Department of Crop and Soil Sciences
Extension Series No. E01-1
January, 2001

NEW YORK CORN SILAGE HYBRID TESTS - 2000

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We initiated the annual testing of corn silage hybrids at four locations in New York in 2000. We evaluated 95 to 115-day hybrids in relative maturity (RM) at Aurora and Batavia, experimental sites that average about 24000 growing degree days (GDD, 86-50° system) from May through September. We evaluated 80 to 100 day hybrids in RM at Canton and Chazy, experimental sites that average about 2000 GDD from May through September. All seed companies were invited to enter their hybrids in these tests at a fee.

Materials and Methods

We planted all hybrids at about 35000 plants/acre to achieve harvest populations of about 32000 plants/acre. All hybrids within a 5-day RM (i.e. 95 to 99-day hybrids) were planted in a separate test in a randomized complete block design with four replications. Each individual hybrid plot consisted of two 18-foot rows spaced 30 inches apart. Each individual plot received starter fertilizer and 150 lbs/acre of sidedressed N at the 4 to 6-leaf (V4 to V6) stage. We used preemergence herbicides and hand-weeding to control weeds. Emergence notes and silking dates were taken for all hybrids.

Both rows of each hybrid at Aurora and Batavia were harvested for silage yield when a hybrid attained about 65% moisture, which corresponded to about the ½ milk line stage of development. At Canton and Chazy, hybrids were also harvested at 65% moisture, a few days after a frost, because most hybrids did not attain the ½ milk line before the frost. Five plants were selected randomly at harvest to estimate moisture content and forage quality of each hybrid. The five-plant subsample was dried at 140°F in a forced air dryer to constant moisture. Samples

were then ground sequentially through hammer and Wiley mills. Samples were then passed through a splitter, reduced to 50 g in weight, and further ground through a cyclone mill, fitted with a l-mm screen.

Samples were analyzed by wet chemistry for neutral detergent fiber (NDF), according to procedures by VanSoest et al. (1991), and for total N (x 6.25 = crude protein) using a Leco FP528N analyzer with Dumas combustion (Wiles et al., 1998). Samples were also analyzed for in vitro true digestibility (IVTD), according to stage 1 of the procedure described by Marten and Barnes (1980). Samples were incubated for 30 hours at 120° F in a buffered rumen fluid containing the Kansas State buffer supplemented with urea at 0.5 g/l. Following fermentation, residues were analyzed for NDF to determine NDF digestibility. The NDF digestibility was calculated as ([l-NDF residue at 30 hours/initial residue] x 100). Milk 95, a spreadsheet that combines silage yield, NDF, and IVTD into a single term, was first used to calculate milk yield per acre for each hybrid (Undersander et al., 1995). After learning that Milk 95 was updated to Milk 2000, which also required starch and ash concentrations, we determined ash content by combusting 1 g of material at 550° C for 3 hours and starch using a YSI 2700 Select biochemistry analyzer. We then calculated milk yield per acre for each hybrid using Milk 2000. We present estimated milk yields from both Milk 95 and Milk 2000 for comparison purposes but will refer only to Milk 2000 yields in the discussion.

Results and Discussion

Aurora and Batavia

Both sites were exceptionally wet in April and May (Table 1). Nevertheless, we planted the Aurora Site on 28 April and the Batavia site on 15 May. Despite the wet conditions after

planting, most hybrids had harvest populations of about 30000 plants/acre (data not shown). July was the second coolest July on record in New York with both sites accumulating only about 555 GDD (Table 1). Nevertheless, all hybrids at Aurora attained the ½ milk line and harvested from 7 to 12th of September. At Batavia, all hybrids attained the ½ milk line stage of development and harvested from 15 to 19th of September.

Site x hybrid interactions did not exist for silage yield, quality characteristics, or estimated milk yield. Consequently, we averaged all the data across sites so each value is the mean of eighth observations (Tables 2 through 5). Hybrids differences existed for all parameters except for silage yield in the 95 to 99 day RM range.

In the 111 to 115 day RM range, DKC61-24 had high silage yield, IVTD, and NDF digestibility (Table 2). Consequently, DKC61-24 had the numerically highest calculated milk yield. The hybrid AP9572, which had high IVTD and NDF digestibility, had statistically similar calculated milk yield as DKC61-24. Likewise, GS1099, which had high silage yield and IVTD and low NDF, also had statistically similar milk yield as DKC61-24.

In the 106 to 110 day RM range, 6511FQ, which had very high IVTD and NDF digestibility, had the numerically highest estimated milk yield (Table 3). The hybrid DK567, which had high silage yield and IVTD, had statistically similar calculated milk yield as 6511FQ. Other hybrids that also had statistically similar calculated milk yield as 6511FQ included H2515, 636XY, and 6682FQBT.

In the 101 to 105 day RM range, 35P12, which had high silage yield and IVTD and low NDF, had the numerically highest calculated milk yield (Table 4). The hybrids DK537, 36G12, and 36R10, which had about 6.5% less silage yield but similar IVTD, NDF, and NDF

digestibility, had statistically similar calculated milk yield as 35P12. The hybrid GS1049, which had lower silage yield, also had statistically similar calculated milk yield as 35P12.

