THE WAR ON WEEDS
Managing herbicide-resistant weeds today before they become a bigger threat tomorrow

Australian farmers finding answers to herbicide resistance
See more on page 4

How livestock manure contributes to the spread of weeds
See page 9

Industry unites to take action against herbicide resistance
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To till or not to till — that is the weed-management question for farmers
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• Where your soybeans go after they leave the elevator.
• Why customers like the animal agriculture sector and biodiesel are so important to your bottom line.
• What your soy checkoff does to grow your success.
• When: July 30-August 7, 2015*

If you’re selected to participate, USB will cover the cost of your trip. The deadline for application is April 4, so visit www.UnitedSoybean.org/SeeForYourself to learn more and submit your application today.

*Dates are subject to change.
Resiliency. It’s a common characteristic of American farmers, who are constantly tested by everything from drought and floods to pests and diseases. While farmers are accustomed to challenges, few have been as formidable a threat as the one currently posed by herbicide-resistant weeds.

Fortunately, we aren’t in this battle alone. The soy checkoff, along with other commodity groups, industry-leading organizations and universities, have banded together to form Take Action, a program that helps farmers manage herbicide resistance. As you’ll see on page 10, our ag technology partners offer a range of free advice to ensure that U.S. farmers aren’t ever plagued by weeds to the degree of our counterparts Down Under.

It may still be winter, but the time to start thinking about your 2015 battle plan to take action against weeds is now. You can find free weed-management resources from the checkoff online at www.TakeActionOnWeeds.com, or turn to page 19 to read about information and tools that some state soy checkoff boards have developed.

Many doctors will tell you that an ounce of prevention is worth a pound of cure. It’s a mentality that is also relevant to weeds. Together, I’m confident we can prevent herbicide-resistant weeds from winning the war. After all, we’ve battled many other foes … and won.

Bob Haselwood,
USB Chairman
Berryton, Kansas, soybean farmer

**FENCEPOST**

**WHAT TECHNOLOGY IS THE MOST HELPFUL FOR FIGHTING WEEDS IN YOUR FIELDS?**

**Steve Reinhard**
*Bucyrus, Ohio*
The thing that works best in my fields is scouting for weeds. We really had to stay on top of marestail this past season, and scouting seemed to help. Other methods we use are tillage and pre- and postemerge herbicides on our Roundup Ready crops.

**Suzanne Shirbroun**
*Farmersburg, Iowa*
Our burndown program includes a residual, a broadleaf burndown and glyphosate for broad-spectrum burndown. We later come back with a post-emerge application. It’s a program that works best for us.

**Jason Strode**
*Owensboro, Kentucky*
The number one thing we use on our farm is a pre-emerge herbicide. We also use mechanical tillage. We maintain some of the cleanest fields by using both of these practices.

**Kristie Swenson**
*Trimont, Minnesota*
We use a combination approach to manage weeds. During the growing season, we spray glyphosate and a different postemerge herbicide. We also walk into the field and pull stray weeds.
The message from weed scientists across the country is clear: If the issue of herbicide resistance isn’t addressed soon, U.S. farmers will face a problem of terrific proportions in only a few years.

Just ask farmers in Australia. That’s right – Australia.

Row-crop farmers more than 17,000 miles from the U.S. soybean belt have a cautionary tale for their American counterparts, one they say U.S. soybean farmers should heed in order to avoid falling victim any further to herbicide-resistant weeds.

“If we don’t do something soon, we’re going to be headed down the same road as Australian farmers, who have been fighting herbicide-resistant weeds for 20 years,” says Jason Norsworthy, University of Arkansas professor and Elms Farming Chair of Weed Science. “That day is quickly approaching for us.”

It’s time to take a trip Down Under to Australia’s farm fields to learn about herbicide resistance problems and solutions.

“The Australian Resistance Problem

The continent of Australia is about as large as the continental United States, and as 19th-century European settlers made it their home, they built a huge sheep industry, among other things. This eventually led landowners to plant ryegrass across much of the country for grazing.

As the sheep industry became less profitable over the years, farms made a gradual shift to row cropping. And the ryegrass that was once intentionally planted for grazing quickly turned into their most problematic weed.

Powles watched herbicide resistance take hold across much of Australia’s cropland in the early 1990s. Farmers used only herbicides, and a small selection of herbicides at that, to control the ryegrass. It provided a temporary fix, but, in the end, biology won. Today, ryegrass in many places in Australia shows resistance to seven or eight modes of action.

“It made good economic sense at the time but not good biological sense,” Powles says. “Unfortunately, evolution doesn’t take any notice of that.”

Sound familiar? Waterhemp, the scourge of many farmers in the Midwest, has shown resistance to six herbicide modes of action. Palmer amaranth, a menace to Southern farmers,
has built resistance to five. And the list gets longer every year.

As good business people, it makes sense for farmers, whether in Australia or in the U.S., to control weeds in the most economical way possible. For years, glyphosate was the answer for many farmers. But the era of glyphosate being lights out on weeds is gone for most. As Powles simply puts it, “It was a great technology overused.”

Nixon is not alone. Many Australian farmers approach weed management with an integrated solution in mind. And that solution is for a large number of acres. “The average farm size in Australia is 10,000 acres,” says Powles. Nixon’s farm stretches across 12,000 hectares, or almost 30,000 acres, proving that an integrated weed-management plan can be adopted for farms both large and small.

“Herbicides are still the best option for weed control,” says Powles. “But it can’t be the only option. Australian farmers know that they cannot rely solely on herbicides. They must also use nonchemical techniques.”

The Australian Resistance Solution

Bob Nixon, a fourth-generation wheat, canola and barley farmer in Western Australia state, has farmed for approximately 20 years and has dealt with resistance issues since he started. But smart decisions and an emphasis on diversity have kept major problems at bay in recent years.

