

## FIELD EXPERIMENT HISTORY

**Title:** Corn and Soybean Rotation Study  
**Experiment:** 09CS **Trial ID** 3468 **Year:** 2011  
**Personnel:** J. G. Lauer, S. Conley; J.M. Gaska, T. H. Diallo, K. D. Kohn,  
**Location:** Arlington, WI **County:** Columbia  
**Supported By:** HATCH

### Site Information

**Field:** 334 W **Previous Crop:** Corn/Soybean **Soil Type:** Plano Silt Loam  
**Soil Test:** **Date:** 6/10/11 **pH** 6.3 **OM (%)** 3.7 **P (ppm)** 18 **K (ppm)** 137

### Plot Management

**Tillage Operations:** Field Cultivator Soil Finisher

<b>Fertilizer:</b>	<u>Analysis:</u>	<u>Rate lbs/A:</u>	<u>Date:</u>
<b>Preplant :</b>	NH4NO3	175	5/09/11
	ESN	175	5/09/11
	SUPER U	175	5/09/11
<b>Starter :</b>	N/A	N/A	N/A
<b>Post plant :</b>	N/A	N/A	N/A
<b>Manure:</b>	N/A	N/A	N/A

**Herbicide:** Roundup Pmax 22 oz/A 5-3-11 **Insecticide:** none  
 Dual II-Magnum 24 oz/A 5-3-11  
 Roundup PMax 22 oz/A 6-17-11  
**Hybrid:** C: Pioneer 35F44  
 S: Pioneer 92Y20

**Irrigation:** None

**Planting Date:** Corn: 5/5/11 **Planting Depth:** C: 1.5" **Row Width:** 30"  
 Soybean: 5/4/11 S: 1"

**Target Plant Density:** Corn: 32500 Plants/A **Planting Method:** Kinze 2000 Interplant planter  
 Soybean: 150000 Plants/A

**Harvest Date:** Corn: 10/21/11 **Harvest Method:** C: Kincaid plot combine  
**Notes:** Soybean: 10/06/11 S: Almaco plot combine #2

### Experimental Design

**Design:** RCB split-split plot **Replications:** 4  
**Plot Size Seeded:** 10' x 35' **Experiment Size:** 2.7 A  
**Harvest Plot Size:** 5' x 31'

#### **Factors/Treatments:**

##### Tillage:

1- No-Till  
2- Conventional

##### Rotation:

1- Continuous Corn or Soybean  
2- Alternating Corn - Soybean  
3- Corn 5yrs. / Soybean 5 yrs

