

PP1247 (Reviewed Sept. 2023)

Fusarium Yellows of Sugarbeet



Figure 1. Lower, older leaves become yellow between the larger veins and eventually die but remain attached to the plant.



Figure 2. Some plants infected with *Fusarium* may have half a leaf with necrosis.

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Fusarium yellows of sugarbeet was identified in the Red River Valley in a few fields between Moorhead, Minn., and Drayton, N.D., in 2002. *Fusarium* yellows is caused by the fungus *Fusarium oxysporum* f. sp. *betae*, although other *Fusarium* species can be involved as secondary invaders.

The disease causes significant reduction in root yield and recoverable sucrose. In storage, the quality of infected roots may deteriorate more rapidly than in noninfected roots.

■ Symptoms

Fusarium yellows first appears on older leaves as chlorosis (yellowing) between the larger veins. As the disease progresses, younger leaves also become chlorotic, and the older, symptomatic leaves become necrotic (Figure 1). Occasionally, only half a leaf is chlorotic or necrotic (Figure 2) (a symptom more typical of *Verticillium* wilt, which also was identified recently on sugarbeet in this region).

In the early stages of the disease, foliage tends to wilt during the day but recovers overnight. Entire leaves eventually die but remain attached to the plant and collapse in a heap around the crown.

This disease has no external root symptoms. A transverse section through the root shows a grayish-brown vascular discoloration (Figures 3-5). Mature plants rarely die, but yield is reduced.

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Figure 3. This infected root has grayish-brown to black discoloration of vascular bundles.



Figure 4. The outer surface of an infected root shows no symptoms. A transverse section through the root shows grayish-brown to black discoloration.



Figure 5. This shows the disintegration of cells in the vascular tissue in an advanced stage of the disease.

■ Biology

Fusarium oxysporum f. sp. *betae* survives in soil and plant residues as spores, chlamydospores or mycelium. When conditions are favorable, the fungus enters sugarbeet roots and invades the vascular system, where it produces toxins that are transported upward in the plant, causing foliar symptoms. The fungus also acts as a “plug” that clogs the vascular tissue and, subsequently, causes wilting.

The disease is favored by high soil temperatures — above 75 F. Symptoms typically do not appear early in the growing season. Fields that are waterlogged or have poor soil structure provide favorable conditions for infection. The fungus survives in soil for many years.

Nematode infection often will increase the severity of *Fusarium* wilt. Fortunately, nematodes have not been identified on sugarbeet grown in Minnesota and eastern North Dakota.

■ Management

Crop rotation may reduce inoculum buildup in the soil, but this practice is unreliable because *F. oxysporum* f. sp. *betae* has a wide host range and chlamydospores survive for many years. Movement of infested soil on contaminated field equipment should be avoided to prevent its spread to noninfested fields.

No fungicide that provides effective disease control is available. Growers who have fields with a history of the disease should plant *Fusarium* yellows-resistant varieties.

Photo credits

Figures provided by C. A. Bradley, M. F. R. Khan, and R. Nelson.

Selected References

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