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Regional Corn Re-plant Recommendations for Iowa

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Abstract
Each year in areas where corn (Zea mays L.) is grown, biotic and abiotic (living and nonliving) factors can prevent timely planting or reduce stands so severely that yield potential may be reduced to unsatisfactory levels. Once these threats are realized, producers must make quick and accurate decisions. Careful evaluation of the current situation in terms of projected yields and profitability is crucial. If projected profitability is not acceptable, replant options should be considered.

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Regional Corn Re-plant Recommendations for Iowa

RFR-11120

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Introduction

Each year in areas where corn (*Zea mays* L.) is grown, biotic and abiotic (living and non-living) factors can prevent timely planting or reduce stands so severely that yield potential may be reduced to unsatisfactory levels. Once these threats are realized, producers must make quick and accurate decisions. Careful evaluation of the current situation in terms of projected yields and profitability is crucial. If projected profitability is not acceptable, re-plant options should be considered.

Re-planting the current crop is often an option. Re-plant decisions require extensive management skill. In considering replanting, producers must evaluate replant costs, risks, and returns against the current crop's predicted yield. Evaluation of weather patterns and weather predictions for the area, time available, available hybrids, additional fertilizer/herbicide/seed costs, and market trends all must be factored into the decision.

Understanding how various hybrids respond to different planting dates is crucial to ensuring optimum yields and maximum profitability in re-plant situations. This research study aimed to provide producers with more accurate recommendations in corn re-plant situations by evaluating how commonly-used relative maturity (RM) corn hybrids respond to a range of re-plant dates. By using a diversity of corn hybrids ranging in their RM at several locations throughout Iowa, more precise recommendations may be possible. Producers can then use these recommendations to better understand the effect re-plant dates have on yield.

Materials and Methods

Multi-year (2010, 2011) and multi-location (four Iowa State University Research and Demonstration Farms) research was conducted, compiled, and analyzed for a total of eight site-years of data. Each site-year incorporated at least four replications and five planting dates (PD) ranging from April 30 to June 25 in approximately 14-day increments. Farm staff at the various ISU research farms planted as close to target dates as possible, adjusting intervals between dates as needed so that the final planting date of June 25 was closely met. See Table 1 for hybrid and planting date information. The first planting date fell within the recommended 98 to 100 percent potential yield window for each location, allowing for a base to evaluate yield loss resulting from later planting dates. Planting date 5 was intended to be no later than June 25, which correlates with rules and regulations of multiple peril crop insurance (MPCI) guidelines.

Plot dimensions were 15 ft (4 rows wide) by 50 ft long. Corn was planted in 30-in. rows and hybrids varied across locations (See Table 1 for hybrids used).

ISU research farm staff applied fertilizer and pest management practices in accordance with university recommendations. Later planted plots remained fallow and were treated accordingly to control weed pressure until planting occurred. Target seeding rate for all locations and dates was 35,000 seeds per acre. Actual seeding rates varied slightly across locations. Farm staff set planters as close to the target seeding rate as possible. Plots at each site with stand reduction greater than

25 percent of the seeding rate were omitted from the analysis.

Results and Discussion

Estimated yields for each hybrid planting date combination were generated by SAS Proc Mixed. Least Squares-means statements indicating significance of estimated yield differences, both across hybrids within a PD and across PDs within a hybrid, were generated (Table 2). A review of the data in Table 2 provides better understanding of what yields producers can expect when re-planting under conditions similar to the growing seasons of 2010 and 2011 in northeast Iowa.

Yields were greater with fuller-season hybrids across PD 1–PD 3 (Table 2). Patterns among hybrids for PD 1 and PD 3 are similar (Table 2). The three fuller-season hybrid yields were similar for PD 1 and PD 3. The shortest-season hybrid yielded the least across planting dates 1–4. All hybrid yields were similar for PD 5.

Data from a previous planting date study indicated that the PD 1 dates were within the 98–100 percent potential yield for northeast Iowa. Thus, for PD 1, it is reasonable to assume length of growing season did not limit yield for any RM hybrid used. The differences in hybrid yields for PD 1 are likely a result of hybrid and their inherent RM differences rather than growing season length limitations.

