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2014

Long Season Corn Silage Variety Trial

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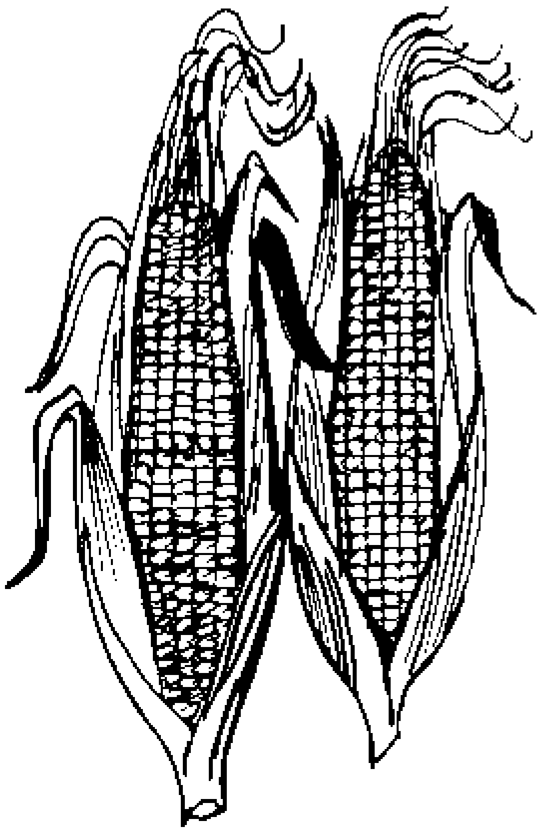

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UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

2014 LONG SEASON CORN SILAGE VARIETY TRIAL

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In 2014, the University of Vermont Northwest Extension Crops and Soils Team evaluated yield and quality of long season corn silage varieties at Borderview Research Farm in Alburgh, VT. Long season corn can be difficult to grow in Vermont, due to the climate's restricted Growing Degree Days (GDDs). In addition, wet springs are becoming more common, delaying corn planting later into the season. However, on many farms, long season corn can produce higher yields and quality than many short season varieties. The test site was at Borderview Research Farm in Alburgh, VT, which has what is considered one of the longest growing seasons in Vermont (2,310 GDDs in 2014). In this year's trial, 45 varieties were evaluated from eight different seed companies. While the information presented can begin to describe the yield and quality performance of these long season corn silage varieties in this region, it is important to note that the data represent results from only one season and one location. Compare other hybrid performance data before making varietal selections.

MATERIALS AND METHODS

Several seed companies submitted varieties for evaluation (Table 1). The plot design was a randomized complete block with three replications. Treatments were 45 long season corn varieties. These varieties, ranging in relative maturity (RM) from 95-112 days, were evaluated for yield and quality. Relative maturity and varietal characteristics were provided by the company (Table 2).

Table 1. Participating companies and local contact information.

Dekalb	Mycogen	Pioneer	Prairie Hybrids
Klaus Busch Knox, NY (518) 320-2462	Claude Fortin Highgate, VT (802) 363-2803	Bourdeau Bros. Sheldon, VT (802) 933-2277	Rodney Hostetler Deer Grove, IL (815)438-7815

Seedway	Albert Lea/Viking	T.A. Seeds	Syngenta
Ed Schillawski Shoreham, VT (802) 897-2281	Mac Ehrhardt Albert Lea, MN (507) 383-1070	Cory Chelko Jersey Shore, PA (866) 813-7333	Alvin Winslow New Glouster, ME (207) 740-8248

Table 2. Forty-five long season silage corn varieties evaluated in Alburgh, VT.

Variety	Company	Relative Maturity (RM)	Traits
282	Prairie Hybrids	101	nonGMO
353	Prairie Hybrids	98	nonGMO
2554	Prairie Hybrids	103	nonGMO
2803	Prairie Hybrids	102	nonGMO
3104	Prairie Hybrids	104	nonGMO
5200	Prairie Hybrids	108	nonGMO
5879	Prairie Hybrids	107	nonGMO
10-05ND	Albert Lea / Viking	105	nonGMO
50-04N	Albert Lea / Viking	104	nonGMO
DKC50-84	Dekalb	100	GENVT2P
DKC53-56	Dekalb	103	GENSS
DKC57-92	Dekalb	107	GENSSRIB
DKC60-67	Dekalb	110	GENSSRIB
DKC61-88	Dekalb	111	GEN VT3PRIB
EX0136	Prairie Hybrids	99	nonGMO
EX2415	Prairie Hybrids	101	nonGMO
EX7247	Prairie Hybrids	100	nonGMO
F2F498	Mycogen	99	SSX
F2F569	Mycogen	105	HXT/LL/RR2
F2F627	Mycogen	109	SSX / LL / RR2
N35T-3110	Syngenta	95	Agrisure Viptera 3110
N37R-3111	Syngenta	97	Agrisure Viptera 3111
N42Z-3111A	Syngenta	99	Agrisure Viptera 3111
N45P-3011A Brand	Syngenta	101	Agrisure Viptera 3110A
N53W-3122 Brand	Syngenta	105	Agrisure 3122 E-Z Refuge
P0157AMX	Pioneer	101	AMX, LL, RR2
P9754AM	Pioneer	97	AM, LL, RR2
SW14 RST 96	Seedway	96	RST, nonGMO
SW14 RST 98	Seedway	98	RST, BMR
SW4009	Seedway	100	Agrisure 3000GT
SW4204L	Seedway	102	LVRR
SW5504 LRR	Seedway	105	LRR
SW5554GT	Seedway	105	GT
SW6604LRR	Seedway	108	LRR
SW6709L	Seedway	110	Agrisure 3000GT
TA477-31	T.A. Seeds	97	Agrisure Viptera 3111
TA545-20	T.A. Seeds	104	LL, Agrisure 3000GT

