Stem Rot and Aggregate Sheath Spot of Rice

Background

Stem rot and aggregate sheath spot are two common diseases of rice in California. Both are present in almost every field. At low levels, the diseases do not affect yield. However, when disease levels are high, early leaf senescence, lodging, and blanking can result in yield reductions.

Stem Rot

Stem rot is caused by the fungus *Sclerotium oryzae*. During the winter, the pathogen survives in straw residue in the form of resting structures called sclerotia. During warm weather, the sclerotia can geminate, grow, and produce more sclerotia. Research has shown that as the number of viable sclerotia in the soil increases, disease severity increases.

After fields are flooded, sclerotia float to the surface and, when conditions are appropriate, germinate and infect rice plants at the water level. Initially, the infection produces small black lesions on the leaf sheath (Fig. 1A). As the disease progresses, lesions get bigger and penetrate into the culm, and in severe cases the whole culm is rotted through. After fields are drained, sclerotia begin forming inside the lesions (Fig. 1B).

Aggregate Sheath Spot

This disease is caused by the fungus *Rhizoctonia oryzae-sativae*. Its cycle is similar to that of stem rot; sclerotia in crop residue constitute the inoculum that will cause infections the following season. In contrast to stem rot, aggregate sheath spot lesions are gray or green with well-defined borders (Fig. 2). As the disease progresses, lesions start developing on higher leaf sheaths (Fig. 3). Leaves of affected sheaths turn yellow and die. When the disease is severe, panicles can be affected; however, this is rare.

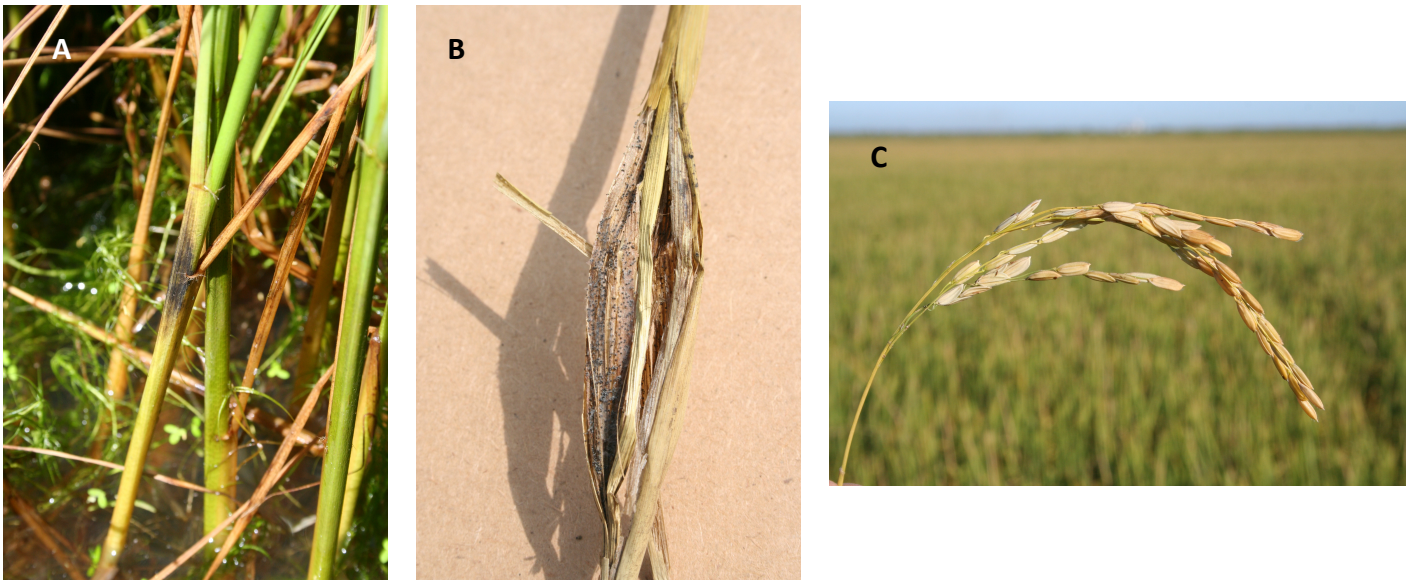

Figure 1. A. Initial stem rot lesion developing near the water level. B. At the end of the season, sclerotia can be found inside rotted culms. C. Panicle blanking caused by stem rot infection.

Management

Straw management

Because both pathogens can survive in straw during the winter, management of straw residue is critical to reduce disease severity. Any actions that improve straw decomposition during the winter will reduce viability of the sclerotia. Chopping and disking straw, followed by winter flooding for several years will reduce disease severity in the field.

Bailing can reduce the amount of inoculum in the field by removing sclerotia with the straw. Cut the straw as close to the ground level as possible to maximize the amount of sclerotia removed.

Burning eliminates the sclerotia, therefore it is recommended when possible.

Fertility

Stem rot development is favored by high nitrogen rates. Apply nitrogen to maximize yield and asses the need of a mid-season nitrogen application.

Aggregate sheath spot can be more severe when potassium is deficient. Asses the level of potassium in the soil and apply if needed.

Varieties

Currently, all pubic varieties in California are susceptible to both diseases.

Fungicides

Fungicides can reduce the incidence and severity of both diseases. The fungicide azoxystrobin (active ingredient in Quadris) applied at the early heading stage has resulted in good levels of disease reduction. Applications made early in the season (35-45 days after seeding) are not as beneficial as applications during early heading.

When disease levels are high, fungicides may not be enough to reduce disease severity. Several years of improved straw management and fertility, combined with fungicides, will help reduce disease levels.

Figure. 2. Early lesions of aggregate sheath spot at the water level

Figure. 3. *Aggregate sheath spot lesions affecting leaf sheath.*

For more on this topic:

- ✓ Integrated Pest Management for Rice, Third Edition. UC Agriculture and Natural Resources.
- ✓ UC IPM for Rice: ipm.ucanr.edu
- ✓ Agronomy Research and Information Center-Rice: rice.ucanr.edu

Agronomy Research and Information Center

http://agric.ucdavis.edu/

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