

FIELD EXPERIMENT HISTORY

Title: 17 Tillage and Fumigation in Corn and Soybean Production Systems
Experiment: 17 Tillage **Trial ID** 2711 **Year** 2005
Personnel: J.G. Lauer, P.J. Flannery, K.D. Kohn, and T.F. Stanger
Location: Arlington, WI **County:** Columbia
Supported By: HATCH

Site Information

Field: ARS396 **Previous Crop:** Corn/Soybean **Soil Type:** Plano Silt Loam
Soil Test: **Date** 5 /6 /04 **pH** 6.8 **OM (%)** 3.0 **P (ppm)** 22 **K (ppm)** 139

Plot Management

Tillage Operations: See Factors

	<u>Analysis:</u>	<u>Rate lbs/A:</u>	<u>Date:</u>
Fertilizer:			
Preplant :	28-0-0	70 gal/A	5 /2 /05
Starter :	N/A	N/A	N/A
Post plant :	34-0-0	59 lbs N/A	6 /17/05
Manure:	N/A	N/A	N/A
Herbicide:	2-4D Ester 0.67 pt/A Dual 2 pt/A Roundup WeatherMax 21 oz/A	Insecticide:	Force 3G @ 4.4 lb/A
Irrigation:	None	Hybrid/Variety:	Trelay 7693 RR2
Planting Date	C: 4/29/05 S: 5/3/05	Row Width:	30"
Planting Method:	Kinze Inter-Row Planter	Planting Depth:	C: 1.5" S: 1.0"
Harvest Date:	C: 10/13/05 S: 10/3/05	Harvest Method:	C: Kincaid Plot Combine S: Almaco Plot Combine

Experimental Design

Design: RCB Split Plot **Replications:** 4
Plot Size Seeded 20' x 100' **Experiment Size** 4.5 Acres
Harvest Plot Size: 5' x 96'

Factors/Treatments:

Rotation

Continuous Corn
 Corn / Soybean
 Soybean / Corn

Tillage for All Rotation

CP = Fall chisel plow and 2 spring field cultivator
 T1 = NT- Planter unit equipped with 1 13-wave coulter with trash whippers
 T2 = NT- Planter unit equipped with 1 13-wave coulter with trash whippers
 T3 = Fall chisel plow, fumigation - Sectagon 42 @ 45 gals/A, and 2 spring field cultivator
 T4 = Spring chisel plow and 2 spring field cultivator
 NT = Planter unit equipped with 1 13-wave coulter with trash whippers

Results: Tables C-72, C-73, and C-74.

**Table C-72. Tillage in Corn and Soybean Production Systems - Corn.
Arlington, WI - 2005.**

Rotation	Tillage treatment	Residue		Test		Grower return	Lodged			Ears		Harvest	
		cover	Yield	Moisture	Weight		Total	Stalk	Root	Barren	Dropped	plants	ears
		%	bu/A	%	lbs/bu	\$/A	%	%	%	%	%	plants/A	ears/A
	CP	28	172	19.8	55	265	1	1	0	5	0	34000	32125
	NT	77	157	24.3	52	230	3	3	0	7	0	34250	31875
	T1	-	159	23.7	52	234	3	2	0	2	0	34625	33875
	T2	-	169	23.7	52	249	2	2	0	6	0	34125	32000
	T3	20	180	21.3	53	272	15	15	0	4	0	34250	33000
	T4	31	176	20.0	54	272	4	4	0	4	0	34250	33000
CC		48	155	24.6	52	225	6	6	0	4	0	33750	32333
CS		29	183	19.7	54	282	3	3	0	5	0	34750	32958
CC	CP	38	164	21.0	53	249	2	2	0	6	0	33500	31500
CC	NT	88	131	27.8	51	181	2	2	0	6	0	33250	31250
CC	T1	-	144	27.7	50	199	4	3	1	1	0	34000	33500
CC	T2	-	152	27.1	50	211	3	3	0	5	0	34250	32500
CC	T3	26	182	22.5	52	270	24	24	0	1	0	34500	34000
CC	T4	40	157	21.4	53	237	3	3	0	5	0	33000	31250
CS	CP	17	180	18.7	56	281	0	0	0	5	0	34500	32750
CS	NT	65	183	20.8	54	278	4	4	0	8	0	35250	32500
CS	T1	-	174	19.7	53	269	2	2	0	3	0	35250	34250
CS	T2	-	187	20.3	54	286	1	1	0	7	0	34000	31500
CS	T3	13	179	20.1	54	274	5	5	0	6	0	34000	32000
CS	T4	21	195	18.6	55	306	5	5	0	2	0	35500	34750
Mean		39	169	22.1	53	253	5	5	0	5	0	34250	32646
Probability(%)													
Rotation (R)		0.1	9.1	0.8	1.7	2.8	22.9	23.2	39.1	43.4	-	37.8	55.5
Tillage (T)		0.0	2.0	0.0	0.0	0.1	0.5	0.5	43.5	15.6	-	99.6	43.3
R x T		25.3	1.5	0.0	27.1	0.2	4.0	3.8	43.5	48.0	-	71.0	21.0
LSD (0.10)													
Rotation (R)		2	13	0.9	1	17	NS	NS	NS	NS	-	NS	NS
Tillage (T)		2	6	0.6	0	9	3	3	NS	NS	-	NS	NS
R x T		NS	9	0.9	1	13	4	4	NS	NS	-	NS	NS
CV(%)													
		14	9	7	2	9	148	150	693	84	-	6	7

