2016 Massachusetts Corn Hybrid Evaluation

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Many hybrids are available for farmers wanting to plant corn for silage and grain. Some will perform better than others will, and some are better suited to the local climate. This report includes yield data for 20 hybrids which were submitted for trial by Doeblers and DeKalb. These hybrids should be available for the 2017 growing season. The twenty corn hybrids were evaluated for silage and grain yield at the University of Massachusetts Crops Research and Education Center, in South Deerfield, Massachusetts in 2016. The soil is a Unadilla silt loam. Each hybrid was assigned to one of four groups based on relative maturity (RM) provided by the seed companies; Group 1, early maturity group (RM <95 days), group 2 mid maturity group (RM 95-100 days), group 3, full season (RM 101-107 days, and group 4, long season (RM>107 days). All hybrids were planted on May 13, 2016. A cone type distributor mounted on a double disc opening corn planter was used in a conventionally prepared seed bed. Plots were planted at the rate of 35,000 seeds per acre in 30 inch rows. Weeds were controlled using glyphosate herbicide applied June 9th.

Plots consisted of 3 rows, 25 feet long, replicated 5 times. The site received 100 lbs. /acre of nitrogen (calcium ammonium nitrate (CAN)) and 80 lbs./acre of gypsum prior to planting, as recommended by an April soil test. Side-dressing was not needed, as determined by a pre side-dress soil nitrate test (PSNT) taken in early July.

Ten foot sections of the central rows were harvested by hand for evaluation of silage yield. Hybrids were harvested by replication September 14, 21, 22, 28, and 29. Harvested hybrids were evaluated for silage and ear yield, percentage ears, and moisture content. Silage yield was adjusted to 70% moisture and earcorn yield to 25% moisture.

Climate data for the evaluation site is presented in Table 1. Overall, in 2016 the corn crop experienced a hot, very dry growing season with June and July especially dry.

Table 1: Climate data for 2016 in South Deerfield, MA.

	GDD[1]			Rainfall (inches)		
	2016	Norm[2]	Deviation	2016	Norm[2]	Deviation
May	270	233	37	2.56	3.34	-0.78
June	499	482	17	1.36	4.58	-3.22
July	706	636	70	1.68	3.64	-1.96
August	714	591	123	3.67	3.55	0.12
September	451	348	103	3.56	4.21	-0.65
Total	**2640**	**2290**	**350**	**12.83**	**19.32**	**-6.49**

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

[2] Norm is based on average of 19 years, 1997-2015, at nearby Orange airport, Orange, MA

Comparisons of silage yields are given in Table 2. Hybrids are arranged according to reported days to maturity. Silage yield based on 70% moisture averaged 22 tons/ acre and ranged from 7 ton/ac to 36 ton/ac in individual plots. There were large differences in yield based on replication; average yields among the five replications ranged from 17 to 28 tons silage per acre at 70% moisture. A summary of relationships between days to maturity and silage yields is shown in bold at the bottom of Table 2. Longest season hybrids out yielded shortest season by an average of 4 ton/acre. Regardless of maturity group all hybrids tested in 2016 yielded very poorly compared to previous years. This is very likely related to drought. Rainfall in June and July was particularly deficient.

Earcorn yield, or percent ears (weight of ears as a percent of total plant biomass), is sometimes given as an indicator of quality, with a higher ear percentage connoting higher quality silage. The longer season hybrids as a group outperformed the shorter season hybrids in this category. The superior performance of the longer season hybrids may be simply because of the specific hybrids submitted. Alternatively, the superior performance may be due to the ability to assimilate carbon over a longer growing season, inherently allowing the plants to produce superior silage, both in terms of yield and quality.

When choosing a hybrid, time to harvest is a consideration if a cover crop is to be planted in the fall. The shortest season hybrid tested this year gave average yield and better than average quality (as defined as percent ears) and could be harvested at the very beginning of September in the Pioneer Valley in Massachusetts. This could be a good choice if an early cover crop is to be planted. The longest season hybrids at 111 and 112 days RM gave the highest yields and also higher than average quality. Note that 3 hybrids were from 2015 seed.

Table 2. Silage Yield 2016.

