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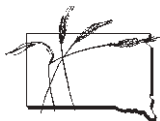
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CONTENTS

- 4 Taming the Bulls and Bears
- 5 Don't Miss the Good Parts on the Trade Policy Ride
- 6 The Grain Marketing Challenge
- 8 Comments from the North Dakota Grain Growers President
- 10 A Dubious Duo
- 12 2019 Variety Scores and Picks
- 16 FGIS Falling Numbers Test Standards
- 18 On-Farm Network Grows Knowledge
- 20 Making Sense of Weather and Climate
- 22 Wheat Stem Sawfly: A Tough Insect
- 24 Scouring for Pests
- 26 Regional Crop Quality Reports Assess Crop/Information
- 28 P & K Rates in Spring Wheat-Soybean Crop Rotation



On the Cover: Words like 'unprecedented' and 'catastrophic' have been used to describe the 2019 agricultural season. With many crops still laying in unharvested, soaked fields and truckloads of product that couldn't be brought to market, no one wants to relive another year like this again. It is time to look ahead to the next season. We are about to embark on a new year and with that comes a new outlook, new goals and new possibilities. The staff at *Prairie Grains* magazine wishes you a successful and safe 2020 season.
Photo: Marlene Dufault/MLD Communications



Working Together to Survive 2019

This year so many farmers have asked me “but what will my lender say?” Farmers are afraid to show lenders how much money was lost in 2019. Working capital disappeared and often a refinance will be needed. I assure the farmer that the bank is expecting those numbers, and the farmer will not be the only one to bring in losses from 2019. There is always a little fear when you bring negative financial news to the bank.

I want to show you the fears from the other side of the desk. Your lender is afraid of you too. I am serious. Your lender is afraid you will pick up your business and walk out the door. Your lender is walking a fine line between letting you make bad business decisions and keeping you happy.

I was speaking to a group of ag lenders, and I was scolding them for enabling farmers to make bad business decisions. There are many farmers with two, and maybe three years of unsold crops. Lenders will extend lines of credit and push back term debt payments, all so the farmer can keep wishing and hoping for beans in the teens. I told these lenders they were enabling farmers to make bad crop marketing decisions and it needed to stop.

One lender spoke up and

“*Farmers need separation of duties in their operation. You should know if a capital purchase is a good idea before you ask your lender.*”

said “Betsy, we can’t make them sell. If we make them sell, and prices rally, we will lose that farmer.” Lenders are afraid to lose customers. They want to keep you happy.

The same is true of capital purchases. I have a few “trigger phrases” in farm management. These phrases cause my head to spin and I suddenly look like I have been possessed by the devil. One of the top trigger phrases is “My lender says it’s fine.”

A farmer will ask me about a capital purchase so I will run some numbers, show impacts on ratios and financials, but it really doesn’t matter. If the lender says it’s fine, the farmer is going to do it anyway. I was supposed to find numbers that confirm it is a good idea. If my numbers say something else, I must have moved a decimal point or made some other mistake.

Farmers need separation of duties in their operation. You should know if a capital purchase is a good idea before you ask your lender. Your lender should be your second opinion, not the first. And most lenders are

horrible at crop marketing. You wouldn’t ask a grain buyer about interest rates, so don’t ask a lender about crop marketing.

If your lender has told you no, that’s a good business partner. You don’t need a yes man in your operation. You need partners who will tell you no, that’s not a good idea at this time. If your lender tells you no, they know they risk losing you as a customer in the short run, but they are hoping to keep you in business for the

long run. It really is hard for a lender to say no, so before you overreact, take a deep breath and remember that was not easy for the lender either. It’s a lot more fun to be a yes man.

I am an educator, not an advisor. I have no ability to stop you from making bad decisions. It is my job to help you understand the impacts of your decisions. Farming is the art of deciding which risks to take, and which risks to avoid. Those decisions will always be the responsibility of the farmer.

A lender will provide the capital, I’ll make sure you understand the risks, and the rest is up to you.

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Don't Miss the Good Parts on the Trade Policy Ride

By Dalton Henry,
Vice President of Policy,
U.S. Wheat Associates

Anyone watching headlines about U.S. trade negotiations and policy should know two things by now: 1) they feel like they are riding a rollercoaster; and 2) it's awfully tough to predict how the ride is going to end. The slow, daunting progress toward final approval of the new U.S. Mexico Canada Agreement (USMCA) and resolution to China's retaliatory tariffs are prime examples. As of this writing, it looks like USMCA is headed for approval. And several other major achievements that will be very good for U.S. wheat farmers have flashed by on the way.

CHINA

While any significant market gains in China will depend on reaching a big picture agreement in the trade war, wheat farmers received good news in September when China proposed new rules governing wheat imports through their tariff rate quote (TRQ). The new rules resulted from the winning World Trade Organization (WTO) dispute case in which the U.S. challenged China. The WTO

panel, in short, found that China had not administered their reduced duty TRQ in a way that was predictable, fair or transparent.

The new rules include an explicit goal for the first time of TRQ utilization, will allow for additional state-owned organizations to apply for quota, and better govern the reallocation of unused quota. The devil will be in the details. Yet the size of China's wheat market, combined with strong demand for hard red spring (HRS) and soft white (SW) U.S. classes that can be blended with domestic production, should provide strong incentive for the TRQ to function. If China were to fully fill the TRQ, it would become the world's third largest wheat importer at 9.6 million metric tons.

BRAZIL

Brazil is the world's fourth largest wheat importer. However, U.S. farmers have had only limited opportunities to market their wheat there because a regional trade agreement gives a tariff advantage to other South American countries. That is changing based on an agreement struck between President Trump and Brazil-

ian President Jair Bolsonaro last spring. That agreement stipulated that Brazil would implement a long-overdue TRQ allowing an additional 750,000 metric tons (MT) of wheat to be imported duty-free from countries that are not part of the regional trade agreement. Brazil can use U.S. winter wheat and freight rates from U.S. Gulf ports to Brazil's northeast region are competitive. That positions U.S. wheat well to capture the bulk of the new allocation, giving us a significant new foothold in a major wheat importer.

JAPAN

Japan is the sixth largest wheat importer in the world and has relied on U.S. HRS, hard red winter and SW for about 50 percent of its supplies for many years. That market position was threatened with the implementation last year of CPTPP. It gave Canadian and Australian producers an effective tariff advantage over U.S. wheat worth about \$20 per MT (or about \$0.55 per bushel) in 2019. That advantage was set to grow to \$30 per MT in 2020, and each year after – a tariff advantage that would be nearly insurmountable in the long run. Fortunately, the



Dalton Henry,
U.S. Wheat Associates

United States concluded a sort of mini-agreement with Japan in September that is, as of this writing, set to take effect Jan. 1, 2020. That agreement will preserve one of our most important wheat markets and was concluded in near record time.

On average, half the U.S. wheat crop is exported, making export markets vitally important to U.S. wheat producers. While trade wars, and retaliatory tariffs have dimmed some hopes of expanded free trade opportunities, it is important to not lose track of the positive effects of an aggressive trade enforcement agenda.

Perhaps we can enjoy the ride a bit more, knowing that in just the last six months, we've seen major developments in three of the largest wheat-importing countries, and that has real impact on demand for products grown by U.S. wheat farmers.



The Grain Marketing Challenge

Article and photo by
Dan Lemke,
Spirited Communications

In addition to a difficult 2019 growing season, farmers in Minnesota and North Dakota are dealing with multiple years of low commodity prices and reduced farm income. Throw in grain quality issues like low falling numbers in wheat and low test weights for corn that led to price discounts, and many farm operations are facing an uphill profitability battle.

Three local marketing experts shared their thoughts on what issues could present problems and opportunities in the months ahead during a marketing panel at the 2019 Prairie Grains Conference.

“Farmers had an absolute grind of a growing season,” says Kevin Karel, general manager for Arthur Companies. “Every crop had quality issues.”

Whether they produced good quality grain or not, farmers face serious challenges finding profit when marketing their commodities. Trade disruptions with some of the nation’s biggest export markets are having a negative effect on prices. For wheat growers, there are also issues closer to home that are equally concerning.

“Domestic wheat milling has not grown in the past 20 years,” Karel says. “Who is your customer in 10 years? Domestic mills won’t keep up with production and

we always want to sell into a growing market.” Allison Thompson, commodity broker for The Money Farm says there hasn’t been a lot of movement in the futures markets.

“The cash market, especially with quality issues and discounts might be the biggest factor going forward,” Thompson says.

Thompson says the January USDA supply and demand report may make some adjustments to their December report and that could cause price movement. Trade deals, especially an agreement with China, also hold the potential for delivering rallies that could offer farmers profit potential. But until a firm agreement is

reached, Thompson says the market thinks news of trade progress is false.

Local demand could present some market opportunities, especially for corn, according to Thompson.

“There’s a lot of standing corn and we still need to supply ethanol plants,” Thompson says. “Watch the end users. There may be some good benefits this year.”

“The market has had low volatility and volatility is your friend,” says Tommy Grisafi, marketing consultant with Advance Trading.

Grisafi cautions that commodity prices can stay low a long time.

“How low can they go if we get a big crop in 2020? We still have average prices even with 18 million acres of prevent plant,” Grisafi says.

