GUEST COLUMN

Keep the Focus on the Basics – Corn Silage

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Forty! What is the significance of this number? My father always told me, "A farmer gets 40 chances to grow the perfect corn crop." This pronouncement assumed a much more physical existence and a health system far less developed than today. Still, whether the number is 50, 55, or 60 years, we need to make every year count. Retaining practices which worked in the past can help ensure continued success. In our quest for the latest technology do we forget about basic practices? With the 2015 corn silage harvest packed and (hopefully) fermenting, it is a good time to review management basics and practices which add value to corn silage.

Dry Matter &Correct Maturity. A first step in making good corn silage is harvesting at the correct dry matter (DM) and maturity. Corn silage harvested <30% DM loses water from leaching and is at risk of clostridial fermentation. Dry silage, >35% DM, is difficult to pack and microbial growth is likely. The University of Wisconsin has good information on measuring moisture content with a microwave (http://corn.agronomy.wisc.edu/Silage/S004.aspx). Taking time to determine whole plant DM before harvest, with a microwave or a forage moisture tester, is important. What about this rule of thumb – harvest corn silage when kernels are between 1/2 and 2/3 milkline? It works well in northern climates where the correlation between whole plant DM and corn kernel development essentially match. However, in southern climates where corn kernels are between 1/2 and 2/3 milkline, whole plant DM is often >35% and the silage is too dry. Soil type, hybrid selection, and growing season impact silage DM. Testing silage moisture is the best way to ensure proper ensiling.

Table 1. Packing tractor weight (assuming 10 hrs of harvest per day)

Acres per Day	Tons/Acre				
	15	18	20	25	30
25	30,000	36,000	40,000	50,000	60,000
30	36,000	43,200	48,000	60,000	72,000
40	48,000	57,600	64,000	80,000	96,000
50	60,000	72,000	80,000	100,000	120,000
75	90,000	108,000	120,000	150,000	180,000
100	120,000	144,000	160,000	200,000	240,000

Packing Density. DM testing helps manage another silage making basic – packing density. In the rush to harvest the perfect corn silage, packing is often the first casualty. When the chopper is running, it is tempting to run flat-out regardless of the number or weight of packing tractors available. The equation for achieving optimum packing density on the silage pile is:

Optimum packing vehicle wt (lbs) = filling rate (T/hr) x 800

Table 1 shows the pounds of packing weight needed, depending on rate of harvest. If you plan to harvest 20 tons/acre and harvest 25 acres/day, you'll need 40,000 lbs and one tractor to ensure proper packing. However, if you increase your harvest to 30 acres/day, you need to add a second tractor. Do you have access to a second tractor and operator to ensure proper packing?

Treat the Silage. Should you use a preservative on the silage? Should the preservative be an acid or an inoculant?

- Inoculants are living organisms applied to silage to enhance fermentation. Bacteria in the inoculant must multiply and grow to produce acid and preserve the silage. Bacteria require the right temperature, correct moisture, and no oxygen if they are expected to produce maximum acid quantity. Inoculants, when used in ideal conditions, can be an excellent management tool.
- Acids are selected when conditions are not ideal for desired inoculant growth, such as forage being too wet or too dry. Organic acids can work as spoilage (mold) inhibitors when silage is too dry (>35% DM). Propionic acid based preservatives control the growth of spoilage organisms, allowing time for natural (epiphytic) lactic acid producing bacteria to grow and multiply. However, when silage is too wet (<30% DM), spoilage organisms may also impact proper fermentation. Organic acid blends are effective at controlling spoilage organisms under too wet and too dry of conditions. Propionic acid and mixtures of propionic acid with other acids, such as acetic, are used to reduce spoilage and increase bunk life.

Silage Covers. A basic practice often overlooked is proper covering. Even the best silage management plan can result in poor quality silage if oxygen and moisture infiltrate the pile. DM loss is greater in bunker silage than bags or upright silos. However, with proper covering and sealing, DM losses in "horizontal" storage are greatly reduced. To properly cover silage, select a high quality polyethylene or other oxygen barrier film. After packing, quickly cover silage. After applying the cover, make sure to weigh down the cover with tires.

Removal Rate. A final basic, often forgotten, is proper removal rates. This starts when designing bunkers – wide bunkers hold more and are easier to pack, but may not be best for removal. This equation, from the University of Wisconsin, calculates bunker silo removal rate:

$$\text{Removal Rate (inches/day)} = \frac{\text{Dry Matter Intake (lbs)} \times \text{Number of Cows}}{\text{14.4 lbs/cu ft} \times \text{Bunker Width (ft)} \times \text{Bunker Height (ft)}} \times 12$$

A good rule of thumb is to remove 6-12˝ per day. By removing at least 6˝ per day, less oxygen infiltrates the pile, reducing yeast and mold spore growth which are dormant in oxygen-free silage piles. Once these spores become active, they start a secondary fermentation in the dairy ration. Using the equation above, if you have 100 cows consuming 30 lbs of corn silage per day, you'll need 3,000 lbs of DM. If your bunker is 15´ tall, 30´ wide and density is 14.4 lbs per cubic foot, you can only feed 5.5˝ per day – not enough to prevent oxygen infiltration in the bunker face. If, however, you make the pile 20´ wide, you can feed 8˝ per day and have a better chance to maintain high quality silage with each subsequent feeding.

Basic silage management is critical to making and maintaining quality forage. When forages comprise 50+% of the dairy cow diet, performing the right steps the first time can ensure your forage management plan results in the best quality feed. By selecting the proper hybrids, packing (and packing, and packing some more), properly covering the silage and feeding 6-12˝ per day, your forage can fully maximize your feed quality to allow greater milk production in each of your 40 plus years in the dairy business.

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