



Northern NY Agricultural Development Program 2015 Project Report

Evaluating Corn Hybrids for Grain Production and Leaf Disease Severity in Northern New York

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Jefferson County: Jon Greenwood, Greenwood Dairy

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Background:

Corn is the primary row crop grown in northern New York (NNY), harvested from about 145,000 acres (12% of the state's total corn acreage) when averaged over the past three years. It provides essential feed for the dairy industry. About 59,000 acres of this total were harvested as grain over the same three-year period, representing 41% of NNY's total corn acreage.

With ethanol production facilities in NY on-line, there are new grain production and marketing opportunities for NNY farmers and increased interest in corn production for grain in this region.

The grain produced by corn hybrids also is a major contributor to silage yield, so grain yield evaluation provides an indication of which hybrids would be good candidates for silage use. It is important to evaluate silage quality on these hybrids as well, but seed companies will often enter their hybrids into grain evaluation trials as a first step in determining what is worth marketing in the region.

Thus grain yield evaluations of commercial hybrids provide essential comparative information to farmers interested in grain production in NNY and to seed companies who make marketing decisions based initially on performance in grain yield trials, and may or may not do subsequent silage evaluations.

As corn seed prices continue to climb, it becomes more and more important to provide the information that allows growers to choose hybrids that are well adapted and likely to be productive in the NNY region.

Methods:

Corn hybrids were solicited from seed companies in the early maturity (1400-1900 growing degree days, 70-85 days to relative maturity) and medium-early maturity (1900-2300 growing degree days, 85-100 days to relative maturity) categories. We evaluated early maturing hybrids at Chazy in Clinton County, and both early maturing hybrids and medium-early hybrids at Greenwood Dairy in Madrid in St. Lawrence County. The hybrids were compared for:

- grain yield,
- maturity,
- stalk quality,
- root quality,
- disease resistance, and
- insect resistance.

Each hybrid was planted in three replications per location, with each replication consisting of a 1/500-acre plot (two rows, 17.5' long). All sites were machine planted. Madrid was combine harvested; Chazy was hand harvested.

Each plot's grain weight and grain moisture percentage at harvest were measured. Grain yields were calculated in bushels per acre at 15.5 percent moisture.

Yield:moisture ratio (a measure of hybrid efficiency in producing high yield under short-season conditions) was calculated as grain yield in bu/acre divided by the percentage grain moisture at harvest. Some breeders use this number as an estimate of hybrid efficiency. Hybrids that show high yields and earlier maturity (lower grain moistures) have higher Y/M ratios.

At harvest time, we counted the number of stalks broken (or lodged) below the ear. This number was expressed as a portion of the total number of plants in the plot (% stalk lodging).

We also counted plants leaning over from the base at more than a 45 degree angle as root lodged, and then expressed this number as a proportion of the total number of plants in the plot (% root lodging).

Early vigor was evaluated at knee-high stage or a bit earlier, with 5 = excellent vigor and 1 = very poor vigor.

Leaf disease severity was judged by stay-green and plant health, rated in September (1 = green plants and no disease, 5 = leaves dead or leaves completely diseased).

We use three statistics to evaluate the quality of the data from these experiments. The coefficient of variation (CV) is a measure of the amount of uncontrolled variability due to differences in the soil, microclimate, fertility, etc. Grain yield CVs below 12 are excellent; those around 15 are acceptable. Grain moisture CVs below 5 are excellent. The least significant difference (LSD) is computed at the 5% level of probability. If a difference between two hybrids is larger than the LSD listed for the trial, then the odds are at least 95 to 5 (or 19 to 1) that there is true varietal difference between the hybrids, or, as the statisticians say, the difference between the two hybrids is "significant."

As a cautionary note, growers should choose hybrids based on multi-year and multi-location data whenever possible, since any hybrid can have a "banner year" or "banner environment" but not necessarily hold up over a range of different locations and growing seasons.

Results:

Crop development was excellent at Madrid, but field variability resulted in unusable data from our site in Chazy. Thus only data from the early and medium-early hybrid trials at Madrid is presented in this report.

Table 1 shows the hybrid evaluation results for early maturity hybrids; Table 2 shows results for medium-early maturity hybrids. Both trials had excellent data quality, reflected in the very low coefficients of variation for yield – both around 7% (for corn grain yield trials, coefficients of variation below 10% are an indicator of excellent data quality).

NOTE: Tables should not be reproduced if any portion is omitted or if data order is changed.