Grisafi doesn’t expect the current conditions to change anytime soon. “I believe that we are in a big bushel, low price environment forever,” Grisafi says. “Every time prices go up, we’re encouraging the rest of the world to farm. Once they build infrastructure, they’re not getting out of it.”

Grisafi says that every banker he knows has some farmer borrowers that they’re worried about.



(L to R) Tommy Grisafi, Advance Trading ; Allison Thompson, The Money Farm; Kevin Karel, Arthur Companies and moderator Betsy Jensen, NCTC - FBM.

continued on page 11



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STRENGTH IN NUMBERS: THE VALUE OF BELONGING TO NATIONAL ASSOCIATIONS THAT LISTEN TO THEIR CONSTITUENTS

The continual shift in demographics to a more urban population results in less people having a direct connection to the farm (i.e. production agriculture). This is becoming especially noticeable in Congress, as House and Senate members, even those from farm states, need additional support and guidance on issues that impact agriculture.

National grower organizations (associations) can be an important component in providing education and guidance to Congress and federal agencies on issues that impact growers. Corn, soybeans, wheat, and many specialty crops have a national organization comprised of support from state level organizations. With this in mind, there are many regional differences within and between crops (e.g. corn production in traditional corn belt has different nuances compared to corn production in the northern plains).

National organizations are only effective if they recognize the issues unique to each production state and region, and subsequently support the specific needs of a given region of dues paying constituents. When the needs of a region go unnoticed and unserved, growers have little choice but to move in a direction that secures support for the constituency in a given state or region.

Paying dues into a national grower organization is a business transaction, and the constituents have a right to expect a return on their investment. Collectively, dues are to be applied to the “greater good” of all members, and thus care must be exercised to ascertain that the “greater good” is achieved by all, and not just a few at the expense of others. Minimal or no return on investment provides the grower constituency with no alternatives but to seek other avenue that optimize their return.

National grower associations, when focused on their mission (e.g. knowing what to do, and what not to do), provide a vital component in supporting the interests of production agriculture. National associations that focus on serving all of their constituents and not simply feeding their own interests prevent the degradation of production agriculture, and simultaneously prevent opportunistic cannibalism within the dues paying membership. National organizations (like all organizations) possess two ears and one mouth, and thus gain far more benefit by listening to their members rather than telling them how policies will be done.

Sincerely,

A handwritten signature in blue ink that reads 'Dennis Haugen'.

Dennis Haugen,
President
North Dakota Grain Growers Association



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A Dubious Duo

By Dan Lemke,
Spirited Communications

Individually, soybean cyst nematode (SCN) and iron-deficiency chlorosis (IDC) can reduce soybean yields and hurt farm productivity. Scientists are researching how the two problems interact and if they're worse as a team than they are individually.

University of Minnesota Extension Soybean Specialist Seth Naeve says SCN and IDC are both major problems in Minnesota. Both are difficult to manage, hard to research and are likely acting together.

Naeve and fellow researchers sought to identify treatments that differentially affect IDC and SCN, and to investigate how IDC and

SCN stresses affect yield and SCN populations.

"We're looking at high level principles of interaction between those two problems. Both cause yellow, stunted soybeans and they regularly occur together," Naeve says.

SCN thrives in high pH soils. High pH helps them reproduce quickly. Soybean IDC is caused by soil conditions that decrease iron uptake by soybean roots.

The Minnesota researchers tested interactions at 9 research sites in southwest Minnesota that had high IDC and high SCN numbers. Naeve says their research showed little interaction between the two soybean problems.

"It appears we can

manage IDC and SCN separately," Naeve says.

Naeve says the first step to managing the issue is to properly identify the problem. A good first step is to soil sample. That's especially important for SCN management.

"Soil sampling for SCN is a required first step," Naeve explains.

Once farmers know their SCN populations, they can make soybean planting decisions based on that data.

"Be certain of very low SCN numbers before planting a susceptible soybean variety," Naeve cautions. "Medium to high populations of 2,000 to 10,000 eggs per cubic centimeter require significant action. Fields with a population of over 10,000 eggs, consider other crops like corn."

Variety selection is the primary way to combat SCN. However, most available varieties rely on one source of genetic resistance. SCN is becoming increasingly resistant to the primary resistance gene, PI 88788.

"One gene is in about 98 percent of soybean seed and it's losing its effectiveness. Biology gets around us," Naeve says.

Naeve advises farmers to diligently identify good SCN resistant varieties. He says some soybean seed varieties that are labeled as SCN resistant really aren't resistant. He recommends that farmers look at public variety trial reports and get input from trusted advisors to make the right seed selection.

continued on page 19



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Marketing from page 6

Farm operations can only survive low prices and eroding equity for so long.

“They’re nervous. If land prices come down, we’d have a serious problem,” Grisafi contends.

“A lot farm wealth is based on land values.”

LOOKING AHEAD

With market conditions unlikely to change substantially in the near term, Karel recommends farmers use the grain marketing tools at their disposal.

“Farmers will put in a risk premium,” Karel says.

“Bet on yourself that you can row a good crop.”

Karel also advises farmers to explore all of their options, including looking at smaller, even specialty markets to find profitability.

“If necessary, look at substitutes. Plant peas or sunflowers. Don’t be afraid to be different,” Karel says. “What can you do to differentiate yourself from an Iowa farmer or a Montana farmer?”

Farmers are being docked in many markets due to low quality crops. To the extent they can control the outcomes, Karel says farmers benefit from raising high quality commodities.

“This region grows highest

quality wheat, corn and soybeans. Quality does matter” Karel adds. “We need the best possible crop because there’s profitability in that.”

While he encourages farmers to be proactive and bet on themselves, Karel also recommends using others as a sounding board for their marketing decisions.

“Think of them as your farm board members. Someone who can help you make good decisions. An independent person to lean on who can help you get the best, most honest advice, not someone to confirm your bias,” Karel says.

“Good marketers have to know their breakeven

costs and they make sure to stay updated,” Thompson explains. “They put in orders, so they know they’re selling at breakeven. Put orders in where you’re profitable. There are some opportunities, so be proactive.”

Thompson says farmers should look to get rid of old crop grain. She also recommends networking and utilizing the insight of others to make marketing decisions.

“Have a plan for 2020 if we never get to your cost of production,” Grisafi says. “We could have a big bear market next year. What happens when we have a bear market is farmers don’t sell. You need to have a plan.”



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2019 Variety Scores and Picks

Anderson rates spring wheat varieties on desired traits

Article and photo by Shawna Aakre, Continually Still

Finding a wheat variety high in yield and protein is a moving target for breeders. But there are currently a lot of good variety options for farmers according to Dr. Jim Anderson, Spring Wheat Breeder at the University of Minnesota (UMN).

Anderson said while breeders continue selecting for traits in areas of agronomic characteristics, diseases and bread-making quality characteristics, the areas of emphasis can vary from time to time. His top picks are always an area of interest to growers, but he said pre-harvest sprouting (PHS) has recently been a hot topic following a tough 2019 harvest.

While they have had the data for years, Anderson said he does not commonly address the issue. According to him, red wheats are more resistance to PHS than white wheats.

“That’s why we started doing preharvest testing in our program a number of years ago. There was kind of an emerging market for white wheats and when we started breeding for them, we tested for sprouting and they are all terrible. So on our scale they’d rate as sixes to tens. For hard red spring (HRS) wheats, they’re generally pretty good.”

After experiencing damage due to PHS and/or low falling numbers in his plots, Anderson’s data shows that sus-

ceptibility to PHS correlates with a low falling number. “Risk probing assessment is done by harvesting 10 spikes per plot right at physiological maturity for each variety. Then varieties will air dry for five days and go into the freezer at 20 degrees below zero to maintain dormancy level. Then they go into a mist chamber for about a week. Basically, they sprout in about five to seven days and the good ones won’t grow at all. So I think our data is fairly robust and is consistent from one year to another,” Anderson said.

He said you can still have low falling numbers without seeing visible sprouting in some varieties that rate well against PHS. He plans to continue refining his data, and this year was a “gold mine” in this area since plot locations experienced low falling numbers. For now, he said the PHS score will be the best to predict a low falling number, combined with knowledge of a few varieties which are an anomaly in this area.

Other characteristics producers and wheat customers find important are also being studied in wheat trials across the 15 locations Anderson and his team manage.

“We have put a lot of emphasis on both lodging resistance and yield over the last decade, and for diseases, mostly Fusarium head blight (FHB) and bacterial leaf streak (BLS),” he said. “We think we’re doing pretty good on rust as well. With BLS, genetics



Dr. Jim Anderson, Spring Wheat Breeder, spoke on his latest varieties at the Prairie Grains Conference.

are important. And of course you need bread making characteristics. We are trying to maintain those properties for HRS wheat as well.”

While studying FHB susceptibility, Anderson has discovered Lang-MN, ND-VitPro and Rollag to be the best options. But he said when a good fungicide is applied there are many varieties that would fair well. He noted Caramba and Prosaro reduced damage by 70 percent in his trials. Miravis Ace is a new fungicide he said has comparable control with a wider window of possible application.

