application per year. See label for tank mixes.
noflurazon Solicam 80DF + simazine Princep, Simazine 90 DG Princep, Simazine 4L	2.5-5 lb + 2.2-4.4 lb 2-4 qt 2-4 lb ai + 2-4 lb ai	Apple	Preemergence.	Broad-spectrum weed control.	Do not use on trees established in the orchard less than 1 year. Do not use on sand, loamy soil, or gravelly soils. Tank-mix with paraquat, glufosinate, or glyphosate for control of emerged weeds.
oryzalin Surflan AS 4 lb/gal	2-6 lb ai 4-12 pt	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring before weeds emerge.	Annual grasses and small-seeded broadleaf weeds.	Rainfall or irrigation following applications improves weed control. Existing weeds should be destroyed before application. Use lower rates for short-term control and higher rates for long-term control. May be tank mixed with diuron or simazine. See label for specific crop and rate recommendations.
oryzalin Surflan 4 AS 4 lb/gal oryzalin 4 lb/gal + simazine Princep, Simazine 90 DG Princep, Simazine 4L	2-4 qt + 2.2-4.4 lb 2-4 qt 2-4 lb ai + 2-4 lb ai	Apple	Preemergence	Annual grass and broadleaf weeds	Apply under trees established in the orchard for at least 1 year. Apply in the spring before annual weeds emerge. Do not apply to gravelly, sandy, or loamy sand soils. Add paraquat or glyphosate for control of emerged weeds.
oxyfluorfen Goal 2XL	0.5-2 lb ai 2-8 pt	Dormant Apple Grape Peach Pecan	Preemergence or postemergence. Add 0.25% nonionic surfactant if weeds are emerged.	Annual grasses and broadleaf weeds.	**Do not** apply after bud swell or if foliage, fruit, or nuts are present.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
paraquat Gramoxone XL 2 lb/gal	0.62 to 0.93 lb ai 2.5-4 pt Add up to 1 qt of a suitable nonionic surfactant to 100 gal of spray solution.	Apple Blackberry (Brambles) Blueberry Grape Peach Pecan	When weeds are actively growing before 6 inches tall.	Annuals and top kill of perennial weeds.	Avoid contact with crop plant. **Do not** graze treated area. **Do not** apply when nuts to be harvested are on ground. **Must be used by certified applicator.** May be tank mixed with simazine. See label for specific crops and rates. Brambles and blackberries: apply before emergence of new shoots as injury may occur.
pendimethalin Prowl H_2O 4 lb/gal Prowl or Pendimethalin 3.3 EC 3.3 lb/gal	Check label for rates.	Apple Grape Peach Pecan	Apply before weeds emerge in the spring	Annual grasses and small-seeded broadleaf weeds	Do not apply to newly planted trees until the soil has settled and no cracks are present. Adequate rainfall or overhead irrigation within 7 days of application is required for effective control. For peach and pecan, do not apply within 60 days of harvest.
pronamide Kerb 50 W	1-4 lb ai 2-8 lb	Blueberry Grape Peach	Preemergence or postemergence. Late fall or early winter.	Annual and perennial grasses and broadleaf weeds.	**Do no**t apply more than 4 lb Kerb/season to blueberries. Apply to established blueberries only.
rimsulfuron Matrix FNV 25 WG	0.063 4 oz	Apple Grape Peach Pecan	While weeds are actively growing.	Broadleaf weeds	Do not apply to trees established less than 1 year or exceed 4 ounces per acre per year. Allow 7 days between application and harvest for apple. Allow 14 days between application and harvest for other crops. Add 0.25% by volume nonionic surfactant.
sethoxydim Poast 1.5E	0.2-0.5 lb ai 1-2.5 pt	Bearing: Apple Blueberry Grape Strawberry Nonbearing: Peach Pecan	Postemergence when grasses are actively growing.	Annual and perennial grasses.	Rate dependent upon grass species, size, and growing conditions. Always add 2 pt Crop Oil Concentrate to each 100 gal spray. Do not apply to nonbearing crops within one year of harvest. **Preharvest intervals:** Apple 14 days Blueberry 30 days Grape 50 days Strawberry 30 days

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
simazine Princep 4 lb/gal 90%DG	2-4 lb ai 2-8 pt 1.75-4.4 lb	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring before bud break of crop.	Annuals and perennials.	One year establishment before application in apple, blackberry, blueberry, and peach, 2-year establishment before application in pecan and 3-year establishment before application in grape. May be used in combination with paraquat. See label for instructions on specific crops and rates.
terbacil Sinbar 80% WDG	0.1-1.25 0.5-4 lb	Apple Blackberry Blueberry Peach Strawberry	Preemergent in spring or fall.	Annuals.	Treat only when bushes have been established for at least one year. Consult label for correct application technique. Do not apply to soils with less than 1% organic matter.
triflurali + isoxaben Snapshot 2.5TG	2.5-5 lb ai 100-200 lb	Nonbearing Blackberry Blueberry Grape Peach Pecan	Preemergent prior to weed germination or immediately after cultivation.	Many broadleaf summer and winter annual weeds.	Do not apply within 1 year of harvest. Do not apply to newly transplanted crops until soil has settled and no visible soil cracks exist. Do not exceed 600 pounds per acre per year. Sequential applications of 150 pounds per acre or more should not be made within 60 days of previous applications.

WOODY PLANTS

General recommendations for applying herbicides to forest trees, brush, and woody vines.

CUT-SURFACE TREATMENTS: FOREST TREES

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Injection	Trees 1 inch in diameter and larger.	Any season, but growing season treatments are most effective. Avoid sap rise and leaf expansion in spring if possible.	(1) 2,4-D (amine) — 4 lb/gal.	Apply 1 ml solution in each cut; space cuts 2 inches apart, edge to edge about waist high.
			(2) triclopyr (Garlon 3A) diluted 1 part Garlon 3A: 1 part water.	
			(3) picloram + 2,4-D (Pathway).	Use on all species any time of year. Overlap injector cuts on hard-to-kill species, such as hickory, dogwood, blue beech, and ash. Do not allow picloram to spill into the root zone of desirable and very susceptible species such as yellow poplar and pine.
			(4) imazapyr (Arsenal Applicators Concentrate) dilute solution: mix 4-6 oz Arsenal AC per gallon of water.	Make cuts through the bark completely around the tree with not more than 2 inches between cut edges. Spray or brush Chopper solution into the cuts until thoroughly wet.
			(5) imazapyr (Arsenal Applicators Concentrate) concentrated solution: mix 25 oz Arsenal AC with no more than 103 oz water.	Make one cut for every 3 inches diameter breast height. Spray 1 ml into each cut. Best results obtained from September - March.
			(6) glyphosate (Accord SP) diluted 1 part Accord SP: 2 parts water.	Apply 1 ml of solution for every 2 inches trunk diameter.
Stump	Sprout control on cut hardwood stumps, particularly on species that sprout profusely: oaks, maple, beech, hickories.	Any season, but most effective as soon as possible after cutting; if possible, treat the same day of cutting.	(1) 2,4-D (amine) — 20 lb/100 gal.	Apply with low volume knapsack sprayer using solid-cone nozzle of medium orifice.
			(2) picloram + 2,4-D (Pathway).	
			(3) triclopyr — 20-25% Garlon 4, + 10% surfactant, + 65-70% diesel fuel.	Triclopyr in diesel fuel can be applied to stumps as late as 3 months after cutting.
			(4) imazapyr (Chopper) — mix 8-12 oz Chopper per gallon of water, diesel, or penetrating oil.	Spray or brush the Chopper solution onto the cambium area (just inside the bark) of freshly cut stumps until thoroughly wet.
			(5) imazapyr (Arsenal Applicators Concentrate) — mix 4-6 oz Arsenal AC per gallon of water.	Spray or brush the Arsenal solution onto the cambium area (just inside the bark). Ensure that the solution thoroughly wets the entire cambium.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
BARK, FOLIAGE, AND SOIL TREATMENTS: BRUSH AND FOREST TREES				
Basal Bark	Scattered brush or "clumps" of hardwood brush and small trees. Can be used on species remaining after foliar spray. Expect poor control on root-suckering species: black locust, hickories, and sassafras. Best results on trees less than 3 inches diameter.	Any season (Avoid leaf expansion).	(1) 2,4-D + 2,4-DP (LV esters) — 8 to 12 lb each per 100 gal oil.	Drench lower 12 to 15 inches of plant. Density of brush will determine rate per acre.
			(2) triclopyr — 1.5 gal Garlon 4 + 98.50 gal diesel fuel.	Spray the lower 1.5 to 2 feet of brush to runoff, ensuring coverage of root crown.
			(3) 2 gal Garlon 4 + 25 gal diesel + 0.5 gal surfactant + 72.5 gal water.	Follow label directions for mixing. Apply as above.
			(4) triclopyr + picloram — 1-2 gal Access in oil to make 100-gal mix.	Works best on basal diameters up to 6 inches. Drench lower 1.5 to 2 feet of stem.
		Late summer, fall, and winter. Reduced control may occur during sap rise or leaf expansion in spring.	(1) imazapyr (Chopper) — mix 8-12 oz Chopper per gallon of water, diesel, or penetrating oil.	Apply to wet the lower 12-18 inches of hardwood stems less than 4 inches in diameter at breast height. Ensure that the roots of desirable hardwoods do not extend into the treated area.
Stream-Line thinline	Same as above except best on trees less than 3 inches diameter with juvenile bark	Best results obtained in March-June.	(1) triclopyr 20-25% Garlon 4 + 10% v/v surfactant + 60-75% diesel fuel.	With a backpack sprayer and a straight stream nozzle, a 2- to 3-inch-wide band of herbicide is sprayed on each stem. Treat the stem from two sides if it is 1- to 3-inch diameter to ensure that the herbicide completely encircles the stem.
Selective Hardwood Control in Pine Plantations	Hardwood sprouts and large trees in young (1- to 6-year-old) pine stands	July through early October.	(1) imazapyr (Arsenal Applicators Concentrate) apply 16-32 oz Arsenal AC per acre in 10-15 gal water. Add 0.25% v/v nonionic surfactant.	Apply as a broadcast spray to release loblolly and Virginia pine. Use 12-16 oz Arsenal AC to release slash pine or shortleaf pine stands at the end of the third growing season or thereafter.
			(2) imazapyr (8-9 oz Arsenal AC) + metsulfuron (1-1.5 oz Escort XP) per acre.	Apply broadcast in 10-15 gallons of spray per acre.
			(3) imazapyr (Arsenal Applicators Concentrate) mix 1 oz Arsenal AC per gallon of water. Add 0.5% v/v minimum nonionic surfactant.	Apply to individual hardwood crowns. Spray to obtain good coverage of the entire crown, but not to the point of runoff. Effective in controlling hardwood sprouts less than 7 feet in height for forest site preparation and pine release. Use as a directed spray to release any conifer species.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliage Spray (low volume, aerial, non-selective)	Large tracts of mixed brush and hardwoods on utility rights-of-way and for range and pasture establishment. All unwanted small trees and shrubs for site preparation in advance of seeding or planting forest trees.	During growing season from late spring to early summer. Effectiveness is decreased during periods of drought.	(1) 8-12 lb 2,4-DP (LV esters) per 30 gal water per acre.	Use aerial application, low-volume sprayer. Use drift control agent in mixture. See Weedone 2,4-DP label for specific instructions.
			(2) 2 lb each of 2,4-D and 2,4-DP (LV esters) and 1.66 lb MSMA per 10 gal water.	Apply 10 gallons of spray per acre before planting to reduce competition from mixed hardwoods and brush.
			(3) triclopyr + picloram + 2,4-D — 0.5 gal Garlon 4 + 1.5 gal Tordon 101 mixture.	Apply 10-15 gallons of spray per acre.
			(4) 0.5 gal Garlon 4 + 0.5 gal Tordon K.	Apply 10-15 gallons of spray per acre.
			(5) hexazinone 1-3 gal Velpar L per acre. Rate depends on soil texture.	For exact rate of Velpar L, consult label. Rate dependent on soil texture.
		Midsummer to fall.	(1) glyphosate — 6-8 qt Accord SP in 10 gal water. Addition of nonionic surfactant at 2.5% v/v is recommended.	
			(2) imazapyr — 48-64 oz of Chopper EC per acre. Addition of nonionic surfactant at 0.5-1% v/v is recommended.	Best results are obtained from late summer or early fall applications; however, Chopper AC can be applied year-round.
		Late summer to early fall.	(1) imazapyr (Chopper EC) — apply 48-64 oz per acre in 10-15 gal water. Add 0.5-1% v/v nonionic surfactant.	
			(2) imazapyr + glyphosate — 32-48 oz Chopper EC + 4-5 qt. Add 0.5-1% v/v nonionic surfactant.	
			(3) imazapyr + triclopyr — 32-48 oz Chopper EC + 32-40 oz Garlon 4. Add 0.5-1% v/v nonionic surfactant.	
			(4) imazapyr + metsulfuron methyl 40-48 oz Chopper EC + 1-2 oz Escort XP. Add 0.5-1% v/v nonionic surfactant.	
		During growing season from leaf out to fall colors.	(1) glyphosate + imazapyr — 1-5 qt Accord SP + 32-64 oz Chopper EC or 1-3 qt Accord SP + 40-64 oz Chopper EC per acre in 10-15 gal of water. Add 0.5% v/v nonionic surfactant.	Apply as a broadcast spray by ground equipment or helicopter for forest site preparation.
			(2) glyphosate + triclopyr — 3-6 qt Accord SP + 1-2 qt Garlon 4 + 2.5% v/v nonionic surfactant.	Apply 10-15 gallons solution per acre.
			(3) fosamine + imazapyr — 4.6 qt Krenite UT + 16-20 oz Chopper + 1.5% v/v nonionic surfactant in 10-15 gal of water.	Apply as a broadcast spray by ground equipment or helicopter for forest site preparation.
	Heavy hardwood competition and residual pine.	Full leaf to Aug. 1.	(1) 2 qt Tordon K + 1 qt Garlon 4 + 16-24 oz Chopper EC.	Use nonionic surfactant at 0.5% v/v.
			(2) 4-8 qt Krenite UT + 16-24 oz Chopper EC + 1% v/v nonionic surfactant.	
			(3) 2 oz Escort XP + 3 qt Garlon 3A + 1% v/v nonionic surfactant.	Spray to wet.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
	Light hardwood competition and residual pine and grasses.	Full leaf to Aug. 1.	(1) 2 qt Tordon K + 1-2 pt Garlon 4 + 8-10 oz Arsenal.	Use nonionic surfactant at 0.5% v/v.
			(2) 8 qt Tordon 101M + 8-10 oz Arsenal.	
		June 1 to leaf drop.	(3) 4-8 qt Krenite UT + 16-20 oz Arsenal AC + 1% v/v nonionic surfactant.	Use higher rates for Virginia and Shortleaf pine. Spray to wet.
	Hardwood, pine, and grass.	Aug. 1 to fall color.	(1) 2 qt Tordon K + 1-2 pt Garlon 4 + 8-10 oz Arsenal.	Use nonionic surfactant at 0.5% v/v.
		June 1 to leaf drop.	(2) 4-8 qt Krenite UT + 16-20 oz Arsenal AC + 1% v/v nonionic surfactant.	Use higher rates for Virginia and Shortleaf pine. Spray to wet.
Foliage Spray (high volume, ground)	Scattered brush or "clumps" of hardwood brush. Can be used on species not controlled by prior sprays, such as maple, oak, ash, and persimmon growing along fence rows, highways, rights-of-way, and other non-crop areas.	Late spring and summer from time foliage is fully developed. Dormant season ineffective.	(1) 2-3 lb each of 2,4-D and 2,4-DP (LV esters) per 100 gal water.	Apply uniformly over top of brush as a coarse spray. With back-pack sprayer, wet all foliage to point of runoff. With hydraulic sprayer, apply 200 to 600 gallons of spray mixture per acre, depending on height and density of brush.
			(2) 1-3 qt Garlon 4 per 100 gal water.	Apply 100-400 gallons of spray per acre depending on size and density of woody plants. Spray to wet.
		Growing season from leaf out to fall colors.	(1) glyphosate — 2-4 qt of Accord SP per 100 gal of water. Add 1-2 qt nonionic surfactant.	Apply 100-200 gallons of spray per acre. Spray to wet.
		Late spring to fall color	(1) 4-8 qt Krenite UT + 2 oz Escort XP per 100 gal water + 1% v/v nonionic surfactant.	Apply 100 gallons per acre. Spray to wet.
			(2) 2 oz Escort XP + 3 qt Garlon 3A + 1% v/v nonionic surfactant per 100 gal water.	Spray to wet.
Soil application with handgun applicator	Individual trees or scattered "clumps" of trees or brush. Can be used to treat large tracts with mixed brush and hardwoods.	Mid-March through May. Rain after application is required to activate the herbicide.	2-4 ml of 25% hexazinone (Velpar L) for each inch of stem diameter. For grid pattern to use in site preparation, refer to Velpar L label.	Apply undiluted with exact-delivery handgun applicator. Direct treatment to soil within 3 feet of root collar of trees to be controlled. For large trees requiring more than one delivery, make applications on opposite sides of the stem. Rate of herbicide when applied in a grid pattern will depend on soil texture. Refer to the Velpar L label for exact rates.
Soil application (dry materials)	Individual trees.	Early spring applications are most effective.	(1) 10% hexazinone (Pronone 10G) — 0.5-0.75 oz per inch diameter of tree.	Apply completely around base of tree. **Do not** apply in root zone of desirable plants. If root grafting occurs, some desirables may be killed outside the treatment area. Increase rates on fine-textured soils (clay, etc.). If slope is greater than 12-15%, damage down the slope from treatment area may occur.
	"Clumps" of brush of all species and sizes. Forestry site preparation and rights-of-way.	Apply before or during period of active growth of species to be controlled, when rainfall can be expected for soil activation.	(1) Pronone 10G — 5-30 lb/A. Soil texture determines rate.	Apply with aerial or ground equipment.
			(2) 75% hexazinone (Velpar ULW) — 2.5 to 5.5 lb/A depending on soil texture.	

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Selective herbaceous weed control in pine plantations	Grasses and broadleaf weeds, such as fescue, bahiagrass, goldenrod, dogfennel, broomsedge, etc.	Late winter to early spring before substantial growth occurs in spring.	(1) sulfometuron — 3-6 oz Oust per acre depending on weed complex.	Apply with ground or aerial sprayers delivering between 5-25 gallons per acre.
			(2) sulfometuron plus imazapyr — 2 oz Oust plus 4 oz Arsenal per spray acre.	Addition of Arsenal increases control of johnsongrass, bermudagrass, and other difficult species.
			(3) sulfometuron plus hexazinone — 2 oz Oust plus 2 to 3 pt Velpar L per acre.	Apply with ground or aerial sprayers at 5-25 gallons per acre
		Mid- to late spring after growth of weeds has begun.	sulfometuron plus glyphosate — 2-3 oz Oust plus 12-16 oz Accord SP per acre.	Apply in at least 10 gallons total solution. Addition of Roundup or Accord SP provides broad spectrum control of herbaceous weeds.
		Early spring to midsummer.	imazapyr (Arsenal AC) — Apply 4-10 oz per acre in 20-30 gal water. Add 0.25% v/v nonionic surfactant or less.	Best not to add surfactant for slash pine. Apply as a broadcast spray or as a 5- to 6-foot-wide band centered over pine rows. Labeled for loblolly, Virginia, and slash pine plantations.
		Late spring to midsummer.	1 oz Escort XP + 4-6 oz Arsenal in 10-30 gal water. Add .25% v/v nonionic surfactant or less.	Loblolly pine only.

DIFFICULT-TO-CONTROL WOODY PLANTS

Foliar spray	Easter Red Cedar	Summer.	Tordon K — .25% solution in 1% diesel: water emulsion.	Spray to wet foliage.
			Tordon 101M — 32 oz + 4 oz nonionic surfactant in 5 gal water.	Spray to wet foliage.
Injection			Pathway — inject 3 to 4 ml for each 3 feet of tree height.	
Foliar spray	Osage Orange	March-June.	metsulfuron methyl (Escort XP) — 1 to 2 oz per 100 gal water with 0.5% nonionic surfactant.	Apply as high volume foliar spray. Treat to runoff.
Basal bark			triclopyr (Garlon 4) — Use 13 oz Garlon 4 + 13 oz Cide-Kick II surfactant + 100 oz diesel fuel.	Apply to smooth bark on stems no larger than 3 inches in diameter.
Foliar spray	Privet	May-Aug.	imazapyr (Arsenal AC) — Use a 1% v/v solution with 0.5% v/v nonionic surfactant in water.	Spray to wet foliage. May require retreatment if sprouting occurs.
		May-Sept.	metsulfuron methyl (Escort XP) — 4 oz/100 gal water + 1% v/v nonionic surfactant	Spray to wet. May require retreatment if sprouting occurs. Can be tank mixed with Arsenal.
		March - April	glyphosate (Accord SP) — 2 qt/A	Spray to wet. Provides excellent control (90 + %), but sprouting may occur.
Foliar spray	Yaupon	May-June.	6 qt Accord SP per acre + 2 qt Garlon 4 per acre	Spray to wet.
Foliar spray	Switchcane or Bamboo	May-Sept.	glyphosate (Roundup or Accord SP) — 4 qt/A + 1% volume to volume nonionic surfactant.	Best results are obtained after burning or cutting patches and applying spray to sprouts.
		Early spring	hexazinone — 8-10 qt/A — Velpar L	Sites should be dry at application time.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Injection	Chinese tallow	May-Feb.	triclopyr (Garlon 3A) Pathfinder II imazapyr (Arsenal AC)	Apply in dilutions and spacings specified on herbicide label. Nontarget plants may be killed or injured by root uptake of Arsenal.
Stumps	Chinese tallow	May-Feb.	triclopyr	Apply to stump tops immediately after cutting.
Basal Bark	Chinese tallow	Before bud break	20% v/v solution triclopyr (Garlon 4)	Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark.
Seedling and Saplings	Chinese tallow	Jul.-Oct.	1% v/v solution imazapyr (Arsenal AC) 30% v/v solution Krenite S 2% v/v solution triclopyr Garlon 4	Spray to wet foliage (add 0.5% nonionic surfactant to all mixtures).
Soil surface	Chinese tallow	Growing season	Velpar L	Apply one squirt with a spot gun per 1 inch stem diameter within 3 feet of the stem or in a grid pattern at spacings specified on the herbicide label. For treatment of extensive infestations in forest situations. Nontarget plants may be killed or injured by root uptake.
Injection and Stumps	Mimosa (silktree)	May-Feb.	triclopyr Garlon 3A imazapyr (Arsenal AC)	Make stem injection using herbicide dilutions as specified on herbicide label. For felled trees, apply these herbicides to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal.
Bark or Basal Bark	Mimosa (silktree)	Before bud break	20% v/v solution triclopyr (Garlon 4)	Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark.
Seedlings and Resprouts	Mimosa (silktree)	Jul.-Oct.	2% v/v solution triclopyr Garlon 3A or Garlon 4 2% v/v solution glyphosate 0.2-0.4% v/v solution Transline	Spray to wet foliage (add 0.5% nonionic surfactant to Garlon 3A and Garlon 4 mixtures).
Injection and Stump	Tree-of-Heaven (Ailanthus)	Midsummer	triclopyr (Garlon 3A) Pathfinder II picloram + 2,4-D (Pathway) imazapyr (Arsenal AC)	Make stem injections in large trees then apply herbicide. For felled trees, apply herbicide to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Basal Bark	Tree-of-Heaven (Ailanthus)	Midsummer.	20% v/v solution triclopyr (Garlon 4)	Apply to young bark of saplings as basal spray in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor).
Foliage Spray	Tree-of-Heaven (Ailanthus)	July-Oct.	1% v/v solution imazapyr (Arsenal AC) 30% v/v solution (Krenite S) 2% v/v solution triclopyr (Garlon 4)	Spray to wet all foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake.
Foliage spray	Baccharis	Midsummer	triclopyr (Garlon 4)	Spray to wet foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake.
Foliage spray	Palmetto	spring	16 oz Garlon 4 + 4 g Escort XP	Spray to wet all foliage. Add 0.5% v/v non-ionic surfactant to spray solution. May require sequential applications for complete control.
WOODY VINES				
Foliage Spray and Soil Application	Poison Ivy	Late spring application most effective.	(1) picloram + 2,4-D — Use 2-3 gal Tordon 101 or Grazon P+D mixture in 15-50 gal water.	Broadcast over root zone. Use picloram only where desirable trees with root zone in the treatment area are expendable.
			(2) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.
		Mid-to late summer.	(1) 4-5 qt Accord SP or Roundup (glyphosate) per acre broadcast or 2% solution with hand sprayer.	Apply as foliar spray while leaves are green. Repeat applications may be necessary. Use the higher rate for plants that have reached woody stage of growth.
Foliar spray	Japanese Honeysuckle	Late spring and summer.	(1) 2,4-D (LV ester) — 4 lb/gal in 100 gal diesel.	Apply as a foliage spray thoroughly wetting all foliage and stems. Density will determine volume of spray per acre. Spot treat regrowth as required. Generally requires a followup or second application.
			(2) glyphosate — wet all foliage with a 2% Roundup or Accord SP solution.	
			(3) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.
			(4) apply 1-2 oz Escort XP or Cimarron per acre in water solution.	Can damage black cherry or cottonwood.
Foliage spray and soil application	Wisteria	Aug.-Sept.	(1) picloram (Tordon K — 0.5 gal/A) (2) glyphosate (Accord SP — 8 qt/A) (3) dicamba (3% Banvel or Clarity) (4) metsulfuron (Escort XP or Cimarron — 1 oz/A) (5) clopyralid (Transline — 20 oz/A).	All treatments provided 90% brownout in first year — all to be reevaluated. (Add 0.5% nonionic surfactant to all mixtures.)

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliar spray	Kudzu	Late spring to midsummer.	(1) picloram + 2,4-D — 1-2 gal Tordon 101 or Grazon P+D mixture in 20 gal water.	Apply as foliage spray after full leaf expansion; repeat when regrowth appears. Will damage pines and hardwoods.
			(2) dicamba + 2,4-D — 3 lb dicamba + 5.5 lb of 2,4-D in 20 gal water.	Note: Use for pine vs. hardwood.
			(3) Escort XP or Cimarron — 4 oz/A.	Can apply over/under pine. Apply after full leaf. Use with 1 quart of nonionic surfactant per 100 gallons of water. Will damage black cherry, cottonwood, winged elm, dogwood, and some other hardwoods.
			(4) Transline — 21 oz/A.	Can apply over or under pines. Can apply around hardwoods but may injure leguminous species.
Foliar spray	Multiflora Rose	Spring.	(1) dicamba — Mix 1 gal Clarity or Vanquish in 100 gal water.	Apply as a foliage spray after full leaf expansion; repeat when regrowth occurs.
			(2) 2,4-D (LV ester) — 4 lb in 100 gal water.	Addition of up to 5 gallons of diesel fuel per 100 gallons of spray will improve control.
			(3) 1-3 qt Garlon 4 or Remedy per 100 gal of water.	Spray to wet foliage.
			(4) Escort XP or Cimarron — 0.75-1 oz per 100 gal water.	See Escort XP above.
		Summer.	(1) Accord SP or glyphosate (3 lb ae/gal) — 1% solution plus 0.5% nonionic surfactant.	Spray to wet foliage.
Foliar spray	Trumpetcreeper	Late summer.	(1) Accord SP or glyphosate (3 lb ae/gal) — 4 qt/A + 0.25% nonionic surfactant.	Apply at least 4 weeks before frost. May require re-treatment.
Foliar spray	Redvine	Late summer.	(1) Vanquish or Clarity - 2 qt/A	Apply at least 4 weeks before frost. May require re-treatment.
Foliar spray	Grape Vine	Late spring to midsummer.	(1) 2,4-D (LV ester) — 4 lb in 100 gal water.	Spray all foliage until wet. Addition of crop oil will improve control.
			(2) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.

DIFFICULT-TO-CONTROL HERBACEOUS PLANTS

Foliar spray	Blue Vervain	Late spring to early summer.	(1) Triclopyr 32 oz Garlon 4 or Remedy 48 oz Garlon 3A (2) Grazon P+D (3) Weedmaster	Add 0.25% v/v nonionic surfactant.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliar spray	Cogongrass (A combination of herbicide treatment following burning or mowing may be more effective than herbicide treatment alone.)	Mid- to late summer.	(1) imazapyr — 48 oz/A or 1% solution of Arsenal or 24 oz/A or 0.5% solution of Arsenal AC with 1 qt nonionic surfactant per 100 gal spray.	Apply in 20 gallons of spray per acre.
			(2) glyphosate — 72 oz/A or 2% solution of 3 lb ae/gal formulation (with 0.5% v/v nonionic surfactant) if none in formulation.	Often requires treatment in consecutive years. Use 20 gallons of spray per acre. Apply mid-July to 2 weeks before killing frost.
			(3) imazapyr + glyphosate — 24 oz/A or 0.5% solution of Arsenal AC or 48 oz/A or 1% Arsenal plus 32 oz/A or 2% Accord SP or glyphosate (3 lb ae/gal) per acre with 0.25% v/v nonionic surfactant.	Apply in 20 gallons of spray per acre.
Foliar spray	Mistletoe	Winter.	Florel — 2 qt/A in 4 gal water + 0.25% nonionic surfactant.	Spray to wet foliage.
Foliar spray	Johnsongrass	Summer.	(1) Fusilade DX at 8-12 oz/A or 0.5% solution + 0.25% nonionic surfactant or 1% crop oil concentrate.	Spray to wet foliage thoroughly, but not to point of runoff.
			(2) Select at 6-8 oz/A or 0.25% solution + 1% crop oil concentrate.	Spray to wet foliage thoroughly, but not to point of runoff.
			(3) Outrider at 1.33 oz/A with 1 qt nonionic surfactant per 100 gal spray.	
			(4) glyphosate (3 lb ae/gal) applied as 2% solution in fall. Add 1 qt nonionic surfactant per 100 gal if formulation has none.	
Foliar spray	Horsetail or scouring rush	Summer.	(1) Telar — 1.3 oz/A.	Repeat applications will be required. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray.
			(2) Oust — 6-12 oz/A.	
			(3) Rely — 3% solution.	
			(4) Casoron — 150-200 lb/A of Carson 4G.	
			(5) Hyvar XL — 6-12 gal/A.	
Foliar spray	Itchgrass	Summer-fall.	Glyphosate (Touchdown) 2% solution.	Spray itchgrass to wet all foliage. Be careful not to spray nontarget plants.
		Spring.	Hexazinone (Velpar) 0.5-0.53 lb/A.	Spray itchgrass to wet all seedling itchgrass foliage thoroughly. Add nonionic surfactant or oil concentrate.
		Summer-fall.	MSMA 4 lb/A.	Spray itchgrass to wet all foliage. If surfactant is not present in the formulation, add nonionic surfactant at 0.25%. If the objective is to encourage bermudagrass growth, use MSMA alone.
		Summer-fall.	Sethoxydim 1.5 % + 1% crop oil concentrate.	Spray itchgrass to wet all foliage but not to the point of runoff.

AQUATIC WEEDS

Rates are expressed on basis of active ingredient unless trade product is named. Where weed growth is heavy, treat only a portion of the area at one time to avoid depleting oxygen in the water during decomposition of vegetation. Treatment of entire ponds or lakes heavily infested with aquatic weeds can result in death of fish.

Calculations for amount of herbicide needed on basis of parts per million by weight (ppmw)

Ditch or canal
W = A x L x C x 0.0000625

W = pounds of active ingredient needed
A = cross section area of channel in sq. ft.
L = length of channel in feet
C = desired concentration of herbicide in ppmw

Pond or lake
W = A x D x C x 2.7

W = pounds of active ingredient needed
A = area of water surface in acres
D = average depth in feet
C = desired concentration of herbicide in ppmw

TREATED WATER USE RESTRICTIONS (NUMBERS OF DAYS).

Common Name	Trade Name	Human			Animal	Irrigation		
		Drinking	Swimming	Fish Consumption	Drinking	Turf	Forage	Food Crops
2,4-D	DMA 4 IVM, Hardball, Navigate, AquaKleen	-[ab]	0	0	0	21[bc]	21[bc]	21[bc]
Bispyribac-sodium		0	0	0[d]	-[e]	-[e]	-[e]	-[e]
Carfentrazone-ethyl	Stingray	1	0	0	-[f]	14[g]	14[g]	14[g]
Copper Complexes Copper Sulfate	Algimycin PWF, Captain, Clearigate, Current, Cutrine Plus, Cutrine-Ultra, Harpoon, Komeen, K-Tea, Nautique, Symmetry	0[h]	0	0	0	0	0	0
Diquat	Harvester, Redwing, Reward, Weedtrine	1-3	0	0	1	1-3	5	5
Endothall	Aquathol K, Aquathol Super K, Hydrothol 191, Hydrothol Granular	7-25[i]	0	0	7-25	0	7-25	7-25
Flumioxazin		0	0	0[d]	0	0.5-5[j]	0.5-5[j]	5
Fluridone	Avast, Sonar A.S. Sonar One, Sonar PR, Sonar Q, Sonar SRP,	0	0	0	0	30	30	30
Glyphosate	Avocet, Aquapro, Rodeo, Shore-Klear, Shore-Klear Plus, Touchdown Pro	0	0	0	0	0	0	0
Imazamox	Clearcast	-[k]	0	0	0	-[k]	-[k]	-[k]
Imazapyr	Aquapier, Gullwing, Habitat	2	0	0	0	120[l]	120[l]	120[l]
Penoxsulam	Galleon	0	0	0	0	-[m]	-[n]	-[o]
Sodium Carbonate Peroxyhydrate	Pak 27, Phycomycin SCP	0	0	0	0	0	0	0
Triclopyr	Navitrol, Navitrol DPF, Renovate3, Renovate OTF	-[p]	0	0	0	-[q]	120	120
Acid Blue #9 & Yellow #23 Dyes	Aquashade, Enviro-Blue	0	0	0	0	0	0	0

[a]See the label distance allowed from potable water intake.
[b]A shorter interval may be used if an approved assay indicates less than 0.1 ppm 2,4-D.
[c]Do not use in ditches where water is used to irrigate highly susceptible crops, such as cotton, grapes, and tomatoes unless an approved assay indicates that 2,4-D concentrations are less than 100 ppb.
[d]Do not apply to waters used for crayfish farming.
[e]Do not use for livestock watering or irrigation until residues reach 1 ppb or less.
[f]Treated water may not be used as a source for livestock until an approved assay indicates carfentrazone-ethyl and degradate is below 0.2 ppm.
[g]This is the interval for applications made to more than 20% of water surface. Consult the label for reduced restriction criteria.
[h]Drinking water restrictions are product-specific; read the label carefully.
[i]The manufacturer suggests a 600-foot potable water application set back.
[j]See the table on the label.
[k]Water can be used when an approved assay indicates imazamox concentrations are less than 50 ppb.
[l]Use restrictions can be reduced if an approved assay indicates imazapyr concentrations are less than 1 ppb.
[m]Water treated with penoxsulam can be used for turf irrigation if concentrations are less than 30 ppb.
[n]For other nonfood crop irrigation or for other irrigation uses, contact SePRO Corporation before irrigation if concentrations exceed 1 ppb.
[o]Do not irrigate established food crops, other than rice, until penoxsulam concentrations are no more than 1 ppb in the irrigation water source. Do not irrigate established rice if concentrations in treated water exceed 30 ppb.
[p]Drinking water can be used only when triclopyr concentrations are less than 0.4 ppm by an approved assay.
[q]If triclopyr residues are determined to be nondetectable by an approved assay, there is no restriction for use of irrigation water on established grasses.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

CONTROL OF SOME COMMON AQUATIC WEEDS WITH HERBICIDES.

	2,4-D	Bispyribac-sodium	Carfentrazone-ethyl	Copper Complexes Copper Sulfate[1]	Diquat	Endothall	Flumioxazin	Fluridone	Glyphosate	Hydrothol 191	Imazamox	Imazapyr	Penoxsulam	Sodium Carbonate Peroxyhydrate	Triclopyr	Acid Blue # & Yellow #23
Algae																
green algae				•												•[2]
blue-green algae (Cyanobacteria)				•										•		•[2]
filamentous and water net				•	•		•			•						
Chara and Nitella				•						•						
Floating Weeds (not attached to bottom)																
duckweed		•	•		•		•	•				•	•			
common salvinia		•	•		•		•		•				•			
giant salvinia		•	•		•		•		•				•			
watermeal			•		•		•	•				•	•			
waterhyacinth	•	•	•		•				•		•	•	•			
water lettuce		•	•		•		•		•		•	•	•		•	
Emergent Weeds (attached to bottom)																
American lotus	•		•		•			•			•				•	
watershield	•		•					•			•				•	
white waterlilly	•		•					•			•	•			•	
frogbit	•	•	•				•					•	•		•	
water pennywort		•	•		•		•				•	•				
Submersed Weeds																
bladderwort					•	•		•	•		•					
coontail					•	•	•	•							•	
bushy pondweeds (*Najas*)					•	•	•	•								
parrotfeather	•	•	•		•	•		•				•	•		•	
Eurasian watermilfoil	•	•	•		•	•	•	•					•		•	
fanwort							•	•							•	
pondweeds (*Potamogeton*)		•			•	•	•	•								
elodea				•	•			•								
hydrilla		•	•	•	•	•	•	•		•			•			
spikerush	•							•								
Marginal Weeds																
alligatorweed	•	•	•		•		•	•	•		•	•			•	
water primrose	•		•		•			•	•		•	•			•	
smartweed	•				•			•	•		•	•			•	
arrowhead	•				•			•				•			•	
willows	•							•	•			•			•	
cattail					•			•	•		•	•				
cutgrass					•			•	•			•				
bulrush								•	•			•				
burweed	•															
phragmites								•	•		•	•			•	

NOTE: It is not intended that any suggested usage in this table be in violation with existing regulations or manufacturer's label.

[1]Use products containing copper with caution because its toxicity to fish and its effectiveness in controlling aquatic weeds depend on total alkalinity of the water.

[2]May reduce the growth of submersed plant species at higher dye concentrations.

Aquatic Weeds, Continued

Aquatic weeds	Treatment	Rate	Comments
Algae			
algae	copper sulfate (pentahydrate)	1 to 2 ppmw	Toxicity to fish and algae increases with temperature but decreases with water alkalinity. For water with less than 50 ppm total alkalinity, do not use copper sulfate. For water above 50 ppm, determine the amount of copper to use by dividing total alkalinity (ppm) by 100. This equals the desired copper concentration in the water. Catfish are not very tolerant to copper. Always leave untreated aquatic areas for fish to move into.
	copper complex	0.67 to 0.75 gal per acre-foot	Complexed forms of copper are more active in alkaline water than the sulfate. For water with less than 50 ppm alkalinity, catfish may be killed. Apply a surface spray. Apply when algae begin to grow and water temperature is above 60 °F. Best results when applied on sunny days.
		1.25 to 1.5 gal per acre-foot	Apply when total alkalinity is above 50 ppm.
blue-green (Cyano-bacteria)	sodium carbonate peroxyhydrate	3 to 100 lb per acre-foot	Decaying algae can reduce dissolved oxygen, which can result in fish kills. To avoid oxygen depletion, apply so that 8 to 10 hours of daylight remain. Do not reapply within 48 hours.
Floating			
duckweed	bispyribac-sodium	1 to 2 oz/A of formulated product	Apply bispyribac-sodium as a broadcast spray. Use the higher rate for more mature, denser weed growth. Apply in a minimum of 30 gallons of water per acre to ensure adequate coverage. Allow 30 days between applications, and apply no more than 8 ounces of product per acre per year. Do not exceed four applications per year.
	diquat	1 gal per surface acre	Foliar spray or injection in nonflowing water. **Do not** apply diquat to muddy water. Apply as overall spray in 50 to 150 gallons of water plus 1 pint of nonionic surfactant. Spray marginal areas to reduce reinfestation. Retreat if necessary.
	flumioxazin	6 to 12 oz/A of formulated product	Apply flumioxazin herbicide as a broadcast spray with an adjuvant approved for use in aquatics. Flumioxazin is a contact herbicide that quickly degrades in the water column, so plants that do not initially come in contact with it will not be controlled. Apply flumioxazin in a minimum of 30 gallons of water per acre to all areas of the water body where weeds exist. Coverage is essential for effective control, as all floating weeds need to be exposed to lethal concentrations in all parts of the water body. Any untreated escapes or reintroductions of plants that were not treated will reestablish in areas where surface weeds had previously been controlled. If a second application is required to provide control, make the treatment when returning weeds are first observed, but wait 28 days after the previous treatment. Application of flumioxazin during early morning hours may enhance weed control. When applying to densely packed, actively growing surface weeds, ensure adequate coverage. Rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation.

Aquatic Weeds, Continued

Aquatic weeds	Treatment	Rate	Comments
giant salvinia	diquat	0.5 to 0.75 gal per surface acre	Use with an approved aquatic wetting agent at 0.25-1% v/v. Repeat treatments may be necessary for complete control.
	flumioxazin	6 to 12 oz/A of formulated product	Apply flumioxazin herbicide as a broadcast spray with an adjuvant approved for use in aquatics. Flumioxazin is a contact herbicide that quickly degrades in the water column, so plants that do not initially come in contact with it will not be controlled. Apply flumioxazin in a minimum of 30 gallons of water per acre to all areas of the water body where weeds exist. Coverage is essential for effective control, as all floating weeds need to be exposed to lethal concentrations in all parts of the water body. Any untreated escapes or reintroductions of plants that were not treated will reestablish in areas where surface weeds had previously been controlled. If a second application is required to provide control, make the treatment when returning weeds are first observed, but wait 28 days after the previous treatment. Application of flumioxazin during early morning hours may enhance weed control. When applying to densely packed, actively growing surface weeds, ensure adequate coverage. Rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation.
	glyphosate	1 to 2 gal per surface acre	Use with an approved aquatic wetting agent at 0.25-1% v/v.
	carfentrazone-ethyl	0.21 to 0.42 qt per surface acre	Use with an approved aquatic wetting agent at 0.25–1% v/v. Repeat treatments may be necessary for complete control.
waterhyacinth	bispyribac-sodium	1 to 2 oz/A of formulated product	Apply bispyribac-sodium as a broadcast spray. Use the higher rate for more mature, denser weed growth. Apply in a minimum of 30 gallons of water per acre to ensure adequate coverage. Allow 30 days between applications, and apply no more than 8 ounces of product per acre per year. Do not exceed four applications per year.
	DMA-4 IVM	0.5 to 1 gal per surface acre	Spray when plants are actively growing. Delay use of treated water for irrigation or domestic purpose for 3 weeks or until approved assay shows no more than 0.1 ppm 2,4-D acid. For use in water bodies that are still or slow moving. Must be applied by trained or licensed applicators. **Do not** treat more than half of a lake or pond at one time to avoid oxygen depletion and fish kill. In large lakes, leave a 100-foot buffer strip.
	Hardball	0.25 to 0.5 gal per surface acre	
Submersed			
elodea	diquat	2 gal per surface acre	Inject or apply on surface of nonflowing water. **Do not** apply diquat to muddy water.
Eurasian watermilfoil	DMA-4 IVM	0.5 to 1 gal per acre-foot	**Do not** treat more than half of a lake or pond at one time to avoid oxygen depletion and fish kill. In large lakes, leave a 100-foot buffer strip. **Do not** treat within ½ mile of potable water intakes. Treat in spring when milfoil starts to grow. Spray on or inject under water.
	Renovate3	0.7 to 2.3 gal per acre-foot	
	Renovate OTF	20 to 270 lb per surface acre	Application rate is dependent upon the mean water depth in the treated area. Potable water set back distances are dependent upon the total area treated; consult the label for proper set-back distances. Applications should be made in the spring or early summer to actively growing plants.
	Hardball	1 to 5 gal per acre-foot	
	diquat	1 to 2 gal per surface acre	Distribute evenly over infested area. Inject or apply on surface of slow-flowing water. **Do not** apply diquat to muddy water.
	endothall (Aquathol Super K)	0.5 to 2.5 ppmw	Safer to fish than dimethyalkylamine salts. Spray or inject liquids under water. Apply granules evenly with cyclone seeder. Apply as soon as possible after weeds begin to grow and water temperature is above 65 °F. When treating in sections, treat on a 5- to 7-day interval. Use higher rates when spot treating.

Aquatic Weeds, Continued

Aquatic weeds	Treatment	Rate	Comments
Eurasian watermilfoil	2,4-D (20% granules)	100 to 200 lb per surface acre	Best results when applied in spring to early summer during early growth stage. Apply uniformly using portable spreader (cyclonic seeder). Rate depends upon weed species, weed mass, water depth, and water pH. Repeat application if needed. **Do not** use water for agricultural purposes, watering dairy animals, or domestic purposes.
bladderwort coontail	2,4-D (20% granules)	150 to 100 lb per surface acre	Rates are based on type of water body treated and average water depth. See label for details. **Do not** use water for irrigation from ponds for 30 days or lakes for 7 days after treatment.
elodea hydrilla naiad pondweed coontail Eurasian watermilfoil	Sonar AS Sonar PR Sonar SRP	0.5 to 4 qt per surface acre 10 to 80 lb per surface acre	Fluridone requires a long contact time (more than 60 days) to be effective. A test available from the manufacturer may be advisable for some water bodies to ensure that adequate concentrations of herbicide remain in the waterbody for effective control.
	Biological control		Grass carp can be stocked in ponds and lakes to suppress submersed aquatic plants. Grass carp are typically stocked at rates of 5–30 fish per acre, depending on the size and extent of plant infestation. In new ponds, 2- to 6-inch fish can be stocked. However, in ponds with established bass populations, 8- to 10-inch carp should be stocked to prevent bass from eating them. Grass carp are somewhat specific about which plants they will eat. They prefer tender, nonwoody vegetation and are best suited for control of submersed plants such as some pond-weeds, bushy pondweeds, hydrilla, egeria, and some macro-algae. As grass carp grow, consumption of plant material will decrease. Additional fish should be stocked about every 5 years to maintain plant suppression.
hydrilla	bispyribac-sodium	1.1 to 2.4 oz per acre-foot	Apply bispyribac-sodium at a rate that will produce an initial concentration of 20 to 45 ppb in the water column of the treatment zone. Use the higher concentrations when weed biomass is heavy, when weeds are more mature and topped out, and/or when treating less susceptible plants. For optimal control, repeat applications to maintain desired water column concentrations of bispyribac-sodium for 60 to 90 days after initial application, or until target weeds are controlled. Do not reapply within 14 days after initial application. Do not exceed four applications per year. Multiple applications (up to four per year) of bispyribac-sodium at lower rates may be needed in water bodies where there is a requirement for selective weed control, or where there is a need to control weed species with a longer exposure time requirement. For subsurface applications, do not allow the water concentration to exceed 45 ppb of bispyribac-sodium in the treatment zone for any application (either initial or when retreating to maintain the effective water concentration).

