Tomato Spotted Wilt Virus

Cooperative Extension Service
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Guide H-242

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Tomato spotted wilt virus (TSWV) is an important disease of many different crops grown in temperate and subtropical regions of the world. TSWV is a unique virus in a virus class by itself. The virus has a wide host range, but some of the more common hosts are tomatoes, peppers, celery, lettuce, eggplant, peanuts, pineapple, many legumes, many ornamentals, and many weeds such as field bindweed and curly dock (table 1). This disease is especially damaging in the ornamental and vegetable greenhouse industry.

Table 1. Partial host range of tomato spotted wilt virus.[1]

ORNAMENTALS			
African Violets	Columbine	Gaillardia	Poppy
Amaryllis	Cosmos	Gladiolus	Primrose
Anemone	Cyclamen	Gloxinia	Ranunculus
Aster	Dahlia	Impatiens	Salvia
Begonia	Delphinium	Larkspur	Snapdragon
Calendula	Dusty Miller	Marigold	Stock
Calla	Exacum	Nasturtium	Statice
Chrysanthemum	Fushia	Peony	Verbena
Cineraria	Geranium	Petunia	Zinnia
VEGETABLES			
Bean	Celery	Lettuce	Potato
Broccoli	Cucumber	Pea	Spinach
Cabbage	Eggplant	Peanut	Tomato
Cauliflower	Kale	Pepper	
WEEDS			
Burdock	Curly Dock	Lambsquarter	Pigweed
Buttercup	Field Bindweed	Morningglory	Shepherdspurse
Chickweed	Jimsonweed	Nightshade	Wild Tobacco
Clover			
MISCELLANEOUS			
Grape	Pineapple	Tobacco	

[1] Table modified from Putnam and Dutky, *Tomato Spotted Wilt Virus*, Maryland Department of Agriculture.

Symptoms of TSWV are numerous and varied. However, there are two fairly common symptoms for which this disease was named. First, the young leaves turn bronze and subsequently develop numerous small, dark spots. Second, the leaves often droop on the plant, creating a wilt-like appearance. Other symptoms include die-back of the growing tips and dark streaking of the terminal stems. Affected plants may develop a one-sided growth habit or may be stunted completely. Plants that are affected early in the growing season often do not produce any fruit, while those

DIAGNOSIS AT A GLANCE

Caused by
Tospovirus—a ssRNA virus

Common hosts
Tomatoes, peppers, celery, eggplant, peanuts, lettuce, pineapple, many legumes, many ornamentals, and weeds such as field bindweed and curly dock

Symptoms
- Young leaves turn bronze in color.
- Leaves develop numerous small, dark spots.
- Plants appear wilted.
- Tips dieback.
- Dark streaking of the terminal stems
- Stunting
- Chlorotic ringspots and raised bumps on fruit
- Fruit are deformed.
- Reduced fruit quality and yield

Transmitted by
Thrips, in a persistent manner

Disease conditions
Warm temperatures and high thrips population

Disease management
Cultural practices:
- Remove all infected plants.
- Weed and insect control
- Crop rotation
- Use reflective mulches.

Check seed sources for “new” tolerant cultivars

infected after fruit-set produce diseased fruit with striking symptoms, including chlorotic ringspots, raised bumps, uneven ripening, and deformation. Infected plants produce poor quality fruit and reduced yield.

TSWV is transmitted from infected plants to healthy plants by at least nine species of thrips. Thrips are tiny (approximately 1/16th of an inch) winged insects that feed on plants through sucking mouthparts. Thrips transmit the virus in a persistent manner, which means that once the insect has picked up the virus, it is able to transmit the virus for the remainder of its life. The virus is not passed on from adult to egg; however, progeny that develop on infected plants will quickly pick up the virus and be effective disease vectors.

Controlling this disease is difficult. The wide host range, which includes many perennial ornamentals and weeds, enables the virus to successfully overseason from one crop to the next. Additionally, efforts to control the insect vectors in agricultural fields has had little effect on TSWV. This is likely due to the fact that large populations of thrips may fly or be blown into treated fields from non-treated areas nearby.

Controlling thrips is somewhat more effective in greenhouse situations. In greenhouses, however, growers should take care to avoid repeated sprays of similar insecticides, as thrips are able to build up resistance to commonly used insecticides in a relatively short time. Rotating the insecticide class is the best approach to insect control. Control of thrips may be obtained with pyrethroids, carbamates, chlorinated hydrocarbons, organophosphates, and soaps. Insecticides are most effective when applied in the morning, when the thrips are most active and the chance for plant damage is reduced. Pesticide regulations change frequently, so check with your local county extension service for information on available insecticides.

While elimination of disease may not be possible, the incidence and severity of the disease may be reduced by using cultural practices such as starting with virus-free plant material, removing all infected plants (once virused, there is no cure for the diseased plant), controlling weeds, and rotating crops. Some studies also have shown that the use of reflective mulches under plants may help to reduce infection. In greenhouses, it may be possible to greatly reduce the number of thrips entering the greenhouse by covering doors and air intakes with a fine mesh (400 mesh) cloth. Efforts are underway to breed cultivars with good horticultural charasteristics that also exhibit tolerance to the virus.

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