

1981 PURDUE TILLAGE STUDIES
AGRONOMY FARM - LONGTIME STUDY

Unusually wet spring weather delayed most operations for 3-4 weeks in 1981. Although plow and chisel corn plots were disked on April 28, no further field work was possible until May 20. Patches of smartweed and giant ragweed were 18-20 inches tall at this time. Paraquat was applied to the entire experimental area on May 20 with a Hi-Boy sprayer.

Corn was planted on May 22 and soybeans were planted on May 28. Rains in June caused ponding water on parts of Rep. I. Although plants were not killed, residues were floated off no-till plots, so most data from Rep. I was not used in analysis. Adequate rains continued throughout the season, and no drouth stress was evident at any time.

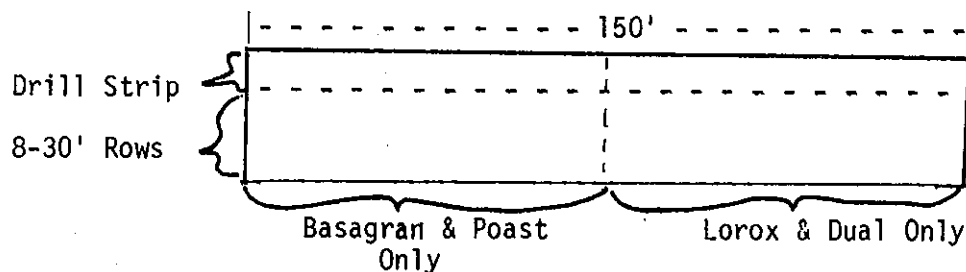
Cultural practices used included:

	<u>CORN</u>	<u>SOYBEANS</u>
Hybrid or Variety	Beck's 65X	Century
Seed Rate	26,000/acre	49 lbs./acre
Seedbed Preparation	Disk 1 early, then disk 1 and field cultivate 1 at planting for plow and chisel.	Disk 1 and field cultivate 1 for plow and chisel.
Fertilizer	0-90-180 b'cast fall '80 250#/ac N as NH ₃ pre-plant 100#/ac 28-28-0 ³ starter	Same No N No starter
Insecticide	Counter in row - 9#/ac Lorsban 4E b'cast on 6-2 for cutworms, 3 pts/ac	No insecticide
Weed Control	Pre-emergence: Bladex 4L, 1.5 qt/ac Atrazine 4L, 1.5 qt/ac Dual 8E, 3 pts/ac	Pre-emergence, S ½ plots: Lorox L, 2.4 pts/ac Dual 8E, 3 pts/ac Post-emergence, N ½ plots: Basagran, 1 qt/ac + 1 qt. crop oil/ac Poast, 1 pt/ac (0.3# AI)
Cultivation	Plow, chisel, ridge - once	Same
Harvest Area	4 rows X 150'	2-30" rows X 60' and 4-10" rows X 60'

Cutworm damage on corn was effectively controlled by Lorsban. There did not appear to be important damage on corn or soybeans from other insects or diseases. Weed control in corn appeared to be adequate in all treatments, although patches of hedge bindweed and morning glory remained uncontrolled.

To evaluate solid seeded soybeans with different tillage and weed control methods, all soybean plots, except the ridged till plant plots, were split for the first time in 1981 in cooperation with Marv Swearingin. One pass was made in each plot with a 7' Tye drill set on 10" spacing. Also, 1/2 of each soybean tillage plot received pre-emergence herbicides but no post-emergence while the other 1/2 received post-emergence but not pre-emergence herbicides. Each tillage plot was split into 4 sub-plots for harvest.

Example:



Weeds which may have affected yield in some no-till plots were patches of smartweed not completely killed by either treatment, and early grass competition before Poast was applied. Otherwise, weed control was good with both treatments. Soybean yields for the rotation x tillage x row width x herbicide study are in Appendix A. Marv Swearingin will present a detailed discussion of this data later. Data from 30" rows with pre-emergence herbicides will be analyzed as in past years.