Aquatic Weeds, Continued

Aquatic weeds	Treatment	Rate	Comments
hydrilla (continued)	flumioxazin	1.1 to 2.1 lb per acre-foot	Apply flumioxazin at a rate that will produce an initial concentration of 200 to 400 ppb (of active ingredient) in the water column. Flumioxazin is rapidly absorbed by target plants but also breaks down quickly in water with a pH greater than 8.5. The pH of water surrounding mats of submersed vegetation can exceed 8.5 by early to midday due to photosynthetic processes. Application of flumioxazin under these conditions may provide only partial weed control, and regrowth is more likely. For best control, apply flumioxazin in a minimum of 30 gallons of water per acre in the early morning to actively growing weeds and early in the season before surface matting occurs. Complete coverage and sufficient contact time of submersed weeds with flumioxazin is required for optimal performance. Application of flumioxazin with subsurface trailing hoses designed to distribute the herbicide within the plant stand will provide more effective and longer-term control of submersed weeds. Use higher concentrations when weed biomass is heavy and/or weeds are more mature and topped out. Any untreated plants that are left in the water column can re-infest treated areas that had previously been controlled. If a second application is required to provide control, make the treatment once returning weeds are observed, but wait at least 28 days after the last treatment. When applying flumioxazin to densely packed, actively growing submersed weeds, a rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation. If aquatic vegetation is dense, treat submersed weeds in sections to avoid a rapid decrease in dissolved oxygen. Flumioxazin should be applied as a subsurface treatment for hydrilla control. For best control of hydrilla, apply during the late winter/early spring and/or early to late fall. Efficacy of flumioxazin will be enhanced at these timings due to lower potential biomass present and lower pH of the water. If applied to mature topped-out hydrilla, flumioxazin will cause some discoloration and loss of growing tips, but regrowth will be rapid.
Emergent and Marginal			
alligatorweed	Biological control		Chemical treatment may not be necessary if specific biocontrol insects, the alligatorweed flea beatle (*Agasicle hygrophila*) and/or stem borer moth (*Vogtia malloi*), are present. The flea beetle is more active in the southern part of the state, and the stemborer is active throughout the state. These insects may not provide control in areas adjacent to fields subject to heavy insecticide usage; e.g., near cotton fields. Contact your county agent or a qualified entomologist for positive identification.
arrowhead	DMA 4 IVM	0.5 to 1 gal per surface acre	Spray on foliage. Use only formulations labeled for aquatics.
	Hardball	0.25 to 0.5 gal per surface acre	
cattail	glyphosate	3 to 5 qt per surface acre	Spray on foliage. See Rodeo entry below.
cattail pondlily waterlily	imazapyr 2 lb ae/gal	2 to 3 pt per surface acre or 1% solution	Spray on foliage. Add 1 quart of aquatic-approved nonionic surfactant per 100 gallons of spray solution.
Actively growing (floating or emersed) grasses, broadleafs and brush	glyphosate	1.5 to 7.5 pt per surface acre or spot treatments use 0.75 to 1.5% solution	For application to floating or emerged vegetation, undesirable shoreline weeds and brush by air, booms, or handheld equipment using 3 to 20 gallons of spray per acre. Do not expect control of vegetation that has a majority of the leaf surface submerged. Add 1 to 2 quarts of nonionic surfactant to 100 gallons of spray, but use only X-77 if applications are made to aquatic sites. For hand guns, use 3 to 6 quarts of Rodeo in 100 gallons of water depending upon weed species. Spray to wet. For broadcast application, use 1.5 to 2.5 pints for small annuals and 3 to 7.5 pints for perennial weeds and brush.

Aquatic Weeds, Continued

Aquatic weeds	Treatment	Rate	Comments
Emergent broadleafs	bispyribac-sodium	1 to 2 oz/A of formulated product	Apply bispyribac-sodium as a broadcast spray. Use the higher rate for more mature, denser weed growth. Apply in a minimum of 30 gallons of water per acre to ensure adequate coverage. Allow 30 days between applications, and apply no more than 8 ounces of product per acre per year. Do not exceed four applications per year.
	carfentrazone-ethyl	4 to 14 oz per acre	Use a nonionic surfactant at 1% v/v. Repeat applications as necessary.
	DMA 4 IVM	0.5 to 1 gal per surface acre	For control of aquatic weeds in lakes, ponds, drainage ditches, and marshes. Apply 2.5 to 4.5 pints per acre of 3.8 pounds per gallon or 1.67 to 3 pints per acre of 5.64 pounds per gallon formulation in 50 to 100 gallons of water.
	Hardball	0.25 to 0.5 gal per surface acre	Spray to wet foliage thoroughly. Apply when leaves are fully developed, actively growing, and are above the water level. Restrict applications to one-third to one-half of lake or pond. Repeat treatment once if needed.
	flumioxazin	6 to 12 oz/A of formulated product	Apply flumioxazin herbicide as a broadcast spray with an adjuvant approved for use in aquatics. Flumioxazin is a contact herbicide that quickly degrades in the water column, so plants that do not initially come in contact with it will not be controlled. Apply flumioxazin in a minimum of 30 gallons of water per acre to all areas of the water body where weeds exist. Coverage is essential for effective control, as all floating weeds need to be exposed to lethal concentrations in all parts of the water body. Any untreated escapes or reintroductions of plants that were not treated will reestablish in areas where surface weeds had previously been controlled. If a second application is required to provide control, make the treatment when returning weeds are first observed, but wait 28 days after the previous treatment. Application of flumioxazin during early morning hours may enhance weed control. When applying to densely packed, actively growing surface weeds, ensure adequate coverage. Rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation.
	Renovate 3	2 to 8 qt per surface acre	Use a nonionic surfactant at 1% v/v.

NONCROPLAND

(Herbicides to control all vegetation)

Recommended rates of the herbicides listed below will kill all vegetation. Low rates, and soils of high clay and organic matter or poor distribution of the herbicide, will all increase the number of escaped weeds and make a repeat application needed. Residual herbicides should never be applied near crops, lawns, shrubbery, or other desirable vegetation or where such plants will be planted within one to four years. The soil life of the herbicide depends on soil type, the particular herbicide, and the rate used. Less "runoff" or lateral movement can be expected where the application is made to a dry soil. Some herbicides are taken up only through the root system, whereas others are foliage- and root-absorbed. In many cases, a combination of a foliar active herbicide and a residual soil herbicide is required to provide "burndown" and residual activity. Spring treatments will control annual weeds, but fall applications often are needed for control of deep-rooted perennial weeds. Use chemicals with care around valuable plant species on ditch banks and turnrows or where water may wash them to other areas. Do not contaminate water supplies or irrigation water. Read the label before using.

Always calibrate sprayers before herbicide application. For foliar applications, the spray volume will usually vary between 30 and 40 gallons an acre for light to moderate vegetation; whereas, 100 to 200 gallons an acre are often required for large dense vegetation. Mix the suggested per acre rate of herbicide in appropriate volumes of water and spray to wet the vegetation. Labels sometime give specific mixing instructions for foliar herbicide applications.

It is often desirable to know the length of an acre when band spraying areas such as fencerows, rights-of-way, etc. Below are several examples:

Band width (ft)	Distance required to treat one acre	
	Ft	Miles
1	43,560	8.25
2	21,780	4.13
3	14,520	2.75
4	10,890	2.06
5	8,712	1.65
10	4,356	0.8

Soil Treatments

Herbicide	Amount of formulation per 1,000 sq ft per acre		Comments
atrazine			Atrazine will provide good residual activity to shallow-rooted annual and perennial plants. Add surfactant for foliar activity. Use high rates for perennial weeds. The addition of contact or systemic herbicides may be considered to control broad-spectrum vegetative problems. **Do not** exceed 10 lb ai/A/year.
4 lb/gal	2.2 - 3.6 oz	6 - 10 qt	
90% DF	2.0 - 4.0 oz	5.3 - 11.1 lb	
bromacil			An effective bare-ground herbicide for johnsongrass and other perennial grasses. Use low rates for annual weeds and higher rates for hard-to-kill perennial weeds. The liquid formulation is not compatible with MSMA, Oust, 2,4-D esters, or other acidic formulations.
80% WP	1.1-5.5 oz	3-15 lb	
2 lb/gal	0.40-2.2 pt	2-12 gal	
4% G	2.3-14 lb	100-600 lb	
bromacil 53% + diuron 27% Krovar II DF	0.75-8.4 oz	2-23 lb	
bromacil 2% + diuron 2% Weed Blast 4G	4.6 - 9.2 lb	200 - 400 lb	These diuron-bromacil formulations are effective for control of broad-spectrum weed populations. They control most broadleaf weeds and grasses, both annuals and perennials. Use low rate for short-term control of annuals, intermediate rates for extended control and perennial suppression, and high rates for control of hard to kill perennials and extended preemergence control.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Soil Treatments

Herbicide	Amount of formulation per 1,000 sq ft	per acre	Comments
dichlobenil			For general weed control and for under asphalt. Apply to the finished grade and cover area soon after application with asphalt. Dichlobenil has a shorter soil life then bromacil or prometone, but is less injurious to nearby trees and shrubbery. For general control using surface applications, consult individual labels. Apply when air temperature less than 60 °F for best results.
4% G	5.75-7 lb	250-300 lb	
10% G	2.3-2.8 lb	100-120 lb	
50% WP	7.5-9.0 oz	20-24 lb	
diuron 90% DF	1.8-5.5 oz	5-15 lb	Highly effective for seedling control after perennials have been controlled. Should be applied in late winter or early spring. The addition of a contact or systemic herbicide might be considered for improved control of broad-spectrum problem situations.
diuron 80% WP	1.8-7.3 oz	15-20 lb	
or			
simazine 80% WP	2.2-4.4 oz	6-12.5 lb	
4 lb/gal	0.37-7.4 oz	5-10 qt	
90% DF	1.8-4.0 oz	5-11.1 lb	
4% G	5.75 lb	250-450 lb	
diuron 40% + bromacil 40% Krovar I	1.5-11.0 oz	4-30 lb	These diuron-bromacil formulations are effective for control of broad-spectrum weed populations. They control most broadleaf weeds and grasses, both annuals and perennials. Use low rate for short-term control of annuals, intermediate rates for extended control and perennial suppression, and high rates for control of hard to kill perennials and extended preemergence control.
diuron 62.22% imazapyr 7.78% Sahara	0.30-0.44 lb	13-19 lb	Use where bare ground is desired in such areas as utility, pipeline, and highway rights-of-way and other noncropland areas. Controls many annual and perennial grasses and broadleaf weeds as well as some brush and vine species. Consult label for recommended adjuvant if used postemergence.
diuron 2% imazapyr 0.5% TopSite	4.6-6.88 lb	200-300 lb	Use where bare ground is desired in such areas as utility, pipeline, and highway rights-of-way and other noncropland areas. Controls many annual and perennial grasses and broadleaf weeds as well as some brush and vine species. Consult label for recommended adjuvant if used postemergence.
prometon			
Pramitol 25 E	1-5.5 pt	5-30 gal	For use on industrial sites, noncropland, and beneath asphalt pavement. Provides long-lasting residual control. Use higher rate for deep-rooted perennials or beneath asphalt. Do not apply where any roots of desirable plants will enter the treated areas.
Pramitol 5 PS	5-20 lb	217-870 lb	A pelleted herbicide mixture containing chlorate-borate-simazine and prometone. Should be applied before plant growth begins. Will provide more effective control of shallow-rooted plants than prometone alone.
sodium chlorate 30% + sodium metaborate 68%	10-30 lb	435-1,300 lb	There are many formulations available of sodium chlorate + sodium metaborate containing varying amounts of the chlorates-borates. Increase the rate for more dilute formulations. The borate addition reduces fire hazard and provides more effective long-term control of shallow-rooted young plants. Apply before germination of weeds for best results. Also useful before application before paving under asphalt. Very little lateral movement in soils generally occurs. Control can be expected for about one year.

Herbicide	Amount of formulation per 1,000 sq ft	per acre	Comments
sodium chlorate + sodium metaborate + residual herbicide			There are many formulations available containing varying concentrations of these herbicides. There are several granular as well as liquid formulations. Bromacil and prometone are two of the most soluble residual herbicides and can be expected to control deep-rooted perennial plants. These may move from the site of application. Atrazine and diuron are perferred where lateral movement by surface water is expected or where shallow-rooted annual and perennial plant control is desired.
chlorate 30-40% +			
borates 47-65% +	10-30 lb	435-1,304 lb	
bromacil 1.5-4%	20-40 lb	870-1,739 lb	
(or)			
diuron 1.25%	2.5-10 lb	110-435 lb	
(or)			
prometon 5%	5-20 lb	217-870 lb	
sulfometuron 75% Oust	0.07-10.18 oz	3-8 oz	For use on noncropland, industrial sites, and beneath asphalt pavement. Rate varies with weed type. Desirable plants may be injured if their roots extend into the treated areas.
tebuthiuron 1% diuron 3% Spraykil SK-13	3.44-9.18 lb	150-400 lb	For use in noncropland areas, under paved surfaces, and on industrial sites. Do not use in cropland. Keep animals off treated areas. Do not apply on or near desirable plants. Don't contaminate irrigation ditches or water used for domestic purposes. Do not use in areas where the water table is 5 feet or less, or in areas which are periodically flooded.
tebuthiuron 2% diuron 6 % Sparaykil SK-26	3.44-9.18 lb	150-400 lb	For use in noncropland areas, under paved surfaces, and on industrial sites. Do not use in cropland. Keep animals off treated areas. Do not apply on or near desirable plants. Don't contaminate irrigation ditches or water used for domestic purposes. Do not use in areas where the water table is 5 feet or less, or in areas which are periodically flooded.
tebuthiuron			Very effective on broadleaf and woody plants. Has good activity on privet. Use high rates for perennial grass and shrub control. Apply in winter or early spring. Add a contact herbicide if rapid kill of established weeds is desired. Best control of woody plants is obtained when applied in the spring when rain will leach the herbicide into the soil.
Spike 80% WP	1.8-7.3 oz	5-20 lb	
Spike 5% G	1.8-7.3 lb	80-320 lb	
Spike 85% DF	1.7-6.9 oz	4.75-18.7	
Velpar 90% SP	0.75-4.4 oz	2-12 lb	Apply spray in 25 to 100 gallons of water just before or soon after weeds emerge. Use medium to high rates on hard-to-kill species, fine-textured soils or soils with high organic matter, or where season long bare ground is desired. For brush control use medium rates and apply in late winter to early summer as a coarse spray underneath the brush. Lower rates may be used for short-term control or only postemergence control for many annual species. Add 1 quart surfactant to 100 gallons of spray.
Velpar L	3.0-15 oz	1 to 6 gal	

Foliage Treatments

Herbicide	1,000 sq ft	Rate/Acre	Comments
2,4-D, 2,4-DP, MCPA, mecoprop, (MCPP), triclopyr, dicamba, or dichlorprop (2,4-DP).	0.75-3 oz	1 to 4 lb a.i. (or) 1-4 qt of 4 lb/gal formulation	For control of broadleaf species only. Use low-volatile esters during cool or drouthy conditions but not when temperatures or windy conditions present drift problems. Repeat as necessary — provides short-term control. Apply in 50 to 100 gallons water with surfactant to uniformly cover broadleaf weeds. Apply when plants are actively growing. Rates are especially effective on woody plants. Reduced rates may be used for herbaceous broadleaf plants.
Note: There are many prepackage mixtures containing 2,4-D plus one to three other herbicides all of which can be very effective on a wide variety of broadleaf weeds. Herbicides such as 2,4-DP, MCPA, MCPP, dicamba, and triclopyr are all excellent broadleaf herbicides each having a little different spectrum of weed control. See woody plants section for additional information. See labels for specific rates and for weeds controlled. In some cases, you should mix grass herbicides such as MSMA or Roundup to provide total vegetation control. See individual section for suggested rates.			
amitrole			Use low rates for annual grasses, broadleaf weeds, poison ivy, and poison oak. Medium rates are for honeysuckle, kudzu, and perennial grass suppression. High rate is for large perennial grasses and woody plants. Apply in 100 gallons/A to wet all foliage after it has fully developed but before frost. Spot treat any regrowth. Amitrole may be mixed with 2,4-D, atrazine, diuron, or simazine for more effective control.
Amitrole T-21% liquid	3-6 oz	1-2 gal	
Amizol-90% powder	6-24 oz	2-8 lb	
Also available under several other trade names			
diquat Reward	0.75-1.5 oz	1-2 qt	Applied to fully wet all foliage. Provides kill or "burn back" of most succulent plants. Useful around buildings, walkways, fences, dry ditches, and clear aquatic areas. **Do not** use treated water for animal consumption, spray, or irrigation within 10 days after treatment.
fluazifop Fusilade DX	0.74-1.1 oz	8-16 oz	Apply as a foliar spray for control of annual and perennial grasses. Add to spray solution either 0.25% surfactant or 1.0% crop oil concentrate. Apply to cover actively growing grasses. Repeat treatment as needed as regrowth occurs. See cotton and soybean sections for additional suggestions.
fosamine Krenite S		1.5-3.0 gal	Apply to brush in late summer or early fall in water to wet all foliage parts. Injury symptoms appear the following spring as failure to produce new leaf growth or growth suppression. Pines may show a response soon after application.
glyphosate	1.0-3.0 oz	3-4 qt	Apply as a broadcast treatment in 10-40 gallons of water/A containing 0.5% surfactant when weeds are actively growing. For handgun or spot treatments use 2 to 4 quarts in 100 gallons water containing 0.5% surfactant. Retreat to control regrowth.
imazapyr Arsenal 2 lb/gal		2.0-6.0 pt	For control of most annuals and perennials including brush species. May apply preemergence but the preferred treatment, especially for perennials, is foliar applications. Complete kill may require several weeks. Make foliar applications using 20 to 60 gallons spray on acre and add 1 quart surfactant/100 gal spray especially if high spray volumes are used.
MSMA	1.1-2.2 oz	2-4 lb a.i. or 3.0 to 6 pt of 6.0 lb/gal	Apply sufficient water to provide spray coverage - usually 20-50 gallons/A. Use lower rates of MSMA for small annual grasses and upper rates for established perennial grasses. Under adverse growing conditions, use up to 0.5% surfactant. Repeated applications will probably be necessary.
paraquat Gramoxone Extra	0.75-1.1 oz	2.0-3.0 pt	Apply in sufficient water to provide spray coverage — usually 20-50 gallons/A. Add 1 quart of nonionic surfactant/100 gal spray. Kills green vegetation covered. Repeat when needed.
sulfometuron Oust — See Turf Section			

See Woody Plants section for additional foliage treatment suggestions.

EQUIPMENT AND CALIBRATION

Tank-Mixing Precautions

- Read product labels carefully and follow all applicable directions, precautions, and limitations.
- Do not exceed recommended application rates for respective products or maximum allowable application rates for any active ingredient in the tank mix.
- For products packaged in water-soluble packaging, do not tank mix with products containing boron. Also, do not mix in equipment previously used to apply a product mixture containing boron unless the tank and spray equipment have been adequately cleaned. (See Equipment Clean-Out Procedures.)
- Always perform a jar test to ensure the compatibility of products to be tank mixed before mixing a full tank.

Sprayer Agitation

Agitation is an essential design and operational component of the agricultural spray system. Agitation is the hydraulic stirring movement of spray solution. Agitation is necessary to maintain the homogeneous mixture required for uniform performance of the pesticide being applied. Poor agitation usually results in nonuniformity of the pesticide application. This may be most visible as crop injury caused by an excess rate of herbicide when the tank is full or recently refilled. As the tank becomes empty, you may see less control of weeds. The amount of agitation needed for the spray system depends upon the type of agitation being used, the size of the spray tanks, the configuration of the spray tanks, and the type of spray solution being applied. The most common type of agitation system is by-pass agitation where part of the spray pump capacity is used to create agitation inside the spray tanks to maintain a homogenous spray solution.

Spray tank agitation requirements are based on the total size of the spray tanks, the configuration of the spray tanks, and the type of pesticide formulation being applied. The volume of the spray tank agitation also depends on the type of tank agitation system being used. A rule of thumb suggests that about 10 percent of the total tank capacity is needed for sufficient agitation. For example, if the total capacity of two tanks is 300 gallons, then 30 gallons per minute (15 gallons per minute per tank) are needed for adequate agitation when conventional by-pass agitation is used. If the by-pass agitation system has induction jets attached, the total volume required for adequate agitation can be reduced.

In some of the new, very large and irregularly shaped spray tanks, it is more difficult to provide adequate agitation because of the way they are made. These tanks were made to more easily fit the tractor configuration than for spray agitation. More traditional EC, EW and flowable liquid pesticide formulations tend to have lower agitation requirements to maintain a homogenous spray mixture. Some formulation types may be prone to settling, especially if the agitation is inadequate or is stopped. In some situations, you may need to add spray adjuvants. Most agitation problems can be easily corrected with careful design and operation of the agitation system.

Where two or more tanks are used, the agitation system should be designed so that all tanks are agitated continuously once the pesticide is added. The operator must then decide whether to use from both tanks simultaneously or from one tank only. When operating from one tank with a full second tank, two separate pump/control/agitation systems are required to agitate both.

Spray tank agitation systems should include a high-volume spray pump and agitators that are carefully designed and installed. Agitators should be placed in the bottom of the spray tank with jets sweeping towards the ends of the tank so that the tank contents are rolled completely.

Total pump capacity is determined by the agitation requirement and the total nozzle requirement. The pump must have adequate capacity for both needs. If the pump is not large enough, it should be either replaced or a separate pump must be added so that one pump would be delivering the spray boom needs, and one pump would be delivering the agitation system needs.

Sprayer Operation

Agricultural sprayers should be operated so that the required rate of pesticide is delivered to the target site. Do not make applications when conditions are conducive to spray drift, poor spray deposition, or poor target coverage.

- Turn off the spraying system when turning or when booms must be raised to clear obstacles or folded for transport.
- Use check valves in individual nozzle bodies to prevent dripping during turns, transport, or when the sprayer is parked.
- Properly clean the sprayer before transporting, storing, or working in other crops or with other pesticides.

Minimize Drift from Ground Applications

Many variables influence drift from agricultural chemical applications. Focusing on the most important variables provides the applicator the greatest opportunity to minimize off-target movement. Research at Mississippi State University measured the relative importance of variables that influence drift from ground and aerial applications. The tips below are listed in order of importance in reducing drift as found in "Predicting ground boom spray drift" by, D. B. Smith, L. E. Bode and P. D. Gerard, Trans of ASAE 43(3):547-553, 2000.

- Maintain the maximum distance possible from the application to sensitive crops or areas downwind of the application by using buffer zones and by choosing times to spray when wind direction is away from sensitive crops and areas.
- Keep the spray release height and the nozzle to the target distance as low as possible to maintain a uniform application pattern from the nozzle for minimum influence of wind and evaporation. Select the proper nozzle type for the application and the nozzle pattern angle. Set the nozzle tip back or forward at approximately 45 degrees to horizontal to minimize height from boom to target.
- Make applications when wind speed is low (3 to 5 mph, but not dead calm indicating an inversion) and direction is away from sensitive crops and areas.

Applicators may benefit from spraying when temperature is low and humidity is high and with pressures no greater than 40 psi when using pattern-producing nozzles. Shielded and hooded sprayers may be used to minimize exposure of the spray to wind; however, one drift study found greater drift due to wind turbulence around a shield.

Aerial Drift Reduction

The tips below for reducing drift from aerial applications are listed in order of importance as found in Guidelines for Aerial Atomization and Spray Drift Reduction for Mississippi Applicators, MAFES Information Bulletin 251, by D. B. Smith, M. H. Willcutt, D. L. Valcore, J. W. Barry and M.E. Teske, Nov. 1993).

- Use the largest droplet size compatible with proper coverage required for the mode-of-action of the pesticide being used. The Department of Agriculture and Commerce Bureau of Plant Industry now requires a minimum of 300 micron vmd spray for glyphosate applications by air.

- Maintain the maximum distance possible from the application to sensitive crops or areas downwind of the application by using buffer zones and by choosing times to spray when wind direction is away from sensitive crops and areas.
- Make applications when wind speed is low (3 to 5 mph, but not dead calm indicating an inversion) and direction is away from sensitive crops and areas.

Mississippi regulations require that the outboard nozzles be no more than 70 percent of the wingspan or rotor span. Nozzles placed beyond this boom position contribute to vortex-influenced drift and non-uniform deposition, and they do not increase the effective swath width of the aircraft.

Oklahoma State University Publication E-948, Aerial Pesticide Drift Management, Ron T. Noyes, Dennis Gardisser and Dennis K. Kuhlman, makes this suggestion: "Make applications at a height of 25 to 50 percent of the aircraft wingspan, measured from the top of the canopy to the boom. This will generally equate to a minimum height of 9 to 10 feet to the gear or 10 to 15 feet from boom to target canopy. Flying too low can lead to narrow swaths, non-uniform distribution, and streaking. It may also lead to increased drift potential due to the excessive control surface movements generally associated with 'wheels in the crop' flying. Achieve level flight before spraying and turn off the spray system before pulling up. Do not use excessive aircraft speeds. As air speed increases, the amount of particle breakup and 'rooster tailing' potential increases. Higher airspeeds also increase the hazards of low altitude flying due to reduced pilot reaction time. Equip the spray boom for immediate/positive shut-off through properly installed bleed lines and well-maintained equipment. Attend educational meetings frequently and read all published information possible to increase your knowledge about factors that contribute to drift."

Sprayer Clean-Up

Thoroughly clean the sprayer after completion of the application, before repairs and maintenance, and before equipment storage or making other applications. Thorough cleaning will reduce the potential for product residues being dislodged during subsequent applications or worker exposure to pesticide residues and fumes from welding during repairs and maintenance.

At the End of the Day

At the end of each day of spraying, rinse the interior of the tank with clean water and then partially fill the tank. Flush the boom and hoses. This will reduce the buildup of dried pesticide deposits that may accumulate in the application equipment.

Upon Completion of the Application

Follow pesticide label directions for cleaning the sprayer. If no specific cleaning compound or procedure is recommended on the pesticide label, follow the procedure below:

- Drain the mixing and loading system, placing any remaining pesticide solution into the sprayer tank. Thoroughly rinse the mix vat, transfer pump, holding tank, and hoses. Clean this equipment with an appropriate spray tank cleaner. Remove and thoroughly clean all filters and screens on the mixing and loading system. Add all rinse water to the sprayer tank, washing the inside of the tank in the process. Apply rinse water to the application area.
- Fill the sprayer tank half full with clean water, washing the inside of the tank in the process; then apply the rinse water to the application area. Flush the boom with clean water. Loosen and physically remove any visible deposits.
- Fill the tank with clean water and 1 gallon of household ammonia (contains 3 percent active). Anhydrous ammonia may also be used at the same or stronger concentrations for every 100 gallons of water. Flush the hoses, boom, and nozzles with the cleaning solution. Then add more water to fill the tank completely. Circulate the cleaning solution through the tank and hoses for at least 15 minutes. Allowing the cleaning solution to sit 12 to 24 hours will result in better neutralization of pesticide residues. Apply the rinse solution to the application area or labeled cropland for the pesticide used.
- Remove the nozzles and screens and clean separately in a bucket containing cleaning agent and water using a soft-bristle brush.
- Repeat step 2 without the nozzles and strainers installed.
- Rinse the tank, boom, and hoses with clean water.
- Thoroughly clean exterior surfaces of spray equipment with a pressure washer or steam cleaner and with cleaning solutions recommended on the pesticide label.
- If the sprayer will be stored for long periods or during freezing weather, add about 2 to 5 gallons of a 50 percent antifreeze solution, allow it to circulate with the pump, and leave it in the sprayer to reduce damage caused by rust, corrosion, and freezing.
- Store the sprayer in a secure area away from frequent human and animal traffic patterns. Always lower raised components, place transmission in park, lock brakes, remove any keys, and lock cab and storage shed doors when leaving any equipment.

***Note:** If other cleaners are used, consult the cleaner label for rinse water disposal instructions. If no instructions are given, dispose of the rinse water on site or at an approved waste disposal facility.

Carefully read and follow the individual cleaner instructions. Consult your ag dealer, applicator, or pesticide manufacturer's representative for a list of approved cleaners.

- CAUTION: Do not use chlorine bleach with ammonia solutions as dangerous gases will form. Do not clean equipment in an enclosed area. Rinse all metal sprayer components thoroughly after using chlorine or ammonia cleaning solutions to prevent rusting.
- Steam clean aerial spray tanks to remove any caked deposits before performing the above cleanout procedure.
- When a tank mix with other pesticides has been applied, examine all cleanout procedures and follow the most rigorous procedure.
- In addition to this cleanout procedure, follow all pre-cleanout guidelines on subsequently applied products, as per the individual labels.
- Properly dispose of all empty pesticide containers, cleaning solutions, and rinse water in accordance with federal, state, and local regulations and guidelines. Triple or pressure rinse all empty pesticide containers and then render them unusable by puncturing the container.
- One accepted method of cleaning solution and rinse water disposal is to apply the rinse water to the field area previously treated. Do not exceed pesticide label recommendations for application rate when applying rinse water.
- Always wear the proper personal protective equipment while filling, cleaning, or working on sprayers.

Spray Tips for Successful Applications

The success of a crop chemical depends on its proper application as recommended by the chemical manufacturer. Proper selection and operation of spray nozzles are very important steps in accurate chemical application. The volume of spray passing through each nozzle plus the droplet size and spray distribution on the target influence weed control.

There is evidence that spray tips may be the most neglected component in today's farming; yet they are among the most critical of items in proper application of agricultural chemicals. For example, a 10 percent over-application of chemical on a twice-sprayed 1,000-acre farm could represent a loss of $2,000-$10,000 based on today's chemical investment of $10-$50 per acre. This does not take into account potential crop damage.

Careful cleaning of a clogged spray tip can mean the difference between a clean field and one with weed streaks. Flat spray tips have finely machined openings to control the spray. Damage from improper cleaning can cause both an increased flow rate and poor spray distribution. Be sure to use recommended strainers in your spray system to minimize clogging. If a tip clogs, use a soft-bristled brush or toothpick to clean it—**never** use a metal object. Use extreme care with soft spray tip materials such as plastic.

A wide selection of equipment is available for application of herbicides for weed control. Follow the manufacturer's guidelines for each specific type of equipment. Selection of the proper nozzle for the desired end-use is critical for proper calibration and application. Available nozzle types, spray patterns, and uses are presented in Table 3.

Precalibration check

Be sure that all sprayer components are free of foreign material and function properly. Inspect nozzle tips and internal parts for obvious wear, defects, proper size and type. Check the flow rate of each nozzle using water. Establish the desired operating pressure and check for uniform output, equal fan angle, and uniform appearance of spray pattern. Replace any nozzle tips having 5 percent more or less than the average flow rate of the other nozzles and/or having obviously different fan angles or patterns. If the average flow rate of the old nozzle tips differs from the flow rate of new nozzle tips or catalog flow rates for new nozzle tips by 10 percent or more, consider replacing with new nozzle tips. Check the flow rate of new nozzle tips before spraying.

Nozzle Height and Uniformity

Type and size of nozzle tip, operating pressure, spray formulation, tip spacing along the boom, tip-to-target distance, fan angle, and angle of nozzle tips in relation to vertical can greatly influence the spray swath uniformity. You can see extreme nonuniformity by spraying onto a prepared surface such as concrete or a dust-covered surface. Rotate fan-type tips approximately 5 degrees from being parallel to the boom so that adjacent spray fans do not interfere with each other. Suggested spray tip heights found in catalogs are a good starting point; however, these tip operating heights may or may not produce the maximum uniformity of application. For a more detailed discussion of spray uniformity and height and recommendations for specific nozzle tips, see Extension Publication 1697 *Improving the Uniformity of Ground Applied Broadcast Sprays* by D.B. Smith and M. H. Willcutt. (Specific recommendations for reducing aerial spray drift can be found in MAFES Information Bulletin 251 *Guidelines for Aerial Atomization and Spray Drift Reduction for Mississippi Applicators* by D.B. Smith, M.H. Willcutt, D.L. Valcore, J.W. Barry, and M.E. Teske.)

Use this formula to determine nozzle size: $GPM = \frac{GPA \times MPH \times Width}{5{,}940}$

The following web sites may be helpful in selecting nozzles, set-up and calibration of spray equipment:

www.agchem.com	Ag.Chem Equipment Co., Minnetonka, MN55343, 800-760-8800
www.teejet.com	Spraying Systems Co. , Wheaton, IL, 770-552-9292
www.delavanagspray.com	Delavan AgSpray Products, Lexington, TN, 800-621-9357
www.sprayers.com	Sprayer Specialties, Inc. Grimes, IA, 800-351-1587

Always be sure to check the rated operating pressure of nozzles when comparing desired flow to rated flow.

1/128th Acre Calibration for Row- and Boom-Nozzle Sprayers

Calibration of sprayers involves selection of the proper nozzle, spraying pressure, and sprayer speed. See Table 3 for selection of nozzles. There are many ways to determine the right combination of these elements. One practical calibration method is given. For a more in-depth discussion of calibration procedures, see Extension Publication 1006 *Calibration of Ground Spray Equipment.*

The 1/128th acre, baby bottle, and 100-foot methods of calibration are based on spraying 1/128th acre. There are 128 ounces per gallon; therefore, ounces sprayed per 1/128th acre equal gallons sprayed per acre. This procedure results in a treated acre calibration. Broadcast herbicide rates should be added to the volume of water calibrated per treated acre.

1. Determine nozzle spacing or swath width. (Note: if you are making **band** applications and use nozzle spacings, you will figure the gallons of spray per **planted** acre.)
2. Refer to Table 1 on next page for length of calibration course and mark calibration course in the field or 340 ft^2/nozzle swath width (feet) course length.
3. Record time required to drive length of calibration course at gear, engine rpm, and implement settings to be used while spraying.
4. Park sprayer, maintain engine rpm used to drive course, and turn on sprayer.
5. Collect all spray from one nozzle for time equal to that required to drive the calibration course.
6. Measure the **ounces** caught. Ounces caught equal gallons per acre of spray applied.
7. Repeat Steps 5 and 6 for several other nozzles.

*** NOTE:** If multiple nozzles are used per row (Figure 4) use the width of area treated by **all nozzles** as the swath width for step 1 and catch the flow from **all** nozzles directed to the row in step 5.

TABLE 1. DISTANCE FOR EACH NOZZLE TO SPRAY 1/128 ACRE.

Effective Swath Width (in)	Course Distance (feet)
6	681
8	510
10	408
12	340
14	292
16	255
18	227
20	204
22	186
24	170
30	136
36	113
38	107
40	102
42	97
48	85

TABLE 2. CALIBRATION LENGTHS FOR BOOMLESS SPRAYERS.

Effective Swath Width (feet)	Course Distance (feet)
15	363
18	302
20	272
22	248
24	227
26	209
28	194
30	182
32	170
34	160
40	136
47	116
50	109
52	105
56	97
60	91

1/8th Acre Calibration for Boomless Sprayers

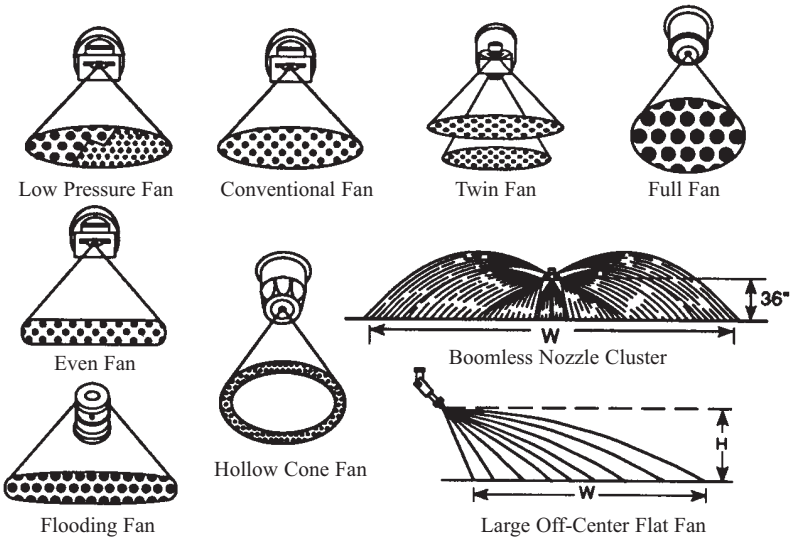
1. Turn on sprayer and measure effective swath width (feet). Note: swath width should be visually assessed when the vehicle is moving at 5 mph with very low wind speed and wind direction is parallel to the direction of travel of the spray vehicle.
2. Refer to Table 2 to determine length of calibration course and mark the calibration course in the field.
3. Record time required to drive course at gear, engine rpm, and implement settings to be used while spraying.
4. Park sprayer, maintain same rpm used to drive course, and turn on sprayer.
5. Catch water in plastic garbage bag for time equal to drive the calibration course.
6. Measure the pints caught. Pints collected equal gallons per acre.

TABLE 3. NOZZLE TYPES, SPRAY PATTERNS AND SUGGESTED USES[1].

Type	Spray Pattern	Pressure (psi)	Suggested Use/Comments
Flat Fan	Fan-like pattern of medium droplets. Not uniform across width.	20-40 (15-40 psi for LP nozzle)	Pre- and postemergence, broadcast booms. Available in low pressure tips that reduce clogging and drift potential. Requires 30% overlap for uniform distribution.
Even Fan	Fan-like pattern. Uniform volume across entire width.	20-40	Pre- and postemergence. Good for banding.
Flooding Fan	Wide, flat pattern of coarse droplet.	10-30	Broadcast booms, chemical-fertilizer mixture, layby. Requires 100% overlap for uniform distribution.
Off-Center Flat Fan (up to OCO8)	Flat-fan pattern. Directed to one side of tip. Swath width 20-144 inches.	20-40	Post-directed, low-profile spraying. Larger drops and increased volume deposited on the toe of pattern. Reasonably uniform deposits are not expected.
Large off-Center Flat Fan	Swath directed to one side from 12 to 33 feet width.	30-40	Herbicide application to ditches and roadsides. Reasonably uniform deposits are not expected.
Cone	Circular, with heavy concentration on outside. Small droplets.	40-60	Complete coverage of foliage. Insecticide, fungicide, and growth regulator applications, and Basagran rigs. Use where slight drifting is not hazardous.
Whirl Chamber (Raindrop[tm])	Hollow cone pattern.	5-20	Used on incorporation equipment.
Rotary Atomizers	Flat plane similar to hollow cone. More nearly uniform droplet size.	Device dependent	Low-volume application of herbicides and insecticides.
Boomless Nozzle Cluster	Wide swath (up to 60 feet). Pattern easily distorted by wind. High spray trajectory.	20-40	Pastures and broadcast spraying where obstructions to booms exist. High drift potential. Not suitable for orchard spraying. Reasonably uniform deposits are not expected.

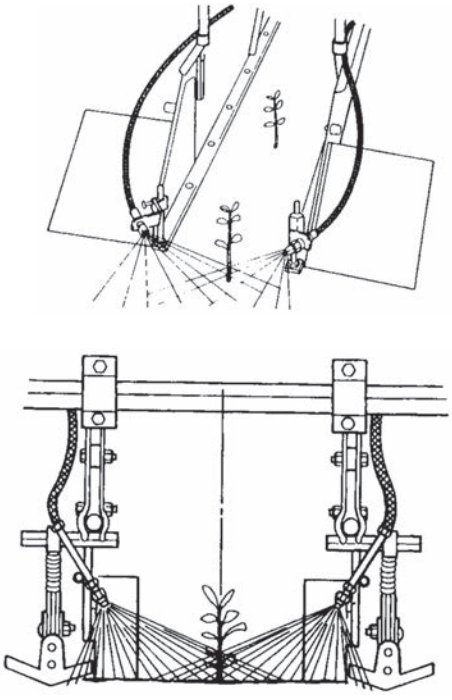
[1]Suggested uses are a composite of recommendations from the manufacturer, research, and Extension. Always follow equipment and chemical label.

Nozzle Patterns



Typical Nozzle Settings

Typical nozzle arrangements for weed control applications are shown in Figures 1-5.



Figures 1 and 2. Flat-fan nozzles for post-direct spraying. Mount nozzle on row shield and direct spray down and back to provide desired overlap and band width.

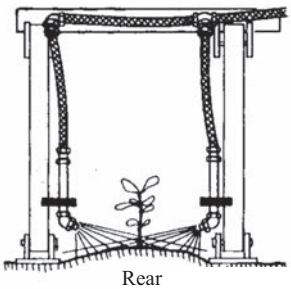


Figure 3. Off-center nozzle for post-direct spraying. Nozzle can be posi tioned further from the crop than regular flat-fan nozzle.

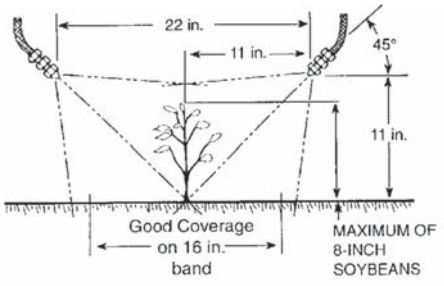


Figure 4. Two-nozzle arrangement for over-the-top applications.

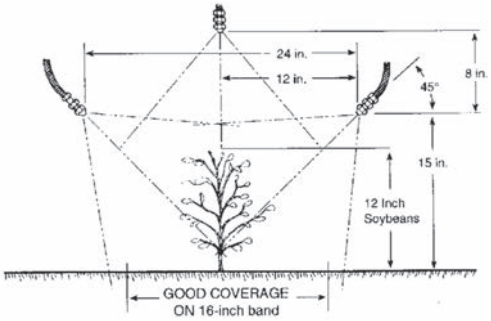


Figure 5. Three-nozzle arrangement for over-the-top applications.

Shielded Sprayers

Shielded sprayers offer a potential to apply herbicides for preplant burn down and in crop post direct with reduced drift and little or no injury to surrounding crops. However, use precautions to prevent drift and resulting crop injury. The shield alone is not enough to permit safe herbicide application when weather conditions are unfavorable. Abide by the normal recommendations for applying herbicides in a manner to reduce drift. Select a nozzle that will produce as large a drop as practical for coverage, spray volume, and control. Lower pressure or extended range nozzles (15 to 20 psi) should be given preference over more conventional nozzles (40 psi) since fine droplet production will be reduced. Set the hood and the nozzles for the lowest position to give adequate coverage of the weeds to be controlled. Angling the nozzles to the rear will usually give better coverage at a lower height as in any post-direct spraying. Never allow a nozzle to spray against the shield or curtain and accumulate to run-off.

Figure 6. Broadcast shielded sprayer operating in "burn-down"

Figure 7. Shielded sprayer in soybeans

Hooded and Shielded Sprayers

Hooded and shielded sprayers offer a potential to apply herbicides for preplant burn down (figure 6 above) and in crop post direct with little or no injury to surrounding crops. A sprayer hood with multiple nozzle configurations is shown in Figure 8. Use precautions to prevent drift and injury to nontarget crops. Do not use when weather conditions are unfavorable for a safe application. During each application, exercise the following precautions:

- Set hood and nozzles for the lowest position to give adequate coverage of weeds to be controlled.
- Never allow a nozzle to spray against the shield or curtain and accumulate to run-off.
- The hood should be operated in contact with the ground and not bounce when using nonselective herbicide in susceptible crops.
- Make sure flaps or curtains extend into the furrow for maximum protection when spraying crops in raised beds.
- Avoid operating a hooded sprayer on sloping ground.
- Maximum operating speed of the tractor and hoods should not be greater than 5 mph with slower speeds preferred for rough or uneven surfaces.
- Leave a minimum of an 8-inch band centered over the drill row untreated when using nonselective herbicides.
- Avoid spraying weeds that are in direct contact with the crop.
- Select low drift, flat fan type nozzles with a 95-degree included spray fan angle that produce medium to large drops suitable for the desired coverage, application, volume, and control.
- Always read and follow herbicide label directions.