In the 95 to 99 day RM range, DK507, DKC48-83, DKC44-42, HL2505, and HLS2041 had statistically similar calculated milk yield (Table 5). All five hybrids had statistically similar silage yield, IVTD, and NDF (except for HL2505), but differed in NDF digestibility.

Canton and Chazy

Both sites were exceptionally wet from April through June (Table 2). Although the Chazy site was planted in mid-May, final stands were very erratic so only portions of each plot were harvested. The Canton site was planted in mid-June so final stands were much better. Nevertheless, harvest densities ranged from 25000 to 31000 plants/acre, which was more variation than we wished. July was also exceptionally cold at both sites so hybrids did not attain the ½ milk line stage at Canton.

Similar to the Aurora and Batavia experiments, site x hybrid interactions did not exist for silage yield, quality characteristics, or calculated milk yield. Once again, we averaged all data across sites so each value is the mean of eighth observations (Tables 6 to 8). Unlike the Aurora and Batavia experiments, most hybrids had statistically similar silage yield, quality characteristics, and calculated milk yield. The lack of differences among hybrids can be attributed in part to less precision, especially for silage yield, associated with differences in harvest populations among hybrids at both sites and lack of hybrid maturity at Canton.

In the 95 to 99 day RM range, nine of the 10 hybrids had statistically similar calculated milk yield (Table 6). The hybrid T29400 had the numerically highest silage yield, GS998 had the numerically highest IVTD and NDF digestibility, and 38K06 had the numerically lowest

NDF. Despite the fact that most hybrids in this RM range had only attained the early denting stage, most hybrids had average IVTD and NDF. The NDF digestibility for most hybrids, except for GS998, averaged less than 51%.

In the 90 to 95 day RM range, eight of the nine hybrids had statistically similar calculated milk yield (Table 7). HLS034 had the numerically highest silage yield, DKC42-22 had the numerically highest IVTD and the lowest NDF, and NX3018 and TMF2404 had the numerically highest NDF digestibility. As with the 95 to 99 day hybrids, most hybrids had average IVTD and NDF but low NDF digestibility.

In the 85 to 89 day RM range, all hybrids had statistically similar calculated milk yield (Table 8). The hybrids HLS113 and HL 2240 had the numerically highest silage yield, which contributed to their numerically highest milk yield. The hybrid HLS012 had the numerically highest IVTD and lowest NDF. Although the 85 to 89 day hybrids were further along in maturity at Canton compared with the 95 to 99 day hybrids, the IVTD and NDF were similar among the two hybrid maturity ranges.

Conclusion

The 2000 growing season in New York was very challenging because of excessively wet conditions in the spring and the excessively cool conditions in July. The Aurora and Batavia sites were planted in a timely manner and most hybrids had excellent yields with high IVTD. Furthermore, the overall precision of these experiments were excellent as indicated by the low LSD values. The Canton and Chazy sites, however, had delayed planting or stand establishment problems, which contributed to somewhat low yields and less overall precision, especially at Chazy. Consequently, we could not detect differences among hybrids for most parameters at the Canton and Chazy sites.

Table 1.

	Precipitation				GDD (86-50^0 F)			
MONTH	AURORA	BATAVIA	CANTON	CHAZY	AURORA	BATAVIA	CANTON	CHAZY
April	4.85	4.88	5.18	4.39	-	-	-	-
May	4.45	4.50	4.92	4.47	352	351	280	241
June	3.76	5.66	3.65	2.88	501	521	417	395
July	2.57	3.08	5.61	2.76	559	554	505	532
August	3.23	3.05	4.71	2.48	557	575	528	525
Sept.	4.22	6.20	4.91	2.16	388	423	311	301

Table 2.

2000 CORN SILAGE TESTS - AURORA & BATAVIA

HYBRID	SYIELD	IVTD	NDF	NDFd	CP	MYIELD95	MYIELD00
				111-115-d RM			
DKC61-24	24.7	81.1	43.8	57.0	6.9	19806	31173
AP9572	22.4	82.0	43.2	57.9	7.3	18623	29181
GS1099	23.3	80.6	41.8	52.6	6.5	19219	28866
H9345	22.2	79.9	45.0	54.3	6.8	17213	27417
DK647BTY	24.0	77.2	44.0	49.0	6.7	17242	27279
H9183RR	20.9	77.3	44.6	50.3	7.0	14879	24218
HY9646	20.8	75.3	48.7	50.8	7.0	12696	22590
LSD 0.05	1.8	3.0	2.1	6.7	0.4	2206	3247

Table 3.

