AVRDC - The World Vegetable Center
Fact Sheet

Pepper Diseases

Tobacco Mosaic Virus
Tomato Mosaic Virus

Mechanically Transmitted Tobamoviruses

Found worldwide

Symptoms

Tobacco mosaic virus (TMV) and tomato mosaic virus (ToMV) are very closely related. TMV has a wider host range, but occurs much less frequently in tomato than in tobacco. Both viruses infect pepper, tomato, potato, and several other hosts including weeds.

All growth stages can be affected. Symptoms can include necrosis on any plant part, defoliation, and/or mosaic symptoms on leaves, stems, and fruit. Generally, infected plants have a chlorotic mosaic with distortion of younger leaves, and stunting. Severely affected leaves are distorted or they may have a necrosis along the main veins accompanied by wilting and leaf drop. Affected fruit is small and may be disfigured with chlorotic or necrotic areas. Fruit set may be severely reduced in affected plants.

On chili pepper, common symptoms are raised bumps and mottled areas of light and dark green on the foliage, with fruit that ripens unevenly and is reduced in size.

Conditions for Disease Development

Both viruses are seed-borne. Only a few seedlings need to be infected for the virus to spread rapidly. This rapid spread within crops is largely due to mechanical

How to Identify Tobacco Mosaic Virus and Tomato Mosaic Virus

Mosaic, stunting, and systemic chlorosis

Leaf distortion and chlorosis

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transmission of the virus by workers on contaminated hands, clothing, and tools during routine operations such as transplanting, tying, pruning, grafting, cultivating, spraying, watering, picking.

Other sources of the virus include infected weed species and irrigation water. Secondary spread of both viruses is by insects such as grasshoppers, small mammals, and birds. Tobacco products used for smoking and TMV-infected tobacco plants are another source of the virus.

The virus is quite stable under adverse environmental conditions and can persist in plant debris in dry soil for 2 years or in moist soil for 1 month or in root debris in fallow soil for 22 months. It can also persist in greenhouse structures for long periods of time.

Healthy seedlings planted in contaminated soil can be infected through minor wounds caused by natural mechanical damage to roots. Mechanically damaged roots can be infected by contaminated re-circulating fluid used for crops grown in hydroponic systems.

Control

Consult with your extension agent regarding infection by TMV or ToMV since other plant viruses may cause similar symptoms. Resistant varieties are available. Check with your extension agent for resistant cultivars that are available in your region.

Use seed from healthy plants only. TMV or ToMV on the seed coat can be eliminated by soaking seed for 20 min in 15% of tri-sodium phosphate solution (TSP) or 2 hr in 10% of the same material, then rinsing thoroughly, and spreading seeds out to dry. Do not re-contaminate seed by placing them in used containers.

Use a minimum 2-year rotation. Avoid following pepper crops with susceptible crops such as tomato, potato, tobacco, eggplant, or cucurbits. Keep production areas and seedbeds free of weeds and other plants that can serve as hosts for the virus.

Locate seedbeds and nurseries far away from tobacco plants and storage warehouses. If growing seedlings and transplants in a greenhouse, then use steam-pasteurized soil in which plant debris has been allowed to thoroughly decompose since ToMV or TMV may be protected in thick pieces of root and stem refuse.

Avoid touching or handling pepper plants prior to setting them in the field. Avoid handling other solanaceous plants prior to handling pepper plants.

Remove diseased seedlings that show leaf twisting, mosaic or unusual growth. Remove one or two plants adjacent to those plants that show symptoms. Do not touch other seedlings while discarding them.

Dip hands in milk while handling plants every 5 minutes (more often if different lots of plants are handled). Rubber gloves will protect hands. Do not clip or damage young seedlings since this increases the possibility of mechanical transmission of the virus from contaminated tools or hands.

Remove diseased plants from the field as soon as virus symptoms are noticed. This will reduce the spread of the virus by direct contact between plants.

Disinfect tools, stakes, and equipment before moving from diseased areas to healthy areas. This can be done by: 1) soaking 10 minutes in a 1:10 dilution of a 5.25% sodium hypochlorite, do not rinse; or 2) by washing (enough to clean) in detergent at the concentrations recommended for washing clothes or dishes. Keep all solutions fresh.

Hands and tools may be washed with soap or milk. Work in diseased areas last, after working in unaffected parts of a field. Wash clothing that comes into contact with ToMV/TMV-infected plants with hot water and a detergent.

For more information on the production of pepper and other vegetables, go to <www.avrdc.org>.

AVRDC Publication 04-594
2004