

Climate Change Controversy

Volatile Growing Conditions are Focus of Midwest Farmers and Researchers

by Karen Simon

When the cold wind whips snow into frosty peaks and icicles glint in the sun, the last thing on our minds is global warming. Most of us have heard enough conflicting information about climate change, we don't know what to believe. Sometimes it's easier to tune it out.

However, a recent study funded by the U.S. Climate Change Science Program looks at the effects of climate change on agriculture, land resources, water resources and biodiversity in the U.S. and documents changes in our ecosystem.

Believing in the science behind climate change and its causes is an individual choice, but one scientist says paying attention and adopting the right crop production and conservation practices now could make the difference between producing an average crop or a bin-buster in the not-so-distant future.

"Climate has changed, it is changing and will continue to change," says Jerry Hatfield, laboratory director of the National Soil Tilth Laboratory and one of the contributing authors of the study. "For agriculture, the bigger issue is that we're entering into a period of greater variability than in the recent past."

Hatfield recommends a whole system approach to dealing with this variability.

"As changes occur in other parts of the world, more and more pressure will be put on the upper Midwest to efficiently produce more food," he says. "It behooves us to begin thinking about how we can put together production systems that are more resilient to stress."

Where do growers start? Hatfield suggests taking a look at these areas:

- Improve soil fertility and organic matter.
- Reduce tillage.
- Maintain crop residue.
- Manage nutrients.
- Implement conservation practices.
- Plant earlier when possible.
- Choose soybean varieties that can withstand stress.
- Manage weeds, diseases and pests carefully.

"Climate change is an opportunity for growers in the upper Midwest," Hatfield says. "By improving efficiencies and the resilience of the production system, growers will be better equipped to cope with the climate extremes they might be subjected to and produce a crop more efficiently."

"How do we build a more resilient production system?" Hatfield continues. "By taking a systems approach – understanding how all the components work together – and, with researchers, agronomists and farmers working together, we will begin to develop better management systems."

Roger Wolf, director of the Iowa Soybean Association environmental program, agrees that a proactive agriculture community will be able to adapt to changing climate conditions.

"We need to look at how we can make watersheds more resilient and target conservation practices to areas where they will be most effective," Wolf says. "As we adapt to climate changes, it's increasingly important to understand the landscape and think strategically about applying conservation practices in places where they make the most sense. This is increasingly important, so we're able to supply food and water that doesn't negatively impact others downstream."

Jim Andrew, a farmer from near Jefferson, Iowa, is an avid conservationist and believes focusing on conservation is the key to dealing with changes in the Midwest's ecosystem.

"I think the climate change argument is over," Andrew says. "It's an issue, therefore we need to deal with it. Farmers should want to be seen as part of the solution, not part of the problem."

Andrew no-tills 100 percent of his crops and feels good that he's doing everything he can to produce crops in an environmentally sound way. Despite extremely heavy rains last summer, the conservation systems he has in place stopped 95 percent of the erosion on his farm.

"I want to be responsible and do the right thing," Andrew says. "We, as farmers, need to keep an open mind and be willing to rapidly adopt technology if it is science-based. As good stewards of the land, we need to get on board because if we don't pay attention, who will?"

Ken Dalenberg, who farms near Mansfield, Ill., says, "We're experiencing more erratic weather with shortened windows of opportunity for planting in the spring, which creates problems with planting, fertilization and weed control. We've made sure we can take advantage of those windows by increasing machinery size and increasing labor – gearing up to be able to accomplish the job in a shorter time frame."

Dalenberg adds that no-till practices provide time savings compared to fields that require more intensive management. "In addition, no-till increases the soil's ability to dry out after heavy rains,

and the residue conserves moisture during dry periods," he says. "Variable-rate fertilizer application also helps to apply only what is needed, where it is needed, helping us to be more sensitive to the environment."

Ray Gaesser, who farms near Corning, Iowa, acknowledges that changes have been occurring, but stops short of attributing it to climate change.

He has seen more rainfall in the past six to eight years – about two inches per year more – and more volatile weather. However, he believes temperatures on his farm appear to be in a cooling phase.

