

## FIELD EXPERIMENT HISTORY

**Title:** Corn and Soybean Rotation Study  
**Experiment:** 09CS **Trial ID:** 3375 **Year:** 2010  
**Personnel:** J. G. Lauer, J.M. Gaska, , T. H. Diallo, K. D. Kohn  
**Location:** Arlington **County:** Columbia  
**Supported By:** HATCH

### Site Information

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

### Plot Management

**Tillage Operations:** See Factors

<b>Fertilizer:</b>	<b>Analysis:</b>	<b>Rate lbs/A:</b>	<b>Date:</b>
<b>Preplant :</b>	NH4NO3	175	4/20/10
	ESN	175	4/20/10
	SUPER U	175	4/20/10
<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:** Mirage plus: 22 oz/ 4-18-10  
 Radar LV: 8 oz/A 4-18-10  
 Dual II Mag :4 oz/A 4-28-10  
 Mirage plus 24oz/A 5-17-10

**Insecticide:** none  
**Hybrid:** C: Pioneer 35F44  
 S: Pioneer 92Y20

**Irrigation:** None

**Planting Date:** Corn: 4/29/10 **Planting Depth:** C: 1.5" **Row Width:** 30"  
 Soybean: 5/5/10 S: 1"

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

**Harvest Date:** Corn: 9/30/10 **Harvest Method:** C: Kincaid plot combine  
 Soybean: 10/04/10 S: Almaco plot combine #2

**Notes:**

### 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:

<b><u>Tillage:</u></b>	<b><u>Rotation:</u></b>	<b><u>Fertilizer/ Rhizobium Inoculants:</u></b>
No-Till	Continuous Corn or Soybean	C: 1- NH4NO3
Conventional	Alternating Corn - Soybean	2- ESN
	Corn 5yrs. / Soybean 5 yrs	3- SUPER U
		S: 1- Excalibre
		2- Optimize
		3- UTC

**Results: Tables C-48, C-49**

**Table C-48. Corn/Soybean Rotation and Tillage Study - Corn.  
Arlington, WI - 2010.**

Tillage	Rotation	Fertilizer	Yield bu/A	Moisture %	Test weight lbs/bu	Grower return \$/A	Lodged			Harvest plants/A
							Total %	Stalk %	Root %	
		ESN	252	24.4	55.0	1087	0.7	0.1	0.6	31375
		NH4NO3	247	25.8	54.8	1060	0.8	0.0	0.8	31107
		SuperU	244	25.8	54.5	1048	0.3	0.0	0.3	30500
	1C		274	21.3	55.6	1198	0.0	0.0	0.0	31917
	1CC		241	27.4	54.6	1027	0.0	0.0	0.0	30167
	1CS		263	23.9	55.5	1138	0.0	0.0	0.0	31875
	2C		248	24.9	54.4	1066	0.0	0.0	0.0	31292
	3C		237	26.5	54.9	1015	1.0	0.0	1.0	30708
	4C		238	26.6	54.4	1018	1.5	0.0	1.5	29667
	5C		232	26.8	54.2	992	1.8	0.1	1.6	31333
	1C	ESN	272	21.1	55.6	1192	0.0	0.0	0.0	33125
	1C	NH4NO3	273	21.5	55.6	1193	0.0	0.0	0.0	31500
	1C	SuperU	276	21.2	55.5	1208	0.0	0.0	0.0	31125
	1CC	ESN	249	26.4	54.9	1063	0.0	0.0	0.0	30250
	1CC	NH4NO3	242	28.2	54.5	1027	0.0	0.0	0.0	30250
	1CC	SuperU	233	27.5	54.4	990	0.0	0.0	0.0	30000
	1CS	ESN	262	23.6	55.7	1135	0.0	0.0	0.0	33125
	1CS	NH4NO3	266	23.9	55.9	1151	0.0	0.0	0.0	30750
	1CS	SuperU	262	24.2	55.0	1129	0.0	0.0	0.0	31750
	2C	ESN	242	24.1	54.3	1046	0.0	0.0	0.0	31125
	2C	NH4NO3	252	25.2	54.7	1082	0.0	0.0	0.0	31500
	2C	SuperU	249	25.4	54.1	1070	0.0	0.0	0.0	31250
	3C	ESN	237	25.3	54.8	1019	0.0	0.0	0.0	30625
	3C	NH4NO3	234	27.2	54.8	1000	1.1	0.0	1.1	31000
	3C	SuperU	241	27.1	54.9	1026	1.8	0.0	1.8	30500
	4C	ESN	252	25.3	55.1	1085	3.3	0.0	3.3	29625
	4C	NH4NO3	232	27.4	54.2	987	1.2	0.0	1.2	29500
	4C	SuperU	230	27.0	53.8	982	0.0	0.0	0.0	29875
	5C	ESN	249	25.1	54.6	1071	1.5	0.4	1.1	31750
	5C	NH4NO3	229	27.4	54.2	978	3.4	0.0	3.4	33250
	5C	SuperU	218	27.9	53.9	928	0.4	0.0	0.4	29000
Conv			261	22.6	55.3	1137	1.2	0.0	1.2	31655
Notill			234	28.1	54.3	993	0.0	0.0	0.0	30333

