

CURRENT RESEARCH EFFORTS IN CORN TO MAXIMIZE IRRIGATION PRODUCTIVITY

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CORN PRODUCT RESPONSE TO IRRIGATION MANAGEMENT

Trial Overview

- Farmers use a variety of irrigation management practices to irrigate their corn crop based on the water availability of their irrigation systems. There may be limitations on the amount of water that can be pumped by the well or the irrigation water may need to be shared across multiple crops.
- Regardless of the reason, farmers would like to know how corn products respond to different irrigation management strategies.

Research Objective

- The study evaluated the impact of different irrigation management strategies on multiple corn products.

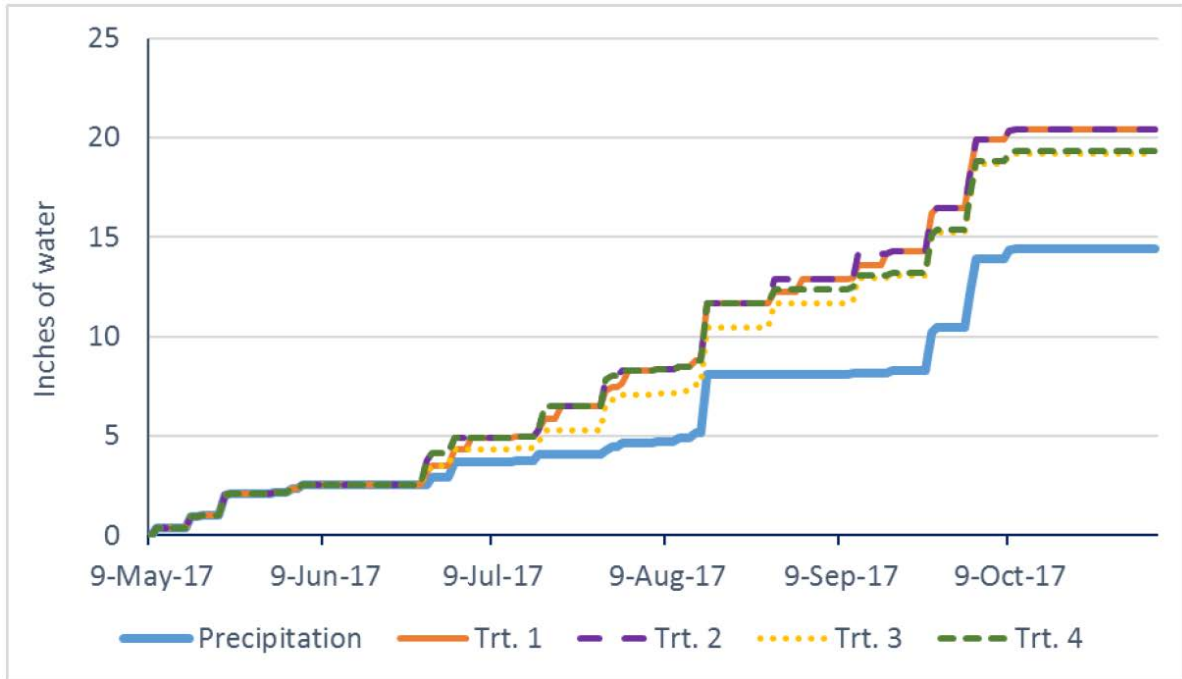
Location	Soil	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield/Acre	Planting Rate/Acre
Gothenburg, NE	Hord silt loam	Corn	Conventional	05/09/2017	10/27/2017	240 bu/a	34,000

SITE NOTES:

- Twenty-two corn products with RM ranging from 100 to 114 were planted on irrigated, conventional-tilled ground previously planted to corn.
- Four different irrigation treatments were applied: (Figure 1)
 - Treatment 1: 100% full irrigation (FI) to meet the evapotranspiration demands of the corn crop; 10 applications of 0.6inch/pass totaling 6.0 inches.
 - Treatment 2: 100% FI; 5 applications of 1.2 inch/pass totaling 6.0 inches.
 - Treatment 3: 60% FI early (up to V16) followed by 100% FI late; 5 applications totaling 4.72 inches.
 - Treatment 4: 100% FI early followed by 60% FI late (after R2); 5 applications totaling 4.92 inches.

