Corn Date of Planting and Maturity in Northeast Iowa

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Introduction

Historically, planting dates can get delayed due to weather and wet soil conditions during the early growing season. Replanting is sometimes necessary due to soil surface crusting from heavy rain events. There always is the question on what maturities of corn should be selected at various planting dates during the planting season for optimal grain moisture and yield. This trial was setup to determine what maturities are well suited for northeast Iowa, but also how maturity selection should be adjusted as planting dates get pushed into late spring.

Materials and Methods

This study was conducted at the ISU Northeast Research Farm in 2017, 2018, 2019, and 2020. In 2017 and 2018, the same three hybrids (P0157AM for 101-day, P0589AM for 105-day, and P1197AM for 111-day) were planted at four target planting dates of April 10, April 25, May 10, and May 25. In 2019 and 2020, P1197AM was replaced with P1366AM for 113 day. The plots were setup in a split plot statistical design with four replications. Target planting date was the whole plot and hybrid was the split plot. A target seeding rate of 35,000 seeds/acre was used. Data collection included growth staging, stand counts, grain yield, and grain moisture.

Results and Discussion

In 2017 and 2020, the study was planted in the second and first week of April, respectively. The earliest field work possible in April of 2018 and 2019 was the third week, due to wet soil conditions. May through September growing degree unit (GDU) accumulation for 2017, 2018, 2019, and 2020 was 2,594; 2,863; 2,605; and 2,635 GDUs, respectively. The number of GDUs required from planting to emergence was less as planting dates were delayed. As planting dates were delayed, the number of GDUs from emergence to maturity generally decreased (Table 3). This was true for 2018 and 2019. However, in 2017 and 2020, the number of GDUs from emergence to maturity was similar across planting dates.

In 2017, there was no yield advantage among the four planting dates (Table 1). Grain moisture was only significantly higher for the last planting date, regardless of hybrid maturity. Yield increased when planting longer hybrid maturities. This was presumably due to optimal heat unit accumulation since pollination occurred by August 2 and the first killing frost occurred October 29, providing a long grain fill period (Table 2). GDUs to get to silking stage (R1) and maturity (R6) were not significantly different for any planting dates (Table 3).

In 2018, the corn yield was highest for the first date of planting (DOP) regardless of hybrid maturity, and consistently lowered as DOP was delayed regardless of hybrid maturity (Table 1). No significant yield difference was noted from any hybrid maturity. GDUs were highest for the earliest planting date, which presumably added yield in a growing season with above average rainfall from planting to harvest (Table 3).

In 2019, grain yields were highest for the second DOP (Table 1), and yields were generally higher for longer maturity hybrids. GDUs to get to R1 and R6 decreased as plantings were delayed (Table 3).

In 2020, grain yields were not significantly different for planting dates and maturities except for the last planting date of the longest maturity hybrid. Grain moisture was only significantly higher for the last planting date of each hybrid.

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Table 1. Corn grain yield and grain moisture (H_20) at harvest for three hybrids at four planting dates at the ISU Northeast Research Farm, Nashua, IA in 2017, 2018, 2019, and 2020.

Date of planting	101-day		105-day		111-day/113-day		Average	
	H_20 %	Yield bu/ac	H_20 %	Yield bu/ac	H_20 %	Yield bu/ac	H_20 %	Yield bu/ac
4/11/2017	18.3 a	222.4 d	18.5 a	239.3 bcd	19.3 a	257.7 a	18.7	239.8
4/25/2017	18.3 a	229.2 d	19.0 a	250.0 abc	20.0 ab	259.1 a	19.1	246.1
5/9/2017	18.6 a	233.7 cd	18.8 a	253.2 ab	19.9 ab	257.3 a	19.1	248.1
5/26/2017	19.9 ab	223.2 d	21.9 bc	250.6 abc	23.7 c	252.6 ab	21.8	242.1
Average yield (bu/ac)	18.8	227.1	19.5	248.3	20.7	256.7		
	$LSD_{0.05}$ Moisture = 2.4, Yield = 17.8							
4/25/2018	16.3 ab	225.2 ab	16.0 ab	222.5 ab	17.2 a	230.1 a	16.5	225.9
5/7/2018	16.7ab	218.5 ab	16.7 ab	218.5 ab	17.8 ab	216.2 ab	17.0	217.7
5/18/2018	17.4 b	211.7 b	17.2 b	209.3 b	18.9 b	212.9 b	17.8	211.3
5/29/2018	19.4 c	189.1 c	19.1 c	183.3 c	23.2 c	190.7 c	20.5	187.7
Average yield (bu/ac)	17.4	211.1	17.2	208.4	19.2	212.5		
	$LSD_{0.05}$ Moisture = 1.1, Yield = 15.8							
4/21/2019	19.8 ab	236.4 cde	19.4 a	244.3 bcd	20.9 bc	271.8 a	20.1	250.9
5/4/2019	19.6 a	244.7 bcd	19.4 a	254.3 b	20.5 abc	271.7 a	19.8	256.9
5/16/2019	20.1 abc	225.2 e	20.5 abc	249.3 bc	21.1 c	254.6 b	20.6	243.0
6/1/2019	20.9 bc	222.4 e	22.3 a	236.9 cde	24.4 d	230.1 de	22.5	229.8
Average yield (bu/ac)	20.1	232.2	20.4	246.2	21.7	257.0		
	$LSD_{0.05}$ Moisture = 1.2, Yield = 15.1							
4/7/2020	15.7 a	200.2 a	15.8 a	192.0 a	17.4 a	202.1 a	16.3	198.1
4/24/2020	15.7 a	203.0 a	15.9 a	203.8 a	16.8 a	200.7 a	16.2	202.5
5/10/2020	16.6 a	198.6 a	16.8 a	202.5 a	18.2 a	198.7 a	17.2	199.9
6/1/2020	22.9 b	203.9 a	28.3 b	202.2 a	35.3 b	176.5 b	28.8	194.2
Average yield (bu/ac)	17.7	201.4	19.2	200.1	21.9	194.5		
	$LSD_{0.05}$ Moisture = 1.5, Yield = 12.3							

