# Forage-Livestock Research Progress Report

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# Some Management Considerations and Strategies for Grazing Alfalfa in the Bermudagrass Belt

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Alfalfa has been grazed by design or default ever since its introduction into the USA. Although alfalfa was originally planted by early colonists on acid soils in the humid climate of the Atlantic seaboard, it was not until the 1849 California Gold Rush when alfalfa showed adaptation and persistence to management and mis-management (Hanson, 1972). As alfalfa moved back to the east with information on soil-fertility, the most common use was for grazing dairy cows. Alfalfa is a highly nutritious forage for hay and grazing. Under the daily management of pastures for dairy cattle, alfalfa became the "forage-of-choice" and was grazed in various rotationally stocked systems. With the nutritive value and other forage attributes, alfalfa became known as the "Queen of Forages".

## Stocking Methods and Persistence

Numerous research articles and state extension Bulletins have recommended some method of rotational stocking to enhance persistence of alfalfa (Popp et al, 2000; Lacefield et al, 1997; Hall, 1994). Many of the earlier varieties of alfalfa that were developed primarily for hay production, were not persistent for more than 2 to 3 years under continuous stocking regimens. One of the first alfalfa varieties released for tolerance to grazing was 'Alfagraze' by Bouton et al, 1991. Although Alfagraze was initially selected under continuous stocking regimens, most all recommendations for Alfagraze and other grazing-tolerant alfalfa varieties includes a graze: rest rotational stocking method to enhance persistence.

Butler et al (2012) evaluated the effects on animal performance of a late-season rest period (August 1 termination) vs a full-season grazing system of continuously stocked alfalfa at the Noble Foundation in Ardmore, OK. Grazing-tolerant alfalfa cultivars included Alfagraze; 'Amerigraze 702', and 'Amerigraze 401+Z' and a conventional, hay type, 'Magnum V'. Stocker ADG ranged from 2.1 to 2.3 lbs/day, respectively, for the August termination or Full-season systems. Stocker gain per acre average for 3 years was 340 lbs/ac for August termination, and 400 lbs/ac for full season. At the end of the third grazing season there was no difference in percent alfalfa stand among the varieties or the grazing season. Between the end of the third year and beginning of the fourth year, however, more than a 50% stand loss occurred for all alfalfa varieties and systems.

Some of the rotational stocking methods that have been recommended includes some of the following examples:

- Active graze for 7-days and rest from grazing for 28-days in Georgia (Bouton and Gates, 2003).
- Graze for about 7 days with a 28- to 42-day rest period in Kentucky (UK ID-97; Lacefield et al, 1997).
- Active grazing for 1- to 2-days with an approximate 35-day rest for season-long grazing in Pennsylvania (Hall, 1994).

**Management Strategies for Graze: Rest Rotational Grazing**

The active grazing, initiation of alfalfa and the duration of deferment (rest) period are influenced by climate and environmental conditions; site and location; season of year; plant development stage for rotation; stocking rate; and management objectives for stand longevity and percent stand acceptable for stocking. The first-limiting factors to consider for initiating any grazing strategy for alfalfa in any climate or USDA Hardiness Zone includes site selection and acceptable soil pH-fertility; initial forage mass at initiation and termination of grazing cycle; and stage of vegetative growth and development before re-grazing is initiated. The "last or final" limiting factor for consideration in grazing alfalfa is the percent stand of alfalfa that is acceptable for the continuation of the stocking regimens. The challenge for grazing management is not **IF** there will be a decline in percent alfalfa stand, but **HOW** to delay stand loss, and at **WHAT LEVEL** of alfalfa stand is acceptable for stocking. Popp et al, 2000, concluded that improvements in cattle rate of gain were observed with only 35% percent stand of alfalfa in the pasture mixture.