continued

**Table C-48. Corn/Soybean Rotation and Tillage Study - Corn.**  
 (continued) **Arlington, WI - 2010.**

Tillage	Rotation	Fertilizer	Yield bu/A	Moisture %	Test weight lbs/bu	Grower return \$/A	Lodged			Harvest plants/A
							Total %	Stalk %	Root %	
Conv		ESN	263	22.1	55.4	1145	1.4	0.1	1.3	32107
Conv		NH4NO3	261	22.8	55.4	1133	1.6	0.0	1.6	31786
Conv		SuperU	261	22.9	55.0	1132	0.6	0.0	0.6	31071
Notill		ESN	241	26.7	54.6	1030	0.0	0.0	0.0	30643
Notill		NH4NO3	233	28.8	54.3	986	0.0	0.0	0.0	30429
Notill		SuperU	227	28.7	54.0	963	0.0	0.0	0.0	29929
Conv	1C		275	21.2	55.5	1206	0.0	0.0	0.0	32000
Conv	1CC		257	23.7	54.8	1112	0.0	0.0	0.0	30833
Conv	1CS		270	22.2	56.2	1174	0.0	0.0	0.0	32083
Conv	2C		261	23.0	55.0	1130	0.0	0.0	0.0	31667
Conv	3C		253	22.7	55.5	1099	2.0	0.0	2.0	31083
Conv	4C		255	22.7	54.9	1108	3.0	0.0	3.0	31083
Conv	5C		260	22.7	54.9	1128	3.5	0.3	3.2	32833
Notill	1C		272	21.4	55.6	1190	0.0	0.0	0.0	31833
Notill	1CC		225	31.0	54.4	942	0.0	0.0	0.0	29500
Notill	1CS		257	25.6	54.9	1103	0.0	0.0	0.0	31667
Notill	2C		235	26.8	53.8	1001	0.0	0.0	0.0	30917
Notill	3C		222	30.4	54.2	931	0.0	0.0	0.0	30333
Notill	4C		221	30.4	53.8	928	0.0	0.0	0.0	28250
Notill	5C		204	30.9	53.6	856	0.0	0.0	0.0	29833
Conv	1C	ESN	278	21.0	55.8	1218	0.0	0.0	0.0	33750
Conv	1C	NH4NO3	269	21.3	55.3	1176	0.0	0.0	0.0	30750
Conv	1C	SuperU	279	21.1	55.5	1223	0.0	0.0	0.0	31500
Conv	1CC	ESN	261	23.3	55.0	1133	0.0	0.0	0.0	31500
Conv	1CC	NH4NO3	260	24.0	54.6	1125	0.0	0.0	0.0	29750
Conv	1CC	SuperU	249	23.9	54.8	1077	0.0	0.0	0.0	31250
Conv	1CS	ESN	272	22.0	56.3	1185	0.0	0.0	0.0	33750
Conv	1CS	NH4NO3	268	22.3	56.7	1169	0.0	0.0	0.0	31000
Conv	1CS	SuperU	268	22.3	55.6	1168	0.0	0.0	0.0	31500