“Using the full basket of weed-control options has enabled us to stay ahead of herbicide resistance,” says Nixon. “Like any aspect of business, paying attention to detail is crucial. Monitor paddocks (fields) and borders, understand the problem, have diversity.”

Harvest Weed-Seed Control

“The biggest difference in approach to herbicide-resistance management between U.S. and Australian farmers is likely the idea of harvest weed-seed control,” says Powles. A rapidly growing number of farmers in Australia practice harvest weed-seed control by collecting and destroying any weed seeds that escaped herbicide applications throughout the growing season and survived through harvest.

“Australian farmers practice harvest weed-seed control because they know they have to,” Powles says.

Most farmers in the U.S. haven’t reached that point … yet.

Many farmers in Australia use narrow windrow burning because it’s the simplest and most economical way to practice harvest weed-seed control. The combine funnels chaff into narrow rows, which farmers later burn.

Research conducted by the Australian Herbicide Resistance Initiative and others shows that this practice destroys 99 percent of ryegrass and other weed seeds, decreasing the amount of seed going back in the seedbank for the following growing season.

A smaller percentage of farmers pull a chaff cart behind the combine, removing all chaff from the field for eventual destruction. And though not in widespread use yet, a new piece of technology called the Harrington Seed Destructor collects all chaff exiting the combine, destroys all seeds through a mill and discharges the chaff back onto the field.

Nixon uses windrow burning in his canola fields, but it is only needed every couple of years, thanks to his proactive weed-management plan. “We only use it when we have to.”

I WILL

Reduce the Weed Seeds in My Soil.

I will take action against herbicide-resistant weeds.
I will know my weeds. I will target their strengths and exploit their weaknesses.
Escapees don’t stand a chance.
I will seek them out and take them down before they go to seed.
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Preventing weed seed production is essential to weed management.
Visit www.TakeActionOnWeeds.com to learn how you can prevent herbicide-resistant weeds from spreading.
The U.S. Herbicide Resistance Future

If not already facing the issue, chances are every U.S. farmer has heard horror stories of resistance from others. But it’s daunting to think about the drastic measures being taken in Australia and consider applying them here.

“When I talk to growers about weed-seed control, they say it seems pretty complicated,” says Norsworthy. “There’s a mindset about weed control that Australian farmers have that U.S. farmers haven’t embraced yet. They (Australian farmers) embrace solutions to the problem.”

But unless changes are made soon, farmers won’t have a choice.

“I’ve seen resistant weeds on my farm,” says Todd Gibson, Norborne, Missouri, farmer and soy checkoff farmer-leader. “I know the problem is only going to get worse if I don’t address it now. We all have to start thinking about weed control differently.”

With funding from the soy checkoff, Norsworthy is testing harvest weed-seed control strategies, including the use of a chaff cart and windrow burning, here in the U.S. with promising results. He predicts that a mechanism to destroy weed seeds as they exit a combine will become standard for major equipment manufacturers in the next decade.

Harvest weed-seed control isn’t the only answer. Norsworthy says cultural practices can make a big difference, too. “Soybeans planted in 15-inch rows will form a canopy in four to five weeks, compared with seven to eight weeks with 30-inch rows,” says Norsworthy.

Canopy development provides shade to the weeds, slowing their growth and reducing the need to apply herbicides, which in turn slows the potential for resistance.

And herbicides will never be out of the picture.

“The key is using effective modes of action,” says Norsworthy. “If farmers have problems controlling weeds one year, they have to think about using different modes of action in future years.”

There’s Still Time to Take Action

The increasing threat of herbicide resistance across the U.S. spurred the soy checkoff to lead the Take Action herbicide-resistance-management initiative. Supported by more than 20 land-grant universities, four other checkoff organizations and eight agrichemical companies, the program encourages farmers to think about a smarter weed-control plan, one that uses diverse herbicides and goes beyond herbicides to control weeds.

“The soy checkoff’s role is to improve the profit potential for America’s soybean farmers,” says Gibson. “Herbicide resistance poses a huge threat to our profitability, so this is an issue the soy checkoff believes needs to be addressed. The collaborative effort and support of the industry show just how important the issue really is.”

With support from all partners, the checkoff has created and distributed materials designed to assist with weed-management decisions, particularly the selection of herbicides. “It’s easy to talk to your retailer and ask to use a different herbicide,” says Gibson. “But that herbicide may attack the same site of action as the herbicide you used previously on that field and not be effective.” Visit www.TakeActionOnWeeds.com for more information and resources for your farm.

With the help of weed scientists across the U.S. and resources like the Take Action program, U.S. farmers still have a chance to confront and win the fight against herbicide resistance. But that fight must begin now. Speaking from experience, Nixon says, “You cannot wait until the resistance problem blows out. Even if it’s one weed, it won’t be long until you have a messy seed bank, and getting back on top of the issue takes so much. In weed management, the only number that works and is acceptable is zero!”
Herbicide-resistant weeds get a lot of coverage in today’s agriculture publications. However, resistance is not new. It’s a recurring issue we’ll need teamwork to manage. Universities and seed and crop-protection companies work hard to develop traits to control and prevent resistance. As retailers, we do our best to develop sound weed-control programs to take advantage of this work. And we’re doing better in delivering educational programs to explain the importance of resistance management.

Going forward, it is critical that we diversify herbicide modes of action. I hope that you have already taken that step on your farm.

When building a program to manage herbicide-resistant weeds, there are several things to consider:

1. **Target weeds**
   As you develop a resistant-weed-management plan, get to know your enemy. A list of your problematic weeds is a place to start: Scout your fields. What is your most common or frequent weed? Is it resistant? That gets you the information you need for a sound weed-management plan.

2. **Cropping plan**
   The days of applying just glyphosate are long gone. Glyphosate’s lack of residual activity meant that crops could be planted without consideration of the herbicides used previously. However, many of the residual herbicides we use today have longer residual activity, requiring a certain amount of time before the next crop can be planted. We need to have long-term cropping plans.

