



### Rice Disease and Their Management

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Diseases are considered major constraints in rice production. The common and most severe diseases in rice are blast, rice yellow mottle virus (RYMV) and bacterial leaf blight.

#### Introduction

Rice or Paddy, the staple food of the people in the eastern, southern and south-eastern parts of India, is grown on about 43 million hectares, which accounts for nearly a third of the total area under food grains in the country. There are many constraints in rice production. The most common being the diseases of rice.

#### Important Diseases of Rice and Their Control Measures

##### Blast of Rice (Causal Organism *Pyricularia oryzae* (Syn: *P. grisea*))

The disease was first recorded in China in 1637. In Japan, it is believed to have occurred as early as in 1704. In Italy the disease called "brusone" was reported in 1828 and in USA in 1876. The disease was first recorded from Tanjore district of Tamil Nadu in 1918.

**Symptoms:** On the leaves, the lesions start as small water soaked bluish green specks, soon enlarge and form characteristic spindle shaped spots with grey centre and dark brown margin. Severely infected nursery and field show a burnt appearance. Node blast: In infected nodes, irregular black areas that encircle the nodes can be noticed. The affected nodes may break up and all the plant parts above the infected nodes may die (Node blast). The flower emergence, the fungus attacks the peduncle which is engirdled, and the lesion turns to brownish-black. This stage of infection is commonly referred to as rotten neck, neck rot, neck blast, panicle blast.

##### Management

- Use of seeds from a disease free crop.
- Grow resistant varieties like Simhapuri, Tikkana, Sriranga, Phalgun, Swarnadhan, Swarnamukhi, MTU 7414, MTU 9992, MTU 1005, Swathi, IR 64, IR 36, Sravani, Jaya, Vijaya, Ratna, RP 4-14, IET 1444, IR20, TKM 6, MTU-3 & 5 and NLR 9672 & 9674 in different tracts of Andhra Pradesh.
- Remove and destroy the weed hosts in the field bunds and channels.
- Split application of nitrogen and judicious application of nitrogenous fertilizers.
- Treat the seeds with Captan or Thiram or Carbendazim or Carboxin or Tricyclazole at 2 g/kg.
- Seed treatment with biocontrol agent *Trichoderma viride* @ 4g/kg or *Pseudomonas fluorescens* @ 10g/kg of seed. Avoid close spacing of seedlings in the main field.
- Spray the nursery with Carbendazim 25 g or Edifenphos 25 ml for 8 cent nursery.  $\frac{3}{4}$  Spray the main field with Edifenphos @ 0.1% or Carbendazim @ 0.1% or Tricyclazole @ 0.06% or Thiophanate Methyl @ 0.1%.
- Antibiotics including Blasticidin at 20 ppm and Kasugamycin at 20 ppm were found effective against blast.

**Brown Spot or Sesame leaf spot or Helminthosporiose (Causal Organism: *Helminthosporium oryzae*)**

In India, this disease is the principal cause of Bengal famine of 1942-43. The first report of the disease in India was made by Sundararaman from Madras in 1919, and now is reported from all of the rice growing states. Under highly favourable conditions, the disease causes a reduction in yield ranging upto 90 per cent.

**Symptoms:** The disease causes blight of seedling. Symptoms appear as lesions (spots) on the coleoptile, leaf blade, leaf sheath, and glumes, being most prominent on the leaf blade and glumes. Dark brown or black spots also appear on glumes which contain large number of conidiophores and conidia of the fungus. It causes failure of seed germination, seedling mortality and reduces the grain quality and weight. The disease is associated with a physiological disorder known as akiochi in Japan. Abnormal soil conditions (Deficiency of potassium) predispose the plants to heavy infection.

**Management**

- Use disease free seeds.
- Field sanitation-removal of collateral hosts and infected debris in the field.
- Crop rotation
- Adjustment of planting time
- Proper fertilization
- Use of slow release nitrogenous fertilizers is advisable.
- Good water management
- Use of soil amendments
- Grow disease tolerant varieties viz., Bala, BAM 10, IR-20, Jaya, Ratna, Tellahamsa and Kakatiya.
- Treat the seeds with Thiram or Captan at 4 g/kg and with Mancozeb @0.3%

**Bacterial Leaf Blight**

The disease was first observed in Japan (1884). In Indonesia, Kresek disease was reported to kill young seedlings completely in 1950. In India, BLB was first reported in 1959. A severe outbreak of the disease occurred in Bihar and Uttar Pradesh in 1963. In the tropics the disease is usually referred as bacterial blight as it often kills entire young seedlings. Taichung Native 1 is highly susceptible.

**Symptoms:** The bacterium induces either wilting of plant or leaf blight. Wilting syndrome known as Kresek. Kresek results either in the death of whole plant or wilting of only a few leaves. The bacterium enters through the hydathodes and cut wounds in the leaf tips, becomes systemic and cause death of entire seedling. Milky or opaque dew drops containing bacterial masses are formed on young lesions in the early morning. They dry up on the surface leaving a white encrustation. The affected grains have discoloured spots surrounded by water soaked areas. If the cut end of leaf is dipped in water, bacterial ooze makes the water turbid.

**Management**

- The disease seed borne the seed should be soaked for 8 hours in agrimycin and wettable ceresin followed by hot water treatment for 10 min.
- Grow resistant cultivars like MTU 9992, Swarna, Ajaya, IR 20, IR 42, IR 50, IR 54, TKM 6, Mashuri, IET 4141, IET 1444, IET 2508, Chinsura Boro, etc.
- Resistant donors: Tetep, Tadukan, Zenith, etc.
- Affected stubbles are to be destroyed by burning or through ploughing.
- Judicious use of nitrogenous fertilizers  $\frac{3}{4}$  Avoid clipping of tip of seedling at the time of transplanting.
- Avoid flooded conditions or drying of the field (not at the time of flowering)
- Avoid flow of irrigation water from infected to healthy field

**Sheath Blight (Causal Organism *Rhizoctonia solani*)**

**Symptoms:** The fungus affects the crop from tillering to heading stage. Initial symptoms are noticed on leaf sheaths near water level. On the leaf sheath oval or elliptical or irregular greenish grey spots are formed. As the spots enlarge, the centre becomes greyish white with an irregular blackish brown or purple brown border. Five to six week old leaf sheaths are highly susceptible.

**Management**

- Avoid excess doses of fertilizers.
- Adopt optimum spacing.
- Eliminate weed hosts.
- Apply organic amendments.
- Avoid flow of irrigation water from infected fields to healthy fields.
- Deep ploughing in summer and burning of stubbles.
- Grow disease tolerant varieties like Shiva (WGL 3943)
- Spray Propiconazole @ 0.1% or Hexaconazole @ 0.2% or Validamycin @ 0.2%

**Conclusion**

Rice yield can be greatly reduced by damage due to diseases. They are mainly caused by bacteria, viruses, or fungi. Planting a resistant variety is the simplest and, often, the most cost effective management for diseases.

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