Grazing strategies for prolonged stand maintenance of alfalfa have been based on plant growth and vegetative stage indicators used for hay harvest regimens. To enhance stand persistence and compromise on hay quantity and hay nutritive value, alfalfa is most-often harvested for hay between the 10% Bloom (Stage 5) and Late Flowering (Stage 6) (Fick and Mueller, 1989). Therefore, some of the recommendations for grazing alfalfa includes initiation of grazing when alfalfa reaches 10% Bloom stage, and then stock it appropriately to defoliate to about a 3-to 4-inch stubble height within a 3 to 7-day period. Thus, size of pasture and stocking rate are the primary management considerations for a successful stocking strategy. Electrical fencing, multiple paddocks, and an alternative "sacrifice" pasture area will allow for management to incorporate a variable stocking method to match forage growth during climatic conditions of wet-dry periods.

**Grazing Strategies Evaluated in Pineywoods of East Texas**

A multi-objective and multiple location experiment during a 5-year period was conducted at the Texas A&M AgriLife Research and Extension Center at Overton (Haby et al, 2002). One of the objectives of this study was that of establishing alfalfa on 5 stakeholder properties in the Pineywoods Vegetational Zone for the purpose of hay production only. Alfalfa was harvested at the 10% Bloom stage. Both Amerigraze 702 and 'GrazeKing' were planted on each of the stakeholder properties. After 4 years of hay production, Amerigraze 702 had percent survival that ranged from 47% to 76% across 4 of the properties. The percent stand of GrazeKing remaining after 4 years ranged from 41% to 64%. These survival rates and hay production levels were considered to be ranked as normal or higher across the alfalfa growing areas in the southwest and Southeastern US.

Haby et al (2004) provided a listing of the critical management strategies for successful establishment of alfalfa on acid soils commonly found in the Bermudagrass Belt of the Southeastern US. The eight most-important management considerations included planning and economic projections; site selection with excellent drainage; soil sampling to different depths and analyses; liming with ECCE-100 and fertilization with appropriate macro- and micro-nutrients; site preparation of prepared seed bed and seeding rate; weed control with proper herbicides; insect control and monitoring of alfalfa weevil; and method of harvesting and utilization.

For the evaluation of stocking method on stand survival at the Overton Center, the following 6 alfalfa varieties were established on clean-tilled areas: Alfagraze, Amerigraze 401+Z, Amerigraze 702, Cimarron 3I, GrazeKing, and HayGrazer (Rouquette et al, 2002). All varieties were established in the fall, and harvested as hay once during the following summer, and twice (23 Mar and 25 May) in the second year. Grazing was initiated in the second year on 16 June following the hay harvest in May. All varieties were stocked at 3 methods Continuous; Rotational-Stage 3 (when alfalfa was at the pre-bud stage); and Rotational Stage 5 (when alfalfa reached 10% Bloom).

After 3 years of grazing six varieties of alfalfa using continuous, rotational at Stage 3 or rotational at Stage 5, there was an effect of stocking method on percent survival of alfalfa (Table 1). Under a continuous stocking regimen to about 3-inch height during the active growing period (Spring to early Fall), a 96 to 100% stand loss occurred. When grazing of alfalfa was initiated at Stage 3 (pre bud), grazed to an approximate 3-inch stubble height (3 days or less), and allowed to rest until plant growth reached Stage 3, Amerigraze 702 showed a 26% survival, Alfagraze at 15%, and Amerigraze 401+Z and Cimarron 3I at 10% stand survival. GrazeKing and HayGrazer had only about 5-6% stand remaining. When alfalfa varieties were rotational grazed using the Stage 5 (10% Bloom) vegetation growth indicator to initiate stocking, most all varieties had a survival rate of at least 50%. Alfagraze and Amerigraze 702 had the highest survival rate at about 61 to 63%. Under the conditions of this prepared seedbed-planted alfalfa in the sandy, acid soils of the Bermudagrass Belt of the southeastern US, there was a significant advantage for stand maintenance using rotational stocking and delaying initiation of grazing events until plants were at Stage 5 (10% Bloom).

Results from this 4-year stand of alfalfa at Overton was similar to a 2-year study evaluating grazing-tolerant alfalfa cultivars under rotational stocking (Bouton and Gates, 2003). At the end of the 2-year experiment at 2 different locations in Georgia, percent survival of Alfagraze ranged from 41 to 48% under continuous stocking to 60 to 63% survival under rotational stocking. Grazing management for the Georgia study incorporated a 7-day grazing period with a 28-day rest. Stubble height for both rotational and continuous stocked alfalfa was controlled to a 3 to 4-inch height. Site, soil, and climatic conditions were likely responsible for the substantial differences in stand survival under continuous stocking in Georgia compared to Texas. Under the continuous stocking regimens at Overton, there was a 96 to 100% stand loss of alfalfa (Table 1).

