

Emerging minor diseases of rice in Odisha

Identification and Management

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Among rice diseases, blast, brown spot, sheath blight, tungro continues to cause more damage. A number of minor diseases have emerged as major problems to rice farming in Odisha and causing a significant reduction in yield and quality. Some of the minor diseases are discussed with identification symptoms and integrated management.

Keywords: Odisha, Rice disease, Symptoms and integrated management

RICE (*Oryza sativa* L) is one of the important and staple food crops of India contributing significantly to the food security of the nation. The production and productivity of rice increased to many folds over the year and the country is exporting the rice to middle-east and African countries. Major rice growing states are West Bengal, Punjab, Haryana, Tamil Nadu, Andhra Pradesh, Kerala, Karnataka, Telangana and Odisha. Rice farming is facing a number of challenges and among them disease contributes significantly to the reduction in yield and economic losses to the farmers.

FALSE SMUT

Pathogen: *Ustilago indica* virens
(Sexual stage: *Villosiclava virens*)

Identification symptoms

The pathogen specifically infects rice flowers and later transforms the grains into smut balls. Initially, the balls are slightly flattened, yellow in colour covered with a thin membrane. As the smut ball matures, it increases in size converting yellowish-green to green or greenish-black. At final maturity, the entire smut ball looks dark black with rough surface. Very few grains in the panicle or all the grains may convert into smut balls (Fig. 1).

Integrated Management

Select seeds which are free of smut balls for sowing. Avoid excess nitrogenous fertilizer application. Follow alternate wetting and drying of the field to avoid moisture build-up

which helps in disease incidence. Remove and destroy infected panicles, crop debris after harvest. Seed treatment should be followed strictly: use carbendazim 50% WP @ 2g/kg or biological control agents like



Fig. 1. Infected rice flowers by false smut

Trichoderma or *Pseudomonas* talc based formulations @ 8-10 g/kg of seeds. Fungicidal spray with Propiconazole 25EC @ 500ml/ha or copper hydroxide 77%WP @ 1.25kg/ha at boot leaf initiation stage. Repeat the above spray at 50% flowering stage.

BAKANAE/FOOT ROT (FOOLISH SEEDLING DISEASE)

Pathogen: *Fusarium fujikuroi*
(Sexual stage: *Gibberella fujikuroi*)

Identification symptoms

Initial symptoms appear as pale green and lanky seedling sporadically in the field. The seedling later shows abnormal elongation which is much taller than the normal plant. Intermodal length will be more and production of fibrous roots seen from each nodes. White powdery mass of the pathogen produces in each node later covers entire plant. The entire plant gets killed without producing any grains. Death of the plants is called as foot-rot. The pathogen produces two toxins, 1. Gibberellic acid which is a growth hormone leads to elongation symptoms and 2. Fusaric acid leads to the death of the young seedlings (Fig. 2).

Integrated Management

Select suitable resistant varieties for sowing. Varieties like Chandan, Improved Tapaswini, Sarasa, Kshira, CR Dhan-311, Wifa-10, Improved Lalat, Palguni, Saket-4, Maudamani, Kalinga-II, Naveen, Kalinga-I, CR Dhan-305, Khitish, Satabdi, CR Dhan-310, CR-29-83, IR-29, Udaya, Padma. Treat the seeds with carbendazim 50% WP @ 2g/kg or biological control agents like *Trichoderma* or *Pseudomonas* talc based formulations @ 8-10 g/kg of seeds. Remove and destroy infected plants from main field. Do not use farmer saved seeds for sowing in the next season. Foliar spray with combination fungicide, Trifloxystrobin 25% + Tebuconazole 50% WG (75%WG) @ 1g/lit will give the protection to some extent.

SHEATH ROT

Pathogen: *Sarocladium oryzae*, *Fusarium fujikuroi* species complex, *Pseudomonas fuscovaginae*

Identification symptoms

The disease is very important emerging problem caused by a number of pathogens. Among them, *Sarocladium oryzae* is the major fungal pathogen. The initial symptoms start as discoloration of the flag leaf. Rotting occurs on the on the leaf sheath which encloses young panicle. Irregular lesions on leaf sheath which are having grey center with reddish brown margin. The lesions coalesce each other and covers entire sheath. Under severe infestation, the developing grains also infected and turn to dirty discolored having white fungal mass. Grains ultimately rot and gets chaffy. The panicle will not emerge out of sheath. The plants may stunt and dies prematurely (Fig. 3).

