the Practical Farmer

Practical Farmers of Iowa Newsletter

Vol. 7, #4
Winter 1992

A TIME TO REFLECT

The winter issue of *the Practical Farmer* is usually devoted, in part, to reflecting on the previous year. This issue continues the tradition by presenting results from 1992 PFI on-farm trials. Twenty-seven cooperators conducted 64 replicated trials in 1992, bringing the total for the last six years to 302. These trials and the information they produce are at the core of what PFI is about. Take some time to look over this information.

In 1992 there were 30 scheduled PFI field days across Iowa. Attendance at scheduled field days was down from 1991, but the 1,900 total for the year was higher because of tours by groups. Surveys of people attending field days showed that 52% were at their first field day and 65% were farmers. Twenty-two percent said the benefits of attending exceeded their expectations, while only 6% said the benefits fell short of their expectations. Thus, PFI field days continue to reach new people who are mostly farmers, and almost one in four leave pleasantly surprised.

PFI's activities each year conclude with the annual membership meeting, which this winter was January 7. Allan Nation, editor of the *Stockman Grass Farmer* and promoter of grass farming, was the keynote speaker. Given the response to Al's talk, he struck a chord with PFI members. Some of what he said is inside along with a variety of informative articles for you to reflect on as winter melts into spring. So sit back in that easy chair and enjoy what's inside.

IN THIS ISSUE

ALLAN NATION ADDRESSES ANNUAL MEMBERSHIP MEETING

(Editor's note: A highlight of the annual membership meeting was the keynote address by Allan Nation. Here is some of what Allan said that day.)

"What we are going to talk about today is how we create change. When I look out on this audience, I want you to know that all of you look like pretty unreasonable people to me. Let me read you what George Bernard Shaw wrote about that. 'A reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. All progress depends on unreasonable men.' So if you want to change Iowa, it is people like yourself that will change Iowa."

"It is very, very difficult ... to change society from the top. It has to bubble up from the bottom. You've got to make it safe for Iowa State to say some of the things that I am going to say. And the way you make it safe is you start having big crowds, you start having enthusiasm, and you start showing profits. Americans love a success story, and that's the way you create change - is to be a success on your own."

"The primary reason most of us don't find success is that we tend to define our businesses too narrow. You know, if you define yourself as being in the buggy whip business, and ... the world's going to automobiles, you're going to go out of business. But if you decide to define yourself as being in the business of making vehicle accelerators, well you just shift with the change."

"So those of you in the livestock business, I would like to challenge you to think of yourself as being in the business of solar collection and conversion. You've got this chunk of America out there, and the way you are going to make a profit is that you are going to concentrate solar energy on that acre and convert it to human food as cheaply and efficiently as possible. We really, all of us, are sun farmers."

"At least half of your time should be spent thinking about what you are doing. What we have found out is that we can become damn efficient doing the wrong thing. We don't ever give ourselves the time to say, 'Wait a minute, what business am I really in? I am in the business of collecting solar energy on this land and converting it into human food.' Okay? You can say, 'Oh well, the way to get out of this is to grow a higher yield of corn.' But if you are doing that by only increasing the energy input of petroleum, it ain't going to work out for you. High input agriculture came about because it was easier to go buy something to solve a problem than it was to sit and think it through."

"One of the things we found out in the 1980s is that very efficient production systems are very brittle. They don't have a lot of resiliency to them. If you're going to produce 200 bushels of corn let's all pray that we've got $2.50 corn, not a dollar corn, because when the price goes down those very efficient systems don't have any give to them. They break, and they break the farmer that tries to make do with them.

"What we are learning ... is that flexibility is far more important in the long run than efficiency. You want to build a flexible system. Tom Frantzen has rediscovered exactly what Iowa State was preaching back in the early 1950s and late 1940s. If you have got a marginal corn crop, turn hogs out there and you could make a pocketful. If you've got a drought year, let that hog go out there and harvest it. You don't need that big machine and all that petroleum energy."

"There is a good quote I found by Teddy Roosevelt. In Cuba in 1898, they were ambushed by

the Spanish troops, and ... the officers sent back runners and said, 'Teddy, what do we do? What do we do?' And Teddy Roosevelt's instructions to his troops are what we need to think about. He said, 'Do what you can with what you have where you are.' Don't go buy something. Don't go do this or that, but think, 'What can I do with what I have where I am?'"

"One of the things I have learned in all my travels is that if you want to learn something, never go and see a man who is selling at a higher market than you are. Always go look at the man that is selling on a lower market than you are because that's where the world's prices are set - it's by the least-cost producer."

"We're working over in Wisconsin on recreating the idea of a seasonal dairy industry. What we are finding out with this idea of community development, you take one production dairyman, put him on a grass-based seasonal dairy, and not only can a 100-acre farm pay a $100,000 income to that family, but that dairyman also, rather than making hay, starts buying hay from another farmer who may be growing a hay crop to build tilth in his soil so that he can grow grain. It is also much more cost-effective for him to start buying grain than to grow it. You know, that land that is going to return $1,000 an acre net profit making milk is not going to be cost effective growing corn silage or grain. You buy that from somebody else. We found that one grass farmer supports five people in his community."

"As a grass farmer, you have to measure your productivity on a per acre basis, the same as a corn farmer, or any other farmer. We got to looking at southern Wisconsin, and the dairy farmers were thinking their salvation was going to come with 20,000 pounds of milk per cow. What they weren't looking at was that it was taking them four acres to produce that. Their milk production per acre was less than Equador, and Wisconsin's dairy income was getting down there like Equador's. And when they put it on a per acre basis they suddenly discovered that what their grandfather knew, was that seasonal dairy production - have that animal dry in the winter time - all of a sudden started producing about 11,000 to 14,000 pounds of milk per acre. With our markets today, all of a sudden we started seeing nets of $1,000 to $1,300 an acre. Never would have seen that on a per head basis."

"... there is a lot for the community as a whole, and the much bigger community of Iowa - there is a lot in it for everybody, what we are talking about today. That the farmer did poorly in the 1980s was reflected in communities as a whole. If the farm community does better, it is going to be reflected in the community as a whole."

"One thing I want to leave with you is I want you to stop thinking about your problems. Whatever you put your attention on will expand. If you focus on what is good about you, you'll create more good things."

"What you in this room are going to have to do is kind of hug each other and hold on and find some support because the rest of the world is going to try to knock you down. At the *Stockman Grass Farmer* we encourage all of our readers to never try to teach a pig to fly. Okay? It is a waste of your time, and it annoys the pig."

PFI ELECTIONS HELD, BOARD CHOOSES OFFICERS

At the January 7 annual membership meeting, two districts held elections for directors. The northwest district elected Paul Mugge to a two-year term. Paul and his wife, Karen, farm 320 acres near Sutherland. Paul has served as an associate board member for the last two years.

The northeast elected Laura Krouse of rural Mt. Vernon as district director. Laura teaches biology at Cornell College and operates a small farm. Laura also grows and sells open-pollinated corn.

Following the general meeting, a new PFI president and vice president were elected by the board. Vic Madsen was elected as the new PFI president, replacing Tom Frantzen. Vic and Cindy Madsen farm 400

acres near Audubon. Paul Mugge was elected as the new PFI vice president.

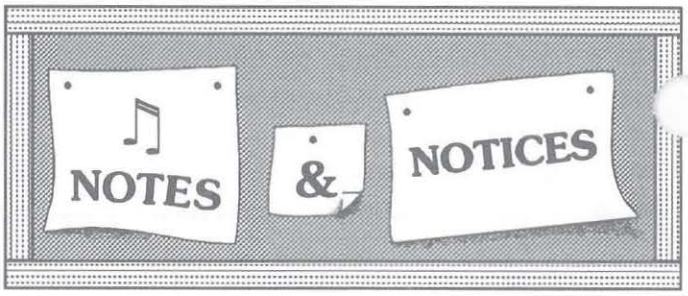
SUSTAINABLE AGRICULTURE ACHIEVEMENT AWARD TO LARRY KALLEM

"PFI has proven to me that when you combine doing what is smart with doing what is right, you end up doing what is wise." With this simple statement and a "thank you," Larry Kallem accepted the PFI Sustainable Agriculture Achievement Award at the annual membership meeting.

Larry Kallem, executive director of the Iowa Institute of Cooperation, has been a behind the scenes supporter and adviser to the PFI Directors. Here is how Dick Thompson, in introduding Larry at the annual meeting, described his role in helping start PFI. "In November of 1984, Sharon and I were asked to be a part of the annual meeting of Institute of Cooperation. In February of 1985, at the ISU Biological Farming Workshop, there were about 300 people there, and Larry asked me to ask if people were interested in having an organization, and hands went up all over the room. And that was the start."

Dick provided some additional details of Larry's role in those early years of PFI, including how he drafted the Articles of Incorporation and the By-Laws. He also read what Larry wrote in 1985 about the new organization. "PFI is a non-profit corporation with two primary goals: 1) to provide farmers access to information and experience about environmentally-sound, profitable farming techniques; and 2) to encourage and guide research aimed at producing more such information. PFI neither sells production inputs or endorses them. It will leave farm policy and politics to other organizations. It sets priorities for research and seeks funds necessary to conduct on-farm research with Iowa State University cooperating."

Dick ended his introduction by noting how the wisdom of these few sentences was clearly obvious nearly nine years later.

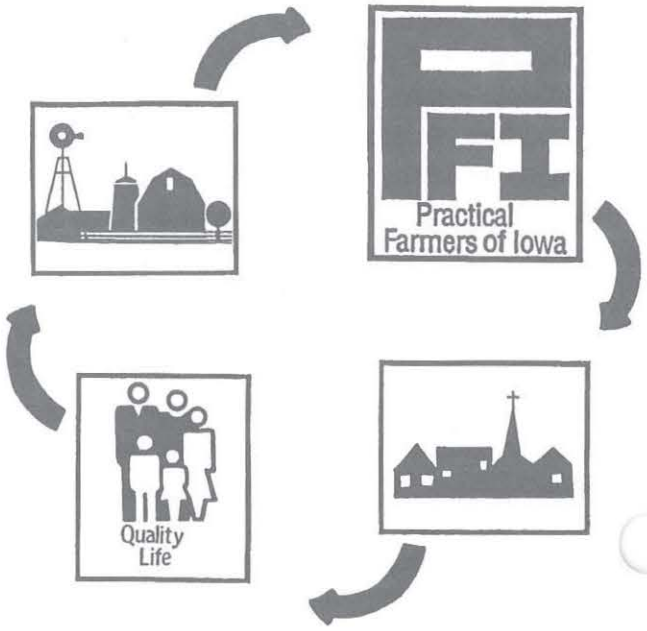


♫ Renew PFI Memberships - LAST CALL

The fall membership drive is drawing to a close. As of the middle of February, we have 364 members who have paid their dues, but 99 who need to renew. THIS IS YOUR LAST PFI NEWSLETTER if you have not renewed your membership. Check with the PFI coordinators or your district director if you're not sure of your status (see back cover for phone numbers). Membership costs $10 a year, but you can now renew for three years for $25.

