CURRENT DISEASE PROBLEMS IN ALFALFA

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Alfalfa is attacked by many fungi, bacteria, viruses and nematodes which USDA estimates reduces hay yields by 24% annually. Even greater losses occur in Kentucky. However, it is the diseases of the root and crown which cause the greatest damage because they limit the number of years a stand can remain productive.

Every alfalfa stand has its share of diseases and few plants in any field are without some disease. Actually, most plants are colonized by several pathogens at the same time. Which pathogen dominates at any one period depends primarily on plant vigor, temperature, moisture and stand management. Thus, the extent of damage to a stand from disease should be reducible through proper management. However, growers have few tools to reduce these diseases after they start causing major damage. Instead, the diseases must be kept in check by using preventative tools like crop rotation, proper cutting intervals, using disease tolerant varieties and good site selection. There are no chemicals cleared for stands which have serious disease problems.

Below is a discussion of a few of the most important diseases currently occurring in Kentucky with a few remarks on some diseases important elsewhere in the U.S.

Spring Black Stem

During the past few years, Spring black stem has become a very significant disease of alfalfa in Kentucky. Typically, it occurs during the cool, wet periods of Spring and Fall causing small irregular black spots on the leaves, petioles, and stems. The leaves turn yellow and drop. Stem lesions are dark green at first; but turn black with time. Stems may become girdled by these lesions and die.

Extensive defoliation has been associated with this disease in Kentucky during the last two seasons. We find the pathogen causing Spring black stem to also be associated with diseased crowns and suspect that the disease plays a major role in finishing off plants that have been weakened by other pathogens. Studies in California have shown that this pathogen is associated with the crown year around and moves to the stem and leaves during cool, humid periods.

At present, about all we can recommend to reduce the impact of this disease is:

References

1) Early cutting of the stand to reduce leaf loss. This also reduces humidity and allows drying of the crown. Our observations indicate greatest damage occurs to both hay quality and crowns when cutting is delayed significantly. This is especially common in Kentucky with the first cutting because growers are involved with other crops and forget their forages. Plus, poor hay making weather frequently prevails at that time of year; yet such weather greatly favors this disease.

2) Varieties which perform well in Kentucky tests at Princeton and Lexington differ little in their susceptibility to Spring black stem.

3) Foliar fungicides show some promise for use against this disease, but none are labelled to date.

4) Avoid poor quality seed because this pathogen is carried on the trash with the seed. Instead, use certified seed produced in dry climates.

**Rhizoctonia Root and Crown Rot**

Rhizoctonia is common to all soils in Kentucky and becomes a problem in our alfalfa stands during hot, humid periods, especially when soil moisture is also high. We saw very little damage from this disease during the drought year of 1980, but it accounted for major damage during the wet years of 1979 and 1981. The disease appears in patches within a stand and a range of plant symptoms may appear on a variety of different plants within the same areas. Some plants appear scalded while others appear stunted. Above ground the disease appears on the buds, crowns, and stems causing water soaked rot that turns black with time. Leaves appear matted together. Alfalfa roots have circular to elliptical lesions associated with the points of lateral root growth from the tap root. These lesions are yellow to brown at first, but become black with time.

This may be our most difficult alfalfa disease to manage in Kentucky, because so few tools are available to control it. No resistant varieties are available for our area. About all we can do at present is watch the stands, especially during hot, humid weather, and cut early if the disease is active in the ground. The disease is favored by excessive nitrogen, so avoid additions of manure to alfalfa, especially during hot, humid weather.

**Southern Anthracnose**

Southern anthracnose is a warm weather disease that led to serious damage to alfalfa stands in 1980 because the fungus entered the crows causing heavy damage to the crowns. Spread of the disease to the crowns occurs when water from dew or rain favors spore release and spores are spread to the crowns during cutting. Apparently, during these dry periods plants were unharmed. Yet, during these dry periods plants were able to resist the advancing infections and entire crowns were destroyed. Many stands throughout Kentucky were damaged heavily by this disease at that time.

