

FIELD EXPERIMENT HISTORY

Title: Tillage in Corn and Soybean Production Systems
Experiment: 17Tillage **Trial ID:** 3373 **Year:** 2010
Personnel: J. G. Lauer, J.M. Gaska, T.H. Diallo, K. D. Kohn, S. Wilkens
Location: Arlington, WI **County:** Columbia
Supported By: HATCH

Site Information

Field: 396 **Previous Crop:** Corn / Soybean **Soil Type:** Plano Silt Loam
Soil Test: **Date:** 10/21/10 **pH** 6.4 **OM (%)** 3.1 **P (ppm)** 15 **K (ppm)** 98

Plot Management

Tillage Operations: See Factors

	<u>Analysis:</u>	<u>Rate lbs/A:</u>	<u>Date:</u>
Fertilizer:	Preplant : N/A	N/A	N/A
	Starter : N/A	N/A	N/A
	Post plant : 28-0-0	200	6/14/2010
	Manure: N/A	N/A	N/A
Herbicide:	Mirage plus: 22 oz/A 4/18/10	Insecticide: None	
	Radar LV: 8 oz/A 4/18/10		
	Mirage plus: 22 oz/A 4/28/10		
	Mirage plus: 22 oz/A 6/17/10		
Irrigation: None		Hybrid/Variety: C: Dekalb DKC52-59 S: NK S21N6	
Planting Date: Corn: 5/5 & 5/24/10 Soybean: 5/20/10		Row Width: 30"	
Planting Method: Kinze 2000 Interplant planter		Planting Depth: Corn: 1.5" Soybean: 1"	
Target Plant Density: 32500 Plants/Acre		Harvest Method: C: Kincaid plot combine S: Almaco plot combine	
Harvest Date: Corn: 10/15/10 Soybean: 10/27/10			

Experimental Design

Design: RCB split split plot **Replications:** 4
Plot Size Seeded: 10' x 50' **Experiment Size:** 3.6 A
Harvest Plot Size: 5' x 46'
Factors/Treatments:

Rotation:

Continuous Corn
 Corn / Soybean
 Soybean / Corn

Tillage For All Rotation:

- 1) CP: Fall chisel plow +2 spring field cultivator.
- 2) T1: Fall Strip-Till, knife 9in., Full Berm,
- 3) T2: Fall Strip-Till, knife 9in., No Berm,
- 4) T3: Fall Strip-Till, knife 6in., Full Berm,
- 5) T4: Fall Strip-Till, knife
- 6) NT: Spring 1-13 wave coulters

Date of Planting:

- 1: May 5
- 2: May 24

Results: Tables C-60, C-61, C-62 and C-63

Table C- 60 .Tillage, Rotation, and Date of Planting in Corn and Soybean Production Systems - Corn. Arlington, WI - 2010.

