Drought Strategies for Alfalfa

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With continued dry conditions throughout New Mexico, farmers with alfalfa fields should consider several production strategies in order to preserve alfalfa stands for future years. Alfalfa, which has the ability to go dormant during extended dry periods, is one of the few crops that can recover once adequate precipitation or irrigation occurs (Fig. 1). As long as plant roots remain viable—white, moist and pliable—the alfalfa plant itself has a chance to survive. Some of the key production strategies to consider during drought in alfalfa include: cutting management, irrigation management (if available), insect control and fertilization needs.

Cutting management is the primary control for increasing stand during drought periods. Harvest frequency will not only determine alfalfa persistence but also the quality of any hay cut. Genetics and preconditioning of the stand can be factors in drought periods. Both of these variables interact to make yield, quality, stand persistence and harvest frequency. Thus, guidelines for determining if a cutting is feasible and if the plant will continue to grow and persist under field conditions are best made based on the plant's maturity stage and economic cutting heights. Although droughty alfalfa can be of high quality (generally quality does not drop initially but quantity does under drought situations), farmers need to maintain enough leaf material for the stressed plant to continue photosynthesis and root growth.

When similar maturity stages are compared, alfalfa produced under dry conditions will be higher in crude protein and digestible dry matter than under wet conditions. However, fiber levels, especially acid detergent fiber, will be lower. With higher feed values, livestock producers should adjust rations accordingly. Nitrates should not be a problem in alfalfa, but increased bloat is possible if livestock graze directly on alfalfa or if alfalfa is green chopped.

Figure 1. Alfalfa is New Mexico's most adaptable and largest crop with over 270,000 acres harvested annually.

Cutting during drought management is similar to dormancy management. Farmers need to keep enough top growth to maintain the plants and retain stands. If the crop is cut during drought, maintain at least 6 to 8 inches of top growth. This height allows continued root and plant functioning, so that the alfalfa can persist through the fall and winter.

If enough top growth is available to make cutting economical while maintaining height as the plant enters dormancy, cuttings can be managed based on when haying is the least stressful to the plants. Although hay is higher in quality when cut during the prebud stage, let

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alfalfa reach at least the 10 percent bloom stage before harvesting. Cutting during flowering allows plants to better handle the dry weather and cutting stress. However, waiting to cut may mean that increased scouting for flower-feeding beetles may be necessary. If areas of the field vary in development, base cuttings on the slowest developing plants in the field. Delayed cutting may decrease quality and number of cuttings. However, it will help encourage stand persistence and plant endurance during the drought. If stands have entered dormancy and top growth does not extend beyond the original 6 to 8 inches left from the first cutting, avoid cutting in order to allow the plants to survive the drought conditions.

Alfalfa can proceed into a dormant phase, which often allows many plants to survive even during drought. During dormancy, alfalfa stands require moisture. During drought, dormant alfalfa stands need 8 to 10 acre-inches of water for each ton of hay produced, depending on the texture, evapotranspiration and soil type as well as soil drainage features and other external climatic factors. This need also is affected by water quality. During a drought, salinity in water can worsen. As salinity increases in irrigation water and soil, additional water is required to meet growth demands. Although alfalfa grows better than most crops on low saline soils, yields can be reduced if poor quality district irrigation water or even more saline well water is used. Once stressed, alfalfa plants will stop growing stems, initiate flower buds and leave very limited stem and leaf growth for cutting. If irrigation or rainfall occurs after alfalfa has entered dormancy, buds developed on the short plants will break at the plant's crown. The result is two different growth stages on each plant. Varying stages among plants and on a single plant complicates cutting decisions, because farmers want quality and quantity. Where irrigation is available but limited, try to maintain stands based on water needs.

In alfalfa, summer irrigations should occur between cuttings, immediately after the hay is removed from the field (at least within 10-15 days after cutting). This helps promote plant maintenance even under stress and allows continued root development—the key to maintaining and retaining a persistent stand. In situations where district irrigation water or the more salty shallow well water is not available, maintain the 6- to 8-inch plant height across the field and allow plants to enter dormancy. Later rains may revive the plants prior to the cooling temperatures in fall and winter. But, if not, the top growth may help plants survive through the drought and into winter dormancy.

Another production strategy during drought is insect control. During a drought, rangeland insects may migrate into cultivated alfalfa fields in search of food sources. Leafhoppers, plant bugs and aphids can all add additional stress to the crop. With hot, dry weather, these insect populations increase rapidly. Monitor recently cut fields as increasing populations of these insects quickly damage new plant regrowth. Remember, too, that if cutting occurs after alfalfa is in bloom, it is necessary to scout fields for flower-feeding insects. If drought delays cutting until after the 10-percent bloom stage, plant quality may decrease and toxic beetles baled with the hay may increase, if present.

Scout for economic thresholds to determine if spraying for leafhoppers, plant bugs or aphids is necessary. Also, make sure the damage is from insects within a field. Although rare in New Mexico, dry weather also can cause boron deficiency symptoms that look similar to damage from potato leafhoppers. Boron leaf damage usually is restricted to the youngest leaves (at the top of the plant), while leafhopper yellowing is usually scattered over the entire plant.

Not only boron but other nutrients must be available to limit stress during drought. Modest topdressing can be applied prior to crop regrowth without causing too much additional salt stress. With most topdressing, rain or irrigation greater than 0.1 inch will dissolve the fertilizer material and dilute any salt effect from the fertilizer. If soil tests are not low in fertility, do not apply additional fertilizer. Established stands generally produce enough nitrogen after the seedling year to supply crop needs. Use soil testing on a three- to five-year basis in alfalfa to determine particular nutrient needs. Because plants cannot use as much fertilizer when they are drought-stressed, a farmer can limit nutrient additions during dry years.

To retain crop persistence in alfalfa during drought years, remember to consider key management techniques. Look at cutting management (height, timing and number), irrigation (if available), insect control and fertilization and optimize crop maintenance and growth during drought periods.

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