

Cercospora Diseases in Rice

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Disease Symptomology

Narrow Brown Leaf Spot (NBLS), caused by the fungus *Cercospora janseana*, is a recurrent foliar disease in rice that initially affected only the leaves, producing narrow, elongated lesions in shades of brown to reddish-brown (Fig.1A). However, as the disease has expanded to impact other parts of the plant, such as the sheath and panicle (Fig.1B, Fig.1C), there is a need to revise both its terminology and management recommendations.

Similar to naming conventions used for blast disease, the disease caused by *C. janseana* is now named based on the infected plant tissue. Therefore, Narrow Brown Leaf Spot (NBLS), the disease's former common name, now refers exclusively to symptoms on the leaf (Fig. 1A). *Cercospora* Net Blotch (CNT) refers to symptoms on the sheath (Fig. 1B). *Cercospora* Panicle Blight (CPB) refers to symptoms on the panicle rachis and branches (Fig. 1C). The disease in general, encompassing

all three symptoms type, is referred to as *Cercospora*. These changes were made to facilitate understanding of the disease, as recent studies have shown that host resistance and disease management vary depending on the colonized tissue.

- A) Narrow Brown Leaf Spot (NBLS):** remains specific to leaf symptoms.
- B) *Cercospora* Net Blotch (CNB):** refers to symptoms on the sheath.
- C) *Cercospora* Panicle Blight (CNP):** refers to symptoms on the panicle.
- D) *Cercospora*:** all three symptoms type.

Disease Diagnostic

Accurate diagnosis is essential to correctly identify the causal agent for each noted issue.

Fig.1. Symptoms of *Cercospora* infection on different rice plant tissues: (A) on leaves, (B) on the sheath, and (C) on the panicle.



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Fig. 2. Comparison of symptoms - (A) Neck blast and (B) *Cercospora* panicle blight.

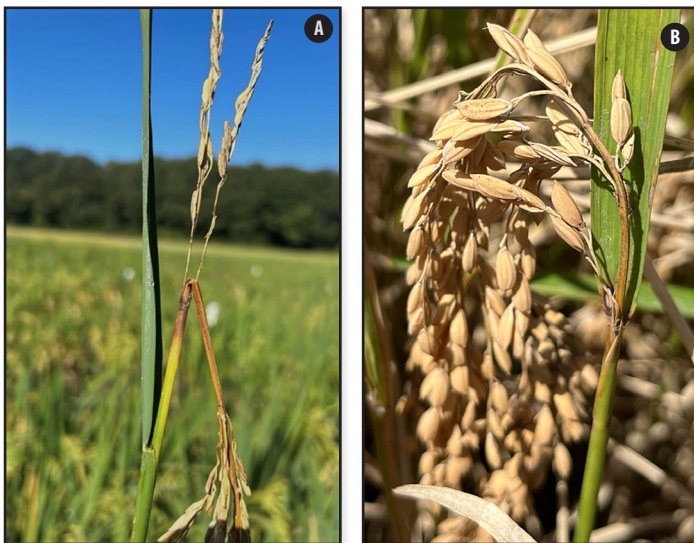


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Misidentification could result in treating the wrong pathogen, leading to ineffective management. A common confusion arises between neck blast (Fig. 2A) and *Cercospora* panicle blight (Fig. 2B), as both produce similar symptoms: darkening and wilting at the panicle base, necrotic lesions girdling the tissue and damage that can cause poor grain filling, panicle breakage or collapse. This similarity shows how challenging it can be to differentiate these two diseases based solely on symptoms (Fig. 2A, Fig. 2B). In such cases, conducting a diagnostic test based on signs of the pathogen is crucial. A sign of the pathogen refers to the observable physical manifestation of the pathogen itself. For example, the presence of fungal spores serves as the strongest indicator of the disease cause.

