

FORAGE ACCUMULATION AND BOTANICAL COMPOSITION OF ALFALFA AND ALFALFA-MIXTURES INFLUENCED BY FORAGE MANAGEMENT

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Alfalfa (*Medicago sativa*) is a valuable legume with high crude protein content being a good source of feed for ruminants. Growing alfalfa in the Southeastern U.S. requires the use of adapted varieties and correct management practices for the expression of its best potential. Mixing alfalfa with common grasses can also confer advantages for the overall mass accumulation through complementarity effect and nutrient cycling. The objective of this study was to evaluate the mass accumulation and botanical composition of alfalfa and alfalfa mixtures during the 2016-2017 growing season, using different harvest schedules (21 [T1], 28 [T2], 35 [T3] and 42 [T4] days harvest). The experiment was conducted at the University of Tennessee Plateau AgResearch and Education Center in Crossville, TN. There were 12 plots composed of pure alfalfa and mixtures with Tall Fescue and Bermudagrass replicated four times. Forage samples were collected every harvest day for determination dry matter yield (DM). In 2016, samples of known ratios of the two mixtures were created, and calibration equations were developed into the NIRS instrument to provide percentages of species that constitute each sample. In 2017, samples were collected manually and separated according to its morphology for determination of the plot's botanical composition. The statistical analysis was performed using GLIMMIX procedure on SAS (Cary, NC 9.4). The effect of harvest schedules differs among species with a minimum significant difference of 404.9 kg/ha ($P = 0.03$). The highest mass accumulation per harvest was observed in mixtures of alfalfa and tall fescue in T4 treatment (3147 kg/ha), which were similar to alfalfa only and tall fescue mixtures in T3 treatment (2275 and 2428 kg/ha, respectively). This was attributed by its long period on the field. Both mixtures with tall fescue and bermudagrass have its mass accumulation increased as the harvest intervals increase, but alfalfa decreases due to leaf losses. The overall lower productivity of mixtures with bermudagrass was attributed by its C4 physiology and light requirements for growth that are shaded by alfalfa. In 2016, the presence of alfalfa in the plots was on average 48% in tall fescue mixtures and 49% in bermudagrass mixtures. In 2017, it decreased to 23% in tall fescue mixtures and 32% in bermudagrass, yet the mass accumulation were not significantly different between years ($P > 0.05$), which indicates that the presence of alfalfa is important for the mass accumulation of a field even in lower amounts.