

# ***INTEGRATED CROPPING SYSTEM DEMONSTRATION PLOTS***



***INNOVATIVE FARMERS  
of  
HURON COUNTY***

***Funded by USDA Saginaw Bay Water Quality Project,  
North Central Region Sustainable Agriculture Grant,  
Memberships & Sponsorships***

During the past five years, Huron County farmers have been participating in the USDA Saginaw Bay Water Quality Demonstration Project for the purpose of reducing the potential for nutrient, sediment and pesticide loading of surface water. The farmers have been cooperating with MSU Extension, Soil Conservation Service and the Soil Conservation District to evaluate production techniques that could be used to reduce starter phosphate usage in high testing soils and the effectiveness of pest scouting, soil nitrate testing and row width. In addition, MSU specialists grid sampled fields testing high in phosphorus to determine if the nutrient is being leached through the soil. While looking at the effectiveness of these production practices, the cooperators and MSU Extension also evaluated the economic feasibility of each practice.

As a result of the USDA Water Quality Demonstration Project, the Huron County Innovative Farmers Group was formed. The group is looking at an integrated cropping system designed to evaluate the environmental, agronomic and economic impact of agricultural practices. The "Integrated Cropping System Demonstration" is designed to address several questions concerning the potential for producing high value crops, such as sugar beets and dry beans, under a high residue system while reducing the potential of nutrient, sediment and pesticide loading of surface water.

The project objectives are:

1. Develop high residue sustainable agriculture cropping system for the production of dry beans, sugar beets and corn using reduced tillage, cover crops and a total integrated cropping system to reduce soil erosion and increase family farm income.
2. Help policy makers, agency representatives and agribusinesses become part of the solution and limit barriers to the adoption of new technology.
3. Develop techniques for farmers to learn farmer-to-farmer and for them to be actively involved in the process to find solutions to societal problems.
4. Increase the efficiency with which commercial fertilizers and pesticides are used in the production of high value field crops, such as sugar beets and dry beans.
5. Demonstrate that zone tillage is agronomically and economically feasible for the row crop rotation used in eastern Michigan.

Two 40-acre parcels have been rented for the purpose of conducting the demonstrations. Site 1 (Shaw site) is located on Wadsworth Road, 1/2 mile east of M-53. The second site (Voelker site) is located south of Pigeon on the corner of Geiger and Caseville Roads.

Four basic tillage systems are being compared. They are fall plow, fall chisel, trans-till and zone-till. The trans-till system consists of a tool bar implement with two 8-wave coulters and a large shank per row being pulled through the soil making 8- to 10-inch tilled strips prior to planting to open up the soil. A conventional planter can then be used to plant the crop into the tilled strips. The zone-till system consists of 3-wave coulters per row mounted on the planter. Tillage and planting are done in one operation. Cover crops will also be incorporated into the cropping system.

The rotations are as follows:

Site 1: sugar beets - corn - dry beans

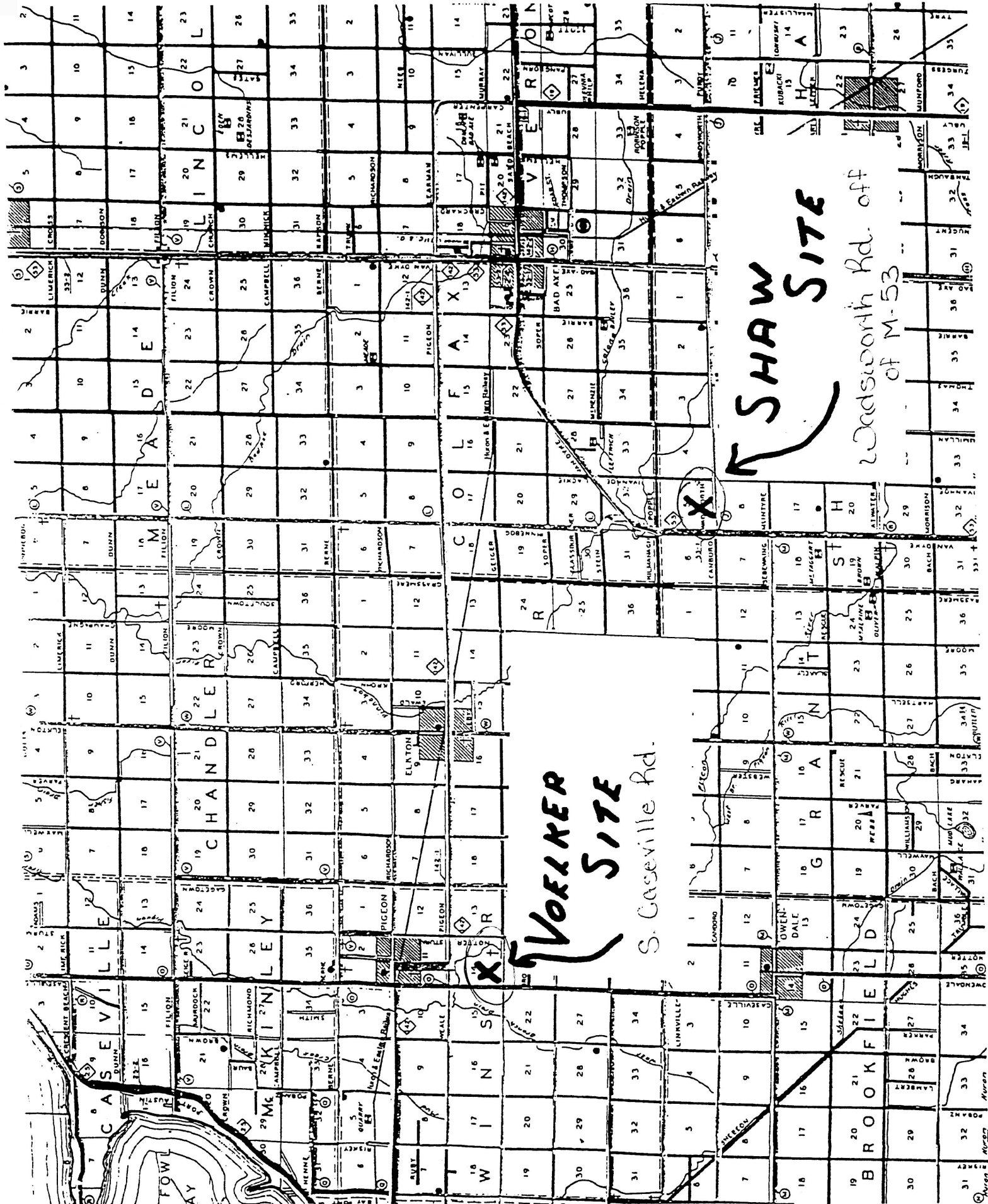
Site 2: sugar beets - corn - dry beans - wheat

At this time, the group is planning to conduct the demonstration for at least five years. In addition to yield and economic evaluations of the plot work, soil quality measurements (carbon/nitrogen ratio, organic matter and biomass) will be made to determine the amount of change over time in the different tillage systems.

