

Stem Rot Disease of Rice

IDENTIFICATION GUIDE

Stem rot disease of rice occurs in most rice-growing regions of the world and is the most prevalent and important disease of rice in California. All California cultivars are susceptible to the stem rot fungus although there are differences among cultivars in tolerance to the disease.

CAUSAL ORGANISM

Stem Rot is caused by *Magnaporthe salvinii*

(Cattaneo) R. Krause & R.K. Webster (syn. *Leptoshaeria salvinii* (Cattaneo). The fungus is most commonly found in its sclerotial state, *Sclerotium oryzae* Cattaneo. It also produces a conidial state, *Nakataea sigmoidea* (Cavera) Subramanian.

SYMPTOMS

The first symptoms are generally observed in the field after mid-tillering stage. Initially the disease appears

as small irregular black lesions on the outer leaf sheaths at the waterline (FIG 1). As the disease progresses, the lesions enlarge (FIG 2 and 3) and the fungus moves inward, forming lesions on the inner leaves (FIG 4). As the season progresses the fungus penetrates and rots the culm (FIG 5 and 6).

(continued on reverse)

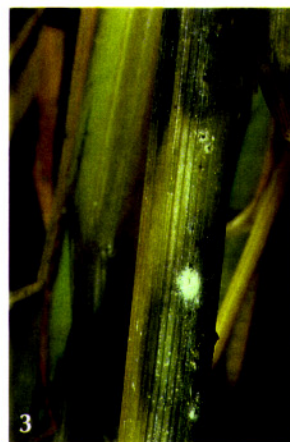
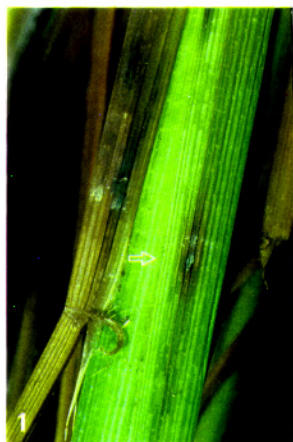
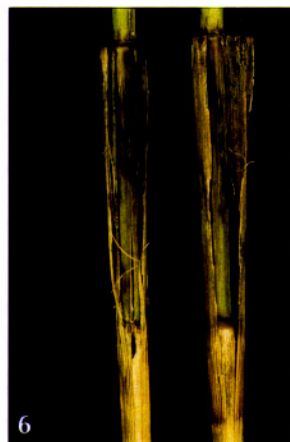
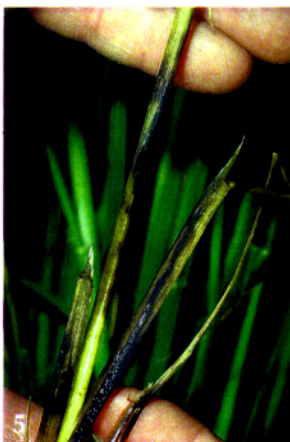


FIGURE 1 Initial lesion of Stem Rot on rice.

FIGURES 2 and 3 Progression of Stem Rot infection at the water surface.



FIGURES 4 and 5 As Stem Rot disease progresses the fungus penetrates the culm and may kill the tiller.

FIGURE 6 Infection has progressed through all the leaves and has penetrated the culm.

Infection of the culm may result in lodging, unfilled panicles, chalky grain, and in severe infections death of the tiller, (FIG 8). Usually

secondary tillers are those most frequently killed (FIG 8). Numerous tiny, black characteristic sclerotia are produced in infected leaf sheath tissue

(FIG 9). Sclerotia and mycelium of the fungus are generally produced inside infected culms (FIG 7) as the plants approach maturity.

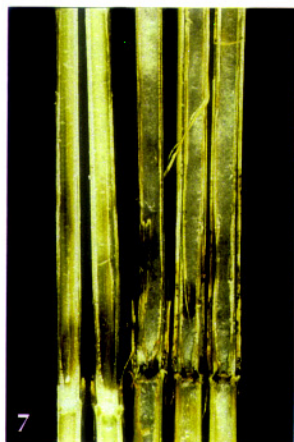


FIGURE 7 Severe infection of culms by Stem Rot.

FIGURE 8 Secondary tiller killed by Stem Rot.

FIGURE 9 Round, black sclerotia of the stem rot pathogen develop on or in infected plant tissue as the rice plant matures.

DISEASE CYCLE AND EPIDEMIOLOGY

The fungus survives between crops as sclerotia in crop debris (FIG 7) or in the soil. After flooding prepared seedbeds in the spring for planting, sclerotia float to the surface of the paddy water, where they infect rice leaf sheaths at the water line. Sclerotia are produced abundantly on diseased tissue as the disease progresses and the rice approaches maturity.

Disease incidence and severity are positively correlated with the number of sclerotia present in the upper layer of the soil in a field before planting.

Severity of the disease increases with the amount of nitrogenous fertilizer and also depends on the time of infection in relation to the growth stage of the plant when infection takes place. Plants are most susceptible to initial infection at the internode elongation stage and infection at this stage usually results in the most severe infections and greatest reduction in yield.

STEM ROT DISEASE MANAGEMENT

The most effective means of reducing stem rot is to limit the number of overwintering sclerotia (initial inoculum). Burning of residue after harvest to destroy sclerotia

and prevent further formation of sclerotia in residue during overwintering is the most effective. Removal of residue by swathing below the infection sites and baling is nearly as effective as burning in reducing carryover inoculum. Additional means of minimizing loss are careful nitrogen fertilization to avoid excess nitrogen beyond that required for maximum yield and avoiding too dense of plant stands. Incorporation of residue in the fall and winter flooding has also been shown to reduce carry over inoculum levels.