♫ PFI Sweat Shirts Available

Several members have expressed an interest in PFI sweat shirts. Cindy Madsen and Irene Frantzen have developed a design that shows how the family, farm and community are all part of PFI (see below). The sweat shirts will be supplied by a small screen printing



business in Audubon. Using this local business for the sweat shirts is an example of the interconnection shown in the design.

The sweat shirts are red, blue, and black on a grey, 50/50 poly/cotton blend. Adult sizes are $17, and youth sizes are $12. Any profits from the sweatshirt sales will be used to buy books for the district libraries. Contact Cindy Madsen, 2186 Goldfinch Ave., Audubon, IA 50025-7318, (712) 563-3044.

♫ Researcher Seeks NE IA Farmer For Small Grains Project

Wayne Hansen, an ISU researcher, is looking for a farmer in NE Iowa willing to help with a research project looking at a three-year production system that will include small grains, annual legumes, and corn. He needs a farmer willing to lease him an accessible area of cropland that is 2.3 acres in size in 1993, 4.5 acres in 1994 and 1995, and 2.3 acres in 1996. Also, he would like to have help in terms of a tractor with a good three-point hitch than can have it's wheels spaced to 30" rows, though he says he could lease the tractor from an implement dealer if necessary. Wayne and others will do the work involved in the project.

The system's first year will have plots of barley interseeded with each of six different annual legumes - annual alfalfa, annual sweetclover, berseem clover, black medic, crimson clover, Korean lespedeza. The barley will be harvested in the summer. Winter wheat or winter triticale will be no-tilled into the stubble. The next spring the legumes will be no-tilled into the wheat or triticale, which will be harvested in the summer. The third year will have corn no-tilled into the wheat stubble left after the second year. The soil nitrate test will be used to determine nitrogen needs for the corn.

Small grain and corn yields at various nitrogen rates for the different legumes will give estimates of the nitrogen contributed by the legumes. Ground cover measurements will provide information on the different combinations to estimate soil losses. Weed counts will allow evaluation of the weed suppressing abilities of the different legumes. Yield of the crops and cost-of-input information will allow economic analysis of the system.

If you farm in northeast Iowa and have an interest in this type of production system, contact Wayne at 515-294-7830.

♫ Forage and Grasslands Conference in Des Moines

The American Forage and Grasslands Council is meeting in Des Moines March 29-31. The Iowa Forage and Grasslands Council brought its display to the PFI annual meeting, and PFI will return the favor for this AFGC meeting, which is shaping up to be a powerful package of information. Tuesday, March 30 is designated *Day of the Producer* and includes workshops and national speakers on grazing, pasture management, and hay production. Speakers include Allan Nation, who keynoted the PFI annual meeting in January. Grazing workshop leaders include Jim Gerrish, from the Forage Research Center at Linneus, Missouri, and Roger Musselman, a producer and Extension agriculturalist from Davis County, Iowa. A spouses' program will also be offered, with the Tuesday agenda including a trip to the Amana Colonies.

Registration for one day of the conference is $25, and full registration costs $50. There will be a $15 late fee after March 1. There are also a number of optional lunches and banquets scheduled, at additional charge. To register or get more information, call 1-800-944-AFGC.

♫ Organic Farming Conference

The Fourth Annual Upper Midwest Organic Farming Conference will be held Friday and Saturday, March 5th and 6th, in Sparta, WI. Topics covered in workshops include community supported agriculture, homeopathy and dairy herd health, farm-scale composting, organic dairying, biodynamics, green manures, marketing, certification, and alternative energy systems for farms. The keynote address will be given on the second day by Roger Blobaum, associate

director of the World Sustainable Agriculture Association. There will be a square dance Friday night and a presentation by Rural Voices theater.

Cost is $50 per person for two days, $30 for one day. This includes meals except for Friday night. For information, contact Dave Engel, RR 1-1198, Soldiers Grove, WI, 54655, (608) 734-3711.

♫ International Fellowship Offered

Eisenhower Exchange Fellowships has announced a competition for citizens of the U.S. for a three-month professional experience in Hungary, January-March, 1994. They are seeking farmers, age 28-45, with demonstrated leadership. The goals of the program are twofold: 1) to give U.S. farmers the opportunity to understand the present trends and future possibilities of agriculture in Hungary; and then 2) to assist in the development of agriculture in a changing economy. Benefits include all travel costs and living allowance for Fellow and spouse. Request an application form in writing to D. Harding, Eisenhower Exchange Fellowships, 256 S. 16th St., Philadelphia, PA 19102. Application forms will be sent upon mailed request only. The application deadline is April 30, 1993.

PFI PROFILES: HAROLD AND PAT WRIGHT

Gary Huber

"I was raised on a small farm in north Tama County" was how Harold Wright began as I sat across the kitchen table from him and his wife, Pat, in their home in Ames. Harold worked twenty-four years for the DOT before retiring in 1982, but the depth of his feelings about the farm he grew up on made it abundantly clear that this little piece of Iowa's heritage was an important part of his life. As Harold said, "This land is part of God's creation, and so I take care of it as best I can."

Pat and Harold Wright in their Ames home.

Harold's love of the land expressed itself after he returned from military service in 1946 and settled in Cedar Rapids. He soon became friends with Russ Hughes, a farmer who lived near Marion. Harold would help Russ on Saturdays, and he saw how Russ did things differently than his neighbors, like contouring his row crops and maintaining good waterways.

Then after Harold's father died in 1953, he started managing the 80 acre home farm. "I applied some of what I learned from Russ on my farm. I saw a lot of soil washing away, and so I made up my mind that things were going to be different. I wanted to be a good steward of the land, and I am. I've made a lot of changes, and it's a better piece of land than when I took over."

Harold laid out contour lines early on - contour lines that are still there to this day. Then in 1961 he and Pat bought an adjacent 40 to bring the total to 120 acres. They use contour strip cropping, with the strips being forty rows wide. They also use a crop rotation that includes corn, soybeans, oats, and hay. Harold notes that, "I enjoy walking the land, figuring out how to do things better."

In 1968 they bought a ridge-till planter from Gordon Davidson, the uncle of PFI cooperators Don and Sharon Davidson of Holland, Iowa. The following year they bought a ridge-till cultivator. During these

early years of learning this new system, Harold got his inspiration from Gordon Davidson and additional support from Ernie Behn, a long-time ridge tiller from Boone County. He notes that he and Pat have been lucky to have had tenants who were willing to use their equipment and work with them on practices that protect the land.

Harold's love of the land has expressed itself in another way - a library of books, journals, newsletters, and other publications that he started in the early 1980's, and to which he has been adding ever since. The library is roughly broken into several subject matter areas - farming practices, the global food supply, organic farming, the future or agriculture, the environment, and sustaining the community. Wendell Berry, Rachel Carson, Frances Moore Lappe', Liberty Hyde Bailey, Sir Albert Howard, C. Dean Freudenberger are a few of the many authors represented. It is an impressive array of books, and you may have seen some of them on display at the annual winter meeting.

Pat's response to a question about her motivations for being a good steward of the land was, "What concerns me is what will happen in the future." Harold concurs and adds that "We've got to get young people into farming or in ten years we'll be in serious trouble."

They have two grown daughters - one a Presbyterian minister in St. Louis and the other a nurse in Des Moines. "I don't know if they'll carry on with the farm after we are gone," says Harold. "I would hope both our daughters would be interested," he continued, "but it may not happen. I myself don't want to sell it in my lifetime. The farm sustains me."

Harold's library is available for loan to organizations doing on-farm research, and for annual meetings, workshops, seminars, and conferences. Starting next January, books from Harold's library will be available each winter from January through mid-March as part of the northcentral District library, which will be operated by Doug Alert of Hampton. Harold and Pat's address is 1718 Clark Avenue, Ames, IA, 50010, and their phone number is 515-232-3361.

SUSTAIN OUR SOCIETY: SOS Part II

Gayle Olson, Mt. Pleasant

(Editors' note, the first part of this conference report appeared in the last issue of the newsletter. This article focuses on positive actions people and groups are taking to address problems of rural communities.)

"Children, Youth and their Families" was the theme of the 1992 National Rural Families Conference held September 23 - 25 at Kansas State University. Marvin Barkis, Speaker of the Kansas House of Representatives, opened the conference with an old African proverb "It takes a whole village to raise a child". The proverb came from the sense of community that the families had, the commitment they had to help with each other's responsibilities, and the strength that developed for the whole village. Recognizing the strong link between family health and community health, the remainder of the conference provided a network of programs developed specifically to improve the physical, mental, emotional, social, and economic health of children and the rural "villages" that are raising them.

In fact, *network* was a key concept of the conference. Many presentations focused on strengthening the network in rural communities. Kathy Collmer of the Kansas Rural Center discussed ways governmental agricultural policy are promoting the passing of family farming and rural communities. One of her handouts listed hundreds of common brand names found in a grocery store - and the few multinational companies that own these brands. She emphasized examples of family farms teaming with small rural businesses to offer top quality products locally. Farms and retail businesses have successfully banded together to provide customers with alternatives that can help influence policy changes.

Other presentations told of local organizations and agencies banding together to make better use of talents and resources within a community. One network in Missouri involved the development of an interagency council made up of farm and non-farm rural residents. Ron Wilson of the Huck Boyd National Institute for Rural Development located in Kansas described a

regional collaboration to aid in rural economic development and delivery of services.

Several states have developed special leadership training to help members of small communities identify and implement solutions to their problems. Mark McCaslin described the University of Nebraska program, entitled "The Nature of Leadership." Gayla Randel and Katey Walker told of an innovative approach to keep some of the bright young people active in rural communities. Their program, Youth Community Leadership, provides leadership training and creates opportunities for youth and adults to work together to identify community concerns and design a plan of action to address those concerns. One of the goals is to develop a sense of ownership and involvement by helping the youth learn how their community works and have a hand at helping to solve the problems. The program has been piloted in Iowa and Kansas.

"It was inspiring to be part of such a large gathering of creative people committed to preserving and strengtening the quality of life in our rural communities."