**Management Considerations for Grazing Alfalfa in Pineywoods of Texas**

Using comparative experiments assessing alfalfa cultivars and stocking methods in the southeastern US, the following considerations are suggested for grazing alfalfa with the primary objective of stand maintenance and persistence:

- Incorporate all suggested guidelines for success in establishing alfalfa on acid soils (Haby et al, 2004).
- Establish alfalfa on prepared seedbed during the autumn.
- Harvest only hay during first spring-summer season of active growth.
- Use electric fencing with easy-adjustments for pasture size which allows for control of pasture size and grazing intensity.
- Incorporate flexible, rotational grazing strategy beginning in the second season of growth.

- Use Stage of vegetative growth (Fick and Mueller, 1989) as indicator for initiation of stocking. Suggest stocking be delayed until alfalfa is at Stage 5 to Stage 6. **THIS IS A NECESSITY TO PROLONG STAND SURVIVAL!!**
- Duration of 3 to 5 day grazing should be used to reach a 3 to 4 inch stubble height. **REMEMBER**: Both stubble height **AND** duration of grazing are major factors influencing **STAND SURVIVAL**. Alfalfa forage and growth rates are uniquely different in late winter and early spring compared to mid-summer periods. Management strategies should be flexible to alter utilization regimens in the different seasons.
- Animals and performance attributes can be enhanced by maintaining Bloat Guard Blocks in alfalfa pastures for protection against bloat and potential death losses. The nutritive value of alfalfa is of sufficient magnitude for stocker cattle or creep grazing of suckling calves. Animal consumption, intake, is affected by body weight and other factors. Thus, cow-calf pairs will consume 3 to 4 times the daily amount of alfalfa compared to lighter weight weaned, stocker cattle.
- During prolonged, hot, dry conditions, consider "skipping" or omitting a grazing cycle, and harvest alfalfa as hay to enhance stand persistence.

There are several management strategies that should be planned and incorporated to prolong the longevity of alfalfa for hay or grazing in the Pineywoods Vegetational Zone in Texas. Under grazing conditions, alfalfa may persist for 4 to 5 years or more with percent stands >50%. Invader species in the Pineywoods includes annual and perennial grasses (bermudagrass). Conditions of increased grazing intensity-duration increases opportunities for weed invasion and stand loss of alfalfa. Alfalfa has been correctly labeled as the "Queen of Forages" due to nutritive value, nitrogen fixation, and numerous forage-animal attributes. However, on the sandy, acid soil conditions of the Southeastern US, Bermudagrass is the "King of Forages" due to persistence-longevity, tolerance of acid soils, and reliable high dry matter production under nitrogen fertilization regimens. The use of alfalfa for hay or grazing in the Pineywoods should be considered as a forage system to fit a "niche" for hay and/or grazing-animal performance management systems. Successful ventures with alfalfa in the Bermudagrass Belt is possible ONLY by following planning-establishment-utilization strategies that have been documented by multi-year experimentation or demonstration.

**Table 1.** Sustainability of alfalfa varieties and percent stand after stocking for three years at Continuous, Rotational-Stage 3, and Rotational-Stage 5 stocking methods.

| Alfalfa Variety | Continuous Stocking | Rotational Stage-3[1] | Rotational Stage-5[2] |
|---|---|---|---|
| | ----------% Stand---------- | | |
| Alfagraze | 2.0 | 15 | 63 |
| Amerigraze 401+Z | 0.5 | 11 | 51 |
| Amerigraze 702 | 1.2 | 26 | 61 |
| Cimarron 3I | 0.3 | 10 | 44 |
| GrazeKing | 3.7 | 6 | 49 |
| HayGrazer | 0.7 | 4 | 47 |

[1] Initiation of Rotational stocking at Stage 3 (pre-bud).
[2] Initiation of Rotational stocking at Stage 5 (10% Bloom).
Rouquette, et al. 2002

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