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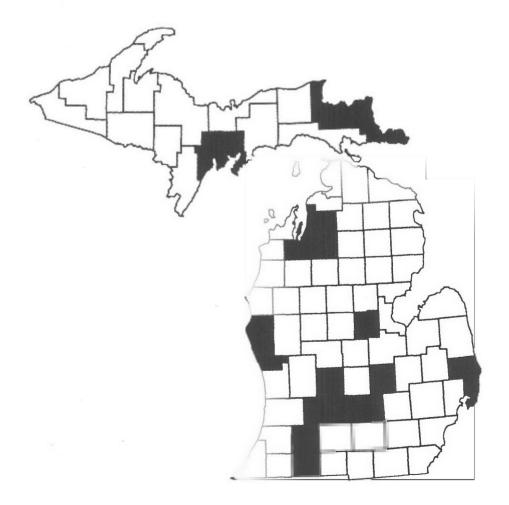


Report designed and prepared by American Farmland Trust

# Michigan On-farm Demonstration and Research Project

# **1991 Results**

Farmers taking the lead in the development of practical, profitable and environmentally sound farming systems.



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### Introduction

Each year, more and more agricultural producers are beginning to question the safety and efficiency of conventional farming practices. They are concerned about ground and surface water pollution, and how it will effect their families. They will no longer tolerate erosion, and are determined to protect the soil and restore it to health. Many wonder if all of cropping inputs used to grow crops are really necessary, and they are reducing their reliance on purchased nutrients and chemical pesticides. Most of all, these farmers want to make a living by working with, and caring for the land. They are searching for viable crop and livestock management alternatives that promote stewardship and resource conservation.

Practical information about the use of alternative farming practices has been hard to find. Many of the sources that farmers have traditionally relied on for information about growing crops and raising livestock have been slow to embrace the concept of sustainable agriculture. As a result, grassroots farmer organizations promoting the development and use of sustainable agriculture have sprung up around the country. With a strong emphasis on farmer-to-farmer networking and hands on experience, these groups are often the single best source of information about alternative farming practices.

The 1991 Michigan On-Farm Demonstration and Research Project was started as a way to help Michigan farmers answer their own questions about sustainable agriculture. A cooperative effort of the Michigan Agricultural Stewardship Association and the American Farmland Trust, the project established sixteen on-farm research and demonstration sites around the state. Each compared conventional and alternative farming practices in an on-farm setting with cooperating producers providing the land, labor and know-how. Demonstration plots were laid out in side-by-side treatments or alternating, field length strips. Research plots were replicated 6 times and randomized for statistical validity. Project cooperators planted and managed their own plots throughout the growing season. Careful records were kept of all agronomic inputs and field operations, with yields carefully checked at harvest. In exchange for their cooperation, participants received a small cost-share payment, free soil testing services, and limited technical assistance.

This report is a compilation of the project results as they were recorded by participating producers during the 1991 growing season. AFT and MASA have tried to provide complete agronomic information for each demonstration/research plot. A simple economic summary of expense and income for each plot has also been included.

Readers should decide for themselves the effectiveness of the techniques demonstrated by the farmers who participated in this project. Remember, it often takes several years of experimentation before a new cropping practice produces good results. Net returns can also be highly variable when you are trying to correct for past management mistakes.

Also remember that no two operations are alike. What works on one farm might cause a total failure on another. Producers interested in adopting any of the alternative farming techniques highlighted in this report are advised to establish their own onfarm test plots before making any major management changes. Start out small, adopt the practice to fit your individual operation and expand as your skills increase.

Farmers with an interest in learning more about sustainable agriculture, or any of the practices presented in this report, are encouraged to contact the Michigan Agricultural Stewardship Association or the American Farmland Trust.

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### Participants in the 1991 On-farm Demonstration and Research Project

**Barry County** Tom Guthrie 7301 Milo Rd. Delton, Mi 49046

Muskegon County Gayle McNitt 6890 S. Mooreland Rd. Ravenna, MI 49451

St. Joseph County Sally and Dale Stuby 18558 Centerville-Constantine Rd. Constantine, MI 49042

Ionia County Bob and Barb Keitzman 9730 Grand River Rd. Clarksville, MI 48815

Kalamazoo County Roger French 10004 Stadium Dr. Kalamazoo, MI 49009

Midland County Jerry Wirbel 4240 Stark Rd. Hope, MI 48628

Eaton County Paul Wing 15335 Wing Rd. Bellevue, MI 49021

Ingham County Bob Fogg 3043 Olds Rd. Leslie, MI 49251 Grand Traverse County Arnold Elzer 12586 Center Rd. Traverse City, MI 49684

Kalkaska County George Shetler 5436 Tyler Rd., SE Kalkaska, MI 49646

Chippewa County Cindy and John Dutcher HC55 -Box 448 Goetzville, MI 49756

St. Clair County Rich Lauwers 3148 Harvey Rd. Capac, MI 48014

Shiawassee County Tom Seamens 6627 West Hibbard Lainsburg, MI 48848

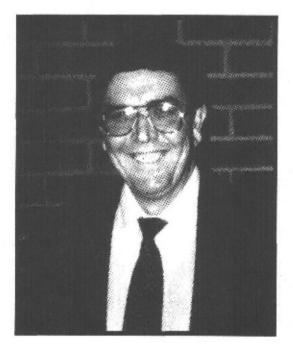
Oceana County Greg Mund 6086 S. 120th St. Rothbury, MI 49452

Delta County Larry Mawby Box 237 Suttons Bay, MI 49682

Antrim County Bob Ricksgers 244 Ricksgers Rd. Alden, MI 49612

# **Project Results**

### Tom Guthrie Barry County



I om Guthrie runs a cash grain operation in Delton. He farms approximately 1225 acres, but also does an additional 3500-4000 acres of custom no-till planting and harvesting in a four county area.

Tom is married and his son Joe, 13, has an active interest in the farm. Tom is secretary of the Michigan Agricultural Stewardship Association, District 4 representative of the Michigan Farm Bureau, a member of the USDA-LISA North Central Region Review Committee and serves on his township Board of Review and Planning and Zoning Committees.



"I became interested in sustainable agriculture when I came to the realization that the non-farmers in this country are going to have a major impact on what I do as a farmer in my own operation.

"In order to be a producer of food and fiber for 98% of the population, I am going to have to do it pretty much in the way they want it done. If that means reducing inputs, I am going to consider that because it's important to consumers. I think it is in my best interest to look at some alternative practices, which aren't necessarily new to me, because as a kid, I did a lot of this. Society pushed us away from some of these practices into using what we consider to be conventional. Maybe we moved too fast and forgot some of the good things we used to do. Maybe we will have to bring some of these practices back and incorporate them into today's agriculture."

#### **Project Comments**

"Previous crop history and soil tests required an additional 175 lbs./ac. of 6-15-40 to be added to the banded plot. If fertilizer costs are adjusted for both treatments to reflect the lower fertilizer application rate, my net return would have been \$173.14 for the broadcast treatment and \$184.21 for the banded treatment.

"I think my demonstration turned out about like I was hoping it would. I can't think of much I would have changed. Certainly it turned out well enough that I would like to try it again next year and begin to incorporate some of these practices into the balance of my program. Working with the demonstration also taught me not to be afraid of trying something new."

# Banded vs. Broadcast Herbicides in Soybeans

### Site Information

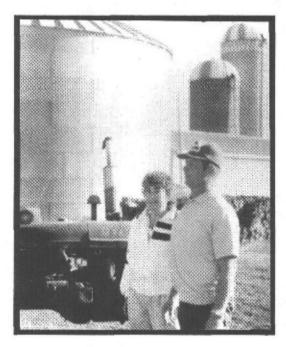
• Previous Crop: corn
• 1990 yield: 119 bu./ac.
Treatment #2 - Five acres
am
K-224 lbs./ac. CEC-8.1
K-130 lbs./ac. CEC-6.8

### Management and Inputs

Date	Treatment #1 Broadcast		Treatment #2 Banded
Fall 90 & Spring 91		Spread Manure 3.0 tons/ac.	
May 8		Disk	
May 10	175 lbs./ac. 6-15-40	Spread Fartilizer	350 lbs./ac. 6 15-40
May 14		Moldboard Plow	
May 16	and the statement	Disk	
May 19	ł	Plant soybeans and spray Asgrow A-2396 Pop: 150,000	
	Broadcast Application of 3.1 lbs./ac. Partner, 1.0 lb./ac. Lorox Plus 1.5 qt./ac. Roundup		Band Application of 1.03 lbs./ac. Partner, .33 lb./ac. Lorox Plus 1.5 qt./ac Roundup
May 24		Rotary Hoe	
June 9	No Cultivation		Cultivate
June 12	No Cultivation		Cultivate
Oct 13	57.35 bu./ac. 13.7% Moisture	Harvest	57.53 bu./ac. 14% Moisture

	#1	#2
Seed/acre	\$ 11.02	\$ 11.02
Pesticides/acre	46.78	27.53
Fertilizer/acre	17.13	34.26
Machinery & labor/acre	67.50	76.68
Total expenses/acre	\$142.43	\$149.49
Gross income/acre	\$315.57	\$316.57
(-) Expenses/acre	142.43	149.49
Net return/acre	\$173.14	\$167.08

### Gayle McNitt Muskegon County



Gayle McNitt grows 500 acres of corn and hay near Ravenna. He is married and farms alone with occasional help from his father. In 1990, Gayle began using a modified no-till/zone-till planting system with the goal of saving soil. This complements most of the permanent conservation practices that he has installed on his farm over the last few years.

In 1990, Gayle and his wife were recipients of a Goodyear Farm Family Award. In addition, he is a member of the Muskegon County ASCS Committee and is a past director of the Muskegon County Soil Conservation District.



"I truly believe that we need to take care of our soil. God put us here to take care of it for him while we put it to our own uses. I also believe that we are using more herbicide and fertilizer than we need. My main goal is to leave the land in better shape for the next generation."

