



**FORAGE CROP
DISEASES**



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FORAGE CROP DISEASES

Introduction

Forage legumes and grasses like other crop plants are hosts to several diseases. For example in North Carolina at least 12 diseases are known to occur on alfalfa, seven on Ladino clover, six on lespedeza, five on orchard grass and four on tall fescue grass.

Some North Carolina farmers have suffered heavy losses from forage crop diseases and diseases can be expected to become more abundant and cause greater destruction in areas where there is a concentration of the crops they attack. Unfortunately, the conditions which favor the growing crop are often the same ones which favor the development and spread of the diseases which attack and destroy it.

What Causes Diseases?

Bacteria, fungi, viruses, nematodes and parasitic seed plants all cause diseases of forage legumes and grasses, with the fungi producing the greatest numbers. Diseases can be grouped as follows:

1. Seedling diseases which damage and sometimes destroy newly established stands.
2. Foliage diseases which reduce forage value and weaken plants.
3. Root, crown and stem diseases which damage and sometimes destroy plants in established stands.

What Effect Does Weather Have on Disease?

Weather conditions, especially temperature and moisture, largely determine the destructiveness of diseases. They are responsible for a disease being of epidemic proportions one season and of minor consequence the next. Unfortunately, weather conditions in North Carolina favor the development and spread of certain forage diseases the year around.

Can Diseases Be Controlled?

Forage diseases, like most other plant diseases, can be controlled. The selection and breeding of forage legumes and grasses

resistant to one or more diseases is the most effective method of control. Disease resistance has already been incorporated into some of the improved forages grown in the United States.

Crop rotation is an important method of reducing damage from soil-borne diseases.

Management through proper grazing and cutting practices also is an effective means of checking the damage caused by certain diseases.

The use of fungicides as sprays, dusts and seed treatments have not been widely recommended for forage crops. In North Carolina no general recommendations have been made for their use as no evidence has been obtained to show that they effectively control any of the major forage crop diseases which occur in the state.

Major Diseases in North Carolina

Crown and Stem Rot

This disease is caused by *Sclerotinia trifoliorum*, a fungus widespread in most soils. Alfalfa, crimson clover, Ladino clover and medium red clover are very susceptible. Lespedeza, cotton, corn, wheat, oats and grasses are among the crops not attacked.

The disease is most destructive during the winter months on new seedlings of alfalfa and clovers. It develops and spreads rapidly during cool, wet weather and can be easily recognized by the scalded circular patches of dead and dying seedlings in affected fields.

The fungus produces small, black, tough bodies about the size of wheat kernels after it has destroyed the plants. These kernel-like bodies carry the fungus through the hot summer months which are unfavorable for its growth. They germinate during the fall months when the weather again is cool and wet. Small inconspicuous, toad-stool-like structures which develop from them produce the spores or seeds of the fungus. These spores re-infect plants and start the disease off each year.

Rotations, using crops not attacked by the fungus, are an effective way of holding the disease in check. When susceptible plants are not available for the fungus to attack it dies out in the soil.



Crown and stem rot on crimson clover.



Crown and stem rot on alfalfa.



Kernel-like bodies and toadstool stage
of crown and stem rot fungus.
(Entire structure about size of dime)

Rhizoctonia Blight

This disease is caused by *Rhizoctonia solani*, a fungus widespread in most soils. It is known to attack many crop plants. Of the forage legumes and grasses it is especially destructive as a foliage disease on big and birdsfoot trefoil, alfalfa, lespedeza, and tall fescue grass.

The disease is most severe during the summer months. It develops rapidly during periods of hot, humid weather and can be easily recognized by the blighted and wilted foliage in areas where growth is dense and rank.

Management through proper mowing or grazing practices is an effective means of holding the disease in check as it is retarded in development when exposed to direct sunlight and good air drainage.

Southern Blight

This disease is caused by *Sclerotium rolfsii*, a fungus widespread in most soils. It is known to attack many crop plants and of the forage legumes Ladino clover, lespedeza and alfalfa are susceptible.

The disease is most severe during the summer months. It develops rapidly during periods of hot, humid weather and can be easily recognized by the blighted and wilted plants covered near the ground level with a white, cottony growth on which small brown seed-like bodies are present.

