

THE NORTH DAKOTA Soybean GROWER MAGAZINE

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Pollinator Plan Developed

The North Dakota Department of Agriculture (NDDA) has developed the North Dakota Pollinator Plan to

ensure that the state maintains its position as a leader in agriculture while protecting pollinators such as honey bees.

The plan represents a balanced public policy that mitigates risk to honey bees while minimizing the impact of that mitigation on production agriculture. Reducing honey bees' exposure to pesticides while ensuring that farmers can continue using the tools they need to be successful is a main objective of the pollinator plan.

Much of the plan consists of best management practices (BMPs) to increase communication among groups and to decrease the bees' exposure to pesticides. Most of the BMPs are voluntary, however, some of them are state law. The plan contains BMPs for beekeepers, landowner/growers and pesticide users. Open communication is encouraged among the parties.

NDDA is developing an interactive, real-time, web-based map to help facilitate that contact.

The new, interactive bee map, set to be launched this spring, will allow pesticide applicators to designate spray-watch areas so that applicators can be notified when hives move into or out of that area. Applicators will also be able to input the field, chemical and potential spray timeline for upcoming pesticide applications into the system. The system will highlight beekeepers, with hives, that are located within a 2-mile radius. The website can send notifications to beekeepers on behalf of the applicator.

Another feature of the new map will give beekeepers the ability to add, edit, delete or deactivate locations. For example, a beekeeper can go into the system and mark a registered location as being active (blue) or empty (gray). This feature

should give additional clarity to pesticide applicators.

Notifications will be sent when the new map becomes available, and training sessions may be scheduled around the state, depending on interest. Please contact NDDA at 701-328-2231, or email bees@nd.gov for more information about potential training sessions.

NDDA also continues to fund research to determine the factors that affect honey-bee health. The complete North Dakota Pollinator Plan may be found on the NDDA homepage at www.nd.gov/ndda.

— Story by Doug Goebing and Samantha Brunner; photos provided by NDDA



A new pollinator plan aims to minimize problems with applicators and bee populations.



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On the cover

Soybean planting will soon be underway.
—Photo courtesy Wanbaugh Studios

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DEALS

on wheels



As the old credit-card company slogan goes, “membership has its privileges.” That motto certainly holds true for North Dakota Soybean Growers Association (NDSGA) members.

NDSGA members enjoy the benefit of knowing that farmer leaders are working on their behalf, in both Bismarck and in Washington, D.C., on policy issues that affect their freedom to operate. Membership also entitles individuals to either Optimize or TagTeam LCO to treat 100 units of seed or QuickRoots to treat 50 units of seed, \$100 dollars off a pallet or tote of soybeans from several different seed companies, and more.

Because their \$200 investment in a 3-year membership also includes membership in the American Soybean Association (ASA), growers have access to additional benefits, including special pricing for vehicles.

Through its affiliation with the National Biodiesel Board (NBB), ASA members can take advantage of the NBB’s Vehicle Discount Program. This benefit offers ASA members discounts on Ford, Chrysler and General Motors vehicles. The preferred pricing options, combined with current incentives, can add up to thousands of dollars off the manufacturer’s suggested retail price.

Milnor, North Dakota, farmer and NDSGA member Paul Ellefson has looked into utilizing the vehicle discount several times. In some cases, dealers are unaware of the benefit to which members are entitled. In other instances, the sales and discounts exceed what is offered through ASA. It’s still a benefit that he doesn’t ignore.

“It’s something I can use to possibly save money now that I know about it,” Ellefson says.

“Most members don’t remember that they have this discount,” adds Ed Erickson, Jr., an ASA director from Milnor, North Dakota. “Growers have spent the \$200 to become members but don’t realize the discounts they could be entitled to. If I can use membership to save money, I’d do that all day long.”

Because dealerships aren’t always aware of the vehicle discounts available to members, it’s a good idea for members to check the pricing for themselves and to provide documentation before visiting a dealer.

Accessing Vehicle-Discount Pricing Information

- To take advantage of vehicle-discount pricing, you must be an ASA member.
- Log in to the ASA web portal at www.soygrowers.com by utilizing your username and password.
- If you don’t have a username and password, send an email to

membership@soy.org, and that information will be sent to you. A login is required to access the company codes that are needed

to compare vehicle discounts.

- Access the vehicle information by clicking on Membership Benefits under the Belong/Join tab.
- Click the link for the desired manufacturer’s program, including the GM Supplier Discount Program, the Chrysler Affiliate Rewards Program and the Ford Partnership Rewards Program. Each link provides the company code that is necessary to learn more about the program.
- Follow the instructions to access the discounts provided by each manufacturer.

— Story by Daniel Lemke

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Are you doing your part?

We all know that profitability in the agriculture sector does not look very positive for the coming growing season. With the lower commodity prices and relatively high input costs, it may be tempting to make changes; however, it is very important to not significantly reduce important inputs or crop-management tools that could lead to reduced crop health. One of these crop-management tools is controlling weeds and pests. Like many other farmers, we try hard to keep our weeds under control on our farm.

As we look at the future of controlling weeds, we have to know this process cannot start after problems emerge. We have to take proactive control of weeds now. Planning chemical rotations is just as important as planning your crop rotations. We can control weeds by staying ahead of the game. Technologies and processes are improving, but managing the entire crop system is

very important to successfully control weeds on all our farms for the future.

Every past and future plan of action should be heard and shared. As farmers, we need to talk to others in our industry in order to share what plans work and which ones aren't as successful. If we all go into this spring knowing the challenges and successes that others have had, it will only make this control problem more feasible for our operations.

Is your plan in place? Are you taking the extra step? I hope everyone will take action to rotate crops and chemicals in order to have different modes of action for years to come. With positive action, we can all stay ahead of future weed-control options.

I wish everyone a safe and successful spring planting season.



Craig Olson, President North Dakota Soybean Growers Association



Membership Application

To join ASA and the North Dakota Soybean Growers Association, complete and return this application with payment.

Name: _____
Spouse: _____
Date of Birth: _____
Farm/Company Name: _____
Address: _____
City, State, Zip: _____
County: _____
Phone: _____
Cell: _____
Email Address: _____

Occupation (Please check all that apply)
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 Finance Elevator Other

Do you currently grow soybeans?
 Yes No
Soybean Acres: _____ Total Acres Farmed: _____

Do you raise:
 Cattle Hogs Poultry Dairy

How did you hear about NDSGA? (Please circle one)
Recruited in person; Recruited by phone, Magazine;
Internet; Mailing; Radio; Event; Other

3-Year Membership \$200 1-Year Membership \$75
 Check enclosed (please make checks payable to NDSGA)
 Credit Card: Visa / MasterCard / Discover / American Express
Card Number: _____
Expiration Date: ____/____ CVC: _____
Name on Card (Please print): _____
Signature: _____

Mail application with payment to:
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North Dakota Soybean Growers Association Leadership Elected



The North Dakota Soybean Growers Association (NDSGA) directors have elected their executive team to serve the state's soybean farmers for the coming year.

Craig Olson of Colfax was re-elected as president while Horace farmer Ryan Richard will serve again as vice president. The treasurer is Eric Broten of Dazey. Joe Ericson of Wimbledon was elected as secretary.

Olson says that he is looking forward to working with the other farmers on the board to address the challenges that North Dakota soybean farmers are facing, including profitability and environmental concerns.

"Water quality is always going to be an issue," Olson says. "We are always looking for ways to improve soil health and quality because it ties into water quality. We will be looking to see how we can work to solve problems."

Because most farmers don't have the time or expertise to influence issues that impact their operations, Olson says that NDSGA membership gives them the assurance that someone is watching out for them.

"If it wasn't for the association, on a lot of issues like water, transportation and trade, there would be no one watching from the farmer's point of view," Olson says. "It's up to us to help solve issues in ways that farmers want them to be solved."

During the association's annual meeting in February, several pro-



NDSGA officers for the coming year are, left to right, Craig Olson, Colfax, President; Ryan Richard, Horace, Vice President; Joe Ericson, Wimbledon, Secretary; Eric Broten, Dazey, Treasurer.

ducers were re-elected to serve on the board of directors: District 4, Broten; and District 5, Brent Kohls, Mayville. Josh Gackle of Kulm was elected to serve as the director representing District 2. Sam Landman of Northwood was elected to represent District 6.

Ryan Pederson of Rolette was appointed to fill the unexpired District 8 term on the board that was previously held by Dennis Renner of Mandan. Edwin Erickson, Jr. of Milnor and Monte Peterson of Valley City will continue to serve as North Dakota's directors on the American Soybean Association. Greg Gussiaas, Carrington, is the DuPont Young Leader on the board of directors. Matt Swenson of Kindred is an at-large director on the board.

—Story and photo by staff

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The Asgrow brand will offer the largest selection of Roundup Ready 2 Xtend soybean products for planting in 2016, with 25 products spanning all eight maturity groups. Included will be eight products for North Dakota farmers. In addition, the new products will provide resistance packages against nematodes and phytophthora root rot.

Despite challenging growing conditions in North Dakota last year, Asgrow soybean products demonstrated strong performance. For 2016, the Asgrow lineup features the latest genetics that combine high yield potential with defensive traits to help farmers continue to maximize performance.

For example, Jerad Liedberg, technical agronomist for the Asgrow DEKALB® brands in North Dakota, cited two leading Asgrow products designed to stand up to disease pressure:

- Asgrow AG0134 Brand – Outstanding yield potential with good overall agronomics, including the Rps1c gene for phytophthora resistance. Its excellent emergence and no-till ratings make it a perfect choice for the northern soybean producer.
- Asgrow AG0835 Brand – Can offer consistent yield potential, with an above average rating on phytophthora tolerance and white mold.

“Our Asgrow soybean product lineup has proven products with good stress tolerance in cool or warm weather, wet or dry,” said Liedberg. “They have a good track record of emergence and strong stand establishment in a wide range of environments.”



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Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Roundup Ready 2 Xtend Soybeans contains genes that confer tolerance to glyphosate and dicamba. Glyphosate herbicides will kill crops that are not tolerant to glyphosate. Dicamba will kill crops that are not tolerant to dicamba. Contact your Monsanto dealer or refer to Monsanto's Technology Use Guide for recommended Roundup Ready® Xtend Crop System weed control programs. Asgrow and the A Design®, Asgrow®, DEKALB®, Genuity®, Roundup®, Roundup Ready®, Roundup Ready 2 Yield® and Roundup Ready 2 Xtend™ are registered trademarks of Monsanto Technology LLC. All other trademarks are the property of their respective owners. ©2016 Monsanto Company.



Dear valued soybean producers,

“The farmer has to be an optimist or he wouldn’t still be a farmer.” Will Rogers (American cowboy and entertainer)

Farmers in Will Rogers’ era—the 1920s and 1930s—experienced some difficult years. They did not have the resources and tools that are available today, such as technology, modern equipment, new varieties and advanced management practices. As determined producers and entrepreneurs, they found a way to persevere until the cycle changed and times were good again. History has shown that the difficult years and the banner years are cyclical. The last several years have been some of the best in our industry’s history; unfortunately, we now find ourselves in a period of lower commodity prices and tighter margins.

At the North Dakota Soybean Council (NDSC) we understand the predictably unpredictable nature of cycles and change. Building on our strategic advancements from the last few years, we are positioned to help achieve maximum profitability for North Dakota soy. We know that the next few years will be more challenging, but there will also be good potential for development and opportunity. To this end, our focus for the next year will be to

- Re-visit our goals and strategies to ensure that we are well positioned to deliver maximum value to you;
- Keep our eyes on what matters the most, focusing on the fundamentals of good business;
- Invest in programs that have the greatest potential to open new markets for our commodity, thus ensuring that our soybeans always have an end user;

- Promote the quality of North Dakota soy for export markets, animal agriculture and human consumption;
- Optimize farmer profitability through prudent investments in soybean research;
- International marketing and educational programs that will benefit you;
- Provide a variety of information and insight about how to manage your operations to the best of your ability in order to drive productivity, profitability and sustainability;
- Discover strategic, out-of-the-box solutions for the opportunities that lie ahead;
- Work hard to create domestic and international markets for North Dakota soy; and
- Through numerous outreach efforts and engagement with you, our industry partners and influencers, we will work to positively affect your competitiveness and prosperity.