##### Fertilizer/ Rhizobium Inoculants:

C: 1- NH4NO3  
2- ESN  
3- SUPER U  
S: 1- Excalibre  
2- Optimize  
3- UTC

**Results: Tables C-43 and C-44**

**Table C-43. Corn/Soybean Rotation and Tillage Study - Corn.  
Arlington, WI - 2011.**

Tillage	Rotation	Fertilizer	Yield bu/A	Moisture %	Test weight lbs/bu	Grower return \$/A	Lodged			Harvest plants plants/A
							Total %	Stalk %	Root %	
		ESN	195	18.3	58.1	1049	2.6	0.0	0.0	33071
		NH4NO3	196	19.5	57.3	1048	7.0	0.0	0.0	33036
		SuperU	196	18.7	57.8	1051	7.3	0.0	0.0	32901
	1C		211	17.1	59.1	1139	4.3	0.0	0.0	33864
	1CC		185	19.2	57.3	995	7.7	0.0	0.0	32963
	1CS		214	18.7	58.3	1149	7.7	0.0	0.0	33349
	2C		198	19.1	57.7	1063	3.3	0.0	0.0	33724
	3C		175	18.7	57.5	943	6.2	0.0	0.0	32717
	4C		191	19.3	57.0	1027	3.9	0.0	0.0	31768
	5C		193	20.0	57.0	1030	6.4	0.0	0.0	32635
	1C	ESN	210	17.1	59.3	1137	3.4	0.0	0.0	33759
	1C	NH4NO3	205	17.1	58.8	1106	4.9	0.0	0.0	33548
	1C	SuperU	217	17.0	59.2	1174	4.7	0.0	0.0	34286
	1CC	ESN	186	18.6	57.8	999	4.4	0.0	0.0	33092
	1CC	NH4NO3	188	19.9	56.8	1005	7.2	0.0	0.0	32529
	1CC	SuperU	183	19.0	57.5	980	11.4	0.0	0.0	33267
	1CS	ESN	209	18.5	58.5	1127	3.1	0.0	0.0	33794
	1CS	NH4NO3	216	19.2	58.0	1161	9.3	0.0	0.0	33513
	1CS	SuperU	215	18.3	58.4	1159	10.6	0.0	0.0	32740
	2C	ESN	196	18.8	58.0	1051	0.6	0.0	0.0	34005
	2C	NH4NO3	203	20.0	57.3	1086	2.2	0.0	0.0	34005
	2C	SuperU	196	18.5	57.8	1054	7.1	0.0	0.0	33162
	3C	ESN	172	18.2	57.7	928	3.8	0.0	0.0	32775
	3C	NH4NO3	181	19.4	56.9	970	10.1	0.0	0.0	32881
	3C	SuperU	173	18.4	57.9	930	4.6	0.0	0.0	32494
	4C	ESN	193	18.2	57.4	1042	0.6	0.0	0.0	31651
	4C	NH4NO3	189	19.9	56.6	1009	7.4	0.0	0.0	31932
	4C	SuperU	192	19.7	56.9	1029	3.9	0.0	0.0	31722
	5C	ESN	197	18.9	57.6	1060	2.3	0.0	0.0	32424
	5C	NH4NO3	187	21.2	56.6	999	7.8	0.0	0.0	32846
	5C	SuperU	193	20.1	56.9	1033	9.0	0.0	0.0	32635
Conv			200	17.1	59.0	1081	6.4	0.0	0.0	33205
Notill			191	20.6	56.4	1018	4.8	0.0	0.0	32800

continue

**Table C-43. Corn/Soybean Rotation and Tillage Study - Corn.**(continued) **Arlington, WI - 2011.**

Tillage	Rotation	Fertilizer	Yield bu/A	Moisture %	Test	Grower	Lodged			Harvest
					weight lbs/bu	return \$/A	Total %	Stalk %	Root %	plants plants/A
Conv		ESN	195	17.0	59.2	1057	3.1	0.0	0.0	33423
Conv		NH4NO3	200	17.3	58.7	1081	8.0	0.0	0.0	33092
Conv		SuperU	204	16.9	59.1	1104	8.2	0.0	0.0	33102
Notill		ESN	194	19.6	56.9	1041	2.1	0.0	0.0	32720
Notill		NH4NO3	191	21.7	55.9	1014	5.9	0.0	0.0	32981
Notill		SuperU	187	20.5	56.5	998	6.5	0.0	0.0	32700
Conv	1C		207	16.5	59.4	1122	7.5	0.0	0.0	33537
Conv	1CC		189	17.0	58.4	1021	7.2	0.0	0.0	33045
Conv	1CS		211	17.5	59.3	1142	9.8	0.0	0.0	33794
Conv	2C		194	16.9	59.2	1050	2.8	0.0	0.0	34263
Conv	3C		195	17.2	59.0	1056	7.1	0.0	0.0	32389
Conv	4C		203	17.3	58.7	1096	5.1	0.0	0.0	32202
Conv	5C		199	17.3	58.8	1077	5.5	0.0	0.0	33209
Notill	1C		214	17.6	58.8	1156	1.2	0.0	0.0	34192
Notill	1CC		182	21.4	56.2	968	8.1	0.0	0.0	32881
Notill	1CS		216	19.8	57.3	1156	5.5	0.0	0.0	32904
Notill	2C		202	21.3	56.2	1077	3.8	0.0	0.0	33185
Notill	3C		155	20.1	56.0	829	5.3	0.0	0.0	33045
Notill	4C		180	21.3	55.2	957	2.8	0.0	0.0	31335
Notill	5C		186	22.8	55.3	984	7.3	0.0	0.0	32061
Conv	1C	ESN	205	16.5	59.9	1110	6.1	0.0	0.0	33443
Conv	1C	NH4NO3	205	16.8	58.9	1107	7.2	0.0	0.0	33654
Conv	1C	SuperU	212	16.4	59.5	1150	9.0	0.0	0.0	33513
Conv	1CC	ESN	186	17.1	58.7	1004	4.2	0.0	0.0	33373
Conv	1CC	NH4NO3	193	17.1	58.1	1043	7.5	0.0	0.0	32811
Conv	1CC	SuperU	188	16.7	58.6	1016	10.0	0.0	0.0	32951
Conv	1CS	ESN	201	17.5	59.2	1086	5.0	0.0	0.0	34848
Conv	1CS	NH4NO3	210	17.6	59.4	1134	11.2	0.0	0.0	33232
Conv	1CS	SuperU	223	17.4	59.4	1205	13.2	0.0	0.0	33302
Conv	2C	ESN	193	16.9	59.4	1042	0.2	0.0	0.0	34497
Conv	2C	NH4NO3	197	17.2	59.0	1062	2.2	0.0	0.0	34075
Conv	2C	SuperU	193	16.6	59.2	1045	5.9	0.0	0.0	34216

