

A close-up photograph of a rice panicle. The panicle is the central part of the rice plant where the grains develop. It is surrounded by green leaves. Some of the grains are yellowish, indicating they are ripe. There are several brown, necrotic lesions on the panicle, which are characteristic of Rice Panicle Blight. The text is overlaid on the image.

Rice Panicle Blight and its Impact in 2010 and 2011

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Two types of blight

- Panicle blight:
 - essentially caused by environmental variables (high temperatures) and can occur **without** a pathogen
 - Can result in poor pollination and thus upright rice panicles due to light grain

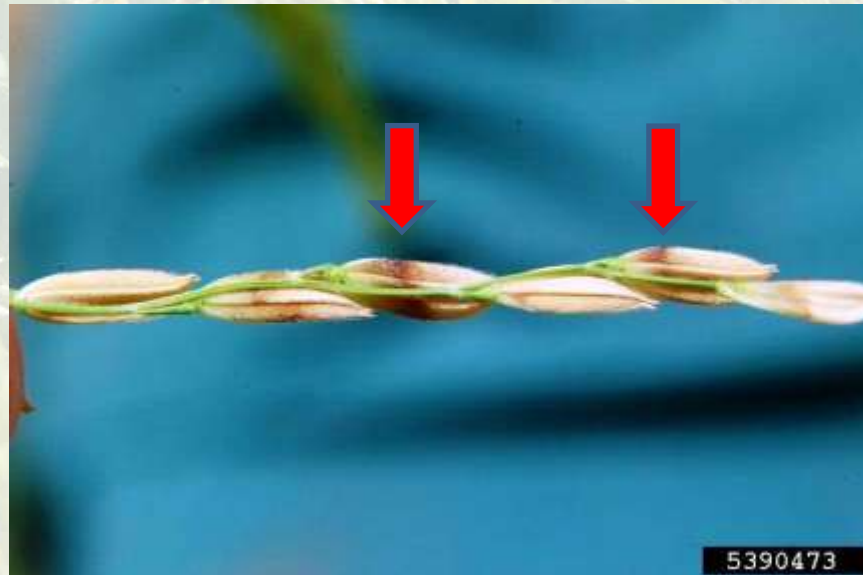


Two types of blight

- Bacterial panicle blight:
 - Caused by the bacteria:
 - *Burkholderia glumae* —→ seedborne (?)
 - *Burkholderia gladioli* —→ seedborne & soilborne
 - Life cycles of the bacteria are not completely understood
 - Typically associated with hot and dry weather
 - Especially when nighttime temperatures are high
 - The bacteria are present in residue, soil, and water throughout MS
 - Also seedborne (but likely a limited source of inoculum)
- **NO CHEMICAL CONTROL MEASURES AVAILABLE**