Our success as a commodity has always been tied to our ability to adapt, change and innovate according to market and environmental conditions. This next year is no exception. As you initiate another planting season, know that the NDSC is working right beside you in order to ensure the continued relevance, success and profitability of our commodity. We’re optimistic that our future remains bright. Together, we will, once again, return to better days.

I wish you a safe and productive planting season!



Diana Beitelspacher,
Chief Executive Officer
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New Videos

The North Dakota Soybean Council is proud to introduce two new short videos highlighting the importance of international marketing and how the soybean checkoff benefits soybean farmers of North Dakota. Watch today and learn more.



Our YouTube channel address is: <https://www.youtube.com/ND Soybean Council>

International Marketing Video



The Value of the Soybean Checkoff Video





North Dakota Soybean Council Elects Executive Officers

Executive board officers were elected during the North Dakota Soybean Council's (NDSC) board meeting March 30, 2016. Tyler Speich of Milnor was re-elected chairman of the board. Speich represents soybean farmers in Ransom and Sargent Counties. Along with his father and brother, Tyler raises soybean, corn, alfalfa, wheat, and sunflowers. The Speichs also operate a cow/calf operation.

The board re-elected Mike Appert of Hazelton as vice chairman. He represents soybean farmers in 21 counties in southwest North Dakota. Appert raises soybeans, corn, sunflowers and pinto beans using no-till as his primary farming practice.

Joe Morken of Casselton was elected secretary. He serves soybean farmers in Cass County. Along with his parents and wife, Morken raises soybeans, small grains and sugar beets on their third generation farm.

Northwood soybean producer Troy Uglen was re-elected treasurer. Uglen represents Grand Forks and Traill counties. He grows soybeans, corn, wheat, dry peas, black turtle beans and spearmint.

—Story and photo by Staff



From left to right: Secretary Joe Morken, Treasurer Troy Uglen, Vice Chairman Mike Appert and Chairman Tyler Speich.

Soybean Producers Elect Four Directors to the North Dakota Soybean Council

North Dakota soybean farmers recently elected four directors to the North Dakota Soybean Council (NDSC). Each director will serve a 3-year term.

Mike Langseth, a soybean producer from Barney was elected to represent Richland County. Mike and his father raise corn and soybeans. Langseth is a member of the North Dakota Soybean Growers Association and the North Dakota Corn Growers Association, along with the Richland County Crop Improvement Association. He holds a bachelor's degree in journalism from the University of Minnesota, and is currently working on his master's degree in soil science from North Dakota State University.

Valley City soybean farmer Matt Gast was elected to represent Barnes County. Along with his brother-in-law and father-in-law, Gast raises soybeans and corn on his family farm. He graduated from Minnesota State University Moorhead with a bachelor's degree in construction management. Along with his wife and children, he enjoys camping, spending time at the lake and vacationing to warm locations.

Austin Langley, a soybean farmer from Warwick was elected to represent Eddy, Foster and Wells Counties. He grows soybeans, edible beans, wheat, barley, alfalfa and corn along with his father and uncles on their no-till farm. His family also operates a cow/calf

operation. Langley is a member of the National Agri-Marketing Association, Farmers Union and 4-H. He is also active in his local church, Winchester Arms Collectors Association and the Safe Alternatives for Abused Families (SAFE) shelter.

Troy Uglen of Northwood was re-elected and represents District 7, which consists of Grand Forks and Traill counties. Uglen farms soybeans, corn, wheat, dry peas,

black turtle beans and spearmint. He's been involved with the Northwood City Council, Northwood Ambulance and Northwood Fire Department. He has been a member of NDSC's Communication Committee for several years and was recently appointed to chair NDSC's Research Committee. He has also been a member of the Outstanding Farmers of America.

—Story and photo by Staff



New NDSC board members, left to right: Matt Gast, Mike Langseth and Austin Langley.



THANK YOU!

At its March 2016 board meeting, the North Dakota Soybean Council (NDSC) bid farewell to veteran board members (from left to right): Rick Albrecht, Wimbledon; Charles Linderman, Carrington; and Scott Gauslow, Colfax. NDSC sincerely thanks these three men for their many years of dedication and service to North Dakota's soybean industry. An appreciation cake was presented by CEO Diana Beitelspacher (second from left) on behalf of NDSC.

New Chair Focuses on Profit Opportunities for Soybean Farmers

Jared Hagert, a soybean farmer from Emerado, North Dakota, has been elected by his fellow United

Soybean Board (USB) farmer-directors to lead the national soy checkoff in 2016. Hagert will be the first chair to implement the board's new Long-Range Strategic Plan which emphasizes soybean innovation for farmers' profit opportunities, including continued high-oleic development, soybean-meal-quality improvements and technological advances to maximize on-farm

profitability.

"The best use of checkoff funds is to invest in programs that provide value back to all U.S. soybean farmers," Hagert says. "To maximize profit opportunities for our farmers, we need to look beyond the bushel and focus on our end users. Meeting their needs will help to drive demand for our crop now and in the future."



USB Chairman Jared Hagert, far left, and his family – wife Brandie, mother Roberta and father Curtis at Commodity Classic in New Orleans, La. March 3.

The following farmer-leaders will be joining Hagert as executive committee members who will oversee USB's profit-building programs:

- **USB Vice Chair:** John Motter, Jenera, Ohio
- **USB Secretary and Oil Target Area Coordinator:** Jimmy Sneed, Hernando, Mississippi
- **USB Treasurer:** Delbert Christensen, Audubon, Iowa
- **USB Past Chair:** Bob Haselwood, Berryton, Kansas
- **USB Meal Target Area Coordinator:** Mike Beard, Frankfort, Indiana
- **USB Sustainability Target Area Coordinator:** Nancy Kavazanjan, Beaver Dam, Wisconsin
- **USB Supply Action Team Lead:** Bill Beam, Elverson, Pennsylvania
- **USB Marketplace Action Team Lead:** John Dodson, Halls, Tennessee

- **USB Demand Action Team Lead:** Lewis Bainbridge, Ethan, South Dakota
- **USB Audit and Evaluation Committee Chair:** Keith Tapp, Sebree, Kentucky

The USB's 70 farmer-directors oversee the soy-checkoff investments to maximize profit opportunities for all U.S. soybean farmers. These volunteers invest and leverage checkoff funds to increase the value of U.S. soybean meal and oil, to ensure U.S. soybean farmers and their customers have the freedom and infrastructure to operate, and to meet the needs of U.S. soy's customers. As stipulated in the federal Soybean Promotion, Research and Consumer Information Act, the USDA Agricultural Marketing Service has oversight responsibilities for the USB and the soy checkoff.

For more information about the United Soybean Board, visit www.unitedsoybean.org

—Story by United Soybean Board, photo by Harvey Morken



Planting Safely: Five Tips to Avoid Accidents

No one plans to have an accident on the farm. However, large equipment and machinery, livestock and chemicals from pesticides to lubricants can all lead to accidents if they are not handled properly. Some studies suggest that tractors, one of the most common implements used on the farm, account for nearly half of all on-farm accidents and the majority of fatalities.

During the spring planting season, putting safety ahead of the excitement about another year's growing season can be easier said than done, but safety is necessary.

Some of the most common tractor activities that result in fatalities are overturning as well as transporting equipment on or off highways, according to the University of Missouri Cooperative Extension Service and Missouri's Show-Me Farm Safety program.

The following tips from the University of Missouri Extension can help prevent these accidents.

1. Reduce speed when turning or crossing slopes and when on rough, slick or muddy surfaces

Slow down before making any turn. Centrifugal force is a major cause of tractor upsets. The centrifugal force tries to keep the tractor going in a straight line. As you double the tractor's speed while it is turning, the danger of upsetting is increased four times.

Reduce speed when turning with a loader. As you turn with a raised loader, you increase the possibility of a tractor overturn. Keep the loader as low as possible, and watch for uneven ground and obstacles, including ditches, holes and rocks, that might cause an upset.

2. Watch where you are going, especially at row ends, on roads and around trees

When coming to the end of a row, slow down. Be alert for fence rows, and make as wide a turn

as possible. If you plan to apply a single brake in the direction of the turn, only do so at a very slow speed. Quick, short, brake-assisted turns can cause upsets.

When operating on highways, tractor operators must follow all rules of the road.

3. Where possible, avoid operating the tractor near ditches, embankments and holes

Avoid holes and depressions that are likely to cause a sideways upset. Reduce the speed to minimize the possibility of a sideways upset. To ensure safety around ditches and river embankments, just stay away. If you must operate near a ditch or riverbank, stay as far from the ditch as it is deep. When operating around a ditch, look ahead for holes, gullies and washouts.

4. Hitch only to the drawbar and hitch points that are recommended by the tractor's manufacturer

Hitching above the normal drawbar height may cause a tractor to tip backwards. Any time you are pulling a load with a tractor, the load is trying to pull the tractor backwards. The tractor tries to pivot around the point where the rear wheels touch the ground. When the tractor's hitch point is raised, the chance for a backward upset greatly increases. Always hitch to the drawbar, and keep it as low as possible.

5. Show your SMV

Displaying a slow-moving vehicle (SMV) emblem reminds other motorists that the vehicle ahead of them may be moving far slower than the posted speed limit and that extra caution is needed.

—Story by the United Soybean Board, photo by Greg Wanbaugh.



Strategies for Profitable Soybean Production

The NDSU Extension Service's projected crop budgets indicate challenges in generating a positive return to

labor and management with soybeans in 2016. With conservative market-price projections and difficulty with reducing costs, the best method to make money with soybeans is by increasing yield. A basic strategy is as follows:

- 1) start with high yield potential: variety selection, and adequate plant establishment and nutrition; and
- 2) enhance plant protection: manage weeds, disease and insects.

The main factors for **variety selection** include yield, maturity, herbicide-tolerance traits, disease resistance, soybean cyst nematode resistance, iron-chlorosis tolerance and market opportunities. NDSU Extension Service has published the *ND Soybean Variety Trial Results for 2015 and Selection Guide* available at your County Extension office.

The current listing of yield comparisons by percentage for selected soybean **plant-establishment** factors based on NDSU trials conducted from 1999-2015 (The

italicized factor is recommended versus the alternative factor.) is as follows:

- Yield *with reduced-till systems* (no-till, strip till and direct seeded) was 4 percent greater than conventional tillage.
- *Soybean following wheat* yielded 5 percent more soybeans as prior crop.
- The *early planted* soybean (last week in April through the first week in May) yield was 9 percent more than the mid-May planted soybeans.

- *Planting rates of 150,000 to 175,000 pure live seeds (pls)/acre* yielded 6 percent more than planting rates of 100,000 to 130,000 pls/acre.
- Yield with *intermediate row spacing* (14 to 21 inches) was 3 percent greater than wide rows (28 to 30 inches).
- Use of *fungicide-treated seed* provided yield 6 percent more than untreated seed.
- *Weed control starting at the planting time* provided yield with 5 percent more post-emergence weed control initiated when weeds were 2- to 4-inches tall.

“ The best method to make money with soybeans is by increasing yield. ”

General soybean **plant nutrition** recommendations are as follows:

- Do not apply fertilizer nitrogen. Use bacterial seed inoculant on fields without prior soybean history, and consider as normal practice for all soybean fields.
- Apply phosphorus and potassium on soils with test levels less than medium.
- A yield response is unlikely with other secondary or micro nutrients.

For more information, NDSU has several publications available through your local County Extension office or online.

An NDSU app is also available to manage all three pest areas: www.ndsu.edu/crops.