Pathogen Identification

The fungi responsible for the diseases neck blast and *Cercospora* panicle blight are *Magnaporthe oryzae* (syn. *Pyricularia oryzae*), and *Cercospora janseana*, respectively. In Figure 3, we have two pieces of contaminated rice panicles, which were exposed to high relative humidity for an extended period of time to promote the fungus infecting the plant to grow out, allowing for the identification of the fungus causing necrosis in the plant. (Fig. 3 A & Fig. 3B)

Diagnoses of the causal organism can also be done from infected leaf tissue. The pathogen *Cercospora janseana* can produce spores on

Fig. 3. Sporulation of (A) *Pyricularia oryzae* (Neck blast pathogen) and (B) *Cercospora janseana* (*Cercospora* panicle blight pathogen) following exposure to high relative humidity in a humidity chamber.

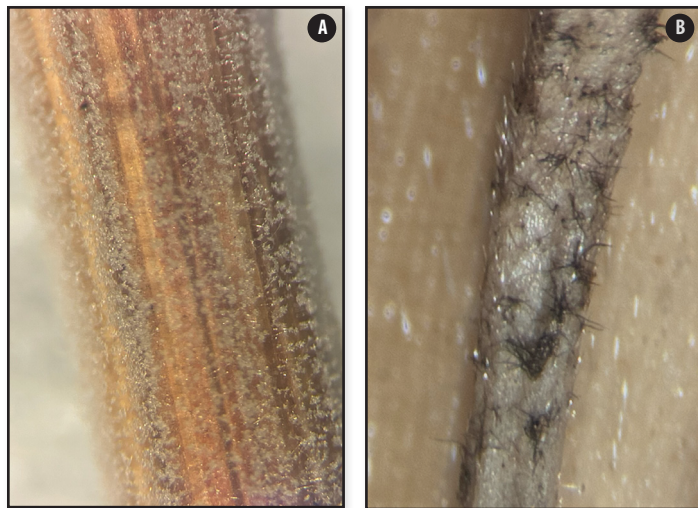


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infected leaf tissue (Fig. 4). Those spores are the asexual fungal structures responsible for the reproduction and spread of the fungus that can result in increased disease in a single field of rice or over a larger area. Some key characteristics of these spores are shape and size. The spores are typically elliptical to oval or cylindrical in shape (Fig. 5A) and range in size from approximately eight to 65 microns in length and three to seven micrometers in width (Fig. 5B).

Fig. 4. Spore production on rice leaves following initial infection by *Cercospora janseana*.



Fig. 5. Morphology and size of *Cercospora janseana* spores.

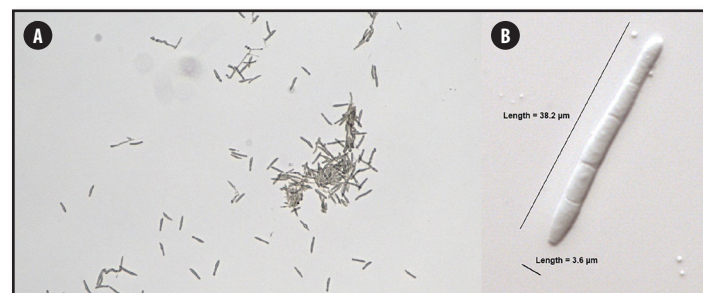


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Disease Management

Research considering effective management strategies is ongoing. The primary fungicide available for controlling diseases caused by *Cercospora* in rice is propiconazole (e.g., Tilt), with a recommended application rate of 6 – 10 fl oz/acre. In Arkansas, leaf symptoms have not commonly been observed, and specific fungicide application for NBLS is typically not suggested. However, the incidence of *Cercospora* net blotch (symptoms on the sheath) and *Cercospora* panicle blight (symptoms on the panicle) are increasing in Arkansas, raising concerns about the need for fungicide applications.

The current recommended timing for controlling *Cercospora* diseases in rice at the boot stage is based on studies conducted by Louisiana State University to manage Narrow Brown Leaf Spot. Since research is ongoing at the University of Arkansas, the recommendation for Arkansas is currently the same as Louisiana's—at the boot stage. However, the University of Arkansas is conducting trials to determine the optimal timing for fungicide applications. As soon as we have data to support any updates, we will share them with you and adjust the recommendations as needed.

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