$LSD_{0.05}$ = least significant difference. Entries that differ by one LSD or more are considered to be in different classes with 95 percent certainty. Entries by year with the same letter are not considered to be significantly different.

Table 2. Corn dates of emergence (VE), silking (R1), and maturity (R6) for 2017, 2018, 2019 and 2020.

Date of planting	VE			R1			R6		
	101-day	105-day	111-day 113-day	101-day	105-day	111-day 113 day	101-day	105-day	111-day 113-day
4/11/2017	5/5	5/5	5/5	7/16)	7/17	7/20	9/16	9/20	9/24
4/25/2017	5/12	5/12	5/12	7/18	7/19	7/23	9/22	9/24	9/28
5/9/2017	5/16	5/16	5/16	7/19	7/21	7/23	9/24	9/26	9/30
5/26/2017	6/1	6/1	6/1	7/28	7/30	8/2	9/30	10/15	10/24
4/25/2018	5/9	5/9	5/9	7/9	7/10	7/14	9/10	9/14	9/18
5/7/2018	5/19	5/19	5/19	7/12	7/14	7/16	9/11	9/16	9/24
5/18/2018	5/25	5/25	5/25	7/17	7/19	7/23	9/15	9/21	9/28
5/29/2018	6/3	6/3	6/3	7/28	7/30	8/1	10/3	10/9	10/14
4/21/2019	5/15	5/15	5/15	7/19	7/20	7/23	9/30	10/1	10/3
5/4/2019	5/20	5/20	5/20	7/19	7/20	7/23	9/30	10/1	10/3
5/16/2019	5/28	5/28	5/28	7/24	7/25	7/29	10/4	10/5	10/9
6/1/2019	6/6	6/6	6/6	8/1	8/2	8/5	10/9	10/12	10/17
4/7/2020	5/06	5/06	5/06	7/17	7/18	7/20	9/7	9/9	9/18
4/24/2020	5/11	5/11	5/11	7/17	7/18	7/21	9/8	9/15	9/19
5/10/2020	5/23	5/23	5/23	7/21	7/22	7/24	9/23	9/25	9/30
6/1/2020	6/6	6/6	6/6	7/30	8/1	8/4	10/8	10/10	10/20

Table 3. Corn growing degree units (GDU) from VE, R1, and R6 for 2017, 2018, 2019, and 2020.

Date of planting	VE			R1			R6		
	101-day	105-day	111-day 113-day	101-day	105-day	111-day 113 day	101-day	105-day	111-day 113-day
4/11/2017	138	138	138	1212	1236	1310	2304	2363	2462
4/25/2017	104	104	104	1187	1213	1314	2335	2390	2457
5/9/2017	94	94	94	1146	1200	1247	2324	2370	2413
5/26/2017	76	76	76	1195	1234	1295	2258	2401	2487
4/25/2018	165	165	165	1193	1216	1320	2451	2522	2620
5/7/2018	147	147	147	1154	1209	1262	2353	2460	2597
5/18/2018	108	108	108	1194	1235	1315	2344	2476	2544
5/29/2018	119	119	119	1186	1217	1252	2338	2372	2396
4/21/2019	133	133	133	1201	1231	1294	2493	2518	2538
5/4/2019	128	128	128	1138	1169	1232	2431	2455	2475
5/16/2019	134	134	134	1164	1182	1277	2392	2397	2430
6/1/2019	88	88	88	1184	1201	1264	2289	2305	2313
4/7/2020	187	187	187	1304	1331	1374	2334	2334	2426
4/24/2020	135	135	135	1282	1309	1373	2312	2375	2413
5/10/2020	110	110	110	1276	1293	1335	2376	2416	2465
6/1/2020	123	123	123	1332	1371	1413	2381	2414	2463