

# Northern NY Agricultural Development Program 2010 Project Report

## 2010 Corn Silage Hybrid Trials in Northern NY

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### **Background:**

Corn silage is a major crop in New York because dairy producers prefer this high-energy forage in the feed ration. Dairy producers in the six-county region (Lewis, Jefferson, St. Lawrence, Franklin, Clinton, and Essex) of Northern NY have planted about 100,000 acres of corn silage annually since 1999, which represents almost 85% of the annual corn acreage in Northern NY. Consequently, dairy producers in Northern NY plant about 20% of the New York corn silage crop (~500,000 acres). Clearly, corn silage is an important crop in Northern NY and Northern NY is an important region of the state for corn silage production. Corn silage research in Northern NY would greatly benefit both Northern NY and New York State.

We have evaluated numerous corn hybrids under different management practices including planting date, plant density, row spacing, N rate and timing, harvest date, and harvest cutting height. In most instances, the hybrid planted had a greater influence on silage quality than have management practices. Consequently, we believe that hybrid selection is the most important management practice affecting corn silage quality in most growing seasons.

Until 1990, most agronomists and animal nutritionists believed that high-yielding grain hybrids were the best corn silage hybrids. In the 1990s, however, it became increasingly clear that high-yielding silage hybrids with excellent quality do not require high grain content. In fact, many agronomists and animal nutritionists now believe that stover fiber digestibility is the most important hybrid characteristic affecting silage quality. Consequently, seed companies have recently released brown midrib and leafy hybrids, which have high stover fiber digestibility. Corn silage hybrid trials, however, have shown that some of the new silage hybrids have reduced emergence in cool wet springs, poor kernel set in warm dry summers, and poor standability at harvest. Corn silage hybrid trials can provide excellent information on the agronomic performance and silage quality of corn silage hybrids grown in specific regions, such as Northern NY, in normal growing conditions, years of cool and wet springs, or years of warm and dry summers.

### **Methods:**

We planted all hybrids with a 2-row plot planter at 36,000 plants/acre to achieve harvest populations of 32,000-34,000 plants/acre. The Madrid site was planted on 29 April and the Sackets Harbor site was planted on 30 April. All hybrids were grouped within a 5-day RM (i.e. 91-95 day RM, 96-100, etc.), and planted in a randomized complete block design with four replications. Each individual plot consisted of two 20-ft. rows spaced 30 inches apart. Each individual plot received about 250 lbs/acre of 10-20-20 at planting. Both sites were well-manured dairy sites so they received no sidedressed N. We used preemergence/postemergence herbicides and hand-weeding to control weeds.

Both rows, trimmed back to an 18-foot length, of each hybrid were harvested for silage yield with a retrofitted 3-row New Holland Chopper with a platform and a weigh-basket, mounted on load cells. The goal was to harvest all hybrids in the 65% moisture range (plus/minus 2%), but some hybrids were drier than planned because of equipment problems and 90 degree temperatures in late August and early September.

We harvested the Sackets Harbor on 27 August, which received 2.5 inches of precipitation on 23-24 August. We harvested the entire experiment on the 27<sup>th</sup> but the hybrids had re-hydrated some so moisture averaged from 69.5 to 71.5% across the hybrid maturity groups. Starch values, however, averaged from 32 to 33.5% across the maturity groups so all the hybrids were probably less than 70% moisture on a physiological basis. Equipment failures delayed harvest at the Madrid site until 8 September where moistures ranged from 57 to 59% across the three maturity groups.

An approximate 10,000 g well-mixed sample was originally collected from the chopper after harvest of each plot. The 10,000 g sample was then ground further in the field with a chipper-shredder. An approximate 700 g sub-sample was then weighed with a gram-scale in the field and refrigerated in a generator-powered freezer (samples were kept cool but not frozen). At the end of each day, the samples were brought back to a Cornell Research Farm for drying. The samples were dried at 140° F in a forced air drier to constant moisture and then weighed to determine moisture content of each sample.

Samples were processed and analyzed by Cumberland Valley Analytical Services, Inc. Samples were analyzed by wet chemistry for neutral detergent fiber (NDF), according to procedures by Van Soest et al. (1991). Samples were incubated for 30 hours at 39°F in a buffered rumen fluid, according to procedures by Van Soest and Robertson (1980) using a flask system and Van Soest buffer. Following fermentation, residues were analyzed for NDF by wet chemistry to determine 30-hour NDF digestibility (NDFD). The NDF digestibility was calculated as  $([1 - \text{NDF residue}/\text{initial NDF}] \times 100)$ . Crude protein (CP), starch, ether extract, and ash were determined using NIRS. Milk per ton and milk per acre were then calculated using the Milk2006 spreadsheet program (Tables 2-5).

Data were analyzed using the PROC GLM procedure of SAS. The LSD values for separating hybrid means were generated at the  $P = 0.10$  level. Hybrids are considered above-average for calculated milk yield, milk/ton, or silage yield when the hybrid's value is above 100% of the mean value within their RM group across sites (and much-above average with values more than 105%).

