

15. Diseases of Black gram

Powdery mildew - *Erysiphe polygoni*

Symptoms

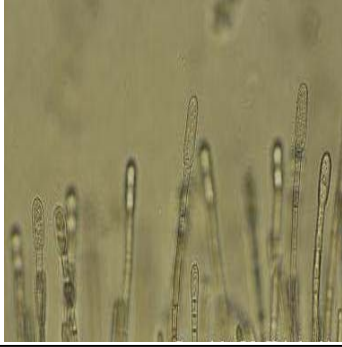
Small, irregular powdery spots appear on the upper surface of the leaves, sometimes on both the surfaces. The disease becomes severe during flowering and pod development stage. The white powdery spots completely cover the leaves, petioles, stem and even the pods. The plant assumes greyish white appearance; leaves turn yellow and finally shed. Often pods are malformed and small with few ill-filled seeds.



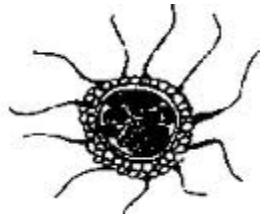
Symptoms

Pathogen

The fungus is ectophytic, spreading on the surface of the leaf, sending haustoria into the epidermal cells. Conidiophores arise vertically from the leaf surface, bearing conidia in short chains. Conidia are hyaline, thin walled, elliptical or barrel shaped or cylindrical and single celled. Later in the season, cleistothecia appear as minute, black, globose structures with myceloid appendages. Each cleistothecium contains 4-8 asci and each ascus contains 3-8 ascospores which are elliptical, hyaline and single celled.



Conidia and conidiophores



Cleistothecium

Favourable Conditions

- Warm humid weather.
- The disease is severe generally during late kharif and rabi seasons.

Disease cycle

The Pathogen is an obligate parasite and survives as cleistothecia in the infected plant debris. Primary infection is usually from ascospores from perennating cleistothecia. The secondary spread is carried out by the air-borne conidia. Rain splash also helps in the spread of the disease.

Management

- Remove and destroy infected plant debris.
- Spray [Carbendazim](#) 500g or [Wettable sulphur](#) 2kg or [Tridemorph](#) 500 ml/ha at the initiation of disease and repeat 15 days later.

Anthracnose - [Colletotrichum lindemuthianum](#) (Sexual stage: [Glomerella lindemuthianum](#))

Symptoms

The symptom can be observed in all aerial parts of the plants and at any stage of crop growth. The fungus produces dark brown to black sunken lesions on the hypocotyl area and cause death of the seedlings. Small angular brown lesions appear on leaves, mostly adjacent to veins, which later become greyish white centre with dark brown or reddish margin.

The lesions may be seen on the petioles and stem. The prominent symptom is seen on the pods. Minute water soaked lesion appears on the pods initially and becomes brown and enlarges to form circular, depressed spot with dark centre with bright red or yellow margin. Several spots join to cause necrotic areas with acervuli. The infected pods have discolored seeds.



Symptoms

Pathogen

The fungus mycelium is septate, hyaline and branched. [Conidia](#) are produced in [acervuli](#), arise from the stroma beneath the epidermis and later rupture to become erumpent. A few dark coloured, septate setae are seen in the [acervulus](#). The [conidiophores](#) are hyaline and short and bear oblong or cylindrical, hyaline, thinwalled, single celled conidia with oil globules. The perfect stage of the fungus produces [perithecia](#) with limited number of [asci](#), which contain typically 8 [ascospores](#) which are one or two celled with a central oil globule.

Favourable Conditions

- High relative humidity (Above 90 per cent),
- Low temperature (15-20° C)
- Cool rainy days.

Disease cycle

The fungus is seed-borne and cause primary infection. It also lives in the infected plant tissues in soil. The secondary spread by air borne conidia produced on infected plant parts. Rain splash also helps in dissemination.

Management

- Remove and destroy infected plant debris in soil.
- Treat the seeds with Carbendazim at 2 g/kg.

- Spray Carbendazim 500g or Mancozeb 2kg/ha soon after the appearance of disease and repeat after 15 days.