When deciding on his top picks, Anderson said the breeder’s list is smaller than in recent years because he is recommending varieties with a PHS score of one or two and FHB score of five or less. Bolles, CP3530, Lang-MN, Linkert, MN-Washburn, Shelly, Ingmar and SY Valda made the cut. Anderson said he sees few negatives to these varieties.

He pointed out his recommendation of a lower seeding rate for Lang-MN. After receiving a tip from producers, Anderson incorporated a 70 percent seeding rate alongside the higher rate in trials and said he saw a significant positive difference in lodging at the lower rate. Anderson also hopes acres of MN-Washburn, released by the UMN in 2019, increase in the future, despite its slightly lower protein content compared to Linkert.

Regarding future releases, Anderson has proposed a new spring wheat variety for consideration. He said it fairs well against BLS and scab, potentially has wide adaptation to different locations and has yielding potential similar to MN-Washburn.

Anderson said he would encourage growers to keep in mind that both their international and domestic users expect a certain baking quality out of their HRS wheat, so it is important to grow good quality wheat, not just high protein. That

begins with careful variety selection for each specific circumstances growers face.

NEW STUDY EXPLORES WHEAT SENSITIVITIES

Farmers have to maintain a delicate balance in choosing a wheat that will grow well on their farm and be of value to consumers. Recently, the gluten free movement has swept the food industry, marked by both science backed information and misinformation.

Farmers acknowledge that celiac disease and gluten and wheat sensitivities exist, as do some triggers of irritable bowel syndrome (IBS) from wheat. Through a new grant, Anderson and his project team hope to reduce wheat sensitivity through the identification of wheat

varieties with naturally low “anti-nutrient” levels for breeding purposes and explore fermentation as a processing technique to reduce poorly absorbed carbohydrates present in wheat.

“Ultimately we’d like to reduce these sensitivity issues. It’s not really known what is causing IBS, and I think that this is a much more serious issue for the industry,” Anderson said.

“There are a lot of people that have decreased or eliminated wheat from their diet due to sensitivity issues. I’ve heard anecdotally often that people are making bread with heritage varieties and their customers don’t have sensitivities. Well, is that genetics or is that a difference in processing? You know

through sourdough processing there is a longer fermentation time. So that’s what we’re trying to investigate with this particular study.” There has been a panel of 230 lines of wheat selected for the study, made up of 46 heritage wheats, 142 modern wheats, five durum wheat

lines, 10 einkorn, 11 emmer and 16 synthetic hexaploids.


These varieties were grown in plots at Crookston University of Minnesota (UMN) Northwest Research and Outreach Center during the

continued on page 14

PICKS
(nothing > 5 FHB or > 2 PHS)


VARIETY	PLUSES	MINUSES
Bolles	Protein	
CP3530	Yield, Balanced	LDG (5)
Lang-MN (0.7X)	Balanced, FHB	
Linkert	Strong, Protein	
MN-Washburn	Strong	Protein
Shelly	Yield	Protein, BLS (6), LDG (5)
SY Ingmar	Balanced, BLS	
SY Valda	Yield, BLS	Protein, Quality (6), LDG (5)





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Variety Candidate MN14105-7

MN14105-7 (Sabin/01S0377-6//Lnkert) 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 ¹	Release Yr.	% MN Acreage	Grain yield					Straw Str.	Test Wt (lbs/bu)	Protein (%)	Baking Quality	Leaf			Stripe		Bact.		Scab
			% of mean	2019	2 Yr	3 Yr	HD					HT	1-9	2 yr	2 yr	1-9	1-9	1-9	
SY-Valda	2015	15.5	109	109	111	54.6	31.3	5	60	14	6	2	1	2	3	4			
Prosper	2011	1.9	104	107	108	56.5	33.1	6	60	14	5	1	6	5	4	4			
Shelly	2016	7.1	106	106	107	57.4	29.5	5	59	14	5	1	3	1	6	4			
TCG-Spittfire	2016	3.9	107	106	107	57.9	31.3	3	59	14	2	3	5	-	3	5			
MN14105-7	-	-	106	105	105	56.2	31.3	4	60	15	4	2	3	-	3	4			
WB9590	2017	13.8						3			3		3		7	6-7			
MN-Washburn	2019	0.3	101	100	103	56.8	30.0	3	60	14	3	1	1	2	3	4			
Lang-MN	2017	1.9	102	102	101	57.3	32.7	5	61	15	3	1	1	1	3	3			
WB9479	2017	9.2						3			2	3	3	-	6	6-7			
SY Ingmar	2014	2.8	99	100	99	55.8	29.2	4	60	15	2	2	2	2	3	4			
WB-Mayville	2011	5.4	97	96	98	52.7	28.0	3	60	15	2	3	3	3	7	8			
Bolles	2015	4.4	96	94	95	57.8	32.3	4	59	16	1	1	2	1	5	4			
Linkert	2013	22.3	93	92	95	55.2	28.5	2	60	15	1	1	3	1	5	5			

¹ WB9590 (13.8% of MN acreage) and WB9479 (9.2%) are not included in this table because they were not tested in 2019.



first year of the study. They were harvested and cleaned and are now in the labs with Dr. George Annor, Assistant Professor of Cereal Chemistry and Technology at UMN Department of Food Science and Nutrition. Annor is in the process of determining levels of two key suspects of irritation caused by wheat based foods. Those suspects are Amylase Trypsin Inhibi-

tors (ATI), a group of proteins in wheat, and the poorly absorbed carbohydrates known as FODMAPs, for fermentable oligosaccharides, disaccharides, monosaccharides, and carbohydrates.

“By next year at this time we should have some data for you so we can at least show if there is genetic variation for this,” Anderson said. “Then

the next step is to conduct fermentation studies on a select subset to see how processing will affect these.”

Minnesota Association of Wheat Growers Executive Director Charlie Vogel said this study has drawn interest from wheat growers because the average consumption of bread and pasta has declined in the

average American household the last 30 years. He said that is partly due to marketing and dietary sensitivities of some consumers.

“If a variety of wheat, or a process, can reduce or modify the gluten in our food ingredient [wheat], a segment of the population is once again able to enjoy quality pastas and breads restoring demand. The farming sector prides itself on providing quality, affordable food. If this study opens the door for wheat to be consumed by more consumers that is very exciting news,” Vogel said.

This study received 37 letters of support overall, including the Minnesota Wheat Council, North Dakota Wheat Commission, Northern Crops Institute, UMN, milling companies and national wheat organizations, which Anderson said gave the Minnesota Department of Agriculture (MDA) no choice but to fund the study. Financial support for the study is coming from the MDA Agricultural Growth, Research and Innovation (AGRI) Crop Research Grant.



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FGIS Falling Numbers Test Standards

Article and photo by Shawna Aakre, *Continually Still*

Most export contracts for wheat out of the U.S. list a falling number specification, and many domestic customers also have parameters on acceptable falling numbers for their processes. In a year like 2019, when falling numbers are a common issue across the region, farmers are asking a lot of questions about the discounts they see on their checks.

“I know it’s been a rough year, so it’s a little bit of sore subject, but falling number is basically an indirect measurement of alpha-amylase,” said Rhonda Lyne, Physical Scientist at the USDA Agricultural Marketing Service (AMS) Federal Grain Inspection Service (FGIS). “Alpha-amylase is an enzyme that can be found in wheat that breaks down starch granules, which has some detrimental effects for the end use

products, including sticky dough, lower loaf volume and processing problems.”

The falling number is calculated by the amount of time it takes a specific viscometer stirrer rod, manufactured only by Perten Instruments, with an end that looks like a bicycle wheel, to drop through a slurry of wheat and water in a test tube. If alpha-amylase is present, the slurry will be less viscous because the enzyme broke the starches down into small chain sugars. A mixture will provide more resistance to the rod falling through when falling numbers are higher.

Many wheat contracts specify that they will take numbers at 300 and above. Below 300 is when the discounts start appearing.

“No one likes that at all, so it’s really critical around that 300 that we get as exact a measurement as we can,” Lyne said. “Above 300, there

is very little alpha-amylase, so everybody is happy. For 400 and above, there’s really no concern for alpha-amylase at numbers that high.”

Lyne said that to keep results consistent, official testing locations across the country must follow a specific procedure using specific equipment. The test starts with grinding a representative 250 gram sample of well mixed wheat to get a uniform sample and then weighing out seven grams to mix with 25 milliliters of distilled water in an automated Shakematic.

Next, the viscometer stirrer is used to scrape the slurry down on the sides of the tube, and then the tube is placed in a boiling water bath at 212 degrees. The starch will start gelatinizing to make a paste. In the bath, the slurry is mixed with the stirrer for 60 seconds and then is allowed to drop by its own weight through the wheat and water mixture.

The total time in seconds it takes the stirrer to reach the bottom of the test tube becomes the official falling number, including the 60 second stirring time. Lyne said two tests of the same wheat must be done and the results must agree within five percent of the average to be considered a valid test. Numbers outside that range, which she said were rare, must get a retest.

The FGIS administers the falling number program at locations across the country. They have official testing instruments at 52 locations, and these locations receive weekly monitoring and a check sample test every six months to ensure accuracy and consistency. Recently, they have made improvements in their required method that include adjusting results based on barometric pressure to help improve the consistency.

