

Lecture 09 - Diseases of Brinjal

Bacterial Wilt: *Pseudomonas solanacearum*

Symptoms



Bacterial wilt symptoms on leaf surface Wilting, stunting, yellowing of the foliage and finally collapse of the entire plant are the characteristic symptoms of the disease. Lower leaves may droop first before wilting occurs. The vascular system becomes brown. Bacterial ooze comes out from the affected parts. Plant show wilting symptoms at noontime will recover at nights, but die soon.

Pathogen

The bacterium is non acid fast, non spore forming, non capsulated and motile by a polar flagellum. The bacterium produces acid but no gas in dextrose, sucrose, lactose and glycerol. Starch hydrolyzed with slight liquefaction of gelatin.

Mode of spread and survival

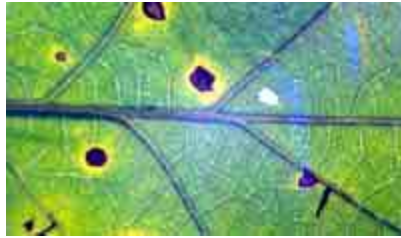
The bacterium infects banana, chillies, fennel, ginger, potato, radish, tomato etc., the bacterium though a non spore former is found to be alive and viable for more than 16 months under laboratory conditions. The pathogen is found to be alive in the infected plant debris for about 10 months. Presence of root knot nematode, *Meloidogyne javanica* increases the wilt incidence.

Management

Use resistant variety .Crop rotation with cruciferous vegetables such as cauliflower help in reducing the disease incidence. Fields should be kept clean and effected parts are to be collected and burnt. Spray Copper fungicides to control the disease (2% Bordeaux mixture.). The disease is more prevalent in the presence of root knot Nematodes, so control of these nematodes will suppress the disease spread.

Cercospora Leaf Spot :*Cercospora solani -melongenae, C. solani*

Symptoms



The leaf spots are characterized by chlorotic lesions, angular to irregular in shape, later turn grayish-brown with profuse sporulation at the centre of the spot. Severely infected leaves drop off prematurely, resulting in reduced fruit yield.

Pathogen

The fungus produces stromata which are globular. Conidiophores in mass are medium dark and slightly olivaceous brown in colour and paler towards the tip. Conidia are sub hyaline to pale olivaceous.

Mode of spread and survival

The disease is spread by air borne conidia.

Management

Pant Samrat variety is resistant to both the leaf spots. Diseases can be managed by growing resistant varieties. Spraying 1 per cent Bordeaux mixture or 2 g Copper oxychloride or 2.5 g Zineb per litre of water effectively controls leaf spots.

Alternaria leaf Spot :*Alternaria melongenae, A. solani*

Symptoms



Cracks appearing in leaf spot. The two species of *Alternaria* occur commonly, causing the characteristic leaf spots with concentric rings. The spots are mostly irregular, 4-8 mm in diameter and may coalesce to cover large areas of the leaf blade. Severely affected leaves may

drop off. *A. melongenae* also infects the fruits causing large deep-seated spots. The infected fruits turn yellow and drop off prematurely.

Pathogen

Mycelium is septate, branched, light brown to dark brown. It is inter and intra cellular. Conidiophores emerge through stomata and dark colored. Conidia are single celled, muriform, beaked and produced in chains. The conidia are with 5-10 transverse septa and a few longitudinal or oblique septa.

Mode of spread and survival

The disease is spread by wind borne conidia.

Management

Spraying 1 per cent Bordeaux mixture or 2 g Copper oxychloride or 2.5 g Zineb per litre of water effectively controls leaf spots.

Little Leaf of Brinjal

Economic Importance

This disease of brinjal was reported from India in 1938 and as far as known it occurs only in India and Sri Lanka. In almost all the states of the country it has become a serious problem facing brinjal cultivation. The yield loss is hundred per cent in the diseased plants.

Symptom



The characteristic symptom is the smallness of the leaves. The petioles are so short and the leaves appear to be sticking to the stem. Such leaves are narrow, soft, smooth and yellow. Newly formed leaves are much more shorter. The internodes of the stem are also shortened.

Axillary buds get enlarged but their petioles and leaves remain shortened. This gives the plant a bushy appearance. Mostly, there is no flowering but if flowers are formed they remain green. Fruiting is rare.

Pathogen

Little leaf was first considered a disease caused by a virus. In 1969 it was attributed to a mycoplasma-like organism, closely related to aster-yellows and curly top.

It is a sap transmissible disease. The organism has been transmitted to *Datura*, tomato and tobacco. It occurs in nature on *Datura fastuosa* and *Vinca rosea*. Natural transmission is through a vector, *Cestius phycytis* (*Eutettix phycytis*) while *Empoasca devastans* is a less effective vector. Perennation of the organism is through its weed hosts.