"We have geared our operation toward being able to deal with more volatility," Gaesser says. "We've enhanced our equipment to get our work done faster, and we do our best to manage crop stress."

Gaesser says adding and improving conservation practices on his farm has always been a priority, and he believes it's crucial to preserving the soil; his farm is 100 percent no-till.

"The Earth has been here a long time, and there are cycles that we need to take into consideration, but we also need to consider we might not understand it all," Gaesser says. "Our challenge, as farmers, is to be prudent in our decision making, choose seed and fertilizer proactively, adopt conservation practices that create a more stable cropping system and manage it the best we can."

In the next issue, we'll talk to soybean breeders about what they're doing to create soybean plants that can adapt to changing climate conditions.



Changes Could Impact How We Manage Crops

Climate change affects average temperatures and temperature extremes, timing and geographical patterns of precipitation, snowmelt, runoff, evaporation and soil moisture, the frequency of disturbances, such as drought, insect and disease outbreaks, severe storms and forest fires, atmospheric composition and air quality, and patterns of human settlement and land-use change.

- It is projected the global average temperature will rise another 1.1 to 5.4 degrees C by 2100, depending on how much the atmospheric concentrations of greenhouse gases increase during that time.
- The U.S. warmed and became wetter during the 20th century, with changes varying by region.
- Increased carbon dioxide (CO₂) and temperature will likely cause the life cycle of grain and oilseed crops to progress more rapidly.
- Climate change is likely to lead to a northern migration of weeds, insects and diseases.
- Recent research also suggests that glyphosate loses its efficacy on weeds grown at the increased CO₂ levels likely in the coming decades.

Source: U.S. Climate Change Science Program Synthesis and Assessment Product 4.3.



A watershed dam and upland terraces in a small watershed project in western Iowa. PHOTO COURTESY OF LYNN BETTS.



Around the World on BIODIESEL

More than a decade after Bryan Peterson's amazing Sunrider expedition, the story of the voyage continues to inspire thousands. Long after the trip, the biodiesel journey lives on.

It is both ironic and fitting that a man who once circumnavigated the Earth in a little boat fueled with biodiesel now lives landlocked in the heart of Iowa. The one-time skipper battled a fierce storm off the southern tip of Africa, needled his way through reefs and shipwrecks in the Nanuku Passage be-

