THOMPSON AGRICULTURE ALTERNATIVES

2009 REPORT

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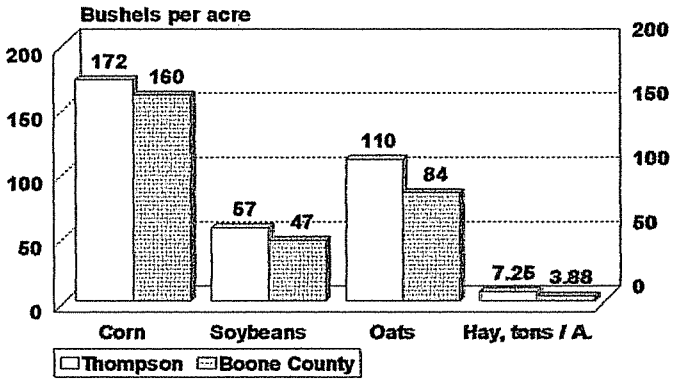
Crop Yields

Thompson vs. Boone County



Since 1994

Figure 5-0

CROPS

Crop yields from our farm have been compared to the Boone County average since 1988. The average is for those years after improvements had been made of the Thompson farm **(Figure 5-0).** Examples are moldboard plowing hay, flex harrow before oats, pulverizer behind oat drill, stacker for picking up residues and BT corn.

Corn

In 1984, the average corn yield was 91 bushels per acre, way below the county average of 121. This is attributed to early season nitrogen and potassium deficiencies. Since beginning row banding N and K with the planter in 1985, yield has been equal to the county average **(Figure 5-1 and Table 5-1).** During the drought year of 1988, yields surpassed county averages by over 27 bushels per acre, which is attributed to better water infiltration from earthworm holes, lower soil bulk density and a greater residue coverage. Moldboard plowing pasture and hay fields has increased corn yields 12 bushels **(Table 5-1).** Corn yields should continue to improve with fall plowing under the manures which places the phosphorus and potassium lower in the soil profile.

Average Corn Yields - Bu./A

Started Plowing under manure and hay 1994

	After Hay	After Soybeans	Boone County
Before plowing 1994	130	129	129
After plowing 1994	176	168	160

Corn yields - 1988 to 2008. Moldboard plowing once every 5 yrs.

Figure 5-1

Average Soybeans Yields

Started plowing under manure and hay 1994

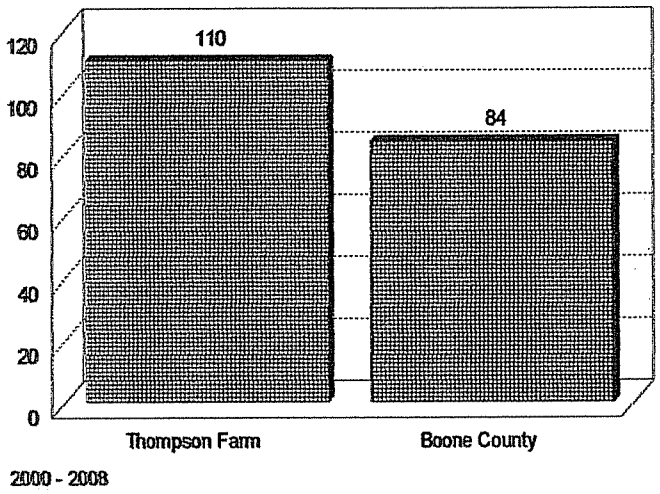
	Dick and Sharon Farm	Boone County	Diff.
Before plowing	48	39	9
After plowing	57	47	10

Soybean yields Bus./A. 1988 to 2008. Moldboard plow once every 5 yrs.

Figure 5-2

Oat Yields - Bushels Per Acre

Flex Harrow & Pulverizer



2000 - 2008

Figure 5-3

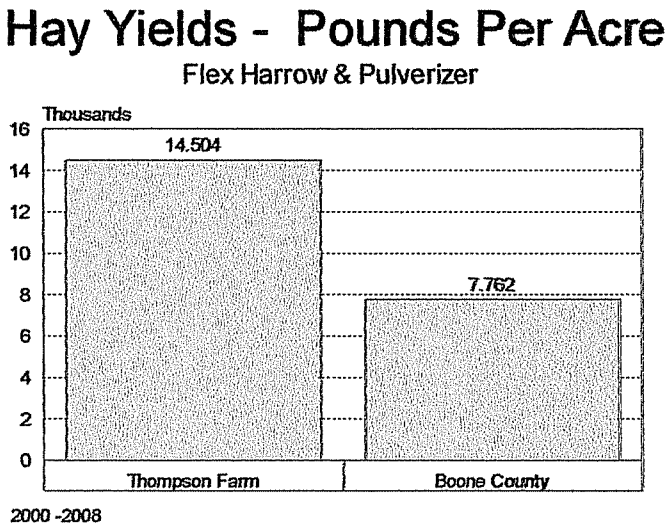


Figure 5-3A

Soybeans

Soybean crop yields have averaged about 10 bushels per acre higher than the county average since 1994. The average soybean yields before plowing for the Thompson farm was 9 bushels per acre over Boone County. After plowing the increase was 10 bushels. The 1994 Thompson soybeans in the 5 year rotation advantage was 19 bushels per acre. **(Figure 5-2 and Table 5-2).** The three reasons for this increase are: the rotation, ridge–till, and the use of manure. The rotation differs from those typical in this area in that soybeans are grown only once every five