Attached is the Innovative Farmers brochure listing sponsors and provides membership information.

For additional information on the Innovative Farmers Group or the Integrated Cropping System Demonstration, contact MSU Extension-Project Office (517)269-6099 or Huron Soil Conservation District (517)269-9540.

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**VOLLER SITE**

**SHAW SITE**

Woodsboro Rd. off  
of M-53

S. Caseville Rd.

## CHANGES MADE FOR THIS PRODUCTION YEAR

The goal of the Innovative Farmer project is to develop alternative production systems that reduce erosion while maintaining or increasing the farm's profitability. Farmers have expressed concern about compaction, poor water infiltration, high investment costs, lack of soil microbial activity and the desire for more leisure time.

A production system that reduces trips over the field, reduces equipment inventory, increases the organic matter and allows for the accumulation of crop residue in the surface layer should address the concerns listed above. Therefore, the systems need to be studied and adjusted during the five year project.

Below, is an outline of the changes made between the first and second year. These changes were made by the working groups that are planning each of the production systems.

As you tour the plots, look for these changes. Try to answer these question: Are they improving the systems? What other changes are needed?

### **Tractor and Planter:**

- Dositron Herbicide Injector system
- Front banding system to incorporate sugar beet and dry bean herbicides
- Two outside Rawson coulters changed to 13 wave for more tillage in strips
- Additional coulters on Yetter system to provide true strip tillage
- Switched to piston fertilizer pump
- Designed system to be able to put fertilizer on either or both sides of row at planting
- Yetter press wheels have less pressure on springs to reduce soil accumulation on wheels
- Seed firming paddles installed on Rawson rows

### **Shaw Site:**

#### **Corn:**

- Used higher planting rate for all systems
- Used longer season variety
- Applied nitrogen with PPI herbicides on plow and chisel strips
- Applied nitrogen with Trans-Till while making strips
- Applied higher rate of Nitrogen when planting zone till
- Applied 7,500 gals liquid dairy manure to field mid-November, 1994

#### **Dry Beans:**

- No major changes from last year

#### **Sugar Beets:**

- 7,500 gals. liquid dairy manure applied to field late August 1994
- Field subsoiled following manure application

## **Voelker Site:**

### **Corn:**

- Strip till system (zone and trans-till) were planted into burned down rye cover instead of wheat residue as in 1994
- Zone till strips had all nitrogen applied at planting
- Zone till strips were not cultivated
- Entire corn field was treated with dual and Bladex PRE-Emerge

### **Dry Beans:**

- Dry beans planted into corn residue (1995) vs. wheat residue (1994)

### **Sugar Beets:**

- Plow and chisel strips planted 10 days before strip till systems
- Strip till systems planted into rye cover crop
- RoNeet banded in front of planter and incorporated by zone till coulters

## **TENTATIVE CHANGES FOR 1996:**

1. use longer shares on cultivator to throw more soil under plants
2. band Treflan in front of planter and incorporate with coulters and possibly band Eptam 20G at back of planter for better dry bean weed control
3. purchase or build "banding unit" so beets and beans can be posted earlier

Innovative Farmer members are encouraged to view the plots and discuss and suggest changes in each production system for the purpose of "fine-tuning" them to reach the goals set for the **Integrated Cropping Systems** project.

As more is seen and learned, additional changes will be made. Each working group has the responsibility of evaluating the group's production system and making changes for the next production year. By utilizing the group's combined knowledge and experiences, the process will be beneficial for everyone.