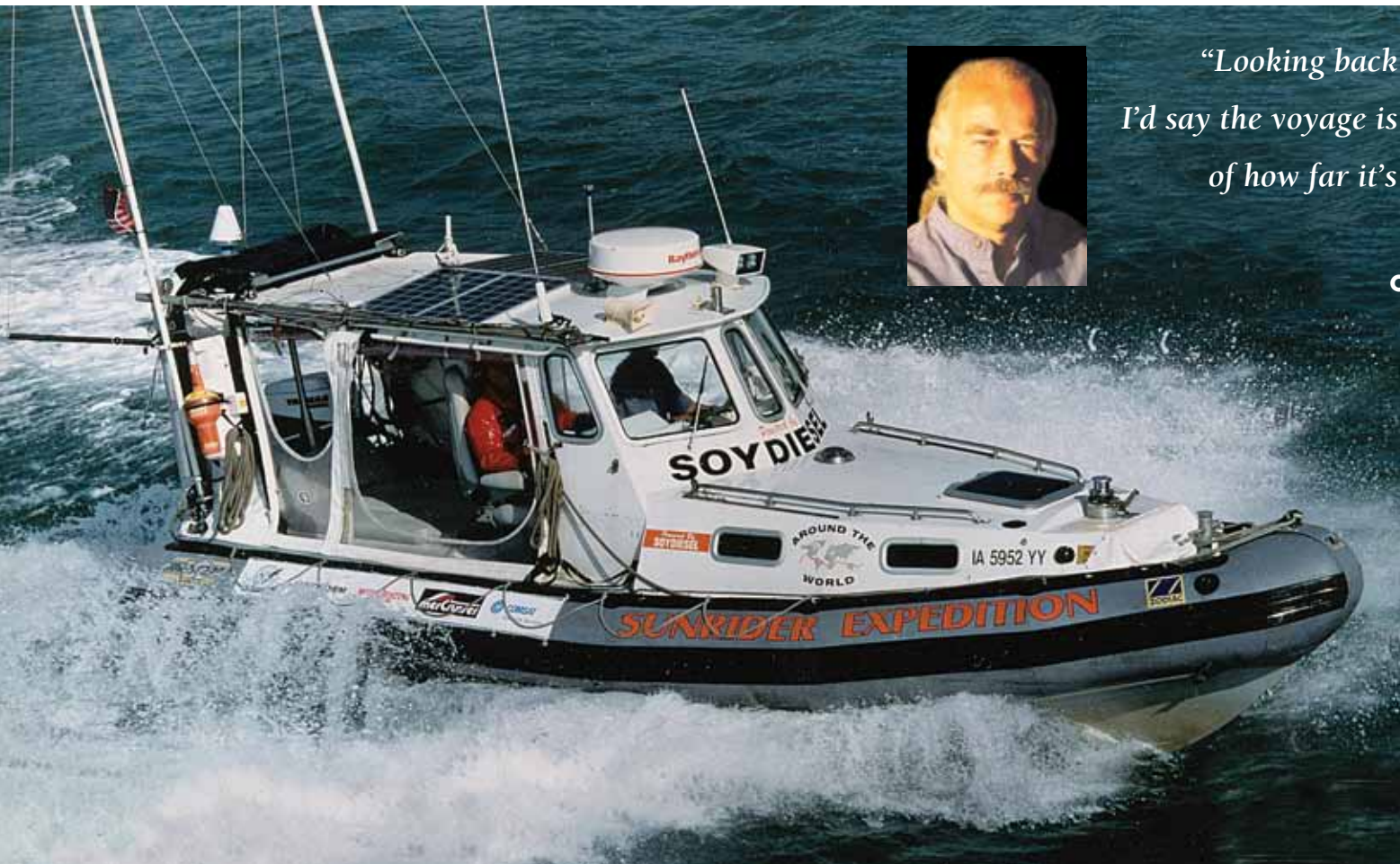
tween the Samoas and Fiji, explored the wonders of Madagascar and taught thousands around the world about renewable energy. Today, Bryan Peterson, captain of the amazing Sunrider expedition, lives smack dab in the middle of American soybean country.

Peterson, a soft-spoken 63-year-old retired publisher, goes quietly about his business in Fairfield, Iowa, these days. He often drops by McDonald's for his morning coffee, talking to farmers who probably have no idea he's the only person to have ever traveled around the

Earth in an inflatable boat powered by a stock diesel stern drive fueled with biodiesel. Peterson enjoys his low-profile life in Iowa.

"The trip took me to the most beautiful places in the world and through circumstances and environments that most people will never experience," Peterson says. "But I like the Midwest. I enjoy the simplicity of it."

December marked the 14th anniversary of the completion of the Sunrider expedition, but it's a trailblazing biodiesel story worth remembering.



*"Looking back
I'd say the voyage is
of how far it's*

In 1994, Peterson completed a 35,000-mile, two-year trip around the world in a 24-foot soft-sided, Zodiac boat powered almost exclusively with B100. The expedition was funded by the United Soybean Board (USB) and 130 other government and corporate sponsors from 14 nations. It was the first documented example of B100 being used in a major marine application by an American.

The voyage demonstrated the practical viability of the renewable fuel and generated a great deal of publicity around the world. Throughout the trip, Peterson made presentations in 25 countries, introducing biodiesel to thousands of people. In the years that followed, he has exhibited Sunrider at more than 90 venues across the country – mostly boat shows – and more than 2 million people have physically seen the vessel, along with Peterson’s exhibit and presentations.