—Story and photo by Greg Endres, NDSU Extension



Challenging market conditions increase the need for soybean farmers to be as productive as possible.



FUSARIUM in those ROOTS

Most soybean growers have heard of Fusarium root rot, a common root disease in the upper Midwest.

Fusarium is a group of fungi that attack a wide range of crop plants, and there are many species in this group. Fusarium head blight of wheat, for example, is one of the most important wheat and barley diseases in the region. In soybeans, we find about 8 different species of Fusarium in the roots of our area. Some are pathogens, and we are not sure what others do in the roots.

Recently, for example, NDSU research showed that *Fusarium tricinctum* is a serious pathogen in this area; at high levels in the soil, it could kill soybean seedlings.

One species that we have been conducting research on for some time is *Fusarium solani*, a very common fungus in soybean roots. When we examined several of this species' isolates/individual strains from different fields under a microscope, they all looked the same, but with DNA analysis, we found that this very diverse group likely consists of multiple species and is now considered a species complex.

This group is the one that was once thought to be responsible for soybeans' sudden death syndrome (SDS), which has become very important in many soybean-producing states. Now, we recognize that SDS is caused by several distinct species of *Fusarium*, not *F. solani*.

Fusarium root rot is a disease that NDSU scientists have been studying since the early 1990s when the North Dakota and Minnesota soybean councils funded research to examine root rot fungi in the two

“Our early research showed the level of damage that this fungus could do.”



Fusarium root rot: infected plant on the left and a healthy plant on the right.

states. At that time, we discovered that this area's soybean roots had many species of *Fusarium* growing in them.

Our early research determined that *F. solani* was one of the principal root-rot fungi in this region because pathogenicity tests, both in the greenhouse and in the field, showed the level of damage that this fungus could do to soybean roots. Furthermore, it was demonstrated that the fungus could also cause a pre-emergence damping-off of soybean seedlings when there were high fungus levels in the soil.

Recently, research at NDSU showed that two dominant strains of this fungus are commonly associated with the region's soybean roots: FSSC5 and FSSC11. FSSC stands for *Fusarium solani* species complex. This research was just published in a scientific journal. The study's important finding was that FSSC5 was either non-pathogenic or weakly pathogenic under moderate soil temperatures, whereas FSSC11 was an aggressive soybean pathogen.

There were also other differences between these strains; FSSC5 grew at higher temperatures than FSSC11. These two strains of *F. solani* might be two different species, but the fungal taxonomists will have to decide that.

Why is this information about these *F. solani* strains important? Both strains of *F. solani* (FSSC5 and FSSC11) are commonly associated with soybean roots, however, only FSSC11 causes serious root rot.

One way that plant pathologists might be able to tell growers whether they have a problem with *F. solani* root rot is if they can differentiate the non-pathogenic FSSC5 from FSSC11 and, subsequently, quantify the amount of pathogenic FSSC11 in the soil, in other words determining the inoculum density in the soil.

To further assist extension plant pathologists with diagnosing a problem, DNA-based detection methods are currently being developed at NDSU in order to specifically detect pathogenic FSSC11 in both soil and soybean roots. The results from this research will not only help to further understand the disease, but also to find ways to manage the root-rot problems in soybeans.

Fusarium root rot can be a serious disease not only for soybeans, but also for other crops, such as dry bean, lentil and peas. Scientists are still trying to understand all the factors involved with the development of root rot in growers' fields.

—Story and photo by Dr. Berlin Nelson, Jr., NDSU



How Important are Soybean Seed Treatments?

It is important for growers to continually examine their input costs, especially when prices are low. This article helps growers to evaluate the costs and benefits of different seed-treatment types for pest management.

Fungicide seed treatments

Fungicide seed treatments are a very good investment. Fungicide seed treatments target the most common soybean pests, the ones that cause root rots. Second, fungicide seed treatments are the least expensive type of seed treatment. As a result, you are more likely to get your investment back and then some.

Understanding the pathogens

There is no field in the state that doesn't have some level of Fusarium, Rhizoctonia, Phytophthora or Pythium. Fusarium and Rhizoctonia are fungi. These fungi have many species (AG groups) that can infect many crops and can occur under a variety of environmental conditions. Phytophthora and Pythium are in a different group of organisms called Oomycetes. While there is some variability with Pythium, the Phytophthora pathogen that infects soybeans (*Phytophthora sojae*) is very specific to soybeans. This pathogen group has swimming spores, so they NEED water to infect soybeans and to damage the crop.

Understanding fungicide seed treatments

For a fungicide seed treatment to be most effective, it must work on both fungi and oomycete pathogens. However, most chemicals do not work well on both pathogens. To compensate, many common seed treatments are actually a combination of chemicals that are packaged together for broad-spectrum control. Using a broad-spectrum product is critical to protect soybeans from the diversity of pathogens to which they are exposed in the soil, and the cost is still low.

Understanding risk factors

Many factors compound the risk of yield loss due to root rots, therefore, increasing the likelihood that a fungicide seed treatment will be a good investment. Short crop rotations; a history of disease pressure; a long history of soybean production; varieties with limited genetic resistance; heavy soils; and cool, wet soils after planting all increase the risk of root-rot damage.

Insecticide seed treatments

Soybean insecticide seed treatments belong to a group of insecticides called neonicotinoids (IRAC Group 4a). These chemicals are absorbed by the plant roots and then translocated to the leaves where it must be ingested by the

insect to kill it. Neonicotinoid seed treatments are only active against insect pests for a narrow window of 3 weeks after planting. However, the major insect pests for North Dakota soybeans are active after this window of protection. For example, the soybean aphid is typically present in soybean fields during the reproductive plant stages in late July through August. Neonicotinoid seed treatments are not effective for controlling soybean aphids that late in the season. Research funded by the North Dakota Soybean Council found that utilizing a neonicotinoid seed treatment did not keep soybean aphids from reaching the economic threshold level of 250 or more aphids per plant; there was no yield advantage for using a neonicotinoid seed treatment versus no neonicotinoid seed treatment when soybean aphids were controlled by utilizing foliar insecticides at the economic threshold level.

Soil insects, such as wireworms or seed-corn maggots, that feed on and injure the seedlings' roots can be controlled with neonicotinoid seed treatments. Any fields coming out of CRP or grassland are at high risk for wireworm damage. Using green cover crops or animal manure as well as having cool, wet springs favors the infestations of seed-corn maggots. Bean-leaf beetles are not common in North Dakota; however, if you have high densities of these beetles, a neonicotinoid seed treatment will only protect against early season defoliation.

Unless you have one of the high-risk situations mentioned previously, using a neonicotinoid seed treatment is not recommended to manage insect pests for soybeans in North Dakota. There are additional research data that show negative impacts from neonicotinoid seed treatment on beneficial insects

that naturally control the soybean's insect pests. Because neonicotinoids are highly soluble in water, the toxin's off-target movement can also move toxins beyond the field border with drainage and runoff, and can negatively impact the environment. While planting, toxic dust can rub off the neonicotinoid-treated seed and can then be carried by the winds to blooming weeds at the field borders, which can negatively impact pollinators (honey bees and native bees).

Timely scouting for insect pests and applying foliar insecticides at economic thresholds are the best way to manage the soybean's insect pests. Asking for soybean seed that does not have insecticide seed treatments will reduce the input costs.

Nematicide seed treatments

Nematicide seed treatments are relatively new for soybean production. They tend to be relatively expensive and are marketed primarily for Soybean Cyst Nematode (SCN). Nematicide seed-treatment products are very diverse, ranging from biological to chemical products. The results of recent seed-treatment trials that were funded by the North Dakota Soybean Council were generally inconclusive, however, other data exist to show that these products have negatively impacted SCN. Nematicide seed treatments may be beneficial in some fields or field areas, with high levels of SCN, but they are not widely recommended. Keep in mind that nematicide seed treatments are not meant to be a replacement for other management tools; genetic resistance and crop rotation are critical for managing SCN.

—Story by Dr. Sam Markell and Dr. Janet Knodel, NDSU



Managing Marginal Lands

It is clear that farming is a business. Farmers evaluate their entire farm with business terms, but are farmers thinking about their acres as individual employees? Each acre is, essentially, an employee

being paid through input costs to produce a crop contributing to the profitability of the farm business.

There are acres on every farm, and often in every field, that are not doing their job. These acres may be ones that often drown-out; are affected by salts or have very light, sandy soil. In any of these cases, the acres should be fired from cash-crop production. Not only do they not contribute, but they also negate the profit from other acres. Unproductive acres can cost the farm the profit from 5, 10, 15 or more acres for each unproductive acre.

The grower should identify the acres that are stealing profit.

This process can be as simple as hand drawing them on FSA maps or using yield maps to query any acre that is producing less than 30 percent of the field average. These acres should be fired from the job of producing the cash crop and should be put to work in other less-expensive ways. Growers should think of it in the same way as a hired worker who does not have the experience or skills to run the drill, planter or combine.

Put these marginal acres to work growing a secondary crop. For example, the salt-affected acre could be utilized to grow barley. Because the yield will be low, keep expenses at a minimum. Do not apply fertilizer, seed when time allows after the cash-crop acres have been seeded, and manage the barley to

control weeds and use water. The grower may not harvest the barley but will cut losses. The grower will likely have to spend more time managing these acres and doing some remediation which, again, is very similar to managing a new or unproductive employee. The land cost is still there, but it is a way to reduce production costs for each acre by hundreds of dollars.

If 10 percent of a farm's acres are unproductive, that farm can save thousands and still have the same number of bushels at the end of the year. The farmer should fire the marginal acres from the cash-crop business and put them to work in sanitation.

—Story and photo by Lee Bries



Unproductive acres need proper management.

Strategies for Managing Waterhemp

If waterhemp is the primary weed in the field, it may indicate that there's a herbicide-resistance issue. This is true with any weed, including Common and or Giant Ragweed, Marestalk or Kochia. It is a critical component of any weed-management strategy to understand the dynamics of the weed seed bank in each field and also within the region. With years of conventional herbicide practices, along with wind and water dispersing the weed seeds, each field or field portion should have a diverse population of weed species. If a grower's current weed-control practice only has weeds known to be glyphosate resistant, there's a dramatic need to change control systems. Knowledge about the weed seed bank in single or multiple fields requires the ability to properly identify weed seedlings as well as maturing plants.

The name Waterhemp given to this weed is often confusing not only for growers, but also for many people who deal with the weed. If a weed is surviving a herbicide program and it looks like a pigweed, it is a Waterhemp or Palmer pigweed. These weeds have developed resistance to many herbicides and now glyphosate. At this point, Red Root Pigweed has not been resistant.

Managing waterhemp should start this year even if growers don't believe that there is a problem. Waterhemp has also become an issue outside the Red River Valley, both to the east and west. They become a problem through selection pressure, pollen drift and seed dispersal. Seed dispersal can be caused by migrating birds, water, wind, the harvesting process and tillage equipment.

Many weed scientists, agronomists and crop consultants

recommend using multiple effective Modes of Action (MOA) with pre-plant, pre-emerge or early post-emerge programs, along with combinations in the tank post emergence, depending on the crop being grown. There is considerable emphasis on new genetic traits that allow growers to use stacked herbicides in order to control resistant weeds in soybeans. If a grower's crop has resistance to an existing MOA, only adding a new MOA to the tank mix doesn't qualify as good weed management. In southern Minnesota, there's a case of waterhemp with resistance to multiple MOAs, so only a couple options still exist.

What is the best strategy for waterhemp? Start or continue an aggressive management approach for weed resistance. There are several methods, but one thing is clear: growers cannot solve resistance issues by only using chemicals. Non-chemical measures need to be added to the system. Cover crops

and crop diversification can be added tools, but the strategies need to fit with the residual herbicides. There's plenty of research that supports how, in the long term, increased management is less expensive than crop loss from weeds. If resistance management is overwhelming, seek advice from trusted advisors. Developing an area grower group that is similar to marketing or farm-management groups would also be beneficial because weeds can move regionally.

