Grazing alfalfa requires top-notch management to ensure optimal stand persistence and animal performance. As with any high-value crop, greater economic return is generally achieved with a higher level of management. In this section, several strategies for achieving desired performance goals will be discussed. With the development of alfalfa cultivars selected specifically for grazing tolerance, some of the management emphasis on stand persistence is diminished, but persistence must remain a prime concern.

**Grazing Management for Stand Persistence**

Several factors affect stand persistence in grazed alfalfa. While some of these factors are similar to mechanically harvested fields, others are unique to grazing. Management considerations include, 1) proper soil site selection, 2) fertility management, 3) insect pests, 4) season of use, and 5) appropriate grazing management.

1) **Proper soil site selection.** As with alfalfa hay production, selecting well drained, naturally fertile fields will produce the best alfalfa grazing opportunities. Aside from the well-documented disease problems associated with wetter soils, the potential for stand damage through animal treading is greatly increased on soggy soils. Physical damage to both the roots and crowns may occur when stock graze alfalfa fields on saturated soils. Soil compaction resulting from grazing when too wet also reduces regrowth potential and stand longevity.

In designing a grazing system, build in flexibility to allow removal of the animals to grass sodded paddocks when the alfalfa paddocks become too wet to graze. On most farms, not every acre is suited to growing alfalfa. Plan to take advantage of that site limitation to provide buffer areas for wet-weather grazing. Including a grass with the alfalfa seeding will produce a more stable soil surface and reduce the risk of trampling damage. Open stand bunch grasses such as orchardgrass or timothy do not provide the
same degree of sod support as grasses such as tall fescue, reed canarygrass, or perennial ryegrass, where adapted. On sandy, well drained soils, the need for the companion grass is reduced.

2) **Fertility management.** Soil pH, phosphorus, and potassium levels all affect alfalfa establishment and persistence. Having proper soil nutrition at time of establishment and early stand development is equally important for hay production and grazing. Once the field is in production, fertility management of the two systems becomes very different.

When hay is harvested from the field, many pounds of soil nutrients are removed from the field. Typical figures reported include 10 to 15 lb of P$_2$O$_5$ and 40 to 60 lb of K$_2$O equivalent per ton of hay. While a six ton hay yield might remove 60 to 90 lb P$_2$O$_5$/acre and 240 to 360 lb K$_2$O/acre, a comparable dry matter yield in pasture may produce 800 lbs of beef per acre containing only 15 to 20 P$_2$O$_5$ and 5 to 10 lb K$_2$O. It is very evident that the removal of mineral nutrients from the field is relatively quite small in a grazing situation compared to hay removal.

The livestock do, however, have the capability of moving large quantities of nutrients around the field through uneven manure redistribution. Generally, greater than 90% of the minerals an animal consumes are excreted back to the soil. The redistribution is not uniform and tends to be concentrated around water, shade, and other preferred lounging areas. The lower the stock density, the farther the animals must travel to water, and the more isolated the shade locations, the more uneven the distribution becomes.

Research at the Forage Systems Research Center has shown that manure distribution is greatly enhanced when travel distance to water is limited to 600 to 800 feet and when stock density exceeds about 10,000 lb animal-liveweight/acre (Peterson and Gerrish, 1995; Gerrish et al, 1995). Designing systems with these parameters in mind will minimize the need for maintenance fertilizer in alfalfa grazing systems. Soils should be tested about every 3 years to ensure that target soil test levels are being maintained.

3) **Insect pests.** One of the greatest advantages that grazing alfalfa holds over hay harvest systems is the virtual elimination of alfalfa weevil as a significant pest. Grazing first growth alfalfa in the late vegetative and early bud stage allows the animals to consume nearly all weevil larvae before significant economic damage occurs. Combining grazing of first growth alfalfa with hay harvest of later crops is a very sound IPM strategy.

Damage by potato leafhoppers and several other lesser insect pests can be greatly reduced with timely grazing. Short grazing periods and high stock density may be even more beneficial in leafhopper control than it is for weevil control.

4) **Season of use.** The season of use for grazing alfalfa can be longer than that for hay harvest, if properly managed. In an area where September 15 is the last recommended hay harvest date, alfalfa may be grazed considerably later. The key difference is that whereas hay harvest removes all the leaf growth and regrowth energy must come from stored carbohydrates, grazing can be managed to remove only a portion of the leaf area. If adequate leaf growth is left below the grazing height, stress of fall harvest is minimal. To accomplish this strategy, a six to eight inch stubble height should be maintained. After killing frosts occur, the alfalfa may be grazed to a lower residual.

During dry periods, alfalfa often does not regrow to an economically harvestable yield level as hay and
part of the growing season is effectively wasted. Grazing can be used to salvage the value of that crop and can also stimulate new crown regrowth when moisture becomes available. Having the flexibility of grazing alfalfa fields greatly increases the utility of alfalfa.

5) **Appropriate grazing management.** Grazing management for alfalfa persistence can take two distinctively different avenues. The first is based on continuous stocking with a flexible stocking rate and is most appropriate for grazing tolerant cultivars. With this approach, the manager’s goal is to maintain an appropriate level of leaf growth to maintain plant vigor. As growth rate varies through the season, it is necessary to vary stocking rate to maintain a near constant grazing pressure. This may be achieved by increasing or decreasing animal number on the pasture or using a buffer fence to hold out some of the area for mechanical harvest.