Main panicle blight symptom

- Grain discoloration
 - notice the two tone discoloration symptom





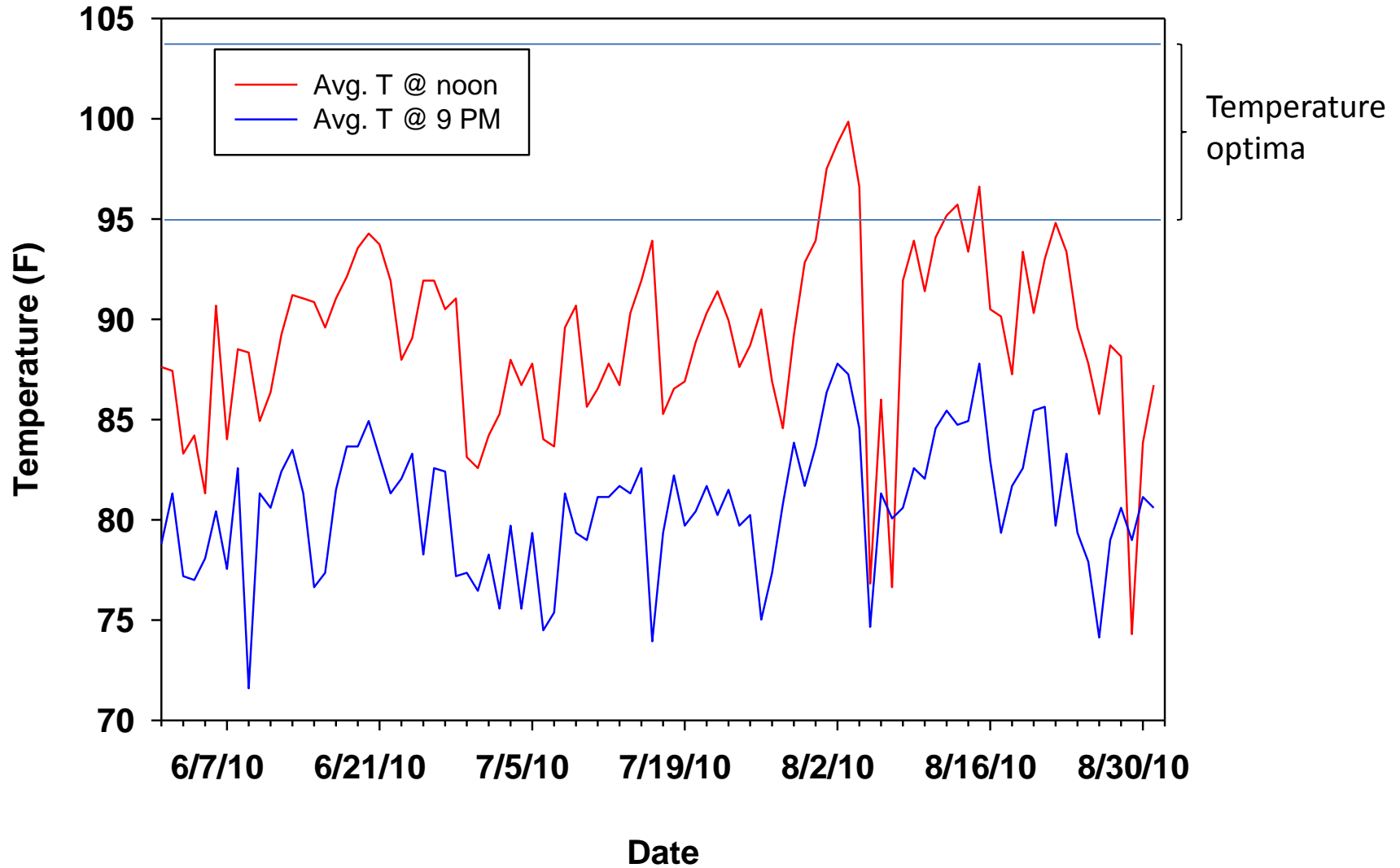
Bacterial panicle blight

- First identified as a disease of rice in Japan in 1956 (grain rotting and seedling blight)
- First identified disease in the U.S. in 1996/1997
 - Bacterium was isolated from symptomatic plants previously blamed on high temperature, water stress, toxic chemical near the root zone
- The term “panicle blight” had been used for 50 years prior to this point