—Story and photo by Greg LaPlante



Developing pressure requires a change in management.

The Threat is Real

Herbicide resistance is growing, and demands change for management practices.

Herbicide-resistant weeds are not new, but the affliction is growing. The first reported instance of weeds becoming resistant was field bindweed, which was identified to be triazine-resistant common groundsel in the 1960s.

Today, according to the International Survey of Herbicide Resistant Weeds, there are 464 unique cases of herbicide-resistant weeds globally among 249 species. Weeds have developed resistance to 22 herbicide sites of action and to 159 different herbicides. Herbicide-resistant weeds have been reported in 86 crops in 66 countries.

University of Arkansas weed-resistance expert Dr. Jason Norsworthy says the rate of glyphosate

resistance continues to grow and spread. By 2020, almost all U.S. row-crop acreage, more than 164 million acres, will be infested with glyphosate-resistant weeds.

Farmer survey information showed that, in 2010, about 7 percent of farmers dealt with resistant waterhemp. By 2014, that number jumped to over 24 percent. Over 28 percent of farmers contended with resistant marehail in 2014, compared to just 13 percent in 2010. Similar resistance growth patterns were seen for ragweed, kochia and the feared Palmer amaranth.

A statement by American Soybean Association director Eric Maupin, who farms in Tennessee, puts the threat of herbicide

resistance in a chilling perspective. “We are quickly approaching the day when we will be unable to grow soybeans in parts of the U.S. because there are no effective herbicide options,” Maupin said.

Glyphosate reliance Norsworthy likens the discovery of glyphosate to that of penicillin, which was an extremely important development with tremendous effectiveness. Overreliance on that treatment led to reduced effectiveness.

“Resistance develops when we plant single-trait seed, use a single herbicide and maybe spray once,” Norsworthy says. “If you lack diversity, it (resistance) will develop. Simplicity has a cost. If we think another simple solution is coming, we’re

wrong because there is nothing.”

“We got here because we were doing the same thing over and over because it was effective and easy,” adds crop consultant Greg LaPlante. “The easy button is gone.”

Growers are seeing more resistance in marehail, waterhemp, kochia and ragweed. Glyphosate-resistant Palmer amaranth is present in 30 states, including three known populations in South Dakota. So far, North Dakota and Minnesota are among the few states that do not have resistant Palmer amaranth. Norsworthy believes that it’s just a matter of time.

“It’s likely that in the next 5 years, you’ll have it in North Dakota,” he warns.

Game Changer

LaPlante says that resistance can become a problem in fields quite quickly. A single weed that escapes can produce thousands of seeds. The next year, if treatment methods don’t change, the population of weeds with resistance to that method can grow, but still not be enough to cause alarm for farmers. Dozens of plants producing thousands of seeds is a major problem waiting to happen. By the third year, if practices don’t change, the number of weeds growing in the field that have resistance can be



Glyphosate-resistant Palmer amaranth.



Dr. Jason Norsworthy.

overwhelming.

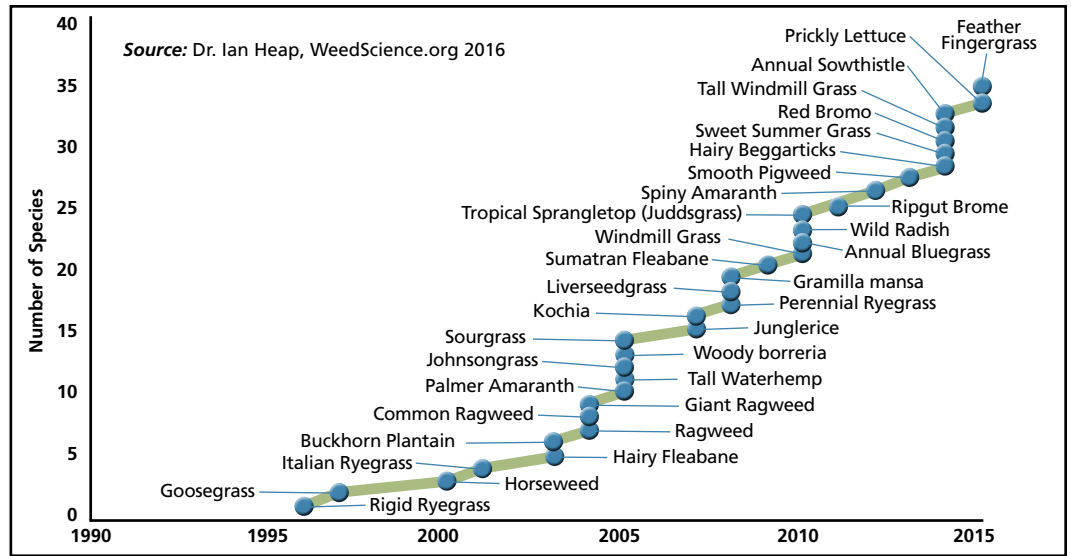
To compound issues with glyphosate resistance, Norsworthy says that farmers and scientists are now seeing weeds with two-, three- and even four-way resistance. “Stacked resistance is a game changer.”

Glyphosate resistance has resulted in increased governmental regulation as evidenced by the new Enlist Duo label which contains herbicide-resistance language. On the label, the Environmental Protection Agency (EPA) says that herbicide failures must be monitored and reported. The label mandates which nozzles must be used and stipulates tank-mixture requirements. Product registration is conditional and expires in 4 or 5 years, based on the number of acres planted.

A delicate balance also exists between resistance management and the required buffer areas. Some herbicides require buffers between application areas, and susceptible vegetation or waterways. Those unsprayed areas can be problematic because buffer and border control is an important component of weed management.

Develop a Plan

While glyphosate resistance is growing, weed control is still possible, if not more complicated. Experts say that successful management involves knowing



Increase in glyphosate-resistant weeds worldwide.

what weeds are present in the field and developing a plan to treat them. That plan needs to include multiple sites of action.

Experts advise farmers to start clean and to stay clean, which means having no weeds at planting and then overlaying residual herbicides. Norsworthy says that a good rule is to apply residual herbicides every 2-3 weeks through canopy formation using multiple effective modes of action. He also says that a quick crop canopy is an effective method for weed control.

Norsworthy also advocates flagging the technology. Flags marking which herbicide-tolerant seed varieties are planted in certain areas of the field can help to ensure that correct modes of action are

used on those crops, reducing the chances of inadvertently spraying fields with the wrong herbicide.

The weed-management process is becoming more complex, and growers may also incur additional costs. In the long run, it is still cheaper than losing entire fields to out-of-control weeds.

“It’s most expensive when fields are overrun and farmers take a large yield hit,” says LaPlante. “The cost of a herbicide program is much higher to address a problem than it is to control weeds in the first place.”

Multiple Solutions

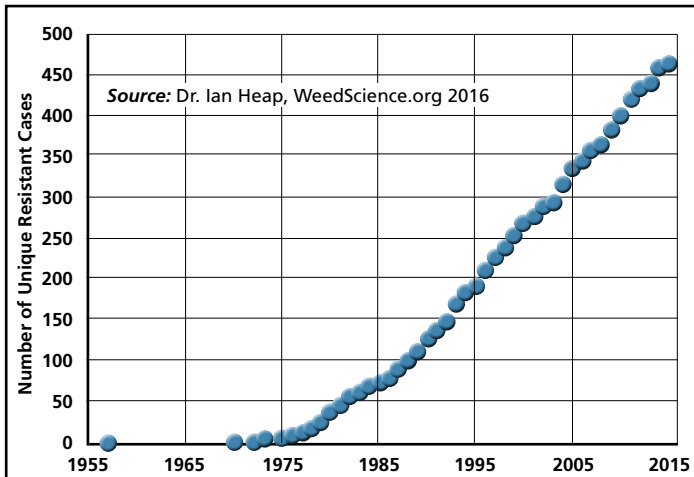
Weed management involves more than herbicides. Norsworthy encourages farmers to integrate

both chemical and non-chemical solutions. Tillage practices, row spacing and seed populations can help with weed control and should be considered.

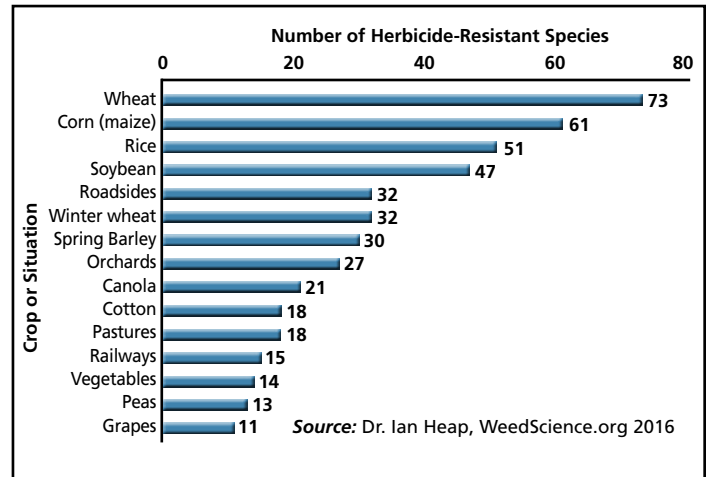
“The solution to resistance may not come from a jug,” Norsworthy contends. “We won’t spray our way out of this problem.”

Norsworthy explains that, once a product such as glyphosate is lost because of resistance, it’s gone. The genes that are resistant to glyphosate will remain in the plant’s genetic code. It’s important that glyphosate and other technologies are stewarded to maintain their effectiveness and availability.

—Story by Daniel Lemke, Graphics courtesy of University of Arkansas



Global increase in unique resistant cases.



Number of herbicide-resistant species by crop.

Protecting Current Weed-Management Technologies

Developing new, innovative weed-control products is a long and difficult process. New products can take

years and significant financial investment before they're ready for market. While new products are unveiled almost seasonally, the last new mode of action was developed nearly 15 years ago.

Because no new magic formula is on the horizon and regardless of their company affiliation, most industry representatives stress the need to steward the products that are currently available to farmers. That focus on stewardship includes protecting new herbicides that are

being developed as well as tried-and-true technologies.

"We have a commitment to responsible commercialization of the Enlist Weed Control System to sustain it as a tool long term," says Dow AgroSciences Enlist Field Services Leader Jonathan Siebert.

Dow AgroSciences has developed a management resource called Enlist Ahead to help growers and applicators use the weed-control system responsibly. The system includes management recommen-

dations and resources; education and training; as well as new technologies, including improved spray nozzles.

"Herbicides and herbicide sites

of action are a finite resource," contends Bret Miller, technical development lead for Syngenta. "Weeds will continue to evolve resistance, so we need to use herbicides in an effective and sustainable way."

Miller recommends using multiple effective sites of action



Matt Moore

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“Herbicides and herbicide sites of action are a finite resource.”

—Bret Miller

with overlapping effectiveness in a weed-management system. He says that other diversified practices, such as tillage, cover crops, crop rotation and row spacing, can be effective to maximize weed management.

Monsanto’s herbicide-resistance management plan includes education and information, evaluation, reporting, best-management practices, and field detection and remediation.

“We are working to make sure our products are stewarded,” says Susan Curvey, technical development manager for Monsanto. “That is really important.”

Curvey explains that Monsanto

is developing new, next-generation chemistries. The corporation is also working with multiple companies to develop new sites of action. Parallel research is being done with both seed and new weed-control products in order to get them to the market faster.

Liberty herbicide uses glufosinate, a nitrogen metabolism inhibitor, as its mode of action. Bayer Seed Technology Manager Matt Moore says that there are no known resistances to Liberty.

“With new chemical developments lacking, proper stewardship of current chemistries is more important than ever,” explains Moore.

Bayer CropScience has developed a S.T.O.P. Weeds with Liberty program to help simplify applications while maximizing control. S.T.O.P. represents starting with clean fields and keeping them clean; targeting weeds under 3 inches tall because they are easier to control; optimizing coverage by using the correct rate, water volume, and droplet size; and pairing with residual herbicides that offer multiple sites of action for pre- and post-emergent weed control.

