

DISEASES OF MINOR MILLETS

Presented
by

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Tenai
Foxtail millet
Setaria italica



Blast - *Pyricularia setariae*

Rust- *Uromyces setariae italica*

Smut: *Ustilago crameri*

Downy Mildew: *Sclerospora graminicola*

Blast - *Pyricularia setariae*



Host : Finger millet, pearl millet, wheat
and *Dactyloctenium aegyptium*.

Symptoms:

On leaves symptoms develop as small pin head water soaked yellowish dot that turns spindle shaped within 2-3 days with greyish centre surrounded by dark brown margin.

The spots coalesce and in severe form the leaves wither and dry up.

Infected node turns black and breaks at the nodal junction.

Favorable condition :

- **Excessive application of nitrogen fertilizers,**
- **cloudy and drizzling weather or dew resulting in continuous leaf wetness for more than 10 h,**
- **night temperature between 15 to 24°C and**
- **relative humidity above 90 per cent.**

Management:

Carbendazim 50 WP @1 g/litre or Ediphenphos 50 EC @1g/Litre of water or combination product of Carbendazim + Mancozeb at the rate 1 g/litre water

Rust- *Uromyces setariae italica*

Symptoms

- **Numerous minute brown uredosori appear on both the sides of the leaf.**
- **Pustules arranged in rows**
- **Heavily infected leaves they cover almost the entire leaf blade. Pustules produced on the leaf sheath, culms and stem. severe infection premature drying of leaves and poor grain set are observed.**

Pathogen :

The teliospores are single celled, pedicellate, oblong, globose, yellowish brown, with smooth, thick walls, which are much thicker at the apex than at the base. Only uredial and telial stages known

Favourable condition : Low temperature and high relative humidity

Management

Spraying of Mancozeb at the rate 2.5 g/ litre of water

Smut: *Ustilago crameri*

Symptoms :

The grain loss caused by the disease varies from 8-50 per cent of the grain yield.

The fungus affects most of the grains in an ear producing sori

The sori are pale greyish in colour

When the crop matures, the sori rupture and produce dark powdery mass of spores.

Pathogen : The spores are dark brown and angular or round in shape and smooth wall

Mode of spread :The fungus is externally seed borne. Soil borne

Management : Steeping seeds in 2 per cent copper sulphate solution or 0.5 per cent formalin for about 30 minutes. Seed treatment with Carbendazim at the rate 2 g/kg seed

Downy Mildew: *Sclerospora graminicola*

Symptoms :

- **Chlorosis of the seedling leaves. The terminal spindle fails to unroll, becomes chlorotic which later turns brown and gets shredded.**
- **Whitish bloom of sporangiophores and sporangia of fungus are prominent on the surface of leaves in humid conditions.**
- **Floral parts are proliferated into green leafy structures showing ‘green ear’ symptom. Conversion is partial or complete**

Mode of spread

- **The fungus is an obligate parasite.**
- **The primary infection is mainly soil or seed borne oospores**

Secondary infection : Sporangia

Management :

- **Collection and removal of infected plant debris**
- **Seed treatment with Metalaxyl at the rate 3 g/kg of seed**

KUDIRAIVALI - *Echinochloa frumentacea*

(Barnyard Millet)

Head Smut: *Ustilago crusgalli*

Kernel Smut: *Ustilago paradoxa*

Leaf Spot or Blight- *Helminthosporium crusgalli*

Leaf blast- *Magnaporthe grisea*



Head Smut: *Ustilago crugalli*

Symptoms

- The infected inflorescence is deformed and destroyed.
- In addition, the smut also produces gall-like swellings on the stem, the nodes of young shoots and in the axils of the older leaves.
- The gall-like swellings are covered by a rough membrane of host tissue rupture and releases the smut spores
- **Smut spores are brown ,spherical and Echinulate.**

Mode of spread: Externally seed borne

Management

- Seed treatment with Carbendazim or Thiram at the rate 2 g/kg seed before sowing.
- The variety PRJ 1 resistant to this disease
- .Rouging of infected plants from the field is also helpful in reducing the spread of disease.

Kernel Smut: *Ustilago paradoxa*

Symptoms :

Only few grains in ear are infected. They are scattered and the affected grains appear as greenish swollen bodies. The sori are round and the size not exceeded the size of the normal grain.

Mode of spread: Externally seed borne

Management

Seed treatment with Carbendazim or Thiram at the rate 2 g/kg seed before sowing

Leaf Spot or Blight- *Helminthosporium crugalli*

Symptoms

- **Dark brown to grey in colour oval lesions and are surrounded by yellow halo.**
- **Under humid conditions fungal growth is visible on these spots.**
- **Similar spots can also be seen on the leaf sheath. The disease is most common under humid conditions.**

Mode of spread : Through seed

Management : Seed treatment with Carbendazim or Thiram at the rate 2 g/kg seed

Proso Millet - *Panicum miliaceum L.*

Panivaragu

Head Smut: *Sporisorium destruens*

Grain Smut-*Ustilago crameri*

Leaf Spot: *Helminthosporium panici-miliacei*



Head Smut: *Sporisorium destruens*

Symptoms

The **entire inflorescence** is modified into a sorus enclosed by a grayish-white false membrane. The membrane ruptures as the plants mature, exposing the dark-brown spore mass and the vascular tissues of the smutted panicle.