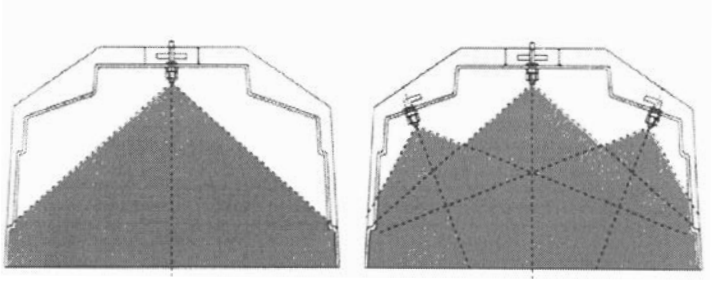


Figure 8. Sprayer hoods with one and three nozzles

Converting Liquid Formulations

$$\text{Volumetric Application Rate (pt/A)} = \frac{8\text{ pt}}{\text{gal}} \times \frac{\text{Rate (lb ai/A)}}{\text{Concentration (lb ai/gal)}}$$

Example: To apply 1 lb/A active rate of a 4 lb/gal material

$$\frac{8\text{ pt}}{\text{gal}} \times \frac{1\text{ lb ai/A}}{4\text{ lb ai/gal}} = 2\text{ pt/A}$$

Similar conversion to liquid ounces/acre (oz/A) may be accomplished by:

$$\frac{\text{oz}}{\text{A}} = \frac{128\text{ oz}}{\text{gal}} \times \frac{\text{Rate (lb ai/A)}}{\text{Concentration (lb ai/gal)}}$$

Converting Dry Material Formulation

$$\text{Amount of product (lb/A)} = \frac{\text{Technical material rate (lb ai/A)}}{\text{Percent active ingredient (\% ai)}}$$

$$\text{Volumetric Application Rate (oz/A)} = \frac{\text{lb ai/A}}{\text{\% Active}} \times \frac{16\text{ oz}}{\text{lb}}$$

Factors to Convert Broadcast Rate/Acre Banding Applications

$$\text{\% area treated with band} = \frac{\text{Total band width sprayed per pass of implement}}{\text{Total row width covered per pass of implement}} \times 100\%$$

This allows computations for skip-row patterns:

Example: A field planted to 8-40-inch row pattern is 50% treated when a 20-inch band is applied to each row:

$$\frac{8 \times 20}{8 \times 40} \times 100\% = 50\%$$

Conversion Factors

Area Measure

1 square mile (mi^2) = 640 acres
1/4 mi x 1/4 mi = 40 acres
1,320 ft x 1,320 ft = 40 acres
1 acre = 43,560 ft^2
1 acre = 208.7 ft x 208.7 ft
1 acre = 13,068 ft of 40-in. rows
13,756 ft of 38-in. rows
14,520 ft of 36-in. rows
16,335 ft of 32-in. rows
17,424 ft of 30-in. rows
1 acre = 0.405 hectare
1 hectare = 2.47 acres
1 hectare = 10,000 m^2
1 yd^2 = 9 ft^2 = 0.836 m^2
1 ft^2 = 144 in^2 = 0.09 m^2
1 cm^2 = 0.155 in^2

Linear Measure

1 in = 2.54 cm
1 ft = 12 in = 30.48 cm
1 yd = 3 ft = 36 in = 91.44 cm
1 rod = 16.5 ft
1 mi = 5,280 ft = 1.6093 km

Conversion Factors *(continued)*

Volume and Liquid Measure

1 yd^3 = 27 ft^3 = 0.76 m^3
1 ft^3 = 1,728 in^3 = 0.028 m^3 = 7.48 gal
1 bu = 1.25 ft^3
1 gal = 231 in^3 = 4 qt = 8 pt = 16 cups
1 gal = 128 fl oz =3.785 L = 3,785 ml = 3,785 cm^3
1 qt = 2 pt = 4 cups = 32 oz = 0.946 L = 946 ml
1 pt = 2 cups = 16 oz = 0.473 L = 473 ml
1 cup = 8 oz = 0.24 L = 240 ml
1 fl oz = 2 tbsp = 6 tsp = 1.8 in^3 = 0.02957 L = 29.57 ml
1 tbsp = 3 tsp = 0.5 oz = 14.78 ml
1 tsp = 0.166 oz = 4.92 ml
1 ml = 0.0338 fl oz

Mass (Weights)

1 U.S. ton = 2,000 lb = 0.907 metric ton
1 metric ton = 2,205 lb (avoir)
1 lb = 16 oz = 453.6 g = 0.4536 kg
1 oz = 28.35 g

Velocity Measure

1 mph = 5,280 ft/hr = 88 ft/min = 1.467 ft/sec
1 m/sec = 196.85 ft/min = 2.24 mph
1 m/sec = 1.942 knots

Pressure Measure

1 atm = 14.7 psi = 406.8 inches H_20 @ 40 °F
1 atm = 29.92 inches Hg @ 40 °F = 760 mm Hg @ 4 °C
1 atm = 1.01325 bar
1 psi = 27.68 inches H_20 @ 40 °F = 144 lb/ft^2 = 703.06 kg/m^2 @ 4 °C
1 psi = 6.8948 x 10^3 pascals = 6.895 Kpa = 2.036 inches Hg
1 psi = 70.3 g per cm^2
1 pascal = 10 dynes/cm^2 = 1.45 x 10^{-4} psi

Temperature

°C = 5/9 (°F - 32)
°F = (9/5 °C) + 32
°K = °C + 273.16
°R = °F + 459.69

* For additional conversions see http://www.abe.msstate.edu/tools.htm

Abbreviations

A = acres
ai = active ingredient
atm = atmospheres
bu = bushels
cm = centimeters
cm^2 = square centimeters
fl oz = fluid ounces
ft = feet
ft^2 = square feet
ft^3 = cubic feet
g = grams
gal = gallons
H_2O = water
Hg = mercury
in = inches
in^2 = square inches
in^3 = cubic inches
kg = kilograms
km = kilometers
L = liters
mi = miles
ml = milliliters
m = meters
m^2 = square meters
mm = millimeters
mph = miles per hour
oz = ounces
psi = pounds per square inch
pt = pints
qt = quarts
tbsp = tablespoons
tsp = teaspoons
yd = yards
°C = Degrees Celsius
°F = Degrees Fahrenheit
°R = Degrees Rankin
°K = Degrees Kelvin

WEED IDENTIFICATION AND WEB RESOURCES

Good judgment, representative field scouting, and proper weed identification are critical in obtaining appropriate recommendations. Several weed identification publications are available to aid in identifying weeds, such as the Southern Weed Science Society's Southern Weed ID Guide and Encyclopedia of North American Weeds DVD. The Southern Weed ID Guide is available as a manual or DVD with more than 2,400 full-color photographs of 447 weed species, along with an interactive key, distribution maps, and descriptions. The DVD also has an interactive tutorial on principles of weed identification, including plant taxonomy, morphology, and terminology. The Interactive Encyclopedia of North America DVD has an expanded array of weed species and excellent tutorials. Lastly, Forest Plants of the Southeast CD is an excellent weed identification tool with great images and descriptions of wildlife uses for many weeds. For purchasing information, contact the Southern Weed Science Society.

Southern Weed Science Society
205 W. Boutz, Bldg. 4, Ste. 5
Las Cruces, NM 88005
Phone: (575) 527-1888 (weekdays between 9 a.m. and 5 p.m. Mountain Time)
E-mail: SouthernWSS@gmail.com
Web site: www.swss.ws

Other Web Sites of Interest:

Crop Data Management Systems	http://www.cdms.net/
Greenbook Data Solutions	http://www.greenbook.net/
Invasive Plant Atlas of the Mid-South (IPAMS)	http://www.gri.msstate.edu/ipams

GLOSSARY OF HERBICIDES

Efforts were made to determine the chemical companies, trade names, and formulations of herbicides suggested in these guidelines that are labeled with the Mississippi Bureau of Plant Industry. Omission of any products containing the active ingredients listed in this book was not intended.

Use Classification

Certain chemicals have been classified by the U.S. Environmental Protection Agency or the Mississippi Department of Agriculture and Commerce, Bureau of Plant Industry as "Restricted Use" to ensure the safety of persons using them and to ensure the safety of the environment. Only certain formulations may be Restricted Use. Any person who is the end user of these products must be a certified applicator or working under the direct supervision of a certified applicator. To become certified, persons should contact their county Extension office or the Bureau of Plant Industry. All dealers who sell any products that are classified as EPA Restricted Use or State Restricted Use must obtain a dealer license from the Bureau of Plant Industry.

Use classifications are shown in the Glossary for each group of products. Following are the classification categories:

R—Products classified as Restricted Use by EPA. They will contain on the front panel of their labels the wording "Restricted Use Pesticide for retail sale to and use only by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification," or similar wording.

G—Products for general use (not restricted by EPA). They can be bought and used by the general public without certification.

Abbreviations used in this section:

DF or DFG — Dry Flowable

DG — Dispersible Granules

DS — Dry Soluble

G — Granules

P — Pellets

RTS — Ready to Spray

RTU — Ready to Use

SG — Soluble Granules

WDG — Water Dispersible Granules

WDS — Water Dispersible Soluble

WSG — Water Soluble Granules

WP — Wettable Powder

WS — Water Soluble Powder

WSB — Water Soluble Bag

WSP — Water Soluble Packet

Common chemical name	Company	Trade names and formulations	Use classification
2,4-D	Dow Agrosciences	GF-2654 — 56.3%	G
2,4-D	Helena Chem.	Barrage HF — 78.1%	G
2,4-D	Helena Chem.	Unison — 19.6%	G
2,4-D	Helena Chem.	Hardball — 19.6%	G
2,4-D	Loveland Prod.	Amine 4 2,4-D Weed Killer — 46.5%	G
2,4-D	Nufarm Americas	UAP Timberland Platoon — 47.3%	G
2,4-D	Ragan and Massey	Compare-N-Save 2,4-D Amine Salt Broadleaf Weed Cont. — 46.8%	G
2,4-D	Sepro	Sculpin G — 20%	G
2,4-D	South. Ag. Insecticides	2,4-D Amine Weed Killer — 46.8%	G
2,4-D	Tacoma Ag	2,4-D Amine 4 — 47.2%	G
2,4-D	Tacoma Ag	2,4-D Ester 4 — 68%	G
2,4-D	Tacoma Ag	2,4-D Ester 6 — 88.4%	G
2,4-D	Universal Crop Protection	2,4-D Amine Weed Killer — 47.2%	G
2,4-D	Universal Crop Protection	2,4-D LO-V Ester Weed Killer — 65.1%	G
2,4-D	Voluntary Purch. Groups	Hi-Yield 2,4-D Amine No. 4 — 47.3%	G
2,4-D	Winfield Solutions	Rugged — 38.4%	G
2,4-D	Nufarm Americas	WEEDestroy AM-40 — 46.8%	G
2,4-D amine	Albaugh	2,4-D Amine 4 — 46.8%	G
2,4-D amine	Alligare	Alligare 2,4-D Amine — 46.8%	G
2,4-D amine	Drexel Chem.	Drexel De-Amine 4 — 47.5%	G
2,4-D amine	Helena Chem.	2,4-D Amine 4 — 46.8%	G
2,4-D amine	Helena Chem.	Opti-Amine — 46.7%	G
2,4-D amine	Helena Chem.	Weed Rhap A-4D — 46.7%	G
2,4-D amine	Loveland Prod.	Clean Amine — 46.5%	G
2,4-D amine	Loveland Prod.	Savage Dry Soluble Herb. — 95%	G
2,4-D amine	Makhteshim-Agan	Defy Amine 4 — 47.2%	G
2,4-D amine	Nufarm Americas	Solution Water Soluble — 96.9%	G
2,4-D amine	Nufarm	Nufarm Weedar 64 Broadleaf Herb. — 46.8%	G
2,4-D amine	Nufarm	Nufarm Weedar 64 (24c) use on Rice — 46.8%	G
2,4-D amine	PBIGordon	Gordon's Amine 400 2,4-D Weed Killer — 46.47%	G
2,4-D amine	Tenkoz	Tenkoz Amine 4 2,4-D Herb. — 46.8%	G
2,4-D amine	Tenkoz	Tenkoz Amine 4 2,4-D Herb. — 46.8%	G
2,4-D amine	Voluntary Purch. Groups	Hi-Yield 2,4-D Selective Weed Killer — 11.84%	G
2,4-D amine	Winfield Solutions	Shredder Amine 4 — 47.3%	G
2,4-D amine	Dow Agrosciences	DMA 4 IVM — 46.3%	G
2,4-D B	Aceto Ag. Chem.	2,4-DB 175 Herb. — 23%	G
2,4-D B	Aceto Ag. Chem.	2, 4 DB 200 Herb. — 26.2%	G
2,4-D B	Albaugh	Butyrac 200 — 25.9%	G
2,4-D B	Albaugh	Butyrac 175 — 23%	G
2,4-D B	Applied Biochemists	Navigate — 27.6%	G
2,4-D B	Winfield Solutions	2,4-DB 200 — 25.9%	G
2,4-D B	Winfield Solutions	2,4-DB 1.75 — 23%	G
2,4-D ester	Alligare	Alligare 2,4-D LV 6 — 88.4%	G
2,4-D ester	Innvictis Crop Care	HavocC LV-Six — 88.4%	G
2,4-D ester	Innvictis Crop Care	Havoc LV-Four — 68%	G
2,4-D ester	Innvictis Crop Care	Havoc AMINE — 47.2%	G
2,4-D ester	Loveland Prod.	Whiteout 2,4-D — 60.8%	G
2,4-D ester	Loveland Prod.	Low Vol 4 Ester Weed Killer — 65.5%	G
2,4-D ester	Loveland Prod.	Low Vol 6 Ester Weed Killer — 88.8%	G
2,4-D ester	Loveland Prod.	Salvo — 81.8%	G
2,4-D ester	Makhteshim-Agan	Defy LV-4 — 68%	G
2,4-D ester	Makhteshim-Agan	Defy LV-6 — 88.4%	G
2,4-D ester	Nufarm	Nufarm Weedone LV4 EC — 67.2%	G
2,4-D ester	Nufarm	Nufarm Weedone 650 Solventless Herb. — 87.3%	G
2,4-D ester	Nufarm	Nufarm Weedone LV4 Solventless — 62.6%	G
2,4-D ester	Nufarm	Weedone LV6 EC Herb. — 87.3%	G
2,4-D ester	PBIGordon	Gordon's LV 400 2,4-D Weed Killer Solvent Free — 61.74%	G
2,4-D ester	Tenkoz	Tenkoz Lo-Vol 4 2,4-D Low Volatile Herb. — 67.2%	G
2,4-D ester	Tenkoz	Tenkoz Lo-Vol 4 2,4-D Low Volatile Herb. — 63.7%	G
2,4-D ester	Winfield Solutions	Shredder 2,4-D LV4 — 66.2%	G
2,4-D ester	Winfield Solutions	Shredder E-99 — 87.4%	G
2,4-D ester	Winfield Solutions	Shredder 2,4-D LV6 — 88.8%	G
2,4-D ester	Albaugh	2,4-D LV 6 — 86.5%	G
Acetic acid	Albaugh	2,4D LV 4 — 63.7%	G
Acetic acid	Fleischmann's Vinegar	Vinagreen — 20%	G
Acetic acid	Greenstar Plant Prod.	Grotek Elimaweed Weed & Grass Killer — 7.15%	G
Acetic acid	Lady Bug Natural Brand	Green Go Grass & Weed Killer RTU — 6.25%	G
Acetic acid	Albaugh	Solve 2,4D — 61.74%	G
Acetochlor	Dow Agrosciences	Surpass EC — 70.87%	G
Acetochlor	Dow Agrosciences	Acetochlor Technical — 95.4%	G
Acetochlor	Dow Agrosciences	Surpass NXT — 75.9%	G

Common chemical name	Company	Trade names and formulations	Use classification
Acetochlor	Dow Agrosciences	Acethochlor Technical — 95.4%	G
Acetochlor	Du Pont	DuPont Breakfree Herb. — 70.87%	G
Acetochlor	Du Pont	DuPont Breakfree NXT Herb. — 75.9%	G
Acetochlor	Du Pont	DuPont Breakfree NXT Herb. — 75.9%	G
Acetochlor	Loveland Prod.	Cadence* NXT Herb. — 75.9%	G
Acetochlor	Monsanto	Harness Herb. — 74.8%	G
Acetochlor	Monsanto	Agrisolutions Confidence Herb. — 74.8%	G
Acetochlor	Monsanto	Confidence Herb. — 75.9%	G
Acetochlor	Monsanto	Harness 20G Granular Herb. — 20%	G
Acetochlor	Monsanto	Degree Herb. — 42%	G
Acetochlor	Monsanto	MON 63410 Herb. — 33%	G
Acetochlor	Monsanto	Warrant Herb. — 33%	G
Acifluorfen	Direct Ag Source	Uproar — 20.1%	G
Acifluorfen	Innvictis Crop Care	Levity — 20.1%	G
Acifluorfen	Summit Agro USA	Acifluorfen 2L — 20.1%	G
Acifluorfen	Tacoma Ag	Acifluorfen 2E Herb. — 20.1%	G
Acifluorfen	United Phosphorus	Ultra Blazer — 20.1%	G
Acifluorfen	Winfield Solutions	Avalanche Ultra — 20.1%	G
Alachlor	Monsanto	IntRRo Preemergent Herb. — 45.1%	R
Alachlor	Monsanto	Micro-Tech Herb. — 41.5%	R
Ametryn	Syngenta Crop Prot.	Evik DF Herb. — 76%	G
Amicarbazone	Arysta Lifescience	Xonerate Herb. — 70%	G
Aminocyclopyrachlor	Du Pont	DuPont Aminocyclopyrachlor Technical — 89.3%	G
Aminocyclopyrachlor	Du Pont	DuPont Aptexor Technical — 89.3%	G
Aminocyclopyrachlor	Du Pont	DuPont Method 240SL Herb. — 25%	G
Aminocyclopyrachlor	Du Pont	DuPont Method 50SG Herb. — 50%	G
Aminocyclopyrachlor	Du Pont	DuPont Aptexor Manufacturing Conc. — 10%	G
Aminopyralid	Dow Agrosciences	Milestone — 40.6%	G
Aminopyralid	Dow Agrosciences	Milestone VM — 40.6%	G
Ammonium nitrite	Mirimichi Green	Mirimichi Green PRO Conc. — 40%	G
Ammonium nitrite	Mirimichi Green	Mirimichi Green Weed and Grass Cont. — 5%	G
Ammonium soap	Bayer Advanced	Natria Grass & Weed Killer RTU — 3.68%	G
Ammonium soap	Lawn and Garden Prod.	Herbicidal Soap — 22%	G
Ammonium soap	Schultz	Garden Safe Brand Weed & Grass Killer — 3.68%	G
Asulam	Helena Chem.	Asulam 4 F — 36.2%	G
Asulam	Tacoma Ag	Asulam 36.2 SL — 36.2%	G
Asulam	United Phosphorus	Asulox Herb. — 36.2%	G
Asulam	Winfield Solutions	Asulam 3.3 Herb. — 36.2%	G
Atrazine	Ambrands	Image Herb. for St.Augustinegrass & Centipedegrass — 4%	G
Atrazine	Ambrands	Image Herb. for St.Augustinegrass & Centipedegrass RTS — 4%	G
Atrazine	Drexel Chem.	Drexel Atrazine 4L — 42.2%	R
Atrazine	Drexel Chem.	Drexel Auguzine — 4%	G
Atrazine	Drexel Chem.	Drexel Atrazine 90DF — 88.4%	R
Atrazine	Drexel Chem.	Drexel Atra-5 — 52.5%	R
Atrazine	Helena Chem.	Helena Atrazine 4 F — 42.6%	R
Atrazine	Helena Chem.	Helena Atrazine 90-DG — 88.2%	R
Atrazine	Helena Chem.	Atrazine 4 L — 41.12%	R
Atrazine	Lesco	Lesco Atrazine 1.05% Plus Fert. 24-0-10 (702199) — 1.05%	G
Atrazine	Loveland Prod.	Atrazine 90 WDG Herb. — 88.5%	R
Atrazine	Loveland Prod.	Atrazine 4L Herb. — 42.2%	R
Atrazine	Makhteshim-Agan	MANA Atrazine 90DF — 88.2%	R
Atrazine	Makhteshim-Agan	Atrazine 4L Herb. — 42.9%	R
Atrazine	Makhteshim-Agan	Atrazine 90 DF — 88.5%	R
Atrazine	Scotts	SLS Fert. w/ Minors Plus Atrazine 20-2-10 — 0.92%	G
Atrazine	Scotts	Super Bonus S 26-2-14 — 1.17%	G
Atrazine	Scotts	Snap Pac South. Weed & Feed 32-0-4 — 1.44%	G
Atrazine	Sipcam Agro USA	Atrazine 90 DF Herb. — 87.72%	R
Atrazine	Sipcam Agro USA	Atrazine 4L Herb. — 41.9%	R
Atrazine	South. Ag. Insecticides	Atrazine 4% St. Augustine Lawn Weed Killer — 4%	G
Atrazine	Spectrum Group	Spectracide Weed Stop for Lawns for St. Augustine & Centipede Lawns Conc. — 4%	G
Atrazine	Swiss Farms Prod.	Vigoro South. Weed & Feed 29-0-4 — 1.38%	G
Atrazine	Syngenta Crop Prot.	Atrazine Technical — 96%	G
Atrazine	Syngenta Crop Prot.	Aatrex 4L Herb. — 42.6%	R
Atrazine	Syngenta Crop Prot.	Aatrex Nine-O — 88.2%	R
Atrazine	Tenkoz	Tenkoz Atrazine 4L Herb. — 42.6%	R
Atrazine	Tenkoz	Tenkoz Atrazine 90DF Herb. — 88.2%	R
Atrazine	Tenkoz	Tenkoz Atrazine 4L Herb. — 42.9%	R
Atrazine	Ortho Group	Ortho Weed B Gon Spot Weed Killer for St Augustine — 0.6%	G
Atrazine	Universal Crop Protection	Atrazine 4L Herb. — 42.6%	R
Atrazine	Universal Crop Protection	Atrazine 90 DF Herb. — 88.2%	R
Atrazine	Universal Crop Protection	Atrazine 4L — 42.12%	R

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Atrazine	Universal Crop Protection	Atrazine 90 — 85.5%	R
Atrazine	Voluntary Purch. Groups	Hi-Yield Atrazine Weed Killer — 4.08%	G
Atrazine	Winfield Solutions	Atrazine 4L — 42.12%	R
Atrazine	Winfield Solutions	Atrazine 90DF — 88%	R
Benefin	Dow AgroSciences	Technical Benefin — 96.6%	G
Benfluralin	Anderson's Lawn Fert.	Pro. Turf Prod. Crabgrass Prev. w/ 2.5% Balan Herb. (D G) — 2.5%	G
Bensulfuron-methyl	RiceCo.	Londax — 60%	G
Bensulide	Gowan	Prefar 4-E Selective Herb. — 46%	G
Bensulide	PBIGordon	Pre-San Granular 12.5G — 12.5%	G
Bensulide	PBIGordon	Bensumec 4LF — 46%	G
Bentazon	Arysta Lifescience	Basagran Herb. — 44%	G
Bentazon	Tacoma Ag	Bentazon 4 Herb. — 44%	G
Bentazon	United Phosphorus	Broadloom Herb. — 44%	G
Bentazon	Winfield Solutions	Basagran — 44%	G
Bentazon, sodium salt	Arysta Lifescience	Basagran Herb. — 44%	G
Bentazon, sodium salt	BASF	Basagran 5L Herb. — 53%	G
Bentazon, sodium salt	BASF	Basagran T&O Herb. — 44%	G
Bispyribac-sodium	Valent U.S.A.	Regiment Herb. — 80%	G
Bispyribac-sodium	Valent U.S.A.	Velocity SG Herb. — 17.6%	G
Bispyribac-sodium	Valent U.S.A.	Tradewind Herb. — 80%	G
Bromacil	Alligare	Bromacil 80 — 80%	G
Bromacil	Amrep	Misty Ex-It Emulsifiable Conc. — 2.3%	G
Bromacil	Amrep	Misty Ex-It CF — 2.75%	G
Bromacil	Check-Mark	Opti-Kill — 3.3%	G
Bromacil	Du Pont	DuPont Hyvar X Herb. — 80%	G
Bromacil	Du Pont	DuPont Bromacil Technical — 97.2%	G
Bromacil	Du Pont	DuPont Hyvar X-L Herb. — 21.9%	G
Bromacil	Momarorporated	Weed Away — 4%	G
Bromacil	Momarorporated	TM05-E01 No Mow 7.5 — 7.5%	G
Bromacil	Momarorporated	No Mow II — 2.44%	G
Bromacil	Pine Valley Eco Prod.	Brom 7.5 Herb. Conc. — 7.5%	G
Bromacil	Total Solutions	Banish — 1.2%	G
Bromacil	Total Solutions	Weed Easy — 4%	G
Bromacil	Zep Commercial	Enforcer Roots & All Plus 365 Conc. — 2.3%	G
Bromacil	Zep	Zep Conc. Weed Killer & Soil Sterilant — 1.52%	G
Bromacil	Zep	Zep Formula 777 EC — 1.52%	G
Carfentrazone-ethyl	FMC	Aim EC Herb. — 22.3%	G
Carfentrazone-ethyl	FMC	QuickSilver T&O Herb. — 21.3%	G
Carfentrazone-ethyl	Sepro	Stingray — 21.3%	G
Chlorimuron-ethyl	Agsurf	Cemax Herb. — 25%	G
Chlorimuron-ethyl	Du Pont	DuPont Classic Herb. — 25%	G
Chlorimuron-ethyl	Nufarm	Curio Herb. — 25%	G
Chlorothalonil	Regal Chem.	Chlorostar VI — 54%	G
Chlorothalonil	Regal Chem.	Chlorostar DF — 82.5%	G
Chlorsulfuron	Alligare	Alligare Chlorsulfuron 75 — 75%	G
Chlorsulfuron	Du Pont	DuPont Telar XP Herb. — 75%	G
Clethodim	Albaugh	Clethodim 2E — 26.4%	G
Clethodim	Amtide	Clethodim 2EC — 26.4%	G
Clethodim	Arysta Lifescience	Clethodim 70% M.U.P. Herb. — 70%	G
Clethodim	Arysta Lifescience	Shadow Herb. — 26.4%	G
Clethodim	Arysta Lifescience	Shadow Ultra Herb. — 12.9%	G
Clethodim	Arysta Lifescience	Clethodim 37% MUP Herb. — 37%	G
Clethodim	Arysta Lifescience	Clethodim 70% MUP Herb. — 70%	G
Clethodim	Arysta Lifescience	Shadow 3EC Herb. — 36.7%	G
Clethodim	Direct Ag Source	Cleanse 2 EC — 26.4%	G
Clethodim	Helena Chem.	Tapout — 12.6%	G
Clethodim	Helena Chem.	Mossy Oak Brand Camo Bio Logic Weed Reaper-Grass Cont. — 12.6%	G
Clethodim	Innvictis Crop Care	Avatar — 26.4%	G
Clethodim	Innvictis Crop Care	Avatar S2 — 26.4%	G
Clethodim	Loveland Prod.	Intensity Post Emergence Grass Herb. — 26.4%	G
Clethodim	Loveland Prod.	Intensity One Post-Emergence Grass Herb. — 12.6%	G
Clethodim	Makhteshim-Agan	Arrow 2 EC Herb. — 26.4%	G
Clethodim	Redeagle Intl.	Clethodim 2E — 26.4%	G
Clethodim	Ritter Chem.	Cleo 26.4 — 26.4%	G
Clethodim	Rotam N. America	Dakota — 26.4%	G
Clethodim	Tacoma Ag	Clethodim 2EC — 26.4%	G
Clethodim	Tenkoz	Volunteer Herb. — 26.4%	G
Clethodim	Tenkoz	Volunteer Herb. — 26.4%	G
Clethodim	Tenkoz	Volunteer Herb. — 26.4%	G
Clethodim	Tide Intl.	Tide Clethodim 2EC — 26.4%	G
Clethodim	Universal Crop Protection	Clethodim — 26.4%	G

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Clethodim	Universal Crop Protection	Cropsmart Clethodim — 26.4%	G
Clethodim	Valent U.S.A.	Envoy Plus Herb. — 12.6%	G
Clethodim	Valent U.S.A.	Select Max Herb. w/ Inside Technology — 12.6%	G
Clethodim	Valent U.S.A.	Select 70% M.U.P. — 70%	G
Clethodim	Valent U.S.A.	Select 2 EC Herb. — 26.4%	G
Clethodim	Valent U.S.A.	Prism Herb. — 12.6%	G
Clethodim	Valent U.S.A.	Select 37% M.U.P. — 37%	G
Clethodim	Willowood	Willowood Clethodim 2EC — 26.4%	G
Clethodim	Winfield Solutions	Section 2EC — 73.6%	G
Clethodim	Winfield Solutions	Section 2EC — 26.4%	G
Clethodim	Winfield Solutions	Select 2EC — 26.4%	G
Clethodim	Winfield Solutions	Section Three Herb. — 36.7%	G
Clodinafop-propargyl	Syngenta Crop Prot.	Discover NG — 6.4%	G
Clodinafop-propargyl	Arysta Lifescience	NextStep NG — 6.4%	G
Clodinafop-propargyl	Syngenta Crop Prot.	Observe — 6.4%	G
Clomazone	FMC	Command 3ME Microencapsuled Herb. — 31.1%	G
Clomazone	Helena Chem.	Command 3 ME — 31.4%	G
Clomazone	Willowood	Willowood Clomazone 3ME — 31.1%	G
Clomazone	Willowood	Willowood Clomazone 3ME — 31.1%	G
Clopyralid	Alligare	Alligare Clopyralid 3 — 40.9%	G
Clopyralid	Dow Agrosciences	Transline — 40.9%	G
Clopyralid	Dow Agrosciences	Lontrel Turf and Ornamental — 40.9%	G
Clopyralid	Dow Agrosciences	Stinger — 40.9%	G
Clopyralid	Lawn and Garden Prod.	Kudzu Killer — 40.9%	G
Clopyralid	Lawn and Garden Prod.	ThistleDown — 40.9%	G
Clopyralid	Nufarm Americas	Clean Slate Selective Herb. — 40.9%	G
Cloransulam-methyl	Dow Agrosciences	FirstRate — 84%	G
Copper	Alligare	Argos — 27.9%	G
Copper	Applied Biochemists	Cutrine-Plus — 9%	G
Copper	Applied Biochemists	Harpoon Aquatic Herb. — 23%	G
Copper	Applied Biochemists	Harpoon Granular Aquatic Herb. — 9.87%	G
Copper	Beaver Plastics	CopperBlock — 11.7%	G
Copper	Check-Mark	Root Free II — 99%	G
Copper	Helena Chem.	Copper-Z 4/4 — 10%	G
Copper	PBIGordon	Gordon's PondMaster Copper Sulfate Crystals — 99%	G
Copper	PBIGordon	Gordon's PondMaster Aquatic Herb. — 8%	G
Copper	Roebic Laboratories	K-77 Root Killer — 99%	G
Copper	Sanco Industries	Root Destroyer — 99%	G
Copper	Scotch	Instant Power Sewer Line Root Destroyer — 99%	G
Copper	Sepro	Komeen — 8%	G
Copper	Zep Commercial	Zep Root Kill — 99%	G
Copper	Zep Commercial	Drain Care Root Kill — 99%	G
Copper	Applied Biochemists	Clearigate — 3.83%	G
Copper	HCC Holdings	Break Thru R-D Root Destroyer — 1%	G
Copper	Sepro	Komeen Crystal — 50%	G
Copper	United Phosphorus	Current — 31.27%	G
Copper	Voluntary Purch. Groups	Hi-Yield Root Killer — 99%	G
Corn gluten meal	Woodstream	Concern Weed Prevention Plus — 100%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher Technical — 96.5%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher CA — 29.6%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher SF — 29.6%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher EZ — 18.2%	G
DCPA	Amvac Chem.	Dacthal Flowable Herb. — 54.9%	G
Dicamba	Albaugh	Dicamba HD — 56.8%	G
Dicamba	Albaugh	Dicamba DMA — 48.2%	G
Dicamba	Alligare	Cruise Cont. — 48.2%	G
Dicamba	Arysta Lifescience	Banvel — 49.4%	G
Dicamba	Arysta Lifescience	Banvel 480 Herb. — 49.77%	G
Dicamba	BASF	Clarity Herb. — 58.1%	G
Dicamba	Direct Ag Source	Dicamba Max 4 — 49.2%	G
Dicamba	Du Pont	DuPont Dicamba XP Herb. — 83.6%	G
Dicamba	Gharda Chem.	Oracle Dicamba Agricultural Herb. — 49.77%	G
Dicamba	Helena Chem.	Vision — 40%	G
Dicamba	Innvictis Crop Care	Veritas D — 48.5%	G
Dicamba	Loveland Prod.	Strut Herb. — 56.8%	G
Dicamba	Loveland Prod.	Rifle Herb. — 48.2%	G
Dicamba	Monsanto	M1691 Herb. — 58.1%	G
Dicamba	Nufarm Americas	Diablo — 48.2%	G
Dicamba	Nufarm Americas	Riverdale Vanquish Herb. — 56.8%	G
Dicamba	Nufarm Americas	Clash Selective Herb. — 56.8%	G
Dicamba	Ritter Chem.	Topeka — 48.2%	G

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Dicamba	Rotam N. America	Topeka — 48.2%	G
Dicamba	Tacoma Ag	Dicamba 4 DMA — 50.2%	G
Dicamba	Tenkoz	Detonate Herb. — 58.1%	G
Dicamba	Universal Crop Protection	Dicamba — 48.2%	G
Dicamba	Willowood	Willowood Dicamba 4 — 50.2%	G
Dicamba	Winfield Solutions	Sterling Blue — 56.8%	G
Dicamba	Winfield Solutions	Sterling Blue — 58.1%	G
Dichlobenil	Ambrands	Image Herb. from Lilly Miller Casoron Gran. — 2%	G
Dichlobenil	Ambrands	Image Herb. from Lilly Miller Noxall Gran. — 2%	G
Dichlobenil	Ambrands	Image Herb. Year-Long Vegetation Killer — 2%	G
Dichlobenil	General Chem.	RootX — 0.55%	G
Dichlobenil	Haviland Consumer Prod.	Blast It — 4%	G
Dichlobenil	Haviland Consumer Prod.	ProTeam ZapZit — 4%	G
Dichlobenil	Lilly Miller Brands	Lilly Miller Casoron Gran. — 2%	G
Dichlobenil	Lilly Miller Brands	Lilly Miller Granular Noxall Vegetation Killer — 2%	G
Dichlobenil	MacDermid Ag. Sol.	Casoron CS — 15.3%	G
Dichlobenil	PBIGordon	Barrier Ornamental Landscaping Herb. — 4%	G
Dichlobenil	Roebic Laboratories	Foaming Root Killer — 0.55%	G
Diclofop-methyl	Bayer Env. Science	Illoxan 3 EC Herb. — 34.7%	R
Diclosulam	Dow Agrosciences	Strongarm — 84%	G
Dimethenamide-P	BASF	Outlook Herb. — 63.9%	G
Dimethenamide-P	BASF	Tower Herb. — 63.9%	G
Dimethenamide-P	Helena Chem.	Sortie — 63.9%	G
Dimethenamide-P	Loveland Prod.	Slider — 63.9%	G
Diquat dibromide	Aceto Ag. Chem.	Aceto Diquat 2L AG Herb. — 37.3%	G
Diquat dibromide	Aceto Ag. Chem.	Aceto Diquat 2L Landscape & Aquatic Herb. — 37.3%	G
Diquat dibromide	Aero Chem.	Sudden Death — 1.85%	G
Diquat dibromide	Alligare	Alligare Diquat Herb. — 37.3%	G
Diquat dibromide	Amrep	Misty Weedtrol CF — 4.35%	G
Diquat dibromide	Amrep	Misty Weedtrol VF — 1.85%	G
Diquat dibromide	Applied Biochemists	Harvester Landscape & Aquatic Herb. — 37.3%	G
Diquat dibromide	Applied Biochemists	Weedtrine D Aquatic Herb. — 8.53%	G
Diquat dibromide	Atco Intl.	Liberator 711 — 1.85%	G
Diquat dibromide	Durvet	AquaVet Submerged Weeds — 37.3%	G
Diquat dibromide	Momarorporated	Edger — 1.85%	G
Diquat dibromide	Nufarm Americas	Nufarm Diquat 2L Herb. — 37.3%	G
Diquat dibromide	Nufarm Americas	Nufarm Diquat SPC 2L Landscape & Aquatic Herb. — 37.3%	G
Diquat dibromide	Rotam N. America	Rowrunner ATO — 37.3%	G
Diquat dibromide	Rotam N. America	Rowrunner AG — 37.3%	G
Diquat dibromide	Sanco Industries	Tsunami DQ — 37.3%	G
Diquat dibromide	Sepro	Littora — 37.3%	G
Diquat dibromide	Sewer Sciences	Razorooter II — 37.3%	G
Diquat dibromide	Sharda USA	Diquash Landscape & Aquatic Herb. — 37.3%	G
Diquat dibromide	Sharda USA	Diquash Ag Desiccant & Herb. — 37.3%	G
Diquat dibromide	Solera ATO	Diquat Landscape and Aquatic Herb. — 37.3%	G
Diquat dibromide	Syngenta Crop Prot.	Reward Manufacturing Conc. — 37.3%	G
Diquat dibromide	Syngenta Crop Prot.	Reward Landscape and Aquatic Herb. — 37.3%	G
Diquat dibromide	Syngenta Crop Prot.	Tribune Herb. — 37.3%	G
Diquat dibromide	The Pond Guy	Ultra PondWeed Defense — 37.3%	G
Diquat dibromide	Total Solutions	Eliminator — 1.85%	G
Diquat dibromide	Zep Commercial	Enforcer Next Day Grass & Weed Killer Conc. — 1.85%	G
Dithiopyr	Agrium Adv. Tech.	Dimension 0.1% Plus Fert. Turf and Ornamental Herb. — 0.1%	G
Dithiopyr	Alligare	Alligare Dithiopyr 40 — 40%	G
Dithiopyr	Bonide Prod.	Bonide DuraTurf Crabgrass & Weed Prev. for Lawns & Ornamental Beds — 0.27%	G
Dithiopyr	Cont. Solutions	Quali-Pro Dithiopyr 2L — 23.6%	G
Dithiopyr	Dow Agrosciences	Dimension EC — 12.7%	G
Dithiopyr	Dow Agrosciences	Dimension Ultra 40WP — 40%	G
Dithiopyr	Dow Agrosciences	Dimension 2EW — 24%	G
Dithiopyr	Infinity Fert.	Sta-Green Crab Ex — 0.25%	G
Dithiopyr	Lebanon Seaboard	Preen South. Weed Prev. — 0.27%	G
Dithiopyr	Lebanon Seaboard	Preen South. Weed Prev. Plus Plant Food — 0.19%	G
Dithiopyr	Lebanon Seaboard	Preen Lawn Crabgrass Cont. — 0.19%	G
Dithiopyr	Lesco	Lesco Dimension 0.1% Plus Fert. 7-0-0 (701096) — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.1% Plus Fert. 0-0-7 (702134) — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.1% Plus Fert. 8-0-0M (702145) — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.1% Plus Fert. 0-0-4M (702178) — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.1% Plus Fert. 19-0-0 (701066) — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 0-0-4M (702182) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 19-0-6 (702024) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 13-0-5M (701012) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 13-0-4M (702180) — 0.15%	G

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Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 24-5-11M (701014) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 13-2-5M (701001) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 19-0-19M (701003) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 5-10-17M (701004) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 24-0-11 (701067) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 8-0-0 (091139) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 5-0-17 (069143) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 8-0-0M (702146) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 5-10-17M (702162) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 13-2-5M (702160) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 24-5-11M (702161) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% Plus Fert. 0-0-7 (702135) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% Plus Fert. 8-0-0 (702136) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% Plus Fert. 8-0-0M (702147) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% Plus Fert. 0-0-7 (701150) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% Plus Fert. 18-0-10 (702032) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% Plus Fert. 0-0-4M (702183) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% Plus Fert. 13-0-0 (091148) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% Plus Fert. 25-0-10 (701072) — 0.21%	G
Dithiopyr	Makhteshim-Agan	Quali-Pro Dithiopyr 40 WSB — 40%	G
Dithiopyr	Swiss Farms Prod.	Vigoro Crabgrass & Weed Prev. — 0.17%	G
Dithiopyr	United Turf Alliance	ArmorTech CGC 2L — 23.6%	G
Dithiopyr	Voluntary Purch. Groups	Hi-Yield Turf & Ornamental Weed & Grass Stopper — 0.13%	G
Dithiopyr	Voluntary Purch. Groups	Hi-Yield Ornamental Weed Prev. — 0.13%	G
Diuron	Alligare	Alligare Diuron 80 DF — 80%	G
Diuron	Alligare	Alligare Diuron 4L — 40.7%	G
Diuron	Direct Ag Source	Cleanshot DF — 80%	G
Diuron	Drexel Chem.	Drexel Diuron 80 Herb. — 80%	G
Diuron	Drexel Chem.	Drexel Diuron 4L — 40%	G
Diuron	Du Pont	DuPont Diuron Technical — 98.4%	G
Diuron	Loveland Prod.	Diuron 80 WDG Weed Killer — 80%	G
Diuron	Loveland Prod.	Diuron 4L Herb. — 40%	G
Diuron	Makhteshim-Agan	Parrot DF — 80%	G
Diuron	Makhteshim-Agan	Karmex 80DF — 80%	G
Diuron	Makhteshim-Agan	Parrot 4L — 40.7%	G
Diuron	Makhteshim-Agan	Determine 4L — 40.7%	G
Diuron	Makhteshim-Agan	Direx 4L — 40.7%	G
Diuron	Makhteshim-Agan	Cleanshot 4L — 40.7%	G
Diuron	Redeagle Intl.	Diuron 4L — 40%	G
Diuron	Willowood	Willowood Diuron 4SC — 40.7%	G
Diuron	Winfield Solutions	Diuron 4L — 40%	G
d-Limonene	Cutting Edge Formulations	Avenger Weed Killer Conc. — 70%	G
d-Limonene	Cutting Edge Formulations	Avenger Weed Killer RTU — 17.5%	G
d-Limonene	Lilly Miller Brands	Conc. WorryFree Brand Weed & Grass Killer — 70%	G
d-Limonene	Lilly Miller Brands	WorryFree Brand Weed & Grass Killer — 17.5%	G
Endothall	United Phosphorus	Hydrothol Granular — 11.2%	G
Endothall	United Phosphorus	Hydrothol 191 Aquatic — 53%	G
Endothall	United Phosphorus	Aquathol K — 40.3%	G
Endothall	United Phosphorus	Aquathol Super K — 63%	G
EPTC	Gowan	Eptam 7E — 87.8%	G
Ethalfluralin	Dow AgroSciences	Technical Ethalfluralin — 96%	G
Ethalfluralin	Dow Agrosciences	Sonalan HFP — 35.4%	G
Ethalfluralin	Loveland Prod.	Curbit EC Herb. — 35.4%	G
Ethephon	Makhteshim-Agan	Ethephon 2SL — 21.7%	G
Ethephon	Redeagle Intl.	Ethephon 6 — 54%	G
Ethofumesate	Bayer Env. Science	Prograss SC Herb. — 42%	G
Ethofumesate	Bayer Env. Science	Prograss Herb. — 19%	G
Ethofumesate	Prime Source	Ethofumesate Select — 42%	G
Ethofumesate	United Phosphorus	PoaConstrictor — 42%	G
Fenoxaprop-ethyl	Bayer Env. Science	Acclaim Extra Herb. — 6.59%	G
Fenoxaprop-p-ethyl	Bayer Advanced	Bayer Advanced Crabgrass Killer for Lawns RTS — 0.41%	G
Fenoxaprop-p-ethyl	Bayer Advanced	Bayer Advanced Bermudagrass Cont. for Lawns RTS — 0.41%	G
Fenoxaprop-p-ethyl	Bayer Cropscience	Whip 360 Herb. — 6.59%	G
Fenoxaprop-p-ethyl	Bayer Cropscience	RiceStar Herb. — 6.7%	G
Fenoxaprop-p-ethyl	Bayer Cropscience	RiceStar HT Herb. — 6.7%	G
Fenpyroximate	Sepro	Akari 5SC — 5%	G
Flazasulfuron	PBIGordon	Katana Turf Herb. — 25%	G
Florasulam	Dow Agrosciences	Florasulam Wet Cake Technical — 99.2%	G
Florasulam	Dow Agrosciences	EF-1343 — 4.84%	G
Florasulam	Dow Agrosciences	Defendor — 4.84%	G
Fluazifop-butyl	Ortho Group	Ortho Grass B Gon Garden Grass Killer — 0.48%	G

