Incorporating Alfalfa into Bermudagrass for Baleage Production: Improving Forage Quality and Yield in the Southeast

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Bermudagrass (*Cynodon dactylon*) is the most prevalent warm-season perennial grass grown in the Southeast. Characterized by high yields and moderate at-best quality, bermudagrass has a substantial need for N fertilization and often-additional supplementation when fed to cattle. Alfalfa *(Medicago sativa)* is a widely-used forage throughout the United States that has a high relative forage quality (RFQ) and is a good source of digestible energy and protein; additionally, it fixes nitrogen and can achieve high yields without commercial nitrogen fertilizers. The management and use of alfalfa and bermudagrass in the Southeast is very similar; recommendations for both include high potassium fertility with multiple applications throughout the growing season, and timely cutting intervals of 4 to 6 weeks. With the development of new alfalfa varieties that are more tolerant to the warm climate and insect pressure, alfalfa is re-gaining popularity in the Southeast. Growing these two species as a mixed sward can provide producers with dual benefit as interseeding alfalfa into bermudagrass can reduce or eliminate the need for N fertilization, increase the relative forage quality by 30+ points, and decrease the need for additional supplementation when fed to livestock, as comparted to monoculture bermudagrass. Furthermore, harvesting these mixtures as baleage can reduce the risk of losses and environmental impacts often associated with dry hay production in the region. The objective of this research is to compare the nutritive value and yield of bermudagrass with and without interseeded alfalfa produced as baleage. This study utilized an established field of 'Tifton 85' (T85) bermudagrass at the University of Georgia Coastal Plains Experiment Station in Tifton, Georgia. Ten 0.2-ha plots were randomly assigned to either T85 or T85 interseeded with 'Bulldog 805' alfalfa on 19 February 2016. T85 bermudagrass-only treatments received nitrogen fertilization (84 units N/ha) four times throughout the growing season. Plots were harvested at early bloom stage and every 28 to 35 days thereafter through the growing season, baled at 40-60% moisture, and individually wrapped. Plots were evaluated at each harvest for botanical composition and forage yield. Bales were sampled prior to wrapping and at 6-week, 9 and 12-month time points to determine nutritive value and associated change over time throughout storage. In year 1, seasonal yields in the bermudagrass-only treatment were greater ($P = 0.008$) than the alfalfa-bermudagrass treatment (9823 vs. 7631 kg/ha, respectively). However, in year 2, the alfalfa-bermudagrass treatment had greater ($P < 0.001$) seasonal yield than the bermudagrass-only treatment (14,810 vs. 7297 kg/ha, respectively). Cumulative yield over the study period also shows greater yields ($P < 0.001$) in the alfalfa-bermudagrass treatment (22,441 vs. 17,121 kg/ha, respectively). Year one nutritive value analyses show that the crude protein (CP) and in-vitro true digestibility (IVTD) were greater ($P = 0.005$ and $P = 0.034$, respectively in the alfalfa-bermudagrass treatment than the bermudagrass-only treatment (13.3 vs 10.2 % CP and 74.1 vs. 71.1 % IVDMD, respectively). Additionally, the neutral and acid detergent fibers (NDF and ADF) were lower ($P < 0.001$ and $P = 0.002$, respectively) in the alfalfa-bermudagrass treatments when compared to the bermudagrass-only treatments (55.7 vs. 68.1% NDF and 28.7 vs. 31.9% ADF, respectively).