Researchers and industry representatives agree that overreliance on a single product will lead to resistance problems. Crop and treatment diversity, along with the careful stewardship of products, is key to managing weeds while keeping the technologies effective and available.

“None of these technologies are silver bullets,” Siebert adds. “New technologies are just an additional tool.”

—Story and photos by Daniel Lemke



Susan Curvey

Best Management Practices for Herbicide Resistance

1. Understand the biology of the weeds that are present.
2. Use a diversified approach for weed management. Focus on preventing weed-seed production and reducing the number of weed seeds in the soil seedbank.
3. Plant into weed-free fields; then, keep fields as weed-free as possible.
4. Plant weed-free crop seed.
5. Scout fields routinely.
6. Use multiple herbicide modes of action (MOAs) that are effective against the most troublesome weeds or those weeds that are most prone to herbicide resistance.
7. Apply the labeled herbicide rate to weeds at recommended weed sizes.
8. Emphasize cultural practices that suppress weeds by using crop competitiveness.
9. Use mechanical and biological management practices, where appropriate.
10. Prevent field-to-field and within-field movement of the weed seed or the vegetative reproductive structures.
11. Manage weed seed at harvest and after harvest to prevent a buildup of the weed seedbank.
12. Prevent an influx of weeds into the field by managing the field borders.

—Courtesy Weed Science Society of America



Johnathan Siebert



Information to SHARE

Farmers utilize tremendous amounts of information for their operations every year. From yield results and

fertilizer data to seed-population statistics, farmers generate and gather vast amounts of information that they can use to make decisions for future growing seasons.

Most farmers are very independent and are rightfully protective of their farm's information. Sometimes, it is in their best interest to share.

The USDA's National Agricultural Statistics Service (NASS) conducts multiple surveys every year, including data surveys that are sent after harvest. That yield information, which is gathered by the county, is then used in a variety of ways, including by the Farm Service Agency (FSA) and Risk Management Agency (RMA) to run farm programs.

"Yield survey information is one of a few pieces that are used to help determine if farmers in those counties will be eligible for payments if they're participating in farm programs," says Darin Jantzi, a North Dakota state statistician.

There are no guarantees that payments will be triggered, but the yield data collected from the NASS surveys are the primary source that the FSA uses to establish county averages.

Participation Needed

In order for NASS to publish county yield information, a minimum of 30 survey responses

must be returned, or the harvested acreage from reports with positive production must account for at least 25 percent of the harvested-acreage estimate.

"The number of counties NASS has been able to publish the past few years has been decreasing, and it's due to declining response rates from producers," Jantzi says. "It is concerning considering NASS data are used by FSA and RMA to administer their farm programs. If

fewer producers are responding, there's less statistically defensible data being used to administer these programs." (See the graphics.)

Problems arose in 2014 when not enough farmers in several North Dakota counties returned their surveys. In LaMoure County, only 22 percent of the selected corn farmers returned their information, while in Logan County, only 20 percent of the selected corn farmers participated. The low response rate impacted

whether corn farmers in those counties received a payment from the Agriculture Risk Coverage-County program, which allows participants to receive revenue coverage when the current-year revenue falls below a guarantee.

Because the number of survey responses and the percentage of coverage fell short of what was needed for a publishable NASS yield estimate, the next option was for FSA to use RMA data. In 2014, that resulted in many LaMoure and Logan County corn farmers missing out on tens of thousands of dollars in program payments.



Darin Jantzi, a North Dakota state statistician, spoke to farmers at the CornVenture in Fargo on February 3.



Voluntary but Vital

Unlike the Agricultural Census that takes place every five years, all other NASS surveys are voluntary. Jantzi says that all individual farm data are kept confidential and that only the aggregated information is published. NASS officials say that high-quality statistical information is essential for the smooth operation of federal farm programs as well as for planning and administering

federal and state programs in areas such as consumer protection, conservation and environmental quality, trade, education and recreation.

Because of the issues faced by some farmers in 2014 and the recognition that the surveys carry weight, Jantzi expects to see a higher rate of return for future surveys. So far, the results have been mixed.

“We aren’t seeing that in all counties,” Jantzi says. “We are seeing

it in many of the counties that were most impacted in 2014, but not all. For counties that weren’t impacted much in 2014, we aren’t seeing higher participation rates.”

Jantzi doesn’t speculate why farmers are hesitant to complete the surveys because it varies by the individual.

“Many farmers want to participate in farm programs because they can potentially get a payment

that helps them with their farming operation during times of low commodity prices and/or when yields are low,” Jantzi adds. “Farmers who are participating in government farm programs should fill the surveys out because it doesn’t make sense to be in a farm program and not participate in the surveys since NASS data are used to help administer those programs.”

Beyond Programs

The value of the yield data that are generated by farm surveys goes beyond government programs and all the way to North Dakota soybean customers. Because approximately 70 percent of the state’s soybeans are exported, overseas markets are vital.

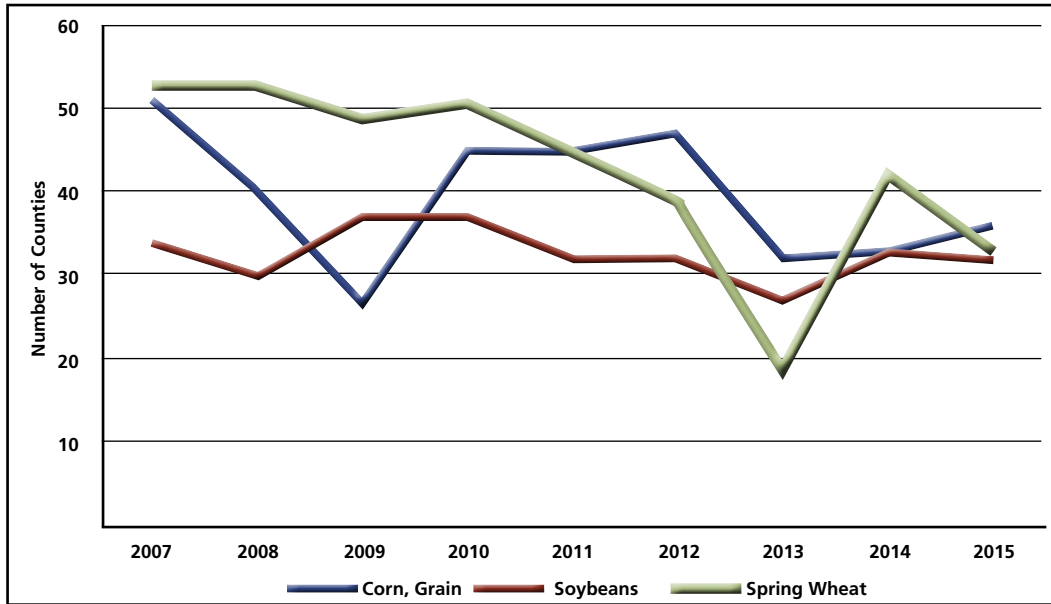
“We rely heavily on NASS data when we meet with buyers from all over the world,” adds Stephanie Sinner, the North Dakota Soybean Council’s director of marketing. “The first thing they ask for is production information, so we hand them NASS data.”

Sinner says that, when farmers don’t submit data, she has to hand the buyers maps with blank spots for production, raising a few eyebrows among buyers.

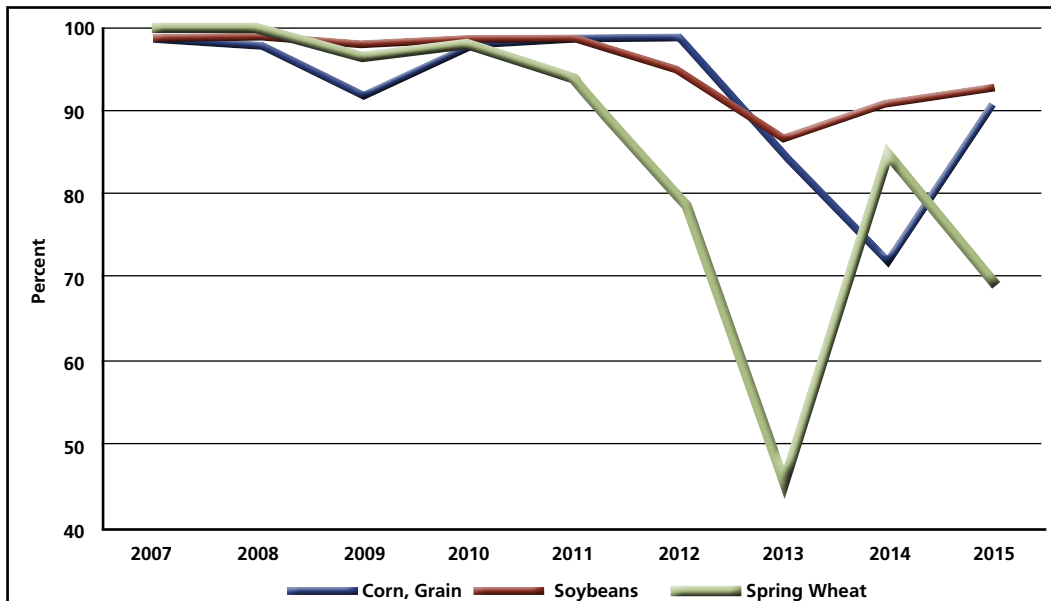
“Then, we have to do a lot of explaining why not all farmers participate in submitting information that they, as our buyers, rely on to make purchasing decisions,” Sinner says.

Jantzi says that the yield survey is short, fairly simple and takes only 5 to 10 minutes to complete. Based on the impact that the information has, it could be time that is well spent.

—Story by Daniel Lemke, graphics courtesy of USDA-NASS, photo by Betsy Armour



Crop County Estimates Number of Counties Published in North Dakota



Crop County Estimates Percent of Production Published in North Dakota



Danuser Sees ND Soy **Building Markets** in *Myanmar* with WISHH

The North Dakota Soybean Council (NDSC) and the American Soybean Association's World Initiative for Soy

in Human Health (WISHH) are making inroads to markets in the southeast Asian country of Myanmar, according to Matt Danuser, an NDSC board member from Marion. Danuser witnessed the country and its growing demand for soy protein in January when he joined a WISHH trade mission to Myanmar.

NDSC partnered with WISHH to participate in U.S. Department of Agriculture (USDA)-sponsored seminars with Myanmar's food manufacturers, edible oil processors and others. Danuser gave presentations about U.S. soybean production as well as buying soybeans from the Pacific Northwest trade route.

"Interest in U.S. soybeans was at the very top of their radar," says Danuser. "They are looking for consistent and reliable product that can arrive in a timely fashion. The country is rapidly expanding, so their demands are, too. Their diets are predominantly rice without a lot of other good sources for protein."

WISHH has conducted USDA-supported market research in Myanmar. Sometimes called Burma, the country is home to more than 55 million people and is located between China and India. WISHH's research suggests that, by partnering with the local industry to improve soy processing and to increase awareness about soy

and soy-based foods, human consumption of soy-based foods will expand in Myanmar, creating a demand for U.S. soybeans.

Danuser sees immediate opportunities for food-grade soybeans. WISHH has worked with four Red River Valley companies to have their soybeans analyzed for soymilk production in Myanmar. While genetically modified organisms are not an obstacle in Myanmar's market, their companies are currently set up to buy food-grade quantities rather than bulk high-tonnage commodities. This trade opportunity is well suited for North Dakota-based growers and shippers. Danuser believes that U.S. soy has a future role for Myanmar's livestock feed sector, too.

Myanmar is already using soy in some foods, ranging from soy nuggets, rice-soy blends, soybean curd, soy cookies and crackers to soy beverages, especially in the northern part of the country. Soy milk is increasingly popular in major cities. Myanmar consumers use large amounts of vegetable oils for frying as well as an ingredient in sauces, soups and curries.