Leaf spot - [Cercospora canescens](#)

Symptoms

Small, circular spots develop on the leaves with grey centre and brown margin. Several spots coalesce to form brown irregular lesions. In severe cases defoliation occurs. The brown lesions may be seen on petioles and stem in severe cases. Powdery growth of the fungus may be seen on the centre of the spots.



Symptoms

Pathogen

The fungus produces clusters of dark brown septate conidiophores. The conidia are linear, hyaline, thin walled and 5-6 septate.

Favourable Conditions

- Humid weather and dense plant population.

Disease cycle

The fungus survives on diseased plant debris and on seeds. The secondary spread is by air-borne conidia.

Management

- Remove and burn infected plant debris.
- Spray Mancozeb at 2 kg/ha or Carbendazim at 500 g/ha.

Rust - *Uromyces phaseoli typica* (Syn: *U. appendiculatus*)

Symptoms

The disease is mostly seen on leaves, rarely on petioles, stem and pods. The fungus produces small, round, reddish brown [uredosori](#) mostly on lower surface. They may appear in groups and several sori coalesce to cover a large area of the lamina. In the late season, [teliosori](#) appear on the leaves which are linear and dark brown in colour. Intense pustule formation causes drying and shedding of leaves.



Symptoms

Pathogen

It is [autoecious](#), long cycle rust and all the spore stages occur on the same host. The [uredospores](#) are unicellular, globose or ellipsoid, yellowish brown with [echinulations](#). The [teliospores](#) are globose or elliptical, unicellular, pedicellate, chestnut brown in colour with warty papillae at the top. Yellow coloured [pycnia](#) appear on the upper surface of leaves. Orange coloured cupulate [aecia](#) develop later on the lower surface of leaves. The aeciospores are unicellular and elliptical.

Favourable Conditions

- Cloudy humid weather, temperature of 21-26° C
- Nights with heavy dews

Mode of Spread and Survival

The pathogen survives in the soil through teliospores and as [uredospores](#) in crop debris. Primary infection is by the [sporidia](#) developed from [teliospores](#). Secondary spread is by wind-borne [uredospores](#). The fungus also survives on other legume hosts.

Management

- Remove the infected plant debris and destroy.
- Spray [Mancozeb](#) 2 kg or [Carbendazim](#) 500 g or [Propiconazole](#) 1L/ha, immediately on the set of disease and repeat after 15 days.

Dry root rot- [Rhizoctonia bataticola](#) (Pycnidial stage: [Macrophomina phaseolina](#))

Symptoms

The disease symptom starts initially with yellowing and drooping of the leaves. The leaves later fall off and the plant dies within a week. Dark brown lesions are seen on the stem at ground level and bark shows shredding symptom. The affected plants can be easily pulled out leaving dried, rotten root portions in the ground. The rotten tissues of stem and root contain a large number of black minute sclerotia.



Symptoms

Pathogen

The fungus produces dark brown, septate mycelium with constrictions at hyphal branches. Minute, dark, round sclerotia are abundant. The fungus also produces dark brown, globose ostiolated [pycnidia](#) on the host tissues. The [pycnidiospores](#) are thin-walled, hyaline, single-celled and elliptical.

Favourable conditions

- Day temperature of 30°C.
- Prolonged dry season followed by irrigation.

Disease cycle

The fungus survives in the infected debris and also as facultative parasite in soil. The primary spread is through seed-borne and soil-borne [sclerotia](#). The secondary spreads is through [pycnidiospores](#) which are air-borne.

Management

- Treat the seeds with carbendazim + thiram at 2 g/kg (1:1 ratio) or pellet the seeds with [Trichoderma viride](#) at 4 g/kg (10^6 cfu/g) or [Pseudomonas fluorescens](#) @ (10^6 cfu/g) of seed.
- Apply farm yard manure or green leaf manure ([Gliricidia maculata](#)) at 10 t/ha or neemcake at 150 kg/ha.

Mungbean Yellow mosaic disease - [Mungbean yellow mosaic virus \(MYMV\)](#)

Symptoms

Initially small yellow patches or spots appear on green lamina of young leaves. Soon it develops into a characteristics bright yellow mosaic or golden yellow mosaic symptom. Yellow discoloration slowly increases and leaves turn completely yellow. Infected plants mature later and bear few flowers and pods. The pods are small and distorted. Early infection causes death of the plant before seed set.