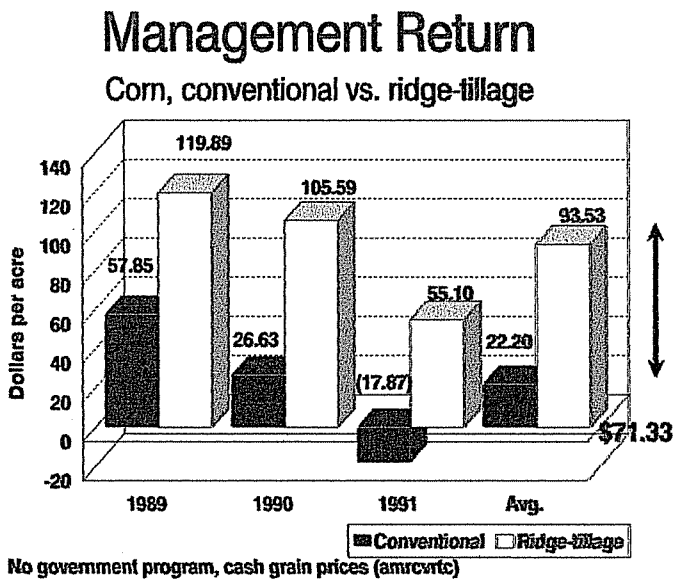


Figure 5-4

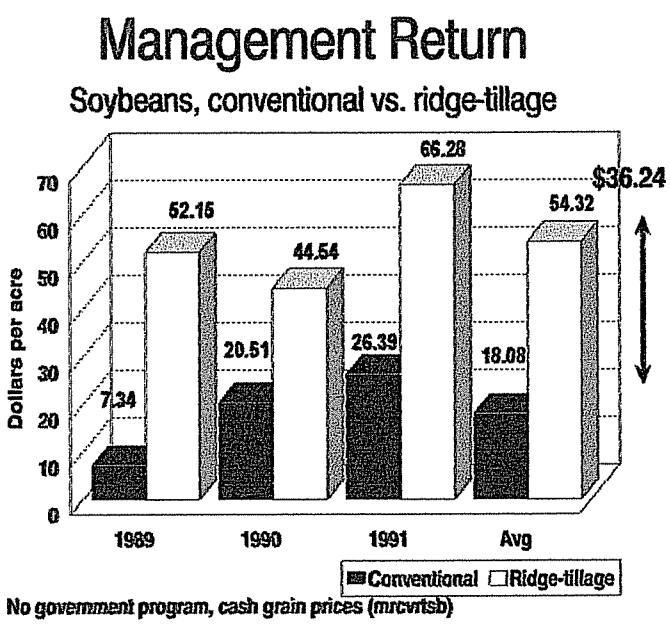


Figure 5-5

years rather than every other year. This greatly reduces the incidence of disease problems. Planting on ridges is also advantageous. Ridges are warmer and dryer in the wet springs. No pre-plant tillage reduces weed pressure and reduces the need for herbicides. Trials during 1991 on the Thompson farm have shown soybean yield reduction when herbicides are used **(Figure 4-6 & Table 4-2).**

Oats

In 1989, the oat seeding and potassium fertilizer rate was modified based on a number of *mistakes* made in 1988, when K_2O fertilizer was accidentally applied at a rate of 120 pounds per acre instead of the intended rate of 60 pounds per acre. The oat variety was changed to 'Don' which went through the drill much faster than anticipated. Oats were seeded at 4.25 bushels per acre, or 1.9 million seeds per acre. ISU recommends a drilling rate of 1.1 million seeds per acre. Three bushels of light oats will give the same seeds per acre as five bushels of heavy oats. Weight measure of oats does not give a good measurement for seeding rate per acre. The same drill setting is maintained regardless of oat test weight. Our seeding rate (by weight) varies from 3 to 5 bushels per acre.

The combination of mistakes in 1988 produced an oat yield of 143 bushels per acre which was over twice the Boone County average that year. Portions

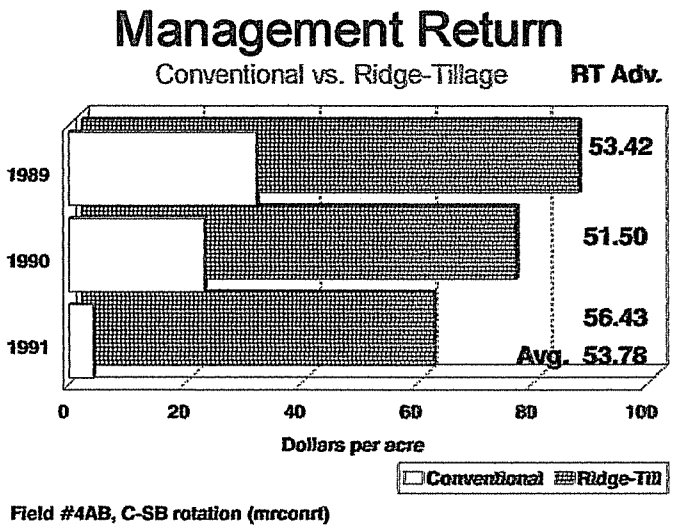


Figure 5-5a

of the field with better soil actually produced yields of 155 bushels per acre. Despite the high seeding rate, an excellent stand of alfalfa and clover, under the oats, was established.

Oat yields starting in 1984 have averaged 23 bushels per acre above the county average **(Figure 5-3 and Table 5-3).**

Additions of K_2O in 1990 and 1991 did not increase yield, so oats have not been fertilized since 1991.

Hay

The hay yields for the Thompson farm are shown in **Figure 5-3A & Table 5-4.** The yields have varied from 8,163 to 17,219 pounds per acre. Since the 2000 improvements, the Thompson advantage is 7,762 pounds per acre over the Boone County

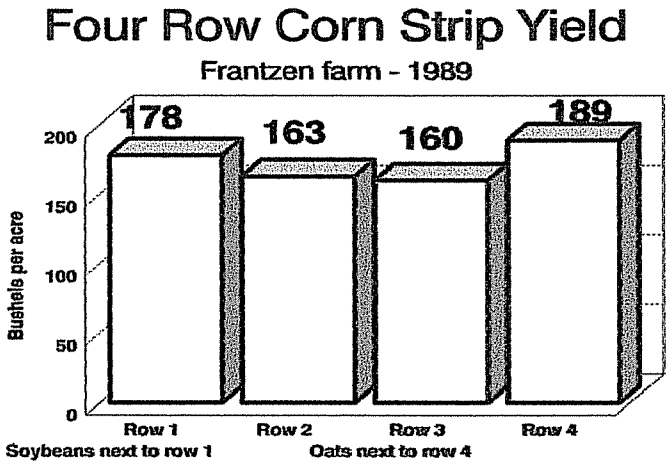


Figure 5-6

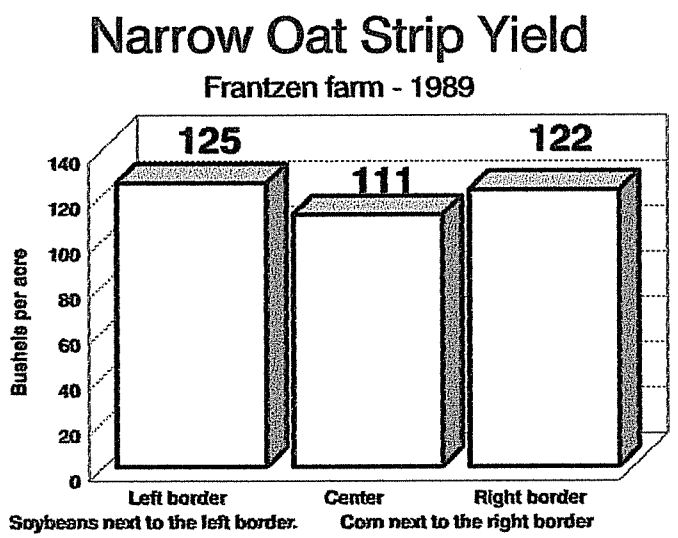


Figure 5-7

average **(Table 5-4).** The input costs for this crop is low and produces a high management return per acre **(Table 5-7).** Economic advantage comes to a balance farm from the use of residues for the livestock. The residue weights from oat straw and stubble, corn stalks, and soybean straw are shown on **Table 5-4a.**

Systems Yield Comparisons

The conventional cash grain, alternative cash grain (strips), and the five year rotation with manure are compared in **Table 5-5.** The manure oats have yielded 16 bushels per acre better than the alternative oats from 1989-1994. The manured soybeans have

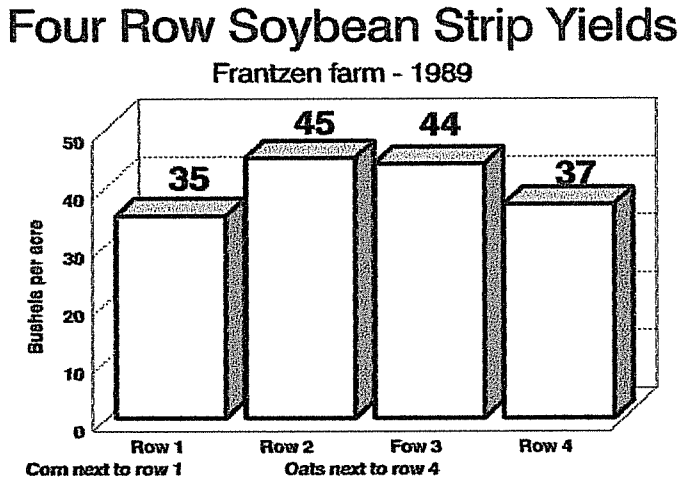


Figure 5-8

out yielded the other soybean rotation by 8 and 9 bushels per acre. The corn yields are essentially the same in all systems.

