



Major Foliar Diseases in Groundnut and their Management

B. D. S. Nathawat*

Assistant Professor
Agricultural Research Station,
Bikaner, Swami Keshwanand
Rajasthan Agricultural
University, Bikaner



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*Corresponding Author

B. D. S. Nathawat*

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INTRODUCTION

Nearly 90 percent of the groundnut grown in the country is *kharif* sown from May - June to September – October. India has the distinction of being the largest producer of groundnut in the world. But average yield is very low i.e., 7.5 qt/ha. Groundnut crop is prone attack by numerous diseases to a much larger extent than any other crops. One of the most important factors contributing to low yield is disease attack. More than 55 pathogens including viruses have been reported to affect groundnut. Some diseases are widely distributed and cause economic crop losses while others are restricted in distribution and are not considered to be economically important at present. The diseases which are of minor magnitude today may become major in a while. Among fungal foliar diseases, only a few are economically important in India such as leaf spots (early and late) and rust which are widely distributed can cause losses in susceptible genotypes to the extent of 70-80 percent when both of them occur together. Belatedly, *Alternaria alternata* leaf spot is becoming increasingly important on rabi/summer crop and also on *kharif* groundnut crop. Other fungal foliar diseases like anthracnose, leaf scorch, *Phomopsis* leaf spot, *Phyllosticta* leaf spot, *Pestalotiopsis* leaf spot, *Drechslera* leaf blight, *Zonate* leaf spot and *Cylindrocladium* leaf spot are not economically important at present time. Similarly, seed and soil-borne diseases collar rot; stem rot and dry root rot have been realized as major limitations in crop production. These diseases cause severe seedling mortality resulting in patchy crop stands in sandy loam soils and reduce the yields by 30-40 percent. Several economically important virus diseases like bud necrosis, peanut (groundnut) mottle and peanut clump disease have also started assuming importance in the recent years in India.

Bud necrosis and Peanut mottle virus (PMV) is a serious disease of groundnut, wide spread with wide host range and can cause severe yield losses ranging up to 60 percent. Reports on diseases caused by nematodes in groundnut are very few in India. The root knot nematodes have been reported to cause damage in various parts of the country.

Major foliar diseases in groundnut

1. Early and late leaf spot:

The leaf spots are also known as tikka disease incited by two species of fungus, *Cercospora arachidicola* and *Cercospora (Phaeoisariopsis) personata*. Small dark brown circular spots appear on the leaves. In case of severe attacks,

defoliation occurs and only the stem remains. The yield of susceptible varieties is substantially reduced. The fungi survive for a long period in the infected plant debris, pods and seeds as conidia, dormant mycelium and perithecia in soil. The volunteer groundnut plants also harbour the pathogens.

Symptom: The disease occurs on all above ground parts of the plant, more severely on the leaves. Both the fungi produce oval to elongate lesions also on petiole, stem and pegs. The lesions caused by both species coalesce as infection widens and severely spotted leaves shed prematurely.



Early leaf spot

Late leaf spot

These spots are dark brown to black which are nearly circular and appears on the both leaf surfaces. Lesions rough in appearance and halo is not so distinct. In severe cases, disease leaflets become chlorotic, then necrotic lesions coalesce resulting in premature senescence and shedding of the leaflets. Prolonged high relative humidity for 3 days, low temperature (20 degrees) with dew on the leaf surface, heavy doses of nitrogen and phosphorous fertilizers and deficiency of magnesium in soil favours the disease.

Management:

- Removal of volunteer groundnut plants and destruction of infected crop debris is important in reducing the primary source of infection.

- Crop rotation is of primary importance in avoiding early season infection.
- Keep weeds under control and grow groundnut and pearl millet in 7:1 ratio.
- Time of sowing and plant spacing are important considerations.
- Seed treatment with Carbendazim or Thiram @2.2g/kg of seed.
- The early and late leaf spots are effectively controlled by the 2-3 spray application of Carbendazim 1gm or Mancozeb 2gm or Chlorothalanyl 2g, hexaconazole 2 ml/litre of water at 15 days interval starting from 4-5 weeks after planting.

2. Rust:

The casual organism of rust disease is *puccinia arachidis*. The disease attacks all aerial parts

of the plant. High relative humidity (above 85 percent), heavy rainfall and low temperature (20-25⁰C) favours disease.

Symptoms: Rust can be readily recognized as orange red coloured pustules (uredinia) usually circular and ranges from 0.5 to 1.4 mm in diameter and appears on the lower leaflet surface.

In severe infection, lower leaves dry and drop prematurely which also leads to production of small shrivelled seeds.

Management:

- Crop rotation and field sanitation.
- Early sowing in the first fortnight of June to avoid disease incidence.
- Intercropping of pearl millet or sorghum with groundnut (1:3) is useful in reducing the intensity of rust.
- Foliar application of aqueous neem extract @2-5 percent is useful and economical for the control of rust.
- 3-4 Spray of Tridemorph 2gm/lit of water at 15-20 days interval gives good management of rust.
- Spray application of Chlorothalanil 2g/lit or Mancozeb 2g/lit or Wettable Sulphur 2g/lit of water on 35 and 50 days after sowing.