Providing adequate services can become a major problem in maintaining rural communities. Several models of training paraprofessionals were discussed. Vanderbilt University trained community women to provide education, support, and advocacy to help meet the health needs of young families. A couple of programs provided training to help people more easily recognize problems and offer assistance to their friends and neighbors. Jon Hevelone of the First Baptist Church in Wamego, Kansas, and Lisa Flachs of the New York Center for Agricultural Medicine and Health each described their programs.

Farm Safety 4 Just Kids, located in Earlham, Iowa, explained the development of local chapters, pulling together community residents and organizations, then providing them with educational resources and guidance to develop a personalized plan to keep kids safe and healthy on the farm. Rick Peterson of Kansas State University presented the Rural Information Support Empowerment Network, a model to enable greater access to information, support, and resources available to farm families.

Many who attended the conference expressed frustration with the lack of understanding of the uniqueness of rural communities. Several presentations described efforts to better equip helping professionals to understand the needs and characteristics of their rural clientele. One program offered through the Texas Extension Service provides training for pastors in rural communities. Another in Kansas trains physicians in the demands of rural medical care and service delivery.

A telecourse program entitled "Rural Communities: Legacy and Change" is scheduled for release in January 1993. It consists of 12 hours of video, student and teacher guides, and a textbook. Although designed as an Annenberg/CPB Telecourse, the videos are designed to stand alone as a community or school program.

It was inspiring to be part of such a large gathering of creative people, committed to preserving and strengthening the quality of life in our rural communities. It was a testimony to the fact that many of our nation's most resourceful and caring people are those who have been raised and wish to remain in rural communities. Rural America is vibrant and alive. We must continue to innovate, share ideas, coordinate our efforts, and celebrate our quality of life. It is a culture as important to our American heritage as any other and must be defended.

If you are interested in further information on any of the programs mentioned, please contact Gayle Olson at 319-257-6967. The 1993 National Rural Families Conference will be held September 22-24 in Manhattan, KS. Anyone interested in attending or presenting can obtain more information by calling 1-800-432-8222.

PFI ON-FARM TRIAL RESULTS, 1992

READING THE NUMBERS, KNOWING THE TERMS

Valid and reliable farmer-generated information is a cornerstone of Practical Farmers of Iowa. Consequently, PFI has worked to develop practical methods that safeguard the accuracy and credibility of that information. PFI cooperators use methods that allow statistical analysis of their on-farm trials. Chief among these are: 1) "replication," and 2) "randomization." (See Figure 1., a typical PFI trial layout.) The farming practices compared in a trial are repeated, or "replicated," at least six times across the field. Thus trial results do not depend on a single comparison only, but on six or more. The order of the practices, or "treatments," in each pair is chosen with a flip of the coin. This "randomization" is intended to avoid unintentional bias. PFI on-farm trials have been recognized for their statistical reliability. So, while PFI cooperators don't have all the answers, they do have a tool for working toward those answers.

When you see the outcome of a PFI trial, you also see a statistical indication of how seriously to take those results. The following information should help you to understand the reports of the trials contained in this newsletter. The symbol "*" shows that there was a "statistically significant" difference between treatments, one that probably did not occur just by chance. We require ourselves to be 95% sure before we declare a significant difference. If, instead of a "*," there is a "N.S.," you know the difference was "not significant."

There is a handy "yardstick" called the "LSD," or "least significant difference," that can be used in a trial with only two practices or treatments. If the difference between the two treatments is greater than the LSD, then the difference is significant. You will see in the tables that when the difference between two practices is, for example, 5 bushels (or minus 5 bushels, depending on the arithmetic), and the LSD is only, say, 3 bushels, then there is a "*" indicating a significant difference.

The LSD doesn't work well in trials with more than two treatments. In those cases, letters are added to show whether results are statistically different from each other. The highest yield or weed count in a trial

CORRECTIONS FROM THE WINTER MEETING

The meeting program from the Jan. 7 annual meeting contained a few inaccuracies. We appreciate members catching these so we can correct them. Table 4, on pages 18-19, states that in Dave and Lisa Lubben's trial of drilled versus rowed soybeans, both treatments were cultivated. That was true of both his tillage trials in corn, but not the soybean trial.

Table 3, on pages 14-15 of the program, lists a trial by Mike and Jamie Reicherts comparing manure to starter and to a treatment of no starter or manure. Actually all three treatments received manure. (See Table 3 of this newsletter.)

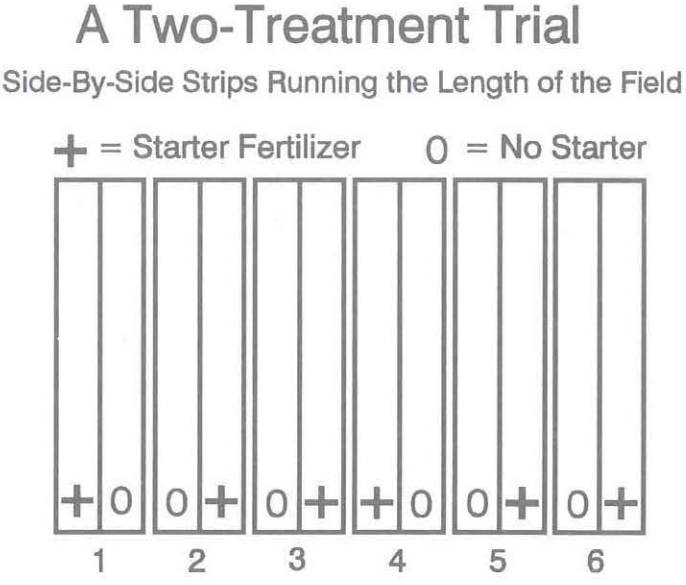


Figure 1. A typical PFI field trial design.

will have a letter "a" beside it. A number with a "b" next to it is significantly different from one with an "a," but neither is statistically different from a number bearing an "ab." A third treatment might produce a number with a "c" (or it might not), and so on.

Average 1992 statewide prices for inputs were assumed in calculating the economics of these trials. Average fixed and variable costs and time requirements were also used. These can vary greatly from farm to farm, of course. The calculations use 1992 harvest time prices of $1.93 per bushel for corn, $5.24 for soybeans, and $1.33 for oats.

Some tables show both a "treatment cost" (which includes relevant costs, but not the total cost of production) and "treatment benefit." The treatment benefit is the relative advantage of a practice compared to the least profitable treatment in that trial, which is assigned a treatment benefit of $0. If there are no significant yield differences in the trial, treatment benefit is calculated solely from input costs. If the yield of a treatment is significantly different from that of the least profitable treatment, then that bushel difference in dollars is also taken into account to calculate treatment benefit for the more profitable practice.

Dollar amounts shown in parentheses ( ) are negative numbers. A treatment "benefit" that is a negative number indicates a relative loss. The highest-yielding practice doesn't always have the greatest treatment benefit! You will see that sometimes the additional input costs of a practice outweigh its greater yield.

Here is one more thing to be aware of. Fertilizer shown with dashes between the numbers (18-46-0) means percent by weight of nitrogen, phosphate, and potash in the product. Fertilizer shown with plus signs (18+46+0) indicates *pounds per acre* of those nutrients in an application.

The results that appear here imply neither endorsement nor condemnation of any particular product. Producers are encouraged to carry out their own trials to find what works in their operations. In reports of trials that involve proprietary products, brand names are included for informational purposes.

NITROGEN

The 1992 growing season was the fifth year PFI cooperators used the late spring soil nitrate test to set nitrogen rates for corn. The late spring, or "pre-sidedress," test is taken when the crop is 6-12 inches tall at the whorl and leads to a recommendation for a rate of nitrogen sidedress, usually at last cultivation. Corn growers who do not sidedress can use the test to see "how they did" with N fertilization. Producers who do sidedress can be conservative with early N applications, assured that any shortfall will be detected in time to make up the difference.

How has the test worked? By now PFI members have used the test in dry years and wet – and in 1992, which was both dry and wet. In the dry years, the test found plenty of nitrate nitrogen in the soil, and recommendations were for little or no additional N. In wet years like 1990, the late spring test generally found very little nitrate N and recommended higher sidedress rates. But in every year there have been exceptions to the trends – high readings in wet years and low readings in dry – and the late spring soil nitrate test has been useful in detecting those exceptional fields.

Some limitations of the late spring test have come to light in PFI trials. These limits are connected to conditions in which biological release of soil nitrate nitrogen from the soil is delayed until after the test. For example, cooperator Tom Frantzen, Alta Vista, notices that his Protivin soils warm very slowly in the spring. In corn following alfalfa, the test recommended Frantzen apply 110-160 lbs N sidedress in 1991. But the yield with this rate was no better than with no sidedress at all, which would not be unexpected in corn following alfalfa.

PFI cooperators have often pushed the test "beyond specifications" by sidedressing less nitrogen than recommended (see Table 1), particularly where there is slow-release livestock manure or green manure in the

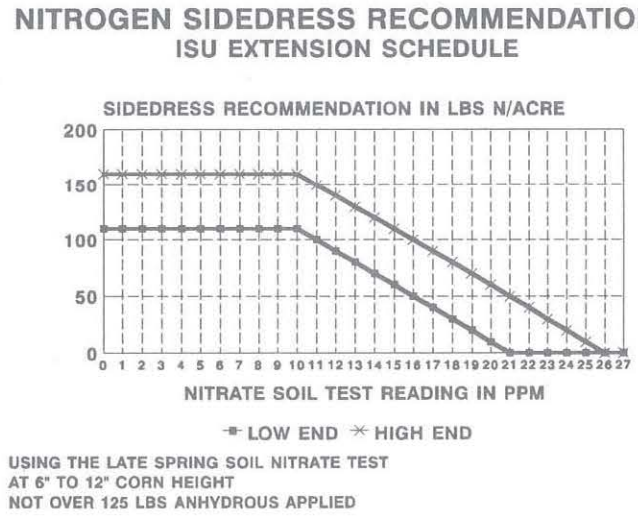


Figure 2. Recommendations accompanying the late-spring soil nitrate test.

system that may not be completely accounted for by the test. They have usually "gotten away with it," but not always. For every grower, that experimentation is part of becoming familiar with how the test works on their own operation.

If ever there was a year to double-cross the late spring test, it was 1992. With the dry spring, soil nitrate levels in eight PFI nitrogen rate trials averaged 20 ppm (parts per million), nearly enough to recommend no sidedressing at all (see Figure 2). Then, just about the time the crop was too tall to sidedress anyway, the rains arrived. In July and August, many farmers received an amount that would be considered a year's supply in some places. This could have invalidated the test in two ways: 1) much of the free soil nitrate nitrogen measured by the test must have been leached out of the root zone or turned into gas through denitrification; 2) the tremendous crop produced by the moisture placed a high demand on the soil for nitrogen.