Rainfall Data

The rainfall data since 1988 is found in **Table 5-6.** The crop year rainfall starts September 1 the previous year and ends August 31.

Ridge and Conventional Tillage Comparison

An economic comparison was made between a standard Boone County farming system (using pre-plant tillage, broadcast inputs of fertilizer and herbicide) vs. our ridge–till program without herbicides and row-banded fertilizer rather than broadcast. This comparison was conducted over a three-year period between 1989 and 1991. No livestock manures have been applied in either system since 1983.

The average three year management return for the ridge–till corn program was $71.33 per acre more than the conventional system **(Figure 5-4).** The average three-year management return for ridge-till soybeans was $36.24 per acre more than conventional **(Figure 5-5).** The average corn and soybean ridge-till economic advantage is $53.78 per acre **(Figure 5-5a).**

The lower input regime for corn included ridge–till in place of conventional tillage, two rotary hoeings and row-banded fertilizer. The side dress nitrogen application was based on results from the late spring nitrate test. Nitrogen was applied at a rate that was 60 lb/A lower than that recommended for the conventional system. There was no drying cost for corn as it was harvested as ear corn.

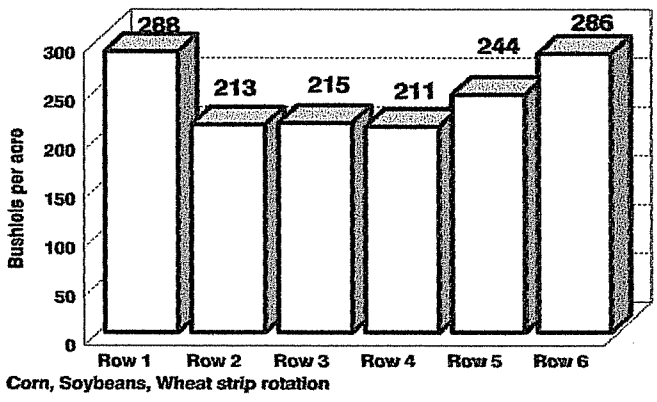


Figure 5-9

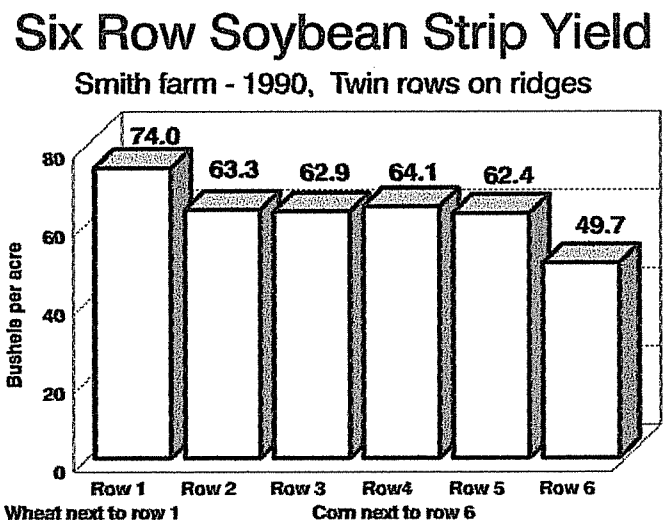


Figure 5-10

The lower input system for soybeans eliminated pre-plant tillage, used improved mechanical weed control, and relied on banded fertilizer applications.

Strip Cropping

In early May of 1990, a 3-inch rain caused considerable damage on a number of farms in Boone County, Iowa. Conventional, reduced tillage conservation practices were not able to control soil loss under these conditions. Land not considered to be highly erodible suffered severe soil loss. Water infiltration in spring tilled soybean fields was extremely poor and certain low areas were flooded for two months. To compound the situation, high winds blew sand on the hillsides, cutting off the corn.

This kind of erratic spring weather demonstrated the need to show workable alternatives to large tilled fields so common in this area.

Strip cropping alters the field landscape by dividing large monocropped areas into four to six row strips of corn, soybeans and cereal grains. The inclusion of fibrous rooted cereal grains in the rotation provides additional erosion protection. The major crops are rotated each year. The rotation includes legumes and fall cover crops for additional soil coverage.

While the soil conservation benefits of a ridge–till strip system are many, the economic benefits are also attractive. For example in 1989-1991, ridge–till, strip cropping of corn and soybeans produced a higher return than conventionally tilled strips of corn and beans. The combination of reduced tillage costs, no purchased herbicide, and row-banded fertilizer had a marked effect on profitability. Yields in ridge–till corn strips were higher than conventional–till corn, while ridge–till soybean yields were slightly lower than conventional–till soybean yields. Nevertheless, the alternative system was more profitable **(Figures 5-4 and 5-5).**

PFI cooperator Tom Frantzen and Iowa State University (ISU) agronomist Dr. Rick Cruse have been experimenting with a three crop, strip cropping system (corn, soybeans, and oats) on the Frantzen farm since 1989. Preliminary results show increased yield from strip cropping in border rows of oats and corn. Generally, corn border rows produce 10 to 30 bu/A more than interior rows because they receive more sunlight. Since 50 percent of the rows in a 4-row strip system are borders, overall yield increases.

Early research on the Frantzen farm shows increased corn yields when oats are adjacent to corn strips **(Figure 5-6)**. While the reasons for this are unclear, it is likely that corn serves as a windbreak and shades the oats, thereby reducing late season heat stress. In turn, maturing oats do not compete with the corn for sunlight. Yields from border row oats are 3 to 10 bushels per acre higher than yields in the center of the strips **(Figure 5-7).**

While corn and oats grown in strips have a marked increase in border row yields, Frantzen has observed a decrease of 3 to 8 bushels per acre in border row soybeans **(Figure 5-8).**

Doug Smith, a ridge–till farmer in Ontario, Canada, has also been working with strip cropping. He rotates corn, soybeans and wheat in six, 30-inch row strips. Smith has observed an upward trend in yield similar to those recorded at the Frantzen farm.

Hand picked yields in all six corn rows averaged 240 bushels per acre on the Smith farm. The inside four rows yielded 216 bushels per acre. The two border rows averaged 287, a 71 bushel per acre increase from the inner rows **(Figure 5-9)**. Corn populations in the border rows were 39,200 plants per acre in comparison to 36,000 plants for inside rows. Yield for the entire strip (mechanically harvested) was 220 bushels per acre.

