2015 PCDF ANNUAL REPORT

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Cereals

Advanced Two-Row Hulless Barley Trial

Susan M[c]Eachern[1], Angel Melnychenko[1] and Ana Badea[2]

Site Information

Location:	Roblin, Manitoba
Cooperators:	Dr. Ana Badea – Barley Breeder, AAFC Brandon
	Rudy Von Hertzberg – Research Technician, AAFC Brandon

Background

There is a prime opportunity for increased commercialization of barley for food today due to its health benefits, demand for healthy foods and a more favorable reception by consumers.

The Six-row and Hulless barley breeding program at Agriculture and Agri-Food Canada's Brandon Research Centre (BRC) has dedicated some of its efforts for the last decade toward the development of hulless food barley lines for milling. Cultivars such as 'Millhouse' [1] and 'Roseland' were released. Efforts continue and elite milling barley lines such as those tested at Roblin are currently under evaluation.

Three registered barley varieties, Roseland, CDC McGwire and Rattan (waxy check) and one wheat variety, AC Cora, were grown at Roblin this year, as well as two numbered breeding lines.

Objective

To evaluate advanced two-row hulless barley lines for human consumption.

Procedure and Project Activities

Treatments:	6 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 14
Fertilizer applied:	All actual lbs./acre
	Side Band - 68 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4
	Seed Placed - 15 lbs. P_2O_5
Pesticide applied:	June 11 – Prestige XC® and Axial BIA®

[1] PCDF, Roblin
[2] AAFC, Brandon

Harvest date: September 10
Product handling: Each individual plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC and Axial BIA to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded. A 1 kg composite sample was sent to AAFC Brandon for further quality analysis.

Table 1. 2015 Advanced Two-Row Hulless Barley Trial Varieties at Roblin, MB*

AC Cora	Roseland
CDC McGwire	H291-10
CDC Rattan	H293-60

* Numbered entries are advanced lines with potential advancement to the cooperative testing system.

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	47 lbs/acre (low)	68
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

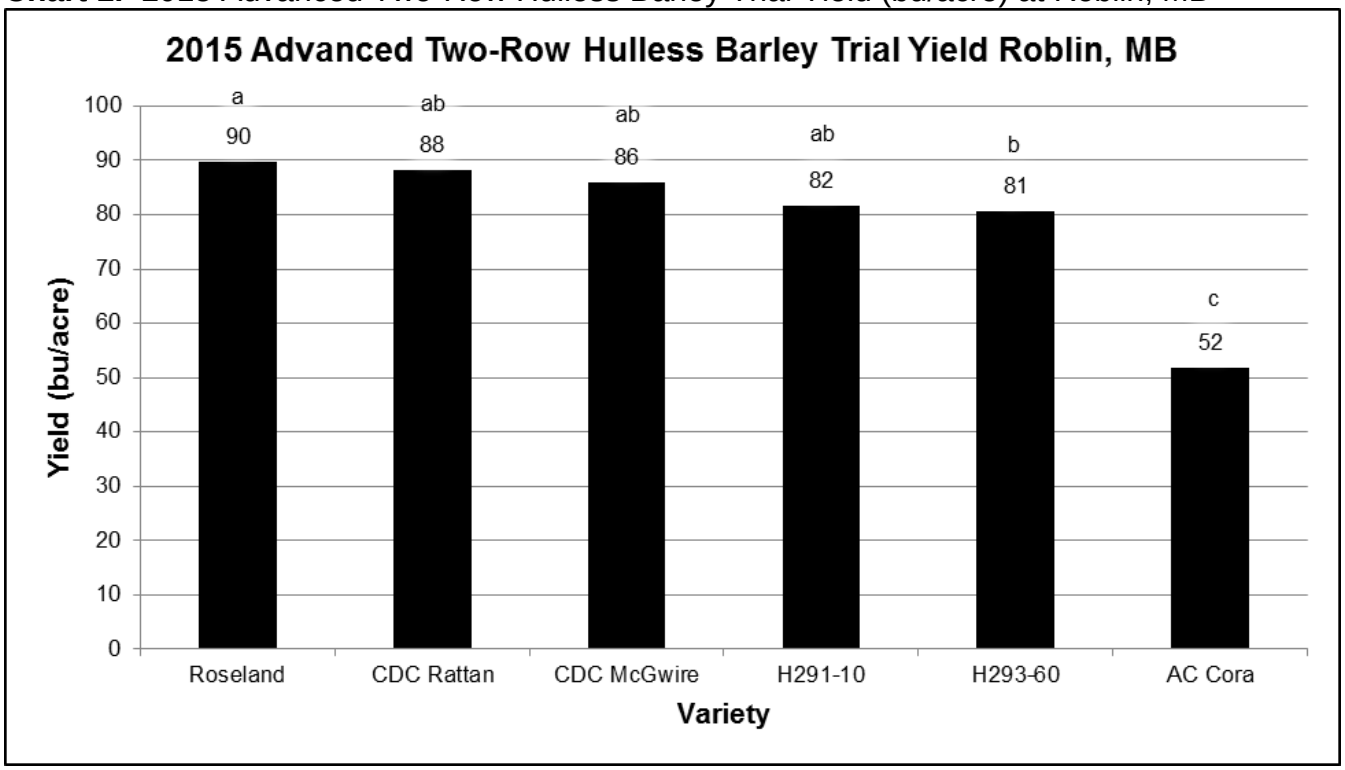
Table 3. 2015 Advanced Two-Row Hulless Barley Trial Results at Roblin, MB

