

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

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)

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

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MN-WASHBURN WHEAT



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- Good straw strength
- Resistant to pre-harvest sprouting
- Excellent overall disease resistance
- Carries BYDV resistance gene

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



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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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