continue

**Table C-43. Corn/Soybean Rotation and Tillage Study - Corn.**  
(continued) **Arlington, WI - 2011.**

Tillage	Rotation	Fertilizer	Yield bu/A	Moisture %	Test weight lbs/bu	Grower return \$/A	Lodged			Harvest plants/A
							Total %	Stalk %	Root %	
Conv	3C	ESN	186	17.3	59.3	1007	5.3	0.0	0.0	32319
Conv	3C	NH4NO3	198	17.4	58.1	1068	10.9	0.0	0.0	32459
Conv	3C	SuperU	202	16.8	59.4	1094	5.0	0.0	0.0	32389
Conv	4C	ESN	198	17.0	58.8	1069	0.2	0.0	0.0	32248
Conv	4C	NH4NO3	200	17.7	58.4	1079	11.2	0.0	0.0	32319
Conv	4C	SuperU	211	17.2	58.9	1141	4.0	0.0	0.0	32038
Conv	5C	ESN	199	17.0	59.0	1077	0.6	0.0	0.0	33232
Conv	5C	NH4NO3	199	17.5	58.7	1076	5.7	0.0	0.0	33092
Conv	5C	SuperU	200	17.4	58.8	1078	10.1	0.0	0.0	33302
Notill	1C	ESN	216	17.7	58.8	1164	0.6	0.0	0.0	34075
Notill	1C	NH4NO3	204	17.4	58.7	1104	2.5	0.0	0.0	33443
Notill	1C	SuperU	222	17.6	58.9	1198	0.4	0.0	0.0	35059
Notill	1CC	ESN	186	20.1	56.9	994	4.6	0.0	0.0	32811
Notill	1CC	NH4NO3	183	22.8	55.5	966	7.0	0.0	0.0	32248
Notill	1CC	SuperU	177	21.2	56.3	944	12.8	0.0	0.0	33583
Notill	1CS	ESN	218	19.5	57.8	1167	1.3	0.0	0.0	32740
Notill	1CS	NH4NO3	223	20.7	56.7	1188	7.3	0.0	0.0	33794
Notill	1CS	SuperU	208	19.1	57.4	1114	7.9	0.0	0.0	32178
Notill	2C	ESN	198	20.7	56.6	1059	1.0	0.0	0.0	33513
Notill	2C	NH4NO3	210	22.7	55.6	1109	2.1	0.0	0.0	33935
Notill	2C	SuperU	199	20.4	56.3	1062	8.3	0.0	0.0	32108
Notill	3C	ESN	158	19.0	56.2	849	2.3	0.0	0.0	33232
Notill	3C	NH4NO3	164	21.5	55.6	872	9.3	0.0	0.0	33302
Notill	3C	SuperU	143	19.9	56.3	766	4.2	0.0	0.0	32600
Notill	4C	ESN	189	19.4	56.1	1014	0.9	0.0	0.0	31054
Notill	4C	NH4NO3	177	22.1	54.7	939	3.6	0.0	0.0	31546
Notill	4C	SuperU	173	22.3	55.0	917	3.8	0.0	0.0	31405
Notill	5C	ESN	195	20.7	56.3	1042	4.1	0.0	0.0	31616
Notill	5C	NH4NO3	175	24.8	54.5	922	9.8	0.0	0.0	32600
Notill	5C	SuperU	187	22.9	55.1	988	8.0	0.0	0.0	31967
Mean			195	18.9	57.7	1049	5.6	0.0	0.0	33003

