

Major Diseases of Paddy and Their Management

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Introduction:

Rice (*Oryza sativa* L.) is the most important staple food crop of the world. Asia is the leader in rice production accounting for about 90% of the world's rice production. The biggest problem faced by the farmers cultivating paddy is damage caused by major pests and diseases affecting it. The identification of disease on the basis of its symptoms is the major step towards the management of the concerned disease. Therefore in this article we are going to discuss the major diseases of paddy, their symptoms, favorable environmental conditions for the spread of the disease, resistant varieties and chemical control of major diseases of paddy.

1. Paddy Blast or Blast of Paddy / Rich Man's Disease

Causal agent: *Pyricularia oryzae* (Sexual stage is *Magnaporthe grisea*)

Importance of the disease: Almost all plant parts of Paddy plants such as leaves, neck and nodes and almost all stages of plant growth (seedling to late tillering and ear heading) are affected by this disease. About 70 – 80% grain loss may be caused by this disease.

Symptoms of Paddy Blast: There are three types of paddy blast and each have some specific symptoms.

A. Leaf Blast of Paddy: Spindle-shaped spots with grey center and



Leaf Blast Of Paddy



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Image 1A. Symptoms of Leaf Blast of Paddy

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brown margin can be seen on leaves which later cause a Blasted or Burnt appearance.

B. Neck Blast Of Paddy – Grayish brown lesions can be seen on the neck, later panicle breaks and fall off.

prolonged dew, rainfall or irrigation which keeps leaves wet for 12-14 hrs. Warm temperature (25-30°C) with high relative humidity (93-99%). Poor aeration (due to dense canopy) and shaded area. High nitrogen



Image 1B. Symptoms of Neck Blast of Paddy

C. Node Blast of Paddy: Affected nodes application (Rich man's disease). show black lesions which later break up.

Resistant Varieties: Nua chinikamini,



Image 1C. Symptoms of Node Blast of Paddy

Favorable Conditions for the Disease: Frequent wetness of leaves due to

Nua Dhusara are Resistant to neck blast, sheath rot & RTV. Other resistant varieties are

Pusa Basmati 1847, Pusa Basmati 1885, CO 47, CO 50, ADT 36, IR 36, IR 64, Tulsi, Rasi, Swarnadhan, Jaya etc.

Chemical Control of the disease:

1. Seed treatment with agrosan GN / Thiram
2. Tebuconazole 250 EC
3. Hexaconazole 5 % EC
4. Tebuconazole 50% + Trifloxystrobin 25% WG
5. Kasugamycin 3% SL

2. Bacterial Leaf Blight Of Paddy:

Causal agent: Bacteria (*Xanthomonas oryzae* pv. *oryzae*)

Symptoms This is a foliar disease, water-soaked spots appear on leaves, and infected leaves turn grayish green and roll up. Leaves turn yellow to straw-colored and wilt as disease progress which results in whole seedlings dry up and die.

fingers. Yellowish bacterial ooze may be seen coming out of the cut ends.

Favorable conditions for the disease:

Occurs mostly in irrigated and rainfed lowlands. Warm temperature (25-34°C), above 70% relative humidity and nitrogen deficient soil condition (Poor man's disease). Strong winds and continuous rainfall are favorable conditions for disease infection.

Resistant Varieties: Ajay, PR-10, Pusa Basmati 1847, Pusa Basmati 1885 etc.

Chemical Control of the disease:

1. Copper Oxychloride 50% WP
2. Streptomycin sulphate 90% + Tetracycline hydrochloride 10% SP
3. Kasugamycin 5% + Copper Oxychloride 45% WP

3. Sheath Rot of Paddy

Causal agent: Fungus (*Sarocladium oryzae*)

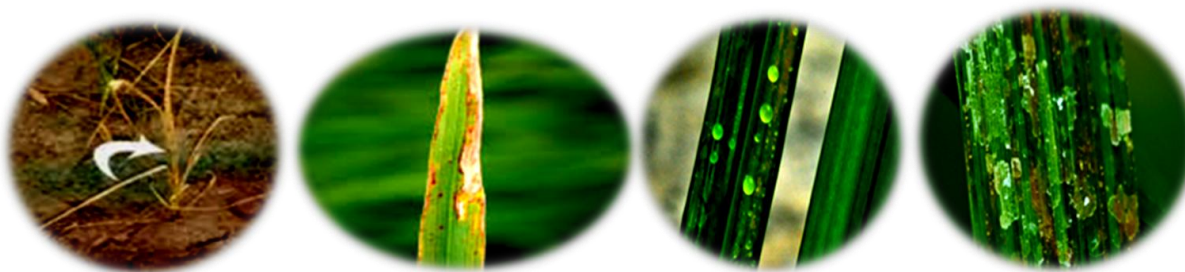


Image 2. Symptoms of Bacterial Leaf Blight Of Paddy

Wilting of seedlings (Kreshek) may sometimes be confused with early Paddy stem borer damage. To distinguish squeeze the lower end of infected seedlings between the

Affecting Stage: Boot leaf stage

Symptoms: Irregular grayish-brown water-soaked lesions can be seen on flag leaf sheath.