“As you increase elevation, you decrease barometric pressure and falling number goes up. We wanted to make sure everyone is on the same playing field by correcting for barometric pressure everywhere,” Lyne said. “And operator variability in shaking tubes can produce different results, so we now require our labs to use the same shaking machine to take out as many human variables as possible.”

If farmers do receive a falling number they do not like, Lyne said there are measures in place allowing for them to ask for a retest and/or appeal. But she said FGIS



Rhonda Lyne, Physical Scientist at the USDA AMS/ FGIS, demonstrates on the viscometer stirrer rod to see if Alpha-amylase is present.

does not have authority over locations conducting unofficial testing and so does not ensure there will be no issues with machine upkeep, cleanliness or testing processes that affect results.”

Official service providers in the region for the test include North Dakota Grain Inspection (Fargo), Northern Plains Grain Inspection (Grand Forks), Montana State Grain (Great Falls) and Grain Inspection Inc. (Jamestown and New Salem, and Appleton, Minn.).

Brian Sorenson, Northern Crops Institute (NCI) Program Manager, said he has received many questions from producers about how long the falling numbers test has been around and administered.

“It’s been around for a long time. It’s just sometimes people have been stung by it and sometimes they haven’t. In a year like this everyone is testing for it. It is an issue that pops up every so often. Bakers and processors are looking for consistency so they know how to run it through their plant efficiently.”

Sorenson likened it to producers not wanting to plant a wheat variety that experiences a significant variability in maturing at harvest time. The processing industry is more automated and controlled than 40 to 50 years ago he pointed out. Millers and bakers could manage variability in falling numbers a little differently at that time. Some millers and bakers will hesitantly

accept wheat with falling numbers because it may save them some money, and they will manage around the issues. Others are sticklers and will not, he said.

Locally, the North Dakota Mill lowered their specification and rejection schedule.

“We often do surveys across the region throughout the years,” Sorenson said. “We have charts with falling number averages to show our export customers because they want to know where the quality grain is and how it compares to where they are buying their grain.”

Sorenson said producers considering storing grain with low falling numbers in the hopes it will

increase face two big challenges. First, he said it is extremely hard to calculate exactly the time it would take because of the many factors involved, some of which may remain unknown. Factors from variety selection to growing conditions may affect it. Second, the falling number may never change.

For those interesting in viewing FGIS falling numbers test video, it can be found by going to www.ams.usda.gov/resources/video-library and clicking on the link titled “FN Determination” under the Falling Number category.



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On-Farm Network Grows Knowledge

Article and photos
by Dan Lemke,
Spirited Communications

Increased yields don't happen by accident. Weather conditions are a huge factor in determining crop productivity, as are improved plant genetics. However, improved management based on better information cannot be discounted.

Wheat productivity is on a steady incline. Minnesota's per bushel wheat production average has increased from 38 bushels per acre in 1989 to 57 bushels per acre in 2019, even with generally poor growing conditions in 2019. Improved management practices are one reason for the increase.

Various farmers from Minnesota, North and South Dakota packed the Alerus Center in Grand Forks for the On-Farm Research Summit, hoping to

learn something from the network's various research projects that they can take back to try on their own farms.

John Jossund farms in Norman County near Perley, Minnesota. He raises wheat, barley, sugarbeets and soybeans. Jossund participates in the On-Farm Research Network (OFRN), having hosted seeding rate trials, a wheat fungicide trial, and a soybean fungicide trial. His goal for being a cooperating farmer was to learn what could make his farm more successful.

"I wanted to see if there are some things that we can do to make wheat more profitable," Jossund says, "to see what actually works out on the farm."

DOES IT PAY

Most on-farm research trials apply what's been learned in small-plot university tests

to real-world settings. While the goal of most research is to prove what products or practices improve crop production, sometimes the results help farmers understand which practices pay, and which do not.

"One of the more interesting things is that maybe a lot of the extra things you do don't pay economically," Jossund explains. "It might increase the yield, but in the end, they probably aren't things that have an economic return."

Jossund is a believer in the on-farm research and is likely to continue participating in the OFRN.

"I think it's a valuable thing. It's taking some of the research projects and getting them out on the farm with the replicated trials," Jossund says. "There's a benefit to it."

Kyle Mehrkens farms south of Thief River Falls. He raises wheat, soybeans, corn, edible beans and recently started planting canola. Like Jossund, Mehrkens has cooperated on several research projects including seed treatments on wheat and nitrification inhibitors. He also has an in-field protein analyzer on combine.

"It's real world," Mehrkens explains. "There's a difference between on-farm, on your own farm as opposed to small plots in certain locations. It's testing we're doing anyway, and it's validating 'is this working or is it not working?' We're doing it on our farm, on our scale with our equipment so we know we can do it. It provides some validity to what we're doing and maybe it works, maybe it doesn't."

Mehrkens says that whether or not the projects farmers are testing shows positive results, there is still plenty that can be learned.

"You don't always have to get results. Sometimes there's value in not getting results. I'm trying this on my farm, but it's not paying," Mehrkens says. "In trials you always want to see a response, that's the general consensus, but sometimes you get as much value when there isn't a response. That's money that could be used somewhere else."

SHARED INFORMATION

"What we've heard from growers is they like to hear from what other farmers are doing," says Tim



Osowski, farmer from Oslo, Minnesota, and member of the OFRN advisory committee. He's seen interest in what the program is doing grow among farmers. The research summit, held each year in conjunction with the Prairie Grains Conference, has seen a marked growth in farmer attendance. "As the years have gone on, the attendance has increased every year."

The OFRN is also gaining a more robust collection of research data, giving more credibility to the research findings. It's also allowed the network of cooperating farmers to look at a wider variety of projects.

Osowski says some projects, including wheat seeding trials, have occurred for several years and have delivered valuable information to farmers.

"A lot of the small plot data that we've seen with things such as seeding rate we've related that into the large plot and really reiterated what researchers have seen," Osowski says.

Understanding optimal seeding rates can help farmers save money by not spending extra money on seed wheat that won't necessarily generate a positive return.

While productivity and profitability are at the heart of most research projects, the studies also support a broader goal.

"There's the bigger picture about conservation and sustainability in agriculture and that's something that

we think through these trials we can put hard data to what growers are already doing to conserve inputs and to conserve the environment," Osowski says. "That is also one of the goals of the research we're doing. In a way, we're not seeing big differences in yield or protein or net income from some of the tests we're doing, but we're also showing that what growers are already doing is sustainable in the environment."

For Josh Anderson, who traveled to the research summit from his farm near Rugby, North Dakota, his goal was to learn. Anderson says he does some of his own testing and wanted to see what other farmers were doing.

"In wheat and soybeans, what have they seen so that maybe I shouldn't waste my time, I should try something else," Anderson says.

Some of the most valuable information Anderson gleaned was which practices didn't deliver an economic return.

"All this stuff that we've been doing and man, does it really pay? Are we throwing money away that we should be saving? With \$5 wheat, you don't really have a lot of bushels to play with," Anderson says. "Sometimes in farming it's nice to be taught what to do and it's also nice to know what not to do."



(Above) Melissa Geiszler & Lauren Proulx, On-Farm Research Coordinators, present findings at the Summit. (Below) A panel shares their experience with the crowd.



Duo from page 10

Naeve says farmers should continually monitor their field SCN levels. Since SCN moves with soil, keeping soil in place to help reduce the spread is important.

"It's a lot easier to keep SCN out than to try to pull those numbers back once they're established in a field," Naeve adds.

As is the case with SCN, IDC is best managed

with genetic tolerance. Iron chelates can also be added to reduce negative IDC impacts.

Soil testing is an important component of managing IDC and SCN in soybeans because visual clues like yellowing soybeans could be caused by IDC, SCN, or even soybean aphids or other fertility issues. Regular soil testing can help farmers understand the challenges they're facing.

Making Sense of Weather and Climate

By Shawna Aakre,
Continually Still

In 2019, the Dakotas experienced their wettest fall on record during the last 125 years. Minnesota had their third wettest and Montana had its second wettest. The extreme precipitation during the Red River Valley harvest season has farmers wondering if this type of weather is an anomaly or here to stay.

Weather changes can be unpredictable day to day. Climate changes can be seen over a long-term period. Farmers know and experience the ups and downs of weather every year and have come to expect the changes of climate on their cropping systems.

“We have a different mindset in this region about what the expectation is for rainfall than we did when I came here in the mid 1980s,” according to John Wheeler, Chief Meteorologist at WDAY. “There is a switch in annual precipitation data during the early 1990s when it started raining around here. In

fact, average annual rainfall suddenly, in the early 1990s coming out of drought, shoots up to about 15 to 20 percent.”

He said that has been the case across the region from eastern North Dakota to west central Wisconsin and southern Manitoba into northern Iowa. Unsurprisingly, there has also been an increase in Red River flooding events during this time, some of which Wheeler attributes to precipitation and some to a shift in land use and changes in river navigation. He said the sequence in extremely heavy precipitation events like the ones last fall have also increased.

Wheeler pointed to components that specifically made this fall so wet. A trough of low pressure started to curve north up into the Great Plains and combined with lows coming off of the Pacific, causing them to gain strength and strengthen surrounding winds. Those physics alone, according to Wheeler, are why there are such fantastic storms in the Great Plains. Second, the dry slot that

storms out of the Rockies often develop stayed south this time. Third, with the increase in rainfall we have seen since the early 1990s, the percentage of storms producing very heavy rainfall also increases.