Stand, Growth and Yield

Corn - Stands for till-planting were reduced compared to other systems, probably due to slippage of drive wheels on the till-planter units reducing seeds dropped. Plant height at 4 weeks showed slight differences due to tillage but none due to previous crop. At 8 weeks, there was a definite growth increase for rotation across all tillage, and a decrease in growth for no-till continuous corn. No-till and till-plant tended to be slightly wetter at harvest than plow and chisel. Corn yield was 6 bu/ac better in rotation, averaging across tillage systems, but there was no significant yield response to tillage.

Table 1. Corn response to tillage and previous crop, Chalmers s.c.l., 1981^{a/}

PREVIOUS CROP	TILLAGE	STAND, 4 WKS. PPA	HEIGHT 4 WKS. IN.	HEIGHT 8 WKS. IN.	HARVEST MOISTURE %	YIELD/AC. @ 15½% M. BU.
Corn	Plow	24,700	33.6	94.6	24.3	169.0
	Chisel	24,900	32.7	94.8	24.1	170.9
	Till	21,200	31.9	92.6	24.9	166.6
	No-Till	23,800	30.9	86.2	25.9	164.6
Soybeans	Plow	25,000	32.1	99.2	24.2	176.4
	Chisel	24,700	34.2	96.6	24.0	170.3
	Till	19,300	31.8	96.9	25.2	173.6
	No-Till	22,400	31.9	98.7	24.5	174.6

a/ Data taken from 3 reps only.

Soybeans - Seed drop and stand were reduced with till-planting, but all stands were within limits considered adequate for maximum yield in 30 inch rows. Till-plant and no-till growth was slightly reduced at 8 weeks, both in rotation and continuous soybeans, but there was no difference in harvest moisture. Yields were better in rotation in all tillage systems except plowing. Yields were lowest in the chisel system, but reasons were not apparent.

Table 2. Soybean response to tillage and previous crop, Chalmers si.c.l., 1981^{a/}.

PREVIOUS CROP	TILLAGE	STAND 4 WKS. PPF	HEIGHT 4 WKS. IN.	HEIGHT 8 WKS. IN.	HARVEST MOISTURE %	YIELD/AC. @ 15½% M. BU.
Corn	Plow	7.2	8.0	33.5	11.2	49.2
	Chisel	8.1	8.1	32.8	10.8	46.2
	Till	6.1	7.2	29.7	10.9	47.6
	No-Till	7.2	7.3	30.1	11.1	48.4
Soybeans	Plow	7.7	7.9	32.2	11.2	49.7
	Chisel	8.1	7.7	32.5	10.7	42.8
	Till	5.7	7.2	29.8	10.8	45.6
	No-Till	7.2	8.1	29.0	10.9	46.8

a/ Data from 3 reps. only.

ANOV, 1981 data - Corn yield was significantly affected by previous crop, but not by tillage in 1981. It is interesting to note that tillage influenced stand, growth and maturity, but not grain yield. There was significant soybean yield response to tillage, previous crop and their interaction:

Table 3. ANOV Summary, Agronomy Farm Tillage Data, 1981.

VARIABLE	CORN				
	STAND 4 WKS.	HEIGHT 4 WKS.	HEIGHT 8 WKS.	HARVEST MOISTURE	BU/AC
	Sig. Level				
Tillage	.01	.05	.01	.10	NS
Previous Crop	NS	NS	.01	NS	.01
Tillage X Prev. Crop	NS	.10	.01	.05	NS
	SOYBEANS				
Tillage	.01	.05	.01	NS	.05
Previous Crop	NS	NS	.10	NS	.05
Tillage X Prev. Crop	NS	.05	NS	NS	.10

Long-Time Yield Trends

Of most interest to me, in looking back at yields over the 7 years of this project, is comparison of no-till vs plowed treatments. C/C no-till yield was significantly lower than plowed yield 3 years, equal 3 years and better 1 year. C/B no-till was lower 2 years, equal 4 years and better 1 year. B/C no-till yield was lower 5 years and equal 2 years, while B/B yield was significantly lower all 7 years.

Table 4. Corn Yield Summary, Agronomy Farm Tillage, 1975-81.