#### **Project** Comments

"In this demonstration, we were trying to see if a foliar application of two gal./ac. of liquid 10-20-10 would increase yields above the additional cost and labor.

"In the treatment that received the foliar application, the plants seemed stronger as the season progressed. But due to the fact that we had above normal rains all spring and summer, I think that we lost a lot of N to leaching. This seemed apparent, particularly when this field is compared to other fields that had residual N from legumes or manure applications. Leaf analysis showed an overall N deficiency. Also, we didn't kill the weeds off soon enough after spreading the ammonia sulfate. The chickweed grew very well!

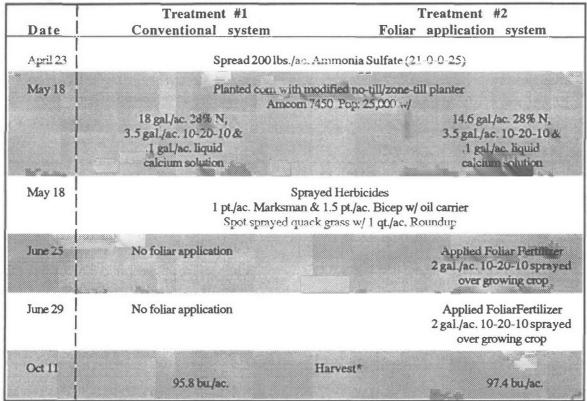
"When checked, there was only a 1.6 bu./ac. yield difference between the two treatments. Although the economic numbers weren't there, I think this should be tried again, preferably in a year with normal rainfall. Overall though, the plot was okay for conditions. However, I intend to make some adjustments for next year."

### **Foliar Fertilizer Demonstration in Corn**

### Site Information

- Normal Rotation: Continuous Corn
  1990 Crop: Corn
- Yield Goal for 1991: 150 bu./ac. 1990 yield: 143 bu./ac.
- Site Size: Treatment #1 11.0 acres Treatment #2 12.0 acres
- Soil types: Nester-Ubly Sandy Loam, Sims Loam
- Soil test:
- #1 pH- 7.6 OM%- 2.8 P- 69 lbs./ac. K- 70 lbs./ac. CEC- 8.5
- #2 pH- 7.4 OM%- 2.7 P- 71 lbs./ac. K- 75 lbs./ac. CEC- 7.6

### **Management and Inputs**



\* Yields corrected to 15.5% moisture.

	#1	#2
Seed/acre	\$ 19.38	\$ 19.38
Pesticides/acre	9.90	9.90
Fertilizer/acre	36.34	52.26
Machinery & labor/acre	41.97	49.77
Total expenses/acre	\$107.59	\$131.31
Gross income/acre	\$239.98	\$243.99
(-) Expenses/acre	107.59	131.31
Net return/acre	\$132.39	\$112.68

### Sally and Dale Stuby St. Joseph County



Dale and Sally farm 770 acres in St. Joseph County. Most is planted to seed corn with the remainder in cash corn, soybeans and wheat. They have a 500 head farrow-to-finish hog operation and their daughters manage 55 ewes as part of a 4-H project. They use a minimum tillage system, and disk cover crops with some chisel plowing.

They are members of the Michigan Farm Bureau, the St. Joseph County 4-H, and FFA. Dale is a County Director of the Michigan Pork Producers.



"We began looking at sustainable agriculture practices due to concerns over groundwater contamination and soil erosion. Nitrates began showing up in the groundwater so we began to examine reducing nitrogen and splitting applications. We have experimented with cover crops, mostly wheat and rye. We felt that the crops would not only minimize erosion but use excess nitrogen remaining in the soil.

"The problems with soil erosion and groundwater contamination led us to the conclusion that we couldn't continue farming profitably using what were then standard operating practices. That led to looking at new ways of doing things.

"We believe in on-going regeneration and stewardship of the land, and that we just borrow it for a time and should leave it in better shape for the next generation. This is the primary reason for our interest in sustainable agriculture."

#### **Project Comments**

"These fields were scouted throughout the growing season and root ratings were evaluated. There were no significant differences in insect levels, emerged populations, root rating or yields in any of the treatments. We thought there would have been an increased likelihood for adult beetles following late soybeans, but it didn't happen.

"Based on these results, we have decided to use 25% less insecticide next year and continue the scouting program."

# **Reduction of Soil Applied Insecticides in Seed Corn Following Soybeans**

### Site Information

- Normal Rotation: Continuous Corn Previous Crop: Wheat/soybeans
- Yield Goal for 1991: 110 bu./ac. 1990 yield: N/A
- Site Size: Twenty-five acres total. Each replication was approximately three acres.\*
- Soil types: Spinks Loamy Sand
- Soil test: pH- 5.8 OM%- 1.3 P- 204 lbs./ac. K- 116 lbs./ac. CEC- 2.6

\* Three different rates of soil insecticide were replicated two times in field length strips. Border strips were also maintained. Field irrigated through a center pivot system.

### Management and inputs

Date	Rate #1	Rate #2	Rate #3	
Spring 1991		Soylean stubble disked		
May 12		Planted seed corn Cargill Inbred Pop:26,100 w/ 5.0 gal./ac. 10-10-10 & 3.0 gal./ac. 0-0-30 liquid fertilizer &		
	No Soil Insecticide	6.0 lbs./ac. Counter	8.0 lbs./ac. Counter	
May 14	Broadcast sprayed pre-emerge herbicides 1.7 qt/ac. Aatrex 4L & 1 qt/ac. Lasso Microtech w/ 10 gal/ac. H20 & 10 gal/ac. 28% N			
June 10	Broadcast sprayed post-emerge herbicides 1 pt./ac. Aatrex 4L & .75 pt./ac. Buctril			
June 18	Applied 90 lbs./ac. N (Anhydrous)			
June 24	Cultivation			
June 25	Bano sprayed post-emerge herbicides 1.0 pt /ac. Prowl			
July 16	10 lbs./a	c. actual N applied through center p	ivot (28%)	
Sept 11		Harvest (ear pick)		
	109.93 bu./ac. 15% Moisture	112.57 bu /ac. 15% Moisture	113.79 bu./ac. 15% Moisture	

	Rate #1	Rate #2	Rate_#3
Seed/acre	\$ 24.47	\$ 24.47	\$ 24.47
Pesticides/acre	19.75	29.59	32.87
Fertilizer/acre	44.05	44.05	44.05
Machinery & labor/acre	55.56	55.56	55.56
Total expenses/acre	\$143.83	\$153.67	\$156.95
Gross income/acre	\$275.37	\$281.99	\$285.04
(-) Expenses/acre	143.83	153.67	156.95
Net return/acre	\$131.54	\$128.32	\$128.09

### Bob and Barb Kietzman Ionia County



Bob Kietzman has a 450 acre cash grain operation near Clarksville, which he runs with the help of his wife, Barb, and son, Ron. Crops on the farm include corn, wheat, soybeans and twenty acres of asparagus. He has also experimented with canola, but is unsure of how it can be worked into a rotation. He has no-tilled for the last eighteen years.

Ron serves on the FFA's advisory committee in both Ionia and Saranac Counties. He recently began working with area farmers to organize an Ionia County No-till Committee, which he currently chairs.



"For the last fifteen years, I have been experimenting with reduced rate herbicide applications. In the last two years, I have focused primarily on looking at different crop rotations and IPM scouting as a way to reduce, if not eliminate, insecticide use. I also soil test every two years, instead of three to four, to determine which nutrients are in the field and how to make best use of them without just piling on fertilizer."

#### **Project** Comments

"This season was almost ideal for growing corn. Overall we saw no real yield difference by reducing our fertilizer applications, although it is my feeling that we had a great deal of carryover N from the alfalfa. We will be looking closely at soil tests next year to see what kind of carryover we can expect.

"I also want to experiment with leaf analysis and tissue testing. We tried it this year but I think I probably sampled to late. I want to try it again next year to see if additional foliar feeding or sidedress applications are necessary during the growing season.

"I liked the full field demonstration, and would like to replicate it again next year. Before making changes to the whole farm, I feel that I would need to see another year or two of data."

# Nitrogen Rate Comparison in No-till Corn Following Alfalfa

#### Site Information

- Normal Rotation: 2Corn/wheat/4Alfalfa Previous Crop: Alfalfa
- Yield Goal for 1991: 130 bu./ac. 1990 yield: N/A
- Site Size: Sixteen acres total. Four trials, each approximately four acres.\*
- Soil types: Lapeer Sandy Loam
- Soil test: pH-6.5 OM%- N/A P-103 lbs./ac. K-404 lbs./ac. CEC- N/A

\* Four different rates of nitrogen were applied.

### Management and Inputs

Date	Rate #1	Rate #2	Rate #3	Rate #4
April 26		Spray burn-de 1.5 que /ac. Roundup	own herdicides & 1 qt/ac. 2,4 d ester	
May 11			-till corn Pop: 28,000 w/	
	140 lbs./ac Ammonia Sulfate (50 lbs./ac. N)	160 lbs./ac. Ammonia Sulfate (75 lbs./ac. N)	180 lbs./ac Ammonia Sulfate (100 lbs./ac. N)	220 lbs./ac. Ammonia Sulphate (150 lbs./ac. N)
May 20			erge herbicides 1 pt./ac. 2,4-d : ster	
Sept 30		Harv	vest*	
	179 bu./ac.	185 bu./ac.	157 bu./ac.	198 bu./ac.

\* Yields corrected to 15.5% moisture.

	Rate #1	Rate #2	Rate #3	Rate #4
Seed/acre	\$24.50	\$24.50	\$24.50	\$24.50
Pesticides/acre	40.85	40.85	40.85	40.85
Fertilizer/acre	11.20	12.80	14.40	17.60
Machinery & labor/acre	42.27	42.27	42.27	42.27
Total expenses/acre	\$118.82	\$120.42	\$122.02	\$125.22
Gross income/acre	\$448.40	\$463.43	\$393.29	\$495.99
(-) Expenses/acre	118.82	120.42	122.02	125.22
Net return/acre	\$329.58	\$343.01	\$271.27	\$370.77

### Roger French Kalamazoo County



**R**oger French, in partnership with his father, runs Dawnera Farms, a 1100 acre dairy and cash grain operation just west of Kalamazoo. He is married and has two children.