“We also had a lot of storms that just really got their act together. We had thunderstorms continually going over the same path one after another. That’s how it can rain for five hours straight. It’s not one storm but countless storms that happen to be moving over on top of themselves. This fall we just kept getting too much. It was a concentration of perfect precipitation makers,” Wheeler said.

Some might ask if this fall’s precipitation is an outcome of climate change. Well, first Wheeler pointed out that Fargo data collected for the last 100 years shows that there was a flattening out of temperature through much of the 20th century. There was a small rise in temperature in the early 1900s when the climate started to get drier. That was followed by the flattening and then in the late ’80s and early ’90s there was another warming trend and the climate saw more moisture. Wheeler highlighted that while both scenarios saw a warming, they each had different moisture situations.

The temperature data showed an increase on average of 2 degrees Fahrenheit over those 100 years. Still, there are less 100 degree days in the Red River

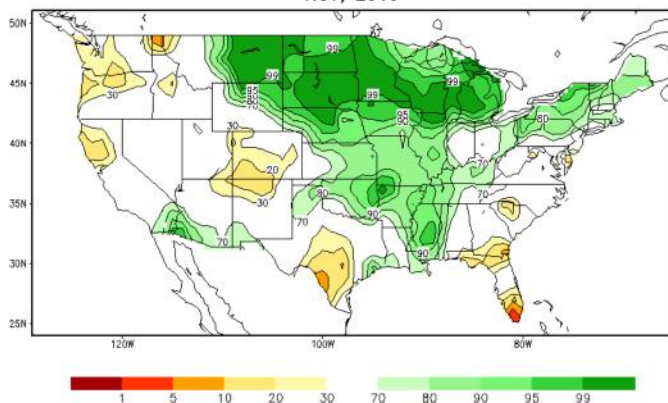
Valley than in the 1930s, when days would hit those highs eight or more times a summer. Wheeler said it is very hard to get even into the 90 degree days easily in years with wet soils in the Northern Plains.

“When the soil gets hot, a lot of that moisture goes into evaporation, creating a cooling effect. When the soils are dry, they heat up and the hot soil heats the lower atmosphere, which is by the way how we have those days in April, when it’s not wet in other years, and the temperatures suddenly jump to 95 degrees in the afternoon,” he said. “That is unique to this climate. So the wet years coincide with the absence of hot weather.”

Another highlight Wheeler found interesting in the Fargo data was the trend in frequency of nights that do not drop below 66 degrees. He said that trend is increasing and there are about three to four more warmer nights a year. Similarly, the number of nights that drop below negative 20 degrees in the winter are decreasing.

“What does this mean? The average temperature of our climate has only changed about two degrees,” Wheeler said. “Weather, however, is by nature very random. So you still get hot and cold days, warm and cool summers, cold or mild winters. So our climate has changed a little bit. Climate change is over a long term period.”

Calculated Soil Moisture Ranking Percentile
NOV, 2019



Minneapolis data also showed an increase in the average dew point of about two degrees over the last 100 years. Wheeler said that demonstrates a relationship between the two degree warming trend and the two degree increase in dew point, which means there is a relationship between the flooding events and the warming. But, he carefully pointed out that he did not make claims about climate change causing a wet fall or that the weather will continue getting wetter. Long-term historical data of world climates shows that climate change happens naturally all the time. He also said the wet trend seems to be localized.

Wheeler said during the warming trend the last 12 to 15 years, the Arctic has been losing ice cover more rapidly. Alaska has seen

a statewide temperature index much higher than average. Because of ice melt in the Arctic, he said there has been about a six inch rise in sea level during the last 100 years.

He cautioned that if there is a more significant increase in sea level, it may get expensive as populations around the coast pull back inland or put up barriers.

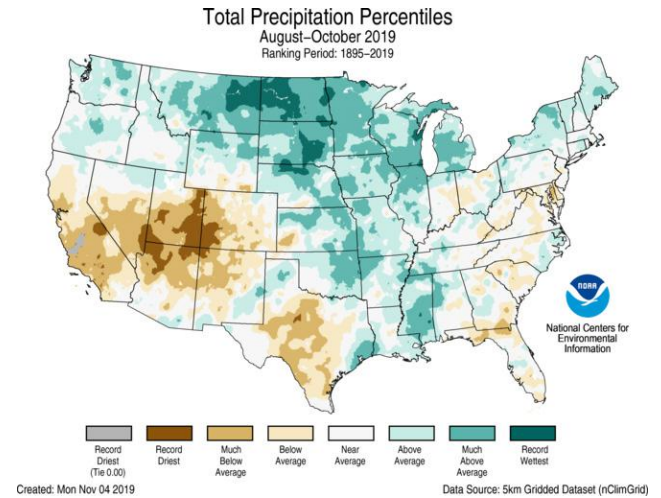
“And guess what, farmers in Minnesota and North Dakota will pay for that. So, you know, I’m not one of these people who will go out and say this storm is a sign of climate change. We are going to have more. We may go dry by spring you know. Weather goes up and down. We have adjusted well and continue to adjust to our changing [crop] growing circumstances. And right

now the climate change has not caused too many problems. But there will be ramifications of ice melting.”

On the weather front, Wheeler said he is often asked what he is forecasting for the next growing season. He said that is a question to which he does

not have an answer. Based on the best current evidence, Wheeler stated that something serious is going on and could spell potential problems in the future.

He said the models that accurately predicted the climate today are “pointing to remarkable changes” in the next 100 years.



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Wheat Stem Sawfly: A Tough Insect

By Shawna Aakre,
Continually Still

Crop pests are a challenge crop producers have been working against since the beginning of agriculture. But more than ever, they are committed to continue learning more about those pests and how to manage them.

One such insect, wheat stem sawfly, has garnered a lot of interest in recent years around the University of Minnesota Northwest Research and Outreach Center. It is a tough insect to fight, according to Dr. Jochum Wiersma, UMN Extension Small Grains Specialist. He and his team have been exploring how wheat varieties hold up against the insect.

They have found wheat stem sawfly emergence to be around or just after the time of jointing in spring wheat. The males emerge first, followed seven to ten days later by the females.

“Emergence is one of the things we have been looking at with our grant,” Wiersma said. “The base temperature 40 day degree model for insect emergence seems to be giving us the best look for this region, which is somewhat similar to other spring wheat regions. So we will keep monitoring the growing degree day model to help us determine when to look for the insect.”

Females will then lay their eggs on the leaf sheath. Larvae will emerge and eat their way into the stem,

then down the stem to the crown. Once to the crown, larvae will girdle the stem, he said, making the stem susceptible to high winds before harvest. Wheat stem sawfly will then make what Wiersma has labeled a “bunker” or “bomb shelter” to help it survive the winter.

He stressed that common methods utilized to fight other pests are not effective against wheat stem sawfly. Wiersma said one of the only options to protect wheat stems from breaking off above the crown before harvest is to swath or use a stripper header right before a critical wind event. Burning, plowing the crowns into the soil and chemical control have all failed to suppress numbers of the insect.

“These little buggers can dig themselves out of the ground four to six inches deep and make their way up in the spring. It’s a really neat little insect if you’re an entomologist. But there is limited success with tillage and no effective chemical control,” Wiersma said. “So variety screening is the obvious logical answer.”

With that in mind, Wiersma and his team are studying if and how 40 different wheat varieties hold up to wheat stem sawfly activity. Plots were hailed out in 2018, the first year of study, making it difficult to determine damage by the insect specifically. In 2019, everything went relatively well according to Wiersma. But surprisingly, no wheat stems fell over in the Crookston plots.

After collecting and cutting open 50 wheat stems from each plot to look for frass, insect larvae excrement, they found that there had been wheat stem sawfly presence in the wheat varieties. He discovered that even solid stem varieties did not have zero percent infection rate in their stems.

Declair, Gunnison and Longmire, considered solid stem varieties, had up to 40 percent wheat stem sawfly presence within the stem. That data means two things to Wiersma. He said there could possibly be false positives because his sample size of 50 stems per plot was not large enough or maybe he needed to explain more carefully what to look for in each stem. But on varieties with a lower percentage of sawfly presence, there is hope.

“Historically, entomologists have scored the trait [solid stem] by looking at the end of the season whether the variety is solid stem or not. What we have now learned is that we have to look mid-season as well. And that’s what I’m going to have to do. We assume that none of our varieties have solid stem features because we’ve never dealt with sawfly. I’m curious to see whether or not those varieties are actually similar to solid stem varieties early in the season.”

Wiersma said if some of the varieties currently used in the region have some solid stem features, farmers here will have options. They may

be able to manage wheat stem sawfly without using varieties out of Montana that are susceptible to many diseases here, including Fusarium head blight.

In the meantime, Wiersma said farmers who have seen wheat stem sawfly and are concerned should employ the use of solid stem varieties. He suggested they plant the first 120 feet of a field adjacent to last year’s infected field with such varieties.

“We still have a couple of questions, but we do think with the way the insect behaves and because we have very little wheat on wheat, that the edge effect is very strong,” Wiersma said.

