Cutting Management Strategies of First-Cut Alfalfa

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First-cutting alfalfa is the largest and most critical of the year. It is very important to know when to cut for highest yield and quality. Forage quality varies with environment and cutting management. Determining a proper forage harvest date is vital since nutritive value drops as the crop matures. Even a slight delay in first cutting can have negative consequences on the rest of the growing season, possibly slowing regrowth and reducing future yield.

Environmental conditions from early spring to first harvest will have a great impact on forage quality. A cool, wet spring will slow growth, allowing forage quality to be maintained for a longer period of time. A dry, warm spring will accelerate alfalfa plant growth and development, resulting in an earlier bloom and reducing forage quality.

Relative forage quality (RFQ) is a measure of nutritive value and intake, and includes both fiber content and digestibility. Forage quality depends on cell wall composition. Cell wall components are mainly cellulose, hemicellulose, and lignin. The first two can be digested by rumen microorganisms, while lignin is indigestible. Lignin is not only indigestible, but prevents microorganisms in the rumen from reaching the cellulose microfibrils, reducing digestibility of the structural carbohydrates cellulose and hemicellulose.

Neutral detergent fiber (NDF) is the total cell wall content of a forage. For example, 60% NDF means 60% of the total forage dry matter is cell wall, while the other 40% includes crude protein, sugars, starch, and other components not in the cell wall. More important than the NDF content (total fiber) is the digestibility of the fiber (NDFD), which indicates the percentage of NDF that is actually digestible and converted to metabolizable energy.

It is important to understand how environmental conditions and plant maturity influence cell wall deposition. Under cool temperatures, cell walls accumulate more cellulose and less lignin for a greater digestibility of the fiber. It is well known that NDFD declines after the first cut (Figure 1) primarily because in later cuts, cell walls are deposited under more stressful conditions (e.g., higher temperature, water stress) leading to an increase in lignin content. There are several methods to estimate when to cut, such as scissors-cutting (sampling fresh forage for lab analysis), Predictive Equations for Alfalfa Quality (PEAQ), and accumulated growing degree units. Each method has advantages and disadvantages, but all have been proven reliable enough to prevent gross miscalculations of first-cut forage quality from year to year.

Figure 1. Average NDFD for first, second, third, and fourth cuts.

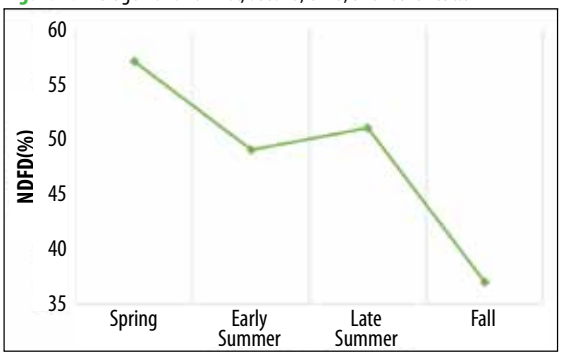

Table 1. Plant height and harvest maturity in alfalfa.

Cutting	Plant height (inches)	Maturity stage
First	32	Late veg – Early bud
Second	23	Late bud – Early flower
Third	19	Early – Late flower
Fourth	16	Late flower

The PEAQ method relies on both plant height and maturity stage and applies only to the first cut. The first cut is usually the tallest but also has a lower leaf-to-stem ratio, resulting in a rapid decline in forage quality as the plant matures. The recommended harvest maturity and plant height for each cut are indicated in Table 1. In order to balance both yield and quality, the recommended stage for first cut is late vegetative to early bud at 30-32" tall. It is also important to consider the health of your stand. If the stand is old (>4 years) or has pervasive winter injury, the additional stress of an early cut will compromise the crown and root reserves. In this situation, it is preferable to harvest later rather than earlier, even if forage quality is compromised.

Cool temperatures, combined with significant snowfall in much of the Midwest this April, will result in a delay in alfalfa growth and development. Many farmers will likely be in need of forage before plants reach harvest stage. So, can we harvest alfalfa in the vegetative stage? Harvesting alfalfa early (15-20" tall) can have several advantages:

- It spreads out the harvest rather than waiting to cut all alfalfa at the same time,
- Its forage quality will be very high,
- Second cutting will probably be ready before summer heat lowers forage quality,
- It may reduce insect and disease problems.

Keep these thoughts in mind to help you maximize the value of your first cutting this year.