

Special Section

Results: 1995 Michigan Sustainable Agriculture Project

MASA

THE LAND STEWARD

Newsletter of the Michigan Agricultural Stewardship Association

Vol. 5, No. 1

February 1996

Five Years Of On-Farm Research

With this publication, MASA completes five years of sponsoring farmer-driven on-farm research and demonstrations and publishing the results.

In 1991, the Michigan Agricultural Stewardship Association and its on-farm research committee began offering financial help, enthusiastic moral support and technical advice to farmers who wanted to try a new idea or practice to see if it would work on their farms.

Most of them wanted to find out for themselves just how much nitrogen they needed to produce that corn crop, for example, or just what rate of herbicide would kill the weeds, or how a cover crop affects yields and soil and water quality. They didn't want to waste their money by applying more than was needed. Many were spurred by environmental concerns; they didn't want to add more agrichemicals to the environment than was needed to do the job.

The on-farm research project is ongoing. Kalamazoo dairyman Roger French chairs the committee that (1) solicits and selects new projects, (2) helps farmers set up on-farm experiments that are scientifically meaningful, and (3) collects and publishes the results.

Most projects attempt to optimize use of inputs, enhance environmental protection and in general help to identify sustainable practices.

In past years, MASA has paid farm-



Richard Ekins got weed-free corn with reduced herbicide rates, but not soybeans (more on pg. 4).

ers \$500 to help defray their costs in carrying out a scientifically valid experiment. Usually that means setting up test plots in which treatments are randomly assigned and replicated four or more times and data are collected and averaged. MASA has paid \$250 for a demonstration project, in which a farmer tries out a new idea or practice, such as composting, in which no side by side testing is needed.

Each project is assigned a coordinator who helps the farmer set up the experiment and collect and compile the results.

Financing in past years has come from the American Farmland Trust and the C.S. Mott Foundation.

A Call for Projects

Again this year, the on-farm research committee is looking for farmers wanting to do projects.

If you have an idea you'd like to test, contact Roger French at Dawnera Farms, 10004 Stadium Drive, Kalamazoo 49009, or call 616/375-0658. An alternate contact is Russ LaRowe, MASA executive director, at 605 N. Birch St., Kalkaska MI 49646 (telephone 616/258-3305).

Deadline for application is March 1. The committee will meet in March, select the projects it wishes to support and contact you in plenty of time to get your project underway this spring.

MASA Elects New Officers

MASA members elected a new president and a new board member and reelected two board members at the annual meeting during the Michigan Agriculture Mega-Conference January 12.

The new president is Cindy Dutcher, from Goetzville in Chippewa County. She and husband John own a farm devoted to forage production for beef, sheep and angora goats. They recently added blueberries and are developing a U-pick operation.

The new board member is Paul

Luttenbacher, a greenhouse grower from Clio in Genesee County, who was one of the original board members of MASA when it was formed in 1990.

Reelected to the board were Marlin Goebel, who runs a cow-calf operation near Hillman in Montmorency County, and Rich Lauwers, a cash crops farmer from Imlay City in St. Clair County.

The Michigan Agricultural Stewardship Association is a non-profit organization, the goal of which is to foster sustain-

able agriculture practices among Michigan farmers. Executive Director is Russ LaRowe, located in the MASA office at 605 N. Birch St., Kalkaska, MI 49646, who may be contacted for membership information or other matters. Phone: 616/258-3305 Fax: 616/258-3318.

MASA officers are: President, Cindy Dutcher, Goetzville 906/297-2120; Vice-President, Robert Fogg, Leslie, 517/589-9290; Secretary, Greg Mund, Rothbury, 616/788-3492; Treasurer, Tom Guthrie, Delton, 616/623-2261 or -2255.

Other directors are Jerry Wirbel, Hope, 517/689-3857; Richard Lauwers, Imlay

City, 313/724-2263; Marlin Goebel, Hillman, 517/742-4505; Christopher Lufkin, Ionia, 616/527-5357; and Paul Luttenbacher, Clio, 810/686-1370. Leadership Development Coordinator is John Durling, Michigan State University, 517/353-3209 Fax 353-7186. Roger French, Kalamazoo, 616/375-0658, chairs the On-Farm Research Committee. Advisory Board Chair is Oran Hesterman, MSU, 517/355-0264.

If you have sustainable agriculture news to share, send it to Newsletter Editor Dick Lehnert, 2700 E. Cavanaugh Rd., Lansing MI 48910. 517/882-2794 Fax: 887-4964.

MASA at MSU's ANR Week - March 6

MASA members and interested farmers are invited to participate in an agroecology discussion session Wednesday, March 6, during ANR Week at Michigan State University.

"There has been significant interest among producer groups and agricultural agency and industry professionals for information on more effective use of biology in production systems," says Richard Harwood, who holds the C.S. Mott Foundation Chair of Sustainable Agriculture at MSU. "Michigan is a leader nationally in several key agroecological areas," he said.

"Scientists here feel they are making significant breakthroughs and are anxious to share their research."

The program will go from 9 a.m. to 4 p.m. at the auditorium of the Plant and Soil Sciences Building on the MSU campus.

Speakers will address use of rotations, cover crops, plant diversity in the landscape, crops residues and other practices that affect biological processes.

To make a reservation for a box lunch to be eaten in the greenhouse conservatory, send \$10 check to MASA, Office of Sustainable Agriculture, c/o Anne Conwell,

A260 Plant and Soil Sciences Building, East Lansing MI 48824.

The day before, March 5, organic farmers will hold educational meetings. In the afternoon, the MASA board of directors meet. In the evening, a play based on the life and works of Rachel Carson will be performed in the Kellogg Center Auditorium. Part of the cost has been defrayed by a grant from MASA. To order play tickets (\$5 each) or have lunch with the organic growers (\$10), contact Anne Conwell at the above address. Feb. 16 is deadline.



Cindy Dutcher

Gary Manley, St. Joseph County

Soil Arthropods Thrive Under Cover Crops

Soil arthropods are small creatures--insects, mites, spiders--that scurry about at ground level finding food for themselves and being food for other organisms. They are part of a complex ecosystem.

Last year, Gary Manley, owner of a 120-acre farm near Three Rivers in St. Joseph County and an agricultural consultant, ran experiments to determine how ground cover affects the number and species diversity of this population of soil arthropods.

As well as being a MASA-supported project, his on-farm work was part of a larger study of cover crops being done by Dale Mutch, an IPM and cover crops Extension specialist at Kellogg Biological Station.



Gary Manley with his arthropod traps

Objectives of the study were to determine ways to increase species diversity and add to the complexity of the soil ecosystem.

system food web, evaluate the influence of selected ground covers on biodiversity and population density of arthropods in the soil ecosystem, and monitor the influence of ground covers on crop development and yield.

The experiment looked at four cover crops interseeded into corn planted into soybean stubble. A non-seeded portion served as a control. Hairy vetch, 20 pounds per acre, was dragged into the soil on May 30, the day before it was planted to corn. In the other treatments, 20 pounds of annual ryegrass, or 15 pounds of annual ryegrass plus 11.25 pounds of crimson clover, or 15 pounds of crimson clover, were planted on June 23 after cultivation the day earlier.

Arthropods were collected during five sampling periods and the number of species and individual specimens were recorded. In all cases, the number of specimens found under cover crops was more than double the number from the control area. Both diversity and density of

arthropods increased with increasing ground cover biomass.

Annual ryegrass plots obtained the largest biomass by late November. At tassel time, hairy vetch plots had the largest biomass. Following tassel, the vetch died back leaving a thick layer of mulch on the soil surface. This mulch layer resulted in higher populations of detritus feeders (mites and Collembola, for example) and the largest total arthropod density during the September-October sampling period.

Various arthropods showed positive response to one or more covers. Diptera, parasitic Hymenoptera and spiders did best in hairy vetch. Isopoda, Opiliones, carabid adults and Staphylinid adults were more numerous in crimson clover. Thysanura and Symphyla appeared to seek the annual ryegrass cover. Chilopoda did not appear to be influenced by type of cover or its presence or absence.

During 1995, with ample rainfall, growing ground covers had no influence on corn yield.