continued

**Table C-48. Corn/Soybean Rotation and Tillage Study - Corn.**  
 (continued) **Arlington, WI - 2010.**

Tillage	Rotation	Fertilizer	Yield bu/A	Moisture %	Test weight lbs/bu	Grower return \$/A	Lodged			Harvest plants/A
							Total %	Stalk %	Root %	
Conv	2C	ESN	253	22.4	54.8	1101	0.0	0.0	0.0	31250
Conv	2C	NH4NO3	267	23.5	55.6	1157	0.0	0.0	0.0	31500
Conv	2C	SuperU	261	23.2	54.5	1133	0.0	0.0	0.0	32250
Conv	3C	ESN	249	22.3	55.4	1083	0.0	0.0	0.0	31000
Conv	3C	NH4NO3	255	22.7	55.7	1108	2.3	0.0	2.3	32750
Conv	3C	SuperU	255	23.0	55.5	1107	3.6	0.0	3.6	29500
Conv	4C	ESN	264	22.1	55.5	1149	6.7	0.0	6.7	31000
Conv	4C	NH4NO3	247	23.1	54.6	1072	2.3	0.0	2.3	31750
Conv	4C	SuperU	254	22.9	54.6	1104	0.0	0.0	0.0	30500
Conv	5C	ESN	262	21.7	54.9	1145	3.0	0.8	2.3	32500
Conv	5C	NH4NO3	259	22.9	55.1	1124	6.8	0.0	6.8	35000
Conv	5C	SuperU	258	23.6	54.6	1116	0.7	0.0	0.7	31000
Notill	1C	ESN	266	21.2	55.4	1165	0.0	0.0	0.0	32500
Notill	1C	NH4NO3	277	21.7	55.8	1209	0.0	0.0	0.0	32250
Notill	1C	SuperU	273	21.3	55.6	1194	0.0	0.0	0.0	30750
Notill	1CC	ESN	236	29.4	54.8	994	0.0	0.0	0.0	29000
Notill	1CC	NH4NO3	224	32.5	54.3	930	0.0	0.0	0.0	30750
Notill	1CC	SuperU	216	31.1	54.0	903	0.0	0.0	0.0	28750
Notill	1CS	ESN	253	25.1	55.1	1086	0.0	0.0	0.0	32500
Notill	1CS	NH4NO3	264	25.5	55.2	1132	0.0	0.0	0.0	30500
Notill	1CS	SuperU	255	26.1	54.4	1091	0.0	0.0	0.0	32000
Notill	2C	ESN	231	25.8	53.8	991	0.0	0.0	0.0	31000
Notill	2C	NH4NO3	236	27.0	53.8	1006	0.0	0.0	0.0	31500
Notill	2C	SuperU	237	27.5	53.8	1006	0.0	0.0	0.0	30250
Notill	3C	ESN	226	28.2	54.2	956	0.0	0.0	0.0	30250
Notill	3C	NH4NO3	214	31.6	54.0	892	0.0	0.0	0.0	29250
Notill	3C	SuperU	226	31.3	54.4	946	0.0	0.0	0.0	31500

continued

**Table C-48. Corn/Soybean Rotation and Tillage Study - Corn.**(continued) **Arlington, WI - 2010.**

Tillage	Rotation	Fertilizer	Yield	Moisture	Test weight	Grower return	Lodged			Harvest plants
							Total	Stalk	Root	
			bu/A	%	lbs/bu	\$/A	%	%	%	plants/A
Notill	4C	ESN	241	28.4	54.7	1021	0.0	0.0	0.0	28250
Notill	4C	NH4NO3	216	31.7	53.7	902	0.0	0.0	0.0	27250
Notill	4C	SuperU	206	31.1	52.9	860	0.0	0.0	0.0	29250
Notill	5C	ESN	236	28.5	54.4	998	0.0	0.0	0.0	31000
Notill	5C	NH4NO3	200	31.9	53.3	831	0.0	0.0	0.0	31500
Notill	5C	SuperU	178	32.3	53.1	740	0.0	0.0	0.0	27000
Means			248	25.3	54.8	1065	0.6	0.0	0.6	30994
<b>Probability(%)</b>										
Tillage (T)			0.0	0.0	0.3	0.0	16.2	32.0	17.7	0.1
Rotation (R)			0.0	0.0	10.2	0.0	38.1	43.1	42.2	0.9
Fertilizer (F)			1.1	0.0	0.2	0.3	67.8	37.2	67.7	10.3
T x R			0.1	0.0	84.1	0.0	38.1	43.1	42.2	19.6
T x F			7.5	0.5	47.7	6.6	67.8	37.2	67.7	92.5
R x F			0.3	16.3	12.1	0.3	71.9	45.6	65.4	9.4
T x R x F			8.6	84.7	59.9	11.9	71.9	45.6	65.4	19.1
<b>LSD(0.10)</b>										
Tillage (T)			5	0.5	0.5	20	NS	NS	NS	592
Rotation (R)			9	1.0	NS	37	NS	NS	NS	1108
Fertilizer (F)			4	0.4	0.2	19	NS	NS	NS	NS
T x R			12	1.4	NS	53	NS	NS	NS	NS
T x F			6	0.6	NS	29	NS	NS	NS	NS
R x F			12	NS	NS	55	NS	NS	NS	1840
T x R x F			18	NS	NS	NS	NS	NS	NS	NS