3. **Soil characteristics**
   Most residual herbicides are rate-dependent in relation to soil type and pH. This means they will be most effective when applied at the full labeled rate and at the recommended weed size.

4. **Apply the labeled herbicide rate at the recommended weed sizes.**
   When it comes to an effective herbicide program, multiple residual herbicides should be applied sequentially before the weeds emerge. Many university weed scientists call this “overlapping residuals.” If you have weeds present at planting, they will be hard to control as the crop grows. Once you have your pre-emerge herbicide in place, you should commit to a plan to cover the field again with an overlapping residual 24-30 days later. The goal is to get the second residual out before the first one becomes ineffective.

5. **Have a whole-farm plan**
   Develop a plan for your whole farm for the entire year. This gives you better time management and weed management. Whether it’s through tillage or a good burndown, you need to plant into a clean seedbed. Throughout the growing season, scouting and managing weeds as they appear are important. At harvest, clean out equipment in-between fields to prevent weed seeds from spreading.

Your cropping and weed-control plan is important, but don’t blindly follow it. Adjust when needed. If you aren’t fighting resistance yet, you will. Contact your input provider for more resistance-management information.

Jason Weirich, director of agronomy for Columbia, Missouri-based MFA Inc., is an expert in weeds and resistance-management practices. A prolific writer and speaker on all things weeds, Weirich’s responsibilities with MFA include employee training, variety testing, applied agronomic research and new-product evaluation through field trials.
Put simply, basis is the difference between the local cash price you can get at any given time from your elevator and the futures price on the Chicago Board of Trade. Unfortunately, there isn’t anything simple about calculating basis. Many factors play a part in the price that farmers receive when they sell their beans.

Availability and costs of transportation help to determine basis. Last fall, the lack of railcars negatively impacted soybean farmers in the northern growing areas. Transportation considerations can also help basis. Farmers who farm near waterways have a stronger basis than those who rely on roads to move their product.

Supply and demand in a farmer’s area also contribute to basis. A local biodiesel plant or poultry operation increases the local demand for soybeans, thus improving basis for farmers who sell their beans nearby.

Another element that contributes to basis is the estimated processed value, or EPV. This is the value of the soybean meal, oil and hulls minus the processing costs. EPV essentially accounts for quality of soybeans. Increasing the amount of the most valuable components, oil and meal, in a load of soybeans makes that load more valuable and increases the price that can be paid to the farmer. This also represents one area of basis where farmers have some control. By selecting seeds that are high in protein and oil, farmers can improve demand for soybeans and, in turn, the price that they receive.
SOYBEAN QUALITY TOOLBOX

A handy tool for making a quality seed-buying decision

By Andy Teague

It’s no secret that when processors buy soybeans to turn into poultry and livestock feed, they are making their choices based on the amount of protein inside. Likewise, food-industry customers need soybeans with high levels of oil. Soybeans with higher oil and protein content are in greater demand, and better demand can lead to a higher price for farmers.

“Soybeans are typically an integral part of poultry and swine rations,” says Laura Foell, United Soybean Board (USB) Meal Action Team chair and a soybean farmer from Schaller, Iowa. “They are a great protein source for those animals.

“Offering higher-quality soybean meal is a win-win for both the soybean farmer and the livestock and poultry producers. If more soybean farmers can supply a high-quality product that livestock and poultry producers desire, the demand for soybean meal will rise.”

While many soybean farmers know the importance of growing higher-quality soybeans, they don’t always know how to do so. It could be as simple as asking your seed dealer or using the Soybean Quality Toolbox, located at www.GrowSoybeanQuality.com, to find varieties that produce more protein.

“Farmers should work with their seed dealers to evaluate their seed purchases each year in order to make sure that our No. 1 customer – animal ag – has the highest-quality soybean meal,” Foell says.

To use the soy-checkoff-funded Soybean Quality Toolbox, simply follow the step-by-step process to find top-performing varieties in your area that offer high protein and oil without sacrificing yield.

For example, in Foell’s area in 2013, the most recent year for which data is available, the Soybean Quality Toolbox shows that varieties from Stine, Channel, Kruger, Renk and others yielded at least 65 bushels per acre and offered high protein and oil levels. This adds up to soybeans with enhanced value for farmers. Check out the tool to find varieties that offer similar results in your area.

IN AS FEED, OUT AS WEEDS

Don’t let livestock manure spread weeds

By Jillian Baker

As weeds continue to march across the United States, farmers are preparing for the many ways weeds can enter their soybean fields.

Manure is a very beneficial resource for growing crops, but many farmers are hesitant to apply manure to their soybean fields because it can spread weeds.

J.D. Green, Ph.D., University of Kentucky extension weed scientist, says it’s possible for weeds like Palmer amaranth to spread through manure to crop fields after being introduced in livestock feed.

“We believe the use of cottonseed hulls as a feed source for livestock, specifically beef and dairy cattle, was one of the routes that introduced Palmer amaranth in Kentucky and other states.” Green says.

“Manure that contains weed seed is then spread on crop fields.”

Whenever farmers apply something in their field, they should make an effort to learn whether weed seeds are present and weigh the benefits against potential risks. For more information on weed management, visit www.TakeActionOnWeeds.com.
Herbicide resistance can’t be overcome by a single commodity group, company, university, farmer or herbicide. That’s why the industry has come together, with leadership from the soy checkoff, to form Take Action, a program that helps farmers manage herbicide resistance. Below, Take Action’s ag technology provider-partners weigh in on what they believe it’s going to take to keep resistance in check.

“Innovation in advancing new herbicide-tolerant systems is important, and effective weed management is about more than choosing the right herbicide. It is about developing a long-term plan that consistently makes proactive weed control a priority, and scouting for escapes a focus. Farmers who plan from seed selection through harvest are generally rewarded with cleaner fields and higher yield potential.”