Rotation	Tillage	Date of Planting	Yield bu/A	Moisture %	Test weight lbs/bu	Grower return \$/A	Lodged			Harvest plants/A
							Total %	Root %	Stalk %	
		May-5	205	13.8	54.3	919	0.1	0.0	0.1	33000
		May-24	204	15.0	52.4	915	0.7	0.1	0.7	34583
	CP		200	14.0	53.3	898	0.7	0.2	0.5	33625
	NT		198	15.1	52.8	889	0.0	0.0	0.0	33500
	T1		209	14.4	53.4	938	1.2	0.0	1.2	34500
	T2		208	14.3	53.4	934	0.0	0.0	0.0	33438
	T3		208	14.2	53.6	934	0.0	0.0	0.0	33500
	T4		202	14.5	53.3	907	0.6	0.0	0.6	34188
	CP	May-5	198	13.4	54.2	889	0.0	0.0	0.0	33625
	CP	May-24	202	14.5	52.4	908	1.5	0.4	1.1	33625
	NT	May-5	201	14.2	53.9	903	0.0	0.0	0.0	32750
	NT	May-24	195	16.0	51.8	874	0.0	0.0	0.0	34250
	T1	May-5	209	13.8	54.5	939	0.0	0.0	0.0	33625
	T1	May-24	209	14.9	52.4	937	2.5	0.0	2.5	35375
	T2	May-5	211	13.8	54.4	945	0.0	0.0	0.0	32625
	T2	May-24	205	14.9	52.4	922	0.0	0.0	0.0	34250
	T3	May-5	208	13.8	54.4	933	0.0	0.0	0.0	32750
	T3	May-24	208	14.7	52.9	935	0.0	0.0	0.0	34250
	T4	May-5	201	13.8	54.2	902	0.8	0.0	0.8	32625
	T4	May-24	204	15.2	52.3	913	0.3	0.0	0.3	35750
CC			202	14.7	53.2	906	0.4	0.1	0.3	33813
CS			207	14.1	53.5	928	0.5	0.0	0.5	33771
CC		May-5	202	14.1	54.2	907	0.3	0.0	0.3	32958
CC		May-24	202	15.4	52.1	904	0.5	0.1	0.4	34667
CS		May-5	207	13.5	54.3	930	0.0	0.0	0.0	33042
CS		May-24	206	14.7	52.6	926	0.9	0.0	0.9	34500
CC	CP		197	14.2	53.2	886	1.1	0.4	0.7	33750
CC	NT		196	15.4	52.7	880	0.0	0.0	0.0	33375
CC	T1		207	14.7	53.2	927	0.0	0.0	0.0	34500
CC	T2		207	14.7	53.4	931	0.0	0.0	0.0	33125
CC	T3		205	14.6	53.4	919	0.0	0.0	0.0	33125
CC	T4		198	14.9	53.0	889	1.1	0.0	1.1	35000
CS	CP		203	13.7	53.3	910	0.3	0.0	0.3	33500
CS	NT		200	14.8	53.0	898	0.0	0.0	0.0	33625
CS	T1		211	14.1	53.6	949	2.5	0.0	2.5	34500
CS	T2		208	14.0	53.4	936	0.0	0.0	0.0	33750
CS	T3		211	13.9	53.9	949	0.0	0.0	0.0	33875
CS	T4		206	14.1	53.5	926	0.0	0.0	0.0	33375

continued

Table C- 60 .Tillage, Rotation, and Date of Planting in Corn and Soybean Production
 (continued) **Systems - Corn. Arlington, WI - 2010.**

Rotation	Tillage	Date of Planting	Yield bu/A	Moisture %	Test weight lbs/bu	Grower return \$/A	Lodged			Harvest plants plants/A
							Total %	Root %	Stalk %	
CC	CP	May-5	196	13.5	54.1	878	0.0	0.0	0.0	34000
CC	CP	May-24	199	14.9	52.4	894	2.3	0.8	1.5	33500
CC	NT	May-5	196	14.5	53.7	878	0.0	0.0	0.0	32500
CC	NT	May-24	197	16.2	51.6	882	0.0	0.0	0.0	34250
CC	T1	May-5	211	14.1	54.4	947	0.0	0.0	0.0	33500
CC	T1	May-24	202	15.3	52.1	908	0.0	0.0	0.0	35500
CC	T2	May-5	209	14.1	54.5	937	0.0	0.0	0.0	32000
CC	T2	May-24	206	15.2	52.2	926	0.0	0.0	0.0	34250
CC	T3	May-5	206	14.2	54.3	927	0.0	0.0	0.0	32000
CC	T3	May-24	203	15.1	52.5	911	0.0	0.0	0.0	34250
CC	T4	May-5	195	14.1	54.0	877	1.5	0.0	1.5	33750
CC	T4	May-24	201	15.7	52.0	901	0.7	0.0	0.7	36250
CS	CP	May-5	201	13.3	54.3	900	0.0	0.0	0.0	33250
CS	CP	May-24	205	14.2	52.4	921	0.7	0.0	0.7	33750
CS	NT	May-5	207	14.0	54.1	929	0.0	0.0	0.0	33000
CS	NT	May-24	193	15.7	51.9	866	0.0	0.0	0.0	34250
CS	T1	May-5	207	13.6	54.5	930	0.0	0.0	0.0	33750
CS	T1	May-24	215	14.5	52.8	967	5.0	0.0	5.0	35250
CS	T2	May-5	213	13.5	54.3	954	0.0	0.0	0.0	33250
CS	T2	May-24	204	14.5	52.5	918	0.0	0.0	0.0	34250
CS	T3	May-5	209	13.4	54.4	939	0.0	0.0	0.0	33500
CS	T3	May-24	214	14.3	53.4	959	0.0	0.0	0.0	34250
CS	T4	May-5	206	13.6	54.5	926	0.0	0.0	0.0	31500
CS	T4	May-24	206	14.7	52.5	925	0.0	0.0	0.0	35250
Means			204	14.4	53.3	917	0.4	0.0	0.4	33792
Probability (%)										
Rotation (R)			25.8	5.4	25.5	25.5	72.6	32.4	53.2	93.1
Tillage (T)			0.3	0.0	1.5	0.3	5.6	43.2	4.3	59.0
Date of Planting (DOP)			72.1	0.0	0.0	67.2	3.7	32.4	4.6	0.0
R x T			92.7	96.0	76.4	92.6	0.8	43.2	0.5	62.0
R x DOP			95.4	28.6	21.6	98.3	21.3	32.4	11.4	76.0
T x DOP			57.2	20.5	52.8	55.3	2.5	43.2	2.0	43.3
R x T x DOP			20.5	91.7	70.4	22.7	2.9	43.2	2.7	89.2
LSD (0.10)										
Rotation (R)			NS	0.5	NS	NS	NS	NS	NS	NS
Tillage (T)			5	0.4	0.3	25	0.8	NS	0.8	NS
Date of Planting (DOP)			NS	0.2	0.2	NS	0.5	NS	0.4	685
R x T			NS	NS	NS	NS	1.1	NS	1.1	NS
R x DOP			NS	NS	NS	NS	NS	NS	NS	NS
T x DOP			NS	NS	NS	NS	1.1	NS	1.1	NS
R x T x DOP			NS	NS	NS	NS	1.6	NS	1.5	NS