**Table 49. Corn/Soybean Rotation Study - Soybean  
Arlington, WI - 2010**

Tillage	Rotation		Inoculant		Grain Yield	Lodg. 1-5	Seed Composition	
	Name	#	Brand	Product			Protein	Oil
				UTC	bu/a 56.8		---- % ---- 34.7	19.3
			ABM	Excalibre	59.5	1	34.9	19.2
			EMD	Optimize	61.8	1	34.8	19.2
	5th yr. SB	8			57.6	1	34.9	19.2
	4th yr. SB	9			61.0	1	34.8	19.2
	3rd yr. SB	10			59.7	1	34.9	19.3
	2nd yr. SB	1			58.5	1	34.7	19.4
	1st yr. SB	2			61.2	1	34.5	19.3
	S/C rotation	13			61.0	1	34.6	19.5
	Cont SB	14			56.5	1	35.2	18.9
	5th yr. SB	8		UTC	54.9	1	34.7	19.2
	5th yr. SB	8	ABM	Excalibre	58.6	1	35.2	19.1
	5th yr. SB	8	EMD	Optimize	59.5	1	34.9	19.2
	4th yr. SB	9		UTC	54.6	1	34.7	19.3
	4th yr. SB	9	ABM	Excalibre	64.0	1	34.8	19.1
	4th yr. SB	9	EMD	Optimize	64.3	1	34.9	19.2
	3rd yr. SB	10		UTC	53.3	1	34.7	19.3
	3rd yr. SB	10	ABM	Excalibre	62.2	1	35.0	19.3
	3rd yr. SB	10	EMD	Optimize	63.6	1	35.0	19.2
	2nd yr. SB	1		UTC	59.1	1	34.7	19.5
	2nd yr. SB	1	ABM	Excalibre	57.3	1	34.8	19.4
	2nd yr. SB	1	EMD	Optimize	59.3	1	34.7	19.4
	1st yr. SB	2		UTC	60.3	1	34.5	19.3
	1st yr. SB	2	ABM	Excalibre	60.0	1	34.5	19.4
	1st yr. SB	2	EMD	Optimize	63.3	1	34.6	19.2
	S/C rotation	13		UTC	61.7	1	34.6	19.5
	S/C rotation	13	ABM	Excalibre	57.8	1	34.5	19.5
	S/C rotation	13	EMD	Optimize	63.6	1	34.6	19.5
	Cont SB	14		UTC	53.6	1	35.0	18.9
	Cont SB	14	ABM	Excalibre	56.7	1	35.3	18.9
	Cont SB	14	EMD	Optimize	59.3	1	35.2	19.0
	Notill				58.6	1	34.8	19.3
Conventional					60.1	1	34.8	19.2
	Notill			UTC	56.5	1	34.8	19.3
	Notill		ABM	Excalibre	58.2	1	34.8	19.3
	Notill		EMD	Optimize	61.2	1	34.8	19.3
Conventional				UTC	57.1	1	34.6	19.3
Conventional			ABM	Excalibre	60.8	1	34.9	19.2
Conventional			EMD	Optimize	62.5	1	34.9	19.2

