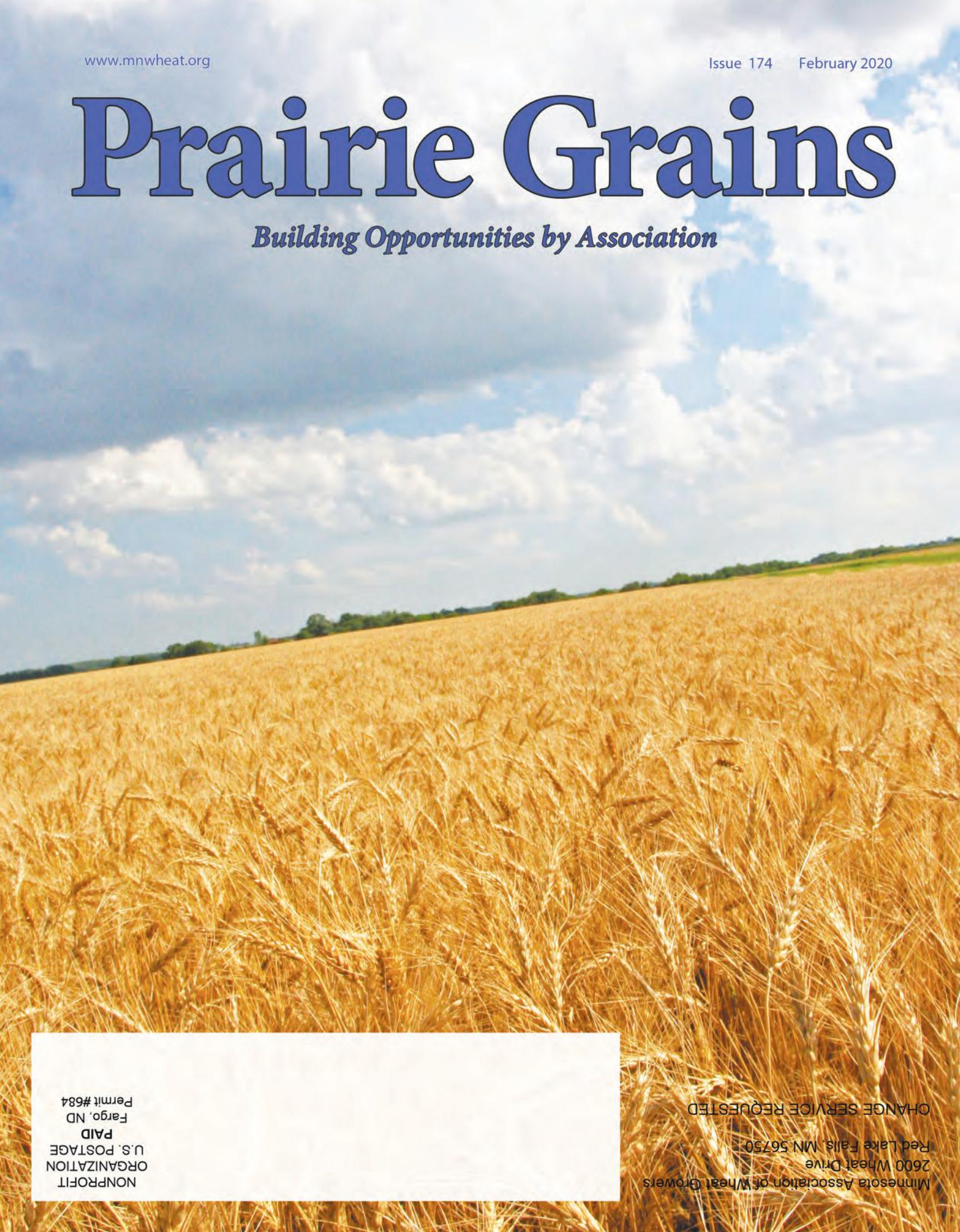


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PRAIRIE GRAINS

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A Memorable 2019

Every trading day buyers and seller determine the price of your grain. If it's too wet to plant, like spring 2019, prices will go higher. If crop conditions look good, prices go lower. It's a daily process. We watch it every day, and every day there is new information.

There are always memorable years for commodity prices, and I think 2019 will be one of those years. We remember \$20 spring wheat in 2008, beans in the teens in 2012, and we're going to remember 2019 for the year nothing happened. The stars were aligning for a bullish year, and nothing happened. We spent most of 2019 saying "That's not possible." It was not possible to plant that much corn with such

a wet spring. It was not possible to get such good yields when the crop was planted late. It was not possible to have that much corn available when so much of it is unharvested.

We viewed the USDA reports, and we said "That's not possible." We spent 2019 convinced the markets were wrong, and we were right. When the China trade deal was signed in January 2020, we patiently waited for the markets to spike higher, and instead they went down.

Why don't the fundamentals matter anymore? I want to assure you the fundamentals do matter.

Supply and demand matter in the long run. We may have short spikes when

prices swing too high, like \$20 wheat, and when prices drop too low, but the market will find equilibrium.

The Chinese trade war, prevent plant acres, unharvested corn, and poor quality wheat all mean there are some unique fundamentals in local areas. Our soybean basis was hit hard by the trade war because Northern Plains soybeans go west, to China, and that market disappeared. Ethanol plants are struggling to buy corn in areas where the corn is still in the field. Livestock farmers are looking for feed in areas where there were large prevent plant acres.

This has meant some local opportunities for basis. Farmers spend too much time trying to predict movement in the futures market, and not enough time looking for basis opportunities. We need to make sure to watch both sides of our cash prices.

For those of you frustrated because the bullish year never materialized, I am with you. I believed we would see higher prices because of late plantings, slow harvest progress and a Chinese trade deal. Higher prices may arrive, but it could be the basis bringing you high prices, and not the futures market.

For those of you still sitting on unsold production from

2018 and 2019, and no sales for 2020, this is my required reminder that you are horrible at predicting prices, and 2019 should be proof of that. No amount of curse words will make the market go higher. Trust me, I have tried. We had rallies, not as large as I would have liked, but there were price movements and sales opportunities.

If we learn anything from 2019, it should be risk management. Even in the most bullish of scenarios, prices can go lower. Make sales on rallies to spread your risk, even if those rallies don't quite reach your price target. Holding grain in the bin is expensive, and when you hold all your grain, or even two years worth of grain, the bills begin to pile up.

Perhaps the bullish fundamentals of 2019 will materialize later this year, when ethanol plants run out of corn, or China makes large purchases of soybeans. The markets always move. It's our job to take advantage of the movements higher.

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NAWG Takes Major Actions to Improve Organization

The National Association of Wheat Growers (NAWG) is the leading advocacy organization for America's wheat farmers, and its CEO, Chandler Goule, and staff are working hard to maintain this reputation. This past year NAWG has taken actions to ensure that the Association can keep up with an unpredictable political climate where social media can sometimes dictate policy decisions. NAWG continues to find innovative ways to meet its farmer's needs and making sure expectations are being achieved. From the 2019 Fall Meeting to the December Strategic Planning Session, NAWG has had productive discussions and succeeded in meeting its goals for the year.

After nearly 40 years in its current location, NAWG will be moving to a new building which sits on Capitol Hill. Since the 1970s, NAWG has been renting office space from its educational counterpart, the National Wheat Foundation (NWF). The Foundation purchased the building in 1978 and, while it has a storied history, the building has been and will be requiring significant financial investment and has consumed more and more valuable staff time and energy to manage. As a result, the National Wheat Foundation Board of Directors decided that it was in the best interests of NAWG to sell the building and relocate to a space more conducive to carrying out the

mission and priorities of the organization. During the Fall Board Meeting in Santa Fe, New Mexico, the Foundation adopted a resolution which included a commitment to work with NAWG's Board on future rent and office space with the intention that NAWG be budget neutral in terms of its rental expense. After much work, it was announced on December 11 that the sale of the building had proceeded and that NAWG would be moving to 25 Massachusetts Ave, NE, thus retaining its strong presence on Capitol Hill.

NAWG's policy committees also met during the Fall Conference and carried out several robust discussions. The Environment and Research Committee received a staff update on several wheat wins included in the Senate-passed FY2020 Agriculture Appropriations bill. While Congress was still operating under a continuing resolution, the Senate-passed bill would fully fund the U.S. Wheat and Barley Scab Initiative (USWBSI) at \$15 million, an increase of \$5.5 million from FY2019. This USWBSI funding increase is a major win for wheat research and was a cornerstone of NAWG President Ben Scholz's testimony delivered to Senate appropriators on April 4. Additionally, the committee reviewed wheat production issues and pests and got a staff update on the implementation of conservation programs authorized by the 2018



Farm Bill. The committee also discussed climate policy and pesticides.

The Domestic and Trade Policy Committee Agenda discussed Congressional action on USMCA and tariffs, Farm Bill implementation, and USDA disaster aid implementation. Additionally, a variety of USDA programming issues were discussed, and staff provided an update on the Grain Standards Act reauthorization and transportation/infrastructure policy.

Lastly, Kim Magin, Bayer's Director of Industry Affairs, provided the full board with an update on the glyphosate lawsuits and Prop 65. Bayer conveyed they are committed to fighting back against these lawsuits and is committed to its product.

To round off the year, NAWG held a workshop to update its strategic plan. Partnered with Syngenta, the three-day workshop took place in Denver, Colorado, and took several months of preparation. The planning process included input from each member state, the NAWG Board of Directors, the NAWG Industry Partners Council (IPC), NAWG Staff, the National Wheat Foundation, and U.S. Wheat Associates on what they see

as the strategic and legislative priorities for NAWG to be for the next five years. NAWG was able to receive representatives from nearly all 20 member states to attend and participate in the successful Strategic Planning session. The group focused on many issues and discussed ways to move the Association forward, both organizationally as well as in terms of its policy and communications activities. However, the overarching theme was to find ways to shortcoming in the Association's budget given trends in the farm economy and consideration non-dues revenue. The session resulted in many short-term and long-term action items which the NAWG team is already underway in addressing. Updates will be provided at NAWG's upcoming conferences.

The National Association of Wheat Growers continually strives to maintain its strong presence on Capitol Hill. Through advocacy, grower engagement and collaboration between states, the organization will continue to be active champions for wheat, regardless of the political climate or landscape. This article highlights some of the current changes NAWG is undertaking but States can anticipate in the future as the organization continues to grow.

Legislative Issues Looming

By Dan Lemke,
Spirited Communications

The 2020 presidential election is still months away and the campaign process is likely to garner plenty of headlines, but activity at the state legislative level will also impact Minnesota farmers.

The 2020 Minnesota legislative session kicks off February 11. The shorter bonding session typically addresses capital investments, but other issues are likely to rise to the surface.

Legislative strategist Bruce Kleven says one issue that will possibly be addressed is a correction to the section 179 tax conformity language that was adopted last session. Section 179 of the United States Internal Revenue Code allows taxpayers to elect to deduct the cost of certain types of property on their income taxes as an expense, rather than requiring the cost of the property to be capitalized and depreciated. For years, Minnesota limited section 179 expensing at \$25,000 in the year of purchase, while the federal limit was \$1 million. The 2019 tax bill raised the State level to \$1 million, phased in over five years (\$200,000 per year).

However, there was an unintended consequence in the tax bill that resulted in some farmers receiving retroactive tax bills from the Minnesota Department of Revenue on equipment that was previously traded. "Retroactive tax bills were

not part of the conversation last spring" Kleven says. "It's a big issue for some people and I hope the legislature will look at it in 2020."

Kleven expects a projected \$1.3 billion budget surplus for 2020 will spur active debate on what to do with the funds. He says most Republicans favor tax cuts while Democrats are seeking a robust bonding bill to pay for projects around the state.