- The trial was set up as a randomized split-plot with irrigation treatment as the whole plot and corn product as the subplot with 4 replications.
- Weeds were controlled uniformly across the study and no insecticide or fungicide applications were needed.

Figure 1. Precipitation and irrigation accumulated in each treatment throughout the growing season.



Understanding The Results

- Corn products performed differently in the irrigation treatments. Some corn products lost a significant amount of yield if they were stressed early. Other corn products showed no difference in yield across the irrigation treatments.
- Corn product performance was classified into five categories based on yield:
 - A) Avoid early-season water stress
 - B) Avoid late-season water stress
 - C) Consistent response across all irrigation treatments
 - D) Handles late-season water stress
 - E) Prefers 0.6 inch/pass applications and handles late-season water stress
- A majority of the corn products fell into category A, where the product had a negative response to early-season stress, or category C, where the product had a consistent response across irrigation treatments (Figures 3).
- The lone corn product in category B was unique as all other corn products could handle late-season stress.
- For categories D and E, there were some slight differences, but the corn products in both categories had high yields when the corn product was exposed to late-season stress. The corn products in category E also yielded higher when 0.6 inch of water was applied per pass compared with all the other categories.

Figure 2. Corn product examples for the five irrigation management categories

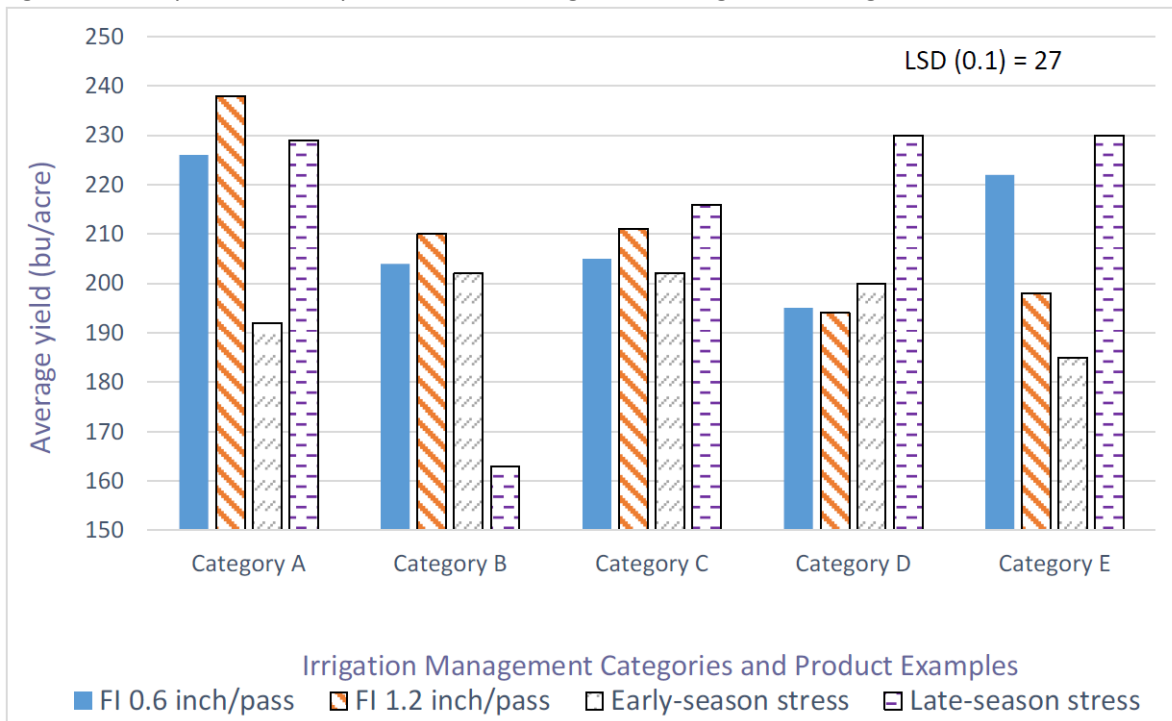
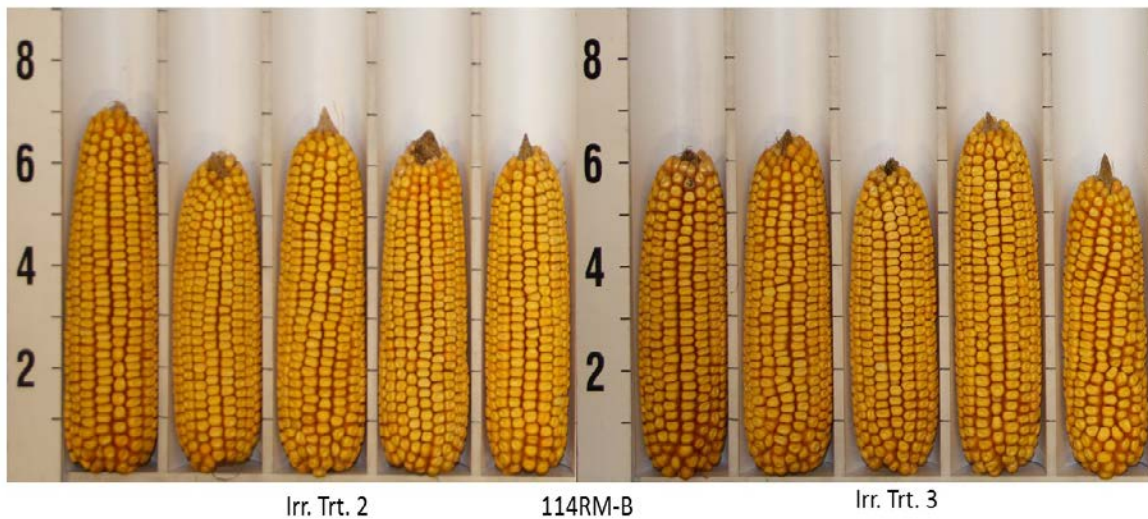