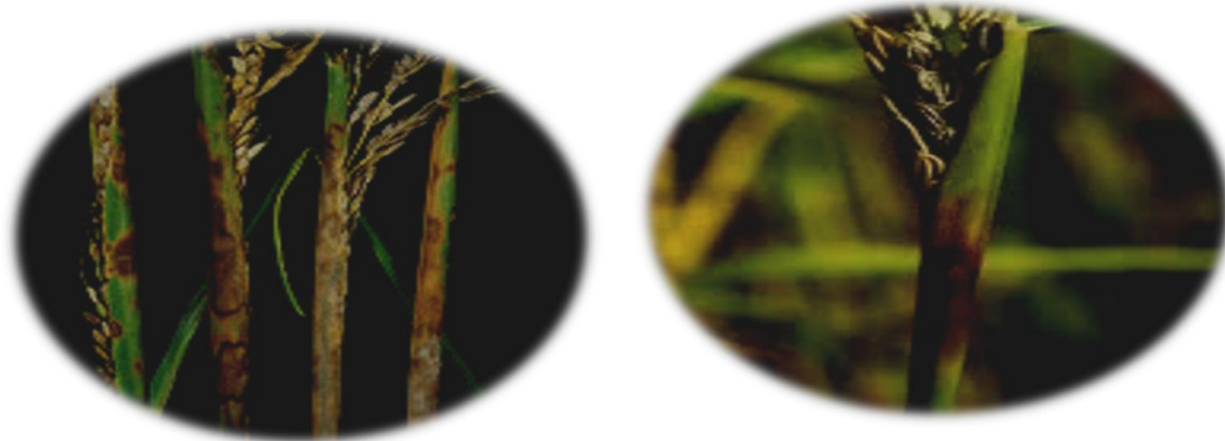


Image 3. Symptoms of Sheath Rot of Paddy

Favorable conditions for the disease:

Wet environment, Excessive nitrogen application, Injuries and wounds in plants, Warm temperature (20 -28°C) with high relative humidity, high planting density.

Resistant Varieties: Nua chinikamini, Nua Dhusara, CR Sugandha Dhan 907, Purnabhog (CRM 2203-4).

Chemical Control:

1. Carbendazim 50% WP
2. Chlorothalonil 75% WP
3. Metalaxyl 8% + Mancozeb 64% WP
4. Kasugamycin 5% + Copper
Oxychloride 45% WP

4. Sheath Blight of Paddy

Causal agent: Fungus (*Rhizoctonia solani*)

Affecting Stages: Tillering to heading

Symptoms: First of all greenish-grey oval lesions appear on the leaf sheath near the water level after that it forms irregular lesions with a greyish-white center and brown margin.



Image 4. Symptoms of Sheath Blight of Paddy

Favorable conditions the disease:

Rainy season, High temperature with high Relative humidity, High nitrogen application, and High plant density.

Chemical Control:

1. Seed treatment with agrosan GN / Ceresan
2. Tebuconazole 250 EC
3. Azoxystrobin 11% + Tebuconazole 18.3% SC
4. Carbendazim 50% WP

5. Kresoxim-methyl 40% + Hexaconazole 8% WG

5. Brown Spot of Paddy

Causal agent: Fungus (*Helminthosporium oryzae*)

Affecting Stages: Seedling to milky stage

Symptoms: Oval or cylindrical dark brown spots with a yellow halo incomplete grain filling and reduced grain quality may be due to infection of florets.

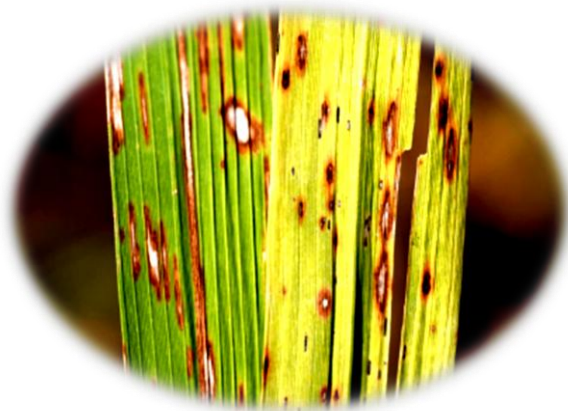


Image 5. Symptoms of Brown Spot of Paddy

Favorable Conditions for the disease: Cool to warm temperature (16 – 36°C) with high relative humidity (86 – 100%). Infected seeds, weeds, and infected stubbles.

Resistant Varieties: CORH -1, CO 44, Bhavani, ADT 44, Rasi, BR 2655, Raksha, Krishna, IR 20, IR 36, IR 50, IR 204, Sabarmati, Bala etc.