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Fluazifop-P-butyl	PBIGordon	Ornamec Over-The-Top Grass Herb. — 6.75%	G
Fluazifop-P-butyl	PBIGordon	Ornamec 170 Grass Herb. — 1.7%	G
Fluazifop-P-butyl	Syngenta Crop Prot.	Fluazifop-p-butyl Technical — 93%	G
Fluazifop-P-butyl	Syngenta Crop Prot.	Fusilade DX — 24.5%	G
Fluazifop-P-butyl	Syngenta Crop Prot.	Fusilade II Turf & Ornamental Herb. — 24.5%	G
Flucarbazone-sodium	Arysta Lifescience	Everest 70% Water Dispersible Granular Herb. — 70%	G
Flucarbazone-sodium	Arysta Lifescience	Align Herb. — 70%	G
Flucarbazone-sodium	Syngenta Crop Prot.	Sierra — 35%	G
Fludioxonil	Syngenta Crop Prot.	Maxim PSP — 0.5%	G
Flufenacet	Bayer Cropscience	Define SC Herb. — 41%	G
Flumetsulam	Dow Agrosciences	Python WDG — 80%	G
Flumetsulam	FMC	Accolade Herb. — 80%	G
Flumiclorac pentyl ester	Valent U.S.A.	Resource Herb. — 10.1%	G
Flumioxazin	Du Pont	DuPont BL3 Herb. — 51%	G
Flumioxazin	Makhteshim-Agan	Outflank — 51%	G
Flumioxazin	Monsanto	Rowel Herb. — 51%	G
Flumioxazin	Nufarm	Panther Herb. — 51%	G
Flumioxazin	Nufarm	Tuscany Herb. — 51%	G
Flumioxazin	Nufarm	Fortitude Herb. — 51%	G
Flumioxazin	Nufarm	Lock Down Herb. — 51%	G
Flumioxazin	Valent U.S.A.	Payload Herb. — 51%	G
Flumioxazin	Valent U.S.A.	SureGuard Herb. — 51%	G
Flumioxazin	Valent U.S.A.	BroadStar Herb. — 0.25%	G
Flumioxazin	Valent U.S.A.	Clipper Herb. — 51%	G
Flumioxazin	Valent U.S.A.	Chateau Herb. SW — 51%	G
Flumioxazin	Valent U.S.A.	Valor SX Herb. — 51%	G
Fluometuron	Arysta Lifescience	Flo-Met 4L — 41.7%	G
Fluometuron	Makhteshim-Agan	Cotoran 4L — 41.7%	G
Fluometuron	Sharda USA	Shotaran 4SC — 41.7%	G
Fluridone	Alligare	Alligare Fluridone — 41.7%	G
Fluridone	Alligare	Alligare Fluridone Granule — 5%	G
Fluridone	Alligare	Alligare Fluridone RTU — 3.79%	G
Fluridone	Applied Biochemists	Restore S.M.A.R.T Selective Mgmt. AQ Restoration Tool Aquatic Herb. — 41.7%	G
Fluridone	Sepro	Sonar PR — 5%	G
Fluridone	Sepro	Sonar SRP — 5%	G
Fluridone	Sepro	Sonar Q — 5%	G
Fluridone	Sepro	Avast ! SC — 41.7%	G
Fluridone	Sepro	Sonar A.S. — 41.7%	G
Fluridone	Sepro	SonarOne — 5%	G
Fluridone	Sepro	Sonar RTU — 3.79%	G
Fluridone	Sepro	Sonar Genesis — 6.3%	G
Fluroxypyr	Alligare	Fluroxypyr — 45.5%	G
Fluroxypyr	Dow Agrosciences	Vista XRT — 45.52%	G
Fluthiacet-methyl	FMC	Cadet Herb. — 10.3%	G
Fomesafen	Cheminova	Dawn Herb. — 22.8%	G
Fomesafen	Cheminova	Rhythm Herb. — 22.1%	G
Fomesafen	Helena Chem.	Sinister — 28.65%	G
Fomesafen	Loveland Prod.	Top Gun Herb. — 22.8%	G
Fomesafen	Makhteshim-Agan	Rumble — 22.1%	G
Fomesafen	Rotam N. America	Andros 2.0 Herb. — 22.8%	G
Fomesafen	Rotam N. America	Andros 1.88 Herb. — 22.1%	G
Fomesafen	Sharda USA	Shafen Herb. — 22.8%	G
Fomesafen	Sharda USA	Shafen Star — 22.1%	G
Fomesafen	Solera ATO	Fomesafen 1.88 Herb. — 22.1%	G
Fomesafen	Syngenta Crop Prot.	Fomesafen Technical — 98%	G
Fomesafen	Syngenta Crop Prot.	Sedona — 22.1%	G
Fomesafen	Syngenta Crop Prot.	Flexstarr — 22.1%	G
Fomesafen	Syngenta Crop Prot.	Reflex Herb. — 22.8%	G
Fomesafen	Syngenta Crop Prot.	Ringside — 22.8%	G
fomesafen	Willowood	Willowood Fomesafen 1.88SL — 22.1%	G
Fomesafen Sodium	Albaugh	Battle Star — 22.1%	G
Fomesafen Sodium	Innvictis Crop Care	Vamos — 22.1%	G
Fomesafen Sodium	Solera ATO	Fomesafen 2 SL Herb. — 22.8%	G
Foramsulfuron	Bayer Env. Science	Revolver Herb. — 2.34%	G
Fosamine ammonium	Albaugh	Krenite S — 41.5%	G
Glufosinate	Bayer Cropscience	Rely 200 Herb. — 18.19%	G
Glufosinate	Bayer Cropscience	Remove Herb. — 18.19%	G
Glufosinate	Bayer Cropscience	Liberty 280 SL Herb. — 24.5%	G
Glufosinate	Bayer Cropscience	Ignite — 24.5%	G
Glufosinate	Bayer Cropscience	Rely 280 — 24.5%	G
Glufosinate	Bayer Cropscience	Ignite 280 SL — 24.5%	G

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Glufosinate	Bayer Env. Science	Finale Herb. — 11.33%	G
Glufosinate	Loveland Prod.	Forfeit 280 — 24.5%	G
Glufosinate	Nufarm	Cheetah Herb. — 24.5%	G
Glufosinate	Solera ATO	Glufos 280SL Herb. — 24.5%	G
Glufosinate	Solera ATO	Reckon 280SL Herb. — 24.5%	G
Glufosinate	Summit Agro USA	Refer 280 SL — 24.5%	G
Glyphosate	Aceto Ag. Chem.	Glyphosate Technical — 98.1%	G
Glyphosate	Aceto Ag. Chem.	Glyfine Plus Herb. — 41%	G
Glyphosate	Aceto Ag. Chem.	Glyfine 5 Plus Herb. — 53.8%	G
Glyphosate	Aero Chem.	Round One — 18%	G
Glyphosate	AgSaver	AgSaver Glyphosate 41% Plus — 41%	G
Glyphosate	Albaugh	Aqua Star — 53.8%	G
Glyphosate	Albaugh	Gly Star Original — 41%	G
Glyphosate	Albaugh	Gly Star Plus — 41%	G
Glyphosate	Albaugh	Gly Star Pro — 41%	G
Glyphosate	Albaugh	Gly Star Gold — 41%	G
Glyphosate	Alligare	Alligare Glyphosate 4 — 41%	G
Glyphosate	Alligare	Glyphosate 5.4 — 53.8%	G
Glyphosate	Alligare	Glyphosate 4 Plus — 41%	G
Glyphosate	Ambrands	Amdro PowerflexWeed & Grass Killer Conc. — 25%	G
Glyphosate	Amrep	Misty Glypho Kill 2 — 2%	G
Glyphosate	Amrep	Misty Glypho Kill 18 — 18%	G
Glyphosate	Applied Biochemists	Shore-Klear Aquatic Herb. — 53.8%	G
Glyphosate	Applied Biochemists	ShoreKlear-Plus Aquatic Herb. — 18%	G
Glyphosate	Argustoli H.C.	Alecto 41-S — 41%	G
Glyphosate	Bonide Prod.	Bonide KleenUp Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Bonide Prod.	Green Thumb RTU Weed & Grass Killer — 1.92%	G
Glyphosate	Bonide Prod.	Bonide KleenUp Weed & Grass Killer 41% Super Conc. — 41%	G
Glyphosate	Bonide Prod.	Green Thumb 41% Super Conc. Weed & Grass Killer — 41%	G
Glyphosate	Check-Mark	Trailblazer MAXX — 53.8%	G
Glyphosate	Cheminova	Glyfos X-TRA — 41%	G
Glyphosate	Cheminova	Glyfos — 41%	G
Glyphosate	Cheminova	Glyfos Aquatic — 53.8%	G
Glyphosate	Cheminova	Glyphosate Conc. — 62.5%	G
Glyphosate	Cheminova	Glyfos MUC 62% — 62%	G
Glyphosate	Cheminova	Glyfos Pro Herb. — 41%	G
Glyphosate	Chemsico	Eliminator Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Chemsico	Ultra-Kill Weed & Grass Killer — 1.92%	G
Glyphosate	Chemsico	HDX Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Chemsico	Ace RTU Weed & Grass Killer 2 — 1.92%	G
Glyphosate	Chemsico	HDX Weed & Grass Killer Conc. — 41%	G
Glyphosate	Chemsico	Eliminator Weed & Grass Killer Conc. — 41%	G
Glyphosate	Chemsico	Ultra-Kill Weed & Grass Killer Conc. — 41%	G
Glyphosate	Chemsico	Ace Conc. Weed & Grass Killer 2 — 41%	G
Glyphosate	Chemsico	Ultra-Kill Weed & Grass Killer Conc. 2 — 25%	G
Glyphosate	Chemsico	Ace Conc. Weed & Grass Killer — 25%	G
Glyphosate	Consus Chem.	Consus Glyphosate Technical — 96.6%	G
Glyphosate	Cont. Solutions	Eraser — 41%	G
Glyphosate	CropSmart	CropSmart Glyphosate 41 Plus — 41%	G
Glyphosate	Dow Agrosciences	Glyphosate Technical — 76%	G
Glyphosate	Dow Agrosciences	Glyphosate 62% Technical Solution — 62%	G
Glyphosate	Dow Agrosciences	Glypro Plus — 41%	G
Glyphosate	Dow Agrosciences	Rodeo — 53.8%	G
Glyphosate	Dow Agrosciences	Accord XRT II — 50.2%	G
Glyphosate	Dow Agrosciences	Durango DMA — 50.2%	G
Glyphosate	Dow Agrosciences	Duramax — 50.2%	G
Glyphosate	Dow Agrosciences	RapidFire — 50.2%	G
Glyphosate	Dow Agrosciences	Glyphosate Technical XG — 96.2%	G
Glyphosate	Drexel Chem.	Drexel Imitator Plus — 41%	G
Glyphosate	Drexel Chem.	Drexel Imitator Plus Weed & Grass Killer — 41%	G
Glyphosate	Drexel Chem.	Drexel Imitator RTU — 2%	G
Glyphosate	Drexel Chem.	Drexel Imitator Aquatic Herb. — 53.8%	G
Glyphosate	Durvet	AquaVet Shoreline Weeds — 53.8%	G
Glyphosate	Ez-ject	EZ-Ject Diamondback Herb. Shells — 83.5%	G
Glyphosate	Farmway	Farmway Glyphosate 62% Manufacturing Conc. — 62%	G
Glyphosate	Farmway	Farmway-Max Glyphosate 41% — 41%	G
Glyphosate	Glysortia	Glysort — 41%	G
Glyphosate	Glysortia	Glysort Plus — 41%	G
Glyphosate	Gro Tec	Eliminator Weed & Grass Killer II RTU — 1.92%	G
Glyphosate	Gro Tec	KnockOut Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Gro Tec	KnockOut Weed & Grass Killer Super Conc. — 41%	G

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Glyphosate	Gro Tec	Eliminator Weed & Grass Killer Super Conc. — 41%	G
Glyphosate	Helena Chem.	Hoss Ultra — 41%	G
Glyphosate	Helm Agro	Glyphosate 97% TGAI — 97%	G
Glyphosate	Helm Agro	Helosate Plus Advanced — 41%	G
Glyphosate	Helm Agro	Helosate 75 SG Herb. — 75.7%	G
Glyphosate	Innvictis Crop Care	Envy Intense — 41%	G
Glyphosate	Innvictis Crop Care	Envy — 41%	G
Glyphosate	Jimmy Sanders	Third Degree Prem. Glyphosate — 41%	G
Glyphosate	Lawn and Garden Prod.	Remuda Full Strength — 41%	G
Glyphosate	Lesco	Lesco Prosecutor Pro Non-Selective Herb. — 41%	G
Glyphosate	Libertas Now	Strikeout Loaded — 41%	G
Glyphosate	Libertas Now	Strikeout Extra — 41%	G
Glyphosate	Loveland Prod.	Mad Dog — 41%	G
Glyphosate	Loveland Prod.	Mad Dog Plus — 41%	G
Glyphosate	Loveland Prod.	Four Power Plus — 41%	G
Glyphosate	Loveland Prod.	Kleenup-Pro — 41%	G
Glyphosate	Loveland Prod.	Makaze — 41%	G
Glyphosate	Loveland Prod.	Cinco — 53.8%	G
Glyphosate	Maid Brands	Do it Best Grass & Weed Killer Conc. — 18%	G
Glyphosate	Maid Brands	Heavy Weight Grass & Weed Killer — 2%	G
Glyphosate	Maid Brands	Do it Best Grass & Weed Killer2 RTU — 2%	G
Glyphosate	Makhteshim-Agan	Glyphogan — 41%	G
Glyphosate	Makhteshim-Agan	Quali-Pro Glyphosate Plus — 41%	G
Glyphosate	Makhteshim-Agan	Glyphogan Plus — 41%	G
Glyphosate	Makhteshim-Agan	Quali-Pro Glyphosate T&O — 41%	G
Glyphosate	Monsanto	MON 0139 62% Technical Solution — 62%	G
Glyphosate	Monsanto	Roundup Custom for Aquatic and Terrestrial Use — 53.8%	G
Glyphosate	Monsanto	AquaMaster Herb. — 53.8%	G
Glyphosate	Monsanto	Glyphosate Technical (Wetcake) — 85%	G
Glyphosate	Monsanto	MON 8750 Herb. — 95.2%	G
Glyphosate	Monsanto	Honcho Herb. — 41%	G
Glyphosate	Monsanto	Honcho Plus Herb. — 41%	G
Glyphosate	Monsanto	Roundup PRO Herb. — 41%	G
Glyphosate	Monsanto	Roundup UltraDRY Herb. — 71.4%	G
Glyphosate	Monsanto	Roundup ProDry Herb. — 71.4%	G
Glyphosate	Monsanto	Ranger PRO Herb. — 41%	G
Glyphosate	Monsanto	Roundup PRO Conc. Herb. — 50.2%	G
Glyphosate	Monsanto	Roundup WeatherMAX Herb. — 48.8%	G
Glyphosate	Monsanto	Roundup PowerMAX II Herb. — 48.8%	G
Glyphosate	Monsanto	Roundup PowerMAX Herb. — 48.7%	G
Glyphosate	Monsanto	Roundup ProMax Herb. — 48.7%	G
Glyphosate	Monsanto	K487 Herb. — 48.7%	G
Glyphosate	Monsanto	IP410 Herb. — 41%	G
Glyphosate	Monsanto	IP410-A Herb. — 41%	G
Glyphosate	Monsanto	IP410FC Herb. — 41%	G
Glyphosate	Monsanto	Roundup Weed &Grass Killer Super Conc. — 50.2%	G
Glyphosate	Monsanto	Roundup Weed & Grass Killer Conc. — 25%	G
Glyphosate	Monsanto	Roundup Weed & Grass Killer RTU — 2%	G
Glyphosate	Newagco	NewAgco Glyphosate Fully Loaded 41 Plus — 41%	G
Glyphosate	Northmoose Chem.	Lajj Plus — 41%	G
Glyphosate	Nufarm Americas	AquaNeat Aquatic Herb. — 53.8%	G
Glyphosate	Nufarm Americas	Razor Herb. — 41%	G
Glyphosate	Nufarm Americas	Razor PRO Herb. — 41%	G
Glyphosate	Nufarm Americas	Primera Razor Pro Herb. — 41%	G
Glyphosate	Nufarm Americas	Foresters' Non-Selective Herb. — 53.8%	G
Glyphosate	Nufarm	Credit 41 Non-Selective Herb. — 41%	G
Glyphosate	Nufarm	Credit 41 EXTRA Non-Selective Herb. — 41%	G
Glyphosate	Nufarm	Abundit Extra Herb. — 41%	G
Glyphosate	PBIGordon	Gordon's Liquid Edger 2 — 1%	G
Glyphosate	PBIGordon	GroundWork RTU 2% Weed & Grass Killer — 2%	G
Glyphosate	PBIGordon	Gordon's Pronto Fast Acting Weed & Grass Killer — 2%	G
Glyphosate	PBIGordon	Gordon's Top Plot Weed and Grass Killer Conc. — 50%	G
Glyphosate	PBIGordon	GroundWork Conc. 50% Super Weed & Grass Killer — 50%	G
Glyphosate	PBIGordon	GroundWork Conc. 25% Weed & Grass Killer — 25%	G
Glyphosate	PBIGordon	Gordon's Pronto Fast Acting Weed & Grass Killer Conc. — 25%	G
Glyphosate	PBIGordon	GlyphoMate 41 Weed & Grass Killer plus Aquatic Herb. — 41%	G
Glyphosate	PBIGordon	Gordon's PondMaster Surface & Shoreline Herb. — 18%	G
Glyphosate	PBIGordon	Gordon's Stump Killer RTU — 32.3%	G
Glyphosate	PBIGordon	Gordon's Pronto Big N' Tuf — 41%	G
Glyphosate	Pro Chem	Dead Zone — 18%	G
Glyphosate	PROKOZ	Prokoz Glyphosate Pro 4 Herb. — 41%	G

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Glyphosate	Ragan and Massey	Compare-N-Save Conc. Grass & Weed Killer 41% Glyphosate — 41%	G
Glyphosate	Ragan and Massey	FarmWorks 41% Glyphosate Plus Conc. w/ Surfactant Grass & Weed Killer — 41%	G
Glyphosate	Ragan and Massey	Compare-N-Save 41% Glyphosate Plus Conc. w/ Surfactant — 41%	G
Glyphosate	Repar Corp	Top Dog Glycel 41% Plus — 41%	G
Glyphosate	Ritter Chem.	Alecto 41S — 41%	G
Glyphosate	Ritter Chem.	Alecto 41 HL — 41%	G
Glyphosate	Ritter Chem.	Alecto UL — 41%	G
Glyphosate	Sanco Industries	Catt Plex Cattail Cont. — 53.8%	G
Glyphosate	Sepro	AquaPro — 53.8%	G
Glyphosate	South. Ag. Insecticides	Weed Pro — 41%	G
Glyphosate	Syngenta Crop Prot.	Traxion — 36.5%	G
Glyphosate	Syngenta Crop Prot.	Tpuchdown Total — 44.9%	G
Glyphosate	Syngenta Crop Prot.	Touchdown HiTech Herb. — 52.3%	G
Glyphosate	Syngenta Crop Prot.	Departure Herb. — 36.5%	G
Glyphosate	Syngenta Crop Prot.	Refuge Herb. — 52.3%	G
Glyphosate	Tacoma Ag	Glyphosate Plus — 41%	G
Glyphosate	Tenkoz	Buccaneer Glyphosate Herb. — 41%	G
Glyphosate	Tenkoz	Buccaneer Plus Glyphosate Herb. — 41%	G
Glyphosate	Texcan Investments	Extinguish Ultra41% GLYPHOSATE PLUS SURFACTANT — 41%	G
Glyphosate	The Pond Guy	Shoreline Defense — 53.8%	G
Glyphosate	Total Solutions	Zap-It — 0.96%	G
Glyphosate	United Laboratories	United 345 Weed Blitz — 18%	G
Glyphosate	Universal Crop Protection	Gly-4 Plus — 41%	G
Glyphosate	Universal Crop Protection	Crop-Sure Glyphosate 41 Plus — 41%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Super Conc. Killzall II — 41%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Super Conc. Killzall II — 41%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Killzall II Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Super Conc. Killzall Weed & Grass Killer — 41%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Killzall Aquatic Herb. — 53.8%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Super Conc. Killzall III — 41%	G
Glyphosate	Winfield Solutions	Cornerstone Plus — 41%	G
Glyphosate	Winfield Solutions	Rascal Plus — 41%	G
Glyphosate	Winfield Solutions	Cornerstone 5 Plus — 53.8%	G
Glyphosate	Winfield Solutions	Cornerstone Plus — 41%	G
Glyphosate	Winfield Solutions	Rascal Plus — 41%	G
Glyphosate	Winfield Solutions	Cornerstone Plus — 41%	G
Glyphosate	Zep Commercial	Enforcer Weed Defeat — 2%	G
Glyphosate	Zep Commercial	Enforcer Weed Defeat Conc. — 41%	G
Glyphosate	Zep	Zep Weed Defeat III — 41%	G
Glyphosate	Zep	Zep Non-Selective Weed Killer Conc. — 27%	G
Halosulfuron-methyl	Aceto Ag. Chem.	Halomax 75 Herb. — 75%	G
Halosulfuron-methyl	Aceto Ag. Chem.	Profine 75 Herb. — 75%	G
Halosulfuron-methyl	Gowan	Sedgehammer Turf Herb. — 75%	G
Halosulfuron-methyl	Gowan	Sandea Herb. — 75%	G
Halosulfuron-methyl	Gowan	Permit Herb. — 75%	G
Halosulfuron-methyl	Gowan	Sedgehammer+ Herb. — 5%	G
Halosulfuron-methyl	Lawn and Garden Prod.	Nutgrass Killer II Selective Herb. — 75%	G
Halosulfuron-methyl	Nufarm Americas	Nufarm Prosedge Selective Herb. — 75%	G
Halosulfuron-methyl	Nufarm Americas	Nufarm Prosedge Selective Herb.2 — 75%	G
Halosulfuron-methyl	Voluntary Purch. Groups	Hi-Yield Nutsedge Cont. — 75%	G
Halosulfuron-methyl	Winfield Solutions	Herbivore Herb. — 75%	G
Herbicidal Soap	Safer	Safer Brand Fast Acting Weed and Grass Killer — 3%	G
Herbicidal Soap	Safer	Safer Brand Fast Acting Weed & Grass Killer Conc. — 19.56%	G
Hexazinone	Du Pont	DuPont Velpar L Herb. — 25%	G
Hexazinone	Du Pont	DuPont Hexazinone Technical — 98.7%	G
Hexazinone	Du Pont	DuPont Velpar ULW Herb. — 75%	G
Hexazinone	Du Pont	DuPont Velpar DF Herb. — 75%	G
Hexazinone	Helena Chem.	Velossa — 25%	G
Hexazinone	Pro Serve	Pronone Power Pellet — 75%	G
Imazamox	BASF	Raptor Herb. — 12.1%	G
Imazamox	BASF	Clearcast Herb. — 12.1%	G
Imazamox	BASF	Beyond Herb. — 12.1%	G
Imazamox	Sepro	Clearcast Herb. — 12.1%	G
Imazapic	Alligare	Panoramic 2SL — 23.3%	G
Imazapic	BASF	Cadre Herb. — 23.6%	G
Imazapic	BASF	Plateau Herb. — 23.6%	G
Imazapic	Makhteshim-Agan	Impose Herb. — 23.3%	G
Imazapic	Nufarm	Nufarm Imazapic 2SL Herb. — 23.3%	G
Imazapyr	Alligare	Alligare Ecomazapyr 2SL — 27.8%	G
Imazapyr	Alligare	Alligare Imazapyr 2SL — 27.8%	G
Imazapyr	Alligare	Imazapyr 4SL — 52.6%	G

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Imazapyr	Alligare	Rotary 2 SL — 27.8%	G
Imazapyr	BASF	Imazapyr Herb. Technical — 98.5%	G
Imazapyr	BASF	Arsenal Herb. Applicators Conc. — 53.1%	G
Imazapyr	BASF	Arsenal Herb. — 27.8%	G
Imazapyr	BASF	Stalker Herb. — 27.6%	G
Imazapyr	BASF	Habitat Herb. — 28.7%	G
Imazapyr	BASF	Chopper Gen2 Herb. — 26.7%	G
Imazapyr	BASF	Arsenal PowerLine Herb. — 26.7%	G
Imazapyr	Cont. Solutions	TVC — 27.8%	G
Imazapyr	Du Pont	DuPont Imazapyr 75XP Herb. — 75%	G
Imazapyr	Du Pont	DuPont Imazapyr II 75XP Herb. — 75%	G
Imazapyr	Ez-ject	EZ-Ject Copperhead Herb. Shells — 83.5%	G
Imazapyr	Nufarm Americas	Nufarm Polaris Herb. — 27.7%	G
Imazapyr	Nufarm Americas	Nufarm Polaris SP — 27.6%	G
Imazapyr	Nufarm Americas	Nufarm Polaris AC Complete Herb. — 53.1%	G
Imazapyr	Sepro	Habitat — 27.77%	G
Imazapyr	SSI Maxim	Arsenal 5G Herb. — 5%	G
Imazapyr	Whitetail Institute	Slay Herb. — 22.87%	G
Imazaquin	Ambrands	Image Herb. Consumer Conc. — 3.3%	G
Imazaquin	Ambrands	Image RTS Herb. Consumer Conc. — 3.3%	G
Imazaquin	BASF	Image 70 DG Herb. — 70%	G
Imazethapyr	Albaugh	Thunder — 22.87%	G
Imazethapyr	BASF	Imazethapyr Herb. Technical — 97.3%	G
Imazethapyr	BASF	Pursuit Herb. — 22.87%	G
Imazethapyr	BASF	Newpath Herb. for Clearfield rice — 22.87%	G
Imazethapyr	Cheminova	Tackle — 1.4%	G
Imazosulfuron	Valent U.S.A.	Celero Herb. — 75%	G
Imazosulfuron	Valent U.S.A.	League Herb. — 75%	G
Imidacloprid	Albaugh	ImidaStar 2L T&O — 21.4%	G
Indaziflam	Bayer Cropscience	Alion Herb. — 19.05%	G
Indaziflam	Bayer Env. Science	Specticle 20 WSP Herb. — 20%	G
Indaziflam	Bayer Env. Science	Specticle Flo — 7.4%	G
Indaziflam	Bayer Env. Science	Specticle G — 0.02%	G
Indaziflam	Ohp	Marengo — 7.4%	G
Indaziflam	Ohp	Marengo G — 0.02%	G
Iodosulfuron-methyl-sodium	Bayer Cropscience	Autumn Herb. — 10%	G
Iron oxide	Bayer Advanced	Natria Lawn Weed Cont. Conc. — 26.52%	G
Iron oxide	Ortho Group	Ortho Elementals Lawn Weed Killer — 1.5%	G
Iron phosphate	Swiss Farms Prod.	Whitney Farms Lawn Weed Killer — 1.5%	G
Iron sulfate	Bonide Prod.	Bonide MossMax — 23.5%	G
Iron sulfate	Waupaca Northwoods	NuLife Rid Moss — 46.75%	G
Isoxaben	Dow Agrosciences	Gallery Technical — 93.5%	G
Isoxaben	Dow Agrosciences	Gallery 75 Dry Flowable — 75%	G
Isoxaben	Dow Agrosciences	Gallery SC — 45.45%	G
Isoxaben	Makhteshim-Agan	Quali-Pro Isoxaben 75 WG — 75%	G
Isoxaben	Voluntary Purch. Groups	Ferti-lome Broadleaf Weed Cont. w/ Gallery — 0.38%	G
Isoxaflutole	Bayer Cropscience	Balance Flexx Herb. — 20%	R
Isoxaflutole	Bayer Cropscience	Balance Pro — 40.5%	R
Lactofen	Valent U.S.A.	Phoenix Herb. — 24%	G
Lactofen	Valent U.S.A.	Cobra Herb. — 24%	G
Linuron	Tessenderlo Kerley	Linex 4L — 40.6%	G
Linuron	Tessenderlo Kerley	Lorox DF — 50%	G
MCPA	Nufarm Americas	MCPA-4 Amine — 48.58%	G
MCPA	Nufarm Americas	Riverdale MCPA LV 4 Ester — 68.7%	G
MCPA	Winfield Solutions	Shredder MCPE — 68.7%	G
MCPP-P-potassium	PBIGordon	Mecomec 4 Turf Herb. — 22.53%	G
Mecoprop-P	Nufarm Americas	MCPP-p 4 Amine — 26%	G
Mepiquat chloride	Albaugh	Mep Star 6X — 23.5%	G
Mepiquat chloride	Albaugh	Mep Star — 4.2%	G
Mesosulfuron-methyl	Bayer Cropscience	Osprey Herb. — 4.5%	G
Mesotrione	Du Pont	DuPont BL4 Herb. — 50%	G
Mesotrione	Scotts	Turf Builder Starter Brand Fert. w/ Weed Prev. 21-22-4 — 0.08%	G
Mesotrione	Syngenta Crop Prot.	Callisto — 40%	G
Mesotrione	Syngenta Crop Prot.	Tenacity — 40%	G
Metolachlor	Drexel Chem.	Drexel Me-Too-Lachlor Herb. — 86.4%	G
Metolachlor	Drexel Chem.	Drexel Me-Too-Lachlor II — 84.4%	G
Metolachlor	Innvictis Crop Care	Visor BroadCrop — 86.4%	G
Metolachlor	Innvictis Crop Care	Visor CRN — 84.4%	G
Metolachlor	Makhteshim-Agan	Parallel PCS Herb. — 86.4%	G
Metolachlor	Makhteshim-Agan	Parallel — 84.4%	G
Metolachlor	Sipcam Agro USA	Sipcam Metolachlor Technical— 97%	G
Metolachlor	Sipcam Agro USA	Stalwart C Herb. — 84.1%	G

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Metolachlor	Sipcam Agro USA	Stalwart Herb. — 86.4%	G
Metribuzin	Bayer Env. Science	Sencor 75% Turf Herb. — 75%	G
Metribuzin	Du Pont	DuPont BL2 Herb. — 75%	G
Metribuzin	Innvictis Crop Care	Derive 75 DF — 75%	G
Metribuzin	Loveland Prod.	LPI Metribuzin Technical — 97.5%	G
Metribuzin	Loveland Prod.	Metribuzin 75 — 75%	G
Metribuzin	Makhteshim-Agan	Glory — 75%	G
Metribuzin	Makhteshim-Agan	Glory 4L — 41%	G
Metribuzin	United Phosphorus	TriCor DF — 75%	G
Metribuzin	United Phosphorus	TriCor 4F — 41%	G
Metribuzin	Winfield Solutions	Dimetric DF 75% — 75%	G
Metsulfuron-methyl	Agsurf	Ciramet Herb. — 60%	G
Metsulfuron-methyl	Agsurf	Metcel VMF Herb. — 60%	G
Metsulfuron-methyl	Alligare	MSM 60 — 60%	G
Metsulfuron-methyl	Amtide	Amtide MSM 60 DF — 60%	G
Metsulfuron-methyl	Cheminova	Accurate Herb. — 60%	G
Metsulfuron-methyl	Cont. Solutions	MSM 25OD — 25%	G
Metsulfuron-methyl	Cont. Solutions	Top Shot — 25%	G
Metsulfuron-methyl	Du Pont	DuPont Ally Herb. — 60%	G
Metsulfuron-methyl	Du Pont	DuPont Ally XP Herb. — 60%	G
Metsulfuron-methyl	Du Pont	DuPont Escort XP Herb. — 60%	G
Metsulfuron-methyl	Du Pont	DuPont Cimarron Max Part A Herb. — 60%	G
Metsulfuron-methyl	Du Pont	DuPont Cimarron Max Part A Herb. — 60%	G
Metsulfuron-methyl	Envincio	Equil Pasture and Turf MSM — 60%	G
Metsulfuron-methyl	Makhteshim-Agan	Quali-Pro MSM Turf — 60%	G
Metsulfuron-methyl	Nufarm Americas	Manor Selective Herb. — 60%	G
Metsulfuron-methyl	Nufarm Americas	Mansion Turf Herb. — 60%	G
Metsulfuron-methyl	Nufarm Americas	Patriot Selective Herb. — 60%	G
Metsulfuron-methyl	Nufarm	Purestand Selective Herb. — 60%	G
Metsulfuron-methyl	Rotam N. America	Rometsol Herb. — 60%	G
Metsulfuron-methyl	Rotam N. America	Plotter Agricultural Herb. — 60%	G
Metsulfuron-methyl	Scotts	Ortho Weed B Gon Pro St. Augustine — 60%	G
Metsulfuron-methyl	Scotts	Spot Weed Ccontrol for South. Lawns — 0.03%	G
Metsulfuron-methyl	Scotts	WeedCcontrol Granules for South. Lawns — 0.03%	G
Metsulfuron-methyl	Scotts	Ortho Weed B Gon Pro St. Augustine II — 60%	G
MSMA	Drexel Chem.	Drexel MSMA 6.6 — 51%	G
MSMA	Drexel Chem.	Drexel MSMA 6 Plus — 47.6%	G
MSMA	Luxembourg-pamol	Target 6.6 — 51%	G
MSMA	Luxembourg-pamol	Target 6 Plus — 48.3%	G
Naphthalene	Bonide Prod.	Bonide Sucker Punch Knock Out Sprouts RTU — 1.15%	G
Naphthalene	Lawn and Garden Prod.	Sucker-Stopper RTU — 1.15%	G
Napropamide	United Phosphorus	Devrinol DF-XT — 50%	G
Napropamide	United Phosphorus	Devrinol 50DF Selective — 50%	G
Napropamide	United Phosphorus	Devrinol 50DF Ornamental — 50%	G
Nicosulfuron	Agsurf	Nicoval Herb. — 75%	G
Nicosulfuron	Cheminova	NIC-IT Herb. — 23.5%	G
Nicosulfuron	Du Pont	DuPont Accent Herb. — 75%	G
Nicosulfuron	Du Pont	DuPont Accent SC Herb. — 4.2%	G
Nicosulfuron	Du Pont	DuPont Accent Q Herb. — 54.5%	G
Nicosulfuron	Rotam N. America	Primero Agricultural Herb. — 75%	G
Norflurazon	Syngenta Crop Prot.	Solicam DF — 78.6%	G
Octanoic acid	Loveland Prod.	Broclean — 33.4%	G
Orthosulfamuron	Isagro USA	Strada WG — 50%	G
Oryzalin	Alligare	Alligare Oryzalin 4 — 41%	G
Oryzalin	Lawn and Garden Prod.	Weed Impede — 40.4%	G
Oryzalin	Lesco	Lesco Surflan AS Specialty Herb. — 40.4%	G
Oryzalin	Loveland Prod.	Oryzalin Coated Gran. — 1.67%	G
Oryzalin	Makhteshim-Agan	Oryzalin 4 AS — 41%	G
Oryzalin	Makhteshim-Agan	Quali-Pro Oryzalin 4 — 41%	G
Oryzalin	United Phosphorus	Surflan A.S. Agricultural Herb. — 40.4%	G
Oryzalin	United Phosphorus	Surflan A S Specialty Herb. — 40.4%	G
Oryzalin	United Phosphorus	PROKoZ Surflan AS Specialty — 40.4%	G
Oxadiazon	Bayer Env. Science	Ronstar Flo Herb. — 34.1%	G
Oxadiazon	Bayer Env. Science	Ronstar G Herb. — 2%	G
Oxadiazon	Bayer Env. Science	Ronstar 50 WSP Herb. — 50%	G
Oxadiazon	Lesco	Lesco RONSTAR 0.95% Plus Fert. 30-0-0M (702116) — 0.95%	G
Oxadiazon	Makhteshim-Agan	Quali-Pro Oxadiazon SC — 34.4%	G
Oxadiazon	Makhteshim-Agan	Quali-Pro Oxadiazon 50 WSB — 50%	G
Oxadiazon	Makhteshim-Agan	Quali-Pro Oxadiazon 2G — 2%	G
Oxadiazon	Makhteshim-Agan	Quali-Pro Oxadiazon 50 MC — 50%	G
Oxadiazon	United Phosphorus	Phoenix Starfigher L — 34.1%	G

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Oxyfluorfen	Dow Agrosciences	Goal Technical Purified — 99%	G
Oxyfluorfen	Dow Agrosciences	Goal 2XL — 22.3%	G
Oxyfluorfen	Dow Agrosciences	GoalTender — 41%	G
Oxyfluorfen	Makhteshim-Agan	Galigan 2E — 22.2%	G
Oxyfluorfen	United Phosphorus	Collide Herb. — 22.3%	G
Paraquat dichloride	Drexel Chem.	Drexel Quik-Quat — 43.2%	R
Paraquat dichloride	Innvictis Crop Care	Devour — 43.2%	R
Paraquat dichloride	Makhteshim-Agan	Parazone 3SL — 43.8%	R
Paraquat dichloride	Sharda USA	Para-Shot 3.0 — 43.2%	R
Paraquat dichloride	Source Dynamics	Paraquat Conc. — 43.2%	R
Paraquat dichloride	Syngenta Crop Prot.	Gramoxone SL — 30.1%	R
Paraquat dichloride	Syngenta Crop Prot.	Gramoxone SL 2.0 — 30.1%	R
Paraquat dichloride	Syngenta Crop Prot.	Cyclone SL 2.0 — 30.1%	R
Paraquat dichloride	Willowood	Willowood Paraquat 3SL — 43.2%	R
Pelargonic acid	Gowan	Scythe Herb. — 57%	G
Pendimethalin	BASF	Prowl Herb. technical — 95%	G
Pendimethalin	BASF	Prowl 3.3 EC Herb. — 37.4%	G
Pendimethalin	BASF	Pendulum 3.3 EC Herb. — 37.4%	G
Pendimethalin	BASF	Pendulum 2G granule Herb. — 2%	G
Pendimethalin	BASF	Pendulum AquaCap Herb. — 38.7%	G
Pendimethalin	BASF	Prowl H2O Herb. — 38.7%	G
Pendimethalin	Drexel Chem.	Drexel Pin-Dee 3.3 T&O — 37.4%	G
Pendimethalin	Everris NA	Corral 2.68G — 2.68%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 1.15 — 1.15%	G
Pendimethalin	Helena Chem.	Helena Pendimethalin — 37.4%	G
Pendimethalin	Integrated Agri. Pro.	PendiPro 3.3 EC Herb. — 37.4%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% Plus Fert. 0-0-4M (702179) — 0.86%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% Plus Fert. 5-10-20 (701078) — 0.86%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% Plus Fert. 15-3-7 (701074) — 0.86%	G
Pendimethalin	Lesco	Lesco Pre-M 0.86% Plus Fert — 1.5%	G
Pendimethalin	Lesco	Lesco Pre-M 3.3 EC Turf — 37.4%	G
Pendimethalin	Lesco	Lesco Pre-M Aquacap Herb. — 38.7%	G
Pendimethalin	Loveland Prod.	Stealth Herb. — 37.4%	G
Pendimethalin	Scotts	Corral 2.68 G — 2.68%	G
Pendimethalin	Scotts	Step 1 Crabgrass Prev. Plus Lawn Fert. 28-0-7 — 1.29%	G
Pendimethalin	Scotts	Turf Builder w/ Halts Crabgrass Prev. 30-3-4, 30-0-4 — 1.29%	G
Pendimethalin	Scotts	Super Turf Builder w/ Halts Crabgrass Prev. 36-3-4, 36-0-4 — 1.24%	G
Pendimethalin	Scotts	Turf Builder w/ Halts Crabgrass Prev. 28-0-5 — 1.29%	G
Pendimethalin	Scotts	Turf Builder Halts Crabgrass Prev. w/ Lawn Food — 1.29%	G
Pendimethalin	Scotts	Step 1 Crabgrass Prev. Plus Lawn Food 28-0-7 — 1.29%	G
Pendimethalin	Scotts	Super Turf Builder w/ Halts Crabgrass Prev. 33-0-5 — 1.29%	G
Pendimethalin	Scotts	Scotts Halts Crabgrass & Grassy Weed Prev. — 1.71%	G
Pendimethalin	Scotts	Halts — 1.71%	G
Pendimethalin	Scotts	Turf Builder w/ Halts Crabgrass Prev. 30-3-4, 30-0-4 — 1.22%	G
Pendimethalin	Scotts	Crabgrass Prev. Plus Fert. (Step 1)32-3-8, 32-0-8 — 1.22%	G
Pendimethalin	Scotts	Crabgrass Prev. Plus Fert. (Step 1) 26-0-3 — 1.22%	G
Pendimethalin	Tenkoz	Acumen Herb. — 37.4%	G
Pendimethalin	United Phosphorus	Satellite HydroCap Herb. — 38.7%	G
Pendimethalin	United Phosphorus	UP-End HydroCap — 38.7%	G
Pendimethalin	Winfield Solutions	Framework 3.3 EC — 37.4%	G
Penoxsulam	Dow Agrosciences	Grasp SC — 21.7%	G
Penoxsulam	Dow Agrosciences	Sapphire — 3.68%	G
Penoxsulam	Gro Tec	Expert Gardener South. Weed & Feed — 0.03%	G
Penoxsulam	Lesco	Lesco LockUp 0.03% Plus Fert. 17-0-7 (701087) — 0.03%	G
Penoxsulam	Lesco	Lesco LockUp 0.03% Plus Fert. 21-0-4M (702186) — 0.03%	G
Penoxsulam	Lesco	Lesco LockUp 0.03% Plus Fert. 0-0-4M (702185) — 0.03%	G
Penoxsulam	Sepro	Galleon SC — 21.7%	G
Penoxsulam	Voluntary Purch. Groups	Ferti-lome Dollar Weed Cont. — 0.04%	G
Picloram	Alligare	Alligare Picloram 22K — 24.4%	R
Picloram	Dow Agrosciences	Tordon K — 24.4%	R
Picloram	Dow Agrosciences	Tordon 22K — 24.4%	R
Picloram	Dow Agrosciences	OutPost 22K — 24.4%	R
Picloram	Nufarm Americas	Trooper 22K Herb. — 24.4%	R
Pinoxaden	Syngenta Crop Prot.	Axial XL Herb. — 5.05%	G
Primisulfuron-methyl	Syngenta Crop Prot.	Beacon — 75%	G
Prodiamine	Agrium Adv. Tech.	Fert. w/ Barricade .375% — 0.04%	G
Prodiamine	Agrium Adv. Tech.	Fert. w/ Barricade .295% — 0.3%	G
Prodiamine	Alligare	Alligare Prodiamine 65 WG Herb. — 65%	G
Prodiamine	Alligare	Alligare Prodiamine 4L — 40.7%	G
Prodiamine	Easy Gardener Prod.	WeedBlock Pre-Emergent Northern — 0.22%	G
Prodiamine	Easy Gardener Prod.	WeedBlock Pre-Emergent South. — 0.38%	G

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Prodiamine	Infinity Fert.	Sta-Green Crab-Ex Plus — 0.37%	G
Prodiamine	Lesco	Lesco Barricade 0.38% Plus Fert — 0.38%	G
Prodiamine	Lesco	Lesco Barricade 0.38% Plus Fert 0-0-7 — 0.38%	G
Prodiamine	Lesco	Lesco Stonewall — 65%	G
Prodiamine	Lesco	Lesco Stonewall 0.2% Plus Fert. 25-0-7 (701249) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.2% Plus Fert. 8-0-0M (702150) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.2% Plus Fert. 0-0-7 (702154) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.2% Plus Fert. 7-0-0 (702156) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.2% Plus Fert. 0-0-4M (702184) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.2% Plus Fert. 0-0-7M (701080) — 0.2%	G
Prodiamine	Lesco	Lesco Barricade 0.2% Plus Fert. 19-0-2 (097206) — 0.2%	G
Prodiamine	Lesco	Lesco Barricade 0.2% Plus Fert. 19-3-5 (097208) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 0-0-4M (702177) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 25-0-8M (701011) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 19-0-19M (701007) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 0-0-8M (701006) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 19-0-7 (702053) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 14-0-7 (701084) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 8-0-0 (HPRE00105) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 0-0-7 (702137) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 8-3-23M (702172) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 8-0-0M (702153) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 65 WDG Herb. — 65%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% Plus Fert. 0-0-7 (702155) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% Plus Fert. 0-0-7M (702148) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% Plus Fert. 8-0-0M (702152) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% Plus Fert. 8-0-0M (702151) — 0.29%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% Plus Fert. 0-0-4M (702188) — 0.29%	G
Prodiamine	Loveland Prod.	Signature Evade .375% Crabgrass Prev. Plus — 0.38%	G
Prodiamine	Loveland Prod.	Signature Crabgrass Prev. w/ Barricade 0.375% Plus — 0.38%	G
Prodiamine	Loveland Prod.	Evade 4 FL — 40.5%	G
Prodiamine	Makhteshim-Agan	Quali-Pro Prodiamine 4L — 40.8%	G
Prodiamine	Makhteshim-Agan	Quali-Pro Prodiamine 65 WDG — 65%	G
Prodiamine	Makhteshim-Agan	Halts Pro — 65%	G
Prodiamine	Makhteshim-Agan	Quali-Pro Prodiamine 65 MC Herb. — 65%	G
Prodiamine	Nufarm Americas	ProClipse 65 WDG — 65%	G
Prodiamine	Regal Chem.	RegalKade 65WDG — 65%	G
Prodiamine	Sipcam Agro USA	Sipcam Prodiamine Technical — 94.8%	G
Prodiamine	Sipcam Agro USA	Cavalcade 65 WDG — 65%	G
Prodiamine	Sipcam Agro USA	PrimeraOne Prodiamine 65WDG Herb. — 65%	G
Prodiamine	Syngenta Crop Prot.	Barricade 4FL Herb. — 40.7%	G
Prodiamine	Syngenta Crop Prot.	Resolute 4FL — 40.7%	G
Prodiamine	Syngenta Crop Prot.	Prodiamine Rodiamine 65— 65%	G
Prodiamine	Syngenta Crop Prot.	Prodiamine Technical — 96%	G
Prodiamine	Syngenta Crop Prot.	Resolute 65WG Herb. — 65%	G
Prodiamine	Syngenta Crop Prot.	Barricade 65WG — 65%	G
Prodiamine	Syngenta Crop Prot.	Barricade MC — 65%	G
Prodiamine	Turf Care Supply	TCS GrowStar Turf Fert. + 0.42% Prodiamine — 0.42%	G
Prodiamine	United Turf Alliance	ArmorTech Kade 65 WDG — 65%	G
Prometon	Amrep	Misty Weed-A-Cide CF — 4.66%	G
Prometon	Atco Intl.	Scorched Earth — 3.75%	G
Prometon	Loveland Prod.	Pramitol 25E Herb. — 25%	G
Prometon	Makhteshim-Agan	Pramitol 25E Herb. — 25%	G
Prometon	Total Solutions	Turf King — 3.73%	G
Prometon	Universal Crop Protection	Pramitol 25E — 25%	G
Prometon	Winfield Solutions	Pramitol 25E — 25%	G
Prometryn	Makhteshim-Agan	Cotton Pro — 44%	G
Prometryn	Syngenta Crop Prot.	Promethryn Technical — 97%	G
Prometryn	Syngenta Crop Prot.	Caparol 4L — 44.4%	G
Pronamide	Dow Agrosciences	Kerb 50-W — 50%	R
Pronamide	Dow Agrosciences	Kerb 50WP — 50%	R
Pronamide	Dow Agrosciences	Kerb WSP — 51%	R
Pronamide	Dow Agrosciences	Kerb SC T&O — 35.6%	R
Pronamide	Dow Agrosciences	Kerb SC — 35.6%	R
Propanamide	Willowood	Willowood Pronamide 3.3SC — 35.6%	R
Propanil	Innvictis Crop Care	Virtue 4EC — 44.4%	G
Propanil	RiceCo.	RiceShot — 43.5%	G
Propanil	RiceCo.	Stam M4 — 44.8%	G
Propanil	RiceCo.	Stam 80 EDF — 81%	G
Propanil	RiceCo.	SuperWHAM! — 41.2%	G
Propanil	Willowood	Willowood Propanil 4SC — 41.4%	G