Paul Guenther, Washtenaw County

Intercrops Work in Seven of Last Eight Years

Paul Guenther has been implementing alternative, sustainable practices on his Washtenaw County farm since 1986. He uses legume cover crops and intercrops, biological soil amendments and reduced-rate and banded herbicides.



Paul Guenther

His quest started with a subscription to *The New Farm* and personal contacts with other producers within the sustainable agriculture movement. Now Guenther is himself a recognized source of information on cover cropping and intercropping.

As intercrops, Guenther has tried seven or eight Australian annual medic varieties, George black medic, crimson and berseem clover and hairy vetch. Guenther looks to intercrops to improve soil quality, help reduce herbicide and ni-

trogen inputs, and control erosion.

As he evaluates legumes for intercropping into corn, he looks for (1) ease of establishment, (2) biomass accumulation that doesn't reduce corn yield, and (3) a life cycle that ends naturally the next spring.

Guenther planned to evaluate berseem and crimson clover in his 1995 MASA research plot. But for the first summer since he began intercropping in 1988, he didn't get any intercrops sown. Weather patterns were such that by time the first-cut hay was made, the corn was too tall to drive through to interseed.

Always philosophical about his own approach to sustainable agriculture, Guenther evaluated his 1995 intercrop failure. "With fewer purchased inputs, we depend more on our own management and labor. This summer we just plain ran out of time to get our work done. But intercrops definitely have a place on our farm and will be back again next year."

Chuck Cornillie, Shiawassee County

Brood Cows Graze Standing Corn

Brood cows graze standing corn on the Chuck Cornillie farm. His 80-head Angus, Simmental and Limousin cow-calf operation in southeastern Shiawassee County was involved in an on-farm demonstration sponsored by MASA for the second year.

Lower cow-calf production costs and reduced environmental impact were his objectives. Overwintering feed is one of a cow-calf operation's most expensive inputs, he says. Grazing standing corn saves 30 to 40 cents per bushel by eliminating costs of combining, hauling, drying, storing and feeding. Cornstalks are also utilized in grazing. Environ-



Chuck Cornillie

mental benefits include eliminating feedlot runoff and reducing fuel consumption for corn harvest and manure handling.

A 16-acre field was planted to a full-season hybrid in early May. No fertilizer was applied based on soil and late spring nitrate tests. In the fall every other six-row strip was combined. Alternate strips and stalks from harvested rows were left for winter grazing. Yields of the combined strips ranged from 50 to 130 bushels per acre. Brood cows in their third trimester of gestation were put on the standing corn December 9. A polywire fence with plastic step-in posts was placed where the corn had been combined. The fence was advanced daily to allow consumption of 10-11 pounds of corn per cow per day. Baled soybean straw (approximately 5% crude protein) was provided as a supplement.

Experience gained in the first year guided Cornillie's management of the second year demonstration. Cows had grazed standing corn in alternating strips of corn and soybeans the previous year, but planting the alternating strips turned out to be a challenge. This year, having measured yields from the machine-harvested strips provided useful information for matching strip size with daily feed requirements.

Cornillie's experiences with grazing standing corn have been shared with farmers. The Cornillie demonstration was a featured stop on a Michigan Cattlemen's Association tour and the subject of a farm magazine article published in several states.

In addition to economic and environmental aspects, Cornillie sees flexibility as a major benefit. "I had another corn field I was going to graze this winter. But when corn got to \$3 last fall, I decided to combine and sell. I like the way this system lets me keep my marketing options open."

Henry Miller, St. Joseph County

Trying Alternative Methods in Growing Seed Corn

Henry Miller's primary crop is seed corn. In recent years, his goal has been to grow less corn after corn. From corn following corn for three or four years, "I am now rotating every year," he said. In 1995, he grew 500 acres of corn for seed, 190 acres of snap beans, 60 acres of alfalfa, and, in a new venture, leased out 370 acres for potatoes.



Henry Miller

Like some other seed corn growers in St. Joseph County, Miller is working with potato growers from other areas of Michigan. Both potato growers and seed corn growers are seeking ways to use effective crop rotations. Both use sandy soils onto which they have added expensive irrigation equipment, so both want to plant high-value crops. As part of the solution, potato acreage in St. Joseph County boomed to 6,000 over the last two years.

One of Miller's goals is to reduce cost of inputs, including tillage, on the seed corn. In his on-farm research in 1995, reported in the tables, he:

(1) applied different rates of nitrogen fertilizer sidedressed and checked the yield response.

(2) tested the effects of tilling versus no-till for seed corn in the year following snap beans and a fall-seeded cover crop of oats.

This is the third year Henry has tested

different rates of nitrogen sidedressed as he tries to home in on the right rate.

In 1993, the lowest rate (68 pounds N per acre sidedressed about 26 pounds N at planting) produced visual symptoms of deficiency. The three rates sidedressed this year showed no response to added nitrogen above the 82 pounds per acre rate (in addition to 30 at planting), but possibly

some response to 82 pounds over 75 pounds.

The no-till seed corn yielded almost identically to corn planted after conventional tillage. Since the crop was planted into oats, which died over the winter, a low rate of Roundup was used as a burndown, making this treatment cheaper than a tillage trip.

1995 SEED CORN NITROGEN RATES			
DATE	Treatment 1	Treatment 2	Treatment 3
Fall 1994		Chisel plow	
5-15		Field cultivate	
5-16	Plant corn with 200 lbs.	15-15-2 starter and 6 lbs. Lorsban	
5-22		Spray Dual 1.5 pints	
5-31		Spray 4 oz. Pounce for flea beetles	
6-13	Sidedress 75 pounds N	82 pounds N	115 pounds N
6-20		Spray Buctril and atrazine for weed control	
September		Harvest	
Yield	98.98 b/a	104.39 b/a	103.10 b/a

NO-TILL VS. TILLED SEED CORN		
Previous Crop: Snap beans		
Date	Treatment 1	Treatment 2
Fall 1994	Chisel plow and plant oats cover crop	
5-15	Field cultivate	Spray 1.4 pints Roundup
5-16		Plant
5-22		Sprayed Dual 1.5 pints
5-31		Sprayed Pounce for flea beetle control
6-13		Cultivate and sidedress N
6-20		Spray Buctril (3.75 pints) and atrazine (.2 pounds)
9-10		Harvest
Yield	138.42 b/a	139.39 b/a

Chellisons Farm, Ingham County

Do Cover Crops Provide Persisting Fertility?

The use of cover crops is increasing as producers seek to improve the health of the soil while maintaining or enhancing farm profitability.

Potential benefits of cover crops include helping farmers cut fertilizer costs, reduce soil erosion and surface water pollution, reduce herbicide costs, reduce the potential for groundwater contamination and cut fuel and irrigation costs.

Legume cover crops such as clover produce nitrogen that becomes available to succeeding crops. In 1995, a test was made at Chellisons Farm in Mason. The farm is owned and operated by Phil and Nolan Hall with their sons Mike and Pete. Together they milk 70 cows and farm nearly 800 acres in a corn-corn-soybeans-wheat/red clover rotation.



Phil Hall

Last year was the third year in a demonstration that looked at the effects of red clover compared to no cover on wheat (1993) and the two corn crops following in 1994 and 1995. Red clover was frost-seeded into wheat when urea was broadcast in the spring of 1993. There was no appreciable difference in wheat yields with clover or in bales of straw harvested (40 bales per acre for both treatments). The cost of the clover seed (\$12 per acre) was the only added expense.

A spring soil nitrate test was used to determine the nitrogen contribution from the clover to the 1994 corn crop. A 55-pound-per-acre nitrogen credit was given for the clover, which allowed a reduced sidedress rate of 55 pounds while the no-cover treatment required 110 pounds of added nitrogen per acre. At the time of sidedressing, clover was seeded into the corn. The clover developed a thick stand under the corn canopy.

That fall (1994) there was a slight corn yield benefit in the clover treatment (148 bushels per acre with clover, 144 without), even with less nitrogen applied.

In 1995, corn was planted again. The entire field was plowed, 100 pounds of 9-44-9 was used as starter fertilizer, and 100 pounds of nitrogen was applied as sidedressed ammonia. The goal was to see if there was any noticeable effect in 1995 from the clover planted in 1993 and 1994.

