Northern NY Agricultural Development Program
2012 Project Report

Corn Hybrids for Grain and Ethanol Production in Northern New York

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Background:

Corn is the primary row crop grown in northern New York (NNY), harvested from about 128,400 acres (12% of NY's total corn acreage) when averaged over the past three years. Jefferson and St. Lawrence counties rank in the top 10 NY counties in terms of corn acreage, and Clinton and Lewis counties are not far behind. It provides essential feed for the dairy industry. About 57,000 acres of NNY's corn acreage were harvested as grain over the same three year period, representing 44% of the area's total corn acreage.

With ethanol production facilities in NY online and corn grain prices over $7.50/bu, there are new grain production and marketing opportunities for NNY farmers and increased corn grain production in this region (Figure 1).

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.

Identifying appropriate hybrids for corn grain production in NNY is a priority for the NNYADP in 2012-2013. As corn seed prices continue to climb rapidly, it becomes more and more important to provide growers with the information that allows them to choose hybrids that are well adapted and likely to be productive in the NNY region.

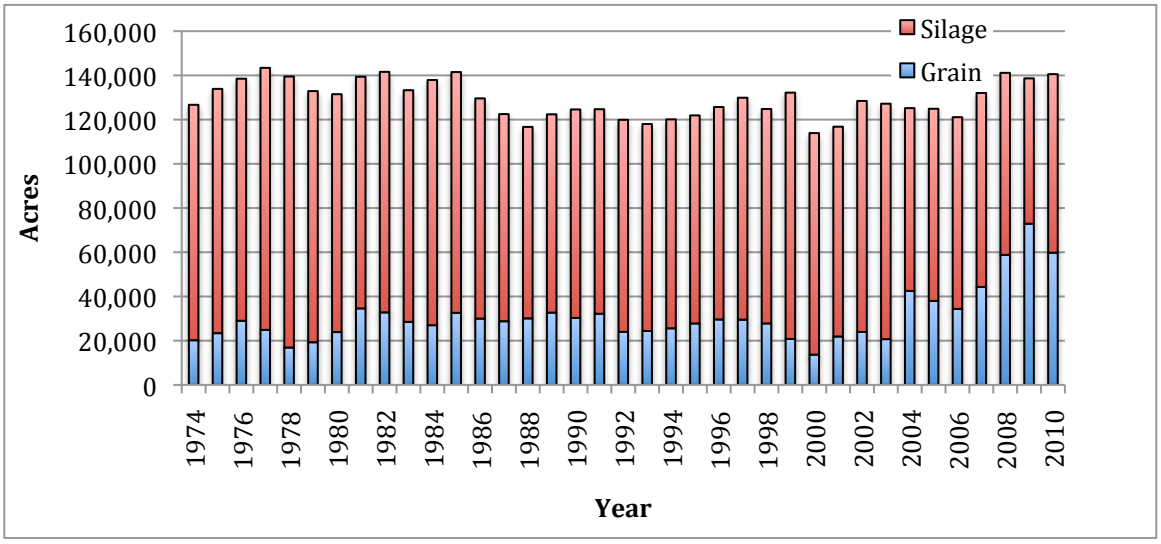

Figure 1. Acres harvested as corn grain (blue) and corn silage (red) in Northern New York from 1974 through 2010.

Methods:

We evaluated early maturing hybrids (1400-1900 growing degree days, 70-90 days relative maturity) at two locations in NNY (Chazy in Clinton County and at the Greenwood dairy farm in Madrid, St. Lawrence County) to identify hybrids that can meet the needs of farmers in the region. Seed companies marketing corn in New York were contacted to request entry of their early maturing commercial hybrids into evaluation tests.

Hybrids were compared for grain yield, maturity, stalk and root quality, and disease 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). Plots were thinned at the 6- to 7-leaf stage to a density of 28,000 to 30,000 plants/acre. Data was collected at thinning time (late June to early July) on plant counts. In September, plots were evaluated for early-season stalk lodging, root lodging, and animal damage. At harvest time (October or November), data were collected on final stalk and root lodging, grain weight, and grain moisture.

