

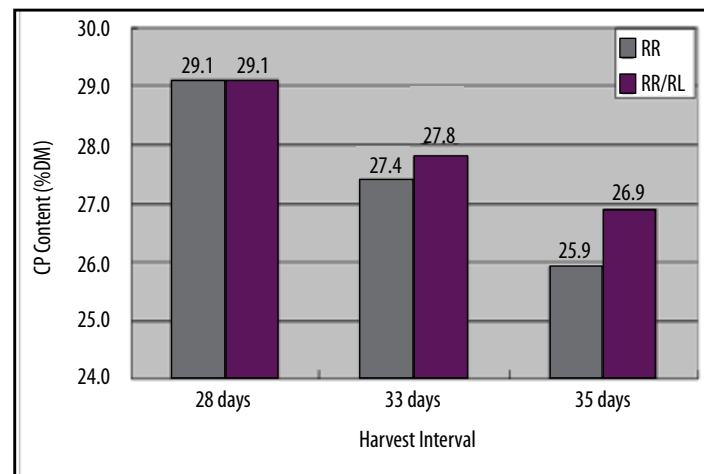
WISCONSIN - Reduced Lignin Alfalfas Appear to Improve Forage NDF Digestibility Dave Combs, University of Wisconsin

The pending release of a transgenic low-lignin alfalfa is creating a flurry of excitement amongst forage producers. Forage Genetics International is expected to soon be marketing a new alfalfa variety called "HarvXtra™." The variety is the first transgenic low lignin, Roundup-Ready® alfalfa to be approved by USDA.

University of Wisconsin-Madison Extension Forage Agronomist Dan Undersander, University of Wisconsin-Madison Dairy Scientist Dave Combs, and visiting professor Zhiqiang Li from China Agricultural University in Beijing, recently evaluated the effect of the low lignin trait on measures of forage quality. They presented their findings in July 2015 at the Joint Annual Meetings of the American Dairy Science Association and the American Society of Animal Sciences.

Alfalfas containing the stacked traits for resistance to Roundup and the low lignin trait were compared to the same line of Roundup-Ready alfalfa without the low lignin trait. The two alfalfa cultivars (Roundup Ready (RR) and double stacked RR and Reduced Lignin (RR/RL)) were harvested at intervals of 28 days, 33 days, and 35 days from research plots in June and harvested for two regrowth periods in July and August 2014. Crude protein (CP), neutral detergent fiber (aNDF), lignin, rate of digestion of NDF, indigestible NDF, and total tract NDF digestibility (TTNDFD) were analyzed by NIRS.

Figure 1. Comparison crude protein content of an alfalfa variety containing the Roundup Ready (RR) trait to an alfalfa containing the stacked traits of Roundup Ready and Reduced Lignin (RR/RL).



Study Findings

- Protein content declined as the harvest interval increased from 28 to 33 to 35 days for both the RR and RR/RL varieties ($P < 0.05$). Protein content, however, was similar for RR and RR/RL alfalfa varieties at each harvest.
- NDF content of alfalfa containing only the RR trait was higher than in the alfalfa with the RR/RL traits (31.6 vs. 30.1).
- There was no difference in NDF content due to the harvest interval.
- Lignin content was not significantly different between RR and RR/RL (5.6 vs. 5.5) or among harvest intervals (5.6 vs. 5.6 vs. 5.5).
- Digestibility of NDF was improved with the low lignin trait, even though lignin contents did not differ.
- Reduced lignin alfalfa tended to be lower in iNDF and have a faster rate of NDF digestion than the alfalfa with only the Roundup Ready trait.
- Lower iNDF values and faster rates of fiber digestion resulted in a significant improvement in the total tract NDF digestibility.

Table 1. Comparison between RR and RR/RL in indigestible NDF (iNDF), Rate of NDF digestion (Kd), and total tract NDF digestibility (TTNDFD).

	Cutting Interval (days)	RR Alfalfa	RR/RL Alfalfa	Average	Probability Value		
					Forage	Harvest Interval	Forage by Harvest Interval
iNDF (%NDF)	28	34.1	29.9	31.7	0.086	0.001	0.470
	33	42.1	37.0	39.9			
	35	39.3	39.2	39.2			
	average	38.7	35.1	36.8			
Kd (%)	28	7.8	7.1	7.4	0.156	0.980	0.153
	33	7.0	8.2	7.5			
	35	6.4	8.9	7.8			
	average	7.0	8.0	7.6			
TTNDFD (%NDF)	28	53.0	56.3	54.9	0.012	0.010	0.849
	33	46.3	51.9	48.7			
	35	46.8	51.1	49.2			
	average	48.6	53.3	51.0			