Rick Cole, Ph.D.
Technology Crop Protection Lead
Monsanto

“Acres with resistant weeds have doubled in the United States since 2009 and are now up to 70 million acres. The International Survey of Herbicide-Resistant Weeds shows that, a little more than a decade ago, there wasn’t a single documented case of glyphosate resistance anywhere in the Corn Belt. Now, researchers have confirmed resistance in weeds such as Palmer amaranth, marestail, ragweed, waterhemp and more. Weeds rob crops of important nutrients, sunlight and water and negatively impact yield. Managing herbicide resistance now can help prevent further development of resistant weeds and can preserve the utility of the tools we have available today.”

John Kalthoff
Cross Platform Portfolio Marketing Leader
Dow AgroScience

“The development of weed resistance cannot be attributed to a single action, but rather to inadequate implementation of weed-management solutions and evolutionary adaptation. Integrated weed-resistance management is the most effective way of reducing the incidence of herbicide-resistance development. Increased awareness, herbicide-user education and conscious efforts by growers will need to be combined to shift the trend of single-chemical-herbicide use to long-term, integrated weed-management approaches.”

Andre Trepanier
Senior Manager, Soybean Products
DuPont Pioneer
SUDDEN DEATH SYNDROME
The Top Five Tips to Minimize Yield Loss
By Heather Manhardt

Sudden death syndrome (SDS) is now among the top yield-robbing diseases in soybeans in the United States. To reduce yield loss from SDS, researchers offer these tips:

“Variety selection plays an important role in the management of SDS,” says Leonor Leandro, Ph.D., associate professor in the Department of Plant Pathology and Microbiology at Iowa State University. “If farmers plant the most resistant varieties available, they are protecting their yields.”

Pick varieties with the highest levels of resistance to SDS, but make sure to consider SCN resistance in your seed selection as well.

Plant in the warmest and driest conditions possible.

Maintain optimal soil conditions by avoiding high moisture levels, poor drainage and soil compaction.

Implement crop rotation in your fields.

Ask your retailer if the new SDS seed treatment, ILeVO®, is right for your farm.

Dawn Refsell, Ph.D.
R&D Manager, Midwest Commercial Unit
Valent USA Corporation

Aaron Locker
Marketing Director
FMC

Les Glasgow, Ph.D.
Herbicide Technical Product Lead
Syngenta

Arlene Cotie
Product Development Manager – glufosinate and Integrated Weed Management
Bayer CropScience

“Weed resistance continues to spread, even into areas that may have had very few issues just a few years ago. If you don’t have an issue, you will. Growers have reported time after time that they always end up spending more money in the end by waiting to control weeds after they have emerged versus having a plan incorporating multiple modes of action to control weeds before they emerge. Waiting until you have the problem will only cost you more money and undue personal stress. Be proactive.”

“Take Action means being proactive and not waiting until there is a problem, but taking preventive steps now. The most essential part of that is to ensure diversity in how we implement weed management. The use of pre-emergence applied, residual herbicides in a two-pass system, along with using effective post-emergence products, enables application of products with multiple modes of action.”

“The easiest route to herbicide-resistance management is not likely going to be the most sustainable. Innovation should be integrated, but not to the extent that it is exclusive. Farming is for the long haul, with farms being passed from generation to generation. It is in our best interest to manage weeds to the best of our abilities every year, as the weed seed bank, too, will be inherited.”

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“Take Action means being proactive and not waiting until there is a problem, but taking preventive steps now. The most essential part of that is to ensure diversity in how we implement weed management. The use of pre-emergence applied, residual herbicides in a two-pass system, along with using effective post-emergence products, enables application of products with multiple modes of action.”

“In 15 years, weeds will still look the same, but how we manage them will look different as we look to new methods and technologies in all phases: mechanical, chemical and cultural. We will need all three areas moving forward, so weed management of the future will emphasize diversity in all phases.”

The soy checkoff plays a critical role in directing research on soybean-production issues. Because SDS is so widespread across the U.S. soybean production area, the checkoff has made the disease an area of focus for soybean research. Learn more about the checkoff investment in SDS research at www.unitedsoybean.org/sds.
INHERITED POWERS

Genetic diversity in wild soybeans could improve today’s yield, composition, stress resistance and more

By Jeff Brown

Looking across this soybean-research plot in eastern North Carolina, the ancient ancestors of modern soybeans are nearly unrecognizable to the human eye.

More akin to a ground cover, weed or vine, the primitive plants that have lived for millennia in China bear little resemblance to today’s lush, upright plants to which they’re technically related. These soybean ancestors cling to the ground as if afraid of the sun. Skinny-stemmed and narrow-leaved, they produce multicolored beans a fraction of the size of today’s commodity soybeans.

Yet it’s the diverse genetics in these runts of the soybean litter that a team of researchers working on a multistate soy-checkoff-funded project believes holds the key to improving today’s commercial soybean varieties in some of the most important ways.

“Our attraction to wild soybeans is that they’re much more diverse than the cultivated soybeans,” says Earl Taliercio, a U.S. Department of Agriculture plant molecular geneticist working on the project. “We are finding a lot of interesting traits – protein and amino acid composition, disease resistance and stress resistance – and we have some initial evidence that we’ll find some good yield genes as well.”

Left to grow uncontrolled in China, these viny wild soybeans have maintained a much more diverse set of genes compared with commercialized varieties. The breeding process got the plants to stand upright, but it also eliminated other beneficial traits.

“Wild soybeans haven’t gone through the bottleneck of having genes selected for agriculture,” says Taliercio. “We’ve lost valuable genetic diversity in selecting plants for cultivation. By some estimates, the wild plants are as much as seven times more diverse than a cultivated soybean.”

Soybeans from wild plants that have grown in China for thousands of years are smaller and come in different colors than today’s commodity beans. Yet researchers believe that genetic diversity could be used to benefit today’s varieties.