These data were used to calculate grain yield per acre and yield:moisture ratio (a measure of hybrid efficiency in producing high yield under short-season conditions). Evaluation results were published in the 2012 Corn Report (annual data) and will be included in the 2014 Cornell Guide for Integrated Field Crop Management (multiple year results).

Results:

The 2012 growing season in northern New York as a whole was favorable for corn. Temperatures tended to run a bit warmer than long term averages, but timely rains helped minimize any crop damage. Although the flowering period in July-August was dry in NNY, drought conditions at this time were much less severe than in other parts of the

state. Overall yields were good at both locations, with the hybrid trial averaging 213 bu/acre at Chazy and 223 bu/acre at Madrid.

Seed companies appear to be moving towards longer season hybrids, as reflected in the very small number of entries submitted for our early maturity trial. In 2012, we had only six hybrids submitted for testing, five of which came from one company. We will be working to broaden this set of entries in future year, in order to make the results more relevant and useful.

Results from the hybrid evaluation trials are shown in Tables 1 through 3. The quality of our testing data this year was excellent, as reflected in the low coefficient of variation (CV) for yield (range from 5.3% to 5.9%). These very low CVs for yield indicate that the values in the tables are reliable and not overly influenced by random variation in the testing fields. Generally, a yield CV below 15% is considered evidence of high quality data.

Table 1 reports data averaged across both Chazy and Madrid locations. Hybrid yields in this over-location analysis averaged 218 bu/acre and ranged as high as 237 bu/acre. Grain moisture at harvest showed only a 2% spread from the driest to the wettest hybrids, indicating that the hybrids tested were quite close in maturity. The yield:moisture ratio provides an indication of hybrid efficiency in producing high yield under short-season conditions. This ratio is one of the best guides to choosing a hybrid with excellent yield potential and appropriate maturity. The absolute value of the yield:moisture ratio is not as important as the relative values of the hybrids tested. The high yield:moisture ratio of hybrids like FS 3722VT3P and FS 3808VT3P indicate that they were especially good in the over-locations analysis, showing both high yields and early maturity (i.e., low grain moisture at harvest).

Table 2 shows the hybrid data from Chazy and Table 3 shows data from Madrid. These data illustrate some of the location-specific challenges that these hybrids faced. Stalk lodging was much more of a problem at Chazy than at Madrid, due in part to animal damage at the Chazy location. The variety FS 4212VT3P was particularly affected by stalk lodging at this site. Madrid, on the other hand, had more root lodging than stalk lodging, although percentages of lodged plants were still quite low overall.

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 environment” but not necessarily hold up as strongly over a range of different locations and growing seasons. This data will be incorporated into the results in the upcoming Cornell Guide for Integrated Field Crop Management, which provides that multi-year summary.

Conclusions/Outcomes/Impacts:

Data in the hybrid production tables in this report shows a number of hybrids that had excellent performance in NNY in 2012. However, hybrid choices should always be made based on the most comprehensive data available, usually multi-year and/or multi-location data. Such data is available in the Cornell Guide for Integrated Field Crop Management

and this publication should be consulted, in combination with the individual test data presented here, when making hybrid choices.

Outreach:

Results of 2011 testing were published in the 2011 Hybrid Corn Grain Performance Trials report (Plant Breeding Mimeo 2012-1, also available on the web at http://plbrgen.cals.cornell.edu/cals/pbg/programs/departmental/corn/index.cfm) and were incorporated into the tables of recommended corn grain hybrids in the 2013 Cornell Guide for Integrated Field Crop Management (Cornell University, 2012, http://ipmguidelines.org/FieldCrops/Chapters/CH03/CH03-2.aspx). These results are available for farmer and seed company use in selecting hybrids best adapted to the challenging soils and climates of NNY. The publications are distributed through extension offices and at various extension and outreach meetings.

Results from 2012 trials, which were harvested in late fall, are available in the 2012 Hybrid Corn Grain Performance Trials report (Plant Breeding Mimeo 2013-1, http://plbrgen.cals.cornell.edu/cals/pbg/programs/departmental/corn/index.cfm) and will be incorporated into the tables of recommended hybrids in the 2014 Cornell Guide for Integrated Field Crop Management (to be published by Cornell University in fall 2013).