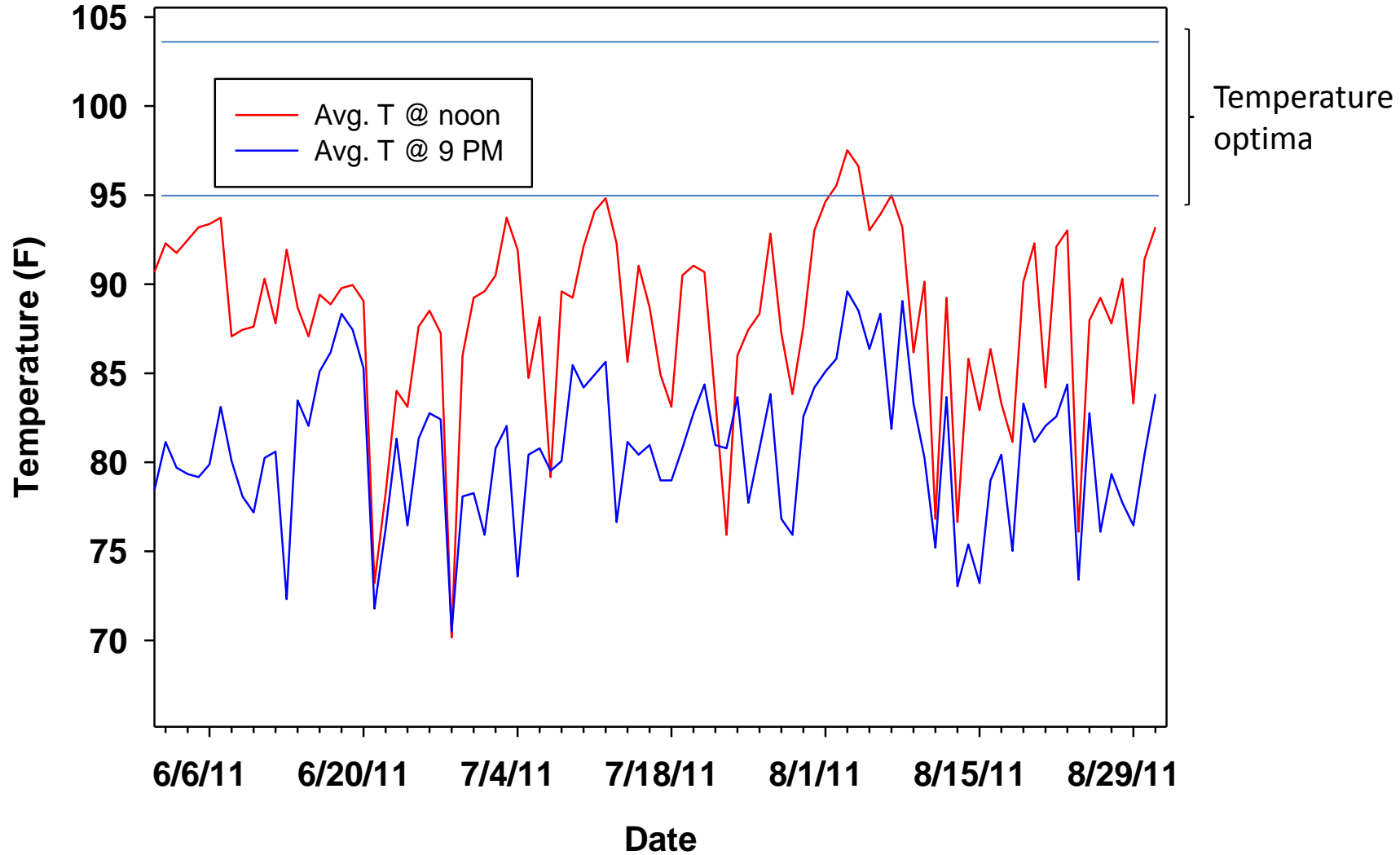
Symptoms associated with BPB

- Seedling blight
- Sheath rot lesions on the flag-leaf sheath
 - Specific symptoms:
 - Vertical lesions with gray centers surrounded by a dark reddish brown lesion
- Panicle blighting with significant yield losses
 - In some cases yield losses attributed to BPB can be on the order of $\geq 40\%$

2010 Season



2011 Season



Disorders commonly confused with BPB

- Straighthead
- Glyphosate/herbicide injury (in some cases)
- Heat damage/lack of pollination
 - Panicle blight (without the bacteria)

