

TOMATO YELLOW LEAF CURL VIRUS: AN EMERGING VIRUS OF TOMATOES IN TENNESSEE

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Tomato yellow leaf curl virus (TYLCV) (Figure 1) is one of the most damaging viral pathogens that impacts tomato crops globally and has continued to spread across the United States [1]. The virus can cause significant production losses in certain host species but is most impactful to tomatoes [2,3,4]. This factsheet is intended to inform growers about TYLCV and the symptoms associated with the disease caused by this virus.

Hosts

TYLCV has a diverse host range including 49 plant species belonging to 16 families [1]. The virus is found globally, affecting plants in both agricultural production and the nursery industry. TYLCV infects a number of host plants including pepper, eggplant, potato, tobacco, jimsonweed, common bean, ornamentals including petunia and lisianthus and weeds; however, tomatoes are the most impacted [1,2]. Infection in some plant species can be symptomless where such plants serve as a reservoir for TYLCV transmission.

Spread Occurs by Three Different Methods

1. Transmission by silverleaf whitefly (*Bemisia tabaci*) Gennadius (Figure 2)
2. Grafting infected tissue to healthy plants
3. Transplanting of infected seedlings

Symptoms

Symptoms include leaf yellowing, leaf curling and cupping, leaf thickening, bushy and stunted in height, mosaic, flower and fruit abortion and tissue death (Figures 3-5). Symptoms develop in 2 to 3 weeks post-infection.



Figure 3. An infected tomato with TYLCV associated symptoms of upward curling, leaf cupping, and stunting



Figure 4. A tomato plant with TYLCV associated symptom of leaf cupping



Figure 5. TYLCV associated symptoms of interveinal and marginal chlorosis or yellowing

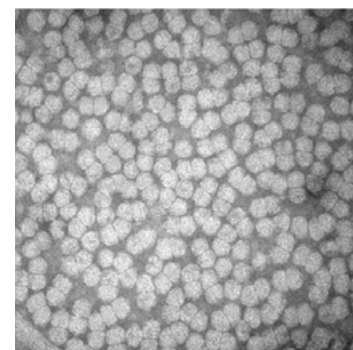


Figure 1. Tomato yellow leaf curl virus observed under an electron microscope



Figure 2. Adult and nymphal silverleaf whiteflies feeding on a host plant

Distribution

TYLCV was originally detected in Israel in the 1960s and has spread globally [1]. The virus was first detected in the United States in Florida in 1997 [1]. Climactic and environmental changes have led to a more favorable environment for whitefly infestations leading to an increased rate of transmission for TYLCV [5]. Both the whiteflies and the virus have continued to spread in the United States and expanded to include Alabama, Arizona, California, Georgia, Hawaii, Kentucky, Louisiana, Mississippi, New York, North Carolina, Oklahoma, South Carolina and Texas [4,6,7,8]. TYLCV was first detected in Tennessee from a tomato plant on a farm in Grainger County in 2024 [9].

