Plant Height as Determinant for Harvesting Alfalfa

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Plant maturity of alfalfa has been used to determine when to harvest for decades. Producers know that as plant maturity increases, forage yield increases. However, waiting until late flowering for maximum yield causes quality to suffer. The typical relationship between maturity and forage quality is illustrated in Figure 1. Forage quality, digestibility and intake potential, decrease with increasing maturity.

Some producers have tried to harvest at a given maturity stage, like late bud, for all harvests during a season. When doing this, however, they find forage quality is less than needed for high-quality hay, frequently 120-130 relative feed value (RFV), especially in first harvest. In second and third harvests, however, harvesting at late bud may result in very high quality, >190 RFV, with lower yield.

Plant height must also be considered when determining optimum harvest maturity. Effect of plant height on forage quality is illustrated in Table 1 adapted from work done by Dr. Ken Albreck, USDA-ARS Dairy Forage Research Center, in developing the PEAQ (Prediction Equations for Alfalfa Quality) system.

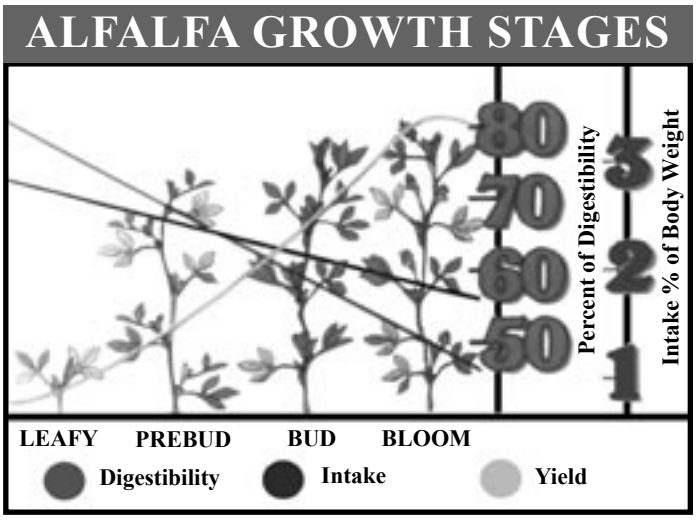

Figure 1. *Maturity effects on forage yield and quality. Source: Garry Lacefield, University of Kentucky*

At all maturity stages, RFV decreases with increasing plant height (Table 1). Note that the RFV decreases 71 units at late vegetative, 61 units at late bud, and 53 units at late flower when alfalfa increases from 20 to 40" in height. Therefore, the taller the plant, the earlier in plant maturity that a harvest must be taken in order to get prime hay (RFV>151) in the bale. The PEAQ system estimates forage quality of alfalfa standing in the field so harvest must initiate at an estimated RFV of 175 or higher to allow for harvesting losses.

Alfalfa plant height obtained in each growth is dependent on the environment, especially precipitation and temperature. With adequate rainfall, alfalfa plants get taller under cool compared to warm environments before initiating flowering. Therefore, first harvest generally is taller than third, especially on dryland. For example, the first harvest has averaged nearly 32" in height by late bud growth stage at Fargo, ND, while a third harvest typically averages only 21". Optimum plant maturity to initiate harvest is markedly different during the first harvest compared to the third harvest.

Table 1. *Forage quality w/plant height & maturity*

Height of tallest stem	Maturity of Stem		
	LV[1]	LB	LF
inches	------ relative feed value ------		
20	213	191	171
25	191	172	155
30	173	156	141
35	156	142	129
40	142	130	118

LV[1] = Late vegetative; LB = Late bud; LF = Late flower

Typical plant maturity at harvest for first cutting is late vegetative to very early bud to get prime hay in the bale. Typical plant maturity at harvest for second, third, and fourth cuttings has been mid to late bud, 25-30% bloom, and 50% bloom or regrowth initiating, respectively. If rainfall is inadequate, maturity at harvest will be more advanced since height is reduced by lack of soil water. This warm spring was very early, initiating plant growth. If the rest of the spring is cool (last 5 days of April and beginning of May), plant height could be greater than normal necessitating harvesting at late vegetative stage for high quality hay.

Plant height has more effect on forage quality than plant maturity! Again, RFV decreases 61 units when alfalfa increases from 20 to 40" in height at the late vegetative stage (Table 1). But RFV decreases only 42 units from late vegetative to late flower at 20" in height and only 31 units at 30" in height.

In summary, adjust maturity at harvest based on plant height to get prime hay in the bale. A quick way to evaluate height effects on forage quality is to use a RFQ stick, sold by the Midwest Forage Association. Place the stick at several locations in the field and read the estimated RFQ of the standing forage.