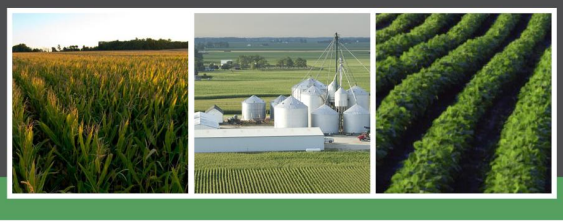



# Managing Corn Silage

**The optimum harvest timing for corn silage is 60 to 70% whole plant moisture content. Corn product selection is one of the most important factors for high-quality silage. Other factors that can influence silage quality include plant population, maturity at harvest, height and length of cut, fermentation process, and storage.**

## WHAT TO CONSIDER

The tonnage and quality of silage are potentially optimum when the kernels are well dented, the moisture content of the corn plant is between 65 to 70%, which equals 30 to 40% of dry matter (DM), and leaves have not turned brown. Substantial seepage and storage losses often occur to silage containing 75% moisture content or more.[1] Cutting silage when corn is in the 63 to 68% moisture content range allows for adequate packing with minimal seepage. Corn at the R6 growth stage (physiological maturity or black layer) can have an average kernel moisture content of 30 to 35%, which is considered ideal for high moisture corn silage or earlage. However, corn moisture content at the R6 growth stage can vary among products and environmental conditions.

## YIELD IMPACT

Nutrients in corn silage are directly related to the percentage of DM; therefore, harvest timing is critical. Digestibility and energy can be influenced by the corn growth stage at harvest. If ensiling is delayed, animal digestibility and weight gain can be diminished. Harvesting silage at lower moisture content levels can increase starch content but may also create harder kernels that require additional processing to get desired starch digestibility. Silage harvested too dry or mature may have less than the desired neutral detergent fiber digestibility (NDFD) and can be more difficult to pack to adequately exclude oxygen and prevent excessive spoilage.

## MANAGEMENT OPTIONS

**Harvest Timing:** The kernel milk line, which forms after denting, is a common visual tool to estimate kernel moisture content. The milk line is a whitish line that separates the solid and liquid parts of the kernel (Figure 1). To estimate kernel moisture content, break an ear and look for the milk line on the developing kernels. As a general rule, when the milk line is 1/2 to 2/3 down from the kernel crown, total plant moisture content is around 60 to 70%. More accurate tools for measuring moisture content are a microwave oven, drying oven, or a commercial forage moisture tester.

**Product Selection:** Full season maturity corn products with high grain yield potential tend to produce the best silage because they can take advantage of a longer growing season and can accumulate more dry matter.[2] At harvest, grain represents about 1/3 to 1/2 of the whole plant dry weight.[1]

**Plant Populations:** Silage tonnage usually increases as plant populations increase; however, plant populations for corn silage are dependent upon the productivity level of the corn product, field characteristics, environment, and management demographics. Increasing plant populations by 10 to 15% over those recommended for grain production can often maximize the potential for silage tonnage.[3] The effects of increased population on fiber content, digestibility, and protein concentration are generally small.

**Cutting Height and Sizing:** Corn silage is traditionally harvested at a height of 4 to 8 inches above ground level, which helps maximize tonnage potential and milk production per acre (Figure 2). Increasing the cutting height can improve forage quality because the lowest



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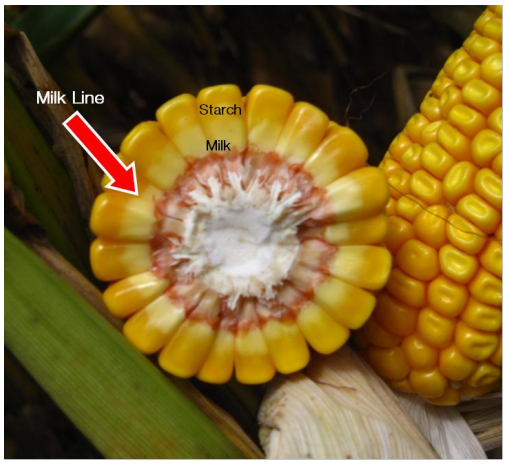


Figure 1. Kernel milk line is the border between the dark yellow hard starch layer and the light milky dough layer. At 1/2 milk line, corn is at full dent (R5 stage), kernel moisture is about 40%, total plant moisture is about 60 to 70%, and over 90% of the normal grain yield can be expected.

Figure 2. Chopping silage.

portion of the corn stalk is typically higher in fiber and lower in digestibility. Silage research has shown that increasing the cutting height to as high as 19 inches, can reduce tonnage potential; however, by increasing silage quality (milk per ton), milk production (milk per acre) may only be slightly reduced.[4] Drought conditions can increase the potential for nitrate rich stalks; therefore, cutting the stalks up to 8-inches higher may be warranted.

Corn silage should be cut into 1/2 to 3/4-inch pieces for packing. Pieces of this size pack more firmly in the silo and are more palatable.

**High Nitrate Silage:** Ensiling is preferred to green chopping as nitrate levels can be reduced by 30 to 50% through fermentation. Suspected high-nitrate silage should be tested prior to feeding livestock. Identified high-nitrate silage should be diluted with feed grains or legume hay.

**Ensiling:** Air and rain infiltration in a silo can cause poor fermentation, spoilage, and reduce nutritional value. There are several types of silos, upright or tower, trench or bunker, or stacks. Aim for 60 to 65% moisture content for silage going into an upright silo and around 65 to 68% moisture content for a bag or bunker silo because of increased packing capabilities. To test for silage moisture, a “grab test” can be utilized. 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 content, and balls with no integrity contain less than 60% moisture content. If silage is too moist, seepage can result in the loss of nutrients and potential damage to upright silos may occur.

If lactic acid levels, which help decrease silage pH, are too low, the silage quality will be reduced because of the fermentation time increases.[5] Corn that is too dry when chopped does not pack well, produces more air pockets, and takes longer to go from an aerobic (with oxygen) into an anaerobic (without oxygen) state. During the aerobic state, the consumption of nutrients raises the temperature, increases the possibility of burning, and lowers silage quality. Laboratory analysis should be completed on corn silage to determine dry matter content and nutrient levels for use when formulating rations.

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