Table 1 shows three trials that used the late spring test to determine the N rate for the "low rate" treatment. These are the three trials by Stock, Hartsock, and Natvig, where the "test rate" in the table is the same as the "low rate" sidedressed. (Jeff Olson's trial has to be discounted because the anhydrous sidedress burned the crop.) One of these three, Mike Natvig's trial, was the first ever to record a statistically significant yield loss at a rate of N determined by the test. It was only a 3.6 bushel loss, but it was unlikely that it was due to chance. After figuring in the cost of an extra 65 lbs of 28% N, Mike lost only an estimated $0.42 per acre at the low rate compared to the high N rate. Averaging over the three trials, the low rates of nitrogen were $4.26 *more* profitable than the high rates.

Since Mike Natvig's trial was the only one with a statistically significant yield difference ("*"), economics in the other trials are based on input costs alone, for an overall savings of $7.60 in the low rates. But what if you assume that all those nonsignificant yield differences are also real? Averaging all the trials, there was a 2.4 bushel higher yield at the high rates, which averaged 46 lbs N higher inputs. At $1.93 per bushel, 2.4 bushels is worth $4.63. In order for the additional 46 lbs N to have paid for itself merely to the break-even point, the nitrogen would have to cost no more than $0.10 per lb.

Late Season Stalk Nitrate Test

One more tool is coming into use in PFI trials. It is a "rear view mirror" test to tell you how the crop fared for nitrogen. This is the late season stalk nitrate-N test. Eight-inch sections of stalks (from 6 to 14 inches above the ground) are taken one-to-two weeks after black layering indicates crop maturity. Below the sufficiency range of 700-2,000 ppm nitrate-N, crop yields may be reduced due to nitrogen shortage. Readings above that range suggest the crop had more N available than it could turn into grain. The stalk test

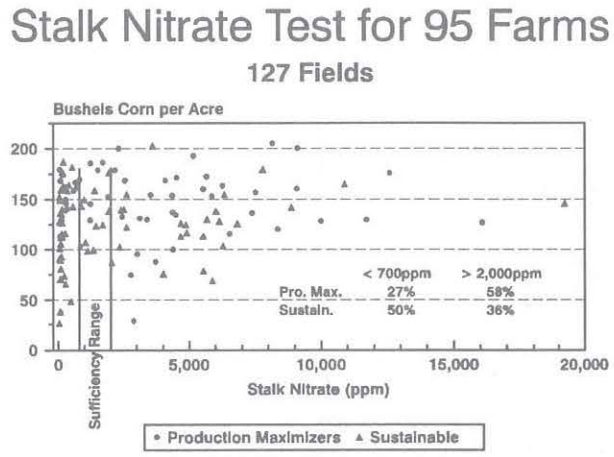


Figure 3. An example of stalk nitrate N and yields.

TABLE 1.
TWO-TREATMENT NITROGEN RATE TRIALS IN CORN

	LOW RATE TRT			HIGH RATE TRT					RECOM-MENDED	
COOPER-ATOR	YIELD (bu)	N RATE (lbs N)	STALK NITRATE N (PPM)	YIELD (bu)	N RATE (lbs N)	STALK NITRATE N (PPM)	RATE DIFF.	SPRING SOIL NITRATE TEST (PPM N)	LOW RATE	HIGH RATE
(AFTER CORN)										
BAUER	155.9	93		157.9	138		45	12	90	140
STOCK	136.8	150		135.9	180		30	7	110	160
AVERAGE	146.3	122		146.9	159		38	10		
(AFTER SOYBEAN)										
ALERT	185.4	116		185.7	166		50	12	90	140
BAUER	175.2	89		180.6	134		45	13	80	130
DAVIDSON	159.6	70	788	161.3	130	1,217	60	11	100	150
HARTSOCK	157.1	116	191	161.4	146	662	30	38	0	0
NATVIG	147.6	18	332	151.2	83	2,534	65	36	0	0
OLSON	175.1	45	16	136.7	120	25	75	24	0	20
WILSON	156.4	58	601	159.4	98	1,409	40	11	100	150
AVERAGE (EXCLUDES OLSON)	163.5	78		166.6	126		48	20		
OVERALL AVERAGE (8 TRIALS)	159.2	89		161.7	134		46	17		

TWO-TREATMENT NITROGEN RATE TRIALS IN CORN

SIDEDRESS									
LOW RATE	HIGH RATE	TEST RATE	YIELD DIFF.	LEAF N SIG.	YLD SIG.	YLD LSD	LOW RATE $ BENEFIT	GAL DIESEL EQUI-VALENT SAVED	COMMENT
45	90	90	-2.0	–	N.S.	2.9	$9.90	10.7	
150	180	150	0.9	N.S.	N.S.	7.3	$6.60	7.2	
			-0.6				$8.25	8.9	
70	120	120	-0.3	–	N.S.	5.4	$11.00	11.9	
45	90	90	-5.3	–	N.S.	10.1	$9.90	10.7	
70	130	130	-1.7	–	N.S.	22.7	$13.20	14.3	HIGH LSD. PART OF 3-TRT TRIAL (SEE TABLE 3)
0	30	0	-4.3	–	N.S.	6.2	$6.60	7.2	HIGH N RATE SET BY YIELD GOAL METHOD
0	65	0	-3.6	–	*	3.5	(0.42)	15.5	COST LARGELY OFFSET THE YIELD INCREASE
0	75	0	38.4	–	*	10.5	–	–	ANHYDROUS N SIDEDRESS BURNED ROOTS
50	90	90	-3.0	–	N.S.	8.1	$4.00	9.5	
			-3.0				$7.38	11.5	14½¢ N REQUIRED TO PAY FOR 3.3 BU CORN YIELD DIFFERENCE
			-2.4				$7.60	10.9	

is better at detecting excess nitrogen use than telling a producer exactly how short of N the crop was. It's a good way of summing up all the year's effects of weather and management.

Figure 3 presents yield-by-stalk nitrate-N for 127 fields of farms across the state in 1991. These data are part of a study of farming practices in the state that typed farmers as "sustainable" or "production maximizers" based on farming practices and attitudes. There was a tendency for more of the fields in the low range for stalk nitrate-N (less than 700 ppm) to be in the sustainable class, but there were also many exceptions. In the coming year, more information will be published on this study, in which many PFI members participated.

MANURE TRIALS

PFI farmers have always been interested in the most efficient and profitable ways to use on-farm resources like livestock manure. This year's field trials with manure looked at economics, timing, placement, comparisons with other fertilizers, and manure's effect on soybeans. (Table 2 and Table 3.)

Vic and Cindy Madsen, Audubon, applied 3,300 gallons of liquid hog manure to soybeans at planting time (Table 2). There was no significant yield response in 1992, even though the field has tested low in potassium. Dick and Mary Jane Svoboda, Aurora, sidedressed 2,500 gallons of hog manure on corn. There was not a significant yield difference this year. In some years manure has significantly raised yields in the Svobodas' trials, and leaf testing has tied the effect to potassium, which can be low on the farm. In 1992, the tally showed a $12.59 loss for the manure treatment, but that does not include $14-worth of P and K fertilizer benefit to the field from the manure.

Tom and Irene Frantzen, Alta Vista, compared: 1) manure preplant-broadcast; 2) manure sidedressed; and 3) no manure, in a three-treatment trial (Table 3). The two manure treatments yielded significantly better than the no-manure treatment, but there was no difference between broadcast and sidedressed. The late spring (pre-sidedress) soil nitrate test showed there was no shortage of nitrogen available to the crop.

Mike and Jamie Reicherts, Alta Vista, compared: 1) manure at planting; 2) starter plus manure sidedress; and 3) manure sidedress alone. The starter-plus-manure yielded best, followed by manure at planting, followed by the sidedress treatment. Mike credits the differences to placement – the manure was between the rows and relatively unavailable to the young crop.

Ron and Maria Rosmann, Harlan, compared: 1) manure at planting followed by sidedressed 28% N; 2) sidedressed N only; and 3) starter fertilizer followed by sidedressed N. Ron carefully adjusted the rates of 28% N so that there would be equal amounts of crop-available nitrogen in all three treatments. The manure treatment yielded significantly better than the sidedress-only treatment. Bringing up the rear was the starter-plus-sidedress treatment. Ron believes the 17 gallons of 9-18-9 starter fertilizer was too close to the seed, reducing the crop stand in the dry planting conditions of 1992.

STARTER FERTILIZER TRIALS

A good argument could be made that there will never be a final answer to the question: "Do starter fertilizers pay?" The difficulty is in the complexity of the situation — there are multiple nutrients, environmental variables, producer goals, and product characteristics to consider (including price and convenience). Besides the yield effect, there is the intangible value of getting a crop off to a faster start to compete with weeds, establish roots, and cultivate earlier. PFI starter trials take place in this context. So remember, what works in one trial this year may not work for someone else, or even for the same farmer in a different year.