Matt Danuser presenting a gift to MEODA chairman Mr. U Myint Kyu.

Danuser met with company representatives who participated in soyfood training at the Northern Crops Institute this past June. He saw their interest in U.S. soy continuing to grow. Multiple companies plan to send staff members to the United States for further training, particularly with extruded soy foods.

"Myanmar's food companies are willing to invest," Danuser says. "There is a need to facilitate bringing these companies together, and WISHH is doing that with repeated contacts with customers. WISHH is promoting health, and it's a great symbiotic relationship."

—Story by Karen Edwards,
photos by Alan Pook



Matt Danuser promotes N.D. and U.S. soybeans in Myanmar.



Soy Transportation Coalition Reelects Officers, Tours Panama Canal During Annual Meeting

The Soy Transportation Coalition (STC) reelected its officers and visited one of the most consequential links in the agricultural logistics chain during the organization's annual meeting on December 2 and 3 in Panama.

Approximately 100 U.S. soybean farmers and staff members from soybean associations participated in the annual meeting, toured the Panama Canal and received an update about the canal's expansion from the Panama Canal Authority's officials.

During the annual meeting, Scott Gauslow of Colfax, North Dakota, was re-elected as the STC chairman. Gauslow grows soybeans and corn on his farm with his wife, Jessica, and their three children. He has been a Soy Transportation Coalition board member since the organization's inception in 2007 and served as the STC vice chairman in 2013-2014. Gauslow recently served as the chairman of the North Dakota Soybean Council.

"I look forward to continuing to serve as chairman of the Soy Trans-

portation Coalition," said Gauslow. "If U.S. soybean farmers truly want to remain the leading supplier in the global marketplace, we need to have a transportation system that can deliver our growing supply to a growing customer demand. I am pleased to be a part of such an organization that focuses on the modes of transportation farmers rely on to be profitable in a competitive industry."

While in Panama, the group toured the current canal locks on both the Atlantic and Pacific sides of the country. In addition, participants saw the new, expanded canal locks that are scheduled to open by April 2016.

"It is incumbent upon farmers to not only be knowledgeable of and passionate about the supply and demand side of their industry. Farmers must also be knowledgeable of and passionate about the transportation system that allows supply to connect with demand," explains Mike Steenhoek, executive director of the Soy Transportation Coalition. "The Panama Canal—both the

current and future expanded canal—is an important artery that allows the U.S. soybean industry to be so competitive in the international marketplace. Farmers need to understand this key link in our logistics chain, which will hopefully serve to increase our resolve and motivation to demand that our nation appropriately invests in our own transportation system. If we fail to make these investments in our ports, inland waterways, railroads, and roads and bridges, the expanded Panama Canal will truly be a missed opportunity."

Annually, approximately 600 million bushels of U.S. soybeans transit the Panama Canal, making them the number one U.S. agricultural commodity utilizing the canal. Recent analysis—funded by the soybean checkoff—examined



To access the Panama Canal report or to learn more about the STC, visit the organization's website at www.soytransportation.org.

the impact of the Panama Canal's expansion on U.S. agriculture. The analysis highlighted that an immediate beneficiary of the expansion is bulk commodities, such as agricultural products.

The report's map highlights how sizable areas of the country could experience greater access to the efficiencies of barge transportation subsequent to the Panama Canal's expansion. According to the research, the draw area for the nation's major navigable waterways could expand from 70 miles to 161 miles. As a result, there will be increased areas of the country that can avail themselves to the inland waterway system. The demand for barge-loading facilities along the country's major rivers will likely increase. The 111-mile line would be the expanded draw area from loading a "Panamax" vessel to a 45-foot draft in southern Louisiana. The 161-mile line denotes loading a small "Capesize" vessel to a 45-foot draft.



STC Chairman Scott Gauslow, Colfax, right, and STC Executive Director Mike Steenhoek, left, during a STC board meeting.



STC Executive Director Mike Steenhoek speaks to Panama Canal officials.

—Story by Mike Steenhoek, photos Joe Murphy

Northern Soybean Expo

The 2016 Northern Soybean Expo was held in Fargo on February 2 and was a record setter. More than 375 farmers, industry representatives and researchers packed the Holiday Inn for a day of market information, research discussion and new developments in soybean farming.

In addition to the North Dakota Soybean Growers Association's expansive tradeshow, the Northern Soybean Expo featured a live taping of U.S. Farm Report as well as presentations by nationally known experts Dr. Barry Asmus and Dr. William Wilson.

Topics struck a chord with farmers. Participation was strong from start to finish.



Dr. Barry Asmus, senior economist with the National Center for Policy Analysis, provided insight about the importance of global free-market economics.



Former U.S. Farm Report host John Phipps served as the emcee for the day's events, bringing a combination of humor and insight to the day.



NDSU professor Dr. Bill Wilson shared information about China, one of North Dakota's most vital soybean markets.



The Northern Soybean Expo began with a taping of the nationally syndicated television show U.S. Farm Report. Guest host John Phipps (second from left), along with market analysts Tommy Grisafi (far left), DuWayne Bosse (second from right) and Mike North (far right), provided insight about current market conditions for North Dakota ag commodities.



Farmers were able to get information at dozens of trade-show booths that lined the exhibit hall at the 2016 Northern Soybean Expo.



North Dakota Soybean Council Chair Tyler Speich welcomed attendees to the 2016 North Soybean Expo.



Nearly 400 farmers participated in the 2016 Northern Soybean Expo, making it the biggest expo on record.



North Dakota Soybean Growers Association President Craig Olson presided over the organization's annual meeting.



United Soybean Board Chair and North Dakota farmer Jared Hagert shared information about soybean checkoff activities.

—Story by Daniel Lemke, photos by Daniel Lemke and Betsy Armour



NDSC Donates Babysoy Bodysuits to Newborns for the Holidays

For the 2015 holiday season, the North Dakota Soybean Council (NDSC) donated over 250 Babysoy Bodysuits (onesies) to parents of newborn babies across the state. Bodysuit donations were made to Sanford Medical Center, Bismarck; St. Alexius Medical Center, Bismarck; Jamestown Regional Medical Center; Altru Health System, Grand Forks; Sanford Medical Center, Fargo; and Essentia Health, Fargo. "Jamestown Regional Medical Center is committed to exceeding expectations in the lives of those

we serve, and by the North Dakota Soybean Council providing these adorable, soy onesies, NDSC is helping us do just that," says Lisa Jackson, foundation director for the Jamestown Regional Medical Foundation. "We are thankful for NDSC's thoughtful gifts that will be provided to parents as they welcome their babies into the world." Made from Azlon from soybeans, or what is commonly referred to as "soybean protein fiber," these colorful and adorable bodysuits are soft and earth friendly. Soybean protein fiber

is the leftover soybean pulp from tofu and soymilk production. "The North Dakota Soybean Council was delighted and proud to donate Babysoy Bodysuits to babies born during the holiday season," says Joe Morken, an NDSC board director from Cassleton. "It was the perfect opportunity for NDSC to spread holiday cheer and a fun way to share one of the many uses of soy with newborns and their families."

—Story and photos by staff



J.R. Perleberg, Tanys Ulmer and their newborn John Russell Perleberg of Pingree, North Dakota, receive a Babysoy Bodysuit from NDSC on Tuesday, December 8, at Jamestown Medical Center.

The Importance of CommonGround N.D. Volunteers

CommonGround North Dakota has seen an uptick of agriculture women and female farmers choosing to participate in statewide and locally organized events, such as Women's Health Conferences, Moms After 5 and Banquet in a Field, during the last 3 years. National participation includes volunteer Sarah Wilson of Jamestown who was featured in a CommonGround video titled "Not a 'Latte,' Pesticide Use on

U.S. Farms." The video had nearly 351,000 views on Facebook and YouTube in January 2016. View the video at <http://bit.ly/notalatte>. Dana Dagman of Enderlin, a farmer and mom of three young boys, became active with CommonGround in early 2015, attending the annual statewide training and helping with Banquet in a Field. "I became involved because of the need I felt to give the farmer's perspective on agriculture-related

issues in today's media," says Dagman. "Since I was not raised on a farm, I understand many consumers' viewpoints and questions. My awareness of how these concerns are misled became more apparent after I started farming with my husband. I realized firsthand how opinions can be incorrect just

because a person does not have a trusted source. CommonGround has provided me training as to how to approach people's concerns using my own perspective and share facts so that I become a trusted source." Kristi Schultz is a sales support lead at Peterson Farms Seed. Schultz says, "I enjoy being able to share my story of what living on a farm means to my family and me. I'm not one to try to get into the nitty gritty of what chemical is used, what antibiotics are used; rather, I want others to understand how much we care about what we do. I find, in talking with people who are not familiar with farming, that they just want to know the basics. Once you listen and share with non-ag consumers, they realize many things are taken for granted."

On March 21st, CommonGround North Dakota's fourth-annual, statewide volunteer training was held at the North Dakota Soybean Council office. The training provided value-added communication training, social-media expertise and research findings. Volunteers then utilize the skill sets

from the training at local and statewide events planned during the year. One of this year's new CommonGround North Dakota volunteers is Laura Rotenberger. Laura is a loan service specialist at AgCountry Farm Credit Services in Lisbon. She and her husband, Steven, are the fourth generation to live and work on his family farm. She maintains a lifestyle blog and features "From the Farm Friday" weekly on MrsLauraBeth.com.

"Since college, my eyes have been opened to how many people are disconnected and unaware about the agricultural world they are living in," says Rotenberger. "I am excited to join the women of CommonGround, trying to shed some light on what we do in ag for those who have never grown up on a farm or worked in this industry."

Stay connected with CommonGround North Dakota on Facebook at [facebook.com/CommonGroundNorthDakota](https://www.facebook.com/CommonGroundNorthDakota). To volunteer, contact Suzanne Wolf at swolf@ndsoybean.org.

—Story and photo by Katie Pinke



Farm and ranch women from across the state met at the North Dakota Soybean Council office in Fargo March 21st for CommonGround North Dakota Volunteer Training. The group learned how to start conversations with the consumers. These conversations are based on their personal experience as farmers and ranchers, and also on science and research.

Cook Your Way to a Healthy Heart with Soyfoods

Creating heart-healthy—and delicious—meals at home can be a daunting task. Do this. Don't eat that.

Fresh vs. frozen. Canned vs. fresh. With the endless litany of expert advice and recommendations flooding the media, it can be hard for a cook to know where to turn for accurate advice and resources.

During this past Heart Month in February, the North Dakota Soybean Council partnered with Sanford Health and the American Heart Association to offer a heart-healthy cooking demonstration at the Avalon Events Center in Fargo. The goal was to help attendees learn tips and tricks for preparing heart-healthy meals at home.

Heart disease is the number one killer of North Dakotans, but heart disease is also 80 percent prevent-

able by addressing controllable health risk factors, such as smoking, diet and exercise, along with uncontrollable factors, such as family history or genetics. Because diet plays a major role in addressing risk factors for heart disease and stroke, providing tools for individuals to prepare heart-healthy, home-cooked meals is an important strategy for reducing heart disease and stroke.

According to the American Heart Association, a diet that is low in saturated fat and low in cholesterol lowers your risk of heart disease. Soy products such as tofu, soymilk, soy flour, edamame, soy nut butter and roasted soy nuts are high

in polyunsaturated fat, fiber, vitamins and minerals while being low in saturated fat and cholesterol-free.

"We're thrilled to partner with the American Heart Association to help spread the word about the health benefits of soyfoods," said Suzanne Wolf, communications director for the North Dakota Soybean Council. "Soyfoods are heart healthy, and according to the FDA, consuming 25 grams of soy protein a day, as part of a diet that is low in saturated fat and cholesterol, may reduce the risk of heart disease. Packed with high-quality protein, soyfoods are an excellent option to keep you and your family energized and satisfied all day long."