RM Category	Days to Maturity	Percent Ears[z]	Silage Ton/ac[y]	Earcorn Ton/ac[x]	Relative Moisture[w]		Hybrid
1	93	67	22	5.8	1	Doebler	RPM® 3316AMT
1	93	61	22	5.6	1.06	DeKalb	DKC43-48RIB[v]
1	94	54	16	3.9	1.16	DeKalb	DKC44-13RIB[v]
2	95	65	23	6.1	1.10	DeKalb	DKC45-65RIB
2	96	59	18	4.3	1.06	DeKalb	DKC46-20RIB
2	96	65	18	4.8	1.14	DeKalb	DKC46-36RIB
2	99	65	21	5.5	1.13	Doebler	RPM® 3916GRQT
2	99	64	23	6.0	1.12	DeKalb	DKC49-72RIB[v]
3	101	66	22	5.8	1.11	Doebler	RPM® 4115 AMT
3	102	65	24	6.1	1.17	DeKalb	DKC52-30RIB
3	104	62	19	4.8	1.19	DeKalb	DKC54-38RIB
3	105	66	22	6.0	1.11	DeKalb	DKC55-20RIB
3	105	66	26	6.8	1.25	Doebler	RPM® 563HXRT
3	107	59	24	5.9	1.25	Doebler	RPM® 4147AMXT
4	108	69	22	6.0	1.15	DeKalb	DKC58-06RIB
4	109	58	20	5.1	1.29	Doebler	RPM® 4917AMXT
4	110	67	23	6.2	1.23	DeKalb	DKC60-67RIB
4	111	66	25	6.7	1.21	DeKalb	DKC61-88RIB
4	111	66	27	7.3	1.22	Doebler	RPM® 5125AMT
4	112	69	25	7.0	1.19	DeKalb	DKC62-08RIB
Average		64	22	5.8			
LSD[u]		9	6	1.8			
Shorter- Season (<95 days)			**19.8**	**5.1**	**1.07**		
Mid-maturity (95-100 days)			**20.7**	**5.6**	**1.11**		
Full-Season (101-107 days)			**22.8**	**5.9**	**1.18**		
Long-Season (>107 days)			**23.8**	**6.4**	**1.22**		

[z] Percent ears is reported on a dry weight basis.

[y] Silage yield is reported as US tons per acre of 70% moisture plant material at harvest .

[x] Earcorn is reported as US tons per acre of ears in the husk at 25% moisture.

[w] Moisture relative to the earliest maturing hybrid at early harvest.

[v] 2015 Seed. Plant population using the 2015 seed averaged 93 plants/100 seeds while 2016 seed averaged 94 plants/ 100 seeds.

[u] LSD , least significant difference is the smallest difference between any two values in the above column in which a difference is considered to be of statistical significance at odds of 19 in 20.

Comparisons of grain yields are given in Table 3. Hybrids are arranged according to reported days to maturity for silage. Summary of relationships between days to maturity and grain yields are shown at the bottom of the table in bold. Note that any effects of "days to maturity" may be related to choice of seed the companies opted to send for trials. Drought was undoubtedly a factor in reducing yields relative to prior years. Grain yields averaged between 152 bu/ac and 226 bu/ac, with full season hybrids out yielding short and mid-season hybrids overall. There was considerable yield variability among the 4 plots of each hybrid. For two hybrids to show statistically significant yield differences, the average difference must exceed 33 bushels/ acre. Moisture content of the grain at harvest was related to "days to maturity", with the short season hybrids averaging lowest moisture and the long season hybrids averaging highest moisture. Two replications were harvested November 18 and the other two were harvested November 22. Overall, average moisture content dropped from 17.8% on November 18 to 17.2% on November 22. Note that these are essentially the same moisture percentages recorded in 2015 on December 16 and 21. Moisture percentages shown in Table 2 are averages of the two harvest dates.

Table 3. Grain corn yield, 2016 season, as harvested November 18 and 22, 2016.

Hybrid Number	Days to maturity	Maturity Group	bu/ac @ 15.5% moist.	Harvest Moist. %[z]	Protein Pct.	Hybrid
11	93	1	152	16.8	7.7	Doebler's RPM® 3316AM™
18	93	1	185	16.2	7.4	DeKalb DKC43-48RIB[x]
19	94	1	175	17.0	7.7	DeKalb DKC44-13RIB[x]
1	95	2	177	17.1	7.7	DeKalb DKC45-65RIB
2	96	2	179	17.0	7.8	DeKalb DKC46-20RIB
3	96	2	187	17.45	7.7	DeKalb DKC46-36RIB
12	99	2	159	17.6	7.6	Doebler's 3916GRQ™
20	99	2	189	17.2	7.8	DeKalb DKC49-72RIB[x]
13	101	3	176	17.5	7.0	Doebler's RPM® 4115 AM™
4	102	3	178	17.85	7.4	DeKalb DKC52-30RIB
5	104	3	193	17.75	7.2	DeKalb DKC54-38RIB
6	105	3	181	17.5	7.1	DeKalb DKC55-20RIB
14	105	3	196	18.95	7.5	Doebler's RPM® 563HXR™
15	107	3	177	19.1	7.5	Doebler's RPM® 4717AM™
7	108	4	191	18.55	7.0	DeKalb DKC58-06RIB
16	109	4	193	19.95	7.4	Doebler's RPM® 4917AM™
8	110	4	177	18.9	7.8	DeKalb DKC60-67RIB
9	111	4	190	18.9	7.6	DeKalb DKC61-88RIB
17	111	4	226	18.75	7.0	Doebler's RPM® 5125AM™
10	112	4	197	19.7	7.6	DeKalb DKC62-08RIB
LSD[y]			33	1.2	0.38	
Short Season (<95 days)		**1**	**171**	**16.7**	**7.6**	
Mid-Season (95-100 days)		**2**	**178**	**17.3**	**7.7**	
Full Season (101-107 days)		**3**	**184**	**18.1**	**7.3**	
Long Season (>107 days)		**4**	**194**	**19.1**	**7.4**	

[z] Moisture was measured at the time of harvest using a Dickey-john® mini GAC® moisture tester.

[y] LSD , least significant difference is the smallest difference between any two values in the column above it which is considered to be of statistical significance at odds of 19 in 20.

[x] Seed planted was for 2015.