ENHANCED MANAGEMENT

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How to use corn silage hybrid trial results

A number of independent Corn Silage Hybrid Testing Programs, including the New York (NY) Corn Silage Hybrid Trials, offer valuable information on hybrid performance. But what if the hybrids you're looking at are not found in individual trials? Hybrids in the trials are a subset, and on the surface may seem limited in their usefulness. However, the results can offer a wealth of information beyond the ranking of participating hybrids.

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In fact, just looking at the top performing hybrids from a single year, while interesting, has limited value. Trial data for an individual hybrid is most useful with multiple locations and multiple years to understand how the hybrid performs across a wide range of conditions. This level of data can be hard to come by in the independent trials but may be available from seed companies.

In the absence of data on a specific hybrid, independent trials offer the opportunity to study how participating hybrids performed relative to their peers at each location, which characteristics, among the participating hybrids, resulted in the most consistent performance, and the expected range in results for important values, such as starch content and fiber digestibility.

With this information, you are equipped to ask individual companies for data on these important characteristics and values in their hybrids. While the specific hybrid may not be in the trial, a company should have information on other hybrids that share the same lineage or have similar performance to a hybrid that exhibited desirable characteristics in the trials.

Comparing to the Location Mean: The mean for a location is the average value of the measured parameter (yield or % starch). Since several localized factors, such as weather and soil type, influence the performance of the hybrids at a particular location, studying the absolute values (yield per acre, % starch or fiber digestibility) is not suggested. It is much more helpful to study the trial mean and compare hybrid performance relative to this mean to gain a better understanding of how it performed under the conditions at that location.

Whole Plant Dry Matter (DM) Considerations: In any testing program, the goal is to harvest all hybrids as close to the same stage of maturity (whole plant DM) as possible. In practice it is recognized that there will be variation in DM at harvest. Yields are corrected to a uniform DM for reporting. They are generally reported at 35% DM. However, it is also important to acknowledge the effect of DM on forage quality. It is recommended to only compare the forage quality results of hybrids that are within three percentage points of DM to each other.

Impact of Location: When data for multiple locations within the same trial are available or data on the same hybrids grown under slightly different management in other testing programs are available, it can be very useful to understand the effects that weather patterns, planting dates, seeding rates and other differences can have on the hybrid. This insight helps to address questions regarding the ability of a hybrid to perform consistently across conditions or if there are specific conditions where it performs best that match the conditions typical of your farm. Again, utilizing company data in conjunction with other trials can be very powerful for this.

It is also important to note that differences in growing conditions does not just impact yield, it can have large impacts on forage quality. While we commonly look at important factors such as whole plant dry matter and starch content, the effect of growing conditions on fiber digestibility was very apparent.

Fiber Digestibility: In recent years several advances in ruminant nutrition have increased our understanding of fiber digestibility, how this drives how much a cow will eat and the implications on her potential to produce milk. The measurement of undigested neutral detergent fiber (uNDF) is being reported by more hybrid testing programs and was an integral piece of data in the new approach to predicting potential milk yields in the NY Corn Silage

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soil nitrate levels in each of the treatments. This was done immediately after harvest during September, in December before snowfall, and in the following April. Sampling was done in study years four, five and six (2003 - 2005) to exclude the first two years of transition from no prior manure to the inputs used in the study. Averaged over years four, five and six of the study, soil nitrate loss in the fall (from September to December) was the highest, at 38% loss in the inorganic N plots. This large decrease was attributed to N loss through leaching and/or de-nitrification. Nitrate loss of about 10% also occurred in plots that received a high rate of liquid manure. In plots that had either high or low applications of composted manure, as well as the plots that had the lower rate of liquid manure, soil nitrate increased 8% from September to December. This suggests that in these treatments, nitrate mineralization in that time period exceeded nitrate-loss.

These results show mineralization of organic N into nitrate from spring applied manure continuing from post corn harvest (September in this study) into December. The following April, soil nitrate levels were significantly lower and similar among all treatments each year, showing a "reset" of nitrate levels that reflects weather impacts on bare soil.

What Does This Mean for Managing N? When following P based manure application guidelines, capturing the N is an important management strategy to meet crop needs. Earlier work showed that P based manure management of fields with no recent manure history can limit N and contribute to reduced crop yields. Mineralized N available in the fall can be effectively captured by planting winter-hardy cover crops with rapid fall growth. This will help with the N supply for the next season's crop as well as offer the soil protective qualities of cover crops.

Organic Matter: Soil organic matter plays a vital role in nutrient cycling and in "weather proofing" soils and crops from extreme conditions, helping to reduce yield losses when weather stress occurs.

In this study levels of SOM only increased in plots with high levels of composted manure and decreased where manure was tillage incorporated or no manure was applied. These results suggest that where tillage is used, in this case, chisel and disk, applying manure during corn years without using cover crops will not improve or in some cases maintain SOM. Practices such as no till or strip till, use of winter hardy cover crops, and injection rather than tillage incorporation of manure, can help counteract organic matter losses in addition to conserving nitrogen.

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Testing Program. Results are online at scs.cals.cornell.edu/extension-outreach/field-crop-production/variety-trials#corn-silage.

Starting in 2016, the NY trials used new methods to evaluate the milk producing potential of corn silage. The Cornell Net Carbohydrate & Protein System (CNCPS) model was used to predict the expected milk yield (in pounds per day) of a typical, Northeastern high lactating ration with each of the participating corn hybrids entered into the same total ration. Again, the relative ranking of the hybrids is more useful than the absolute values, but this approach uses a much more in depth analysis to assess how each hybrid may perform in an actual ration compared to previous approaches. It is evident in the report how the uNDF content of each hybrid may affect the potential dry matter intake of the ration and the subsequent effect on projected milk yield.

Starch Content & Digestibility: Starch content is a popular number to look at and justifiably so. At the risk of excessive repetition, this is another case where it is critical to look at these values in the context of the location mean, rather than absolute values as growing conditions and stage of harvest (whole plant dry matter) can affect this value.

Starch digestibility is more challenging. We know this value changes as the silage ferments, and laboratories continue to refine their ability to accurately predict starch digestibility using NIR methods, compared to the more intensive wet chemistry laboratory testing methods. It is also recognized that results from green (unfermented) samples, as are often used in Hybrid Testing Programs, are less consistent. It is generally accepted that a hybrid with good starch digestibility before fermentation will remain incrementally better after fermentation when compared to a hybrid that starts with lower digestibility before fermentation. Inquiring with a company about their data is quite beneficial, especially if they have wet chemistry data on fermented samples. It is always best to compare results from the same laboratory. However, if the results available are from different labs, ask for data from multiple hybrids to establish the relative differences in like datasets.

Yield and Agronomic Characteristics: While yield often receives too much attention in silage hybrid selection, you do want strong hybrids that have a competitive yield and are able to handle potential stressors. Some of these stressors may be more broadly driven by weather, while others may be typical of the micro-climate you farm, such as soil drainage, air drainage (disease prevalence) or elevation-driven temperature trends.

This is another instance where rather than focusing on actual yield numbers, pooling data from multiple locations and sources and matching this with weather data from those locations will help you understand if a hybrid's performance is consistent across conditions or if it excels and falters in certain situations that may be applicable to your area. ❐

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