Ray and Marj Stonecypher, Floyd, compared two kinds of liquid starters (10-34-0, and "food grade" 3-18-18) with no starter. (See Table 3.) The two starters were supplemented with some 0-0-60, and enough 28% N was banded at planting so all three treatments

TABLE 2. TRIALS USING MANURE, 1992			
COOPERATOR		MADSEN	SVOBODA
PREVIOUS CROP		CORN	SOYBEANS
MANURE TREATMENT	TYPE	3,300 GAL AT SOYBEAN PLANTING	2,500 GAL MANURE, 3 GAL 3-18-18
	N CONTENT (MANURE + FERTILIZER) (LBS)	165	113
	N AVAILABLE (LBS)	83	82
	LEAF N (%)	--	--
	YIELD (BU/ACRE)	41.6	133.3
	$ COST	$19.37	$30.19
PURCHASED INPUT TREATMENT	TYPE	NO MANURE	28% N, 3 GAL 3-18-18
	N RATE (LBS/ACRE)	0	81
	LEAF N (%)	--	--
	YIELD (BU/ACRE)	42.2	129.5
	$ COST	$0.00	$17.60
DIFFERENCE	RATE DIFF. (LBS N)	83	1
	YIELD DIFF. (BU)	-0.6	3.8
	YIELD SIGNIFICANCE	N.S.	N.S.
	YIELD LSD (BU)	1.4	4.7
	LEAF N SIGNIF.	--	--
MANURE $ BENEFIT		($19.37)	($12.59)
COMMENTS		LOW SOIL K, VERY HIGH SOIL P	MANURE SUPPLIED 45 LB P, 45 LB K

TABLE 3. MULTIPLE-TREATMENT TRIALS

				TREATMENT "A"				
COOPERATOR	CROP	PREVIOUS CROP	YIELD SIGNIFI-CANCE	DESCRIPTION	YIELD (bu.)	STAT.	TRT COSTS	$ BENEFIT
DAVIDSON	CORN	SOYBEANS	N.S.	70 LB N / ACRE	159.5	a	$15.40	$13.20
DORDT COLLEGE	SOYBEANS	CORN	*	LAND O'LAKES 2121	48.8	ab	$0.00	$0.00
FRANTZEN	CORN	SOYBEANS	*	2,500 GAL. LIQUID MANURE PREPLANT BROADCAST	191.4	a	$19.07	$1.36
REICHERTS	CORN	SOYBEANS	*	2,000 GAL MANURE SURFACE-APPLIED AT PLANTING (20+15+30 CROP-AVAILABLE)	124.5	b	$19.58	$55.07
ROSMANN	CORN	SOYBEANS	*	MANURE AT PLANTING, 28% N SIDEDRESS	161.0	a	$66.47	$59.54
THOMPSON	SOYBEANS	CORN	N.S.	STANDARD BUFFALO PLANTER (GAUGE WHEEL & COULTER ON ROW) SMARTWEEDS PER ACRE:	62.0 69	a bc	$0.00	$10.06
LEAZER	CORN	CORN	*	7 LBS COUNTER INSECTICIDE BAND	147.8	a	$10.71	$15.32
LEAZER	SOYBEANS	CORN	N.S.	15 LBS PELLETED LIME BANDED WITH PLANTER	45.2	a	$0.57	$11.43
STONECYPHER	CORN	SOYBEANS	N.S.	(30+9+40) STARTER, USING 3-18-18 LIQUID	169.6	a	$52.44	$0.00
SVOBODA	CORN	SOYBEANS	N.S.	(1+6+6) STARTER, USING 3-18-18 LIQUID	112.3	a	$8.25	$0.00
THOMPSON	SOYBEANS	CORN	N.S.	SUSPENSION STARTER (3+15+60)	59.7	a	$13.50	$0.00
THOMPSON	CORN	HAY	N.S. (Pr>F=0.056)	SUSPENSION STARTER (50+15+45)	184.7	ab	$17.50	$27.80
THOMPSON	CORN	SOYBEANS	*	SUSPENSION STARTER (50+15+45)	191.0	a	$17.50	$51.83
TIBBS	CORN	SOYBEANS	*	21+54+68 PLACED IN 0+0+130 ANHYDROUS BAND	208.1	a	$36.92	$25.14

MULTIPLE-TREATMENT TRIALS

TREATMENT "B"					TREATMENT "C"					
DESCRIPTION	YIELD (bu.)	STAT.	TRT COSTS	$ BENEFIT	DESCRIPTION	YIELD (bu.)	STAT.	TRT COSTS	$ BENEFIT	OVERALL COMMENTS
100 LBS N / ACRE	160.6	a	$22.00	$6.60	130 LBS N / ACRE	161.3	a	$28.60	$0.00	788, 1,343, & 1,271 PPM STALK NITRATE N
LAND O'LAKES 2200	49.7	a	$0.00	$21.78						
LAND O'LAKES 2333	50.4	a	$0.00	$25.64	LAND O'LAKES 2777	45.5	b	$0.00	$0.00	EVALUATION OF VARIETIES SUITED TO 36" RIDGES
2,500 GAL MANURE SIDEDRESSED	193.4	a	$19.07	$5.25	NO MANURE APPLIED	180.8	b	$0.00	$0.00	ALL TRTS RECD. 53+8+50 STARTER. SOIL NO3=31 PPM. NO SIGNIF. LEAF TISSUE DIFFS.
41+10+24 STARTER, 3,000 GAL SIDEDRESS	132.7	a	$32.04	$58.37	NO STARTER, 3,000 GAL SIDEDRESS	96.0	c	$19.58	$0.00	IN-ROW STARTER BETTER EARLY THAN BETWEEN-ROW MANURE. NO LEAF TISSUE DIFFS.
28% N SIDEDRESS ONLY	152.5	b	$17.38	$92.13	STARTER + 28% N SIDEDRESS	130.5	c	$67.19	$0.00	EQUIVALENT AVAILABLE N IN ALL THREE TRTS. THE STARTER MAY HAVE REDUCED CROP STAND.
OFF-ROW, MODIFIED PLANTER	61.9	a	$0.00	$10.06						
SMARTWEEDS PER ACRE:	139	a								
RYE FALL-DRILLED ON RIDGE	61.2	a	$10.06	$0.00	DRILL ONLY, NO SEED	61.8	a	$9.36	$0.70	RYE COVER TRT HAD FEWEST SMARTWEEDS
SMARTWEEDS PER ACRE:	46	c			SMARTWEEDS PER ACRE:	116	ab			
"BIOROOT PLUS" ROOT STIMULANT	140.6	b	$8.90	$0.00	NO INSECTICIDE, NO ROOT STIMULANT	137.4	b	$0.00	$8.90	3,000 GAL MANURE APPLIED FALL 1991
110 LBS 6-28-29 STARTER	46.5	a	$12.00	$0.00	NO STARTER, NO PELL LIME	43.5	a	$0.00	$12.00	
(30+34+60) STARTER, USING 10-34-0 LIQUID	165.5	a	$50.54	$1.90	(30+0+0) STARTER	168.5	a	$32.71	$19.73	N-ONLY TRT HAD LOWER LEAF K & WAS 1-2% DRIER AT HARVEST
(1+0+0) STARTER, USING 28% N	100.3	a	$0.22	$8.03	NO STARTER	100.1	a	$0.00	$8.25	3-FOOT HEIGHT DIFF. ON 7/2. YIELD DIFF. NEARLY SIG.
DRY STARTER (3+15+60)	59.5	a	$11.44	$2.06	NO STARTER	59.2	a	$0.00	$13.50	
DRY STARTER (50+15+45)	189.0	a	$15.14	$30.16						
LIQUID STARTER (45+14+13)	184.7	ab	$45.30	$0.00	NO STARTER FERTILIZER	180.0	b	$0.00	$45.30	$ BENEFIT OF TRTS REL. TO LIQUID EXCLUDES YIELD DIFFERENCES
LIQUID STARTER (45+14+13)	178.6	a	$45.30	$0.00	NO STARTER FERTILIZER	165.9	c	$0.00	$20.79	$ BENEFIT OF TRTS REL. TO LIQUID EXCLUDES YIELD DIFFERENCES
P & K BAND SEPARATE FROM N BAND	207.0	a	$36.92	$22.82	0+0+150 ANHYDROUS N ONLY, NO P & K	183.8	b	$15.00	$0.00	P & K EFFECT, BUT NO PLACEMENT EFFECT

received 30 lbs N. After all that careful adjusting, there was no difference in yield, so the economic comparison reflects only input costs and the fact that the no-starter corn was about 2% drier at harvest.

Dick and Mary Jane Svoboda, Aurora, also did some careful adjusting in their starter fertilizer trial. They compared: 1) 3 gallons of 3-18-18; 2) just enough 28% N (1 lb) to equal the nitrogen in the 3-18-18; and 3) no starter or nitrogen at planting. The starter treatment yielded about 12 bushels better than the other two treatments, but the difference was not statistically significant. However, in early July the difference among the three practices was striking. The corn that had received the starter was 2-3 feet taller than the N-only treatment or the check treatment. (See photo.)

The actual amount of nutrients in the Svobodas' starter was small (about 1+6+6). The question was apparently not "When did the crop need the *most* nutrients?" but "When did the crop need nutrients the *most*?" The check treatment and N-only corn was short, showed leaf symptoms of potassium deficiency, and had weak root systems that extended horizontally. The starter corn was taller, greener, and had stronger root systems that were directed down. Down was where the only soil moisture was, until July. It seemed that the root systems of the small plants had just never "found" the soil moisture that was there in the deeper soil. The corn recovered amazingly in July and August. But the appearance on July 2 was that a little bit of starter, by helping root systems get established, had saved the crop. Dick Svoboda has seen less dramatic starter effects in previous trials, but he has never observed a significant yield difference.

Richard and Sharon Thompson, Boone, carried out three trials comparing forms of starter fertilizers (Table 3). In soybeans following corn, they compared: 1) suspension starter fertilizer; and 2) dry starter, both at 3+15+60; with 3) no starter of any kind. The yields were not significantly different. In corn following hay, the Thompsons compared: 1) suspension 50+15+45; 2) dry 50+15+45; 3) liquid 45+14+13; and 4) no starter. The dry starter yielded better than the no-starter control treatment. The liquid and suspension

Dick Svoboda holds a corn plant from the starter treatment on the left, two plants from the zero-starter treatment on the right.

treatments' yields were intermediate between those two extremes. Judging solely on the basis of yield and input cost, the no-starter treatment was the most profitable in both these trials.

In the third trial, corn following soybeans yielded significantly better with either suspension or liquid starter than with no starter at all. The liquid starter was the least profitable practice, however, due to the cost. Richard Thompson is also working with equipment manufacturing representatives to develop a deeper banding implement for his planter. A deeper band of fertilizer might be more accessible to the crop in a dry spring like 1992.

OTHER FERTILITY TRIALS

Several additional fertility trials were carried out by cooperators. Paul and Karen Mugge, Sutherland, checked for residual differences due to deep banding in the ridge versus surface broadcast P and K fertilizer in December, 1990 (Table 4). There was no yield effect in 1992, and none was seen in 1991, either.

Jeff and Gayle Olson, Mount Pleasant, tried banding pelleted lime with the planter (Table 4). There was no significant yield effect. Steve and Gloria Leazer, Wilton, carried out a three-treatment trial to

compare: 1) 15 lbs pelleted lime banded with the planter; 2) 110 lbs 6-28-29 "biological" starter fertilizer; and 3) a check treatment of no starter or pell lime (Table 3). There were no statistically significant yield differences, giving the economic edge to the check treatment.

Ray and Marj Stonecypher, Floyd, designed a trial to evaluate the efficiency of applying planting-time nitrogen in a surface band (as with herbicide carrier) versus an incorporated band (Table 4). There was no yield difference in 1992, even though the late spring soil nitrate test indicated the crop did require additional sidedress nitrogen.