Currently, Roger is a member of the Board of Directors of the Michigan Agricultural Stewardship Association and the Kalamazoo County Farm Bureau. He farms using a biological input program in conjunction with a modified ridge-till system.



"I define low-input sustainable agriculture as a biological system that uses renewable products. This is our fifth year using biologicals. We feel that the biological program makes late season ammoniacal nitrogen more available to the growing plant. We also adopted this system to promote environmental health, to protect the health of our family, and to improve the general vitality of the farm."

#### **Project** Comments

"Each thirty unit increase in actual N cost is approximately \$6.00. This plot indicates that cutting back to a rate of 60 lbs./ac. of nitrogen will maintain a satisfactory level of productivity, however, it might not work on other farms without the use of biologicals. It took five years of biological improvement for us to reduce our nitrogen inputs from an average of 120 lbs./ac. We intend to incorporate these results into our farm managemnt plan for next year."

### Nitrogen Rate Comparison in Corn Following Soybeans

### Site Information

- Normal Rotation: 2Corn/wheat, hay or soybeans 1990 Crop: Soybeans
- Yield Goal for 1991: 120 bu./ac.
- 1990 yield: 40 bu./ac. • Site Size: Four and one-half acres total.\*
- Soil types: Spinks Loamy Sand
- Soil test: pH-6.7 OM%-1.0% P-297 lbs./ac. K-177 lbs./ac. CEC-4.0

\* Four different rates of nitrogen were replicated six times on 24 randomized plots.

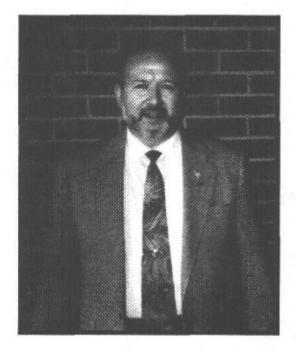
### **Management and Inputs**

Date	Rate #1	Rate #2	Rate #3	Rate #4	
Fall 90	Light tillage with Aerway tool & fall application of biologicals. 1 gal./ac. humic acid (Bio-Hume), 1 gal./ac. liquid carbon (Bio-Carb), & 1 gal./ac. Thiosol (12-0-0-26 sulfur) (1.3 lbs./ac actual N)				
May 2		Light tillage with soil fini er			
May 3	3.5 gal./ac. 28% N, 1 gal./ac. E 2.5 g 4 oz./ac. Mangane	Asgrow 70 rayed 12" band liquid Bio-Mix, 5 gal./ac. Bi Side gal./ac. 28% N, 4 gal. ese,3 oz./ac. Boron, 6 Side-dr	ant corn 6 Pop: 20,600 fertilizer & biological mix o-C, & .5 gal./ac. Bio-Car -dress (2'x3') /ac. 8-30-5,.5 gal./ac. BF- & 3.5 oz./ac. Copper (10.1 ess (3'x5') .0 calcium) (5.5 lbs./ac. a	tb (10.4 lbs./ac. actual N) MT, lbs./ac.actual N)	
May 13		Rota	ry Hoe		
May 18	Rotary Hoe				
May 29			- emerge hers. Ides c. Buch		
June 3			d sideress with & 3 gal./ac. Bio-K (0-0-5) 20 gal./ac. 28% N (60 lbs./ac.)	(2.6 lbs./ac. actual N)& 30gal./ac.28% N (90 lbs./ac.)	
June 6		Cultivate a	od build ridges		
Sept 15	103.71 bu./ac. @ 30 lbs./ac. total N @	Han 106.98 bu./ac. 960 lbs./ac.total N	rvest* 109.27 bu./ac. @ 90 lbs./ac.total N	105.67 bu./ac. @ 120 lbs./ac.total N	

\* Each of the above figures represents the average yield of six replicated plots. All yields corrected to 15.5% Moisture

	Rate #1	Rate #2	Rate #3	Rate #4
Seed/acre	\$16.99	\$16.99	\$16.99	\$16.99
Pesticides/acre	6.13	6.13	6.13	6.13
Fertilizer/acre	44.55	50.05	55.55	61.05
Machinery & labor/acre	60.62	60.62	60.62	60.62
Total expenses/acre	\$128.29	\$133.79	\$139.29	\$144.79
Gross income/acre	\$259.79	\$267.98	\$273.72	\$264.70
(-) Expenses/acre	128.29	133.79	139.29	144.79
Net return/acre	\$131.50	\$134.19	\$134.43	\$119.91

### Jerry Wirbel Midland County



erry Wirbel farms 1000 acres outside of Hope, MI with his wife Pearl, and his son, Louis. They raise sugar beets, corn, dry beans, wheat, and approximately thirty acres of assorted vegetables. Over the past two years, the Wirbels have begun the transition from a conventional to a no-till system.

Jerry is President of the Michigan Agricultural Stewardship Association, Chairman of the Midland County ASCS Board, and a member of the Midland County Farm Bureau Board of Directors. Pearl is President of the Midland County Farm Bureau.



"Things are not getting any cheaper. Machinery is going up, fertilizer is going up, chemicals are going up... My idea is that by using less inputs you have less cost. Also, using less inputs helps out the environment, saves soil and protects the water. It's better all around."

#### **Project Comments**

"On June 1, the fields were too wet to field cultivate and finish planting corn, so I thought I might try spot spraying the patches of quack grass. I thought if I filled the spray tanks only one-half full, I wouldn't have any problems. Well, I was wrong, because the tire tracks really caused some serious compaction problems in the no-till section of the field. The drill had problems getting through the packed soil and the beans came up more slowly, too.

"Because of the wet spring, I was short on time to get all my work done. I had the fertilizer for the beans custom applied. Because of the small size of the no-till plot, the company was reluctant to blend and deliver a small amount. They ended up just doubling the rate on that field. I also rented the no-till drill we used from the local SWCD. Due to scheduling problems, I did not get the drill until four days after I had planted the row beans.

"The extra fertilizer and seed for the drilled beans was \$3.07 per acre more than the conventionally planted beans, but the no-till beans yielded 73 lbs./ac. more. This extra yield gave me \$10.95 more per acre plus I didn't have to field or row cultivate. I spent less time on tillage, too. Our plans now include the purchase of a no-till drill for 1992 and using no-till for all our dry beans."

# **Comparison of No-till and Conventional Black Turtle Beans**

### Site Information

- Normal Rotation: Sugar beets-corn-dry beans Previous Crop: Corn
- Yield Goal for 1991: 18 CWT/ac. 1990 yield: 130 bu./ac.
- Site Size: Treatment #1- Twenty-five acres Treatment #2- Five acres
- Soil types: Lenawee silty clay loam
- Soil test: pH-7.85 OM%-4.25 P-8.34lbs./ac. K-325lbs./ac. CEC-26.98

### **Management and Inputs**

Date	Treatment #1 Conventional System	Treatment #2 No-till System
June 1		t spray for quack grass 2 qts./ac. Roundup
June 6	Bros 50.15s./nc. 46-0-0 & 100.15s./ns.110-00	adcast applied fertili: er 110 lbs: /ac=46=0=0 & 200 lbs./ac=0=60=
June 10	Sprayed 2 qts./ac. Lasso Micro-tech and incorporated w/field cultivator. Planted beans in 30" rows 45 lbs./acre w/ 12512s./acre 10-34-0 starter	
June 14		No-till drilled beans in 7.5" rows at 60 lbs./ac., Sprayed 2 qts./ acre Lasso Micro-tech
July 1	First cultivation	
July 15	Second cultivation	
October 10	28.33 cwt./ac.	Harvest 29.10 cwt./ac.

	#1	#2
Seed/acre	\$ 8.10	\$ 10.80
Pesticides/acre	33.50	33.50
Fertilizer/acre	23.48	23.85
Machinery & labor/acre	61.00	42.08
Total expenses/acre	\$126.16	\$110.23
Gross income/acre	\$424.95	\$436.50
(-) Expenses/acre	126.16	110.23
Net return/acre	\$298.79	\$326.27

### Paul Wing Eaton County



Paul farms about 400 acres with his son, Tom, in Eaton County primarily on highly erodible ground. Besides operating a dairy and raising some beef cattle, they also grow corn for silage, alfalfa for haylage, and a small amount of soybeans for calves as a protein supplement. A mix of no-till and conventional tillage is used.

Paul is married and has five children. He is a member of Farm Bureau and is vice-chairman of the Eaton County Soil Conservation District. Paul was recently elected to the board of the Eaton County Dairy Herd Improvement Association.



"I have always been looking for new and different ways to do things. The primary reason that I got into sustainable agriculture was to get rid of chemicals. I wanted to quit spraying entirely so I decided to experiment with cultivation and other tillage practices to control weeds. I've become concerned with chemical use since I lost a family member to cancer who had doctors tell him it was a result of chemical use. He wasn't particularly careful with them. But at what point are you being careful or not?

"I have always used chemicals but for the rest of my life and for my son's well-being I'd like to get away from them. I know sprays are better nowadays, but how much is too much? That was my thinking in getting into the program this last year."

#### **Project Comments**

"We were very happy with the project and I felt we learned a lot. 1991 was our best year ever for corn and soybeans. The information we gained this year is; 1.) we will not band spray herbicides in no-till again, 2.) with our highly erodible soils, no-till on alfalfa sod is a good option and we will chisle-finish on the rest of the corn ground where we can, and 3.) chisle-finish/band spray and cultivate vs. no-till/ broadcast spray/cultivate are economically comparable practices. I'm not sure of the chisle/ cultivate idea. This year we did only one cultivation because of time conflicts with haying.

"Next year we will try chisle-finish/rotary hoe/ cultivate, possibly with a different cultivator. We will probably hire someone to do nothing but tillage. Hopefully we'll be able to control weeds this way instead of using chemicals. Cultivation will be done where possible, no matter what tillage option is used."

