18. Diseases of Soybean

Dry root rot - *Macrophomina phaseolina*

Symptoms

The disease symptom starts initially with yellowing and drooping of the leaves. The leaves later fall off and the plant dies with in 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.

Symptoms

Pathogen

The 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

Favourable conditions

- Day temperature of 30˚C
- 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 spread

is through seed-borne and soil-borne sclerotia. The secondary spreads is through pycnidiospores which are air-borne.

Management

- Treat the seeds with Carbendazim or Thiram at 2 g/kg or pellet the seeds with *Trichoderma viride* at 4 g/kg or *Pseudonomas fluorescens* @ 10g/kg of seed.
- Apply farm yard manure or green leaf manure *(Gliricidia maculata)* at 10 t/ha or neem cake at 150 kg/ha.

Wilt - *Fusarium* oxysporum f. sp. *tracheiphilum*

Symptoms

Symptoms do not appear until the plants are about six weeks old. Initially a few plants are noticed with pale green flaccid leaves which soon turn yellow. Growth is stunted, chlorosis, drooping, premature shedding or withering of leaves with veinal necrosis often occurs and finally plant dies within 5 days. Brownish, purple discoloration of the cortical area is seen, often extends throughout the plant.

Symptoms

Pathogen

The fungus produces falcate shaped macroconidia which are 4-5 septate, thin walled and hyaline. The microconidia are single celled hyaline and oblong or oval. The chlamydospores are also produced in abundance.

Favourable conditions

Temperature of 20-25˚C and moist humid weather.

Disease cycle

The fungus survives in the infected stubbles in the field. The primary spread is through soilborne chlamydospores and infected seeds. The secondary spread is through conidia by irrigation water.

Management

- Treat the seeds with Carbendazim or Thiram at 2 g/kg or treat the seeds with *Trichoderma viride* at 4 g/kg.
- Spot drenching with Carbendazim at 0.5 g/litre.

Leaf spot - *Cercospora sojana*

Symptoms

Light to dark gray or brown areas varying from specks to large blotches appear on seeds. The disease primarily affects foliage, but, stems, pods and seeds may also be infected. Leaf lesions are circular or angular, at first brown then light brown to ash grey with dark margins. The leaf spot may coalesce to form larger spots. When lesions are numerous the leaves wither and drop prematurely. Lesions on pods are circular to elongate, light sunken and reddish brown.

Symptoms

Favourable conditions

- Fungus survives in infected seeds and in debris.
- Warm, humid weather favor disease incidence

Management

- Use resistant varieties.
- Use healthy or certified seeds.
- Rotate soybean with cereals.
- Completely remove plant residue by clean ploughing the field soon after harvest.
- Destroy last years infected stubble.
- Seed treatment with Thiram + Carbendazium (1:1) @ 2g/kg seed.
- Spray Mancozeb @ 2g/L or Carbenzadium (500 mg/L).

Mosai - Soybean mosaic virus (SMV)

Symptoms

Diseased plants are usually stunted with distorted (puckered, crinkled, ruffled, narrow) leaves. Pods become fewer and smaller seeds. Infected seeds get mottled and deformed. Infected seeds fail to germinate or they produce diseased seedlings.

Symptoms

Pathogen

It is caused by *Soybean mosaic virus* - a potyvirus. Flexuous particles 750 - 900nm long, ss RNA genome

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Disease cycle

Soybean mosaic virus is seed borne. The SMV can be transmitted through sap, 32 aphid species are involved in transmission.

Favorable conditions

- Temperature around 18^{o} C
- Humid weather.

Management

- Deep summer ploughing.
- Use resistant or tolerant varieties.
- Use healthy/certified seeds.
- Keep the field free from weeds.
- Rogue out infected plants and burn them
- Pre-sowing soil application of Phorate @ 10 kg/ha.
- Two foliar sprays of Thiamethoxam 25 WG @ 100 g/ha or Methyl demeton 800 ml/ha at 30 and 45 days after sowing.