

The Effect of Increased Concentration of Neutral Detergent Soluble Fiber in Alfalfa on Intake and Digestibility in Lambs.

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Forage quality improvement in alfalfa for enhanced ruminant animal performance has focused on reduction of fiber concentration. Plant breeding and selection for increased concentration of pectin, estimated by an assay for neutral detergent soluble fiber (NDSF), and was carried out at Cornell University. The alfalfa cultivar developed, N-R-Gee, had been selected for two cycles of increased NDSF concentration. Following the work of Teclé et al, who found that NDSF was correlated with *invitro* digestibility, the next step was an animal feeding trial. The cultivars N-R-Gee and Vernal were planted in 1-acre fields in 2009 and harvested for dry hay three times in 2010. Vernal is the low-quality check cultivar. Core samples from 10 bales of each lot of hay (2 cultivars, 3 harvests) were analyzed and Harvest 1 and 3 hays were chosen for the feeding trial based on the results. Harvest two hay was unacceptable due to excessive leaf loss. Sixteen ram lambs were fed the coarsely ground hays, four lambs per pen and four pens (each cultivar/harvest fed to one of four pens) for three weeks to determine feed efficiency (animal gain/hay fed). Samples of the hay and orts (hay not eaten) were taken daily and combined by week, and the lambs were weighed once per week. After the three week pen study, eight lambs (two of the four lambs from each pen) were then put in metabolism crates and fed the hay from the cultivar/harvest that they had been fed in the pens. These lambs were in the crates for an additional week to collect the data for determining percent apparent digestibility.

Table 1: Feed efficiency and percent apparent digestibility of two cultivars of alfalfa hay from two harvests in 2010.

Alfalfa Cultivar	Harvest	Feed Efficiency	% Apparent Digestibility
N-R-Gee	1	0.26	63.1
VERNAL	1	0.20	61.8
N-R-Gee	3	0.13	59.5
VERNAL	3	0.09	58.7

Hay from first harvest was higher in feed efficiency ($P=0.0555$) and apparent digestibility ($P = 0.0474$) than hay from third harvest. The cultivar selected for high NDSF concentration, N-R-Gee, had higher feed efficiency ($P = 0.141$) and percent apparent digestibility ($P = 0.165$) than Vernal at both harvests. Ruminant animals fed alfalfa hay selected for higher NDSF concentration had improved animal performance compared Vernal, the low quality check cultivar.

Response from Selection for Pectin Concentration and Indirect Response in Digestibility of Alfalfa. 2006. Teclé, I.Y, D.R. Viands, J.L. Hansen, and A.N. Pell. *Crop Sci.* 46:1081–1087.