### **Comparison of Banded and Broadcast Herbicides in No-till and Conventional-till Corn**

### Site Information

Normal Rotation: Corn-soybeans	• 1990 Crop: Soybeans	
• Yield Goal for 1991: 100 bu./ac.	• 1990 yield: 33 bu./ac.	
• Site Size: Treatment #1- 3.4 acres	Treatment #2- 3.4 acres	Treatment #3- 3.4 acres
• Soil types: Oshtemo sandy loam		
• Soil test: pH- 6.2 OM%- NA P- 14	12 lbs./ac. K- 256 lbs./ac.	CEC-9

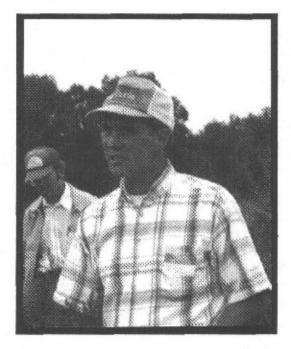
### **Management and Inputs**

Date	Treatment #1 Conventional-till	Treatment #2 No-till	Treatment #3 No-till
April 19	Chisle plow		
May 7	Light tillage w/soil/finisher		
May 9		Planted corn in 30" rows Pioneer 3751 Pop: 20,000	
	Band sprayed he 2.5 lbs./ac. Aa 1.25 qts./ac		Broadcast spray herbicides 2.5 lbs./ac Aatrex 9.0 & 1.25 qts./ac. Prowl
June 6	A Sur State	Cultivate	
June 19	Sid	edress 120 lbs./ac. (28%)	N
October 29	148.4 bu /ac.	Harvest* 109.7 bu/ac.	137.6 bul/ac.

\*Yields corrected to 15.5% moisture.

	#1	#2	#3
Seed/acre	\$ 20.60	\$ 20.60	\$20.60
Pesticides/acre	15.33	15.33	15.33
Fertilizer/acre	27.43	27.43	27.43
Machinery & labor/acre	55.53	40.73	40.73
Total expenses/acre	\$118.89	\$104.09	\$104.09
Gross income/acre	\$371.74	\$274.80	\$344.69
(-) Expenses/acre	118.89	104.09	104.09
Net return/acre	\$252.85	\$170.71	\$240.60

### Bob Fogg Ingham County



Bob and Joann Fogg farm approximately 335 acres in Ingham County. They have three children and have worked with the Rodale Institute for the past five years. The operation incorporates a twenty-five cow dairy herd with an organic cash crop system. In addition to the twenty-five cows, they maintain an equal number of replacements. They raise fifty to sixty acres of corn, soybeans and alfalfa. Small grains and legumes are also grown and manure is incorporated in rotation with a cover crop.

The Foggs began weaning themselves off chemicals in 1981, and have not used herbicides or chemical fertilizer since 1986. Bob uses conventional tillage but is not concerned that the practice will result in excessive soil erosion because of his rotations, his



use of cover crops, and the build-up of organic matter these create.

"My main motivation to experiment with alternative farming practices initially was due to environmental interests. I felt we were putting too much stress on the environment with the amount of inputs we were using. At first, economics never entered my mind. But since then, lower cost and greater returns have come to the front burner. Economics is the most commonly asked question when it comes to organic farming. I'd like to say that we were making more money, but there are a lot of other factors such as markets, weather, etc. But the biggest thing is that you don't have to put up a lot of money to plant crops. Now, my cash flow is a lot more steady and I don't have to spend the money to put crops in."

#### **Project Comments**

"Even though a second rotary hoeing did not have a significant impact on yields, there was less weed pressure on the plots that got two passes. The dryness of the year had an impact on the similarity in yields.

"Though I was a little disappointed that there wasn't a more significant difference between the two plots, I was glad to discover that some weed control decisions aren't as critical in a dry year as I had originally thought. In future years, some practices may be given different priorities, leaving more time for other management decisions."

### Weed Control without Herbicides in Soybeans

### Site Information

- Normal Rotation: Corn-soybeans 1990 Crop: Corn
- Yield Goal for 1991: 35 bu./ac. 1990 yield: 28 bu./ac.
- Site Size: Twelve acres total\*
- Soil types: Hillsdale/Riddles sandy loam
- Soil test: pH-6.2 OM%-2.5 P-54 lbs./ac. K-143 lbs./ac. CEC-6

\* Two different treatments were replicated and randomized six times. A total of twelve, one acre plots were established.

### Management and Inputs

Date	Treatment #1		Treatment #2	
April 20		Disk corn stalks		
May 10		Disk corn stalks		
May 25		Moldboard plow		
June 1		Disk field		
June 6	C	Cultipack and harrow		
June 8	Cors	Plant beans oy 79 Pop: 12 seeds/ft. 38" rows		
June 17	Rotary hoe			
June 26	Rotary hoe		Rotary hoe	
July 4		Cultivate		
July 12		Cultivate	28	
Oct 24	36.0 bu./ac.	Harvest	35.7 bu./ac.	

	Treatment #1	Treatment #2
Seed/acre	\$ 10.00	\$ 10.00
Pesticides/acre	0	0
Fertilizer/acre	0	0
Machinery & labor/acre	91.94	95.57
Total expenses/acre	\$101.94	\$105.57
Gross income/acre	\$198.09	\$196.44
(-) Expenses/acre	101.94	105.57
Net return/acre	\$ 96.15	\$ 90.87

### Arnold Elzer Grand Traverse County



Arnold and his wife, Betty, own and operate thirty acres of apple and cherry orchards in Grand Traverse County. They also have two acres in vegetable production with the produce sold at a local farmer's market. The fruit products are marketed directly to area grocery stores. The Elzers have three children. Arnold is a member of the Michigan Farm Bureau, the Northwest Michigan Horticultural Society and the Grand Traverse Fruit Growers Association.

"Up until the last three to four years, I had always sprayed according to the recommended amounts of the Fruit Spraying Calendar. It seemed to me that no consideration was given to climate and weather differences. My past experience had indicated that



pest populations tend to explode when you get substantial rain followed by warm weather, but the spraying recommendations did not take that into account. It led me to ask the question, why am I doing this every time I got the sprayer out? Chemicals are expensive and we know that using less of them will make everybody happier. I began to experiment with IPM systems and to learn to identify particular insects. I began to monitor MSU's weekly scouting reports to find out where and what type of insects were involved. This last year I participated in a course at the Kellogg Biological Station which trained me to link IPM theory with insect identification through scouting. I believe that these new approaches will prove for more profit as well as being environmentally safer."

#### **Project** Comments

"This year was not a typical year. It was mild and we didn't have an excessive amount of rain. Based on those conditions I would have probably cut back on spraying a little anyway, so I will need to look at the next few years to get a better picture.

"Pesticide applications are going to vary considerably from year to year due to fluctuations in insect and disease pressures, weather conditions, crop size and many other factors. It is probably unrealistic to assume that growers can experience these savings every year.

"However, I was extremely pleased that I was able to apply pesticides only as needed and not have to follow a pre-determined schedule that did not reflect actual pest counts. Working with the consultant and IPM technician, I was able to greatly improve my ability to identify insects (both deleterious and beneficial) and plan to use this skill to conduct my own IPM scouting next season."

### Pesticide Reduction Demonstration in Apples and Cherries

### Summary

Elzer normally applies pesticides on his twelve acres of apples and 18 acres of cherries in accordance with the recommendations listed in Michigan State University's "Fruit Spraying Calendar". This year, with the help of technical assistance provided through the Michigan Department of Agriculture's Residue Reduction Program, the Grand Traverse County SWCD, and the American Farmland Trust, Elzer applied pesticides based on the recommendations of the program's IPM technician and crop consultant.

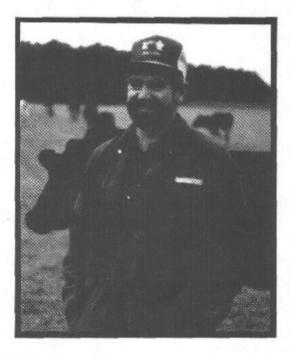
Scouting made it possible for the producer to eliminate two insecticide applications for the cherry crop, and five and one-half of the preventative sprays for the apple crop. These reductions, as compared to previous years' expenditures, saved Elzer approximately \$1753.00 and 227 pounds of active ingredient. This equals a savings of \$58.46/ac. with a reduction of 7.6 lbs/ac.

Spray	Product	Units/ac.	Acres	Total units	Cost /unit(\$)	Total Savings(\$
Dormant	Superior Oil	8.0 gal.	12	96	2.90	278.40
	Lorsban 4 EC	4.0 pts.	12	48	5.21	250.08
Prepink	Captan 50 WP	4.0 lbs.	12	48	2.40	115.20
Petal fall	Captan 50 WP	4.0 lbs.	12	48	2.40	115.20
	Ambush 25 WP	0.81bs	12	9.6	13.50	129.60
2nd Cover	Imidian 50 W/P	4.0 lbs.	12	48	3.20	153.60
6th Cover	Captan 50 WP	4.0 lbs.	12	48	2.40	115.20
	Imidan 50 WP	4.0 lbs.	12	48	3.20	153.60

### Pesticides not applied through the use of IPM practices, in 1991.

Cherries						
Spray	Product	Units/ac.	Acres	Total units	Cost /unit(\$)	Total Savings(\$)
Fruit fly	Imidan 50 W	3.01bs.	18	54	3.20	172.80
Preharvest	Sevin 50 W	6.0 lbs.	18	108	2.50	270.00

### George Shetler Kalkaska County



George Shetler runs a 40 cow dairy operation on approximately 275 acres outside of Kalkaska. He also grows corn using a minimum tillage system. He is married and has five children.

George is the Chairman of the Kalkaska County Soil and Water Conservation District, as well as Treasurer of the local school board.

"My basic motivation is to farm more safely, producing milk and meat without chemical inputs. Family health and economics also were primary reasons for changing to a more sustainable system."