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Propanil	Willowood	Willowood Propanil 4EC — 44.4%	G
Propiconazole	Albaugh	Propi-Star 2EC — 41.8%	G
Propionic acid	Agco Parts Division	AGCO Buffered Acid — 64.5%	G
Propionic acid	Case	Thirty Plus — 64.5%	G
Propoxycarbazone-sodium	Bayer Cropscience	Olympus 70% Water Dispersible Granular Herb. — 70%	G
Prosulfuron	Syngenta Crop Prot.	Peak Custom-Pak — 57%	G
Pyraflufen-ethyl	Nichino America	Edict 2SC IVM — 2%	G
Pyraflufen-ethyl	Nichino America	Venue Herb. — 2%	G
Pyraflufen-ethyl	Nichino America	ET Herb. — 2.5%	G
Pyraflufen-ethyl	Sepro	Octane 2% SC — 2%	G
Pyrithiobac-sodium	Agsurf	Pysonex Herb. — 33.6%	G
Pyrithiobac-sodium	Du Pont	DuPont Staple Herb. — 85%	G
Pyrithiobac-sodium	Du Pont	DuPont Staple LX Herb. — 33.6%	G
Pyrithiobac-sodium	Makhteshim-Agan	Pyrimax 3.2L Herb. — 32.88%	G
Pyroxasulfone	BASF	Zidua Herb. — 85%	G
Pyroxsulam	Dow Agrosciences	PowerFlex — 7.5%	G
Pyroxsulam	Dow Agrosciences	PowerFlex HL — 13.13%	G
Pyroxsulam	Du Pont	DuPont GR1 Herb. — 13.13%	G
Quinclorac	Advan	Halts Post Crabgrass Cont. — 40%	G
Quinclorac	Advan	Eject 4L Turf Herb. — 40%	G
Quinclorac	Albaugh	QuinStar 4L — 40%	G
Quinclorac	Albaugh	QuinStar Turf — 75%	G
Quinclorac	Albaugh	Armor Tech Quin Pro — 75%	G
Quinclorac	BASF	Quinclorac Manufacturing Use Product — 98%	G
Quinclorac	BASF	Drive XLR8 Herb. — 18.92%	G
Quinclorac	BASF	Facet L Herb. — 18.92%	G
Quinclorac	Cont. Solutions	Quinclorac 1.5L — 18.92%	G
Quinclorac	Makhteshim-Agan	Ryzon 75DF — 75%	G
Quinclorac	Makhteshim-Agan	Quali-Pro Quinclorac 75DF — 75%	G
Quinclorac	Nufarm Americas	Nufarm Quinclorac SPC 75 DF Herb. — 75%	G
Quinclorac	Prime Source	Quinclorac 1.5L Select — 18.92%	G
Quinclorac	Select Source	Quinclorac Select 75DF — 75%	G
Quizalofop-p-ethyl	Canyon Group	Targa Herb. — 10.3%	G
Quizalofop-p-ethyl	Du Pont	DuPont Assure II Herb. — 10.3%	G
Quizalofop-p-ethyl	Sharda USA	Se-CURE Herb. — 10.3%	G
Rimsulfuron	Agsurf	Rimgro Herb. — 25%	G
Rimsulfuron	Cheminova	Solida Herb. — 25%	G
Rimsulfuron	Cheminova	Bestow Herb. — 25%	G
Rimsulfuron	Du Pont	DuPont Matrix Herb. — 25%	G
Rimsulfuron	Du Pont	DuPont Resolve DF Herb. — 25%	G
Rimsulfuron	Du Pont	DuPont(tm) TranXit Herb. — 25%	G
Rimsulfuron	Du Pont	DuPont(tm) Resolve Herb. — 25%	G
Rimsulfuron	Du Pont	DuPont Matrix FNV Herb. — 25%	G
Rimsulfuron	Du Pont	DuPont Resolve SG Herb. — 25%	G
Rimsulfuron	Du Pont	DuPont Matrix SG Herb. — 25%	G
Rimsulfuron	Makhteshim-Agan	Quali-Pro Rimsulfuron 25 DF — 25%	G
Saflufenacil	BASF	Treevix powered by Kixor Herb. — 70%	G
Saflufenacil	BASF	Sharpen powered by Kixor Herb. — 29.74%	G
Saflufenacil	BASF	Detail powered by Kixor Herb. — 29.74%	G
Sethoxydim	BASF	Segment Herb. — 13%	G
Sethoxydim	BASF	Poast Herb. — 18%	G
Sethoxydim	BASF	Poast Plus Herb. — 13%	G
Sethoxydim	Bonide Prod.	Bonide Grass Beater Over-the-Top Grass Killer Conc. — 13%	G
Sethoxydim	Lawn and Garden Prod.	Grass Getter — 18%	G
Sethoxydim	Nufarm Americas	Nufarm Sethoxydim SPC — 13%	G
Sethoxydim	South. Ag. Insecticides	Grass Killer contains Vantage — 13%	G
Sethoxydim	Voluntary Purch. Groups	Ferti-lome Over-the-Top Grass Killer — 18%	G
Sethoxydim	Voluntary Purch. Groups	Hi-Yield Grass Killer — 18%	G
Sethoxydim	Whitetail Institute	Arrest Herb. — 0.13%	G
Siduron	PBIGordon	Tupersan Herb. WP — 50%	G
Simazine	Drexel Chem.	Drexel Simazine 90DF — 90%	G
Simazine	Drexel Chem.	Drexel Simazine 4L — 42.1%	G
Simazine	Loveland Prod.	Simazine 90 WDG Herb. — 90%	G
Simazine	Loveland Prod.	Simazine 4L Flowable Herb. — 42.8%	G
Simazine	Sipcam Agro USA	Simtrol 4L Simazine Flowable Herb. — 42.8%	G
Simazine	Sipcam Agro USA	Sim-Trol 90 DF Herb. — 90%	G
Simazine	Syngenta Crop Prot.	Princep 4L — 41.9%	G
Simazine	Syngenta Crop Prot.	Princep Liquid — 41.9%	G
Simazine	Syngenta Crop Prot.	Simazine Technical — 97%	G
Simazine	Syngenta Crop Prot.	Princep Caliber 90 Herb. — 90%	G
Simazine	Winfield Solutions	Simazine 4L — 41.9%	G

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S-Metolachlor	Du Pont	DuPont(tm) Cinch Herb. — 82.4%	G
S-Metolachlor	Syngenta Crop Prot.	S-Metolachlor Technical — 96%	G
S-Metolachlor	Syngenta Crop Prot.	Dual Magnum — 83.7%	G
S-Metolachlor	Syngenta Crop Prot.	Medal EC — 83.7%	G
S-Metolachlor	Syngenta Crop Prot.	Dual II Magnum — 82.4%	G
S-Metolachlor	Syngenta Crop Prot.	Medal II EC — 82.4%	G
S-Metolachlor	Syngenta Crop Prot.	Dual II G Magnum — 16%	G
S-Metolachlor	Syngenta Crop Prot.	Pennant Magnum — 83.7%	G
S-Metolachlor	Tenkoz	Brawl Herb. — 83.7%	G
S-Metolachlor	Tenkoz	Brawl ll Herb. — 82.4%	G
S-Metolachlor	Winfield Solutions	Charger Max — 82.4%	G
S-Metolachlor	Winfield Solutions	Charger Basic — 83.7%	G
Sodium benzoate	South. Ag. Insecticides	Basagran Sedge Cont. — 44%	G
Sulfentrazone	Du Pont	DuPont Sulfentrazone XP Herb. — 75%	G
Sulfentrazone	FMC	Sulfentrazone Technical — 91%	G
Sulfentrazone	FMC	Zeus XC Herb. — 39.6%	G
Sulfentrazone	FMC	Spartan 4F Herb. — 39.6%	G
Sulfentrazone	FMC	Dismiss Turf Herb. — 39.6%	G
Sulfentrazone	FMC	Ortho Weed B Gon FLEX — 39.6%	G
Sulfentrazone	Ortho Group	Ortho Nutsedge Killer for Lawns — 0.05%	G
Sulfentrazone	Ortho Group	Ortho Nutsedge Killer for Lawns RTS — 1.4%	G
Sulfometuron methyl	Agsurf	Sulfomet XP Herb. — 75%	G
Sulfometuron methyl	Alligare	Alligare SFM 75 — 75%	G
Sulfometuron methyl	Du Pont	DuPont Oust XP Herb. — 75%	G
Sulfometuron methyl	Nufarm Americas	Spyder Selective Herb. — 75%	G
Sulfosulfuron	Monsanto	MON 37500 Technical — 98%	G
Sulfosulfuron	Monsanto	Maverick Herb. — 75%	G
Sulfosulfuron	Monsanto	Outrider Herb. — 75%	G
Sulfosulfuron	Monsanto	Certainty Turf Herb. — 75%	G
Tebuconazole	Albaugh	TebuStar 3.6L — 38.7%	G
Tebuconazole	Luxembourg-pamol	Tegrol 3.5F — 38.7%	G
Tebuconazole	Sharda USA	Tebu-Crop3.6F — 38.7%	G
Tebuthiuron	Alligare	Alligare Tebuthiuron 80 WG — 80%	G
Tebuthiuron	Alligare	Alligare Tebuthiuron 20 P — 20%	G
Tebuthiuron	Dow Agrosciences	Spike 80DF — 80%	G
Tebuthiuron	Dow Agrosciences	Spike 20P — 20%	G
Tebuthiuron	SSI Maxim	Sprakil S-5 Brush Cont. Gran. — 5%	G
Tembotrione	Bayer Cropscience	Laudis Herb. — 34.5%	G
Terbacil	Tessenderlo Kerley	Sinbar WDG — 80%	G
Thiencarbazone methyl	Bayer Cropscience	WG 63 Herb. — 21%	G
Thifensulfuron methyl	Cheminova	Harass Herb. — 75%	G
Thifensulfuron methyl	Cheminova	Edition Broadspec Herb. — 25%	G
Thifensulfuron methyl	Cheminova	Edition Tank Mix Herb. — 40%	G
Thifensulfuron methyl	Du Pont	DuPont Harmony GT XP Herb. — 75%	G
Thifensulfuron methyl	Du Pont	Harmony GT Herb. — 75%	G
Thifensulfuron methyl	Du Pont	DuPont Harmony SG Herb. (w/ TotalSol SG) — 50%	G
Thifensulfuron methyl	Du Pont	DuPont Harmony X-tra 1 Herb. — 50%	G
Thifensulfuron methyl	Nufarm	Treaty Herb. — 75%	G
Thifensulfuron methyl	Rotam N. America	Volta Agricultural Herb. — 75%	G
Thiobencarb	K-i Chem.	Bolero Technical — 97.4%	G
Thiobencarb	Valent U.S.A.	Bolero 8 EC — 84%	G
Topramezone	Amvac Chem.	Impact Herb. — 29.7%	G
Topramezone	BASF	Armezon Herb. — 29.7%	G
Topramezone	BASF	Frequency Herb. — 29.7%	G
Topramezone	BASF	Pylex Herb. — 29.7%	G
Tribenuron-methyl	Cheminova	Nuance Herb. — 75%	G
Tribenuron-methyl	Du Pont	DuPont Express XP Herb. — 75%	G
Tribenuron-methyl	Du Pont	DuPont Express Herb. (w/ TotalSol SG) — 50%	G
Tribenuron-methyl	Nufarm	Victory Herb. — 75%	G
Triclopyr	Alligare	Alligare Triclopyr 4 — 61.6%	G
Triclopyr	Alligare	Alligare Triclopyr 3 — 44.4%	G
Triclopyr	Ambrands	Image Herb. Brush & Vine Killer — 8%	G
Triclopyr	Applied Biochemists	Navitrol DPF Aquatic Herb. — 14%	G
Triclopyr	Applied Biochemists	Navitrol Landscape and Aquatic Herb. — 44.4%	G
Triclopyr	Bayer Advanced	Bayer Advanced Brush Killer Plus Conc. — 8.8%	G
Triclopyr	Bayer Advanced	Bayer Advanced Brush Killer Plus RTS — 8.8%	G
Triclopyr	Bayer Advanced	Bayer Advanced Brush Killer Plus RTU — 0.8%	G
Triclopyr	Bonide Prod.	Bonide Stump-Out Stump & Vine Killer — 8.8%	G
Triclopyr	Cont. Solutions	Clear Pasture — 61.6%	G
Triclopyr	Dow Agrosciences	Pathfinder II — 13.6%	G
Triclopyr	Dow Agrosciences	Grandstand R — 44.4%	G

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Triclopyr	Dow Agrosciences	Turflon Ester — 61.6%	G
Triclopyr	Dow Agrosciences	Garlon 3A — 44.4%	G
Triclopyr	Dow Agrosciences	Element 3A — 44.4%	G
Triclopyr	Dow Agrosciences	Element 4 — 61.6%	G
Triclopyr	Dow Agrosciences	Garlon 4 — 61.6%	G
Triclopyr	Dow Agrosciences	Garlon 4 Ultra — 60.45%	G
Triclopyr	Dow Agrosciences	Hammer — 44.4%	G
Triclopyr	Dow Agrosciences	Triclopyr Triethylamine Salt Solution — 44.4%	G
Triclopyr	Dow Agrosciences	Remedy Ultra — 60.45%	G
Triclopyr	Dow Agrosciences	Forestry Garlon XRT — 83.9%	G
Triclopyr	Dow Agrosciences	Turflon Ester Ultra — 60.45%	G
Triclopyr	Dow Agrosciences	Remedy — 61.6%	G
Triclopyr	Helena Chem.	Trycera — 29.4%	G
Triclopyr	Lawn and Garden Prod.	Turflon Ester — 60.45%	G
Triclopyr	Lawn and Garden Prod.	Monterey Brush & Vine Control — 8.8%	G
Triclopyr	Nufarm Americas	Platform Herb. — 44.4%	G
Triclopyr	Nufarm Americas	Tahoe 3A Herb. — 44.4%	G
Triclopyr	Nufarm Americas	Relegate Selective Herb. — 61.6%	G
Triclopyr	Sepro	Renovate 3 — 44.4%	G
Triclopyr	Sepro	Renovate OTF — 14%	G
Triclopyr	South. Ag. Insecticides	Brush Killer — 8.8%	G
Triclopyr	Ortho Group	Ortho MAX Poison Ivy & Tough Brush Killer Conc. — 8%	G
Triclopyr	Ortho Group	Ortho Weed B Gon Chickweed, Clover & Oxalis Killer for Lawns Conc. — 8%	G
Triclopyr	Ortho Group	Ortho MAX Poison Ivy & Tough Brush Killer RTU — 0.7%	G
Triclopyr	Voluntary Purch. Groups	Ferti-lome Brush Killer Stump Killer — 8.8%	G
Triclopyr	Voluntary Purch. Groups	Ferti-lome Cut Vine & Stump Killer RTU — 8.8%	G
Triclopyr	Voluntary Purch. Groups	Hi-Yield Turflon Ester Ultra — 60.45%	G
Trifloxysulfuron-sodium	Syngenta Crop Prot.	Envoke — 75%	G
Trifloxysulfuron-sodium	Syngenta Crop Prot.	Monument 75WG — 75%	G
Trifluralin	Aceto Ag. Chem.	Aceto Trifluralin 4 EC Herb. — 43%	G
Trifluralin	Dow AgroSciences	Technical Trifluralin — 96.3%	G
Trifluralin	Dow AgroSciences	Treflan 4D — 43%	G
Trifluralin	Dow Agrosciences	Treflan HFP — 43%	G
Trifluralin	Fiberweb	Biobarrier Root Cont. System — 17.5%	G
Trifluralin	Helena Chem.	Trifluralin 4 EC — 43%	G
Trifluralin	Helena Chem.	Treflan 4 EC — 43%	G
Trifluralin	Lawn and Garden Prod.	Vegetable and Ornamental Weeder — 43%	G
Trifluralin	Lebanon Seaboard	Preen Garden Weed Prev. — 1.49%	G
Trifluralin	Lebanon Seaboard	Lebanon Treflan 5G — 5%	G
Trifluralin	Lebanon Seaboard	Preen Mulch Plus — 0%	G
Trifluralin	Loveland Prod.	Trifluralin 10G — 10%	G
Trifluralin	Loveland Prod.	Trifluralin HF — 43%	G
Trifluralin	Makhteshim-Agan	Triflurex HFP — 42.78%	G
Trifluralin	Miracle Gro	Miracle-Gro Garden Weed Prev. 1 — 1.47%	G
Trifluralin	Miracle Gro	Miracle-Gro Shake 'N Feed All Purpose Plant Food Plus Weed Prev. 1 10-10-10 — 0.15%	G
Trifluralin	Tenkoz	Tenkoz Trifluralin 4 Emulsifiable Conc. — 43%	G
Trifluralin	Anderson's Lawn Fert.	Easy Weed & Green 9-17-9 — 0.74%	G
Trifluralin	Anderson's Lawn Fert.	Easy Weeder Flower and Garden Weed Prev. — 1.47%	G
Trifluralin	Universal Crop Protection	Trifluralin 4EC — 43%	G
Trifluralin	Voluntary Purch. Groups	Hi-Yield Herb. Gran. Containing Treflan — 1.47%	G
Trifluralin	Anderson's Lawn Fert.	Pro. Turf Prod. Weed & Grass Prev. w/ 5% Treflan Herb. — 5%	G
Trifluralin	Winfield Solutions	Trust Herb. — 43%	G
		Defoliants and Desiccants	
Diquat dibromide	Syngenta Crop Prot.	Reglone Desiccant — 37.3%	G
Ethephon	Bayer Cropscience	Prep Brand Ethephon for Cotton and Tobacco — 55.4%	G
Imidacloprid	Sharda USA	Sharda Imidacloprid 5SC — 48.7%	G
Isopropyl myristate	Bayer Healthcare	Resultix — 50%	G
Paraquat dichloride	Helm Agro	Helmquat 3SL — 43.8%	R
Paraquat dichloride	MacDermid Ag. Sol.	Firestorm — 43.8%	R
Paraquat dichloride	Sinon USA	Bonedry — 43.8%	R
Sodium chlorate	CoreAgri	CoreAgri Polyfoliant V Defoliant-Desiccant — 45%	G
Sodium chlorate	Drexel Chem.	Drexel Defol — 28%	G
Sodium chlorate	Drexel Chem.	Drexel Defol 5 — 42.3%	G
Sodium chlorate	Drexel Chem.	Drexel Defol 750 — 52%	G
Sodium chlorate	Tronox	Tronox Sodium Chlorate — 99.5%	R
Sodium chlorate	Tronox	Tronox Sodium Chlorate Solution — 43.7%	R
Thidiazuron	Arysta Lifescience	Thidiazuron 4SC — 42.4%	G
Thidiazuron	Direct Ag Source	Detach Ultra — 42.4%	G
Thidiazuron	Innvictis Crop Care	Vacate — 41.4%	G
Thidiazuron	Loveland Prod.	Take Down SC Cotton Defoliant — 42.4%	G

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Thidiazuron	Makhteshim-Agan	Klean-Pik 500SC — 42.4%	G
Thidiazuron	Nufarm Americas	FreeFall SC Cotton Defoliant — 42.4%	G
Thidiazuron	Winfield Solutions	Daze 4SC — 42.4%	G
Tribufos	Amvac Chem.	Folex 6EC Cotton Defoliant — 70.5%	G
Tribufos	Amvac Chem.	Vestage — 70.5%	G
Tribufos	Bayer Cropscience	Def 6 Emulsifiable Defoliant Very Low Odor — 70.5%	G
Tribufos	Loveland Prod.	DFT 6 EC Cotton Defoliant — 70.5%	G
Tribufos	Redeagle Intl.	Tribufos 6 — 70.5%	G
Tribuphos	Innvictis Crop Care	Quiver — 70.5%	G
		Fumigants	
1,3-Dichloropropene	Dow Agrosciences	Curfew — 97.5%	R
1,3-Dichloropropene	Dow Agrosciences	Telone II — 97.5%	R
1-Methylcyclopropene	Flora Life	EthylBloc — 0.14%	G
1-Methylcyclopropene	Flora Life	EthylBloc Sachet — 0.01%	G
Aluminum phosphide	Bernardo Chem.	Gastoxin Fumigation Tablets — 57%	R
Aluminum phosphide	Bernardo Chem.	Gastoxin Fumigation Pellets — 57%	R
Aluminum phosphide	Bernardo Chem.	Gastoxin Fumigation Sachet Chain (100) — 57%	R
Aluminum phosphide	Bernardo Chem.	Gastoxin Fumigation Sachets (6) — 57%	R
Aluminum phosphide	Bernardo Chem.	Gastion Fumigation Sachets (50) — 57%	R
Aluminum phosphide	D&D Holdings	Fumitoxin Tablets — 55%	R
Aluminum phosphide	D&D Holdings	Detia Fumex Bags — 57%	R
Aluminum phosphide	D&D Holdings	Fumitoxin Pellets — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Tablets — 55%	R
Aluminum phosphide	D&D Holdings	Detia Phos Tablets — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Pellets — 55%	R
Aluminum phosphide	D&D Holdings	Detia Phos Pellets — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin PrePac Rope — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Tablet PrePac — 55%	R
Aluminum phosphide	Douglas Prod.	Phosfume 2 Aluminum Phosphide Fumigation Pellets — 60%	R
Aluminum phosphide	Douglas Prod.	PH 3 Aluminum Phosphide Fumigation Pellets — 60%	R
Aluminum phosphide	Douglas Prod.	Phosfume 2 Tablets — 60%	R
Aluminum phosphide	ROC Enterprises	Killz-All 60 Tablets — 60%	R
Aluminum phosphide	ROC Enterprises	Killz-All 60 Pellets — 60%	R
Aluminum phosphide	United Phosphorus	Weevil-Cide Tablets — 60%	R
Aluminum phosphide	United Phosphorus	Weevil-Cide Pellets — 60%	R
Aluminum phosphide	United Phosphorus	Weevil-Cide Gas Bags — 60%	R
Carbon dioxide	Trifecta	Ant Zap — 100%	G
Carbon dioxide	Trifecta	Mole Zap — 100%	G
Chloropicrin	TriEst Ag Group	Tri-Pic 100 Fumigant — 99%	R
Chloropicrin	TriEst Ag Group	Pic Plus Fumigant — 85.5%	R
DMDS	Arkema	Paladin — 99.8%	R
DMDS	Arkema	Paladin EC — 93.8%	R
Ethylene oxide	ARC Specialty Prod.	Ethylene Oxide — 100%	G
Magnesium phosphide	D&D Holdings	Degesch Magtoxin Granules — 94.6%	R
Magnesium phosphide	D&D Holdings	Degesch Feumicel / Strip — 56%	R
Magnesium phosphide	D&D Holdings	Degesch Magtoxin PrePac Spot Fumigant — 66%	R
Malathion	Douglas Prod.	MaxKill Dusta-Cide 6 — 6%	G
Metampotassium	Amvac Chem.	K-Pam HL — 54%	R
Metam-sodium	Amvac Chem.	Vapam HL Soil Fumigant — 42%	R
Metam-sodium	Douglas Prod.	Sanafoam Vaporooter II — 30%	R
Metam-sodium	Tessenderlo Kerley	Sectagon 42 — 42.2%	R
Methyl bromide	Great Lakes Chem.	Meth-O-Gas Q — 100%	R
Methyl bromide	ICL-IP America	Metabrom 100 — 100%	R
Methyl bromide	Great Lakes Chem.	Meth-O-Gas 100 — 100%	R
Methyl bromide	TriEst Ag Group	Methyl Bromide 100 — 100%	R
Methyl bromide	ICL-IP America	Metabrom Q — 100%	R
Paraformaldehyde	Noble Pine Prod.	Steri Dri — 62.3%	G
Phosphine gas	Cytec Industries	ECO2FUME Fumigant Gas — 2%	R
Phosphine gas	Cytec Industries	VAPORPH3OS Phosphine Fumigant — 99.3%	R
Sulfuryl fluoride	Dow Agrosciences	ProFume — 99.8%	R
Sulfuryl fluoride	Dow Agrosciences	Vikane — 99.8%	R
Thiadiazine	Copper Care Wood Pres.	Super-Fume — 98%	G
		Plant Growth Regulators	
1-Methylcyclopropene	Agro Fresh	SmartFresh ProTabs — 2%	G
1-Methylcyclopropene	Agro Fresh	SmartFresh — 3.3%	G
1-Methylcyclopropene	Agro Fresh	SmartFresh SmartTabs — 0.63%	G
1-Methylcyclopropene	Agro Fresh	AFxRD-038 — 3.8%	G
Acifluorfen, sodium salt	Redeagle Intl.	Aciflurofen 2 — 20.1%	G
Ancymidol	Fine Americas	Abide — 0.03%	G

Common chemical name	Company	Trade names and formulations	Use classification
Ancymidol	Sepro	A-Rest — 0.03%	G
Aviglycine hydrochloride	Valent Biosciences	ReTain Plant Growth Regulator Soluble — 15%	G
Benzyladenine	Valent Biosciences	MaxCel Plant Growth Regulator Solution — 1.9%	G
Chlormequat chloride	Fine Americas	Citadel — 11.8%	G
Chlormequat chloride	Nufarm Americas	Nufarm Chlormequat SPC Plant Growth Regulator — 11.8%	G
Chlormequat chloride	Ohp	Cycocel Plant Growth Regulator — 11.8%	G
Copper hydroxide	Sepro	SpinOut — 7.1%	G
CPPA	Fbsciences	Carbon Power — 0.18%	G
CPPA	Fbsciences	Arcus — 0.9%	G
Cyclanilide	Bayer Cropscience	Cyclanilide 18% SC — 18%	G
Cytokinin (as kinetin)	Acadian Seaplants	Stimplex Crop Biostimulant — 0.01%	G
Cytokinin (as kinetin)	Bonide Prod.	Bonide Tomato & Blossom Set Spray RTU — 0%	G
Cytokinin (as kinetin)	CP Bio	Kinetin Technical — 98.5%	G
Cytokinin (as kinetin)	Loveland Prod.	Validate — 0.5%	G
Cytokinin (as kinetin)	Stoller Enterprises	X-Cyte — 0.04%	G
Cytokinin (as kinetin)	Voluntary Purch. Groups	Ferti-lome Tomato & Pepper Set RTU — 0%	G
Cytokinin (as kinetin)	P.B.T.	Cytokin Bioregulator Conc. — 0.01%	G
Cytokinin (as kinetin)	Fine Americas	Configure — 2%	G
Daminozide	Fine Americas	Dazide 85 WSG — 85%	G
Daminozide	Ohp	B-Nine WSG — 85%	G
Dicamba	Sharda USA	DiCash DGA-4 — 58.1%	G
Dichlobenil	Ohp	Casoron 4G — 4%	G
Dikegulac sodium	Ohp	Augeo Plant Growth Regulator — 18.5%	G
Dikegulac sodium	PBIGordon	Atrimmec Plant Growth Regulator — 18.5%	G
Dithiopyr	Gro Tec	Pennington Signature Series Crabgrass Prev. — 0.25%	G
Ethephon	Arysta Lifescience	Ethephon 6 — 55.4%	G
Ethephon	Bayer Cropscience	Florel Brand Ethephon Plant Growth Regulator — 3.9%	G
Ethephon	Bayer Cropscience	Ethrel Brand Ethephon Plant Regulator — 21.7%	G
Ethephon	Bayer Cropscience	Cerone Brand Ethephon Plant Regulator — 39.9%	G
Ethephon	Bayer Env. Science	Proxy Growth Regulatory — 21.7%	G
Ethephon	Direct Ag Source	Harvest Pro — 55.4%	G
Ethephon	Fine Americas	Collate — 21.7%	G
Ethephon	Helena Chem.	Flash — 27%	G
Ethephon	Helena Chem.	Oskie — 27%	G
Ethephon	Innvictis Crop Care	Velour — 55.4%	G
Ethephon	Integrated Agri. Pro.	HarvestPro Plant Growth Regulator — 55.4%	G
Ethephon	Integrated Agri. Pro.	HarvestPro Plant Growth Regulator — 54%	G
Ethephon	Lawn and Garden Prod.	Florel Brand Growth Regulator — 3.9%	G
Ethephon	Loveland Prod.	Boll Buster — 55.4%	G
Ethephon	Makhteshim-Agan	Setup 6SL — 55.4%	G
Ethephon	Makhteshim-Agan	Quali-Pro Ethephon 2SL — 21.7%	G
Ethephon	Nufarm Americas	Super Boll Plant Regulator — 55.4%	G
Ethephon	Nufarm Americas	Verve Plant Growth Regulator — 21.7%	G
Ethephon	Nufarm Americas	Nufarm Ethephon 2 PGR — 21.7%	G
Ethephon	Redeagle Intl.	Ethephon 78% MUP — 77.6%	G
Ethephon	South. Ag. Insecticides	Florel Plant Growth Regulator — 3.9%	G
Ethephon	Winfield Solutions	Boll'd 6 — 54%	G
Ethephon	Winfield Solutions	Boll'd — 55.4%	G
Ethylene	Airgas Specialty Gases	Ethylene — 98.5%	G
Flumetralin	Syngenta Crop Prot.	Prime+ EC — 15%	G
Flurprimidol	Sepro	Cutless 0.33G — 0.33%	G
Flurprimidol	Sepro	Cutless 50W — 50%	G
Flurprimidol	Sepro	Topflor — 0.38%	G
Flurprimidol	Sepro	Topflor Granular — 0.17%	G
Flurprimidol	Sepro	Cutless MEC — 16%	G
Gibberellic acid	Fine Americas	Falgro 2X LV — 6.18%	G
Gibberellic acid	Nufarm Americas	GibGro 20% Powder — 20%	G
Gibberellic acid	Nufarm Americas	GibGro 4LS — 4%	G
Gibberellic acid	Stoller Enterprises	N-Large — 4%	G
Gibberellic acid	Stoller Enterprises	N-Large Premier — 6.26%	G
Gibberellic acid	Stoller Enterprises	N-Large 10SP — 10%	G
Gibberellic acid	Valent Biosciences	RyzUp 40% Water Soluble Granule Plant Growth Regulator — 40%	G
Gibberellic acid	Valent Biosciences	RyzUp SmartGrass Plant Growth Regulator Water Soluble Granule — 40%	G
Gibberellic acid	Valent Biosciences	ProGibb 40% Water Soluble Granule Plant Growth Regulator — 40%	G
Gibberellic acid	Valent Biosciences	VBC-30110 Plant Growth Regulator Water Soluble Granule — 40%	G
Gibberellic acid	Valent Biosciences	RyzUp Plant Growth Regulator — 4%	G
Gibberellic acid	Valent Biosciences	ProGibb T&O Plant Growth Regulator (PGR) Solution — 4%	G
Gibberellic acid	Valent Biosciences	ProGibb 4% Plant Growth Regulator Solution — 4%	G
Gibberellic acid	Valent Biosciences	ProGibb LV PLUS Plant Growth Regulator Solution — 5.7%	G
Gibberellic acid	Valent Biosciences	Release Plant Growth Regulator Soluble Powder — 10%	G

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Gibberellin	Valent Biosciences	Release LC Plant Growth Regulator Solution — 4%	G
Gibberellins	Valent Biosciences	ProCone Plant Growth Regulator Solution — 4%	G
Harpin	Plant Health Care	ProAct Foliar Spray — 1%	G
Harpin	Plant Health Care	Employ — 1%	G
Harpin	Rx Green Solutions	Axiom — 1%	G
Hydrogen cyanamide	Alzchem AG	Dormex — 50%	R
Indole	Ohp	Hormodin 2 — 0.3%	G
Indole	Ohp	Hormodin 3 — 0.8%	G
Indole	Ohp	Hormodin 1 — 0.1%	G
Indole-3-butyric acid	Bonide Prod.	Bonide Bontone II Rooting Powder — 0.1%	G
Indole-3-butyric acid	Brooker Chem.	Hormex Rooting Powder #1 — 0.1%	G
Indole-3-butyric acid	CP Bio	IBA Tech — 98%	G
Indole-3-butyric acid	Green Light	Green Light Root Stimulator & Starter Solution 5-15-5 — 0%	G
Indole-3-butyric acid	Growth Tech.	Clonex Rooting Gel — 0.31%	G
Indole-3-butyric acid	Helena Chem.	Kickstand PGR — 0.01%	G
Indole-3-butyric acid	Hortus USA	Hortus IBA Water Soluble Salts(20%) — 20%	G
Indole-3-butyric acid	Schultz	Garden Safe Brand TakeRoot Rooting Hormone — 0.1%	G
Indole-3-butyric acid	Techpac	Garden Tech RootBoost Rooting Hormone — 0.1%	G
Indole-3-butyric acid	Voluntary Purch. Groups	Ferti-lome Rooting Powder — 0.1%	G
Indole-3-butyric acid	Voluntary Purch. Groups	Ferti-lome Root Stimulator & Plant Starter Solution — 0%	G
Kinetin	CP Bio	HappyGro — 0.5%	G
Maleic hydrazide	MacDermid Ag. Sol.	Royal MH-30 Xtra — 30.3%	G
Maleic hydrazide	MacDermid Ag. Sol.	Royal MH-30 — 21.7%	G
Mefluidide	PBIGordon	Embark 2-S Plant Growth Regulator — 28%	G
Mefluidide	PBIGordon	Embark Turf and Ornamental Growth Regulator — 3.2%	G
Mepiquat chloride	Aceto Ag. Chem.	Aceto Mepiquat 4.2% Plant Regulator — 4.2%	G
Mepiquat chloride	AgSaver	Mepit — 4.2%	G
Mepiquat chloride	Arysta Lifescience	Mepichlor 4.2% Liquid — 4.2%	G
Mepiquat chloride	Arysta Lifescience	Pix Ultra — 3.9%	G
Mepiquat chloride	Arysta Lifescience	Pix WSG — 90%	G
Mepiquat chloride	Direct Ag Source	Flat Top MC — 4.2%	G
Mepiquat chloride	Drexel Chem.	Drexel MEP 42 — 4.2%	G
Mepiquat chloride	Innvictis Crop Care	Veto — 4.2%	G
Mepiquat chloride	Loveland Prod.	Mepiquat — 4.2%	G
Mepiquat chloride	Nufarm Americas	Mepex Plant Growth Regulator — 4.2%	G
Mepiquat chloride	Tacoma Ag	Mepiquat PGR — 4.2%	G
Mepiquat chloride	Willowood	Willowood Mepi Chlor 4.2% — 4.2%	G
Mepiquat chloride	Winfield Solutions	Compact — 4.2%	G
Mepiquat pentaborate	BASF	Pentia Plant Regulator — 9.6%	G
Naphthaleneacetic acid	Amvac Chem.	K Salt Fruit Fix 800 — 24.2%	G
Naphthaleneacetic acid	Amvac Chem.	K Salt Fruit Fix 200 — 6.25%	G
Naphthaleneacetic acid	Valent Biosciences	PoMaxa Plant Growth Regulator — 3.5%	G
Paclobutrazol	Davey Tree Expert	ArborLock 2SC — 22.3%	G
Paclobutrazol	Fine Americas	Piccolo — 0.4%	G
Paclobutrazol	Fine Americas	Piccolo 10 XC — 4%	G
Paclobutrazol	Greenleaf Chem.	Downsize (Pacobutrazol 0.4%) — 0.4%	G
Paclobutrazol	Greenleaf Chem.	Shortstop Plant Growth Regulator for Trees — 22.3%	G
Paclobutrazol	Ohp	Paczol Ornamental Growth Regulator — 0.4%	G
Paclobutrazol	Rainbow Treecare	Cambistat — 22.3%	G
Paclobutrazol	Sepro	Profile 2SC — 21.8%	G
Paclobutrazol	Syngenta Crop Prot.	Trimmit 2SC PGR — 22.3%	G
Paclobutrazol	Syngenta Crop Prot.	Clarelle — 22.9%	G
Paclobutrazol	Syngenta Crop Prot.	Bonzi Ornamental Growth Regulator — 0.4%	G
Paclobutrazol	Syngenta Crop Prot.	Paclo Pro Ornamental Growth Regulator — 0.4%	G
Paclobutrazol	United Turf Alliance	ArmorTech PAC 223 — 22.3%	G
Paclobutrazol	Water Env. Tech.	Bush Load Paclo 0.4% — 0.4%	G
Paclobutrazol	Zhejiang Tide Cropscience	Tide Paclo 2SC — 22.3%	G
Prodiamine	Gro Tec	Expert Gardener Crabgrass Prev. Plus Fert. 30-0-4 — 0.29%	G
Prodiamine	Gro Tec	Pennington Crabgrass Prev. + Lawn Fert. 5-10-25 — 0.38%	G
Prohexadione calcium	BASF	Apogee plant growth regulator — 27.5%	G
Prohexadione calcium	Cleary Chem.	Anuew Turf Growth Regulator — 27.5%	G
Trinexapac-ethyl	Lesco	Lesco Regimax PGR Plant Growth Regulator — 11.3%	G
Trinexapac-ethyl	Loveland Prod.	Game Up Plant Growth Regulator — 11.3%	G
Trinexapac-ethyl	Makhteshim-Agan	Quali-Pro T-NEX 1 AQ — 11.3%	G
Trinexapac-ethyl	Nufarm Americas	Nufarm T-Pac SPC MEC Plant Growth Regulator — 11.3%	G
Trinexapac-ethyl	Prime Source	Train-Pac Select — 11.3%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Palisade 2EC — 25.5%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Trinexapac-ethyl-Technical — 97%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Primo Maxx — 11.3%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Podium — 11.3%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Palisade EC — 12%	G

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Trinexapac-ethyl	United Turf Alliance	ArmorTech PGR 113 MC — 11.3%	G
Uniconazole	Fine Americas	Concise — 0.06%	G
Uniconazole	Valent U.S.A.	Sumagic Plant Growth Regulator — 0.06%	G
		Weed and Feed	
2,4-D amine	Anderson's Lawn Fert.	American Green Weed & Feed 16-4-8 — 1.11%	G
Atrazine	Lesco	Lesco Atrazine 0.76% Plus Fert. — 0.76%	G
Atrazine	Scotts	Turf Builder Bonus S South. Weed & Feed2 — 1.29%	G
Atrazine	Scotts	Weed & Feed For St. Augustinegrass Weed Control + Lawn Fert. — 1.38%	G
Atrazine	Scotts	Super Turf Builder Bonus S South. Weed & Feed — 1.29%	G
Atrazine	Scotts	Scotts Turf Builder Bonus S South. Weed & FeedB 29-0-10 — 1.29%	G
Atrazine	Scotts	Bonus S 29-1-10 — 1.29%	G
Atrazine	Scotts	Super Bonus S 1 South. Weed & Feed 26-2-14 — 1.17%	G
Atrazine	Swiss Farms Prod.	Vigoro South. Weed & Feed — 1.38%	G
Atrazine	Swiss Farms Prod.	Vigoro Super Green South. Weed & Feed w/ Atrazine 29-0-4 — 1.38%	G
Atrazine	Swiss Farms Prod.	Vigoro Ultra Turf Phosphorus Free South. Weed & Feed 29-0-4 — 1.38%	G
Atrazine	Swiss Farms Prod.	Vigoro Super Green South. Weed & Feed 29-0-4 — 1.38%	G
Atrazine	Lesco	Lesco Atrazine 1.05% Plus Fert. 21-0-7M (701186) — 1.05%	G
Atrazine	Lesco	Lesco Atrazine 1.05% Plus Fert. 21-0-7M (701187) — 1.05%	G
Atrazine	Lesco	Lesco Atrazine 0.92% Plus Fert. 15-0-15 (#HPST00108) — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 0.76% Plus Fert. 0-0-7 (#HPST00107) — 0.76%	G
Atrazine	Lesco	Lesco Atrazine 0.92% Plus Fert. 15-0-5 (#HPST00106) — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 0.92% Plus Fert. 20-0-20 (#HPST00105) — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 0.92% Plus Fert. 18-0-8 (#HPST00104) — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 1.05% Plus Fert. 22-0-11 (#HPST00103) — 1.05%	G
Atrazine	Lesco	Lesco Atrazine 0.92% Plus Fert. — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 1.05% Plus Fert. — 1.05%	G
Atrazine	Gro Tec	Pennington Signature Series Centipede & St. Augustine Weed & Feed — 1.1%	G
Atrazine	Voluntary Purch. Groups	Ferti-lome St. Augustine Weed & Feed — 0.81%	G
Atrazine	Sunniland	TurfGro Pro. Weed & Feed 16-0-8 — 0.92%	G
Barricade	Winfield Solutions	5-0-20 Fert. w/ 0.38% Barricade — 0.38%	G
Bifenthrin	Bonide Prod.	Bonide DuraTurf Insect & Feed — 0.07%	G
Bifenthrin	Loveland Prod.	Signature Fert. w/ 0.073% Talstar LC — 0.73%	G
Corn gluten meal	Woodstream	Concern Weed Prevention Plus Lawn Food 8-2-4 — 82%	G
Dichlorprop-p	Scotts	Snap Pac Fert. w/ Crabgrass Prev. 30-0-4 — 0.2%	G
Dithiopyr	Swiss Farms Prod.	Vigoro Crabgrass Prev. & Lawn Fert. 30-0-4 — 0.2%	G
Dithiopyr	Swiss Farms Prod.	Vigoro Ultra Turf Phosphorus Free Turf Fert. w/ Weed Stop 30-0-4 — 0.2%	G
Dithiopyr	Loveland Prod.	Signature Dimension 0.10 Plus Fert. — 0.1%	G
Dithiopyr	Loveland Prod.	Signature Dimension 0.19% Plus Fert. — 0.19%	G
Dithiopyr	Loveland Prod.	Signature Dimension 0.15% Plus Fert. — 0.15%	G
Dithiopyr	Helena Chem.	Pro-Mate Dimension 0.1% Plus Fert. 19-0-8 w/ Methylene Urea — 0.1%	G
Dithiopyr	Agrium Adv. Tech.	Spread It and Forget It Fert. w/ Dimension 0.15% — 0.15%	G
Dithiopyr	Anderson's Lawn Fert.	Turf Prod. Fert. w/ 0.25% Dimension Turf Herb. 21-0-10 — 0.25%	G
Dithiopyr	Anderson's Lawn Fert.	Fortify Crabgrass Prev. Plus Lawn Food 20-0-4 — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.1% Plus Fertilizer 0-0-7M — 0.1%	G
Dithiopyr	Lesco	Dimension0.1% Plus Fertilizer — 0.1%	G
Dithiopyr	Lesco	Dimension 0.15% Plus Fert — 0.15%	G
Dithiopyr	Lesco	Dimension Crabgrass Pre-emergent Plus Fert 19-0-7 — 0.15%	G
Dithiopyr	Lesco	Dimension 0.15% Plus Fert 19-0-2 — 0.15%	G
Dithiopyr	Lesco	Dimension 0.15% Plus Fert 19-0-6 — 0.15%	G
Dithiopyr	Lesco	Dimension 0.21% Plus Fert — 0.21%	G
Dithiopyr	Lesco	Dimension 0.21% Plus Fert 0-0-7 — 0.21%	G
Dithiopyr	Lesco	Dimension 0.21% Plus Fert 18-0-10 — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.19% Plus Turf & Ornamenal 25-0-5 — 0.19%	G
Dithiopyr	Lebanon Seaboard	Lebanon ProScape Fert. 16-0-8 w/ Dimension 0.19% — 0.19%	G
Dithiopyr	Lebanon Seaboard	Greenview Crabgrass Cont. Plus Lawn Food — 0.19%	G
Dithiopyr	Lebanon Seaboard	Ace Green Turf Crabgrass Prev. w/ Fer.t 30-0-4 — 0.19%	G
Dithiopyr	Lebanon Seaboard	Greenview Crabgrass Cont. Plus Lawn Food 26-0-4 w/ Preen — 0.19%	G
Dithiopyr	Voluntary Purch. Groups	Ferti-lome Weed & Feed w/ Dimension — 0.13%	G
Dithiopyr	Voluntary Purch. Groups	Ferti-lome Winterizer & Weed Prev. II for South. Grasses — 0.13%	G
Dithiopyr	Knox Fert.	KGRO Prem. Crabgrass Prev. 30-0-3 — 0.13%	G
Dithiopyr	Harrell's	Fert. w/ Dimension 0.19% — 0.19%	G
Dithiopyr	Harrell's	Fert. w/ Dimension 0.25% — 0.25%	G
Dithiopyr	Harrell's	Fert. w/ Dimension 0.15% — 0.15%	G
Dithiopyr	Harrell's	Fert. w/ Dimension .1% — 0.1%	G
Dithiopyr	Turf Care Supply	TCS Growstar Fert. w/ Crab-Buster Crabgrass Prev. — 0.15%	G
Dithiopyr	Howard Johnson's	Howard Johnson's Prevents Crabgrass Plus w/0.172% Dimension — 0.17%	G
Dithiopyr	Sunniland	TurfGro Pro. Crabgrass Cont. Pre-Emergent — 0.17%	G
Gibberellic acid	Frit Industries	Green-Sol Sul15Plus — 0.03%	G
Imidacloprid	Voluntary Purch. Groups	Ferti-lome Azalea/Evergreen Food Plus w/ Systemic — 0.2%	G
Imidacloprid	Voluntary Purch. Groups	Ferti-lome Palm Tree Food w/ Systemic — 0.2%	G

