

16. Diseases of Green gram

Powdery mildew - *Erysiphe polygoni*

Symptoms

Powdery mildew is one of the widespread diseases of several legumes in green gram. White powdery patches appear on leaves and other green parts which later become dull colored. These patches gradually increase in size and become circular covering the lower surface also. When the infection is severe, both the surfaces of the leaves are completely covered by whitish powdery growth. Severely affected parts get shriveled and distorted. In severe infections, foliage becomes yellow causing premature defoliation. The disease also creates forced maturity of the infected plants which results in heavy yield losses.

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, thinwalled, 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.

Favourable Conditions

- The pathogen has a wide host range and survives in oidial form on various hosts in off-season.
- Secondary spread is through air-borne oidia produced in the season

Disease Cycle

The fungus 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

- Use resistant varieties

- The seeds must be sown early in the month of June to avoid early incidence of the disease on the crop.
- . Spray Carbendazim 500g or Wettable sulphur 1.5 kg or Tridemorph 500 ml/ha at the initiation of disease and repeat 15 days later.

Anthracnose - *Colletotrichum lindemuthianum* - (Sexual stage: *Glomerella lindemuthianum*)

Symptoms

The disease appears on all aerial part parts and at any stage of plant growth. Circular, black, sunken spots with dark center and bright red orange margins on leaves and pods. In severe infections, the affected parts wither off. Seedlings get blighted due to infection soon after seed germination.

Pathogen

The Disease appears on 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

- The disease is more sever in cool and wet seasons.

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

- Hot water treatment at 54° for 10 min.
- Use disease free seed.
- Follow crop rotation
- 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

This is an important disease of green gram and is usually occurs in a severe form, causing heavy losses in yield. Spots produced are small, numerous in numbers with pale brown centre and reddish brown margin. Similar spots also occur on branches and pods. Under favourable environmental conditions, severe leaf spotting and defoliation occurs at the time of flowering and pod formation.

Pathogen

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

Favourable conditions

- High humidity favours disease development.

Disease cycle

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

Management

- Cultivate resistant varieties.
- Intercrop the moong with tall growing cereals and millets.
- Follow clean cultivation.
- Use disease free seed.
- Maintain low crop population density and wide row planting.
- The crude extracts of cassava, garlic, and zinger are applied for controlling the disease effectively.
- Mulching reduces the disease incidence resulting in increase yield.
- Spray Mancozeb 2kg/ha or Carbendazim 500 g/ha.

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

Symptoms

The disease appears as circular reddish brown pustules which appear more commonly on the underside of the leaves, less abundant on pods and sparingly on stems. When leaves are severely infected, both the surfaces are fully covered by rust pustules. Shriveling followed by defoliation resulting in yield losses.

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.

Disease Cycle

The pathogen survives in the soil as [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 1 2 kg or Carbendazim 500 g or [Propiconazole](#) 1L/ha kg/ha, immediately on the set of disease and repeat after 15 days.
- Use tolerant varieties.

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.

Pathogen

The fungus produces dark brown, septate mycelium with constrictions at hyphal branches. Minute, dark, round sclerotia in abundance. 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 spread is through air-borne [pycnidiospores](#).

Management

- Treat the seeds with Carbendazim + Thiram at 2 g/kg or pellet the seeds with [Trichoderma viride](#) at 4 g/kg or [Pseudonomas fluorescens](#) @ 10g/kg of seed.
- Apply farm yard manure or green leaf manure ([Gliricidia maculate](#)) at 10 t/ha or neem cake at 150 kg/ha.

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.

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. Germinate 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 green gram variety like Pant Moong-3, Pusa Vishal, Basanti, ML-5, ML-337, PDM-54 and Samrat.
- 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 rugosity in older leaves becomes severe and leaves thickened. Crinkling and curling of the tips of leaflets are seen. Petioles as well as internodes are shortened. Infected plant gives a stunted and bushy appearance. Flowering is delayed, inflorescence, if formed, are malformed with small size flower buds and fail to open.

Pathogen

Casual organism of the disease is not yet ascertained work is in progress in different laboratories.

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*](#)

Symptoms

Upward cupping and curling of leaves with vein clearing. Infected leaves are brittle and sometimes show vein necrosis on the under surface of the leaves, extends 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

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.