"The bonding bill will be a fight because it requires 60 percent for approval, not just a 51 percent majority," Kleven says. "That will require buy in from both parties."

Policy issues including guns and school safety are likely to rise to the forefront during the 2020 session. That discussion could include enhanced background checks for gun purchases and a red flag law that permits police or family members to petition a state court to order the temporary removal of firearms from a person who may present a danger to others or themselves.

Another emerging issue in Minnesota is legalization of recreational marijuana. Kleven says there are currently two cannabis parties in Minnesota that have each gathered at least 5 percent of the popular vote in the last general election. Kleven says legalization would allow the state to tax and regulate the industry. "Young people want it legalized," Kleven explains. "Le-

galization would also likely be part of a larger criminal justice reform effort."

Even before the session begins, Kleven advises farmers to keep an eye on state agency rulemaking activities. Among the issues being addressed is climate change.

In December, Governor Tim Walz established the Climate Change Subcabinet and the Governor's Advisory Council on Climate Change. The Subcabinet and the Advisory Council will guide the administration in the pursuit of action to combat climate change.

Kleven expects the advisory group to look closely at emissions, with transportation and agriculture to be a focus, including livestock emissions. In December, the Minnesota Pollution Control Agency (MPCA) announced that large animal feedlot operators with plans to expand must include a check of greenhouse gas emissions.

MPCA officials contend the assessment will not be grounds for a permit denial.

Other facets of the climate change effort include increased electric car charging infrastructure and research into the benefits of using cover crops to capture greenhouse gases.

In the fall of 2019, the Department of Natural Resources (DNR) conducted a pilot study to screen hunter-harvested deer for the presence of neonicotinoids. Hunters were encouraged to send the spleen of harvested deer to the DNR for analysis. The spleen helps to filter blood.

Neonicotinoid insecticides are applied through seed treatments and in foliar sprays to control pests like soybean aphids.

Kleven says the Environmental Protection Agency and Minnesota Department of Agriculture regulate spray applications, but not seed treatments. The focus and pressure on treated seed could lead to regulations.



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The Changing World of Plant Genetics

By Dan Lemke,
Spirited Communications

One of the most impactful new tools in agriculture will likely have nothing to do with farm equipment. Just as biotechnology revolutionized crop farming, many people believe gene editing is the next breakthrough that will substantially change agriculture.

“Gene editing represents the next big wave of opportunity,” contends Northern Crops Institute Executive Director Mark Jirik.

With the global population expected to rise to 9 billion people by 2050, food demand is expected to double from what is produced today. While that growing demand presents some challenges, there are also opportunities for agriculture. Farmers will need to continue increasing their productivity and they’ll need to do it on a shrinking number of farm acres.

Enter gene editing.

SPEEDING THE PROCESS

Developing a biotech or genetically modified crop involves transferring DNA from a different organism into the plant to achieve the desired result. This process can involve precise or random gene locations. Biotech crop development carries a high scientific and regulatory cost. There are currently 10 biotech crops available. Gene editing changes DNA sequence in existing plants. Gene editing allows scientists to make precise,

intentional changes in the genetic material of plants or animals. Those changes mirror what could be done through traditional plant breeding. Technologies like CRISPR Cas-9, Talen and Zinc Fingers are used to make gene edits, which can include gene knockout, gene insertion, gene silencing or gene expression. Gene editing can be done with a single gene or with numerous genes.

“Plant breeding is getting more precise,” says David Boehm, research and development manager for SES-Vanderhave. “Plant breeding is still a numbers game.”

The challenge for plant breeders is to combine yield performance with other qualities or disease tolerance traits. Speed, cost and reliability are also key factors in variety development.

“Gene editing is a powerful tool for efficiency,” Boehm explains. “Now I can predict what the progeny will produce if I make a cross. I can predict it before I make it. That’s the power of the data we have today.”

Under its biotechnology regulations, USDA does not currently, nor do they plan to regulate gene edited plants that could have otherwise been developed through traditional breeding techniques. Boehm says the European Union, however, is still a no-go zone for both biotech and gene edited crops.

Gene edited crops are



David Boehm, research and development manager for SESVanderhave, recently spoke at the Prairie Grains Conference.

already available and are being planted in the United States. They include Calyxt high oleic soybeans and DuPont-Pioneer’s waxy corn.

GLOBAL INTEREST

Jirik says in the last seven years, the U.S., China, the European Union, Japan and Korea all had patents applied for genetic traits in crops like rice, corn, wheat, tomatoes and cotton. The top patented traits were male sterility, herbicide tolerance, virus resistance and bacterial resistance. Wheat traits that could be developed through gene editing could include high fiber wheat, reduced gluten varieties, extended shelf life, herbicide tolerance and improved yield.

Jirik says a study done by North Dakota State University (NDSU) shows that genetic editing would substantially reduce the time and the cost required to bring traits to market. The NDSU study showed genetically modified traits

could take between 6 and 10 years and \$52 million to \$128 million to develop. Genetically edited traits could be available in 4 to 7 years at a cost of about \$8 million to \$24 million.

Jirik says gene edited traits will cost less and come a lower risk for developers. Companies will need fewer planted acres to offset development costs. That opens the door for more specialty crops, plants that match consumer trends, and greater niche opportunities. There are still challenges with gene editing because the agriculture system is built for uniformity, plus some traits are impossible to achieve through gene editing. There are also concerns with consumer perceptions. “Consumers very much care,” Jirik says. “How will they perceive these changes because we’re making changes that could happen naturally?”

“We see gene editing as the next wave of technol-

ogy to impact agricultural production,” says Norm Sissons, marketing director for Cibus, a privately owned technology company. Sissons says Cibus is focused on the development of improved crop characteristics through gene editing. The company utilizes breakthrough precision gene-editing technologies.

“We’re really talking about speed and cost. This technology opens opportunities in traits we couldn’t afford to look at before,” Sissons says.

Sissons says that through their breeding process, Cibus has several canola traits that are close to market. Those traits include pod shatter resistance and improved oil quality. Cibus

has launched their own Falco™ seed brand. Sissons says Cibus is also looking at new herbicide modes of action, and disease tolerance including resistance to sclerotinia in canola.

COMMUNICATION
Biotechnology acceptance has been spotty around the world in part because of consumer pushback to the technology. Gene editing proponents know that the agriculture industry needs to be out front when discussing gene editing.

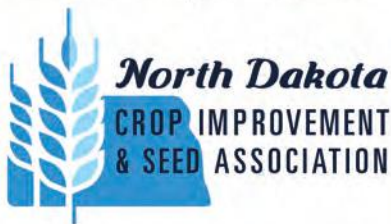
“We need to talk about the benefits,” Sissons says. “We hear a lot about sustainability. We need to look for messages that connect people. What are their concerns and what are we doing about them?”



Sissons says there are more questions about gene edited crops in Europe than elsewhere. He says the scientific community is aligned on the issues of food safety with gene editing, but the political side is not aligned. Because genetically edited crops are indistinguishable from those developed through traditional breeding, some experts believe change will come to Europe,

opening that market to gene edited crops. With an exploding global population in need of food, plant breeding will take on increasing importance and offer opportunity.

“Breeding tools will adapt and improve with genetic and computational knowledge,” Boehm says. “We need more bright data scientists, engineers and project managers in plant breeding.”



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Concern Grows Over New Soybean Pest

By Dan Lemke,
Spirited Communications

It's difficult for farmers to prepare for the unknown and that uncertainty is what has researchers so concerned about the soybean gall midge.

In 2018, soybean growers in Nebraska, Iowa and South Dakota noticed soybeans were wilting and dying. This was occurring particularly along field edges. The stems were brittle near the base. Inside the stem of farmers found small, orange, gall midge larvae. Later in the season, soybean stems were breaking where the midge injury occurred, causing significant crop losses in many fields. Later in the summer of 2018, gall midge was discovered in southwestern Minnesota.

Previously, researchers presumed midge infestations were secondary to previous

soybean injury from hail and disease. However, scientists now believe the insects can infest soybean plants directly. Minnesota Soybean Research Director David Kee says the soybean gall midge, *Resseliella maxima*, feeds on the insides of the soybean plant.

Gall midge adults are tiny, mosquito-like insects that lay eggs at the base of the soybean plant. The emerging larvae burrow under the outer layer of the soybean plant to eat the growing layer inside. Crop damage is caused by the larval feeding inside the stem, which causes brittle stems and significant yield losses when populations are high. Midge larvae feed under the epidermis of the stem, weakening the stem and causing lodging, which further adds to the yield losses. Kee says gall midge were confirmed in 14 Minnesota counties in 2019, primarily

in southwestern Minnesota, but their presence is edging closer to the Red River Valley.

"Infestations are nearing the Red River headwaters," Kee says. "What's to keep them from getting here? They have the potential to spread, so keep an eye out for them."

Kee says that most damage from soybean gall midge occurs along field edges, but fields with longer infestations could see damage creep farther into the field. As adults emerge from overwintering, they're going to the closest soybeans. Kee says research shows that new gall midge hatches can occur in just over three weeks.

"It's about 25 days per generation, so we can have four generations in a year if we have a long growing season," Kee explains.

The big challenge is the unknown, which is what Kee says makes gall midge infestation scary.

"There's a lot we don't know about the gall midge, including the fact that we don't know how to kill it," Kee says.

Researchers say some biological gall midge control does come from beetles and parasitic wasps. Timing a midge hatch can be very difficult, so insecticide treatments aren't likely to be effective.

A key for farmers to identify potential gall midge issues is scouting. Infestations are most likely on field edges and adjacent to soybeans that were infested the previous year. Farmers are encouraged

continued on the next page



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Covering a Ghost Disease

By Dan Lemke,
Spirited Communications

Midwest soybean farmers continue to battle with a largely hidden pest that robs them of yield potential. Soybean cyst nematode (SCN) can reduce yields by up to 30 percent before any outward symptoms are evident, and it's a growing problem in many regions.

SCN is a small plant-parasitic roundworm that lives in the soil attacks soybean roots. Several generations can hatch each growing season, causing populations to explode if left unchecked. Because SCN eggs travel via soil movement, wind, farm implements, and water can move SCN rapidly, causing problems where there was none before.

"SCN is a really bad problem in soybeans because it's a ghost disease," says North Dakota State University Professor Marisol Berti. "You don't see it, so it's always good to test your soil to see what you have."

Most farmers combat SCN by planting soybean varieties

that are SCN resistant. Most varieties use the same strain of genetic resistance, which is starting to lose its effectiveness.

As soil-dwellers, SCN are dependent upon plant roots to survive. Berti says some crops are host crops, meaning SCN can grow and thrive on them. Soybeans, edible beans and clover are host crops. Other crops are non-hosts, so SCN cannot colonize and feed on them. Some other plants are toxic to SCN, including brassicas like turnips, radishes and camelina. Trap crops encourage SCN eggs to hatch, but the juvenile worms are then unable to feed on the plant's roots, so the young worms die.

Berti and other NDSU researchers are studying the effects cover crops planted before soybeans or interseeded with soybeans have on SCN populations and soybean yield.

Researchers interseeded brown mustard, winter camelina and crambe at the soybean V6 stage

New Soybean Pest page 10

to walk field edges and look for plants with darkened stems at the base near the soil level. Gall midge feeding injury is visible after the V2 stage for soybeans.

Researchers are continuing to screen insecticides and track timing of adult soybean gall midge emergence. They'll also conduct a major survey for distribution in Minnesota. University of Minnesota researchers will also examine the potential of parasitic wasps during 2020.