Table 1. Categorization of the different corn products based on average yield in the different treatments.

A	B	C	D	E
106 RM	113 RM-A	110 RM-A	105 RM-A	112 RM-B
112 RM-A		110 RM-B	112 RM-C	111 RM-A
105 RM-B		113 RM-B	103 RM	
109 RM-A		114 RM-A		
114 RM-B		100 RM		
111 RM-B		113 RM-C		
108 RM-B		104 RM		
		111 RM-C		
		108 RM-A		

Figure 3. Corn ears from the 114 RM-B corn product. Performance of the 114 RM-B corn product across two irrigation treatments, Treatment 2. 100% FI with 1.2 inch/pass and Treatment 3. 60% FI early (up to V16) followed by 100% FI late. The 114 RM-B corn product was grouped into Category A (avoid early-season water stress).



What Does This Mean For Your Farm

- Corn products do respond differently to different irrigation management strategies.
- Producers should work with their local seed sales team to identify a corn product that will work with their irrigation system.
- Ask your agronomist how their branded corn products performed in this study

Legals

The information discussed in this report is from a single site, replicated demonstration. This information piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

For additional agronomic information, please contact your local seed representative. Developed in partnership with Technology Development & Agronomy by Monsanto.

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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CORN PRODUCT PERFORMANCE INFLUENCED BY SEEDING AND IRRIGATION RATE

Trial Overview

- Managing irrigated corn production is intensive and demanding as farmers try to extract value out of every input.
- There are many interactions in the field that impact yield potential, including seeding rate, irrigation environment, and corn product. This study was designed to evaluate the interaction of these factors on the yield potential of different corn products.

Research Objective

- Evaluate the effect of different seeding rates under full and limited irrigation on corn product yield potential to aid producers in selecting the optimal corn products and planting populations for the irrigation environment on their farm.