**Table C-73. Tillage in Corn and Soybean Production Systems - Soybean.
Arlington, WI - 2005.**

Rotation	Tillage treatment	Residue cover	Yield	Moisture	Grower return	Seed Composition			Protein	Oil	Protein + Oil
						Oil	Protein	Fiber			
		%	bu/A	%	\$/A	%	%	%	lbs/A	lbs/A	lbs/A
SC	CP	41	52	12.4	278	20.1	33.7	4.8	1056	630	1687
SC	NT	91	54	12.5	285	19.8	33.9	4.8	1085	637	1722
SC	T1	-	54	12.5	286	19.7	33.9	4.8	1092	638	1730
SC	T2	-	52	12.6	278	20.1	33.4	4.8	1052	632	1684
SC	T3	29	57	12.7	300	19.9	33.9	4.8	1148	675	1823
SC	T4	50	56	12.5	298	19.8	33.9	4.8	1141	666	1807
Mean		52	54	12.5	288	19.9	33.8	4.8	1096	647	1742
Probability(%)											
Tillage		0.0	60.7	37.0	60.7	38.0	92.6	83.0	45.2	78.4	57.3
LSD (0.10)											
Tillage		4	NS	NS	NS	NS	NS	NS	NS	NS	NS
CV(%)											
Tillage		11	8	2	8	2	2	1	7	9	8

**Table C-74. Crop Rotation, Tillage, and Fumigation Influence on Corn Growth and Development.
Arlington, WI - 2005.**

Rotation	Treatment	Observation Day of Year	Leaf Development			Plant Height
			Leaf Collars	Hail Adjusters Method	Total Leaves	
			no./plant	no./plant	no./plant	inches
		151	1.8	3.2	3.7	4.5
		165	5.3	7.2	8.7	16.7
		180	8.3	11.0	12.6	40.3
		194	13.0	12.9	15.9	68.2
		208	17.8	17.6	17.8	79.1
	CP		9.4	10.4	11.8	41.0
	NT		8.8	10.0	11.4	40.4
	T3		9.3	10.5	11.8	42.2
	T4		9.5	10.6	12.0	43.3
	CP	151	1.9	3.1	3.6	4.4
	CP	165	5.4	7.4	8.8	17.7
	CP	180	8.6	11.0	12.8	40.8
	CP	194	13.4	13.0	16.1	65.3
	CP	208	17.8	17.6	17.8	77.1
	NT	151	1.4	2.8	3.1	4.1
	NT	165	4.8	6.5	8.1	15.5
	NT	180	7.8	10.6	12.1	37.4
	NT	194	12.0	12.4	15.4	66.8
	NT	208	18.0	17.8	18.0	78.4
	T3	151	2.0	3.4	3.9	4.9
	T3	165	5.4	7.3	8.6	15.4
	T3	180	8.4	11.0	12.6	39.0
	T3	194	12.9	13.1	15.9	69.3
	T3	208	17.8	17.7	17.8	82.2
	T4	151	2.0	3.3	3.9	4.5
	T4	165	5.7	7.8	9.2	18.1
	T4	180	8.5	11.3	13.1	43.8
	T4	194	13.5	13.2	16.2	71.4
	T4	208	17.8	17.6	17.8	78.8
	CC		9.0	10.1	11.5	39.9
	CS		9.6	10.7	12.0	43.6

(continued)

Table C-74. Crop Rotation, Tillage, and Fumigation Influence on Corn Growth and Development.
(continued) **Arlington, WI - 2005.**