PREVIOUS CROP	TILLAGE	BU/AC							
		1975	1976	1977	1978	1979	1980	1981	75-81 AVG.
Corn	Plow	176.1	140.4	137.8	146.8	205.1	149.3	169.0	160.6
	Chisel	165.0	147.4	135.5	144.7	190.8	136.0	170.9	155.7
	Ridge	141.4	154.7	137.2	135.5 ^{a/}	191.3	142.6	166.6	---
	(Till- 80-81) No-Till	165.4	153.7	136.3	146.1	176.6	134.4	164.6	153.9
Soybeans	Plow	167.4	145.1	146.1	145.4	209.5	166.0	176.4	165.1
	Chisel	177.1	140.8	149.5	140.2	206.7	159.4	170.3	163.4
	Ridge	149.5	154.7	147.8	142.1 ^{a/}	194.8	164.2	173.6	---
	(Till- 80-81) No-Till	175.2	143.4	144.4	142.8	187.6	155.8	174.6	161.0

^{a/} Planted one week later in 1978.

Table 5. Soybean Yield Summary, Agronomy Farm Tillage, 1975-81.

PREVIOUS CROP	TILLAGE	BU/AC							
		1975	1976	1977	1978	1979	1980	1981	75-81 Avg.
Corn	Plow	56.4	54.4	55.4	39.3	48.6	54.4	49.2	51.1
	Chisel	57.6	50.7	54.1	45.0	49.5 ^{a/}	54.6	46.2	51.1
	Ridge (Till 80-81)	49.9	50.9	50.4	39.4	48.3 ^{a/}	55.0	47.6	--
	No-Till	56.0	48.3	52.1	36.2	43.5	51.8	48.4	48.0
Soybeans	Plow	52.7	48.0	50.3	38.2	47.9	54.3	49.7	48.7
	Chisel	52.2	45.5	48.8	37.8	49.2 ^{a/}	50.7	42.8	46.7
	Ridge (Till 80-81)	49.1	46.0	47.5	35.2	45.9 ^{a/}	48.1	45.6	--
	No-Till	47.8	41.4	44.6	34.1	45.0	49.5	46.8	44.2

^{a/} Ridges were disked down and soybeans replanted in 1979.

Cutworm Damage - Tim Johnson, graduate student in Entomology, took black cutworm counts in all corn plots (4 reps.) on June 3. Average cut and damaged plants for the 8 tillage treatments are reported in Table 6.

Table 6. Corn Damaged by Black Cutworms, Agronomy Farm Tillage, 1981.

CUT PLANTS, %*			DAMAGED PLANTS, %*		
C/B	Till-Plant	7.25 a	C/B	No-Till	6.00 a
C/C	No-Till	3.50 b	C/C	Till-Plant	3.50 b
C/B	No-Till	3.00 b c	C/B	Till-Plant	3.50 b
C/C	Till-Plant	1.50 b c	C/C	No-Till	2.75 b c
C/C	Chisel	0.50 c	C/B	Chisel	1.00 c d
C/B	Chisel	0.50 c	C/C	Chisel	0.75 c d
C/B	Plow	0.50 c	C/C	Plow	0.75 c d
C/C	Plow	0.25 d	C/B	Plow	0.25 d

*Includes Duncans MRT.

Damage was obviously greater in treatments that did not have pre-plant tillage (no-till and till-plant). Lorsban applied June 2 provided effective control.

Other data collected in 1981 by Agronomy graduate students Jose Carlos Cruz (Moldenhauer) and Daniel W. McCracken (Van Scoyoc) included: soil surface cover after planting; daily max-min soil temperatures at a 4 inch depth through the first 8 weeks of the growing season; weekly soil moisture readings to a 3 foot depth with a neutron probe through

the growing season; plant tissue analysis for nutrients; organic matter, P, K and pH distribution in the soil; the effect of corn residue vs soybean residue on soil aggregation; and the effect of tillage system and rotation on soil density at 0-4 inches. This data will be reported in detail in the students' theses, but some highlights from 1981 included:

Residue cover shortly after planting showed 1, 11, 21, and 61% following corn and 1, 5, 12, and 33% following soybeans, respectively, for plow, chisel, till plant and no-till.

Bulk density taken within two weeks after planting at the 0-4 inch depth between non-traffic rows was 1.19, 1.12, and 1.29 gms/cm³, respectively, for plow, chisel, and no-till.

Soil temperature (4-inch depth) averaged 2-3^o C colder under no-till than plow, chisel, and till plant through the first ten weeks after planting following corn.

