Preventing Corn Silage Shrinkage and Spoilage

Corn Silage is a major ingredient in most dairy rations. If, for example, a dairy producer harvests 25 acres for corn silage and the yield is 20 tons per acre, then there should be 500 tons of corn silage available to be incorporated into a ration to be fed to the dairy herd over the next 12 months. But, will there really that amount of corn silage available for the year’s feeding? The answer is no. There is dry matter loss through fermentation, wastage and spoilage that affects corn silage inventory. How much wastage and spoilage is acceptable? Dry matter loss with fermentation and feeding should be less than 10%, yet on some farms losses can be as great as 25% or more.

When evaluating yield, it is disappointing if there is a 2 to 5 ton less corn silage yield per acre that anticipated. Yet, it is easy to lose 2 to 5 ton/acre in storage or through the farm’s feeding system practices if everything possible isn’t done to prevent wastage and spoilage. Therefore, the cost of producing the corn silage also has to take into account the feed losses that don’t get to the bunk. Decreasing feed shrinkage is a good management strategy to help reduce these costs. The high quality silage harvested must be preserved and the tonnage maintained as best possible.

<table>
<thead>
<tr>
<th>Moisture (%)</th>
<th>Harvest</th>
<th>Storage</th>
<th>Field tonnage to feeding</th>
<th>Total</th>
<th>Tons to grow 1 ton feedable CS**</th>
</tr>
</thead>
<tbody>
<tr>
<td>70+</td>
<td>4.0</td>
<td>13.7</td>
<td>4.0</td>
<td>21.7</td>
<td>1.26</td>
</tr>
<tr>
<td>60-69</td>
<td>5.0</td>
<td>6.3</td>
<td>4.0</td>
<td>15.3</td>
<td>1.17</td>
</tr>
<tr>
<td>Under 60</td>
<td>16.2</td>
<td>6.3</td>
<td>4.0</td>
<td>26.5</td>
<td>1.33</td>
</tr>
</tbody>
</table>

**Figures show tons of corn silage that must be grown for every ton of corn silage to be fed.
*from “Corn Silage Production, Management, and Feeding,” North Central Regional publication

What management practices can help prevent spoilage? They include harvesting corn silage at around 33% dry matter for bunkers, around 33% for piles, about 36% for stave silos, and 30-40% for ensiling in bags. If the silage is too dry, it becomes difficult to pack.

Let’s look a little more in-depth at silo packing management. For bunker silos, tractor weight, packing time, layer thickness, height of silage, and moisture content all affect packing. The goal is to achieve a silage density of greater than 16 lbs of dry matter per cubic ft. High
silage density increases storage capacity and reduces silage porosity, which reduces oxidation loss and preserves the high feed quality harvested. A University of Wisconsin formula for packing in a bunker silo is as follows: divide the pack tractor weight by 800 to get tons of silage that can be packed per hour. A 40,000 lb tractor can pack about 50 tons/hr. This equates to about seven wagonloads (7-8 tons/wagon) in a one-hour period for adequate packing to be achieved. The most desirable method of packing bunker silos is the progressive wedge method, where silage is continually packed on a 30-40% grade. This minimizes the surface area that is open to exposure to the air that can result in dry matter and forage quality losses. If this is not possible, then silos should be packed by spreading relatively thin layers of silage (6 inches deep) and packing it well.

For silo bags, research from the USDA Forage Research Center in 2002 indicates the effects of dry matter content on density in corn silage varied by bagging machine. Core samples taken at the face of bags during emptying found considerable variation in density. The outer inches on the top and upper sides had densities on average 40% of those in the center and lower portions. This suggests the need for higher feed out rates than might be anticipated for similar average densities in bunker silos.

It is also important to know that dry matter densities in bag silos can vary by machine and operator. If hiring a custom bagger, the dairy producer must have the assurance the operator is filling the bags properly and obtaining the correct density. Also, substantial spoilage losses can occur if bags are not routinely monitored for holes and patched or if overly dry silage (greater than 40% dry matter) is fed out under warm weather.

What is the potential spoilage and silage inventory loss from these two storage systems?

Do not try to stretch the corn silage inventory by feeding spoiled silage to the dairy herd. The quality of the total mixed ration (TMR) mix should not be compromised by incorporating spoiled silage into the TMR. Poor quality corn silage in the TMR creates a poor quality TMR.
Feeding spoiled silage, even at only 5% of the total ration dry matter will reduce intake. Nutrient digestibility and rumen health is compromised. The spoiled silage can partially or totally destroy the forage mat in the rumen. Cows will then be more susceptible to metabolic disorders, displaced abomasums and hoof problems. This also means the producer loses milk production, and/or there is the added dollars spent replacing lost energy and protein in the ration to compensate for the poorer quality. And remember, feeding spoiled silage to dry cows and young heifers can have a negative impact on their fertility and reproductive efficiency as well.

Dairy producers, if there is usually too much spoiled silage in your storage system and if there is too much shrinkage of corn silage inventory on your farm, then now is the time to determine some management strategies to change that situation before corn silage harvesting begins.

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