*on the expedition,
a timely reminder
[biodiesel] come.”*

**Bryan Peterson
captain of the Sunrider**

Living Out His Dream

Peterson said the Sunrider voyage started years before the trip actually began. The California native lived in Hawaii for a decade, had stints as a police officer, firefighter, tour-boat operator, venture capitalist, and publisher of travel and environmental guides for USA Today. By the early 1990s, he had settled in Iowa with his wife and children and owned a successful publishing company. Still, something yearned inside him.

“The business was going well, but I had a dream

of traveling around the world.” Peterson says. “I thought to myself, ‘If I don’t go now, I will never go.’ I wanted to take my son with me on certain legs of the voyage – spend valuable time with him.”

Peterson had previously hiked across Alaska with his eldest son and believed it was important to plan another ambitious adventure with his younger boy, who was about 11 years old when Peterson started soliciting sponsors for the voyage.

“So I did it,” Peterson says. “I closed down the business and dedicated myself to the expedition 100 percent. The cash flow stopped.”

Finding Support for the Voyage

Peterson says finding sponsors was the hardest stage of the Sunrider expedition.

“I was on the phone for two years, sometimes making 20 phone calls a day, knowing that almost every person I would talk to was going to say ‘no,’” Peterson says. “I was ruthlessly honest with people and told everyone exactly what I thought ... and the sponsors started to come together. The United Soybean Board was among the groups that were totally supportive.”

Peterson, a longtime “Zodiac groupie,” was intent on making the voyage in a Zodiac boat. The company, famous for manufacturing durable and extremely stable soft-sided boats, had received thousands of requests for boats in the past but had rarely, if ever, given them away.

“I’ve heard they had never given a boat to anyone – not even Jacques Cousteau himself – so it was unprecedented when they said they would supply a boat for my voyage,” Peterson says.

After two years of working the phones, Peterson had gained 130 sponsors, including the USB, Zodiac, MerCruiser, Earth Day International and MotorBoating magazine.

The boat he received, a 24-foot Zodiac Hurricane 730 rescue model, had a rigid modified deep-V hull. The boat was built with a watertight aluminum cabin, custom built for Sunrider. Solar



panels were built into the boat’s aluminum canopy to generate electricity in good weather. Sunrider was powered by an off-the-shelf MerCruiser diesel stern drive – a 3.6-liter, 180-horsepower engine. The backup power was a 27-horsepower Yanmar diesel outboard, which was used in emergency situations only.

Peterson is reluctant to place a price tag on Sunrider – it would be almost impossible to itemize every cost that went into it, he says – but he estimates its value at between \$200,000 and \$400,000.

“The boat itself was worked on by experts in Vancouver, Washington and other places,” Peterson says. “If you had to pay for each aspect of the work ... let’s just say it would be tough for most people to buy a boat like this.”

Choosing the Fuel

“The Sunrider voyage turned out to be a remarkable voyage,” Peterson says. “And, you know, using biodiesel was a completely rational thing to do. I knew going into the voyage that biodiesel was a good fuel. Safety was paramount, so I would not have used a fuel I couldn’t trust. The appeal of biodiesel is that it is a clean, renewable fuel that doesn’t stink and won’t kill fish. It was clearly the right thing to do.”

Peterson did not have a history with biodiesel before the Sunrider expedition.

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In fact, he originally wanted to make the trip in a boat powered by solar energy. However, it wasn't safe or practical at the time.

"So, I started looking at other means of renewable energy," Peterson says. "I knew that a guy had once crossed the Pacific in a boat with two small diesel outboards, so I knew it could be done."

While searching for sponsors, Peterson started investigating biodiesel, which actually hadn't been named biodiesel yet – most referred to it as soybean oil fuel or soydiesel. He found help at the U.S. Department of Agriculture's Office of Energy and the University of Idaho. He learned that biodiesel was being used widely in Europe and had been used in World War II.

"The idea of biodiesel was still relatively unknown in America," Peterson says.

In fact, the National Biodiesel Board had not yet been created and even the USB knew little about the renewable fuel.

Peterson tested the performance of various blends of biodiesel in a truck engine, splash blending everything from B100 to B20 in an effort to find out how the engine would react to different mixtures.

