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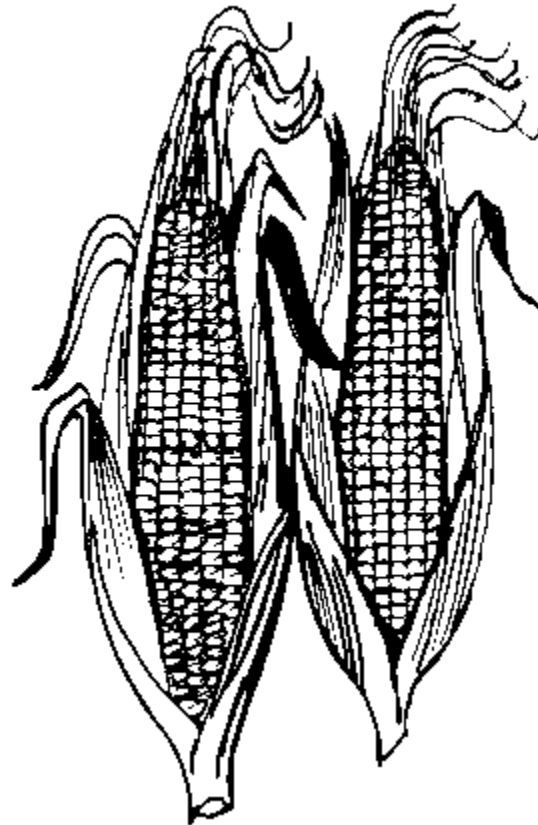


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# 2009 Short Season Corn Silage Variety Trial



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**UNIVERSITY  
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**EXTENSION**

## 2009 VERMONT SHORT SEASON CORN SILAGE TRIAL

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In 2009, the University of Vermont Extension conducted an experiment to evaluate yield and quality of short season corn hybrids. It is important to remember that the data presented are from a single test at only one location. Hybrid-performance data from additional tests in different locations and often over several years should be compared before you make conclusions.

### TESTING PROCEDURE

In 2009, the University of Vermont Extension conducted a short season corn variety trial at the Seward Family Farm in East Wallingford, VT. Several seed companies submitted varieties for evaluation. Companies and contact names are listed in Table 1. Six corn varieties ranging in maturities from 80-90 days were grown at this site. The Relative Maturities (RM) was provided by the companies. The specific varieties, their traits, and relative maturities are listed in Table 2

**Table 1. Participating Companies and Local Contact Information**

Mycogen	Dekalb/Monsanto	Seedway
Claude Fortin District Sales Manager Highgate, VT 802-363-2803	Scott Walker District Sales Manager Schenectady, NY 315-528-0580	Leon R. Walker Inc 5565 State Route 4 Fort Ann, NY 12827 518-639-5223

**Table 2. Varieties and Descriptions evaluated in Rutland, VT**

Company	Name	RM	Traits*
Seedway	E316	90	Leafy Hybrid
Seedway	E224RR	85	RR grain hybrid
Mycogen	TMF2R055	80	RR
Mycogen	F2F297	90	BMR
Mycogen	TMF2Q296	86	RR
Dekalb	DKC38-89	88	VT3

\* RR – ROUND-UP READY CORN is resistant to the herbicide glyphosate, a post-emergent, foliar applied, non-selective herbicide that controls a broad spectrum of weeds.

BMR – Brown Mid-Rib Corn is of higher digestibility because it contains less lignin than other non BMR corn hybrids. BMR corn is not considered a GMO.

VT3 – VT Triple® hybrids protect against: Western Corn Rootworms, Northern Corn Rootworms, European Corn Borers, Black Cutworms, Stalk Borers, Wireworms, White Grubs, Seed Corn Maggots, Early Flea Beetles, and Corn Earworms

### WEATHER DATA

Seasonal precipitation and temperature recorded at weather stations in close proximity to the trial site is shown in Table 3. This season brought cooler than normal temperatures and higher than normal rainfall patterns across the region. In general corn silage yields were average to below average for most farms including our trial locations. Below average Growing Degree Days (GDD) resulted in corn maturing at a slower rate and hence a later than normal harvest date. The total accumulated GDD for corn growth was 1817 which was about 230 GDD less than normal for this area.

