

Harvesting alfalfa and alfalfa-grass . . .

How low should we mow?



Mowing height is a trade-off between yield and quality. But how much quality do you gain for the loss in yield?

by Everett D. Thomas

IT'S inconvenient and sometimes embarrassing when the results of the research we do don't agree with our preconceived notions. Such was the case with two years of field trials here at the William H. Miner Agricultural Research Institute in Chazy, N.Y. that evaluated the mowing height of established alfalfa-grass. Mowing at a 2-inch stubble height, as recommended by some agronomists, obviously increases yields but would this be at the ex-

We thought that the higher stubble height would result in faster drying of the forage but found no meaningful difference between the two mowing heights.

pense of forage quality? That's what we thought. We also thought that leaving a high stubble — in our trials, 4 inches of it — could result in less surface debris being vacuumed up by the disk mower, resulting in lower ash levels. (A previous Hoard's Dairyman article reported an increase in the number of hay crop silage samples with high ash concentrations — over 10 percent. Harvest management was cited as a possible cause.)

Forage quality was similar . . .

We did a field trial in 2005 on a single cutting of alfalfa-grass, mowing at 2-1/2 and 4-1/2 inches stubble height. We found that while the shorter mowing height increased yield, there was little difference in forage quality. Hmmm. We concluded that at least part of the reason



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for the unexpected results was that the field we used was very uneven, making it difficult to mow at a uniform height. So it was back to the drawing board — the alfalfa field, actually — and we did a second mowing height trial in

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2006 using a much more uniform field, this time doing three cuts instead of just one.

The forage was second-year alfalfa-reed canarygrass, with almost 60 percent grass in the first cut but 70 to 75 percent alfalfa in the second and third cuts. Yields were calculated using the combined alfalfa-grass forage, but then we hand-separated and analyzed both the alfalfa and canarygrass. We hand-clipped randomly selected 2-foot by 3-foot areas, cutting all plants at the 2-inch stubble height. We then cut off the bottom 2 inches of the stem to get the 4-inch cutting height and analyzed the forage using wet chemistry. We did this to eliminate the variability that could have occurred had we sampled one group of plants mowed at 2 inches and a different group mowed at 4 inches.

The thumb rule was correct . . .

"The book" says that harvesting at 2 inches versus 4 inches results in a yield increase of about 500 pounds of dry matter per inch. Remarkably,

Keep track of ash concentrations in forage analyses of chopped hay crops (fresh or postensiling), and if they start to creep over 10 percent, take a closer look at your fields to make sure you're harvesting the forage and not the field.

that's exactly what we found: Combining all three cuts, mowing at 2-inch stubble height resulted in a yield of 4.2 tons of dry matter per acre, while we got only 3.7 tons per acre at 4 inches. And there was a significant yield difference regardless of which harvest we measured: First-, second-, and third-cut yields were 18 percent, 11 percent, and 8 percent higher respectively for the 2-inch mowing height, while overall yield was 13 percent higher.

Sure, leaving less stubble increases yield but what about forage quality? We analyzed each of the three cuts separately. While there were some differences between cuttings — lower crude protein and higher fiber levels for first-cut since it contained a much higher proportion of grass — the differences between cutting heights were similar. And since most farmers want to set their mower for a particular height and leave it there all year, we'll focus on forage quality for the three harvests combined (see table).

We wouldn't expect to see much difference in ash since the plants were hand-harvested. However, while the differences in crude protein and NDF were statistically significant, most farmers

Forage quality of alfalfa-grass harvested at 2- and 4-inch cutting heights*

Item (% DM)	2 inch	4 inch	Probability (P value)
Crude protein, %	18.9	19.6	0.04
NDF, %	48.9	47.5	0.03
Ash, %	8.4	8.5	0.29
NDF-d, 24 hr, %	54.3	55.5	0.26
Milk/ton, lbs.	2,993	3,075	
Milk/acre, lbs.	12,569	11,377	

*Miner Institute, 2006, average of three cuttings.

wouldn't be willing to lose half a ton of dry matter per acre to improve protein and fiber levels by a single percentage point. Knowing how woody the bottom few inches of an alfalfa stem appears to be, we were very much surprised by the lack of any statistical difference in fiber digestibility. We also calculated projected milk production using the University of Wisconsin's Milk2000 spreadsheet. Most farmers would agree that a 3 percent increase in milk per ton of forage wouldn't compensate for half a ton less dry matter and 10 percent less milk per acre.

Mower-conditioner cuttings yielded . . .

For each cutting, we harvested forage from the same field using a John Deere MoCo disk mower-conditioner. While we aimed for the same 2-inch and 4-inch cutting heights as in our hand-harvested plots, the actual mowing heights, based on measuring stubble height from 15 random locations within each plot, averaged 3.1 inches and 4.3 inches. A defective load cell in our truck scales prevented accurate yield determination.

However, when we analyzed chopped forages from these plots we found less than a 1 percentage point difference in crude protein, ash, and NDF. There was 8 percent higher NDF digestibility and projected milk per ton in favor of the 4.3-inch mowing height, but combining this data with the more precisely done hand-harvested trial, it doesn't seem

Unless your feeding program demands the highest forage quality even at the expense of yield, our two years of research suggests that you should set your mower to leave approximately a 2-inch stubble height.

to make a compelling case for mowing much higher than 2 inches. We also thought that the higher stubble height would result in faster drying of the forage, but found no meaningful difference between the two mowing heights.

In a nutshell, cut it short . . .

Unless your feeding program demands the highest forage quality even at the expense of yield, our two years of research suggests that you should set your mower to leave approximately a 2-inch stubble height.

One precaution is that mowing height should accommodate uneven fields and especially unpicked stones. Keep track of ash concentrations in forage analyses of chopped hay crops (fresh or postensiling), and if they start to creep over 10 percent, take a closer look at your fields to make sure you're harvesting the forage and not the field.