There was considerable yield variability among the 10 plots in the trial. One very high result was thrown out as abnormal. The average corn yield from the wheat plus clover plots was 114.6 bushels per acre, almost identical to the 114.1 yield on the wheat-only plot.

The effect of the clover, while significant in the following year's corn in 1994, in this test did not show a fertility effect. Phil said yields overall were low in that field this year compared to his other corn, and he can't explain the disappointing yield in either the treated or untreated plots.

Sheridan Farms, Tuscola County

How Much Tillage for Sugar Beets?

Pat Sheridan is already sold on the Ray Rawson way of doing things; he uses the Rawson zone tillage system, in which coulters mounted on a cart in front of the planter provides all the tillage at planting time. Last year, the zone tillage planter unit was extended to sugar beets for the first time.



Pat Sheridan

The farm's 1,500 acres near Fairgrove in Tuscola County is devoted to corn, wheat, soybeans, dry beans and sugar beets. Pat farms with his father, Pat, and son Lucas.

Last year, Sheridan Farms participated in a MASA demonstration project comparing three different tillage options for sugar beets.

While the Sheridans had already decided to plant using the zone tillage planter, they had one field that had been tilled and needed tillage for leveling. It was a good time to compare.

One field, 190 acres with the new tile, was fall-plowed and field cultivated twice in the fall, and the beets were planted with the zone-till unit in the spring. One 80-acre field was field cultivated once in the fall and zone-till planted the next spring. A third 80-acre field was zone-till planted in the spring with no other tillage. In each case, the previous crop was soybeans.

The results: The heavily fall-tilled field yielded 13.7 tons per acre. The fall field cultivated field yielded 12.3 tons per acre. The zone-tilled beets yields 15.4 tons per

acre. "The beets in the moldboard-plowed field looked the best early," Pat said, "but at the end the zone-tilled beets yielded the best."

The yield differences may not be scientifically significant. The field that was heavily tilled in the fall had root aphid damage the next year. And the fields were not identical. Pat says the Sheridan Farms have 15 different soil types. "Most are clay loam," he said. "But these are old lakebed

soils so there are sand bars in the fields as well."

Pat says he's "playing with" a Rawson-designed tool called a zone builder. A deep-tilling shank--a ripper point--is used in the fall to disturb the soil where the rows will be planted the next year. Pat considers it a "transitional tool," useful once to break up compaction, on the path to the once-over planting procedure with the zone tillage system.

Jon Mills, Van Buren County

Rye Wasn't a Good Nurse Crop for Alfalfa

When Jon Mills conceived his MASA research project, he thought the results would be opposite of what they were.

"I would like to investigate what happens if alfalfa is seeded directly into an established field of drilled rye seeded to be taken as a grain crop," he said then. "The alfalfa will be seeded at different rates to determine at which rate it can best be established, the most economical cost and at which point, if any, the alfalfa seeding becomes a pest to the rye crop."

In fact, the rye suppressed the alfalfa so thoroughly fewer than two plants per square foot survived when the rye was harvested.

"The alfalfa was there," he said. "You could see the rows. It came up good, but then it died off. There was good rain and the rye averaged 47 bushels per acre. It

seemed like the rye was toxic to the alfalfa."

Mills grows 150 acres of alfalfa hay for sale and to feed to the 150 head of beef he raises from calf size to slaughter weight. He's chairman of the Van Buren Soil Conservation District, from which he rented the no-till drill and put on 10, 15 or 20 pounds of alfalfa seed per acre. It was planted into 7.5 acres of rye planted last fall. He grows 30 to 50 acres of small grains each year, as well as 150 acres of corn and 60 of soybeans.

Mills found the alfalfa didn't do well in rye, whether on sandy soil or the black loam in one low corner of the field. With alfalfa seed at \$2.50 a pound, this was an expensive test, one he won't try again. For whatever reason, rye wasn't a good nurse crop for alfalfa.

George and Sally Shetler, Kalkaska County

Grazing Fattens Dairy Operation's Bottom Line

MASA's longest-running demonstration project involves the Shetler family's intensive rotational grazing project for their dairy herd.

George and Sally had five children at home when the project began in 1990. Now, only two are at home to help with the farm. Part of the reason for their moving toward grazing was to address the labor shortage they saw coming.

Now, the 275-acre Kalkaska County farm is devoted entirely to forage. The farm has grown no corn for two years and does not plan to return to corn. George's goals of reducing labor and cost of production have been largely achieved.

After experimentation with exotic grasses, George settled on some conventional grass-legume mixes. This year he will seed more orchard grass, which has performed well with high quality and longevity.

Although production per cow dropped,

supplemental feed costs dropped as well. The results has been a fairly steady rise of income over feed costs (based on 1991 prices for feed and milk).

Glenn Kole, Michigan State University Extension district farm management agent, has compiled data on 10 farms in northwest Michigan--five that used grazing, five that used conventional confinement feeding. Production per cow on the

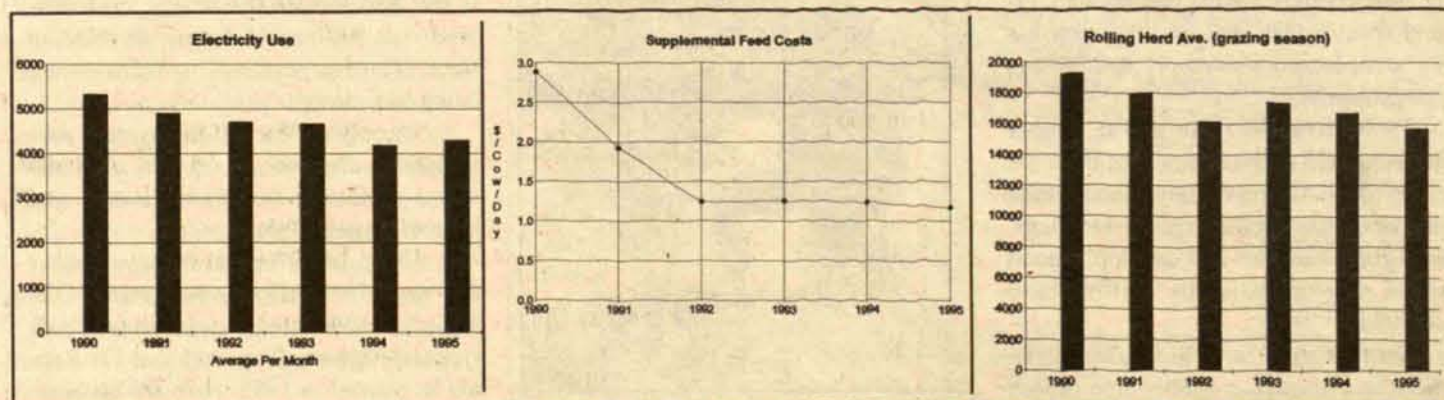
five grazed herds, averaging 86 cows per herd, was very close to Shetler's 16,319 pounds of milk. The confined herds averaged 105 cows and 20,712 pounds of milk per cow.

A big difference was labor hours required per cow. The grazed herds required 71 hours per cow, the confined herds 107 hours. Confined herds required more acres per cow, 6.13 acres

compared to 4.39 for the grazed cows.

Net farm income on the grazed herds was \$431 per cow compared to \$397 for the confined animals.

The three charts show measurements taken on the Shetler farm. Electricity use is down about a thousand kilowatts per month and supplemental feed costs are less than half what they were in the last year that the Shetlers kept their cows confined.



Richard Ekins, Jackson County

Using Half-Rate Herbicides on Corn and Soybeans

"I think I can get satisfactory weed control right across the board using half rates of herbicides mixed with vegetable oil," said Richard Ekins, a farmer from Rives Junction in Jackson County. "But that assumes weeds are pretty well under control to begin with. If not, I wouldn't try it."



Cutting herbicide rates in soybeans left some weeds uncontrolled.

Last year Ekins used half rates on about half his 110 acres of corn and soybeans. On the other half, he used full rates.

The full-rate program in corn cost \$19.60 an acre for two quarts of Bicep II. He cut that in half, but added \$2.80 for a quart of Landoil, which he mixed with the herbicide before adding it to the tank. He sprayed his fields with 10 gallons of water per acre. The two programs produced nearly identical results--no noticeable weed pressure, he said. Net savings: \$7 an acre.