Symptoms

Pathogen

It is caused by [Mungbean yellow mosaic India virus \(MYMIV\)](#) in Northern and Central region and [Mungbean yellow mosaic virus \(MYMV\)](#) in western and southern regions. It is a

Begomovirus belonging to the family geminiviridae. [Geminata](#) virus particles, [ssDNA](#), [bipartite genome](#) with two genomic components [DNA-A](#) and [DNA-B](#).

Disease cycle

Transmitted by [whitefly](#), [Bemisia tabaci](#) under favourable conditions. Disease spreads by feeding of plants by [viruliferous whiteflies](#). Summer sown crops are highly susceptible. Weed hosts viz., [Croton sparsiflorus](#), [Acalypha indica](#), [Eclipta alba](#) and other legume hosts serve as reservoir for inoculum.

Management

- Rogue out the diseased plants up to 40 days after sowing.
- Remove the weed hosts periodically.
- Increase the seed rate (25 kg/ha).
- Grow resistant black gram variety like VBN-1, PDU 10, IC12/2 and PLU 322. Cultivate the crop during rabi season.
- Follow mixed cropping by growing two rows of maize (60 x 30 cm) or sorghum (45 x 15 cm) or cumbu (45 x 15 cm) for every 15 rows of black gram or green gram.
- Treat the seeds with [Thiomethoxam](#)-70WS or [Imidacloprid](#)-70WS @4g/kg
- Spray [Thiamethoxam](#)-25WG @ 100g or [Imidacloprid](#) 17.8% SL @ 100 ml in 500 lit of water.

Leaf crinkle disease - [Urdbean leaf crinkle virus \(ULCV\)](#)

Symptoms

Crinkling and curling of the tips of leaflets and increase in leaf area. Crinkling and rugosity in older leaves becomes severe and leaves thickened. Petioles as well as internodes are shortened. Infected plant gives a stunted and bushy appearance. Flowering is delayed, if inflorescence is formed, is malformed with small size flower buds and fails to open.

Pathogen

Casual organism of the disease is not yet ascertained.

Disease cycle

Presence of weed hosts like [Aristolochia bracteata](#) and [Digera arvensis](#). Kharif season crop and continuous cropping of other legumes serve as source of inoculum. The virus is seed-

borne and primary infection occurs through infected seeds. Perhaps white fly, [*Bemisia tabaci*](#) helps in the secondary spread. The virus is also sap transmissible.

Management

- Use increased seed rate (25 kg/ha).
- Rogue out the diseased plants at weekly interval up to 45 days after sowing. Cultivate seed crop during rabi season.
- Remove weed hosts periodically.
- Spray methyl demeton on 30 and 40 days after sowing at 500 ml/ha.

Leaf curl / Necrosis - [*Groundnut bud necrosis virus*](#) (GBNV)

Symptoms

Upward cupping and curling of leaves with vein clearing. Infected leaves turn brittle and sometimes show vein necrosis on the under surface of the leaves, extending to the petiole. Plants affected in the early stages of growth develop top necrosis and die. Plant may produce a few small and malformed pods.

Pathogen

It is caused by [*Groundnut bud necrosis virus*](#)

Disease cycle

The virus is transmitted by thrips viz., [*Frankliniella schultzei*](#), [*Thrips tabaci*](#) and [*Scirtothrips dorsalis*](#). The virus survives in weed hosts, tomato, petunia and Chilli.

Management

- Rogue out infected plants up to 30 days after sowing.
- Remove the weed hosts which harbour virus and thrips.
- Spray imidachlor at 500 ml/ha on 30 and 45 days after sowing.

Minor diseases

Ascochyta leaf spot - [*Ascochyta phaseolorum*](#)

Small irregular spot with grey to brown centre and yellow border. They rapidly enlarge to produce very large brown lesions with concentric markings.

Bacterial blight - [*Xanthomonas phaseoli*](#)

Circular, reddish brown spots appear on leaves, enlarge to form irregular brown lesions.
Water soaked, sunken spots with red border occur on pods.