Table 3. 2009 Temperature, precipitation, and Growing Degree Days summary- Rutland, VT

Rutland	April	May	June	July	August	September	October
Average Temperature	45.2	55	62	66.1	67.8	57.3	44.1
Departure from Normal	+0.4	-1.9	-2.8	-3.1	+0.6	-1.6	-4.0
Precipitation	1.7	3.8	3.9	9.3	7.7	2.3	4.8
Departure from Normal	-1.1	+0.28	+0.05	+4.72	+3.52	-1.61	+1.59
Growing Degree Days (50°)	139.5	259.5	387.0	502.5	555	295.5	65
Departure from Normal	+34.5	-55.2	-57.0	-91.2	+21.8	-17.0	-83.8

\*Based on National Weather Service data from cooperative observer stations in close proximity to field trials. Historical averages are for 30 years of data (1971-2000).

### CULTURAL PRACTICES

The seedbed was prepared with conventional tillage methods. The previous crop was corn. Starter fertilizer was applied at a rate of 255 lbs of 25-0-12 to the acre. Four- row plots were planted with a John Deere 7000 planter on May 26, 2009. The seeding rate was 32,000 seeds to the acre. The soil type was Castile gravely fine sandy loam on an A slope (0-3%). The plot design was a randomized complete block with two replications. Urea nitrogen was side-dressed at a rate of 100 lbs/ acre at V6 growth stage. Roundup was sprayed on July 7, 2009 at 1.5 quarts/acre. On October 16<sup>th</sup> the corn was harvested by hand from an 87.5 ft<sup>2</sup> sub-plot and weighed with a platform scale. A subsample of ten plants was chopped with a Troy-Built chipper shredder, mixed, and a sample collected for moisture determination and quality analysis. A second ten-plant sample was used to determine ear and stover weights. Pertinent trial information is summarized in Table 4.

Table 4. Short Season corn variety trial information - 2009

Trial Information	Seward Farm, E. Wallingford, VT
Soil type	Gravely fine sandy loam
Previous Crop	Corn
Row Width (in.)	30
Planting date	26-May
Harvest date	16-Oct
Harvest population (plants/acre)	26,000
Tillage operations	Spring PlowDisk
Manure (gal/acre)	Spring & Fall applied - 7500 gal/acre

### SILAGE QUALITY

Silage quality was analyzed using wet chemistry techniques at Cumberland Valley Analytical Services in Hagerstown, Maryland. Plot samples were dried, ground and analyzed for crude protein (CP), neutral detergent fiber (NDF), and 30h digestible NDF (dNDF). Mixtures of true proteins, composed of amino acids, and nonprotein nitrogen make up the CP content of forages. The CP content of forages is determined by measuring the amount of N 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. Evaluation of forages and other feedstuffs for NDF digestibility 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 NDF digestibility. Forages with increased NDF digestibility will result in higher energy values, and perhaps more importantly, increased forage intakes. Forage NDF digestibility can range from 20 – 80%.

The silage performance indices of milk per acre and milk per ton were calculated using a model derived from the spreadsheet entitled, “MILK2007” 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.

## PRESENTATION OF DATA

Results for the short season variety trial are listed in Table 5. Dry matter yields were calculated and then adjusted to 35% dry matter for the report. Varieties are ranked by dry matter at harvest in table 5. The numbers presented in the tables are of two replications. There is a figure displaying the relationship between milk per ton and milk per acre. The dotted lines dividing the figure into four quadrants represent the mean milk per ton and acre for the location. Therefore hybrids that fall above the lines performed better than the average and hybrids below the lines performed below average.

## LEAST SIGNIFICANT DIFFERENCE (LSD)

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 (LSD's) at the 10% level of probability 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 in 9 out of 10 chances that 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 A is significantly different from hybrid C but not from hybrid B. The difference between A 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 A and C 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.