Taliercio and the team continue to use state-of-the-art equipment and techniques to breed wild soybean lines for public and commercial breeders to use, which could result in more diverse varieties for farmers to plant.

$7.70-12.96 MORE PER ACRE

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MORE DEMAND. BETTER PRICE.
If soybean farmers increased the protein content in their soybeans by just 1 percentage point, they could earn an additional $7.70-12.96 per acre.
AND THAT ISN’T CHICKEN FEED.

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Taliercio and the team continue to use state-of-the-art equipment and techniques to breed wild soybean lines for public and commercial breeders to use, which could result in more diverse varieties for farmers to plant.

$7.70-12.96 MORE PER ACRE

SOYBEAN QUALITY MATTERS

MORE DEMAND. BETTER PRICE.
If soybean farmers increased the protein content in their soybeans by just 1 percentage point, they could earn an additional $7.70-12.96 per acre.
AND THAT ISN’T CHICKEN FEED.

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INHERITED POWERS
Genetic diversity in wild soybeans could improve today’s yield, composition, stress resistance and more

By Jeff Brown

Looking across this soybean-research plot in eastern North Carolina, the ancient ancestors of modern soybeans are nearly unrecognizable to the human eye.

More akin to a ground cover, weed or vine, the primitive plants that have lived for millennia in China bear little resemblance to today’s lush, upright plants to which they’re technically related. These soybean ancestors cling to the ground as if afraid of the sun. Skinny-stemmed and narrow-leaved, they produce multicolored beans a fraction of the size of today’s commodity soybeans.

Yet it’s the diverse genetics in these runts of the soybean litter that a team of researchers working on a multistate soy-checkoff-funded project believes holds the key to improving today’s commercial soybean varieties in some of the most important ways.

“Our attraction to wild soybeans is that they’re much more diverse than the cultivated soybeans,” says Earl Taliercio, a U.S. Department of Agriculture plant molecular geneticist working on the project. “We are finding a lot of interesting traits – protein and amino acid composition, disease resistance and stress resistance – and we have some initial evidence that we’ll find some good yield genes as well.”

Left to grow uncontrolled in China, these viny wild soybeans have maintained a much more diverse set of genes compared with commercialized varieties. The breeding process got the plants to stand upright, but it also eliminated other beneficial traits.

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SWITCHING GEARS
Engineer exchanges corporate career for the family farm
By Nancy Hallahan

Darin LaBar is fascinated by things many of us find frightening. Science, data analysis and structured constraints are the cornerstones of engineering, so it’s not surprising that this Michigan State engineering graduate, who is drawn to science and learning, pursued a career that focuses on those three things. What might be surprising is how well he says this path prepared him to farm.

LaBar has fond memories of growing up with his brothers on a south-central-Michigan grain farm purchased by their great-grandfather. As a child, he was intrigued by tractors and farm equipment – an early indication of his passion for engineering. This passion translated into a successful career, first with General Motors and then with aerospace giant Lockheed Martin.

After that, LaBar was designing medical devices for Stryker Corporation when he received a phone call that changed everything. “At 70 years old, my dad was ready to retire,” he recalls. “He presented me with the opportunity to come home and take over the farming operation.”

True to his analytical nature, LaBar created spreadsheets and analyzed financials before making his decision. “After years spent watching the farm change and grow over time, I knew that farming was in my heart,” he says. “I weighed the stability of both industries, health care and farming. People are always going to need health care, and people are always going to need to eat, but I knew it was an opportunity I would never have again, and one that would allow me to be more accessible to my family. I realized that I wanted to work for the future of my family, not for my next promotion.”

The chemistry involved in growing a soybean plant and the interactions with microorganisms in the soil also intrigued this avid learner. And while switching careers may sound daunting, LaBar was surprised how much overlap he saw between the two industries.

“Farming is a lot like engineering in terms of inputs and outputs, and no one produces more data to analyze than a farmer,” he says. “There are many opportunities to learn and utilize applied science in both industries. Farmers can never learn too much; they are shrewd businesspeople.”

What contrasts did LaBar see? “As an engineer, statistical methods can be used to determine which factors have the greatest impact on your desired outcome; you really don’t take risks,” he says. “Any farmer knows that farming itself is a risk. The factor that affects my yields the most is one I can’t control – the weather.”

LaBar’s two young children enjoy riding in the tractor and going for parts with him. But whether or not they someday join him on the farm is for them to decide. “Dad never told me what to do,” he says. “He gave me a choice. Likewise, I’ll support whatever path they choose.”

His own path might not have been a direct one, but he’d do it all the same again. “I believe the future is bright for both engineering and agriculture,” he says. “Science doesn’t quit.”
A farmer’s weed-management toolbox is always evolving to add diversity, fight arising resistance or utilize the newest technology. Farmers who grow high oleic soybeans can expect the same genetic and herbicide-resistance packages from high oleic varieties that they get from their traditional soybeans.

Today, dicamba- and other herbicide resistant soybeans are in the regulatory approval pipeline, offering farmers new modes of action to add to their weed-management plans. Once approved, one or multiple traits may then be stacked with high oleic traits, pending breeding programs and approvals in countries where stacked traits require approval.

The new herbicide-resistant traits will offer farmers the opportunity to maximize crop yield potential by challenging tough weeds. Stacking the traits with high oleic will offer them increased profit opportunities as well.

“Giving commodity and high oleic soybean farmers multiple modes of action for different types of weeds provides more options in raising the most productive crops they can grow,” says Warren Kruger, Monsanto’s North America Soybean Breeding high oleic lead. “Farmers know their weed-management needs, and we want them to choose the chemistries that fit their needs in the field.

“Weed issues are a limiting factor in productivity, and that’s a large motivating factor for us. “We want to make these herbicide traits available for high oleic farmers as well.”