Soybeans bordering corn strips decreased 14 bu/A, a trend similar to that observed on the Frantzen farm. However, soybeans planted in twin rows on the ridge increased 11 bushels per acre in rows bordering wheat. Locating soybean strips next to cereal grain appears to lessen the negative border effect. The four inner rows of soybeans averaged 63.2 bushels per acre. The average yield from the entire strip was 62.7 bushels per acre **(Figure 5-10)**.

1991 Experiments

The Thompson farm has devoted 10 acres to this cash grain system. No livestock manures have been applied since 1983.

1991 marked the first year of testing for the alternative strip cropping system on the Thompson farm. Since this was essentially year zero for the experiment, no treatment effect could be noted, nor were potential insect or disease problems evident. In 1992 the corn will follow a legume.

The three-year corn, soybeans, oats/legume rotation in narrow four-row strips (12 feet) was established on permanent ridges. Two rows of fall drilled cover crops were established on the ridge top following corn harvest. The fertilizer is row-banded by the planter. The conventional rotation was established in a traditional block field design.

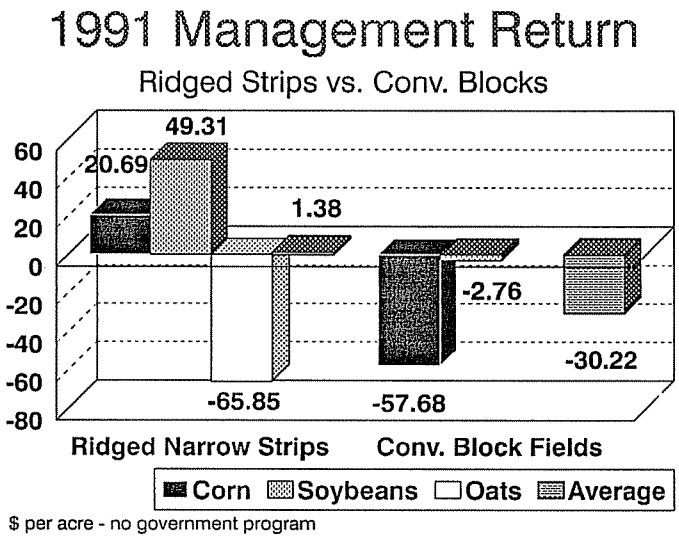


Figure 5-11

Fertilizer and herbicides are broadcast and pre-plant tillage is with a disk or field cultivator.

For both systems Asgrow 626 corn and Tri Valley Brat soybeans were planted on June 9. Soybean planting densities were similar for both systems although corn was planted at a slightly higher rate in the alternative strip system in order to fully utilize the border effect. The strips of soybeans were double pass pre-emerge rotary hoed on June 11 and once after emergence on June 14. The conventional system was not rotary hoed because it is not common practice in Boone County. Cultivation also differed between systems. The corn and soybeans in the strip crop system were cultivated three times, while the conventional system was cultivated only once.

In-row and inter-row broadleaf weeds were counted in each system, and velvetleaf was separated from other broadleaf weeds. Statistically, velvetleaf weed counts were similar in corn and soybeans across both rotations with the exception of "other" in-row broadleaf weeds. These were higher in the alternative system than in the conventional system.

Economically, the alternative system fared very well. Management return in alternative soybean strips were $52.07 per acre more than in the conventional system due to lower cost for tillage and weed control. Alternative strips of corn returned $78.37 per acre more due to a combination of reduced tillage cost and higher yield. This increased profit from the corn crop more than made up for a poor oats crop in the strip crop system. Despite oat strip losses, the alternative system returned $31.60 per acre more than the conventional system **(Figure 5-11)**.

1992

Figure 5-12 shows the management return for 1992. The ridged soybean return was better again in 1992. No pre-plant tillage, no herbicides and less weeds helped the ridged soybeans in the strip crop system make more money than soybeans in the conventional system. The weed control in the conventional herbicide treated soybeans did not work well. It took considerable time and effort by the ISU people to hand pull the broadleaf weeds.

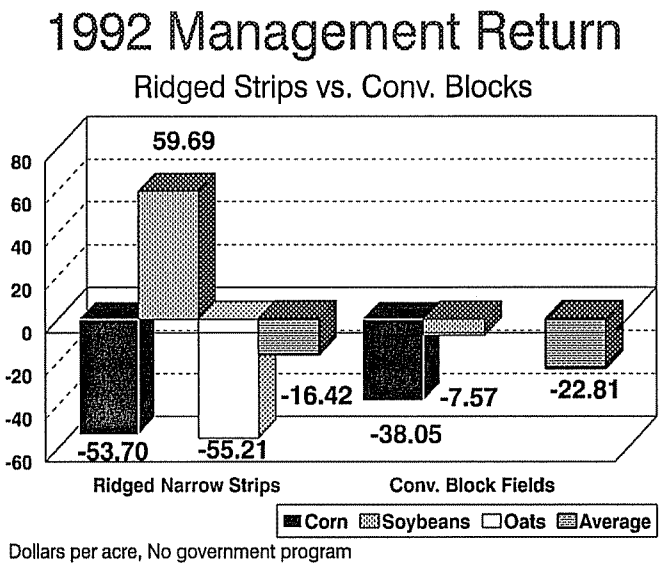


Figure 5-12

The ridged corn strips returned less than the conventional block fields in 1992. The live clover that was established in the oat strips the previous year used up all the soil moisture in the corn strips during the dry May and June, though the heavy rains in July saved the corn crop in the strips. The oats lost money again.

The experiment will be monitored for a number of years by a team of ISU scientists led by Dr. Rick Cruse. They will be studying the border effect on crop yields.