Hybrid	Yield
A	6.0
B	7.5*
C	9.0
LSD	2.0

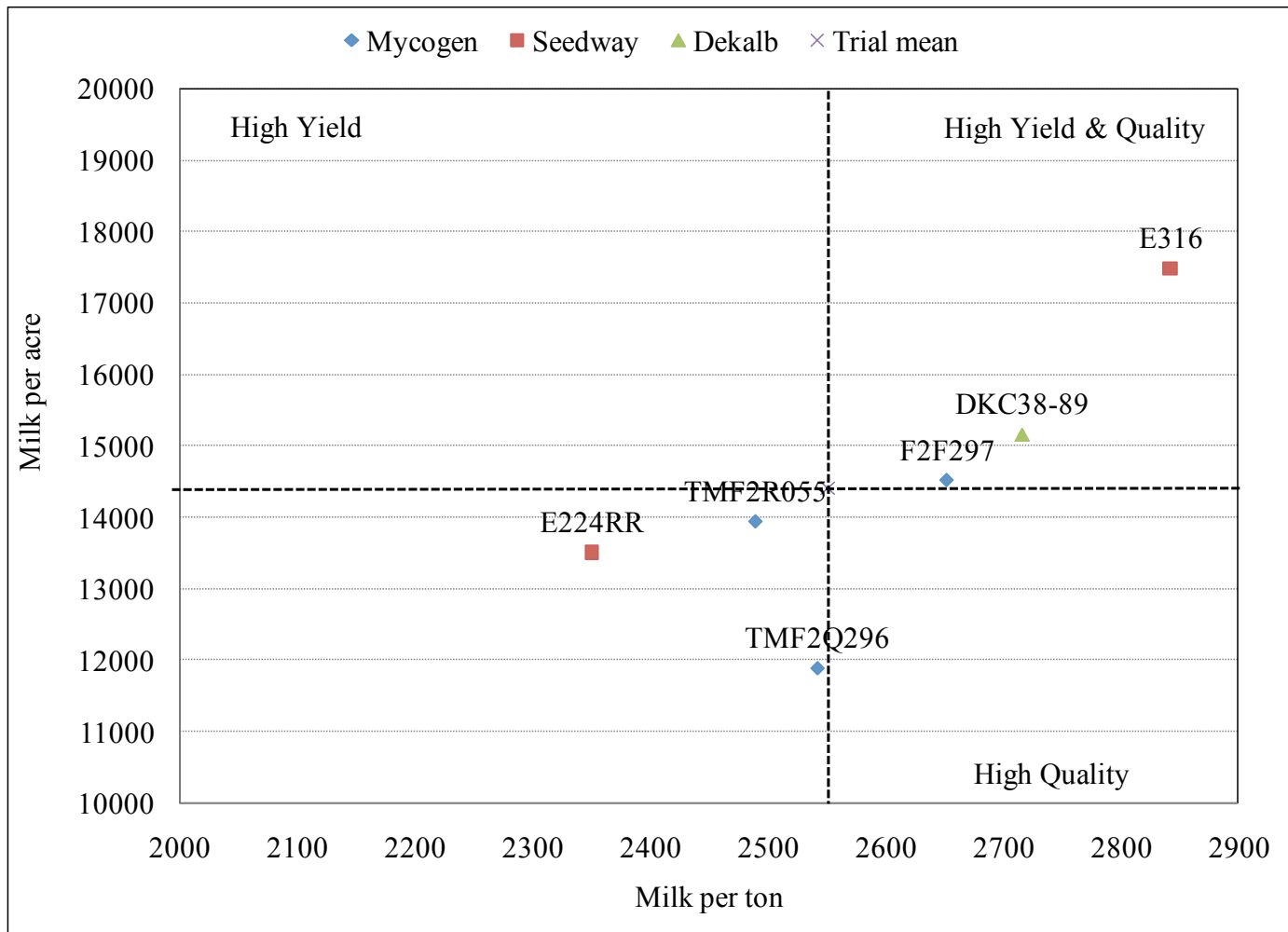
## RESULTS

Table 5. Silage yield and quality evaluation of short season corn varieties- Rutland, VT

Company	Hybrid	DM at harvest %	Yield 35 % DM T/A	Stover %	Ear %	Forage Quality Characteristics					Milk per	
						CP	ADF	NDF	dNDF	Nel	ton	acre
						%	%	%	%	%		
Mycogen	F2F297	30.0	15.8	48.5	51.5	8.30	27.9	49.2	59.4	0.74	2652	14511
Dekalb	DKC38-89	31.0	15.9	52.0	48.0	8.20	29.0	50.6	58.6	0.75	2716	15151
Seedway	E224RR	32.0	16.6	53.0	47.0	6.95	31.5	52.5	54.0	0.7	2350	13506
Mycogen	TMF2R055	34.0	16.1	50.0	50.0	9.10	27.6	47.9	51.6	0.73	2489	13933
Seedway	E316	38.2	19	47.5	52.5	7.05	28.5	46.2	61.9	0.67	2842	17483
Mycogen	TMF2Q296	43.0	11.3	42.5	57.5	8.20	28.5	50.7	63.1	0.72	2542	11882
Trial mean		31.0	15.6	48.9	51.1	8.40	28.2	49.4	58.1	0.72	2551	14410
LSD (0.10)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

NS - None of the varieties were significantly different from one another.