Rotation	Treatment	Observation Day of Year	Leaf Development			Plant Height
			Leaf Collars	Hail Adjusters Method	Total Leaves	
			no./plant	no./plant	no./plant	inches
CC		151	1.7	3.0	3.6	4.4
CC		165	5.1	6.9	8.4	16.2
CC		180	8.0	10.7	12.2	37.9
CC		194	12.2	12.3	15.5	65.2
CC		208	17.8	17.6	17.8	75.7
CS		151	1.9	3.3	3.8	4.6
CS		165	5.6	7.5	9.0	17.2
CS		180	8.7	11.3	13.1	42.6
CS		194	13.7	13.5	16.3	71.2
CS		208	17.9	17.7	17.9	82.5
CC	CP		9.1	10.2	11.6	39.8
CC	NT		8.4	9.6	10.9	37.9
CC	T3		9.3	10.5	11.8	41.9
CC	T4		9.1	10.2	11.7	39.9
CS	CP		9.8	10.7	12.1	42.3
CS	NT		9.2	10.4	11.8	43.0
CS	T3		9.4	10.6	11.8	42.5
CS	T4		9.9	11.0	12.4	46.7
CC	CP	151	1.8	3.0	3.4	4.4
CC	CP	165	5.0	7.1	8.5	17.8
CC	CP	180	8.1	10.6	12.3	39.4
CC	CP	194	12.9	12.8	15.9	64.3
CC	CP	208	17.8	17.5	17.8	73.3
CC	NT	151	1.0	2.5	3.0	3.7
CC	NT	165	4.5	5.9	7.4	13.5
CC	NT	180	7.3	10.1	11.4	33.6
CC	NT	194	11.0	11.6	14.9	63.3
CC	NT	208	18.0	17.8	18.0	75.5
CC	T3	151	2.0	3.4	4.0	5.0
CC	T3	165	5.4	7.4	8.8	16.5
CC	T3	180	8.6	11.0	12.6	39.1
CC	T3	194	12.6	12.9	15.8	68.1
CC	T3	208	17.8	17.6	17.8	80.5
CC	T4	151	2.0	3.3	3.9	4.5
CC	T4	165	5.4	7.4	8.9	16.8
CC	T4	180	8.1	10.9	12.5	39.5
CC	T4	194	12.4	12.1	15.6	65.1
CC	T4	208	17.6	17.5	17.6	73.5

(continued)

Table C-74. Crop Rotation, Tillage, and Fumigation Influence on Corn Growth and Development.
(continued) **Arlington, WI - 2005.**

Rotation	Treatment	Observation Day of Year	Leaf Development			
			Leaf Collars no./plant	Hail Adjusters Method no./plant	Total Leaves no./plant	Plant Height inches
CS	CP	151	2.0	3.3	3.9	4.3
CS	CP	165	5.9	7.8	9.1	17.6
CS	CP	180	9.1	11.4	13.3	42.3
CS	CP	194	14.0	13.3	16.4	66.4
CS	CP	208	17.8	17.6	17.8	80.9
CS	NT	151	1.8	3.0	3.3	4.6
CS	NT	165	5.0	7.1	8.9	17.5
CS	NT	180	8.4	11.1	12.9	41.3
CS	NT	194	13.0	13.1	16.0	70.3
CS	NT	208	18.0	17.8	18.0	81.3
CS	T3	151	2.0	3.5	3.9	4.8
CS	T3	165	5.4	7.1	8.4	14.3
CS	T3	180	8.3	11.0	12.5	38.9
CS	T3	194	13.3	13.4	16.1	70.5
CS	T3	208	17.9	17.8	17.9	83.9
CS	T4	151	2.0	3.4	4.0	4.5
CS	T4	165	6.0	8.1	9.5	19.3
CS	T4	180	8.9	11.8	13.8	48.0
CS	T4	194	14.6	14.3	16.8	77.6
CS	T4	208	17.9	17.6	17.9	84.0
Mean			9.3	10.4	11.7	41.7
Probability(%)						
Rotation (R)			0.0	0.0	0.0	0.0
Treatment (T)			0.0	0.0	0.0	10.4
R x T			1.3	2.8	1.0	6.6
DOY (D)			0.0	0.0	0.0	0.0
R x D			0.2	0.2	0.3	2.2
T x D			1.9	29.2	19.5	54.9
R x T x D			44.9	59.3	64.2	97.9
LSD (0.10)						
Rotation (R)			0.2	0.1	0.1	1.2
Treatment (T)			0.2	0.2	0.2	NS
R x T			0.3	0.3	0.3	2.9
DOY (D)			0.2	0.3	0.2	1.5
R x D			0.3	0.3	0.2	2.6
T x D			0.5	NS	NS	NS
R x T x D			NS	NS	NS	NS
CV(%)						
			6	6	5	13