"The truck ran fine, and I walked away from the experience totally convinced biodiesel would be a viable fuel for my voyage," Peterson says.

Officials at MerCruiser had never heard of biodiesel, but they were interested in how the diesel stern drive would handle the renewable fuel.

"They tested 200 gallons of biodiesel at their plant, and the results were better than they normally achieved with regular diesel," Peterson says.

At that point, Peterson had found his fuel. In fact, he was so enamored by biodiesel and the possibilities it represented, he considered trying to make his own fuel as he traveled around the world. It was, of course, a short-lived idea.

As it turned out, biodiesel was shipped to various ports along the path of the Sunrider voyage; larger boats sometimes carried extra shipments of

biodiesel for refueling at sea on the longest legs of the trip. The boat's four permanent below-deck tanks held a total of 250 gallons of fuel, while above-deck flexible bladder tanks held another 300-plus gallons. Not much biodiesel was produced in the United States when the Sunrider expedition began, and the fuel Peterson received throughout the first half of the journey was produced at a pilot plant in Kansas City. Later in the voyage, additional U.S. biodiesel plants came on line and began supplying fuel to the Sunrider expedition.

"I never had problems with biodiesel," Peterson said. "In fact, I found it to be a preferable fuel."

There were times during the voyage when Peterson did not have adequate amounts of biodiesel. For example, one shipment was stolen from a drop point, and Sunrider's tanks had to be topped off with petroleum diesel.

"It was never more than a 50/50 blend, but what a difference," Peterson says. "We really had a tough time dealing with the smell and the fumes of regular diesel once we got used to biodiesel. Other than a few occasions, we used nothing but 95 percent to 100 percent biodiesel all the way around the world. I don't think there could be a stronger statement made about a renewable fuel."

The Meaning and Purpose of the Voyage

Throughout the expedition, Peterson stopped in 25 countries, educating those he met and brightening the lives of thousands of children along the way. The Zodiac boat became a virtual floating classroom, demonstrating to the world the viability of biodiesel and the efficiency of solar energy. In addition, Peterson was able to spend valuable time with his



youngest son, who joined him on the safest legs of the journey.

The trip took over two years to complete. Peterson said he spent about one year at sea and about 14 months on land during the voyage. Sunrider left Oregon in July 1992, circled the world, and arrived in San Francisco Bay in early September 1994.

Peterson says the trip had a profound influence on his life that he's still interpreting.

"It was a linchpin," he says. "It released all these new possibilities for me in terms of relating to people and business in a way that I never imagined."

In some ways, the Sunrider experience lives on.

"The expedition is different for me now than it was the day I got back," Peterson said. "In that way, the trip never really ended. It's still going on from my perspective."

After the expedition, Sunrider was put on display at Disney's Epcot Center for two weeks. That's when Peterson realized that people around the country might want to hear about the voyage and see the boat. Among his many ventures and hobbies, such as working on inflatable boats, Peterson has spent much of the last decade touring the United States, displaying Sunrider and speaking about the voyage.

"I have put on twice the mileage showing the boat in America than I did traveling around the world in it," he says.

Peterson is thankful his efforts helped push biodiesel into the limelight in the United States and around the globe. He says he's excited to see the biodiesel industry grow, and he's especially happy to see biodiesel marine applications becoming more common.

"On one hand, it's surprising to see how far biodiesel has come," Peterson says. "On the other hand, it's a testament to the fuel itself. Looking back on the expedition, I'd say the voyage is a timely reminder of how far it's come."

** Article contributed by Tom Bryan, Biodiesel Magazine.*

EARTHTRACE Eco-Boat Smashes Round-the-World Speed Record by Nearly 14 Days



Pete Bethune
Earthrace Skipper

Skipper Pete Bethune, a former oil worker, has dedicated the past six years of his life toward reaching his goal of smashing the record in his amazing boat using biodiesel, including an attempt last year called off after meeting three huge storms in the Mediterranean.