The soybean experiment didn't work quite as well. He used a preplant burndown of a half-pint of 2,4-D and a half-pint of Roundup, half rates, plus Landoil. "I was satisfied with the results of that," he said. At planting time, he used half rates of Lasso and Lorox, again with Landoil. "I think there are better herbicides than these," he said. "I was not satisfied with that combination even at full labeled rates."

Both ragweed and giant foxtail were not well controlled. He used seven ounces per acre of Assure II and got good control of the foxtail. "When the beans ripened, it wasn't as bad as it looked in the summertime," he said. "I don't think yield was reduced by the ragweeds."

Savings with the reduced rates were greater than with corn. The full-rate program cost \$34.02 per acre, \$21.52 at half rate with oil.

Ekins has always tried to keep herbi-

cide rates low, partly for economic, partly for environmental reasons. He likes to use atrazine on corn, but thinks farmers may lose the right to use this effective herbicide. "When I used tillage, I used atrazine

half rate with oil post-emergence, then I cultivated once if I needed to. With no-till, you don't have the option to cultivate."

In future years, Ekins plans to continue using herbicides at half rates with Landoil,

then look to post-emergence herbicides, broadcast if necessary but otherwise spot-sprayed. With modern herbicides, the options are there to rescue a crop if that's needed.

Duane Roberts, Kent County

Rotary Hoe Preplant Showed No Benefit

When Duane Roberts read about it in *No-Till Farmer*, it sounded like a great idea. So he tested it on his farm last year as a MASA-funded research project.

"I was looking for an outstanding difference," he said. "But comparing the two, I had only 200 pounds of corn difference over 15 acres."

The practice he tried was using a rotary hoe to perform a light tillage operation after spraying herbicide but before planting corn. He uses the Rawson coulter zone-tillage system, with which there is usually no other tillage before planting. The idea behind using the rotary hoe before planting was to stir the soil a bit, expose the surface to air to dry and warm and at the same time do a light incorporation of herbicide to enhance its performance.



Duane Roberts

On May 31, he sprayed Gramoxone as a burndown on ground in corn stubble from the previous year. In the same tank mix was the preemergence herbicide Surpass. He waited one day to let the Gramoxone work, then rotary hoed half the ground in alternate strips covering 12 corn rows. He made five replications. One day later he planted. A month later he used 2,4-D. On November 30, he harvested and weighed the corn. The yields were virtually dead even.

"I borrowed the rotary hoe from a neighbor," Duane said. "I won't buy one based on these results."

Like many farmers, however, he's looking at ways to improve the performance of no-till in years with cool, wet spring conditions.

Roberts farms 400 acres of corn, hay and wheat and milks 70 cows. Because

many of his farm acre are highly erodible, perfecting no-till has been his goal.

In 1994, he experimented with row cleaners on three of his six no-till corn planter units, and saw a yield advantage

for row cleaners in corn stubble, getting 15 more plants per 100 feet of row and about seven bushels more corn per acre. He equipped the remaining planter units for use this year.

Paul and Tom Wing, Barry County

Interseeded Cover Crops: What To Do in Year 2

In past years, Barry County farmers Paul Wing and his son Tom have been involved in MASA on-farm research looking at reduced-herbicide methods of controlling weeds in corn: cultivation, rotary hoeing, banding herbicides. Their 1995 plot work was an extension of work begun the previous year.



Paul Wing

The Wings plan to use more banded herbicides, which reduces chemical use by two-thirds. They also want to do something valuable with the area left between the bands.

In 1994, the Wings became involved with a Michigan State University project studying interseeded cover crops. After research at the Kellogg Biological Station, Extension IPM and cover crops specialist Dale Mutch extended the trials from plots to farmers' fields. The Wings carried out part of that project. Paul was enthusiastic about it, because he believes cover crops improve soil tilth and are a positive part of sustainable farming methods.

The Wings sowed four cover crops between the rows of corn: crimson clover, annual ryegrass, Canadian mammoth clo-

ver, and a mixture of crimson clover and annual ryegrass. In the control area, no cover crop was planted. The trials covered 15 acres and were replicated four times.

In 1994, the plots in which cover crops were interseeded yielded more than those without. Paul thinks the cover crop may have helped suppress weeds.

In 1995, the Wings planted no-till corn into the strips remaining from 1994. They sprayed Roundup at 1 1/2 quarts to the acre in mid-May, then planted starting May 22.

There were several problems. First, the Roundup did not kill all the clover. Partly as a result, the soil was dry, and the no-till planting resulted in a poor, inconsistent stand.

Prowl and atrazine were applied in mid-June, but weed control for the year was poor. The thin corn stand did not form a solid canopy. Plot yield data was not taken. Overall, the field yielded only 55 bushels of corn per acre, with areas without cover crops looking somewhat better.

"We think we need to be flexible with no-till," Paul Wing said. "It did not produce a good stand under our conditions. We also need to apply Roundup at the right time and in amounts that control clover."

The Wings farm about 600 acres devoted to corn, soybeans and hay. They milk 80 cows and also feed some steers.

L.L. "Bud" Coulter, Antrim County

Making Chestnuts Fit Forests and Orchards

For L.L. "Bud" Coulter, retirement turned into an adventure in agro-forestry. Coulter, who's been retired about 15 years, developed a desire to work with chestnuts.

Chestnuts come in two very different forms, and Coulter wants to see both of them developed.

He has devoted his retirement years to these goals:

One is to help establish oriental chestnuts as an orchard crop, particularly to help orchardists in northwest Michigan diversify. Tart cherries are the predominant orchard fruit in that area, and the crop has long been plagued with supply, demand and price problems.

Demand for chestnuts is good, Coulter says. About 23 million pounds of them are imported from Europe, Italy mainly, each year. Americans need to evaluate seedlings, select good varieties and develop a good method of propagation by grafting onto rootstocks.

Another goal is to help restore the American chestnut, a timber tree driven nearly to extinction in this century by chest-

nut blight. Chestnut trees still grow up as sprouts from old stumps, but ultimately they succumb to the blight.

Coulter would like see the tree restored to its former grandeur as a forest tree for timber and as a producer of high quality



Bud Coulter prunes a chestnut tree.

nuts. It is now believed that there are two genes for resistance to the blight, he said, and these genes can be obtained from oriental chestnuts by crossbreeding.

The work of crossing and backcrossing is being done now, while a remnant population of American chestnuts still exists. Coulter is president of the American Chestnut Foundation, Bennington, Vermont, which maintains research farms near Meadowview, Virginia, and is undertaking test plantings of blight-resistant chestnuts in the Appalachian Mountains, once covered with billions of American chestnut trees. Third-generation backcrosses are being test planted.

Not only are the nuts highly desirable, American chestnut wood was once the wood of choice for rot-resistance and smooth, easily worked grain.

Using MASA grant money, Coulter has worked to develop and test some of the basic "rules" for growing chestnuts of both types, using a small orchard near Elk Rapids he planted in 1988. Here are his basic keys to oriental chestnut establishment:

1. Plant 2-year-old seedlings selected for vigor, root development and parentage. Seedlings will have much variability.
2. Survival of grafts has been erratic. One cultivar, Colossal, shows promise in southwest Michigan.
3. Soil must be well-drained, somewhat acidic and biologically active.
4. Wind protection is imperative.
5. Suitable soil moisture must be maintained.
6. Eliminate all weeds, especially quackgrass, in a two-foot radius. Chestnuts react to quackgrass as if it were toxic to them.
7. Fertilize as for other fruit trees.
8. Protect against rodents and deer, and occasionally insects.
9. Organic mulch is desirable.
10. Tree tubes offer protection, but must be monitored. Start with short ones and keep growing space open and free of debris.
11. Nurture them and they will reward you. Ignore them and they will frustrate you.

Hawkins Homestead, Ingham County**Eliminating Starter Fertilizer in No-Till Soybeans**

Does starter fertilizer on soybeans pay off with increased yields above fertilizer costs? That is what Sid Hawkins and Tony Igl of Hawkins Homestead farm in Ingham County wanted to find out.

Hawkins Homestead, near Mason, is a partnership between Sid and Carol Hawkins and their daughter and son-in-law



Sid Hawkins, Tony Igl

Jeanine and Tony Igl. The Hawkins family has operated the farm since 1862. The farm contains 2,300 acres now devoted to a corn-corn-soybeans-wheat rotation.

