2012

Regional Corn Re-plant Recommendations for Iowa

Anthony J.W. Myers
Iowa State University, ajmyers@iastate.edu

Roger W. Elmore
Iowa State University, relmore@iastate.edu

Stephanie Marlay
Iowa State University

Lori Abendroth
Iowa State University

Regional Corn Re-plant Recommendations for Iowa

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.

Keywords
RFR A1159, Agronomy

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences

Regional Corn Re-plant Recommendations for Iowa

RFR-A1159

Anthony Myers, graduate assistant
Roger Elmore, professor
Stephanie Marlay, agricultural specialist
Lori Abendroth, former agronomy specialist
Department of Agronomy

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 (six at Northwest Research Farm) 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 April 30 as possible, adjusting intervals between dates as needed so that the final planting date of June 25 was closely met. See Table 1 for information for each site-year. The first planting date fell within the recommended 98-100 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 10 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 at each location).

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 (Tables 2 and 3). A review of the data in Tables 2 and 3 provides better understanding of what yields producers can expect when re-planting under conditions similar to the growing seasons of 2010 and 2011in northwest Iowa.

Yields of all hybrids for PD 1 differed from each other (Table 2). Yields were greater with fuller-season hybrids across all planting dates. Patterns among the hybrids for PD 2-PD 5 are similar (Table 3). For the last four planting dates, the middle two hybrid yields were similar, and the shorter-season hybrid yielded less, and the fullest season hybrid yielded more.

Data from a previous planting date study indicated that the PD 1 dates were within the 98–100 percent potential yield for northwest 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 all hybrids decreased with later re-plant dates. The PD when yields were affected varied among hybrids. However, significant yield reductions are likely at PD 5. Producers who project a re-plant date of PD 5 may need to consider the potential of planting other crops as alternatives to corn.

Hybrids seem to be affected differently by the shortening growing season that accompanies later planting dates. Yields of the earliest hybrid (DKC 3353) were not affected until PD 5 (Table 3). Yield reductions for DKC 4327 occurred around PD 4. Yield reductions for DKC 4837 began at PD 2. All yields for DKC 5509 differed from each other and yield reduction occurred at PD 2.

The fullest-season hybrid (DKC 5509) was highest yielding across all planting dates. The shortening growing season effect that often accompanies later planting date did not seem to reduce the yields of full-season RM hybrids below the yields of the shorter-season RM hybrids. Future studies may use longer RM hybrids to more effectively demonstrate how shortening growing season can limit yield.

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.

Acknowledgements

We thank the following ISU farm personnel who established and maintained these research trials: Mike Fiscus, Ken Pecinovsky, Ryan Rusk, and Kevin Van Dee.

Table 1. Corn hybrid and planting date information for replant study at the Northwest Research Farm.

			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	NW	DKC 3353 VT3	83	Apr 29	Apr 29	May 15	May 11	May 27	May 24	June 9	June 8	July 2	July 1
B	NW	DKC 4291/4327 VT3‡	93	Apr 29	Apr 29	May 15	May 11	May 27	May 24	June 9	June 8	July 2	July 1
C	NW	DKC 4837 VT3	98	Apr 29	Apr 29	May 15	May 11	May 27	May 24	June 9	June 8	July 2	July 1
D	NW	DKC 5509 GENSS	105	Apr 29	Apr 29	May 15	May 11	May 27	May 24	June 9	June 8	July 2	July 1

†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 at the Northwest Research Farm.

	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 (RM‡ 83)	143.8	A	156.6	A	147.7	A	134.6	A	85.9	A
DKC 4291/4327 (RM 93)§	173.4	B	172.3	B	172.1	B	145.0	B	96.9	B
DKC 4837 (RM 98)	188.3	C	175.8	C	171.5	C	151.7	C	101.1	B
DKC 5509 (RM 105)	212.2	D	215.2	D	196.6	D	162.9	D	113.1	C

†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 letter are not different from each other (P<0.05).
‡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 3. Comparison of estimated corn yields within a hybrid across planting dates at the Northwest Research Farm.

	Hybrid							
	DKC 3353 (RM† 83)		DKC 4327 (RM 93)		DKC 4837 (RM 98)		DKC 5509 (RM 105)	
Planting date	Yield (bu/acre)	LS-Sig‡	Yield (bu/acre)	LS-Sig	Yield (bu/acre)	LS-Sig	Yield (bu/acre)	LS-Sig
1	143.8	BC	173.4	A	188.3	A	212.2	B
2	156.6	A	172.3	A	175.8	B	215.2	A
3	147.7	AB	172.1	A	171.5	BC	196.6	C
4	134.6	C	145.0	B	151.7	C	162.9	D
5	85.9	D	96.9	C	101.1	D	113.1	E

†RM = Relative maturity in days.
‡LS-sig column indicates the SAS LS-Means analysis of difference between estimated yields within a hybrid. Planting date yields within the same hybrid (column) with the same letter are not different from each other (P<0.05).