Managing Forage Quality by Cutting Height

Adapted from a PennState Extension article by Zhiguo Wu and Greg Roth

Corn silage is an important forage source and usually accounts for 30-40% of the dairy cow diet. Recently, interest has developed in cutting corn silage higher during harvest to improve forage quality. Cutting corn silage higher can increase silage quality since the lower part of the crop is poorly digestible, but this can also reduce yield. Is the improved quality large enough to offset the yield loss and further increase profitability of the dairy? What factors should be considered before choosing to cut corn higher? The decision to chop corn silage at higher levels is a farm-specific question and is likely influenced by a number of other considerations.

Cutting silage at higher levels can be a tool for farmers to manage the dry matter of the crop. Since harvesting silage a foot higher will generally increase dry matter in the harvested crop by 2% units, farmers could use this to harvest earlier. Since corn silage generally dries down at a rate of ~0.5%/day, this translates into harvesting approximately four days earlier. This would be important when working with a custom operator or managing harvest logistics. In other situations, where the crop is already too dry, it is probably best to harvest at the normal 6" height.

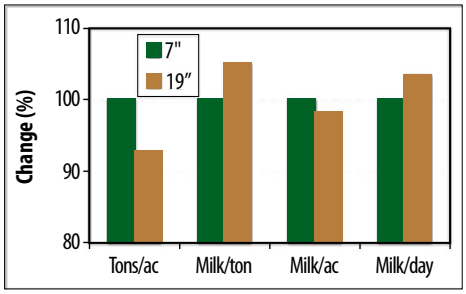

Figure 1. Potential production changes, along with milk production changes observed in two feeding trials. Silages were included in the diets at 40%. In both studies, dry matter intake was not affected by cutting height, while milk yield increased for the higher-cut diet. Increases in milk yield were similar, averaging 3 lbs/day. Milk fat content, however, decreased for the high-cut diet in both studies, with the reduction averaging 0.3%/unit. Milk protein content was not affected. Results would suggest the net benefit of feeding high-chop corn silage when substituted in the ration for conventional silage is minimal. However, further analysis was able to demonstrate a positive return when considering ration cost.

Chopping higher can also leave more residue in the field, improving soil erosion protection. However, this effect is likely small on fields that will be planted with a rye cover crop. One consideration on those fields is that some of the remaining stalks could be harvested with the following year's rye crop, potentially reducing the forage quality of ryelage harvested the next spring.

The response to cutting height may be influenced by several other variables. Some specialty hybrids may contain more sugar in the stalk or have high stover fiber digestibility. Therefore, the quality response to increased cutting height may be diminished. For example, brown midrib hybrids have been reported to change little in quality to offset the impact on yield.

Another potential benefit with higher cutting is nitrate reductions in harvested material. This is particularly important in drought seasons.

Another consideration is the effect on your forage inventory. Particularly if high chop corn silage or other forage sources are fed at a higher level, storage will need to be increased to meet the needs of the herd. If the storage capacity on the farm is already limiting, then a higher chop and increased corn silage feeding levels would exacerbate this problem. Each inch in cutting height reduces harvested yield by ~0.05 tons/ac.

High-chop corn is most profitable when fed to lactating animals, since dry cows and heifers are less likely to be responsive to the resulting increase in quality. Our analysis shows, in some situations, higher-cut corn silage can improve milk production when directly substituted in the ration. But it can also decrease milk fat content, resulting in a net economic benefit which is negative to slightly positive. Minimizing decreases in milk fat is critical. When we switched from conventional to high-cut corn silage and rebalanced the ration with more forage, there appeared to be a potential advantage of 7¢/cow/day for the high-cut ration. This is consistent with reports that using high-cut corn silage allowed more forage to be included in the diet with comparable milk production. In addition to reducing feed costs, this approach should also help maintain milk fat content and, therefore, should be most suitable for use with high-chop corn silage.

Apart from increasing energy content and nutrient digestibility, high chopping can be a tool to manage dry matter content and harvest timing of corn silage. However, there are many other farm-specific factors that can affect the profitability of the practice and should be considered. It is important farmers do their own analyses before making the switch to higher-cut corn silage. For more information please check out our extension article at bit.ly/3iApQs5, which contains additional references and cost analyses.