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Harvesting High-Quality Corn Silage

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Abstract
Proper harvest management is critical for high-quality corn silage, and it starts with harvest timing. This ensures that the harvested crop is at the optimum moisture for packing and fermentation. Silage that is too wet may not ferment properly and can lose nutrients through seepage. If silage is too dry when harvested, it has lower digestibility because of harder kernels and more lignified stem fiber. In addition, dry silage does not pack as well, thus increasing the potential for air pockets, excessive heating, and mold.

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Harvesting High-Quality Corn Silage

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Proper harvest management is critical for high-quality corn silage, and it starts with harvest timing. This ensures that the harvested crop is at the optimum moisture for packing and fermentation. Silage that is too wet may not ferment properly and can lose nutrients through seepage. If silage is too dry when harvested, it has lower digestibility because of harder kernels and more lignified stem fiber. In addition, dry silage does not pack as well, thus increasing the potential for air pockets, excessive heating, and mold.

Optimum silage moisture at harvest ranges from 55-60 percent for upright oxygen-limiting silos; 60-65 percent for upright stave silos; 60-70 percent for bags; and 65-70 percent for bunkers. Due to variability among hybrids and growing conditions, best management is to collect a representative chopped sample and check whole-plant moisture content using a commercial forage testing laboratory, forage moisture tester, or microwave oven rather than simply estimating it from the kernel milkline. Instead, kernel milkline should be an indicator of when to collect the first silage samples for moisture testing.

A general guideline is to begin moisture testing when the milkline is about one-fourth of the way down the kernel from the dent end for horizontal silos, and about 40 percent of the way down the kernel for vertical silos. Then, under normal crop development conditions, assume a constant drydown rate of about 0.6 percent per day, and measure moisture again prior to harvest.

Grain Processors

Length of cut and crop processing are also important for obtaining high-quality corn silage. A grain processor on the chopper breaks cobs and kernels, and increases surface area which improves digestibility, reduces cob sorting, and results in higher density silage that packs better.

Although grain processors on the chopper are expensive and require more energy, the higher-quality silage produced can increase milk production by 300 pounds per cow per year. The benefit of crop processors is greatest when there are drier, harder kernels resulting from delayed harvest or drought. When using a grain processor, chopper cut length can be increased to reduce horsepower requirements while maintaining optimum particle size. For unprocessed corn, ideal chop length is three-eighth inch theoretical length of cut. For processed corn, recommended settings are a three-fourth inch theoretical length of cut with 0.08 to 0.12 inch roll clearance.

A 4 to 6 inch cutting height is generally recommended for corn silage, as it maximizes silage yield and milk per acre. However, drought-stressed corn can accumulate nitrate in the lower part of the stalk, thus increasing the potential for nitrate poisoning, particularly in older livestock on lower-energy rations. The potential for high nitrate silage can be even worse if drought-stressed silage is harvested within 10 days after rainfall, since rainfall can lead to a sharp increases crop uptake of soil N.

Some producers increase the height of cutting to increase silage quality. While this will produce silage with a higher ratio of grain to stover, and thus a

higher silage quality, it will reduce harvested yield and reduce the contribution of fiber from silage in rations.

Silage with high nitrate levels can be managed by dilution with other feeds or by increasing the cutting height to 12 inches, or 18 inches, thus leaving more of the higher nitrate lower stalk in the field. However silage cut at this greater height has been shown to have 8 to 15 percent less silage yield and 2 to 12 percent less milk per acre. So, the lower tonnage with high-chop silage is seldom justified in the absence of high nitrate levels.

When harvest begins, fill silos rapidly to reduce exposure of silage to oxygen and to reduce fungal growth. For bunker silos, pack silage as tightly as possible in progressive wedges in depths of 6 inches or less. Then cover and seal well.

Adapted by Stephen K. Barnhart, Iowa State Extension Agronomist, from an August 2009 newsletter article by Jeff Coulter, UMN Extension Corn Agronomist

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