Dairy Cattle Feeding Tips For Immature Corn

by Pat Hoffman and Randy Shaver, Extension Dairy Nutritionists, University of Wisconsin–Madison and University of Wisconsin/Extension

1. **Test for moisture.** Expect moisture content of corn silage and high-moisture corn to be highly variable as it is fed out of the silo because of variable maturity and dry-down at harvest. Test moisture content frequently of wet ensiled feeds at feed-out and adjust as-fed feeding rates to maintain correct dry matter amounts and proportions of these feedstuffs in the diet (see table).
2. **Test for starch.** Expect starch content of corn silage and high-moisture corn to be highly variable, because of variable grain yield and ear kernel fill. Starch is a major component of corn silage and high-moisture corn and has a large influence on its energy content. Test corn silage and high moisture corn for starch content and adjust grain feeding rates accordingly.
3. **Adjust for low test weight corn.** Low test weight corn may be prevalent in some areas. Minnesota reports similar energy values and animal performance for corn with test weights ranging from 50-58 pounds/bushel. Corn with test weight below 50 pounds/bushel has an energy value about 95% of normal test weight corn (may need to increase feeding rates of low test weight corn to maintain desired energy content). Analyzing for nutrient content, including starch, and estimating energy value using modern summative equations is a good way to determine feeding rates for low test weight corn. It is important to feed corn on a weight and nutrient basis rather than on basis of volume.
4. **Processing and preserving.** High-moisture corn harvested too wet (> 35-40% kernel moisture) is possible but excessively fast starch digestibility can be harmful to high producing dairy cows. Ensiling may also be a problem when high-moisture corn contains excessive moisture as ethanol fermentations can occur. Depending on specific conditions, you may decide at harvest to inoculate high-moisture corn with a microbial additive, treat it with an organic acid stabilizer, or treat it at full rates with an organic acid preservative to aid aerobic stability so these types of corn can be limit fed in the diet.
5. **Test for NDFD.** Immature forages may have variable levels of neutral detergent fiber digestibility (NDFD). Corn silage harvested too wet (> 65% whole-plant moisture) may have acceptable NDFD. Many commercial forage-testing labs test for NDFD (test is highly recommended). When you know NDFD, you can more accurately estimate the energy value of corn silage and other forages. When NDFD is low in corn silage or other forages, adjust grain feeding rates accordingly or add highly-digestible by-product fiber sources to the diet.
6. **Control Molds and Yeast.** Test for mycotoxins. A key to handling immature corn silage and grain is to control the inventory and aerobic instability. Corn silage and high moisture corn made from immature corn often has to be fed at a much lower feeding rate than normal corn or corn silage. Additives and inoculants to control molds and yeast can improve aerobic stability allowing more flexibility in feed-out rates. If producing corn silage or high moisture corn from corn that stood in the field for an extended period, test it for mycotoxins, especially the Fusarium sp. mycotoxins (vomitoxin, zeralanone and T-2 toxin). Fusarium molds are especially problematic in cool fall conditions on immature corn. If the silage or high moisture corn is contaminated with any of these anti-quality factors, you may prevent decreases in milk production, cow health or reproductive performance by diluting the affected silage with other feeds.

GENERAL HARVESTING & FEEDING GUIDELINES FOR CORN AT VARIOUS STAGES OF MATRUITY[1,2]