2000 CORN SILAGE TESTS - AURORA & BATAVIA

HYBRID	SYIELD	IVTD	NDF	NDFd	CP	MYIELD95	MYIELD00
				106-110-d RM			
6511FQ	22.8	82.4	45.1	61.1	6.6	18467	29692
DK567	23.7	80.5	42.1	53.7	7.0	19302	28815
H2515	22.6	79.1	44.7	53.0	7.1	16905	27137
636XY	21.3	80.5	42.6	53.9	7.5	17214	26581
6682FQBT	21.3	80.9	42.3	53.9	7.1	17560	26410
34G81	21.0	79.7	40.5	48.6	7.3	17314	24641
E670L	20.8	79.0	44.0	52.6	7.1	15667	24507
34B23	22.0	79.7	42.3	50.2	6.9	17397	24218
EX98590	21.0	78.8	46.6	54.5	7.5	14924	24143
DKC58-52	20.1	77.9	42.3	47.8	6.9	15249	22561
LSD 0.05	1.8	3.0	2.1	6.7	0.4	2206	3247

Table 4.

2000 CORN SILAGE TESTS - AURORA & BATAVIA

HYBRID	SYIELD	IVTD	NDF	NDFd	CP	MYIELD95	MYIELD00
				101-105-d RM			
35P12	23.0	79.9	41.7	51.8	7.1	18623	27492
DK537	21.3	79.7	42.7	52.1	6.6	16768	24989
36G12	21.6	79.4	41.4	50.4	6.9	17464	24953
36R10	21.5	79.9	42.1	52.2	7.4	17248	24938
GS1049	20.5	80.3	40.1	49.9	6.7	17264	24672
DKC53-32	20.0	79.1	43.0	51.6	6.9	15508	23045
H7615RR	19.7	79.0	42.9	50.8	7.2	15214	22129
LSD 0.05	1.8	3.0	2.1	6.7	0.4	2206	3247

Table 5.

2000 CORN SILAGE TESTS - AURORA & BATAVIA

HYBRID	SYIELD	IVTD	NDF	NDFd	CP	MYIELD95	MYIELD00
				95-99-d RM			
DK507	20.1	82.0	41.0	56.1	6.9	17372	24893
DKC48-83	21.3	80.1	41.0	56.1	6.9	17729	24803
DKC44-42	21.4	79.1	40.1	47.8	6.7	17492	24498
HL2505	20.8	79.6	45.3	54.7	7.3	15521	24177
HLS041	21.1	78.4	40.6	46.7	6.9	17022	24033
DKC47-72	20.2	77.4	42.2	46.3	6.8	15123	21491
LSD 0.05	NS	3.0	2.1	6.7	0.4	2206	3247

Table 6.

2000 CORN SILAGE TESTS - CANTON & CHAZY

HYBRID	SYIELD	IVTD	NDF	NDFd	CP	MYIELD95	MYIELD00
				95-99-d RM			
GS998	19.2	79.6	44.0	53.9	7.1	14712	22133
T29400	22.0	74.6	44.1	42.4	6.9	14893	21392
8640	20.0	77.1	42.9	46.5	6.6	14683	21262
H7187	19.5	78.4	42.4	49.9	7.0	15115	20844
GS929	18.8	78.8	43.4	51.1	6.8	14253	20602
38T27	19.5	77.1	45.9	50.3	7.1	13526	20559
E390L	19.6	76.5	45.7	48.7	7.1	13343	20445
AP9340	17.0	78.1	42.6	48.7	7.2	13107	20061
469XP	19.5	76.0	45.0	46.1	7.2	13346	19773
38K06	17.0	76.6	41.8	43.8	7.0	12708	17812
LSD 0.05	4.0	3.1	3.0	7.2	0.4	2100	3100

Table 7.

2000 CORN SILAGE TESTS - CANTON & CHAZY

HYBRID	SYIELD	IVTD	NDF	NDFd	CP	MYIELD95	MYIELD00
				90-95-d RM			
NX3018	19.0	78.8	42.6	50.2	7.5	14489	21392
3681FQ	19.9	76.6	45.3	48.3	7.1	13761	21162
DKC42-22	19.2	79.1	41.2	49.2	6.9	15233	20827
HLS034	22.1	75.1	45.0	42.5	6.8	14434	20652
N3030BT	18.6	76.9	40.8	42.9	6.9	14134	19495
TMF2404	18.2	78.3	43.2	50.1	7.0	13422	19480
DKC44-42	18.9	76.1	43.8	45.8	6.7	13432	19056
EX96477	18.3	76.1	43.2	44.8	7.2	13100	18293
9199	15.2	76.6	44.1	48.7	7.2	10902	16471
LSD 0.05	4.0	3.1	3.0	7.2	0.4	2100	3100

Table 8.

2000 CORN SILAGE TESTS - CANTON & CHAZY

HYBRID	SYIELD	IVTD	NDF	NDFd	CP	MYIELD95	MYIELD00
				86-89-d RM			
HLS113	19.8	75.7	45.1	46.2	7.3	13432	19506
HL2240	20.3	75.1	45.7	45.5	7.2	13413	19377
DKC36-71	18.6	75.7	42.7	43.2	7.3	13900	18226
HLS012	16.9	78.6	41.5	48.4	7.1	13344	18209
DKC39-45	15.9	77.4	40.9	44.6	6.9	12207	16786
LSD 0.05	4.0	3.1	3.0	NS	0.4	NS	NS