Chemical Control:

1. Seed treatment with agrosan GN / Ceresan

2. Propiconazole 25%EC

3. Hexaconazole 5 % SC

4. Tricyclazole 18 % + Mancozeb 62 % WP

5. Azoxystrobin 18.2% + Difenconazole 11.4% SC

6. False Smut Of Paddy

Causal agent: *Ustilaginoidea virens*

Affecting stages: Flowering stage to maturity

Symptoms: Spikelets have orange or greenish-black velvety smut balls which cause chaffy grains



Image 6. Symptoms of False Smut of Paddy

Favorable conditions for the disease: Warm temperature (25 – 35°C) with high relative humidity (above 90%), High nitrogen fertilization, Heavy rainfall and winds

Resistant Varieties: VNR 2111, GK 5025, IRH 74, 27P64, RH 10488.

Chemical Control:

1. Azoxystrobin 18.2% + Difenconazole 11.4% SC
2. Thiophanate Methyl 70% WP
3. Azoxystrobin 11% + Tebuconazole 18.3% SC
4. Validamycin 3% L

7. Tungro Disease of Paddy

Causal agent: Rice Tungro virus (RTSV and RTBV)

Affecting Stages: Almost all growth stages especially the vegetative stage

Vector of the disease: Leafhoppers

Symptoms: Stunted plants, Yellow to orange discoloration in leaves.

2. Chlorpyrifos 50% + Cypermethrin 5% EC
3. Lambda Cyhalothrin 5% EC
4. Thiamethoxam 25 % WG

Resistant Varieties: Vikramarya, Surekha, Bharani, CO 45, CO 48, IR 36 etc.

8. Foot rot / Bakanae / Foolish Seedling Disease of Paddy

Causal agent: Fungus (*Gibberella fujikuroi*)

Affecting stages: Seedling to tillering stage

Symptoms: Infected plants produce tall and thin tillers with yellowish-green and



Image 7. Symptoms of Tungro Disease of Paddy

Favorable conditions for the disease: Presence of vectors, Virus sources (infected stubbles), Weeds in the field

Management: Tungro disease can't be controlled and cured but we can control the vector by the following chemicals

1. Pymetrozine 50 % in Water Dispersible Granules [WDG]

pale leaves they are incapable of supporting their own weight hence foolish seedling disease.

Favorable condition: Infected seeds, Strong wind and water

Chemical Control:

1. Thiophanate Methyl 70% WP
2. Mancozeb 63% + Carbendazim 12%



Image 8. Symptoms of Foot rot / Bakanae / Foolish Seedling Disease of Paddy

3. WP Tebuconazole 50% + Trifloxystrobin 25% WG

Favourable conditions the disease:

High nitrogen fertilizer, infected stubbles,

4. Kresoxim-methyl 40% + Hexaconazole 8% WG

Plants with wounds as a result of insect attack.

Chemical Control:

Resistant Varieties: Super Basmati, Basmati 2000, Basmati 515, DR 82, DR 83 etc.

1. Carbendazim 50% WP

2. 8.3% Azoxystrobin + 66.7% WG Mancozeb

3. Zineb 68% + Hexaconazole 4%

4. Validamycin 3% L

9. Stem Rot of Paddy

Causal agent: Fungus (*Sclerotium oryzae*)

Resistant Varieties: Improved Sona,

Affecting stages: Early tillering stage IR 22, VL 8, Basmati 370 etc.

Symptoms: Initial symptoms include appearance of small black lesions on the outer leaf sheath. Later lodging occurs in infected culm which results in chalky grains production.

10. Grassy Stunt Disease of Paddy

Causal agent: Rice grassy stunt virus

Affecting stages: All growth stages but most vulnerable at the tillering stage.

Vector: Brown plant hopper (BPH).



Image 9. Symptoms of Stem Rot of Paddy



Image 10. Symptoms of Grassy Stunt Disease of Paddy

Symptoms: Affected plants showed stunted growth, excessive tillering, diseased hills looks grassy and rosette.

Favourable Conditions the disease: Year after year rice sowing may create favorable condition for vector survival.

Management: The disease can't be controlled and cured but we can control the vector

1. Acephate 50 % + Imidacloprid 1.8 % SP
2. Chloropyriphos 50 % EC
3. Pymetrozine 50% WG
4. Buprofezin 20% + Acephate 50%

Resistant Varieties: IR 26, IR 64, IR 36, IR 56, IR 72 etc.

11. Khaira Disease of Paddy

Cause: It is due to Zn deficiency.

Symptoms: Usually seen in nursery, Yellow patches at leaf base on both side of midrib. Root growth restricted and usually main root turn brown.

Management:

1. Spray 5 Kg ZnSO₄ with 2.5 Kg lime per hectare at 10 DAS in nursery
2. Spray 5 Kg ZnSO₄ with 2% Urea in 1000 liter water per hectare at the time of sowing.



Image 11. Symptoms of Khaira Disease of Paddy