Allen Tibbs, Alden, is a PFI member but not a cooperator. In 1992, he submitted an application to *PFI Sustainable Projects* to study placement of phosphorus and potassium fertilizer. The P and K was placed in a band either: 1) in the same location as a band of anhydrous ammonia N; or 2) separate from the anhydrous band. The third treatment received nitrogen but no P or K fertilizer. Allen wondered if the acidity in the anhydrous band would make phosphorus or potassium more available in his calcareous soils. The yield difference he observed was not between the P and K placements but between the two P and K fertilizer treatments and the treatment receiving no P or K (Table 3).

John Wurpts, Ogden, also carried out on-farm trials under *Sustainable Projects* funding. For the second year, John compared fertilizer recommendations from ISU with those of a local consultant. The Iowa State recommendation, made with assistance from Extension field specialist John Creswell, was for no additional fertilizer in soybeans and for 120 lbs of nitrogen in corn. The local consultant recommended a variety of biological products for each crop. There was not a significant yield difference in either crop, but there were differences in input costs (Table 4).

PFI member Mike Hermanson, Story City, conducted replicated trials on his own for three years comparing conventional and biological fertilizers (Table 4). In two years of corn and one year of soybeans, there was no statistically significant difference in yields, but the biological program cost on average $26.63 per acre more.

MISCELLANEOUS TRIALS

Cooperators' trials don't always fit in neat categories. Ron Vos, at the Dordt College Ag Stewardship Center, carried out a soybean variety trial for the 38-inch ridge-till system the Center is now using (Table 3). In the second year of another variety trial, the college compared multileaf alfalfa to a similar alfalfa without the multileaf trait (Table 7). Seed cost, yield, crude protein, total digestible nutrients, and relative feed value were all similar in the two alfalfa varieties.

Ted and Donna Bauer, Audubon, compared purchased soybean seed with seed they had grown and cleaned through a neighbor (Table 4). Yields were not significantly different, so the homegrown seed saved about $3.93 per acre.

Tom and Irene Frantzen, Alta Vista, who are enthusiastic growers of grain amaranth, compared the rotation effect of amaranth and soybean on ridge-till corn (Table 4). The corn following amaranth was stunted at one end of the field. Soil moisture samples taken the first week of July revealed no difference. Leaf samples at silking showed significantly higher calcium and magnesium in corn following amaranth than corn following soybeans, but there were no other nutrient differences. The effect on yield was 31 bushels. The phenomenon remains somewhat of a mystery. More trials will be needed to settle the question of amaranth's compatibility with other row crops.

Jeff and Gayle Olson evaluated the effectiveness of soil-applied insecticide in a second-year corn field that had been scouted for rootworm beetles in 1991 (Table 4). Even though Jeff reports there were only 3-4 beetles per week in the sticky traps in 1991, insecticide significantly increased yields in 1992. Possible factors are the way sampling was done and the calibration for the sticky traps, which is being reexamined by ISU researchers.

TABLE 4. FERTILITY & OTHER TRIALS

COOPERATOR	CROP	TREATMENT "A"		TREATMENT "B"
		DESCRIPTION	YIELD (bu.)	DESCRIPTION
HERMANSON '90	CORN	AGRIENERGY BIOLOGICAL FERTILIZERS	111.6	CONVENTIONAL FERTILIZER (28% N)
HERMANSON '91	SOYBEANS	AGRIENERGY BIOLOGICAL FERTILIZERS	48.8	CONVENTIONAL PROGRAM (NO FERTILIZER)
HERMANSON '92	CORN	AGRIENERGY BIOLOGICAL FERTILIZERS	198.0	CONVENTIONAL PROGRAM (28% N & HERBICIDE BAND)
MUGGE	SOYBEANS	BROADCAST 30+80+90 IN DECEMBER, 1990	49.2	DEEP BANDED 30+80+90 IN DECEMBER, 1990
OLSON	SOYBEANS	78 LB/A PELL LIME BAND AT PLANTING	61.4	NO PELL LIME
STONECYPHER	CORN	SURFACE BANDED N AT PLANTING	163.8	SUBSURFACE BANDED N AT PLANTING
WURPTS	CORN	BIOLOGICAL FERTILIZER PROGRAM	180.6	ISU FERTILIZER RECOMMENDATIONS (120 LBS N)
WURPTS	SOYBEANS	BIOLOGICAL FERTILIZER PROGRAM	47.9	ISU FERTILIZER RECOMMENDATIONS (NO FERTILIZER)
BAUER	SOYBEANS	SEED SAVED, CLEANED	52.5	PURCHASED SEED
FRANTZEN	CORN	FOLLOWING AMARANTH IN 1991	117.9	FOLLOWING SOYBEANS IN 1991
CONRAD	CORN	SOIL INSECTICIDE AFTER '91 SOYBEANS	216.5	NO SOIL INSECTICIDE
OLSON	CORN	SOIL INSECTICIDE AFTER CORN IN 1991	168.3	NO INSECTICIDE AFTER CORN

FERTILITY & OTHER TRIALS

TRT "B"	DIFFERENCE				
YIELD (bu.)	YIELD DIFF.	YLD LSD (bu.)	YLD SIG.	$ BENEFIT OF TRT "A"	COMMENT
109.8	1.9	13.2	N.S.	($26.35)	WEED PRESSURE IN FIELD.
47.8	0.9	1.9	N.S.	($18.67)	
198.8	-0.9	1.7	N.S.	($34.88)	TURKEY COMPOST, 0-0-60, MICRONUTRIENTS, & STARTER ON WHOLE FIELD
48.5	0.7	1.8	N.S.	($0.08)	NO RESIDUAL EFFECT FROM 1990, NO EFFECT IN 1991 EITHER
65.3	-4.0	7.6	N.S.	($2.96)	FIELD WAS LAST LIMED IN 1989
161.3	2.5	4.4	N.S.	($0.00)	LATE SEASON STALK NITRATE N LESS THAN 300 PPM IN BOTH TRTS.
177.6	2.9	5.4	N.S.	($34.89)	BIOLOGICAL RECOMMENDATIONS MADE BY DEALER FOR AGRIENERGY
48.3	-0.4	1.9	N.S.	($41.69)	BIOLOGICAL RECOMMENDATIONS MADE BY DEALER FOR AGRIENERGY
51.2	1.2	3.2	N.S.	$3.93	131,000 SEEDS/ACRE, 49 LB/ACRE. $1.50/BU SEED CLEANING COST
148.9	-31.0	10.8	*	($61.81)	CORN AFTER AMARANTH 6% WETTER, UNEVEN GROWTH
197.5	19.0	8.3	*	$22.45	HALF RATES LORSBAN & FORCE APPLIED WITH CONRAD BANDERS
151.9	16.4	6.4	*	$18.34	3-4 BEETLES/WEEK TRAPPED IN 1991, INDICATING LOW PRESSURE

TABLE 5. TILLAGE TRIALS IN 1992

COOPERATOR	CROP	TREATMENT "A"		TREATMENT "B"
		DESCRIPTION	YIELD (bu.)	DESCRIPTION
DAVIDSON	SOYBEANS	PREPLANT DISK, 6 2/3" DRILL SPACING	43.3	PREPLANT DISK, 38" RIDGE TILLAGE
LUBBEN	SOYBEANS	NO-TILL DRILL	42.9	PREPLANT DISK TILLAGE, ROW-PLANTED
LUBBEN	CORN	NO-TILL	150.6	DISK TILLAGE
LUBBEN	CORN	NO-TILL	149.4	DISK TILLAGE
OLSON	SOYBEANS	NO-TILL DRILL	55.1	RIDGE TILLAGE
REICHERTS	OATS	PREPLANT DISK TILLAGE	97.7	DRILLED OVER RIDGES

TILLAGE TRIALS

Tillage is one of the most fundamental building blocks of a cropping system. There the agreement ends. Some prefer primary tillage, some say ridge tillage is the best of both worlds, and others believe no-till is the way of the future. This year six replicated tillage comparisons were carried out by three PFI cooperators.

Anyone attending a tillage show in the last year sensed the wide interest in no-till, particularly drilled soybeans. Most of the PFI tillage trials this year were efforts by cooperators to get some answers for themselves.

Don and Sharon Davidson, Grundy Center, compared drilled soybeans to ridge-till soybeans (Table 5). Don was in the process of changing row widths on the farm, so the whole field was disked prior to planting. Don intends to keep the same trial on that ground for several more years. In 1992 there was no significant yield difference between the treatments, although the drilled soybeans might have yielded better if they hadn't had a weed problem at one end of the field. The whole field received a postemerge broadcast application of Assure II and Pinnacle. In a similar trial in 1991, the drilled soybeans yielded better but wound up costing Davidson more. In 1992, costs were greater in the row-planted soybeans.

Dave and Lisa Lubben, Monticello, practice no-till on part of their crop acres, and they are always trying to make it work better. They compared disk-tillage soybeans to no-till drilled beans in 1992 (Table 5). There was no significant yield difference, and the no-till

TILLAGE TRIALS IN 1992

TRT "B"	DIFFERENCE				
YIELD (bu.)	YIELD DIFF.	YLD LSD (bu.)	YLD SIG.	$ BENEFIT OF TRT "A"	COMMENT
39.8	3.5	5.7.	N.S.	$8.58	BOTH TRTS BROADCAST POST, WEEDS IN DRILLED AT ONE END
41.4	1.4	2.7	N.S.	($11.25)	NO-TILL RECEIVED AN EXTRA PREPLANT BROADCAST
149.6	1.0	7.8	N.S.	$4.43	SOFT GROUND. BOTH TRTS BROADCAST, CULTIVATED ONCE
171.6	-22.2	7.6	*	(38.38)	HARD GROUND. BOTH TRTS BROADCAST, CULTIVATED ONCE
55.1	0.0	3.8	N.S.	($27.26)	NO-TILL EMERGED POORLY IN VALLEYS, SO SIMILAR STANDS
96.4	1.3	12.1	N.S.	($5.20)	RIDGES EITHER DISKED OR NOT

costs were higher because of seeding rate differences and a preplant broadcast for the drilled soybeans.

Lubben carried out two similar trials in corn that yielded contrasting results. In a field with good tilth, the yields were the same in both no-till and disk-till corn, and the no-till came out ahead because of lower input costs. However, in the former pasture Dave describes as having compacted soil, no-till yielded 22 bushels less than the disked ground. This information will help Lubben match the tillage to the field in future years.

Jeff and Gayle Olson, Mount Pleasant, compared ridge-till and no-till soybeans (Table 5). Yields were similar, and the two separate postemergence spray passes in the no-till helped to make it the less profitable practice in this trial.

