

## Forage Nutritive Value of a Reduced Lignin Alfalfa Cultivar Compared With Conventional Alfalfa Cultivars

Angela Parker<sup>1</sup>, R. Mark Sulc<sup>1</sup>, Kenneth Albrecht<sup>2</sup>, Kim Cassida<sup>3</sup>, Marvin Hall<sup>4</sup>,  
Jeffrey Herrmann<sup>5</sup>, Doohong Min<sup>6</sup>, Steve Orloff<sup>7</sup>, Dan Undersander<sup>2</sup>

<sup>1</sup>The Ohio State University, Columbus, OH 43210, <sup>2</sup>University of Wisconsin-Madison, Madison, WI 53706, <sup>3</sup>Michigan State University, East Lansing, MI 48824, <sup>4</sup>Pennsylvania State University, State College, PA 16802, <sup>5</sup>Monsanto Company, St. Louis, MO 63167, <sup>6</sup>Kansas State University, Manhattan, KS 66506, <sup>7</sup>UCCE Siskiyou County, Yreka, CA 96097

Forage nutritive value is important for maintaining high production in ruminant animals. Alfalfa (*Medicago sativa*) digestibility declines as the plant matures due to lignification in secondary cell walls. Scientists at Forage Genetics International, The Samuel Robert Noble Foundation and the U.S. Dairy Forage Research Center collaborated to modify the lignin content and composition in alfalfa through genetic modification. The reduced lignin trait has been released commercially in conjunction with Monsanto Company under the brand name of HarvXtra™ alfalfa. The hypothesis is that this new transgenic cultivar should maintain acceptable nutritive value longer than conventional alfalfa cultivars. The objective of this research was to evaluate the change in nutritive value over time of HarvXtra™ alfalfa compared with conventional cultivars. Field trials were established in six states (KS, MI, OH, PA, CA, WI) in April to early May 2015 with three alfalfa varieties: cv. HarvXtra-008 is the reduced lignin cultivar, cv. 54R02 was selected for high yield, and cv. WL 355RR was selected for high nutritive value. Plots were arranged in a randomized complete block design with three or four replicates and a split-plot restriction on treatment randomization. Growth cycle sampled was the main plot factor and alfalfa cultivar was the subplot factor. The first growth of the seeding year in all plots was clipped off uniformly and discarded. In the second and third growth cycles of the seeding year, plots were hand sampled at 20, 23, 27, 30, 34, and 37 days of regrowth to a 5-cm stubble height. Samples were dried at 60 C, ground through a Wiley mill with a 6-mm screen followed by a Udy mill with a 1-mm screen. Samples were analyzed by calibrated Near Infrared Spectroscopy. Data were analyzed by location and growth cycle. There were no sample date x cultivar interactions ( $P > 0.15$ ) for neutral detergent fiber (NDF) and only at MI in the second growth cycle for NDF digestibility (NDFD); however, HarvXtra-008 was consistently highest in NDFD at all dates. A date x cultivar interaction ( $P < 0.15$ ) was found for acid detergent lignin (ADL) at CA in the second growth cycle, at WI in the third growth cycle, and at MI for both growth cycles; however, HarvXtra-008 was consistently lowest in ADL at all dates at those sites. HarvXtra-008 was consistently higher ( $P < 0.05$ ) in NDFD (+49.6 g/kg) and lower in NDF (-29.6 g/kg) and ADL (-9.0 g/kg) than the other two cultivars across locations and dates. This represents a 10% increase in NDFD, 10% decrease in NDF, and 18% decrease in ADL across locations and sampling dates. Although HarvXtra-008 did not appear to have a slower rate of decline in nutritive value over time than the other two cultivars, it was consistently superior in nutritive value on all dates sampled in the seeding year. Results from this experiment provide growers with preliminary data on HarvXtra-008 and its potential nutritive value gain compared with conventional alfalfa. The experiment is continuing at all six sites in 2016.