DuPont Pioneer plans to do the same. According to André Trépanier, DuPont Pioneer Soybean Marketing Manager, the company “plans to combine the Plenish® high oleic trait with the herbicide-tolerant traits our customers want so farmers can continue to successfully recapture soybean industry market share.”

“Soybean farmers want to bring additional value and uses to the soybean industry through high oleic soybeans,” adds Kruger. “We are responsive and receptive to that and are working very hard to ensure high oleic soybeans provide the same herbicide platform as commodity soybeans. Stacking technologies gives high oleic farmers multiple modes of action. High oleic farmers will have the seamless choice of selecting which herbicide they want to apply, or both.”
GROWTH MARKETS
High oleic soybeans growth careful and calculated
By Greta Erwin

The soybean industry anticipates the need for 18 million acres of high oleic soybeans by 2023 to meet potential demand. Each year, the number of high oleic soybean acres increases significantly in those areas where they are currently grown. Before broad-range availability of the varieties can be realized, the seed companies providing the trait need to receive additional global regulatory approvals. Those approvals allow for easy handling of the soybeans and allow them to be shipped to other countries, which is very important because more than half of U.S. soybeans are exported.

“We are experiencing strong growth from year to year, and in 2015 we will see that continue with expansion in our established supply chains in Ohio, Indiana and the Delmarva areas,” explains Russ Sanders, director, DuPont Pioneer Food and Industry Markets group, which markets Plenish® high oleic soybean varieties.

The delay in the high oleic approvals isn’t a result of concerns about the product’s performance or safety, but rather the political dynamics of the European Union biotech regulatory process.

“Plenish is approved in all other major soybean markets, including China. In the EU, however, we are waiting for approval along with 11 other biotech traits that are in a similar stalled position, including products for multiple crops for several growing regions. We continue to be hopeful that the gridlock will be resolved sometime in 2015, which will enable full-scale commercialization,” says Sanders.

Mindy Whittle, Monsanto’s soybean industry affairs lead, says Monsanto is preparing for increased production pending Chinese and EU approvals for the high oleic trait found in its Vistive® Gold soybean varieties.

“We are focused on seed production and small amounts of growth in coordination with processors who are capable and committed to a high degree of stewardship,” says Whittle. “We are continuing a robust breeding program so that we will have plenty of high oleic seed for 2016 planting, when we anticipate global approvals.”

A limited number of food companies use high oleic currently in their products. More than 500 companies and industrial users are testing high oleic soybean oil, signaling to soybean processors their intentions to purchase the oil once it is widely available. The graphic shows the targeted expansion areas for high oleic soybeans by 2023, which expands the potential availability of the oil.

“With more processors accepting the varieties and more farmers growing the soybeans, end users will be able to adopt high oleic soybean oil with this promise of a more reliable supply,” Whittle says.

HOT ON SOY
Increasing Bioheat® use leads to greater soybean value
By Ethan Hartkemeyer

New data show demand for Bioheat® (biodiesel blended with heating oil) is growing and capable of even greater growth in the future. The rise increases demand for soybean oil and adds value for soybean farmers and the entire industry.

A recent survey from the National Oilheat Research Alliance (NORA) and Brookhaven National Laboratory found that more than 35,000 buildings in the Northeast and Mid-Atlantic states already use Bioheat blends of more than B5 (5 percent biodiesel) effectively. This indicates substantial growth in biodiesel use for heating applications – leading to additional value for biodiesel and its main ingredient, soybean oil.

The study coincides with another study from NORA showing most oilheat users can transition to blends of up to B20 using their existing heating systems.

Bioheat’s growing momentum, which many in the northeast U.S. experienced firsthand during January’s blizzard, contributes to the total demand for biodiesel and the soybean oil used to make it. As research continues to approve the use of higher blends of Bioheat in oilheat systems, soybean farmers will continue to gain from the value being added by this increased demand.

Production and deliveries of Bioheat continue to rise.
Farmers balance weed management, crop performance and sustainability on their farm

By Jillian Baker

Farmers are moving toward no-till practices, but many still rely on tillage to control weeds. Thinking ahead to the new planting season, it’s important to know which option is best for your farm.

Purdue University associate professor Bryan Young, Ph.D., says the deep-till method buries the weed seeds deep enough where many can’t germinate.

“In a deep-tilled environment, you may be removing about 80 percent of the weed seeds from the germination zone, which alleviates some of the pressure for the following year, but might increase the weed seed longevity in the soil over the years beyond that,” says Young.

Although tillage is seen as a useful weed-management tactic, farmers still have a tough decision to make because reducing tillage can improve crop performance as well as farmers’ sustainability.

“We recommend no-till soil practices because they use less fuel, conserve soil, build soil structure and hold more water, all of which can improve yield,” says Brad Soncksen, assistant state conservationist at Natural Resources Conservation Service in Nebraska.

“They also protect the soil from erosion by maintaining crop residues on the surface, allow the soils to hold more carbon and increase organic matter.”

Conservation tillage has grown from 17 percent of acreage in 1982 to 63 percent today.

U.S. CONSERVATION-TILLAGE ACRES FOR THE LAST 30 YEARS

Total acreage today: 325,600,000 acres; 63 percent is conservation-tillage acreage: 205,128,000 ACRES

Total U.S. soybean acreage in 1982: 362,447,000 acres; 17 percent was conservation-tillage acreage: 61,615,990 ACRES

Source: American Farm Bureau Federation, USDA National Agricultural Statistics Service
READY OR NOT...
Panama Canal expansion could boost U.S. soy’s competitive advantage
By Laura Smith

A looming deadline is fast approaching for U.S. soy’s competitive advantage. By the end of December, construction on the Panama Canal expansion will be completed. The eventual opening of this expansion will give exporters the opportunity to more efficiently move products, such as U.S. soybeans, to end users in China and other countries.

