Western Dairy News
for the West, about the West, from the West
September 2005
Volume 5, No. 9

Corn silage harvest guidelines & options

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THE number of options producers face during corn silage harvest increases every year. Traditional guidelines for harvesting corn silage focused on crop maturity and storage options; when the crop was at the correct maturity the corn silage was harvested, placed in a bunker or silo, and allowed to ferment. Today, corn silage requires a variety of choices to be made. Options such as cutting height, processing, and inoculants impact the harvested yield and feed value of a corn silage crop. To make an informed decision, explore the implications of various options.

Maturity and harvest moisture

Whole plant moisture at the time of ensiling is critical to insure quality fermentation. Considerable effort has focused on defining the relationship between whole-plant moisture content and kernel maturity, which is often called kernel milkline.

The best performance by lactating cows occurs when corn silage is harvested at one-half to two-thirds milkline. At this kernel milkline, the whole plant moisture is approximately 35 percent. However, whole-plant moisture and kernel milkline are not always directly related, so monitor the whole plant moisture in addition to watching kernel milkline.

Although kernel milkline can help gauge the maturity of corn silage, do not decide harvest time based solely on kernel moisture. Determine the whole plant moisture content of corn silage by chopping several plants and testing the dry matter content of a subsample of the chopped plants. Decide when to harvest the corn silage crop based on whole plant moisture content, not just the kernel milkline.

When determining the best time to harvest corn silage, remember to consider the time required to harvest the entire crop and factor in schedules of custom harvesters if they are being used. For extended harvest times, consider starting to chop when the dry matter of the corn silage is a couple of percentage units below the ideal dry matter percentage. By the time the last of the crop is harvested, the dry matter percent may be several points greater than when harvest began. When corn silage is being harvested in a short period of time, aim for a dry matter content of 35 percent, since there will be less variation during the harvest period.

Cutting height

Raising the cutting height of corn silage has been a controversial issue for several years. Traditionally, corn silage has been harvested at a height of 4 to 6 inches. On a tonnage basis, chopping corn silage at this normal height results in greater yields of silage. Recently, several research trials evaluated whether the results of increasing the cutting height of corn silage improved corn silage quality.

Increasing the cutting height of corn silage decreases yields due to the extra stalk that is left in the field. In one study, tonnage decreased by 10 percent when cutting height was raised 13 inches. When corn silage supplies are short, increasing cutting height is not a good option since a significant amount of tonnage remains in the field.

The main advantage of increasing cutting height is increased quality of the corn silage. The reduced amount of stover harvested results in increases in the percentage of grain in the corn silage. In one study, corn silage harvested 13 inches higher resulted in a starch content 2.2 percentage units greater. When normal and high-cut corn silages were fed to lactating cows, the high-cut silage resulted in increased milk yield of 3.3 pounds per day, but fat-corrected milk didn't change.

The increased quality of high-cut corn silage has enhanced milk production approximately 3 percent with certain feeding strategies. The big question is whether or not the improved percentage of grain in the stover results in sufficient improvement in feed efficiency and milk production to offset the yield reduction resulting from the increased cutting height.

Although manystudies on high-cut corn silage focus on the quality of corn silage and the affect on milk production, few actually evaluate the economics of increasing the cutting height of corn silage at the whole farm level.

The Integrated Farm System Model (IFSM) was used to evaluate the economics of increasing corn silage cutting height. The scenarios used in the model evaluated the

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Production effort for Western Dairy News is generously sponsored by Monsanto Dairy Business

use of a 6-inch versus an 18-inch cutting height. Even when an increase in milk yield was assumed in the model, raising the cutting height of corn silage did not result in an increase in farm income in any of the scenarios that were modeled.

In one scenario, average net return was $15 per cow greater if corn silage was cut at 6 inches as compared to 18 inches. When greater milk production was factored into the model, the average net return for corn silage cut at 18 inches was still $6 per cow less than when corn silage was harvested at a 6-inch cutting height.

Another factor to consider with increased cutting height is the effect of the greater amount of stover left in the field. These greater stover levels can increase the amount of field work required to incorporate the extra organic residue from the crops and can actually result in increased field work.

The amount of nutrients removed from the field is also changed by the cutting height of the corn silage. If one farming operation goal is to remove the most nutrients from the soil, leaving more of the corn plant in the field may not be a good choice. Reducing the yield of corn silage by 0.5 tons of dry matter per acre means 12.8 pounds of N and 2.6 pounds of P remain in the field compared to corn silage harvested at the normal height. When multiplied by 500 or 1,000 acres, the amount of additional N and P that could be removed from the fields by using a normal cutting height for corn silage is significant.

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Processing

Processing corn silage occurs when it is passed through rollers immediately after chopping. The goal of processing is to break the corn kernel and crush the fiber portion of the plant. Processing corn silage increases availability of the starch and fiber and decreases waste from uneaten cobs. Although processors were not common in the past, today most choppers have them. In addition, processing is usually an option when using custom harvesters.

Spacing of the rollers is important to insure that the kernels and stover portion of the plant are sufficiently crushed. A recent university study found that a roller spacing of 8 mm was not sufficient to crush the kernels and may not result in an increase in fiber digestion. In the same study, a roller spacing of 4 mm was adequate to process both the kernels and the fiber.

One of the biggest challenges can be insuring that corn silage is adequately processed during harvest. Processing can slow down the chopper, so make sure the person doing the chopping is harvesting the corn silage to your specifications. If corn silage is not processed correctly, cows will not utilize as many of the nutrients and the corn silage will not provide as much energy to the animals.

Processing rollers will wear with time, resulting in corn silage that is not processed right. Therefore, check silage processing throughout the harvest period and from year to year. When checking silage processing, pay special attention to the corn kernels. If the rollers start to wear the fiber portion of the plant may still be adequately processed but some of the kernels may not be broken. Even though the corn silage was being processed correctly on the first day, it doesn't mean the last corn silage harvested will be processed just as well.

Inoculants

The use of inoculants on grass crops has become a common practice. However, the value of using inoculants on corn silage is not as clear due to the naturally higher starch contents and decreased buffering capacity of corn silage. Deciding whether or not to use an inoculant on corn silage is the first decision required. Determining which inoculant to apply is a complex issue and can be a much more complicated decision.

Applying inoculants during chopping insures that fermentation proceeds properly. Improvements in fermentation are not the only advantage of using inoculants on corn silage. Applications of certain types of inoculants can also help stabilize corn silage during aerobic conditions. Another possible benefit may be increased fiber digestibility by cows, resulting in corn silage with greater feed value.

The most common bacterial species included in inoculants are *Lactobacillus plantarum* species. This type of bacteria improves fermentation of the silage. Applying an inoculant decreases the pH during fermentation. Some inoculants contain *Lactobacillus buchneri*, which assists with aerobic stability of the silage. When inoculants are used, apply them at a rate of >90 billion live bacteria per ton.

There are a wide variety of different inoculant products available on the market. If you choose to apply an inoculant, begin by deciding the main goal behind its use. Certain bacteria are better for the promotion of fermentation, whereas others do a better job of promoting aerobic stability. When applying an inoculant, select a reputable product that has been tested in independent research trials.

Summary

The options available during corn silage harvest are increasing each year. Having goals in mind of how corn silage fits into an operation helps determine which options are viable for your dairy operation.

Western Dairy News is published as a service to people interested in the health and welfare of the Western dairy industry. Archives of this publication may be found at:
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