

## **Here are some tips on corn silage harvest management . . . .**

**by**

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### **At what stage of maturity should we harvest?**

Years ago, it was recommended that corn silage should be harvested at the black-layer stage of maturity. In recent years, research and field experience has shown that this practice usually results in silage that is too dry to be well utilized by dairy cows.

Positioning of the kernel milkline is another method of maturity staging that has been used as an indicator of when to harvest whole-plant corn for silage. The best lactation performance by dairy cows has been shown to occur at roughly the one-half milkline stage of maturity.

But, recent research and field experience has shown considerable variation in the relationship between whole-plant moisture content and positioning of the kernel milkline. This variation is related to differences in hybrids and their dry-down characteristics and differences in growing conditions. Blindly harvesting whole-plant corn for silage at one-half milkline will sometimes result in silage without the right moisture content for good preservation and utilization.

It now appears that the best use of kernel milkline positioning is as an indicator of when to start monitoring whole-plant moisture content. Once most of the kernels are dented and the milkline is visible, it is time to chop some whole plants for measurement of moisture content. Whole-plant moisture content should be your trigger for when to harvest corn silage.

Special attention must be paid to making an accurate determination of moisture content. Over several years of monitoring the corn dry-down in their counties, our extension agents report a tendency for the microwave-oven and Koster-tester methods to over-estimate the dry matter content of whole-plant corn.

Considerable care and time must be taken to drive off all of the water and reach a stable endpoint weight before calculating sample dry matter content when using these on-farm methods. Another option is to have the sample dry matter content determined by a commercial testing lab. Analyzing the sample just for dry matter content is not usually very expensive and using the near infrared (NIR) method of analysis allows for a rapid turn around time.

## **At what moisture should we harvest?**

The best lactation performance by dairy cows has been shown to occur at 65% to 70% whole-plant moisture. This range in whole-plant moisture content works well for achieving good preservation in horizontal silos. Harvesting whole-plant corn with more than 70% moisture increases seepage losses, increases acidity which can lower dry matter intake, and reduces dry matter yield per acre.

Whole-plant corn harvested for storage in upright silos may need to be chopped a bit drier than 65% moisture to minimize seepage. But, research has consistently shown reduced fiber and starch digestion along with reduced lactation performance for corn silage harvested at 60% moisture or less. Corn silage harvested at 60% moisture or less will need to be either chopped fine or processed to minimize losses in starch digestion and lactation performance.

## **At what length should we chop?**

The general recommendation for corn silage harvested with a conventional harvester (without a crop processor) is 3/8" theoretical length of cut (TLC). This recommendation may vary between 1/4" to 1/2" TLC depending upon whole-plant and kernel moisture content, hybrid, and forage harvester.

To get good breakage of cobs and kernels with a conventional harvester it is often necessary to chop finer than we would like from an effective fiber standpoint. Unbroken kernels tend to pass through the cow undigested and large pieces of cobs or whole cobs are prone to sorting in the feed bunk. This typically means that only 5% to 10% of the silage should be in the coarse particle fraction or retained on the top screen of the Penn State-Nasco shaker box.

Evaluate percent coarse particles and degree of kernel and cob processing to determine the proper TLC setting for your harvester. Corn silage that is harvested past 1/2 milkline stage of maturity or with less than 65% whole-plant moisture may need to be chopped at 1/4" TLC. It may be possible to chop corn silage that is harvested at an immature or wet stage and hybrids that exhibit soft kernel texture at 1/2" TLC. It appears that brown mid-rib (low lignin) corn silage should not be chopped at less than 1/2" TLC to maintain effective fiber.

Based on our research, the recommended chop length for corn silage harvested with a harvester fitted with a crop processor is 3/4" TLC. This normally means that 20% to 30% of the processed silage will be in the coarse particle fraction or retained on the top screen of the Penn State-Nasco shaker box. Processed corn silage that is harvested at black-layer stage of maturity or with about 60% whole-plant moisture may need to be chopped at 1/2" TLC. We have no data with processed silage at lengths greater than 3/4" TLC, but there have been field reports of excessive equipment wear at TLC of an inch or more.

## **How can we tell if our crop processing is being done properly?**

Based on our research, the recommended roll clearance ranges from 1/16 to 1/8 inch (1 to 3 millimeters). Roll clearance is determined using feeler gauges. If you do not have feeler gauges, lay the blade of your pocketknife flat between the rolls and adjust the clearance until the rolls tighten against the blade. Harvest some whole plants, shake out the chopped material, and visually inspect each screen for the degree of kernel and cob processing. We would like to see all of the kernels broken. Pieces of cob, if discernible, should be no larger than the end of your little finger. If kernel and cob breakage is not complete, then tighten the rolls until kernel damage is complete or consider reducing your TLC. This may be necessary for processed corn silage that is harvested at black-layer stage of maturity or with about 60% whole-plant moisture. With processed corn silage harvested at an immature or wet stage that tends to mush, you can set roll clearance to 1/8 inch (3 millimeters). Make sure that you follow all recommended safety practices whenever making any machine adjustments.

## **At what height should we chop?**

Silage dry matter yield is reduced about 15% as the row-crop head is raised from 6 to 18 inches. But, estimated milk per ton increases because the more fibrous and less digestible portion of the whole-plant material is left in the field.

This results in estimated milk per acre being reduced only about 3%. Prioritize your needs for maximum yield versus high quality to determine the best cutting height for your situation. This may vary from year to year depending upon the inventory and quality of your haycrop silage.

From an erosion control standpoint, more beneficial crop residue can be left in the field without sacrificing much milk per acre. Also, because nitrates tend to concentrate in the bottom portion of the stalk raising the crop-head head helps minimize nitrate concerns. This may or may not be an issue depending on your crop growing conditions.

## **Summary . . . .**

Harvesting whole-plant corn at the right moisture content and particle size is crucial to making high-quality corn silage that is well utilized by dairy cows.

Whole-plant moisture content rather than kernel milkline positioning should be your trigger for when to harvest corn silage. Monitor particle size and kernel and cob breakage to ensure that the forage harvester-crop processor is doing the job.

Remember to use additives properly, pack well, and cover securely to minimize storage losses.