

Major Diseases of Soybean and Their Control

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Introduction

Soybean (*Glycine max* L.) commonly known by various name *i.e.* Bhat, Bhatman, Ramkulthi, Bhut, Kalitur, Teliakulth and Garryakalay in India, and it belongs to family Leguminosae and sub-family Papilionoidae. The important soybean growing countries are USA, China, Brazil, Mexico and Russia (Singh, 2008). The crop suffers from number of phytopathogenic fungal diseases and amongst them, root rot diseases such as Black root rot (*Thielaviopsis basicola*), Charcoal rot (*Macrophominaphaseolina* (Tassi) Goid), Cotton root rot (*Phymatotrichum omvorum*), *Fusarium* root rot (*Fusarium* spp.), Mycoleptodiscus root rot (*Mycoleptodiscus terrestris*), *Phytophthora* root rot (*Phytophthora sojae*) and *Rhizoctonia* root and stem rot (*Rhizoctonia solani*) causes serious losses to the crop right from seedling stage to maturity (Anonymous, 2009).

1. Soybean rust (*Phakopsora pachyrhizi*)

The most common symptoms are grey green, tan to dark brown or reddish brown lesions particularly on the undersides of the leaflets. These lesions are called uredia and they contain spores of the fungus. Lesions tend to be angular, are restricted by leaf veins, and reach 2-5 mm in diameter. Lesions may also appear on petioles, pods, and stems. Lesions are frequently associated with leaf chlorosis, and high lesion densities result in premature defoliation and early maturity. However, the symptoms of the two diseases can be differentiated by the presence of multiple uredia in the rust lesion and by the irregular cracks that usually appear in host tissue with a bacterial pustule lesion. Rust epidemics are most severe during long periods of leaf wetness when the mean daily temperature is less than 28°C. Urediniospores are the primary means of disease spread. Soybean is susceptible at any stage of development, but symptoms usually appear from the middle to late in the season because a prolonged

wet, cool period is required for infection and sporulation. Spread of urediniospores is by windblown rain.

Control

- Use healthy/certified seeds.
- Keep the field free from weeds.
- Rogue out infected plants and burn them

2. Soybean bacterial blight (*Pseudomonas savastonoipv. glycinea*)

Blight lesions are most conspicuous on leaves but also occur on stems, petioles, and pods. Small, angular, translucent, water-soaked, yellow to light brown spots appear on leaves. The centres soon dry out, turn reddish brown to black and are surrounded by a water-soaked margin bordered by a yellowish green halo. Young leaves are most susceptible. Infected young leaves are distorted, stunted, and chlorotic. The angular lesions enlarge in cool, rainy weather and merge to produce large, irregular dead areas. *P. savastonoipv. glycinea* over seasons in surface crop residue and in seeds. Seeds can be infected through the pods during the growing season or they may be invaded during harvesting. Primary infections on cotyledons often result in secondary lesions on seedlings. It is seed-borne.

Control

- Deep summer poughing.
- Use healthy/certified seeds.
- Destroy infected crop debris
- Seed treatment with streptocyclin @ 250 ppm (2.5 g/10 kg seeds).
- Application of any copper fungicides @ 2 g/lit along with streptocyclin at the rate of 250 ppm (2.5 g/10lit water).

3. Soybean downy mildew (*Peronospora manshurica*)

Early stages of the disease are characterised by indefinite yellowish-green areas on the upper surface of the leaves. As the disease progresses, those infected areas become greyish brown or dark brown and have yellowish-green margins. Severely infected leaves fall off prematurely. A greyish mould-like growth develops on the under surface of the spots when weather is wet and temperatures are cool. The

disease also attacks the pods and infects the seeds. The disease is favoured by cool temperatures and wet conditions.

Control

- Plant certified disease-free seeds.
- Use resistant varieties, if available.

4. Soybean mosaic potyvirus (SMV)

Symptoms vary with host, virus strain, plant age at infection, and environment. Most infected cultivars are slightly stunted with fewer pods that are sometimes dwarfed and flattened, without hairs, and without seeds. Trifoliolate leaves have a mosaic of light and dark green areas that may later become raised or blistered, particularly along the main veins. Primary leaves of some cultivars may show necrotic local lesions, which merge, into veinal necrosis followed by yellowing and leaf abscission.

Seeds from infected plants may be mottled brown or black, depending on hilum colour. Seeds may be smaller and germination reduced as compared to seed from non infected plants.

Control

- Use certified disease-free seeds.
- Keep the field free from weeds.
- Rogue out infected plants and burn them
- Two foliar sprays of Thiamethoxam 25 WG @ 100 g/ha or Methyl demeton 800 ml/ha at 30 and 45 days after sowing to control the vector.

References

1. Anonymous. 2009. http://en.wikipedia.org/wiki/List_of_soybean_disease. 19: 24.
2. Singh, C. 2008. *Modern Techniques of Raising Field Crops*, pp. 273-291.