



# Extension FactSheet

Plant Pathology, 2021 Coffey Road, Columbus, OH 43210-1087

## Verticillium Wilt of Alfalfa

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**V**erticillium wilt is a serious disease of alfalfa, with the potential to reduce forage yield and quality, and to shorten the life of a productive stand. This disease has been present in Europe since 1918, but was not known to occur in the U.S. until 1976, when it was found in seed production fields in the Pacific Northwest. Since that time *Verticillium* wilt has been found in several midwestern and eastern states, including Wisconsin, Minnesota, Iowa, Kansas, Illinois, Michigan, Ohio, Pennsylvania, and New York. It is likely that spread of the disease occurred with the planting of infested seed produced in the Pacific Northwest.

Surveys conducted in Ohio in 1982 and 1983 revealed no presence of *Verticillium* wilt. In 1984, the disease was found in an alfalfa field in northwestern Franklin County. It has subsequently been confirmed on 17 farms in 9 Ohio counties (Franklin, Medina, Stark, Wayne, Knox, Ashland, Holmes, Columbiana, and Logan). Since *Verticillium* wilt appears to be restricted to areas where the average daily July temperature does not exceed 70 degrees Fahrenheit, it is unlikely that alfalfa in southern Ohio will be affected.

### Cause of the Disease

*Verticillium* wilt is caused by a fungus, *Verticillium albo-atrum*, which enters the water-conducting cells of the alfalfa plant and restricts the upward movement of water and nutrients. The fungus produces spores within the plant, or on cut stem surfaces following harvesting operations. Spores may be carried long distances by wind or by flying insects. The most common means of plant-to-plant spread of the fungus within a field is on harvesting equipment. Cutter-bars or flails pick up spores from an infected plant and transfer them to the cut stems of a healthy plant. Spores germinate on the cut surfaces and produce filaments (hyphae) that grow into stems and ultimately into roots. After an infected plant dies, *Verticillium* lives within the dead plant tissue.

Although other strains of *Verticillium albo-atrum*, as well as other species of *Verticillium*, are present in soils throughout Ohio, only the alfalfa strain of *Verticillium albo-atrum* causes

significant damage to alfalfa. The alfalfa strain can infect other plant species including lambsquarters, smartweed, wild mustard and dandelion, and can survive in these weed hosts in the absence of alfalfa.



Figure 1. Symptoms of *Verticillium* wilt in alfalfa. Upper leaflets are small, yellow to pink, and frequently curled or twisted.

## Symptoms

Verticillium wilt symptoms usually do not become conspicuous until the third production year. Affected plants are scattered throughout a field, but occasionally occur in large patches. In the early stages of the disease, leaflets wilt during periods of slight water deficit, but may recover at night or after a light rainfall. A yellow, V-shaped discoloration at the tip of a leaflet is an early indication of *Verticillium* infection. Eventually, leaflets wilt, turn yellow or pink, and often curl or twist (Figure 1). These abnormally small, twisted leaflets occurring near the top of the stem are the most characteristic symptoms of the disease. Stems are stunted, but frequently remain green and erect (in contrast to the drooping stems caused by anthracnose). Taproots appear healthy and sound, but have a dark ring (the water-conducting tissues) which is evident when the taproot is cut in cross section. Stands become thin as infected plants die.

## Control

### Variety Selection

In areas where Verticillium wilt is known to be present, the use of disease resistant varieties is an important control measure (Figure 2). This is especially true if stands are to be maintained longer than 3 years. On farms where the disease has been identified, it is absolutely essential to use a Verticillium-resistant variety.

Most seed companies now have one or more varieties with Verticillium wilt resistance. A current list of these varieties can be found in OSU Extension Factsheet AC-41, "Disease Resistance Characteristics of Alfalfa Varieties," available from county or district Extension offices or from the Ohio State University Extension Publications Office, Columbus.

### Harvesting

Verticillium wilt is spread throughout a field, and from one field to another, primarily by harvesting activities. For this reason, infested fields should be harvested last. Harvesting



Figure 2. Verticillium-wilt resistant variety (left) and susceptible variety (right) after 6 years.

equipment should be disinfested with a solution of 10% chlorine bleach (e.g., 'Clorox') after harvesting operations are completed.

### Handling Verticillium-infested Forage

Whenever possible, harvest Verticillium-infested alfalfa as haylage, as the disease agent does not survive ensiling. Infested fields may also be used for grazing, since the fungus does not survive passage through the digestive tract of ruminant animals.

Off-farm movement of hay should be avoided. Also, infested hay should not be fed in close proximity to healthy alfalfa fields.

### Crop Rotation

*Verticillium albo-atrum* cannot survive in the soil for long periods in the absence of a susceptible host plant. Infested fields should be deep plowed and not planted to alfalfa for a period of 2 to 3 years. Corn or small grains are non-hosts and make excellent rotation crops for eliminating *Verticillium*. Control of broadleaf weeds during the rotation period is important, since some of these may be hosts for the fungus.

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