Earthrace, the world's fastest eco-boat, has smashed the world speed record for a powerboat to circumnavigate the globe, completing the journey in 60 days, 23 hours, 49 minutes – knocking almost 14 days off the previous record.

The boat crossed the finish line in Sagunto, Spain, at 12:24 Greenwich Mean Time (GMT) on Friday, June 27, 2008, having traveled around 24,000 nautical miles fueled by biodiesel to demonstrate and draw global attention to the potential for alternative fuel sources.

Earthrace is a 24-meter tri-hull wavepiercer built in New Zealand. The record attempt, run by a team of international volunteers from New Zealand, the U.K., Sweden, Guyana and Hungary, has been completed as a carbon-neutral project.

She set off from Spain on April 27, 2008, at 13:35 GMT in an attempt to challenge the world record that had remained unbroken since 1998, when it was set by the British boat, Cable and Wireless Adventurer. Earthrace's finish in Spain was monitored by D. Jaime Pérez López, Presidente de la Federación Territorial Motonáutica de la Comunidad Valenciana.

Earthrace, a not-for-profit enterprise, has overcome many obstacles during its journey, the most challenging of which was the replacement of the boat's drive-shaft and propeller after hitting sea debris near Palau, encountering monsoon conditions in the Indian Ocean and bypassing a massive backlog of ships waiting to transit the Panama Canal. Despite this, the crew has emerged victorious after almost two months at sea.

Skipper Pete Bethune, a former oil worker, has dedicated the past six years of his life toward reaching his goal of smashing the record in his amazing boat using biodiesel, including an attempt last year called off after meeting three huge storms in the Mediterranean.

"We're completely stoked to have achieved something so incredible," Bethune says. "Earthrace's success has proved that any form of transport, including marine, can be nondamaging to the environment as well as being high performance.

"It is still early days for alternative fuel, and there are issues that need to be addressed by those with the power to make change happen," Bethune continues. "But I hope that Earthrace and her adventure highlight to the world the importance of continuing to research and develop alternative fuel sources for global use.

"This fantastic team of people and this astonishing boat have broken the record by a massive margin, and I finally feel that all the sacrifices made, especially by my family, have been worth it," Bethune continues. "I'm also enormously grateful to all the individuals and companies that have supported us along the way, some of them since the very beginning. Without them, none of this would have been possible."





U.S. Soybean Farmers Respond to Demand

As we approach the end of the fourth-largest soybean harvest on record, the United Soybean Board (USB) and soybean checkoff point out the role U.S. soybean farmers play in feeding and fueling this country and the world.

In direct response to strong global demand for more soy products, U.S. soybean farmers responded emphatically last spring by planting more soybeans.

According to the most recent crop production report from the U.S. Department of Agriculture's National Agricultural Statistics Service (USDA-NASS), U.S. soybean production rose significantly from a year ago. USDA forecasts total U.S. soybean production at 2.92 billion bushels, up 9 percent over last year. Also, NASS estimates harvested soybean acres at 74.4 million acres, a 16 percent spike over last year.

In the spring, wet weather delayed plantings. Later, during critical parts of the growing season, a lack of moisture struck some areas. In total,

weather factors added up to a decreased average yield.

USB Chairman Ike Boudreaux says he hopes the NASS numbers are reassuring for those who are skeptical that an affordable supply of soy exists.

"I've always believed we're part of the solution," says Boudreaux, who raises soybeans in Lebeau, La. "U.S. soybean farmers can produce enough soybeans to satisfy food, feed and fuel needs. We're part of the answer."

Based on a checkoff-funded survey conducted last summer, most Americans agree with Boudreaux. The National Agricultural Image Survey indicated 82 percent of eligible voters surveyed believe U.S. farmers are not to blame for higher food prices. It also found more than two-thirds of consumers support biodiesel as a source of energy that can meet our needs in the next five to 10 years.

At this time of year, many Americans sit down to enjoy holiday feasts featuring turkeys and hams, making it a good time to consider the U.S. soybean indus-

try's relationship with the U.S. animal agriculture industry.

