

TECHNICAL NOTES

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OPTIMIZE FORAGE QUALITY BY AFTERNOON HARVESTING

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This note summarizes new research supporting advantage of afternoon harvesting of forages. It was prepared as a handout for producer meetings. It is cryptic by design. More in-depth information may be obtained by viewing the WEBB PAGE or contacting the author. Many scientists have contributed to these findings and credits are so noted. Photocopying of this note is permissible.

- Plants accumulate sugars during the day and use them up at night. This causes a diurnal cycling of forage sugars and overall quality (Fig. 1). Cutting forage during late afternoon (PM) captures much of the extra sugar, causing the afternoon cut hay to have higher feed value than morning-cut hay (AM) (Mayland et al., 1998 and Fisher et al. 1999, in press).
- Total digestible nutrients are likely higher, and ADF and NDF are lower in afternoon than morning cut hay (Fisher et al. 1999, in press).
- Cattle, sheep and goats have a strong preference for afternoon-cut hay compared with morning-cut hay. Animals also eat more PM- than AM-cut hay and consume more nutrients (Fisher et al., 1998 & 1999).
- Dairy cows will eat about 8% more (*ad lib*) TMR containing 40% PM-cut alfalfa hay than one containing (*ad lib*) AM-cut alfalfa hay and will produce about 8 % more milk (Kim, 1995). Adjusting schedules to cut hay in afternoon and early evening can increase feed value of hay as much as 15%.
- Green-chopped alfalfa cut in the afternoon will have more feed value and is relished more by cows than if cut in the morning (Mayland, unpublished).
- When making silage from alfalfa or clover hay, one can enhance the fermentation process by cutting the hay in the afternoon compared to cutting in the morning (Owens, 1996).
- Increased sugars in afternoon- vs. morning-cut hay dilute the ADF and NDF values. Measuring these small changes in ADF or NDF may not be precise enough to measure increased benefits of afternoon harvested hay. Sugar methodology is needed that could be adapted to routine forage testing. Afternoon vs. morning-cut hay may have an additional 10 to 30 relative feed value (RFV) units (Mayland et al., 1998).
- Grazing animals eat more grass and clover in afternoon than morning. Animal behavior is related to increases in soluble carbohydrates (Orr et al., 1997).
- Dairy cows foraging pastures under 24-h strip grazing management produced 8% more milk when the fence was moved at 4 PM vs. 6 AM. (Orr et al., 1998).
- Increased sugars in afternoon forage may explain increased bite counts in afternoon vs. morning grazing.
- The daily increase in forage sugars may follow similar patterns among varieties. High referenced or digestible varieties may have higher sugar levels than low referenced or low digestible ones (Shewmaker et al. 1999). Breeders are encouraged to add some measure of soluble sugars to their selection criterion.

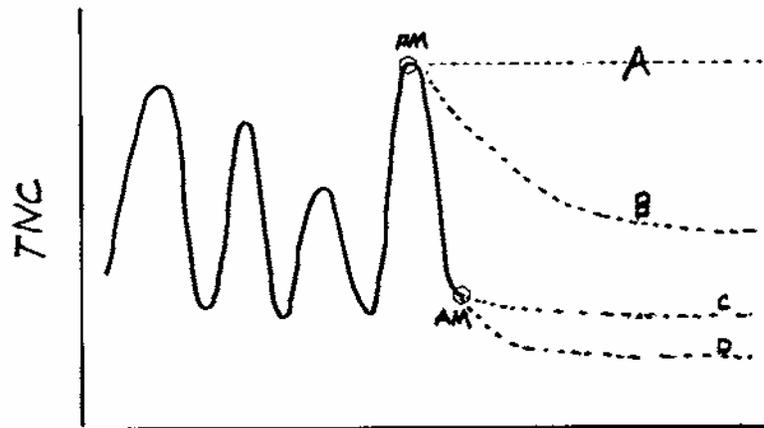


Figure 1. Example of diurnal cycling of sugar levels in green forages showing higher concentrations in mid- to late afternoon. Cutting in afternoon captures these higher levels. Rapid drying of hay preserves more sugars (A/C) than will slow drying (B/D).

Table 1. Intake and composition of alfalfa hays used in preference experiment with cattle. Fisher et al. (*in press*)

Hay Harvest	ADF	NDF	TNC	Intake
	----- % -----			g/meal
Afternoon - 8 July	31.0	40.8	4.32	1022
Morning - 9 July	32.6	42.9	3.62	842
Afternoon - 14 Aug	32.1	41.5	5.00	619
Morning - 15 Aug	32.7	43.0	3.53	324
Afternoon - 22 Sept	27.9	36.4	6.65	1320
Morning - 23 Sept	28.7	37.4	5.43	1107
Afternoon average	30.3	39.6	5.32	987
Morning average	31.3	41.1	4.19	758

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