*INTEGRATED CROPPING SYSTEM  
DEMONSTRATION PLOTS*

**Shaw Site**

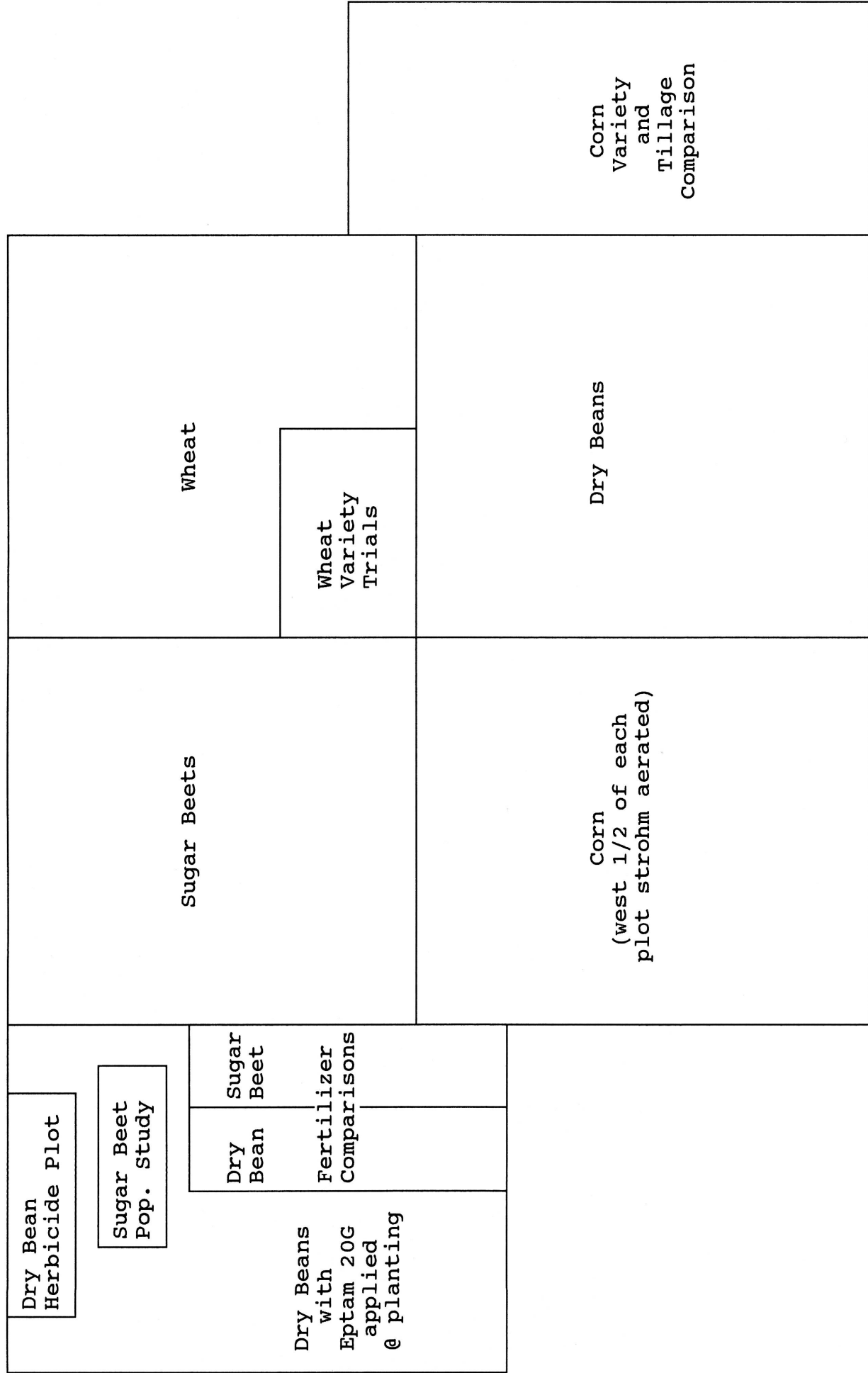


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SITE 1: MIKE SHAW

Please refer to the individual crop sheets for detailed information.



X = you are here  
Wadsworth Road



## POTENTIAL SOIL LOSS INFORMATION

The goal of the Innovative Farmers Integrated Cropping System Project is to develop tillage systems that reduce wind erosion by leaving at least 20% residue after planting and are economically viable. Residue checks were taken after planting for each replicated strip. Jerry Fischer, Natural Resources Conservation Services District Conservationist, determined the potential soil loss from wind and water erosion based on the percent residue left on the soil's surface and soil type. About \$1.5 million is spent annually in Huron County for ditch maintenance. That's roughly \$3 per acre per year. The MAX: Economic Analysis Program is being used to calculate the economic loss or gain from each tillage system. In the MAX program, fields that have a soil loss in excess of "T" (tolerable soil loss) are charged \$5 per ton (the cost is derived from the value of the soil, nutrients and organic matter contained in a ton of soil). As one member pointed out at a winter meeting, "the soil loss charge shown in the MAX program should be put away to pay for future ditch clean-outs."

Below is the Potential Soil Loss based on 1995 residue checks for the Shaw Site. "T" value for this site is 4 tons per acre.

### POTENTIAL SOIL LOSS Tons/Acre *Shaw Site*

<b>CORN - (Residue - Sugar Beets &amp; Rye)</b>				
	Percent Residue	Water Erosion	Wind Erosion	Combined Erosion
Plow	0.8	1.6	3.5	5.1
Chisel	2.9	1.3	3.0	4.3
Trans-Till	6.7	1.0	2.6	3.6
Zone-Till	7.8	0.8	2.2	3.0
<b>DRY BEANS - (Residue - Corn Stalks)</b>				
Plow	5.5	1.9	2.7	4.6
Chisel	22.9	0.8	0.8	1.6
Trans-Till	37.4	0.6	0.4	1.0
Zone-Till	45.1	0.3	0.1	0.4
<b>SUGAR BEETS - (Residue - Wheat Straw Mulch)</b>				
Plow	5.1	1.4	3.4	4.8
Chisel	34.0	0.6	1.7	2.3
Trans-Till	39.0	0.5	0.7	1.2
Zone-Till	48.0	0.4	0.4	0.8

## SOIL TEST RESULTS

### *Shaw's Corn Plot*

**Previous Crop:** Sugar Beets

**1994 Yield:** *Plow* - 19.9 T *Zone-Till* - 19.5 T

PLOT ID 0" - 4"	101A	103A	201A	203A	303A	301A
TILLAGE	PLOW	ZONE-TILL	PLOW	ZONE-TILL	ZONE-TILL	PLOW
pH	7.7	7.8	7.8	7.9	8.0	7.8
PHOS	87	90	101	116	120	113
POTASH	296	320	472	400	488	408
CAL	3368	3874	3200	3958	4400	4000
MAG	424	464	480	472	496	496
ORGANIC MATTER	2.3% (field composite)					

PLOT ID 4" - 12"	101B	103B	201B	203B	303B	301B
TILLAGE	PLOW	ZONE-TILL	PLOW	ZONE-TILL	ZONE-TILL	PLOW
pH	7.8	7.8	7.8	7.7	7.9	7.8
PHOS	54	68	60	87	85	85
POTASH	264	224	256	264	248	360
CAL	3621	3705	4042	3840	4480	3920
MAG	512	480	472	352	448	576