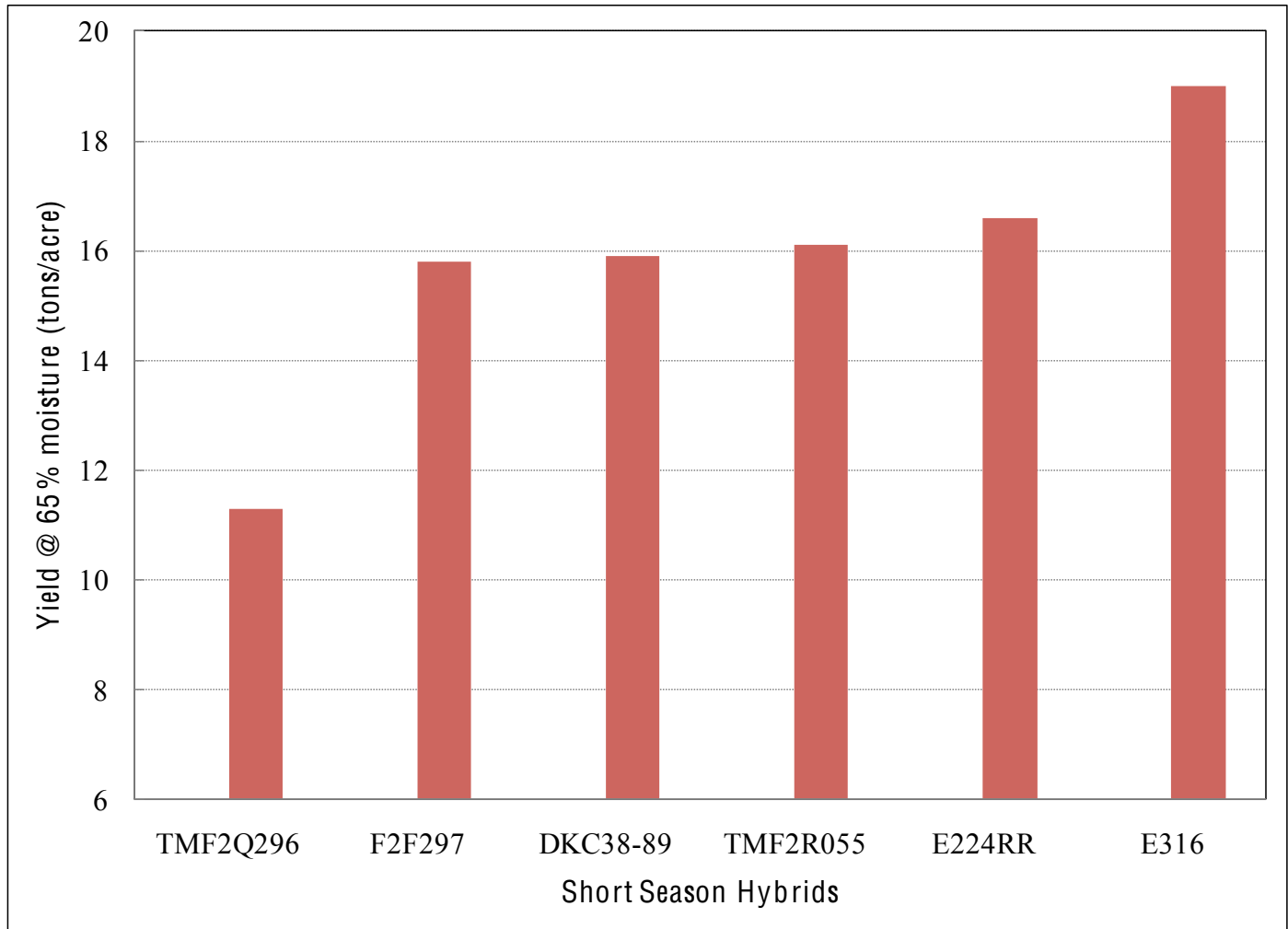
Figure 1. Relationship between milk per ton and milk per acre



Dotted lines represent the mean milk per ton and milk per acre.

## RESULTS

Figure 2. Yield comparison of short season corn silage hybrids.



Yields were not statistically different among the hybrids.

## DISCUSSION

There was no statistical differences for any attributes recorded from this variety trial. This could be attributed to the small harvest sample size and the large amount of variance within the field (slope, water availability). Although no statistical differences were found among the hybrids there are some obvious trends that can be identified from the data.

UVM Extension would like to thank Art Seward and family for their generous help with the trials. We would also like to thank Claude Fortin of Mycogen for the hybrid seed donation and Jennifer Durham (NRCD) for her help with planting and data collection.

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