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# G80-488 Spring and Summer Black Stem Diseases of Alfalfa (Revised June 1992)

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# Spring and Summer Black Stem Diseases of Alfalfa

**Spring and summer black stem of alfalfa, their causes, symptoms, and control are discussed.**

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Of the two black stem diseases found in the central and northern Great Plains, spring black stem predominates summer black stem. Both are damaging when weather conditions favor their development. Although their symptoms differ, each causes spotting and darkening of stems and spotting of leaves.

## Spring Black Stem and Leaf Spot

### Cause

Spring black stem and leaf spot is caused by the fungus *Phoma medicaginis* var. *medicaginis*. This fungus survives the winter as pycnidia or dormant mycelium in overwintered stem lesions or fallen leaves.

### Symptoms

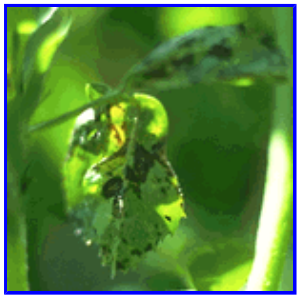

**Figure 1. Dark irregular lesions of spring black stem. (13K JPG)**

Symptoms occur primarily on stems and leaves but seedpods, crowns and upper taproots also may become infected. In spring small black spots develop on leaves, petioles and stems of new shoots. The leaf lesions are irregular, and enlarge and merge until much of the leaflet is covered (*Figure 1*). Infected leaves yellow and drop from the plant. Lesions on stems and petioles turn black. As stem lesions enlarge and merge, most of the stem becomes black (*Figure 2*). If the stem is girdled by the advancing lesions, it will die. The fungus also can invade the plant base and cause the crown and upper taproot to rot.

### Conditions Favoring Disease Development

Pycnidia form in abundance in infected stems during late fall and early winter. In spring during wet weather spores are produced inside the pycnidia. As they ooze from the pycnidia, they are splashed by rain onto the

leaves, petioles and stems of newly emerged shoots. The new shoots become infected as they grow through the residue from the previous year's crop. Some spores may be spread by wind and insects. The fungus often may be found at the feeding sites of the root curculio insect. The foliage must be wet from dew or rain for infection and spread to occur. The disease continues to move upward in the canopy if cool, wet weather persists through spring.

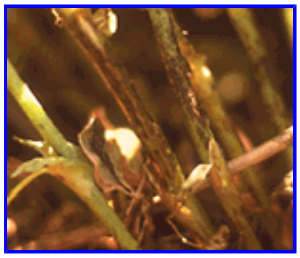

**Figure 2. Darkening of stems caused by spring black stem. (24K JPG)**

The fungus also is carried in the seed. A seedling blight can occur when infected seed is planted. The disease will often spread from these seedlings to nearby healthy seedlings. Early seedling loss creates stand establishment problems.

Spring black stem and leaf spot is usually a problem only on the first cutting. Regrowth from this cutting may become infected but disease severity is generally light. If environmental conditions between mid-April and mid-June are favorable (cool and wet) for disease development, plants may become defoliated before cutting. When severe, as much as two-thirds to three-fourths leaf defoliation can occur which results in the first cutting being primarily stems. This not only reduces yield but significantly lowers the quality of the hay.

Spring black stem is present in Wyoming each year and may be particularly severe at higher elevations (> 5000 ft). In Nebraska the disease becomes severe after cool, wet weather.

**Control**

Early cutting is recommended if spring black stem and leaf spot is prevalent on the lower portion of plants. Scout fields weekly in spring to determine the extent of disease development. Decide whether to cut early based on the results of scouting fields and weather forecasts. Don't delay the decision to cut early, otherwise most of the leaves may have been lost by harvest. Ideally, one-tenth bloom is the optimum growth stage for harvesting while maintaining forage quality and limiting premature leaf loss due to disease. If the field is recovering from winter injury, it may be necessary to delay the first cutting at the risk of foliage loss to spring black stem and leaf spot.

A few moderately resistant cultivars have been developed. Multi-resistant cultivars with a high level of resistance to spring black stem and leaf spot should soon be available.

Alfalfa stands are sometimes burned in early spring to control alfalfa weevil. This practice also has been shown to reduce the inoculum of spring black stem. Grazing the aftermath after a hard freeze in the fall, which is frequently done in Wyoming and Nebraska, also should reduce pathogen inoculum.

Using certified seed produced in arid areas will insure maximum stand establishment and reduce the chance of seedling blight caused by the spring black stem fungus.

## Summer Black Stem and Leaf Spot

**Cause**

Summer black stem and leaf spot is caused by the fungus *Cercospora medicaginis*. This fungus is most active in the warm, humid regions of the United States and occurs every year in the eastern half of Nebraska. *C. medicaginis* survives as dormant mycelium in infected stems and leaves.

**Symptoms**

The most obvious symptom is premature leaf defoliation starting with the lower leaves and progressing

upward in the canopy. The leaf spots, which develop before the stem lesions, are ash-gray and roughly circular. These are quite distinct and once you are familiar with them they can easily be distinguished from those of other leaf spot diseases.

Lesions on the stem are long and range from a reddish brown to a chocolate brown. Sometimes infection of the stems is severe enough to kill the stem.

**Conditions Favoring Disease Development**

In the central Great Plains, summer black stem rarely causes losses to the first cutting but can be a problem in the second and third cuttings. Warm-to-hot, wet or humid weather favor disease development. When the humidity approaches 100 percent in the plant canopy in July and August, plants become infected by spores produced on the previous crop residue. Wind and water (rain and irrigation) spread the fungus spores. Secondary spread occurs within the plant canopy on infected leaves and stems.

As with most leaf and stem diseases of alfalfa, losses are greatest if harvest is delayed until full bloom. Summer black stem and leaf spot can develop rapidly the final week before harvest.

This disease is usually not severe enough by itself in Nebraska to cause economic loss. However, in the presence of other leaf diseases, the combined severity may cause substantial loss of forage. Summer black stem has not been identified in Wyoming.

**Control**

Scout fields regularly during the growing season to provide sufficient warning of pending summer black stem and leaf spot problems far enough in advance to adjust cutting schedules. Adjusting the cutting schedule to disease development is the most practical and economical means of control in established stands.

A copper hydroxide fungicide can be applied 10 to 14 days or earlier before harvesting the second and third cuttings. This method can prevent some disease problems, but it may not be economical for the grower.

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