U.S. poultry and livestock annually consume 98 percent of the soybean meal utilized in this country, which equated to 30 million metric tons last year. Feeding the poultry and livestock industries creates a demanding market situation for soybeans, one that requires quantity and quality.

The soybean checkoff works to ensure that U.S. soybean farmers and other rural residents fully understand the importance of animal agriculture. It also invests in research to improve soybean traits for animal nutrition and to remove allergens and other anti-nutritional factors from soy.

"The market for soybeans is good, and U.S. soybean farmers have again stepped up to the plate this year," Boudreaux says. "Farmers will continue to respond to the market and continue to make sure there is a constant, abundant supply of high-quality soybeans."



PHOTO COURTESY OF BOB ELBERT.



Fungicide, Insecticide Both Profitable in On-Farm Test

by Mick Lane

Lee Coburn wasn't sure what to expect when he agreed to devote part of his soybean acres to a replicated strip trial study of the effectiveness of fungicides and insecticides, but he was pleased with the final result.

Coburn, who farms near Radcliffe, Iowa, grows seed beans for two different companies and has had a lot of experience with insecticides over the years.

"We've always scouted for aphids and used insecticides whenever populations were approaching economic thresholds," he says.

"In recent years, I've seen results from the Iowa Soybean Association (ISA) On-Farm Network® fungicide studies in my area that suggested to me that using a fungicide in 2008 would be a good idea, based on product costs and soybean prices," Coburn continues.

Three Trials in One Field

Last spring, Coburn agreed to conduct three separate but related sets of strip trials on one soybean field to help gather additional data for the On-Farm Network.

"I'd worked with the On-Farm Network in the past by putting out replicated strip trials to study nitrogen rates," Coburn says. "But I'd never done trials with soybeans."

He says the trial field was planted May 15 to RC2177, a Roundup Ready® variety from Croplan Genetics he was producing for seed.

"We treated the seed with Cruiser and Apron, which seemed to have kept bean leaf beetle populations low," Coburn says. "We put the first application of Roundup on in early June.

"We decided that we'd put off our second application of Roundup until we knew if we needed to put on an insecticide, too, in order to save on application costs," Coburn continues.

Tank Mix: Herbicide, Fungicide, Insecticide

"Aphid populations were at economic threshold in a couple of fields in early August, so we decided to put insecticide on all our fields," Coburn says. "With the price of beans and the possibility of bumping yields a little more, we thought

it made sense to include a fungicide in the mix, especially since the application cost would be spread over all three products."

The fungicide/insecticide/herbicide application for Coburn's trial was made on August 6. Products used for this trial were Stratego® and Leverage®, both from Bayer CropScience.

"On one side of the field, we had replicated strips of fungicide vs. no fungicide," Coburn explains. "On the other side, we had strips of insecticide vs. no insecticide. In the middle, we tested the fungicide and the insecticide against strips where neither was applied.

"Within a few weeks, we could see the different strips across the field from the edge," he continues. "The differences continued to be visible through harvest."

The fungicide-only treated strips yielded an average of 57.1 bushels per acre, compared to 52.5 bushels for the untreated strips in that portion of the field. The yield increase was 4.6 bushels per acre, or roughly 9 percent.

Coburn's insecticide-only treated strips yielded 68.0 bushels per acre, versus 57.7 bushels for the untreated strips on the



Replicated Strip Trial Insecticide Plus Fungicide

eastern side of the field. The yield increase in this set of strips was 10.3 bushels per acre, or about 18 percent.

In the center of the field, the fungicide-plus-insecticide strips averaged 66.6 bushels, compared to 55.2 bushels per acre for the untreated strips. With both products, the yield increase was 11.4 bushels per acre, which was nearly 21 percent more.

Tracy Blackmer, ISA director of research, says Coburn's test showed that both the insecticide and the fungicide alone significantly increased soybean yields.

"Both products alone were profitable," he says. "One of the things we're hearing about is a synergistic effect when using both an insecticide and a fungicide. Even though the yield from the combined product was a little higher, I'm not sure it was enough we could say there's an additive effect from using both, particularly from just this one trial.

