

2008 Evaluation of Corn Hybrids in Massachusetts

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In 2008 we evaluated corn hybrids submitted by contributing companies at three locations. Table 1 shows some information related to planting at these locations. In each site, hybrids were grouped in two maturity groups based on relative maturity (RM) provided by the seed companies; short season group (84-100 days) and full season group (>100 days). Our earlier studies at the University of Massachusetts Crops Research and Education Center Farm indicated that average yield of earlier maturing corn hybrids were similar to later maturing hybrids. If confirmed, using earlier maturity corn hybrids along with earlier planting can provide the opportunity for farmers to plant their cover crops early for maximizing N recovery after corn and fall manure application. Our multi-year research studies have shown that well-established cover crops (achieving 1100 GDDs) can accumulate more than 100 lb N per acre.

In all locations corn hybrids were planted in early May (Table 1). A cone type distributor mounted on a double disc opening corn planter was used in a conventionally prepared seed bed.

Table 1: Field manure history, fertilizer added, pre-sidedress N test (PSNT) and planting and harvesting dates for the three locations used for corn hybrid evaluations.

Location	Manure	Fertilizer	PSNT	Planted	Harvested
UMass	N	15-8-12 (650 lb/a)	38.3	May 1	Sept. 10–18
Deerfield	Y	None	24.8	May 7	Sept. 5–10
Concord	Y	Ca NH ₄ NO ₃ (250 lb/a)	21.0	May 8	Sept. 8–12

Plots were planted at the rate of 32,000 seeds per acre in 30 inch rows. Plots consisted of 3 rows with a length of 25 feet. Each hybrid was replicated 4 times in all locations. Weeds were controlled as follows:

UMass: pre-emergence application of 2 quarts of Bicep II Magnum per acre.

Deerfield: Dual II Magnum 2.5 pints per acre and Prowl 4 pints per acre.

Concord: Atrazine 1 quart per acre + Lasso 1 quart per acre.

PSNT result at Concord location was slightly lower than optimum (Table 1). UMass Extension recommends 75 lbs N/acre when soil test NO₃-N level is 21-25 ppm. However, we have noticed that some dairy and livestock farmers who are in a “price-cost squeeze” under fertilizing their corn fields. Therefore, we decided to avoid side dressing at Concord location to evaluate the yield response of all hybrids to a potentially nitrogen deficient condition.

Corn hybrids were harvested by hand at different dates when their kernels reached 50-65% milk line. Harvested hybrids were evaluated for yield of silage and ear, percentage ears, and moisture content. Ten feet of central row from each plot was taken for yield estimation. Silage yields were adjusted to 70% moisture and ear corn yields to 25% moisture. Moisture content is reported as a percentage of corn harvested as silage. Climate data for UMass and Deerfield locations is presented in Table 2. In general, short season group hybrids required 2032 GDD and full season group hybrids required 2118 GDD, from planting to 50% milk line stage. We recommend that farmers use the accumulated GDD from early May to early September on their farm as a guide in selecting hybrid RM. A mixture of hybrid maturities is recommended to minimize risk of drought effect during silking stage which has a significant impact upon yield and ear percentage. Summary of mean comparison of yield, ear %, and moist %, for two maturity

group hybrids within each location is shown in Table 3. Yield performance of all hybrids and average GDD requirements for hybrids from planting to silking stage for two locations are presented in Table 4.

Table 2: Climate data for 2008 in S. Deerfield, MA.

	GDD ¹		Rainfall (inches)	
	2008	Norm	2008	Norm
May	284	282	1.35	3.89
Jun	505	533	5.82	3.75
Jul	640	697	6.11	3.91
Aug	497	638	3.35	4.10
Sep	192	199	4.99	3.79
Total	2118²	2349	21.61³	20.24

¹ Growing Degree Days was calculated as: $GDD = \Sigma(T_{max} + T_{min})/2 - 50$

² Total GDD for late maturity group. Total for early maturity group was 2032.

³ Total rainfall for late maturity group. Total rainfall for early maturity group was 19.88 inches.

Table 3: Mean comparison of yield, ear %, and moist %, for two maturity group hybrids within each location.