Soil temperature under no-till after soybeans averaged 2^o C warmer than after corn the first ten weeks after planting.

No-till had between 2-4 cm more soil water after corn than after soybeans the first ten weeks after planting.

Wet seive analysis of air-dried soil-residue mixtures after a period of incubation revealed that, within the same particle size, corn residue produced more water-stable aggregates > 2 mm than soybean residue.

Agronomy Farm--Till-Plant Equipment Study

In areas adjacent to the long-term tillage study, several attachments were used on the J.D. max-emerg. units to push trash and clods to row middles. Treatments included: (1) the Buffalo planter unmodified; (2) J.D. with double disk furrowers; (3) J.D. with a V-wing bed topper; (4) J.D. with the Buffalo sweep; (5) J.D. with fluted coulter; and (6) J.D. with no attachment. The V-wing, double disks and Buffalo sweep were modified to mount on the planter units on the same bracket where the fluted coulter normally mounts.

Plots were 8 rows wide and were so located that 4 reps were primarily on Raub soil and 4 reps were primarily on Chalmers soil. All 8 rows were machine harvested to check yields. Ridges were made at cultivating time in corn the previous year. Hybrid was Beck's 65X and row width was 30 inches, 200 lbs/ac N was applied as NH₃ preplant.

Stand growth and yield data from this experiment are presented in Table 7. Stands were reduced with the Buffalo planter, probably due to slippage of the drive wheel, causing fewer seeds dropped. Growth and yield among all treatments were quite uniform among reps with an 8 bushel yield increase for the darker soil. ANOV showed yield response to both soil and equipment to be significant (.05). The LSD for equipment was 4.54 bu/ac.

Table 7. Corn Response to Till-Planting Equipment, Agronomy Farm, 1981.

<u>SOIL</u>	<u>EQUIPMENT</u>	<u>STAND</u>	<u>HEIGHT</u>	<u>BU/AC</u>
		<u>4 WEEKS</u>	<u>4 WEEKS</u>	
			Inches	
Chalmers si.c.1.	Buffalo	21,060	35.9	160.3
	JD - Sweep	24,250	37.0	167.6
	JD - V-wing	23,880	38.3	162.1
	JD - Double Disk	24,120	36.5	165.3
	JD - No-till Coulter	25,880	37.7	160.6
	JD - No Attachment	<u>25,000</u>	<u>37.1</u>	<u>162.6</u>
	Soil Average	(24,042)	(37.1)	(163.1)
Raub si.1.	Buffalo	21,180	34.6	150.8
	JD - Sweep	23,440	33.8	158.4
	JD - V-wing	23,250	33.5	159.4
	JD - Double Disk	24,440	34.6	156.2
	JD - No-till Coulter	23,690	33.2	154.0
	JD - No Attachment	<u>23,560</u>	<u>32.6</u>	<u>152.4</u>
	Soil Average	(23,260)	(33.7)	(155.2)

Yield Response to equipment across soil type:

Buffalo 155.5, Sweep 163.0; V-wing 160.7; Double Disk 160.8; Coulter 157.3; and No Attachment 157.5.

SEPAC TILLAGE TRIALS

This was the second year for this experiment and planting was again drastically delayed due to adverse weather. Two-row beds were made in the fall, 1980. Plowing, chiseling and disking for these respective treatments were done on April 2. No further preparation was possible until June 17. All plots to receive tillage were disked on June 17 and again on June 18. Weeds present on June 17 varied greatly with treatment. The beds, the only plots with fall tillage had many 3-4 foot tall smartweeds and horseweeds, all plots with spring tillage had mostly annual grasses, and no-till plots had mostly "poverty grass" and mustard with a few large broadleaves in old dead furrows. Herbicides used gave satisfactory control except on large broadleaves in beds. Insects and diseases did not appear to be important problems in this experiment.

As in the Agronomy Farm experiment, all soybean plots, except beds, were split with drill vs row and pre-emergence vs postemergence herbicides. These yield comparisons are reported in Appendix A. Data from 30-inch row beans with pre-emergence herbicides was included in the long-term analysis.