**Table C- 61 Corn and Soybean Cropping Systems - Soybean
Arlington, WI - 2010.**

<u>Tillage treatment</u>	<u>Yield bu/A</u>	<u>Moisture %</u>	<u>Grower return \$/A</u>
CP	56	10.2	638
NT	58	10.1	664
T1	58	10.2	663
T2	59	10.2	672
T3	59	10.2	669
T4	56	10.2	641
Mean	58	10.2	658
<u>Probability(%)</u>			
Tillage (T)	11.1	15.4	11.1
<u>LSD(0.10)</u>			
Tillage (T)	NS	NS	NS

**Table C-62. Tillage and Rotation Systems Influence on Corn Stover Agronomic and Biofuel Measurements.
Arlington, WI - 2010. †**

Rotation	Tillage	Harvest		Yield							CP	ADF	NDF	NDFD	ADL	Lignin	Glucan	Xylan	Cell	Hem
		Density plants/ A	Moisture %	Stover		TEP	TE	Etoh	-----%-----											
				g/plant	T/A	G/T	G/A	g/L												
	CP	33600	28.3	81	3.0	97.3	290	3.29	4.7	54.2	82.2	49.5	4.7	17.5	35.5	20.3	41.7	28.5		
	NT	32800	39.7	87	3.1	96.3	298	3.53	4.9	53.7	81.1	49.8	4.7	17.3	35.1	20.1	41.2	28.1		
	T3	32700	35.4	81	2.9	97.4	282	3.32	4.4	54.3	82.2	50.2	4.9	17.6	35.5	20.3	40.9	28.8		
CC		32800	38.9	87	3.1	95.6	299	3.36	4.8	53.9	81.1	49.6	4.6	17.4	34.8	20.0	40.8	27.4		
CS		32300	30.0	78	2.9	98.3	280	3.41	4.5	54.2	82.6	50.1	4.9	17.5	35.9	20.5	41.7	29.5		
CC	CP	34000	30.4	87	3.3	95.5	312	3.27	5.1	53.5	81.3	48.7	4.6	17.5	34.8	19.9	41.4	27.7		
CC	NT	32500	46.1	91	3.3	95.3	308	3.69	4.7	53.3	80.6	51.2	4.7	17.1	34.6	20.1	40.2	27.6		
CC	T3	32000	40.3	83	2.9	96.2	277	3.12	4.7	55.0	81.3	49.0	4.6	17.6	35.1	20.0	40.8	27.0		
CS	CP	33200	26.2	74	2.7	99.1	267	3.32	4.2	54.8	83.0	50.4	4.9	17.6	36.1	20.7	41.9	29.3		
CS	NT	33000	33.3	83	3.0	97.3	289	3.38	5.0	54.1	81.7	48.4	4.7	17.4	35.7	20.1	42.1	28.6		
CS	T3	33500	30.6	79	2.9	98.5	286	3.52	4.2	53.7	83.0	51.4	5.1	17.6	35.9	20.6	40.9	30.5		
Mean		33000	34.5	83	3.0	97.0	290	3.38	4.7	54.1	81.8	49.8	4.8	17.4	35.4	20.3	41.2	28.4		
Probability (%)																				
Rotation (R)		66.2	21.9	28.2	30.8	5.8	42.9	83.0	11.7	77.0	6.0	78.0	15.1	76.8	5.0	10.6	24.1	2.9		
Tillage (T)		64.4	51.3	68.4	75.4	57.4	80.7	14.6	13.0	72.7	5.6	88.8	70.1	59.3	58.0	66.7	25.4	56.4		
R x T		58.1	83.5	84.4	59.1	76.5	58.7	5.6	2.5	30.3	75.8	15.6	54.6	82.6	83.1	34.7	16.1	16.4		
LSD (0.05)																				
Rotation (R)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.6	
Tillage (T)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
R x T		NS	NS	NS	NS	NS	NS	NS	0.6	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