Take home messages

- Even very low levels of SCN (< 50 eggs/100 cm³), SCN populations can explode up to 140-fold if a SCN-susceptible variety is planted
- SCN populations increased 2-4 fold even in the resistant variety
- Fall-planted cover crops reduced SCN populations in the resistant variety but not in the susceptible variety except in Crookston
- Fall-seeded cover crops preceding soybean is one more potential tool to manage SCN

NDSU NORTH DAKOTA STATE UNIVERSITY

in Prosper and Casselton, North Dakota. They planted winter camelina and brown mustard after wheat and before soybeans at plots in Prosper and Crookston, Minnesota. The scientists also planted both SCN resistant and SCN susceptible soybean varieties.

The researchers then tested SCN numbers and soybean yield at the end of the 2019 growing season.

While Berti says SCN numbers were all over the board, their research confirmed that even low SCN numbers can explode quickly if susceptible varieties are planted. In one plot SCN numbers increased from 5,000 eggs to 155,000 eggs per cubic centimeter of soil in one month.

"That shows how fast those numbers can increase," Berti says.

Results showed that fall seeded cover crops did result in a reduction in SCN numbers when planted with resistant varieties. Fall seeded cover crops didn't show an improvement in SCN populations when planted with susceptible varieties except in Crookston.

Berti says while the SCN resistant varieties did show a reduction in SCN numbers, interseeded cover crops did not reduce SCN populations, nor did they impact soybean yield.

"Fall seeded cover crops following wheat and before soybeans may be one more tool for SCN management," Berti says, "but we have a lot more work to do."

More information on the cover crop trial is available at mnwheat.org.

Increasing Market Opportunities in Asia

By Shawna Aakre,
Continually Still

Farmers have seen considerable volatility in wheat prices in the recent past, but there is hope as exports to South East Asia (SEA) continue to increase.

That good news was delivered to farmers by Joe Sowers, U.S. Wheat Associates Regional Vice President of the Philippines and South Korea, at the Prairie Grains Conference in December. He said the U.S. has seen increased sales to that region over the last 12 years, currently exporting almost a quarter of a billion bushels to them. They went from being 11 percent of U.S.

global sales a decade ago to about 26 percent last year.

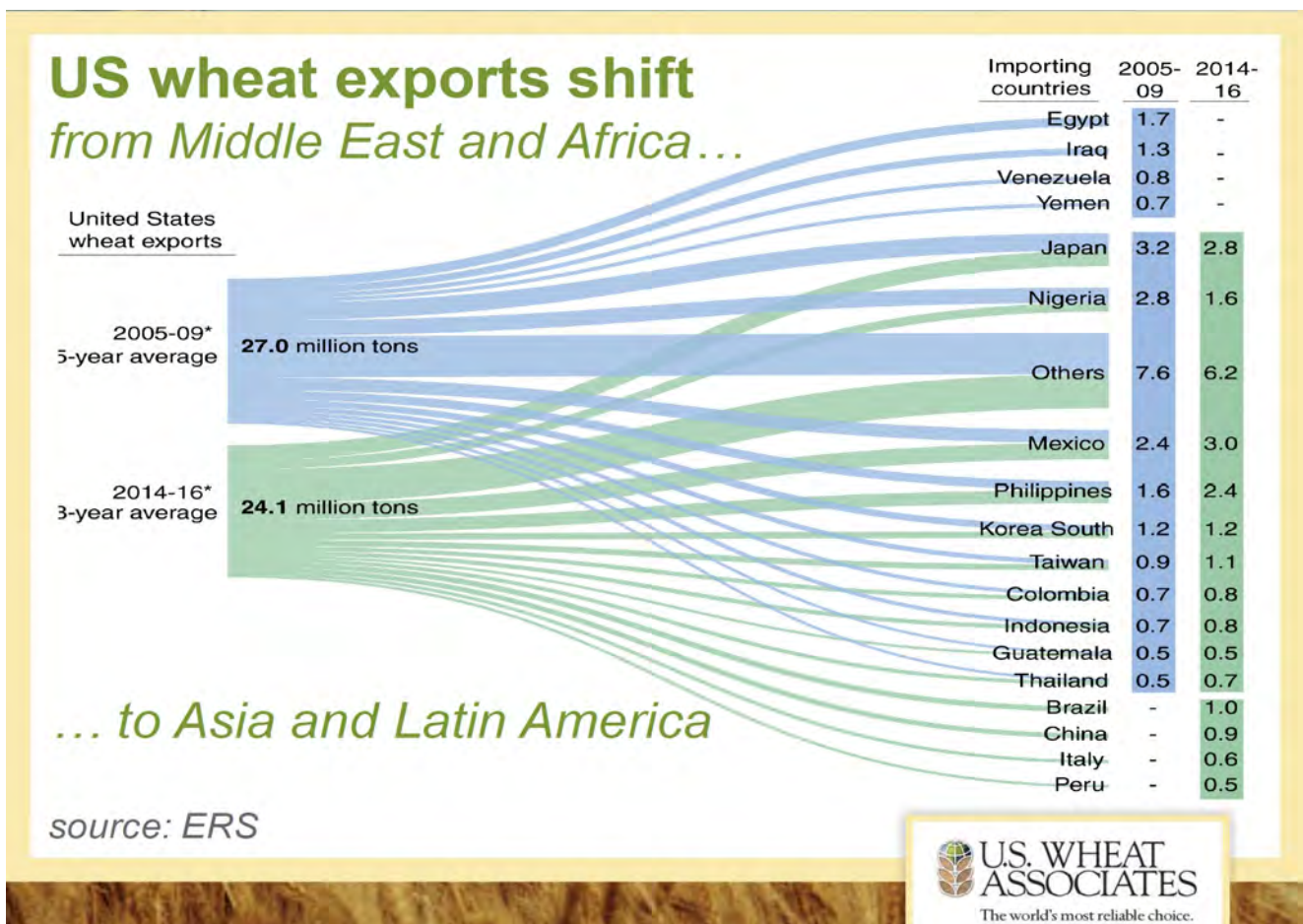
Sowers attributed a small part of the increase to China blocking U.S. wheat exports through various means including tariffs. Since China had been the third largest market in the world for U.S. spring wheat, wheat prices took a hit. Countries like the Philippines took advantage of that price and increased imports dramatically. Sales were also better to Thailand and Malaysia and huge into Bangladesh, which is very rare, Sowers said. That means spring wheat sales to the region went from 20 percent about a decade ago to nearly half.

“In our little region, sales are going up like mad. The last five years we have exceeded the entire U.S. export program every single year. Amazing,” Sowers said. “Now what’s driving this increase? We need to talk population. Many countries in the region, with the exception of Thailand, are growing about one percent. The Philippines, which has a young population, is growing about 1.6 percent. That’s the fastest growing large country on the planet earth today.”

The middle class and consumption in those countries is also growing at a rapid pace. Sowers pointed out that 90 percent of the Fili-

pino population is below the age of 55, which economists consider the super consumer cohort. He contrasted that with North Asia, where countries like Japan are seeing a decline in population; and Korean and Japan have a much older population and slower rates of growth. By 2030 projections, the U.S. and Canada are seeing very little growth in the middle class, Sub-Saharan Africa is not expected to improve its middle class growth, Latin America is doing well and the Middle East is projected to double its middle class.

“An analysis from the Brookings Institution says that 88 percent of the next entrance in the middle class



will be in Asia,” Sowers stated. “China and India will be taking up a large chunk. But the rest of Asia will see more entrance into the middle class than the rest of the world combined. That matters because these consumers are able to choose what they want rather than what they can afford.”

There is a changing lifestyle and diet in that region Sowers said, helping the middle class consumption of wheat based foods. Indonesian wheat consumption is up 50 percent in the last ten years. He pointed out that in the Philippines it took only five years to grow by 50 percent and Thailand, Myanmar, Vietnam and Malaysia are also growing very quickly. Much of that is made up of new products, new opportunities and new qualities of food that U.S. wheat exports are fitting into very nicely according to Sowers. Also on a positive note for the U.S. wheat market in SEA, Australia has faced some tough years resulting in a lesser quality crop.

Yet, all of this new demand does not seem to be translating into better prices for farmers.

“And that’s because of the advent of the Russian wheat export. They went from the largest importer of wheat to the largest wheat exporting country in the world in the span of 25 short years. That is a two billion bushel swing in trade. That’s going to leave a mark and hurt.”

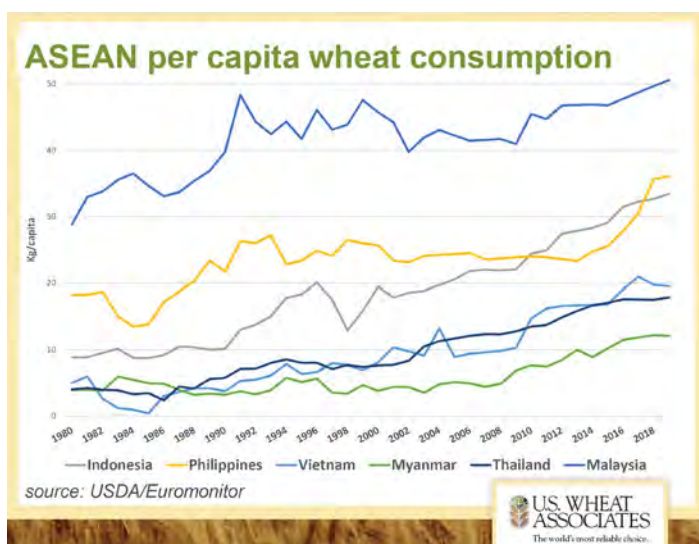
Sowers said the wheat export increase was a result of 2015 trade sanctions placed on Russian exports of prod-

ucts like military goods, munitions and oil after the country annexed Crimea. They couldn’t sell anything but wheat, he said, and they had every incentive to invest in it and move forward. The Middle East and Africa are on the back door of Russia, resulting in lost sales for the U.S. during that time. Sowers said that region is also not as quality sensitive as the SEA region, so more expensive, higher quality wheat from the U.S. does not entice them as much.

The U.S. did pick up Latin America sales since then, but Argentina is also a wheat producing country. Sowers said that hard red spring wheat growers have a different and desirable product, which makes them more fortunate than their counterparts growing hard red winter wheat in the U.S.

However, in Indonesia, Malaysia, Thailand and Vietnam, noodle consumption makes up a significant portion of wheat use. In the Philippines, the opposite is true as half of their consumption goes into baked goods, similar to the U.S. Sowers said that is what makes it the number one market in the world for hard red spring (HRS) wheat. Sales to the Philippines have more than doubled and the U.S. is now exporting over 110 million bushels to the country.

While small bakers who do not want long development time or mixing tolerance are still prevalent in countries like Indonesia, Sowers said automated lines are beginning to grow and so is HRS wheat export potential.



“Demand for wheat based foods in the ASEAN [Association of Southeast Asian Nations] region has increased at an extraordinary pace in recent years, partly because wheat is extremely inexpensive. We are optimistic increased per capita demand will continue in the long-term, even when prices come back up,” Sowers said.

The challenge still remains to change the scarcity mentality of many of these countries. That mentality comes from a time of the dictators when people did not have much. It is a struggle to get them to spend more on things like flour, Sowers said, when that means they would have to spend less on items they enjoy. But the goal is to change that mindset and emphasize quality.

“We at U.S. Wheat help them come up with new products, differentiate themselves from their next door competitor, gain their margins through efficiencies, not through decreased input prices, and remind them that if you use good products it gives

you a peace of mind and saves you on headaches.”

He said quality ultimately pays. Bakers and millers in the region are embracing this message and using an “American Quality Wheat” icon on their packaging to inform their customers of the value they provide.

Sowers encourages HRS wheat producers to continue focusing on high quality wheat for the miller and baker. He said the global market has a lot of low quality wheat at unsustainable prices for northern plains farmers.