continue

**Table C-43. Corn/Soybean Rotation and Tillage Study - Corn.**(continued) **Arlington, WI - 2011.**

Tillage	Rotation	Fertilizer	Yield bu/A	Moisture %	Test weight lbs/bu	Grower return \$/A	Lodged			Harvest
							Total %	Stalk %	Root %	plants plants/A
<b>Probability(%)</b>										
Tillage (T)			19.1	0.0	0.0	11.6	8.9	0.8	24.1	16.8
Rotation (R)			0.2	3.6	0.0	0.1	5.9	1.3	0.6	0.6
T x R			9.3	13.9	0.9	7.0	16.9	33.2	36.4	39.2
Fertilizer (F)			96.5	0.0	0.0	97.1	0.0	3.4	0.0	75.7
T x F			1.1	0.0	13.1	0.8	79.2	23.4	76.4	47.4
R x F			55.8	21.2	95.2	56.0	2.9	12.4	2.7	73.1
T x R x F			54.1	43.3	43.7	54.4	70.2	72.9	6.7	63.0
<b>LSD(0.10)</b>										
Tillage (T)			NS	0.7	0.4	NS	1.5	0.0	NS	NS
Rotation (R)			15	1.4	0.7	79	2.8	0.0	0.0	908
T x R			22	NS	0.9	113	NS	NS	NS	NS
Fertilizer (F)			NS	0.4	0.2	NS	1.3	0.0	0.0	NS
T x F			9	0.7	NS	46	NS	NS	NS	NS
R x F			NS	NS	NS	NS	4.0	NS	0.0	NS
T x R x F			NS	NS	NS	NS	NS	NS	0.0	NS