Mode of spread and survival

The disease is transmitted by leaf hoppers, *Hishimonas phycytis* and *Empoasca devastans* and grafting. *E. devastans* is less effective vector. Perennation of virus is through weed host. This disease has a very wide host range.

Management

The severity of the disease can be reduced by destruction of affected plants and spraying of insecticides. New crop should be planted only when diseased plants in the field and its neighbourhood have been removed.

Methyl demeton 25 EC	2 ml / litre
Dimethoate 30 EC	2 ml/ litre
Malathion 50 EC	2 ml/litre

has been recommended for vector control.

Although mycoplasmas are reported to be suppressed by tetracyclines field application of this method has not yet been recommended. Varietal resistance has not been systematically studied. Cultivars such as Pusa Purple Cluster, Arka Sheel, Aushy, Manjari Gota and Banaras Giant show moderate resistance to resistance in the field. Other cultivars found tolerant to the disease are Black Beauty, Brinjal Round and Surati.

Damping off: *Pythium aphanidermatum*, *Pythium indicum*, , *Phytophthora parasitica*, *Rhizoctonia solani* and *Sclerotium rolfsii*.

Symptom

Sudden collapsing of the seedlings occur in the seed bed. The seedlings are attacked at the collar region and the attacked seedlings are toppled down. The disease spreads through fungi present in the soil. The disease spreads through fungi present in the soil.

Management

The disease can be controlled by seed treatment with agrosan or ceresin @2gm/kg of seed.

Tobacco mosaic virus (TMV)

Symptoms

Mosaic mottling of leaves and stunting of plants are the characteristic symptoms of tobacco mosaic virus. Mosaic symptoms are mild in early stages but later become severe. Infected leaves are deformed, small and leathery. Very few fruits are produced on infected plants. The important symptom produced by tobacco mosaic virus is conspicuous mottling of leaves. Leaves also develop blisters in advanced cases. Severely infected leaves become small and misshapen. Plants infected early remain stunted. PVY is easily sap transmitted.

It is transmitted in the field through aphids, *Aphis gossypii* and *Myzus persicae* and perpetuates on weed hosts like *Solanum nigrum* and *S.xanthocarpum*. TMV is transmitted by sap, contaminated implements and clothes, soil debris and hands of labour. It can perpetuate on many cultivated plants like cucurbits, legumes, pepper, tobacco, tomato and weed hosts. The virus survives in plant debris in soil.

Management

Destroy all weeds and avoid planting cucumber, pepper, tobacco, tomato near brinjal seed beds and field. Wash hands with soap and water before working in seed beds. Prohibit smoking or chewing of tobacco who are handling brinjal seedlings. Spray insecticides like Dimethoate 2 ml/litre or Metasystox 1 ml/litre of water to control the insect vectors.

Collar rot :*Sclerotium rolfsii*

Symptoms

The disease occasionally occurs in serious form. The lower portion of the stem is affected from the soil borne inoculum (sclerotia). Decortication is the main symptom. Exposure and necrosis of underlying tissues may lead to collapse of the plant. Near the ground surface on the stem may be seen the mycelia and sclerotia. Lack of plant vigour, accumulation of water around the stem, and mechanical injuries help in development of this disease.

Management

Seed treatment with 4 g of *Trichoderma viride* formulation per kg seed will help in reducing the disease. Spraying with Mancozeb @ 2g/Litre of water. Collection and destruction of diseased parts and portions of the plant.

Fruit rot :*Phomopsis vexans*

Symptoms

Affects all above the ground plant parts. Spots generally appear first on seedling stems or leaves. Girdle seedling stems and kill the seedlings. Leaf spots are clearly defined, circular, up to about 1 inch in diameter, and brown to gray with a narrow dark brown margin. Fruit spots are much larger, affected fruit are first soft and watery but later may become black and mummified. Center of the spot becomes gray, and black pycnidia develop.

Pathogen

Pycnidia with or without beak are found in the affected tissue. They are globose or irregular. Conidiophores in the pycnidium are hyaline, simple or branched. Conidia are hyaline, one celled and sub cylindrical. Ascospores are hyaline, narrowly ellipsoid to bluntly fusoid with one septum.

Mode of spread and survival

The fungus survives in the infected plant debris in the soil. It is seed borne. The spores are spread by rain splashes. The fungus spreads through implements and insects.

Management

Seeds should be dipped in hot water at 50°C for 30 min. spraying with difolation 0.2% or captan 0.2% in the nursery and field at 7 – 10 days interval controls the disease. Deep summer ploughing, three year crop rotation and collection and destruction of diseased plant debris are some of the other control methods. Spraying the crop in the field with zineb 0.2% or Bordeaux mixture 0.8% is effective in controlling *Phomopsis* blight.