

Tomato Spotted Wilt Virus (TSWV) Information and Control Strategies

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Healthy vs with TSWV

Tomato Spotted Wilt Virus (TSWV)

- Obligate pathogen: survives only in living host
- Has an enormous host range (over 550 plant species!)
- Many hosts may not show any symptoms
- Symptoms on tomato:

leaf bronzing w/ small dark spots	poor (or no) fruit set
leaf curling and distortion	brown raised spots on green fruit
plant stunting	yellow rings on ripe fruit
die-back of growing tips	irregular ripening of fruit
- Is transmitted by thrips (populations increase during dry weather)
- Is very difficult to control



Photographs of TSWV on tomato



Early symptoms



Later symptoms

The Insect Vectors

- Insects transmitting TSWV:
 - western flower thrips (most common vector)
 - onion thrips
 - tobacco thrips
 - yellow flower thrips
 - up to six other thrips species (rare)
- General description of thrips:
 - very tiny (about 1/32 inch long), slender
 - pale yellow to dark brown or black
 - with and without wings
- Thrips feeding damage:
 - silvery flecked area and scars on flowers and leaves
 - tiny black spots (fecal spots) on flowers and leaves
 - deformed flowers and leaves



Thrips Life Cycle (TSWV Disease Cycle)

- Females lay eggs in tender tissues (underside of leaves or flower buds)
100 - 300 eggs during adult lifetime
- Larvae feed on diseased plant
TSWV **ACQUIRED**
15 minutes of feeding required
larvae CANNOT transmit TSWV
- Mature larvae drop-off plants and pupate in soil and plant litter
- Winged adults emerge and feed on healthy plants
TSWV **TRANSMITTED** to healthy plant
(no adult thrips-to-egg transmission)
- Adult thrips survive and can spread TSWV for up to 45 days
6 - 15 life cycles completed in a season (varies with temperature)
at 90 F, one every 14 days
at 50 F, one every 44 days



A Few of the Hosts for TSWV

- Vegetables and other crops:

tomato	lettuce	cucumber	snap bean	lupin
pepper	celery	watermelon	pea	soybean
potato	spinach	cauliflower	peanut	tobacco
eggplant	melon	southern pea	alfalfa	cotton

- Weeds:

chickweed	burdock	oxeye daisy	black nightshade
bindweed	galinsoga	spiny amaranth	morning glory
thistle	bindweed	sowthistle	shepherd's purse
lambsquarters	purslane	spanish needle	nettleleaf goosefoot

- Ornaments:

(Almost all greenhouse crops except roses and poinsettias are susceptible.)

impatiens	chrysanthemum	zinnia	gladiolus	primrose
begonia	African violet	peony	snapdragon	amaryllis
geranium	delphinium	dahlia	anemone	salvia



Disease Control Strategies for TSWV of Tomato

- Greenhouse sanitation

avoid introducing thrips or TSWV-infected plants

DON'T KEEP HOLD-OVER PLANTS in greenhouse

create disease-free buffer around greenhouse

monitor for thrips infestations

hot-pink or blue sticky cards

use indicator plants (e.g., 'Majestic' or 'Calypso' petunias)

- Cultural practices

use reflective mulches (silver)

control populations of thrips with an insecticide* program

soil drench of Admire (imidacloprid) when set transplants

foliar sprays of Monitor (methamidophos) rotated with SpinTor (spinosad)

- Use tomato varieties resistant to TSWV

Amelia, BHN 601, BHN 640, Crista, Nico, Red Defender, Quincy, Talladega, etc. **



*Always read and follow pesticide labels

** Horticultural aspects for TN still under evaluation

Current Research at WTREC

- Horticultural*:

Several TSWV-resistant varieties are being evaluated:

Amelia

Nico

Red Defender

Mt. Fresh+ (susceptible standard)

- Alternative control measures being evaluated*:

Materials that activate plant resistance mechanisms:

Actigard

Plant growth-promoting rhizobacteria

*Results will be posted in December 2007



2007 Tomato Test