The plot at Hawkins Homestead was part of both the 1995 USDA Sycamore Creek Watershed Project Demonstration

and the MASA on-farm demonstration. The partners have been part of these demonstration projects for four years.

In the past, Michigan State University studies have shown that starter fertilizer for soybeans can be reduced or eliminated without showing a yield loss. Starter fertilizers are typically used to boost plant growth early in the season. Most of this growth can be attributed to phosphorus, with nitrogen also providing a benefit, especially under no-till conditions.

Results at the Hawkins Homestead plot showed no significant yield response to starter fertilizer in soybeans (see table).

Cost savings, from fertilizer not used and planting time saved, can be realized when starter fertilizers are reduced or eliminated. There is also a reduction in potential phosphorus contamination of surface water from runoff and potential nitrogen

contamination of groundwater from leaching.

Reducing or eliminating needless fer-

tilizer applications makes good sense to farmers who want to increase profits and become more environmentally friendly.

Starter vs. No Starter Fertilizer on Soybeans

Previous crop: Corn	Tillage: No-till
Planting date: May 18, 1995	Harvest date: October 12, 1995
Yield goal: 55 bushels per acre	Variety: Northrup King 1990
Herbicides: Pursuit, Roundup, 2,4-D	
Fertilizer: No starter vs. 4 gallons per acre 6-24-6 Alpine starter	
Application: In row with planter	Cost: \$2.40 per gallon
Preplant soil test data: pH 6.3; P 95#/a; K 264#/a; NO ₃ -N, 4 ppm.	

	No starter	Starter
Moisture	12.0	12.2
Yield (bu/a) at 13% moisture	51.3	51.3
Fertilizer (\$/a)	Zero	\$9.60
Gross income per acre after fertilizer cost	\$307.80	\$298.20

Cherry Bay Orchards, Leelanau County**Improving Biodiversity in Apple and Cherry Orchards**

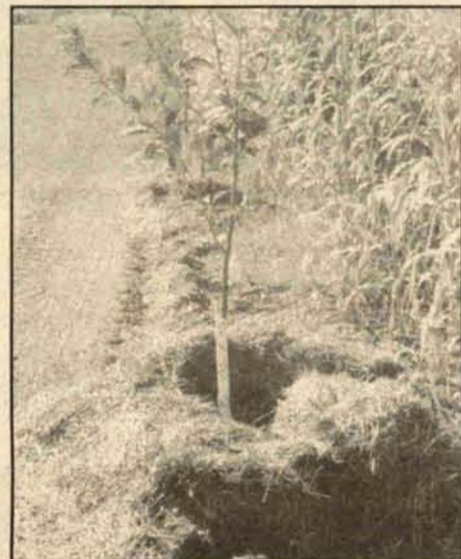
Cherry Bay Orchards is continuing to look at improved biodiversity in the farm's apple and cherry orchards. IPM specialist Francis Otto reported that this year continued to be a year of experimentation on the farm.



Francis Otto

A block of apples that was treated with compost in 1994 received a second treatment in 1995. In 1994 the farm used municipal compost from nearby Traverse City. This year the block received manure from a local farmer who had turned it periodically.

Cherry Bay is a large farm, owned by Bob Gregory and partners, consisting of 600 acres of cherries and 350 of apples.



A young apple tree with compost

The farm is experimenting with practices that reduce input costs and build levels of beneficial insects. No yield differences can be proven at this time. Otto senses that the compost is affecting the block. Scouting leads him to believe the compost block has less insect pressure than others. Tree growth appears better as well.

A field scheduled for a new planting is also getting an experimental treatment. The fallow fields were seeded with cover crops incorporated before the trees were planted. This field also received 500-750 pounds per acre of gypsum. Instead of bulk

gypsum, crushed drywall scrap from new construction areas, free of paint, was applied. The farm used a material headed for the landfill to supply a calcium need in the orchard.

According to Otto, "We are looking at several ideas: compost, alternative nutrient sources and improved ground covers that enhance pollination. All increase that important biodiversity we need for better orchard management. We don't know which ideas will be beneficial but we think some combination will make the farm more profitable and sustainable."

Tom Guthrie, Barry County**A Wheat Cover Crop Before Corn**

Each year, Tom Guthrie devotes about six acres of his thousand-acre Barry County farm to a test plot. He uses it for his own education, and to show to the visitors that come to his farm each year. And there are quite a few visitors.

Tom was president of MASA during 1995 and is vice-president of Michigan Farm Bureau. His farm is also part of the MIFFS project funded by the Kellogg Foundation through MASA. Tom plays host to MASA members, MIFFS collaborators, children from local schools and other visitors.

In 1994, the eight 30- x 1160-foot strips were in corn and soybeans. That fall, he planted bin-run wheat as a cover crop on the soybean strips and left the corn

ground with no fall planting. He wanted to see how the wheat would influence corn yields this year.

Procedures and results are shown in the table.

The 18-bushel yield increase can not be attributed to the cover crop alone, since there is a 10 percent yield increase that would normally be expected from the rotation from soybeans to corn. Tom does believe the fresh organic matter incorporated in the spring in his sandy-loam soil contributed to the yield increase.

Tom and his son Tom III grow 500 acres of hay, 170 acres of wheat and 120 acres of soybeans. Cash-crop hay is their major crop. While they usually grow no corn, they custom combine about 3,000 acres of corn and soybeans each year. They also have 60 beef cows and raise Holstein bull calves from weaning to 600 pounds each year.

Corn in Wheat Cover Crop

	Treatment 1	Treatment 2
1994 crop	Soybeans	Corn
Fall 1994	Planted wheat cover	No cover
Spring 1995	Chisel plow and disc	
May 13	Planted corn: Asgrow 623 at 21,800 population with 120 pounds 19-19-19	
	Sprayed 1 quart each Bladex, atrazine and Dual with 61 pounds nitrogen in 28% N solution	
Nov. 1	Harvest	
Yield	146.17 b/a	128.09 b/a
Gross value at \$2.75/bushel	\$401.97	\$352.25
Cost of cover ¹	\$25.12	
Net value	\$376.85	\$352.25

¹Disk, \$10; plant, \$8; 2 1/2 bushel wheat seed, \$7.12

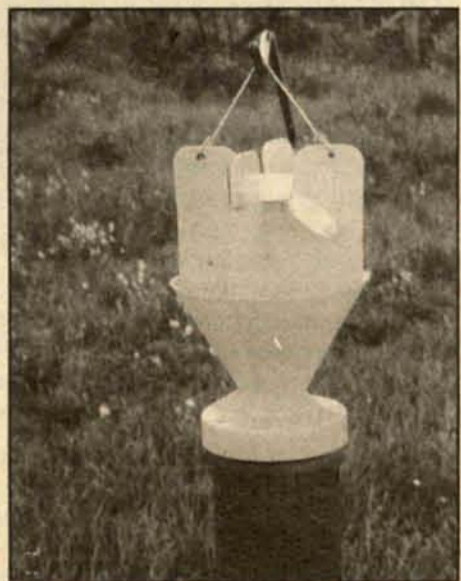
L. Mawby Vineyards, Suttons Bay**Flamers and Chafer Traps in Vineyards**

Larry Mawby likes a challenge. Controlling pests in orchards and vineyards using non-chemical methods is goal and a challenge, something he works at but hasn't achieved.

Larry owns and operates L. Mawby Vineyards and winery on about 15 acres in Leelanau County. Past MASA demonstration projects centered around an orchard the farm owns in the Upper Peninsula, where he tried codling moth control using pheromones and mating disruption.

This last year Larry built a flamer and used it late in the season, not early enough to get an accurate measure of it's usefulness. A flamer is a tractor-mounted propane torch used to incinerate weeds, insects and, in some cases, to prune sucker growth. The Mawby flamer was built on the farm with parts purchased from Wisconsin. Larry said the machine cost about \$1000 and he tested it a couple of times. This coming season will provide the real test when he attempts to control weeds and possibly prune the grapes with a quick, targeted pass through the vineyard with the flamer.

