Tospoviruses of Tomato and Management

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Tospoviruses

Genus: *Tospovirus*

Family: Bunyaviridae

Origin: *Tospovirus* derived from its first member *Tomato spotted wilt virus* (TSWV)

Tospoviruses in US

Tomato spotted wilt virus (TSWV)

Impatiens necrotic spot virus (INSV)

Iris yellow spot virus (IYSV)

Groundnut ringspot virus (GRSV) - 2009

Tomato chlorotic spot virus (TCSV) – 2012

The genomes of TCSV, GRSV are analogous to TWSV

Tomato spotted wilt virus (TSWV)

http://www.ent.uga.edu/veg/solanaceous/thrips.htm

Groundnut ringspot virus (GRSV)

Tomato chlorotic spot virus (TCSV)

Geographic Distribution

- TSWV is widespread in eastern US states
- GRSV not prevalent outside of south FL
  - found in SC, NY
- TCSV only found in south FL

- Webster et al. 2014

Outbreak in Homestead – Fall 2014

Average 5-10% plants infected

Some fields up to 30%

Fall 2014 in Homestead

Local and systemic infection
- necrosis
- stunting

Started about 3 weeks after transplanting

TCSV Predominates in Homestead

All tomato samples submitted in fall 2014 were infected with *Tomato chlorotic spot virus* (TCSV).

TCSV is the newest of the three tospoviruses infecting tomatoes in Florida (reported in 2012), and it has been the predominant one detected in the Homestead area for the past few years.

Neither *Groundnut ringspot virus* (GRSV) nor *Tomato spotted wilt virus* (TSWV) was detected from those samples.

- Scott Adkins (USDA, Ft. Pierce)

TCSV

First reported from south Florida on tomato, pepper (Londono et al. 2012)

Vectors:

- western flower thrips (*Frankliniella occidentalis*)
  widespread in US and FL
- common blossom thrips (*F. schultzei*)
  less frequent in US, but found recently in cucurbits and solanaceous crops in M-Dade County (Kakkar et al. 2012)

Other Thrips Species?

Florida flower thrips (*F. bispinosa*)

tobacco trips (*F. fusca*)

- commonly present in southeastern US
- known to transmit tospoviruses

Webster et al. (2014)

- Neither was observed to transmit GRSV
- TCSV? Unknown, need further studies

Host Range

Experimentally - primarily solanaceous species: (except underlined)

Vegetables: tomato, pepper, tomatillo, eggplant, lettuce

Ornamentals: tobacco, petunia, impatiens

Weeds: Jimsonweed

- Not clear, need further investigations

Field Observations – 12/10/2014

More serious in areas close to

- squash, bean fields
- fruit grove with abundant weeds

Thrips Populations

Thrips - *F. occidentalis*

- *F. schultzai*

Several hundreds tomato (and a few weed) samples collected in Homestead

- Populations of both thrips species low
- No or few larvae found in tomato flowers

Dak Seal - Dec. 2014

Further Research

Host range: any other vegetables, ornamentals, fruit trees, weeds?

Vectors: other thrips species?

reproduction

Symptoms: time after inoculation (thrips feeding)

10-12 days (Polston)

Source, transmission, transplants …

Integrated Management
(e. g. TSWV – NFREC)

- Select resistant variety (*Sw5* gene)
- Remove weed reservoirs from around production area
- Exclude thrips from transplant production
- Use UV reflective mulch to repel thrips
- Apply Actigard (acibenzolar-S-methyl) to reduce symptom expression

- Apply insecticides to limit secondary virus spread.
- Destroy crops promptly after harvest

Cooperation is KEY to success!

Trials at TREC

Being planned in spring 2015

- Variety screening for resistance (*Sw5* gene)
- Insecticide for control of thrips

Need Your SUPPORT!

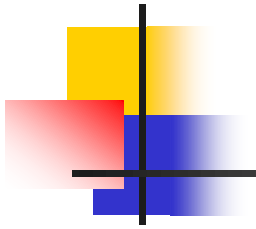
- 200 'Sanibel' transplants (late January)
- Support letters for a proposal on tomato TCSV management to FDACS SCBG in February

References

Londoño, A., H. Capobianco, S. Zhang, and J. E. Polston. 2012. "First Record of Tomato Chlorotic Spot Virus in the U.S." Tropical Plant Pathology 37: 333–338

UF/IFAS PP306 – “Tomato Chlorotic Spot Virus” (http://edis.ifas.ufl.edu/pp306)

UF/IFAS ENY859 – “Managing Thrips and Tospoviruses in Tomato” (http://edis.ifas.ufl.edu/in895)



Thank you !

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