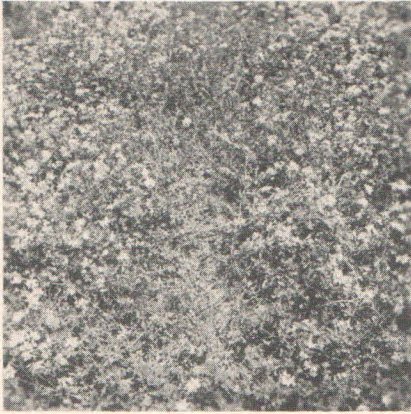
Management through proper mowing or grazing practices is an effective means of holding the disease in check as it is retarded in its development when exposed to direct sunlight and good air drainage.

Bacterial Wilt

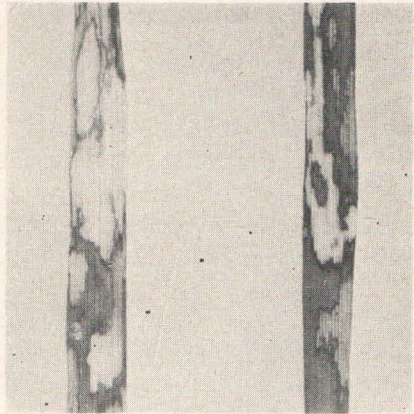
This disease is caused by a bacterium, *Corynebacterium insidiosum*. It is known to occur in the soils in the mountain region of the state and is destructive only on alfalfa.

Individual plants in second and third year fields appear yellow and sickly during the spring months and soon die. Stands frequently become so thinned and depleted by the third year that they are no longer worth maintaining.

Bacterial wilt can be controlled by using wilt resistant varieties of alfalfa. Buffalo, a variety recently developed, is well adapted to the area of the state where bacterial wilt is known to occur.



A



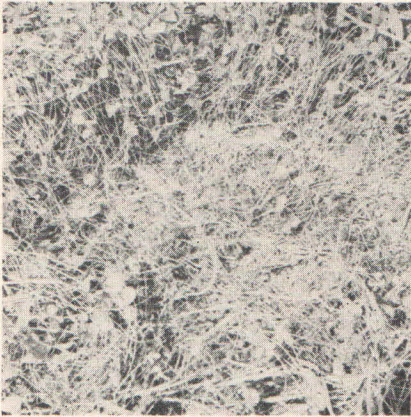
B

A—Rhizoctonia blight on big trefoil.

B—Rhizoctonia blight on tall fescue.

C—Southern blight on Ladino clover.

D—Cottony growth and seed-like bodies of the Southern blight fungus.



C



D

Leaf and Stem Diseases

These diseases are caused by many different fungi and are extremely common on all forage legumes and grasses. They cause severe damage to the foliage with subsequent reduction in the grazing or hay value. Diseased plants become weakened and may later die from drought, cold and normal grazing or mowing. The following leaf and stem diseases occur most commonly :

Alfalfa

- Downy mildew—*Peronospora trifoliorum*
- Leaf spot—*Pseudopeziza medicaginis*
- Leaf blotch—*Pyrenopeziza medicaginis*
- Black stem—*Ascochyta imperfecta*
- Summer black stem—*Cercospora zebrina*
- Anthracnose—*Colletotrichum trifolii*
- Rust—*Uromyces striatus*

Ladino Clover

- Bacterial blight—*Pseudomonas syringae*
- Pepper spot—*Pseudoplea trifolii*
- Leaf blight—*Curvularia trifolii*

Crimson Clover

- Sooty blotch—*Cymadothea trifolii*

Red Clover

- Powdery mildew—*Erysiphe polygoni*
- Zonate leaf spot—*Stemphylium sarcinaeforme*

Tall Fescue

- Net blotch—*Helminthosporium dictyoides*

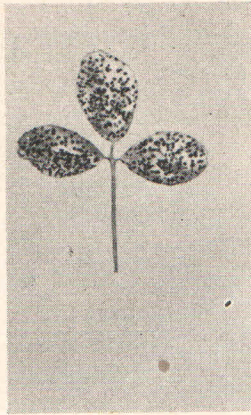
Orchard Grass

- Brown strip—*Scolecotrichum graminis*
- Leafspot—*Stagonospora maculata*
- Rust—*Uromyces dactylidis*

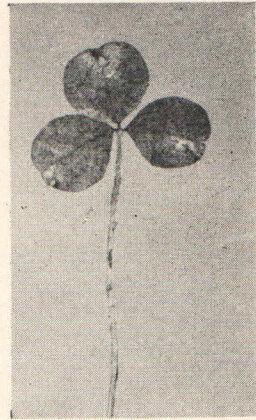
These diseases can be held in check by proper management practices. When affected fields or pastures are mowed or grazed before severe foliage damage occurs, no great loss results and the regrowth of the respective legume or grass will have less disease.



