

Forage Nutritive Value, Yield, and Preference of Legumes under Horse Grazing in the Establishment Year

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Legumes have potential to provide high quality pasture, but are rarely grazed as monocultures. The objectives of this research were to evaluate forage nutritive value, yield, and preference of legumes under horse grazing. Research was conducted in 2014 and 2015 in St. Paul, MN. Legumes were established as monocultures in a randomized complete block design with four replicates. Stands were established on May 16, 2014 and April 27, 2015. Four to six adult horses grazed 8 alfalfa (*Medicago sativa* L.) varieties, one red clover (*Trifolium pratense* L.), and one white clover (*Trifolium repens* L). Legumes were measured for yield on July 1, August 5, and September 15, 2014 and on June 29, July 23, August 24, and October 12, 2015 when legumes reached the bud stage. Samples to determine forage nutritive values were harvested prior to grazing. In both years, horses grazed for four to five hours a day for four consecutive days each time grazing was initiated. Legumes were visually assessed for the percentage of forage removal on a scale of 0 (no grazing) to 100 (100% of legumes grazed) to determine horse preference. Statistical significance was set at $P \leq 0.05$ and means separations were determined using Tukey HSD. Forage nutritive values are reported for the final grazing of each year and environmental interactions prevented the combination of years. In both years, red and white clover had the highest crude protein content ranging from 27 to 31% dry matter (DM; $P \leq 0.0268$). In both years, white clover had the greatest non-structural carbohydrate (NSC) concentration compared to red clover and the alfalfa varieties ($P \leq 0.0052$). NSC content of white clover ranged from 12 to 20% DM. In both years, red clover had the highest neutral detergent fiber concentration (38% DM) and white clover had the highest amount of equine digestible energy (DE) (2.71 Mcal/kg). Since legumes were grazed at a relatively immature growth stage, forage quality of all legumes was high and exceed equine DE requirements for adult horses at maintenance. Forage nutritive values for the alfalfa varieties were not consistently different in either year. In both years, alfalfa varieties yielded more compared to white clover (6.5 Mt/ha; $P < 0.0001$). The top alfalfa variety yielded 16.0 and 12.9 Mt/ha in 2014 and 2015, respectively. In both years, horses had similar preference for all legumes and removed between 72 to 99% of available forage. Although white clover had the greatest content of equine DE, it had the least amount of yield. This research helps to confirm that legumes are a nutrient dense, high yielding and preferred forage under grazing by adult horses.