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Dairy Nutrition Fact Sheet
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Considerations for Working with Immature Corn Silage

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In some parts of New York, the 2011 corn crop may not reach normal maturity. There may be small ears, poor grain fill or even no ears on the corn plant at the time of harvest. We have seen this same situation in previous years. The following points may be helpful as you work with immature corn that will be harvested for corn silage.

1. Nutrient composition – Immature corn will usually be wet (<25-30% DM), higher in crude protein, higher in fiber, higher in sugar and lower in starch than "normal" corn silage. However, energy value may be 85-95% of the energy value of normal corn silage. Remember that corn silage is really grass forage with an ear attached. In the early growth stages, the plant can be a highly digestible source of fiber since lignin (as % of the total fiber) will often be lower than in mature corn silage. The energy in immature corn silage is mainly from the digestible plant rather than the grain. In 2000, we sampled some immature corn at the Cornell T&R Center. Most of this was in the dough stage and had starch levels between 5 and 20%. Normal corn silage is 25-40% starch. The predicted energy values for these samples were 80-95% of normal maturity corn silage.
2. Harvesting considerations – The biggest challenge is the moisture content of immature corn silage. It is not uncommon for these plants to be < 30% DM when they are ready to harvest. Key points to think about are:
    - If at all possible, wait until whole plant dry matter is > 32-34% dry matter. Harvesting wetter increases runoff from the silage and makes it difficult to get a good fermentation.
    - Store any immature corn silage in a separate storage facility if possible.
    - Take some samples during harvest and have them analyzed to provide a base of information on the nutrient content of the crop.
    - Check chopper settings and particle size of the material coming out of the chopper. If using the Penn State box, target 10-20% on the top screen and < 40% in the pan.

- Since ear and kernel development is poor, kernel processing is probably not needed.
- Follow normal silage management practices of filling fast, packing and covering the top with plastic or the new oxygen limiting silage covers.
- Immature corn silage should be high in sugar content to provide readily available carbohydrates to support fermentation. However, it may be lower in the normal bacterial population coming into the silo from the corn plant. The addition of a lactic acid based inoculant may be beneficial to stimulate fermentation.
- If possible, give the silo 3-4 months after filling before beginning to feed the silage out.

3. Forage analysis – Since there can be many factors that influence the nutrient composition of immature corn silage; an actual analysis of your specific corn silage is needed. This information can be used in both determining the price of this silage and also in balancing rations. A wet chemistry analysis may be better than NIR since calibrations for normal corn silage may not fit with immature silages. You may want to discuss this with the forage laboratory. Make sure that starch, NDF digestibility and a fermentation analysis are included.
4. Yield – Yield will be highly variable. Dr. Greg Roth at Penn State suggests that silage yield for corn plants without ears or poorly pollinated ears may be 1 ton of dry matter for each foot of plant height. This is based on the plants being 30% dry matter. Corn that is 5 feet high would be expected to yield about 5 tons of dry matter (16.6 tons of wet corn silage).
5. Economic value - The actual price will depend on a combination of yield, nutrient composition and dry matter content. Dr. Bill Weiss at Ohio State indicates that immature corn silage is worth about 85% of the economic value of normal corn silage at the same dry matter content. This is based on a number of runs over the years using the Sesame program. A major factor influencing the final price is adjusting for differences in dry matter content. The following example indicates how this pricing approach can be used to determine the value at the time of feeding:

    - Value of "normal' corn silage = $70/ton (35% DM)
    - Value of immature corn silage = $70 * 0.85 = $59.50 (still assumes 35% DM)
    - If actual dry matter is 27%, then the adjusted price = 45.90/ton
      (27/35 *$59.50)
    - If you want to "estimate" the value of the standing crop, use 70% of the adjusted price. This would be $41.65 in this example.

This represents the value at the time of feeding the corn silage to the cow. You could also use the following tools to determine the price of immature corn silage based on forage analysis data and current market prices for other feeds:

- Forages.xls (www.das.psu.edu/research-extension/dairy/nutrition/forages)
    - Scroll down to Forage Value spreadsheet

- Sesame (www.sesamesoft.com)
    - A license must be purchased to use this program.

6. Feeding considerations – Work with your nutritionist to determine the best way to use this silage on your farm. In some cases, it might be logical to use the immature corn silage for specific groups of cows or heifers. This will depend primarily on the nutrient profile, dry matter content and fermentation characteristics. It might be best to limit the use of this silage in rations for close-up dry cows and fresh cows if possible.
7. Summary –

    - Immature corn silage will vary both in nutrient composition and dry matter content.
    - Dry matter content will usually be low (<30% DM) in immature corn plants. Ensiling wet corn silage can result in unusual fermentations and the resulting silage may cause decreased dry matter intake when fed to cows.
    - Try to hold off on harvest until whole plant dry matter is > 32-34%.
    - Forage analysis is essential to characterize the immature corn silage on your farm and determine how it can best be used in dairy rations.
    - The energy value will probably range from 80-95% of normal corn silage.
    - The economic value will be about 85% of normal corn silage before adjusting for dry matter content.