



First Cut Harvest Timing and Tips

Plant maturity at harvest is the biggest driver of alfalfa yield and nutritional quality. Unfortunately, they are inversely related. If the plant is allowed to mature to the flower stage, yield is increased, but quality is reduced in terms of leaf-to-stem ratio (influencing protein levels) and digestion of the plant NDF.

Yields are less in cool, cloudy weather, and in the presence of insects, disease or drought. Yield is greater with adequate moisture, high solar radiation and 24 to 29°C weather.

Harvesting immature alfalfa will produce a high RFV along with high crude protein forage. During the ensiling process much of the protein is degraded into soluble protein that at high levels can result in ration balancing challenges. If rumen microbes don't utilize excessively high levels of nitrogen, the cow will excrete it through the urinary system. Often high milk urea nitrogen (MUN) in dairy herds is a result of feeding these high protein immature alfalfa silages. Additionally, immature alfalfa has lower physically effective NDF that results in ration balancing challenges. Lowered cud chewing and potential for rumen health issues from feeding high RFV alfalfa results in the need for supplemental straw or some other lower quality forage source. Thus, it is vital to aim to harvest at the right maturity.

Harvest Maturity: When to Cut?

Choice of maturity at harvest depends on the class of animal to which the crop will be fed (see chart below) and the need for quantity versus quality. It is important to set harvest goals and hope for cooperative weather.

Livestock Type	RFV Range
High Producing Dairy Cow Dairy Calf	140 - 160
Late Lactation Dairy Cow Heifer 3 – 12 months Stocker Cattle	125 - 145
Heifer 12 – 18 months Beef Cow with Calf	115 - 130
Heifer 18 – 24 months Dry Cow	100 - 115

Dairy producers generally prefer alfalfa for lactating cattle in the range of 160-180 RFV/RFQ. Harvest schedules need to account for a 20 point loss in RFV/RFQ from harvest through field wilting and fermentation. If 180 RFQ is desired, harvest needs to occur when plants are close to 200 RFV/RFQ.

There are various methods of staging alfalfa for harvest maturity, here are 3 options.

1. Plant Growth Stages

The stage of maturity can help predict the quality of the stand, see chart below. Typically to achieve feed for high producing cows one aims for the 20-30-40 rule (protein- ADF-NDF), which usually is when 10% of the field is in bud stage (more than 2 nodes with visible buds, no visible flowers/pods) as shown in the image.



Expected Forage Quality Values as Alfalfa Advances in Maturity

STAGE OF MATURITY	CRUDE PROTEIN	ACID DETERGENT FIBRE	NEUTRAL DETERGENT FIBRE	DIGESTIBLE DRY MATTER	RELATIVE FEED VALUE
	% OF DRY MATTER				
Vegetative	>22	<25	<34	>69	>188
Bud	20-22	25-31	34-41	67	166
Early Bloom	18-19	32-36	42-46	62	131
Late Bloom	16-17	37-40	47-50	60	115
Seed Pod	<16	>41	>50	<58	<108

Source: N.P. Martin and J.G. Linn. University of Minnesota.

2. PEAQ Stick Evaluation

The predictive equation for alfalfa quality (PEAQ) is a field tool designed primarily to help determine the first harvest date by monitoring plant height and maturity. Plant height is an excellent indicator of staging harvest because RFV and RFQ decrease as the plant height increases. This method does not work well for weedy or grassy stands, or for very short (<16") or very tall (>40") stands.

The PEAQ stick evaluation begins by;

1. Sample 4 to 5, 2ft² sections representative of the entire alfalfa field while avoiding lodged or leaning areas.
2. Determine the growth stage (vegetative, bud or flower) of the most mature stem (may not be the tallest stem).
3. Find the single tallest stem and hold the stem up next to the stick, noting the estimated plant RFV and NDF value closest to the tip of the stem (not the tip of the tallest leaf).

3. Scissor Cutting Method

Another option to stage alfalfa is sending fresh samples out of the field to a forage lab. Alfalfa sampling begins at about 14 inches of height. This method has a longer turn around time than a PEAQ stick.

Harvest Timing: am vs. pm?

