

## **Ascochyta Blight of Gram**

**Pathogen:** *Ascochyta rabiei*; **Perfect stage (Teleomorph):** *Didymella rabiei*

**Taxonomic Position of the Pathogen:** Sub-division-Deuteromycotina; Class: Coelomycetes; Order: Sphaeropsidales; family: Sphaeropsidaceae

**Perfect Stage:** (Subdivision: Ascomycotina; Class: Loculoascomycetes, Order: Dothidiales, Family: Dothidiaceae)

**Distribution & Importance:** *Ascochyta* blight is the important disease of chickpea in many parts of the world. It leads to yield losses ranging from 10% to 100%. In India, it is common in northern chickpea growing states including Punjab, Haryana, Himachal Pradesh, Uttar Pradesh and Bihar.

**Symptoms:** All the above ground parts of the plant are infected. Dark lesions appear on the stem and leaves first, then on the pods. On the stem and petioles, the lesions are oval or elongated, whereas on the leaves and pods, round and up to 1.25 cm. in diameter. When the lesions are fully developed, the margin appears brown and the centre yellowish, withered, and studded with the minute, dark fructifications (pycnidia) of the fungus, often concentrically arranged. When the spots girdle the stem, the entire plant withers and ultimately die.

The infection of the disease begins from the base of the plant, progresses upwardly and, finally, results in the death of the whole plant. When the disease infestation is severe, the patches of diseased plants may be seen in the field, and ultimately the entire field is involved. During dry conditions of weather the disease remains restricted, but if there are intermittent rains the whole crop may be involved because the spread of the disease is very rapid in wet weather.

**Pathogen:** The fungus produces hyaline to brown and septate mycelium. Pycnidia, the fruiting bodies, on stems, leaves, and pods are round or spherical to sub-globose, dark brown, immersed in the tissues, and measuring 100 to 200  $\mu\text{m}$  in diameter. Each pycnidium has a prominent ostiole, which is 30-50  $\mu\text{m}$  wide. Its wall is composed of 1-3 layers of pseudoparenchymatous cells. Conidia are borne on short, ampulliform conidiophores within the pycnidia and lie embedded in a slimy material. The conidia are hyaline, oval to oblong, straight or slightly curved, obtuse at the ends, with a medium septum, 10  $\mu\text{m}$  long and 4  $\mu\text{m}$  broad. Mostly the conidia are 1-septate (bicelled) but some of them may be non-septate (single celled). They germinate by producing long germ tubes after maturity. The conidia remain viable within the pycnidia for one year or more. The perfect stage is *Didymella rabiei* (= *Mycosphaerella rabiei*), which is reported from Eastern Europe and has not been found in Indian climatic conditions. In perfect stage, the dark coloured, globose pseudothecia are formed. The pseudothecia are characterized by 8-ascospored asci. The ascospores are bicelled with one cell larger than the other. They are prominently constricted at the septum.

**Disease Cycle:** The pathogen perennates on or in the seed and also as pycnidia on diseased plant debris left in the crop field. Seed-borne perennation is considered to be the main source of primary infection in Indian conditions. It has been observed that at high temperatures prevailing in the chickpea growing areas of our country after crop harvest, the viability of the pathogen in crop debris is totally lost. Mostly the propagules of the pathogen are present on or in the seed-coat, few on cotyledons and embryo. The pathogen infects berseem also. Isolates from berseem infect chickpea and vice-versa. The primary inoculum becomes available after the development of the pathogen from germinating seed or from infested soil. The primary inoculum multiplies on hypocotyl, epicotyl, and near the stem base and then spreads to above ground parts. Conidia produced from primary infection lesions spread through raindrop splashes in a windy weather, by insects, etc. and cause secondary infection.

### Predisposing Factors:

Weather conditions with strong winds in the months of February and March when the temperatures are around 22-26°C are most favourable for fast spread of the disease. Conidia are abundantly produced and disseminated, possibly to long distances, along the direction of the prevailing wind. Years of high rainfall during the crop season are very much favourable for the development of disease in epidemic form.

### Management of Disease:

(i) Clean and healthy seeds obtained from disease-free areas should be sown. Blighted plants should be sorted out at early stage, pulled out by hands, and burnt.

(ii) Since the seeds are the main source of primary inoculum, seed-treatment prior to sowing is important to manage the disease. They should be treated with Bavistin + Thiram in 1:3 ratios at the rate of 2.5 g/kg seed.

(iii) Three sprays of Bavistin (0.5 kg/ha) at intervals of 10 days usually at pod formation stage effectively controls the disease in the field. Iprodione (Rovral) and hexacap (3 g/kg seed) provide 98% control, whereas Chlorothalonil (Bravo-500) (6 ml/kg), hexacap (4 g/kg), and thiabendazole (5g/kg) are claimed to completely eradicate the seed-borne inoculum. In mild cases of attack, sprays of Zineb, Maneb, Captan, and Daconil are useful hence recommended.

(iv) Use of resistant varieties is most effective. Although there are not many resistant varieties released for use in our country, Kabuli type varieties are more resistant to disease than desi-type. Kabuli type lines ILC 3864, 3870, and 4421 have been reported resistant to *Ascochyta* blight of chickpea.