**CROP:** Corn

**SITE:** Shaws

**Previous Crop:** Sugar Beets

**Soil Test:** pH 7.7 OM 2.3% P 128 K 345 Ca 3440 Mg 400 Zn 9 ppm Mn 38 ppm

**Nitrate Test Credit:** 6/14/95 Plow - 107 Chisel - 115 Trans-Till - 75 Zone-Till - 98

**Soil Test Recommendation:** N - 180 P - 0 K - 0 Zn - 2

TILLAGE SYSTEM		PLOW	CHISEL	TRANS-TILL	ZONE-TILL
<b>Variety:</b>		DeKalb 471			
<b>Planted Population:</b> planted 1 1/2" deep		31,000			
<b>Planting Date:</b>		May 8, 1995			
<b>Plant Population:</b>	5/30/95	30,504	28,800	28,878	28,452
	7/05/95	26,386	27,582	26,571	28,313
<b>% Residue:</b>		.77	2.87	6.7	7.8
<b>Fertilizer:</b>	Pre	44 lbs. N plus 2 lbs. Zn		50 lbs. N w/Trans-Till	None
	Plant	20 lbs. N 19 lbs. P <sub>2</sub> O <sub>5</sub>	65 lbs. N 19 lbs. P <sub>2</sub> O <sub>5</sub>	50 lbs. N plus 2 lbs. Zn	100 lbs. plus 2 lbs. Zn
	Post	N/A followed N credits			
<b>Herbicide:</b>	Burndown			Roundup 1 pt. & AMS & Quest	
	Pre	Broadcast Dual PPI 1 qt.		Broadcast Dual 1 qt., Bladex 1 lb.	
	Post	Clarity 1 pt.			
<b>Cultivated:</b>		6/16/95			
<b>Planter:</b>		1 coulter/w fertilizer			3 coulters
<b>Tillage:</b>		Fall plow, Spring mulch 2x	Fall chisel, Spring mulch 2x	Spring trans-till	N/A
<b>Manure:</b>		7,500 gals. - November 18 & 19, 1994			
<b>Cover Crops:</b>	Species			Rye	
	Timing			Seeded prior to lifting beets	
<b>Yield (bu/a):</b>		149.6	153.5	151.9	154.3
<b>Profit/A:</b>		\$150.18	\$146.80	\$142.58	\$157.85

**CROP:** Dry Beans

**SITE:** Shaws

**Previous Crop:** Corn

**Soil Test:** pH 7.6 OM 2.2 P 97 K 224 Ca 2971 Mg 424 Zn 10 ppm Mn 21 ppm

**Soil Test Recommendation:** N - 40 P - 0 K - 0 Zn - 2 Mn - 3 **Yield Goal:** 20 cwt/a

TILLAGE SYSTEM		PLOW	CHISEL	TRANS-TILL	ZONE-TILL
<b>Variety:</b>		Vista's			
<b>Planted Population:</b>		123,082			
<b>Planting Date:</b>		June 6, 1995			
<b>% Residue:</b>		5.5	22.9	37.4	45.1
<b>Emergence Date:</b>		6/13/95		6/15/95	6/16/95
<b>Stand Plants:</b>	6/16/95	6.0	6.2	5.5	
	7/10/95	5.2	5.4	4.93	5.0
<b>Fertilizer:</b>	Burndown	N/A		Roundup 1 qt. & AMS & Quest on 5/21	
	Plant	13 gals. 28% plus Zn & Mn			
<b>Herbicide:</b>	Pre	Eptam 1 ¼ qts., Treflan 1 pt. PPI			
	Plant			Dual 1 qt. in a 10" band	
	Post	1 pt. Basagran in 10" band w/cultivation on 7/3/95			
<b>Planter:</b>		Fertilizer coulters			3 coulters
<b>Tillage:</b>		Fall plow, Mulch 3x	Fall chisel, Mulch 3x	Spring trans-till	N/A
<b>Cover Crops:</b>	Species			Corn stalks	
<b>Cultivation:</b>		2x		3x	
<b>Yield (cwt/a):</b>		22.7	24.6	23.4	21.6
<b>Profit/A:</b>		\$187.61	\$229.92	\$210.59	\$182.57

**CROP:** Sugar Beets

**SITE:** Shaws

**Previous Crop:** Wheat

**Soil Test:** pH 7.8    OM 1.8%    P 80    K 328    Ca 2819    Mg 335    Zn 8 ppm    Mn 29.5 ppm

**Nitrate Test Credit:** 6/06/95 - 15 lbs.

**Soil Test Recommendation:**    N - 40    P<sub>2</sub>O<sub>5</sub> - 60    K<sub>2</sub>O - 0

TILLAGE SYSTEM		PLOW	CHISEL	TRANS-TILL	ZONE-TILL
<b>Variety:</b>		Beta 5931			
<b>Planted Seed Spacing:</b>		4" spacing			
<b>Planting Date:</b>		May 1, 1995			
<b>Stand/100':</b>	5/22/95	168	135	142	116
	7/05/95	127	124	93	97
<b>% Residue:</b>		5.1	34	39	48
<b>Fertilizer:</b>	Pre	13 lbs. N, 9 lbs. P <sub>2</sub> O <sub>5</sub> , 18 lbs. K <sub>2</sub> O/1,000, 7,500 gals. manure in August 1994			
	Plant	33 lbs. N, 50 lbs. P <sub>2</sub> O <sub>5</sub> , 6 lbs. K <sub>2</sub> O			
	Post	40 lbs. N w/cultivation on 6/14/95			
<b>Herbicide:</b>	Pre	N/A			
	Plant	Pyramin 2.8 pts. in a 10" band			
	Post	Betamix 1 pt., H-273 .3 pt. at first cultivation 5/27 Second cultivation on 7/6			
<b>Planter:</b>		1 coulter for fertilizer			3 coulters
<b>Tillage:</b>		Fall plow, Spring mulch 1x	Fall chisel, Spring mulch 1x	Fall mulch 2x	
				Spring trans-till	N/A
<b>Cover Crops:</b>	Species	N/A			
	Timing				
<b>Cultivation:</b>		3x			
<b>Percent Sugar:</b>		16.825	17.259	17.807	17.684
<b>Yield (tons/a):</b>		18.4	17.0	18.1	17.9
<b>Profit/A:</b>		\$346.43	\$322.39	\$391.60	\$386.13

## **ADDITIONAL DEMONSTRATION PLOTS**

A number of related applied research plots were conducted in cooperation with Michigan State University Extension specialists. These plots were designed to address questions being generated by the Innovative Farmer project. Results of these applied research projects will be made available during the winter.

