

DISEASES OF RICE

1. BLAST DISEASE

Symptoms

The fungus attacks the crop at all stages from seedlings in nursery to heading in main field. The typical symptoms appear on leaves, leaf sheath, rachis, nodes and even the glumes.

Leaf blast: On the leaves, the lesions start as small specks, soon enlarge and form characteristic spindle shaped spots with grey centre and dark brown margin. The spots join together as the disease progresses and large areas of the leaves dry up and wither.

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



Neck blast: When ear emerges the neck of the panicle is infected and it becomes black and shrivelled. This stage of infection is commonly referred to as rotten neck/neck rot/neck blast/panicle blast. In early neck infection, grain filling does not occur and the panicle remains erect like a dead heart caused by a stem borer. In the late infection, partial grain filling occurs.

Causal organism/ Etiology

Pyricularia oryzae (Sub-division: Deuteromycotina)

Perfect stage – *Magnaporthe grisea*

- Conidiophores are simple, 2-4 septate and olivaceous in color
- At the tip of conidiophore 3 celled, pyriform- obclavate hyaline to pale olive conidia are formed
- The pathogen produces toxins namely piricularin, pyriculol, α -picolinic acid

Disease Cycle

- **Primary Infection** – Mycelium & Conidia in the infected straw & seeds
- **Secondary Infection** – Conidia spread by wind and rain splashes

Epidemiology/ favourable conditions

- The fungus causes infection rapidly at a temperature of around 24-28°C
- A high relative humidity(92%), cloudy weather, dew deposition favours disease development

Disease Management

- Planting disease free seeds
- Judicious application of nitrogenous fertilizers
- Spraying fungicides e.g. Kitazin, carbendazim, bavistin
- Application of antibiotics e.g. Blastocidin, Kasugamycin @ 20 ppm
- Cultivation of blast resistant varieties like IR-8, IR-36, Jaya, Swarnadhan.

2. Brown spot of rice

- This disease is also referred to as **fungal blight**
- This disease is the principal cause of the famous **Bengal Famine** in 1942-43

Symptoms

- Brown colour, round to oval spots appear on the leaf and leaf sheath
- In severe case the spots coalesce to form large patches of withered tissues
- The grains also become infected and black colour spots appear on glumes



Causal Organism:

Helminthosporium oryzae (Deuteromycotina)

(Sexual stage: *Cochliobolus miyabeanus*)

Sporophores arise as lateral branches from the hyphae and bears conidia. Typical conidia are slightly curved, widest at the middle and tapering toward the apex. Mature conidia are brownish with a moderately thin peripheral wall. The pathogen produces toxin namely cochliobolin/ ophiobolin.

Disease Cycle

- **Primary infection** – Fungal mycelium surviving in infected plant parts and seeds (seed borne) and on collateral hosts (*Leersia hexandra*, *Echinochloa colona*, *Pennisetum typhoides*)
- **Secondary infection** – Conidia spread through wind and water.

Epidemiology

- The fungus requires 25-30°C temperature and 90% or more RH for infection.
- Excessive nitrogenous fertilizer application and cloudy weather aggravates the disease.

Disease Management

- Seeds should be treated with Thiram, organomercurial before sowing
- Cultivation of resistant varieties e.g. Padma, IR-24, Co-20, CH. 13, CH. 45
- Seedlings should be sprayed with Dithane-Z-78
- Spray the crop in the main field twice with Carbendazim + Mancozeb @0.2%, first after flowering and second spray at milky stage.

3. Bacterial blight

Symptoms

- The bacterium induces either wilting or leaf blight or sometimes yellowing of leaves
- Wilting known as **Kresek** occurs within 3-4 months after transplanting. It results in wilting of few leaves or death of plant
- In leaf blight phase dull greenish water soaked or yellow spots appear on tips and margins of leaves
- The lesions extends along margins to the leaf sheaths, coalesce to form straw color or blighted lesions
- The inner margin of lesions become wavy



- Sometimes droplets of bacterial ooze pale amber colour found on affected portions
- In severe infections all leaves are attacked and premature drying results

Causal organism:

Xanthomonas oryzae pv. oryzae

Bacterium is rod shaped, gram negative, aerobic with polar flagellum

Disease Cycle

- **Primary infection** - Bacterium overwintering in seed, soil or in plant stubbles
- **Secondary infection** – Bacterial ooze

Epidemiology

Heavy rain with severe wind, heavy dew, deep irrigation water, and temperature of 22-26⁰C favours disease development. Application of excessive nitrogen and plants in shade are more prone to disease

Management

- Grow resistant cultivars like Swarna, Ajaya, IR 20, IR 42, IR 50, IR 5.
- Affected stubbles are to be destroyed by burning or through ploughing
- Judicious use of nitrogenous fertilizers
- Seed treatment with Agrimycin @0.025% and wettable Ceresan @0.05% followed by hot water treatment at 52-54°C for 10 mins eradicates bacteria
- Seed treatment with Streptocycline @ 0.01 %.
- Spray Streptocycline @ 0.01 % and Copper oxychloride @ 0.3%.