Variety	Yield (kg/ha)	Days to Heading*	Height (cm)	Disease (1-9)*	Lodging (1-9)*	Days to Maturity*
Roseland	4830	66	93	3	2	100
CDC Rattan	4739	61	75	4	1	93
CDC McGwire	4627	61	79	4	1	95
H291-10	4388	60	87	5	2	92
H293-60	4342	58	86	5	2	92
AC Cora	2783	54	91	4	2	96
Grand Mean	4285	60	85	4	2	95
% CV	5.8	1.5	2.9	11.0	27.0	1.3

LSD 5%	451.7	1.6	4.6	0.8	0.8	2.2
Significant Difference	Yes	Yes	Yes	Yes	Yes	Yes

Days to Heading* = Days from Seeding to 50% of Plants Headed
Disease (1-9)* = 1 – No Disease, 9 – Severe Disease
Lodging (1-9)* = 1 – Plants Fully Erect, 9 – Plants Completely Flat
Days to Maturity* = Days from Seeding to 50% of Plants Mature

Chart 1. 2015 Advanced Two-Row Hulless Barley Trial Yield (bu/acre) at Roblin, MB



The test in 2015 was quite small and was comprised of only two breeding lines targeted for flour and milling use along with suitable checks: Roseland, CDC McGwire, CDC Rattan and AC Cora.

Unfortunately, none of the two entries had higher grain yield than CDC McGwire or Roseland checks at the Roblin location. However, prior to making any recommendation for these two lines, yield data from other locations and lab quality data will have to be analysed when available.

Conclusions

Inclusion of barley flour will enhance the dietary fibre and antioxidant content of a wheat flour blend. The goods made out of this flour blend will constitute a healthier food choice for consumers.

Acknowledgements

This research was supported in part by funding from the Western Grains Research Foundation.

For technical assistance, we gratefully thank R. Von Hertzberg and B. Graham from the Brandon Research Center, MB, Canada and PCDF for continued support with growing and caring for the field trials.

References

[1] Therrien M.C., and Ames, P. N. (2006) Crop Sci. 46: 2715-2716.

Schedule

This trial will not be grown in 2016 as it has been discontinued.

Advanced Six-Row Malt Barley Trial

Susan M[c]Eachern[1], Angel Melnychenko[1] and Ana Badea[2]

Site Information

Location: Roblin, MB
Cooperators: Dr. Ana Badea – Barley Breeder, AAFC Brandon
Rudy Von Hertzberg – Research Technician, AAFC Brandon

Background

Manitoba Parkland has the potential to successfully produce commercial six-row malting barley.

AAFC Brandon's barley breeding effort is aimed at developing new varieties of six-row malting barley well-suited to Western Canada with improved disease resistance and agronomic performance, combined with enhanced quality traits to expand market opportunities at home and abroad.

Three registered malting varieties, CDC Mayfair, Celebration and Tradition, and two registered feed varieties were grown at Roblin this year, as well as 10 numbered breeding lines under evaluation for possible advancement to the 2016 registration trial (Table 1). The lines A513-20, A515-8 and SM131557 were entered in the test only for feed purpose and should be compared only to the feed checks.

Objective

To evaluate different lines of six-row barley for malting and feed.