† TEP, Theoretical ethanol potential; TE, Theoretical ethanol; Etoh, ethanol; CP, crude protein; ADF, acid detergent fiber; NDF; neutral detergent fiber; NDFD, neutral detergent fiber digestibility; ADL, acid detergent lignin; Cell, cellulose; Hem, hemicellulose

Table C-63. Plant Segment, Tillage, and Rotation Systems Influence on Corn Stover Agronomic and Biofuel Measurements. Arlington, WI - 2010.†

Rotation	Tillage	Plant Segment	Harvest		Yield					CP	ADF	NDF	NDFD	ADL	Lignin	Glucan	Xylan	Cell	Hem
			Density plants/ A	Moisture %	Stover g/plant	T/A	TEP G/T	TE G/A	Etoh g/L										
CC			33000	21.2	43.6	3.9	95.4	371	3.35	4.9	53.0	81.0	50.4	4.7	17.2	34.6	20.1	40.4	28.0
CS			33400	16.6	39.2	3.5	98.2	347	3.40	4.5	53.3	82.5	50.6	5.0	17.3	35.7	20.7	41.4	30.1
	CP		33800	16.5	40.3	3.7	97.1	360	3.29	4.7	53.2	82.1	50.2	4.8	17.3	35.2	20.5	41.4	29.0
	NT		32900	20.2	43.6	3.9	96.2	371	3.49	4.9	52.9	81.0	50.6	4.8	17.1	34.9	20.2	40.9	28.7
	T3		32900	20.1	40.4	3.6	97.2	348	3.34	4.5	53.5	82.0	50.9	4.9	17.4	35.3	20.4	40.4	29.4
CC	CP		34200	20.4	43.7	4.1	95.1	387	3.26	5.2	52.5	81.4	49.4	4.6	17.4	34.5	20.0	41.3	28.1
CC	NT		32700	22.2	45.7	4.0	95.2	383	3.32	4.7	52.5	80.4	52.1	4.7	16.9	34.4	20.2	39.8	28.1
CC	T3		32200	21.1	41.4	3.6	96.0	343	3.70	4.7	54.0	81.1	49.8	4.7	17.3	34.9	20.2	40.3	27.7
CS	CP		33500	12.6	36.9	3.3	99.0	331	3.28	4.3	53.8	82.9	51.1	5.0	17.3	35.9	20.9	41.6	29.9
CS	NT		33200	18.2	41.4	3.7	97.2	358	3.28	5.0	53.2	81.7	49.0	4.8	17.3	35.5	20.3	42.1	29.4
CS	T3		33700	19.0	39.4	3.6	98.4	353	3.39	4.2	53.0	82.9	51.9	5.1	17.4	35.7	20.7	40.5	31.0
		BE		23.3	46.2	4.1	97.9	405	3.42	4.4	59.0	82.7	46.1	4.4	18.7	36.6	19.5	43.5	25.3
		AE		14.6	36.6	3.3	95.7	315	3.33	5.0	47.4	80.7	55.0	5.2	15.8	33.7	21.2	38.3	32.7
CC		BE		25.2	49.7	4.4	96.5	428	3.39	4.6	58.1	81.8	45.8	4.3	18.5	36.0	19.4	43.1	24.9
CC		AE		17.2	37.5	3.3	94.4	316	3.31	5.1	47.9	80.1	55.1	5.1	16.0	33.2	20.9	37.8	31.0
CS		BE		21.3	42.7	3.8	99.3	382	3.44	4.1	59.8	83.6	46.3	4.6	19.0	37.2	19.8	43.9	25.7
CS		AE		11.9	35.7	3.2	97.0	314	3.35	4.9	46.9	81.4	55.0	5.4	15.6	34.2	21.4	38.8	34.5