Last year he also attempted to control rose chafer with an insect trap fitted with a scent pot. Larry placed a ring of traps around his vineyard to trap the chafers on their migration into the vineyard. This is the second year that he has used the traps, and for the second year he had to spray for control. In fact, this year required two



A trap for rose chafers

sprays where one would normally have sufficed.

"There is the possibility the rose chafers are actually drawn into the vineyard because we're putting these traps out there," Larry said. "Rose chafers are terrible flyers and not very smart; maybe they had trouble figuring out where the grapes were until we put out attractants."

The traps cost about \$19 each including the attractant and Larry is going to tighten the spacing and set traps further from the vineyards in one more attempt next year.

Bernard Wall, Midland County

Leaves Make Good Livestock Bedding

For Bernard Wall, it's not how big a farmer is that counts. Bigger farms make a bigger environmental impact, to be sure, but that doesn't excuse the small farmer.

So Bernie, with 40 acres and fewer than a dozen beef cows, has jumped into resource recycling and composting as far as his resources allow.

On Sept. 26, he and his wife Dolores held a demonstration at their farm, which attracted about 20 neighbors—including Mayor Gene Robinson and public works director Bill Cozat from Coleman, the small city two miles away. The city officials discovered the Walls had been taking leaves from city residents and friends for about four years, and Bernie was using them for cattle bedding, getting one more use



Bernie Wall shows how he turns compost using his manure spreader.

from an otherwise not very useful resource.

They all watched a demonstration as neighbor George Bromin used his front-end loader to fill a manure spreader from one windrow and then unload it slowly with

power takeoff power into a parallel row. That's how Bernie turns the manure-leaf mixture for compost.

As the demonstration ended, the mayor described how the city has, for four years, been hauling and dumping its leaves on a growing pile and asked Bernie, "How many leaves do you do want?"

The result? "I'm covered up with leaves," Bernie reported later. "I took all they brought me." Besides three 200-foot-long windrows, he's got two boxstalls full

and a garage full of bagged leaves. "They tell me more are coming next spring, from the late rakers," he said.

Bernie now has more leaves than manure, and is thinking of ways to make them useful. "Maybe this'll catch on," he said. "I saw some other farmers in town collecting leaves to bed their cattle." His cows like the leaf bedding, he says, and it works real well. He thinks bigger livestock farms could take a lot of leaves and make good use of them.

Jim and Tara Good, Barry County

Rotational Grazing of Dairy Steers

Jim and Tara Good of Barry County rotationally grazed dairy steers as their 1995 MASA demonstration project. Building on their previous year's experience as graziers, they concentrated on getting the



Jim Good checks the fence.

cattle across the pasture faster and not overgrazing. They also economized on overwinter grain costs. "Cattle that come off high grain rations just don't perform well on pasture," Jim said.

Twenty-two deacon calves were purchased in August 1994. After weaning, they were fed limited shelled corn and protein pellets and all the hay they could eat. On April 22 they went on pasture weighing about 450 pounds each. Pasture species included timothy, orchard grass, bluegrass, brome grass, and red clover along with various perennial weeds. Inadequate rainfall between mid-June and the beginning of September limited pasture growth. Cattle were sold at 750 pounds on September 20, earlier than planned because of the lack of pasture.

Cattle were weighed periodically and rates of gain were calculated. Average daily gains of 2.6, 1.9, and 1.6 pounds were realized at the beginning, middle and end of the grazing season.

Variable costs of production (per head) during the trial were:

purchased calves	\$76
mortality (18%)	14
over-winter shelled corn, pellets, and milk replacer	100
over-winter hay	48
veterinary, supplies, misc.	40
pasture charge	42
Total variable costs	320
Sale price	425

Return to labor,

management, and capital \$105

Three calves died shortly after pur-

chase, and another was lost to bloat when animals were switched from drought-stressed grass to alfalfa pasture. Over-winter feed costs were minimized by limiting grain intake. Pasture charge (\$25 per acre) is what the Goods would have received in rent from another farmer. Sale price was \$57 per hundredweight.

The \$105 per animal return to labor, management, and capital compares favorably with what the Goods would expect from feedlot beef. Other advantages that they see with grazing are less use of pesticides than with corn-fed beef and very low capital investment.

Richen Farms, Ingham County

Composting Hog Carcasses and Afterbirth

Composting has been used to dispose of dead hogs and afterbirth at Richen Farms since April of 1994 as part of a demonstration that will continue through 1996. The on-farm research, supported by MASA, is also part of the Sycamore Creek Water Quality Project.

Scientific data collected at the farm will be used to support amendments to Michigan's dead animal laws to include composting as an effective and safe method of disposal. Dale W. Rozeboom and Josep Garcia, researchers in the Animal Science Department at Michigan State University, and Barb Straw in the Large Animal Medical Clinic, have been collecting and analyzing data the Michigan Department of Agriculture can use to support legislative approval of this disposal method. Target date is early 1997.

Richen Farms, of Mason in Ingham County, is now farmed by brothers Dave and Steve Cheney after their father, Richard's, retirement. It is a 250-sow farrow-to-finish operation, producing about 5,500 market hogs each year.

For the composting, four 7-foot wide, 15-foot deep, 5-foot tall plywood bins were built in an open-sided pole barn to serve as primary and secondary composting bins. In each primary bin, straw is first added as a base layer. Layers of bulking agent (spelt hulls) and animal tissue are added until a bin is full. Temperatures are monitored. After about two months, material from one bin is moved to the secondary composting bin. After two months more, the compost material is either reused as bulking agent (50/50 with fresh bulking agent) or spread

onto fields as a soil amendment.

More than 13,000 pounds of tissue was composted in the first year. Pile temperatures reached 150 degrees in all piles, even in the winter months. Seven batches were completed.

As the project continues, MSU researchers continue to monitor composting activities at Richen Farms. Of greatest interest is (1) finding out about the survival of microorganisms that might be pathogens and (2) discovering the fertilizer value of compost.

Samples are being taken regularly and tested for bacterial and viruses known to be pathogens of swine. The research is being conducted to verify that disease-causing microbes do not survive the composting process. Other samples are analyzed for nitrogen, phosphorus and potassium content.

Currently, incineration, burial and rendering are legal options for disposing of dead animals and afterbirth. Incineration eliminates diseases, but has economic and environmental drawbacks. Burial is not easy in winter, and burial sites attract scavengers that can spread disease—and also pose some threat to groundwater. Renderers seldom serve small producers.

A similar project carried out by MSU researchers led to legislative approval of composting as a method of getting rid of dead poultry. According to Dale Rozeboom, work is also underway to extend this method to cattle, sheep, horses and animals killed along roadways.



Dennis Iott

Dennis Iott, Kalkaska County

Land Swaps: A Creative Way To Rotate Potato Land

The Iotts started swapping land with a neighbor farm a couple of years ago. Ralph and Denny Iott grow potatoes. In recent years there have been some major changes in the potato industry and these changes have prompted changes on the Iott farm.

Denny explained that the farm raises seed potatoes as well as potatoes for processing. The seed potato business demands that the seed potatoes be virtually free of disease and virus problems. In an effort to maintain disease-free stock the farm uses an extensive rotation - snap beans in some years, wheat, and extensive cover crops -- on their family farm in Kalkaska County. About two-thirds of the farm is into cover crops any given year. This requires a large land base, larger than the Iotts had so an innovative

approach to land use had to be found.

Land swapping allowed potatoes to be planted on ground that had been in corn production for several years. In addition, some of the Iott ground is planted to crops that they aren't equipped to grow. The farm uses towable center pivot irrigation systems that can be moved to the neighboring farm. In addition the neighboring farm raises hogs and need a place to spread manure. The Iotts have learned that manure can be used on fields as long as there are a couple of manure free years before potatoes are planted in a field. This eliminates the scab problem associated with manure on potato ground.

The cover crops that are used vary from year to year but generally include sudax, rye, hairy vetch and other legumes. Denny feels that idling so much land is good for the ground and good for the crop. It breaks disease cycles, increases organic matter and reduces pesticide and irrigation costs.



Dave Cheney shovels spelt hulls.

The composting is so complete, he said, that after four months only a few larger bones and teeth are recognizable, and they are so fragile they break up during the spreading process.

