

ETIOLOGY AND CONTROL OF RICE AND WHEAT CROP DISEASES

Major diseases of rice and their causal organism

S.No	Name of disease	Causal organism
1)	Rice Blast	<i>Pyricularia grisea</i>
2)	BROWN SPOT OF RICE	<i>Helminthosporium oryzae</i>
3)	Bacterial Blight	<i>Xanthomonas oryzae pv. Oryzae</i>
4)	Sheath Blight of rice	<i>Rhizoctonia solani</i>
5)	False Smut	<i>Ustilaginoidea Virens</i>
6)	Khaira disease	Zinc deficiency
7)	Tungro Disease of Rice	RICE tungro virus

1) RICE BLAST

SYMPTOMS:

- Disease can infect paddy at all growth stage and all aerial parts plant (Leaf, neck and node).
- Among the three leaves and neck infections are more severe.
- Small specks originate on leaves -subsequently enlarge into spindle shaped spots (0.5 to 1.5cm length ,0.3 to 0.5cm width) with ashy center.
- Several spots coalesce and form big irregular patches.

Leaf blast:

- Several cases of infection -entire crop give a blasted or burnt appearance -hence the name 'BLAST'
- Severe cases -lodging of crop after ear emergence)

BLAST NECK

- Neck region of panicle develops a black color and shrivels completely /partially grain set inhibited, panicle breaks at the neck and hangs

NODAL BLAST

- BECOME NODAL BLACK AND BREAK UP.

Etiology

- Mycelium: septate, hyaline to olivaceous.
- Reproduction is asexual by curved to fusiform 4 celled hyaline ascospores produced in perithecia.

INFECTION:

- **PSI:** Conidia from infected seeds and plant debris.
- **SSI:** Air borne conidia.

Management:

Cultural method:

- Remove collateral weed hosts from bunds and channels.
- Use only disease-free seedlings.
- Avoid excess nitrogen.
- Apply N in three split doses (50% basal,25% N in panicle initiation stage).
- Use resistant variety CO 47.

Chemical method:

- Spray after observing initial infection of the disease.
- Carbendazim 50WP @500g/ha (or)
- Tricyclozole 75 WP @ 500g/ha (or)
- Metominostrobin 20 SC @ 500ml/ha (or) 47
- Azoxystrobin 25 SC @ 500 ml/ha

2) BROWN SPOT OF RICE:

SYMPTOMS:

- Occur in nursery as well as main field.
- Causes blight of seedlings.
- Leaf spotting is very common.
- Isolated brown, round to oval (resemble sesame seed)
- Spots measures 0.5 to 2.0 mm in breadth _ coalesce to form large patches.
- Seed also infected (black or brown spots on glumes spots are covered by olivaceous velvety growth).
- Infection also occurs on panicle neck with brown color appearance.
- 50% yield reduction in severe cases.



Etiology:

- Mycelium is inter or intracellular.
- Septate conidiophores emerge in groups through the epidermis or stomata.
- Bears conidia singly, are 8-10 celled, tapering towards end and buldge at middle, brownish in color.

INFECTION:

- **PSI: infected seeds.**
- **SSI: collateral hosts.**

Management:

Preventive measures:

- Use of resistant varieties – Rasi, IR 36, Jagannath.
- Proper crop nutrition
- Avoid water stress
- Clean cultivation

Cultural practices :

- Use disease free seeds for sowing.
- Do not use high nitrogenous fertilizer
- Use resistant variety Amruth

Chemical control :

- If the disease observed in field than spray 1g of ediphenphos or 2g mancozeb or 2.25g in 1 liter of water

3) BACTERIAL BLIGHT:

Symptoms:

Kresek Phase:

- 1) Results from early systemic infection.
- 2) Leaf rolling, drooping, yellowing and withering of tillers.
- 3) Death of the affected tillers.

Margin Blight:

- 1) Watersoaked translucent spots on margin and along with midrib.
- 2) Elongated streaks with wavy margin becoming white yellow coloured.
- 3) Streaks coalesce filling vascular bundles with bacteria.
- 4) Milky exudations from leaf.
- 5) Grain discolouration with watersoaked spots.

Etiology:

- Shape: Rod shaped occurring singly or in pairs.
- Flagellation: Monotrichous, Polar.
- Bacterium is Gram -ve.
- Aerobic and Capsule former.
- No formation of spores.

Infection:

- PSI: Seed born inoculum carried externally or internally.
- SSI: Wind or water carried inoculum causing passive infection through stomata, hydathodes or wounds.

Management:

Cultural measures:

- Use of resistant varieties - Ajaya, Asha, Biraj, CO-43, Gobind, IR-64, Janaki, PR-4141, Radha, Sona Mahsuri, Sujata, Suraj, Swarna, Udaya.
- Balanced fertilizer application - Split application of N
- Reduce the disease spread by careful handling of seedlings during transplanting, maintaining shallow water in nurseries, providing good drainage during severe flooding.
- Reduce the amount of inoculum through clean cultivation and drying the fallow fields.
- Remove collateral weed hosts from bunds and channels.
Use only disease-free seedlings.
- Apply N in three split doses, 50% basal, 25% in tillering phase and 25%N in panicle initiation stage.

Chemical control:

- Seed treatment with 0.1 g Streptomycin and 0.1 g Copper Sulfate or 0.3 g Agrimycin-100 and 0.1 g Copper Oxchloride in one liter of water for 20 minutes.
- Foliar spray of 0.05 g Streptomycin and 0.05 g Copper Sulfate.

LOOSE SMUT OF WHEAT

- All wheat growing regions of India.
- Loss – 30%

- Symptoms:
- Symptoms ear emerged first than normal in some varieties.
- Mostly all ears in a stool affected.
- Less tillering.
- Except awns all parts of ear converted into smut spore.
- Black powder in ear-covered by silvery membrane.
- Membrane burst later and smut spore release
- Rachis
- Group of smut spore called sorus
- Respiration
- Dry weight of plant

Pathogen – *Ustilago segetum*

Ustilago tritici

- Disease is internally seed borne.
- Pathogen survive in embryo as secondary mycelium.
- Infection-systemic
- Tem. -23 C
- Smut spore -18 -20 C
- R.H. – 60 -85 %

Disease management

- Use of heatly seed for sowing.
- Seed treatment – vitavax @2.5 gm/kg seed.
- Hot water treatment – (1). Seed dip in coldwater -4 hrs 64-85 F
(2). Seed dip in hot water – 132 F – 10
Minutes
(3). Drying of seed
- Solar treatment -by Luthra,1953
In may-june - seed dip in cold water-8-12 O'clock-4 hrs
Seed drying in sun light-12-4 O'clock- 4 hrs
- Dis. Res. Var. – DWR-59,PBW-213,HD-2221,HD-2203,Kalyan