“My job is the easiest in the world. I sell a product that everybody wants, and that’s what you grow.”

Sowers said that in the Philippines, millers and bakers are looking for a stable price they can adjust to. He said they understand farmers here need a price increase to make enough to continue to grow the wheat they need. It’s the volatility of prices, due to our current situation, that concerns them.

Making the Right Choice

By Dan Lemke,
Spirited Communications

University of Minnesota Extension Agronomist Jochum Wiersma is encouraging Minnesota farmers not to give up on planting wheat in lieu of other crops like corn and soybeans because there still are opportunities in wheat production.

Wiersma says farmers like to plant soybeans because yields have been stable in northern Minnesota for years, so farmers know what to expect. Corn yields are gradually increasing as well. While 2019 was a challenging year for crop production, Wiersma says the Minnesota statewide wheat average was 57 bushels per acre, which still follows trendlines showing gradually increased wheat yields.

“Don’t ditch wheat,” Wiersma says.

CHALLENGING YEAR
Minnesota wheat farmers faced numerous challenges in 2019. Some other issues took a back seat. Wiersma says that if it wasn’t for the very wet conditions, sprout damage and low Hagberg falling numbers, more attention would have been given to problems like bacterial leaf streak, Fusarium head blight and vomitoxin.

“2019 was the worst year for scab since 2004,” Wiersma says. “We had way more scab.”

Wiersma says most wheat with falling numbers below 250 will likely be used for feed. Vomitoxin levels aren’t a big issue if the grain is fed

“If it’s wasn’t for a record wet fall, sprout damage, and Hagberg falling numbers we would now only be talking Bacterial leaf streak, Fusarium head blight (scab) and deoxynivalenol (vomitoxin).”

- Dr. Jochum Wiersma

to cattle, but it’s a different story for wheat fed to hogs.

CAREFUL SELECTION
Wiersma says the best way to avoid scab and vomitoxin issues is to plant wheat varieties with strong resistance.

“You have to plant varieties resistant to fusarium head blight. That’s the best bet for making the grade,” Wiersma explains. “You can’t spray your way out of this disease.”

Bacterial leaf streak (BLS) is also showing up in wheat fields across Minnesota. Wiersma says because farmers have no control options, planting varieties resistant to BLS is the only real management option that’s available.

Wiersma says preharvest sprout (PHS) was a problem at many locations in 2020 which contributed to low falling numbers. Research shows that falling numbers between 200-300 indicate that some level of sprouting has occurred. Falling numbers less than 150 indicate that the grain was highly sprouted and is not usable for many food applications.

When choosing seed varieties, “PHS rating numbers matter. Good

varieties hang in there the longest,” Wiersma says.

Several factors can result in low falling numbers including late maturity alpha-amylase (LMA). Wiersma doesn’t believe LMA was the problem. Pre harvest sprout may have been the major factor in the low falling numbers found in a large percentage of Minnesota’s 2019 wheat crop.

Wiersma advises farmers who are keeping bin-run seed that they plan to plant in 2020 to retest germination before they plant it. If the seed breaks dormancy, there will be downgraded vigor and reduced germination.

“Test seed again in March,” Wiersma says. “If germination value goes down, plant another seed lot. With bin-run seed, retest it to see what you have because we may have some ugly surprises.”

Wiersma says good variety choices for 2019 include Bolles, CP3530, Lang-MN, Linker, Shelly, MN-Washburn, SY Ingmar and SY Valda. Farmers should consider the pluses and minuses of each variety to best match them to the individual farm challenges.

MN-TORGY

- MN14105-7 (Sabin/01S0377-6/Linkert) has shown high yields, especially in southern MN along with medium protein levels. Disease resistance is good, among the best for bacterial leaf streak (rate 3 on 1-9 scale) and moderately resistant to scab (4). Straw strength is moderate, better than Shelly and Lang-MN, but not as strong as MN-Washburn or Linkert.

Variety	Release Yr.	Gain yield			HD	HT	Straw		TWT		Prot. (%)	Baking		Leaf		Stipe		Baot.		Scab
		% MN	% of mean	n			1-9	2 yr	1-9	1-9		1-9	1-9	1-9	1-9	1-9				
SY-Valda	2015	15.5	109	109	111	54.6	31.3	5	60.0	14.0	6	2	1	2	3	4				4
Prosper	2011	1.9	104	107	108	56.5	33.1	8	59.7	13.7	5	1	6	5	4	4				4
Shelly	2018	7.1	106	106	107	57.4	29.5	5	59.4	14.1	5	1	3	1	6	4				4
TCG-Spitfire	2018	3.9	107	106	107	57.9	31.3	3	58.7	13.9	2	3	5	-	3	5				4
MN14105-7	-	-	106	105	105	56.2	31.3	4	59.9	14.8	5	2	3	-	3	4				4
MN-Washburn	2019	0.3	101	100	103	56.8	30.0	3	59.8	14.0	3	1	1	2	3	4				4
Lang-MN	2018	1.9	102	102	101	57.3	32.7	5	60.6	14.8	3	1	1	1	3	3				3
SY Ingmar	2014	2.8	99	100	99	55.6	29.2	4	60.1	15.1	2	2	2	2	3	4				4
WB-Mayville	2011	5.4	97	96	96	52.7	28.0	3	59.6	15.4	2	3	3	3	7	8				8
Bolles	2015	4.4	96	94	95	57.8	32.3	4	59.2	16.1	1	1	2	1	5	4				4
Linkert	2013	22.3	93	92	95	55.2	28.5	2	59.9	15.4	1	1	3	1	5	5				5

UNIVERSITY OF MINNESOTA | EXTENSION

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MN-Torgy

The University of Minnesota Wheat Breeding Research team has introduced a new variety honoring long time Minnesota Association of Wheat Growers Executive Director Dave Torgerson. MN-Torgy was released in January and features high yields and medium protein levels. It has shown good resistance to BLS and moderate resistance to scab as well as moderate straw strength.

Wheat Quality Counts

By Dan Lemke,
Spirited Communications

Wheat yields are important to farmers, but so too is quality because quality is a main concern for customers of Minnesota's hard red spring wheat.

North Dakota State University's (NDSU) Wheat and Carbohydrate research program was established in 1905 and operates a wheat quality lab on the NDSU campus in Fargo. The lab does complete wheat analysis from field to table. The program develops a regional wheat quality report, an export cargo survey, tests nursery samples, and conducts research projects.

"Quality is what our customers are looking for," says DeLane Olsen, NDSU research specialist. Olsen says Minnesota wheat travels between 2,500 and 9,400 miles to reach its final destination. The top customers for hard red spring wheat include the Philippines, Japan, Taiwan, Korea and Mexico. Approximately half of Minnesota's hard red spring wheat is exported.

The high protein content and superior gluten quality of hard red spring wheat make it ideal for use in fine baked goods including yeast breads, hard rolls and specialty products such as hearth breads, whole grain breads, bagels and

pizza crusts. Flour mills in the United States and around the world also use hard red spring wheat extensively as a blending wheat to increase the gluten strength in a batch of flour. Adding hard red spring to lower protein wheat improves dough handling and mixing characteristics as well as water absorption.

The NDSU Wheat Quality Lab is equipped to test wheat quality factors such as milling quality, flour quality, dough quality and bread-making quality.

Customers seek out hard red spring wheat for use in bakery products including bread, rolls, buns and

even noodles. Each bakery product has a unique formulation and requires flours with different functionality.

"High quality gluten is the main reason bakers choose hard red spring wheat flour," Olsen says.

Olsen says researchers at the NDSU lab test protein quantity using Near Infrared Transmittance. They test protein quality by measuring wet gluten. A farinograph measures the water absorption of flours, the relative mixing time, the stability to overmixing, and rheological properties of

continued on page 18

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Research Tackles Soybean Challenges

By Dan Lemke,
Spirited Communications

Soybean checkoff funds are used to help develop new markets for soybeans and soybean products. Those funds also support public research intended to improve soybean production and farmer profitability.

Directors on the Minnesota Soybean Research and Promotion Council (MSRPC) approved funding for 25 soybean production research projects in their 2019 fiscal year. The MSRPC-supported projects were done collaboratively with the University of Minnesota, North Dakota State University and the Minnesota Wheat On-Farm Research Network.

BIOPESTICIDES

Among the intriguing research projects supported by the MSRPC is an effort at the University of Minnesota to identify biopesticides that showed promise in protecting crops. Minnesota Soybean Research Director David Kee says the aim was to identify biologically derived nematicides and anti-fungal compounds. High performing biological agents would then be tested against sudden death syndrome (SDS) and soybean cyst nematode (SCN).

Kee says researchers identified 16 potential ingredients. The ingredients were tested as seed coating treatments and amended spore formulations in greenhouse trials against SDS. Kee says there were positive results against fusarium from one compound, which will undergo further research.

GALL MIDGE

The soybean gall midge is a new pest that is causing damage to soybeans and concern among farmers and researchers.

In 2018, soybean growers in Nebraska, Iowa and South Dakota noticed soybeans that were wilting and dying, particularly along field edges. The stems were brittle near the base with dark lesions. Inside the stem of affected plants, they found small, orange, gall midge larvae. Crop losses were significant in many fields because the infestation caused stems to break. Later in 2018, gall midge was discovered in Minnesota soybeans.

Gall midge hatch in the spring and are becoming a problem for soybean farmers. Two separate species of gall midge have been identified, (SGM & WGM, *see below*) Infestations are typically found along field edges.

Kee says researchers tested several insecticides for their effectiveness in controlling gall midge. While insecticides can reduce midge numbers, Kee says it will be difficult to control gall midge with insecticides because there tends to be at least two hatches per growing season.

Kee says there are some natural gall midge predators including ground beetles and platygastriid wasps. Researchers are also investigating other biological controls.

Gall midge infestations in Minnesota are limited, but they're expected to continue spreading, so farmers are strong encouraged to scout field edges for early detection.

FUNGICIDES IMPACT ON SOYBEAN YIELD

Soybean white mold trials have shown that foliar fungicides have been most effective in white mold reduction and soybean yield enhancement when fungicides are applied at the R1-R3 stages. Tests have shown up to 35 percent yield increases.

Kee says researchers had low levels of white mold in test plots in 2019, but

fungicides did delay plant maturity. Research showed that foliar fungicides worked well in areas where disease pressure was more rampant. Otherwise, treatments showed little benefit.

"If you're going to use it, make sure you have a problem," Kee says. "There's no yield benefit for blanket usage."

Kee says researchers also received increasing reports of Frogeye leaf spot in soybeans in several southern Minnesota counties. Frogeye leaf spot is a soybean disease that infects leaves, stems and pods. Crop losses can be as high as 30 percent on susceptible varieties with severe leaf blighting.

University researchers confirmed that the pathogen found in Minnesota is resistant to the strobilurin class of fungicides, which significantly impacts management options.

WATERHEMP

Researchers screened waterhemp control from 13 residual herbicides at one-quarter and one-half rate. That information will be used as preliminary information to test a micro-rate program for cost and control effectiveness in 2020.



Resseliella maxima (SGM)



(University of Minnesota Extension Pictures)



Karshomyia caulicola (WGM) - Sclerotinia Sclerotiorum



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Trade Issues a Top Farm Priority

By Dan Lemke,
Spirited Communications

Garden City, Minnesota farmer and Minnesota Farm Bureau Federation President Kevin Paap recognizes that trade and exports are a concern, in part, because farmers are so good at what they do.

“We’re blessed that we can grow more than we can use,” Paap says. “Trade is important to our economic success because we need to export.”

For the past year and a half, trade issues have moved to the forefront as an ongoing trade war with China has shaken up export markets.