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Indaziflam	Turf Care Supply	Specticle 0.0142% Plus Fert. 15-0-5 — 0.01%	G
Indaziflam	Turf Care Supply	Specticle 0.0213% Plus Fert. 18-0-5 — 0.02%	G
Indaziflam	Turf Care Supply	Specticle 0.0213% Plus Fert. 24-0-8 — 0.02%	G
Indaziflam	Turf Care Supply	Specticle 0.0213% Plus Fert. 5-0-20 — 0.02%	G
Indaziflam	Turf Care Supply	Specticle 0.0213% Plus Fert. 15-0-15 — 0.02%	G
Iron Sulfate	Scotts	Moss Control Granules for Lawns — 17.5%	G
Iron Sulfate	Scotts	Snap Pac Moss Cont. for Lawns — 17.5%	G
Kinetin (plant hormone)	Frit Industries	Green-Sol GS70 — 0.02%	G
Mesotrione	Scotts	Step 1 For Seeding Starter Lawn Food With Weed Prev. — 0.08%	G
Mesotrione	Scotts	Turf Builder Starter Food For New Grass + Weed Prev. — 0.08%	G
Metsulfuron-methyl	Scotts	Scotts Snap Pac South. Weed & Feed2 — 0.02%	G
Metsulfuron-methyl	Scotts	Scotts Turf Builder Bonus S South. Weed & Feed 4 — 0.02%	G
Oryzalin	Harrell's	Fert. w/Surflan 1.0% — 1%	G
Oryzalin	Harrell's	Fert. w/Surflan 0.75% — 0.75%	G
Oxadiazon	Loveland Prod.	Signature Fertilizer w/ 1.0% Ronstar — 1%	G
Oxadiazon	Helena Chem.	Pro-Mate Oxadiazon 1% Plus Fertilizer 0-0-7 (W/MOP) — 1%	G
Oxadiazon	Anderson's Lawn Fert.	Golf Prod. 5-5-20 Fert. plus 1% Ronstar — 1%	G
Oxadiazon	Lesco	Lesco Ronstar 0.95% Plus Fert. 0-0-14M (701144) — 0.95%	G
Oxadiazon	Lesco	Ronstar 0.95% Plus Fert — 0.95%	G
Oxadiazon	Harrell's	Fert. w/ Ronstar 0.75% — 0.75%	G
Oxadiazon	Harrell's	Fert. w/ Ronstar 0.95% — 0.95%	G
Oxadiazon	Harrell's	Fert. w/ Ronstar 1.2% — 1.2%	G
Pendimethalin	Scotts	Scotts Turf Builder Halts Crabgrass Prev. and Lawn FoodB — 1.29%	G
Pendimethalin	Swiss Farms Prod.	Vigoro Crabgrass Prev. & Lawn Fertilizer I — 1.22%	G
Pendimethalin	Anderson's Lawn Fert.	Golf Prod. Nitrogen/Potassium Fert. 14-0-14 Plus Turf Weedgrass Cont. — 1.07%	G
Pendimethalin	Anderson's Lawn Fert.	Turf Prod. Fert. w/ 0.86% ProPendi Herb. 0-0-7 — 0.86%	G
Pendimethalin	Lesco	Lesco Pre-M 1.5% Plus Fert. — 1.5%	G
Pendimethalin	Lesco	Lesco Pre-M 1.5% Plus Fert. 0-0-8 — 1.5%	G
Pendimethalin	Lesco	Lesco Pre-M 0.86% Crabgrass Pre-Emergent Plus Potash 0-0-7 — 1.5%	G
Pendimethalin	Lesco	Lesco Pre-M 0.86% Flus Fert 0-0-7 Mini — 0.86%	G
Pendimethalin	Lesco	Lesco Pre-M 0.86% Plus Fert 19-3-7 — 0.86%	G
Pendimethalin	Lesco	Lesco Pre-M 0.86% Plus Fert (088515) — 0.86%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% Plus Fert. 25-2-5 (702044) — 0.86%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% Plus Fert. 19-3-7 (701212) — 0.86%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% Plus Fert. 0-0-7 (702100) — 0.86%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 0.86 — 0.86%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 0.75% — 0.75%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 1.0% — 1%	G
Pendimethalin	Turf Care Supply	TCS GrowStar Pendimethalin 0.86% + Fert. — 0.86%	G
Pendimethalin	Turf Care Supply	TCS GrowStar Pendimethalin 0.86% + Fert. — 0.86%	G
Pendimethalin	Howard Johnson's	Pendimethalin 0.86% Plus 0-0-7 — 0.86%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% Plus Fert. — 0.03%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% Plus Fert. 0-0-7M — 0.03%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% Plus Fert. 17-0-7 — 0.03%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% Plus Fert. 21-0-7M — 0.03%	G
Penoxsulam	Lebanon Seaboard	Ace Green Turf St. Augustine Weed & Feed — 0.03%	G
Penoxsulam	Lebanon Seaboard	Ace Green Turf Weed and Feed for South. Lawns 20-0-10 — 0.03%	G
Penoxsulam	Gro Tec	Sta-Green Phosphorus-Free South. Weed & Feed — 0.04%	G
Penoxsulam	Knox Fert.	KGRO South. Weed & Feed 30-0-3 — 0.04%	G
Penoxsulam	Turf Care Supply	TCS Growstar South. Weed & Feed w/ Penoxsulam-Summer — 0.04%	G
Penoxsulam	Turf Care Supply	Sta-Green South. Weed & Feed — 0.04%	G
Penoxsulam	Turf Care Supply	TCS Growstar South. Weed & Feed w/ Penoxsulam-Winter — 0.04%	G
Penoxsulam	Turf Care Supply	Sta-Green South. Weed & Feed (29-0-10) — 0.04%	G
Penoxsulam	Howard Johnson's	Howard Johnson's Lockup 0.03% South. Herb. Plus — 0.03%	G
Penoxsulam	Howard Johnson's	Pennington Seed Lockup 0.03% South. Herb. Plus Fert. 15-0-5 — 0.03%	G
Penoxsulam	Central Garden & Pet	Pennington Ultragreen South. Weed & Feed 30-0-4 — 0.03%	G
Prodiamine	Bonide Prod.	Bonide DuraTurf Crabgrass Prev. — 0.28%	G
Prodiamine	Scotts	Scotts Fert. 14-0-5 w/ Halts II — 0.28%	G
Prodiamine	Scotts	Scotts Fert. 24-0-8 w/ Halts II — 0.28%	G
Prodiamine	Scotts	Scotts Fert. 22-0-8 w/ Halts II — 0.28%	G
Prodiamine	Scotts	Scotts Fert. 14-2-5 w/ Halts II — 0.28%	G
Prodiamine	Scotts	Scotts Fert. 0-0-7 w/ Halts II — 0.28%	G
Prodiamine	Loveland Prod.	Signature Evade .295% Crabgrass Prev. Plus — 0.3%	G
Prodiamine	Loveland Prod.	Signature Crabgrass preventer w/ Barricade 0.295% Plus — 0.3%	G
Prodiamine	Loveland Prod.	Signature Evade Crabgrass Prev. .2% Plus — 0.2%	G
Prodiamine	Winfield Solutions	Groundwork Crabgrass preventer 16-0-6 w/ 0.28% Barricade — 0.28%	G
Prodiamine	Winfield Solutions	0-0-7 Fert. w/ 0.38% Barricade — 0.38%	G
Prodiamine	Anderson's Lawn Fert.	Turf Prod. Fert. w/ 0.38% Barricade Herb. (18-0-4) — 0.38%	G
Prodiamine	Anderson's Lawn Fert.	Golf Prod. Fert. w/ 0.48% Barricade Herb. (5-5-30) — 0.48%	G
Prodiamine	Anderson's Lawn Fert.	Turf Prod. Fert. w/ 0.426% Barricade Herb. 18-0-4 — 0.43%	G
Prodiamine	Anderson's Lawn Fert.	Pro. Turf Prod. Fert. w/ Barricade Herb. 0-0-7 — 0.43%	G

Common chemical name	Company	Trade names and formulations	Use classification
Prodiamine	Anderson's Lawn Fert.	Pro. Turf Prod. 5-5-25 w/ Barricade Herb. — 0.43%	G
Prodiamine	Lesco	Lesco Barricade 0.28% Plus Fert. 0-0-7 (097213) — 0.28%	G
Prodiamine	Lesco	Lesco Barricade 0.28% Plus Fert. 19-0-2 (097645) — 0.28%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% Plus Fert. — 0.29%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% Plus Fert. — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% Plus Fert. 17-0-6 (701253) — 0.29%	G
Prodiamine	Lesco	Lesco stonewall 0.37% Plus Fert. 8-0-0 (701190) — 0.37%	G
Prodiamine	Lesco	Lesco Barricade 0.2% Plus Fert. 19-0-5 (701200) — 0.2%	G
Prodiamine	Lesco	Lesco Barricade 0.43% Plus Fert. 19-0-7 (701207) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 8-3-23M (701193) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% Plus Fert. 0-0-7 (702061) — 0.29%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% Plus Fert. 0-0-7M (702062) — 0.29%	G
Prodiamine	Lesco	Lesco Barricade 0.28% Plus Fert. 15-0-5 (701203) — 0.28%	G
Prodiamine	Lesco	Lesco Barricade 0.28% Plus Fert. 17-0-5 (701201) — 0.28%	G
Prodiamine	Lesco	Lesco Barricade 0.38% Plus Fert. 19-0-6 (701268) — 0.38%	G
Prodiamine	Lesco	Lesco Barricade 0.38% Plus Fert. 24-0-7 (701206) — 0.38%	G
Prodiamine	Lesco	Lesco Stonewall 0.2% Plus Fertilizer — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 0-0-8 — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% Plus Fert. 19-0-7 — 0.43%	G
Prodiamine	Lesco	Lesco Barricade 0.43% Plus Fert. 0-0-7 — 0.43%	G
Prodiamine	Lesco	Lesco Barricade 0.2% Plus Fert — 0.2%	G
Prodiamine	Lesco	Stonewall 0.43% Plus Fert. — 0.43%	G
Prodiamine	Lesco	Lesco Barricade 0.28% Plus Fert. — 0.28%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% Plus Fert. 14-0-4 (702112) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% Plus Fert. 15-0-0 (702113) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% Plus Fert. 19-0-6 (702114) — 0.37%	G
Prodiamine	Lebanon Seaboard	Lebanon ProScape Fert. 16-0-8 w/ Barricade 0.43% — 0.43%	G
Prodiamine	Gro Tec	Pennington Signature Series Crabgrass Prev. + Lawn Fert. — 0.29%	G
Prodiamine	Gro Tec	Sta-Green Phosphorus Free Crab-Ex Plus w/ Lawn Fert. — 0.37%	G
Prodiamine	Voluntary Purch. Groups	Ferti-lome for All Seasons Lawn Food Plus Crabgrass & Weed Prev. — 0.38%	G
Prodiamine	Harrell's	Fert. w/Barricade 0.38% — 0.38%	G
Prodiamine	Harrell's	Fert. w/Barricade 0.3% — 0.3%	G
Prodiamine	Harrell's	Fert. w/Ronstar 0.67% — 0.67%	G
Prodiamine	Harrell's	Fert. w/Barricade 0.21% — 0.21%	G
Prodiamine	Harrell's	Fert. w/Barricade 0.45% — 0.45%	G
Prodiamine	Turf Care Supply	TCS GrowStar Turf Fert. + 0.42% Prodiamine — 0.42%	G
Prodiamine	Howard Johnson's	Howard Johnson's Prem. Fert. Crabgrass Cont. Phosphate Free — 0.29%	G
Prodiamine	Howard Johnson's	Howard Johnson's Crabgrass Cont. Plus w/ 0.37% Prodiamine — 0.37%	G
Prodiamine	Howard Johnson's	HJE All Season Crabgrass Cont. Plus w/ Prodiamine — 0.29%	G
Prodiamine	Howard Johnson's	Pennington Seed Crabgrass Cont. Plus w/ 0.37% Prodiamine 17-0-3 — 0.37%	G
Prodiamine	Howard Johnson's	Crabgrass Cont. Plus w/ 0.37% Prodiamine — 0.37%	G
Prodiamine	Howard Johnson's	Crabgrass Cont. Plus w/ 0.37% Prodiamine — 0.37%	G
Prodiamine	Howard Johnson's	Howard Johnson's Crabgrass Cont. Plus w/ 0.37% Prodiamine 0-0-7 — 0.37%	G
Prodiamine	Central Garden & Pet	Pennington Ultragreen Crabgrass Prev. Plus Fert. 30-0-4 — 0.29%	G
Prodiamine	Sunniland	Turfgro Pro. Crabgrass Cont. Plus Fert. 19-0-8 — 0.37%	G
Sulfentrazone	Harrell's	Fert. w/ Echelon 0.5% — 0.5%	G
Sulfentrazone	Harrell's	Fert. w/ Echelon 0.3% — 0.3%	G
Sulfentrazone	Harrell's	Fert. w/ Echelon 0.375% — 0.38%	G
Trifluralin	Lebanon Seaboard	Preen Gon Weed Prev. Plus Plant Food — 1.47%	G
Trifluralin	Netafim Irrigation	Techfilter — 13.44%	G
Trifluralin	Knox Fert.	KGRO Garden Weed Prev. 9-17-9 — 0.74%	G

GLOSSARY OF HERBICIDE MIXTURES

Herbicide Mixtures for Cropland

Product	Company	Use Class	Chemical Content
1544 LCO Turf Herb.	PBIGordon	G	Penoxsulam — 0.71% + Carfentrazone-ethyl — 0.47% + 2,4-D ester — 0.72%
4-Speed Selective Herb.	Nufarm Americas	G	Mecoprop-P — 6.31% + Dicamba — 2.52% + 2,4-D — 38.03% + Pyraflufen-ethyl — 0.06%
4-Speed XT Selective Herb.	Nufarm Americas	G	Pyraflufen-ethyl — 0.07% + 2,4-D — 41.92% + Dicamba — 3.46% + Triclopyr — 4.81%
875 BrushKiller	PBIGordon	G	2,4-D amine — 23.45% + MCPP-p — 12.55% + Dicamba — 4.24%
Ace RTS Conc. Lawn Weed Killer	Chemsico	G	2,4-D amine — 0.84% + 2,4-D amine — 7.59% + MCPP-p — 1.83%
Aegis ESR	AMGI	G	Sodium 5-nitroguaiacolate — 0.1% + Sodium o-nitrophenolate — 0.2% + Sodium p-nitrophenolate — 0.3%
Afforia Herb.	DuPont	G	Flumioxazin — 40.8% + Tribenuron-methyl — 5% + Thifensulfuron methyl — 5%
Agrisolutions Confidence Xtra 5.6L Herb.	Monsanto	R	Acetochlor — 33.4% + Atrazine — 26.9%
Agrisolutions Confidence Xtra Herb.	Monsanto	R	Atrazine — 18.3% + Acetochlor — 46.3%
Alligare Cody Herb.	Alligare	G	2,4-D amine — 39% + Clopyralid — 5.1%
Alligare Dicamba + 2,4-D DMA	Alligare	G	2,4-D amine — 36% + Dicamba — 12.5%
Alligare MSM + Chlorsulfuron	Alligare	G	Metsulfuron-methyl — 48% + Chlorsulfuron — 15%
Alligare Picloram + D	Alligare	R	2,4-D amine — 39.6% + Picloram — 10.2%
Alligare Prescott Herb.	Alligare	G	Clopyralid — 12.1% + Triclopyr — 33%
All-Season Brush No-More	PBIGordon	G	Dicamba — 1.65% + 2,4-D ester — 9.74% + 2,4-D ester — 4.78%
All-In-One Lawn Weed & Crabgrass Killer I Conc.	Bayer Advanced	G	Quinclorac — 0.1% + 2,4-D amine — 4.85% + Dicamba — 0.45%
All-In-One Lawn Weed & Crabgrass Killer I RTS	Bayer Advanced	G	Quinclorac — 1.61% + Dicamba — 0.45% + 2,4-D amine — 4.85%
All-In-One Lawn Weed & Crabgrass Killer RTS	Bayer Advanced	G	Quinclorac — 1.61% + Dicamba — 0.45%
All-In-One Lawn Weed and Crabgrass Killer I RTU	Bayer Advanced	G	2,4-D amine — 0.31% + Dicamba — 0.03% + Quinclorac — 0.1%
Amdro Nutsedge & Crabgrass Killer Conc.	Central Garden & Pet	G	Sulfentrazone — 1.6% + Quinclorac — 5% + Sulfentrazone — 1.6% + Quinclorac — 5%
Amdro Powerflex Lawn Weed Killer Conc.	Ambrands	G	Mecoprop — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%
Andersons Golf Prod. Goosegrass/Crabgrass Cont.	Anderson's Lawn Fert.	G	Oxadiazon — 1.31% + Bensulide — 5.25%
Anthem ATZ Herb.	FMC	R	Atrazine — 42.5% + Pyroxasulfone — 5.15% + Fluthiacet-methyl — 0.15%
Anthem Flex Herb.	FMC	G	Pyroxasulfone — 37.1% + Carfentrazone-ethyl — 2.65%
Anthem Herb.	FMC	G	Fluthiacet-methyl — 0.69% + Pyroxasulfone — 22.61%
AquaStrike	United Phosphorus	G	Diquat dibromide — 10.6% + Dipotassium endothall — 28.6%
Aquasweep	Nufarm Americas	G	2,4-D amine — 34.2% + Triclopyr — 15.2%
ArmorTech SureZone	United Turf Alliance	G	Dicamba — 1.68% + 2,4-D amine — 18% + 2,4-D amine — 6.49% + Sulfentrazone — 0.43%
ArmorTech Threesome	United Turf Alliance	G	Dicamba — 2.77% + 2,4-D amine — 8.17% + 2,4-D — 30.56%
Audit 1:1	Arysta Lifescience	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 25%
Audit 4:1 Herb.	Arysta Lifescience	G	Thifensulfuron methyl — 40% + Tribenuron-methyl — 10%
Audit 75 WDG Herb.	Arysta Lifescience	G	Tribenuron-methyl — 18.75% + Thifensulfuron methyl — 56.25%
Authority Assist Herb.	FMC	G	Imazethapyr — 6.67% + Sulfentrazone — 33.33%
Authority Elite Herb.	FMC	G	Sulfentrazone — 7.55% + S-Metolachlor — 68.25%
Authority First DF Herb.	FMC	G	Cloransulam-methyl — 7.9% + Sulfentrazone — 62.1%
Authority Maxx Herb.	FMC	G	Sulfentrazone — 62.12% + Chlorimuron-ethyl — 3.88%
Authority MTZ DF Herb.	FMC	G	Sulfentrazone — 18% + Metribuzin — 27%
Authority XL Herb.	FMC	G	Sulfentrazone — 62.22% + Chlorimuron-ethyl — 7.78%
Autumn Super 51 WDG Herb.	Bayer Cropscience	G	Iodosulfuron-methyl-sodium — 6% + Thiencarbazone-methyl — 45%
Axial Star Herb.	Syngenta Crop Prot.	G	Fluroxypyr — 12.4% + Pinoxaden — 4.9%
Axiom DF Herb.	Bayer Cropscience	G	Metribuzin — 13.6% + Flufenacet — 54.4%
Bareground Ultra	Pro Serve	G	Sodium chlorate — 30% + Borate — 49% + Bromacil — 1.5%
Barren	Total Solutions	G	2,4-D ester — 1.09% + Bromacil — 0.98%
Barrier Year-long Vegetation Killer Conc.	PBIGordon	G	Imazapyr — 1.74% + Glyphosate — 3.82%
Basis Blend Herb.	DuPont	G	Thifensulfuron methyl — 10% + Rimsulfuron — 20%
Basis Gold Herb.	DuPont	R	Nicosulfuron — 1.34% + Rimsulfuron — 1.34% + Atrazine — 86.78%
Basis Herb.	DuPont	G	Thifensulfuron methyl — 25% + Rimsulfuron — 50%
Battle Star GT	Albaugh	G	Fomesafen — 5.88% + Glyphosate — 31.75%
Biathlon Ornamental Herb.	Ohp	G	Prodiamine — 0.75% + Oxyfluorfen — 2%
Bicep II Magnum	Syngenta Crop Prot.	R	S-Metolachlor — 26.1% + Atrazine — 33%
Bicep II Magnum FC	Syngenta Crop Prot.	R	S-Metolachlor — 26.1% + Atrazine — 33%
Bicep Lite II Magnum	Syngenta Crop Prot.	R	Atrazine — 27.3% + S-Metolachlor — 35.8%
Blindside Herb.	FMC	G	Metsulfuron-methyl — 6% + Sulfentrazone — 60%
Bonus S Max South. Weed & Feed & Fire Ant Killer 1 30-2-9	Scotts	G	Bifenthrin — 0.14% + Atrazine — 1.35%
Bonus S Max South. Weed & Feed & Fire Ant Killer 26-2-9	Scotts	G	Atrazine — 1.07% + Bifenthrin — 0.11%
Boundary 6.5EC	Syngenta Crop Prot.	G	S-Metolachlor — 58.2% + Metribuzin — 13.8%
Brash	Winfield Solutions	G	Dicamba — 12.4% + 2,4-D amine — 35.7%
Brawl ll ATZ Herb.	Tenkoz	R	S-Metolachlor — 26.1% + Atrazine — 33%
Breakfree ATZ Herb.	DuPont	R	Atrazine — 24.4% + Acetochlor — 32.6%
Breakfree ATZ Lite Herb.	DuPont	R	Acetochlor — 43.4% + Atrazine — 16.3%
Breakfree NXT ATZ Herb.	DuPont	R	Atrazine — 26.9% + Acetochlor — 33.4%
Breakfree NXT ATZ Herb.	DuPont	R	Atrazine — 26.9% + Acetochlor — 33.4%

Product	Company	Use Class	Chemical Content
Breakfree NXT Lite Herb.	DuPont	R	Acetochlor — 46.3% + Atrazine — 18.3%
Breakfree NXT Lite Herb.	DuPont	R	Acetochlor — 46.3% + Atrazine — 18.3%
Broadaxe Herb.	FMC	G	Sulfentrazone — 7.55% + S-Metolachlor — 68.25%
Broadhead Herb.	FMC	G	Quinclorac — 66.1% + Carfentrazone-ethyl — 3.9%
Bromacil/Diuron 40/40	Alligare	G	Bromacil — 40% + Diuron — 40%
Brush Killer	PBIGordon	G	MCPP-p — 6.93% + 2,4-D amine — 25.93% + Dicamba — 2.76%
Brushmaster Herb.	PBIGordon	G	2,4-D ester — 9.24% + Dicamba — 3.01% + 2,4-D ester — 18.85%
Buctril 4 EC Herb.	Bayer Cropscience	G	Bromoxynil octanoic — 28% + Bromoxynil — 27%
Bullet Herb.	Monsanto	R	Atrazine — 14.5% + Alachlor — 25.4%
Burnmaster Herb.	Nufarm	G	Dicamba — 10.73% + 2,4-D — 49.64%
Cadence* ATZ NXT Herb.	Loveland Prod.	R	Acetochlor — 33.4% + Atrazine — 26.9%
Cadence* LA NXT Herb.	Loveland Prod.	R	Atrazine — 18.3% + Acetochlor — 46.3%
Callisto GT	Syngenta Crop Prot.	G	Mesotrione — 3.4% + Glyphosate — 34%
Callisto Xtra	Syngenta Crop Prot.	R	Mesotrione — 5.36% + Atrazine — 34.3%
Campaign Herb.	Monsanto	G	Glyphosate — 12.9% + 2,4-D amine — 20.6%
Candor Herb.	Nufarm Americas	G	2,4-D ester — 34.4% + Triclopyr — 16.5%
Canopy Blend Herb.	DuPont	G	Chlorimuron-ethyl — 8.3% + Metribuzin — 50%
Canopy Herb.	DuPont	G	Metribuzin — 64.3% + Chlorimuron-ethyl — 10.7%
Canopy EX Herb.	DuPont	G	Tribenuron-methyl — 6.8% + Chlorimuron-ethyl — 22.7%
Capreno Herb.	Bayer Cropscience	G	Thiencarbazone-methyl — 5.6% + Tembotrione — 28.3%
Capstone	Dow Agrosciences	G	Triclopyr — 16.22% + Aminopyralid — 2.22%
Catamaran	Luxembourg-pamol	G	Chlorothalonil — 16.7% + Phosphorous acid — 38.9%
Cavalcade PQ	Advan	G	Prodiamine — 32.5% + Quinclorac — 32.5%
Caveat Herb.	Agsurf	G	Rimsulfuron — 25% + Nicosulfuron — 50%
Cedock Herb.	Agsurf	G	Metribuzin — 64.3% + Chlorimuron-ethyl — 10.7%
Celsius WG Herb.	Bayer Env. Science	G	Dicamba — 57.4% + Thiencarbazone-methyl — 8.7% + Iodosulfuron-methyl-sodium — 1.9%
Change Up Selective Herb.	Nufarm Americas	G	Fluroxypyr — 6% + Dicamba — 4.17% + MCPA — 51.05%
Chaparral	Dow Agrosciences	G	Aminopyralid — 62.13% + Metsulfuron-methyl — 9.45%
Chaser 2 Amine	Loveland Prod.	G	Triclopyr — 15.2% + 2,4-D amine — 34.2%
Chaser Turf Herb.	Loveland Prod.	G	2,4-D ester — 34.4% + Triclopyr — 16.5%
Chettah Max Herb.	Nufarm	G	Fomesafen — 10.88% + Glufosinate — 20.73%
Chickweed Clover & Oxalis Killer	Bonide Prod.	G	Dicamba — 1.35% + MCPA — 13.72% + Triclopyr — 1.56%
Chickweed Clover & Oxalis Killer RTU	Bonide Prod.	G	Triclopyr — 0.08% + MCPA — 0.74% + Dicamba — 0.07%
Chisum Herb.	Cheminova	G	Metsulfuron-methyl — 48% + Chlorsulfuron — 15%
Chlormet Herb.	Agsurf	G	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%
Chlormet XP Herb.	Agsurf	G	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%
Cimarron Max Herb.	DuPont	G	2,4-D — 35.25% + Dicamba — 12.25% + Metsulfuron-methyl — 0.75%
Cimarron Max Part B Herb.	DuPont	G	Dicamba — 12.4% + 2,4-D — 35.7%
Cimarron Plus Herb.	DuPont	G	Chlorsulfuron — 15% + Metsulfuron-methyl — 48%
Cinch ATZ Herb.	DuPont	R	S-Metolachlor — 26% + Atrazine — 33%
Cinch ATZ Lite Herb.	DuPont	R	Atrazine — 28.1% + S-Metolachlor — 35.8%
Civility Extra	Innvictis Crop Care	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%
Cleansweep D Herb.	Nufarm	G	Bromoxynil octanoate — 24.01% + 2,4-D ester — 31.22% + Fluroxypyr — 9.5%
Clear Choice	Petro-Canada Lubricants	G	2,4-D amine — 0.03% + Mecoprop — 0.02% + Dicamba — 0%
Clear Choice Conc.	Petro-Canada Lubricants	G	Dicamba — 0% + Mecoprop-P — 0.02% + 2,4-D amine — 0.03%
Clearpath Herb.	BASF	G	Quinclorac — 61.98% + Imazethapyr — 13.02%
Cloak EX Herb.	Nufarm	G	Chlorimuron-ethyl — 22.7% + Tribenuron-methyl — 6.8%
Cloak Herb.	Nufarm	G	Metribuzin — 64.3% + Chlorimuron-ethyl — 10.7%
Confidence Xtra 5.6L Herb.	Monsanto	R	Acetochlor — 33.4% + Atrazine — 26.9%
Confidence Xtra Herb.	Monsanto	R	Atrazine — 18.3% + Acetochlor — 46.3%
Confront	Dow Agrosciences	G	Clopyralid — 12.1% + Triclopyr — 33%
Consust WDG T&O Fungicide	Regal Chem.	G	Chlorothalonil — 50% + Thiophanate-methyl — 16.66%
Cool Power Selective Herb.	Nufarm Americas	G	Triclopyr — 5% + Dicamba — 3.6% + MCPA — 56.14%
Corvus Herb.	Bayer Cropscience	R	Thiencarbazone-methyl — 7.6% + Isoxaflutole — 19%
Crab-E-Rad Plus	Lawn and Garden Prod.	G	2,4-D — 6.56% + Dicamba — 0.68% + Quinclorac — 4.09%
Crab-E-Rad Plus RTU	Lawn and Garden Prod.	G	Dicamba — 0.03% + 2,4-D amine — 0.33% + Quinclorac — 0.21%
Credit Xtreme Herb.	Nufarm	G	Glyphosate — 30.94% + Glyphosate — 22.99%
Crossbow	Dow Agrosciences	G	2,4-D ester — 34.4% + Triclopyr — 16.5%
Crossbow	Helena Chem.	G	2,4-D — 34.4% + Triclopyr — 16.5%
Crossbow	South. Ag. Insecticides	G	2,4-D ester — 34.4% + Triclopyr — 16.5%
Crossbow	Universal Crop Protection	G	2,4-D — 34.4% + Triclopyr — 16.5%
Crossbow Herb.	Tenkoz	G	2,4-Dester — 34.4% + Triclopyr — 16.5%
Crossbow L Herb.	Loveland Prod.	G	Triclopyr — 16.5% + 2,4-D ester — 34.4%
Crusher Herb.	Cheminova	G	Rimsulfuron — 25% + Thifensulfuron methyl — 25%
Degree Xtra Herb.	Monsanto	R	Atrazine — 14.5% + Acetochlor — 29%
Derigo Herb.	Bayer Env. Science	G	Foramsulfuron — 24% + Iodosulfuron-methyl-sodium — 2.4% + Thiencarbazone-methyl — 10%
Dibro 2+2	Nufarm Americas	G	Bromacil — 2% + Diuron — 2%
Dibro 4 + 2	Nufarm Americas	G	Bromacil — 2% + Diuron — 4%
Dicamba + 2,4-D	Tacoma Ag	G	Dicamba — 12.5% + 2,4-D — 36%
Diligent Herb.	DuPont	G	Flumioxazin — 25.25% + Rimsulfuron — 6.31% + Chlorimuron-ethyl — 6.31%

Product	Company	Use Class	Chemical Content
Dismiss South Herb.	FMC	G	Imazethapyr — 6.67% + Sulfentrazone — 33.33%
Distinct Herb.	BASF	G	Dicamba — 55% + Diflufenzopyr-sodium — 21.4%
Doom Weed Killer Spray	QuestVapco	G	2,4-D amine — 0.29% + Bromacil — 0.5%
Drexel Simazat 4L	Drexel Chem.	R	Atrazine — 21.03% + Simazine — 21.41%
Drexel Trizmet II	Drexel Chem.	R	Atrazine — 33.1% + Metolachlor — 26.1%
Duet	RiceCo.	G	Bensulfuron-methyl — 0.32% + Propanil — 41.2%
DuraTurf Lawn Weed Killer	Bonide Prod.	G	MCPP-p — 0.31% + 2,4-D — 1.37% + Dicamba — 0.13%
DuraTurf Crabgrass Plus Crabgrass & Broadleaf Weed Killer	Bonide Prod.	G	Quinclorac — 0.35% + Dithiopyr — 0.12% + Dicamba — 0.06% + 2,4-D — 0.68%
DuraZone Conc. Weed & Grass Killer	Bayer Advanced	G	Diquat dibromide — 0.89% + Glyphosate — 20.46% + Indaziflam — 0.09%
DuraZone RTU Weed & Grass Killer	Bayer Advanced	G	Indaziflam — 0.01% + Diquat dibromide — 0.06% + Glyphosate — 1.41%
E-2 Herb.	Nufarm Americas	G	2,4-D — 39.53% + Dicamba — 4.1% + Fluroxypyr — 5.9%
Echelon 4SC Herb.	FMC	G	Prodiamine — 27.3% + Sulfentrazone — 13.6%
Endrun	Helena Chem.	G	Dicamba — 2.77% + MCPP — 8.17% + 2,4-D — 30.56%
Enlite Herb.	DuPont	G	Flumioxazin — 36.21% + Chlorimuron-ethyl — 2.85% + Thifensulfuron methyl — 8.8%
Enforcer Weed Shot Lawn Weed Killer Conc.	Zep Commercial	G	Mecoprop-P — 1.34% + Dicamba — 0.62% + 2,4-D amine — 5.56%
Envive Combo 770 Herb.	DuPont	G	Thifensulfuron methyl — 2.9% + Chlorimuron-ethyl — 9.2% + Flumioxazin — 29.2%
Envive Herb.	DuPont	G	Thifensulfuron methyl — 2.9% + Chlorimuron-ethyl — 9.2% + Flumioxazin — 29.2%
Eraser Foaming Weed Killer	Cont. Solutions	G	Glyphosate — 0.96% + Pelargonic acid — 1%
Escalade 2	Nufarm Americas	G	2,4-D — 39.53% + Dicamba — 4.1% + Fluroxypyr — 5.9%
Esplanade EZ	Bayer Env. Science	G	Indaziflam — 0.09% + Glyphosate — 20.46% + Diquat dibromide — 0.89%
Everett	Alligare	G	Triclopyr — 16.5% + 2,4-D ester — 34.4%
Expert Gardener Crabgrass & Broadleaf Weed Killer	Gro Tec	G	Dicamba — 0.18% + Quinclorac — 2.74%
Expert Herb.	Syngenta Crop Prot.	R	Atrazine — 22.9% + Glyphosate — 10.8% + S-Metolachlor — 18.6%
Extreme Herb.	BASF	G	Glyphosate — 22% + Imazethapyr — 1.8%
FallOut Herb.	Agsurf	G	Tribenuron-methyl — 6.8% + Chlorimuron-ethyl — 22.7%
Fierce Herb.	Valent U.S.A.	G	Flumioxazin — 33.5% + Pyroxasulfone — 42.5%
Fierce XLT Soybean Herb.	Valent U.S.A.	G	Flumioxazin — 24.57% + Pyroxasulfone — 31.17% + Chlorimuron — 6.67%
Finesse Cereal and Fallow Herb.	DuPont	G	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%
Finesse Grass & Broadleaf Herb.	DuPont	G	Flucarbazone-sodium — 46.7% + Chlorsulfuron — 25%
Finesse Herb.	DuPont	G	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%
FirstShot SG Burndown Herb. (w/ TotalSol SG)	DuPont	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 25%
Flexstar GT 3.5	Syngenta Crop Prot.	G	Glyphosate — 22.4% + Fomesafen — 5.88%
FM 5050-ES Weed Zapper	Delta Foremost Chem.	G	Petroleum distillate, oils, solvent, or hydrocarbons; also paraffinic hydrocarbons, aliphatic hydrocarbons, paraffinic oil — 85.45% + Bromacil — 1%
ForeFront HL	Dow Agrosciences	G	Aminopyralid — 8.24% + 2,4-D amine — 41.26%
ForeFront R&P	Dow Agrosciences	G	2,4-D — 51.06% + Aminopyralid — 6.58%
Freehand 1.75G Herb.	BASF	G	Pendimethalin — 1% + dimethenamide-P — 0.75%
FulTime	Dow Agrosciences	R	Atrazine — 16.6% + Acetochlor — 24.8%
FulTime NXT	Dow Agrosciences	R	Atrazine — 14.5% + Acetochlor — 29%
Fusion Herb.	Syngenta Crop Prot.	G	Fenoxaprop-p-ethyl — 6.76% + Fluazifop-P-butyl — 24.15%
Galvan	Innvictis Crop Care	G	Metribuzin — 14.13 + Metolachlor — 57.64%
Gangster Herb.	Valent U.S.A.	G	Flumioxazin — 51% + Cloransulam-methyl — 84%
Gemini 3.7 SC	Everris NA	G	Isoxaben — 15.5% + Prodiamine — 23.3%
GF-2726 SR	Dow Agrosciences	G	2,4-D — 24.4% + Glyphosate — 22.1%
GF-2727	Dow Agrosciences	G	Glyphosate — 22.1% + 2,4-D — 24.4%
G-Max Lite Herb.	BASF	R	Atrazine — 29.5% + dimethenamide-P — 24.1%
Grasp Xtra	Dow Agrosciences	G	Triclopyr — 23.06 + Penoxsulam — 2.77%
Grazon P+D	Dow Agrosciences	R	2,4-D — 39.6% + Picloram — 10.2%
GrazonNext	Dow Agrosciences	G	Aminopyralid — 6.58% + 2,4-D — 51.06%
GrazonNext HL	Dow Agrosciences	G	Aminopyralid — 8.24% + 2,4-D amine — 41.26%
Green Light Amaze Grass & Weed Prev.3	Swiss Farms Prod.	G	Oryzalin — 1% + Benefin — 1%
Green Thumb Conc. Lawn Weed Killer	Bonide Prod.	G	2,4-D amine — 0.6% + MCPP — 0.14% + Dicamba — 0.07%
Green Thumb Conc. Vegetation Killer	True Value	G	Imazapyr — 0.09% + Glyphosate — 5.03%
Green Thumb RTS Lawn Weed Killer	True Value	G	Mecoprop-P — 1.34% + 2,4-D amine — 5.56% + Dicamba — 0.62%
Green Thumb RTU Lawn Weed Killer	Bonide Prod.	G	Dicamba — 0.07% + 2,4-D amine — 0.6% + Mecoprop — 0.14%
Green Thumb RTU Vegetation Killer	True Value	G	Imazapyr — 0.02% + Glyphosate — 1.02%
Groundclear Vegetation Killer Conc.	Ortho Group	G	Glyphosate — 5% + Imazapyr — 0.08%
Groundclear Vegetation Killer RTU1	Ortho Group	G	Glyphosate — 5% + Imazapyr — 0.08%
Groundclear Vegetation Killer RTU	Ortho Group	G	Glyphosate — 1% + Imazapy5 — 0.02%
Ground Force Vegetation Killer Conc.	Bonide Prod.	G	Glyphosate — 5.03% + Imazapyr — 0.09%
Ground Force Vegetation Killer RTU	Bonide Prod.	G	Imazapyr — 0.02% + Glyphosate — 1.02%
GroundWork Conc. Crabgrass & Broadleaf Weed Killer	PBIGordon	G	2,4-D amine — 6.42% + Quinclorac — 2.13% + Dicamba — 0.6%
GroundWork Conc. Poison Ivy & Brush Killer	PBIGordon	G	MCPP-p — 2.92% + 2,4-D amine — 12.1% + Dicamba — 1.34%
GroundWork Conc. Weed Killer	PBIGordon	G	Dicamba — 0.84% + MCPP-p — 1.83% + 2,4-D amine — 7.59%
GroundWork Conc. Year-Long Vegetation Cont.	PBIGordon	G	Glyphosate — 0.58% + Imazapyr — 0.27%
Guardsman Max Herb.	BASF	R	dimethenamide-P — 18.2% + Atrazine — 35.3%
Halex GT	Syngenta Crop Prot.	G	Mesotrione — 2.05 + S-Metolachlor — 20.5% + Glyphosate — 20.5%
Harmony Extra Herb.	DuPont	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%

Product	Company	Use Class	Chemical Content
Harmony Extra Herb. (w/ TotalSol SG)	DuPont	G	Tribenuron-methyl — 16.67% + Thifensulfuron methyl — 33.33%
Harmony Extra SG Herb. (w/ TotalSol SG)	DuPont	G	Tribenuron-methyl — 16.67% + Thifensulfuron methyl — 33.33%
Harmony Extra XP Herb.	DuPont	G	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%
Harness Xtra 5.6L Herb.	Monsanto	R	Acetochlor — 33.4% + Atrazine — 26.9%
Harness Xtra Herb.	Monsanto	R	Atrazine — 18.3% + Acetochlor — 46.3%
Harrell's Granular Herb. 75	Harrell's	G	Trifluralin — 3% + Oxyfluorfen — 2%
Harrow Herb.	Cheminova	G	Thifensulfuron methyl — 25% + Rimsulfuron — 50%
HireHand P+D	Dow Agrosciences	R	2,4-D — 39.6% + Picloram — 10.2%
Hi-Dep Broadleaf Herb.	PBIGordon	G	2,4-D amine — 16.3% + 2,4-D amine — 33.2%
Hi-Yield Crabgrass Cont.	Voluntary Purch. Groups	G	Benefin — 1.33% + Trifluralin — 0.67%
Hi-Yield Killzall Ext. Cont.	Voluntary Purch. Groups	G	Glyphosate — 40.15% + Prodiamine — 7.51%
Hi-Yield Killzall Ext. Cont. RTU	Voluntary Purch. Groups	G	Prodiamine — 0.5% + Glyphosate — 2%
Hornet WDG	Dow Agrosciences	G	Clopyralid — 60% + Flumetsulam — 18.5%
Horsepower Selective Herb.	Nufarm Americas	G	Triclopyr — 5.59% + Dicamba — 4.82% + MCPA — 48.99%
Huskie Herb.	Bayer Cropscience	G	Bromoxynil octanoate — 13.4% + Pyrasulfotole Technical — 3.3% + Bromoxynil heptanoate — 12.9%
Image Herb. Kills Crabgrass II	Ambrands	G	Quinclorac — 56.25% + Sulfentrazone — 18.75%
Instigate Herb.	DuPont	G	Mesotrione — 41.67% + Rimsulfuron — 4.17%
Intimidator	Loveland Prod.	G	Fomesafen — 7.16% + S-Metolachlor — 36.29% + Metribuzin — 8.05%
Jewel Pre-emergent Herb.	Everris NA	G	Pendimethalin — 1.25% + Oxadiazon — 2%
Keystone	Dow Agrosciences	R	Acetochlor — 32.6% + Atrazine — 24.4%
Keystone LA	Dow Agrosciences	R	Acetochlor — 43.4% + Atrazine — 16.3%
Keystone LA NXT	Dow Agrosciences	R	Atrazine — 18.3% + Acetochlor — 46.3%
Keystone NXT	Dow Agrosciences	R	Acetochlor — 33.4% + Atrazine — 26.9%
Knock Down	Pro Chem	G	Bromacil — 0.5% + 2,4-D amine — 0.29%
Knock Out II	Aero Chem.	G	2,4-D ester — 1.09% + Bromacil — 0.98%
Knock Out Non-Selective Weed Killer	Aero Chem.	G	2,4-D ester — 1.09% + Bromacil — 0.98%
Krovar I DF Herb.	DuPont	G	Diuron — 40% + Bromacil — 40%
Landmark XP Herb.	DuPont	G	Chlorsulfuron — 25% + Sulfometuron methyl — 50%
Lariat Flowable Herb.	Monsanto	R	Atrazine — 15.5% + Alachlor — 27.2%
Last Call Selective Herb.	Nufarm Americas	G	Fluroxypyr — 3.89% + Fenoxaprop-p-ethyl — 2.7% + Dicamba — 2.7%
LATIGO	Helena Chem.	G	Dicamba — 18.28% + 2,4-D — 24.62%
Lawn Weed Cont.	Scotts	G	2-4,D — 2.95% + Dicamba — 0.48%
Layby Pro	Tessenderlo Kerley	G	Linuron — 20.3% + Diuron — 20%
Lazer MC	Nufarm	G	Dicamba — 2.32% + 2-4,D — 54.18% + MCPP — 13.31%
LeadOff Herb.	DuPont	G	Rimsulfuron — 16.7% + Thifensulfuron methyl — 16.7%
Ledger Herb.	Tenkoz	G	Metribuzin — 13.8% + S-Metolachlor — 58.2%
Lesco Echelon 0.3% Plus Fert. 11-0-5 (702125)	Lesco	G	Prodiamine — 0.2% + Sulfentrazone — 0.1%
Lesco Eliminate LO Herb.	Lesco	G	Dicamba — 2.3% + 2,4-D — 47.33% + Mecoprop-P — 8.17%
Lesco Eliminate Q Weed & FeedLIMINATE Q WEED & FEED	Lesco	G	Dicamba — 0.06% + 2,4-D — 0.68% + Quinclorac — 0.35%
Lesco Eliminate-D Herb.	Lesco	G	Dimethoxane — 2.64% + MCPA — 9.97% + 2,4-D amine — 6.61%
Lesco LockUp Extra 2 w/ Fert. 0-0-4M (702187)	Lesco	G	Penoxsulam — 0.01% + 2,4-D — 1.04% + Dicamba — 0.08%
Lesco Momentum FX2 Herb.	Lesco	G	Fluroxypyr — 4.2% + 2,4-D — 44.2% + Triclopyr — 3.86%
Lesco Momentum Q Herb.	Nufarm Americas	G	2,4-D — 13.24% + Dicamba — 1.38% + Quinclorac — 8.25%
Lesco RedZone 2 Herb.	Nufarm Americas	G	Mecoprop-P — 6.31% + Dicamba — 2.52% + 2,4-D — 38.03% + Pyraflufen-ethyl — 0.06%
Lesco Stonewall PQ Herb.	Advan	G	Prodiamine — 32.5% + Quinclorac — 32.5%
Lesco Three-Way Ester ll Herb.	Lesco	G	Dicamba — 3.6% + MCPA — 56.14% + Triclopyr — 5%
Lesco Three-Way Selective Herb.	Lesco	G	Mecoprop — 8.17% + Dicamba — 2.77% + 2,4-D — 30.56%
LEXAR EZ HERB.	Syngenta Crop Prot.	R	Mesotrione — 2.44% + S-Metolachlor — 19% + Atrazine — 18.61%
LEXAR HERB.	Syngenta Crop Prot.	R	S-Metolachlor — 19% + Atrazine — 18.61% + Mesotrione — 2.44%
Liberator 531	Atco Intl.	G	2,4-D — 0.6% + Dicamba — 0.25% + MCPP-p — 1.04%
Liberator 600	Atco Intl.	G	Bromacil — 0.98% + 2,4-D ester — 1.09%
Lineage Clearstand Herb.	DuPont	G	Imazapyr — 63.2% + Metsulfuron-methyl — 9.5%
Lineage HWC Herb.	DuPont	G	Sulfometuron methyl — 28.1% + Imazapyr — 37.5% + Metsulfuron-methyl — 7.5%
Lineage Prep Herb.	DuPont	G	Sulfometuron methyl — 15.3% + Imazapyr — 54.5% + Metsulfuron-methyl — 4.1%
Liquid Turf Builder w/ Plus 2 Weed Cont. 25-1-2, 25-0-2	Scotts	G	Mecoprop-P — 1.15% + 2,4-D amine — 2.29% + Dichlorprop — 1.13%
Lumax EZ Herb.	Syngenta Crop Prot.	R	Atrazine — 10.2% + S-Metolachlor — 27.1% + Mesotrione — 2.71%
Lumax Selective Herb.	Syngenta Crop Prot.	R	S-Metolachlor — 29.4% + Atrazine — 11% + Mesotrione — 2.94%
M1750 Herb.	Monsanto	G	Glyphosate — 37.9% + Dicamba — 18.8%
Makaze Yield Pro	Loveland Prod.	G	Cytokinin (as kinetin) — 0.01% + IBA — 0.5% + Glyphosate — 41%
Marvel Herb.	FMC	G	Fluthiacet-methyl — 1.2% + Fomesafen — 30.08%
Matador	Loveland Prod.	G	Metolachlor — 43.72% + Metribuzin — 6.14% + Imazethapyr — 1.38%
Matador-S	Loveland Prod.	G	Metribuzin — 8.23% + Metolachlor — 37.08% + Imazethapyr — 1.83%
Mec Amine-D	Loveland Prod.	G	Mecoprop-P — 8.17% + Dicamba — 2.77% + 2,4-D amine — 30.56%
Medal	Syngenta Crop Prot.	R	S-Metolachlor — 26.1% + Atrazine — 33%
Milestone VM Plus	Dow Agrosciences	G	Triclopyr — 16.22% + Aminopyralid — 2.22%
Millennium Ultra 2	Nufarm Americas	G	Dicamba — 4.65% + 2,4-D — 37.32% + Clopyralid — 2.54%
Misty 2 Plus 2	Amrep	G	Diuron — 2% + Bromacil — 2%
Misty C-Lex II	Amrep	G	Dicamba — 0.62% + 2,4-D amine — 5.56% + MCPP — 1.34%
Misty Repco Kill III	Amrep	G	2,4-D ester — 1.09% + Bromacil — 0.98%