Mike and Jamie Reicherts, Alta Vista, are serious about oats and about narrow strip intercropping, so naturally they want to know the best way to raise oats in strips. It would be convenient to drill oats right over the ridges left by the row crops in the strip system, but do oats yield better on tilled soil? There was no yield difference between "ridge-till" oats and conventional disk tillage oats in the Reicherts' field trial in 1992 (Table 5.) A similar trial by neighbor Tom Frantzen in 1990 yielded the same result.

WEED TRIALS

The challenges in weed management in 1992 came from the weather. Postemergence herbicides were ineffective in the dry spring and early summer

TABLE 6. WEED MANAGEMENT TRIALS

COOPERATOR	LOW RATE TREATMENT				HIGH RATE TRT
	DESCRIPTION	YIELD	BROADLEAFED WEEDS/ACRE	OTHER WEED INFORMATION	DESCRIPTION
(CORN)					
MADSEN	NO ROTARY HOE, 2X CULTIVATE	170.7	--		PLANTING BAND, NO HOE, 2X CULTIVATE
MUGGE	3X HOE, 3X CULTIVATE, NO HERBICIDE	152.3		SIGNIFICANTLY HIGHER GRASS PRESSURE	PLANTING BAND, NO HOE, 3X CULTIVATE
OLSON	SPRING RYE COVER, 2X HOE, NO HERBICIDE	95.9	117	SIGNIFICANTLY HIGHER GRASS RATING	NO SPRING RYE, HERBICIDE PLANTING BAND
THOMPSON	NO HOEING, 2X CULTIVATION, NO HERBICIDE	189.7	33		3X HOE, 2X CULTIVATION, NO HERBICIDE
WILSON	2X ROTARY HOE, 2X CULTIVATE, NO HERB.	155.6	67		PLANTING BAND, 2X HOE, 2X CULTIVATE
(SOYBEANS)					
GRAU	2X HOE, 2X CULTIVATE, NO HERBICIDE	51.9	--		PLANTING BAND, 1X HOE, 2X CULTIVATE
LACINA	2X HOE, 3X CULTIVATE, NO HERBICIDE	47.2	222	BROADLEAFS & GRASS BOTH SIGNIFICANTLY MORE	2X HOE, 3X CULTIVATE, 2 POST BANDING PASSES
MUGGE	2X HOE, 3X CULTIVATE, NO HERBICIDE	51.1	111		PLANTING BAND, 2X CULTIVATION
OLSON	SPRING RYE COVER, NO HERBICIDE	59.9	30	SIGNIFICANTLY HIGHER GRASS NUMBERS	SPRING RYE, BROADCAST HERBICIDE
ROSMANN	2X HOE, 2X CULTIVATE, NO HERBICIDE	50.4	186	BROADLEAF WEED COUNT = BUTTONWEEDS	PLANTING BAND, 2X HOE, 2X CULTIVATE
THOMPSON	NO HOE, 2X CULTIVATE, NO HERBICIDE	63.1	4		3X HOE, 2X CULTIVATE, NO HERBICIDE

WEED MANAGEMENT TRIALS

HIGH RATE TREATMENT			TREATMENT DIFFERENCES					COMMENTS
YIELD	BROAD WEEDS	OTHER WEED INFORMA-TION	YIELD DIFF.	YLD. SIG.	YLD. LSD	BRDL. WEED SIG.	LOW RATE $ BENEFIT	
170.7	--		0.0	N.S.	6.3	--	$5.40	
158.2			-5.9	*	5.6	--	($9.45)	
169.1	56	39 LBS 28% N USED AS CARRIER	-73.1	*	10.1	N.S.	($141.34)	RYE DRIED SOIL EARLY, PLANTER LEFT SOME ON RIDGE SHOULDERS
190.0	50	DOUBLE FIRST HOEING, SINGLE SECOND	-0.3	N.S.	4.5	N.S.	$9.28	NEITHER YIELD NOR BROADLEAFS SIGNIFICANTLY AFFECTED
155.4	18		0.3	N.S.	4.4	N.S.	$6.12	
53.1	--		-1.2	N.S.	2.7	--	$2.33	BOTH TRTS "WEED FREE"
50.7	91		-3.5	*	2.8	*	$14.40	DISK PRIMARY TILLAGE
52.7	55		-1.5	N.S.	2.9	N.S.	($8.22)	ADDITIONAL TRIPS COST MORE THAN HERB. BAND
67.0	22	RYE KILLED BY PREPLANT HERB.	-7.1	*	3.4	N.S.	$4.91	BROADCAST HERB. WAS EFFECTIVE BUT EXPENSIVE
51.1	117	SIGNIFICANTLY HIGHER LEAF Ca, LOWER N	-0.7	N.S.	1.6	N.S.	$4.50	
61.7	10		1.4	N.S.	2.4	N.S.	$9.28	

conditions, while there were plenty of good days for using the rotary hoe. But cultivating helped dry the soil, and the rains came just when it was too late to cultivate anyway, allowing weeds to grow profusely. There were no easy routes to success. What might have worked in previous years could be a real dud in 1992. If there was a key, it was in knowing your system, adjusting it a little, and staying in control.

There were three trials in corn and four in soybeans that evaluated row crops with and without herbicides (Table 6). In five of these seven trials, the system using mechanical controls instead of chemical/mechanical was the more profitable one. In one of these, the only trial not in ridge-till, Tom and Alesia Lacina's banded soybeans yielded significantly better but were less profitable because of two postemergence spray passes across the field. In Paul Mugge's trial in soybeans, mechanical control was less profitable not because of a yield difference but due to the cost of two extra rotary hoeings and a cultivation.

Richard and Sharon Thompson, Boone, compared the effectiveness of three rotary hoe passes (double-hoeing the first time, single the second) with no rotary hoeing (Table 6). In neither corn nor soybeans did they see a significant difference in yield or in numbers of broadleafed weeds, which were uniformly low.

The Thompsons also compared four no-herbicide systems for their ability to control weeds: 1) the standard Buffalo™ planter (depth gauge wheel and coulter over the row); 2) a Buffalo planter modified so these items were off the row; 3) rye drilled on the ridge the previous fall; and 4) an empty drill that disturbed the ridge in the fall but planted no seed. A patch of sunflowers dominated the count of total broadleaf weeds, but the fall rye treatment had significantly fewer smartweeds than the other treatments (Table 3). The highest smartweed count was with the modified planter.

FORAGE, COVER CROPPING, AND WEED MANAGEMENT

Two cooperators gave serious examination to the use of cover crops to control weeds. Jeff and Gayle Olson, Mount Pleasant, compared mechanical and chemical means of removing a cover of spring-seeded rye from the ridge (Table 7). The herbicide band did a better job, as shown by the significant difference in soybean yield and grass counts. In a second trial, in corn, the Olsons compared 1) spring-drilled rye, removed mechanically, to 2) no rye plus an herbicide band. Again, the rye treatment yielded significantly less. The rye had dried the soil by planting time, and the planter alone couldn't remove all the rye from the ridge shoulders.

Dick and Sharon Thompson, Boone, compared the effect of different fall-seeded cover crops on corn: 1) rye; 2) rye/hairy vetch; 3) oats/hairy vetch/canola; and 4) no cover crops (Table 7). The no-cover treatment and the oat/vetch/canola treatment yielded significantly better than the two treatments that included rye. There were no significant differences in numbers of broadleafed weeds. In a second trial in corn, the Thompsons compared; 1) fall-seeded rye; 2) fall drill-only (no seed); and 3) a check treatment of no rye or drill disturbance. This time neither corn yields nor weed counts were significantly different.

NARROW STRIP INTERCROPPING

In 1992 PFI cooperators received support from the Leopold Center for Sustainable Agriculture to document crop growth and economics in narrow strip intercropping. In narrow strip intercropping, alternating strips of different crops run side by side across the field. In addition to erosion control and other benefits, the practice can achieve overall yield increases when crops on the strip borders use sunlight and moisture in complementary ways.

In two trials, winter cover crops competed severely with corn in the narrow strips (Table 8). However, two cooperators saw corn yields increased considerably in

TABLE 7. FORAGE, COVER CROPPING, & WEED MGT. TRIALS

COOPERATOR	CROP		TRT 1		TRT 2		TRT 3		TRT 4		COMMENT
DORDT COLLEGE	ALFALFA	COVER:	CROWN MULTILEAF				STANDARD CROWN				
		YIELD (T/ACRE):	2.28	a					2.30	a	SAME SEED COST FOR ALL VARIETIES
SEEDED IN 1991		CRUDE PROTEIN (%):	27.2	a					27.7	a	
		TOT. DGST. NUT. (%):	70.6	a					71.0	a	
		REL. FEED VALUE:	137.7	a					138.0	a	
		REL. TRT BENEFIT:	$0.00						$0.00		
OLSON	SOYBEANS	COVER:	RYE				RYE				
		HERBICIDE:	NONE				PLANTER BAND				
		YIELD (bu.):	59.9	b			67.0	a			YIELD BENEFIT OF HERBICIDE WAS OUTWEIGHED BY COST
SPRING SEEDED RYE		TRT COST:	$8.14				$26.79				
		TRT BENEFIT:	$4.91				$0.00				
		BROADLEAF WEEDS/A:	30	a			22	a			
		GRASS/ACRE:	304	a			63	b			
OLSON	CORN	COVER:	RYE				NONE				
		HERBICIDE:	NONE				PLANTER BAND				
		YIELD (bu.):	95.9	b			169.1	a			RYE TRT HOED 2X, PLANTER DID NOT REMOVE RYE FROM RIDGE SHOULDERS
SPRING SEEDED RYE		TRT COST:	$12.87				$14.58				
		TRT BENEFIT:	$0.00				$139.44				
		BROADLEAF WEEDS/A:	117	a			56	a			
		GRASS RATING (0-6):	4.3	a			0.7	b			
THOMPSON	CORN	COVER:	RYE		RYE/ VETCH		OAT/ VETCH/ CANOLA		NO COVER		
		YIELD (bu.):	182.0	b	187.0	b	196.8	a	198.4	a	
FALL-SEEDED COVERS		TRT COST:	$10.06		$15.71		$22.61		$0.00		
		TRT BENEFIT:	$5.65		$0.00		$16.90		$42.54		
		BROADLEAF WEEDS/A:	250	a	234	a	326	a	207	a	
THOMPSON	CORN	COVER:	RYE		DRILL ONLY				NO COVER		
		YIELD (bu.):	186.7	a	192.4	a			190.6	a	
FALL-SEEDED COVERS		TRT COST:	$10.06		$9.36				$0.00		
		TRT BENEFIT:	$0.00		$0.70				$10.06		
		BROADLEAF WEEDS/A:	104	a	83	a			90	a	