Cultural practices used were:

	<u>CORN</u>	<u>SOYBEANS</u>
Hybrid - Variety	Beck's 60X	Williams 79
Date Planted	June 17-18	June 18-19
Seed Rate	24,000/ac.	48 lbs./ac.
Nitrogen	175 lbs/ac as NH ₃	None
Starter Fertilizer	26-13-13	None
Insecticide	Counter 15G, 9#/ac	None
Herbicides	Preplant: Beds: 2 qt. Roundup Others: 1 qt. Paraquat Pre-emergence: .75 qt. Bladex 4L .75 qt. Aatrex 4L 3 pts. Dual Post Emergence: 2, 4D on Reps III & IV	Preplant: Same Same Pre-emergence: 1.25 lbs. Lorox 50W 3 pts. Dual
Cultivation	Plow, Chisel & Disk - once	Same
Harvest	4 rows, full length	2 rows X 82 feet

To level and widen beds, triangular bed "toppers" were made to mount on the front of the JD planter. However, excessive weed growth at planting prevented their use. As in 1980, corn and beans were no-tilled into the beds and, again, there was a problem in keeping the planter centered. Thus, rows were occasionally in the furrow with some seed uncovered. With bean rows on the edges of the beds, the bottom 2 nodes of plants could not be harvested, so yields were not checked on bed beans for 1981. Corn yields were not checked in a separate trial which compared 2 bed shapes, due to irregular stands and poor weed control.

Stand, Growth and Yield

Corn stands were slightly reduced in beds and plant growth was slowed for no-till and beds, even at this late planting date. Moisture at harvest was very high due to late planting, making accurate testing difficult. Yields for plow, chisel and disk systems were similar both in continuous and rotation cropping. No-till yields were reduced by 20 bushels or more in corn after corn but reduced only slightly in rotation.

Soybeans in plow, chisel, disk and no-till treatments showed little difference in stand, growth or yield.

ANOV showed corn yield response to tillage and the tillage X previous crop interaction to be significant, reflecting the no-till response to rotation. Soybean yield differences were not significant. Comparing yields in 1980 and 1981 (Table 10) shows response to tillage to be very similar, perhaps reflecting the late planting date both years. Soybean yields are also similar except for the effect of phytophthora root rot on no-till yield in 1980. A resistant variety was used in 1981.

Table 8. Crop Response to Tillage, Clermont si.l., SEPAC, 1981.

PREVIOUS CROP	TILLAGE	CORN				
		STAND 4 WKS.	HEIGHT 4 WKS.	HEIGHT 8 WKS.	HARVEST MOISTURE	YIELD /AC.
		PPA	INCH	INCH	PERCENT	BU.
Corn	Plow	21,075	43.1	101.1	33.3	123.3
	Chisel	20,625	47.4	103.1	31.6	131.4
	Disk	21,050	45.0	100.6	33.0	125.2
	Bed	19,175	41.9	97.9	33.8	118.2
	No-Till	19,600	42.1	92.7	32.1	104.6
Soybeans	Plow	20,500	42.9	101.1	34.2	122.0
	Chisel	19,925	43.3	98.6	33.9	118.9
	Disk	20,600	42.7	99.6	33.9	120.0
	Bed	17,000	39.0	94.5	34.3	109.8
	No-Till	19,875	43.4	95.2	33.3	115.5
		SOYBEANS				
		STAND 4 WKS.	HEIGHT 8 WKS.	HARVEST MOISTURE	YIELD /ACRE	
		PPF	INCH	PERCENT	BU.	
Corn	Plow	7.2	29.7	10.5	43.1	
	Chisel	6.6	31.6	11.0	41.4	
	Disk	6.8	31.7	10.6 ^{a/}	38.6 ^{a/}	
	Bed	4.0	26.3	--	--	
	No-Till	5.6	30.1	11.2	42.2	

^{a/} Accurate harvest with combine not possible due to shape of bed and position of rows.

Table 9. ANOV Summary, SEPAC Tillage Data, 1981.

VARIABLE	CORN				
	STAND 4 WKS.	HEIGHT 4 WKS.	HEIGHT 8 WKS.	HARVEST MOISTURE	BU/ AC.
	- - - - - Sig. Level - - - - -				
Tillage	.01	.05	.05	NS	.10
Previous Crop	NS	NS	NS	NS	NS
Tillage X Previous Crop	.05	NS	NS	NS	.01
	SOYBEANS				
Tillage	.01	--	.01	NS	NS

Table 10. 1980-81 Yield Summary, SEPAC Tillage.