For those unsure of how to identify the insect, Wiersma said it is pretty simple. Farmers should take up a few stems of wheat, cut them open and take out larvae if they find any. Wheat stem sawfly larvae make a distinct shepherd’s hook when exposed to light.

The good news is wheat stem sawfly is also on the lunch menu of a particular parasitoid wasp, which according to Wiersma, can “with surgical precision deposit eggs into the larvae through the stem.” He said the main reason they did not see clipping in the Crookston plots was because of a fair amount of parasitism. So Wiersma is hoping that the insect is going through a cycle which includes an increase in parasitoid wasp activity that will phase out the increase seen in wheat stem sawfly.

Best of the Best in Wheat and Soybean Research

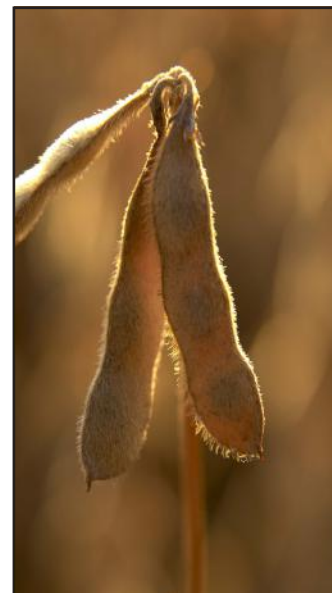


Alerus Center, Grand Forks ~ February 5, 2020
Courtyard by Marriott, Moorhead ~ February 6, 2020

The North Dakota State University and the University of Minnesota Extension, along with MAWG, MWR&PC, MSR&PC, NDSC, NDGGA, and NDWC have joined together to present producers with current research information. In this day-long workshop, growers will have the opportunity to learn from researchers and extension specialists.

These sessions are Free. Pre-registration is encouraged. CEU credits will be available.

To register call, (218) 253-4311 ext 7 or go online at www.mnwheat.org and click on Best of the Best link.



PROGRAM

Please Note: There are several different speakers, topics and times between the Grand Forks & Moorhead sessions.

8:25 a.m. Welcome

Soybean Research Recap - Dr. Hans Kandel, NDSU Extension, Fargo Grand Forks 8:30 am / Moorhead 9:00 am

Using NDVI Images for Predicting Yield and Protein in Wheat - Dr. Joel Ransom, NDSU Extension, Fargo Grand Forks 9:00 am / Moorhead 9:30 am

Getting the Best Price You Can (Market Outlook) - Dr. Frayne Olson, NDSU Extension, Fargo Grand Forks 9:30 am

The Bad and the Ugly – Bacterial Leaf Streak and Scab in 2019 - Dr. Andrew Friskop, NDSU Extension, Fargo Grand Forks and Moorhead 10:15 am

Spring Residue and Soil Water Management Following a Wet Harvest - Dr. Aaron Daigh, Dept. of Soil Sciences, NDSU, Fargo Grand Forks and Moorhead 10:45 am

SCN Coalition and Soybean Stem Disease Survey - Dr. Sam Markell, NDSU Extension, Fargo Grand Forks and Moorhead 11:15 am

11:45 - 2:00 p.m. Lunch and Hands on Demos
Lunch speaker (Grand Forks): **How to Allocate Your Limited Resources to Get the Biggest Bang for Your Buck** - Dr. Bryon Parman, NDSU Extension, Fargo

Lunch speaker (Moorhead): **Getting the Best Price You Can (Market Outlook)** - Dr. Frayne Olson, NDSU Extension, Fargo

Hands on Demonstrations:

- **Soybean Gall Midge** - Dr. Angie Peltier, U of M Extension, Crookston
- **Drone Applications in Wheat and Soybean** - John Nowatzki, Machine Specialist, NDSU Extension, Fargo
- **Hagberg Falling Number - Challenges of a Simple Test and a Complex Problem** - Dr. Jochum Wiersma, U of M Extension, Crookston
- **Weedbot, a Weed Detecting Robot** - Dr. Heather Zhang, NDSU Biosystems Engineering, Fargo
- **Pubescence and Petioles Pinpoint Pigweed ID** - Dr. Joe Ikley, NDSU Extension, Fargo

Fertilizing Wheat and Soybean, Suggestions for 2020 - Dr. Dave Franzen, NDSU Extension, Fargo Grand Forks ONLY 2:05 pm

How to Allocate Your Limited Resources to Get the Biggest Bang for Your Buck - Dr. Bryon Parman, NDSU Extension, Fargo Moorhead 2:05 pm

Are Northern Soybeans Catching a Wave of Southern Soybean Diseases? - Dr. Dean Malvick, U of M Extension, St. Paul Grand Forks 2:35 pm / Moorhead 8:30 am

Weather or Not, Use the Tools You Got - Daryl Ritchison, Director North Dakota Agricultural Network, Fargo Moorhead ONLY 2:35 pm

3:05 p.m. Adjourn

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The North Dakota Grain Growers Association and North Dakota Wheat Commission, along with North Dakota State University Extension have joined together to present producers with the latest in wheat research, weather outlook and market trends. Please join us for this day-long workshop.

The event is FREE but pre-registration is encouraged. For more information, call the ND Wheat Commission at (701) 328-5111.

Thursday, February 13, 2020
Williston Area Recreation Center (ARC)
Williston State College Campus

Program

- 8:00 a.m. Seasonal Weather Outlook**
– Jared Marquis, UND, Grand Forks
- 9:00 a.m. Spring Wheat Breeder's Update**
– Andrew Green, NDSU, Fargo
- 9:30 a.m. Small Grain Disease Update**
– Andrew Friskop, NDSU, Fargo
- 9:50 a.m. Small Grain Agronomy Update**
– Joel Ransom, NDSU, Fargo
- 10:30 a.m. Soil Acidity in MT**
– Rick Engel, MSU, Bozeman
- 11:15 a.m. Soybean Fertility in Western ND & S Management**
– Dave Franzen, NDSU, Fargo
- 12:00 p.m. Lunch**
- 12:50 p.m. ND Wheat Commission Update**
– Dustin Johnsrud
- 1:05 p.m. Hands-on demonstrations ***
- 2:30 p.m. Biology and Management of Waterhemp and Palmer Amaranth** - Joe Ikley, NDSU, Fargo
- 2:50 p.m. Basics of Successful Soybean Management in Western ND** - Hans Kandel, NDSU, Fargo
- 3:20 p.m. Saline Seep Reclamation with Salt-tolerant Alfalfa**
– Clair Keene, NDSU - WREC
- 3:40 p.m. Market Outlook, MFP, Land Values and Rental Rates**
– Bryon Parman, NDSU, Fargo
- 4:30 p.m. 'Best' Program Ends. Adjourn & Social Hour**
- 5:30 p.m. Dinner ** + Awards to follow**
- 6:30 p.m. Featured evening speakers:**
Regenerating Soil Health While Improving the Bottom Line - Jerry Doan; and
Diversifying Ag: Thinking Outside the Fence - Jay Doan

** Dinner tickets are \$10. Registration is not required for the dinner. For more information call the Williams Extension office at 701-577-4595.

* **Hands-on demonstrations:** Pigweed ID, Joe Ikley; Herbicide Resistance Hands-on with Resistant Biotypes, Brian Jenks; Seed Quality & Wet Grain, Joel Ransom and Andrew Friskop; Real-time Sensors, John Nowatzki, NDSU

Scouring for Pests

By Dan Lemke,
Spirited Communications

To make good management decisions, farmers need to know what they're up against. For the past five years, University of Minnesota Extension Crops Educator Angie Peltier has been involved with a concerted effort to survey soybean pests in North-western Minnesota.

Researchers began collecting regional pest pressure data in 2015 to help farmers make pest management decisions. 2019 was the fifth year the survey was conducted, covering 762 fields in Minnesota and North Dakota.

Soybean aphids were among the pests that scouts were looking for during the survey, and with good reason. In 2017, some soybean aphid populations in the area were confirmed to have pyrethroid resistance.

"2017 was a real breakout year in terms of pyrethroid resistance," Peltier says. Pyrethroids are a class of insecticide used to treat pests, including soybean

aphids. Some aphid populations have developed a resistance to pyrethroids, meaning farmers need to vary their treatment modes of action for aphids just as they do for weeds.

Peltier says that a key for aphid management is thorough scouting. Aphids require treatment when 80 percent of plants are infested with an average of 250 aphids per plant and populations are growing.

"Two hundred fifty aphids per plant is a level that allows us to get in the fields and treat before yield is affected," Peltier says. "If populations aren't at that threshold and growing, there's no need to spray. That protects the economics, the environment and the available technologies because we don't have a lot of treatment options."

Peltier says the thresholds are based on data and not emotions. She recommends treatments only when necessary to preserve yield potential. If the threshold is not reached, avoid the unnecessary treatment to preserve efficacy of insecticides.



Photo: University of Minnesota

ticides. Not spraying can also save growers as much as \$9 to \$22 per acre.

Peltier says crop scouts saw grasshoppers in dry areas and some spider mites, but soybean aphid numbers were relatively low. Not many farmers treated for aphids in 2019. Farmers may have a cold winter to thank for that.