continued

Table C-63. Plant Segment, Tillage, and Rotation Systems Influence on Corn Stover Agronomic and Biofuel
 (continued) **Measurements. Arlington, WI - 2010.†**

Rotation	Tillage	Plant Segment	Harvest		Yield														
			Density plants/ A	Moisture %	Stover		TEP	TE	Etoh	CP	ADF	NDF	NDFD	ADL	Lignin	Glucan	Xylan	Cell	Hem
					g/plant	T/A	G/T	G/A	g/L	-----%-----									
	CP	BE		20.9	44.9	4.1	97.9	405	3.26	4.5	59.1	82.9	45.8	5.2	19.0	36.6	19.5	43.8	25.5
	CP	AE		12.0	35.7	3.3	96.2	315	3.65	5.0	47.3	81.4	54.6	4.4	15.7	33.8	21.4	39.1	32.6
	NT	BE		24.6	49.1	4.3	97.4	422	3.14	4.6	58.7	82.1	45.8	5.2	18.3	36.3	19.5	43.1	25.0
	NT	AE		15.8	38.0	3.4	95.0	320	3.32	5.1	47.0	79.9	55.3	4.6	16.0	33.6	20.9	38.7	32.4
	T3	BE		24.2	44.6	3.9	98.5	388	3.34	4.1	59.0	83.1	46.6	5.3	19.0	36.9	19.6	43.7	25.6
	T3	AE		15.9	36.3	3.2	95.9	309	3.54	4.8	48.0	80.9	55.1	4.6	15.7	33.7	21.3	37.0	33.2
CC	CP	BE		22.4	50.8	4.7	96.5	457	3.16	5.0	57.7	81.7	45.4	4.2	18.4	36.1	19.3	43.4	25.3
CC	CP	AE		18.3	36.7	3.4	93.7	319	3.37	5.4	47.3	81.1	53.4	5.1	16.4	33.0	20.8	39.2	31.0
CC	NT	BE		25.3	52.8	4.6	95.7	444	3.82	4.5	57.3	81.7	47.1	4.4	18.0	35.5	19.4	42.7	25.5
CC	NT	AE		19.0	38.7	3.4	94.6	323	3.48	5.0	47.7	79.0	57.2	5.1	15.9	33.3	21.0	36.9	30.7
CC	T3	BE		28.0	45.7	3.9	97.1	381	3.19	4.5	59.3	82.1	44.9	4.3	19.0	36.4	19.4	43.2	24.0
CC	T3	AE		14.2	37.2	3.2	94.8	306	3.09	4.9	48.8	80.2	54.7	5.2	15.6	33.4	21.0	37.3	31.4
CS	CP	BE		19.5	39.1	3.5	99.2	351	3.36	4.0	60.5	84.1	46.2	4.5	19.5	37.2	19.8	44.1	25.6
CS	CP	AE		5.6	34.6	3.1	98.8	310	3.28	4.6	47.2	81.7	55.9	5.4	15.0	34.7	22.0	39.1	34.2
CS	NT	BE		23.9	45.5	4.0	99.0	399	3.59	4.8	60.2	82.6	44.5	4.4	18.6	37.2	19.7	43.5	24.4
CS	NT	AE		12.5	37.2	3.3	95.4	318	3.08	5.2	46.2	80.8	53.4	5.3	16.0	33.9	20.9	40.6	34.3
CS	T3	BE		20.5	43.5	4.0	99.8	395	3.38	3.7	58.8	84.1	48.3	4.8	19.0	37.4	19.9	44.2	27.1
CS	T3	AE		17.6	35.3	3.2	97.0	313	3.70	4.7	47.1	81.7	55.5	5.4	15.8	34.1	21.5	36.8	34.9
Mean			33200	18.9	41.4	3.7	96.8	360	3.28	4.7	53.2	81.7	50.5	4.8	17.3	35.2	20.4	40.9	29.0

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