Continued

**Table 49. Corn/Soybean Rotation Study - Soybean**  
(continued) **Arlington, WI - 2010**

Tillage	Rotation		Inoculant		Grain Yield	Lodg.	Seed Composition	
	Name	#	Brand	Product			Protein	Oil
					bu/a	1-5	---- % ----	
Notill	5th yr. SB	8			56.0	1	35.0	19.1
Notill	4th yr. SB	9			59.9	1	34.9	19.2
Notill	3rd yr. SB	10			57.7	1	35.0	19.2
Notill	2nd yr. SB	1			57.3	1	34.8	19.3
Notill	1st yr. SB	2			60.1	1	34.5	19.5
Notill	S/C rotation	13			60.5	1	34.7	19.5
Notill	Cont SB	14			58.9	1	34.8	19.2
Conventional	5th yr. SB	8			59.3	1	34.9	19.2
Conventional	4th yr. SB	9			62.0	1	34.7	19.3
Conventional	3rd yr. SB	10			61.7	1	34.8	19.3
Conventional	2nd yr. SB	1			59.7	1	34.6	19.5
Conventional	1st yr. SB	2			62.4	1	34.5	19.2
Conventional	S/C rotation	13			61.6	1	34.4	19.5
Conventional	Cont SB	14			54.2	1	35.5	18.7
Notill	5th yr. SB	8		UTC	54.0	1	35.1	19.1
Notill	5th yr. SB	8	ABM	Excalibre	57.6	1	35.1	19.1
Notill	5th yr. SB	8	EMD	Optimize	56.2	1	34.8	19.2
Notill	4th yr. SB	9		UTC	52.4	1	34.9	19.3
Notill	4th yr. SB	9	ABM	Excalibre	62.7	1	35.0	19.1
Notill	4th yr. SB	9	EMD	Optimize	64.7	1	34.9	19.2
Notill	3rd yr. SB	10		UTC	50.3	1	34.9	19.2
Notill	3rd yr. SB	10	ABM	Excalibre	60.2	1	35.1	19.3
Notill	3rd yr. SB	10	EMD	Optimize	62.5	1	35.0	19.2
Notill	2nd yr. SB	1		UTC	59.0	1	34.8	19.3
Notill	2nd yr. SB	1	ABM	Excalibre	55.2	1	34.8	19.4
Notill	2nd yr. SB	1	EMD	Optimize	57.8	1	34.9	19.3
Notill	1st yr. SB	2		UTC	60.4	1	34.5	19.5
Notill	1st yr. SB	2	ABM	Excalibre	57.4	1	34.5	19.5
Notill	1st yr. SB	2	EMD	Optimize	62.4	1	34.6	19.4
Notill	S/C rotation	13		UTC	61.4	1	34.7	19.5
Notill	S/C rotation	13	ABM	Excalibre	56.6	1	34.7	19.5
Notill	S/C rotation	13	EMD	Optimize	63.5	1	34.8	19.4
Notill	Cont SB	14		UTC	58.2	1	34.9	19.1
Notill	Cont SB	14	ABM	Excalibre	57.4	1	34.7	19.2
Notill	Cont SB	14	EMD	Optimize	61.0	1	34.8	19.2
Conventional	5th yr. SB	8		UTC	55.7	1	34.3	19.4
Conventional	5th yr. SB	8	ABM	Excalibre	59.6	1	35.2	19.1
Conventional	5th yr. SB	8	EMD	Optimize	62.7	1	35.1	19.2
Conventional	4th yr. SB	9		UTC	56.8	1	34.5	19.4
Conventional	4th yr. SB	9	ABM	Excalibre	65.4	1	34.6	19.2
Conventional	4th yr. SB	9	EMD	Optimize	63.9	1	34.9	19.3
Conventional	3rd yr. SB	10		UTC	56.4	1	34.5	19.4
Conventional	3rd yr. SB	10	ABM	Excalibre	64.1	1	34.9	19.4
Conventional	3rd yr. SB	10	EMD	Optimize	64.6	1	35.0	19.3

continued

**Table 49. Corn/Soybean Rotation Study - Soybean**  
(continued) **Arlington, WI - 2010**

Tillage	Rotation		Inoculant		Grain Yield	Lodg.	Seed Composition	
	Name	#	Brand	Product			Protein	Oil
					bu/a	1-5	---- % ----	
Conventional	2nd yr. SB	1		UTC	59.2	1	34.6	19.6
Conventional	2nd yr. SB	1	ABM	Excalibre	59.3	1	34.8	19.4
Conventional	2nd yr. SB	1	EMD	Optimize	60.7	1	34.5	19.4
Conventional	1st yr. SB	2		UTC	60.3	1	34.5	19.2
Conventional	1st yr. SB	2	ABM	Excalibre	62.6	1	34.6	19.2
Conventional	1st yr. SB	2	EMD	Optimize	64.2	1	34.6	19.1
Conventional	S/C rotation	13		UTC	62.0	1	34.5	19.5
Conventional	S/C rotation	13	ABM	Excalibre	58.9	1	34.3	19.4
Conventional	S/C rotation	13	EMD	Optimize	63.8	1	34.5	19.5
Conventional	Cont SB	14		UTC	49.0	1	35.2	18.7
Conventional	Cont SB	14	ABM	Excalibre	56.0	1	35.9	18.6
Conventional	Cont SB	14	EMD	Optimize	57.5	1	35.5	18.8
Means					59.4	1.0	34.8	19.3
<b>Probability %</b>								
Tillage (T)					6.0	>50	>50	49.7
Rotation (R)					<0.1	>50	<0.1	<0.1
T x R					1.3	>50	0.4	1.1
Inoculant (I)					<0.1	>50	0.6	31.6
T x I					27.0	>50	0.7	38.6
R x I					<0.1	>50	>50	>50
T x R x I					39.7	>50	5.9	>50
<b>LSD 10%</b>								
Tillage (T)					1.2	NS	NS	NS
Rotation (R)					1.9	NS	0.2	0.2
T x R					2.8	NS	0.3	0.3
Inoculant (I)					1.1	NS	0.1	NS
T x I					NS	NS	0.2	NS
R x I					3.1	NS	NS	NS
<b>CV %</b>					6	0	1	1