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NEW MEXICO AGRONOMY TECHNICAL NOTE NO. 75

SUBJECT: ECS – NEW MEXICO AGRONOMY FIELD NOTE 1 - ALFALFA

Purpose: To distribute Agronomy Technical Note No. 75.

Effective Date: Maintain on web page.

Filing Instructions: Discard when noted.

Attached is Agronomy Technical Note 75. This technical note was compiled by Tom Collins, Soil Conservationist, Roswell, NM field office, as the first of a series of New Mexico Agronomy Field Notes. This tech note should be useful to soil conservationists working with producers in crop production and for those interested in preparing for Certified Crop Advisor certification.

GEORGE CHAVEZ
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Attachment

NM Crops

Alfalfa

General



Alfalfa has the highest forage value of all common hay crops. Alfalfa uses large amounts of water to produce high yields. Alfalfa is a drought resistant crop. It has a vast root system that can extend to moist soil and goes dormant during drought. Alfalfa is one of the few plants that exhibit autotoxicity. Alfalfa seed will not grow in existing stands of alfalfa. Alfalfa fields must be plowed down or rotated to another crop before reseeding. Alfalfa stand persistence is strongly influenced by winter hardiness, harvest frequency and pest resistance. A stand should be replaced when there are less than 5 plants per sq. ft. (40 stems per sq. ft.) The producer should rotate to another crop for at least 1 year before reseeding.

Winter Hardiness

Winter hardiness is influenced by Fall Dormancy (FD) and is rated from 1 (very dormant) to 9 (not dormant). Fall dormancy reflects both the short day and lower temperatures associated with cooler seasons. More dormant varieties (FD 1-3) green up later in the spring, and stop growing in the fall. Non-dormant varieties (FD 7-9) green up early and yield more with adequate water. They can be used in short term rotations (4

year) and are at risk for stand loss due to harsh winter conditions.

Planting

Alfalfa should be planted in early spring or late summer in well-drained soils. Soil pH must be 6.2 or higher for seedlings. Pre-planting phosphorus may be required. Seeding depth is $\frac{1}{4}$ to $\frac{1}{2}$ inch. Sow in spring as soon as danger of frost has past. Fall planting should be done at least 6 weeks ahead of the historic fall freeze date. Several irrigations in the fall will ensure a good stand. Drill seeding rates are 15-20 pounds per acre nationwide. Causes of seeding failure include: Low (acidic) soil pH, loose soil, high salinity and seeding too deep.

Harvest

Ideally, alfalfa hay is cut just as the field is beginning to flower and 10% of the field is in bloom. Forage growers frequently cut forages at a height of 3-inches or more. Shorter cutting height leads to higher yields. On established stands, cuts are usually made in 28-day cycles. Frequently cut alfalfa may not last as many years before the stand begins to thin. An average annual yield per acre in New Mexico is 4.9 tons.

Nutrients N-P-K

Alfalfa is a legume crop that can fix atmospheric nitrogen. A 5-ton/ac alfalfa crop will fix up to 250 lb/ac of nitrogen per year. Alfalfa has also been shown to be effective at reducing soil nitrate levels

with depth. Many New Mexico soils are so deficient in phosphorous that vegetative growth is affected. Phosphorus is most available in soils at a pH of 6.5. Most agricultural production in New Mexico occurs on soils with a pH between 7.2 and 8.2 which, greatly reduces available phosphorus. Most New Mexico soils contain enough potassium for crop production. In the past, it has seldom been necessary to add this nutrient. Soil test analyses for high pH soils are recommended to identify nutrients in the least supply.

Manure

Manure applied and incorporated, before seeding can increase essential nutrients used by alfalfa. Top dressing manure on established stands is not recommended because crowns can be smothered. Composted manure easily settles below the alfalfa canopy and provides the nutrients needed for improved crop production. Manure rate should be based on crop phosphorus needs and the nutrient content of the manure.

