

THE FORAGER

Agronomics with livestock in mind!

More Mileage from Corn Silage: Selecting Hybrids

Corn is a versatile crop that can be planted from early to late spring. In the fall, producers have the option of harvesting corn for either silage or grain. Corn silage is an important source of forage. Producers often need to reevaluate cropping systems and increase their use of corn silage, especially in dairy rations.

Corn can produce high dry matter yields, and is a good crop to recycle nutrients from manure and help maintain water quality. It is easily ensiled, resulting in palatable forage with a relatively consistent quality and higher energy content than many other forage sources. Corn silage production often requires less labor/machinery than other harvested forages, all of which can impact the cost per ton of dry matter produced.

Corn silage quality characteristics

Any good forage crop should have high dry matter yield, high protein content, high energy content (high digestibility), high intake (low fiber), and optimum dry matter content at harvest for acceptable fermentation and storage. With the exception of high crude protein, corn silage exhibits these characteristics better than many types of forage. Both hybrid selection and agronomic management influence silage yield and quality.

Hybrid selection

Corn hybrid selection is one of the most important management decisions in silage production. Selecting the correct hybrid can often mean the difference between profit and loss. Even selecting the "best" hybrid might not be enough if some aspect in agronomic management is lacking such as delaying harvest. Selecting hybrids for silage production depends somewhat on whether a field is planted specifically for silage or whether the field may be harvested for grain. Many producers grow corn for both grain and silage, deciding at harvest what fields are to be used for each purpose. This flexibility is appreciated because at planting it is often difficult to predict overall forage needs later in the year or know what the condition of the corn crop will be at harvest. Acreage of silage production may increase in years when perennial forage legume production is reduced due to winterkill, drought or when moisture stress or early frost limits corn grain production. On the other hand when adequate forage from other crops isn't readily available and corn grain yields are adequate, producers may prefer the option of selling their grain production on the cash market.

How different are corn hybrids for silage quality?

Until recently there was little information about the extent of variation in the nutritional quality of corn hybrids. Most concepts about nutritive value of silage corn were the result of past studies of grain:stover ratios and genetic oddities such as the brown midrib mutants. It is generally agreed that most single gene mutants or germplasm stocks exhibiting radically altered morphology (profuse tillering, barren or "sugar" corn, dwarf, etc.) will not have much use as forage types due to their inherently poor productivity compared to adapted hybrids selected for grain production. In recent years, corn germplasm has been undergoing selection for forage yield and quality, as well as nutritional value. After evaluating nearly 40 different corn hybrids that are typically grown in Wisconsin, Coors

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(1994) reported that the highest yielding grain hybrids were not necessarily the highest yielding silage hybrids. Furthermore, whole plant digestibility and fiber ranges seem rather narrow. In a similar study using another set of commercial hybrids, Carter et al. (1992) also reported a relatively narrow range for whole plant digestibility. Whole plant digestibility estimates by Alan et al. (1990) were slightly larger, while those of Hunt (1992) were even more significant.

Animal performance

Predicting animal performance and relating it to improvements in corn silage quality is complex. In numerous studies, differences in fiber and digestibility translate into differences in animal performance. Researchers in Idaho found that high quality corn silage (low fiber/high digestibility) produced more beef/acre than low quality silage. The optimum silage composition can vary depending on the type of cattle it's fed to and the other components of the ration. The best estimates of animal performance responses can be obtained through forage analysis. The University of Wisconsin, along with many other universities, evaluates corn hybrids for silage yield and quality characteristics. A silage performance index using milk per acre and milk per ton was calculated using a model derived from the spreadsheet entitled Milk 2000 developed by research scientists at the University of Wisconsin. Milk per acre and milk per ton approximates a balanced ration meeting animal energy, protein and fiber needs based on forage quality. This model is based on equations predicting intake and animal requirements from data derived from National Research Council tables on nutrient requirements of dairy cattle. The values of milk per acre and milk per ton are based on a standard cow weight and level of milk production (1350 lbs. body weight and 90 lbs. per day at 3.8 % fat). A dairyman who buys feed off-farm would be interested in feeding the best quality silage he could purchase and would be most interested in milk produced per ton of silage. A dairyman who grows his own feed on-farm would be interested in both producing quality silage as well as high yields from the farm land base. **Relatively small differences in corn silage fiber and digestibility translate into large differences in predicted animal performance.** Repeatable differences for whole-plant fiber and digestibility were observed in the "high" and "low" quality checks. Previously identified high quality hybrids were above average for milk/acre and milk/ton, while low quality hybrids were average to below average in this trial. Consistent performance regardless of environment is important for making hybrid selection decisions for silage quality.

The final consideration for hybrid evaluation should be quality. Differences exist among commercial corn hybrids for digestibility, NDF digestibility and protein. Make sure that silage hybrids have high forage yields, high digestibility, low fiber levels and stover that is highly digestible. This can help to improve overall productivity and profitability today and in the future.

(Edited from an article by Joe Lauer, University of WI- Madison)

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