



Pacific Pests, Pathogens & Weeds - Fact Sheets

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Rice stem rot (430)



Photo 1. Infection of tillers by stem rot, *Magnaporthe salvinii*.



Photo 2. Rice stems with spots and large lesions of stem rot, *Magnaporthe salvinii*.



Photo 3. Sclerotia of stem rot, *Magnaporthe salvinii*, on the inside of a leaf sheath.



Photo 4. Sclerotia on leaf sheaths, and spots on a stem, caused by stem rot, *Magnaporthe salvinii*.

Common Name

Rice stem rot

Scientific Name

Magnaporthe salvinii. It is also known under its asexual names, *Leptosphaeria salvinii* and *Sclerotium oryzae*. Note, a similar fungus, identified as *Sclerotium hydrophilum*, associated with infections of the outer leaf sheath of rice and weed grasses occurred on the Guadalcanal Plains, Solomon Islands, in the mid-1970s.

Distribution

Widespread. Africa, Asia, North, South and Central America, the Caribbean, Europe, Oceania. It is recorded from Australia, Fiji, New Caledonia, and Papua New Guinea.

Hosts

Rice is the main host; minor hosts are wild grasses.

Symptoms & Life Cycle

The fungus causes stem rot, chalky grains and unfilled panicles. Symptoms appear first on the leaf sheaths near water level during early heading and grain filling (Photo 1).

Hard black balls of fungal threads ('sclerotia') germinate on the leaf sheaths, infect, causing large black spots, which penetrate to the stem; rots on the stem cause lodging and, in severe cases, death of the tillers (Photo 2). Numerous sclerotia form on and inside the leaf sheaths (Photos 3&4). Apart from sclerotia, the fungus produces spores, 'conidia' and sexual 'ascospores'.

Infection is severe on plants damaged by wounds made by insects. Too much nitrogen fertilizer and too little potassium affects disease development.

Spread occurs as sclerotia which float in the irrigation water. Sclerotia are also the means of survival. These are produced on the tillers

and survive in the soil, on straw and stubble. They float to the surface during soil preparation and irrigation. Seedborne infection occurs, but its importance is not clear. Infection by sclerotia is thought to be the more likely cause of stem rot.

Impact

IRRI reports that it can cause heavy losses in many countries, e.g., India, Japan, the Philippines, and Vietnam. Leaf sheaths decay, resulting in lodging and low grain filling.

Note, similar outbreaks occurred on the Guadalcanal Plains, Solomon Islands, in the mid-1970s, and *Sclerotium hydrophilum* was shown to be the cause. This was found to be weakly pathogenic, unless plants were weakened by brown planthopper or armyworm attack.

Detection & inspection

Look for black spreading spots on the leaf sheaths and stems at water level. Look for the many hard black sclerotia on the spots that form on the outside and inside of the leaf sheaths, and within the hollow stems. Look for stem rots that cause lodging.

Management

CULTURAL CONTROL

Before planting:

- Plough the land frequently before sowing or transplanting.
- Applications of lime have been used to reduce soil pH.

During growth:

- Periodically, drain the fields to reduce the number of sclerotia.
- Use the correct balance between nitrogen and potassium fertilizers. It is best to split applications.

After harvest:

- Collect straw and other debris after harvest and burn it with the stubble, or plough everything into the soil.
- Rotate with forage or legume crops.

RESISTANT VARIETIES

There are no highly resistant varieties, although there are differences in ability of varieties to withstand lodging. Contact your local agriculture office for information.

CHEMICAL CONTROL

Copper oxychloride, fentin hydroxide and thiopantate-methyl at the start of the disease is said to be effective, but careful consideration should be given to the economics of this method of control. The possible association of the disease with insect attack by brown plant hopper and armyworm, or with nutritional imbalance should be considered before application of fungicides.

When using a pesticide, always wear protective clothing and follow the instructions on the product label, such as dosage, timing of application, and pre-harvest interval.

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Information (and Photo 1) from Stem rot. Rice Knowledge Bank. IRRI. (<http://www.knowledgebank.irri.org/training/fact-sheets/pest-management/diseases/item/stem-rot>); and CABI (2018) Magnaporthe salvinii (stem rot) Crop Protection Compendium. (<http://www.cabi.org/cpc>); and from Elazegai F, Islam Z (2003) Diagnosis of common diseases of rice. International Rice Research Institute. (<http://www.knowledgebank.irri.org/images/docs/diagnostic-of-common-diseases-of-rice.pdf>). Photo 2&3 Donald Groth, Louisiana State University AgCenter, Bugwood.org. Photo 4 Milton Rush, Plant Pathology, Louisiana State University, Bugwood.org.

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