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Common Alfalfa Diseases in Nebraska

PLANTS SHOWING THESE SYMPTOMS . . .	. . . PROBABLY HAVE THESE DISEASES
Wilting and yellowing. Plants dying out in stands that are three years old or older.	Bacterial wilt or root rot
Small circular brown spots on leaves that are yellowing and dying.	Leaf spot or rust
Elongated black areas on stems.	Black stem
Upper leaves light green and distorted. Whitish mold on surface.	Downy mildew

INSIDE THIS CIRCULAR YOU WILL FIND MORE INFORMATION ABOUT THE SYMPTOMS, CAUSE, AND CONTROL OF THESE ALFALFA DISEASES.

EXTENSION SERVICE - UNIVERSITY OF NEBRASKA
COLLEGE OF AGRICULTURE AND U. S. DEPARTMENT
OF AGRICULTURE COOPERATING W. V. Lambert, Director

Common Alfalfa Diseases in Nebraska

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Extension Plant Pathologist

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ALFALFA WILT

Symptoms. This disease does not ordinarily appear until established stands are two to three years old. The first indication is when plants begin to die here and there within the field. Affected plants first show wilting and yellowing, become stunted and gradually die (fig. 1). The stands of susceptible varieties are seriously reduced by the fourth or fifth year.

The best way to diagnose alfalfa wilt is to examine the roots. Wilt-infected plants have a yellow to dark brown ring under the bark of the root as compared to a white color of the same tissues in healthy

Fig. 1. The stunted, light colored plant in the foreground is dying from bacterial wilt.

roots (fig. 2). In the earlier stages of the disease the yellow color occurs only in narrow streaks but as it progresses the streaks broaden and merge into a continuous yellow to brown ring and eventually the entire root interior may become yellow.

Cause. Wilt is caused by a bacterium (*Corynebacterium insidiosum*). The causal bacteria can enter the plant only through wounds. The alfalfa root is subject to many injuries such as those caused by alternate freezing and thawing, insects and by mechanical equipment during harvesting. Whenever the disease organism is present it is readily carried into wounds. Irrigation greatly favors the disease because the water can distribute the disease organism throughout the field and the excessive moisture is ideal for the survival of the bacteria. Alfalfa fields on dryland are seldom materially affected by this disease.

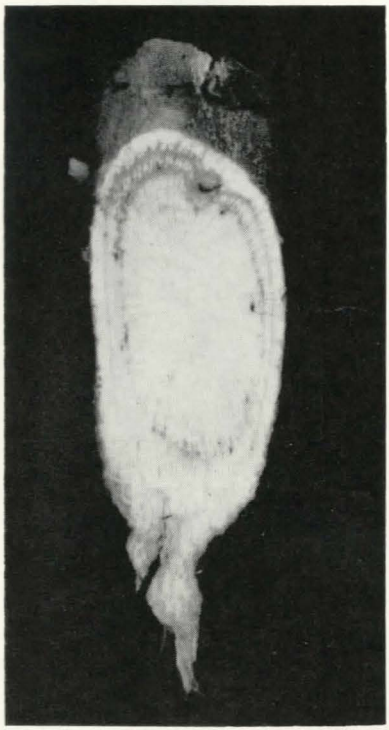

Fig. 2. The internal dark ring in this diagonally cut alfalfa root is a typical symptom of alfalfa wilt.

Once the bacteria are in the plant, they become established within the vascular system (the tissues which transport food and moisture in the plant). Here they multiply to such great numbers that they plug the vascular system. This causes the plant to wilt and die. Following death, the roots decay and the bacteria are released into the soil where they may be carried to new infection sites by wind or water.

Control. Planting resistant varieties is the most effective means of controlling bacterial wilt of alfalfa. Presently recommended wilt-resistant varieties are Ranger and Buffalo.

ROOT ROTS

Symptoms. Various plants in an established stand wilt and die (much like those affected by bacterial wilt). Upon examination, portions of the root are found to be badly rotted. The deterioration may begin in the crown and extend down the central portion of the root, or the root may rot off lower down (fig. 3). The rotted tissues are brown to black.