PREVIOUS CROP	TILLAGE	CORN			SOYBEANS		
		1980	1981	AVG.	1980	1981	AVG.
Corn	Plow	113.5	123.3	118.4	38.9	43.1	41.0
	Chisel	121.8	131.4	126.6	39.6	41.4	40.5
	Disk	117.0	125.2	121.1	40.0	38.6	39.3
	Bed	97.6	118.2	107.9	35.6	--	
	No-Till	104.9	104.6	104.7	18.7 ^{a/}	42.2	30.4
Soybeans	Plow	116.2	122.0	119.1			
	Chisel	112.0	118.9	115.4			
	Disk	119.5	120.0	119.8			
	Bed	91.2	109.8	100.5			
	No-Till	119.6	115.5	117.5			

^{a/} Phytophthora root rot reduced yield.

Tillage Demos at PAC's in 1981

About 15 acres of corn was no-till planted at Pinney PAC into an alfalfa-brome grass mixture on Tracy s.l. The local S&WCD J.D. 6-row planter was used. The pasture mixture was sprayed with 1 qt/ac Paraquat about 10 days preplant. The brome grass still was green at the base of the leaves at planting. Since high rates of triazines could not be used due to subsequent cropping plans, another pint of Paraquat was used with a mixture of Atrazine and Bladex. Good control resulted. Rodents (probably ground squirrels) reduced stand in part of the no-till area. Where stands were adequate, yield checks were 158 bu/ac., about 20 bu/ac. better than a plowed comparison in the same field. The trial was planted on May 27 and NH₃ was applied June 23.

Several fields of corn were no-till planted at the Feldun PAC in addition to Mengel's N study. The farm planter (JD) was used and NH_3 was applied on June 25. Some insect damage (common stalk borer or smartweed borer) was noted in late June. Yield checks were about the same as for plowed fields at the farm.

Plans for 1982

We again plan to split soybean plots at the Agronomy Farm and at SEPAC as in 1981 (drilled vs rows, pre vs post emergence). The till-plant equipment study will be repeated at the Agronomy Farm, but without the Buffalo till planter which has been returned to Fleisher Mfg. Till-plant plots in main Agronomy Farm experiment will be planted with the JD planter with disk furrowers attached. Ridges were made at SEPAC in the fall for a till-plant demo in 1982. Bed tops at SEPAC will be leveled at planting (somehow!).

APPENDIX A

SOYBEAN YIELD RESPONSE TO ROW WIDTH, HERBICIDE, TILLAGE AND ROTATION - 1981

I. PURDUE AGRONOMY FARM - LAFAYETTE

SOYBEAN YIELDS (4 Reps.)

<u>ROTATION</u>	<u>TILLAGE</u>	<u>HERBICIDES</u>			
		<u>PRE</u>		<u>POST</u>	
		<u>ROW</u>	<u>DRILL</u>	<u>ROW</u>	<u>DRILL</u>
C-SB	Fall Plow	50.0	54.3	49.4	60.2
	Fall Chisel	47.3	54.7	49.7	60.1
	Till Plant	(48.8)	--	--	--
	No-Till	<u>47.6</u>	<u>51.1</u>	<u>38.7</u>	<u>49.2</u>
	Average	48.3	53.4	45.9	56.5
SB-SB	Fall Plow	49.0	46.9	47.8	56.6
	Fall Chisel	44.0	52.8	41.7	49.0
	Till Plant	(44.9)	--	--	--
	No-Till	<u>46.9</u>	<u>56.7</u>	<u>38.6</u>	<u>47.0</u>
	Average	46.6	52.1	42.7	50.9

TRIAL AVERAGES

C-SB Rotation	50.8	
Continuous SB	47.8	
	<u>DRILLED</u>	<u>ROWS</u>
Rotation	54.9	47.1 = 7.8 Bu/A = 16.6%
Continuous SB	51.5	44.7 = 6.8 Bu/A = 15.2%
	<u>PRE</u>	<u>POST</u>
Rotation	50.9	51.2
Continuous SB	49.4	46.8

