Managing Silage in Corn

- To reap the benefits of corn silage, it must be of a high quality.
- Silage management is influenced by several factors such as harvest timing, product selection, plant population, ensiling, storage, and height/length of the cut.
- Analyze silage at a laboratory to determine dry matter content and nutrient levels before formulating rations.

Harvest Timing

The best time for harvesting corn for silage is when kernels are well dent, but before the leaves turn brown and when moisture content of the corn plant is between 65 to 70%, which equals to 30 to 40% of dry matter (DM). The quantity and quality of the silage is at peak during this time. Substantial seepage and storage losses often occur to silage containing 75% moisture or more.2

Nutrients in corn silage are directly related to the percentage of DM; therefore, proper timing of corn harvest is critical. Digestibility and metabolizable energy can be influenced by corn growth stage at harvest. If ensiling is delayed, animal digestibility and weight gain can be diminished. Silage harvested too dry or mature can have harder kernels, which contain more starch, instead of desirable sugars and digestible fiber.

Product Selection

Selecting the right corn product is one of the most important factors that affect silage quality and yield potential. A corn product selected for silage should produce high yields of quality silage. Corn silage products that mature slightly later than grain products (5 to 10 more RMs) generally produce higher silage yields. However, selecting products with a range in relative maturity can widen the harvest window.

Corn products that mature late usually tend to produce better silage. Products that take advantage of a longer growing season can accumulate more dry matter.1 At harvest, grain represents about 1/3 to 1/2 of the whole plant dry weight.2

Plant Population

Silage quality and yield potential are significantly affected by plant population. For corn silage, plant population can be planted 10 to 15% higher than the recommended rate for grain production;6 however, higher densities can result in smaller plants and ear size resulting in low yield potential. Protein content and digestibility can also be decreased at higher populations.

Ensiling

Air and rain infiltration can cause poor fermentation and spoilage in a silo. Rain will increase moisture/seepage, which can lead to the development of undesirable bacteria and an increase in nutrient leaching, all of which can reduce the silage nutritional value.
Managing Silage in Corn

When possible, the corn silage should be harvested at a moisture content appropriate for the type of silo used. There are several types: upright or tower silos, bunker silos, and bag silos. Aim for 60% moisture content for silage going into an upright silo and around 70% moisture content for a bunker silo, because of increased packing capabilities.

Silage moisture content can be tested using a “grab test” method. Squeeze the chopped forage into a ball and hold for 20 to 30 seconds. If moisture content within the ball is over 75%, the ball will hold its shape. Balls with no juice and falling apart contain 60 to 70% moisture, while balls with no integrity contain less than 60% moisture. If the silage is too moist, seepage can result in damage to upright silos and also cause nutrient loss.

Corn that is too dry when chopped does not pack well and produces more air pockets when packed. Poorly packed silage takes longer to go from an aerobic (with oxygen) to an anaerobic (without oxygen) state. During the aerobic state, the consumption of nutrients raises the temperature, increasing the possibility of burning and reducing silage quality.

Storage
Approximately three weeks after ensiling the fermentation process is completed and silage is ready to be fed.

In upright silos, silage spoilage can be avoided if two inches of the silage is removed daily in the winter and three inches daily in the summer. In bunker silos, three inches of the silage is recommended to be removed daily in the winter and four inches daily in the summer.

Dry matter losses may be greater in bunker than in upright tower silos. The losses can be kept similar if bunker silos are built with 12 to 16 feet side walls. The depth improves compaction, decreases oxygen, and reduces the percentage of total volume exposed to surface spoilage.

If silos drain, nutrients can be lost in the drainage. Bunker or small upright silos have little seepage when DM levels range from 30 to 35%.

However, large upright silos (30 feet × 70 feet) may have seepage even when silage is stored at 35% DM.

Height/Length of Cut
Corn silage is traditionally harvested at a height above ground level, which helps maximize yield potential and still keeps the quality desired.

Increasing the cutting height improves silage quality because the lowest portion of the corn stalk is typically higher in fiber and lower in digestibility; however, research has shown that increasing the cutting height of corn silage decreases yield potential due to the extra stalk that is left in the field.

If the plants have been under drought conditions, nitrate levels may be elevated in the lower stalks. In this situation, cutting the corn up to eight inches higher than normal may be warranted to avoid harvesting the nitrate-rich stalk. Nitrate levels can be reduced by 30 to 50% through fermentation. Silage with high nitrates should be diluted with feed grains or legume hay.

Corn silage should be cut into 0.5 to 0.75 inch pieces for packing. Silage pieces of this size can be packed more firmly in the silo and be more palatable. Ensiling is preferred to green chopping because of the fermentation process.

Analysis
Laboratory analysis should be completed on corn silage to determine the DM content and nutrient levels for use when formulating rations.

Sources: