2017 Massachusetts Corn Hybrid Evaluation

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Many hybrids are available for farmers wanting to plant corn for silage and/or grain. Some will perform better than others, and some are well suited to the local climate. This report includes silage yield data for 13 hybrids which were submitted for trial by Albert Lea, Doebler's and DeKalb. These hybrids should be available for the 2018 growing season. The hybrids were evaluated for silage and grain yields at the University of Massachusetts Amherst Crops Research and Education Center, in South Deerfield, Massachusetts in 2017. The soil was 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 (RM <95 days), group 2; mid- maturity (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 18, 2017. 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 Acuron herbicide at 2.5 qt per acre. Herbicide application was on May 19, 2017.

Plots consisted of 3 rows, 25 feet long and 2.5 feet wide, and replicated 5 times. The site received around 150 lbs/acre of nitrogen (300 lb urea) prior to planting, as recommended by an April soil test and sidedressed on June 28th with another 300 lb urea. Side-dressing was based on a pre side-dress soil nitrate test (PSNT) taken in late June.

Ten foot sections of the central rows were harvested by hand for evaluation of silage yield. Hybrids were harvested by replication on September 22 (group 1), September 25 (group 2), and October 4 (groups 3 and 4). Harvested hybrids were evaluated for silage and ear yield, percentage ears, and moisture content. Silage yield was adjusted to 70% moisture (harvest moisture had averaged 64%) and earcorn yield to 25% moisture. Note that harvests were later than usual.

Climate data for the evaluation site is presented in Table 1. Overall, in 2017 the corn crop experienced a cool growing season until September when it became unseasonably warm. The cool weather in July and August, as well as the low rainfall in July are likely responsible for the poorer than normal yields. Nutrient levels and weed control were not judged to be sub-optimal, but plants were judged to be smaller than expected.

Table 1: Climate data in 2017 for South Deerfield, MA and area norms.

	GDD[1]			Rainfall (inches)		
	2017	Norm[2]	Deviation	2017	Norm[2]	Deviation
May	198	224	-26	6.54	3.30	3.24
June	488	481	7	4.65	4.42	0.23
July	628	637	-9	2.5	3.54	-1.04
August	559	595	-36	4.3	3.56	0.74
September	489	350	139	2.42	4.18	-1.76
October	274	88	186	8.86	4.20	4.66
May - August	**1873**	**1937**	**-64**	**17.99**	**14.82**	**3.17**
May - October	**2636**	**2375**	**261**	**29.27**	**23.20**	**6.07**

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

[2] Norms are averages of 20 years, 1997-2016, at nearby Orange airport, Orange, MA

Comparisons of silage yields of corn hybrids are given in Table 2. Hybrids are arranged according to reported days to maturity. Silage yield adjusted to 70% moisture content averaged roughly 19 tons/acre and ranged from 14 ton/ac to 24 ton/ac in individual plots. Yield of 25 ton/ acre would be considered normal. 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 2 ton/acre. Regardless of maturity group all hybrids tested in 2017 yielded poorly compared to previous years. This is very likely related to drought. As mentioned earlier, rainfall in June and July (during rapid growth of corn) was particularly deficient. Drought tolerant hybrids presumably performed best.

Earcorn yield, or percent ears (weight of ears as a percent of total plant biomass), is used as an indicator of silage quality, with a higher ear percentage connoting higher quality silage (more energy in grain than stover). The longer season hybrids as a group out-yielded the shorter-season hybrids, though they did not have better quality. In the past we often found the different RM groups of corn yielded similarly. The present superior performance of longer-season hybrids could be due to the ability to assimilate carbon over a longer (and hot September) growing season, inherently allowing the plants to produce superior silage, both in terms of yield and quality. However, using shorter-season corn hybrids provides the opportunity to plant cover crops in a timely manner. Early planting of cover crops not only maximizes the benefits to environment and recovering nutrients, but also provides biomass which can be grazed or cut as baleage in the following spring.

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 only slightly less

yield and better than average quality (as defined as percent ears) and could be harvested in mid- September in the Pioneer Valley in Massachusetts. One of these hybrids could be a good choice if an early cover crop is to be planted. The longer season hybrids did have higher yields. Note that differences in harvest moisture are due to harvest date chosen, not to inherent differences in hybrids. The early maturing hybrids could probably have been harvested up to a week earlier and still have had moisture content acceptable for ensiling.

Table 2. Data related to corn silage hybrid evaluation in MA, 2017.

RM Category	Days to Maturity	Percent Ears[z]	Silage Ton/ac[y]	Earcorn Ton/ac[x]	Harvest Moisture Pct[w]		Hybrid
1	92	69	18	5.8	64	Albert Lea	Viking 42-92
1	93	68	17	5.6	67	Albert Lea	Viking 74-93
1	93	68	19	3.9	65	DeKalb	DKC43-48RIB
1	93	68	18	6.1	62	Doebler's	RPM® 3316 AM™
2	95	71	19	4.3	64	Albert Lea	Viking 51-95
2	95	70	18	4.8	63	DeKalb	DKC45-65RIB
2	99	66	17	5.5	64	Doebler's	3916GRQ™
2	99	66	17	6.0	66	DeKalb	DKC49-72RIB[v]
3	101	69	18	5.8	58	Albert Lea	Viking 53-01
3	105	68	20	6.1	64	Doebler's	RPM® 563HXR™
3	107	66	21	4.8	61	DeKalb	DKC57-92RIB
4	111	65	21	6.7	64	DeKalb	DKC61-88RIB
4	111	62	19	7.0	66	Doebler's	RPM® 5125 AM™
LSD[v]		2	2.5	0.9	2		
Average		**67**	**19**	**6.9**	**64**		
Harvest 9/22		68	18	6.5	64	1	Shorter- Season (<95 days)
Harvest 9/25		68	18	6.6	64	2	Mid-maturity (95-100 days)
Harvest 10/4		67	20	7.4	61	3	Full-Season (101-107 days)
Harvest 10/4		64	20	7.3	65	4	Long-Season (>107 days)

[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 tons per acre of ears in the husk at 25% moisture.

[w] Moisture at the time of harvest.

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

Grain samples of twenty-five linear feet of row were harvested on November 30, 2017 using a two-row plot combine. Five replicates were harvested for each hybrid. Yields, as well as moisture content and protein are reported in Table 3. On the whole yields were higher for the longer season hybrids. Moisture content was higher as

well, but all hybrids would require further drying to achieve the desirable 15.5% moisture, even harvested at the very end of November. Protein as estimated using NIRS was lower than in 2016.

Table 3. Grain yield and quality, harvest of November 30, 2017.

Days to maturity	Maturity Group	bu/ac @ 15.5% moist.	Harvest Moist. %[z]	Protein Pct.	Hybrid	
92	1	180	18.1	6.3	Albert Lea	Viking 42-92
93	1	195	17.1	7.0	Albert Lea	Viking 74-93
93	1	203	17.2	6.4	DeKalb	DKC 43-48 RIB
93	1	178	17.7	6.6	Doebler's	RPM® 3316AM™
95	2	204	17.9	6.5	Albert Lea	Viking 51-95
95	2	207	19.1	6.4	DeKalb	DKC 45-65 RIB
99	2	178	19.8	6.3	Doebler's	3916GRQ™
99	2	217	19.1	6.7	DeKalb	DKC49-72RIB
101	3	188	19.9	6.3	Albert Lea	Viking 53-01
105	3	214	22.1	6.7	Doebler's	RPM® 563HXR™
107	3	203	22.2	6.8	DeKalb	DKC57-92RIB
111	4	252	21.4	6.7	DeKalb	DKC61-88RIB
111	4	202	22.0	6.3	Doebler's	RPM® 5125AM™
Average		**201**	**19.4**	**6.5**		
LSD[y]		31	1.2	0.2		
Short Season (<95 days)	1	189	17.5	6.5		
Mid-Season (95-100 days)	2	201	19.0	6.5		
Full Season (101-107 days)	3	202	21.1	6.6		
Long Season (>107 days)	4	227	21.7	6.5		

[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.