**Table 44. Corn/Soybean Rotation Study - Soybean  
Expt. 1190 Arlington, WI**

Tillage	Rotation		Inoculant		Grain Yield bu/a	Lodg. 1-5	Seed Composition	
	Name	#	Brand	Product			Protein	Oil
							---- % ----	
				UTC	55.7	1.0	32.4	20.2
			ABM	Excalibre	56.1	1.0	32.4	20.2
			EMD	Optimize	55.9	1.0	32.4	20.2
	5th year SB	10			56.6	1.0	32.5	20.2
	4th year SB	1			53.9	1.0	32.1	20.3
	3rd year SB	2			58.2	1.0	32.8	20.1
	2nd year SB	3			55.9	1.0	32.2	20.2
	1st year SB	4			56.6	1.0	32.4	20.2
	S/C rotation	13			57.4	1.0	32.2	20.2
	Continuous SB	14			52.7	1.0	32.6	20.1
	5th year SB	10		UTC	55.0	1.0	32.5	20.2
	5th year SB	10	ABM	Excalibre	56.8	1.0	32.5	20.1
	5th year SB	10	EMD	Optimize	58.1	1.0	32.6	20.1
	4th year SB	1		UTC	51.7	1.0	32.3	20.3
	4th year SB	1	ABM	Excalibre	55.7	1.0	32.3	20.3
	4th year SB	1	EMD	Optimize	54.2	1.0	31.9	20.4
	3rd year SB	2		UTC	57.3	1.0	32.8	20.1
	3rd year SB	2	ABM	Excalibre	58.3	1.0	32.8	20.1
	3rd year SB	2	EMD	Optimize	59.0	1.0	32.8	20.1
	2nd year SB	3		UTC	57.2	1.0	32.2	20.2
	2nd year SB	3	ABM	Excalibre	55.8	1.0	32.4	20.1
	2nd year SB	3	EMD	Optimize	54.7	1.0	32.0	20.2
	1st year SB	4		UTC	57.4	1.0	32.3	20.1
	1st year SB	4	ABM	Excalibre	55.4	1.0	32.3	20.2
	1st year SB	4	EMD	Optimize	57.1	1.0	32.6	20.2
	S/C rotation	13		UTC	58.3	1.0	32.3	20.1
	S/C rotation	13	ABM	Excalibre	58.8	1.0	31.9	20.3
	S/C rotation	13	EMD	Optimize	54.9	1.0	32.3	20.1
	Continuous SB	14		UTC	52.9	1.0	32.5	20.2
	Continuous SB	14	ABM	Excalibre	51.6	1.0	32.8	20.0
	Continuous SB	14	EMD	Optimize	53.6	1.0	32.6	20.1
Notill					55.6	1.0	32.3	20.3
Conventional					56.2	1.0	32.5	20.1
Notill				UTC	55.5	1.0	32.3	20.3
Notill			ABM	Excalibre	55.6	1.0	32.3	20.3
Notill			EMD	Optimize	55.6	1.0	32.3	20.3
Conventional				UTC	55.9	1.0	32.5	20.1
Conventional			ABM	Excalibre	56.5	1.0	32.5	20.1
Conventional			EMD	Optimize	56.3	1.0	32.5	20.1
Notill	5th year SB	10			56.1	1.0	32.2	20.3
Notill	4th year SB	1			52.8	1.0	32.3	20.4
Notill	3rd year SB	2			57.8	1.0	32.7	20.1
Notill	2nd year SB	3			54.1	1.0	31.9	20.3
Notill	1st year SB	4			58.2	1.0	32.5	20.2
Notill	S/C rotation	13			58.1	1.0	32.2	20.3
Notill	Continuous SB	14			52.0	1.0	32.1	20.5