Odors during the composting are "musty" or "earthy," not like the odor of rotting flesh. Composting, he said, is carried out by organisms that use the carbon in the bulking agent (sawdust or hulls) and the nitrogen in protein. The key is to keep dead animal tissue covered with at least four inches of bulking material to discourage flies and bacteria that cause rotting. Reusing the bulking agent 50/50 with new material allows use of a material already seeded with the microbes that carry out the composting process.

In tests to date, organisms such as salmonella were destroyed within the first seven days of the composting process.

Jonathan Chase, Sanilac County

Grazing-Based Seasonal Dairying

Jonathan Chase is working hard to make his Brown City grass-based, seasonal dairy a viable operation. The 40-acre farm milks 42 cows, and the goals are (1) to milk during the pasture season and (2) to buy minimal feed for dry cows in winter. To do that requires mass freshening in spring.

Getting all the cows to freshen in a window of a couple of weeks in spring is

creased the cost of drugs to get the job done. The second cow did better and was successfully bred for a May 28 due date.

"Holsteins are hard to breed in very hot weather," Chase reports. "To have cows freshen in May requires that we breed them in the hottest, most humid time of year."

John and Cindy Dutcher, Chippewa County

Diversifying an Upper Peninsula Farm

John and Cindy Dutcher farm about 300 acres near Goetzville in Chippewa County, raising Angora goats, sheep and



New MASA president Cindy Dutcher and executive director Russ LaRowe.

beef cattle. Declines in wool and mohair prices prompted them to look at alternative crops.

In 1994 they turned an unproductive hay field into a blueberry planting. Blueberries were the choice because soil is acid (pH

Chase said that he intends to use more British breeds to increase conception rates during August.

Chase intends to continue to push toward a seasonal dairy and may again use Dexamethasone and Lutalyse if herd synchronization problems persist.

He has solved one winter feed problem: He raises May-born young stock to about 300 pounds before selling them to a neighbor in the fall. He has first option to buy the heifers back. This eliminates the need for feed and housing for young stock during winter.

4.4 to 4.9) and there is a U-pick niche in serving nearby Sault Ste. Marie.

They planted 575 plants in the last two years. "We could have put the whole field in, I suppose, but I want this to be a cash project," said Cindy. "We spread the plantings to spread the risk and keep the cash flow."

The field receives manure before planting, and the berries are mulched with aged cedar chips to control weeds in the rows.

Raw wood chips require too much nitrogen to decompose, robbing the young plants. Row centers are mowed. Investment in land, planting stock and labor can run several thousand dollars per acre. The plants are expected to produce in their third year.

The Dutchers hope to use the blueberries to draw customers to the farm where other farm produce may be sold as well. Beef and herb sales are both possibilities.

Richard Lauwers, St. Clair County

The N Value of Clover before Corn

MASA board member Dick Lauwers of Imlay City embarked on a study looking at the value of nitrogen-fixing and -holding cover crops. Dick frost-seeded clover into a spelt crop on March 11. One plot received 10 pounds per acre of Alsike clover;



Dick Lauwers

the other 10 pounds per acre of medium red clover.

The spelt crop yielded the same on both plots but the total pounds of organic matter produced from the two clovers was very different. The red clover produced 5,249 pounds per acre while the Alsike clover produced only 2,282 pounds.

Lauwers will plant corn on the plots next year and attempt to show the value of the frost-seeded clovers.

Gary Buchholz, Huron County

Leaving More Residue To Protect Soil

Having rich, black, productive, drought-tolerant soils capable of high yields is somewhat a mixed blessing these days. Farmers like Gary Buchholz, who farms 425 acres and milks 55 dairy cows with his father near Harbor Beach in Huron County, believe they must keep that soil from moving into the ditches and into Saginaw Bay.

To do that seems to mean saving residue by doing less tillage. That soil is difficult to farm with less tillage. Farmers like Buchholz are trying to make it work by testing new methods on their farms.

Buchholz, who also works part-time as a hoof trimmer, is convinced of the importance of on-farm research. In 1995, he tried rotational grazing of dairy heifers, purchased and used a completely shielded weed sprayer, and used Trans-Till to preserve residue.

In his rotational grazing, 50 dairy heifers were grazed from June through October on alfalfa-grass pasture. Cows were rotated every two or three days through 18 paddocks on 13 acres. Buchholz was pleased with the results and plans to continue or expand the practice next year.

Spray drift was eliminated and herbicide effectiveness was increased with a completely shielded sprayer. Buchholz imported the Ag-Shield sprayer from Canada and says his may be the first in Michigan. Eventually the sprayer may allow him to lower herbicide rates.

The most deliberate experiment on the Buchholz farm was also the most disappointing. This replicated trial compared corn established following either conventional tillage or Trans-Tillage. Conventional tillage included fall Soil Saver and spring disk and field cultivator operations.



Gary Buchholz and daughter Holly

The Trans-Till was used in early May, four days before corn planting. The implement consists of a residue-cutting coulter, a deep-penetrating shank to fracture the soil, and two eight-wave coulters set to the sides of the shank.

From his perspective as a soil steward, Buchholz liked what he observed in the Trans-Till plots. Crop residue reduced erosion and sopped nitrates from winter-applied dairy manure. Worm counts were higher, worm casts were more abundant, and soil structure was better. However, Buchholz was disappointed with the Trans-Till yield and economic return. Corn (following corn) averaged 96 bushels per acre with Trans-Tillage and 117 with conventional tillage. Gross margin was \$62 per acre for Trans-Till and \$143 for conventional. (Gross margin is revenue from corn sale minus costs of purchased inputs and custom rate field operations. See table.)

Buchholz wonders why neighbors and other Huron County Innovative Farmers

have fared better with Trans-Till. A suggested explanation is that they are putting down nitrogen with the Trans-Till shank, something he did not do.

Buchholz intends to keep on-farm re-

searching until he finds a tillage system that will protect the soil, accommodate his manure application needs, and maintain economic return. That, Buchholz says, is the sustainability test.

Conventional Tillage and Trans-Till Comparison

Input or Field Operation	Conventional	----(\$/a)---	Trans-Till
Seed (Pioneer 3769)	31.22		31.22
Fertilizer			
5-20-33 1% Zn (250 lbs)	18.89		18.89
28% N (9.2 gal)	8.01		8.01
82-0-0 (120 lbs)	19.59		19.59
Pest scouting	4.56		4.56
Preplant herbicides			
2,4-D (1 pt)	0.00		1.74
Roundup (1.5 qt)	0.00		19.41
activator	0.00		1.07
Post emergence herbicides			
Accent (2/3 oz)	0.00		17.34
activator	0.00		1.07
Clarity (0.5 pt)	0.00		5.01
Clarity (.68 pt)	6.81		0.00
Trans-Till (spring)	0.00		10.00
Soil Saver (fall)	10.70		0.00
Disk	9.20		0.00
Field cultivator	7.55		0.00
Planter	12.35		12.35
Cultivator	7.55		7.55
Herbicide sprayer	4.80		9.60
Combine	21.00		21.00
Total purchased input and field operation costs	162.23		188.41
Revenue from corn sale	305.33 ¹		250.23 ²
Gross Margin	143.10		61.82

¹ 117 bu @ \$2.75/bu less drying charges

² 96 bu @ \$2.75/bu less drying charges

Bob Fogg, Ingham County**'A Direct Market for What We Grow . . .'**

As Bob Fogg sees it, the markup in the food business is awful . . . ly attractive. No way should the store price be two and three times what the farmer gets.

Armed with the belief there is money to be made by being his own middleman and retailer, the Fogg family is putting the finishing touches on a new facility just off the U.S. 127 freeway at the Leslie exist near their farm.



A modern kitchen graces the Learning Center.

Actually, it's on the farm where Bob's mother lives and where he was born and grew up. Bob and his family live on their own farm a mile away.

Recently, they bought the family home farm, adding its 120 acres to the 257 they had--and gaining in the process an old chicken laying house Bob's dad, Arthur, had built in 1965 and used until 1985. The 40- x 220-foot building, with the cages intact, had sat there unused for 10 years until Bob figured out it might serve a grand purpose.

Actually, several purposes.

RETAIL SALES

Starting last August, the Fogs began refurbishing the old building. They added a store front, so it no longer looks like a home for chickens. Immediately behind the front is the retail sales area, which will house in a 40 x 30 space displays of organically grown products and a checkout counter.