Much of northern Minnesota and North Dakota experience a very cold winter. Peltier says much of northwestern Minnesota was about 14 degrees below normal in January and February. Very cold weather means a high aphid mortality rate. Aphid eggs tend to be above soil level. The eggs freeze between -25 and -35 degrees. Because of the cold, fewer eggs survived to infest soybean plants.

Gall midge was found in southwestern Minnesota in 2018. Soybean gall midge is an insect that has also been recorded in soybeans in Nebraska, Iowa, South Dakota and Missouri.

Crop damage is caused by gall midge larva feeding inside the stem, causing brittle stems. Infestation can cause significant yield losses when



University of Minnesota Extension Crops Educator Dr. Angie Peltier

populations are high. Tiny red or orange midge larvae feed under the epidermis of the stem, weakening the stem near the base of the plant, causing lodging. Most infestations have been discovered along field edges.

“Check toward the base of the plant,” Peltier says. “Make sure you don’t have gall midge, because we need to get a handle on this.”

While the gall midge had not been discovered in northwestern Minnesota or North Dakota, Peltier advises farmers to keep a watchful eye on their field edges for unexplained plant loss.



Small white spots are SCN cysts

Photo: University of Minnesota

Best of the Best in Wheat Research & Marketing

The North Dakota Grain Growers Association and North Dakota Wheat Commission, along with North Dakota State University Extension have joined together to present producers with the latest in wheat research, weather outlook and market trends. Please join us for this day-long workshop.

The event is FREE but pre-registration is encouraged. For more information, call the ND Wheat Commission at (701) 328-5111.

Friday, February 14, 2020
Clarion Hotel Convention Center, Minot
2200 E Burdick Expy, Minot

NDSU Extension Workshop - Sponsored by the ND Grain Growers Association and the ND Wheat Commission

Program

- 8:25 a.m. Welcome**
– *LoAyne Voigt, Renville County Extension Agent*
- 8:30 a.m. Managing Surface Acidity in No-Till Systems**
– *Chris Augustine, NDSU Extension, Minot*
- 9:00 a.m. Small Grain Disease Update**
– *Andrew Friskop, NDSU Extension, Fargo*
- 9:30 a.m. Soybean Fertility in Western ND & S Management**
– *Dave Franzen, NDSU Extension, Fargo*
- 10:00 a.m. Marketing Outlook & Picking the Best Crop for 2020**
– *Bryon Parman, NDSU Extension, Fargo*
- 11:00 a.m. Key Practices for Successful Soybean Production in NW North Dakota**
– *Hans Kandel, NDSU Extension, Fargo*
- 11:30 a.m. Updates from ND Grain Growers and ND Wheat Commission**
- 12:10 p.m. Lunch**
- 1:00 p.m. Hands-on demonstrations ***
- 2:00 p.m. Weeds Control Challenges in 2019 and What to Look Out for in 2020** – *Joe Ikley, NDSU Extension, Fargo*
- 2:25 p.m. Spring Wheat Variety Performance in 2019**
– *Greg Endres, NDSU Extension, Carrington*
- 2:55 p.m. Agronomic Update: What We Learned in 2019**
– *Joel Ransom, NDSU Extension, Fargo*
- 3:20 p.m. Adjourn**

* **Hands-on demonstrations:** Identifying Pigweeds, *Joe Ikley*; Herbicide Resistance Weeds, *Brian Jenks*; Seed Quality, *Joel Ransom and Andrew Friskop*; Real-time Technology for Monitoring Crops & Livestock, *John Nowatzki, NDSU*

Regional Crop Quality Reports Assess Crop, Provide Valuable Information to Customers

For over 60 years, state wheat commissions and U.S. Wheat Associates (USW) have been conducting regional crop quality reports for the area's hard red spring wheat (HRS) and durum. These reports are funded by the wheat check off organizations from Minnesota, Montana, North Dakota, South Dakota, Idaho and Washington and quality analysis is done at the wheat quality labs at NDSU. Similar regional reports are done for the other classes of wheat and USW compiles quality data from all six classes of U.S. wheat into one report that is used annually for customer education and outreach.

The quality data isn't always rosy. However, getting

accurate information to customers is important, whether it's good or bad.

Jim Peterson, NDWC Policy and Marketing Director, says "Our job is to represent the entire crop to help optimize the strengths our wheat has over competitors and help our customers manage year-to-year changes in end-use performance," he said. "We don't try to hide things, and customers really find value in our surveys because they trust they're the most accurate representation of the crop." This year the HRS and durum crops faced more quality issues than normal and collecting samples was challenging due to harvest delays. For the U.S. HRS and northern durum region, samples collected represent the whole

crop, not just what is moving to the elevator at harvest.

The charts (page 30) summarize the quality parameters of the 2019 HRS and durum crops. The HRS crop shows a generally high grade with high protein levels. However, well below average levels for vitreous kernel content and falling number were results of an unusually wet harvest. There were also areas of elevated DON levels. In laboratory evaluation of milling and baking parameters, higher flour extraction values and larger loaf volumes are positives for buyers. Dough properties are revealing a crop with lower stability and lower absorption. Some of the decline in dough strength

is due to a shift in varieties planted, in addition to impacts from weather.

The 2019 Northern U.S. durum crop is showing lower grade distributions compared to last year, with sharply lower vitreous kernels, lower falling numbers, and higher damaged kernels. Portions of the crop tout excellent quality, but a much smaller share than typical. Laboratory milling and pasta evaluations reveal lower semolina extraction with lower color scores and less cooked firmness, however mixing strength is up from recent years.

For both classes of wheat, portions of the crop are of good quality, but some quality parameters were broadly impacted by the challenging harvest. Significant carry-over stocks from the excellent quality 2018 crops will help meet customer requirements, but high quality demands will still command premium market values. Some customers have already adjusted contract specifications to balance market availabilities with price and end product quality demands, and depending on where premiums for quality wheat elevate to, more customers may look at specification adjustments.

The end of harvest brings many overseas customer visits to the region to hear detailed quality information and gain a better understanding of the supply and

continued on page 30



Dr. Frank Manthey and Dr. Senay Simsek discuss wheat quality samples with Japanese customers during a visit to NDSU this fall.



Keep Your Focus on the Field



Between weather, fluctuating markets and ever-shrinking margins, you have enough to worry about. The North Dakota Grain Growers Association will represent your interests on regulation and policy issues so you can focus on raising the best crop you can. Let's work together to ensure North Dakota agriculture remains profitable for generations to come.

You Raise. We Represent.

Join today at NDGGA.com



Phosphorus and Potassium Rates in Spring Wheat-Soybean Crop Rotation

By Shawna Aakre,
Continually Still

Liebig's Law of the Minimum says, "Growth is not controlled by the total amount of resources available, but by the scarcest resource". This leads farmers and researchers to continually identify limiting factors in order to open up new possibilities for plant growth.

That's why Research Agronomist Dr. Dave Grafstrom, University of Minnesota Magnusson Research Farm near Roseau, and his team have embarked on a multi-year study to determine the influence of phosphorus (P) and potassium (K) soil levels in a wheat and soybean crop rotation.

"Basically, USDA District 10, that's northwest Minnesota, has seen a 700,000 acre increase in soybeans from 2007 to 2017. That's a lot in ten years. Yet, soybean yield has remained pretty flat in those years, around 35 bushels per acre

according to the recording service," Grafstrom said. "Wheat has had about a 15 bushel increase."

There are many positive things that have come from advances of the two crops, but Grafstrom points out that farmers would like to know if P and K are limiting their current yields, as well as the ideal rates of application for the crops.

In the first year of the study, there were four locations. Two locations were on-farm, real world scenarios near Baudette and Elbow Lake. The other two were controlled six by 15 foot plots on the Magnusson Research Farm. All locations received a complete soil analysis at two depths, zero to four inches deep and six to 24 inches deep, which included micro and macro nutrient profiles to determine the soil's starting point. The team plans to test only for P & K in years two and three of the study, followed by another complete analysis in year four.

"By putting P & K on every year, we will hopefully increase the levels of each, but we may discover something we don't want or like. And the law of the minimum might come in to play," Grafstrom said. "Conversely, there is also the law of the maximum. Is more always better? Absolutely not. So we are trying to look at a soybean-wheat crop rotation for four years minimum to aim for managing 80 bushel wheat and 50 bushel soybeans."

Results in the first year show that as P rate is increased, wheat yields also increased gradually from about 82 to 90 bushels per acre in soil originally testing low in P. Those results range across an applied P rate of 0, 20, 40, 60, 80 and 100. Grafstrom said that surprisingly, wheat protein was higher even in higher testing K soil. He cannot say for sure what this means, but it is an observation thus far. Soybean yield showed a definite response to an increase in K, even in high testing K

soil. Grafstrom again was careful to point out the data is only from one year of study.