Procedure and Project Activities

Treatments: 16 (Table 1)
Replication: 3
Plot size: 1.2m x 5m
Test design: Randomized Complete Block Design
Seeding date: May 14
Fertilizer applied: All actual lbs./acre
Side Band - 67 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4
Seed Placed - 15 lbs. P_2O_5
Pesticide applied: June 11 – Prestige XC® and Axial BIA®
Harvest date: September 10

[1] PCDF, Roblin
[2] AAFC, Brandon

Product handling: Each individual was plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. The trial was sprayed with Prestige XC and Axial BIA at the 2 to 4 leaf stage to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included early season plant counts (plant/m^2), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded. A 1 kg cleaned composite sample was sent to AAFC Brandon for further quality analysis.

Table 1. 2015 Advanced Six-Row Malt Barley Trial Varieties at Roblin, MB*

AC Ranger	Vivar	A515-8	SM131578
CDC Mayfair	A512-1	SM131557	SM131581
Celebration	A513-20	SM131569	SM131591
Tradition	A514-58	SM131576	SM131604

* Numbered entries are advanced lines with potential advancement to the cooperative testing system.

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	47 lbs/acre (low)	68
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

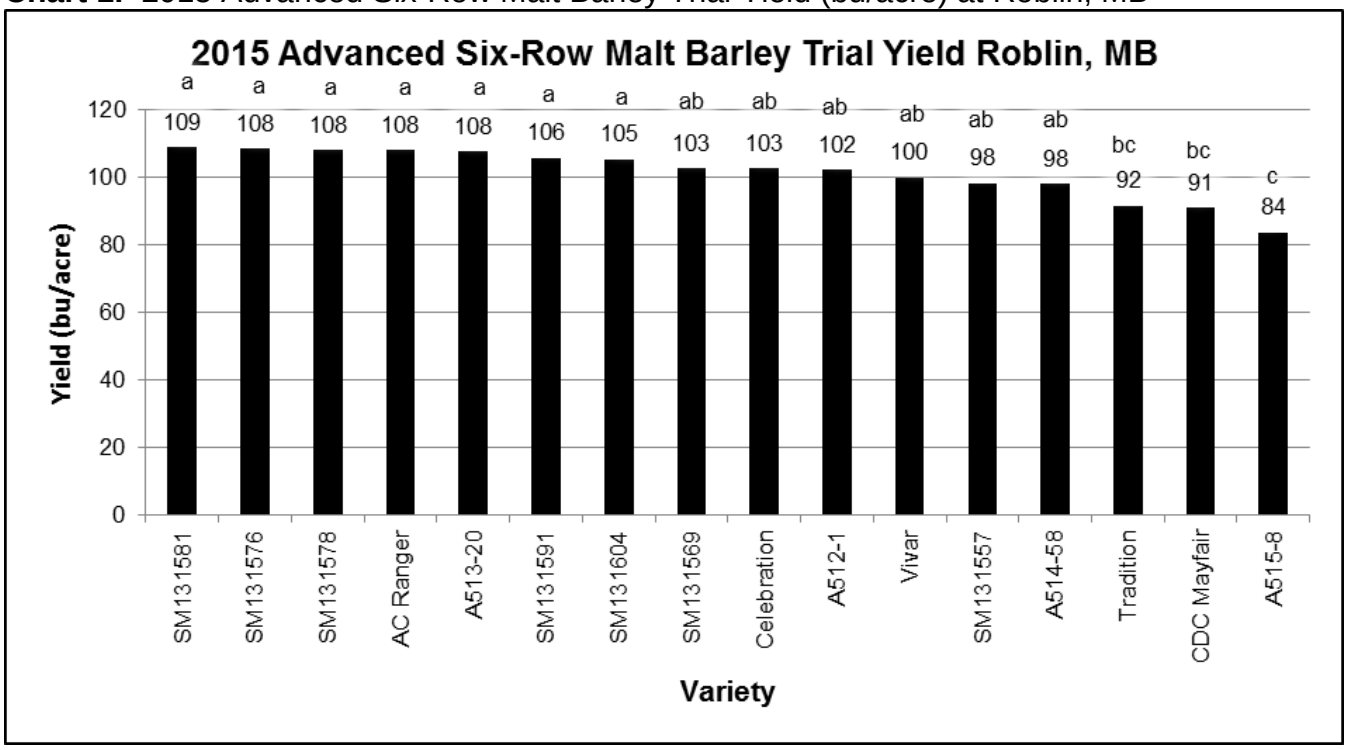
Table 3. 2015 Advanced Six-Row Malt Barley Trial Results at Roblin, MB