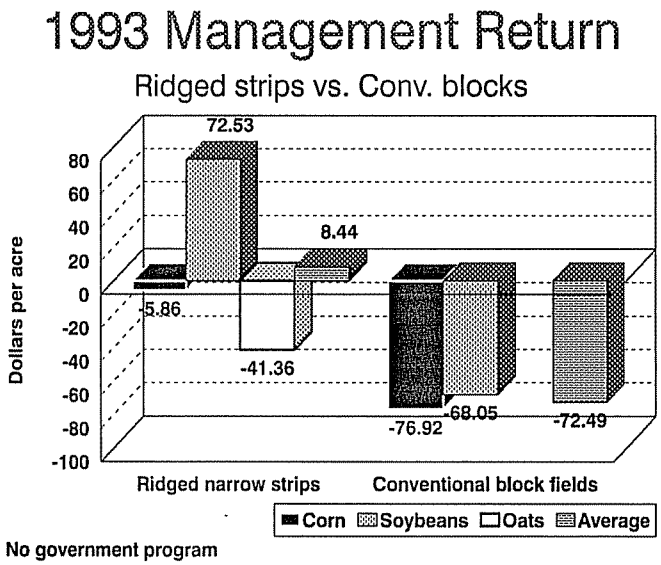


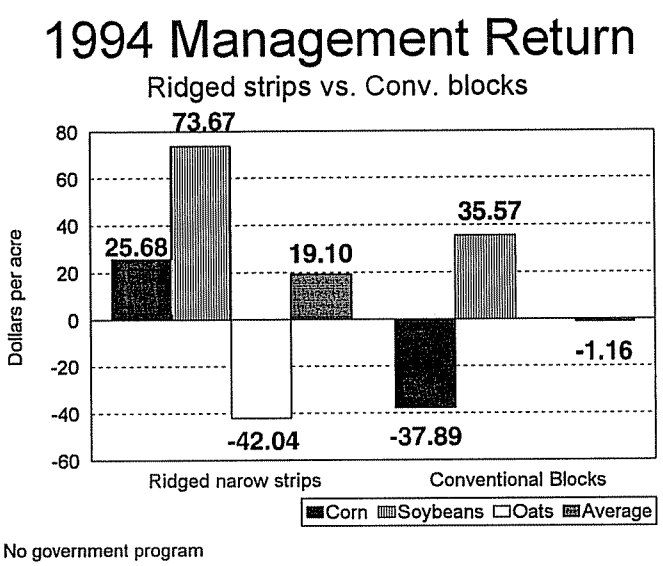
Figure 5-13

1993

Mammoth clover was the legume drilled with the oats in the spring. Mammoth clover is supposed to winter kill in this area but it was a living cover in each of the three springs of 1991, 1992 and 1993. The legumes planted in 1993 spring oats were Santiago medic and Berseem clover. These should winter kill and form a dead mulch for 1994 planting of corn. The Berseem had 100% winter kill and the Medic was 75%. Hairy vetch was drilled in one strip after oat harvest and will be a living mulch the following spring. Crimson clover, suggested by Marianne Sarrantonio, Rodale Research Center, was used in the seeding year 1994. Crimson growth should be somewhere between the shortness of Medic and the tallness of Berseem.

The oats in the strips along with the conventional block corn and soybeans lost money in 1993 **(Figure 5-13).** Conventional tillage with herbicides producing 98 bushel per acre corn and 32 bushels soybeans is not a wining combination. In a stress year, a low cost-low risk system will help keep the farmer in business.

The differences between the two systems is dramatic for the soybean crop in 1993. The alternative ridged strips of soybeans outyielded the conventional soybeans by 13 bushels per acre. Along with lower costs of tillage and weed control, the ridged strips increased the management return by about $140.58 per acre **(Figure 5-14).** This was the first year to place the planter row fertilizer two inches below the seed, the prior two years the fertilizer was placed 3 inches to the side at seed level.



No government program

Figure 5-15

1994

The corn yields of 172 and 173 bushels per acre were the same for ridged narrow strips and the conventional blocks. The soybean yields were very close at 57 and 61 bushels per acre. The oat yield was poor in the narrow strips at 71 bushels per acre.

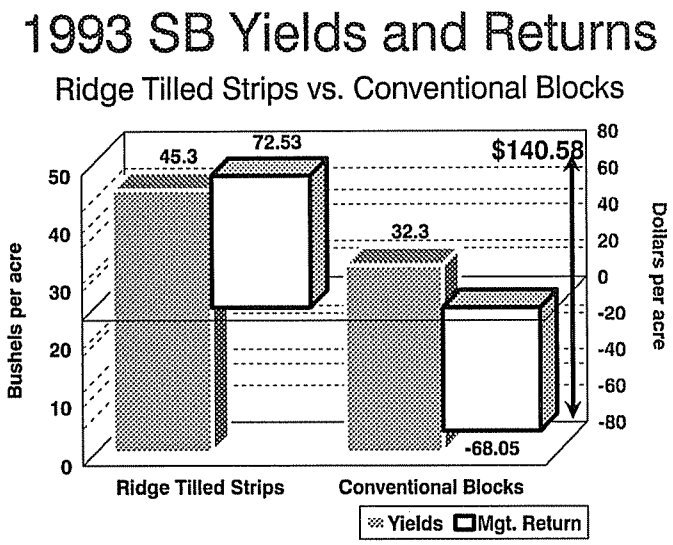


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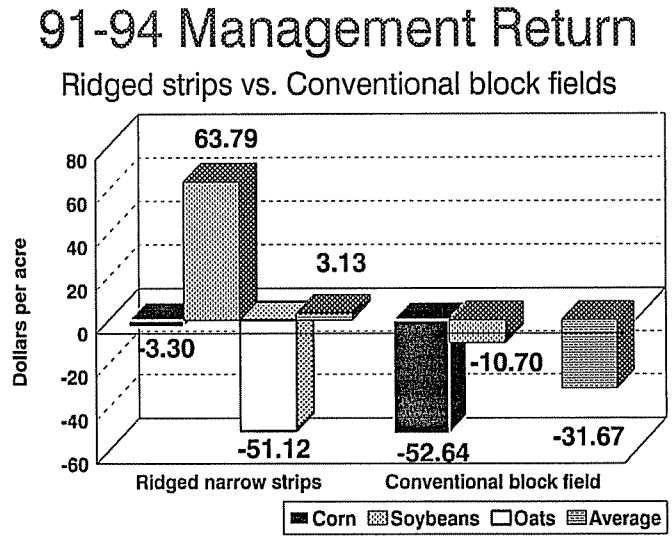
Figure 5-14



No government program

Figure 5-16

The management return per acre was $19.10 per acre for the narrow strips and a negative $1.16 for the conventional blocks **(Figure 5-15).**

Four Year Average

The average management return between the two systems is shown in **Figure 5-16.** In spite of the continuous loses each year for the oat crop, the ridged narrow strip system produced a management return of $3.13 per acre. The conventional blocks had a negative return of $31.67. The Boone County 91-94 corn and soybean rotation had a loss of $53.22 per acre for the same time period **(Table 5-7).**

1995

The ridged narrow strips and the conventional blocks comparison were discontinued in 1995. These two systems did not come close to the $71.18 per acre income for the 91-94 C-SB-C-O-H rotation **(Table 5-7).**

2009 Update

Our first field day with Rodale Institute was in 1984. Field 2 had too many experiments, like rye and oats aerial seeded with an airplane over the soybean ridges. Ridging the corn following the oats did not change the corn yield, adding 50# side dress nitrogen increased the yield 10 bushels. The starter fertilizer or biological product did not increase yields. **The no rye strip increased the yield 17 bushels.** The strip with rye and compost on top of ridges yielded 45 bushels, 69 bushels less than the county average of 121 **(Figure 5/17).** Lessons learned; need more replicatations, don't use rye aa a cover before corn, and all kinds of fertility should be placed down in the soil.

Figure 5-17 tells lots of stories. The manure bunker saves nutrients, allows spreading at one time in the fall, less odor, with dryer weather and more time to do the spreading. Spreading in the spring was not a happy experience, the mud and getting stuck, and the neighors are planting corn. 1994 was the first time to plow manures under in the fall and the corn yields responded. The black bars (Boone County corn average) also show yield increases from improved genetics. The negative 69 bushels in 1984 to a postive 62 in 2008,compared to the county average is very encouraging.

