

Lecture 19 - Diseases of Betelvine

Foot rot or Leaf rot or wilt - *Phytophthora parasitica* var. *piperina*

Symptoms

The fungus attacks the vines at all stages of crop growth. Initial symptom is sudden wilting of vines. The affected vines show yellowing and drooping of the leaves from tip downwards. The leaves become dull due to loss of lustre. The affected plant dry up completely within 2 or 3 days. The succulent stem turns brown, brittle and dry as stick. The lower portion of the stem near the soil level shows irregular black lesions upto second or third internode. The diseased internodes undergo 'wet rot' and the tissue become soft, slimy with a fishy odour. The roots of the affected plants also show extensive discolouration and rotting.

In the young crop, the fungus produces 'Leaf rot' symptoms. The leaves near the soil region show circular to irregular water soaked spots, often starting from the edge. The spots rapidly enlarge and cover a part or whole of the leaf blade, which shows rotting. The leaves turn brown to dark brown or dirty black and defoliation occurs. The leaves with in 2-3 feet height of the vine show the leaf rot symptom.

Pathogen

The fungus produces hyaline, non septate mycelium. The sporangia are thinwalled, hyaline ovate or pear shaped with papillae, measuring 30-40 X 15-20um. Zoospores, which are liberated from the sporangia, are kidney-shaped and biflagellate. Oospores are dark brown, globose and thick walled.

Favourable Conditions

September to February months with high atmospheric humidity and low night temperature (23°C and below) are highly favorable.

Mode of Spread and Survival

The fungus is soil-borne and survives as facultative saprophyte in the infected plant debris and in the soil as oospores and chlamydospores. The fungus mainly spreads from field to field through irrigation water. The secondary spread is through sporangia and zoospores disseminated by splash irrigation and wind-borne rains.

Management

Select well matured (more one year old) seed vines from fields. Soak the seed vines in Streptocycline 500 ppm + Bordeaux mixture 0.05 per cent solution for 30 minutes. Apply 150 kg N/ha/year through neemcake (75 kg N) and 100 kg P₂O₅ through Super phosphate and 50 kg Muriate of potash in 3 split doses, first at 15 days after lifting the vines and second and third dose at 40-45 days interval. Apply shade dried Neem leaf or *Calotrophis* leaves at 2t/ha in 2 split doses and cover it with mud. Collect and destroy the infected vines and leaves. Regulate irrigation during the cold weather period. Drench the soil with 0.5 per cent Bordeaux mixture at 500 ml/hill during the cool weather period (October-January) at monthly intervals.

Sclerotium foot rot and wilt - *Sclerotium rolfsii*

Symptoms

The vines of all stages are susceptible to the disease. The infection usually starts at the collar region. Whitish cottony mycelium is seen on the stem and roots. The stem portion shows rotting of tissues at the point of attack and the plants show dropping of leaves and withering finally dry up.

Pathogen

The fungus produces white to grey mycelium which have profuse branching. Sclerotia are spherical smooth and shiny. Brown coloured mustard like sclerotia are seen on the infected stem and soil near the vines.

Favourable Conditions

May-July months with high temperature of 28-30°C

Mode of Spread and Survival

The fungus is soil-borne and grow saprophytically in the dead plant tissue in soil. The fungus also survives as sclerotia in the infected plant debris in the soil for more than one year. The sclerotia spreads through irrigation water. The pathogen also survives on other hosts like chilli groundnut and brinjal.

Management

Remove the affected vines along with the roots and burn. Apply more of soil amendments like neemcake, mustard cake or farmyard manure. Drench the soil with 0.1 per cent Carbendazim.

Powdery mildew- *Oidium piperis*

Symptoms

The disease affects the crop at all stages of its growth and infection is mainly noticed on tender shoots and leaves. Whitish powdery growth is seen on both the surface of leaves which later enlarges and cover the major portion of the leaves. The affected tender shoots and buds are deformed and shrivelled and margins of leaves turn inwards. When the disease advances, the whitish growth turns to brown blotches and in severe cases, the leaves turn yellow and defoliation occurs.

Pathogen

The fungus is ectophytic and produces profusely branched, hyaline and septate hyphae on the surface of the leaves. The conidiophores are short, club shaped, non-septate and hyaline and produce conidia in chains. Conidia are single celled, hyaline elliptical, and borne over short conidiophore.

Favourable Conditions

Dry humid weather during the months of May-July.

Mode of Spread and Survival

The fungus survives in the infected crop residues in the soil. The primary infection is from soil-borne inoculum. The secondary spread in the field is through wind-borne conidia and carried through splash irrigation.

Management

Collect and burn the infected leaves. Spray 0.2 per cent Wettable Sulphur or dust Sulphur at 25 kg/ha after plucking the leaves.

Anthracnose- *Colletotrichum piperis*

Symptoms

The leaves show small black circular spots initially which later enlarge and develop to a size of 2 cm in size, become concentric and covered with a yellow halo. The affected leaves turn pale yellow and dry up with large black dots in the centre of the spots. Black, circular lesions may develop on the stem, enlarge rapidly and girdle the stem resulting in withering and drying.

Pathogen

The fungus produces large number of acervuli containing short, hyaline conidiophores and black coloured setae. The conidia are single celled, hyaline and falcate.

Mode of Spread and Survival

The fungus remain in the infected plant debris in the field. The primary infection is through the soil-borne conidia, spread by rainwater splash or splash irrigation. The secondary spread in the field is aided by air-borne conidia.

Management

Collect and destroy the infected vines and leaves. Spray 0.2 per cent Ziram or 0.5 per cent Bordeaux mixture after plucking the leaves.

Bacterial leaf spot or stem rot - *Xanthomonas campestris p.v. betlicola*

Symptoms

The disease initiates as tiny, brown water soaked specks on the leaves surrounded by a yellow halo, which enlarge later and become necrotic and angular, mostly confined to interveinal areas. The infected leaves lose their lustre, turn yellow, show withering and fall off. Under wet weather condition, infection spreads to stem showing small elongated black lesions on lower nodes and inter nodes. These lesions increase in size in both directions and blackening may spread to the length of several nodes. The stem tissues become weak and break easily at the infected nodes and the vine show withering and drying.

Pathogen

Bacterium is a small rod with a single polar flagellum. It is Gram negative and non-spore forming.

Favourable Conditions

Cloudy weather with intermittent rains and high relative humidity. Two to 3 years old vines are highly susceptible.

Mode of Spread and Survival

The bacteria which are viable in the infected vines and leaves serve as a primary source of inoculum. Rain splashes and splash irrigation water help in the secondary spread.

Management

Remove and burn the infected vines and stubbles in the field. Regulate irrigation during cold weather season. Spray Streptocycline 400 ppm+Bordeaux mixture 0.25 per cent at 20 days intervals, after plucking the leaves.