JANTA VEDIC COLLEGE, BARAUT

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	*Pyriculria grisea*
2)	BROWN SPOT OF RICE	*Helminthosporium oryzae*
3)	Bacterial Blight	*Xanthomonas oryzae pv. Oryzae*
4)	Sheath Blight of rice	*Rhizoctonia solani*
5)	False Smut	*Ustilaginoidea Virens*
6)	Khaira disease	Zinc dificiency
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 speaks 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 debries.
- **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 gigh 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 transluscent 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 Streptocycline and 0.1 g Copper Sulfate or 0.3 g Agrimycin-100 and 0.1 g Copper Oxychloride in one liter of water for 20 minutes.

• Foliar spray of 0.05 g Streptocycline 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 slivery membrane.
- Membrane burst later and smut spore release
- Rachis
- Group of smut spore called sorus
- Respiration
- Dry weight of plant

Pathogen – *Ustiago 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 hrs064-85 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