TABLE 8. NARROW STRIP INTERCROPPING TRIALS

COOPERATOR	ROW DIRECTION	NARROW STRIPS OR WHOLE FIELD BLOCKS	YIELDS (bu.)			COMMENTS
			CORN	SOY-BEANS	OATS	
ALERT	N-S	STRIPPED:	227	45	80	ESTABLISH-MENT YEAR FOR THE SITE
		BLOCKED:	187	--	--	
DAVIDSON	NW-SE	STRIPPED:	92.6	39.1	--	ESTABLISH-MENT YEAR. STRIPS HAD VETCH COMPETEING
		BLOCKED:	91.1	39.1	--	
FRANTZEN	N-S	STRIPPED:	E: 161.2 M: 157.2 W: 143.0	47	75.2	WORKED WITH R.M. CRUSE TO MEASURE CORN YIELD BY ROW LOCATION
		BLOCKED:		47	70.0	
MUGGE	E-W	STRIPPED:	179.0	69.0	100.0	
		BLOCKED:	175.0	62.0	105.0	
OLSON	NW-SE	STRIPPED:	198.9	60	--	
		BLOCKED:	173.9	59	--	
OLSON	E-W	STRIPPED:	167.6	--	NONE	
		BLOCKED:	149.2	--	NONE	
THOMPSON	E-W	STRIPPED:	137.7	48.2	--	STRIPS HAD COVER CROP COMPETING
		BLOCKED:	177.8	52.2	--	

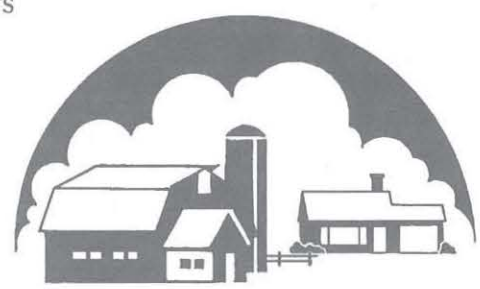
strips – 40 bushels for Doug Alert, New Hampton, and approximately 20 bushels for Jeff Olson. It was the first year of strips on the site for Alert. It will be interesting to see if that strip bonus is maintained in future years or if disease and pests build up. PFI cooperators are working with ISU researcher Richard Cruse to address those questions.

Probably the most elaborate narrow strip plot design is on the farm of Paul and Karen Mugge, Sutherland. They are comparing three crop rotations in strips, with blocks of single crops in the field for comparison. Paul harvested a modest four bushel corn increase in strips compared to field blocks in 1992. Surprisingly, soybeans in the strips yielded seven bushels better than the soybeans in the solid blocks. In the three-crop strips, Mugge observes, the soybeans can "lean over" after oats are removed from the field, and this gives them access to more sunlight.

MANAGEMENT-INTENSIVE GRAZING

This report has been all about field crops, but PFI cooperators have also been carrying out demonstrations of intensive rotational grazing, planned grazing, management-intensive grazing – there are many names for it. The idea is that by moving animals to optimize forage quality and growth, livestock can be grazed profitably even in some places where confinement systems don't pencil out.

In 1992 PFI cooperators worked with the Leopold Center for Sustainable Agriculture to document this kind of grazing. Some took weights and body condition scores, and cooperators are using the ISU Extension Beef Cow Record System to track the profitability of this enterprise. In the next year, PFI members will begin to see reliable data about the profitability of management-intensive grazing in Iowa.



AG LAW CONFERENCE: THE DUTY OF STEWARDSHIP

Merlin Pfannkuch, Ames

U.S. agriculture has not moved significantly in the direction of the land ethic envisioned by Aldo Leopold a half century ago. As a result, concern over environmental consequences of production agriculture has focused on law to help ensure greater attention to conservation in farming practices.

This was the general theme of a symposium examining whether there is a duty of agricultural stewardship in Iowa that took place Jan. 29, at the State of Iowa Historical Building, in Des Moines. The symposium was held to mark the 50th anniversary of the Iowa Supreme Court's decision that upheld the constitutionality of the Iowa law that requires a landlord to notify a tenant in advance of terminating a farm lease. The Court said the law could be upheld under the state's police power – it serves the public interest in preserving the national wealth represented by farmland.

The various speakers agreed that U.S. agriculture has entered a new era in recent years, an era most graphically symbolized nationally by the tying of farm program benefits to farming practices in the 1985 farm bill.

Symposium organizer Neil Hamilton, agricultural law professor at Drake University, said that whatever stewardship means – and it means different things to different people – it is apparent that we are using law to implement a duty of stewardship.

Law, however, doesn't necessarily have to be regulatory, several speakers noted. Legislation can be passed to promote best management practices, for instance. Former state representative Paul Johnson of Decorah reviewed the innovative Iowa legislation in the late 1980s, such as the 1987 Groundwater Protection Act. It was designed to better integrate environmental concerns and agriculture by focusing mainly on research, demonstration, and education. Johnson said that he is worried that farmers have now taken a break from trying as hard as they can, however, so environmental groups are starting again to say: "Let's stick it to 'em."

The symposium featured a panel discussion of farmers, including PFI members Tom Frantzen of New Hampton and Ron Rosmann of Harlan. Rosmann said he believes there should not be any difference between the concepts of stewardship and sustainable agriculture. He said the definition of sustainable agriculture should include not only *who* will farm but *how* and *how many*.

Another farmer panel member also made a direct connection between agriculture and the rural community. John Miller of Cedar Falls, a member of the state soil conservation board, said that bankers, lawyers, and farm managers need to consider whether the highest farm rent possible is good for the community.

FOOTPRINTS OF A GRASS FARMER: EXPERIENCES FROM '92, PLANS FOR '93

by Tom Frantzen,
Alta Vista

The skills of management intensive grazing are developed on farms and with years of experience. 1992 was my third year. During these three years, the Practical Farmers of Iowa (PFI) grew from having few graziers to over a dozen pasture buffs in my Northeast Iowa district alone. This growth is an important development. We now have a farmer-to-farmer grazing resource base. This base led to the creation of the PFI Grazing Club, a growing roster of PFI members who support each other's development of grazing skills.

This also lead to the creation of a PFI district library. From this library, members can access to the latest books and videos purchased with $2.00 from each member's PFI annual dues. The library is busy. Individuals are joining PFI in order to tap into this district resource. In time, I see this to grow into a valuable part of agriculture for farmers. It is especially valuable to beginning farmers as they replace ones who retire. This is really the beginning of a grassroots information network. This network is supported by PFI, and publications such as the *New Farm* and the *Stockman Grass Farmer*. To make this network operate, we must share information and experiences. Excellent informational books and videos are available. Our shared experiences are of great value.

On our farm in 1992, we followed the planned grazing method outlined by Allan Savory in his book, *Holistic Resource Management*, 1988. Our family formulated goals including profits, livestock species, and effect on the land base. This was not easily planned nor implemented. Yet, the planning proved very valuable. Some of the pasture land was used for farrowing for several years. Past practices called for moldboard plowing and row crop production to break up swine disease buildup. This year's planning called for grazing stocker cattle to provide profits and breakup disease cycles. The cattle were bought at 475 lbs. bodyweight in May and grazed until October, when pasture forages were exhausted. At times, they grazed off Canadian field peas and oats in a strip graze system. The cattle were weighed as they came off pasture producing a 2.5 lb. daily gain and a gross income of $400 per acre. Thus the plan to produce profit and upset disease cycles worked.

In my last Footprints column, Nov. 1992, I detailed a strip crop shelter belt farrowing system designed and implemented this past year. At this point, I am so impressed by its performance, that I intend to expand the system and aggressively pursue its development. Tress, strip crops, and livestock look like a viable way of producing a diverse and economically sustainable farming system.

At present, I am concerned about some aspects of the system. My #1 concern is the management of the forage legumes used in this cropping plan. Is red clover alone the best choice? How close to the ground can it be grazed in the fall? Would a polyculture be a better choice? The goal is profit from a diverse grazing system.

My 2nd concern ... Corn fits well into the system providing for shelter during the season and feed for the stock in the fall. To grow the corn, I intend to plow the previous season's pasture-farrowed strip of clover. This destroys the ground cover. I could try no-till, yet my past experiences with no-till has been poor at best. Ridges do not fit into the system. At present, I will use the plow until a better concept arrives.

#3 ... I want to expand the economic diversity of the operation with some form of commercial use of shelterbelt trees. What type of nut or wood production could fit into the system? I am carefully observing the work of Phillip Ruetters at the Badgersett Tree Farms near Canton, Minnesota. Last August, our family toured his tree breeding research farm. His emphasis is on producing chestnut and hazelnut trees and bushes for commercial nut production.

Again, this next year, we are planning to host another PFI tour on our farm. You are welcome to come and share the experience as together we discover new dimensions in sustainable agriculture.

FROM THE KITCHEN

Marj Stonecypher, Floyd

It's 1993 and in the mail (yes, the IRS seems to get into our mailbox too) are the new seed catalogues. THINK SPRING!! Have you got your order already to mail in for new seeds? Me too, Ha-Ha!

Have you thought of ordering some Herbs? You can use them in just about anything -- soups, meats, fish, vegetables, bread, jelly, dressings and teas -- to give an added delicious new taste.

Fresh herbs are preferable to dried or frozen, because the fresh are more flavorful. Herbs have stronger flavor when gathered on a hot, sunny day. Most of them lose their essential flavor after seven or eight months, when dried. They, also, lose their flavor if exposed to the heat of cooking longer than 30 minutes. Add during the last 20 to 30 minutes of cooking, except for the bay leaf, which may be cooked for several hours. Herbs need only to be exposed to heat long enough for their oils to release their flavors.

Here are recipes for two different herb seasonings that make excellent salt substitutes. They can be used for cooking or they can be put in a shaker for table use.

SALTLESS SURPRISE: 2 teaspoons garlic powder, 1 teaspoon basil, 1 teaspoon anise seed, 1 teaspoon oregano and 1 teaspoon powdered lemon rind.

PUNGENT SALT SUBSTITUTE: 3 teaspoons basil, 2 teaspoons summer savory, 2 teaspoons celery seed, 2 teaspoons ground cumin, 2 teaspoons sage, 1 teaspoon thyme and 2 teaspoons marjoram.

Put each recipe separately into a blender, food processor or clean coffee grinder. Blend well. Store in a glass container in a dark, cool place. To prevent caking, add a few grains of rice.

I have a "Herb Usage Chart" of what to use different herbs in. If you would like a copy of it, let me know and I will mail you one.

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