TA583-22	T.A. Seeds	108	Genuity VT2Pro, RIB Complete
TMF2H699	Mycogen	110	SSX / LL / RR2
TMF2H706	Mycogen	109	SSX / LL / RR2
TMF2L538	Mycogen	101	SSX / LL / RR2
TMF2Q413	Mycogen	96	Herculex1, LL, RR2
TMF2R447	Mycogen	98	Genuity, Smartstax
TMF2R720	Mycogen	110	SSX / LL / RR2
TMF2R737	Mycogen	112	SSX / LL / RR2

Agrisure 3000GT – Agrisure® 3000GT provides hybrids with excellent tolerance to in-season applications of glyphosate and glufosinate herbicides and protects against corn borer and corn rootworm.
Agrisure GT - Agrisure® GT corn provides tolerance to in-crop applications of a broad range of glyphosate-based herbicides.
Agrisure Viptera 3110A - Agrisure Viptera® 3110 is first-ever trait stack labeled to control true armyworm The Agrisure Viptera 3110 trait stack is available in hybrids with both glyphosate and glufosinate tolerance.
Agrisure Viptera 3111 – The Agrisure Viptera® 3111 trait stack controls 14 above- and below-ground insects with a choice of either glyphosate or glufosinate applications.
Agrisure 3122 E-Z Refuge – Agrisure® 3122 E-Z Refuge trait stack is intended for use in areas where corn rootworm and lepidopteran pest management are primary concerns. This product features 5 percent blended refuge in a bag for convenience and easy compliance.
AM1- Optimum® AcreMax® provides an insect control solution allowing growers to simplify and reduce their corn rootworm refuge by placing refuge in a bag (RIB).
CB-Corn Borer
CruiserMaxx – Resistant to the pesticide CruiserMaxx™ (thiamethoxam, azoxystrobin, fludioxonil, mefenoxam).
Genuity - Genuity® corn products are protected from a broad range of above and below-ground insect pests of corn, including European corn borer, fall armyworm, corn earworm, Northern corn rootworm, Western corn rootworm, and black cutworm.
GT - Glyphosate tolerant
HXT – Herculex Xtra® provides season-long control of a variety of pests, including European corn borer, Western bean cutworm, corn, rootworm, and black cutworm.
IRM –Insect Resistance Management strategies are used to delay or prevent the onset of insect resistance to controls such as *Bt* proteins.
LFY – Conventional, leafy (forage trait).
Refuge Advanced - Dow AgroSciences Refuge Advanced® hybrids deliver the required insect refuge hybrid incorporated in the bag.
SSX – SmartStax corn provides a broad spectrum of insect control, using multiple modes of action, as well as glyphosate herbicide (Roundup Ready®, Touchdown®) and glufosinate-ammonium (LibertyLink®) tolerance.
LFYRR – Leafy, with pesticide tolerance for glyphosate systems.
LL – Glufosinate-ammonium herbicide (LibertyLink®) tolerant.
RIB – RIB Complete® (Refuge In a Bag) means that refuge seed is blended into each bag of insect-protected corn seed.
RR – Roundup Ready corn is glyphosate herbicide (Roundup®) tolerant.
RR2 – Roundup Ready 2 corn is glyphosate herbicide (Roundup®, Touchdown®) tolerant.

The soil type at the Alburgh location was a Benson rocky silt loam (Table 3). The seedbed was fall chisel plowed and spring disked followed by spike tooth harrow. The previous crop was spring wheat and spring canola. Starter fertilizer (10-20-20) was applied at a rate of 250 lbs per acre. Plots were 30 feet x 5 feet and replicated 3 times. The trial was planted with a John Deere 1750 planter on 20-May.The seeding rate was 34,000 seeds per acre. An herbicide mix of Lumax® (S-metolachlor, atrazine, and mesotrione) at 3 quarts per acre and Accent® (nicosulfuron) was sprayed, post-emergence, on 5-Jun. Corn was harvested between October 6 and 9th with a John Deere 2-row chopper, and forage was weighed in a wagon fitted with scales. Dry matter yields were calculated and then yields were adjusted to 35% dry matter.