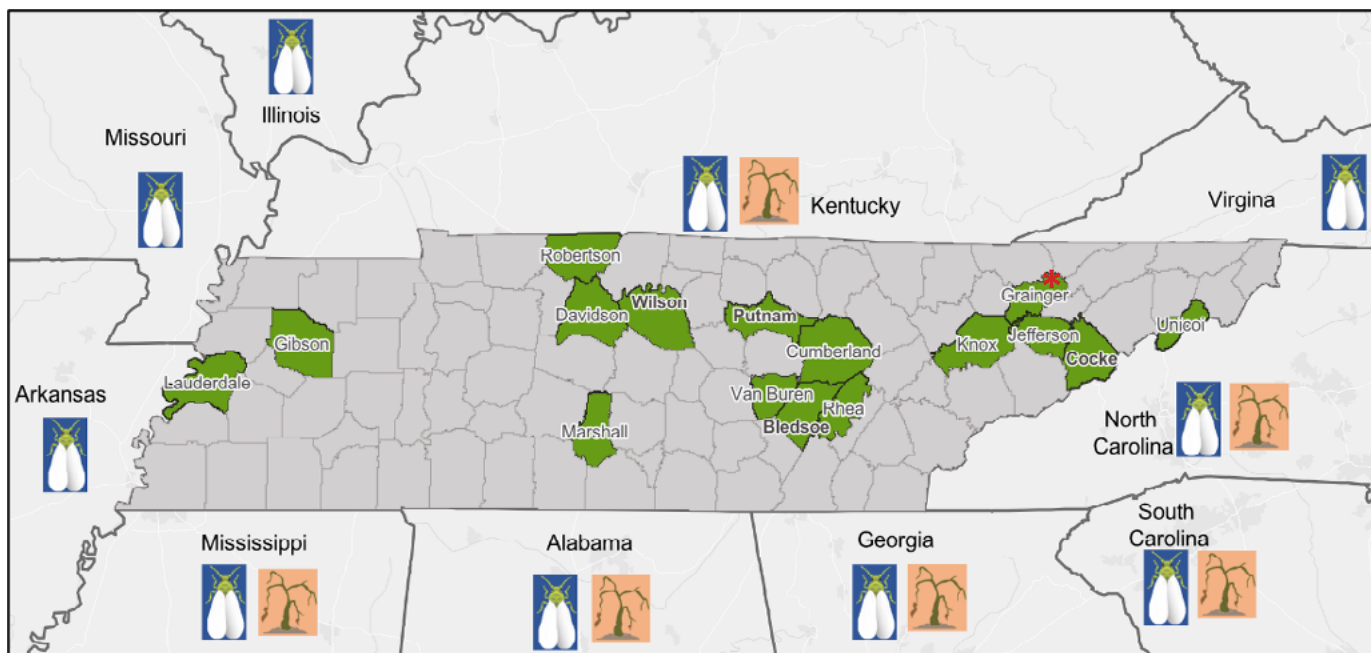


Figure 6. Tennessee counties, highlighted in green, represent the greatest concentration of tomato production; Grainger County has an asterisk denoting the detection of TYLCV. Surrounding states known to have only the whitefly vector or presence of both the whitefly vector and TYLCV are noted with the appropriate symbols; insect symbol indicates *B. tabaci* presence and the sick plant infers confirmed TYLCV.

Damage

Regions across the globe have experienced losses up to 100 percent with heavy silverleaf whitefly infestations transmitting the virus [1,2,3]. Tennessee is one of the leading tomato producers in the United States [10]. As depicted in Figure 6, the surrounding states have confirmed detection of TYLCV and the silverleaf whitefly vector. TYLCV was detected in Tennessee in a region known for sporadic occurrences of silverleaf whiteflies [4,9].

Disease Management

There are several Integrated Pest Management strategies that can be used to manage whitefly populations and minimize the spread of TYLCV. Unlike many diseases where we treat the pathogen, in this case, we use preventative and management strategies directed against the whitefly vector and TYLCV.

Cultural Control

- Use reflective mulches
- Use resistant cultivars
- Plant virus-free and whitefly-free transplants
- Avoid planting other host plants close to tomatoes
- Remove symptomatic plants & weeds near production
- Do not import transplants from regions with confirmed TYLCV and whitefly occurrences
- Monitor whitefly populations
- Practice good sanitation

Biological Control

- 48 species of predatory insects, 62 species of parasitoids, and nine species of pathogens reported as natural enemies of silverleaf whiteflies [4]
- Entomopathogens (e.g., fungi, viruses, nematodes, protists, and bacteria) [4]

Chemical Control

- Rotate products to prevent insecticide resistance such as insect growth regulators, contact insecticides, oils and soaps
- For more information regarding chemical applications please review the- [Southeastern Vegetable Crop Handbook](#)

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Photo Credit

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