### **SHAW SITE:**

#### **DRY BEAN HERBICIDE PLOTS**

*Karen Renner, MSU Herbicide Specialist*

This a plot is comparing 12 different herbicide and cultivation treatments for dry beans. The replicated plots are planted to plow, chisel, zone-till w/residue managers, zone-till w/o residue managers and no-till. Because of minimum weed pressure, the plot is being used to evaluate dry bean tolerance. The plot was planted on June 7 and the variety is Mayflower.

Roundup was applied to the zone-till and no-till plots on May 23, 1995. The herbicide packages include:

1. Dual PRE followed by Galaxy POST
2. Dual PRE followed by Basagran + Reflex POST
3. Dual PRE followed by Basagran + Pursuit POST
4. Dual PRE followed by Basagran POST
5. Dual PRE followed by NO POST
6. Poast + Galaxy POST
7. Poast + Basagran + Reflex POST
8. Basagran + Pursuit POST
9. Poast + Basagran POST
10. Poast Only
11. Pursuit Plus PRE
12. Cultivate Only

This plot will be repeated in 1996.

#### **MSU WHEAT VARIETY TRIALS**

*Rick Ward, MSU Wheat Breeder*

This is part of Michigan State University's out-state wheat variety trials. A number of commercial varieties, as well as several experimental varieties, are planted in the plots. A complete report on the plot results will be available this fall.

The wheat planted around the variety plot is Chelsea and is entered in the Wheat 2000 Project. The plot was planted at a rate of 2.1 million seeds per acre. Sixty pounds of nitrogen was applied on March 27 with another 20 lbs. applied with the 2,4-D herbicide. The 28% was mixed 50-50 with water as the herbicide carrier. The final yield was 79.5 bu. per acre.

## DRY BEAN AND SUGAR BEET FERTILIZATION STUDY

*Don Christenson, MSU Fertilizer Specialist*

The purpose of the plots is to compare dry bean and sugar beet production with and without starter phosphorus. Growers have expressed concern about the fertilizer recommendations especially under high residue situations. This plot is designed to address those concerns. All of the plots received the same amount of starter nitrogen. For the dry beans, that was 40 lbs. and for the sugar beets it was 90 lbs. Replicated strips are marked showing the comparisons.

### Dry Beans:

Soil Test Recommendations:	N - 40	P <sub>2</sub> O <sub>5</sub> - 0	K <sub>2</sub> O - 0
Starter Applied:	N - 35	P <sub>2</sub> O <sub>5</sub> - 35	K <sub>2</sub> O - 0 vs 35 lbs. N only

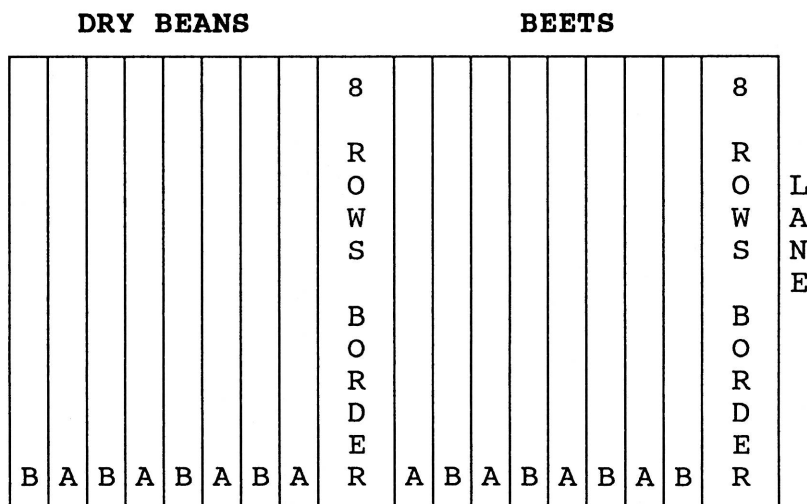
### Sugar Beets:

Soil Test Recommendations:	N - 40	P <sub>2</sub> O <sub>5</sub> - 60	K <sub>2</sub> O - 0
Starter Applied:	N - 90	P <sub>2</sub> O <sub>5</sub> - 35	K <sub>2</sub> O - 0 vs 90 lbs. N only

Each plot is four rows wide and are replicated four times.

### DRY BEAN AND SUGAR BEET FERTILIZER COMPARISON TREATMENTS:

Beets	A - Nitrogen 90 lbs. only
	B - 90 lbs. Nitrogen and 38 lbs. Phosphorous
Dry Beans	A - 35 lbs. Nitrogen
	B - 35 lbs. Nitrogen and 35 lbs. Phosphorous



Note: At each end of the plots, alternating four rows look poor for about 20' - 30'. The liquid fertilizer dripped from the injectors and took a few feet to get it flowing again.

### HARVEST RESULTS: Dry Beans

Treatment:	% Moisture	Cwt/Acre
Nitrogen Only	17.5	20.63
Nitrogen plus Phosphorus	16.72	20.43

