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Dairy, Livestock and Field Crops News

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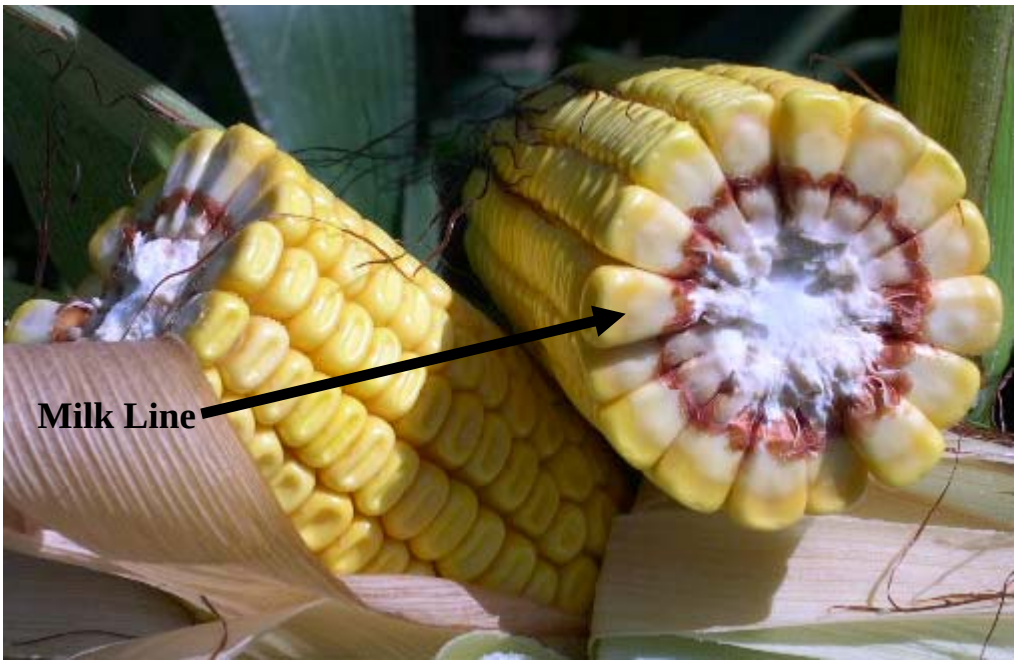

Corn Silage Strategies

David R. Balbian

Corn silage harvest is right on our doorstep. As I write this I only hope that the deluge of rain most of you experienced this summer stops long enough to get it off the field. Although much of the corn crop looks good out there (with the occasional dips in height where the low wet spots are in the field) some late-planted corn could be hard pressed to reach silage maturity.

Here are some thoughts in regard to this year's crop:

- If at all possible keep cows on fermented corn silage during harvest. They will thank you for it.
- If you must feed "green" corn have your nutritionist rebalance your ration. Often a touch of feed grade urea is helpful in improving digestion of this "green" corn.
- Shoot for 30 to 35% dry matter at harvest, dryer in upright silos and wetter in bunk silos.
- Although milk line does not correlate well with whole plant dry matter, its presence does indicate its time for a check. Chopping a few representative plants and using a koster tester is probably the best method to use.
- Segregate "normal" corn silage from any immature corn silage. This will provide an opportunity for allocation to specific animal groups. If you mix corn silages from various stages of development you will compromise the feed value of the "normal" corn silage.
- Although many of you are growing specific silage varieties, many of you are not. If you have dual purpose varieties and are growing some corn for grain be sure you chop plenty of acreage for C.S. before you commit the balance to grain. With the poor quality hay crop most people have this year a heavier C.S. diet can be one way to improve milk production and reduce the pounds of grain required in the ration.
- More people are covering bunk silos with the heavier mil plastic that's black on one side and white on the other (white side up). It does pay off in reduced spoilage.
- If you expect to have more C.S. than you can use you may want to try selling some. If that's not a viable option consider raising your cutting height to increase the quality. With all the wet weather this year I'd expect lignin content to be above average in C.S. Lignin is the totally indigestible portion of the fiber. Lignin tends to be at a higher level in the lower part of the stalk. So a higher cut height will not only increase the grain concentration, it will also reduce the lignin content of your corn silage.

Immature Corn Silage – Nutritional Considerations

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The 2004 growing season in New York has again deviated from "normal". In many areas of the state, corn silage planting was delayed due to wet weather. Corn for silage was still being planted in early July. For this corn to mature, a lot of GDU's (growing degree units) and a late frost will be needed. It normally takes 50-55 days from silking to maturity for most corn silage hybrids. An early frost will greatly increase the acres of immature corn silage harvested. Table 1 contains an approximate timetable from silking to one-half milk line and maturity, and the effect of maturity on whole plant moisture and silage yield.