II. SOUTHEASTERN PURDUE AG CENTER - NORTH VERNON

SOYBEAN YIELDS (4 Reps)

ALL SPRING TILLAGE AND ROTATION AFTER CORN

<u>TILLAGE</u>	<u>HERBICIDES</u>				<u>TILL. AVG.</u>	
	<u>ROW</u>	<u>PRE</u>		<u>POST</u>		
		<u>DRILL</u>	<u>ROW</u>	<u>DRILL</u>		<u>ROW</u>
Spring Plow	43.1	42.9	44.9	53.5	46.1	
Spring Chisel	41.4	38.5	42.4	52.8	43.8	
Spring Disc	38.6	40.8	44.7	49.7	43.4	
No-Till	42.2	56.7	43.4	59.5	50.4	
Average	41.3	44.7	43.9	53.9		

TRIAL AVERAGES

<u>DRILLED</u>	<u>ROWS</u>
49.3	42.6 = 6.7 Bu/A = 15.7%
<u>PRE</u>	<u>POST</u>
43.0	48.9 = 5.9 Bu/A = 13.7%

CHRONOLOGY OF EVENTS, 1981 TILLAGE RESEARCH

April 2	Chiseled and disked at SEPAC
April 3	Plowed at SEPAC (Biehle)
April 7	Applied NH_3 to corn plots in main Agronomy Farm experiment
April 8	Applied NH_3 to corn till-plant equipment study
April 9	Located demo areas at Feldun PAC
April 28	Disked on plowed and chiseled plots and chopped stalks for no-till at Agronomy Farm
May 4	Applied N to Mengel's corn at Agronomy Farm
May 21	Planted corn in till-plant equipment study
May 22	Planted all corn in main tillage at Agronomy Farm
May 27	Planted Pinney PAC no-till demo
May 28	Field cultivated all bean areas and planted all beans at Agronomy Farm (main exp., Swearingin, Mengel & Steinhardt)
May 29	Applied pre-emergence herbicides to beans at Agronomy Farm
June 2	Sprayed all Agronomy Farm corn with Lorsban for cutworms
June 16	Sprayed Paraquat and Roundup at SEPAC
June 17	Planted all beds at SEPAC and disked for plow, chisel and disk treatments
June 18	Planted plow, chisel, disk and no-till corn and plow, chisel and disk beans at SEPAC
June 19	Planted no-till and bed beans + Scott's experiment, SEPAC
June 20	Sprayed Basagran on beans & Rep. I corn at Agronomy Farm
June 23	Cultivated plow and chisel corn at Agronomy Farm
June 24	Applied NH_3 to Pinney PAC demo
June 24	Ridged corn for till-plant and applied Poast on beans at Agronomy Farm
June 25	Applied NH_3 to Feldun PAC no-till demos
June 26	Cultivated plow, chisel and ridge beans at Agronomy Farm
July 1	Applied NH_3 to SEPAC corn
July 7	Sprayed Steinhardt's beans with Basagran
July 8	Sprayed Reps III & IV at SEPAC with 2, 4-D (Biehle)
July 13	Cultivated plow, chisel and disk corn and beans, SEPAC
Oct. 2	Harvested row beans at Agronomy Farm, including Mengel's.
Oct. 5	Harvested drilled beans at Agronomy Farm
Oct. 8	Harvested Steinhardt's beans at Agronomy Farm
Oct. 14	Harvested SEPAC beans, tillage, Mengel's and Scott's.
Oct. 19	Harvested corn at Agronomy Farm, tillage and till-plant study
Oct. 20	Harvested Mengel's corn, Agronomy Farm
Oct. 29	Harvested corn, SEPAC
	Terry took Buffalo to Nebraska
Oct. 30	Spread lime on all tillage plots, Agronomy Farm
	Chopped stalks for plow, chisel, ridge at Agronomy Farm
Nov. 8	Plowed and chiseled at Agronomy Farm
Nov. 9	Ridged bean stubble at Agronomy Farm
Nov. 10	Chiseled and ridged for Farm Progress Show demo.
Nov. 13	Made ridges for till-plant demo, SEPAC
Nov. 17	Made beds, SEPAC