*INTEGRATED CROPPING SYSTEM  
DEMONSTRATION PLOTS*

**Voelker Site**



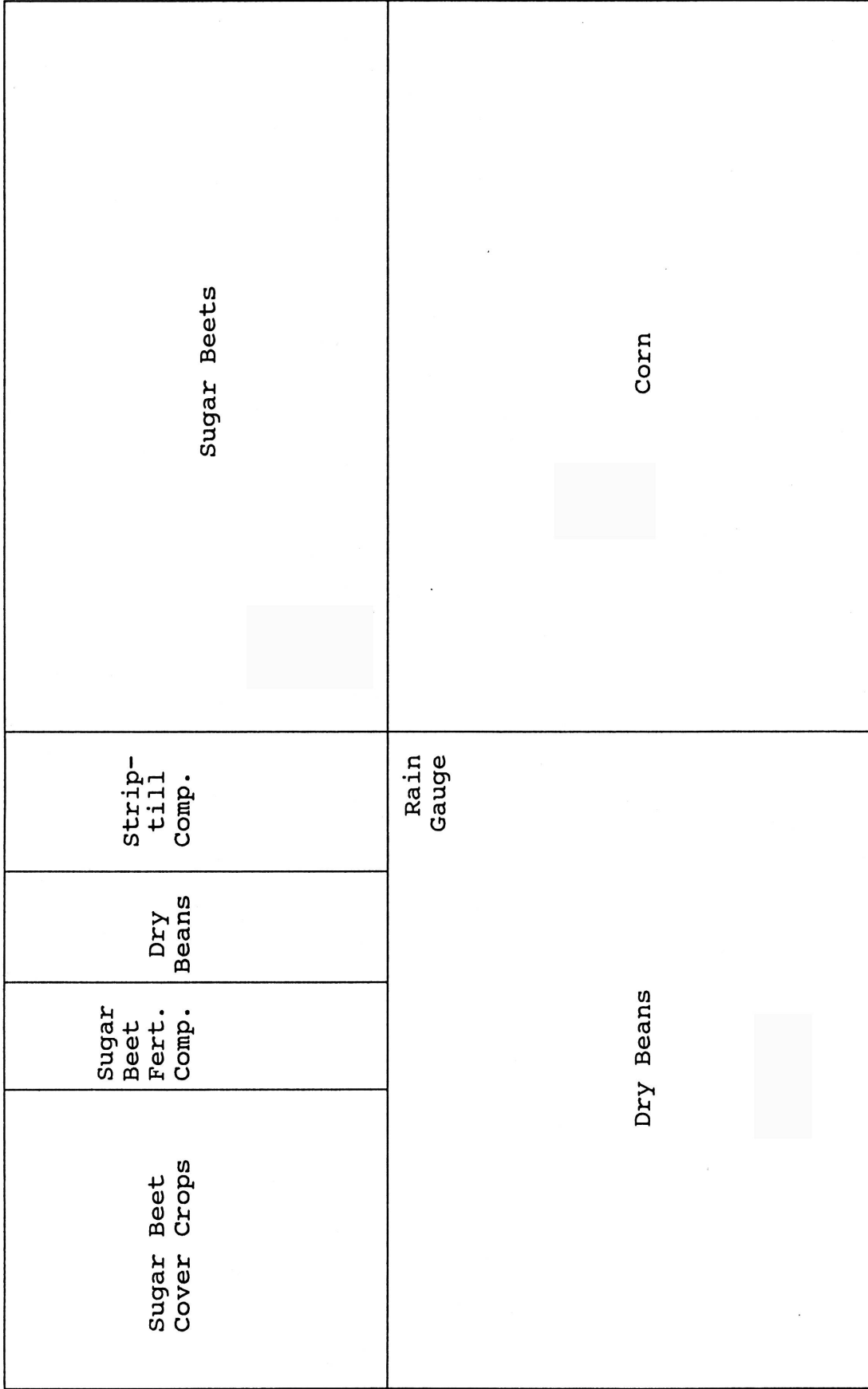
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SITE 1: ROSS VOELKER

Please refer to the individual crop sheets for detailed information.



NORTH

X = you are here  
Caseville Road

## POTENTIAL SOIL LOSS INFORMATION

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Below is the Potential Soil Loss based on 1995 residue checks for the Voelker Site. "T" value for this site is 4 tons per acre.

### POTENTIAL SOIL LOSS Tons/Acre *Voelker Site*

<b>CORN - (Residue - Sugar Beets &amp; Rye)</b>				
	Percent Residue	Water Erosion	Wind Erosion	Combined Erosion
Plow	0.42	1.7	4.0	5.7
Chisel	3.0	1.4	3.4	4.8
Trans-Till	11.0	0.8	2.2	3.0
Zone-Till	19.5	0.7	0.8	1.5
<b>DRY BEANS - (Residue - Corn Stalks)</b>				
Plow	6.6	1.9	3.1	5.0
Chisel	31.6	0.8	0.4	1.2
Trans-Till	43.2	0.5	0.4	0.9
Zone-Till	52.1	0.3	0.4	0.7
<b>SUGAR BEETS - (Residue - Dry Beans &amp; Rye)</b>				
Plow	2.2	1.8	3.5	5.3
Chisel	10.5	1.7	3.0	4.7
Trans-Till	52.3	0.8	0.4	1.2
Zone-Till	80.0	0.2	0.1	0.3

**IS SOIL EROSION CAUSED BY WIND A PROBLEM IN MICHIGAN'S THUMB?  
SHOULD FARMERS BE CONCERNED ABOUT  
THE SEDIMENT IN THE DITCHES?**

In March of 1993, snow samples were collected from ditches adjacent to the sites described below. Site 1 was a ditch protected by a 33 ft. wide filter strip with the upwind field chisel plowed corn stalks. Site 2 was a ditch protected by a 60 ft. wide filter strip with the adjacent field fall plowed. The third site was a ditch with no filter strip and the upwind field fall plowed.

The samples were analyzed and are provided below:

Site 1:	Phosphorus	.22 ppm
	Nitrogen	1.41 ppm
	Suspended Solids	240 ppm
Site 2:	Phosphorus	.32 ppm
	Nitrogen	1.57 ppm
	Suspended Solids	380 ppm
Site 3:	Phosphorus	3.20 ppm
	Nitrogen	1.57 ppm
	Suspended Solids	2,600 ppm

Source: NRCS data obtained as part of Saginaw Bay Water Quality Demonstration Project.

In March of 1992, snow cores were taken from ditches on the south side of fields. Samples were analyzed and the data is shown below;

Sample 1 (fall plowed field)	2,000 ppm of sediment
Sample 2 (chisel plowed field)	200 ppm of sediment
Sample 3 (corn stalks-no tillage)	110 ppm of sediment

A composite sample of the drain that these these fields drained into yielded 1,000 ppm of sediment.

Late in the fall of 1994, Jerry Fischer, Huron County NRCS, installed a snow fence across three tillage strips at the Voelker Innovative Farmers Site. Later in the winter, snow cores were taken from the drifts accumulated behind the snow fence. The data is illustrated below:

<u>strips</u>	<u>plowed</u>	<u>chiseled</u>	<u>zone-till</u>
Total nitrogen	55 ppm	5.6 ppm	4.5 ppm
Total Phosphate	27 ppm	2.8 ppm	.89 ppm
Suspended Solids	16,000 ppm	1,600 ppm	420 ppm

Based on this data, collected from sites in the Thumb Area, it appears that we need to keep the soil in the field. It has been estimated that a ton of soil is worth \$3-\$6. A ton of soil per acre is equivalent to a layer 1/128th of an inch thick. Residue, filter strips, windbreaks and reduced tillage are all techniques that can be used to reduce wind and surface water erosion.

