

## Diseases and their management in Kharif Green Gram

Milind Sagar\*, <sup>2</sup>Narendra Singh and <sup>3</sup>Dharmendra Kumar Gautam

### **Introduction:**

Greengram [*Vigna radiata* (L.) Wilczek] is one of the most ancient and widely grown leguminous crop in India and remaining parts of the world. It is mainly cultivated in kharif season but with the development of early maturing varieties, it has also been proved to be an ideal crop for spring and summer seasons also. Greengram is an excellent source of high-quality protein, can be boiled or eaten whole and contains about 25 % of protein. It also contains high quality of lysine and tryptophan and consumed as whole grain or as well as in the form of dal for eating purposes. Greengram is an easy digestible pulse crop, hence, is preferred to the patients by doctors. Higher amount of ascorbic acid, riboflavin and thiamine is recorded in sprouted seeds of greengram. Despite, of these characters its productivity is very low in India. Due to different types of disease attacks on its productivity of greengram gets hampered. There is now tremendous pressure on farmers, and they are finding solutions to cop with the diseases and their easy management with low

cost of cultivation. During the last several years, considerable progress has been made in the utilization of bioagents and seed inoculation with rhizobium and PSB for increasing productivity of this crop.



### **Different types of diseases of greengram**

#### **1. Powdery mildew - *Erysiphe polygoni***

##### **Symptoms**

Irregular and small powdery spots are appeared on both surfaces of leaves or sometimes only on upper surface of leaves. During flowering and pod development stage this disease becomes very severe due to which plant get died without completing its life cycle. When disease gets out of control the white powdery spots starts to completely cover the

Milind Sagar\*, <sup>2</sup>Narendra Singh and <sup>3</sup>Dharmendra Kumar Gautam

\*P.G. Research scholar, Department of Agronomy, College of Agriculture

<sup>2</sup>Professor and Head, Department of Agronomy, College of Agriculture

<sup>3</sup>P.G. Research scholar, Department of Fruit Science, College of Horticulture

Banda University of Agriculture and Technology, Banda, U.P.-210001



leaves, petioles, stem sometimes pods in maturing stage. The plant shines greyish or gives white appearance on leaves and finally shedding occurs. Due to this disease pods morphology also gets affected and finally reduction of yield occurs.

### Pathogen

Fungus of powdery mildew is ectophytic, mostly spreads on the surface of the leaves, injecting haustoria into the epidermal cells of leaves. Conidiophores arises vertically from the leaf surfaces, bearing conidia in short chains. Conidia are hyaline in structure, thin walled, elliptical shaped or cylindrical and single celled. In last of season, cleistothecia appear as minute, black, globose structures with myceloid appendages. Favorable conditions to this disease is mostly severe during the late kharif and rabi seasons under warm humid weather.

### Disease cycle

This Pathogen is an obligate parasite and can survive as cleistothecia in the infected plant debris. Primary infection usually occurs

from ascospores from perennating cleistothecia. The secondary spread is carried out through air-borne conidia. Rain splashes also helps pathogen to spread the disease in near agricultural fields.

### Management

1. Removal and destroy infected plant debris like leaf, twigs, branches and pods.
2. Spraying of Carbendazim 500g or Wettable Sulphur 2kg or Tridemorph 500 ml/ha at the starting of disease and also repeat the spray after 15 days of first spray.

### **2. Anthracnose - *Colletotrichum lindemuthianum***

#### Symptoms

The symptom of anthracnose can be seen by naked eyes in all aerial parts of the green gram and also at any stage of crop growth. This fungus produces dark brown to black sunken lesions on the hypocotyl area and causing decay of the seedlings. Small brown lesions appear on leaves, mostly adjacent to veins, which later become greyish white center with dark brown or reddish margin.



The lesions can be seen easily on the petioles and stem. The severe symptom is seen on the pods. Minute water-soaked lesions gets appeared on the pods initially and becomes brown and enlarges to form circular, depressed spot with dark center with bright red or yellow margin. Several spots join to cause necrotic areas with acervuli. The most important symptom is that discolored seeds are found in the pods of greengram.

### **Pathogen**

The mycelium of fungus is septate, hyaline and branched. Conidia is produced in acervuli, arises from the stroma of leaf beneath the epidermis and later rupture to become ruptured. A few dark colored, septate setae are seen in the acervulus. The conidiophores are hyaline and short and bear oblong or cylindrical, hyaline, thin-walled, 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 in it.

### **Favorable Conditions**

1. High relative humidity (Above 90%),
2. Low temperature (15-20° C)
3. Low temperature with rainy days.

### **Disease cycle**

This fungus is naturally a seed-borne and cause primary infection. Mostly lives in infected plant tissues in soil. The secondary

spreading of this disease is occurring through air borne conidia produced on infected plant parts. Rain splashes also helps in dissemination of the disease.

### **Management**

1. Collect and destroy infected plant and burn them or dig in soil.
2. Treatment of seeds with Carbendazim at 2 g/kg.
3. Spray of Carbendazim 500g after the appearance of disease and repeat it after 15 days.

### **3. Leaf spot - *Cercospora canescens***

#### **Symptoms**

Irregular, Small spots get develop on the leaves after the infection with grey center and brown margins. Large number of small spots coalesce to form brown irregular lesions on leaf surface. In most of the cases defoliation starts. The brown lesions may be seen on petioles and stem in most of the cases irrespective of place and climate. Powdery growth of the fungus can be seen easily on the center of the spots on upper and lower surface of leaves.





## Pathogen

This fungus produces clusters of dark brown septate conidiophores on plant surface. The conidia are linear, hyaline, thin walled and 5-6 septate is common.