Integrated management

Select suitable resistant varieties for sowing: Jalmagna, Latisali, Rasi, Pankaj etc., Treat the seeds with carbendazim 50% WP @ 2g/kg or biological control agents like *Trichoderma* or *Pseudomonas* talc based formulations @ 8-10 g/kg of seeds. Soil application of *Pseudomonas*

fluorescens @ 2.5kg/ha after 30 days of transplanting mixing with 50kg FYM. Removal and destruction of weeds, infected stubbles should be done at critical periods. Application of potash at tillering stage is helpful in disease reduction. At booting stage, spray fungicides like carbendazim 50% WP @ 500g/ha or mancozeb 75% WP @ 1kg/ha or Iprobenphos 48EC @ 1kg/ha or Thiophanate methyl 70%WP @ 500g/ha or Isoprothiolane 40%EC @ 750 ml/ha. During the grain maturity stage, spray systemic fungicides like Ediphenphos @ 500g/ha or a combination of Tridemorph 80% EC (fungicide) + phosphamidon 40% SL (insecticide) to give better control of sheath rot. Foliar spray of calcium sulphate and zinc sulphate is effective against sheath rot.

GRAIN DISCOLOURATION/ DIRTY PANICLE DISEASE

Pathogen: *Drechslera Oryzae*, *Sarocladium oryzae*, *Alternaria padwickii*, *Curvularia* spp., *Epicoccum* sp., *Fusarium moniliforme*, *Aspergillus* spp.