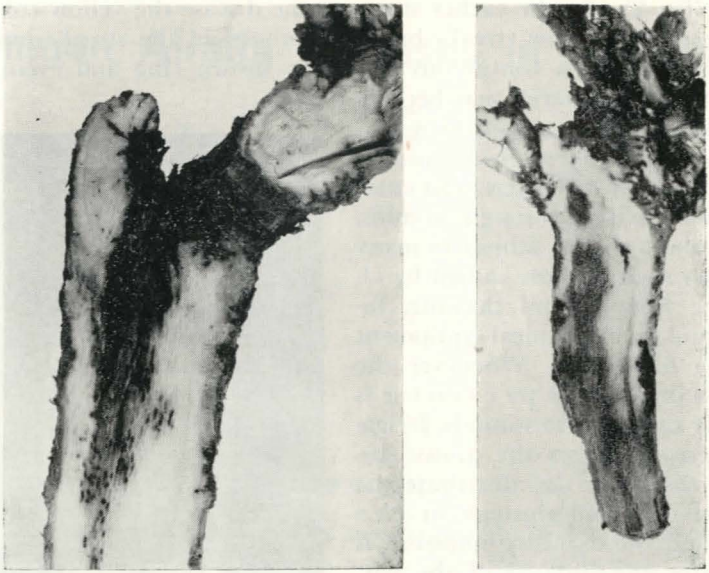

Fig. 3. Two types of alfalfa root rot: at the left the disease is entering from the crown, but at the right it is entering from further down on the root. (Photo courtesy of Dr. E. F. Erwin, University of California.)

Cause. Several soil-borne fungi are capable of causing alfalfa root rot. Apparently the ability of the root rot organisms to attack is associated in many instances with plants weakened by unfavorable winter or summer conditions. The plants are usually attacked before they resume growth after winter or summer dormancy.

Control. No control measures are known.

LEAF SPOT

Symptoms. This disease is manifested by small, circular, brown spots which appear on the leaves (fig. 4). When the spots become numerous, the leaves turn yellow, die and drop from the plant. During seasons of moist weather leaf spot diseases may cause excessive defoliation. The lower leaves are the first to drop and the disease moves upward progressively on the plant, gradually causing most of the leaves to fall.

Cause. There are several fungi capable of causing leaf spot in alfalfa, *(Pseudopeziza medicaginis, Pyrenopeziza medicaginis,* and *Stemphylium sacrinaeforme*). The life habits of these various leaf spot fungi are essentially the same. The fungus invades the leaf tissue,

causing it to die. The disease organism does not necessarily die out following the death of the leaf but may remain alive throughout the winter in these tissues. The next spring, the organism produces spores (fungus seed) which are carried by air currents to the young alfalfa leaves. In the presence of moisture the spores germinate, producing