At the event, attendees were treated to a smorgasbord of recipes that featured soy foods. The attendees also heard from experts, including the American Heart Association, a nutritionist from Sanford Health and chefs from the Avalon Events Center.

For more information about upcoming American Heart Association events and additional heart-healthy recipes for your family, visit www.heart.org/NorthDakota.

*—Story by Chrissy Meyer,
photos by staff.*



While on KVLV TV's North Dakota Today show, Suzanne Wolf, far right, showed viewers how easy and delicious tofu can be.



Attendees sampled soyfoods during the heart-healthy cooking demonstration on February 16.





Celebrate April is Soyfoods Month and a Good Night's Sleep

Research Study Suggests that Soy Isoflavones May Help You Sleep Better

Many people suffer from sleep issues. If you have trouble sleeping or suffer from insomnia, you may want to add soyfoods to your daily diet. New results from the first population study to examine the relationship between soy and sleep habits indicate that soyfoods offer striking benefits. Soyfoods are uniquely rich sources of isoflavones, naturally occurring compounds that are classified as plant estrogens. The estrogen hormone tends to promote better sleep, both in terms of quality and duration.

A recent population study was conducted with over 1,000 Japanese adults. Participants were

interviewed to determine the amount of soy and isoflavones that were consumed, and the adults answered questions about how long and how well they slept. Among the group of participants, 13 percent reported a regular sleep duration (7 to 8 hours a day), and 56 percent reported sufficient sleep quality. After adjusting for potential confounding factors, individuals in the group with the highest soy intake were almost twice as likely to sleep at least 7 to 8 hours and were about twice as likely to have better sleep quality. People in the highest intake group consumed about two servings of soyfoods per day.

This study is good news for the millions of Americans who suffer from insomnia. According to survey data from the National Sleep Foundation, 48 percent of Americans say that they have occasional insomnia while 22 percent experience insomnia. Getting a good night's sleep is a vital component of overall good health and can aid in maintaining a healthy weight. Sleep-deprived people tend to snack more at night, and they may also crave higher-carbohydrate foods and larger portions.

In the United States, popular soyfoods include tofu, soymilk and edamame. The Soyfoods Council

offers tips and ideas about enjoyable ways to consume soy. On its website, you'll also find easy recipes to incorporate more soyfoods in your diet. Beverage ideas include the berry-rich Silken Shake that is made with firm, silken tofu; fresh or frozen strawberries; cranberry juice; vanilla and the sweetener of your choice. Another soy-based drink, the Pomegranate Cherry Vanilla Smoothie, features vanilla soymilk; pomegranate juice and frozen, dark, sweet cherries. For more soybean or soyfood information, go to thesoyfoodscouncil.com.

—Story by Linda Funk, photo by The Soyfoods Council

Pomegranate Cherry Vanilla Soy Smoothie

If this refreshing smoothie were any healthier, we'd have to call it medicine! Don't drink it because it's good for you. Drink it because it tastes so good. It makes a great breakfast or afternoon snack, and you can whip it up in less than 5 minutes.

- 6 ounces pomegranate juice, such as Pom, chilled
- 1 cup vanilla soy milk, chilled
- 1/2 cup frozen, dark, sweet cherries
- 4-5 ice cubes

Combine the pomegranate juice, soy milk, cherries, and ice in a blender. Process until smooth, and pour the mixture into two tall glasses. Garnish with pomegranate seeds, if desired, or a dollop of soy ice cream.

Makes 2 servings



Nutritional analysis per serving:
115 calories, 4 g protein, 23 g carbohydrates, 1 g fiber, 2 g fat, 0 g saturated fat



Spraying by the NUMBERS

The rapid advance of herbicide resistance can be largely attributed to the repeated use of chemicals with the same site or mode of action, which refers to the way the herbicide controls susceptible plants. Specifically, modes of action describe the biological processes that are disrupted by the herbicide. These biochemical pathways control the plants' growth and development; when herbicides are applied, the processes cannot be carried out, and plant injury or death occurs.

Herbicides are grouped into categories based on their site of

action. Glyphosate, for example, is categorized as an amino-acid synthesis inhibitor while 2, 4-D is classified as a growth regulator.

To help simplify which mode of action that herbicides utilize, the categories are grouped by number. There are 30 different modes of action, so there are 30 group numbers. Glyphosate, for example, is in Group 9 while 2, 4-D is in Group 4.

Some widely used herbicides and groupings include

Group 1

Poast, Select and Assure II



Combat resistance by rotating herbicide modes of action.

Group 2

Raptor, Express and FirstRate

Group 3

Mitotic Prowl, Sonalan and Treflan

Group 4

2,4-D; Banvel and Starane

Group 5

Atrazine and Metribuzin

Group 9

Glyphosate

Group 10

Liberty

Group 14

Flexstar/Reflex, Spartan, Valor and Sharpen

Group 15

Dual, Harness/Surpass, Outlook and Zidua

By selecting products from different group numbers, farmers know that they're switching their treatments.

"Product names come and go," says Dr. Richard Zollinger, NDSU extension weed specialist, "and that may make farmers believe it's a new product when, in fact, it may just be a new blend of herbicide active ingredients with the currently-used sites of action."

Names and herbicide mixes change, but the group number is usually printed on the herbicide label, giving growers another way to guard against repeatedly using the same modes of action.

A North Dakota herbicide chart prepared by NDSU is available for download at www.ndsoygrowers.com. Farmers can also utilize a mode-of-action look-up tool at <http://takeactiononweeds.com/understanding-herbicides/site-of-action-lookup/>.

The numbering system is designed to help simplify the process of selecting herbicides with different modes of action in order to reduce the likelihood of resistance.

—Story and photos by Daniel Lemke



Farmers have 30 different modes of action from which to choose.



Know the Enemy

Getting 70 percent right on a weed-identification exam may constitute a passing score, but in terms of weed control, that result would be an epic fail. Proper weed treatment starts with knowing what you face.

“The first step in good manage-

ment is weed identification because, if that’s wrong, everything else will be wrong,” says Dr. Richard Zollinger, an NDSU weed scientist.

“Weed identification is extremely important,” adds crop consultant Greg LaPlante. “I would rank it a 10. You need to know your

weeds and densities for an effective weed-control strategy. Not all herbicides are effective on all weeds, so we need the right mode of action for the weeds in that field.”

Because herbicides are most effective when weeds are small, seedling identification is vital, yet challenging. Treatment options for redroot pigweed may be different than those for waterhemp. Recognizing the difference between the two weeds when a seedling is 2-inches tall takes a trained eye or access to resources.

Many university extension programs have seedling identification resources available on a website, booklet or mobile app. The Take Action on Weeds effort, supported by multiple farm organizations and crop-protection companies, contains comprehensive information about weeds that are commonly found in North Dakota fields. That information can be accessed at www.takeactiononweeds.com. Extension agents, as well as most crop consultants and agronomists, are trained to identify which weeds are present.

Other resources, including books such as “Weeds of the West,” can be helpful for farmers.


Zollinger says that most farmers

know their farm’s weed history and are aware of which weeds are present. It never hurts to be well armed because seeds are mobile and because weed pressures aren’t diminishing.



NDSU has developed a mobile app with information about more than two dozen commonly occurring weeds. Creating the app was supported by North Dakota soybean farmers. The app includes weed photos as well as some management options, including which products and modes of action have effective control.

—Story by Daniel Lemke, photos by the United Soybean Board




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Thinking Small

The simplicity of simple one-pass, post-emergence glyphosate applications allowed farmers to break one of Dr. Richard Zollinger's 10 Commandments of weed control: spraying weeds when they're small.

Zollinger, a weed control specialist at North Dakota State University, says that farmers used to spray weeds when they were small but would often have to apply herbicides again weeks later if a second flush of weeds appeared. With the advent of glyphosate, many farmers opted to wait until the weeds were bigger and more seeds had sprouted before hitting them with one dose. That technique was effective until glyphosate-resistant weeds became more common.

"Now, we have to add herbicides to glyphosate to plug that hole," Zollinger says.

Nearly all herbicides should be applied to weeds that are 3 inches tall or smaller for the greatest effectiveness. Zollinger explains that research has shown how, even when glyphosate was sprayed on glyphosate-tolerant ragweeds when they were an inch tall, a high percentage of the weeds were controlled. The control diminished for 2-inch weeds and dropped off substantially when the weeds grew to be 3 inches (or more) tall.

Because many of today's herbicides are contact and not systemic, spraying smaller weeds covers a higher percentage of the surface area



and increases the likelihood that weeds will be controlled.

"Dead weeds don't make seeds," Zollinger says, repeating his mantra for weed management. "If you kill them all, you'll never, ever have resistance."

Spraying larger weeds can exacerbate problems with resistance. Later

glyphosate applications may kill some weeds, but the more resilient plants with resistance will be the ones left to propagate and to fill the soil seedbank.

—Story by Daniel Lemke, photo by the United Soybean Board

I WILL
REDUCE THE WEED SEEDS
IN MY SOIL.

Preventing weed seed production is essential to weed management. Visit www.TakeActionOnWeeds.com/request to get your free Take Action Kit and learn how you can prevent herbicide-resistant weeds from spreading.





Catching the Drift of Pesticide Application

Many factors can influence the effectiveness of on-farm weed-management practices. The timely application of effective herbicides plays a vital role in controlling yield-rob-

bing weeds. Maximizing herbicide effectiveness while minimizing the unwanted consequences that spraying causes is not a simple process.

While weed control is the

ultimate purpose for herbicide applications, an important part of that process is to control the drift. Drift is the movement of spray particles and vapors off-target, causing

less-effective control and possible injury to susceptible vegetation, wildlife and people.

“There is a direct relationship between drift and herbicide efficacy,” says Greg Kruger, assistant professor and cropping systems specialist at the University of Nebraska. “The more you can reduce drift, the more effective your applications will be.”

Kruger conducts research at the University of Nebraska, spray testing variables such as wind speed, particle size and even sprayer nozzles. Kruger says that “the Big Four” factors for particle drift are wind speed, boom height, the distance from susceptible vegetation and spray-particle size.

—Continued on page 32

Mapping Weed Control Success

Good maps are very helpful to plot your direction. Mapping out a weed control strategy can be a valuable tool to help farmers simulate various weed control options and maximize the effectiveness of management plans.

Dr. Tom Peters, assistant professor and extension agronomist with both North Dakota State University and the University of Minnesota, charts weed manage-

ment plans for research plots based on the weeds that are present. Using the North Dakota Weed Control Guide, Peters is able to map out the herbicides and sites of action he will be using for their effectiveness at controlling the waterhemp, lambsquarters and redroot pigweed that are present on this Moorhead, Minnesota research plot. (See graphic below)

“Learn about the weeds that are

growing on your farm,” Peters says. “Study your foe, then find out their Achilles heel.”

Mapping weed management plans can help farmers ensure they will achieve maximum control without relying on one or two treatment options.

—Story by Daniel Lemke,
photo by Staff



Dr. Tom Peters

Site of Action	Herbicide	Waterhemp	Lambsquarters	Redroot pigweed
9	glyphosate	P	F-E	E
15	Dual Magnum	F-G	P-F	F-G
14	Valor	G-E	G-E	G-E
4	2,4-D	F	E	F-G
4	dicamba	P-G	G-E	P-G
10	Liberty	F-E	F-G	E

SOURCE: 2015 North Dakota Weed Control Guide

Control Scale:

E = Excellent = 90 to 99%
G = Good = 80 to 90%
F = Fair = 65 to 80%
P = Poor = 40 to 65%
N = No Control



—Continued from page 31

Wind Speed

When the wind speed doubles, there is a nearly 700 percent increase in drift when readings are taken 90 feet downwind of the sprayer. Experts recommend spraying when the wind is 10 miles per hour or less.

Boom Height

Kruger says that, when the sprayer-boom height was decreased from 36 to 18 inches, the amount of drift decreased 350 percent when

measured 90 feet downwind from the sprayer.