Location	Soil	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield/Acre	Planting Rate/Acre
Gothenburg, NE	Hord silt loam	Corn	Conventional	05/07/2017	11/01/2017	240 bu/a	24K, 30K, 36K, 42K

- Twenty-one corn products were tested with RM ranging from 105 to 116.
- Two irrigation rates were used:
 - 100% full irrigation (FI) to meet the evapotranspiration demands of the crop (totaling 6 inches)
 - 50% of FI (totaling 3 inches)
- Irrigation treatments were applied using a variable rate irrigation system.
- The study design was a split-split plot with irrigation as the whole plot, corn product as the first split, and planting density as the second split.
- Watermark granular matrix soil moisture sensors were installed before tassel to track soil moisture.
- Weeds were controlled uniformly across the study and no fungicides or insecticides were applied.

Understanding The Results

- There was a general trend across corn products for higher yields at the 36,000 or 42,000 seeds/acre seeding rates as seen in Table 1.
 - For the 100% FI treatment, 42,000 seeds/acre provided the highest yield potential.
 - For the 50% FI treatment, 36,000 seeds/acre provided the highest yield potential.
- The response of some corn products differed from the generalized trend. For example, the 114RM-B product yielded the highest at 30,000 seeds/acre at both irrigation rates.

What Does This Mean For Your Farm

- Farmers should select corn products that have shown good performance in the seeding rate and irrigation environments on their farm.
- Producers should work with their local seed sales team to identify how their branded corn products performed in this study.

Table 1. Corn product performance influenced by seeding rate and irrigation.

	Seeds/A				Av Yield
	24,000	30,000	36,000	42,000	
	-----bu/a-----				
105RM-A	200	207	216	214	209
100% FI	202	217	217	230	216
50% FI	196	187	214	182	195
105RM-B	202	215	225	231	218
100% FI	207	232	231	248	229
50% FI	198	197	219	214	207
106RM-A	197	214	231	232	218
50% FI	197	214	231	232	218
106RM-B	202	206	226	225	215
100% FI	202	223	235	243	226
50% FI	201	190	217	208	204
108RM-A	206	220	215	210	213
100% FI	213	235	233	229	228
50% FI	198	204	196	192	197
108RM-B	209	240	232	225	226
100% FI	217	247	239	253	239
50% FI	200	232	224	197	213
109RM	194	214	213	225	212
100% FI	211	237	231	252	233
50% FI	176	192	194	199	191
110RM-A	210	230	240	235	229
100% FI	219	245	261	253	245
50% FI	201	215	218	217	213
110RM-B	205	227	233	235	225
100% FI	208	228	235	242	228
50% FI	203	227	231	228	222
110RM-C	194	206	209	209	204
100% FI	196	209	198	212	204
50% FI	192	203	220	206	205
112RM-A	193	205	205	202	201
100% FI	183	204	219	194	200
50% FI	203	206	191	210	202

	Seeds/A				Av Yield
	24,000	30,000	36,000	42,000	
	-----bu/a-----				
112RM-B	205	220	230	214	217
100% FI	218	234	249	229	232
50% FI	192	206	210	198	202
112RM-C	203	232	228	228	223
100% FI	211	247	251	265	243
50% FI	194	218	205	191	202
113RM-A	204	232	231	225	223
100% FI	212	239	240	243	233
50% FI	196	226	222	207	213
113RM-B	187	204	199	194	196
100% FI	179	213	211	199	200
50% FI	196	195	188	189	192
113RM-C	207	223	208	223	215
100% FI	219	246	233	263	240
50% FI	195	200	183	184	190
113RM-D	210	220	240	219	222
100% FI	207	212	230	216	216
50% FI	213	228	250	222	228
114RM-A	220	234	244	249	237
100% FI	237	260	253	268	255
50% FI	203	208	235	231	219
114RM-B	212	241	234	240	232
100% FI	222	253	246	252	243
50% FI	202	230	221	227	220
115RM	223	244	256	261	246
100% FI	232	247	259	274	253
50% FI	214	241	252	249	239
116RM	233	257	260	262	252
100% FI	234	265	271	294	262
50% FI	232	250	249	245	244
Av. Yield	206	224	228	227	221

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