#### **Project Summary**

In1991, Shetler began year one of an Intensive Rotational Grazing Project to compare the production costs and long term fertility of grazed and conventionally harvested fields in a



dairy operation. He also evaluated the effiency of using intensive rotational grazing as a way to reduce labor, electricity use and supplemental feed costs during the summer months.

Approximately 50-60 acres of the farm were fenced off into ten acre paddocks with two strand high-tensile electric wire. These paddocks were grazed at one acre intervals with movable fencing that allowed new grazing areas to be opened twice a day. No back fencing was used to prevent regrazing.

Pasture types ranged from newly seeded pure alfalfa stands to well established alfalfa-grass mixes. Shetler also integrated small grain crops (oats & rye) into the system. Forage analysis testing was done throughout the growing season to monitor pasture production and balance supplemental rations.

#### **Project Comments**

"The 1991 cropping season was the first year of this demonstration. Cows performed well all season but did not match production levels acheived in 1990. This is due, in part, to the difficultly of modifying the supplemental energy and protein rations fed in the barn to meet changes in forage quality in the field. A more consistant forage testing program needs to be implemented next year.

"A second factor that must be considered is that the cows were on a 3x milking schedule in 1990. Some studies have shown that 3x milking increases production. If this is true, a decline in total milk production would be expected with a change to a 2x schedule.

"I am convinced that the slight decrease in total milk production was more than compensated for by the relaxed summer schedule. Less time was needed for daily chores, less hay ground had to be covered, and fewer machinery breakdowns occured. It also appeared that the cows looked better and were more content ("bright-eyed"). This, plus the pleasure of watching cows graze on summer evenings, all contributed to making farming fun again."

# Intensive Rotational Grazing Demonstration

1990 = Conventional System 1991 = Intensive Rotational Grazing System

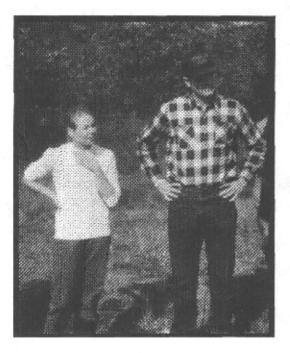
### **Milk Production**

	DHIA Roll	ing Herd Average	Relative Valu	ue (\$/cow/day)*
	1990	1991	1990	1991
May				
Milk (lbs.)	18783	19035	8.26	8 7'Z
Fat %	3.65	3.86		
Protein %	3.40	3.38		
June				
Milk (lbs.)	19071	18414	8.60	8.42
Fat %	3.66	3.94		
Protein %	3.39	3.39		
July	-			
Milk (lbs.)	19256	17931	8.68	8.60
Fat %	3.66	3.99		
Protein %	3.38	3.41		de States
August				N. C. N. C. M. S.
Milk (lbs.)	19445	17710	8.77	8.50
Fat %	3.66	4.01		
Protein %	3.36	3.43		
September			n n	
Milk (Ibs.)	19725	17412	8.00	8.36
Fat %	3 67	4.02		
Protein %	3.35	3,44		
October				
Milk (lbs.)	19768	17262	8.92	8.29
Fat %	3.68	4.03		
Protein %	3.35	3.42		

\* Figures based on \$13.54 milk price and \$0.11 butterfat differential. No protein premium available on this farm at this time.

Electricity (KWH)	consumpti	on	Labor and equipm (\$/ac.)*	ent cost	5	Suppliment (\$/cow/day) <sup>3</sup>		costs
	1990	1991		1990	1991		1990	1991
May	5540	5220	Manure spreading	18.38	3.12	May	2.83	2.66
June	5160	4510	Silo filling (haylage)	48.83		June	3.03	1.77
July	5210	4630	Dry hay harvest	36.97		July	2.76	1.78
August	5340	5220	Pasture clipping		15.67	August	2.83	1.67
September	5360	4650	Fence building/repair			September	2.88	1.77
October	5350	5200	water maintenance		3.00	October	2.98	1.91
Total	31,960	29,430	Manual labor (rotation	1		Average	\$2.89	\$1.93
			of paddocks &herd)		2.65			
required electri cleaners, silo ur	icity for ventila ploaders and fee		Total/acre	\$104.18	\$24.44	* Feed ration Grain Mix (		
system, the cat	tle were in the l feed handling,	tational grazing barns only at milking manure handling, and KWH used.	* Rates according to MSU E-2131 Custom Work F			Dry Hay @ Com Silage Halage @ S	\$50.00/ton @ \$25.00/to	

### Cindy and John Dutcher Chippewa County



ohn and Cindy Dutcher raise Angora goats for mohair, near Goetzville, MI. They also raise sheep for wool and have a small herd of beef cattle. The Dutchers grow their own hay and sell any extra.

"We bought an abandoned farm in 1981 that was really brushed in. We wanted to pasture livestock but the capital outlay for field improvements was too expensive. Goats are traditionally used for brush control and are well suited to Michigan. There were lots of Angora goats in the area so that's how we ended up with them.

"We began fencing goats into small areas because we didn't have much money, and it worked really well. That's where the portable system came from.

"The side benefit turned out to be quality pastures.



After the brush was cleared off, a numerous variety of clovers and legumes reappeared. Goats don't prefer these so the fields filled in nicely. We then put the cattle and sheep to graze behind the goats.

"If we didn't utilize this approach, we would've needed to use a lot of mechanical brush clearing, and we wanted to get into something that would give us a return pretty fast instead of capital outlay."

#### **Project Comments**

"We're happy with the project. The goats had to be trained to the electric netting. They all tried it out, and two became tangled, so it is important to observe them carefully until they are trained. By the end of the first day, they all left the fence alone.

"Local sources indicate that brushland conversion costs run approximatley \$75-100/ac. We estimate our costs to be approximately \$50/ac. This does not include any return from the sale of goats or mohair.

"We feel that we could reduce our per acre costs and get better conversion from the animals if we increase the number and size of the animals, grazing each paddock on a shorter schedule with more animal pressure.

"In the spring, we will reevaluate regrowth in the paddocks to see how effective the goats were at actually killing the larger brush. Some of the better established brushy plants may require more than one season of grazing and browsing before they are killed.

"We would like to utilize a solar power charger in the future. That would eliminate grounding rods and is more environmentally sound. We plan to use more rotational grazing in the future and want to get the cattle and sheep in behind the goats even in the nonproject paddocks."

### Weed and Brush Control Demonstration using Angora Goats

### Equipment

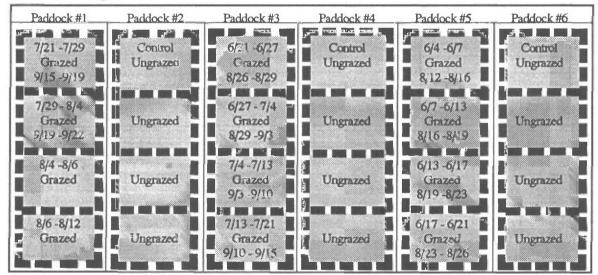
- Four rolls of 36" electronet
- Water Pails
- One battery powered fence charger Mineral Salt Blocks
- Two 3" ground rods

### Methods

The field to be cleared was divided into six plots of approximately one-half acre each. Three plots were designated as controls that would not be grazed. The remaining three were designed as demonstration plots that were to be "goated". The three grazed plots were divided into four smaller paddocks of approximately .125 acres using electric netting. (See chart below.)

Thirteen yearling Angora bucks (50-60 lbs.) and two senior Angora bucks (100-150 lbs.) were selected for the project. All animals were wormed, deloused and had their hooves trimmed prior to being turned out into the test area. The goats were transported to the demonstration site in the back of a pick-up. Twenty gallons of water and a mineral salt block were provided in each paddock. Color coded markers were used as reference points and each paddock was photographed before turning the animals loose.

The 15 animals were moved through the system of paddocks from June 4 to the end of the project year on September 22.



### 1991 Grazing Schedule

### **Observations**

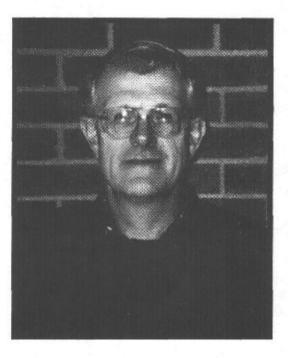
When first released into a paddock, the goats preferred the young growth from willow and tag alder, goldenrod heads, and all new grass and weed shoots. After these were gone, the animals began to push down and girdle the larger brush. This behavior was observed throughout the grazing period, however, activity did slow down significantly near the end of the year, particularly in the last paddock grazed.

A substantial amount of young brush was killed and older brush was severely girdled. This produced large openings in the brush canopy, providing more light to more palatable grass and forb species.

No differences were noted in fleece weight or overall health between the goats grazed on the brushland and animals of similar size and age grazed on maintained pastures.

### Rich Lauwers St. Clair County





Rich and his wife farm about 2500 acres with their sons, Mark and Mike. They primarily grow sugar beets, wheat, soybeans and corn using no-till and ridge-till systems. Rich is a member of the St. Clair County Farm Bureau and has served on the local school board for the past twelve years. "We were primarily motivated to begin looking at sustainable agriculture out of a desire to leave the land in better shape than we found it. We also want to farm as cheaply as possible in order to make a living. One of our goals is to use less inputs and still maintain the same level of production."

### **Project** Comments

"We will be planting beets on ridges again next year. We will also spray Roundup on the entire ridgetill field. By planting time there are some pretty good size weeds and that's the only way to get things burned down."