## SOIL TEST RESULTS

### *Voelker's Corn Plot*

Previous Crop: Sugar Beets

1994 Yield: *Plow* - 19.9 T *Zone-Till* - 14.2 T

PLOT ID 0" - 4"	101A	104A	201A	204A	304A	301A
TILLAGE	PLOW	ZONE-TILL	PLOW	ZONE-TILL	ZONE-TILL	PLOW
pH	6.0	6.1	5.9	6.6	7.3	7.2
PHOS	407	339	320	407	407	349
POTASH	579	696	488	744	960	656
CAL	3600	3600	3680	4080	4560	4160
MAG	528	576	544	616	624	684
ORGANIC MATTER	(field composite)					

PLOT ID 4" - 12"	101B	104B	201B	204B	304B	301B
TILLAGE	PLOW	ZONE-TILL	PLOW	ZONE-TILL	ZONE-TILL	PLOW
pH	6.2	6.4	6.3	6.8	7.2	7.4
PHOS	394	280	289	360	382	247
POTASH	672	400	526	564	571	526
CAL	3760	3840	3840	4240	4560	4160
MAG	592	600	584	658	624	676

CROP: Corn

SITE: Voelkers

Previous Crop: Sugar Beets

Soil Test: pH 6.4    OM 3.4    P 320    K 655    Ca 3360    Mg 541    Zn 15 ppm    Mn 24 ppm

Nitrate Test Credit: 6/14/95    Plow - 68    Chisel - 110    Trans-Till - 105    Zone-Till - 87

Soil Test Recommendation:    N - 190    P<sub>2</sub>O<sub>5</sub> - 0    K<sub>2</sub>O - 0

TILLAGE SYSTEM		PLOW	CHISEL	TRANS-TILL	ZONE-TILL
				Spring	
Variety:		Pioneer 3752			
Planted Population: <i>planted 1 1/2" deep</i>		31,000			
Planting Date:		May 5, 1995			
Plant Population:	5/22/95	29,691	30,543	30,156	29,265
	7/05/95	32,239	31,263	29,835	27,582
% Residue:		.42	3	11	19.5
Fertilizer:	Plant	40 lbs. N			170 lbs. N, 19 lbs. P <sub>2</sub> O <sub>5</sub>
	Post 6/15/95	69 lbs.	40 lbs.		0 lbs.
Herbicide:	Burndown			1 pt. Roundup, AMS & Quest	
	Pre	Dual 1 qt., Bladex 1 lb. Broadcast			
	Post	Clarity 1 pt. Broadcast			
Cultivation:		Sidedress and Cultivated 1x on 6/15/95			No Cultivation
Planter:		Fert. Coulter			3 coulters
Tillage:		Fall plow, Mulch 1x	Fall chisel, Mulch 1x	Spring trans-till	N/A
Cover Crops:	Species			Rye	
	Timing			Seeded prior to lifting beet, April 24, burndown	
Yield (bu/a):		152.0	151.8	155.1	152.9
Profit/A:		\$137.99	\$151.46	\$158.29	\$128.55

**CROP:** Dry Beans

**SITE:** Voelkers

**Previous Crop:** Corn

**Soil Test:** pH 6.9    OM 2.9    P 296    K 616    Ca 3520    Mg 556    Zn 14 ppm    Mn 31 ppm

**Soil Test Recommendation:** N - 40 P - 0    K - 0

TILLAGE SYSTEM		PLOW	CHISEL	TRANS-TILL		ZONE-TILL
				Spring		
<b>Variety:</b>		Mayflower				
<b>Planted Population:</b>		120,780 plants/acre, 54.8 lbs.				
<b>Planting Date:</b>		June 6, 1995				
<b>% Residue:</b>		6.6	31.6	43.2	52.1	
<b>Emergence Date:</b>		6/11/95		6/12/95		
<b>Stand Plants/Ft.:</b>	6/16/95	6.9	7.2		5.9	
	7/10/95	6.5	6.6	6.4	6.0	
<b>Fertilizer:</b>	Plant	40 lbs. N (13 gals. 28%)				
	Burndown			Roundup 1 pt., AMS & Quest		
<b>Herbicide:</b>	Pre	Eptam 1 qt., Treflan 1 pt.				
	Plant			Dual 1 qt. rate in a 10" band	Dual broadcast	
	Post	Basagran @ 1.5 pts. rate in 10" band w/cultivation on 6/30/95 and 7/26				
<b>Planter:</b>		Fert. coulter			3 coulters	
<b>Tillage:</b>		Fall plow, Mulch 3x	Fall chisel, Mulch 3x	Trans-till		
<b>Cover Crops:</b>	Species				Corn stalks	
<b>Cultivation:</b>		2x		3x		
<b>Yield (cwt/a):</b>		23.0	23.7	21.7	23.1	
<b>Profit/A:</b>		\$172.92	\$192.81	\$159.84	\$191.76	

CROP: Sugar Beets

SITE: Voelkers

Previous Crop: Dry Beans

Soil Test: pH 6.8    OM 2.9    P 310    K 549    Ca 3124    Mg 604    Zn 14 ppm    Mn 31.6 ppm

Nitrate Test Credit: 6/06/95 - 20 lbs.