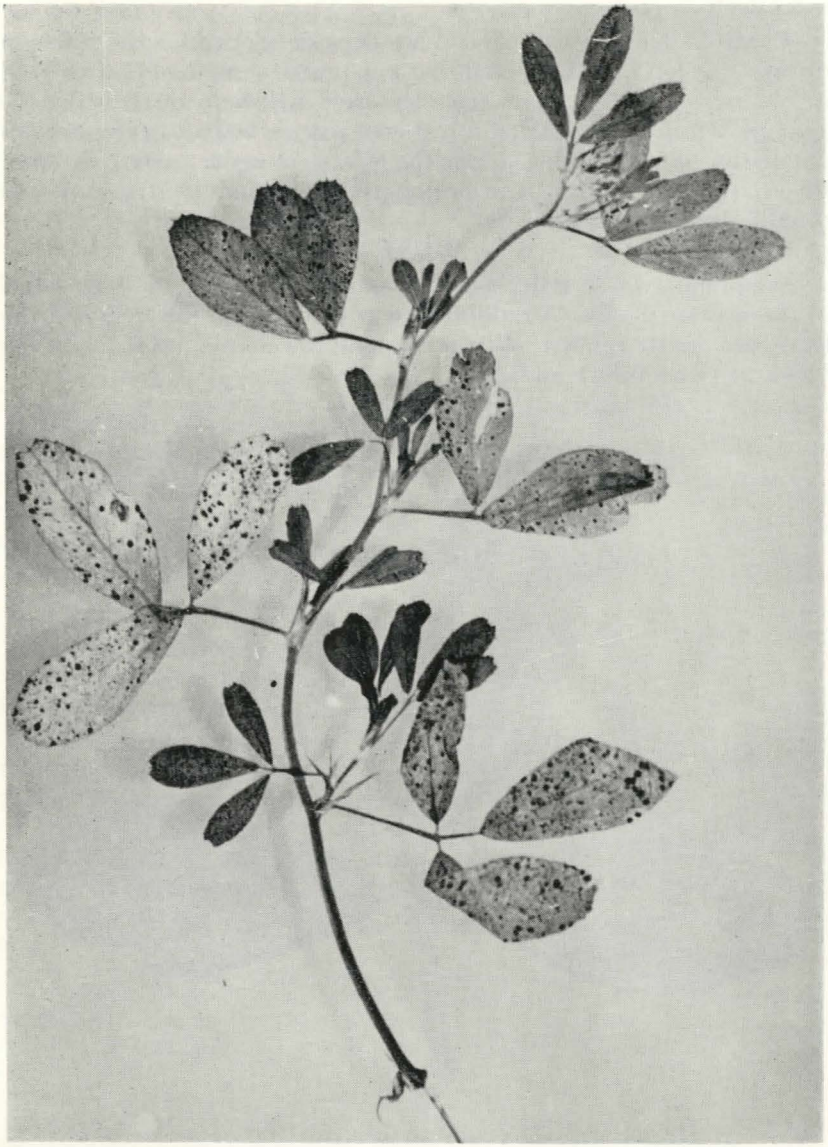

Fig. 4. Alfalfa leaflets showing numerous dark spots caused by a leaf spot disease.

an infection tube which enters the leaf tissues. From this initial infection a fungus body grows and feeds upon the cells of the alfalfa leaf with the infection finally manifesting itself as a brown spot.

Moisture is a very important factor in the development of alfalfa leaf spot. During very dry seasons the disease is not noticeable but during periods of excessive moisture it can develop very rapidly and extensively.

Control. No effective control has been developed for the leaf spot diseases. It has been suggested that any practical method that will aid in removing infected leaves from the field will help in reducing the amount of infection. When a leaf spot disease starts to cause serious defoliation it is advisable to cut the alfalfa in order to save as many leaves as possible. Except in prolonged wet periods this practice will usually check the disease.

RUST

Symptoms. Dark reddish-brown spots develop on the leaves late in the season (fig. 5). A reddish dust will collect on the fingers if the leaves are gently rubbed. When the spots are numerous, many of the leaves will turn brown and die.

