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PERSISTENCE OF ALFALFA VARIETIES UNDER THREE STOCKING METHODS ON COASTAL PLAINS SOILS IN EAST TEXAS

F. M. Rouquette, Jr., J. Kerby, G. Nimr, and V. Haby

Background. A cooperative research project in East Texas between TAES-Overton and the Southern Region Sustainable Agriculture Research and Education (SARE) Program was initiated to ascertain the influence of method of cattle stocking on persistence of alfalfa varieties. Six varieties of alfalfa, including Alfagraze, GrazeKing, Amerigraze 401 + Z, Hay Grazer, Amerigraze 702, and Cimmaron 3I, were drilled into a prepared seed bed in the fall of 1997. The site was treated with ECCE 100% lime to an initial pH of about 7.5. Two, 1.5-acre sites were planted to a total of 6 replications of each variety in sub-plots 21 x 150 ft. The entire area was harvested as hay only during 1998. In the fall of 1998, each 1.5 acre block was sub-divided into 3 sub-blocks that had each alfalfa variety represented as 3 randomly located replications in individual plots of 21 x 50 ft. During the 1999, 2000, and 2001 growing season three stocking methods used were as follows: (1) continuous stocking to a stubble height of 3-inches or more; (2) rotational stocking, initiate grazing at Stage 5 or 10% bloom and graze to an approximate 3-inch stubble; (3) rotational stocking, initiate grazing at Stage 3 or pre-bud and graze to an approximate 3-inch stubble. The duration of stocking on rotational treatments was 3 days or less. Pastures were stocked during each month from March through September. Data for persistence, stand height and density, and nutritive value were taken at about monthly intervals throughout each of the three years. On November 5 and 6, 2001, final alfalfa readings for plant count per sq. ft., stems per plant, stand height, and percent stand was conducted on each replicate sub-plot.

Research Findings. Except for a few isolated plants, alfalfa was not sustainable in plots that were continuously stocked (Table 1). Stand loss ranged from 97 to 100% across all 6 varieties. The grazing treatment of rotationally stocking as plants reached Stage 3 resulted in nearly complete loss of stand in one block of 3 replications, and about a 50 to 100% loss of stand in the other block of 3 replications. The most optimistic survival ratings for alfalfa which was rotational stocked each time the plant reached Stage 3 was that of using only 4 of the 6 replications. Four reps were chosen to eliminate the inclusion of plots that may have been damaged due to proximity of water facilities. If this was considered, then Amerigraze 702 at 25.6% stand represented the best survival attained. Most of the stand loss in both the continuous stocked and rotational stocked at Stage 3 occurred during the 2001 summer period. The only grazing treatment that had substantial, sustainable alfalfa stand was the rotational stocking when plants reached Stage 5 or about 10% bloom. Again, due to considerable variation in percent stand

among replications, a 4-replicate projection showed that most varieties had about a 50% survival rate. However, in this scenario, both Alfagraze and Amerigraze 702 had about 60% stand remaining after 3 years of grazing. The stand loss on the entire 6 replications, however, showed nearly a 65% stand loss with only Amerigraze 702 maintaining an approximate 50% stand. The most detrimental factors contributing to significant stand loss during this grazing experiment was summer drought and the invasion of common bermudagrass. By nature of the graze-defer treatment of rotational stocking when plants reached Stage 5, the alfalfa canopy reduced the extent of plot invasion by common bermudagrass. Thus, this method of grazing, which simulated conventional hay harvest, provided the least stand loss during the 3-year period.

Application. A preliminary conclusion is that alfalfa is not sustainable as an exclusive summer-grazing pasture plant on Coastal Plains soils in East Texas. This may also be valid for the southeastern USA. For alfalfa to be sustainable on Coastal Plains Soils, our research indicates that alfalfa should be used primarily as a hay crop, and grazed only during early spring and/or late fall or early winter following a hard freeze when defoliation by animals would not be detrimental to stand. The method of rotational grazing in this experiment required relatively high stocking rates during a 3-day grazing event. Stocking rates of 60 to 70 1000-lb animals per acre were needed to consume the alfalfa regrowth. The intensive management requirements for such a rotationally stocked system would likely be un-acceptable by most beef operators. Dairy producers, however, who utilize intensively stocked paddocks between milking-feeding periods, could likely incorporate alfalfa into their overall grazing management system. Additional utilization research with alfalfa is warranted to examine various graze-hay methods during the growing season as management systems to enhance persistence and stand maintenance.

Table 1. Percent stand of alfalfa varieties after three years stocking at three grazing methods.

Variety	Rotational Stocked				Continuous Stocked
	Stage 5		Stage 3		6 reps
	4 reps	6 reps	4 reps	6 reps	
Percent Stand					
Alfagraze	63	38	15.4	11.4	2.0
GrazeKing	49	33	6	4.4	3.7
Amerigraze 401 + Z	51	34	10.8	7.2	0.5
Hay Grazer	47	33	4.2	2.6	0.7
Amerigraze 702	61	46	25.6	22.1	1.2
Cimmaron 3 I	44	35	10.2	7.1	0.3