The United States is backing away from the Trans Pacific Partnership trade agreement and challenges in finalizing the U.S. Mexico Canada (USMCA) trade agreement have also thrown some of the nation’s biggest and traditionally most consistent export markets into turmoil. Those trade disruptions have a direct impact at the farm level.

“Agriculture has had a

positive trade balance since 1959, that puts ag at the tip of the spear when it comes to retaliation,” Paap says.

“Trade is important to ag and to the U.S.,” says North Dakota Wheat Commission Administrator Neal Fisher. “Everyone benefits from sound policy. Ag exports make up about one-third of gross farm income.”

Fisher says the U.S. exports about \$140 billion in ag products annually. “Agriculture consistently generates a surplus, which is sometimes overlooked,” Fisher adds.

Because most agriculture commodities operate in a global economy, farmers are impacted by decisions made outside of their control. Wheat industry representatives push for trade agreements that help their farmers.

“Trade policy has always been a big concern in the wheat industry,” U.S. Wheat Associates Vice President Joe Sowers says.

Fisher and Sowers say pulling out of the Trans

Pacific Partnership (TPP), a 12-nation trade agreement has hurt U.S. wheat farmers. Japan is the second largest spring wheat market. TPP would have put U.S. wheat farmers on equal footing with their competitors in Japan and other growing markets.

“The wheat industry had a hand in building the TPP,” Fisher says. “When the U.S. backed away, Canada and Australia became the big winners.”

Fisher says the withdrawal left U.S. wheat at 40 cents a bushel disadvantage to wheat grown in Australia and Canada.

PROGRESS AND OPTIMISM

The USMCA passed on January 16, 2020, a trade agreement with Japan is in place and nearly complete, and the framework has reportedly been finalized for a Phase One trade agreement with China. All of these trade treaties would be beneficial to Minnesota grain and livestock farmers. However, until the agreements are finalized, their impact remains uncertain.

“Right now, with Japan and China, until everything is agreed to, nothing is agreed to,” Paap says.

Wheat industry leaders are encouraged that the U.S. and Japan are close to a trade deal that will give U.S. farmers the same advantages as farmers in countries that signed on to the TPP. Sowers says that while the U.S. lost out on some market opportunities due to the TPP withdrawal, trade discussions are taking place with potential customers like the Philippines, Indonesia, Korea and Vietnam.

Trade negotiations may occur at a high level of government, but Paap says farmers can still influence the process.

“If you’re not at the table you’ll be on the menu,” Paap says. “Never underestimate the impact a call to your Congressman can have from your combine or your barn. Never underestimate that it’s important. There are a lot of challenges in agriculture right now, but farmers have to keep hammering away.”

Quality from page 15

the dough during mixing. Baking is the ultimate test of wheat quality.

Hard red spring wheat is known for its high protein, high gluten strength and high absorption levels. That’s what customers at home and abroad are seeking.

Olsen says the target for protein is 14.5 percent with higher farinograph absorption levels.

Olsen says that while wheat breeders have increased yield in wheat varieties, some quality and stability has been lost. However, she was surprised at protein

levels during this year’s crop despite challenging growing conditions.

In addition to laboratory testing, NDSU Wheat Quality Specialist and Professor Senay Simsek and program staff host trade teams, conduct seminars, conduct workshops, host

visiting scientists, and conduct research projects to improve quality and connect with customers.

The work is part of an effort to keep moving the wheat system forward.

Market Outlook for 2020

By Dan Lemke,
Spirited Communications

Farmers across the Midwest dealt with challenging growing conditions including a late spring in many areas, wet conditions during the growing season and difficulties harvesting the year's crops. It has also been a challenging period for finding profitability in grain markets. Trade disruptions, depressed prices, reduced yields in many commodities and low-quality grain means farmers need diligence in their marketing efforts.

According to USDA's Crop Production Summary, Minnesota corn yields in 2019 were estimated at 174 bushels per acre, down eight bushels from 2018 and 20 bushels per acre lower than 2017. Curt Abfalter, Market Analyst for CHS Hedging, says 2019 had the first below trendline corn yields in six years.

Nearly 20 million acres were placed into prevent plant, almost double the previous record high. As of December 1, 2019, 11 percent of the nation's corn remained unharvested.

Corn marketing has been affected by lagging export demand. Abfalter says the U.S. has sustained annual export sales of at least 1.8 billion bushels for many years. Exports so far in the 2019-2020 marketing year are sluggish. Ethanol profitability has also weighed on the markets.

"We've had negative ethanol margins for much of the year," Abfalter says.

Looking ahead, Abfalter

expects gradual corn price strength based on the January crop report, and a likely February selloff. He also expects the market to exceed January highs. A strong basis also suggests selling more grain earlier.

"If you have high quality corn, it may garner a premium. If you're dealing with low quality, you may have to look for opportunities," Abfalter says. "Sell that more quickly, if possible."

USDA estimates U.S. soybean production is at 3.55 billion bushels, and soybean harvested area is estimated at 75 million acres. Minnesota soybean yields averaged 44 bushels per acre, down from a year ago. Soybean production was lower due to challenging weather and reduced acreage as well as a lot of late planted soybeans.

Abfalter says there was a slow start to soybean exports, but levels have caught up to a year ago.

"By the end of the crop year, I think we will export more beans," Abfalter explains. "China is buying U.S. soybeans and soybean basis levels are strong."

A Phase 1 trade agreement has been signed between the U.S and China, but the deal's full impacts are still unknown. China has agreed to purchase and import on average at least \$40 billion of U.S. food, agricultural, and seafood products annually, totaling more than \$80 billion over the next two years.



Curt Abfalter, Market Analyst-CHS Hedging, speaks in front of a crowd at the Small Grains Update meeting in Lancaster, MN.

Products will cover the full range of U.S. food, agricultural, and seafood products, including soybeans, corn, wheat and pork.

Competition for global soybean markets will be strong, particularly from Brazil and Argentina. Weather conditions are currently favorable for crop development and infrastructure for moving grain from farm to market is rapidly improving. Despite that competition and an expected good soybean crop in South America, Abfalter expects U.S. soy acreage to rebound in 2020.

"There are a lot of variables that will drive market volatility in the next 4 to 5 months," Abfalter says.

Abfalter says wheat prices are trading near 12-year lows in part because of global competition.

"There's a lot of wheat in the U.S. and the world," Abfalter explains. "There's always somebody in the world growing a wheat crop."

Whatever the crop farmers raise, Abfalter recommends growers get proactive in their marketing approach.

"Look for different ways to sell grain because you can take the market or you can make the market," Abfalter contends. "Think about ways to make sales. What are your targets? Every year gives you some opportunities. Get some sales made. Work with someone to make a plan. Do something to take the emotion out of the equation."

In addition to making a marketing plan, Abfalter says farmers should consider locking in their fertilizer needs for 2020.

"I'm concerned that we have enough fertilizer in the system right now to get us going in the spring," Abfalter says.

Abfalter says because nearly all fertilizer ingredients are shipped in from other parts of the country, there could be logistical problems in the spring.

American Malting Barley Association, Inc.

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2020 AMBA Recommended Malting Barley Varieties

The American Malting Barley Association (AMBA) Board of Directors approved the addition of AAC Connect, LCS Odyssey, Moravian 164 and Moravian 170 to the recommended list of malting barley varieties for 2020.

AMBA is a trade association of brewing, distilling and malting companies and the list is meant to inform US producers on the malting varieties that the industry will be using in the coming year.

Not all varieties will be used in large quantities and growers are encouraged to contact their local elevator, grain handler or processor to gauge market demand for any variety grown in their region prior to seeding.

Dr. Bill Legge developed AAC Connect at the Brandon Research Centre, Agriculture and Agri-Food Canada. It is a two-row, spring malting barley variety that was registered in Canada in 2016. It has plump kernels, good resistance to lodging, improved resistance to FHB, and has greater yield than AC Metcalfe and CDC Copeland. The variety is licensed to Canterra Seeds in Canada and distributed in the US by Meridian Seeds.

LCS Odyssey, a spring two-row malting variety, was developed by the Limagrain

UK breeding program and is marketed in the US by Limagrain Cereal Seeds. LCS Odyssey has an unusually wide area of agronomic adaptation, achieving peak yields in Montana, Colorado and the Pacific Northwest. The maturity of LCS Odyssey is not generally a good fit for North Dakota and Minnesota. LCS Odyssey is a non-producer of Glycidic Nitrile (GN).

Dr. Bob Brunick of Molson Coors Beverage Company developed Moravian 170 and released it in 2019. Moravian 170 is an early maturing, two-row, spring malting barley. It was bred

and developed for irrigated production in Colorado. It is a short statured barley with good lodging resistance and yields equal to or greater than Moravian 069. Moravian 170 produces high yields and quality grain in heat-stressed conditions and can be produced with 2-3 fewer inches of irrigation water than Moravian 069. Moravian 170 is a proprietary barley variety of Molson Coors Beverage Company.

Dr. Bob Brunick of Molson Coors Beverage Company developed Moravian 164 and released it in 2019. Moravian 164 is a medium statured, two-row, spring

malting barley. It was bred and developed for irrigated production in the San Luis Valley of Colorado. Moravian 164 produces higher grain yields and greater plump seed than Moravian 069. Moravian 164 can be produced with 1-2 fewer inches of irrigation water than Moravian 069 without an increased risk of reducing grain yield, grain plumpness or malting quality. Moravian 164 is a proprietary barley variety of Molson Coors Beverage Company.

Contact: Scott E. Heisel, AMBA VP & Technical Director (414) 272-4640

The complete list of recommended malting barley varieties for 2020 is as follows:

Two-Rows

AAC Connect	Conlon	LCS Odyssey	Moravian 170
AAC Synergy	Conrad	LCS Violetta*	Newdale
ABI Growler	Endeavor*	Merit 57	Pinnacle
ABI Voyager	Expedition	Moravian 37	Puffin*
AC Metcalfe	Explorer	Moravian 69	Scarlett
Bill Coors 100	Hockett	Moravian 164	Thunder*
CDC Copeland	ND Genesis	Moravian 165	Wintmalt*
Charles*	LCS Genie		

Six-Rows

Celebration	Lacey	Quest	Tradition
Innovation	Legacy	Thoroughbred*	

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Learning From Those Who Do

By Dan Lemke,
Spirited Communications

Changing farm management practices doesn't usually happen haphazardly. Farmers typically need a good reason and plenty of supporting evidence before making a shift in tactics. Sometimes that information comes from other farmers who have already made adjustments to their management style.

Several farmers who have changed their practices to include reduced tillage and cover crops shared their experiences with other curious farmers at the Minnesota Wheat On-Farm Research Network Summit in Grand Forks. Just as every farm is different, each of the growers on the panel had different reasons for adding cover crops.

Mikayla Tabert farms with her husband and father near Red Lake Falls. She says her father has utilized no-till or strip till management for over 25 years. The main reason for changing

from conventional, full tillage to reduced tillage was for erosion control and to build soil organic matter. Cover crops were added in 2012 on about 35 acres.

"Now pretty much all of our land gets cover crops," Tabert says. "We experiment with the species because we want diversity."

Tabert says they've experimented with as many as 50 different plant species in their cover crop mix, which also serves as grazing forage for cattle.

Drayton, North Dakota farmer Michael Larson says he does less conventional tillage every year. While he will till after sugarbeets in order to level fields, he's almost entirely no-till.

Larson incorporates cover crops to bolster soil health.

"We changed because we learned there's more than just a physical and chemical component to soil, there's also a biological link," Larson says.

"We need to focus more on that biology because it helps a lot of things."

Larson says including cover crops into a farm's management plan involves a systems approach.

"When thinking about cover crops, you have to think about what the next year's crops will be," Larson says. "You can't just look at one year."