Location	Maturity	Silage ¹ T/ac	Earcorn ² T/ac	Pctear %	Moist %	Earmoist %	Silking days ³
UMass	Early	34.1b [†]	8.0a	59a	61b	39b	80.7b
	Late	36.7a	8.4a	57b	64a	43a	86.0a
Deerfield	Early	29.6b	7.1b	60a	61b	44b	74.4b
	Late	34.4a	8.2a	59a	67a	47a	78.9a
Concord	Early	26.7a	5.9a	55a	66b	46b	-
	Late	27.3a	5.7a	52b	69a	48a	-

¹Silage @70% moisture ²Earcorn @ 25% moisture ³Days after planting

† Means with the same letter within each location are not significantly different at $P \leq 0.05$.

Results from this study (Table 4) indicated that silage and ear yield and silage quality (ear/stover ratio) were significantly reduced when soil N level was not at the sufficient level. Silage yield, ear yield, and ear percentage for Concord location which subjected to N deficiency compared to the average of the other two locations reduced by 25%, 27%, and 6%, respectively.

Table 4: Yield, and ear % for all hybrids planted at the **University of Massachusetts Crops Research and Education Center Farm** (May 1, 2008), Deerfield (May 7, 2008), and Concord (May 8, 2008) and harvested at 50% milk line.

BRAND	HYBRID	RM Group	-----UMass-----				-----Deerfield-----				-----Concord-----			
			Silage ¹ T/ac	Earcorn ² T/ac	Pctear %	Silk GDD ³	Silage ¹ T/ac	Earcorn ² T/ac	Pctear %	Silk GDD	Silage T/ac	Earcorn T/ac	Pctear %	Silk GDD
DEKALB	DKC 45-79	95	33.5	8.6	64	1022	30.1	7.6	63	1045	24.2	5.9	60	-
DEKALB	DKC 50-44	100	35.8	9.0	63	1050	33.3	8.7	66	1168	27.6	6.4	58	-
LICA	946L	94	36.7	8.2	56	1126	26.4	7.0	67	995	25.1	6.1	61	-
LICA	9707 Btill	97	32.0	8.1	63	1000	29.3	6.7	57	1121	30.1	6.3	52	-
LICA	99S7	99	33.3	7.5	56	1126	28.7	5.9	52	1227	28.4	5.7	50	-
AGRISURE	N20R-GT	84	32.4	7.3	57	1050	28.2	7.0	62	995	25.5	5.7	56	-
SEEDWAY	SW 3301L	90	33.5	7.5	56	1244	30.6	6.6	54	1201	26.5	5.1	48	-
DAIRYLAND	3000-6	100	35.2	8.1	57	1103	30.0	7.4	61	1201	25.8	5.7	55	-
Mean			34.1	8.0	59	1090	29.6	7.1	60	1119	26.7	5.9	59	-
DEKALB	DKC 52-59	102	34.6	8.6	62	1189	33.2	8.1	61	1137	26.6	6.3	60	-
DEKALB	DKC 54-49	104	37.5	8.8	59	1126	33.8	8.9	66	1168	27.6	6.6	59	-
DEKALB	DKC 61-69	111	36.5	8.3	57	1142	38.5	8.6	56	1214	29.0	5.2	44	-
DEKALB	DKC 63-42	113	38.9	9.2	59	1206	34.9	8.5	61	1168	27.6	5.8	53	-
DEKALB	DKC 67-87	117	36.5	7.9	54	1244	34.8	8.4	61	1168	23.5	4.7	49	-
DAIRYLAND	3002-6	105	35.9	7.6	53	1142	33.6	7.9	59	1214	29.0	5.8	50	-
DAIRYLAND	3005-7	105	35.9	8.1	56	1219	33.5	8.1	60	1184	26.2	5.3	50	-
DAIRYLAND	3007-6	106	34.2	8.0	58	1244	32.7	7.8	59	1201	29.6	6.0	51	-
DAIRYLAND	3008-4	109	36.9	8.3	56	1142	32.9	7.6	58	1201	27.0	5.8	54	-
DAIRYLAND	3012-6	115	40.4	9.1	56	1279	36.1	8.3	57	1137	26.9	5.5	51	-
Mean			36.7	8.4	57	1193	34.4	8.2	59	1179	27.3	5.7	52	-
Overall Mean			35.4	8.2	58	1155	32.2	7.7	60	1148	27.0	5.8	53	-
CV (%)			7.7	9.4	3.3	2.4	10.5	10.8	4.0	2.3	10.6	14.0	6.7	-

¹Silage @70% moisture

²Earcorn @ 25% moisture

³GDD required for silking