

6. Soya bean

Glycine max. Family: Fabaceae

1. Rhizoctonia Blight:

This disease is distributed throughout India but more severe in Madhya Pradesh and Uttaranchal. The disease may cause yield loss up to 35 %. The causal fungus infects all plant parts, root, lower stem of seedlings as well as mature plant, stem, leaves, petioles and pods.

Symptoms: Initially the disease appears on lower leaves as water soaked lesions which are later turned as greyish brown to reddish brown and finally turn dark brown. Subsequently, the affected leaves get blighted and in severe cases the whole crop looks blighted. During flowering time the root of affected plants show brown to dark brown discoloration of cortical region. The root tissues may also be lignified. A reddish brown canker may encircle the stem at the base and drooping of leaves is also common. Under high humidity the fungal mycelium can be observed on leaves and in between closely spaced plants. Oval to elongated spots appear on stem, petiole and pods. Dark brown sclerotia are formed on leaves and petioles. The disease also affects the seedlings causing stunting and also pre emergence mortality. Seeds on infected plants may show irregularly shaped tan or light brown sunken lesions.

Pathogen: The disease is caused by *Rhizoctinia solani* Kuhn. The perfect stage of the pathogen is *Thanatephorus cucumeris*. The mycelium of the causal fungus produces branches at right angle of the main hypha, slightly constricted at the main junction and have a cross wall near the junction. The pathogen produces sclerotia – like tufts of short, broad cells that function as chlamydospores, or the tufts develop into sclerotia. The basidia of the perfect stage develop on a membranous layer of mycelium and have four strigmata, each bearing one basidiospore.

Disease Cycle: The pathogen is seed, soil and air borne. Inoculum in the seed or soil causes infection and is responsible for pre and post emergence mortality. Inoculum may be splashed out and infects the stem and leaves of the older plants and spread from leaf to leaf and plant to plant by contact. The parts detached from infected plants serve as secondary inoculum. Rain or free moisture on plant surface with warm (24-32 C) and humid weather will cause severe infection.

Diseases Management:

- Seed treatment with Thiram + Carbendazium (2:1) @ 3g/kg seed.
- Use Mancozeb or copper fungicide at 2.5gm/l or carbendazim 1 g/lit.
- Use of moderately resistant / tolerant varieties like PK 262, 416, SL-295 etc. and mulching are helpful to avoid losses due to this disease.

2. Bacterial Pustule

Pustule has been reported in most soybean growing areas of the world where warm and humid weather prevails during crop season. The disease may cause premature defoliation, which may decrease yield by reducing seed size and number of grains. The disease causes upto 18% losses to the soybean crop and is responsible for early yellowing and defoliation.

Symptoms

- Small yellowish green pods with reddish brown centres are formed on the upper surface of leaves.
- The central portion of the individual spot appears slightly raised.
- Small pustules are found on the under side of the leaves. Similar pustules also occur on pods.
- The pods may merge to produce large irregular dead areas.
- The dead tissue sometime may rupture and tear away. Heavily infested leaves turn yellow and fall and in susceptible plants complete defoliation can occur.
- The bacterium survives in crop debris and seed.



Causal organism: The bacterium, *Xanthomonas axonopodis* pv. *glycines* is the causal pathogen. Colonies on beef infusion agar are pale yellow, become deep yellow with age and are small, circular, and smooth, with an entire margin.

- It develops during warm and wet weather.
- The disease spreads rapidly in rainy conditions.
- It is seed born.

Disease Cycle: The pathogen overseasons in seeds, in crop residue, and in the rhizosphere of roots. Strains can infect common bean and cowpea. The pathogen spreads through splashing water or wind blown rain and during operation when foliage is wet. The pathogen can enter the plant through natural openings and wounds. Warm weather and frequent showers promote the development of this disease.

Diseases Management:

- Remove and burn infected plant debris.
- Crop rotation with grain crop is recommended.
- Grow resistant varieties.
- 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/10 lit water) or two sprays at 45 and 55 DAS with a mixture of Blitox@0.2% + Streptocycline@250ppm effectively control the disease.