Distance from Susceptible Vegetation

If the distance downwind is doubled, the amount of drift decreases fivefold. Kruger says that, if the distance downwind increases from 100 to 200 feet, there is only 20 percent as much drift at 200 feet as there is at 100 feet.

Particle Size

The spray's particle size plays a big role in the distance those

particles can travel. Droplets with a 5-micron diameter, which is similar to fog, can travel up to 3 miles in a 3-mile-per-hour wind. Fine particles with a 100-micron diameter travel 44 feet while fine rain at 1,000 microns travels less than 5 feet in a 3-mile-per-hour wind.

"Spray-particle size is something that farmers can control," Kruger adds.

Kruger says that the optimal droplet size varies with every chemical. Nozzle type, orifice size, spray solution and operating pressure all impact the droplet size, therefore

affecting the application's coverage and the risk of drift.

Understanding all the variables can be challenging, but detailed application requirements are described on pesticide labels. Each chemical has instructions that identify factors such as droplet size, nozzle type, flow rate and setbacks from susceptible species. That information is there because it is part of the EPA's labeling process.

"Know the label because the label is the law," Kruger explains.

Kruger says that sprayer technology and equipment are getting much more sophisticated. Effective applications with minimal risk from drift are a matter of tailoring applications to the product that is being applied.

"The difference in application effectiveness comes down to the details," Kruger says.

The University of Nebraska has created a ground-spray app for smart phones that helps farmers and pesticide applicators make decisions about droplet size and the potential for drift. The app calculates the size of the spray droplets that are generated from a range of nozzles with various pressures and that use different spray solutions. The free app is available for both iPhone and Android formats.

—Story by Daniel Lemke, photos by United Soybean Board



Controlling particle drift is an important part of herbicide application.

Reasons to Change

Farmers know that herbicide resistance is a growing problem because ag experts, researchers and others have trumpeted that message for years. As with many farming decisions, it often takes some convincing for farmers to change the way they operate.

Control crop consultant Lee Briese says that, in most herbicide-resistance cases he has seen, the decision growers made to change how they farm was not voluntary.

"It's taken a personal disaster," Briese says. "It's taken having a field of their own that has become unmanageable before growers will make changes. Resistance is an issue with both weeds and people."

Changing Course

Aaron Stroh read about the nightmarish situation some farmers in the southern United States faced with resistant Palmer amaranth overrunning entire fields and rendering the land unmanageable. The issue resonated with Stroh and his brother who farm near Lamoure, North Dakota, because they faced challenges with resistant kochia and waterhemp.

"I was reading about what was happening elsewhere, and it changed my view on what we were

doing here," Stroh explains. "I didn't want a disaster like that."

Stroh says that he and his brother stopped using twice-a-season Roundup applications and began incorporating more pre-plant herbicides as well as a second-pass residual herbicide on soybeans.

They are including cover crops so that they don't burn out herbicides. They are planting all Liberty Link soybeans this year to get another herbicide mode of action into the mix. Crop rotation is also part of their plan. Depending upon market opportunities, in addition to corn and soybeans, the Strohs have planted wheat, cereal rye, barley and peas.

"We like to change up the rotation to get weeds off balance," Stroh says.

Some of the Strohs' high-saline soils have been taken from the row-crop production and planted to grasses or alfalfa, which is mowed and fed to livestock.

In this Together

Stroh also began talking with other farmers who were changing their approaches in order to find out what worked for them. North Dakota State University Extension Soil Health Specialist Dr. Abbey Wick says that connections to other

growers can be a strong motivator.

"I think innovative farmers need to be in contact with other like-minded innovative farmers," Wick says. "I'm finding this bond to be very important as they try to stick to their best management practices. It also helps advance their practices on-farm. In a hard time, these bonds with other farmers keep them on their current path."

Briese says that farmers like the Strohs are the minority, but more growers are recognizing that the threat is real.

"Realizing there is a problem isn't hard," Briese says. "The difficulty is ownership of that problem. It's theirs. Not their neighbor's, it's not a problem in their area, it's theirs and they must address it."

Holding out Hope

Briese believes that farmers hear enough "fear messages" about herbicide resistance and what needs to be done. He promotes a message of hope that disasters can be prevented.

"We have options. I know many ways to keep weeds from making seeds. Herbicides are just one way," Briese says.

There is also hope once weeds have taken over an area. Briese has worked with farmers who have successfully reclaimed fields that were once overrun with resistant weeds. It may take several growing seasons,

but it can be done.

In most cases, Briese says, resistant weeds haven't overtaken entire fields. Generally, there are small pockets where farmers need to focus treatments in order to prevent larger-scale issues.

As is the case with most challenges, both on and off the farm, Stroh and Briese agree that it's best to make changes before a problem exists.

"There are solutions," Briese insists. "The solutions are better the sooner you start."

Tied to the Land

Wick explains that it often takes a personal relationship and the development of trust before farmers are comfortable adopting changes based on others' advice. It's not always an economic or business consideration that is the tipping point.

"There is often an emotional aspect," Wick contends. "Most farmers want to give the next generation the opportunity to succeed, so it's not always an economic decision. Innovators don't necessarily care about the cost; they want to do what's right for their family."

Stroh shares that sentiment. "I want to take care of the land for the next generation," he says.

—Story by Daniel Lemke

Community-Based Weed Management

Most weed-management challenges aren't confined to isolated farms or singular fields. Because weeds can spread in many ways, Dr. Tom Peters believes the solution to weed management may lie in farmers' commitment to working together.

Peters is an assistant professor and extension agronomist, working with both North Dakota State University and the University of Minnesota. While his primary focus is sugarbeets, weed management is not specific to one crop.

"We've been talking about weeds management from a series of technical approaches," Peters says. "I believe it's a social problem."

Group Effort

Marketing groups are common in agriculture as small numbers of farmers get together to discuss tactics, strategies and experiences for grain marketing. Peters believes a similar approach could have a big impact by getting neighboring farmers to combat weeds collectively.

"The idea is to try to get groups to formalize what we think is already occurring and then replicate it," Peters says. "Once we see it working in one area, we could replicate it and implement it in other areas."

Peters knows the community approach is a viable concept. Farmers in southern states, both in cotton-growing regions and in areas where Palmer amaranth infestations have become major issues, have worked together to successfully manage problems.

Economic Benefit

Community efforts not only affect weed control, but grower behavior can also impact the bottom line for the farmers and their neighbors. Data from the U.S. Department of Agriculture's Economic Research Service (USDA-ERS) tracked 20 years of average returns. With a corn/soybean crop rotation, when a farmer and his neighbor both ignored herbicide resistance, they each had an average return of over \$311 per acre. When both

—Continued on page 34

Getting to Know the Grower



Sam Landman
Northwood, North Dakota

Tell us about your farm.

I farm with my dad. We grow primarily wheat, corn, soybeans and pinto beans, but we will grow other crops if the market calls for them. I started farming 8 years ago, and I'm the 5th generation.

What do you like best about farming?

I like the freedom to make your own decisions and be your own boss. I've always enjoyed running

equipment, but it's also fun to watch your crops grow and see your hard work pay off.

Did you always know farming was something you wanted to do?

I was born to farm. I started farming with my toys on the carpet at a very young age, and I've been hooked ever since, although I didn't make the official decision until I went off to college.

What's most exciting about the upcoming planting season?

We are trying out some different tillage practices on our farm, so it's exciting to see how it will turn out.

How and why did you get involved with the North Dakota Soybean Growers Association?

I've always enjoyed reading the magazine, but I really took notice of the organization after my brother Daniel won the scholarship that

they offer. I wanted to get involved in advocacy, and when I was asked to run for the NDSGA board, I thought that would be great opportunity to do so.

If you could change something about the current operating climate for North Dakota farmers what would it be?

I think it would be nice to have access to more markets and to be able to keep more of our product closer to home rather than shipping it overseas.

What has changed most about farming since you've been involved?

The amount of data that is available to the grower has increased significantly. It's hard to keep up sometimes, but utilizing this data has many advantages.

What do you like to do outside farming?

I go golfing anytime I can get away

from the farm during the summer months. In the winter, I enjoy snowmobiling, curling and traveling when I can.

Do you have a hidden talent that would surprise people?

I guess I consider myself pretty good at coming up with puns.

If you could go anywhere in the world, where would it be?

Australia. I'm curious about the farming practices there, and I would like to see the large equipment they use.

If you could help non-farmers understand one key issue from a farmer's perspective, what issue would you choose?

The definition of sustainability and how essential our modern practices are to that matter.

—By Daniel Lemke

—Continued from page 33
farmers managed resistance, the return was over \$378. According to the USDA-ERS research, even if only one farmer managed resistance, both farmers saw a benefit.

Peters, who grew up on a Minnesota farm, remembers that his dad's best friends were his neighbors. Because the landscape of farming has changed and fewer farmers are working more land, growers don't always know the person farming

next to them and they don't interact as much as farmers once did.

"Solving a problem caused by herbicides with more herbicides doesn't make intuitive sense," Peters says. "We need to find a way to return to where farmers can work from some common ground. If they can work together on grain marketing and management, why not weeds management?"

Peters doesn't believe the future for weed management will come

from a jug or a bag, but from farmers working together. If that collaboration happens, he expects the landscape of farming to change again.

"How we respond to resistance management will likely be how agriculture looks 20 years from now," Peters says.

For more information about community-based weed management, contact Dr. Peters at thomas.j.peters@ndsu.edu.

—Story by Daniel Lemke

Resistance-Management Returns *Source: USDA-ERS*

Corn-Soybean Rotation		Neighbor			
		Manages	Resistance	Ignores	Resistance
Grower	Manages Resistance	\$/acre	378.36	\$/acre	336.19
	Ignores Resistance	\$/acre	319.44	\$/acre	311.77

- Annualized present values, over 20 years of net returns
- Similar qualitative patterns obtained for continuous corn; uniformly lower returns for continuous soybean

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Derik Pulvermacher
Crosby, North Dakota

Tell us about your farm.

I raise small grains in Burke and Divide Counties: spring wheat, durum, lentils, canola, corn and soybeans.

Why did you get involved with the North Dakota Soybean Council?

Soybeans are a new crop for our area, and the Council looked like a great way for me to get involved and represent our area's interests.

Why are soybeans a part of your crop mix?

There are a lot of reasons. Marketing, rotational benefits, nitrogen credit for next year's crop, the ability to clean up weeds by planting a Roundup Ready crop. Our initial introduction was spurred by high prices, and we had unusually high moisture that the pulses we were raising had diseases.

What's your favorite food?

Camarones con Rajas, jumbo shrimp stuffed with cream cheese and smoked salmon, then wrapped in bacon at Los Compadres in Williston, North Dakota.

If you could add equipment or technology to your farm, what would it be?

A new planter with all the bells and whistles, or a state-of-the-art seed-cleaning facility.

If you could win a vacation, where would you go?

A European tour highlighted with long stays in Ireland and Germany.

What changes do you expect to see on your farm in the next 5 to 10 years?

I expect to implement variable rate seed and fertilizer application while planting based on a zone soil sampling program. I would also foresee increases in corn and soybean production with the advances in the seed industry is making in early maturing varieties.

What's the one piece of farm equipment or technology you wouldn't want to be without?

RTK (assisted steering). Right now, I'm seeding with two different-width air seeders on 12" spacing with 0" of overlap and seeding between the rows of last year's crop. After planting, we are able to move the RTK receivers to the sprayer and combine.

Do you have hobbies?

I enjoy camping, hunting, boating, skiing and riding motorcycles.

What do you like best about farming?

I went to school at NDSU for agronomy and worked in the industry for years. Seed and variety selection was always my favorite part of that work. Now, being able to try new things on my own farm is probably my favorite thing. Right now, it's different ways to use soybeans in my rotation that includes lentils and canola that not many people have experimented with.

— By Staff

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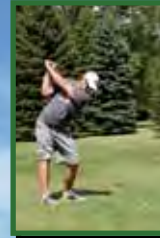
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