Table 1. Days from silking to various developmental stages of corn plants.[a]

Stage of Maturity	Approximate calendar days to ½ milk line	Approximate calendar days to maturity	Whole plant % moisture	Percent of maximum silage yield
Silking	35-45	50-60	80-85	50
Blister	25-35	40-50	80-85	60
Late Milk	15-25	30-40	75-80	70
Early Dent	5-15	20-30	70-75	80
½ Milk Line	0	10-15	60-70	100

[a]From Pioneer Dairy Update, Sept., 1996.

Days to maturity are estimated by assuming an accumulation of 20 Growing Degree Units per day (a high of 80 and low of 60, for example). If the weather is cooler, development will be slower, if it is warmer, the corn will mature faster. The quality and maturity of the corn silage harvested depends on a large number of factors. These include hybrid, fertilization program, planting population, planting date, GDU's, rainfall and frost date. These factors will result in a large amount of variation in corn silage quality.

Table 2 contains nutrient composition data for corn silages with varying grain contents. Immature corn silage is high in NDF, low in NFC and low in predicted NE_l. Actual nutrient content of samples from specific farms can vary considerably from these numbers.

Table 2. Nutrient composition and predicted milk production from corn silage.[a]

Grain % of DM	DM, %	CP % of DM	NDF, % of DM	Lignin % of NDF	NFC,[b] % of DM	NE_l Mcal/[c]	Milk[d] lbs
0	25	9.0	60	5	23.4-29.4[e]	.57-.64	18.4-20.6
30	33	9.5	49	11	34.5	.67	21.6
40	33	9.2	45	8	38.7	.74	23.9
50	35	8.0	41	7	43.3	.77	24.8

[a]Source: Feed library, CNCPS V 4.0, Animal Science Mimeo 213, Cornell University, June, 2000.
[b]NFC, % = 100 – (CP, % + NDF, % + Fat, % + Ash, %)
[c]Predicted using the CNCPS V 4.0 model
[d]Predicted milk, on an energy basis, that could be produced if 10 lbs of dry matter from corn silage is fed.
[e]NFC varies due to ash content. Ash content of immature corn silage will range from 5 to 11% of total plant dry matter.

What About the Composition of the NFC?
Immature corn silage will contain a majority of the NFC as sugars with very little starch. As corn grain matures, the starch component will increase and the sugars will decrease.

When Should Immature Corn be Harvested?
Immature corn is low in dry matter content (Tables 1 and 2). If possible, harvesting should be delayed until the plant is > 30% dry matter. Harvesting the plant at low dry matter content will alter silage fermentation, increase silage runoff and potentially depress feed intake.

What If the Corn Gets Frosted?
A killing frost will cause the plant to lose leaves and begin to dry down. The stalk will contain most of the moisture and will dry down slowly. Samples should be analyzed for dry matter to determine the proper harvest time. The plant will often appear drier than it really is.

What About Silage Management Practices?
Silage management practices are critical to harvesting and storing immature corn. Dry matter content should be 30% or greater. Sharp knives will give a clean cut rather than tearing or shredding the plant. Packing, covering and particle size guidelines used in harvesting "normal" corn silage need to be followed.

How Will Fermentation be Altered?
The immature corn plant will contain a high level of sugars to support fermentation. If a low level of lactic acid bacteria is present, a high acetic acid and low lactic acid silage may be produced. An extended fermentation due to the low dry matter content will also result in higher levels of soluble protein, ammonia and other nonprotein nitrogen compounds. A research proven inoculant should be used to improve fermentation efficiency and shift the fermentation towards lactic acid production. For any silage additive used, ask the company for data regarding application rates and efficacy for use with wet, immature forages.

Should Nonprotein Nitrogen (NPN) Sources be Added at Harvest?
NPN sources should not be added unless the plant has at least reached the milk stage. Adding NPN to wetter, immature forages can adversely alter fermentation and potential intake by the animal.

What About Fiber Digestibility?
Fiber digestibility is usually lower in corn silages grown in cool, wet years. Lignin will comprise a higher percent of the fiber fraction of the plant. This is probably related to moisture stress. The weather during the time period from tasseling to cob formation is the most critical phase of growth in determining potential changes in digestibility. Actual fiber digestibility will be difficult to predict with the highly variable weather patterns that existed during the growing season.

What Ration Adjustments Are Needed?
The nutrient composition data in Table 2 provides a starting point. The following points should assist in utilizing this forage:

1. Forage testing will be essential due to the large variation in nutrient content expected. Additional tests such as fiber digestibility, fermentation profiles, sugar and starch may be helpful. Wet chemistry analysis may be preferable unless the forage testing lab has recalibrated the NIR instrument for this growing season.

2. The portion of the energy provided should be from NFC sources such as soy hulls, beet pulp, hominy, corn gluten feed and other similar sources. Immature corn silage will probably have a higher level of residual sugars, which are rapidly available in the rumen. Added fat sources may also help.

3. Immature corn silage may be higher in soluble and other NPN compounds if an extended fermentation takes place. This may require an adjustment in the protein mix to provide more undegradable protein.

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