Table 3. Long season corn variety trial specifics, Alburgh, VT, 2014.

Location	Borderview Research Farm – Alburgh, VT
Soil type	Benson rocky silt loam
Previous crop	Spring wheat and spring canola
Tillage operations	Fall chisel plow, disk and spike tooth harrow
Seeding rate (viable seeds ac^{-1})	34,000
Planting equipment	John Deere 1750 corn planter

Treatments (varieties)	45
Replications	3
Row width (in.)	30
Plot size (ft)	5' x 30'
Planting date	20-May
Starter fertilizer (at planting)	250 lbs ac^{-1} 10-20-20
Weed control	3 qt ac^{-1} Lumax®, 0.33 oz ac^{-1} Accent®, 5-Jun
Additional fertilizer (topdress)	200 lbs ac-1 urea (46-0-0), 2-Jul
Harvest dates	6 to 9-Oct

An approximate 2 lb. subsample of the harvested material was collected, dried, ground, and then analyzed at the University of Vermont's Testing Laboratory, Burlington, VT, for quality analysis. Dry matter yields were calculated and then adjusted to 35% dry matter.

Silage quality was analyzed using the FOSS NIRS (near infrared reflectance spectroscopy) DS2500 Feed and Forage analyzer. Dried and coarsely-ground plot samples were brought to the lab where they were reground using a cyclone sample mill (1mm screen) from the UDY Corporation. The samples were then analyzed using the FOSS NIRS DS2500 for crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), 30-hour digestible NDF (NDFD), nonstructural carbohydrates (NSC), and total digestible nutrients (TDN).

Mixtures of true proteins, composed of amino acids, and non-protein nitrogen make up the CP content of forages. The CP content of forages is determined by measuring the amount of nitrogen and multiplying by 6.25. The bulky characteristics of forage come from fiber. Forage feeding values are negatively associated with fiber since the less digestible portions of plants are contained in the fiber fraction. The detergent fiber analysis system separates forages into two parts: cell contents, which include sugars, starches, proteins, non-protein nitrogen, fats and other highly digestible compounds; and the less digestible components found in the fiber fraction. The total fiber content of forage is contained in the neutral detergent fiber (NDF). Chemically, this fraction includes cellulose, hemicellulose, and lignin. Because of these chemical components and their association with the bulkiness of feeds, NDF is closely related to feed intake and rumen fill in cows. Recently, forage testing laboratories have begun to evaluate forages for NDF digestibility (NDFD). Evaluation of forages and other feedstuffs for NDFD is being conducted to aid prediction of feed energy content and animal performance. Research has demonstrated that lactating dairy cows will eat more dry matter and produce more milk when fed forages with optimum NDFD. Forages with increased NDFD will result in higher energy values and, perhaps more importantly, increased forage intakes. Forage NDFD can range from 20 – 80% NDF.

Net energy for lactation (NE_L) is calculated based on concentrations of NDF and ADF. NE_L can be used as a tool to determine the quality of a ration, but should not be considered the sole indicator of the quality of a feed, as NE_L is affected by the quantity of a cow's dry matter intake, the speed at which her ration is consumed, the contents of the ration, feeding practices, the level of her production, and many other factors. Starch can also have an effect on NE_L, where the greater the starch content, the higher the NE_L

(measured in Mcal per pound of silage), up to a certain point. High grain corn silage can have average starch values exceeding 40%, although levels greater than 30% are not considered to affect energy content, and might in fact have a negative impact on digestion. Starch levels vary from field to field, depending on growing conditions and variety.

The silage performance indices of milk per acre and milk per ton were calculated using a model derived from the spreadsheet entitled "MILK2006," developed by researchers at the University of Wisconsin. Milk per ton measures the pounds of milk that could be produced from a ton of silage. This value is generated by approximating a balanced ration meeting animal energy, protein, and fiber needs based on silage quality. The value is based on a standard cow weight and level of milk production. Milk per acre is calculated by multiplying the milk per ton value by silage dry matter yield. Therefore, milk per ton is an overall indicator of forage quality and milk per acre an indicator of forage yield and quality. Milk per ton and milk per acre calculations provide relative rankings of forage samples, but should not be considered as predictive of actual milk responses in specific situations for the following reasons:

1) Equations and calculations are simplified to reduce inputs for ease of use,
2) Farm to farm differences exist,
3) Genetic, dietary, and environmental differences affecting feed utilization are not considered.