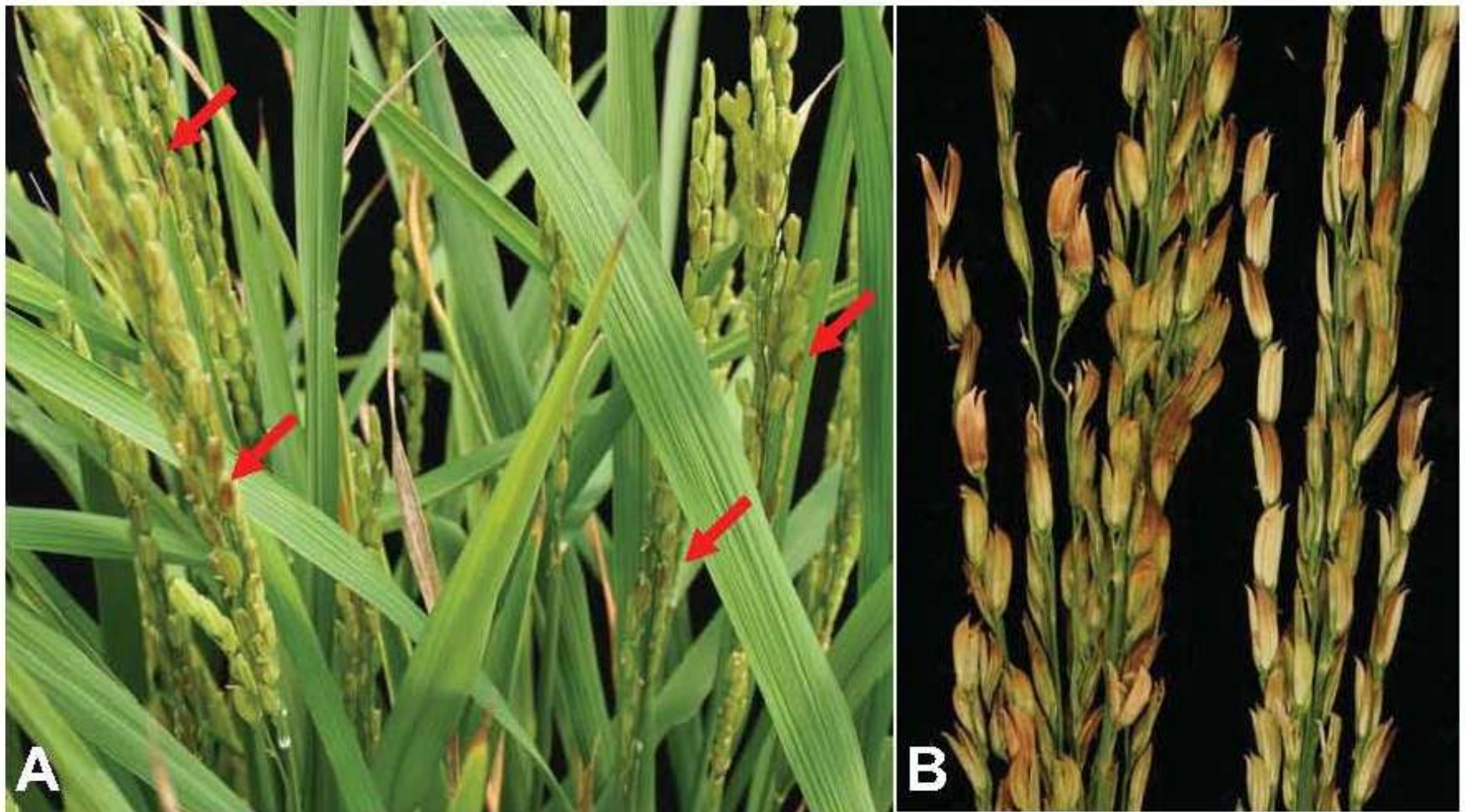


Fig. 4. Symptoms of panicle blight induced by spray inoculation (A: 7 days; B: 4 weeks).

Photo courtesy of S. Lu, MSU



- Field level photo of infected panicles, notice the discoloring of the florets and the upright nature of the entire panicle due to lack of grain filling following infection

Photo courtesy of S. Lu, MSU



Symptoms of bacterial panicle blight on rice caused by *Burkholderia glumae* in the greenhouse. Left: Sheath rot induced by injecting the bacterium; right: diseased florets induced by spraying the bacterium.

MS bacterial panicle blight research program

- Field level survey
 - Includes symptomatic plants, soil and water sampling to determine presence of the causal organisms
- Greenhouse varietal screening
 - Two types of inoculum challenge:
 - Spray
 - Injection

Bacterial panicle blight management options

- Arkansas research suggests (R. Cartwright):
 - Plant earlier to avoid extended periods with warm overnight temperatures
 - Plant early maturing varieties to avoid the hottest part of the summer
 - Reduce plant density
 - Work under the assumption that “Less seed = less bacteria”
 - Using less nitrogen fertilizer and maintaining high levels of potassium in the soil
 - LSU suggests reducing nitrogen fertilization has not been successful



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