U.S. soy already has an advantage of being the more reliable and often more affordable supplier of soybeans when compared with South American soybeans, so this engineering marvel should only improve these efficiencies. To take advantage of the deeper canal, U.S. ports will need to maintain a depth of 45 to 50 feet. These depths allow Panamax vessels, which can carry up to 2 million bushels, to be loaded to maximum capacity. This is 500,000 additional bushels per load over current ships.

“Most soybean exports that use the canal move through the ports around New Orleans,” says Woody Green, soybean farmer from South Carolina. “The projected depth through this area is 45 feet, which leaves room for vessels to be loaded. It’s important to maintain this depth.”

With the Water Resources Reform and Development Act now in place to provide increased funding for port and inland waterway maintenance, the U.S. agriculture sector is hopeful that major agricultural ports will be ready for the opening of the canal expansion.

SOY BITES

FARM-SHOW FOODS FRIED WITH HIGH OLEIC
Farm show attendees recently got to taste the benefits of high oleic soybean oil. The Pennsylvania Soybean Board (PSB) partnered with five other farmer-led organizations at the Pennsylvania Farm Show to fry chicken sandwiches, cheese cubes, mushrooms and more with high oleic soybean oil. Concessionaires at the Fort Wayne (Indiana) Farm Show also used the oil.

NEW PRODUCTS INCREASE SOY DEMAND
Last year, 33 new soy-based products hit the market with the help of soy checkoff support, bringing the total number of products commercialized in the past 25 years to more than 800. “When you look around and see how many brands of shampoos, lotions and cosmetics are out there, the potential for soy is enormous,” says United Soybean Board Chairman Bob Haselwood, a soybean farmer from Berryton, Kansas.

TALKING INNOVATION AT CONNECTIONS
The soy checkoff is analyzing feedback that was generated by the U.S. soy industry at USB’s December Connections event. Participants discussed how to increase U.S. soybean farmers’ profitability through three areas: soybean research, maximizing value in U.S. soybean meal and farmer technology acceptance. To download a full report of the Connections discussions visit UnitedSoybean.org/Connections2014/.

MEET YOUR CUSTOMERS
The checkoff invites U.S. soybean farmers to meet their customers, learn about their needs and see how they affect farmers’ bottom lines during this year’s See for Yourself program. Visit www.UnitedSoybean.org/SeeforYourself to apply. The program also allows farmers to see the results of checkoff investments and provide feedback on checkoff programs.

THE POWER OF ONE PANAMAX VESSEL

A 1 PANAMAX (60K TONS) CARRIES 2,000,000 BUSHELS (18,144,000 GALLONS)

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SOY TO THE WORLD
Biotechnology gains acceptance beyond U.S. borders
By Cassie McCloud

Chinese consumers have many of the same food-buying concerns and questions as American shoppers.

With Chinese customers buying more than half of U.S. soy exports, they must not have concerns about biotechnology, right?

Actually, the opposite is true. Many Chinese consumers, especially moms, have misconceptions about the safety and environmental impacts of genetically modified (GMO) foods. These misconceptions are the target of newly expanded checkoff educational efforts that are a natural extension of years of similar work in the United States.

“Moms across the globe worry about the health and welfare of their families, and Chinese moms are no exception,” says Nancy Kavazanjian, soy checkoff director from Wisconsin who also leads the checkoff’s communication efforts.

Recently, the U.S. Soybean Export Council (USSEC) invited four women soybean farmers from the United States to Beijing to participate in town-hall meetings with professional Chinese women to talk with the Chinese women about the safety of GMO crops grown on their own farms.

The Chinese women asked many questions about food safety and food security, including:

• Does the United States send its GMO crops for export and save non-GMO crops for itself?
• Is the seed from GMO crops sterile?
• What are the general benefits of biotechnology?

“It was easy to see that, just like us, the Chinese women want to raise strong, healthy, happy families and are as concerned as we are about protecting our planet, sustaining our neighborhoods and leaving the world a better place,” says Kavazanjian, who also serves as chairwoman of the U.S. Farmers and Ranchers Alliance. “We shared a connection with them, and we’re looking forward to future conversations with moms overseas.”

The Farm Moms initiative is just one of the ways that USSEC is continuing the GMO conversation in China.

MACHINERY PETE
Answers from one of the most trusted names in farm equipment
By Nicole Postin

We caught up with TV and social media personality Greg Peterson, better known as “Machinery Pete,” to learn about his auctioneer-price-reports business. In 1989, at the suggestion of his father, who was a third-generation implement dealer, Peterson started the business he refers to as the “Kelley Blue Book for farm machinery.” Today, he calls on more than 1,000 auctioneers all over the United States and Canada to gather sale information for bankers, farmers, buyers and sellers alike.

1. What major changes have you seen in equipment over the years?
Agriculture has changed greatly over the past 25 years. Today we see so much technology going into farming, with GPS, precision agriculture and more, the equipment is becoming more complicated, bigger and faster. I don’t think farmers get enough credit for their willingness and ability to adapt.

2. What is the most interesting item you’ve ever seen at an auction?
In 2009, in Hamilton, Illinois, there was a farm retirement sale. This farmer had three John Deere 4440 tractors that had been kept in a shed for nearly 27 years with very few hours on them. I wrote about this, and the article spread quickly. The day of the sale, there were 3,500 people who came from all over the country just to see this tractor sell. It finally sold for $58,000.

3. Do you have any upkeep or resale advice for farming equipment?
The best investment for your equipment is a quality shed to store it in. The second thing I would suggest is to shoot a quick cellphone video of your tractor and planter running in the spring, or the combine harvesting in the fall. When it comes time to sell, you can show the video to the prospective buyer and get them emotionally invested as they learn the story of your farm.
The Illinois Soybean Association (ISA) offers farmers several tools for managing herbicide resistance. ISA started tracking herbicide resistance online with its WeedMap Toolkit. The tool can be found at www.ILSoy.org/profitability/weed-management. ISA also developed www.ILSoyAdvisor.com, a soybean-specific tool with the latest information and recommendations for growing better beans. The site includes specific weed-management recommendations.