Yield data and stand characteristics were analyzed using mixed model analysis using the mixed procedure of SAS (SAS Institute, 1999). Replications within trials were treated as random effects, and hybrids were treated as fixed. Hybrid mean comparisons were made using the Least Significant Difference (LSD) procedure when the F-test was considered significant ($p<0.10$).

Variations in yield and quality can occur because of variations in genetics, soil, weather, and other growing conditions. Statistical analysis makes it possible to determine whether a difference among hybrids is real or whether it might have occurred due to other variations in the field. At the bottom of each table a LSD value is presented for each variable (i.e. yield). Least Significant Differences (LSDs) at the 0.10 level of significance are shown. Where the difference between two hybrids within a column is equal to or greater than the LSD value at the bottom of the column, you can be sure that for 9 out of 10 times, there is a real difference between the two hybrids. Hybrids that were not significantly lower in performance than the highest hybrid in a particular column are indicated with an asterisk. In the example below, hybrid C is significantly different from hybrid A but not from hybrid B. The difference between C and B is equal to 1.5, which is less than the LSD value of 2.0. This means that these hybrids did not differ in yield. The difference between C and A is equal to 3.0, which is greater than the LSD value of 2.0. This means that the yields of these hybrids were significantly different from one another. The asterisk indicates that hybrid B was not significantly lower than the top yielding hybrid C, indicated in bold.

Hybrid	**Yield**
A	6.0
B	7.5*
C	**9.0***
LSD	2.0

RESULTS

Weather data was recorded with a Davis Instrument Vantage PRO2 weather station, equipped with a WeatherLink data logger at Borderview Research Farm in Alburgh, VT (Table 4). From May-Oct. there were an accumulated 2,310 GDDs, at a base temperature of 50° F. May and June were extremely wet, delaying planting for many growers. June had 2.40 inches more than the 30-year average (1981-2010). The temperatures in July and August were cooler than the 30-year average. Frost damage due to a mid-September freeze resulted in harvesting several varieties before they had dried down to the desired moisture of 35%.

Table 4. 2014 weather data for Alburgh, VT.

	May	Jun	Jul	Aug	Sep	Oct
Average temperature (°F)	57.4	66.9	69.7	67.6	60.6	55.0
Departure from normal	1.0	1.1	-0.9	-1.2	0.0	6.8
Precipitation (inches)	4.90	6.09	5.15	3.98	1.33	2.00
Departure from normal	1.45	2.40	1.00	0.07	-2.31	-1.60
Growing Degree Days (base 50°F)	238	501	613	550	339	69
Departure from normal	40	27	-27	-31	21	69

Based on weather data from a Davis Instruments Vantage Pro2 with WeatherLink data logger.
October data represents weather recorded through the last corn harvest, 14-Oct 2014.
Historical averages are for 30 years of NOAA data (1981-2010) from Burlington, VT.

Plant populations, European corn borer damage, and harvest data were analyzed for all 45 corn varieties (Table 5). Plant populations were determined and corn borer damage was assessed prior to harvesting. The average plant population per acre was 28,140 lower than the seeding rate of 34,000 plants per acre. Poor plant populations may have resulted from wet and cool weather following planting.

The average percent corn borer damage was 1.30%, and corn borer damage varied significantly by variety. Twenty-eight of the 45 varieties trialed did not have corn borer damage. The variety ‘SW4204L’ had the most severe corn borer damage with 12% per acre.

Dry matter varied significantly by variety, with the greatest dry matter (lowest moisture) was the variety ‘N35T-3110’ (61.5%). The average dry matter for the trial was 42.6%. Yields did vary significantly by variety (Figure 1). The average yield at 35% dry matter (65% moisture) was 25.6 tons ac^{-1}. The highest yielding was the Mycogen variety ‘TMF2R720’ with 36.6 tons ac^{-1}. Other high yielding varieties included, ‘TMF2H699’ (34.3 t ac^{-1}), ‘DKC61-88’ (33.0 t ac^{-1}), and ‘SW6709L’ (31.4 t ac^{-1}).

Table 5. Harvest data for 45 long season corn varieties, 2014, Alburgh, VT.