Continue

**Table 44. Corn/Soybean Rotation Study - Soybean**  
(Continued) **Expt. 1190 Arlington, WI**

Tillage	Rotation		Inoculant		Grain Yield bu/a	Lodg. 1-5	Seed Composition	
	Name	#	Brand	Product			Protein ---- % ----	Oil
Conventional	5th year SB	10		UTC	57.2	1.0	32.8	20.0
Conventional	4th year SB	1			54.9	1.0	32.0	20.3
Conventional	3rd year SB	2			58.6	1.0	32.8	20.1
Conventional	2nd year SB	3			57.8	1.0	32.5	20.1
Conventional	1st year SB	4			55.1	1.0	32.3	20.1
Conventional	S/C rotation	13			56.6	1.0	32.1	20.1
Conventional	Continuous SB	14			53.4	1.0	33.1	19.7
Notill	5th year SB	10		UTC	54.5	1.0	32.1	20.3
Notill	5th year SB	10	ABM	Excalibre	56.2	1.0	32.3	20.2
Notill	5th year SB	10	EMD	Optimize	57.7	1.0	32.4	20.3
Notill	4th year SB	1		UTC	50.4	1.0	32.4	20.3
Notill	4th year SB	1	ABM	Excalibre	55.1	1.0	32.4	20.4
Notill	4th year SB	1	EMD	Optimize	53.0	1.0	32.2	20.4
Notill	3rd year SB	2		UTC	56.5	1.0	33.0	20.0
Notill	3rd year SB	2	ABM	Excalibre	56.1	1.0	32.8	20.1
Notill	3rd year SB	2	EMD	Optimize	60.9	1.0	32.5	20.3
Notill	2nd year SB	3		UTC	55.3	1.0	31.9	20.3
Notill	2nd year SB	3	ABM	Excalibre	54.0	1.0	32.3	20.2
Notill	2nd year SB	3	EMD	Optimize	52.9	1.0	31.6	20.3
Notill	1st year SB	4		UTC	60.9	1.0	32.5	20.2
Notill	1st year SB	4	ABM	Excalibre	56.5	1.0	32.3	20.3
Notill	1st year SB	4	EMD	Optimize	57.2	1.0	32.8	20.2
Notill	S/C rotation	13		UTC	58.4	1.0	32.4	20.2
Notill	S/C rotation	13	ABM	Excalibre	60.2	1.0	32.0	20.3
Notill	S/C rotation	13	EMD	Optimize	55.8	1.0	32.2	20.3
Notill	Continuous SB	14		UTC	52.6	1.0	31.8	20.6
Notill	Continuous SB	14	ABM	Excalibre	51.5	1.0	32.4	20.4
Notill	Continuous SB	14	EMD	Optimize	51.9	1.0	32.2	20.5
Conventional	5th year SB	10		UTC	55.6	1.0	32.9	20.1
Conventional	5th year SB	10	ABM	Excalibre	57.5	1.0	32.7	20.0
Conventional	5th year SB	10	EMD	Optimize	58.4	1.0	32.8	20.0
Conventional	4th year SB	1		UTC	52.9	1.0	32.2	20.3
Conventional	4th year SB	1	ABM	Excalibre	56.2	1.0	32.1	20.3
Conventional	4th year SB	1	EMD	Optimize	55.5	1.0	31.6	20.4
Conventional	3rd year SB	2		UTC	58.2	1.0	32.7	20.1
Conventional	3rd year SB	2	ABM	Excalibre	60.5	1.0	32.8	20.2
Conventional	3rd year SB	2	EMD	Optimize	57.1	1.0	33.0	20.0
Conventional	2nd year SB	3		UTC	59.1	1.0	32.4	20.1
Conventional	2nd year SB	3	ABM	Excalibre	57.7	1.0	32.6	20.0
Conventional	2nd year SB	3	EMD	Optimize	56.6	1.0	32.4	20.1
Conventional	1st year SB	4		UTC	53.9	1.0	32.1	20.1
Conventional	1st year SB	4	ABM	Excalibre	54.3	1.0	32.4	20.2
Conventional	1st year SB	4	EMD	Optimize	57.0	1.0	32.5	20.2
Conventional	S/C rotation	13		UTC	58.3	1.0	32.2	20.0
Conventional	S/C rotation	13	ABM	Excalibre	57.4	1.0	31.8	20.2
Conventional	S/C rotation	13	EMD	Optimize	53.9	1.0	32.4	20.0

Continue

**Table 44. Corn/Soybean Rotation Study - Soybean**(Continued) **Expt. 1190 Arlington, WI**

Tillage	Rotation		Inoculant		Grain Yield	Lodg.	Seed Composition	
	Name	#	Brand	Product			Protein	Oil
					bu/a	1-5	---- % ----	
Conventional	Continuous SB	14		UTC	53.3	1.0	33.2	19.7
Conventional	Continuous SB	14	ABM	Excalibre	51.6	1.0	33.2	19.6
Conventional	Continuous SB	14	EMD	Optimize	55.3	1.0	33.0	19.8
Means					55.9	1.0	32.4	20.2
<b>Probability %</b>								
Tillage (T)					13.3	>50	17.9	1.2
Rotation (R)					10.0	>50	6.3	13.8
T x R					>50	>50	6.2	0.1
Inoculant (I)					>50	>50	>50	>50
T x I					>50	>50	>50	>50
R x I					0.3	>50	6.1	9.0
T x R x I					10.4	>50	30.5	>50
<b>LSD 10%</b>								
Tillage (T)					NS	NS	NS	0.1
Rotation (R)					3.4	NS	0.4	NS
T x R					NS	NS	0.6	0.2
Inoculant (I)					NS	NS	NS	NS
T x I					NS	NS	NS	NS
R x I					3.8	NS	0.5	0.2
<b>CV %</b>					5	0	1	1