## **Ridge-till vs. Conventional till Sugar Beets**

### Site Information

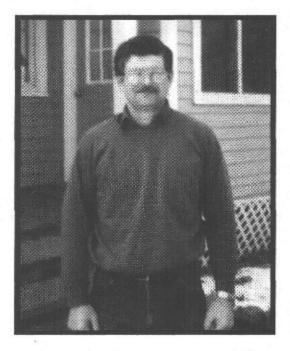
- Normal Rotation: Corn-soybeans-sugar beets-wheat
  1990 Crop: Soybeans
  Ni-11 Could for 1001, 20 targets
- Yield Goal for 1991: 20 tons/ac.
- 1990 yield: 50 bu./ac.
- Site Size: Treatment #1 3.5 acres Treatment #2 23.3 acres
- Soil types: N/A
- Soil test: pH- 6.5 OM%- N/A P- 200 lbs./ac. K- 295 lbs./ac. CEC- 13

### Management and Inputs

Date	Treatment #1 Conventional-till	Treatment #2 Ridge-till
May 3	Spread fertilizer	Clean ridges
-	200 lbs./ac. 9-23-36	Spread fertilizer
	Field cultivate (2 passes)	200 lbs./ac. 9-23-36
	Plant beets in convential seed bed	Plant beets on ridges
	Pop: 1.2 lbs./ac. beet seed	Pop: 1.2 lbs./ac. beet seed
		nce herbicides at planting ac. Nortron & 1.5 pt./ac. Antor
May 10		Spray hpt./ac. Koundup before crop emergence
May 31		mergence herbicides c Betamix
have o	First ct	Ditivation
June 20		tion and sidedress c. N (28%)
Oct 31	Ha 14.5 toxis/ac.	irvest

	#1	#2
Seed/acre	\$ 24.00	\$ 24.00
Pesticides/acre	69.69	75.57
Fertilizer/acre	25.04	25.04
Machinery & labor/acre	92.35	92.49
Total expenses/acre	\$211.08	\$217.10
Gross income/acre	\$507.50	\$570.50
(-) Expenses/acte	211.08	217.10
Net return/acre	\$296.42	\$353.40

### Tom Seamans Shiawassee County



d om Seamans runs a 100 cow dairy operation on approximately 700 acres in Shiawasee County. He is married, has three children and is assisted by his father in day to day farm management. About one-half of his cropland is dedicated to the production of alfalfa and corn silage, with the rest in cash crops (corn, soybeans, wheat and oats). He uses no-till as his primary planting system.

Tom is currently Secretary of the Shiawassee County Soil and Water Conservation District and President of the Owasso Milk Producers Association.



"I always enjoyed tillage, and I think that every farmer likes to plow. But it became easy to see that although the residue that you turn under is good for the soil, it really needs to be on top to stop erosion. So I went to chisle plowing to leave more residue on the surface, and from there, my next step was no-till.

"I don't like purchasing any more nutrients than I have to, so I try to utilize as much waste from the herd as I can. I am also interested in using less soil insecticide. Overall, I am always looking for ways to reduce cost and save time in producing crops. I guess I am always intersted in improving my efficiency."

#### **Project** Comments

"I would like to reduce my insecticide investment for next year, but I want to see the results from other test plots before I do. I am convinced that the lower rate did not have a detrimental effect on the crop, but I don't think that rootworm was a big problem this year. If there are some other producers with similar results, I will seriously consider reducing my insecticide rates by one-fourth in corn after corn. I would also like to work soybeans in to my rotation to cut back on insecticides."

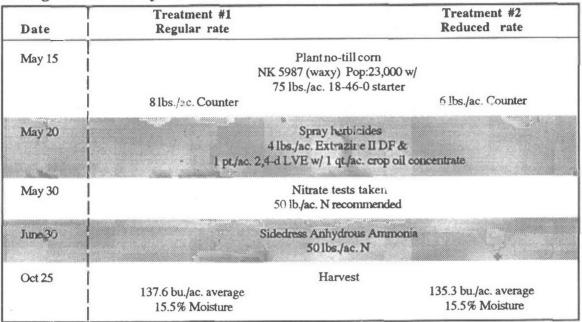
### Soil Insecticide Reduction Demonstration in Second Year Corn

### Site Information

- Normal Rotation: Oats-wheat-2corn-oats/alfalfa
- Yield Goal for 1991: 120 bu./ac.
- Field Size: Two and one-half acres total\*
- Soil types: Miami sandy loam, Conover loam
- Soil test: pH-6.3 OM%-2.15 P-270 lbs./ac. K-380 lbs./ac. CEC-9.25

\* This plot was planted in alternating, planter width strips. Each treatment was replicated three times.

### **Management and Inputs**



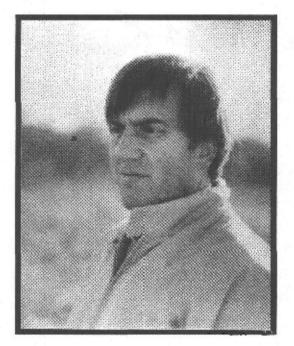
#### **Economic Results**

	#1	#2	
Seed/acre	\$20.13	\$20.13	
Pesticides/acre	27.77	24.79	
Fertilizer/acre	16.38	16.38	
Machinery & labor/acre	45.78	45.78	
Total expenses/acre	\$110.06	\$107.08	
Gross income/acre	\$344.69	\$338.93	
(-) Expenses/acre	110.06	107.08	
Net return/acre	\$234.65	\$231.85	

• 1990 yield: 120 bu./ac.



### Greg Mund Oceana County



Greg is an asparagus and fruit grower, as well as the SCS District Conservationist for Muskegon County. He has 30 acres of new asparagus and 27 acres of tart cherries, sweet cherries, peaches and plums. He is married and has four children.

"I am motivated to experiment with alternative practices because of scientific evidence that pesticides are detrimental to the evironment, particularly water resources. I'm not sure of the outcome of using alternatice practices like this biological spray program, but I'd like to stick with it for two to three years to see if it will work."

#### **Project Summary**

Mund is in the first year of a two to three year alternative program utilizing "biological" inputs for the production of tart cherries.

In 1991, using IPM methods, he was able to eliminate one insecticide spray from the the IPM control block. In the Biological control block, no insecticide sprays were used. Fungicide and herbicide programs were the same for both blocks.

Unfortunately, due to a late frost and hot, humid weather during pollination, both blocks produced only two tons/ac. during the 1991 season.

#### **Project Comments**

"I had some problems with the equipment, and my lack of experience with the biological program probably hurt me more than anything else. I was not able to get out and do some spraying that probably should have been taken care of. I have picked up some new equipment and I'll give it another try next year. I'm looking forward to it, and would like to try the biological program on all my acreage, but I think I have a lot more learning to do first."

# **Biological Spray Demonstration in Tart Cherries**

#### Site Information

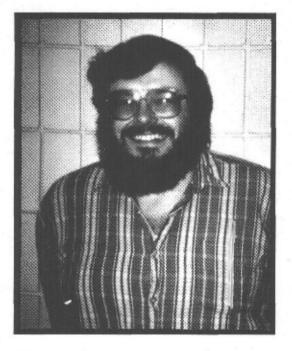
- Previous Crop: Tart cherries 1990 yield: 7.8 tons/ac. 1991 yield goal: 6-7 tons/ac
- Site Size: IPM control orchard nine acres Biological control orchard two acres
- Soil types: Spinks, Benona loamy sand
- Soil test: pH- 5.0 OM%- N/A P- 218 lbs./ac. K- 122 lbs./ac. CEC- 4.0

Date	Product	Units /acre	Cost(\$)	Total \$	Date	Product	Units /acre	Cost(\$) /unit	Total S
		10010							
April 20	21-17-18	500 lbs.	.10/lb	50.00	April 20	21-17-18	500 lbs.	.10/lb	50.00
May 3	Funginex	1.5 pts.	68.00/gal	12.75	April 26	TNA 6-12-6	1 qt.	24.00/gal	6.00
	Codacide oil	l pt.	19.50/gal	2.44		H2O2	4 oz.	16.00/gal	.50
			.0			Dextrose	5 lbs.	.41/lb	2.05
May 18	33-0-0	500 lbs.	.09/1b	45.00	April 27	Colloidal Phos.	300 lbs.	.11/lb	33.00
May 20	Roundup	1 pt.	50.00/gal	6.25		Colloidal Flios.	500105.	.11/10	33.00
	Codacide oil	1 pt.	19.50/gal	2.44	May 18	33-0-0	500 lbs.	.09/lb	45.00
May 22	Bravo	2 pts.	17.28/gal	4.32	May 20	Roundup	1 pt.	50.00 gal	6.25
	Guthion WP	2 lbs.	4.16/lb	2.08		Codacide oil	1 pt.	19.50/gal	2.44
	Codacide oil	1 pt.	19.50/gal	2.44					
		- F			May 21	H2O2	8 oz.	16.00/gal	.50
	Sylett	1.5 lbs.	7.45/lb	11.18	1	20-0-0	4 lbs.	1.35/lb	5.40
	Codacide oil	1 pt.	19.50/gal	2.44		12-50-0	21bs.	1.53/lb	3.06
		-1-			1	TNAFLO	7 oz.	52.00/gal	.55
June 17	Sylett	1.5 lbs.	7.45/lb	11.18					
	Guthion 3F	1.5 pts.	38.30/gal	7.18	May 22	TNA 6-12-6	1 qt.	24.00/gal	6.00
	Codacide oil	l pt.	19.50/gal	2.44		H2O2	4 oz.	16.00/gal	.50
					1	Dextrose	.5 lb.	.41/lb	.20
June 22	Nutri-Phos ZBK	1 qt.	10.00/gal	2.50		Bravo	1.5 pts.	17.28/gal	3.24
	Nuti-Phos 3-15	5 lbs.	1.64 lb	8.20		Codacide oil	1 pt.	19.50/gal	2.44
June 23	Bramoxone Plus	1.5 pts.	31.00/gal	5.81	June 2	Sylett	1.5 lbs.	7.45/lb	11.18
	Crop oil conc.	1.5 pts.	3.90/gal	.73		Codacide oil	1 pt.	19.50/gal	2.44
	Sylett	1.5 lbs.	7.45/lb	11.18	June 25	Sylett	1.5 lbs.	7.45/lb	11.18
	Sulfur	7 lbs.	.50/lb	3.50		Sulfur	7 lbs.	.50/lb	3.50
	Rovral	1.2 lbs.	17.90/lb	21.48		Rovral	1.2 lbs.	17.90/lb	21.48
	Ethrel	.25 pts.	49.50 gal	1.55		Ethrel	.25 pts.	49.50 gal	1.55
July 14	Bravo	2.5 pts.	17.28/gal	5.40	July 14	Bravo	2.5 pts.	17.28/gal	5.40
	Sulfur	7 lbs.	.50/lb	3.50		Sulfur	7 lbs.	.50/lb	3.50
	Codacide oil	1 pt.	19.50/gal	2.44		Codacide oil	1 pt.	19.50/gal	2.44
August 8	Roundup	l pt.	50.00/gal	6.25	August 17	7 Sylett	1.5 lbs.	7.45/lb	11.18
	Codacide oil	l pt.	19.50/gal	2.44		Codacide oil	1 pt.	19.50/gal	2.44
Total ch	emical & fertili	<u> </u>	-	237.12	Total ch	emical & fertil	izer cost/ac	ere	\$243.4

### IPM spray and fertilizer program

**Biological spray program** 

### Larry Mawby Delta County



Larry Mawby is the co-owner and manager of a 300 acre orchard near Garden, in Delta County, and a vinyard near Suttons Bay in Leelanau County. He grows cherries, apples and grapes for retail and wholesale markets. Larry also produces wine marketed under the L. Mawby label.