Variety	RM	Plant population	Corn borer damage	DM at harvest	Yield at 35% DM
		number ac^{-1}	% ac^{-1}	%	tons ac^{-1}
282	101	25458	1.91*	42.8	22.7
353	98	27491	**0.00***	44.1	25.0
2554	103	28169	**0.00***	42.6	26.5
2803	102	20425	**0.00***	41.8	22.5
3104	104	29814	**0.00***	43.2	28.2
5200	108	22554	0.83*	39.8	24.5
5879	107	26910	**0.00***	34.4	25.2
10-05ND	105	33493	**0.00***	46.0	25.2
50-04N	104	26523	3.65*	43.6	26.6
DKC50-84	100	29040	**0.00***	45.2	21.9
DKC53-56	103	23135	**0.00***	45.1	26.3
DKC57-92	107	26910	**0.00***	44.1	27.5
DKC60-67	110	29814	**0.00***	39.8	30.6
DKC61-88	111	24490	**0.00***	36.6	33.0*
EX0136	99	25362	**0.00***	43.1	20.8
EX2415	101	25555	**0.00***	34.5	17.9
EX7247	100	28072	0.60*	46.8	26.5
F2F498	99	24587	**0.00***	42.2	21.2
F2F569	105	23135	4.69	45.2	22.2
F2F627	109	25652	7.02	39.3	21.8
N35T-3110	95	30565	**0.00***	**61.5***	21.8
N37R-3111	97	38405*	**0.00***	46.2	20.9
N42Z-3111A	99	**38841***	**0.00***	52.6	26.9
N45P-3011A Brand	101	33251	**0.00***	46.1	19.1
N53W-3122 Brand	105	38478*	**0.00***	42.7	26.6
P0157AMX	101	25458	0.45*	42.3	25.7
P9754AM	97	27491	**0.00***	46.0	26.4
SW14 RST 96	96	30589	0.31*	38.6	24.3
SW14 RST 98	98	30589	1.16*	39.1	17.0
SW4009	100	24587	**0.00***	42.5	23.5
SW4204L	102	30879	12.0	44.7	27.9
SW5504 LRR	105	33299	11.5	47.3	27.7
SW5554GT	105	28362	2.48*	41.6	28.5
SW6604LRR	108	22651	**0.00***	41.4	27.3
SW6709L	110	31460	**0.00***	37.2	31.4*
TA477-31	97	26523	**0.00***	42.6	24.5
TA545-20	104	34364*	**0.00***	44.5	30.2

TA583-22	108	23522	**0.00***	41.2	27.9
TMF2H699	110	30492	5.60	37.3	34.3*
TMF2H706	109	29234	**0.00***	35.0	30.6
TMF2L538	101	25749	**0.00***	44.9	26.1
TMF2Q413	96	23716	1.28*	46.0	24.2
TMF2R447	98	21877	3.28*	43.2	18.1
TMF2R720	110	34461*	0.30*	38.1	**36.6***
TMF2R737	112	24878	1.37*	34.4	28.9
LSD (0.10)		4602	4.40	3.53	5.65
Trial mean		28140	1.30	42.6	25.6

* Treatments that did not perform significantly lower (p=0.10) than top-performing treatment in a particular column.
Treatments shown in **bold** are top-performing in a particular column.

Forage quality characteristics varied significantly by variety (Table 6). The average CP level was 7.11%. Crude protein was highest in the Mycogen variety ‘TMF2R447’ (8.17%), though this was not statistically greater than 10 other varieties. The Mycogen variety F2F498 had the lowest ADF (21.2%), though this was not statistically greater than 7 other varieties. The lowest NDF (38.1%), was the Mycogen variety F2F569, this variety also had the highest nonstructural carbohydrates (NSC) (47.7%). Digestible NDF (NDFD), or the amount of NDF that is digestible in a 30-hour period, varied significantly by variety, and averaged 43.9% of NDF. The top performer in NDFD was the Mycogen variety ‘TMF2H699’ (45.6%), though this was not statistically greater than 17 other varieties.

There was a varietal impact on the total digestible nutrients (TDN) in the trial; T.A. Seeds variety ‘TA583-22’ had the highest concentration of TDN (75.1% of silage dry matter). This was not statistically greater than 11 other varieties. Net energy for lactation (NE_L) varied significantly by variety; ‘TA583-22’ was also the top performing variety having 0.75 Mcal of energy per lb. of feed.