Product	Company	Use Class	Chemical Content
Misty Repco Kill LF	Amrep	G	Bromacil — 0.61% + 2,4-D ester — 1.09%
Mojave 70 EG	Alligare	G	Imazapyr — 7.78% + Diuron — 62.22%
Monobor Chlorate	Pro Serve	G	Borate — 48.5% + Sodium chlorate — 30%
Nautique	Sepro	G	Copper — 14.9% + Copper — 13.2%
Negate 37WG	Cont. Solutions	G	Metsulfuron-methyl — 20% + Rimsulfuron — 16.67%
Nimble Herb/	Cheminova	G	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%
Northstar CustomPak	Syngenta Crop Prot.	G	Primisulfuron-methyl — 7.5% + Dicamba — 43.9%
Nufarm Double O SPC Herb.	Nufarm Americas	G	Oxyfluorfen — 2% + Oryzalin — 1%
Nufarm Imazuron Herb.	Nufarm Americas	G	Imazapyr — 7.78% + Diuron — 62.22%
Obey Herb.	FMC	G	Quinclorac — 13.2% + Clomazone — 13.2%
OH 2 Ornamental Herb.	Scotts	G	Oxyfluorfen — 2% + Pendimethalin — 1%
OH2	Everris NA	G	Pendimethalin — 1% + Oxyfluorfen — 2%
Olympus Flex Herb.	Bayer Cropscience	G	Mesosulfuron-methyl — 4.5% + GPropoxycarbazone-sodium — 6.75
On Deck	Helena Chem.	G	Dicamba — 10.8% + 2,4-D — 24.16%
One Step	Momarorporated	G	2,4-D — 1.09% + Bromacil — 0.98%
Onetime Herb.	BASF	G	Mecoprop — 7.98% + Dicamba — 2.13% + Quinclorac — 15.95%
Opensight	Dow Agrosciences	G	Aminopyralid — 62.13% + Metsulfuron-methyl — 9.45%
Optill powered by Kixor Herb.	BASF	G	Saflufenacil — 17.8% + Imazethapyr — 50.2%
Optill PRO powered by Kixor Herb.	BASF	G	Imazethapyr — 50.2% + Saflufenacil — 17.8% + dimethenamide-P — 63.9%
Orion Herb.	Syngenta Crop Prot.	G	Florasulam — 0.39% + MCPA — 42.25%
Oust Extra Herb.	DuPont	G	Metsulfuron-methyl — 15% + Sulfometuron methyl — 56.25%
Oustar Herb.	DuPont	G	Sulfometuron methyl — 11.8% + Hexazinone — 63.2%
Outlaw	Helena Chem.	G	2,4-D — 24.28% + Dicamba — 12.18%
Overdrive Herb.	BASF	G	Dicamba — 55% + Diflufenzopyr — 21.4%
Panoflex Herb.	DuPont	G	Thifensulfuron methyl — 10% + Tribenuron-methyl — 40%
Pastora Herb.	DuPont	G	Metsulfuron-methyl — 15% + Nicosulfuron — 56.2%
Pasture Pro Brush Killer for Hard-to-Kill Brush	PBIGordon	G	Dicamba — 1.22% + 2,4-Dester — 15.97% + Triclopyr — 8.4%
Pasture Pro Herb.	PBIGordon	G	2,4-D amine — 16.3% + 2,4-D amine — 33.2%
Pasture Pro Weed & Brush Killer Tankables	PBIGordon	G	2,4-D amine — 16.3% + 2,4-D amine — 33.2%
Parallel Plus	Makhteshim-Agan	R	Metolachlor — 28.9% + Atrazine — 30%
PasturAll HL	Dow Agrosciences	G	2,4-D — 44.45% + Aminopyralid — 2%
PastureGard	Dow Agrosciences	G	Triclopyr — 25% + Fluroxypyr — 8.6%
PastureGard HL	Dow Agrosciences	G	Triclopyr — 45.07% + Fluroxypyr — 15.56%
Pathway	Dow Agrosciences	G	2,4-D amine — 20.9% + Picloram — 5.4%
Patron170	Nufarm Americas	G	2,4-DP-p — 16.1% + 2,4-D — 32.1%
Pennington Lawn Weed Killer	Gro Tec	G	Mecoprop — 0.21% + Dichlorprop — 0.21% + 2,4-D — 0.43%
Permit Plus Herb.	Gowan	G	Thifensulfuron methyl — 7.78% + Halosulfuron-methyl — 66.2%
Perspective Herb.	DuPont	G	Aminocyclopyrachlor — 39.5% + Chlorsulfuron — 15.8%
Piper Herb.	Valent U.S.A.	G	Flumioxazin — 33.5% + Pyroxasulfone — 42.5%
Poison Ivy & Brush Killer BK-32 Conc.	Bonide Prod.	G	Dicamba — 1.35% + MCPA — 13.72% + Triclopyr — 1.56%
Poison Oak & Ivy Killer RTU	Bonide Prod.	G	Dicamba — 0.07% + 2,4-D amine — 0.6% + Mecoprop-P — 0.14%
Power Zone Broadleaf Herb. for Turf	PBIGordon	G	Carfentrazone-ethyl — 0.48% + MCPP-p — 5.39% + Dicamba — 2.69% + MCPA — 41.98%
Pramitol 5PS	Makhteshim-Agan	G	Sodium chlorate — 39.8% + Prometon — 5% + Borate — 40.78%
Pramitol 5PS Pelleted Herb.	Loveland Prod.	G	Borate — 40.78% + Prometon — 5% + Sodium chlorate — 39.8%
Preen Lawn Weed Cont.	Lebanon Seaboard	G	2,4-D — 1.37% + Dicamba — 0.13% + 2,4-D — 0.31%
Preen Lawn Weed Cont. plus Crabgrass Prev.	Lebanon Seaboard	G	Dithiopyr — 0.16% + Mecoprop-P — 0.14% + Dicamba — 0.06% + 2,4-D — 0.64%
Preen Mulch Plus	Lebanon Seaboard	G	Isoxaben — 0% + Trifluralin — 0%
Prefix Herb.	Syngenta Crop Prot.	G	S-Metolachlor — 46.4% + Fomesafen — 10.2%
Prep-It Herb.	Loveland Prod.	G	Imazapyr — 8.36% + Glyphosate — 22.13%
Primera Millennium Ultra 2	Nufarm Americas	G	Dicamba — 4.65% + 2,4-D — 37.32% + Clopyralid — 2.54%
Primera Triplet Low Odor	Nufarm Americas	G	Mecoprop-P — 8.17% + Dicamba — 2.3% + 2,4-D — 47.33%
Primera Triplet SF	Nufarm Americas	G	Dicamba — 2.77% + 2,4-D — 30.56% + Mecoprop-P — 8.17%
PrimeraOne PrimeTime	Nufarm Americas	G	Mecoprop-P — 8.58% + 2,4-D — 33.3% + Dichlorprop-P — 8.45%
ProDeuce	Nufarm Americas	G	Prodiamine — 7.51% + Glyphosate — 40.15%
Progeny Herb.	Nufarm Americas	G	MCPA — 51.46% + Dicamba — 3.6% + Triclopyr — 5%
Pronto Fast Acting Vegetation Killer	PBIGordon	G	Imazapyr — 1.74% + Glyphosate — 3.82%
Pronto Vegetation Killer	PBIGordon	G	Glyphosate — 3.82% + Imazapyr — 1.74%
Prozone Weed Beater Complete	Bonide Prod.	G	Prodiamine — 0.2% + Sulfentrazone — 0.1%
Pummel	Makhteshim-Agan	G	Imazethapyr — 2.94% + Metolachlor — 55.49%
Pyresta Herb.	Nichino America	G	2,4-D ester — 60% + Pyraflufen-ethyl — 0.2%
Q4 Plus Turf Herb. for Grassy & Broadleaf Weeds	PBIGordon	G	Sulfentrazone — 0.69% + Quinclorac — 8.43% + 2,4-D amine — 11.81% + Dicamba — 1.49%
Quali-Pro 2-D	Makhteshim-Agan	G	Clopyralid — 12.1% + Triclopyr — 33%
Quali-Pro 2DQ	Cont. Solutions	G	Quinclorac — 3.3% + Dicamba — 4.21% + 2,4-D — 40%
Quali-Pro 3-D	Makhteshim-Agan	G	Dicamba — 2.77% + 2,4-D amine — 30.56% + Propionic acid — 8.17%
Quali-Pro T/l 2.5 G Herb.	Makhteshim-Agan	G	Isoxaben — 0.5% + Trifluralin — 2%
QuikPRO Herb.	Monsanto	G	Glyphosate — 73.3% + Diquat dibromide — 2.9%
Quincept Herb.	Nufarm Americas	G	2,4-D — 13.24% + Dicamba — 1.38% + Quinclorac — 8.25%
Rage D-Tech Herb.	FMC	G	Carfentrazone-ethyl — 1.44% + 2,4-D ester — 65.52%
Rainbow Weed Killer	Rainbow Technology	G	Tebuthiuron — 2% + Diuron — 6%
Rainbow Johnson Grass & Weed Killer Foam	Rainbow Technology	G	Pelargonic acid — 1% + Glyphosate — 0.96%

Product	Company	Use Class	Chemical Content
RangeStar	Albaugh	G	2,4-D — 35.7% + Dicamba — 12.4%
Rapport BroadSpec Herb.	Nufarm	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 25%
Rapport TankMix Herb.	Nufarm	G	Tribenuron-methyl — 10% + Thifensulfuron methyl — 40%
Razor Burn	Nufarm Americas	G	Diquat dibromide — 2.1% + Glyphosate — 41%
Realm Q Herb.	DuPont	G	Mesotrione — 31.25% + Rimsulfuron — 7.5% + Thifensulfuron methyl — 4%
RebelEX	Dow Agrosciences	G	Penoxsulam — 2.95% + Cyhalofop-butyl — 21.06%
RebelEX CA	Dow Agrosciences	G	Penoxsulam — 2.95% + Cyhalofop-butyl — 21.06%
Redeem R&P	Dow Agrosciences	G	Clopyralid — 12.1% + Triclopyr — 33%
Regal O-O Herb.	Regal Chem.	G	Oxadiazon — 1% + Oxyfluorfen — 2%
RegalStar II	Regal Chem.	G	Oxadiazon — 1% + Prodiamine — 0.2%
Renovate MAX G	Sepro	G	2,4-D amine — 14% + Triclopyr — 4%
Report Extra	Cheminova	G	Chlorsulfuron — 62.5% + Metsulfuron-methyl — 12.5%
Require Q (mp) Herb.	DuPont	G	Rimsulfuron — 6.25% + Dicamba — 52.94%
Resolve Q (mp) Herb.	DuPont	G	Thifensulfuron methyl — 4% + Rimsulfuron — 18.4%
Resolve Q Herb.	DuPont	G	Rimsulfuron — 18.4%
RiceBeaux	RiceCo.	G	Propanil — 35% + Thiobencarb — 31%
RicePro	RiceCo.	G	Propanil — 43% + Quinclorac — 2%
Rifle-D Herb.	Loveland Prod.	G	2,4-D amine — 35.7% + Dicamba — 12.4%
RM43 43% Glyphosate Plus Weed Prev.	Ragan and Massey	G	Glyphosate — 43.68% + Imazapyr — 0.78%
Roughneck	Nufarm	G	Glyphosate — 3.42% + Glyphosate — 37.54%
Roundup Conc. Ext. Cont. Weed & Grass Killer Plus Weed Prev.	Monsanto	G	Glyphosate — 18% + Diquat dibromide — 0.73% + Imazapic-ammonium — 0.3%
Roundup Conc. Max Cont. 365	Monsanto	G	Imazapic-ammonium — 1.6% + Glyphosate — 18% + Diquat dibromide — 0.73%
Roundup Conc. Poison Ivy & Tough Brush Killer Plus	Monsanto	G	Triethylamine triclopyr — 2% + Glyphosate — 18%
Roundup Conc. Weed & Grass Killer Plus FastAct Select	Monsanto	G	Diquat dibromide — 2.25% + Glyphosate — 41%
Roundup Conc. Wild Blackberry Plus Vine & Brush Killer	Monsanto	G	Triclopyr, triethylamine salt — 2% + Glyphosate — 18%
Roundup Conc. Poison Ivy Plus Tough Brush Killer	Monsanto	G	Triethylamine triclopyr — 2% + Glyphosate — 18%
Roundup QuikPRO Herb.	Monsanto	G	Glyphosate — 73.3% + Diquat dibromide — 2.9%
Roundup RTU Ext. Cont. Weed & Grass Killer Plus Weed Prev.	Monsanto	G	Glyphosate — 1% + Imazapic-ammonium — 0.02% + Imazapic-ammonium — 0.02% + Glyphosate — 1% + Pelargonic acid — 2%
Roundup RTU Max Cont. 365	Monsanto	G	Diquat dibromide — 0.04% + Imazapic-ammonium — 0.08% + Glyphosate — 1%
Roundup RTU Poison Ivy & Tough Brush Killer Plus	Monsanto	G	Glyphosate — 1% + Triethylamine triclopyr — 0.1%
Roundup RTU Poison Ivy Plus Tough Brush Killer	Monsanto	G	Glyphosate — 1% + Triethylamine triclopyr — 0.1%
Roundup RTU Weed & Grass Killer III	Monsanto	G	Glyphosate — 2% + Pelargonic acid — 2%
Roundup RTU Weed & Grass Killer Plus FastAct Select	Monsanto	G	Glyphosate — 2% + Diquat dibromide — 0.11%
Roundup RTU Wild Blackberry Plus Vine & Brush Killer	Monsanto	G	Glyphosate — 1% + Triclopyr — 0.1%
Roundup Sure Shot Foam Weed & Grass Killer	Monsanto	G	Pelargonic acid — 1% + Glyphosate — 0.96%
Roundup Weed & Grass Killer Conc. Plus	Monsanto	G	Glyphosate — 18% + Diquat dibromide — 0.73%
Roundup Weed & Grass Killer RTU Plus	Monsanto	G	Glyphosate — 2% + Pelargonic acid — 2%
Roundup Weed & Grass Killer Sure Shot Foam	Monsanto	G	Pelargonic acid — 1% + Glyphosate — 0.96%
Rout Ornamental Herb.	Everris NA	G	Oxyfluorfen — 2% + Oryzalin — 1%
Rowel FX Herb.	Monsanto	G	Flumioxazin — 30% + Chlorimuron-ethyl — 10.3%
Sahara DG Herb.	BASF	G	Diuron — 62.22% + Imazapyr — 7.78%
Scotts Spot Weed Cont. for Lawns	Scotts	G	2,4-D amine — 0.12% + Quinclorac — 0.1% + Dicamba — 0.05% + Mecoprop-P — 0.22%
Scotts Touch Up Weed Control For Your Lawn	Scotts	G	Dicamba — 0.05% + Quinclorac — 0.1% + 2,4-D amine — 0.12% + MCPP — 0.22%
Scotts Turf Builder Weed & Feed3	Scotts	G	2,4-D — 1.21% + Mecoprop-P — 0.61%
Season Long Weed Cont. for Lawns Conc.	Bayer Advanced	G	2,4-D amine — 4.73% + Dicamba — 0.52% + Isoxaben — 2.63% + Mecoprop-P — 1.1%
Season Long Weed Cont. for Lawns RTS	Bayer Advanced	G	Dicamba — 0.52% + 2,4-D amine — 4.73% + Isoxaben — 2.63% + Mecoprop-P — 1.1%
Sedge Ender Conc.	Bonide Prod.	G	Sulfentrazone — 1.36% + Prodiamine — 2.73%
Sequence	Syngenta Crop Prot.	G	S-Metolachlor — 29% + Glyphosate — 21.8%
SFM Extra	Alligare	G	Metsulfuron-methyl — 15% + Sulfometuron methyl — 56.25%
Showcase	Dow Agrosciences	G	Isoxaben — 0.25% + Oxyfluorfen — 0.25% + Trifluralin — 2%
Showdown	Helena Chem.	G	Glyphosate — 3.42% + Glyphosate — 37.54%
Slider ATZ	Loveland Prod.	R	Atrazine — 35.3% + dimethenamide-P — 18.2%
Slider ATZ Lite	Loveland Prod.	R	dimethenamide-P — 24.1% + Atrazine — 29.5%
Snap Pac Weed & Feed 25-0-4 (5.1 Slow Release)	Scotts	G	2,4-D — 0.72% + Dichlorprop-P — 0.09% + Mecoprop-P — 0.15%
Snapshot 2.5 TG	Dow Agrosciences	G	Isoxaben — 0.5% + Trifluralin — 2%
Snapshot DG	Dow Agrosciences	G	Trifluralin — 2% + Isoxaben — 0.5%
Solitare Herb.	FMC	G	Quinclorac — 56.25% + Sulfentrazone — 18.75%
Solstice Herb.	FMC	G	Mesotrione — 38.52% + Fluthiacet-methyl — 2.2%
Sonic	Dow Agrosciences	G	Cloransulam-methyl — 7.9% + Sulfentrazone — 62.1%
Sortie ATZ	Helena Chem.	R	Atrazine — 35.3% + Dimethenamid — 18.2%
Sortie ATZ Lite	Helena Chem.	R	Atrazine — 29.5% + dimethenamide-P — 24.1%
South. Season Long Weed Cont. for Lawns Conc.	Bayer Advanced	G	2,4-D amine — 4.73% + Dicamba — 0.52% + Isoxaben — 2.63% + Mecoprop-P — 1.1%
South. Season Long Weed Cont. for Lawns RTS	Bayer Advanced	G	2,4-D amine — 4.73% + Dicamba — 0.52% + Isoxaben — 2.63% + Mecoprop-P — 1.1%

Product	Company	Use Class	Chemical Content
South. Weed Killer for Lawns Conc.	Bayer Advanced	G	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%
South. Weed Killer for Lawns RTS	Bayer Advanced	G	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%
South. Weed Killer for Lawns RTU	Bayer Advanced	G	2,4-D amine — 0.31% + Dicamba — 0.03% + Mecoprop-P — 0.08%
Spartan Advance Herb.	FMC	G	Sulfentrazone — 5.7% + Glyphosate — 41.48%
Spartan Charge Herb.	FMC	G	Sulfentrazone — 31.77% + Carfentrazone-ethyl — 3.53%
Specticle Total	Bayer Env. Science	G	Diquat dibromide — 0.89% + Glyphosate — 20.46% + Indaziflam — 0.09%
Spectracide Kudzu Poison Ivy/Oak and Other Tough Brush Killer	Spectrum Group	G	Dicamba — 0.07% + 2,4-D amine — 0.59% + MCPP — 0.14%
Spectracide Vegetation Killer Conc. 2	Spectrum Group	G	Diquat dibromide — 0.72% + Prometon — 2.2%
Spectracide Vegetation Killer Conc. 3	Spectrum Group	G	Imazapyr — 0.09% + Glyphosate — 5.03%
Spectracide Vegetation Killer RTU	Spectrum Group	G	Prometon — 0.14% + Diquat dibromide — 0.05%
Spectracide Vegetation Killer RTU 2	Spectrum Group	G	Imazapyr — 0.02% + Glyphosate — 1.02%
Spectracide Weed & Grass Foaming Edger	Spectrum Group	G	Diquat dibromide — 0.18% + Dicamba — 0.04% + Fluazifop — 0.06%
Spectracide Weed & Grass Foaming Edger w/ Ext. Cont.	Spectrum Group	G	Oxyfluorfen — 0.1% + Fluazifop-P-butyl — 0.06% + Dicamba — 0.04% + Diquat dibromide — 0.12%
Spectracide Weed & Grass Killer 2	Spectrum Group	G	Diquat dibromide — 0.12% + Dicamba — 0.04% + Fluazifop-P-butyl — 0.06%
Spectracide Weed & Grass Killer 3	Spectrum Group	G	Dicamba — 0.04% + Diquat dibromide — 0.12% + Fluazifop-P-butyl — 0.06%
Spectracide Weed & Grass Killer Conc. 2	Spectrum Group	G	Fluazifop-P-butyl — 1.15% + Dicamba — 0.77% + Diquat dibromide — 2.3%
Spectracide Weed & Grass Killer for Large Areas Conc.	Spectrum Group	G	Fluazifop-P-butyl — 1.15% + Dicamba — 0.77% + Diquat dibromide — 2.3%
Spectracide Weed & Grass Killer w/ Ext. Cont.	Spectrum Group	G	Diquat dibromide — 0.12% + Dicamba — 0.04% + Oxyfluorfen — 0.1% + Fluazifop-P-butyl — 0.06%
Spectracide Weed & Grass Killer w/ Ext. Cont. Conc.	Spectrum Group	G	Fluazifop-P-butyl — 1.15% + Oxyfluorfen — 1.92% + Dicamba — 0.77% + Diquat dibromide — 2.3%
Spectracide Weed Stop for Lawns	Spectrum Group	G	Dicamba — 0.07% + 2,4-D — 0.59% + Mecoprop — 0.14%
Spectracide Weed Stop for Lawns AccuShot Foaming Spray 2	Spectrum Group	G	Dicamba — 0.07% + 2,4-D amine — 0.59% + Mecoprop — 0.14%
Spectracide Weed Stop for Lawns Conc.	Spectrum Group	G	2,4-D amine — 7.59% + Dicamba — 0.84% + Mecoprop-P — 1.83%
Spectracide Weed Stop for Lawns Plus Crabgrass Killer	Spectrum Group	G	Quinclorac — 0.12% + Sulfentrazone — 0.02% + Dicamba — 0.03% + 2,4-D amine — 0.25%
Spectracide Weed Stop for Lawns Plus Crabgrass Killer Conc.	Spectrum Group	G	2,4-D amine — 3.74% + Dicamba — 0.43% + Sulfentrazone — 0.22% + Quinclorac — 1.79%
Spectracide Weed Stop for Lawns Plus Crabgrass Prev. Gran.	Spectrum Group	G	2,4-D — 0.64% + Dicamba — 0.06% + Mecoprop-P — 0.14% + Dithiopyr — 0.16%
Speed Zone Broadleaf Herb. for Turf	PBIGordon	G	2,4-D ester — 28.57% + Dicamba — 1.71% + MCPP-p — 5.88% + Carfentrazone-ethyl — 0.62%
Speed Zone Lawn Weed Killer	PBIGordon	G	2,4-D ester — 28.57% + Dicamba — 1.71% + Carfentrazone-ethyl — 0.62% + MCPP-p — 5.88%
Speed Zone South. Broadleaf Herb. for Turf	PBIGordon	G	Dicamba — 0.67% + 2,4-D ester — 10.49% + MCPP-p — 2.66% + Carfentrazone-ethyl — 0.54%
Speed Zone RTU Lawn Weed Killer	PBIGordon	G	MCPP-p — 0.07% + Carfentrazone-ethyl — 0% + Dicamba — 0.02% + MCPA — 0.34%
Spirit	Syngenta Crop Prot.	G	Prosulfuron — 14.2% + Primisulfuron-methyl — 42.8%
Spitfire Herb.	Nufarm	G	2,4-D — 50.31% + Dicamba — 5.44%
Spoiler Herb.	Nufarm Americas	G	Mecoprop-P — 8.58% + 2,4-D — 33.3% + Dichlorprop-P — 8.45%
Sprakil SK-13 Granular Weed Killer	SSI Maxim	G	Diuron — 3% + Tebuthiuron — 1%
Sprakil SK-26 Granular Weed Killer	SSI Maxim	G	Tebuthiuron — 2% + Diuron — 6%
SPURGE POWER	Lawn and Garden Prod.	G	MCPA — 56.14% + Dicamba — 3.6% + Triclopyr — 0.5%
Spyder Extra Selective Herb.	Nufarm Americas	G	Metsulfuron-methyl — 15% + Sulfometuron methyl — 56.25%
SquareOne Herb.	FMC	G	Carfentrazone-ethyl — 3.9% + Quinclorac — 66.1%
Stalwart MTZ	Sipcam Agro USA	G	Metolachlor — 58.2% + Metribuzin — 13.8%
Stalwart Xtra Herb.	Sipcam Agro USA	R	Metolachlor — 26.1% + Atrazine — 33%
Stanza Herb.	FMC	G	Flumetsulam — 18.5% + Clopyralid potassium — 60%
Statement Herb.	Cheminova	G	Metolachlor — 46.3% + Fomesafen — 10.2%
Status Herb.	BASF	G	Diflufenzopyr — 17.1% + Dicamba — 44%
Step 2 Weed Cont. Plus Lawn Fert. 28-0-6	Scotts	G	2,4-D — 1.18% + 2,4-D — 1.18% + Mecoprop-P — 0.59% + Mecoprop-P — 0.59%
Steadfast Herb.	DuPont	G	Rimsulfuron — 25% + Nicosulfuron — 50%
Steadfast Q Herb.	DuPont	G	Nicosulfuron — 25.2% + Rimsulfuron — 12.5%
Storm Herb.	United Phosphorus	G	Acifluorfen — 29.2% + Bentazon — 13.4%
Stout (mp) Herb.	DuPont	G	Thifensulfuron methyl — 5% + Nicosulfuron — 67.5%
Stout Herb.	DuPont	G	Thifensulfuron methyl — 5% + Nicosulfuron — 67.5%
Strade Pro	Isagro USA	G	Orthosulfamuron — 42.05% + Halosulfuron-methyl — 11.92%
Strada XT2	Isagro USA	G	Quinclorac — 60% + Orthosulfamuron — 10%
Strategy	Loveland Prod.	G	Clomazone — 5.6% + Ethalfluralin — 18.2%
Streamline Herb.	DuPont	G	Aminocyclopyrachlor — 39.5% + Metsulfuron-methyl — 12.6%
Strike Three	Winfield Solutions	G	Dicamba — 2.77% + 2,4-D amine — 30.56% + Mecoprop — 8.17%
Sulfomet Extra Herb.	Agsurf	G	Sulfometuron methyl — 56.25% + Metsulfuron-methyl — 15%
Super Trimec Broadleaf Herb.	PBIGordon	G	2,4-D ester — 15.9% + 2,4-D ester — 32.45% + Dicamba — 5.38%
Super Turf Builder Weed & Feed	Scotts	G	2,4-D — 1.18% + 2,4-D — 1.18% + MCPP-p — 0.59% + MCPP-p — 0.59%
Super Turf Builder Winterguard Fall Weed & Feed 1	Scotts	G	Mecoprop-P — 0.52% + 2,4-D — 1.03%
Super Turf Builder w/ Plus 2 Weed Cont. 29-3-3, 29-2-3	Scotts	G	Mecoprop-P — 0.5% + 2,4-D — 1%

Product	Company	Use Class	Chemical Content
Suprend	Syngenta Crop Prot.	G	Prometryn — 79.3% + Trifloxysulfuron-sodium — 0.7%
SureStart	Dow Agrosciences	G	Clopyralid — 4.27% + Acetochlor — 41.67% + Flumetsulam — 1.3%
SureStart II	Dow Agrosciences	G	Flumetsulam — 1.3% + Acetochlor — 41.67% + Clopyralid — 4.27%
Surflan XL 2G	United Phosphorus	G	Oryzalin — 1% + Benefin — 1%
Surge Broadleaf Herb. for Turf	PBIGordon	G	MCPP-p — 6.8% + 2,4-D — 18.79% + Sulfentrazone — 0.67% + Dicamba — 3.02%
Surmount	Dow Agrosciences	R	Picloram — 13.24% + Fluroxypyr — 10.64%
Surveil Co-Pack	Dow Agrosciences	G	Flumioxazin — 51% + Cloransulam-methyl — 84%
Synchrony STS Herb.	DuPont	G	Chlorimuron-ethyl — 31.8% + Thifensulfuron methyl — 10.2%
Synchrony STS SP Herb.	DuPont	G	Thifensulfuron methyl — 10.2% + Chlorimuron-ethyl — 31.8%
Synchrony XP (mp) Herb.	DuPont	G	Chlorimuron-ethyl — 21.5% + Thifensulfuron methyl — 6.9%
Synchrony XP Herb.	DuPont	G	Chlorimuron-ethyl — 21.5% + Thifensulfuron methyl — 6.9%
T Zone Broadleaf Herb. for Tough Weeds	PBIGordon	G	Dicamba — 2.43% + 2,4-D ester — 31.82% + Sulfentrazone — 0.73% + Triclopyr — 8.4%
T Zone SE Broadleaf Herb. for Tough Weeds	PBIGordon	G	2,4-D ester — 29.32% + Dicamba — 2.22% + Triclopyr — 7.72% + Sulfentrazone — 0.66%
Tailspin Herb.	Loveland Prod.	G	Triclopyr — 16.1% + Fluroxypyr — 5.6%
Tailwind	Makhteshim-Agan	G	Metolachlor — 58.52% + Metribuzin — 13.93%
Thunder Master	Albaugh	G	Glyphosate — 22% + Imazethapyr — 1.8%
Throttle XP Herb.	DuPont	G	Sulfentrazone — 48% + Sulfometuron methyl — 18%
Throttle XP Herb.	DuPont	G	Chlorsulfuron — 9% + Metribuzin — 44.6%
Top Down	Check-Mark	G	2,4-D amine — 0.29% + Bromacil — 0.5%
Topsite 2.5G Herb.	SSI Maxim	G	Imazapyr — 0.5% + Diuron — 2%
Tordon 101 Mixture	Dow Agrosciences	R	Picloram — 10.2% + 2,4-D amine — 39.6%
Tordon RTU	Dow Agrosciences	G	2,4-D amine — 20.9% + Picloram — 5.4%
Torment	Makhteshim-Agan	G	Fomesafen — 22.05% + Imazethapyr — 5.38%
Treaty Extra Herb.	Nufarm	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%
Triamine	Nufarm Americas	G	2-4,D — 16.3% + 2,4-DP-p — 8.1% + MCPP-p — 8.2%
Triamine Jet Spray Spot Weed Killer	Nufarm Americas	G	2,4-DP-p — 0.16% + 2,4-D — 0.33% + MCPP-p — 0.16%
Tribute Total	Bayer Env. Science	G	Halosulfuron-methyl — 30.8% + Foramsulfuron — 19.8% + Thiencarbazone-methyl — 9.9%
Trillium	Regal Chem.	G	Dicamba — 2.77% + 2,4-D amine — 8.17% + 2,4-D amine — 30.56%
Trimec 1000 Low Odor Broadleaf Herb.	PBIGordon	G	Dicamba — 2.68% + 2,4-D amine — 1.22% + MCPP-p — 8.17% + 2,4-D amine — 34.59%
Trimec 878 S.I. Herb.	PBIGordon	G	2,4-D amine — 10.86% + MCPP-p — 18.91% + Dicamba — 4.62%
Trimec 899 Broadleaf Herb.	PBIGordon	G	Dicamba — 2.77% + MCPP-p — 8.17% + 2,4-D amine — 30.56%
Trimec 992 Broadleaf Herb.	PBIGordon	G	2,4-D amine — 30.56% + MCPP-p — 8.17% + Dicamba, — 2.77%
Trimec Crabgrass Plus Lawn Weed Killer Conc.	PBIGordon	G	2,4-D amine — 6.42% + Quinclorac — 2.13% + Dicamba — 0.6%
Trimec Crabgrass Plus Lawn Weed Killer Ready Spray	PBIGordon	G	2,4-D amine — 6.42% + Quinclorac — 2.13% + Dicamba — 0.6%
Trimec Crabgrass Plus Lawn Weed Killer RTU	PBIGordon	G	Dicamba — 0.03% + Quinclorac — 0.1% + 2,4-D amine — 0.31%
Trimec Bentgrass Formula Broadleaf Herb.	PBIGordon	G	Dicamba, — 2.53% + MCPP-p — 9.92% + 2,4-D amine — 6.12%
Trimec Classic Brand Broadleaf Herb.	PBIGordon	G	Dicamba, — 2.76% + MCPP-p — 6.93% + 2,4-D amine — 25.93%
Trimec Encore Broadleaf Herb.	PBIGordon	G	MCPP-p — 8.16% + MCPA — 38.68% + Dicamba, — 3.81%
Trimec Lawn Weed Killer	South. Ag. Insecticides	G	2,4-D amine — 3.05% + Mecoprop — 5.3% + Dicamba, — 1.29%
Trimec Lawn Weed Killer	PBIGordon	G	2,4-D amine — 7.59% + MCPP-p, DMA salt — 1.83% + Dicamba — 0.84%
Trimec Nutsedge Plus Lawn Weed Killer Conc.	PBIGordon	G	Dicamba — 0.57% + Sulfentrazone — 0.15% + MCPP-p — 2.2% + 2,4-D amine — 6.1%
Trimec Ready Spray Lawn Weed Killer	PBIGordon	G	2,4-D amine — 5.56% + MCPP-p — 1.34% + 2,4-D amine — 0.62%
Trimec South. Broadleaf Herb. for Sensitive South. Grasses	PBIGordon	G	Dicamba, — 3.85% + MCPP-p — 17.37% + 2,4-D amine — 18.74%
Trimec South. Lawn Weed Killer Conc.	PBIGordon	G	2,4-D amine — 2.73% + Dicamba — 0.6% + 2,4-D amine — 2.93%
Trimec Weed Killer Tankables	PBIGordon	G	Dicamba — 2.77% + 2,4-D amine — 8.17% + 2,4-D amine — 30.56%
Triple Threat	Total Solutions	G	2,4-D — 4.55% + MCPP — 2.29% + 2,4-DP — 2.26%
TripleFLEX Herb.	Monsanto	R	Flumetsulam — 1.3% + Acetochlor — 41.67% + Clopyralid — 4.27%
TripleFLEX II Herb.	Monsanto	G	Flumetsulam — 1.3% + Acetochlor — 41.67% + Clopyralid — 4.27%
Triplet Low Odor Prem. Selective Herb.	Nufarm Americas	G	Mecoprop-P — 8.17% + Dicamba — 2.3% + 2,4-D — 47.33%
Triplet SF Selective Herb.	Nufarm Americas	G	Dicamba — 2.77% + 2,4-D — 30.56% + Mecoprop-P — 8.17%
Tri-Power Selective Herb.	Nufarm Americas	G	MCPA — 40.42% + Mecoprop-P — 7.99% + Dicamba — 3.97%
Trivence Herb.	DuPont	G	Chlorimuron-ethyl — 3.9% + Flumioxazin — 12.8%
Trooper P+D Herb.	Nufarm Americas	R	2,4-D amine — 39.6% + Picloram — 10.2%
Trower3 Selective Herb.	Nufarm Americas	G	Mecoprop-P — 7.74% + Dicamba — 3.2% + 2,4-D — 47.77%
T-Square Herb.	Agsurf	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%
Turf Builder I w/ Plus 2 Weed Cont. 28-0-3	Scotts	G	2,4-D — 1.18% + Mecoprop-P — 0.59%
Turf Builder Weed & Feed 1	Scotts	G	2,4-D — 1.21% + MCPP-p — 0.61%
Turf Builder Winterguard I w/ Plus 2 Weed Cont. 28-0-3	Scotts	G	2,4-D — 1.18% + Mecoprop-P — 0.59%
Turf Builder Winterguard w/ Plus 2 Weed Cont. 22-4-11	Scotts	G	2-4,D — 1.04% + Mecoprop-P — 0.52%
Turf Builder Winterguard w/ Plus 2 Weed Cont. 26-3-12, 26-2-12	Scotts	G	2,4-D — 1.21% + Mecoprop-P — 0.61%
Turf Builder w/ Plus 2 Weed Cont. 28-3-3, 28-2-3, 28-1-4	Scotts	G	2-4,D — 1.21% + Mecoprop-P — 0.61%
Turflon D	Dow Agrosciences	G	Triclopyr — 16.5% + 2,4-D ester — 34.4%
Valor XLT Soybean Herb.	Valent U.S.A.	G	Chlorimuron-ethyl — 10.3% + Flumioxazin — 30%
Verdict powered by Kixor Herb.	BASF	G	dimethenamide-P — 55.04% + Saflufenacil — 6.24%
Vessel	PROKOZ	G	2,4-D amine — 30.56% + 2,4-D amine — 8.17% + Dicamba — 2.77%
Veteran 720 Herb.	Nufarm Americas	G	Dicamba — 12.82% + 2,4-D — 24.58%
Viewpoint Herb.	DuPont	G	Metsulfuron-methyl — 7.3% + Imazapyr — 31.6% + Aminocyclopyrachlor — 22.8%

Product	Company	Use Class	Chemical Content
Vigoro Fall Weed & Feed 30-0-10	Swiss Farms Prod.	G	Mecoprop-P — 0.17% + 2,4-D — 0.11% + Dicamba — 0.07%
Vigoro Ultra Turf Weed & Feed for Bahia & Mixed Lawns 28-0-3	Swiss Farms Prod.	G	Mecoprop-P — 0.17% + 2,4-D — 1.11% + Dicamba — 0.07%
Vigoro Weed & Feed for Bahia & Mixed Lawns 28-0-3	Swiss Farms Prod.	G	Mecoprop-P — 0.17% + 2,4-D — 1.11% + Dicamba — 0.07%
Vise	Makhteshim-Agan	G	Fomesafen — 10.3% + Metolachlor — 48.26%
Visoratz	Innvictis Crop Care	R	Metolachlor — 26.1% + Atrazine — 33.1%
Volta Extra	Rotam N. America	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%
Weed & Feed Weed Cont. Plus Lawn Fert. 26-0-3	Scotts	G	2,4-D — 1.18% + 2,4-D — 1.18% + Mecoprop-P — 0.59% + Mecoprop-P — 0.59%
Weed and Brush Killer United 85	United Laboratories	G	2,4-D ester — 1.09% + Bromacil — 0.98%
Weed B Gon MAX	Ortho Group	G	Mecoprop — 0.22% + 2,4-D amine — 0.12% + Dicamba — 0.05%
Weed B Gon MAX Conc.	Ortho Group	G	2,4-D — 13.72% + Dicamba — 1.35% + Triclopyr — 1.56%
Weed B Gon MAX Conc. Plus Crabgrass Cont.	Ortho Group	G	Quinclorac — 2.13% + 2,4-D — 6.42% + Dicamba — 0.6%
Weed B Gon MAX Conc. Plus Crabgrass Cont. Singles	Ortho Group	G	Quinclorac — 2.13% + 2,4-D — 6.42% + Dicamba — 0.6%
Weed b Gon MAX for South. Lawns Conc.	Ortho Group	G	Mecoprop-P — 0.49% + Carfentrazone-ethyl — 0.16% + 2,4-D — 4.01% + Dicamba — 0.27%
Weed B Gon MAX for South. Lawns RTS	Ortho Group	G	Mecoprop-P — 0.49% + Carfentrazone-ethyl — 0.16% + 2,4-D ester — 4.01% + Dicamba — 0.27%
Weed B Gon MAX for South. Lawns RTU	Ortho Group	G	Dicamba — 0.01% + 2,4-D ester — 0.18% + Carfentrazone-ethyl — 0.01% + Mecoprop-P — 0.02%
Weed B Gon MAX Plus Crabgrass Cont.	Ortho Group	G	Quinclorac — 0.1% + Mecoprop-P — 0.22% + Dicamba — 0.05% + 2,4-D amine — 0.12%
Weed B Gon MAX Plus Crabgrass Cont. RTS	Ortho Group	G	Quinclorac — 2.13% + 2,4-D — 6.42% + Dicamba — 0.6%
Weed B Gon MAX Ready Spray	Ortho Group	G	MCPA — 13.72% + Dicamba — 1.35% + Triclopyr — 1.56%
Weed B Gon MAX RTU	Ortho Group	G	Mecoprop-P — 0.22% + 2,4-D — 0.12% + Dicamba — 0.05%
Weed B Gon Pro	Nufarm Americas	G	Mecoprop-P — 8.17% + Dicamba — 3.73% + 2,4-D — 33.83%
Weed B Gon Pro South.	Nufarm Americas	G	MCPA — 40.42% + Dicamba — 3.97% + Mecoprop-P — 7.99%
Weed B Gon Weed Killer for Lawns	Ortho Group	G	Mecoprop-P — 0.22% + 2,4-D amine — 0.12% + Dicamba — 0.05%
Weed B Gon Weed Killer for Lawns Conc.	Ortho Group	G	MCPA — 13.72% + Dicamba — 1.35% + Triclopyr — 1.56%
Weed B Gon Weed Killer For Lawns Conc.2	Ortho Group	G	MCPP, DMA salt — 2.13% + 2,4-D amine — 8.66% + Dicamba — 0.37%
Weed B Gon Weed Killer for Lawns RTS	Ortho Group	G	MCPA — 13.72% + Dicamba — 1.35% + Triclopyr — 1.56%
Weed B Gon Weed Killer For Lawns RTS2	Ortho Group	G	MCPP — 2.13% + 2,4-D amine — 8.66% + Dicamba — 0.37%
Weed B Gon Weed Killer For Lawns RTU2	Ortho Group	G	Dicamba — 0.03% + 2,4-D amine — 0.61% + MCPP — 0.15%
Weed B Gon Weed Killer For St Augustinegrass RTS	Ortho Group	G	Dicamba — 0.03% + 2,4-D amine — 0.61% + MCPP — 0.15%
Weed Beater Lawn Weed Killer Conc.	Bonide Prod.	G	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%
Weed Beater Plus Crabgrass & Broadleaf Weed Killer RTS	Bonide Prod.	G	2,4-D amine — 6.42% + Dicamba — 0.6% + Quinclorac — 2.13%
Weed Beater Plus Crabgrass & Broadleaf Weed Killer RTU	Bonide Prod.	G	Dicamba — 0.03% + 2,4-D amine — 0.31% + Quinclorac — 0.1%
Weed Beater Ultra Conc.	Bonide Prod.	G	Dicamba — 1.65% + MCPA — 31.55% + Mecoprop-P — 6.16% + Carfentrazone-ethyl — 0.22%
Weed Beater Ultra RTS	Bonide Prod.	G	Dicamba — 1.65% + MCPA — 31.55% + Mecoprop-P — 6.16% + Carfentrazone-ethyl — 0.22%
Weed Beater Ultra RTU	Bonide Prod.	G	Carfentrazone-ethyl — 0% + Mecoprop-P — 0.07% + MCPA — 0.34% + Dicamba — 0.02%
Weed Blast Residual Weed Cont.	Loveland Prod.	G	Bromacil — 4% + Diuron — 4%
Weed Free Zone	Voluntary Purch. Groups	G	2,4-Dester — 10.49% + Carfentrazone-ethyl — 0.54% + Mecoprop-P — 2.66% + Dicamba — 0.67%
Weed Free Zone RTS	Voluntary Purch. Groups	G	2,4-D ester — 10.49% + Carfentrazone-ethyl — 0.54% + Mecoprop-P — 2.66% + Dicamba — 0.67%
Weed Free Zone RTU	Voluntary Purch. Groups	G	Dicamba — 0.02% + Carfentrazone-ethyl — 0% + Mecoprop-P — 0.07% + MCPA — 0.34%
Weed Impede2 IN 1 Conc.	Lawn and Garden Prod.	G	Prodiamine — 7.51% + Glyphosate — 40.15%
Weed Impede 2 IN 1 RTU	Lawn and Garden Prod.	G	Prodiamine — 0.5% + Glyphosate — 2%
Weed Out Broadleaf Weed Cont.	Voluntary Purch. Groups	G	2,4-D amine — 1.65% + MCPP — 0.4% + Dicamba — 0.18%
Weed Out Lawn Weed Killer	Voluntary Purch. Groups	G	Dicamba — 1.21% + 2,4-D amine — 5.45% + 2,4-D amine — 5.88%
Weed Out Lawn Weed Killer RTU	Voluntary Purch. Groups	G	2,4-D amine — 0.6% + Dicamba — 0.07% + Mecoprop-P — 0.14%
Weed Out w/ Q	Voluntary Purch. Groups	G	2,4-D amine — 6.42% + Quinclorac — 2.13% + Dicamba — 0.6%
Weed Out w/ Q RTS	Voluntary Purch. Groups	G	Dicamba — 0.6% + 2,4-D amine — 6.42% + Quinclorac — 2.13%
Weed Out w/ Q RTU	Voluntary Purch. Groups	G	Dicamba — 0.03% + Quinclorac — 0.1% + 2,4-D amine — 0.31%
Weed-Out Lawn Weed Killer RTS	Voluntary Purch. Groups	G	Dicamba — 0.81% + 2,4-D amine — 1.91% + 2,4-D amine — 3.33%
Weed Killer for Lawns Conc.	Bayer Advanced	G	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%
Weed Killer for Lawns RTS	Bayer Advanced	G	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%
Weed Whacker	Lawn and Garden Prod.	G	2,4-D amine — 2.26% + MCPA — 2.3% + 2,4-D — 4.55%
Weed Whacker Jet Spray	Lawn and Garden Prod.	G	2,4-D, amine salt — 0.33% + Dichlorprop-P — 0.16% + Mecoprop-P — 0.16%
Weedblast 4G Weed Killer	SSI Maxim	G	Diuron — 2% + Bromacil — 2%
Weedmaster Herb.	Nufarm	G	Dicamba — 12.4% + 2,4-D, amine salt — 35.7%
Westar Herb.	DuPont	G	Hexazinone — 68.6% + Sulfometuron methyl — 6.5%
Wilt	Detco Industries	G	2,4-D, amine salt — 0.29% + Bromacil — 0.5%
Wipe-Out Crabgrass Killer Plus	Green Light	G	2,4-D, amine salt — 7.3% + Dicamba — 0.84% + Quinclorac — 3.5%
Wither LVP Non-Selective Weed Killer	Lawson Prod.	G	Bromacil — 0.61% + 2,4-D — 1.09%
XL 2G	Setre Chem.	G	Oryzalin — 1% + Benefin — 1%
Yukon Herb.	Gowan	G	Halosulfuron-methyl — 12.5% + Dicamba — 55%
Zemax Selective Herb.	Syngenta Crop Prot.	G	S-Metolachlor — 36.8% + Mesotrione — 3.68%
Zeus Prime XC Herb.	FMC	G	Sulfentrazone — 31.77% + Carfentrazone-ethyl — 3.53%

