

When, What, and How Deep to Plant Corn on Well-Drained Soils in New York?

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The average corn planting date is considerably earlier now compared to 25 years ago, especially in the Midwest USA. Here, in NY, planting is earlier than ever but still lags behind most upper Midwest states. For example, only 53% of the corn was planted by May 20th in NY from 2008-2012 compared with 84% in Minnesota, 68% in Wisconsin, and 71% in Michigan. Certainly, the soils in the upper Midwest States are as cold as New York in late April or early May. Consequently, the slower planting pace in New York must be attributed to either wetter soils; lack of readiness, especially for dairy producers that must include manure application into their corn management strategy; previous negative experiences by growers with April planting dates; or lack of belief that the newer hybrids with seed treatments can be planted into somewhat cold soils.

Some growers, however, are planting earlier and planting at the “one size fits all” depth of 2-inches. Early planted corn (~mid-April), however, can take 3 to 4 weeks to get out of the ground and a shallower planting depth may be beneficial for April planting dates. Other growers will not plant until May and if soils conditions are wet, their planting extends into late May or early June. When planting is delayed after May 20th, growers in NY wonder if they should switch to an earlier hybrid. We initiated small-plot research at the Aurora Research Farm in 2013 to answer three questions concerning corn planting: 1) Can corn be safely planted in early and mid-April on well-drained soils in NY without risk of poor stands and subsequent yield loss, 2) when should grain growers switch from a full-season to a shorter season hybrid, if planting is delayed, and 3) is the 2-inch seeding depth optimum from early April through early June planting dates?

We planted a 103-day (203-44STXRIB from Channel) relative maturity (RM) and a 96-day (DKC46-20VT3P RIB from DeKalb) RM hybrid on April 5, April 19, May 6, May 17, and June 1 at 1.0, 1.5, 2.0, 2.5, and 3.0 inch seeding depths at a rate of 32,000 seeds/acre. We determined stand establishment at ~ the 4th leaf stage (V4), about 3-6 weeks after planting, depending upon planting date. We harvested all plots on October 27th, once the grain moisture of the 103-day hybrid planted on June 1 was below 35%.

Plant populations had a significant planting date x seeding depth interaction (Table 1). When averaged across hybrids,

the 1.5-inch depth consistently was among seeding depths with the highest stand establishment on all planting dates. The 1.5 inch seeding depth averaged ~85% plant establishment on the April 5 and May 6 planting dates and ~90% on the other planting dates. The 1.0 inch seeding

Table 1. Early plant populations of corn at the 4th leaf stage (V4) at five planting dates and five seeding depths, in 2013 when averaged across two hybrids (DKC46-20 VT3P-RIB and 203-44STXRIB).

DEPTH	PLANTING DATE				
	4/5	4/19	5/6	5/17	6/1
inches	plants/acre				
1.0	27,000	29,000	28,000	29,000	24,500
1.5	27,000	28,000	27,500	28,000	29,000
2.0	24,500	28,500	28,500	28,000	29,000
2.5	24,500	28,500	28,500	27,500	28,000
3.0	21,500	27,500	28,500	26,500	27,000
LSD 0.05	2,025 [†]				

[†]LSD compares seeding depth means within a planting date.

depth also had 85-90% emergence on the first four planting dates but only ~75% emergence on the June 1 planting date (probably because of dry conditions for the first 8 days after planting). In contrast, the 2.0 and 2.5 inch seeding depths had mostly ~90% stand establishment on the last four planting dates but only ~75% for the April 5 planting date. The 3.0 inch seeding depth had above 80% stand establishment on the last four planting dates but only ~65% establishment on the April 5 planting date. Planting on the shallow side (<2.0 inches) for early-planted corn and deeper (>1.5 inches) for later-planted corn proved to be the correct strategy for stand establishment in 2013.