Larry is a member of the Board of Directors of the Michigan Agricultural Stewardship Association and a member of the NW Michigan Organic Growers Association. He is also a board member of the Sleeping Bear Dunes Fresh Fruits Cooperative and serves on the Leelanau County Board of Reveiw.

"My primary interest in sustainable agriculture is to make my farming operation truly sustainable so that it may continue for generations to come. Every human



being should be committed to not abusing the planet and leaving the environment in better shape than it was before."

#### **Project Comments**

"Overall, I was very happy with the plot. I never expected that we would get any final answers from this year's demonstration, although the results were certainly encouraging. We also found some interesting new questions that should be followed up on.

"Our plot was intended to advance the limits of understanding for the role that mating disruption can play in the commercial production of apples. We hoped to find that a simple substitution of massive amounts of disruption pheromones for the normal pesticide spray would result in effective control.

"Preliminary results seem to indicate that the pheromone disruption is effective in controlling codling moth. However, other pests have become a problem in the trial block. These pests are insects not normally destructive in orchards because their populations are usually limited by incidental control during the regular use of pesticides. In the trial block, their populations reached damaging levels during the growing season. This was not altogether unexpected, but never the less, disappointing.

"Although the use of the disruption control strategy may not result in a dollar savings to the grower, the economic value of the method must be measured against the larger costs to society that stem from the use of conventional pest control practices. If society is willing to pay a higher price for apples produced using the disruption strategy, growers may be able to adopt this practice."

# **Codling Moth Mating Disruption Demonstration in Apples Using Pheromone Emitters**

Demonstration size: Control block - Ten acres Trial block - Ten acres

#### Summary

Codling moth is a destructive insect in commercial apple orchards. After mating, the female lays her eggs on the developing apple fruits. When the eggs hatch, the larvae feed on the apples. The damage caused by the feeding larvae makes the fruit commercially valueless.

Control of codling moth is typically achieved through a series of chemical applications timed to kill the hatching larvae. Common insecticides used for control are Diazinon, Guthion, Imidan, Lannate, Sevin and Asana.

In recent years, attention has focused on controlling codling moth with the use of pheromones. Pheromones are chemicals emitted by the female moth when she is ready to mate. The pheromones, wafting through the orchard, are used as a scent trail by the males. Many growers have used pheromone baited sticky traps to capture male moths as they seek out females. This system helps growers to know when the moths are beginning their mating period and allows them to calculate the time of egg hatch. With this information, growers can make their pesticide applications more effective.

Another use of pheromones is now being tested for the control of codling moth. Since males need to follow a pheromone scent trail to find females, disrupting this trail disturbs the reproductive cycle of the moth. Flooding an orchard with codling moth pheromone would make the scent trail of individual females invisible to the males. As a result, the female could not mate, and she would die without reproducing.

This technique has been used successfully on other insects that use pheromones to find mates, particularly Gypsy Moth and Oriental Fruit Moth. Prior to this test, it had been used only experimentally on apple codling moth. Grower Larry Mawby, and Dr. Jim Johnson of MSU felt that the technique had merit, and the two set up a large scale trial using a new pheromone dispensing system at Mawby's Garden Orchard property in Delta County, MI during the 1991 growing season.

A 20 acre block of 15 year old apple trees of several different cultivars was selected for the demonstration site. This block was especially well suited for the trial because it was separated from other fruit trees by approximately 200 yards. The 20 acres was divided into two 10 acre sections, with the west 10 acres serving as the demonstration site and the east 10 acres as the control.

In early June, just prior to first generation codling moth emergence, the pheromone dispensers were placed in the demonstration block. The dispensers look like tubular twist ties, with the pheromone contained inside the tube. The walls of this tube are made of a special semi-permeable membrane which allows the pheromone to outgas into the atmosphere at a controlled rate.

The emitters provided season long pheromone coverage. They were placed at a rate of four per tree, with one in each quadrant of the exterior of the tree. At approximately 112 trees/ac., more than 4000 pheromone emitters were used in the 10 acre trial block. No pesticides were used for the control of apple codling moth.

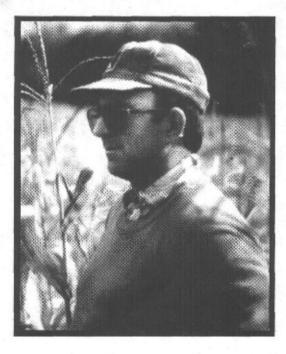
The control block received no pheromone emitters. Pheromone sticky traps were placed in the control block, as well as in some wild apple trees next to the demonstration site, in an attempt to monitor the flight of mature males. Guthion was applied at a rate of two lbs./ac. one time during the growing season to control apple codling moth in the control block.

At the time of printing, data collected at this site by MSU has not been completely analyzed, however, based on the harvest, packing and sales experience of the grower, the level of codling moth control in the trial block is commercially acceptable. He reports no higher rate of codling moth injury in the pheromone treated site.

While these results are encouraging, it must be understood that a single year's results are not enough to accurately determine the effectiveness of this technique. In an area with very high codling moth infestation, it is likely that gravid females would find their way into a pheromone treated orchard from outside the block. Also, the effect of reduced pesticide applications could result in a population increase of other damaging pests.

Because the pheromone emitters are still in the experimental stages, and are not yet commercially available, no economic data is available for this trial. The grower reports that the cost of labor required to place the dispensers throughout the orchard was equivalent to the labor, machinery and product cost of two pesticide sprays in the control block.

# Bob Ricksgers Antrim County



**B**ob and his wife, Brenda, own a dairy operation in Antrim County. They currently milk 48 cows and raise 350 acres of crops for feed, comprised of corn, alfalfa and oats. Bob has been a no-tiller for the last fifteen years, but has used disking and light cultivation in some fields in recent years for weed control.

The Ricksgers have five children. Bob is a member of the Michigan Farm Bureau and Milk Producers. He has been a board member of the Antrim County Soil Conservation District for the last seventeen years and is currently the local chair of the Michigan Association of Conservation Districts. Brenda serves on the Antrim County Farm Bureau Board.



"My primary motivation in getting into sustainable agriculture was the bottom line. That is, getting the most production for the least amount of investment. I do whatever I can to make an extra dollar or two and help the environment. I've been experimenting with eliminating fertilizer and herbicides as well as utilizing manure more effectively to keep it out of the streams."

#### **Project Comments**

"This year's demonstration plot was aimed at looking at different rates of nitrogen application. I wanted to look at whether a different combination would make a significant difference in yield. Yields this year were considerably lower than normal due to dryness, I only got twenty five to thirty percent of what I expected. I was surprised, however, with the increase in yield that I saw from the fields where starter fertilizer was applied. My light soil combined with little rain might have kept it available rather than leeching out. I'll probably need to run a couple more checks to see whether I get the same results."

# Nitrogen Rate Comparison on Sandy Soils

### Site Information

- Normal Rotation: Continuous corn
- Previous Crop: Corn • 1990 yield: NA
- Yield Goal for 1991: 15 tons/ac. • Site Size: Twelve acres total\*
- Soil types: Kalkaska sand, Emmet sandy loam
- Soil test: not available

\* Five different rates of nitrogen were replicated four times in field length strips. Each N treatment was randomized.