3. Alternaria leaf spot:

Leaf spot disease is caused by *Alternaria arachidis*, *A. Alternata* and *A. tenuissima* pathogen.

Symptoms: Lesions produced by *A. arachidis* are brown in colour and irregular in shape surrounded by yellowish halos. Symptoms produced by *A. tenuissima* are characterized by blighting of apical portions of leaflets which turn light to dark brown colour. In the later stages of infection, blighted leaves curl inward and become brittle.

Management:

- Use healthy certified seeds.
- Deep summer ploughing and removal plant debris is helpful in reducing disease incidence.
- Foliar spray of Copper oxychloride and Mancozeb 2.0 g/litre water are effective in controlling the disease.

4. Stem rot/Sclerotium wilt:

The disease is incited by *Sclerotium rolfsii*

Symptoms: The first symptoms are development of white fungal threads over affected plant tissue particularly on stem which results in sudden wilting of a branch which is completely or partially in contact with the soil.



Management:

- Cultural practices such as deep burial of organic matter, plant debris before sowing is particularly useful in reducing the sclerotium wilt.
- Seed treatment with Carbendazim/Thiram/Captan @2-3 g/kg seed is effective.
- Seed treatment with 4gm *Trichoderma viride* formulation followed by application of 2.5 kg *Trichoderma viride* formulation mixed with 100kg farm yard manure before sowing is recommended.

5. Collar rot or seedling blight or crown rot:

The disease is caused by *Aspergillus niger* and *A. pulverulentum*. The fungus is both seed-borne and soil-borne and so the infection can be seen at any stage from sowing onwards. Deep sowing of seeds, high soil temperature (30-35°C) and low soil moisture is congenial for disease development.

Symptoms: The disease usually cause damage within one month of sowing and appears in three phases. The seed can be attacked at any time after its sowing.

Pre-emergence rot: Seeds may be killed in pre-emergence rotting attacked by soil borne conidia and rotting of seeds prevent the seeds to germinate. Seed are covered with black masses of spores and internal tissues of seed become soft and watery.

Post-emergence rot: Post-emergence infection causes the death and rapid decay of seedlings. The pathogen attacks the emerging young seedling and cause circular brown spots on the cotyledons. The symptoms spread later to the hypocotyls and stem. Brown discoloured spots appear on collar region. The affected portion become soft and rotten, resulting in the collapse of the seedling. The collar region is covered by profuse growth of the fungus and conidia affected stem also show shedding symptom.

Crown rot: The infection when occurs in adult plants show crown rot symptoms. Large lesions develop on the stem below the soil and spread upwards along the branches causing

drooping of leaves, wilting and death of the plants.

Management

- Deep sowing of seed should be avoided as etiolated hypocotyls are prone to infection.
- Avoiding mechanical damage, destroying plant debris, deep ploughing and rotation of groundnut with gram and wheat is useful in reducing the collar rot disease incidence.
- Seed treatment with *Trichoderma viride*/*T. harizanum* @ 4g/kg seed and soil application of *Trichoderma* @25kg/ha preferably in combination with organic amendments such as castor cake or neem cake or mustard cake @ 500kg/ha.
- Treat the seeds before sowing with Thiram 75% WP @5g/kg seed or Captan 80% WP 3g/kg seed or Mancozeb 75% @ 3g/kg or Carbendazim 50% WP @ 2g/kg of kernels control the seed borne infections.

6. Dry root rot/dry wilt:

The causal organisms of the disease are *Macrophomina phaseolina* and *Rhizoctonia bataticola*. Fungus remains dormant as sclerotia for a long period in the soil and in infected plant debris. The primary infection is through soil borne and seed borne sclerotia. The secondary spread of sclerotia is aided by irrigation water, human agency, implements, cattle etc. prolonged rainy season at seedling stage and low lying areas have more disease.

Symptoms: The disease may appear at any stage of the crop growth. Water soaked necrotic spots appear on the stem just above the ground level. In the early stages of infection reddish brown lesions appears on the stem just above the soil level. The leaves and branches show drooping, leading to death of the whole plant. Pod infection leads to blackening of the shells and sclerotia can be seen inside the shells. The kernels turn black with abundant sclerotia internally and externally on the testas and shells.

Management:

- Good Agricultural Practices (GAP) such as balanced fertilization, timely irrigation

and pest management encourage good crop growth which may help in reducing the disease.

- Seed treatment with spores and mycellial fragments of *Trichoderma viride* has been shown to prevent invasion by *M. phaseolina*.
- Seed treatment with Carbendazim 2g/kg seed or Captan 3g/kg seed or Thiram @ 4g/kg seed is most useful.
- Spot drench with Carbendazim at 0.5 g/lit effective in managing the disease.