Mode of spread: Externally seed borne

Management:

Seed treatment with Carboxin and Benomyl @ 2g/ kg of seed

Grain Smut-*Ustilago crameri*

Symptoms

Most of the grains are transformed into white grayish sacs (smut sori). The sori are slightly pointed to oval and filled with black powder.

Mode of spread : Externally seed borne

Management:

- **Seed treatment with Carbendazim or Thiram at the rate 2 g/kg seed**
- **Collection and burning of diseased ears**
- **Crop rotation for 2-3 years.**

Leaf Spot: *Helminthosporium panici-miliacei*

Symptoms :

- **Infected leaves produced brown rectangular spot**
- **Seed infection causes seed rotting, coleoptile spot and seedling blight.**

Mode of spread :Through seed

Management : Seed treatment with Carbendazim or Thiram at the rate 2 g/kg seed

KODO MILLET- Varagu

Paspalum scrobiculatum



- **Head Smut- *Sorosporium paspali***
- **Rust: *Puccinia substriata***
- **Ergot or Sugary Disease- *Claviceps paspali***
- **Udbatta Disease: *Ephelis oryzae*. (*Balansia oryzae sativae*)**
- **Bacterial Leaf Streak: *Xanthomonas* sp**
- **Phanerogamic Partial Root Parasite - *Striga* spp**

Head Smut- *Sorosporium paspali*

Symptoms :

The entire panicle is transformed in to long sorus and covered by cream coloured thin membrane. In some cases it is enclosed in the flag leaf and may not emerge fully. The membrane burst open and exposes the black mass of spores

Mode of spread :

The disease is mainly seed borne.

Management : Seed treatment with Carboxin or Thiram @ 2 g/ Kg

Rust: *Puccinia substriata*

Symptoms :

The erumpent, oval, brown uredia are formed on the **upper surface** of the leaf blade and on the leaf sheath. The brown coloured telia are formed on the **under surface** of the leaf blade and on the leaf sheath

Mode of spread :

Uredia are present throughout the year on grass hosts and from where they disseminate to the main cultivated crop.

Management:

Eradication of the grass hosts is partly useful in reducing the primary inoculum

Ergot or Sugary Disease- *Claviceps paspali*

Symptoms :

- **The disease manifests time of panicle emergence.**
- **Majority of the spikelets in the panicle is affected.**
- **Pearly drops of honeydew oozing out from the infected spikelets**
- **The droplets are soon hardened into reddish brown crusts later turn in to dark grey sclerotia**

Management:

- **Removal and destruction of infected panicles**

Udbatta Disease

Ephelis oryzae (Teleomorph: *Balansia oryzae sativae*)

Symptoms

- **The affected panicles are transformed into a compact agarbatti like shape, hence the name “Udbatta**

Management:

- **Removal and burning of affected panicles**
- **Keeping the bunds free from weeds that serve as collateral hosts seed treatment with Carbendazim @2g/kg seed**

Bacterial Leaf Streak: *Xanthomonas* sp

Symptoms:

The disease manifests itself as pale yellow streaks measuring running parallel to the veins of leaf. Later, the streaks enlarge turn brown. In severe infection, the entire leaf withers away. The leaves may be **shredded along the length. Streaks may also be formed on shoots and peduncle of panicles.**

Management:

Two foliar sprays of Streptomycin sulphate at the rate 300 ppm, first just after the appearance of disease and subsequently after 15 days interval are effective against the disease along with 2.5 fold increase in yield.

Phanerogamic Partial Root Parasite: *Striga densiflora*

Symptoms

The under-ground portion of Striga plant remain attached to the roots of host plant **by houstonia, from which the parasite absorbs water and nutrients. The attacked plants are stunted with poor aerial growth and bear lanky panicles. If the infestation occurs in early stage, the plants may dry up before flowering.**

Management:

Weeding or hand pulling of Striga plants before flowering is the cheapest and effective method for its eradication..

Little millet (*Panicum sumatrense*)
Formerly *P. miliare*



Rust :*Uromyces linearis*

Symptoms

Numerous, narrow, minute, brown pustules arranged in **linear rows appear on the upper surface of the leaves.**

Pathogen :

The Uredia are brown and erumpent. The urediospores are brown, round, echinulate. The telia are black in colour. The teliospores are thick walled, smooth, globose, brown with persistent, long thick pedicels, fresh urediospores germinate readily but not the teliospores.

Downy mildew : *Sclerospora graminicola*

Blast : *Pyricularia grisea*