## **Results:**

The 2010 growing season in Northern NY was the 5<sup>th</sup> warmest at Watertown since 1940 (Table 1). The Sackets Harbor site had about the same number of total GDD from 1 May through August as the Aurora site, which typically has 250 more GDD during the growing season. Both sites were dry in May and the Sackets Harbor site was exceedingly dry for a 4-week period from late July until 22 August (only 0.26 inches of precipitation). Nevertheless, the 80-85 day RM hybrids averaged 23.5 tons/acre, the 91-95 day RM hybrids (two brown midrib hybrids) yielded 22.9 tons/acre, and the 96-100 day RM hybrids yielded 24.0 tons/acre at Sackets Harbor (Table 1). In contrast, the Madrid site had no dry conditions in August and the 85-100 day hybrids yielded 24.4 tons/acre, the 91-95 day hybrids yielded 27.5 tons/acre, and the 96-100 day hybrids yielded 29.1 tons/acre (Table 2).

Six hybrids at Sackets Harbor and eight hybrids at Madrid had above-average calculated milk yields in the 85-90 day RM group (Tables 1 and 2). When averaged across sites, 87S9 from LICA had much-above milk yields because of much-above silage yields at both sites. Also, HL SR35 from Hyland Seed continued to perform well in northern NY with much above average milk yield associated with much-above silage yield at both sites. The new hybrid, 480 from Master's Choice, also had much-above milk yield because of much-above average silage yield and above-average milk/ton value at both sites. New hybrids, ST-9789 from Dairyland and HL B24R from Hyland Seed, which performed exceptionally well at Madrid, had above-average milk yields because ST-9789 had an above-average milk/ton value and HL B24R had above-average silage yield. The 84-day hybrid, TA290-11 from T.A. Seeds, continued to perform well in Northern NY with much-above milk yield because of above-average silage yields and an above-average milk/ton value.

Ten hybrids at Sackets Harbor and nine hybrids at Madrid had above-average milk yields in the 91-95 day RM group (Tables 1 and 2). When averaged across sites, Hi.DF.-3195-Q from Dairyland had much above-average milk yields, mainly because of its extraordinary silage yield at Madrid. Once again, 946 LRR from LICA (5<sup>th</sup> year in the test) and 478SL from Doebler's (2<sup>nd</sup> year in test), had much-above average milk yields in Northern NY because of much-above silage yields. New hybrids, DS95RB from Croplan and DKC45-52 from DEKALB, had much-above average milk yields because of an above-average silage yield and milk/ton value for DS95RB and much-above average silage yield from DKC45-52. New hybrids, TA 451-19 from T.A. Seeds and N34N-3000GT, an NK brand, had above-average milk yields, because of an above-average silage yield and milk/ton value for TA451-19 and above-average silage yield for N34N-3000GT. The Mycogen hybrid, TMF2L418, which performed very well at Sackets Harbor, continued to have above-average milk yield because of above-average silage yield as did the new hybrid, H9407BRC from Hyland Seed. The brown midrib hybrid, F2F383 from Mycogen, which was only tested at Sackets Harbor because of late arrival of the seed, had above-average milk yield at Sackets Harbor of its much-above milk/ton value.

Three hybrids at Sackets Harbor and two hybrids at Madrid had above-average calculated milk yields in the 96-100 day RM group (Tables 1 and 2). When averaged across sites, new hybrids, 5288VT3 from GROWMARK FS and 2702 L from Wolf River Valley, had much above-average milk yields because of much-above silage yields. Another new hybrid from Wolf River Valley, 2596 LRR, had above-average milk yield because of above-average silage yield and above-average milk/ton value.

### **Conclusions/Outcomes/Impacts:**

The 2010 growing season in New York was one of the warmer growing seasons in NY, which probably contributed to the record state corn yields in NY (150 bushels/grain). The data at both sites in northern NY was fairly consistent across sites, which indicates good hybrid stability allowing for the results of this study to apply to most farms in Jefferson and St. Lawrence Co. Unfortunately, because of funding uncertainty and the tremendous cost of moving equipment to Northern NY we will not test at these sites in 2011. Hopefully, the funding will be restored for the 2012 growing season and we can return to these two excellent test sites that benefits dairy farmers in Northern NY.

### **Outreach:**

The results of these studies were immediately sent out to industry, county extension educators, and members of the Northeast Dairy Producers' Association (NEDPA) in early November so dairy producers in Northern NY could make informed decisions on corn silage hybrid selection before the seed discounts expired in mid- to late November, depending upon the seed company. In addition, we incorporated the results of this study into the recommended corn silage tables found in our annual Cornell Guide for Integrated Field Crop Management. We only list hybrids that have above-average relative calculated milk yields in their hybrid RM group (i.e. 96-100, 101-105 day RM, etc.). We also list the relative silage yields and milk/ton values for the recommended hybrids. We published the updated recommendation list in our December 2010 newsletter, What's Cropping Up? ([www.fieldcrops.org](http://www.fieldcrops.org)). We also presented the results of the study at our Field Crop Dealer Meetings in late October of 2010, our In-Service Program for county extension educators in mid-November 2010, and numerous winter workshops for farmers from January through early in 2011. Needless to say, the information from these trials is shared with thousands of members of the New York agricultural community.

### **Acknowledgments:**

We received \$9000 in funding from the Northern New York Agricultural Development Program (NNYADP). Seed companies paid \$400/entry for testing at two sites to cover the \$30/sample cost for quality analyses (\$320/entry for the two sites).

### **Reports and/or articles in which the results of this project have already been published.**

The results for the yield data were reported in our 2010 Field Crop Dealer Meeting Abstracts (Crop and Soil Science Department, Extension Series 2010-1), our What's Cropping Up? newsletter that was published in December of 2010 (Vol.20, No.4, p.1-3, on our web site at : [www.fieldcrops.org](http://www.fieldcrops.org)), and in our 2011 Cornell Guide for Integrated Field Crop Management.

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