



Fusarium Wilt of Watermelon

Dan Egel

Extension Plant Pathologist, Southwest Purdue Agricultural Center

(812) 886-0198 egel@purdue.edu

Introduction

Fusarium wilt is one of the most serious watermelon diseases in Indiana. This publication describes the cycle and symptoms of Fusarium wilt and offers management recommendations.

Disease Cycle and Symptoms

The fungus that causes Fusarium wilt in watermelon is known as *Fusarium oxysporum* fsp. *niveum*—or FON. Due to the specificity of FON to watermelon, it cannot infect even such closely related plants as cucumber and cantaloupes.

FON forms resilient spores in the soil that can remain viable for many years in the absence of a host. That means Fusarium wilt can appear in a field in which watermelon may not have been previously planted for many seasons. Also, any process that moves soil may be responsible for spreading Fusarium wilt between, or within, fields from one season to the next.

The FON pathogen does not produce spores above ground in the field, so Fusarium wilt is not known to spread from plant to plant within one season. However, FON may be transmitted on seed and cause wilt symptoms on watermelon transplants in greenhouses; there is also evidence that Fusarium wilt may spread from plant to plant on seedlings in a transplant greenhouse. Alternatively, healthy transplants may be planted to the field only to have symptoms show up later in the season.

Fusarium wilt may become severe in sandy soils with a pH in the range of 5.5 to 6.5 and soil temperatures of 77° to 80° F.

The first symptom often observed in the field is a one-sided wilt of a plant or the wilt of one runner (Figure 1). This one-sided wilt is common in plants three to four weeks after they have been transplanted. Infected plants have white, healthy roots while the vascular tissue is brown and discolored (Figure 2). In the field, infected plants often appear in clusters (Figure 3).

The appearance of Fusarium wilt in the field mirrors the population of the fungus in the soil. Symptoms of Fusarium wilt may also be observed on mature plants, in which case a portion of the vines at the base of the plants may have died and the older leaves of living vines may have turned brown (Figure 4).

When Fusarium wilt affects seedlings, however, the wilt may not necessarily be one-sided (Figure 5). Instead, affected seedlings in a transplant greenhouse may first exhibit a die-back and scorched appearance.

Disease Management and Timeline

Fusarium wilt is difficult to manage; successful strategies will incorporate a combination of the following components.

- Crop rotations of more than six years may lessen the survival rate of the FON pathogen in the soil and decrease the severity of symptoms.
- Fumigation may help lessen the incidence and severity of Fusarium wilt.
- The fungicide prothioconazole (Proline®) is labeled for Fusarium wilt of watermelon and has been shown to lessen disease severity if applied through drip irrigation according to the label.
- Sanitation in the transplant greenhouse will help to avoid occurrence of Fusarium wilt. Inspect transplant greenhouses for symptoms of Fusarium wilt and remove symptomatic trays as well as adjacent trays. Always use new or clean and sanitized transplant trays. Make sure benches and all tools that come into contact with greenhouse soils are clean and sanitized. For information on sanitization, see HO-250-W.
- Although no commercial watermelon varieties are completely resistant to Fusarium wilt, some offer partial resistance—which will help lessen the impact of this disease.
- Biofumigation with crops in the brassica family or a green manure of crimson clover or hairy vetch has shown promise in lessening disease symptoms. However, suppression of Fusarium wilt differed among geographical areas where the cover crops were used.
- Grafting of commercial watermelon varieties as scions onto roots stocks of interspecific root stocks of *Cucurbita* spp. is used in many other countries and has the potential to eliminate Fusarium wilt of watermelon if cost-effective. Grafting has become adopted on a small scale on watermelon production in the eastern U.S.

The table below provides a timeline for Fusarium wilt management.

| Timing | Management Measures |
|--------------------|---|
| Winter / Offseason | Long rotations of six years or more are necessary to keep inoculum from building up in the soil. Cover crops are planted in the offseason. Some cultivars offer partial resistance (See Purdue Extension publication ID-56, <i>Midwest Vegetable Production Guide for Commercial Growers</i>). |
| Greenhouse | Fusarium wilt may be seedborne. Inspect seedlings for symptoms of Fusarium wilt. Use new transplant trays or sanitize trays well. Grafted plants are a possible management tool. |
| Vine touch | Fusarium wilt symptoms are particularly likely at this stage, so fields should be scouted for diseased plants. Get an official diagnosis on any questionable symptoms. Keep records of where Fusarium wilt occurs. Ensure that fungicides are applied via drip. |
| Harvest | Do not save any seed from fields where Fusarium wilt has been observed. |

Learn More

For more information, including cultivars that offer partial resistance to Fusarium wilt in watermelon, see Purdue Extension publication ID-56, the *Midwest Vegetable Production Guide for Commercial Growers*, available at <https://mwveguide.org> or by visiting the Purdue Extension Education Store at <https://edustore.purdue.edu>.



Figure 1. Watermelon plants with a one-sided wilt are characteristic of plants infected with Fusarium wilt.



Figure 2. Brown, discolored vascular tissue is characteristic of watermelon with *Fusarium* wilt. Discolored vascular tissue is often on one side of the stem; this characteristic may coincide with the one-sided wilt observed in Figure 1.



Figure 3. Clusters of wilted or dead plants are typical of the distribution of *Fusarium* wilt in watermelon. Plants in areas of the field with high spore concentrations in the soil often develop symptoms before plants in areas with relatively low spore populations, giving the appearance of disease spread.



Figure 4. Symptoms of *Fusarium* wilt on mature watermelon vines has caused two of the vines (indicated by red arrows) to die and turn brown. Many of the older leaves of vines that are still green have turned brown.



Figure 5. *Fusarium* wilt of watermelon transplants. The true leaves of these transplants have wilted and died as a result of infection by the *Fusarium* wilt fungus. These plants have not come into contact with the fungus in the soil, so the *Fusarium* wilt fungus likely came from either the seed or survival of the fungus on a used transplant tray. Note the clustered appearance of diseased seedlings; there is evidence that, in a transplant greenhouse, *Fusarium* wilt may spread from plant to plant.

All photos by Dan Egel.