The second approach is to use rotational stocking to regulate extent of defoliation and length of rest period. Management flexibility is also required in this system to allow different degrees of defoliation and regrowth depending upon performance objectives. With optimal growing conditions, alfalfa may be re-grazed with only 20 to 25 days of rest while environmentally stressful conditions may require rest period of 40 days or more. Typical mid-season rest period are in 28 to 35 day range.

**Grazing Management for Animal Performance**

While alfalfa is recognized as a high quality forage, there are situations where alfalfa fails to produce the expected animal performance. Understanding the morphology and growth habit of alfalfa is one of the keys to grazing it successfully. Using alfalfa in combination with other forages can result in better performance than either crop gives alone. There are several areas of concern regarding animal performance including, 1) bloat potential, 2) seasonal variance in quality, 3) day-to-day variance in quality, 4) complementary forages, and 5) appropriate supplementation.

1) **Bloat potential.** Bloat is probably the greatest single fear that livestock producers have about grazing alfalfa, as well as other legumes. This particular topic is dealt with extensively in another chapter of this proceedings so it is covered only briefly here. This is not to diminish the seriousness of the problem, but only to avoid redundancy.

Successful alfalfa graziers have reported several strategies for reducing bloat losses. Probably the most common recommendation is to seed a grass with the alfalfa to provide some other forage entering the rumen. Unfortunately we know very little about how much grass is necessary and if one species or variety is more effective than another in bloat reduction. A second common recommendation is to never allow the animals to stand hungry before turning them to a new paddock. From this perspective, set stocking alfalfa may be much safer than rotational stocking. Using multiple moves each day with a high stock density forces the stock to consume stems and leaves together which minimizes bloat occurrence. Avoiding moving stock when heavy dew or rainfall is fresh on the alfalfa has also been recommended. Many graziers do not rotate alfalfa paddocks until midday to avoid morning dews. On any given farm, on any given day, these strategies may or may not work.

2) **Seasonal variance in quality.** Alfalfa is of highest quality in the cooler times of the year including both spring and fall. With increasing summer temperatures, lignin content will increase and animal performance will decline. Keeping rest periods to the shortest acceptable length will help limit lignification. Seasonal
variances in quality will be most pronounced in continuously stocked pastures while quality may be more readily controlled in a rotational system through regulation of the rest period.

Infestation with potato leafhopper will also reduce forage quality. Keeping rest periods short and grazing at high stock density will help offset leafhopper impact. If leafhoppers remain in the stubble, post-grazing insecticide treatment may be necessary.

3) **Day-to-day variance in quality.** In continuously stocked pastures, forage quality is fairly similar from one day to the next while seasonal variances may be prominent. In rotational systems, seasonal variance is reduced, but daily variance may be very significant. If stock are rotated on a daily basis, the quality from one day to the next may be very uniform. As the length of the grazing period increases, the daily variance in nutrient intake also increases.

Livestock typically graze alfalfa from the top down. The first bite may be almost entirely leaf material and be exceptionally high in crude protein and low in ADF. Using rumen cannulated heifers to collect forage samples, it is not uncommon to measure protein levels higher than ADF levels. As the animals remain on a particular paddock for several days, the nutrient intake declines each day until on the final day the intake may be less than maintenance requirement (Morrow, et al., 1991).

4) **Complementary forages.** Alfalfa in the vegetative stage may be very high in degradable protein and low in fiber. Even though we may consider this to be very high quality forage, it may actually produce disappointing animal performance. Including grasses with the alfalfa in the pasture may enhance livestock performance. While pure alfalfa hay may produce better results than alfalfa-grass hay mixtures, the alfalfa-grass mixtures often produce better animal performance than pure alfalfa. This basic difference may be due to grasses in a pasture being grazed at much less mature stages than the same grass as a hay crop. Grasses with rapid regrowth potential such as orchardgrass, fescue, or ryegrass are better suited for pasture mixes with alfalfa than are slower regrowth grasses such as timothy or smooth bromegrass.

Companion grasses also benefit the animal through reduction of bloat potential and reducing potential mud problems. Some non-traditional forages such as crabgrass and quackgrass which are not popular as companion grasses in hay systems work well with alfalfa in grazing situations. Grazing alfalfa greatly increases the flexibility of management and opens broader horizons for livestock producers.

5) **Appropriate supplementation.** As with bloat, supplementation is discussed in detail in another chapter of these proceedings. While much research has focused on supplementation of low quality pastures, little work has been done on supplementation of high quality pastures. Due to the high crude protein, low fiber nature of vegetative alfalfa, the most appropriate supplements are likely to be high energy materials based on digestible fiber.

**Summary**

Paying attention to the details is what makes successful alfalfa grazers successful. Both plant and animal management need to be given balanced consideration in designing alfalfa based grazing systems. Many more opportunities exist for the alfalfa grazer compared to the producer limited to mechanical harvest systems.
Literature Cited