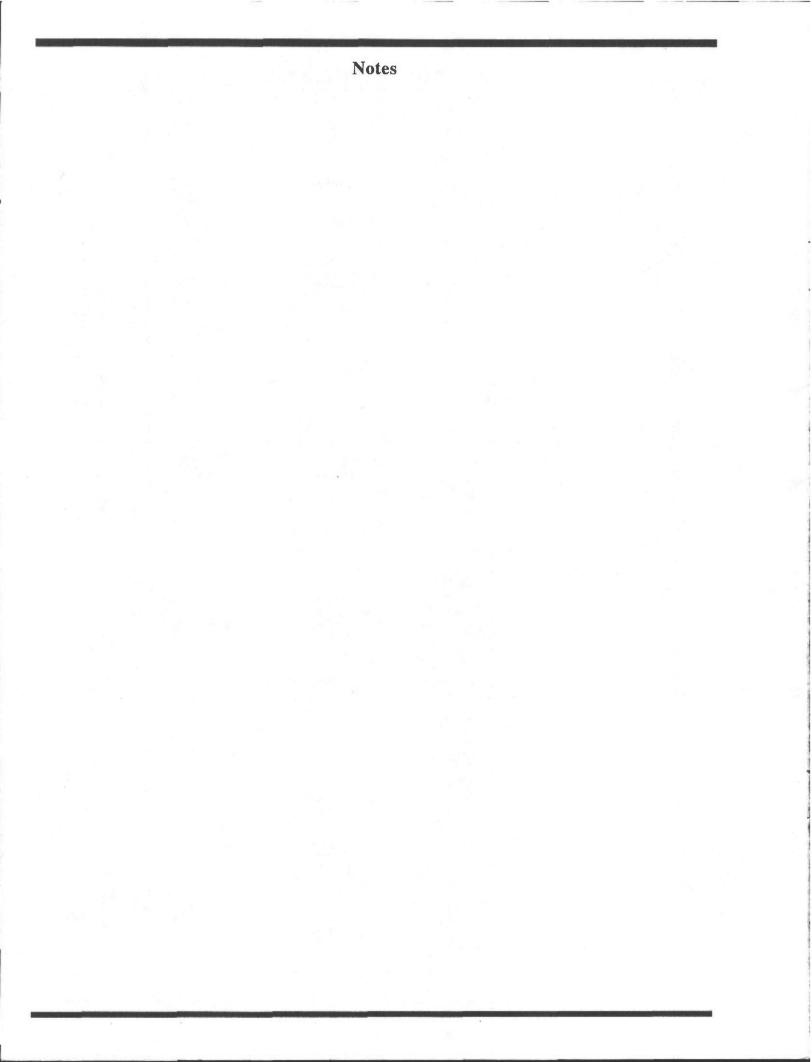
### Management and Inputs

Date	Raie #1	kats #2	Rate #3	Rate #4	Rate #5
May 22	65 lbs./ac.	Spre: None applied	ad dry fertilizer (0- 65 lbs./ac.	0-46) None applied	Noneapplied
May25		Pioneer 1 pt./ac.	Plant corn SB95, Population 2 Atrazine 4L and .5	0,00 with pt./ac.Paraquat	
	3 gal./a	c. 10-20-10 starter 1	tertilizer (1, 2, 3 &	4)	No starter
July 15	30 lbs./ac. N	Culitvate No N applied	e & Sidedress with 60 lbs./ac-N		No N applied
October 15	Harvest (chop for silage)				
	30 lbs./ac. N   5.00 tons/ac.	Starter N only 4.59 tons/ac. All figure	63 lbs./ac. N 5.70 tons/ac. s represent dry mat	93 lbs./ac. N 4.88 tons/ac. tter weights.	No N applied 3.24 tons/ac.

#### **Economic Results**

	#1	#2	#3	#4	#5
Per acre value of crop*	\$98.50	\$90.42	\$112.29	\$96.14	\$63.83
-)Fertilizer treatment cost	32.21	15.00	34.24	24.87	0
Net return	\$66.29	\$75.42	\$78.05	\$71.27	\$63.83

\*Assuming value of corn silage at \$25/ton and a per acre harvest cost of \$26.50.



**Additional Project Results** 

# Tom Seamens, Shiawassee County Nitrogen Reduction Demonstration in Second Year Corn

### Site Information

- Normal Rotation: Oats-wheat-2corn-oats/alfalfa Previous Crop: Corn
- Yield Goal for 1991: 120 bu./ac.
- 1990 yield: 120 bu./ac.

- Site Size: 1.65 acres total\*
- Soil types: Miami sandy loam, Conover loam
- Soil test: pH-6.3 OM%-2.15 P-270 lbs./ac. K- 380 lbs./ac. CEC-9.25

\* This demonstration was planted in alternating, planter width strips. Each rate was replicated two times.

#### Management and Inputs

Date	Treatment #1 Regular N rate		Treatment #2 Reduced N rate
May 15		Plant com NK 5987 (waxy) Pop:23,000 w/ 75 lbs./ac. 18-46-0 starter & 8 Ibs./ac. Counter	
May 20	1 pt./ac	Spray herbicides 4 lbs./ac. Extrazine II DF & . 2,4-d LVE w/ 1 qt./ac. crop oil cond	centrate
May 30		Nitrate tests taken 50 lb/ac. N recommended	
June 30	70 lbs./ac. N	Sidedress Anhydrous Ammonia	50 lbs./ac. N
Oct 25	14] .8 bu./ac. 15.5% Moisture	Harvest*	140.1 bu./ac. 15.5% Moisture

#### **Economic Results**

	#1	#2
Seed/acre	\$20.13	\$20.13
Pesticides/acre	27.77	27.77
Fertilizer/acre	18.88	16.38
Machinery & labor/acre	45.78	45.78
Total expenses/acre	\$112.56	\$110.06
Gross income/acre	\$355.20	\$350.95
(-) Expenses/acre	112.56	110.06
Net return/acre	\$242.64	\$240.89

# Tom Guthrie, Barry County Banded vs. Broadcast Herbicides in Corn

#### Site Information

- Normal Rotation: Alfalfa-c-sb-c-sb-w Previous Crop: Soybeans
- Yield Goal for 1991: 110 bu./ac. 1990 yield: 47 bu./ac.
- Site Size: Treatment #1 Five acres Treatment #2 Five acres
- Soil types: 22B & 22C Kalamazoo Loam
- Soil test:
- #1 pH-7.0 OM%-1.8 P-96 lbs./ac. K-274 lbs./ac. CEC-7.7
- #2 pH-7.0 OM%-2.0 P-102 lbs./ac. K-178 lbs./ac. CEC-6.3

### **Management and Inputs**

Date	Treatment #1 Broadcast		Treatment #2 Banded
Fall 90 & Spring 91		Spread Manure 3.0 tons/ac.	
May 8		Disk	
May 10	175 lbs./ac. 6-15-40	Spread Fertilizer	3501bs./ac. 6-15-40
May 14		Moldboard How	
May 16	Broadcast Application of 3.1 lbs./ac. Partner, 1.0 lb./ac. Bladex DF, .5 lb./ac. Atrazine DF & 1.5 qt./ac. Roundup w/ 101 lbs./ac N (28%) N	Disk, Plant Corn and Spray Payco SX 687 Pop: 23,000 w/ 85 lbs./ac. 10-34-0 starter &	Band Application of 1.03 lbs./ac. Partner, .33 lb./ac. Bladex DF, .17 lb./ac. Atrazine DF & 1.5 qt./ac Roundup w/ 101 lbs./ac. N (28%)
May 24		Rotary Hoe	
June 9	No Cultivation		Cultivate
June 12	No Cultivation		Cultivate
Sept 26	117 bu./ac.	Harvest*	110 bu./ac.

\* Yields corrected to 15.5% moisture.

### **Economic Results**

	#1	#2
Seed/acre	\$ 16.96	\$ 16.96
Pesticides/acre	\$ 37.32	\$ 24.42
Fertilizer/acre	\$ 30.79	\$ 47.92
Machinery & labor/acre	\$ 67.72	\$ 76.90
Total expenses/acre	\$152.79	\$166.20
Gross income/acre	\$293.09	\$275.88
(-) Expenses/acre	\$152.79	\$166.20
Net return/acre	\$140.30	\$109.35



## And Parks

### American Farmland Trust Sustainable Agriculture Program

"Land," said Aldo Leopold, "is not merely soil; it is a fountain of energy flowing through a circuit of soils, plants and animals."

Unfortunately, many of the farming practices commonly used by agricultural producers over the last few decades have severely altered this biological "circuit." Soil erosion and sedimentation, the widespread contamination of ground and surface waters, and the loss of wildlife habitat ...all are serious problems that, in part, stem from man's agricultural activities.

Sustainable agriculture is an alternative approach to crop and livestock production that encourages the use of practices that do not degrade land or water resources. Sustainable farming methods make better use of biological assets and reduce overall reliance on purchased agricultural inputs.

On-farm research and demonstration projects conducted in recent years throughout the U.S. have proven that sustainable farming systems work, and that they are as productive and profitable as conventional systems.

The American Farmland Trust Sustainable Agriculture Program works with agricultural producers to promote alternative farming systems which are practical, profitable and environmentally sound. To accomplish this, staff work in three program areas:

- Assistance to grassroots organizations: AFT assists in the establishment of farmer-directed groups which play a fundamental role in promoting sustainable agriculture.
- Advocacy AFT promotes the development of public policy and programs that support alternative farming systems at the local, state, and federal levels.
- On-farm demonstration and research projects: AFT makes financial and technical assistance available for farmers to experiment with alternative production techniques.

In addition, the Sustainable Agriculture Program provides educational opportunities for farmers. Workshops, field days, conferences, and publications are all part of this effort.

As we advance into the future, so must we increase our efforts to become better stewards of the land. The American Farmland Trust is committed to this philosophy. The Sustainable Agriculture Program will continue its efforts to promote alternative farming systems, so the resource base that supports us all can remain productive for many generations to come. The Michigan Agricultural Stewardship Association (MASA) is a statewide, not-for-profit educational organization committed to the development and use of sustainable farming systems.

Formed in 1991 by a group of innovative farmers and agricultural professionals, MASA works to:

- Increase awareness and educate the public on sustainable agriculture issues;
- Promote research that will determine the sustainability of alternative farming systems;
- Aid in the development of sustainable agriculture techniques for use on Michigan farms, and assist in their adoption by Michigan's farmers;
- Encourage cooperation between producers, agribusiness, researchers and government agencies for the development of sustainable farming systems.

Soil conservation, water quality and wildlife issues are also concerns of MASA members.

MASA believes that Michigan producers need access to practical, readily usable information on sustainable farming systems.

The organization holds field days, workshops and farmer meetings throughout the year ro educate its members about ways to reduce some of the negative ecological impacts associated with agricultural production and to farm more profitably.

The organization participates in the establishment of on-farm demonstration and research plots, designed by farmers and agricultural professionals to compare conventional and alternative production methods.

Members of MASA receive newsletters and special mailings on sustainable agriculture issues and events.

Name	\$25 —Individual or Family Membership
Address	\$150 — 3 year Charter Membership
City State Zip	\$100 — Institution/Business Member
Phone	Please make check payable to MASA
	nembership form and check to: o Rd., Delton MI 49046

### **MASA Membership Application**

The Michigan Agricultural Stewardship Association (MASA) is a statewide, not-for-profit educational organization committed to the development and use of sustainable farming systems.

MASA 7301 Milo Rd. Delton MI 49046

The American Farmland Trust (AFT) is a private, non-profit, membership organization founded in 1980 to protect our nation's farmland. AFT works to stop the loss of productive farmland and to promote farming practices that lead to a healthy environment. Annual membership is \$20.00.

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