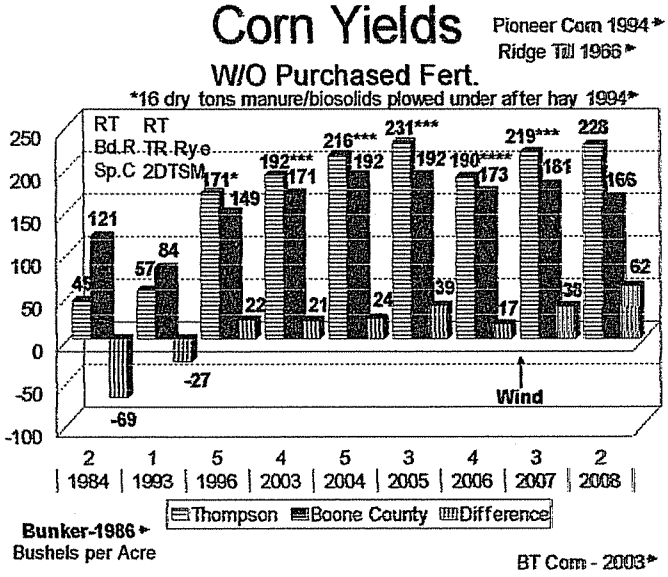


Figure 5-17

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CORNYDS2.XLS

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**Corn Yields, Bu./A. * - Following Moldboard Plow, < - Disk, > - Chisel, ^ - No manure spread,**													
2	**Thompson Farm versus Boone County Average**													
3				Strips										Boone
4			C-SB	C-SB-O	--------C-O-M-M-M-M-M-----			----------C-SB-C-O-H----------						County
5	Year	Variety	Corn	Corn	------Meadow to Corn-----			Corn following Hay			Corn following Soybeans			Average
6			Blocks		Field #	Yields	Thompson	Field #	Yields	Thompson	Field #	Yields	Thompson	
7							Difference			Difference			Difference	
8	1984				9	111.63	-9.17	5	104.11	-16.69	2	78.50	-42.30	120.80
9	1985				7	134.46	9.26	3	141.43	16.23	4CD	143.21	18.01	125.20
10	1986							1	132.18	-12.72	5	118.29	-26.61	144.90
11	1987				8	156.08	12.58	2	128.49	-15.01	3	116.15	-27.35	143.50
12	Drought 1988	P-3295			6	96.52	9.42	4CD	111.39	24.29	1	116.63	29.53	87.10
13	1989	P-3295	130.60	144.30				5	113.30	-17.20	2	145.40	14.90	130.50
14	1990	DeK-636	124.79	135.49	9	137.47	18.67	3	135.19	16.39	4CD	131.09	12.29	118.80
15	1991	AsG-746	120.07	141.02	7	131.99	8.59	1	113.14	-10.26	5	123.17	-0.23	123.40
16	1992	AsG-746	177.80	137.70				2	193.00	29.20	3	189.90	26.10	163.80
17	Flood 1993	AsG-746	97.80	107.60	8 *fall	107.30	23.30	4CD *	89.80	5.80	1	71.63	-12.37	84.00
18	1994	AsG-746	173.17	171.98	^6 *fall	172.35	7.05	5 *	155.17	-10.13	2	170.85	5.55	165.30
19	1995	P-3489						3 *	179.35	29.45	4CD*	159.87	9.97	149.90
20	1996	P-3489			^9*sp	178.51	29.61	1*	169.52	20.62	5*	170.73	21.83	148.90
21	1997	P-3489						4**	161.25	12.15	3*	148.28	-0.82	149.10
22	1998	P-3335			^7*sp	147.33	0.73	2*	180.57	33.97	1*	164.10	17.50	146.60
23	1999	P-3335						5**	140.02	-15.58	4**	138.73	-16.87	155.60
24	2000	P-3335			^8<fall	158.86	3.26	3**	152.77	-2.83	2*	135.11	-20.49	155.60
25	2001	P-33P66						4***	146.88	-7.12	5**	138.33	-15.67	154.00
26	2002	P-34M94			^6>fall	180.81	7.31	1**	176.46	2.96	3**	176.56	3.06	173.50
27	2003	P-33P67						2**	192.83	22.03	4***	191.90	21.10	170.80
28	2004	P-33P67			^9>fall	202.96	10.76	5***	215.56	23.36	1**	209.39	17.19	192.20
29	2005	Pioneer						3***	231.40	39.00	2**	202.72	10.32	192.40
30	2006	Pioneer						4****	189.52	16.82	5***	185.89	13.19	172.70
31	2007	P-33D13						1***	204.67	23.87	3	218.72	37.92	180.80
32	2008	P-33D13						2***	228.28	62.28	4*****	198.00	32.00	166.00
33	2009													
34	2010													
35	2011													
36	Average		137.37	139.68		147.41	-1.21		159.45	10.84		153.73	5.11	148.62
37	Before mdbd.					128.03	-0.64		130.25	1.58		129.15	0.48	128.67
38	After mdbd.					164.02	4.18		175.88	16.04		167.55	7.71	159.84
39														

Table 5-1

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	A	B	C	D	E	F	G	H	I	J
1	Soybean Yields, Bushels Per Acre (* - Following Moldboard Plow)									
2	Thompson Farm versus Boone County Average									
3		Soybean	**********Thompson Farm**********						Boone County	Thompson
4		Varieties	C-SB-O-M-M	C-SB Blocks	C-SB-O/gm	C-SB-C-O-H			Average	C-SB-C-O-H
5	Year				Strips	Field #	Plant date	Yields	Yields	Difference
6	1984					4CD	5/16/1984	34.29	35.00	-0.71
7	1985	Asg-2943				5	5/10/1985	48.22	39.90	8.32
8	1986	M-Cheyenne II				3	6/8/1986	44.17	42.30	1.87
9	1987	M-Cheyenne II				1	5/13/1987	52.21	46.30	5.91
10	1988	M-Saulk II				2	5/16/1988	41.45	24.00	17.45
11	1989	M-Saulk II	48.30	40.30	41.80	4CD	5/22/1989	54.34	41.50	12.84
12	1990	M-MoHawk		43.15	42.67	5	6/1/1990	48.55	39.80	8.75
13	1991	M-Ute	55.76	49.61	47.54	3	6/8/1991	52.96	41.70	11.26
14	1992	Stine-2250	64.40	52.20	48.20	1	5/15/1992	60.55	46.10	14.45
15	1993	Stine-2250		32.30	45.30	2	5/26&6/6	45.33	32.60	12.73
16	1994	Stine-2250		61.20	57.45	4CD *	5/19/1994	71.30	52.00	19.30
17	1995	Stine-2250				5 *	5/19&5/31	59.00	49.00	10.00
18	1996	Stine-2671				3*	5/21/1996	54.98	46.30	8.68
19	1997	Stine-2250				1*	5/19/1997	58.77	44.60	14.17
20	1998	Stine-2250				4CD**	5/28&6/1	56.06	47.00	9.06
21	1999	Stine-2488				2*	5/27/1999	53.85	42.90	10.95
22	2000	Stine-2499				5**	4/29/2000	59.83	39.70	20.13
23	2001	Stine-2499				3**	5/17/2001	57.12	40.10	17.02
24	2002	P-92B63				4CD***	5/8/2002	57.38	47.70	9.68
25	2003	P9305				1**	5/21/2003	34.75	34.30	0.45
26	2004	P92M72				2**	5/8/2004	63.55	52.00	11.55
27	2005	P92M72				5***	5/23/2005	71.20	56.30	14.90
28	2006	P92M72				3***	5/12/2006	60.32	50.00	10.32
29	2007	P92M72				4CD****	5/17/2007	61.25	53.70	7.55
30	2008	P92M72				1	5/21/2008	36.70	43.50	-6.80
31	2009									
32	Avg.		56.15	46.46	47.16			53.53	43.53	9.99
33	Before mdbd.							48.21	38.92	9.29
34	After mdbd.							57.07	46.61	10.46