For Barnesville farmer Ryan Hough, cover crops and reduced tillage not only make soil health sense, the practices also fit with his available resources.

"Labor was a big reason," Hough says. "It's just my brother and me. So, with no-till, spring field work is just a burndown herbicide pass. We don't have to till ahead of planting."

Although labor was a contributing factor, Hough is seeing some additional, longer-term benefits. "I drank the soil health Kool-Aid," Hough quips.

"Now I'm seeing better soil aggregation, better water infiltration, and less soil erosion. There's also less need for waterways."

Paul Dragseth of Crookston recently took the plunge to include cover crops. He does some strip tilling and began planting cover crops for soil health and for grazing cattle in 2018.

"I'm hoping to stay with it for a while," Dragseth says.

WATER MANAGEMENT 2019 was a challenging growing season for farmers. The year was marked by a wet start, a dry middle for many, and then nearly overwhelming rainfall in September and October. Those conditions proved difficult for farmers using all types of management practices.

"We struggled this spring getting things warmed up," Tabert says. "Then we got dry. Fall was interesting, too. We were in fields seeding cover crops while combines were rolling on wheat."

Getting cover crops established is an ongoing challenge because each year is different, and rainfall is unpredictable. Farmers are also concerned with their ability to get into the field in a timely fashion to get cash crops planted. Despite the challenges, farmers are seeing benefits to the reduced tillage and cover crops, even in a very wet fall.

"After 3 or 4 years of no-till, fields are solid and we have less ruts," Tabert





Photo: Coreen Berdahl

Several farmers who have changed their practices to include reduced tillage and cover crops shared their experiences with other curious farmers at the Minnesota Wheat On-Farm Research Network Summit in Grand Forks. From left to right: Dr. Hans Kandel, NDSU; Paul Dragseth, Crookston, MN; Ryan Hough, Barnesville, MN; Michael Larson, Drayton, ND; and Mikayla Tabert, Red Lake Falls, MN.

says. “You do have to be careful to avoid ruts with no-till because you don’t fix them with tillage.”

“Water infiltration is changing,” Larson says. “That improves trafficability.”

Larson built a root box to see if water infiltration is changing as a result of his tillage and cover crop practices. He says the experiment showed water is absorbed more quickly and more deeply into the soil as a result of those management changes.

CONSTANT LEARNING

Nutrient management is a concern for farmers incorporating cover crops. Panelists said they either banded fertilizer with crops at planting or broadcast applied fertilizer hoping to catch timely rains. Weed management practices also changed with the use of cover crops, although cover crops have been shown to be effective at crowding out weeds.

In addition to targeting improvements in soil health, reduced erosion and

organic matter improvement, Tabert says farmers need to make changes based on profitability. “We’re farming for profit,” Tabert says. “We spend about 30 to 40 percent less on herbicides and fertilizer.”

Tabert says that yields on land that has been in long-term no-till were higher than on fields they just started farming.

Because each year and each farm is different the panelists recommend that farmers who are interested

in utilizing cover crops do some experimenting on a small portion of their farm. Some growers are experimenting with 44-inch and even 66-inch crop row spacing to allow for better cover crop establishment. Others are investigating different crop combinations to resolve soil compaction or soil salinity issues.

“Experiment on a small acreage if you’re going to try,” Tabert adds. “You’re not going to lose the farm on 4 acres.”

Choosing the Right Cover Crop

By Dan Lemke,
Spirited Communications

Not all cover crops are created equal, but each can fulfill a valuable purpose.

Although farmers have dozens of species at their disposal, crop consultant Dr. Lee Bries says farmers who are considering incorporating cover crops into their operation should make plant choice based on their needs.

“Cover crop use depends on farmer goals,” Bries says.

Cover crops can be used to help with water management, to reduce wind and water erosion, to combat

soil salinity, or to increase plant and root diversity.

Bries divides cover crops into what he calls the five food groups. The mix includes cool season grasses, cool season broadleaves, warm season grasses, warm season broadleaves and legumes.

“This is what I want you to be feeding your soil,” Bries says. “I’ve seen soil health improvements with this mix.”

Bries says the most common “gateway” cover crops include cereal rye, oats, radishes, turnips and barley.

“If you’re dealing with pre-

vented plant acres, cereal rye is first choice,” Bries says. “Cereal rye should grow vegetatively and stay in that stage, so it will provide good weed control.”

Radishes help to manage water, reduce compaction, have good frost tolerance, fast growth, and have low seed per acre rate. Turnips are good for cattle grazing, while oats performs well on sandy ground and provides good protection against wind erosion.

Many farmers who plant cover crops use multiple species. Bries says that mix doesn’t need to be elaborate as one to three species are enough to provide

benefit. Farmers need to keep their goals in mind when selecting a crop mix.

“Pick them to match your needs because you can do a lot with just a few crops,” Bries explains.

Because herbicides are frequently used to terminate cover crops grown in conjunction with cash crops, growers need to understand the interactions between herbicides and their crops.

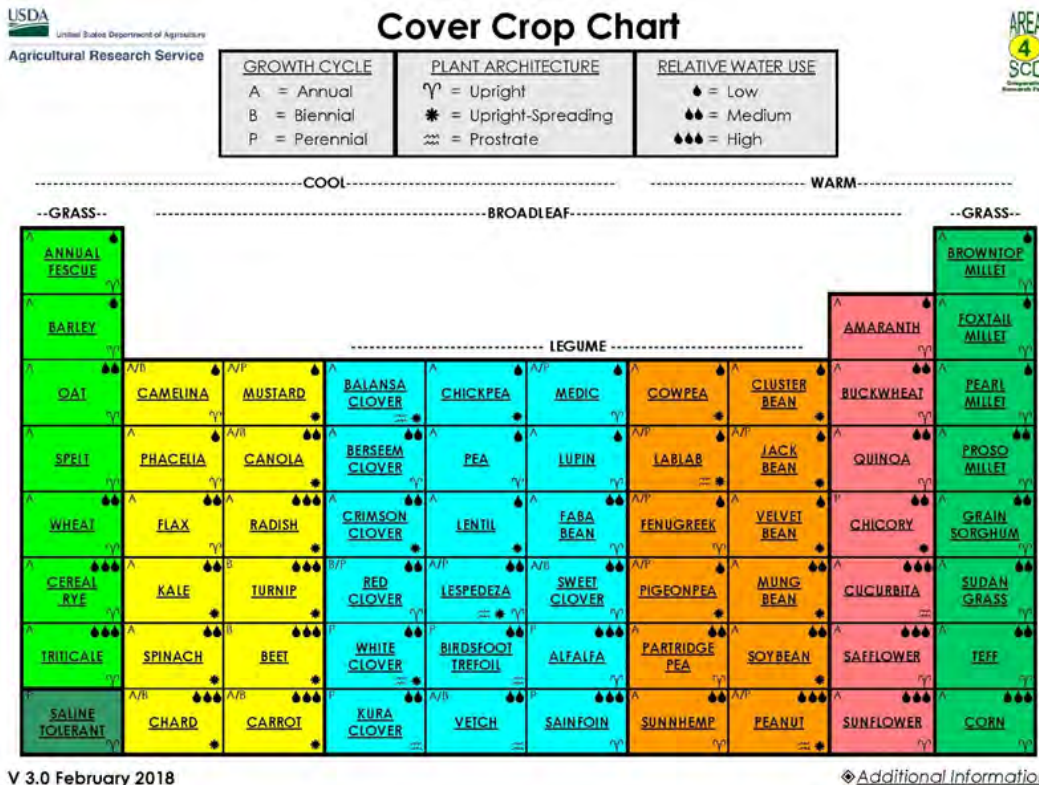
“Fit herbicides to your weeds and fit your cover crops to the herbicide,” Bries says, “don’t fit herbicide to cover crops. I’d much rather have you target the weeds, then fit cover crops into that plan.”

Farmers need to watch herbicide labels for plant back restrictions, carry-over restrictions and grazing restrictions placed on herbicides. The pesticide label is the law.

Bries says the North Dakota State University (NDSU) Extension Weed Guide provides good information on herbicides usage, <https://www.ag.ndsu.edu/weeds/weed-control-guides/nd-weed-control-guide-1>

Because there can be a lot to learn about using cover crops, Bries says the USDA Cover Crop periodic table, Midwest Cover Crop Council selector tool, and NDSU Soil Health web page, <https://www.ndsu.edu/soilhealth/> can be good farmer resources.

COVER CROP CHART “PERIODIC TABLE”



Management Matters

Five Crucial Management Decisions to Help Your Spring Wheat Thrive

By Grant Mehring, Northern Region Technical Product Manager, WestBred® Wheat

It's been said that the average wheat grower makes upward of 40 critical management decisions throughout the course of one growing season. While I don't want to under or over-emphasize any of those individual decisions, I've identified five key decisions that, when thoughtfully considered, will help growers manage their crops to maximize yield potential.

5 Critical Spring Wheat Management Decisions

- What varieties should I choose? Plant Certified Seed varieties that are well-suited to your environment and select multiple

varieties to minimize risk around maturity, disease, drought, yield, or protein.

- How should I effectively manage weeds? In a short spring wheat season, every day counts. Scout your fields early and often, know the weeds you're combating, and devise a weed management strategy accordingly.

- What's the most effective way to protect my crop? Plan on one to three fungicide applications each season. While scouting, look for signs of pressure from aphids, armyworms, grasshoppers, or cutworms. Apply insecticides as needed.

- How do I manage for my environment? Moisture and temperature may not

be under our control, but they do play a huge role in yield potential. Respond to both by monitoring and managing fertility, specifically nitrogen and sulfur.

- How else can I maximize yield potential? You can't harvest wheat efficiently if it's lying on the ground, losing both yield and combine speed. Picking the right varieties, knowing your nitrogen levels, and harvesting in a timely manner can help minimize loss from lodging.

For additional spring wheat management tips, contact Grant Mehring at grant.mehring@bayer.com.

Performance may vary, from location to location and from year to year, as local



Grant Mehring

growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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Does it Pay to Apply Fungicides to Wheat at Flag-leaf Emergence?

By Melissa Geiszler,
On-Farm Research
Coordinator; MN Wheat
Research and Promotion
Council

Wheat fields in northwestern MN are susceptible to infection by leaf diseases during the growing season. In response to producer interest in a more intensive fungicide management program for spring wheat in MN, the On-Farm Research Network began a new trial in 2018 to test the profitability of adding a fungicide application at flag leaf emergence in-between fungicide applications at tillering and flowering.

TRIAL SETUP

Two fungicide treatments were replicated 3-4 times in a field-scale trials in Grant, Norman, Polk, Red Lake, Pennington, Marshall, Roseau, and Lake of the Woods counties during 2018 and 2019 (Figure 1). The 'Control' treatment received two fungicide applications, the first at the 4-5 leaf stage during tillering and the second during early flowering. The 'Treated' strips received three fungicide applica-

tions, the first during tillering, the second at flag leaf emergence (when the last leaf was 80-100% emerged), and the third during early flowering. Details about the rates and chemicals used are outlined in Table 1.

Varieties used were selected based upon their leaf disease resistance ratings from UMN variety trials. In 2018, only the variety Mayville was used, but in 2019 in response to producer feedback the varieties SY Valda, TCG Spitfire and WB 9590 were also added to the trial.

At harvest, yield was measured by weighing one pass of the combine in a weigh wagon or grain cart with a calibrated scale. Grain was also sampled from each plot to measure moisture content, protein content, and test weight.