## Disease cycle

The fungus survives for long period of time on diseased plant parts and also on infected seeds. The secondary spread is through air-borne conidia.

## Management

1. Collect or detach infected plant debris and burn it far from the field.
2. Spraying of Mancozeb at 2 kg/ha or Carbendazim at 500 g/ha is effective.
3. Rust - *Uromyces phaseoli typica* (Syn: *U. appendiculatus*)

## Symptoms

This disease is commonly seen on leaves, petioles, stem and pods of the plant. The fungus produces small, round shaped, reddish-brown uredosori mostly on lower surface of the leaves. They can appear in groups and several sori coalesce to cover a large area of the lamina. In the late kharif season, teliosori appear on the leaves which are linear and dark brown in color. Intense pustule formation causes drying and shedding of leaves which finally causes low photosynthetic rate.

## Pathogen

It is autoecious, long cycled 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 color with warty papillae at the top. Yellow colored pycnia appear on the upper surface of leaves. Orange colored cupulate aecia develop later on the lower surface of leaves. The aeciospores are unicellular and elliptical.

## Favorable Conditions

1. Cloudy weather, with temperature of 21-26° C
2. Most of the nights with heavy dews in field.

## 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 another legume hosts like black gram and other leguminous crops.

## Management

1. Collect the infected plant debris and destroy it out of the field.
2. Spray of Mancozeb 2 kg, immediately on the set of disease and repeat after 15 days.
4. Dry root rot- *Rhizoctonia bataticola* (Pycnidial stage: *Macrophomina phaseolina*)

## Symptoms

Dry root rot disease symptom starts initially with yellowing and drooping of the younger 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

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.

## Favorable conditions

1. Day temperature of upto 30°C.
2. 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 are through pycnidiospores which are air-borne.

## Management

1. Treatment of the seeds with carbendazim + thiram at 2 g/kg (1:1 ratio) or pellet the seeds with *Trichoderma viride* at 4 g/kg (10<sup>6</sup>cfu/g) of seed.
2. Apply FYM or green leaf manure (*Gliricidia maculata*) at 10 t/ha or neem cake at 150 kg/ha.
5. **Mungbean yellow mosaic disease - Mungbean yellow mosaic virus (MYMV)**

## Symptoms

In early infestation small yellow patches or spots appear on green lamina of young leaves. Soon it develops into a characteristic bright yellow mosaic symptom. Yellow discoloration slowly increases and leaves turn completely yellow.



Infected plants mature later and bear few flowers and pods due to which productivity is affected. The pods are small and distorted in shape. Early infection causes death of the plant before seed setting in plant.

### Pathogen

It occurs 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 gemonic components DNA-A and DNA-B.

### Disease cycle

Transmitted mainly through whitefly, *Bemisia tabaci* mostly under favorable conditions. Disease spreads by feeding of plants by viruliferous whiteflies. Summer sown crops are highly susceptible to this disease. Weed hosts viz., *Croton sparsiflorus*, *Acalypha indica*, *Eclipta alba* and also other legume hosts serve as reservoir for inoculum in plant.

### Management

1. Rogue out the infected plants and continue this process upto to 40 days after sowing.
2. Removal of weeds simultaneously with rogue of infected plant parts.
3. Increasing the seed rate upto 25 kg/ha.
4. Cultivation of resistant greengram variety.

5. Follow mixed cropping by growing two rows of maize (60 x 30 cm) or sorghum (45 x 15 cm) or cucumber (45 x 15 cm) for every 15 rows of green gram.

6. Treatment of the seeds with Thiomethoxam-70WS.

7. Spraying of Thiamethoxam-25WG @ 100g or Imidacloprid 17.8% SL @ 100 ml in 500 liters of water.

### **6. Leaf crinkle disease - Urd bean leaf crinkle virus (ULCV)**

#### Symptoms

Crinkling and curling of the tips of leaflets. Crinkling and rugosity in older leaves becomes severe and leaves thickened in border. Petioles as well as internodes are shortened. Infected plant gives a stunted and bushy appearance while infected. Flowering is delayed due to which late pollination occurs and pod formation is late, if inflorescence is formed, mostly get malformed with small size flower buds and fails to open and no pollination occurs.



## Disease cycle

Kharif season crop and continuous cropping of other legumes serve as source of inoculum. This virus is seed-borne and primary infection occurs through the infected seeds. White fly, works as a vector in the secondary spread of disease.

## Management

1. Increased the seed rate up to 25 kg/ha.
  2. Rogue out of infected plants at weekly interval up to 45 days after sowing.
  3. Spraying of methyl demeton on 30 and 40 days after sowing at 500 ml/ha.
- 7. Leaf curl / Necrosis - Groundnut bud necrosis virus (GBNV)**

## Symptoms

Upward curling of leaves with vein clearing is the main symptom of this disease. Most of the infected leaves turn brittle and often shows veined necrosis on the lower surface of the leaves of greengram, extending to the petiole. Plants affected in the early stages of growth develop top necrosis and eventually dies. Plant produces small, colorless and deformed pods due to which yield is reduced. Pathogen commonly occurs through Groundnut bud necrosis virus.

## Disease cycle

This virus is mostly transmitted by thrips viz., *Frankliniella schultzei*, Thrips tabaci and *Scirtothrips dorsalis*. The virus

survives in weed hosts, tomato, petunia and Chilli.



## Management

1. Removal of infected plants up to 30 days after sowing of crops.
2. Remove the weed hosts which harbors the vector viruses and thrips.
3. Spraying of imidachlor at 500 ml/ha on 30 and 45 days after the sowing of crop.