To study different scenarios, there were two sets of 15 treated plots and one control plot. Fertilizer

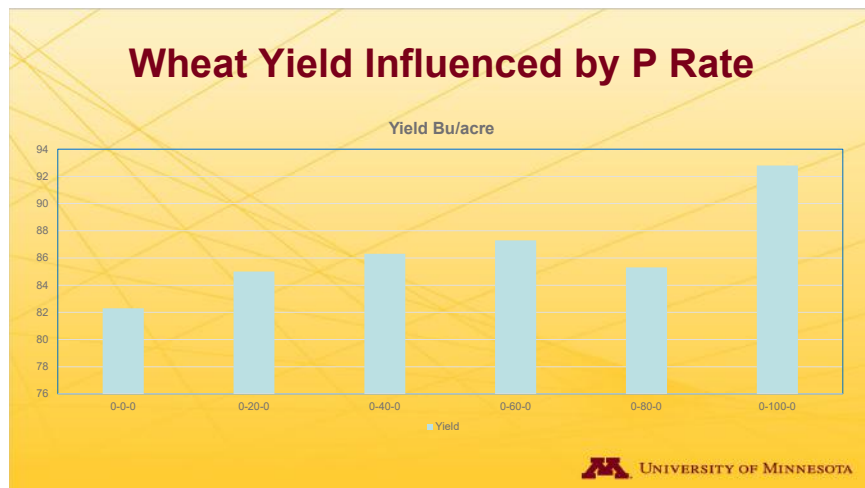
treatments were applied in the spring for the first year of trials and after harvest for years two through four.

For the 2019 wheat trials, nitrogen in the form of urea was applied pre-plant incorporated (PPI) at 160 pounds per acre. P and K treatments were applied by hand to each plot with a P source of 11-52-0, nitrogen (N) being subtracted to equalize the N rate Grafstrom said. Linkert was then seeded at 120 pounds per acre on May 11. Plots were harvested September 2.

For soybeans, Asgrow AG005X8 was seeded at 225,000 seeds per acre, with a final plant population of 181,000 on May 17. P and K treatments were applied by hand again, 0-26-0 being the P source. Plots were harvested October 31.

On-farm research trials received two treatments, the first being the farmer's original practices. The second application was an additional 50 units of P and K in four replicated strips across the field in the spring. An additional 50 units will be added after each harvest for the remaining three years of the study. Grafstrom said that researchers are making appropriate adjustments of the N rate if needed to balance out their comparison to small plot data.

Grafstrom said he and his team are looking for more participating farmers and hoping to continue



the study long-term. He urged interested farmers to reach out to him soon. "Sometimes, as researchers, we over think things," Graf-

strom said. "And so to get a fresh perspective from you as farmers...you guys are out doing what you do. For me, it really recharges my batteries

and gets me grounded to get that fresh perspective." Grafstrom reminds farmers that if they are interested in looking more closely at

the study and data from 2019, his Prairie Grains presentation can be found at mnwheat.org.

Large Plot Trial Results - 2019

Wheat

- No treatment differences
- FP - Wheat yield = 90.3 bu/ac
- Elevated P&K = 90.8 bu/ac
- FP - Protein = 11.5%
- Elevated P&K = 11.1%
- FP - Test wt = 59.4 #/bu
- Elevated P&K = 59 #/bu

Soybeans

- No treatment differences
- FP Soybean yield 53.9 bu/ac
- Elevated P&K = 55.8 bu/ac
- FP Test wt = 57.3 #/bu
- Elevated P&K = 57.6 #/bu



Small Plot Wheat and Soybean Trial Summary - 2019

Wheat

P & K	Bu/Acre	Wt./Bu	Protein ³
0-20-0	85.0	60.3	15.3
0-40-0	86.3	60.3	15.3
0-60-0	87.3	60.2	15.1
0-80-0	85.3	60.3	15.1
0-100-0	92.8	60.2	15.2
0-0-20	81.3	60.0	15.4
0-0-40	81.5	60.0	15.4
0-0-60	83.3	60.0	15.5
0-0-80	81.3	60.3	15.7
0-0-100	82.5	60.1	15.7
0-20-20	89.0	60.1	15.3
0-40-40	86.5	60.1	15.2
0-60-60	85.3	60.2	15.1
0-80-80	77.5	60.0	15.3
0-100-100	87.8	60.3	15.2
0-0-0	82.3	60.2	15.3
LSD @5%level	8.6	0.3	0.2
LSD @10%level	7.2	0.2	0.2
CV(%)	7.2	0.3	1.1

Soybean

	Bu/Acre	Wt./Bu	Protein ³	Oil ³
0-20-0	65.3	57.4	36.7	20.4
0-40-0	62.0	57.5	37.1	20.4
0-60-0	61.5	57.2	37.4	20.5
0-80-0	61.0	57.5	36.9	19.6
0-100-0	63.8	57.1	37.8	20.3
0-0-20	61.8	57.3	37.0	20.4
0-0-40	63.5	57.5	37.0	20.4
0-0-60	67.5	57.5	36.9	20.2
0-0-80	61.5	57.5	37.0	20.0
0-0-100	68.0	57.4	37.0	20.3
0-20-20	67.8	57.3	36.9	20.3
0-40-40	64.3	57.5	36.7	20.0
0-60-60	64.3	57.4	37.0	20.5
0-80-80	62.3	57.5	37.2	20.3
0-100-100	68.5	57.3	37.4	20.2
0-0-0	61.7	57.3	36.9	19.9
LSD @5%level	7.7(ns)	0.4	NS	NS
LSD @10%level	6.4	0.3	0.8	0.8
CV(%)	8.5	0.5	1.8	2.3



price situation. This year buyers were well aware of the harvest delays and corresponding quality issues in both the HRS and durum crops and were rightfully concerned about obtaining quality wheat to meet their needs. The U.S. HRS and durum region wasn't the only area affected by these issues, the Canadian crop was also affected making the supplies of high quality wheat a bit tighter than previous years. After hearing more detailed quality information and gaining a better understanding of the level of supplies available, most customers felt assured they could obtain the quality needed, even if it might be at premium price levels. They were also put at ease by the fact that the elevator system is quite astute at segregating out wheat with substantial quality issues and diverting it to appropriate market channels.

Similar conversations were held during the overseas crop quality seminars conducted by USW. The seminars help educate U.S. wheat customers on a variety of issues including supply and demand data, trade policy updates, and quality information. This year USW hosted 43 seminars in 41 countries. During the USW crop quality seminars, USW staff, state commission staff and various consultants present quality data. USW technical staff and milling and baking consultants also offer customer service and more specific technical presentations.

Jim Peterson, NDWC, trav-

eled to Europe to present HRS and durum quality data. The durum crop faced more quality issues this year and with a smaller production base, the issues are more widespread. However, customers are working through the crop and finding what types of quality parameters they can work through and still produce the end products they desire. "Customers in Europe welcomed the in-depth discussion on the 2019 crop quality, due to the extreme weather experienced during harvest." Peterson said. "There are good demand opportunities in Italy this year, with good sales already made. Our biggest asset in the EU for both durum and HRS is the high protein levels found in our wheat. Customers will need to manage the other challenging factors in this year's crop, such as lower falling numbers, as their local production is deficient in protein, and they need imports."

USW technical staff and milling and baking consultants also offer customer service and technical training to help customers work through any crop issues and help them find the best wheat for their end use needs. North Dakota State University researcher Dr. Senay Simsek presented quality data in South America and North Asia. In addition to the crop quality data, she had the opportunity to present on some special topics, which were well received by customers. This type of technical work and interaction with customers is important to solving any issues they may be having in their mill or bakery

AVERAGE QUALITY FACTORS FOR U.S. NORTHERN GROWN DURUM WHEAT

QUALITY FACTORS	2019	2018	5YR.
KERNEL DATA			
Test Weight - lb./bu.	61.1	61.4	60.5
Protein % (12% moisture)	13.9	14.5	13.9
Damage %	2.3	0.3	0.4
Falling Number (seconds)	345	425	384
Vitreous Kernels %	64	90	87
Grade	2 AD	1 HAD	1 HAD
SEMOLINA DATA			
Semolina Extraction (%)	57.5	69.3	67.1
Gluten Index (%)	67	57	60
Mixogram (1-8)	6.4	5.3	5.3
SPAGHETTI PROCESSING DATA			
Color Score (1-12)	7.8	8.3	8.7
Cooked Firmness (g-cm)	3.8	4.5	4.4

HARD RED SPRING WHEAT

QUALITY FACTORS	2019	2018	5YR.
KERNEL DATA			
Test Weight - lb./bu	60.7	62.2	61.7
Protein % (12% moisture)	14.5	14.5	14.1
Damage %	0.7	0.4	0.2
Falling Number (seconds)	337	399	381
Vitreous Kernels %	55	86	74
Grade	1 NS	1 DNS	1 NS
MILLING DATA			
Flour Extraction	68.7	68.1	67.9
DOUGH & BAKE DATA			
Farino Absorption (%)	62.6	64.2	62.7
Farino Stability (min)	10.0	11.4	11.2
Loaf Volume (cm)	1019	988	963

and also offers increased demand potential if they can find increased applications for U.S. wheat classes.

The crop quality reports and corresponding crop quality seminars and other customer service work done by USW is imperative to

maintaining and expanding our customer base. In years where quality issues arise, it can be challenging, but providing our customers with accurate and honest data and helping them work through the crop continues to build trust in U.S. wheat.





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

www.cropexpo.com



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?

Sponsored by: 



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.

Sponsored by:



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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Call the MAWG office at 218-253-4311 and choose the type of membership that is best for you.

Visit mnwheat.org to join today.