Table 5-2

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Practical Farmers of Iowa

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	A	B	C	D	E	F	G	H	I	J
1	**Oats Yields, Bushels Per Acre. **Pulverizer behind drill**							***Oats drilled into loose plowing**		
2	**Thompson Farm versus Boone County Average**									
3			**********Thompson Farm**********						Boone County	C-SB-C-O-H
4			C-SB-O/gm	C-O-M-M-M-M-M		C-SB-C-O-H			Average	Thompson
5	Year	Variety	Strips	Field #	Yields	Field #	Plant date	Yields	Yields	Difference
6	1984	Ogle				1		66.69	79.00	-12.31
7	1985	Ogle				2	3/22/1985	126.89	83.00	43.89
8	1986	Ogle				4CD	3/28/1986	82.21	65.00	17.21
9	1987	Ogle				5	4/7/1987	75.03	64.00	11.03
10	1988	Don				3	3/26/1988	142.50	66.90	75.60
11	1989	Don	100.27	8	121.93	1	4/1/1989	135.78	83.00	52.78
12	1990	Don	87.56	6	102.43	2	3/27/1990	92.64	62.80	29.84
13	1991	Don	68.77			4CD	4/2/91F	64.80	53.70	11.10
14	1992	Don	75.20	9	69.67	5	4/11/1992	79.64	68.60	11.04
15	1993	Don	37.44	7	44.79	3	4/26/1993	57.41	43.80	13.61
16	1994	Don	71.08	8	104.60	1	3/25/1994	105.57	75.00	30.57
17	1995	Don	81.36	6	67.08	2*	4/1/95F	84.61	78.90	5.71
18	1996	Don				4CD	4/3/96F	86.11	66.30	19.81
19	1997	Don		9	105.20	5	4/18/1997	91.03	75.40	15.63
20	1998	Don				3	4/18/1998	67.85	44.30	23.55
21	1999	Don		7	81.52	1	3/21/1999	80.65	85.70	-5.05
22	2000	Don				4	3/14/2000	97.01	73.60	23.41
23	2001	Don				2	4/18/2001	94.10	78.00	16.10
24	2002	Don				5**	3/29/2002	115.54	91.80	23.74
25	2003	Don		6**	131.78	3**	4/3/2003	144.47	98.50	45.97
26	2004	Don				4**	4/5/2004	108.20	74.80	33.40
27	2005	Don				1**	3/29/2005	124.55	86.70	37.85
28	2006	Don				2**	4/5/2006	129.18	96.30	32.88
29	2007	Don				5**	4/20/2007	73.01	77.80	-4.79
30	2008	Don				3**	4/16/2008	74.76	63.60	11.16
31										

Table 5-3

	A	B	C	D	E	F	G	H	I	J
1	**Oats Yields, Bushels Per Acre. **Pulverizer behind drill**							***Oats drilled into loose plowing**		
2	**Thompson Farm versus Boone County Average**									
3			**********Thompson Farm**********						Boone County	C-SB-C-O-H
4			C-SB-O/gm	C-O-M-M-M-M-M		C-SB-C-O-H			Average	Thompson
5	Year	Variety	Strips	Field #	Yields	Field #	Plant date	Yields	Yields	Difference
32										
33										
34										
35	Avg.		74.53		92.11			96.01	73.46	22.55
36	Pulverizer avg.							109.96	84.21	25.74

Table 5-3

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HAYYDS.XLS

	A	B	C	D	E	F
1	**Mixed Legume & Grass Hay Yields, Pounds Per Acre**					
2	**Thompson Farm versus Boone County Average**					
3				Boone	Thompson	
4	Year	Field #	Yields	County	Difference	Comments
5	1989	3	11,360	5,300	6,060	
6	1990	1	10,364	6,540	3,824	
7	1991	2	9,099	5,660	3,439	
8	1992	4CD	10,920	6,680	4,240	
9	1993	5	8,163	3,580	4,583	
10	1994	3	9,666	6,240	3,426	
11	1995	1	8,915	7,560	1,355	
12	1996	2	9,679	6,080	3,599	
13	1997	2	8,272	5,080	3,192	
14	1998	5	13,227	6,500	6,727	
15	1999	3	9,947	6,540	3,407	
16	2000	1	13,089	6,200	6,889	Flex Harrow before drilling oats
17	2001	1	14,188	6,260	7,928	Flex Harrow before drilling oats
18	2002	2	14,502	6,000	8,502	Flex Harrow before drilling oats
19	2003	5	12,493	7,420	5,073	Flex Harrow, Drill, Pulverizer
20	2004	3	15,126	7,860	7,266	Flex Harrow, Drill, Pulverizer
21	2005	4	16,693	7,400	9,293	Flex Harrow, Drill, Pulverizer
22	2006	1	17,219	6,040	11,179	Flex Harrow, Drill, Pulverizer
23	2007	2	11,764	5,800	5,964	Flex Harrow, Drill, Pulverizer
24	2008	5	15,458			Flex Harrow, Drill, Pulverizer
25	2009					Flex Harrow, Drill, Pulverizer
26	Average		12,007	6,249	5,576	
27	Avg. before		9,965	5,978	3,987	
28	Avg. Flex		14,504	6,623	7,762	
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Table 5-4

resyds

	A	B	C	D	E
1	Residue Yields				
2	Pounds per acre				
3				* Stacker & BT	
4	Year	Oat Straw	Oat Stubble	Corn Stalks	Soybean Stubble
5	1988	2,143	1,950		
6	1989	3,366	2,000	2,250	
7	1990	2,800	2,000	2,250	
8	1991	1,591	3,050	2,125	
9	1992	3,015	1,645	3,474	
10	1993	2,522	1,505	3,008	678
11	1994	2,857	2,239	3,534	1,768
12	1995	2,247	2,313	3,179	1,408
13	1996	2,939	4,290	3,469	1,319
14	1997	2,900	1,902	3,205	1,060
15	1998	3,433	3,958	2,736	770
16	1999	1,731	4,377	3,351	728
17	2000	3,496	4,009	4,223	1,501
18	2001	3,536	2,603	3,803	940
19	2002	5,163	5,095	*5294	1,833
20	2003	3,088	2,049	*7544	1,145
21	2004	3,394	3,926	*6701	1,291
22	2005	3,467	5,261	*4654	1,102
23	2006	2,962	2,559	*4612	898
24	2007	2,007	5,016	*5653	893
25	2008	2,518	3,110	*3842	1,214
26					
27					
28					
29					
30					
31					
32					
33					
34					
35	Average	2,913	3,088	3,124	1,159
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Table 5-4a