Farmers in Kentucky face an invasion of herbicide-resistant Palmer amaranth that has some farmers shaking their heads. To combat this weed, the Kentucky Soybean Board (KSB) took action and featured resistant-weed specialist Ford Baldwin, Ph.D., at its Intensive Soybean Management Workshops in February. To learn more about managing Palmer amaranth, visit www.TakeActionOnWeeds.com.

The Michigan Soybean Promotion Committee (MSPC) has been a strong supporter of weed-management research and extension through partnerships with weed scientists at Michigan State University. MSPC has supported herbicide-resistant weed screening for more than seven years and has sponsored several projects related to new weed-management technologies, glyphosate-resistant weeds and weed management in non-GMO soybeans. Michigan farmers can find out how to sample their weeds for herbicide resistance by searching “free screening” at www.MichiganSoybean.org.

The Mississippi Soybean Promotion Board (MSPB) recently distributed the 2015 Mississippi Soybean Production Best Management Practices Guide to all soybean farmers in the state. The guide provides important production information for weed and insect management, irrigation scheduling, planting date, variety selection and seed treatments. MSPB has also highlighted weed management on social media. Follow MSPB’s Wednesday Weed of the Day series by liking the Mississippi Soybean Promotion Board on Facebook or following @MSSoy on Twitter.

The Missouri Soybean Merchandising Council (MSMC) funds programs with University of Missouri Extension to provide farmers, crop consultants and others with timely, accurate information on best-management practices to prevent and control herbicide-resistant weeds. Missourians also have the WeedID Guide, which includes photos and detailed descriptions for more than 400 weeds. The guide is available online at www.extension.missouri.edu and as an app for iPhone and Android.

To stay ahead of herbicide-resistant weeds, Nebraska farmers can download a copy of the 2014 Guide for Weed Management at www.cropwatch.unl.edu/weed. New information and weed-management events can also be found in the Nebraska Soybean Board’s (NSB) SoybeaNebbraska magazine and at www.agronomy.unl.edu.

The New Jersey Soybean Board (NJSB) recently hosted its 2015 Producers Meeting, a daylong event covering soybean-production topics. The meeting provided an opportunity for farmers to hear from researchers about herbicide-resistant-weed management. Each farmer also received the New Jersey Soybean Production Guide. Contact the NJSB office at 609-585-6871 to receive your production guide.

The New York Corn & Soybean Growers Association (NYCSGA) funded a research project that has confirmed northern stem canker (NSC) in New York soybean fields. NSC is similar to other soil-borne diseases that restrict the movement of water and nutrients to soybean leaves, but NSC is marked by stem lesions called cankers that form near nodes and result in wilting and necrosis above the canker. For more information, visit www.cornell.edu and search for “northern stem canker.”

The North Carolina Soybean Producers Association (NCSPA) continues to promote its Weed-Free NC campaign to encourage all farmers to take a zero-tolerance approach to herbicide-resistant weeds. To learn more about best practices to address herbicide resistance and for helpful resources, go to www.WeedFreeNC.com.

Palmer amaranth has considerable potential to reduce yield and increase costs of Ohio soybean production. Ohio State University’s Mark Loux, Ph.D., has led the effort to educate soybean farmers about this weed, determine the distribution and severity of weed populations and give farmers the information they need to manage established weeds. For more information about this research and other production topics, visit the Ohio Soybean Council (OSC) website at www.soyohio.org/soybeanrewards.

Weed management was a conversation topic at the 2015 Penn State Extension Crops Conferences held throughout January and February. These daylong conferences were supported in part by the Pennsylvania Soybean Board (PSB) and gave attendees the opportunity to learn about relevant soybean-production topics such as soil sampling, insect and weed management and crop budgeting. To learn more about these topics, visit www.pasoybean.org.

Virginia Tech recently hired Michael Flessner, Ph.D., as an extension weed science specialist. He will work closely with the Virginia Soybean Board (VSB) to research herbicide-resistant weeds and how to combat them. He also plans to research the use of high-residue cover crops and harvest weed-seed control. Do you have a weed-management issue on your farm? Email flessner@vt.edu. Farmer input will help Flessner determine future research projects.
Managing weeds and herbicide resistance in my fields is a year-round effort. I will keep in mind the following practices and actions that might be appropriate for my farm during each season.*

**I WILL**

Create a plan of action for the coming year, considering available herbicides to control the weed spectrum in each field.

Consider alternatives to implement in case of weather delays.

Attend educational meetings.

Explore new technologies to help reduce herbicide resistance.

**I WILL**

Clean machinery before changing to a different field to prevent weed seed spread.

If possible, harvest the fields with the highest weed counts last to reduce contamination of neighboring fields.

Mow, disk, till, burn, use a herbicide or plant cover crops after harvest to help reduce the growth of weeds.

**I WILL**

Overlay different residual herbicides and cultural practices to reduce chances of weed escapes:

- Pre-emergence
- Post-emergence
- Narrow row spacing
- Scout fields regularly
- Rotate crops

Remove cover crops in a timely manner to prevent weeds from growing before planting.

Remove weeds by hand, if needed.

**I WILL**

Evaluate the effectiveness of my weed-management plan up to this point in the season and make notes for changes to next year’s plan.

Continue to scout, control and remove weeds.

For more information and additional resources, visit [www.TakeActionOnWeeds.com](http://www.TakeActionOnWeeds.com).

*Depending on my location and herbicide resistance.

Brought to you by the soy checkoff.

Take action is supported by BASF, Bayer, DuPont, Monsanto, Syngenta; and corn, cotton, sorghum, soy and wheat organizations. The United Soybean Board neither recommends nor discourages the implementation of any advice contained herein, and is not liable for the use or misuse of the information provided. ©2015 United Soybean Board.