Typically, anthracnose is more common as a stem canker manifested by the presence of bleached, bent, dead, young shoots scattered around the fields. Close observation of these diseased stems should reveal a diamond-shaped lesion with small pepper-like spots inside the lesion. However, the crown infections are characterized by sudden death of many of the stems from a crown with the lesions in the crown appearing as a dry rot, stained abundantly with blue to black specks of the fungus. As the lesions advance into the root, the tissue turns brick red. Stems emerging from such crowns are usually dead and appear to have been bleached except for being blue-black at the base. Such stems are brittle and easily break from the crown.

Good management tools exist for this disease in that excellent resistance is available in varieties which are performing well in Kentucky tests. Arc, Classic, Olympic, Saranac-AR, and Vanguard are varieties with good resistance to this disease that are performing well in University tests. A new race of this fungus, however, has appeared in some areas of the U.S. to which these varieties do not resist. But that race has not yet been detected in Kentucky. With crops other than clover or alfalfa for two to three years, greatly reduces the fungus in the stand. However, inoculum is moving into our fields probably from nearby pastures. We strongly suggest that growers use resistant varieties to manage southern anthracnose, a major disease threat to Kentucky stands.

**Phytophthora Root Rot**

Phytophthora root rot is a disease associated with wet, poorly drained, and poorly managed alfalfa stands. Although the causal agent is common in our soils, we seldom find it causing serious problems on good managed alfalfa sites. However, since the fungus is common to our soils, the potential for damage exists during unusually wet seasons and poorly drained spots of otherwise good alfalfa fields.

This is a disease of the root system where the pathogen attacks the tap root causing reddish brown lesions that later turn black and girdle the root. Affected plants turn yellow and appear stunted and they die from drought stress, cold injury or occasionally even from the above ground attacks by this pathogen.

Phytophthora root rot can be controlled in Kentucky by using good cultural practices and resistant varieties where it has
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appeared previously. The resistant variety, Apollo, is the only resistant variety that has yielded well in Kentucky tests. Resistant varieties should be considered if Phytophthora root rot has been a problem in the particular field being used. However, no variety has juvenile resistance to this disease. So, cultural practices must be applied even with resistant varieties to avoid heavy losses from this disease during the seeding period. Avoid fields that are poorly drained and be aware of temporary wet sites on otherwise well drained fields. Deep plowing this disease.

Verticillium Wilt

To date, Verticillium wilt has been found only in areas north of Kentucky, especially on a line north of Pennsylvania, Northern Iowa, and Oregon. This is primarily a cool season disease so many feel it is unlikely that it can become a problem in Kentucky. However, the disease has recently been found to be seed-borne, so we should be watchful for it because the fungus could adapt since our climate is cool enough for the disease to operate during Spring and Fall months.

The no-till concept has been widely accepted in Virginia for corn and soybean production. However, alfalfa is still commonly established by plowing and tilling the soil into a fine seedbed. Each year many tons of productive topsoil is eroded by rainfall on these prepared seedbeds. The resulting gullies remain in the hayfield for the life of the stand to damage equipment and "rattle the teeth" of the operator.

Other advantages of establishing alfalfa without tillage quickly come to mind. Moisture in the seedbed is conserved for use by the new seedlings instead of being lost to the atmosphere after tillage. Time is saved during seeding because of the reduced number of trips across the field. Fuel conservation also results from fewer trips that require less power.

Research at Virginia Tech, as well as at other universities, has established several "musts" for establishing no-till alfalfa:

1. Living competition must be eliminated.
2. Plant debris tall enough to shade the soil surface must be removed.
3. Protection must be provided against a wide spectrum of insects.
4. Seed must be placed in the soil and no deeper than one inch.
5. Soil fertility and pH must be adequate.

Elimination of plant competition is dependent primarily upon herbicides. The general "recipe" being followed in Virginia is:

Apply 2,4-D if broadleaf plants are present. After 10-14 days apply Paraquat. After another 10-14 days apply Paraquat again. Seed 15 lb of alfalfa seed plus 15 lb of 10G granular Furadan per acre.

There are many variations of this general guideline, depending on the particular situation. For example, 2,4-D may not be needed if broadleaf weeds are not present. It may also be applied earlier than indicated, such as in fall prior to spring seedling or in the spring prior to summer seeding. The rate of Paraquat may vary from 1 to 4 pts. per application, depending on