A cooler with a display front gives customer access. Behind that there's a wash and preparation room, a space for repackaging grains and flour, a prep room for eggs and a large storage area for cleaned and bagged grain.

"I raise eight different grains on my farm," Bob said. "From these we can generate about 15 products for sale." On his certified organic farm, Bog raises spelt, barley, soft white winter wheat, hard red winter wheat, oats, rye, hairy vetch, buckwheat, soybeans, corn and hay and pasture. About half his acreage is in clear hilum soybeans, the mainstay of soymilk and other soybean products.

Some of the grains will be sold whole, some ground into flour. A local bakery will use grains from Fogs to produce a variety of breads for sale in the market.

The Fogs also raise produce, two to three acres of melons, tomatoes, cucumbers, peppers and other vegetables. Bob expects to have to augment his produce with items bought from other organic growers to fill out the shelves in the retail space.

One other product: eggs. The rear of the old chicken building will still contain chickens, about 2,000 of them raised as organic farmers believe they should be, on the floor with adequate space and access to the outdoors.

"The egg market looks very promising," Bob said. The Fogg family used to sell eggs retail, but gave it up in 1970. The eggs were sold from the house then. "Busi-

ness was too good and people talked too long," Bob said. Neighbors who stopped for eggs felt obliged to visit. Having the sales barn will make egg sales a more profitable business--more commercial and less a social transaction.

Bob believes the market will fill a niche that is now about empty. It will serve as both a retail and wholesale outlet for organically produced foods produced by the Fogs and other organic producers.

As now planned, Bob's wife, JoAnn, will manage the store. They have three children, Nathan, 20; Adam, 14; and Sarah, 13. "They're welcome. There's space for them if they want it," he said.

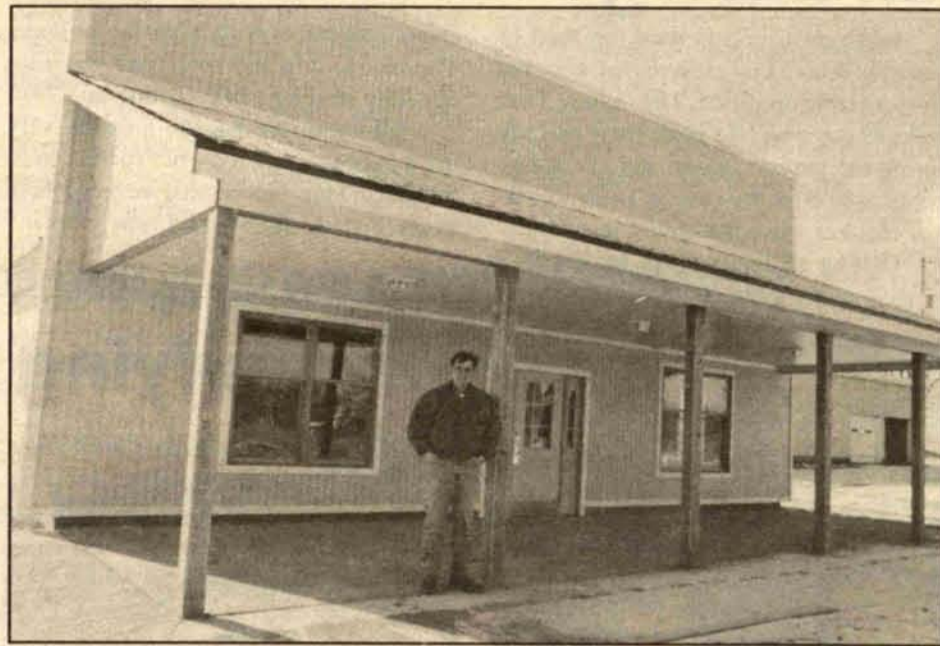
THE LEARNING CENTER

One "different" element in the building is a well-equipped kitchen in a room set up with chairs and table. It's called The Learning Center.

The Fogs have two grants from two agencies that help them build and administer the center. One is from MIFFS (the Michigan Integrated Food and Farming Systems Initiative); the other from SARE (the North Central Region Sustainable Agriculture Research and Education agency).

The MIFFS grant was made last fall. The purpose is to help Fogs and others create an organic food network that includes consumers and other organic farmers. The project is called "Growing and Marketing Food Locally: Building Alternative Models."

The project was originally proposed as two projects. The Fogs wanted to create a network for organic farmers and a market for locally produced food. Michigan State University anthropologist Laura DeLind and Mason organic farmer Markus Held proposed forming a CSA. The projects were rolled into one, the goals being to involve people in the processes of



Addition of a storefront transforms a chicken laying house into a retail store.

producing, distributing and consuming food, and to introduce more locally grown food into the community. The Held farm will be organized as a CSA (Community Supported Agriculture), in which consumers contract for a share of the farm's production. Part of the plan is to hire a coordinator experienced in the operations of food cooperatives.

The SARE grant supports community education. The Fogg's new kitchen will be used to demonstrate food preparation and preservation techniques, but the room is not restricted to that. The general mission is to do things that strengthen rural communities, serving as a place to meet and express themselves about sustainable farming and environmental concerns.

ON-FARM RESEARCH

With all that going on, Bob continues to do MASA-sponsored on-farm research. The project on his farm this year was set back by dry weather and will be done next year.

Working with MSU entomologist Doug Landis, Bob's project was to provide permanent cover for beneficial insects. Landis's work has shown that beneficial insects--those that prey on or parasitize insect pests--need a nearby place to live during the part of the crop year when the crop isn't there.

Last spring, Bob seeded a pasture mix of grasses and legumes into 15-foot-wide strips 200, 400 and 600 feet apart. These "hedgerows" would be permanent. Landis planned to study how the beneficial insects fared and how deeply they penetrated into the fields, thus determining the ideal spacing for field borders.

One of Bob's tactics as an organic farmer has been release of large number of predator insects such as preying mantises and lady bird beetles. Bob want to find how the hedgerows might help provide permanent habitat and maintain a continuous population of these beneficial insects.

By Dick Lehnert

Innovative Farmers of Huron County**Evaluating Alternative Production Systems**

For the last five years, Huron County farmers have been participating in the USDA Saginaw Bay Water Quality Demonstration Project. The goal is to reduce the potential for nutrient, sediment and pesticide loading in surface water.

The farmers have been working with MSU Extension, the Natural Resources Conservation Service and the Soil Conservation District. As a result of the Water Quality Project, the farmers formed an organization called the Innovative Farmers of Huron County.

The Innovative Farmers have rented two 40-acre fields on which they conduct research trials. MASA supports this project, as well as the projects of individual members who do on-farm research trials or demonstrations.

While goals of the Innovative Farmers coincide with those of the water quality project, the farmers also expressed concern about soil compaction, poor water infiltration, high investment costs, lack of soil microbial activity and a desire to have more leisure time. So they want a production system that reduces trips over the field, reduces equipment inventory, increases crop residue and increases organic matter and soil tilth.

The Integrated Cropping System Demonstration is designed to compare four tillage systems as they are applied to crops in two rotations: the three-year rotation of sugar beets, corn and dry beans and that

same rotation with wheat in the fourth year.

The tillage systems are fall plow, fall chisel, zone-till and Trans-Till. The Trans-Till system consists of a tool bar implement with two eight-wave coulters and a large shank per row. It is used to open the soil ahead of planting. Zone-till is carried out during planting with three coulters per row mounted on the planter.

During the winter, Innovative Farmers meet to discuss results and incorporate new ideas into the next year's research work.

At each of the two research sites, growers can look at each of the rotation crops growing on 10 acres. In addition, MSU researchers have collateral projects under way evaluating cover crops for sugar beets,

sugar beet plant populations, herbicides and fertilizers and corn varieties.

The group is also using Purdue University's MAX: Economic Analysis computer program to compare the economic returns from the various tillage production systems. Farmers throughout the Corn Belt participate in the program, and the results are published each year. Innovative Farmers can compare their production costs with those of growers using similar, or different, tillage systems in different areas.

For additional information on the Innovative Farmers and the Integrated Cropping System Demonstration, contact MSU Extension-Huron County at 517/269-9949.

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