The time of day to harvest alfalfa (am vs. pm) is an interesting topic and research results fall on both sides of the debate. The basic idea is that cutting later in the day allows the crop to deposit more sugars to improve palatability and aid in silage fermentation.

Although am vs. pm forages differ in initial composition, it is not clear that these differences persist after drying and/or fermentation. Despite the plants being cut, they are still alive and cellular respiration will reduce sugar levels at night and in the section of the window not receiving sunlight.

Research in Wisconsin showed 11 of 14 alfalfa samples had higher sugars with pm-cut alfalfa; yet only one of the 14 had higher sugar levels in the stored forage. A Miner Institute study showed no statistical difference in plant sugars, starch, NDF, or *in vitro* digestibility between am and pm harvesting.

Many researchers in the Midwest and East Coast believe it makes more sense to harvest early in the day to maximize the hours of drying from solar radiation rather than expose the crop to delayed drying and increased weather risk.



Cutting Height

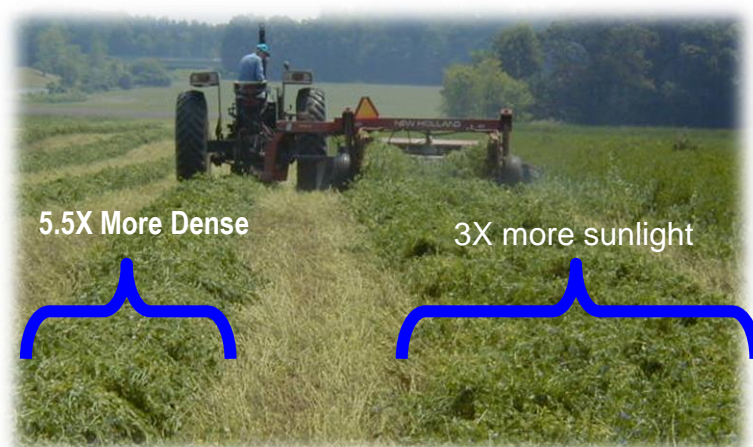
Lowering the cutter bar obviously results in higher yields of alfalfa. Research shows that alfalfa can be cut as short as 1.5 inches and that each inch above this will result in 0.5 tonnes per acre reduction in annual yields. However, increased yields must be balanced against the tendency for disc mowers to vacuum soil (ash) into the crop. This causes lower digestibility and the potential for increased soil-borne bacteria and spores that can have a negative impact on fermentation.

For most producers, cutting pure-alfalfa stands at 2.5-3.0 inches seems to be a good compromise. To prevent shortened stand life, this should be increased to 3 or 4 inches if the stand includes grasses.



Length of Cut Chopper Setting: 1/4 - 1/2"
As forage becomes dryer, shorten cut

Swath Width- Wide is Better



Research from University of Cornell found that having a wide swath saves sugars for better fermentation, more net energy is available to the cow, soluble protein is reduced, and more milk/ton of forage is produced.

Narrower swath results in less drying time underside of swath, thus promotes cellular respiration longer reducing the overall quality.

Inoculants Preserve and Protect

DuPont Pioneer leads the industry in the development of inoculants and application technology. Microbiologists work to identify efficient strains of bacteria to stimulate a rapid fermentation and to inhibit aerobic spoilage.

The key alfalfa silage (80%+ of field alfalfa) Sila-Bac[®] inoculants are 1174, 11H50, 11AFT (*L. buchneri*) and for grass silage (20%+ of field is grass) Sila-Bac[®] inoculants 11G22, and 11GFT (both *L. buchneri*) are recommended.

Recommended Moisture Content of Alfalfa or Grass Forages for Ensiling with Sila-Bac[®] Brand Inoculants.

Bunker or Stave Silo	Sealed Silo	Bag Silo	Baleage
55-68%	40-60%	55-65%	50-60%

If you have to stop harvesting due to weather or moisture conditions, put the mixed inoculant into the fridge for up to 5 days. If you will not be back harvesting within 5 days (ie. between cuts), place the mixed inoculant into the freezer. To thaw inoculant, take out of freezer 24hours before use. DO NOT microwave or place in hot water.



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