The effect of growing season length relative to later re-plant dates is apparent when yields are reviewed across planting dates within a hybrid (Table 2). Yields of hybrids decreased with later re-plant dates for all hybrids. The PD when yields were affected was similar for the three shorter-season hybrids. The difference in response to later planting dates between the three shorter-season hybrids and the fuller-season hybrid at PD 4 indicates producers may need to consider switching to shorter RM hybrids. Similar yields among hybrids at PD 5 suggest that growing season length may limit yield for all hybrids at this date. Producers may want to consider planting crops alternative to corn as this date approaches.

The three fuller-season hybrids were highest yielding from PD 1–PD 3 except for DKC 4837 at PD2. Hybrids DKC 4837 and DKC 4291/4327 were similar and yielded most at PD4. Growing season appears to first affect the fullest-season hybrid by PD3 (Table 2). Growing season does not seem to affect yield of the three shorter season hybrids until PD4. Yield of the fullest-season hybrid was reduced below the yield of shorter-season hybrids by PD 4. Yield within hybrid was reduced for all RM hybrids by PD 4 and again by PD 5 (Table 2). Reduced growing season length may partially explain these observations. Analysis of all data is suggested to further understand interactions between yield and re-plant date.

The tables in this report should serve as a guide for producers when making replant decisions. Producers must consider weather predictions for the area, time available, available hybrids, additional fertilizer/herbicide/seed costs, and market trends plus the data observed here. Only after all other economic variables have been considered should producers utilize the values within this report to estimate likely yields in similar replant situations.

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Table 1. Corn hybrid and planting date information for replant study at the ISU Northeast Research Farm, Nashua, IA.

			Target date	First planting April 30		Second planting May 14		Third planting May 28		Fourth planting June 11		Fifth planting June 25	
Hybrid	**Location**	**Hybrid**	**RM†**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**
A	NE	DKC 3353 VT3	83	Apr 29	May 2	May 16	May 17	May 28	May 27	June 10	June 9	June 23	June 25
B	NE	DKC 4291/4327 VT3‡	93	Apr 29	May 2	May 16	May 17	May 28	May 27	June 10	June 9	June 23	June 25
C	NE	DKC 4837 VT3	98	Apr 29	May 2	May 16	May 17	May 28	May 27	June 10	June 9	June 23	June 25
D	NE	DKC 5509 GENSS	105	Apr 29	May 2	May 16	May 17	May 28	May 27	June 10	June 9	June 23	June 25

†RM = relative maturity in days.
‡2010/2011 hybrids. DKC 4327 was substituted for DKC 4291 in 2011 due to lack of seed production and availability of DKC 4291 by Monsanto.

Table 2. Comparison of estimated yields within a planting date across corn hybrids as well as within corn hybrids across planting dates at the ISU Northeast Research Farm, Nashua, IA. 2010 & 2011 averages.

	Planting date									
	1		2		3		4		5	
Hybrid	**Yield (bu/acre)**	**LS-sig**	**Yield (bu/acre)**	**LS-sig**	**Yield (bu/acre)**	**LS-sig**	**Yield (bu/acre)**	**LS-sig**	**Yield (bu/acre)**	**LS-sig**
DKC 3353 VT3 (RM 83)¶	154.5	B†a‡	164.5	Ca	151.1	Ba	128.6	Bb	104.4	Ac
DKC 4291/4327§ (RM 93)	185.2	Aa	192.1	ABa	180.2	Aa	146.3	Ab	100.5	Ac
DKC 4837 (RM 98)	188.9	Aa	182.91	Ba	182.4	Aa	142.8	Ab	98.7	Ac
DKC 5509 (RM 105)	198.7	Aa	204.4	Aa	175.8	Ab	127.5	Bc	102.0	Ad

†LS-sig column indicates the SAS LS-means analysis of difference among hybrid yields within a planting date. Hybrid yields within the same planting date (column) with same capital letter are not different from each other ($P<0.05$).
‡LS-sig column indicates the SAS LS-means analysis of difference among planting date yields within a hybrid. Planting date yields within the same hybrid (row) with same small letter are not different from each other ($P<0.05$).
§2010/2011 hybrids. DKC 4327 was substituted for DKC 4291 in 2011 due to lack of seed production and availability of DKC 4291 by Monsanto.
¶ RM = relative maturity in days.