

The Rebellion of the Queen: Alfalfa as the Optimum Forage for Climate-Smart Dairy Systems

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The objective of this study was to determine the effects of genotype and dormancy on dry matter yield (DMY), neutral detergent fiber digestibility (NDFD), and undegraded NDF (uNDF) concentration in alfalfa. In 2025, 6 varieties of alfalfa (8 replicates each) were seeded in plots (5-m long × 1-m wide). Varieties represented 2 genotypes (conventional vs. reduced-lignin) within 1 of 3 dormancies (groups 4, 5, or 6), as for a 2 × 3 factorial arrangement of treatments. Plots were harvested 4 times during 2025 at intervals of 28 to 35 days using research plot harvester (RCI 36A) with a mounted biomass scale. Forage samples were collected, dried (55°C), ground (1-mm Wiley), and incubated in the rumen of 2 rumen-cannulated milking cows for 48 and 240 h using filter bags (25 µm). Bags were washed in a washing machine upon the completion of each time point and then dried in an oven (55°C). Undigested NDF was measured to determine NDFD at 48 h and uNDF concentration after 240 h. Data were analyzed in SAS using a mixed model as for a randomized complete block design with repeated measures (i.e., cut within plot as subject). The model included the random effect of block, the fixed effects of genotypes, dormancy, and cut, and all interactions. Neither genotype ($P = 0.92$) nor dormancy ($P = 0.39$) affected DMY. Differences in DMY existed among cuts ($P < 0.01$) with cut 4 having the lowest DMY (1.16 Mg/ha) and cuts 1, 2, and 3 having the greatest (1.89 Mg/ha). Neither genotype ($P = 0.71$) nor dormancy ($P = 0.66$) affected NDFD. Difference in NDFD existed among cuts ($P < 0.01$) with cut 4 having the lowest NDFD (52.6%) and cuts 1, 2 and 3 having the greatest NDFD (64.3%). Genotype ($P = 0.81$) and dormancy ($P = 0.59$) had no effects on uNDF concentration (NDF basis). Differences in uNDF concentrations existed among cuts ($P < 0.01$) with the lowest uNDF at cut 1 (29.8%), the intermediate uNDF at cuts 2 and 4 (43.5%), and the greatest at cut 3 (47.1%). In conclusion, genotype and dormancy had no effect on NDFD, DMY, or uNDF in alfalfa.

Keywords: Alfalfa, reduced-ligning, NDFD, low-lignin