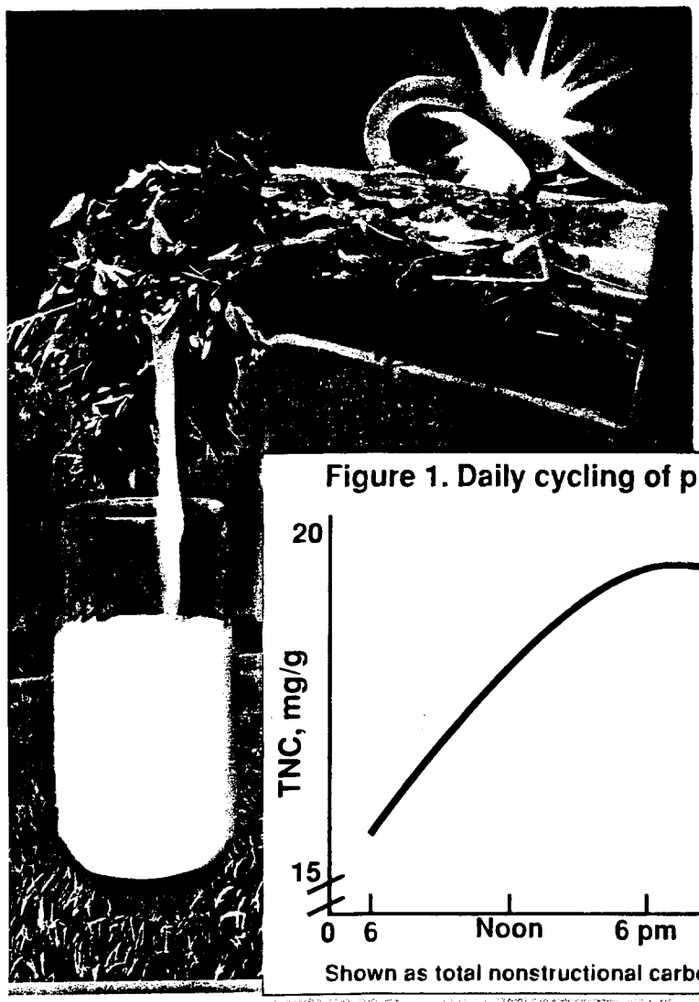
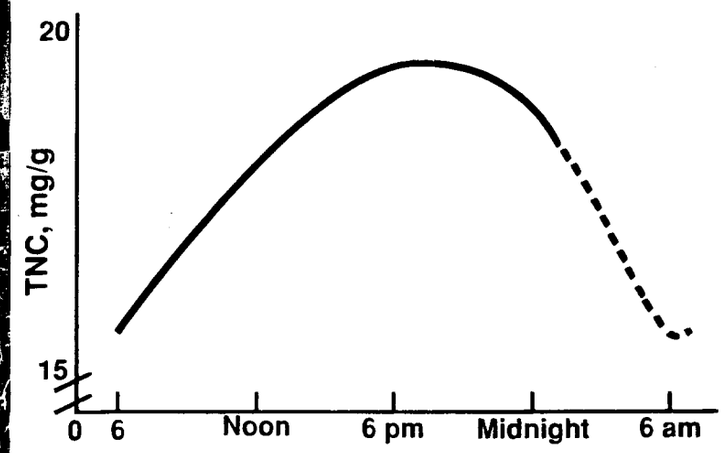


Late-afternoon-cut hay makes more milk

Whether you're feeding green chop or ensiled forage, or even grazing cows, p.m.-cut/grazed hay will make more milk.

by Hank Mayland and Glenn Shewmaker

Figure 1. Daily cycling of plant sugars



Shown as total nonstructional carboyhydrates (TNC) in forage.

POURING a glass of milk is only a few steps away from pouring a glass of sunshine. Solar energy drives photosynthesis in green plants to produce simple sugars. When these plants are eaten by the cow, those sugars provide energy to rumen microorganisms which, in turn, provide energy to the cow for milk production.

On warm sunshiny days, soluble sugars accumulate in plants faster than the plants can use them. At night, photosynthesis does not operate, and there is a loss of soluble sugars. This whole process results in a daily cycling of soluble sugars in the forage. Figure 1 clearly shows the gradual accumulation of plant sugar which builds as the day progresses. The drop in plant sugars occurs sometime after sunset.