A



B



C

A—Downy mildew on alfalfa.

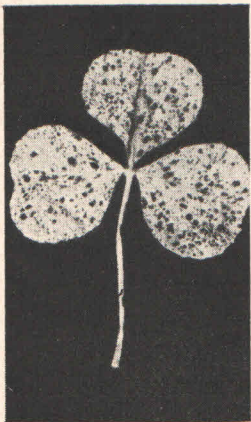
B—Common leaf spot on alfalfa.

C—Pepper spot on Ladino clover.

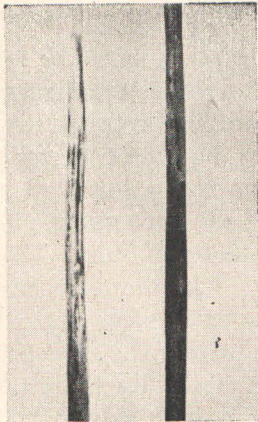
D—Sooty blotch on crimson clover.

E—Net blotch on tall fescue.

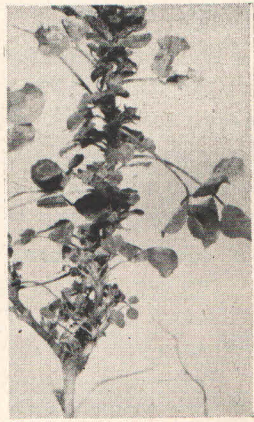
F—Stem nematode on alfalfa.



D



E



F

Root Rots

Root rots as diseases of forage legumes and grasses are caused by several fungus pathogens. Established stands of alfalfa are frequently severely depleted by root rotting fungi. *Fusarium spp.* and *Rhizoctonia solani* occur commonly throughout the Piedmont and Coastal Plain areas. Violet root rot, caused by the fungus *Rhizoctonia violacea*, is a common disease in established alfalfa fields in the mountain area.

No control methods are known for any of the root rots, although rotation and proper cultural and management practices are beneficial in maintaining stands.

Root Knot

Root Knot is caused by *Meloidogyne sp.*, a nematode widespread in most sandy soils in the state. It is known to attack many crop plants and of the forage legumes, lespedeza and Ladino clover are very susceptible.

Disease symptoms are easy to detect as top growth of infested plants is yellow and stunted in appearance and the roots of such plants have knots or galls.

Rotation using crops which the nematode does not attack is an effective means of depleting populations in infested soils. Resistance to the nematode has been incorporated into Rowan, a recently developed variety of Korean lespedeza adapted to the major growing areas of the state. Ladino clover is so susceptible to root knot that it should not be planted on nematode infested soils.

Dodder

Dodder, *Cuscuta arvensis*, a parasitic seed plant is widespread in the state and attacks forage legumes especially when they are being saved for a seed crop. Lespedeza is very susceptible. Frequently entire fields can be seen covered with the bright yellow dodder vine which saps its entire food supply from the plant upon which it is attached. Such fields yield materially less hay or seed than uninfected ones.

Dodder seed is carried in the seed lots, hay and manure of infected legumes. Once introduced into the soil it will persist for several years even without a susceptible host.

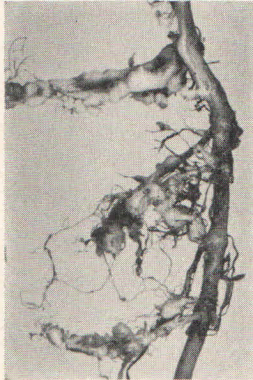
Rotation using crops which are not attacked by dodder checks its spread but susceptible legumes should not be replanted on known infested land for several years.



Alfalfa field in the mountains showing areas where all plants have been killed by the violet root rot fungus. Alfalfa should not be replanted in infected fields for a period of 4 to 5 years.



Root rot
on alfalfa.



Root knot on
Ladino clover.



Dodder on
Lespedeza.

Other Diseases

Other diseases are known to occur on forage legumes and grasses in North Carolina. They at present, however, are of minor economic importance. It is entirely possible that as acreage of forage crops increases, certain of these diseases may develop in importance.

Management is the key . . .

Good management is the best way to reduce losses from forage crop diseases. Proper grazing and cutting practices are an effective means of checking the damage caused by certain above-ground diseases. Crop rotation is an important method of reducing damage from soil-borne diseases. Management is the key in forage disease control.