Harvest Stage	Yield Potential, %	DM	CP	NDF	NDFD	Starch	Forage to Grain Ratio
Vegetative (Tassels Emerging)	36	85	12.5	60	70	0	100:00:00
	Harvesting Considerations: Harvest as silage; contains too much moisture to ensile. Allow to freeze, monitor and ensile at proper moisture content. Consider an inoculant if temperatures are cold at ensiling. **Feeding Considerations:** Similar to typical grass; allocate to heifers and dry cows. For lactating cows supplement grain (some may need to be fine ground).						
Silking	42	83	11.2	66	68	0	100:00:00
	Harvesting Considerations: Harvest as silage; contains too much moisture to ensile. Allow to freeze, monitor and ensile at proper moisture content. Consider an inoculant if temperatures are cold at ensiling. **Feeding Considerations:** Similar to typical grass; allocate to heifers and dry cows. For lactating cows supplement grain (some may need to be fine ground).						
Blister - Early Milk **NOTE: variable stage rapid changing quality*	62	81	9	61	68	2.0-10.0	90:10:00
	Harvesting Considerations: Harvest as silage; contains too much moisture to ensile. Allow to freeze, monitor and ensile at proper moisture content. Consider applying Lactobacillis Buchneri to increase aerobic stability especially if starch contents are > 10.0 %. **Feeding Considerations:** Similar to typical grass; allocated to heifers and dry cows (silage may be very low in pH). For lactating cows supplement grain. Test for starch content (may be low but starch is very degradable).						
Milk - Early Dough **NOTE: variable stage rapid changing quality*	77	77	8.5	55	66	10-20.0	75:25:00
	Harvesting Considerations: Harvest as silage; contains too much moisture to ensile. Allow to freeze, monitor and ensile at proper moisture content. Consider an inoculant to control aerobic stability; consider organic acids/organic acid stabilizers to control aerobic stability. Store in locations that provide flexibility. **Feeding Considerations:** Contains rapidly degradable starch; high in fermentation acids. Rates may need to be limited to reduce acidosis potential. Storing in flexible locations with excellent aerobic stability is preferred. Consider adding buffers to stabilize rumen pH. Add 2-4 oz of urea to diets to stabilize rumen pH if needed. Diets may not require fine ground corn.						
Late Dough-Early Dent	91	73.4	8	49	65	24	64:36:00
	Harvesting Considerations: Harvest as silage; contains too much moisture to ensile. Allow to freeze, monitor and ensile at proper moisture content (can reach proper moisture content quickly under good drying conditions). Consider applying an inoculant to control aerobic stability. Consider organic acids/organic acid stabilizers to control aerobic stability. Store in locations that provide flexibility. Attempting to salvage grain for high moisture corn is generally not advised; kernels are too wet and are subject to mycotoxin producing molds if left in the field. Grain can be salvaged as snaplage but feeding options [illegible] **Feeding Considerations:** Contains rapidly degradable starch; high in fermentation acids. Rates may need to be limited to reduce acidosis potential. Storing in flexible locations with excellent aerobic stability is preferred. Consider adding buffers to stabilize rumen pH. Add 2-4 oz of urea to cow diets to stabilize rumen pH if needed. Diets may not require fine ground corn. Test for starch content. When made and fed from this stage as high moisture corn or snaplage irreversable milk production losses may occur due to low energy content, excessive starch degradability or mycotoxin contamination.						
3/4 Milk Line	95	71	8	46	61	29	56:44:00
	Harvesting Considerations: Monitor moisture content; make as normal corn silage. Kernel processing may not be required. Consider applying an inoculant to control aerobic stability. Conserving as high moisture grain is possible but risky. Kernels moisture content is borderline (high); some additional drying time maybe required. Adverse weather could delay high moisture corn harvest increasing mold potential. Treat high moisture corn with organic acids or Lactobacillus Buchneri to increase aerobic stability. **Feeding Considerations:** Contains moderately degradible starch, however, normal aspects of feeding should apply. Diets may not require fine ground corn. Test for starch content. If harvested for high moisture content corn the amount fed may need to be limited because of rapid starch degradability. Since rates may need to be limited, high moisture corn stored in a flexible locations with excellent aerobic stability are at a premium. Energy contents maybe low.						
1/2 Milk Line	100	64	7.5	43	60	31	52:48:00
	Harvesting Considerations: Monitor moisture content; harvest as corn silage. Consider kernel processing. Or, monitor moisture content; harvest as high moisture corn. Consider inoculating high moisture corn with Lactobacillus Buchneri to increase aerobic stability. **Feeding Considerations:** Feed as normal corn silage or high moisture corn.						
Black Layer	100	58	7.5	40	57.5	34	48:52:00
	Harvesting Considerations: Harvest as high moisture corn. Harvesting as dried corn is also an option. If harvested for corn silage consider chopping somewhat finer and using a kernel processor. **Feeding Considerations:** Feed as normal high moisture corn or dried corn. Starch may be slowly degraded for corn silage. Some fine ground corn may be required in the diet if low starch digestibility is suspected.						

[1] *Adapted from Lauer, J. 2004. Negotiating the Value of Immature Corn Silage. Wisconsin Crop Manager. September 9, 2004. 1(24):158:161.*

[2] *Mention of specific inoculants or inoculant management practices is intended as a consideration. Under certain conditions the feeding level of immature corn silage may need to be limited in the diet therefore silages that are aerobically stable and can be fed under slow silo removal rates may be required. Specific inoculant species mentioned above may not be necessary in all situations.*