



Plant Pathology
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Verticillium wilt, a disease of alfalfa caused by the fungus, *Verticillium albo-atrum*, was identified in 1981 by University of Minnesota plant pathologists in several alfalfa fields in three Minnesota counties (Carver, Sherburne, and Dakota). The disease has been a serious problem in northern Europe for over 30 years. In the United States, it was first found in Washington state in 1976 and later in Idaho and Oregon.

Verticillium wilt was first discovered in Wisconsin in 1980 and has now been found in at least 24 counties in that state. Although it is currently known to occur in three counties in Minnesota, it may be much more widespread. Alfalfa fields throughout the state should be examined during the spring regrowth period in mid-May to determine the distribution and severity of the disease.

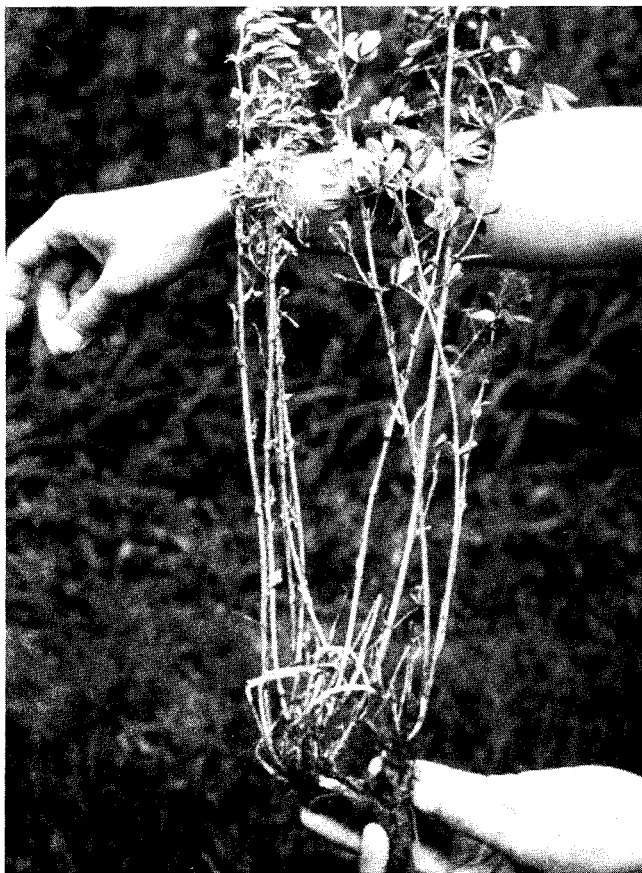
Symptoms of the disease are wilting leaves turning yellow while the stems remain green often after the leaves are dead (picture 1). The upper tap root and crown usually have light brown to orange streaks. After symptoms appear, the plant dies. Regrowth from infected crowns is weak and stunted. The foliar symptom is best observed during spring growth and again in the fall (second best time). A good symptom to look for is unilateral wilt (picture 2). The stems from one section of the crown appear wilted, stunted and dead while another portion of the crown has normal, healthy stems. Positive diagnosis requires isolation and identification of the fungus. Initial surveys for *Verticillium* wilt found many plants infected with Anthracnose stem lesions. *Verticillium* wilt infected plants do not have stem lesions near the soil. The stem often remains green and healthy even when leaves are dry and brown.

The disease is usually not observed in an alfalfa stand until the third production year. The diseased plants are usually scattered thinly through the stand at first (picture 3). Once established, depending on weather conditions and



Picture 1: Dead leaves and green stem.

Alfalfa Verticillium Wilt



Picture 2: Plant (left) is wilted and diseased, plant (right) is healthy and normal.

other factors, the disease may spread rapidly and deplete a stand within a year after first observation. Generally, it is not serious in a short rotation of 2-3 production years.

The fungus can be introduced into a field in various ways. These include plant material with the seed or within the seed itself, manure, hay, on farm machinery, from animals including birds, and humans. The most likely long distance spread is by seed that is not thoroughly cleaned or by diseased seed. Once established in a field, the fungus spores spread during hay harvest by wind, water, or any other means from infected plants to healthy ones.

Precautions may be taken to reduce the chances of establishment or spread of the disease. Plant only well cleaned seed. Treat seed with a fungicide containing thiram to reduce the chances of introducing the fungus with the seed. The fungus can live for long periods in alfalfa stems, so hay or manure from animals fed infested hay should not be spread on producing alfalfa fields or on fields to be planted to



alfalfa. Harvest the youngest fields first and the older fields or fields known to have the disease last. Before harvesting the next field, wash harvesting equipment with water after removing all plant debris.

Several varieties claimed to be resistant to *Verticillium* wilt have been released by seed companies and a limited amount of seed will be available for planting. These varieties are being tested for forage production and persistence in Minnesota as well as their resistance to other major Minnesota diseases. Winter survival and resistance to other diseases in Minnesota are still very important factors when selecting a new variety.

Verticillium wilt symptoms in the field can be confused with other diseases. If the grower suspects *Verticillium* wilt, he should take the stems to his county extension personnel. They will forward the stems along with the necessary information to the: Plant Disease Clinic, University of Minnesota, Room 304 Stakman Hall, 1519 Gortner Avenue, St. Paul, MN 55108. There the stems will be examined for the presence of the fungus.

Picture 3: Infected plants scattered in stand.

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