Despite the plant population x seeding depth interaction for plant populations, grain yield only had a seeding depth response (Table 2). When averaged across hybrids and planting dates, the 1.5 and 2.0 inch seeding depths yielded greater than the 2.5 and 3.0 inch seeding depth by about 4%. The 1-inch seeding depth yielded the same as the other four seeding depths. It is not clear why the 2.0 and 2.5 inch seeding depths did not have greater yield reductions on the April 5 planting date with plant populations of only 24,500 plants/acre.

A planting date x hybrid interaction did exist for grain yield, however (Fig.1). The 103 day hybrid yielded ~11% higher (235 bushels/acre) than the 96-day hybrid (212 bushels/acre) when averaged across both April planting dates and five seeding depths. The 103-day hybrid planted on April 5 and 19 did have higher average grain moisture (20.1 and 19.6%, respectively) than the 96-day hybrid (17.5

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and 17.7%, respectively) at harvest on October 27. Nevertheless, the 11% yield increase would offset the additional drying costs if both hybrids were harvested on the same dates. Grain yields did not vary between hybrids on subsequent planting dates. The 96-day hybrid averaged 19.4 and 20.8% grain moisture compared with 22.1 and 26.3% for the 103 day hybrid, when planted on May 6th and May 17, respectively (data not shown). The similar yield but lower grain moisture of the 96-day hybrid on these two planting dates indicates that the switch from a 103 to a 96-day hybrid should have occurred as early as May 6 in 2013.

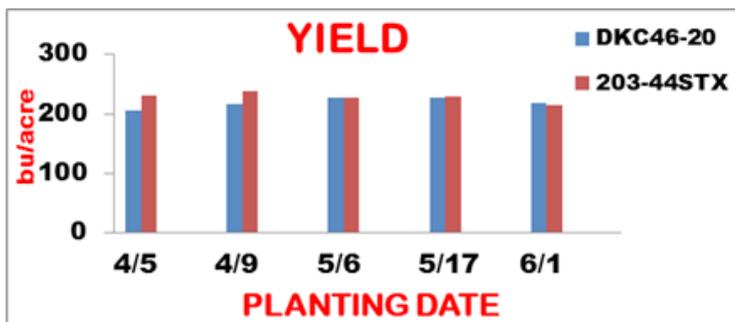


Fig. 1 Yield of a 96-day (DKC46-20VT3PRIB) and a 103-day (203-44STXRIB) corn hybrid, averaged across five seeding depths, at five planting dates in 2013.

Conclusion

Planting at the 1.5 inch depth consistently resulted in the highest plant populations and grain yields among seeding depths across all planting dates. Despite the lower plant populations for the 2.0 vs. 1.5 inch seeding depth on the April 5 planting date, grain yields did not vary between these two seeding depths. The 2.5 and 3.0 inch seeding depth yielded about 4% lower than the 1.5 and 2.0 inch seeding depths, although plant populations between the 2.0 and 2.5 inch seeding depth were similar across all planting dates.

The 103 day hybrid yielded ~11% more than the 96-day hybrid for the April planting dates but both hybrids yielded similarly for the May and June 1 planting dates. Because of lower grain moisture and similar yield for the 96-day vs. 103-day hybrid on the later three planting dates, the switch from 103 to 96-day hybrids on May 6 would have resulted in the most profit, if both hybrids were harvested in late

Table 2. Yield of corn at five planting dates and five seeding depths, in 2013 when averaged across two hybrids (DKC46-20 VT3P-RIB and 203-44STXRIB).

DEPTH	PLANTING DATE					Mean
	4/5	4/19	5/6	5/17	6/1	
inches						
1.0	225	233	223	225	213	224
1.5	230	225	226	232	227	228
2.0	225	231	232	235	223	229
2.5	218	226	217	217	211	218
3.0	195	224	236	235	207	218
LSD 0.05						10*

†LSD compares seeding depth means.

October. The 2013 growing season was warm and wet from early April through mid-July and cool and wet for the remainder of the growing season. Climatic conditions vary each year and climatic conditions strongly influence planting date, hybrid RM, and seeding depth effects on yield. We will conduct this study another year to see if there is consistency in plant population and grain yield data across growing seasons. Keep in mind that this study was conducted on a well-drained soil and does not apply to poorly drained soils.