RESULTS

- In 2019, the flag leaf fungicide treatment increased the yield of Mayville by 2.3 bushels per acre (Figure 2).
- Yield was not significantly different between treatments for TCG Spitfire

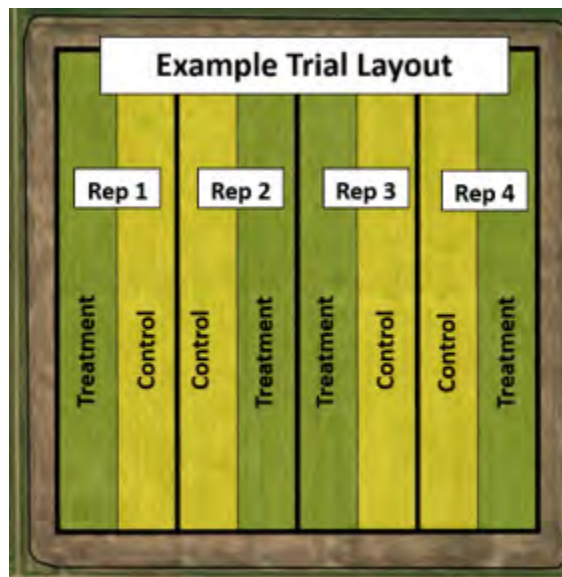


Figure 1. Both treatments are replicated at least 3-4 times across the field. Individual plots are 1-2 passes of the application equipment wide, so that one full swath of the combine can be harvested from the middle of each plot.

and WB 9590, however these results are based on only two locations for each variety in 2019. We would like to test additional locations for these varieties in 2020 before attempting to draw any conclusions about their response to a flag leaf fungicide application.

- When combined across all locations, adding a fungicide application at flag leaf emergence in-

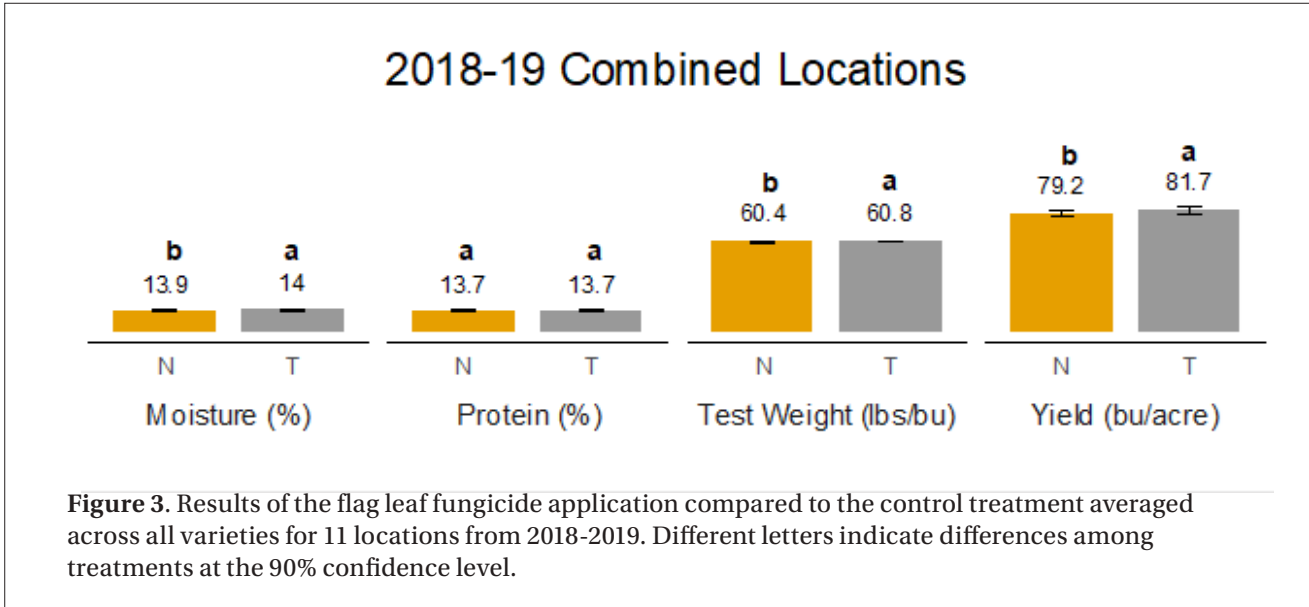
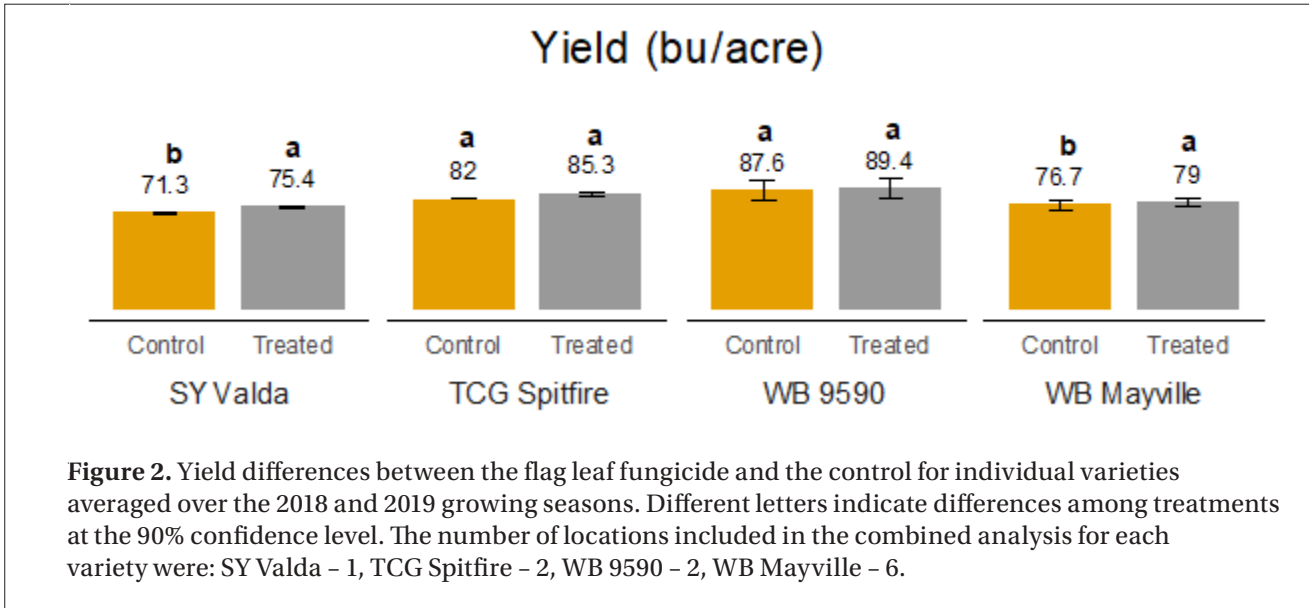
creased yield by an average of 2.5 bushels per acre.

- When averaged across all locations from 2018-2019, the flag leaf fungicide treatment had 0.4 lbs per bushel greater test weight. While the flag leaf fungicide treatment resulted in a statistically higher moisture content at harvest over the control, this is likely not an agronomically significant difference between treatments for the tested locations.

Table 1. Products, rates, and timing of fungicide applications for the trial treatment and control.

Growth stage (rate)	Flag leaf fungicide treatment	Control
4-5 leaf (2 oz/acre) ¹	Tilt (propiconazole)	Tilt (propiconazole)
Flag leaf (2 oz/acre)	Priaxor (fluxapyroxad+pyraclostrobin)	None
Early flowering (6.5 oz/acre) ²	Prosaro prothioconazole+tebuconazole)	Prosaro (prothioconazole+tebuconazole)
¹ Two locations in 2019 used Alto (cyproconazole) at 2 oz per acre		
² Two locations in 2019 used Miravis Ace (propiconazole+pydiflumetofen) at 13.7 oz per acre		

- The application cost for the flag-leaf fungicide was \$14.50 per acre (\$6.50/chemical + \$8.00/application). At several individual locations during the study, the yield



increase from the treatment was able to cover the cost of the application. However, on average, the increase in yield for combined locations did not cover the cost of the application.

- The full report is available online at <https://mnwheat.org/farm-research-network/>

The On-Farm Research Network will continue this trial in 2020 to test the response to adding a flag leaf fungicide application for the selected varieties. With

additional locations, we will be more confident in the conclusions we can draw from the data about the profitability of more intensive fungicide management programs in spring wheat.

As a reminder, whenever making multiple applications of fungicides or other crop protection products during a single growing season, be sure to rotate or include multiple modes of action to avoid building up populations of resistant diseases or pests.

Reach out to your local university extension agent or agronomist for more information about how to rotate chemical modes of action in your farm's crop protection program.

MN Wheat's On-Farm Research Network conducts field-scale replicated strip trials to answer the production questions of wheat producers in MN. Funding for this research has been provided by the MN Wheat Research & Promotion Council and MN Depart-

ment of Agriculture, in addition to generous product donations provided by BASF and CHS Ag Services. Questions can be directed to Melissa Geiszler, On-Farm Research Coordinator, by email at mgeiszler@mnwheat.com or by phone at 218-253-4311 Ext. 8.



Income Potential and Weather Fight Against Winter Wheat Seeding for 2020

By Claire Hutchins,
USW Market Analyst

With winter wheat prices remaining at or less than the cost of production and with a very wet planting season, it is no surprise that many U.S. farmers chose to plant slightly less winter wheat for harvest in 2020. USDA's 2020/21 Winter Wheat Seedings report, released Jan. 10, reported U.S. farmers planted 30.8 million acres (12.5 million hectares) of winter wheat, down slightly from 2019/20 and 7% less than the 5-year average of 33.2 million acres (13.4 million hectares). Decreases for HRW and white winter wheat more than offset an increase in SRW planted area. USDA

noted that this is the second smallest number of winter wheat acres on record.

HARD RED WINTER (HRW) USDA assessed HRW planted area at 21.8 million acres (9.35 million hectares), down 1% from 2018. Planted acreage is down year-over-year in several major HRW-producing states with the largest decreases reported in Colorado, Montana and Nebraska. Colorado planted area fell 12% year-over-year to 1.90 million acres due to extreme dryness in the southeast, depressed commodity prices and pest pressure in the northeast. Record low planted area of 900,000 acres (364,000 hectares) in Nebraska can

be attributed to weaker marketing conditions and an overly wet, late soybean harvest which prevented fall HRW planting.