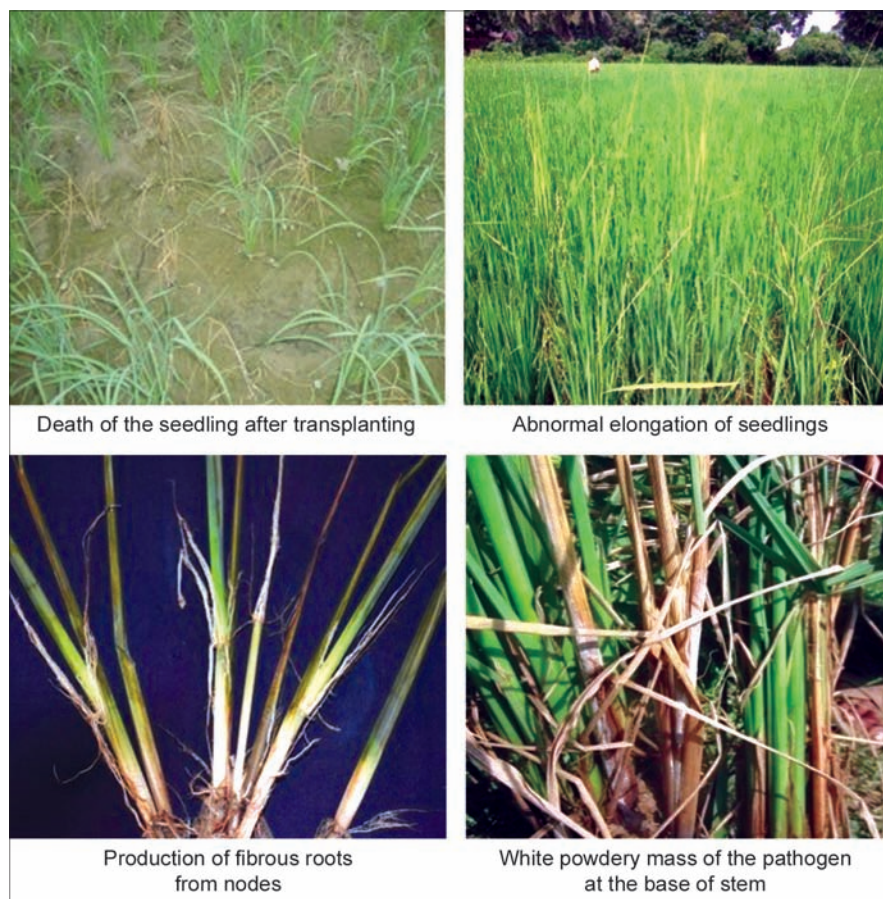


Fig. 2. Foot rot symptoms



Fig. 3. Sheath rot symptoms

Identification symptoms

The disease is an important emerging problem in all the rice growing seasons. The type of infection may be external contamination by saprophytic pathogens or internally seed born where pathogens infects endosperm. There are different kinds of like ashy grey discolouration, black discolouration, pink discolouration and light brown discolouration based on the pathogens involved. The infected grains convert into dirty discolored grains which have numerous spots and lesions on them. Infection in field may transfer to storage where the pathogens multiply and produces some of the harmful toxins. Early infection in field leads to complete yield losses due chaffiness of the grains. Severe infection leads to rotting of the panicles leads to qualitative and quantitative losses.

Integrated management

Use the disease free seeds. The seeds should also be free from damage, chaffiness and other deformities. Treat the seeds with

carbendazim 50% WP @ 2g/kg or biological control agents like Trichoderma or Pseudomonas talc based formulations @ 8-10 g/kg of seeds. At tillering and pre-flowering stage, spraying of carbendazim 50% WP @ 500 g/ha or copper oxychloride 50% WP @ 1 kg/ha will control the disease effectively. At boot leaf initiation stage, spray with Mancozeb 75% WP @ 1 kg/ha or Iprobenphos 48% EC @ 500 ml/ha or Carbendazim 50% WP @ 250 g/hac. During grain maturity stage, spray with Mancozeb 75% WP @ 1 kg/ha or Iprobenphos 48% EC @ 500 ml/ha. Biological control agents like Trichoderma atroviride or Bacillus amyloliquefaceance talc based formulations @ 10 g/lit of water at grain maturity stage

EARLY SEEDLING BLIGHT

Pathogen: *Sclerotium oryzae*, *Sclerotium rolfsii*

Identification symptoms

The disease is one of the important emerging diseases



Fig. 4. Grain discolouration symptoms



Fig. 5. Early seedling blight symptoms

generally appears in nursery beds during the cold season (winter months). Initial symptoms start as wilting or drooping of the seedling in the nursery bed. Later, white mycelia mat of fungus develops on soil surface covering the seedlings. Fungal mat covers almost both root and shoots. As the disease progresses, development of white mustard shaped sclerotial bodies seen which later turn to dark brown hard structures. Disease may appear sporadically in nursery or covers entire nursery. Severe infection leads to death of the seedlings.

Integrated management

The disease is seasonal and do not have any resistant varieties. Follow

clean cultivation: do not allow the nursery to in wet condition, always allow stand in water. Remove and destroy the infected seedlings. Drench with Carbendazim 50% WP @ 3g/lit or Carbendazim (12%) + Mancozeb (63%) WP@ 2g/lit of water.

NARROW BROWN LEAF SPOT

Pathogen: *Cercospora janseana*

Identification symptoms

The disease is emerging as a major problem in wet periods. The disease causes severe necrosis of the leaf tissue and drying and death of the leaves. Initially, short, linear, brown lesions appears on leaf blades later extends to leaf sheath, pedicels and

glumes. The lesions are 2-10 mm long and 1 mm wide in size. Size of the lesions depends on varietal susceptibility. The resistant cultivars have narrower and darker lesions whereas; the susceptible cultivars have wider and light brown. The lesions coalesce each other giving dried and burning appearance to field.

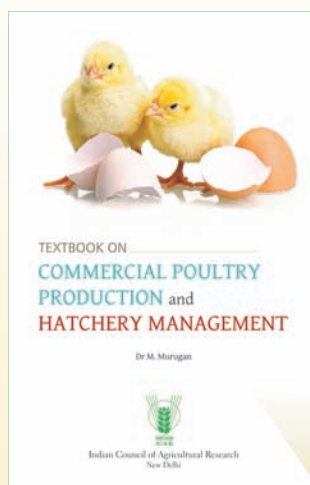
Integrated management

Foliar spray of Carbendazim 50% WP @ 500g or Mancozeb 75% WP @ 2kg or Hexaconazole 5% SC @ 500 ml/ha.

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