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	A	B	C	D	E	F	G	H	I
1	Thompson Farm Systems								
2	Yields, Bushels Per Acre								
3	Year	Conventional Cash Grain		*****'Alternative Cash Grain			*******'C-SB-C-O-H/Manure***		
4		Corn	Soybeans	Corn	Soybeans	Oats	Corn	Soybeans	Oats
5									
6	1989	130.60	40.30	144.30	41.80	100.27	129.35	52.70	135.78
7	1990	124.79	43.15	135.49	42.67	87.55	133.14	48.55	92.64
8	1991	120.07	49.61	141.02	47.54	68.77	118.16	52.96	64.8
9	1992	177.80	52.20	137.70	48.20	75.20	191.45	61.68	79.64
10	1993	97.80	32.30	107.60	45.30	37.44	80.70	45.50	57.41
11	1994	173.17	61.20	171.98	57.45	71.08	163.01	71.30	105.57
12									
13									
14	Avg.	137.37	46.46	139.68	47.16	73.39	135.97	55.45	89.31
15									
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Table 5-5

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**Rainfall from previous September 1 through August 31 of current year.**													
2														
3	Month	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
4														
5	Sept.	0.63	4.12	3.23	1.65	2.94	3.16	3.64	2.99	2.72	3.46	3.01	0.72	2.23
6	Oct.	0.90	0.24	2.82	1.79	2.83	2.02	1.46	3.24	0.42	1.78	4.01	3.87	0.28
7	Nov.	0.29	1.85	0.04	1.30	2.84	2.00	0.47			3.55	0.86	0.70	0.90
8	March			5.18					0.58		0.85	2.22		0.50
9	April	1.67	2.19	1.82	7.55	2.68	0.30	0.99	2.46	0.82	3.12	2.56	7.15	
10	May	2.67	4.57	8.37	5.20	1.02	5.80	2.01	3.71	5.28	2.67	4.45	5.34	3.53
11	June	2.38	3.62	9.08	3.73	0.53	7.30	5.94	4.32	6.22	3.41	10.42	7.02	4.59
12	July	3.59	2.30	4.80	0.98	9.15	18.49	3.01	3.77	4.70	3.23	2.18	5.19	2.50
13	August	4.93	1.61	2.68	3.45	2.32	11.43	4.65	4.13	3.85	1.52	5.74	5.31	4.86
14														
15	Total	17.06	20.50	38.02	25.65	24.31	50.50	22.17	25.20	24.01	23.59	35.45	35.30	19.39
16														
17														
18	Month	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
19														
20	Sept.	1.05	5.58	1.06	3.19	1.25	3.88	8.24	1.58					
21	Oct.	1.42	3.21	3.21	0.64	1.07	0.00	2.20	5.25					
22	Nov.	1.86	1.76		3.45	1.50	1.66	1.05						
23	March		0.25		2.56		2.08	3.80	1.93					
24	April	4.26	3.53	3.28	1.80	2.82	4.78	6.18	5.88					
25	May	7.21	4.30	4.22	6.49	3.32	1.14	5.61	9.03					
26	June	2.45	2.48	5.06	3.39	4.27	1.36	2.35	8.78					
27	July	3.03	3.39	6.27	2.54	4.37	4.55	3.90	7.74					
28	August	2.86	8.19	1.08	4.36	4.00	6.91	9.65	1.95					
29														
30	Total	24.14	32.69	24.18	28.42	22.60	26.36	42.98	42.14					
31														
32														
33														
34														

Table 5-6

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MR94.XLS

	A	B	C	D	E	F	G	H	I
1	**Management Return, Dollars Per Acre**								
2	Crop	1989	1990	1991	1992	1993	1994	1995	Average
3									
4	Corn	-0.32	-28.66	-2.91	84.41	66.15	90.33	295.51	72.07
5	Soybeans	87.58	49.65	56.32	93.45	89.74	195.31	148.85	102.99
6	Corn	86.25	20.11	70.13	90.83	-64.52	141.30	258.86	86.14
7	Oats	47.41	1.70	-1.67	2.22	-7.10	54.22	68.75	23.65
8	Hay	176.35	109.24	69.41	162.30	143.02	90.67	75.77	118.11
9	Corn avg.	42.97	-4.28	33.61	87.62	0.82	115.82	277.19	79.11
10	C-SB-C avg.	57.84	13.70	41.18	89.56	30.46	142.31	234.41	87.07
11	O-H avg.	111.88	55.47	33.87	82.26	67.96	72.45	72.26	70.88
12	C-SB-C-O-H avg.	79.45	30.41	38.26	86.64	45.46	114.37	169.55	80.59
13									
14	Corn		42.30	57.42		114.07	155.49		92.32
15	Soybeans	55.62		76.99	119.57				84.06
16	Oats	95.62	16.43		21.66	-22.40	101.20	62.91	45.90
17	Meadow	67.44	72.64	109.57	79.54	-0.03	1.99	-58.90	38.89
18	Meadow	67.44	72.64	109.57	79.54	-0.03	1.99	-58.90	38.89
19	Meadow							-58.90	-58.90
20	Meadow Rotation	71.53	51.00	88.39	75.08	22.90	65.17	-28.45	49.37
21									
22	Corn strips			20.69	-53.70	-5.86	25.68		-3.30
23	Soybean strips			49.31	59.65	72.53	73.67		63.79
24	Oats strips			-65.85	-55.21	-41.36	-42.04		-51.12
25	C-SB-O strips			1.38	-16.42	8.44	19.10		3.13
26									
27	Thompson Corn conv.	2.93	-65.81	-57.68	-38.05	-76.92	-37.89		-45.57
28	Thompson Soybeans conv.	-22.97	-8.43	-2.76	-7.57	-68.05	35.57		-12.37
29	C-SB avg.	-10.02	-37.12	-30.22	-22.81	-72.49	-1.16		-28.97
30	Boone County Corn	2.71	-78.09	-50.19	-64.65	-113.49	-51.59	89.47	-37.98
31	Boone County SB	-16.37	-27.53	-40.25	-28.50	-66.08	-10.97	16.23	-24.78
32	Boone County C/SB	-6.83	-52.81	-45.22	-46.58	-89.79	-31.28	52.85	-31.38
33	C-SB-C-O-H adv. over C/SB	89.47	67.53	68.48	109.45	117.94	115.53		94.73
34	C-SB-C-O-H adv. over BC C/SB	86.28	83.22	83.48	133.22	135.24	145.65	116.70	111.97
35	Prices								
36	Corn $/bu.	2.20	2.05	2.25	1.90	2.65	2.00	2.95	2.18
37	Soybeans $/bu.	5.50	5.70	5.45	5.35	6.55	5.35	6.40	5.65
38	Oats $/bu.	1.40	1.10	1.20	1.25	1.40	1.25	1.75	1.27
39	Hay $/ton	70.00	60.00	60.00	70.00	90.00	75.00	80.00	70.83
40	Straw $/ton	50.00	45.00	45.00	40.00	50.00	60.00	70.00	48.33
41	Stalks $/ton			50.00	50.00	50.00	50.00	50.00	50.00
42	No government program								

Table 5-7