Product	Company	Use Class	Chemical Content
Plant Growth Regulator Mixtures			
Aquashade	Aquashade	G	Acid Blue 9 — 12.6% + Acid Yellow 23 — 1.04%
Arrive	Innvictis Crop Care	G	Cytokinin — 0.15% + 3-Indoleacetic acid — 0.85%
Ascend	Winfield Solutions	G	Gibberellic acid — 0.03% + Indolebutyric acid — 0.05% + Cytokinin — 0.09%
Ascend WSG	Winfield Solutions	G	Indolebutyric acid — 0.37% + Gibberellic acid — 0.25% + Cytokinin — 0.76%
Chaperone	Arysta Lifescience	G	ATONIK — 0.1% + Sodium o-nitrophenolate — 0.2% + pnsp — 0.3%
Consensus	Loveland Prod.	G	Salicylic acid — 0.04% + IBA — 0.02% + Chitosan — 1%
Cytoplex HMS	P.B.T.	G	Indolebutyric acid — 0.01% + Cytokinin — 0.01% + Gibberellic acid — 0%
Dip'N Grow	Dip'n Grow	G	Naphthaleneacetic acid — 0.5% + Indolebutyric acid — 1%
Fascination Plant Growth Regulator Solution	Valent Biosciences	G	Gibberellin — 1.8% + Cytokinin B — 1.8%
Finish 6 Pro Harvest Aid for Cotton	Bayer Cropscience	G	Ethephon — 52.6% + Cyclanilide — 3.3%
Fresco	Fine Americas	G	Benzyladenine — 1.8% + Gibberellin — 1.8%
Gin Out Plant Growth Regulator	Nufarm Americas	G	Kinetin — 0% + Mepiquat chloride — 4.2%
Gravity PGS	Winfield Solutions	G	Gibberellic acid — 0.03% + Indolebutyric acid — 0.05% + Cytokinin — 0.09%
Legacy	Sepro	G	Trinexapac-ethyl — 5% + Flurprimidol — 13.26%
MegaGro	CP Bio	G	IBA — 0.85% + Kinetin — 0.15%
Mepex Gin Out Plant Growth Regulator	Nufarm Americas	G	Kinetin — 0% + Mepiquat chloride — 4.2%
Musketeer	Sepro	G	Trinexapac-ethyl — 1.4% + Paclobutrazol — 5.6% + Flurprimidol — 5.6%
PGR IV	Arysta Lifescience	G	Gibberellic acid — 0% + Indolebutyric acid — 0%
Pix Plus	Arysta Lifescience	G	Mepiquat chloride — 4.2% + B. cereus strain BP01 — 0.01%
Potenza	Loveland Prod.	G	Mepiquat chloride — 4.2% + Indolebutyric acid — 0.06% + Kinetin — 0% + IBA — 0.85% + Cytokinin — 0.15%
Receptor	Helena Chem.	G	Kinetin — 0.01% + Indole — 0% + Gibberellic acid — 0%
Stance Plant Regulator	Bayer Cropscience	G	Cyclanilide — 2.1% + Mepiquat chloride — 8.4%
Stimulate Yield Enhancer	Stoller Enterprises	G	Cytokinin — 0.01% + Indolebutyric acid — 0.01% + Gibberellic acid — 0.01%
Typy Plant Growth Regulator Solution	Nufarm Americas	G	Benzyladenine — 1.8% + Gibberellin — 1.8%
Defoliant Mixtures for Cropland			
Adios Cotton Defoliant	Arysta Lifescience	G	Thidiazuron — 12% + Diuron — 6%
Ginstar EC Cotton Defoliant	Bayer Cropscience	G	Thidiazuron — 12% + Diuron — 6%
Display Cotton Harvest Aid	FMC	G	Carfentrazone-ethyl — 18.04% + Fluthiacet-methyl — 4.75%
Redi-Pik 1.5EC Cotton Defoliant	Makhteshim-Agan	G	Thidiazuron — 12% + Diuron — 6%
FirstPick Cotton Harvest Aid/Defoliant	Nufarm Americas	G	Urea, sulfate (1:1) — 58.6% + Ethephon — 18.3%
CutOut Cotton Defoliant	Nufarm Americas	G	Thidiazuron — 12% + Diuron — 6%
Fumigant Mixtures for Cropland			
Terr-O-Gas 98	Great Lakes Chem.	R	Chloropicrin — 2.00 + Methyl bromide — 98.00
Terr-O-Gas 67	Great Lakes Chem.	R	Methyl bromide — 67.00 + Chloropicrin — 33.00
Terr-O-Gas 75	Great Lakes Chem.	R	Chloropicrin — 25.00 + Methyl bromide — 75.00
Brom-O-Gas 2%	Great Lakes Chem.	R	Methyl bromide — 98.00 + Chloropicrin — 2.00
MBC Conc.	Hendrix and Dail	R	Methyl bromide — 98.00 + Chloropicrin — 2.00
Tri-Brom 50	TriEst Ag Group	R	Methyl bromide — 50.00 + Chloropicrin — 49.70
Tri-Brom 67	TriEst Ag Group	R	Methyl bromide — 67.00 + Chloropicrin — 33.00
Tri-Brom 80	TriEst Ag Group	R	Methyl bromide — 80.00 + Chloropicrin — 19.90
Pic Clor 60	TriEst Ag Group	R	Chloropicrin — 59.60 + 1,3-Dichloropropene — 39.00
Tri-Brom 98	TriEst Ag Group	R	Methyl bromide — 98.00 + Chloropicrin — 2.00
Pic Clor 60 EC	TriEst Ag Group	R	1,3-Dichloropropene — 37.10 + Chloropicrin — 56.70
Hi-Yield Total Release Fogger	Voluntary Purch. Groups	G	Pyrodone — 0.40 + Pyrethrins — 0.05 + Permethrin — 0.44
Weed and Feed Mixtures			
Ace Green Turf RTS Weed & Feed Conc.	Chemsico	G	2,4-D amine — 3.25% + Dichlorprop-P — 1.61% + Mecoprop — 1.63%
Ace Green Turf Weed & Feed 30-0-4	Lebanon Seaboard	G	Mecoprop-P — 0.17% + 2,4-D — 1.11% + Dicamba — 0.07%
Ace Green Turf Winterizer Weed and Feed 24-0-12	Lebanon Seaboard	G	2,4-D — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07%
Golf Prod. 36-0-0 w/ Dimension Turf Herb. & Ronstar	Anderson's Lawn Fert.	G	Oxadiazon — 1% + Dithiopyr — 0.13%
Golf Prod. Turf Fert. 22-0-16 w/ Dimension Turf Herb. & Ronstar	Anderson's Lawn Fert.	G	Dithiopyr — 0.13% + Oxadiazon — 1%
Bonide DuraTurf Weed & Feed	Bonide Prod.	G	2,4-D ester — 1.35% + MCPA — 0.36% + Dicamba — 0.09% + 2,4-D — 0.18%
Bonide Liquid Weed & Feed 20-0-0 RTS	Bonide Prod.	G	2,4-D — 2.26% + Propionic acid — 1.17%
Expert Gardener Liquid Weed & Feed 15-0-0	Gro Tec	G	Mecoprop — 1.63% + 2,4-D amine — 3.25% + Propionic acid — 1.61%
Expert Gardener Weed & Feed	Gro Tec	G	Mecoprop — 0.81% + Mecoprop-P — 0.16% + Dicamba — 0.06%
Fert. w/ Starteem #2	Harrell's	G	Oxadiazon — 0.75% + Trifluralin — 0.25% + Benefin — 0.25%
Fert. w/ Team Pro 0.86%	Harrell's	G	Benefin — 0.43% + Trifluralin — 0.43%
Ferti-lome A-Vert Plus Lawn Food	Voluntary Purch. Groups	G	Trifluralin — 0.27% + Benefin — 0.53% + Isoxaben — 0.29%
Ferti-lome Centipede Weed & Feed	Voluntary Purch. Groups	G	2,4-D amine — 0.29% + 2,4-D amine — 0.17% + Dicamba — 0.07%
Ferti-lome Crabgrass Prev. Plus Lawn Fert.	Voluntary Purch. Groups	G	Trifluralin — 0.39% + Benefin — 0.76%
Ferti-lome Pro. Turf Weed Out Lawn Fert. Plus Crabgrass Prev.	Voluntary Purch. Groups	G	Dicamba — 0.06% + 2,4-D — 0.64% + Dithiopyr — 0.19% + Mecoprop-P — 0.14%
Ferti-lome Weed Free Zone Plus Lawn Fert.	Voluntary Purch. Groups	G	Mecoprop-P — 0.17% + Dicamba — 0.07% + 2,4-D ester — 1.15% + Sulfentrazone — 0.03%

Product	Company	Use Class	Chemical Content
Ferti-lome Weed Out Plus Lawn Fert.	Voluntary Purch. Groups	G	2,4-D amine — 0.29% + 2,4-D amine — 0.17% + Dicamba — 0.07%
Ferti-lome Weed-Out Pro Turf	Voluntary Purch. Groups	G	2,4-D ester — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07% + Dithiopyr — 0.16%
Fortify Phosphorus Free Winterizer Plus Weed Cont. 18-0-12	Anderson's Lawn Fert.	G	2,4-D amine — 0.14% + 2,4-D amine — 0.15% + 2,4-D amine — 0.56%
Fortify Weed & Feed 22-0-3	Anderson's Lawn Fert.	G	2,4-D amine — 0.14% + 2,4-D amine — 0.15% + 2,4-D amine — 0.56%
Fortify Weed Cont. Gran.	Anderson's Lawn Fert.	G	2,4-D amine — 1.65% + 2,4-D amine — 0.4% + Dicamba — 0.18%
Gordon's Liquid Weed & Feed 2 15-0-0	PBIGordon	G	2,4-D amine — 4.51% + MCPP-p — 2.33%
Gordon's Pasture Pro Plus One-Step Weed & Feed 15-0-0	PBIGordon	G	2,4-D amine — 2.57% + 2,4-D amine — 1.26%
Gordon's Weed & Feed 15-0-0 Tankables	PBIGordon	G	2,4-D amine — 2.57% + 2,4-D amine — 1.26%
Green Care Weed & Feed 12-0-6	Gro Tec	G	Mecoprop-P — 0.17% + Dicamba — 0.07% + 2,4-D — 1.11%
Green Charm Weed and Feed w/ Triamine 10-6-4	Gro Tec	G	2,4-D — 0.31% + 2,4-D — 0.15% + Dichlorprop-P — 0.16%
Green Thumb Early Spring Crabgrass Prev. + Lawn Fert. (27-0-5)	Anderson's Lawn Fert.	G	Trifluralin — 0.38% + Benefin — 0.77%
Green Thumb Late Spring Weed & Feed Lawn Fert. (29-0-3)	Anderson's Lawn Fert.	G	2,4-D amine — 0.18% + 2,4-D amine — 0.7% + 2,4-D amine — 0.18%
Green-Sol GS48	Frit Industries	G	Kinetin — 0.01% + Gibberellic acid — 0.02%
Greenview Broadleaf Weed Cont. Plus Lawn Food	Lebanon Seaboard	G	Mecoprop-P — 0.17% + 2,4-D — 1.11% + Dicamba — 0.07%
Greenview Weed & Feed w/ Preen 27-0-4	Lebanon Seaboard	G	Dicamba — 0.07% + 2,4-D ester — 1.11% + Mecoprop-P — 0.17%
Gro-Fine Economy Weed & Feed 11-0-7	Knox Fert.	G	Dicamba — 0.07% + 2,4-D ester — 1.11% + Mecoprop-P — 0.17%
Groundwork Weed & Feed 23-0-7	Winfield Solutions	G	Propionic acid — 0.12% + Dicamba — 0.05% + 2,4-D — 0.55%
Hi-Yield Weed & Feed	Voluntary Purch. Groups	G	Dicamba — 0.08% + 2,4-D amine — 0.18% + 2,4-D amine — 0.32%
HJE All Season Weed & Feed w/ Lazer	Howard Johnson's	G	Mecoprop-P — 0.16% + 2,4-D, dimethylamine salt — 0.66% + Dicamba — 0.03%
HJE All Season Weed & Feed w/ Triamine	Howard Johnson's	G	Dichlorprop-P — 0.16% + 2,4-D — 0.31% + Mecoprop-P — 0.16%
HJE Weed & Feed w/ Lazer	Howard Johnson's	G	Dicamba — 0.03% + 2,4-D, diethylamine salt — 0.66% + Mecoprop — 0.16%
Howard Johnson's Prem. Fert. Weed and Feed Phos. Free 26-0-3	Howard Johnson's	G	Mecoprop-P — 0.36% + 2,4-D — 0.18% + 2,4-D ester — 1.35% + Dicamba — 0.09%
Howard Johnson's Viper Weed and Feed	Howard Johnson's	G	Dicamba — 0.07% + 2,4-D ester — 1.08% + Mecoprop-P — 0.29% + 2,4-D — 0.15%
KGRO Prem. Weed & Feed 30-0-3	Knox Fert.	G	Dicamba — 0.07% + 2,4-D ester — 1.11% + Mecoprop-P — 0.17%
Lesco Echelon 0.3% Plus Fert.	Lesco	G	Sulfentrazone — 0.1% + Prodiamine — 0.2%
Lesco Echelon 0.3% Plus Fert. 11-0-5	Lesco	G	Sulfentrazone — 0.1% + Prodiamine — 0.2%
Lesco Eliminate Q Weed & Feed 17-0-3M (702200)	Lesco	G	2,4-D — 0.68% + Dicamba — 0.06% + Quinclorac — 0.35%
Lesco Lockup Extra 2 w/ Fertilizer 0-0-7M (#701145)	Lesco	G	Penoxsulam — 0.01% + 2,4-D — 1.04% + Dicamba — 0.08%
Lesco Momentum Force 21-0-11E Weed & Feed	Lesco	G	Mecoprop-P — 0.32% + 2,4-D ester — 1.2% + Dicamba — 0.08% + 2,4-D — 0.16%
Lesco Momentum Force Weed & Feed	Lesco	G	Mecoprop-P — 0.32% + 2,4-D — 0.16% + 2,4-D ester — 1.2% + Dicamba — 0.08%
Lesco Weed & Feed 18-0-9M	Lesco	G	Mecoprop-P — 0.15% + 2,4-D — 0.56% + Dichlorprop-P — 0.14%
Lesco Weed & Feed Plus Fert.	Lesco	G	Mecoprop-P — 0.15% + 2,4-D — 0.56% + Dichlorprop-P — 0.14%
Lilly Miller Ultragreen Weed & Feed w/ Trimec Herb.	Lilly Miller Brands	G	2,4-D — 0.65% + 2,4-D amine — 0.16% + Dicamba — 0.07%
Pennington Seed Echelon 0.3% Granular Herb. on Fert.	Howard Johnson's	G	Sulfentrazone — 0.1% + Prodiamine — 0.2%
Pennington Signature Series Weed & Feed	Gro Tec	G	Mecoprop — 0.17% + Dicamba — 0.07% + 2,4-D — 1.11%
Pennington Signature Series Winterizer Weed & Feed	Gro Tec	G	Mecoprop — 0.17% + Dicamba — 0.07% + 2,4-D — 1.11%
Pennington Ultragreen Weed & Feed 30-0-4	Central Garden & Pet	G	Dicamba — 0.07% + 2,4-D ester — 1.11% + Mecoprop-P — 0.17%
Pennington Weed & Feed	Gro Tec	G	2,4-D ester — 1.11% + Dicamba — 0.07% + Mecoprop — 0.17%
Preen Lawn StepSaver Weed Cont. Plus Fert 24-0-6	Lebanon Seaboard	G	Dicamba — 0.07% + Mecoprop-P — 0.17% + 2,4-D ester — 1.11% + Dithiopyr — 0.16%
Scotts Turf Builder Weed & FeedB 28-0-3	Scotts	G	Mecoprop-P — 0.15% + Dichlorprop-P — 0.09% + 2,4-D amine — 0.72%
Scotts Turf Builder Winterguard Fall Weed & FeedI	Scotts	G	2,4-D — 1.21% + Mecoprop-P — 0.61%
Spectracide Weed & Feed 20-0-0	Spectrum Group	G	Mecoprop — 1.63% + Dichlorprop-P — 1.61% + 2,4-D — 3.25%
Sta-Green Phos Free Winterizer Weed & Feed	Infinity Fert.	G	Ethylhexyl phthalate — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07%
Sta-Green Phosphorus Free Weed & Feed	Gro Tec	G	Mecoprop — 0.17% + Dicamba — 0.07% + 2,4-D — 1.11%
Sta-Green Phosphorus Free Winterizer Weed & Feed	Gro Tec	G	Mecoprop — 0.17% + Dicamba — 0.07% + 2,4-D — 1.11%
Sta-Green RTS Weed & Feed 20-0-0	Spectrum Group	G	Dichlorprop-P — 1.61% + Mecoprop — 1.63% + 2,4-D amine — 3.25%
Sta-Green Weed & Feed	Infinity Fert.	G	Ethylhexyl phthalate — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07%
Step 2 Weed Control Plus Lawn Food	Scotts	G	Mecoprop-P — 0.59% + 2,4-D — 1.18%
TCS GrowStar Lazer Weed & Feed	Turf Care Supply	G	Mecoprop-P — 0.24% + Dicamba — 0.04% + 2,4-D — 0.99%
TCS GrowStar Winterizer Lazer Weed & Feed	Turf Care Supply	G	Mecoprop-P — 0.24% + Dicamba — 0.04% + 2,4-D — 0.99%
Pro. Turf Prod. 22-0-4 w/ Trimec Herb.	Anderson's Lawn Fert.	G	2,4-D — 0.55% + Dicamba — 0.05% + Propionic acid — 0.12%
Pro. Turf Prod. Fert. 16-0-8 w/ Escalade Herb.	Anderson's Lawn Fert.	G	Acidic acid — 0.21% + Dicamba — 0.07% + 2,4-D — 0.87%
Turf Prod. Fert. w/ LockUp & Dicamba Herb. 18-0-5	Anderson's Lawn Fert.	G	Dicamba — 0.07% + Penoxsulam — 0.03%
TurfGro Pro. Weed & Feed 20-0-6	Sunniland	G	MCPP — 0.12% + 2,4-D — 0.55% + Dicamba — 0.05%
Vigoro RTS Weed & Feed 20-0-0	Spectrum Group	G	Dichlorprop-P — 1.61% + 2,4-D amine — 3.25% + Mecoprop-P — 1.63%
Vigoro Super Green Lawn Fert. Plus X-tended Weed Cont. 32-0-4	Swiss Farms Prod.	G	Dicamba — 0.06% + Mecoprop-P — 0.14% + Dithiopyr — 0.19% + 2,4-D — 0.64%
Vigoro Ultra Turf Phosphorus Free Weed & Feed 28-0-3	Swiss Farms Prod.	G	2,4-D — 1.11% + Dicamba — 0.07% + Mecoprop-P — 0.17%
Vigoro Weed & Feed 28-0-3	Lebanon Seaboard	G	Dicamba — 0.07% + 2,4-D ester — 1.11% + Mecoprop-P — 0.17%
Vigoro Weed & Feed 28-0-3	Swiss Farms Prod.	G	2,4-D — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07%
Vigoro Weed & Feed for Bahia & Mixed Lawns I	Swiss Farms Prod.	G	Mecoprop-P — 0.59% + 2,4-D — 1.18%
Vigoro Weed & Feed I	Swiss Farms Prod.	G	Mecoprop-P — 0.59% + 2,4-D — 1.18%

ADJUVANTS FOR HERBICIDES

Surfactants

The surfactant concentrations recommended in the guidelines are based on the use of surfactants that are 85% (+10%) active. All numbers have been rounded off to the nearest whole number in the following list of adjuvants currently registered. If a surfactant is used with a lower level of activity, proportionally more should be used to obtain the desired concentration. The surfactant market provides a variety of trade names with great differences in levels of active ingredients.

Because of the confusion that frequently occurs concerning the purchase of a suitable surfactant, the following suggestions are provided:

1. Purchase a surfactant specifically manufactured and marketed for use in agriculture; use only nonionic surfactants sold specifically for use with herbicides and cleared for use under Public Law 518.

2. Purchase on the basis of percentage active ingredient. It is less profitable, for example, to purchase a product with 20% active ingredient at $4 per gallon than it is to purchase a product with 80% active ingredient at $10 per gallon.

3. Do not consider isopropyl alcohol or water as active ingredients. Many products on the market are deceptive because they may include isopropyl alcohol (isopropanol) as a "functioning agent" or some other nondescript term to imply that the alcohol is an active ingredient. If the label on the container does not specifically state the percentage active ingredient (% surfactant) in the container, ask the dealer for this information.

4. Do not purchase products manufactured for household use to use with herbicides. Many of the surfactants present in household detergents and related products are excellent surfactants per se, but they may be present in low concentrations, in mixtures, or in combination with other products that interact with herbicides to reduce the level of weed control obtained.

5. Be wary of claims that a surfactant may cost much more but can be used at concentrations much lower than with conventional surfactants. Evidence does not exist that there is any one particular surfactant being marketed that is so effective that the amount normally needed for adequate control can be greatly reduced as compared to other suitable surfactants that are available. Premium prices may be paid for surfactants marketed in this manner with a poor return on the investment.

6. In deciding on the most economical surfactant to purchase for use with herbicides, ignore the following claims: (1) the surfactant contains a silicone or some other agent that will help keep the spray equipment clean; (2) the surfactant increases water penetration into the soil; or (3) use of the surfactant will increase root penetration and nutrient uptake by the crop. Often these claims have not been verified. The use of such claims may imply that the product being offered will cost more than surfactants being offered by reputable agricultural outlets.

7. There are no "miracle" surfactants. There are many good surfactants on the market, but there are none that justify greatly increased prices. There are none that are so highly effective that the use rate can be reduced below that recommended for specific herbicides in these weed control guidelines.

8. Some companies recommend the use of certain adjuvants with their products. Consult labels for approved adjuvants.

Oil + Surfactants and/or Emulsifiers

Several poorly defined terms characterize this group of adjuvant mixtures. The suggested addition of a crop oil concentrate (COC) refers to products that contain 80 to 85% petroleum or vegetable oil plus 15 to 20% surfactant and emulsifiers. Use of blends, other than emulsifiable oils, containing more than 85% oil has not been evaluated adequately for use with herbicides.

The term "emulsifiable oil" generally refers to products that contain about 98% oil and 1 to 2% emulsifiers. The terms "nonphytotoxic oils" and "phytobland oils" also have been used for this group of adjuvants. Generally, crop oil concentrates are being used in place of emulsifiable oils in herbicide spray mixtures.

Registered Adjuvants

Manufacturer	Brand name	% Active agent
APSA-80 All Purpose Spray Adjuvant Conc.	Access Business Group	20.00
Assist Polymer Based Adjuvant	Ag Source.	99.97
Topside	AgXplore Intl.	74.75
NZone	AgXplore Intl.	33.00
Contain	AgXplore Intl.	100.00
NZone Max	AgXplore Intl.	41.25
NZone GL	AgXplore Intl.	33.00
Synurgize	AgXplore Intl.	45.50
Combust	AgXplore Intl.	72.00
Tyrant	AgXplore Intl.	100.00
Triple Play	AgXplore Intl.	100.00
Phuse	AgXplore Intl.	80.00
Purge	AgXplore Intl.	100.00
Alligare MSO West	Alligare	97.00
Alligare Pattern	Alligare	30.00
Alligare Anti-Foamer	Alligare	10.00
Alligare MSO	Alligare	100.00
Alligare MVO Plus	Alligare	99.00
Alligare OSS/NIS	Alligare	99.00
Alligare Water Conditioner	Alligare	100.00
Alligare Surface	Alligare	100.00
Alligare Surface West	Alligare	90.00
Basal Oil Blue	Alligare	100.00
Alligare Surface	Alligare	100.00
Pace pH Plus	Arch Chem.	98.00
Pace pH Minus	Arch Chem.	92.00
Pace Stabilizer and Conditioner	Arch Chem.	98.50
Pace Alkalinity Plus	Arch Chem.	100.00
Cide-Kick II	Brewer Intl.	100.00
Poly Cont. 2	Brewer Intl.	30.00
Poly Film - R	Brewer Intl.	100.00
Orchex 796	Calumet Lubricants	100.00
Transmit	Check-Mark	81.75
Chemtrol Deposition Aid Drift Retardant	Chemorse	1.00
Conquer Spray Adjuvant	Chemorse	92.50
DRP-955 Drift Retardant and Penetrator	Davidon	5.20
Decco 313 Buffer Conc.	Decco US Post-Harvest	24.00
Diamulse C	Diacon Technologies	100.00
Diamulse CX	Diacon Technologies	60.00
Diamulse 11	Diacon Technologies	18.00
Diamulse D	Diacon Technologies	87.00
Diamulse F	Diacon Technologies	70.00
Drexel Hot Mes	Drexel Chem.	100.00
Drexel AMS-Supreme	Drexel Chem.	2.50
Drexel Primary	Drexel Chem.	40.00
Drexel Sir-Factant	Drexel Chem.	80.00
Drexel Special 80	Drexel Chem.	80.00
Drexel Surf-AC 820	Drexel Chem.	80.00
Drexel Surf-AC 910	Drexel Chem.	90.00
Drexel Vegetoil	Drexel Chem.	93.00
Drexel Vegetoil	Drexel Chem.	7.00
Drexel Peptoil	Drexel Chem.	17.00
Drexel Holzit	Drexel Chem.	100.00
Drexel Hum-AC 820	Drexel Chem.	80.00
Drexel Lox	Drexel Chem.	100.00
Drexel Lox Plus	Drexel Chem.	45.20
Drexel Pas-800	Drexel Chem.	80.00
Drexel Peptoil	Drexel Chem.	83.00
Drexel Beanoil	Drexel Chem.	60.00
Drexel Primary	Drexel Chem.	60.00
Drexel AMS-Supreme	Drexel Chem.	34.00
Drexel AMS-Xtra	Drexel Chem.	34.00
Drexel Beanoil	Drexel Chem.	40.00
Clorox Pool&Spa Stabilizer Conditioner	Easy 123 Pool Care	99.00
Clorox Pool&Spa Alkalinity Booster	Easy 123 Pool Care	100.00
Clorox Pool&Spa pH Plus	Easy 123 Pool Care	100.00
Clorox Pool&Spa pH Plus 1	Easy 123 Pool Care	100.00
Clorox Pool&Spa pH Minus 1	Easy 123 Pool Care	10.00
Clorox Pool&Spa Conc. Muriatic Acid	Easy 123 Pool Care	31.45
Clorox Pool&Spa Non-Chlorine Shock Oxidizer	Easy 123 Pool Care	75.00

Manufacturer	Brand name	% Active agent
Clorox Pool&Spa pH Minus	Easy 123 Pool Care	95.00
ES-2000	Ecolab	1.75
Boost 3001	Ecolab	4.90
Boost 3201	Ecolab	4.90
Exspor Activator Conc.	Ecolab	10.80
Liquid K	Ecolab	15.40
Liquid K	Ecolab	2.98
Boost 3001	Ecolab	6.00
Boost 3201	Ecolab	6.00
ES-1000	Ecolab	71.20
Boost 3001	Ecolab	6.00
Boost 3201	Ecolab	6.00
ES-1000	Ecolab	20.00
Liquid K	Ecolab	1.40
ES-1000	Ecolab	8.00
Break-Thru	Evonik Goldschmidt	100.00
Break-Thru T&O	Evonik Goldschmidt	100.00
Audible 90 MS	Exacto	90.00
Audible 80 MS	Exacto	80.00
Scrimmage MS	Exacto	90.00
Motion MS	Exacto	100.00
Handoff MS	Exacto	95.00
Yardage MS	Exacto	80.00
Completion MS	Exacto	45.00
Reverse	Exacto	10.00
Back Field	Exacto	90.00
Offside MS	Exacto	92.00
Penetrator Plus (Deposition Agent)	Helena Chem.	99.00
AD-SPRAY 90	Helena Chem.	90.00
Cidewinder	Helena Chem.	98.00
Cohere	Helena Chem.	90.00
Hyper-Active	Helena Chem.	24.00
Hyper-Active	Helena Chem.	56.00
Induce	Helena Chem.	90.00
Inlet	Helena Chem.	90.00
Kammo Plus	Helena Chem.	100.00
NXS	Helena Chem.	80.00
Request	Helena Chem.	50.00
Sta-Put Plus	Helena Chem.	0.81
Blendex VHC	Helena Chem.	90.00
Ground Zero	Helena Chem.	100.00
Optima	Helena Chem.	90.00
Dyne-A-Pak	Helena Chem.	76.00
Foambuster	Helena Chem.	20.00
Kinetic	Helena Chem.	99.00
Interactive	Helena Chem.	43.00
Grounded	Helena Chem.	99.00
Align	Helena Chem.	35.00
Soy-Dex Plus	Helena Chem.	99.00
StrikeZone MXD	Helena Chem.	100.00
Accuquest WM	Helena Chem.	35.00
Quest	Helena Chem.	50.00
Penetractor Plus	Helena Chem.	99.00
Reservoir DGA	Helena Chem.	19.88
Duce	Helena Chem.	100.00
Fire-Zone	Helena Chem.	100.00
Clasp	Helena Chem.	1.00
Crop Oil Conc.	Helena Chem.	85.00
AD Spray 101	Helena Chem.	23.60
First Up ST	Helena Chem.	15.00
Accuzone DC	Helena Chem.	100.00
Premium MSO	Helena Chem.	100.00
Agri-Dex	Helena Chem.	99.00
Nutrasyst	Helena Chem.	5.00
Nutrasyst Conc.	Helena Chem.	3.00
FoambusterMax	Helena Chem.	30.00
Kinetic HV	Helena Chem.	99.00
Hel-Fire	Helena Chem.	90.00
Dyne-Amic	Helena Chem.	99.00
AD-SPRAY 80	Helena Chem.	80.00
Pointblank WM	Helena Chem.	100.00
Buffer Xtra Strength	Helena Chem.	50.00

Manufacturer	Brand name	% Active agent
Justified	Helena Chem.	100.00
Smoke	Helena Chem.	56.40
Combat Plus	Helena Chem.	30.00
Invade	Innvictis Crop Care	100.00
Invade RST	Innvictis Crop Care	100.00
Navigator	Innvictis Crop Care	99.20
Navigator HC	Innvictis Crop Care	100.00
Rendezvous CTM	Innvictis Crop Care	57.00
Traverse	Innvictis Crop Care	80.00
V-Drift	Innvictis Crop Care	1.00
Velomax	Innvictis Crop Care	99.00
Verifact	Innvictis Crop Care	95.00
Vixen AC-D	Innvictis Crop Care	100.00
Vixen AC-L	Innvictis Crop Care	42.00
Verimax AMS	Innvictis Crop Care	36.00
Vixen D	Innvictis Crop Care	100.00
Voyager 80-20	Innvictis Crop Care	80.00
Voyager 90-10	Innvictis Crop Care	90.00
Envelop	Innvictis Crop Care	80.00
Jacuzzi Alkalinity Up c/o Clearon	Jacuzzi Hot Tubs	100.00
Jacuzzi Spa Shock Oxidizer c/o Clearon	Jacuzzi Hot Tubs	80.00
Jacuzzi pH Up c/o Clearon	Jacuzzi Hot Tubs	100.00
Jacuzzi pH/ Alkalinity Down c/o Clearon	Jacuzzi Hot Tubs	95.00
Equalizer	Jimmy Sanders	80.00
Superfact	Jimmy Sanders	95.00
Supermax AMS Dry Formulation	Jimmy Sanders	100.00
Soysurf MSO	Jimmy Sanders	100.00
Silsurf	Jimmy Sanders	99.00
Inside Out	Jimmy Sanders	100.00
Contact	Jimmy Sanders	30.00
Complement	Jimmy Sanders	80.00
Soysurf X-tra	Jimmy Sanders	76.00
Surfoil Plus	Jimmy Sanders	97.00
Super Surf 90	Jimmy Sanders	90.00
Super Max AMS	Jimmy Sanders	36.00
Soysurf Plus	Jimmy Sanders	100.00
Low Foam Surfactant	Jimmy Sanders	80.00
High Foam Marker	Jimmy Sanders	100.00
Ag-Edge	Jimmy Sanders	100.00
Soysurf	Jimmy Sanders	100.00
Surfoil 60/40	Jimmy Sanders	100.00
Gundown Max	Jimmy Sanders	90.00
Surfoil	Jimmy Sanders	99.00
Chemtrol	Jimmy Sanders	1.00
Muriatic Acid	Kik Intl.	31.45
Kem-Tek Pool & Spa Care Contractor Strength Muriatic Acid	KIK Pool Additives	29.00
Kem-Tek Pool & Spa Care Contractor Strength Muriatic Acid 1	KIK Pool Additives	31.45
Kem-Tek Pool & Spa Care Swimming Pool Muriatic Acid	KIK Pool Additives	14.50
Aqua Guard Muriatic Acid	KIK Pool Additives	29.00
Aqua Chem Balanced for Clean Pools Muriatic Acid	KIK Pool Additives	31.45
BioGuard Muriatic Acid Contractor Strength	KIK Pool Additives	31.45
Kem-Tek Pool & Spa Care Spa Non-Chlorine Shock Oxidizer	KIK Pool Additives	75.00
Aqua Guard Non-Chlorine Shock Oxidizer	KIK Pool Additives	75.00
Pro Guard Muriatic Acid	KIK Pool Additives	31.45
Aqua Guard Muriatic Acid 1	KIK Pool Additives	31.45
Pro Side Muriatic Acid	KIK Pool Additives	31.45
Pro Guard Muriatic Acid Contractor Strength	KIK Pool Additives	31.45
Kem-Tek Pool & Spa Care Muriatic Acid	KIK Pool Additives	31.45
Pool Essentials Muriatic Acid	KIK Pool Additives	31.45
Kem-Tek Pool & Spa Care Spa pH Minus	KIK Pool Additives	10.00
Aqua Guard pH Up	KIK Pool Additives	100.00
Kem-Tek Pool & Spa Care pH Plus	KIK Pool Additives	100.00
Kem-Tek Pool & Spa Care Spa pH Plus	KIK Pool Additives	100.00
HDX pH Plus	KIK Pool Additives	100.00
Kem-Tek Pool & Spa Care Alkalinity Booster	KIK Pool Additives	100.00
HDX Alkalinity Booster	KIK Pool Additives	100.00
Aqua Guard Alkalinity Booster	KIK Pool Additives	100.00
Aqua Guard pH Down	KIK Pool Additives	95.00
Kem-Tek Pool & Spa Care pH Minus	KIK Pool Additives	95.00
HDX pH Minus	KIK Pool Additives	95.00
Aqua Guard Stabilizer Conditioner	KIK Pool Additives	99.00
Kem-Tek Pool & Spa Care Stabilizer Conditioner	KIK Pool Additives	99.00

Manufacturer	Brand name	% Active agent
HDX Stabilizer Conditioner	KIK Pool Additives	99.00
FastRate	Land View	51.00
Herb.Helper	Lawn and Garden Prod.	20.00
Monterey – Natures's Own Spray Helper	Lawn and Garden Prod.	80.00
Monterey – Nature's Own Spray Helper	Lawn and Garden Prod.	3.00
Herb. Helper	Lawn and Garden Prod.	80.00
Monterey – Nature's Own Spray Helper	Lawn and Garden Prod.	17.00
Lesco Conform	Lesco	19.00
Lesco Conform	Lesco	20.00
Lesco 90/10 Nonionic Surfactant	Lesco	90.00
Supa Stik PN	Liquid Fertiliser Pty.	99.00
Aqufact	Loveland Prod.	91.00
Herbimax	Loveland Prod.	83.00
Herbimax	Loveland Prod.	16.32
Penetron	Loveland Prod.	47.00
Loveland Bark Oil	Loveland Prod.	100.00
Strike Force	Loveland Prod.	88.00
Emulsifier Blend	Loveland Prod.	100.00
Spreader 90	Loveland Prod.	90.00
Timberland 90 Low Foam Non-Ionic Spreader	Loveland Prod.	90.00
E-Z Mix	Loveland Prod.	65.00
Phase II	Loveland Prod.	80.00
Hi Wett Super Spreader	Loveland Prod.	100.00
Gunsmoke	Loveland Prod.	80.00
Timbersurf 90 Non-Ionic Spreader	Loveland Prod.	90.00
Actamaster Soluble Crystal Spray Adjuvant	Loveland Prod.	99.00
Actamaster Spray Adjuvant	Loveland Prod.	34.00
Attach	Loveland Prod.	100.00
Amigo	Loveland Prod.	93.00
MSO Conc.	Loveland Prod.	100.00
Liberate	Loveland Prod.	100.00
Freeway	Loveland Prod.	100.00
Activator 90	Loveland Prod.	90.00
LI 700	Loveland Prod.	80.00
Phase	Loveland Prod.	90.00
Choice Weather Master	Loveland Prod.	50.00
Tactic	Loveland Prod.	63.40
Reign	Loveland Prod.	1.00
Flame	Loveland Prod.	52.70
Reign LC	Loveland Prod.	30.00
Compadre	Loveland Prod.	100.00
MSO Conc. w/ Leci-Tech	Loveland Prod.	100.00
Weather Gard Complete	Loveland Prod.	100.00
Maximizer Crop Oil Conc.	Loveland Prod.	83.00
Maximizer Crop Oil Conc.	Loveland Prod.	16.30
Bond Max	Loveland Prod.	57.50
Widespread Max	Loveland Prod.	100.00
Unfoamer	Loveland Prod.	12.50
Vader	Loveland Prod.	90.00
Scanner	Loveland Prod.	80.00
Franchise	Loveland Prod.	100.00
Amaze Gold	Loveland Prod.	34.00
Choice Trio	Loveland Prod.	55.00
Infuse	Loveland Prod.	99.00
Foam Eater Squeeze	MacDermid Ag. Sol.	10.00
Exit	Miller Chem. and Fert.	100.00
Foam Fighter	Miller Chem. and Fert.	100.00
Mist Cont.	Miller Chem. and Fert.	100.00
Nu-Film-IR	Miller Chem. and Fert.	100.00
Nu Film P	Miller Chem. and Fert.	100.00
Nu Film 17	Miller Chem. and Fert.	100.00
Spray Aide	Miller Chem. and Fert.	100.00
MON-10, Water Conditioning Agent	Monsanto	50.00
Monty's NanoBoost	Monty's Plant Food	9.50
Nalco 60625	Nalco	15.00
Quick-Dissolve Stabilizer	Natural Chemistry L.P.	99.00
Salt Shock Oxidizer	Natural Chemistry L.P.	38.00
PoolBrand Alkalinity Booster	Nava Water Prod.	100.00
Member's Mark Quality Guaranteed Alkalinity Booster	Nava Water Prod.	100.00
Clearcil Chlorine Free P.E.T. Tab	Nava Water Prod.	26.30
Clearcil Chlorine Free P.E.T. Tab	Nava Water Prod.	35.00

Manufacturer	Brand name	% Active agent
Clearcil Chlorine Free ClearOx 30	Nava Water Prod.	30.00
Suffusion Gran.	Ohp	22.00
Suffusion Liquid	Ohp	100.00
Suffusion Tablets	Ohp	100.00
Wetcit	Oro Agri	8.92
TransFilm Anti-Transpirant & Sticker	PBIGordon	14.93
TransFilm Anti-Transpirant & Sticker	PBIGordon	13.54
Gordon's Spreader Sticker Tankables	PBIGordon	80.00
Gordon's Spreader Sticker	PBIGordon	80.00
Border Xtra 8L	Precision Laboratories	100.00
Protyx	Precision Laboratories	100.00
Speed	Precision Laboratories	100.00
Direct	Precision Laboratories	100.00
Import	Precision Laboratories	100.00
Gundown Max	Precision Laboratories	100.00
Exchange	Precision Laboratories	100.00
Transport Ultra	Precision Laboratories	80.00
Kixyt	Precision Laboratories	100.00
Simplyx	Precision Laboratories	100.00
Transport LpH	Precision Laboratories	100.00
Border AQ	Precision Laboratories	45.00
Avianis DC	Precision Laboratories	99.80
Exchange	Precision Laboratories	60.00
Gundown Max	Precision Laboratories	10.00
Exchange	Precision Laboratories	37.60
Import	Precision Laboratories	76.00
Border Xtra 8L	Precision Laboratories	37.12
Protyx	Precision Laboratories	96.50
Speed	Precision Laboratories	99.00
Direct	Precision Laboratories	30.00
Transport Ultra	Precision Laboratories	80.00
Kixyt	Precision Laboratories	98.00
Simplyx	Precision Laboratories	100.00
Transport LpH	Precision Laboratories	100.00
Volare DC	Precision Laboratories	100.00
ProSolutions Defoamer	Pro Solutions	10.00
ProSolutions 90/10 Surfactant	Pro Solutions	90.00
ProSolutions 80/20 Surfactant	Pro Solutions	80.00
Plex Mate Surfactant	Sanco Industries	80.00
38-F Drift Retardant Additive	Sanitek Prod.	32.00
41-A Drift Retardant Additive	Sanitek Prod.	30.00
Corn Foam	Sewer Sciences	78.50
Home and Garden Spreader Sticker	South. Ag. Insecticides	100.00
Herbi-Oil S83-17 Spray Adjuvant	South. Ag. Insecticides	83.00
Sterilex Ultra Activator Solution	Sterilex	6.00
Sterilex Ultra-Kleen Solution 2	Sterilex	6.00
Sterilex Ultra Activator Solution	Sterilex	6.00
Sterilex Ultra-Kleen Solution 2	Sterilex	6.00
Sterilex Ultra Activator Solution	Sterilex	4.90
Sterilex Ultra-Kleen Solution 2	Sterilex	4.90
Natur'l Oil	Stoller Enterprises	93.00
Sundance Spas Spa Shock Oxidizer	Sundance Spas	80.00
Sundance Spas pH Up	Sundance Spas	100.00
Sundance Spas pH/Alkalinity Down	Sundance Spas	95.00
Sundance Spas Alkalinity Up	Sundance Spas	100.00
Desikote	Taminco	18.00
Hi-Yield Spreader Sticker	Voluntary Purch. Groups	90.00
AquaZone pH Minus	W. W. Adcock	100.00
AquaZone pH Plus	W. W. Adcock	100.00
AquaZone Oxidizing Shock & Swim	W. W. Adcock	45.00
AquaZone Alkalinity Increase	W. W. Adcock	100.00
AquaZone Stabilizer	W. W. Adcock	100.00
Crosshair	Wilbur Ellis	100.00
Corral Poly	Winfield Solutions	30.00
Destiny HC	Winfield Solutions	92.00
Inergy	Winfield Solutions	100.00
Interlock	Winfield Solutions	100.00
Level 7	Winfield Solutions	65.00
Noble	Winfield Solutions	92.50
Placement	Winfield Solutions	100.00
PowerLock	Winfield Solutions	95.00

Manufacturer	Brand name	% Active agent
Preference	Winfield Solutions	89.50
Prime Oil	Winfield Solutions	83.00
Prime Oil	Winfield Solutions	15.47
Rush	Winfield Solutions	31.62
Silkin	Winfield Solutions	99.00
Superb HC	Winfield Solutions	92.00
Top Surf	Winfield Solutions	80.00
Activate Plus	Winfield Solutions	90.00
Aduro	Winfield Solutions	80.00
Alliance	Winfield Solutions	50.00
Class Act Flex	Winfield Solutions	60.00
Class Act NG	Winfield Solutions	50.50
Complete Compatibility	Winfield Solutions	60.00
Complex	Winfield Solutions	23.03
Transfix	Winfield Solutions	96.00
Aqua-King Plus	Winfield Solutions	95.00
Surf-King Plus	Winfield Solutions	95.00
Droplex	Winfield Solutions	100.00
Atmos	Winfield Solutions	92.00
Masterlock	Winfield Solutions	100.00
Wick	Winfield Solutions	100.00
AirCover	Winfield Solutions	99.00
Airtech	Winfield Solutions	60.00
Turbulence	Winfield Solutions	100.00
Breeze	Winfield Solutions	65.00
Thoroughbred	Winfield Solutions	99.00
Newtone	Winfield Solutions	80.00
Gulfstream	Winfield Solutions	95.50

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Manufacturer	Brand name	% Active agent
Winfield Solutions	Complex	23.03
Winfield Solutions	Corral Poly	30.00
Winfield Solutions	Destiny HC	92.00
Winfield Solutions	Droplex	100.00
Winfield Solutions	Gulfstream	95.50
Winfield Solutions	Inergy	100.00
Winfield Solutions	Inergy	100.00
Winfield Solutions	Interlock	100.00
Winfield Solutions	Level 7	65.00
Winfield Solutions	Masterlock	100.00
Winfield Solutions	Noble	99.00
Winfield Solutions	Placement	100.00
Winfield Solutions	PowerLock	95.00
Winfield Solutions	Preference	89.50
Winfield Solutions	Prime Oil	83.00
Winfield Solutions	Prime Oil	15.47
Winfield Solutions	Rush	40.00
Winfield Solutions	Silkin	99.00
Winfield Solutions	Superb HC	92.00
Winfield Solutions	Surf-King Plus	95.00
Winfield Solutions	Thoroughbred	99.00
Winfield Solutions	Top Surf	80.00
Winfield Solutions	Transfix	96.00
Winfield Solutions	Turbulence	100.00
Winfield Solutions	Wick	100.00

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