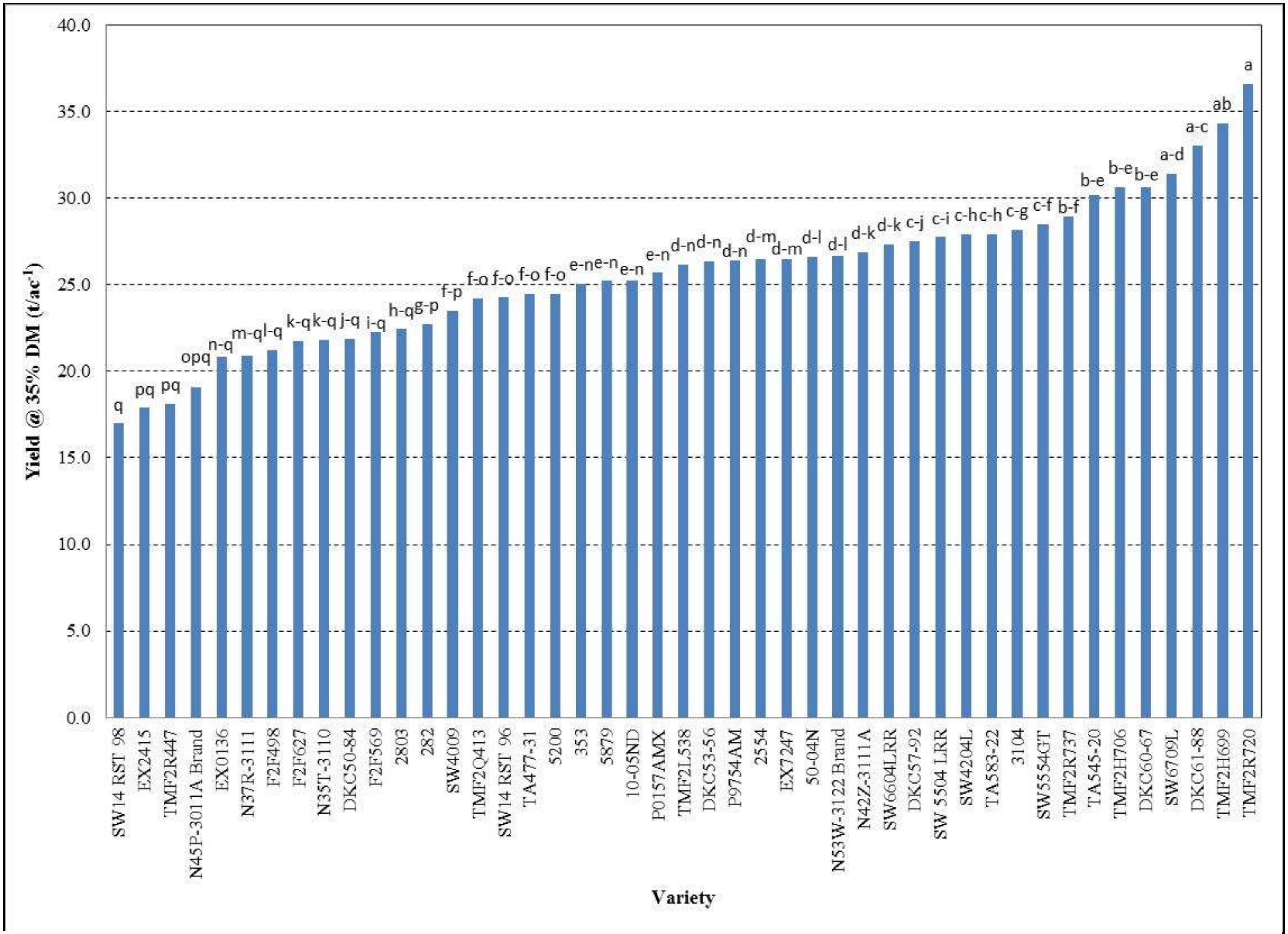

Figure 1. Yields of 45 long season corn varieties, Alburgh, VT, 2014. Treatments that share a letter do not differ significantly from one another (p=0.10).

Table 6. Forage quality data for 45 long season corn varieties, 2014, Alburgh, VT.