Next steps if results suggest continued work is needed in the areas of research, demonstration and/or education:

In future years when funding is available to support the additional costs of travel to the NNY region, we will plan to continue testing hybrids in NNY to ensure that farmers and seed companies have a solid basis for their choices of corn grain hybrids for this important region of the state. We will also incorporate a greater range of maturity into these tests, including the somewhat longer-season hybrids that many NNY growers are finding they can use in light of warmer, longer growing seasons. This should also increase the number of hybrids evaluated, making the data more useful to growers.

Acknowledgments:

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Reports/articles in which results of project have already been published:

Smith, M.E. 2013. 2012 New York Hybrid Corn Grain Performance Trials. Cornell University, Cornell Cooperative Extension, Plant Breeding and Genetics 2013-1. 16 pp.

Smith, M.E. 2012. Hybrid selection for corn grain hybrids. pp. 51-55. In: Cox, W.J. and M. McKellar (eds.) 2013 Cornell Guide for Integrated Field Crop Management. Pesticide Management Education Program, Cornell University, Ithaca NY. 160 pp.

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Table 1. 2012 early maturity hybrid evaluation data from Chazy and Madrid combined.

Brand	Hybrid	Yield, bu/acre	Grain Moisture, %	Yield: Moisture Ratio	Lodging, %		Plant Count
					Stalk	Root	
FS InVISION	FS 3722VT3P	221	19.3	11.4	0.0	0.0	56
FS InVISION	FS 3808VT3P	221	19.6	11.3	0.0	0.0	57
FS InVISION	FS 4027VT3P	218	19.8	11.0	0.0	0.0	57
RPM®	278HXR[a]	182	19.9	9.2	0.0	0.0	54
FS InVISION	FS 4212VT3P	229	20.8	11.0	0.2	0.0	57
FS InVISION	FS 3984VP3	237	21.4	11.1	0.0	0.0	57
	Mean	218	20.1	10.9	0.1	0	56
	C.V. (%)	5.7	2.8				
	LSD (P<0.05)						

Table 2. 2012 early maturity hybrid evaluation data from Chazy.

Brand	Hybrid	Yield, bu/acre	Grain Moisture, %	Yield: Moisture Ratio	Lodging, %		Plant Count
					Stalk	Root	
FS InVISION	FS 4027VT3P	212	19.2	11.0	7.6	0.0	53
FS InVISION	FS 3722VT3P	212	19.6	10.8	5.7	0.0	52
FS InVISION	FS 3808VT3P	205	19.8	10.4	8.5	0.0	53
RPM®	278HXR™	202	19.8	10.2	4.1	0.0	48
FS InVISION	FS 4212VT3P	220	22.2	9.9	26.7	0.0	54
FS InVISION	FS 3984VP3	228	22.9	10.0	4.9	0.0	54
	Mean	213	20.6	10.4	9.6	0.0	52
	C.V. (%)	5.9	2.1				
	LSD (P<0.05)	22	0.8				

Table 3. 2012 early maturity hybrid evaluation data from Madrid.

Brand	Hybrid	Yield, bu/acre	Grain Moisture, %	Yield: Moisture Ratio	Lodging, %		Plant Count
					Stalk	Root	
FS InVISION	FS 3722VT3P	230	19.0	12.1	0.0	1.1	60
FS InVISION	FS 3808VT3P	236	19.3	12.3	0.0	0.0	60
FS InVISION	FS 4212VT3P	237	19.3	12.3	0.0	1.1	60
FS InVISION	FS 3984VP3	245	20.0	12.3	1.7	3.3	60
RPM®	278HXR™	162	20.0	8.1	0.6	4.4	60
FS InVISION	FS 4027VT3P	225	20.4	11.1	0.0	0.6	60
	Mean	223	19.6	11.4	0.4	1.8	60
	C.V. (%)	5.3	4.3				
	LSD (P<0.05)	21	1.5				