Leaves questions to be answered . . .

Can this cycling of sugars be sensed by cows, and, if so, is there any difference in intake and milk production? Do the extra sugars in the afternoon forage affect grazing behavior, green chopped forage intake, wilted forage, ensilability, animal preference, or hay intake?

In the past, we may have dismissed or simply ignored the potential impact that daily cycling of soluble sugars has on intake and performance. However, several recent independent studies have provided a resounding YES to each of the above questions.

In a USDA-Agricultural Research Service study, Dwight Fisher, Joe Burns, and Hank Mayland discovered that cattle, sheep, and goats strongly preferred grass hay cut at sundown, compared with hay cut at sunup. The grass hay had been grown, cut, and baled in Idaho. It was then shipped to North Carolina were it was fed. Animal preference was attributed to the extra soluble sugars in the hay cut at sundown. The study was repeated using alfalfa cut at sundown and sunup. Results were similar to those obtained when feeding the grass hay.

Our current investigations suggest that sugars begin accumulating in forages at a steady rate from an hour or two after sunrise and continue until one to two hours before sunset. To start cutting at midafternoon and continue until an hour or two after sundown will provide a six to seven-hour cutting period which is common to many operations.

Grazing animals prefer high sugar . . .

Free-grazing animals adopt behavioral patterns allowing them to optimize their energy intake. Grazing ruminants generally eat more and faster in mid to late afternoon than at other times. The faster intake rate may be a response to sweeter forage available in the afternoon compared with morning. Cattle have a keen perception of sugars, and some animals can sense differences of less than 1 percent soluble sugars.

Strip grazing is a tool used to concentrate grazing on an area for a short time. For dairy cows on pasture, it is common to use a 24-hour interval and move the electric fence just before cows return from morning milking. Research in England by Robert Orr and his co-workers has shown that moving the fence after the late-afternoon milking enables the plants to accumulate more soluble sugars so cows eat more of the luscious, high-sugar forage and produce more milk.

Ensiling some crops can be difficult because of insufficient soluble sugars to promote satisfactory fermentation. Research conducted at the University of Wisconsin-Madison by Vance Owens and his co-workers examined the effect of cutting time on fermentability. They found that red clover and alfalfa harvested in late afternoon contained more sugar and fermented more quickly than forage harvested earlier in the morning.

Looking at cutting plans . . .

Alfalfa hay is an important ingredient in dairy cow rations throughout much of the U.S. Dairy quality hay is characterized as having high digestibility, promoting a high dry matter intake by the cows. These characteristics are generally predicted from calculated values of acid detergent fiber (ADF) and neutral detergent fiber (NDF) which are often determined by near infrared spectroscopy.

In some markets, relative feed value (RFV) is the index of choice. The RFV index is calculated from values of ADF and NDF. In Western markets, an RFV of 170 or greater is considered as dairy quality. By cutting alfalfa hay in late afternoon versus in early morning, you can make a difference of 10 to 20 RFV points. For the hay grower, that may be a 15 to 20 percent boost in dollar return.

If dew or rain prevents complete drying of hay in the field, the grower may be able to get a 10-hour wilt and then green chop the forage for direct feeding to the animals. Dairymen who use this approach note greater milk production from animals fed green-chop forage that was cut in the afternoon versus cut in the morning.

Afternoon hay raised production . . .

Feeding total mixed rations (TMR) containing alfalfa hay cut in the afternoon versus morning increased milk production. In a Utah State University study by Daeyoon Kim and Michael Arambel, 22 midlactation Holsteins were fed a TMR containing 40 percent alfalfa hay. For one group, the alfalfa was cut at 4 to 6 p.m. and the other at 6 to 8 a.m. The group on the p.m.-cut hay ate six pounds more TMR per day and produced 7.5 pounds more milk per day than the other group eating the TMR containing a.m.-cut alfalfa hay.

We have shown that the daily cycling of sugars in plants is important to dairy animals. Appetites can be stimulated and milk production can be enhanced by eating afternoon forage. The soluble sugars may not only satisfy a "sweet tooth," but they are important in providing readily available energy for growth and milk production.

This remarkable research is ongoing, and more is yet to be learned. Nevertheless, the early results can be adapted by forage growers and dairy producers. The bottom line is that these practices can be implemented with little or no additional cost.

So, pour yourself a glass of sunshine.

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