Variety	*Forage quality characteristics*							Milk	
	CP	**ADF**	**NDF**	**NDFD**	**NSC**	**TDN**	**NE_L**	**ton^{-1}**	**ac^{-1}**
	% of DM	% of DM	% of DM	% of NDF	% of DM	% of DM	Mcal lb^{-1}	lbs	lbs
282	7.09	25.1	43.9	45.1*	39.4	71.8	0.71	3340	26527
353	7.19	22.4*	41.9*	44.1	41.8	72.1	0.71	3363	29468
2554	6.97	25.7	47.0	43.2	36.8	69.1	0.68	3133	29014
2803	6.98	24.2	41.1*	44.6*	43.4*	73.5*	0.73*	3475*	27432
3104	7.68*	22.7*	39.3*	43.7	44.1*	72.9*	0.72*	3431*	33489
5200	7.86*	24.2	41.0*	44.0	40.6	73.8*	0.73*	3506*	30018
5879	6.91	25.3	42.7*	44.3*	40.5	72.8*	0.72*	3423*	30129
10-05ND	7.04	26.5	46.7	43.4	38.6	70.3	0.69	3233	28791
50-04N	7.27	25.2	42.5*	44.5*	41.8	73.0*	0.72*	3442*	32029
DKC50-84	6.28	24.4	42.4*	43.2	43.2*	72.2	0.71	3380	25970
DKC53-56	6.98	23.4*	40.5*	44.7*	45.1*	73.2*	0.73*	3454*	31814
DKC57-92	6.70	25.0	42.4*	43.6	42.4*	72.3	0.71	3382	32484
DKC60-67	7.54*	25.4	44.6	43.8	36.3	70.4	0.69	3228	34697
DKC61-88	7.44*	26.8	45.0	44.1	35.7	71.5	0.70	3315	38248*
EX0136	6.45	25.1	44.7	44.2	39.0	71.3	0.70	3301	23979
EX2415	6.80	26.5	45.9	44.6*	37.6	71.8	0.71	3344	20936
EX7247	6.68	22.4*	40.9*	43.7	43.9*	72.9*	0.72*	3424*	31735
F2F498	7.44*	**21.2***	39.6*	45.4*	45.5*	72.5*	0.72	3390	25181
F2F569	7.04	21.8*	**38.1***	44.9*	**47.7***	73.8*	0.73*	3502*	27216
F2F627	6.98	25.9	46.6	43.7	39.1	69.5	0.68	3164	24031
N35T-3110	6.56	28.6	53.2	40.4	33.2	65.6	0.64	2876	21901
N37R-3111	7.51*	24.9	44.5	42.2	38.7	70.2	0.69	3220	23508
N42Z-3111A	6.86	28.6	52.0	41.4	33.6	66.7	0.65	2957	27944
N45P-3011A Brand	7.14	27.1	47.7	41.9	36.0	69.3	0.68	3156	20994
N53W-3122 Brand	6.85	26.8	47.0	43.1	36.3	70.3	0.69	3230	30213
P0157AMX	7.51*	24.6	42.5*	44.4*	40.1	72.4	0.72	3390	30421
P9754AM	6.92	24.9	45.5	43.5	39.8	70.2	0.69	3215	29710
SW14 RST 96	7.15	24.7	45.8	44.0	37.9	69.2	0.68	3140	26859
SW14 RST 98	6.51	28.3	54.2	43.3	34.8	64.1	0.62	2743	16161
SW4009	7.38*	22.8*	38.6*	44.7*	43.3*	74.7*	0.74*	3569*	29358
SW4204L	6.60	30.0	53.6	42.6	30.6	67.0	0.65	2981	29156
SW5504 LRR	6.82	24.8	43.2	43.7	42.0	72.5*	0.72*	3406*	32832
SW5554GT	6.73	26.0	44.3	43.4	40.4	71.7	0.71	3342	33283
SW6604LRR	7.99*	27.1	47.5	43.4	33.8	70.0	0.69	3205	30483
SW6709L	6.95	27.6	49.3	43.7	33.6	69.8	0.68	3187	35007
TA477-31	6.60	23.9*	43.2	44.3*	41.5	72.1	0.71	3368	28521
TA545-20	6.97	25.4	44.1	44.7*	41.1	71.7	0.71	3341	35070
TA583-22	7.13	23.4*	38.9*	45.4*	45.5*	**75.1***	**0.75***	**3603***	35190
TMF2H699	7.53*	30.2	52.8	**45.6***	28.4	69.1	0.68	3129	37571*

TMF2H706	7.47*	28.2	47.3	45.2*	34.1	70.0	0.69	3194	34370
TMF2L538	6.33	26.0	45.1	44.4*	41.4	72.1	0.71	3363	31132
TMF2Q413	7.01	24.8	45.5	43.7	39.9	70.2	0.69	3218	26768
TMF2R447	**8.17***	24.3	44.1	45.0*	38.2	70.6	0.69	3245	20436
TMF2R720	7.76*	25.8	44.5	43.8	34.7	71.5	0.71	3319	**42435***
TMF2R737	8.08*	26.8	45.2	44.7*	35.5	71.1	0.70	3283	33055
LSD (0.10)	0.90	2.77	4.93	1.33	5.42	2.63	0.03	204	6535
Trial mean	7.11	25.4	44.8	43.9	39.0	71.1	0.70	3287	29457

* Treatments that did not perform significantly lower (p=0.10) than top-performing treatment in a particular column.
Treatments shown in **bold** are top-performing in a particular column.

Milk per ton and milk per acre can indicate the yield and quality of corn silage varieties (Figure 2). Milk per ton, an indicator of corn silage quality, was significantly highest in the T.A. Seeds variety 'TA583-22' (3603 lbs per ton); this was not statistically different from 10 other varieties. Milk per acre, which takes into consideration the dry matter yield of each variety, was statistically different by variety. The average milk per acre was 29,457 lbs ac^{-1}. The Mycogen variety 'TMF2R720' had the highest lbs per acre at 42,435. Other top performing varieties include; DKC61-88 (38,248 lbs ac^{-1}) and TMF2H699 (37,571 lbs ac^{-1}).