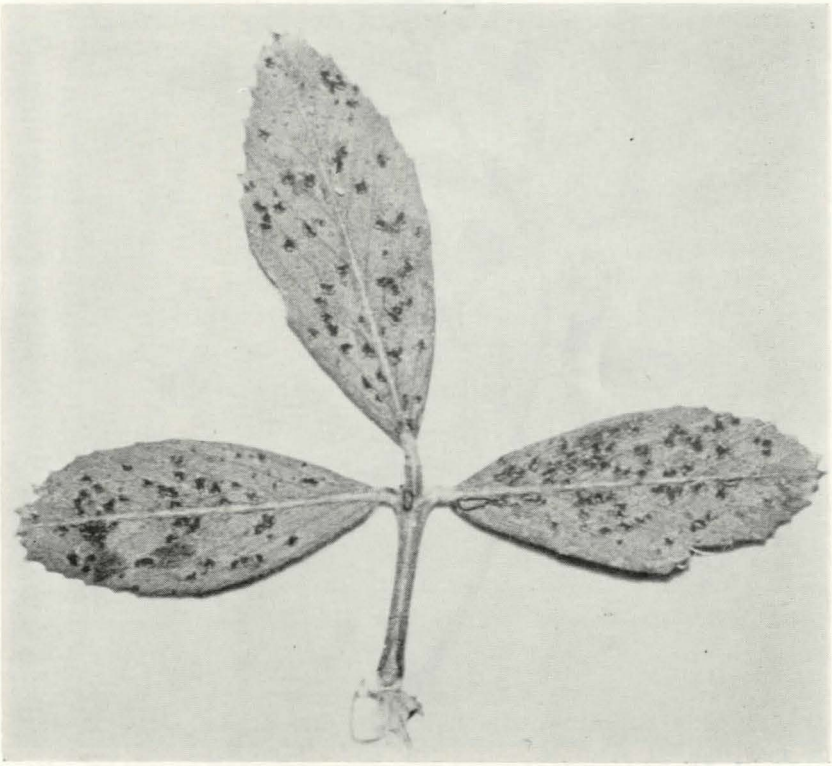

Fig. 5. The small, dark pustules on this alfalfa leaf were caused by rust.

Cause. This disease is caused by a fungus *(Uromyces striatus)*. The reddish material in the spots is a mass of spores of the rust fungus. These spores are caught in air currents and carried from plant to plant and field to field. When they are deposited on alfalfa foliage and free moisture is present, they may germinate and cause infection.

Rust is not able to survive during the winter in Nebraska but can survive in southerly portions of the United States. During the spring and summer, the spores are carried northward, generally arriving in Nebraska about September. This disease is usually not a serious problem in forage production in this state but can cause trouble for seed producers.

Control. There is no practical control for rust.

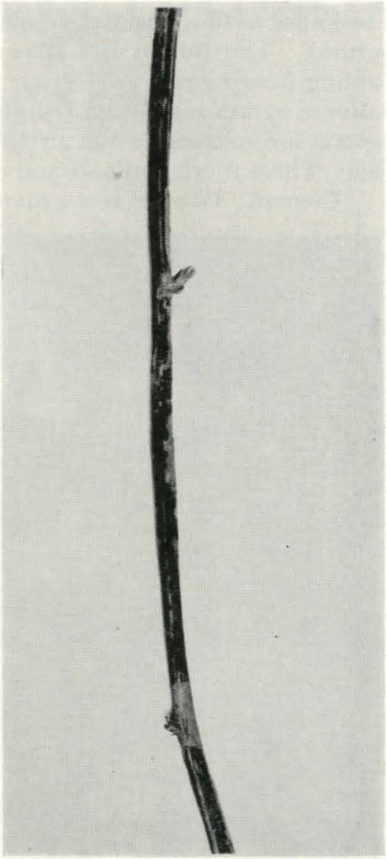

Fig. 6. The black lesions on this alfalfa stem are caused by black stem disease.

BLACK STEM

Symptoms. Black areas appear on the alfalfa stems (fig. 6). When the disease is severe the entire stem turns black and young shoots are killed. Black spots may develop on the leaves and if numerous, they cause the leaf to die and drop.

Cause. This disease may be caused by several different fungi. The disease organism continues to live in the old dead leaves and stems during the winter. In the spring, spores are produced which are carried by air currents to the growing alfalfa. Cool temperatures and moist conditions favor infection and development of the disease.

Control. Mow or graze affected fields before severe foliage damage occurs. The regrowth will probably have much less of the disease.

DOWNY MILDEW

Symptoms. Light green leaves appear, especially at the tip-end of the stem (fig. 7). Upon close examination, a grayish white mold can be seen upon the surface of the affected leaves. Infected stems are reduced in size and the leaflets frequently are twisted and curled. The leaf tissues may eventually collapse and die.

Cause. This disease is caused by a fungus *(Peronospora trifoliorum).* The fungus can remain alive in the crown buds, thus enabling it to remain alive from season to season. It may also remain alive as spores in previously infected dead tissues. In the spring, these spores are released in the air where they can be carried to alfalfa foliage. There they germinate and cause infection.

Control. Control is the same as for leaf spot.

Fig. 7. The upper leaves of this plant have become whitish from mildew. (Photo courtesy of U.S.D.A.)