"We're hoping to be able to do more trials like this in 2009, because we feel growers need to know more about this subject," Blackmer continues.

More Information

Coburn's trial was one of more than 500 replicated strip trials conducted by growers working with the On-Farm Network in 2008. Results of all trials are posted by trial type by county on the Internet, at <http://www.isafarmnet.com/08striptrialresults.html>. The results are posted without the participating growers' identification. To learn more about the different trials, contact the On-Farm Network at info@isafarmnet.com, or call 800-383-1423, ext. 233.

The On-Farm Network is partially funded by the soybean checkoff. Additional funding and support for specific types of trials comes from a variety of sources, including Bayer Crop-Science, BASF, the Iowa Department of Agriculture, through the Integrated Farm and Livestock Management program, and the USDA Natural Resources Conservation Service.





TO TILL OR NOT TO TILL

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With the late harvest and wet field conditions, a few farmers may have run out of time to finish all their fieldwork this fall. Therefore, tillage may not be completely done. Does that really matter?

Until the early 1970s, tillage for corn and soybean production was mostly related to managing weeds and seedbed preparation. Introduction of new herbicides and improved tillage and planting equipment resulted in a shift toward reduced tillage systems throughout the 1980s and 1990s. Conservation tillage systems such as no-tillage production, in general, offer advantages over conventional systems in conserving soil and water, sustaining soil productivity, and reducing labor and energy requirements.

Despite the potential benefits, adoption of no-tillage practices has been slow in Iowa. Lack of site-specific knowledge of the no-tillage system has most likely been the main limitation to its use in corn and soybean production. In 2008, there were 9.6 million total soybean acres in Iowa, with an estimated 30 percent planted using no-tillage practices.

Selecting a tillage system is a complex decision that changes from region to region, field to field, year to year and grower to grower. In addition, management levels and risks for different tillage systems vary greatly. Some soils and cropping systems may yield more with tillage while others may yield more without tillage. On well-drained, coarse-textured soils, no-tillage may produce the most consistent high yields and have the lowest management risk. In contrast,

poorly drained soils in high rainfall areas usually benefit from tillage due to warmer and drier springtime conditions that favor timely field operations and early season crop growth. In most corn and soybean regions, almost any tillage and planting system can be used to grow a crop. The critical question is which system fits within the time, cost and management constraints of a specific farm or field. Risk assessment is a very personal, but important, process in choosing a tillage system.

Most of the research conducted in the Midwest has shown soybeans generally do not respond to tillage, and other management practices should be given more consideration for gaining maximum yield potential. This is not to say all tillage should be abandoned. In Iowa, where some fields, particularly in the north-central part of the state, are poorly drained and remain wet in the spring, some tillage in the spring may be necessary to get the seedbed ready for planting.

In order to help the Iowa farmer adopt no-tillage soybean production practices – or at least a reduced form of tillage, one-pass, compared to the current system, two-pass – it is important we have management recommendations available. These recommendations are necessary to make no-tillage successful and limit the potential for yield loss.

In 2007, I started a large research project at six locations in Iowa, funded by the checkoff and the Iowa Soybean Association, to develop management recommendations for no-tillage soybean production systems. The project will be



No-tillage research site on Keith De Bruin's farm near Oskaloosa, Iowa, 2008.

finished after the 2009 growing season. Of the six locations, two of the locations are located within what we call the “Des Moines Lobe,” that is the area in north-central Iowa with poorly drained fields and calcareous soils.

Growing concern over environmental problems such as erosion of sediment and runoff of nutrients and pesticides coupled with increasing input costs of machinery, labor and fuel make no-tillage production an attractive practice. Based on the last two years of research, it looks like the majority of the acres in Iowa can be planted in no-tillage without a yield loss. We have consistently seen a significant yield loss over the last two years in the Des Moines Lobe, which follows the literature from other states. Regarding agronomic decisions, it is still a little bit too early to address them, but based on what I have seen until now, it doesn't seem to be that different from our traditional practices in our tilled system.

More information on soybean management can be found at www.soybeanmanagement.info.