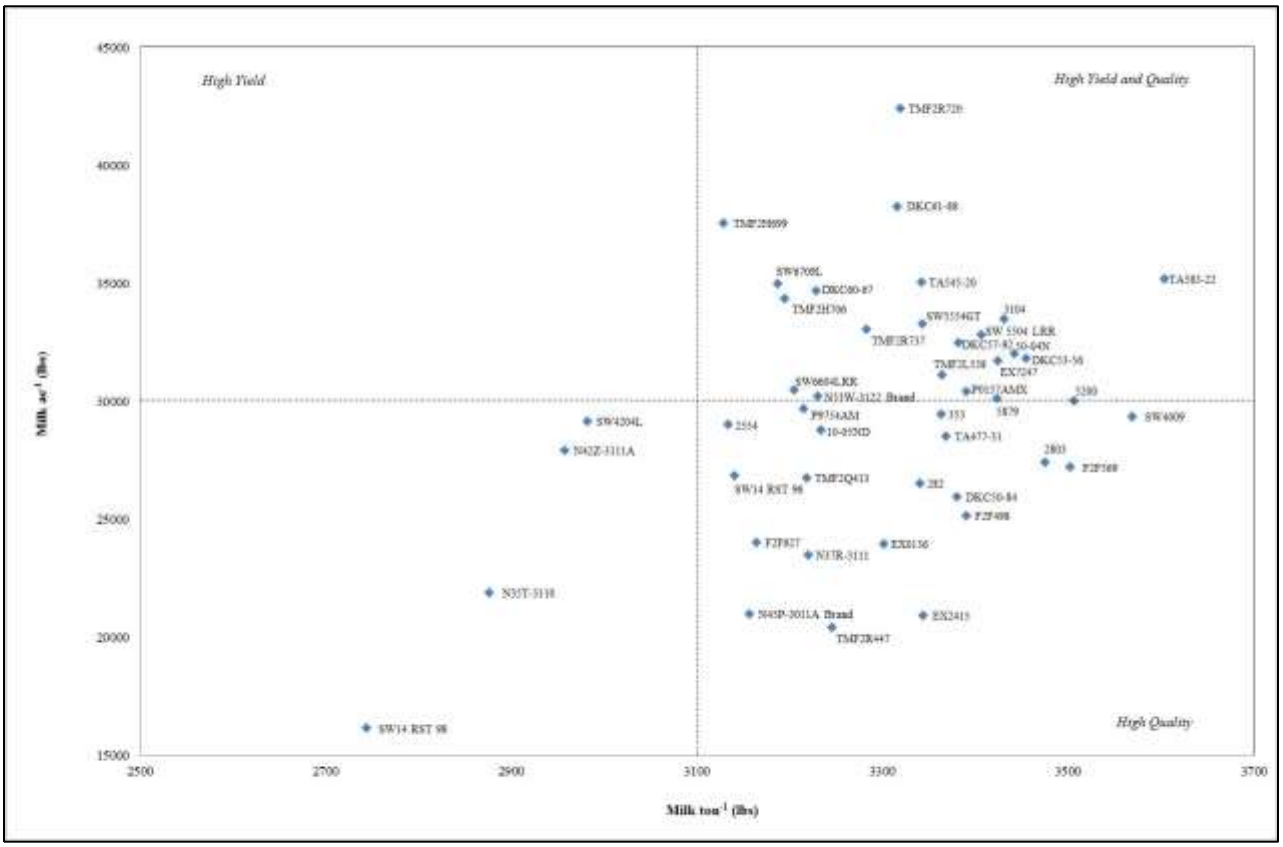

Figure 2. Milk production of 45 long season corn varieties, Alburgh, VT, 2014. Shows relationship between milk per ton and milk per acre. Dotted lines represent the mean milk per ton and milk per acre for the trial.

DISCUSSION

Several varieties this year yielded over 30 tons ac^{-1} at 35% dry matter content. This was surprising considering the cool wet spring which delayed planting, cooler temperatures during corn growth in July and August, and an early killing frost in September. The average yield for this year's long season corn variety trial was 4.2 tons higher than in 2013 (22.4 tons ac^{-1} at 35% dry matter). These yields indicate that long season corn varieties, ranging in this trial from 95 days to 112, can yield well in parts of northern Vermont. Generally, long season corn varieties tend to have more abundant yields and higher quality than short season corn, but often these varieties cannot maximize yield and quality potential due to the short growing season found in most regions of Vermont.

There was no severe lodging of corn stalks; however, there was incidence of European corn borer damage in several varieties. Not surprising the varieties with corn borer resistance showed little or no signs of damage; however, it's interesting to note that several nonGMO varieties also had little or no corn borer damage.

Forage quality differed significantly by variety in all measurements. The variety TA583-22 had the highest TDN, NE_L, and milk ton^{-1}. Several of the varieties trialed in 2014 produced high yielding and quality feed.

It is important to note that these results, while significant, represent only one year of data at only one location. Consult additional research before making varietal selections or other agronomic decisions.

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