Soil Test Recommendation:    N - 90    P<sub>2</sub>O<sub>5</sub> - 0    K<sub>2</sub>O - 0

TILLAGE SYSTEM		PLOW	CHISEL	TRANS-TILL	ZONE-TILL
				Spring	
Variety:		Mono-Hy E-17			
Planted Seed Spacing:		4"			
Planting Date:		April 24, 1995		May 3, 1995	
Stand Beets/100':	5/18/95	126	139	129	147
	7/05/95	120	107	115	107
% Residue:		2.2	10.5	52.3	80
Fertilizer:	Plant	40 lbs. N			
	Post	40 lbs. N w/cultivation on 6/14/95			
Herbicide:	Plant	Pyramin 10" band			Roneet 10" band in front of coulters
	Post	Betamix 1 pt., H-273 .3 pt. at cultivation 5/26			
Insecticide:	Pre	N/A			
Planter:		Fert. coulters			3 coulters
Tillage:		Fall plow, Mulch 1x	Fall chisel, Mulch 1x	Spring trans-till	N/A
Cover Crops:	Species			Rye	
	Timing			Roundup 1 pt. plus AMS & Quest Spring burndown 4/24	
Cultivation:		3x			
Percent Sugar:		16.571	16.236	17.799	18.511
Yield (tons/a):		20.1	20.5	20.4	19.2
Profit/A:		\$392.85	\$381.30	\$467.75	\$463.47

## COVER CROP STUDY

*Richard Harwood, MSU Sustainable Agriculture Chair*

### VOELKER SITE:

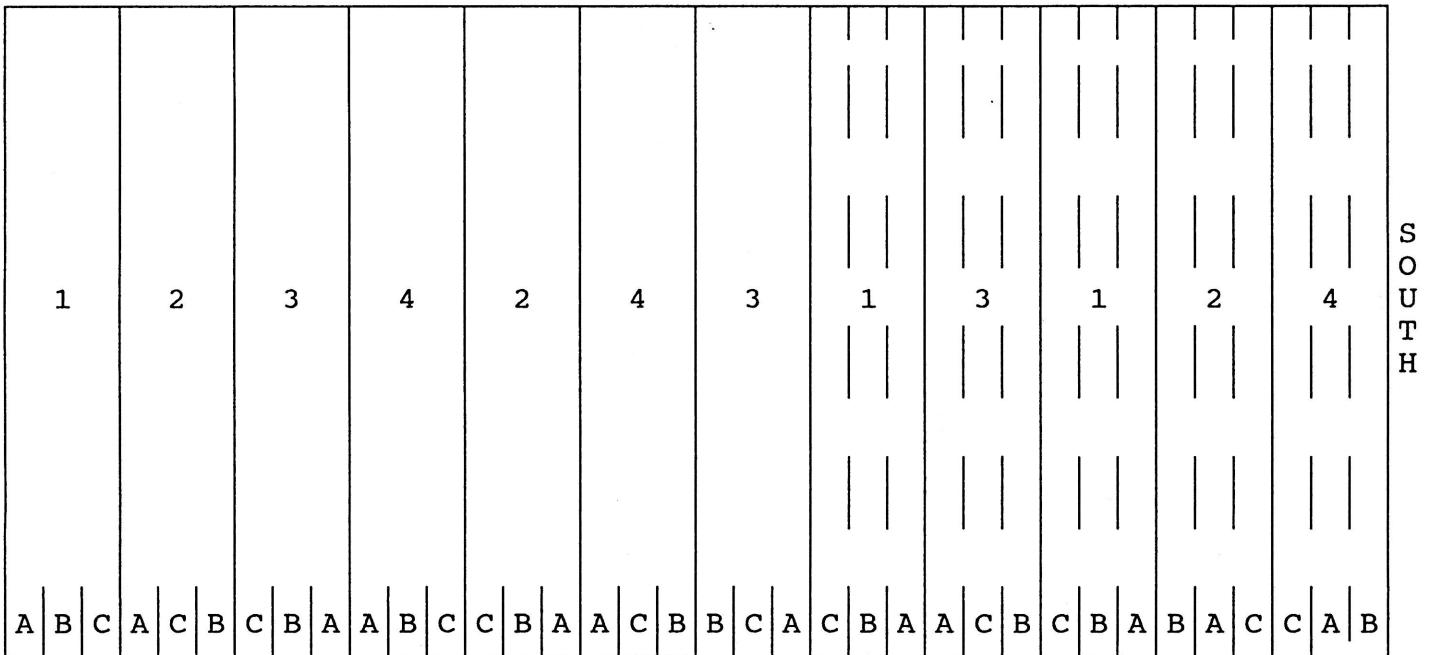
This study is one of several being conducted around the state. In the Thumb Area, there are three plots looking at cover crops specifically for sugar beets.

The 1994 crop was wheat and the field was prepared by chiseling and field cultivating. The cover crops were planted last September. Replicated and randomized 30 ft. wide strips were planted to wheat, rye and triticale. This spring the covers were sprayed with Prism. The beets were planted on May 3. Two passes in each cover crop strip were trans-tilled while one pass was zone-till directly. The flag for each strip is located in the first row on the north edge of each plot.

### SUGAR BEET COVER CROPS

**TREATMENT:**

1 - Wheat	A - Zone-Till
2 - Triticalli	B - Trans-Till (Fall)
3 - Rye	C - Trans-Till (Spring)
4 - No Cover	



### PLANT STANDS: (plants per 100 ft. of row)

PLOT RESULTS:	Zone-Till	Trans-Till	Tons/Acre	% Sugar
Wheat	124.6	119.3	25.7	17.10
Triticale	114.7	141.0	26.8	16.35
Rye	104.7	120.0	26.5	17.76
No Cover	76.0	84.7	28.3	15.59



## FALL STRIP-TILLER COMPARISON

Two strip-tillers were compared in alternating four-row strips. The two strip-tillers were the Trans-Till and Yetter. Conditions were a little wet in the fall when the tilling was done. This spring the plots were planted on May 5 using the planter in the zone-till mode with all three coulters down. The plots were fertilized the same as the trans-till plots in the regular corn plot. The variety is also Pioneer 3752. Yields will be taken in the fall.

Comments: The corn in this plot is very uneven and is similar to the corn planted last year into wheat stubble. This is also the first year that corn has been planted in this section without conventional tillage whereas the corn in the regular plot is in the second year of trans-till.

T R A N S - T I L L	Y E T T E R	T R A N S - T I L L	Y E T T E R	T R A N S - T I L L	Y E T T E R	T R A N S - T I L L	Y E T T E R	T R A N S - T I L L	L A N E
LANE									