

PEARL MILLET DISEASES

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Downy mildew or Green ear – *Sclerospora graminicola*

Symptoms

Systemic infection

Seedlings (3-4 leaves stage) – leaves chlorotic or yellowish with profuse white growth on lower leaf surface

Seedling dies within 30 days and do not tiller

Grown up plants

No death of plant; Tender leaves are severely affected

Green ear

Transformation of earhead partially or fully into green leaves



The glumes and spikelets are hypertrophied

Stamens and pistils are also converted into leafy structures

High sporulation occurs in malformed leafy structures under humid conditions

In severe cases, leafy structures are necrotic due to formation of oospores

Pathogen

Obligate parasite

Mycelium hyaline, aseptate, intercellular

Sporangiophores emerge through stomata, short and stout base with cluster of sporangia

Sporangia hyaline, elliptical, thin-walled, papilla, 3-12 zoospores

Oospores spherical, thick and smooth walled, yellowish brown

Mode of spread and survival:

Oospores in soil (viable for 10 years)

Seed – survive in embryo as dormant mycelia

Sec. spread – Sporangia

Fav. Condition: High RH, Low temp. (15-25°C) with moisture on foliage

Management

Deep ploughing buries oospores

Crop rotation

Transplanting reduces disease incidence

Growing of resistant varieties – Co 7, WCC 75

Seed treatment – Metalaxyl 6 g/kg

Spraying metalaxyl 500 g or mancozeb 1.0 kg/ha on 20 DAS

Rust – *Puccinia penniseti* or *Puccinia substriata* var. *penicilliariae*

Symptoms

Infect at all stages

Lower and older leaves are most affected

Minute, reddish brown pustules occur in groups

Dark brown linear patches at later stages representing teleutosori

Brinjal – **pycnial and aecial stage (alternate host)**





Rust pustules in brinjal (pycnial and aecial stages)

Alternate host of cumbu rust

Pathogen

Macrocytic or heteroecious rust

Uredospores – oval, elliptic or pyriform, yellowish brown, sparsely echinulate, pedicellate

Teliospores – Dark brown, two-celled, cylindrical to club shaped, broad at top and tapering towards base, short pedicellate

Teliospores germinate to produce four-celled promycelium and four basidiospores

Pycnia form on upper leaf surface of brinjal bearing pycniospores and receptive hyphae. Pycniospores are oblong or elliptic and hyaline

Cup-like **aecia** bear aeciospores in chain

MOS and S: Alternate host crop and wind borne uredospores

Management:

Sowing during Dec – May results in lesser incidence

Spraying of Wettable sulphur 2500g/ha or Mancozeb 1000g/ha.

Smut – *Tolyposporium penicilliariae*

Symptoms

Pathogen infects florets and transform them into large plumpy sacs (sori) containing black powdery mass of spores

Young sori larger and greener than healthy grains

Matured sori dark brown and easily broken – release millions of smut spore balls

Sori are pearl or oval shaped, 3-4 mm long, 2-3 mm broad at top



Pathogen

Confined to sorus

Teleutospores (chlamydospore or smut spores) occur in compact ball

Spore ball circular to near polyhedral, 200-1400 nos in a ball

Individual spores do not separate, angular to round, light brown, germinate to produce four-celled promycelia & terminal sporidia

MOS & S: Soil borne teleutospores – primary inoculum

Air-borne sporidia – sec. inoculum

Fav. Condition: High humidity and successive monocropping

Management

Removal of affected earhead

Crop rotation

Summer ploughing

Ergot / Sugary disease – *Claviceps fusiformis*



Symptoms

Pathogen infects the florets
(ovary)

Creamy pink or red
coloured, sweet, sticky
liquid (contains conidia)
exudes from affected ovary

Later dark coloured long,
hard sclerotia formed. They
are broad at base, narrow tip
and curved at middle,
smooth, 3-8 mm long

Pathogen

Conidial stage: Macro conidia and microconidia

Macroconidia – hyaline, fusiform, unicellular

Microconidia – hyaline, globular, unicellular

Sclerotial stage

Sclerotia – elongated to round, light pink to dark brown to black and compact (hard), germinate to produce 1-16 fleshy stipes with capitulum having perithecial projections

Perithecia are pyriform; Asci interspersed with paraphyses.

Asci long, hyaline with apical pores

Ascospores are thread-like, hyaline, non-septate

MOS & S: PS – Sclerotia in soil

SS – Conidia in honey dew (wind, insects and rain)

Fav. Condition

Temperature – 18-30°C

RH – more than 90 %

Light shower during flowering

Management

Adjusting the sowing time

Mechanical removal of ergot sclerotia using 20 % brine solution

Varieties are less susceptible than hybrids

Spray carbendazim 500 g/ha or or Mancozeb 1000g when 5 - 10% flowers have opened and again at 50% flowering stage.

Head mould –Many fungi



Leaf blast – *Pyricularia setariae*



Symptoms

Diamond shaped to circular spots up to 1 cm long with dark brown margin and light coloured centre occurs

Spots are surrounded by chlorotic yellow haloes



Southern blight –

Sclerotium rolfsii



Phyllosticta leaf blight – *Phyllosticta penicilliariae*



Minor diseases

Top rot or Twisted top or Pokah Boeng – *Fusarium moniliforme*

Zonate leaf spot – *Gloeocercospora sorghi*



Thank you