Diseases

Diseases include bacterial wilt (Bw), Fusarium wilt (Fw), Phytophthora root rot (PRR), and anthracnose (An). Bacterial and Fusarium wilt are water-conducting tissue infections of alfalfa's roots. These diseases prevent water flow to leaves, resulting in wilted shoots and, eventually, death of infected plants. Roots infected with bacterial wilt often will have a yellowish brown discoloration of the taproot's inner woody cylinder. Fusarium infection is recognized by brown to red streaks in the taproot's inner woody cylinder. Phytophthora root rot is a fungal disease associated with excessive soil moisture. This disease causes yellowish to brown

areas on roots and crowns that eventually become black and rotten. Top growth of infected plants appears stunted and yellow. Anthracnose, also caused by a fungus, attacks alfalfa stems, preventing water flow to the rest of the shoot and causing sudden wilting. These wilted shoots have a characteristic "shepherd's crook" appearance. Anthracnose also can cause a bluish black crown rot.

Insects

There are many insects that feed on alfalfa in New Mexico. Varietal resistance is available for spotted alfalfa aphid (SAA), pea aphid (PA) and blue alfalfa aphid (BAA). As with disease resistance, choose varieties that have at least an "R" rating for each of the insects. Varieties with resistance to insects that are not adapted to your area might not be preferred, due to a historical decrease in yield associated with the resistance. Another insect, cowpea aphid, has been found in alfalfa fields in several areas of New Mexico in recent years. Adult cowpea aphids are smaller than other common aphids. They are black with white or yellow markings on legs and antennae. Nymphs are gray to purple and can be confused with blue alfalfa aphid. Infestations can occur in early spring when alfalfa begins to grow. Plants are severely stunted; reducing first cutting yields and causing possible stand loss if not controlled.

Nematodes

Root-knot nematodes (southern, northern, and Columbia root-knot nematodes) probably have been an undetected cause of yield and stand reduction on many farms in New Mexico. Root-knot nematodes prefer sandy loam soils and rarely damage

alfalfa in heavier-textured soils. In addition to direct damage from these nematodes, a second concern is that they become an avenue for infection by other pathogens. High carry-over populations of southern root-knot nematodes from summer rotation crops, like silage corn, can cause serious damage to fall-planted alfalfa. Resistant alfalfa varieties are available for both southern and northern root-knot nematodes.

Stem nematodes also can be a serious problem in alfalfa. These nematodes infect crown buds after cutting if the soil is moist and humidity is high. Infected stems are stunted and have swollen nodes. The bud and leaf nematode, another nematode usually found with stem nematodes, can cause leaves to become distorted and turn white during warm weather. Both of these nematodes mainly occur in heavy soils. Stem nematodes have been reported in northern New Mexico, but don't seem to cause the serious problems found elsewhere in the western U.S.

Pasture



Alfalfa is the most widely used forage legume. When cattle are rotated from an alfalfa pasture, the pasture should be rested for 28-35 days. Continuous stocking is not recommended for good pasture health. Alfalfa has a high potential to cause bloat in livestock. Bloat is caused during digestion when

fermenting gasses in livestock are trapped in thick foam that does not allow the animal to burp up the gas. Death is normally due to suffocation. Alfalfa can cause bloat in the spring, summer, and fall. In the fall, bloat conditions are caused by frequent heavy dew or fall frost. As long as the plant remains green, there is potential for bloat. Forage maturity is the most significant contributing factor in bloat. The highest risk of bloat occurs when legumes are in the pre-bud or vegetative stage. Bloat is twice as likely to occur when plants are grazed at a height of 8 to 10 inches rather than at a height of 20 to 30 inches.

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Alfalfa field in the Shasta Valley near Yreka, California. Photo by Doug Wilson. ARS Image Number K7198-13

Cattle. Photo by Keith Weller. ARS Image Number K7649-6

Web Resources:

Utah State University plant disease site
<http://utahpests.usu.edu/plantdiseases/>

Kentucky IPM Pest Information Pages
<http://www.uky.edu/Ag/IPM/scoutinfo/alfalfa/disease/anthracn/alfanth1.htm>

Field Crop Diseases Information and Management for Illinois
<http://cropdisease.cropsci.uiuc.edu/>

Ohio State University College of Food, Agricultural, and Environmental Sciences (Fact Sheets)
<http://ohioline.osu.edu/lines/facts.html>

North Carolina Pest Management Web Page
<http://ipm.ncsu.edu/agdealers/fieldcrops.htm>

Diseases of Forage Crops, University of Wisconsin
<http://www.plantpath.wisc.edu/PDDCEducation/ScoutSchool/General/TofC.htm>