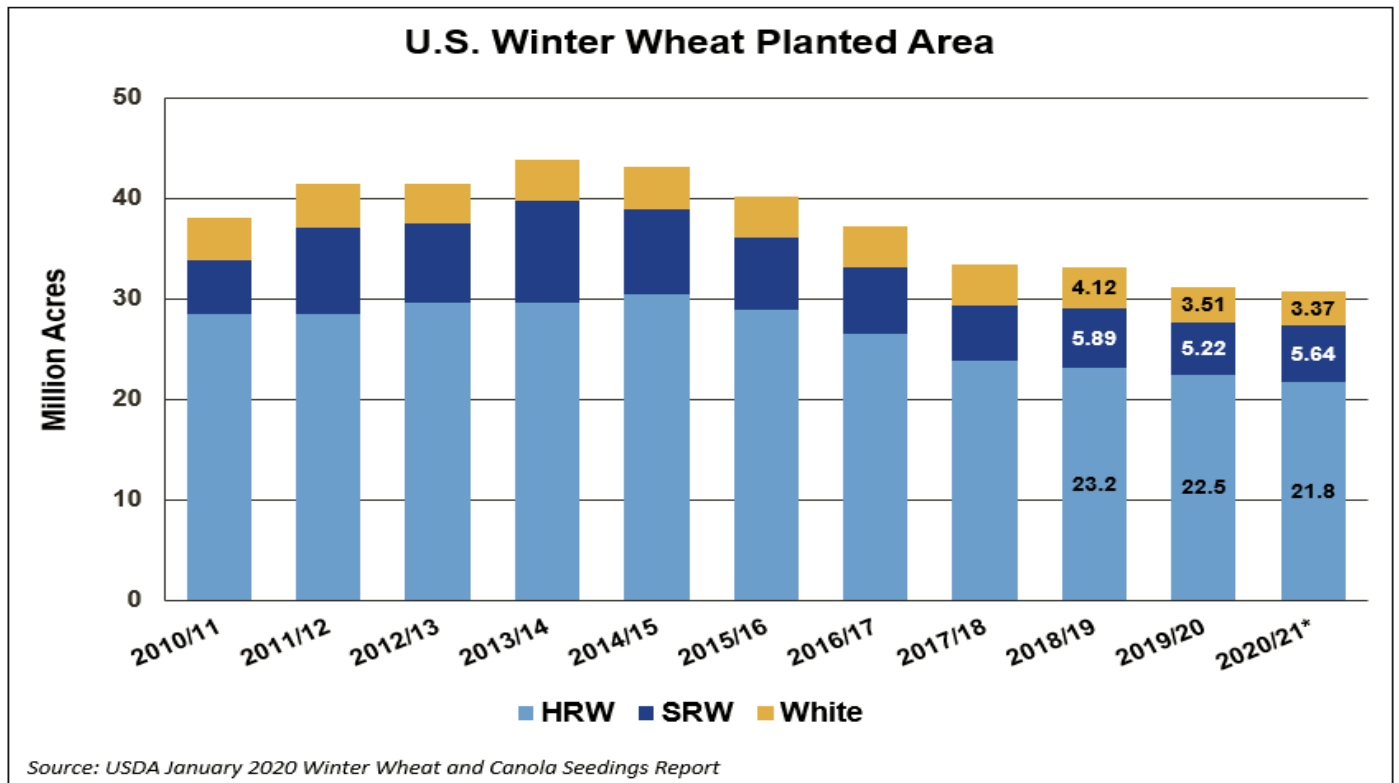
"This didn't just happen overnight," says Royce Schaneman, executive director of the Nebraska Wheat Board. "State-wide plantings have been trending down for a number of years due to poor marketing conditions."

HRW planted area in Kansas and Oklahoma is stable year-over-year at 6.90 million acres (2.79 million hectares) and 4.20 million acres (1.7 million hectares), respectively.

Total winter wheat planted area in Texas jumped 9% year-over-year to 4.90 million acres (1.94 million hectares). About 95% of Texas winter wheat is HRW and 5% is SRW.

"Adequate soil moisture in many regions, combined with favorable marketing conditions compared to cotton, allowed producers to maximize HRW acres," says Darby Campsey, director of communications and producer relations for the Texas Wheat Producers Board.

In South Dakota, North Dakota, Montana and Wyoming, a very wet fall also prevented more HRW seeding, although these



states usually plant a relatively small percentage of total U.S. HRW.

SOFT RED WINTER (SRW)

Total SRW planted area of 5.64 million acres (2.28 million hectares) increased 8% from 2018. Increases in most SRW-producing states more than offset decreases in Delaware, Illinois Indiana, Michigan, Missouri and Wisconsin.

According to Tadd Nicholson, executive director of the Ohio Corn and Wheat Growers Association, the state's SRW planted area increased 12% over last year to 560,000 acres (227,000 hectares) due to ideal, timely planting conditions following a miserably wet spring which left many corn and soybean acres unplanted.

In Illinois, SRW planted area fell 25% from last year to 490,000 acres (198,000 hectares).

"It was one of the craziest years for weather in Illinois," says Mike Doherty, interim executive director of the Illinois Wheat Association "It was the third wettest year on record and most of the precipitation fell in the first eight months. Farmers were beside themselves trying to manage other crops through the wet weather. Across the state, corn and soybeans were harvested 30 to 60 days late. You just can't plant winter wheat if you can't get the other crops out of the ground."

There is also SRW grown in areas of Texas and Campsey reports that "strong mar-

keting opportunities and better, dryer planting conditions for SRW compared to last year's overly wet field conditions led to a significant increase in SRW acreage year-over-year."

WHITE WINTER WHEAT

White winter wheat planted area fell to an estimated 3.37 million acres (1.36 million hectares), down 4% from 2018. White winter wheat planted area in Idaho, Oregon and Washington fell below last year. Idaho farmers reported planting 720,000 acres (291,000 hectares) compared to 730,000


acres (295,000 hectares) in 2018. Planted area in Oregon fell 5% from last year to 700,000 acres (283,000 hectares). Washington planted area fell slightly less than 2018 to 1.70 million acres (688,000 hectares).

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U.S. Wheat Associates Board of Directors Elect Officers for 2020/21

WASHINGTON, DC — The U.S. Wheat Associates (USW) board of directors elected new officers for the 2020/21 (July to June) fiscal year at their meeting Jan 17, 2020, in Washington, D.C. The board elected Michael Peters of Okarche, Okla. as Secretary-Treasurer; Rhonda Larson of East Grand Forks, Minn., as Vice Chairman; Darren Padget of Grass Valley, Ore., as Chairman. These farmers will begin their new leadership roles at the USW board meeting in June 2020 when current Chairman Doug Goyings of Paulding, Ohio, will become Past Chairman. USW is the export market development organization for the U.S. wheat industry.

"I'm excited. We have a great team here at U.S. Wheat Associates," Peters said after his election as the next USW officer. "I'm sure there will be many challenges ahead but I'm looking forward to tackling them."

Peters said being asked to represent Oklahoma wheat farmers in Italy, Israel and Morocco first peaked his interest in the work being done overseas to promote U.S. wheat. "It is very important for us to build upon those relationships and support to increase overseas demand," he added.

Michael Peters is a farmer and rancher growing hard red winter wheat and canola, and winter grazing stocker cattle on wheat. Peters is President of his local CHS Coop Board, is a member of the Okarche Rural Fire Fighters' Association Board. He has also served as President of St. John's Lutheran Church. He currently serves as a Commissioner and Secretary of the Oklahoma Wheat Commission. As a USW Director, Peters serves as Chairman of the Wheat Quality Committee. He has participated in several farm leadership programs sponsored by CHS

and the National Wheat Foundation. Peters and his wife Linda have two teenage boys who work with him and his father on their farm.

Rhonda Larson was raised on her family's Red River Valley farm and has been engaged in the operation full-time for nearly 30 years. Her father started the farm 51 years ago growing potatoes, wheat and barley. With her two brothers and her son, the third generation on the farm, they currently grow wheat and sugarbeets. Larson has been a board member of the Minnesota Wheat Research & Promotion Council for 17 years; serving as chair from 2010 to 2012. She served on the Wheat Foods Council board and is a long-time member of the Minnesota Association of Wheat Growers and the Red River Valley Sugarbeet Growers Association. As a USW director, she served on the Long-Range Planning Committee and the Budget Committee. Larson received a bachelor's degree in public administration and a juris doctor's degree in law from the University of North Dakota.

Darren Padget is a fourth-generation farmer in Oregon's Sherman County, with a dryland wheat and summer fallow rotation currently producing registered and certified seed on 3,400 acres annually. Previously, Padget held positions on the Oregon Wheat Growers League board of directors and executive committee

for seven years, serving as president in 2010. He chaired the Research and Technology Committee for the National Association of Wheat Growers (NAWG) and served on the Mid-Columbia Producers board of directors, for which he was an officer for 10 years.

Doug Goyings' family has been farming in northwestern Ohio since 1884. Together with his wife Diane, son Jeremy, daughter-in-law Jessica and his twin grandsons, Goyings grows soft red winter (SRW) and has hosted numerous trade teams on their farm. With more than 35 years of experience representing wheat and Ohio agriculture, Goyings has been a member of the USW board while serving as a director for the Ohio Small Grains Checkoff Board since 2009 and is a past chairman of the USW Long-Range Planning Committee. He is also a past-president of his local Farm Bureau and previously sat on the board of directors for the Ohio Veal Growers Inc., Creston Veal, Inc., and Paulding Landmark, Inc.

Wheat Associates' (USW) mission is to develop, maintain, and expand international markets to enhance wheat's profitability for U.S. wheat producers and its value for their customers in more than 100 countries. Its activities are made possible through producer checkoff dollars managed by 17 state wheat commissions and cost-share funding provided by USDA's Foreign Agricultural Service. For more information, visit www.uswheat.org.



(L to R): Michael Peters, Oklahoma; Rhonda Larson, Minnesota; Darren Padget, Oregon; Doug Goyings, Ohio; Vince Peterson, USW.



2020 International Crop Expo

Wednesday, February 19th ~ 9 am to 5 pm

Thursday, February 20th ~ 9 am to 4 pm

Alerus Center, Grand Forks, ND

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Keynote Speaker



Dr. David Kohl

1:00 p.m. Wednesday, February 19th

Agriculture Today: It Is What It Is... What Should We Do About It?

The agricultural economic down turn is in the seventh year and counting. Razor thin margins combined with increased volatility is the economic environment that most in the industry are facing. The result is massive changes in the structure of agriculture and rural communities. What is the state of the trade agreements and the short and long-term implications to the bottom line? Where are interest rates, land values, and food trends leading the industry? This session will discuss the assessment of management IQ that often places one in the top third or bottom third of profitability. What are the financial and business management characteristics that one must focus on in planning, strategizing, executing and monitoring for 2020 and beyond?

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Molly Yeh

1:00 p.m. Thursday, February 20th

American chef, blogger and cookbook author

Molly Yeh is the star of Food Network's series, Girl Meets Farm. She rose to national prominence with the debut of her memoir, Molly On The Range: Recipes and Stories from an Unlikely Life on a Farm. Molly has been featured by the New York Times, Food & Wine, Bon Appetit, and New York Magazine. Outside the kitchen, Molly is a Juilliard-trained percussionist and has performed with orchestras around the world, in off-Broadway theatre, and as the glockenspielist for the pop-band, San Fermin. She lives on a farm on the North Dakota-Minnesota border with her fifth-generation farmer husband and their little flock of chickens.

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Check website for program times.

Seminar Topics

Small Grains

Wednesday

- Soil Testing after a Wet Fall: How Low Can You Go?
- Challenges and Opportunities of Using Drones to Aid in Crop Management Decisions
- Options for Spring Application of Fertilizer
- Emotional Stress on the Farm: Implementing Practical Strategies to Cope *(Joint Session with Beans)*

Thursday

- Small Grain Disease Update: What We Learned in 2019
- Drying and Storage Options for High Moisture Grain
- 2020 Marketing without 20/20 Vision *(Joint Session with Beans)*

Soybeans / Dry Beans

Wednesday

- Optimizing Fungicide Application Methods for Improved Management of White Mold in Soybeans and Dry Beans
- North Dakota Soybean Fertility Revisions
- Updated Soybean Management Practices
- Emotional Stress on the Farm: Implementing Practical Strategies to Cope *(Joint Session with Small Grains)*

Thursday

- Soybean Weed Management Challenges in 2020
- What's New for Insect Pests of Dry Beans and Soybean
- 2020 Marketing without 20/20 Vision *(Joint Session with Small Grains)*

Potatoes

Wednesday

- Fertilization after Fall Flooding
- United Potato Growers Potato Outlook
- National Potato Council Update
- New Products from BASF for Potato Management
- Syngenta - Vibrance Ultra
- Use of Aerial Imagery for Potato Growers

Thursday

- Minnesota Certified Seed Report
- North Dakota Certified Seed Report
- What's with the Wild Fall Weather?
- Trapping Spores of Late Blight: The Canadian Experience
- Pointers on Spring Fumigation
- 2020 Vision on Seed Management
- Common Scab: A Problem with No Solution?

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