Variety	Yield (kg/ha)	Days to Heading*	Disease (1-9)	Height (cm)	Days to Maturity*
SM131581	5849	54	4	67	92
SM131576	5829	53	4	77	90
SM131578	5803	55	3	73	95
AC Ranger	5803	56	4	73	93
A513-20	5791	53	4	86	91
SM131591	5689	55	3	68	93
SM131604	5661	53	4	74	89
SM131569	5514	54	4	68	90
Celebration	5513	54	4	83	89
A512-1	5498	52	4	79	90

Vivar	5370	57	4	71	92
SM131557	5283	55	4	78	89
A514-58	5276	52	4	86	89
Tradition	4927	53	5	84	88
CDC Mayfair	4887	54	4	79	90
A515-8	4500	52	5	79	88
Grand Mean	5450	54	4	76	90.5
% CV	7.9	1.4	10.4	4.4	1.2
LSD 5%	718.0	1.2	0.7	5.6	1.8
Significant Difference	Yes	Yes	Yes	Yes	Yes

Days to Heading* = Days from Seeding to 50% of Plants Headed
Days to Maturity* = Days from Seeding to 50% of Plants Mature

Chart 1. 2015 Advanced Six-Row Malt Barley Trial Yield (bu/acre) at Roblin, MB



At the Roblin site with the 2015 testing conditions, only one of the three feed barley lines, A513-20, had higher yield than the check cultivar Vivar. However, it did not surpass the other check, AC Ranger. Out of the seven malting lines tested, five of them, SM131581, SM131576, SM131578, SM131591 and SM131604 had higher yield than all three malting checks. The other two malting lines, SM131569 and A512-1, had also higher yield than the check cultivars Tradition and CDC Mayfair, but similar to Celebration.

The three malting lines, SM131581, SM131576 and SM131578, look to be promising based on yield. If they show consistency at the other testing locations with respect to yield and good

malting quality, which at the moment are unknown, then they will be entered for extensive evaluation in the 2016 Western Cooperative Six-Row Barley Registration Test.

Conclusions

Three malting varieties look promising for yield and malting quality results are unknown at this time. If they meet malting quality requirements, they will be entered for evaluation in the 2016 Western Cooperative Six-Row Barley Registration Test.

Acknowledgements

This research was supported in part by funding from the Western Grains Research Foundation.

For technical assistance we gratefully thank R. Von Hertzberg and B. Graham from Brandon Research Centre and PCDF for continued support in growing and caring for the trials.

Schedule

PCDF plays an important role with varietal evaluation for Dr. Ana Badea's six-row breeding lines. Due to limited resources, PCDF will not conduct this trial in 2016.

Advanced Forage Barley Grain Trial

Susan M[c]Eachern[1], Angel Melnychenko[1] and Ana Badea[2]

Site Information

Location:	Roblin, Manitoba
Cooperators:	Dr. Ana Badea – Barley Breeder, AAFC Brandon
	Rudy Von Hertzberg – Research Technician, AAFC Brandon

Background

Forage barley varieties produce high total biomass but usually have insufficient grain yield to compete with regular varieties when only grain production is desired. Thus, the barley breeding effort at AAFC Brandon is aiming to develop new varieties of dual purpose six-row forage-feed barley well-suited to Western Canada with improved disease resistance and agronomic performance, combined with enhanced quality.

Two registered cultivars, AC Ranger and Vivar, were grown at Roblin this year, as well as 14 numbered breeding lines (Table 1) for a total of 16 entries.

Objective

To test the top barley forage lines from the barley breeding program at AAFC Brandon for grain yield and quality.

Procedure and Project Activities

Treatments:	16 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 14
Fertilizer applied:	All actual lbs./acre
	Side Band - 68 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4
	Seed Placed - 15 lbs. P_2O_5
Pesticide applied:	June 11 – Prestige XC® and Axial BIA®
Harvest date:	September 10
Product handling:	Each individual plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A

[1] PCDF, Roblin
[2] AAFC, Brandon

pre-emerge application of glyphosate was applied. The trial was sprayed with Prestige XC and Axial BIA at the two to four leaf stage to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included early season plant counts (plants/m^2), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days form seeding to 50% of plants mature) and lodging (1-9).

All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded. A 1 kg composite sample was sent to AAFC Brandon for further quality analysis.

Table 1. 2015 Advanced Forage Barley Grain Trial Varieties at Roblin, MB*

AC Ranger	EX827-21	EX828-20	EX828-32
Vivar	EX827-28	EX828-29	EX828-37
EX826-39	EX827-30	EX828-30	EX828-46
EX827-18	EX827-32	EX828-31	EX828-49

* Numbered entries are advanced lines with potential advancement to the cooperative testing system.

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	**Fertilizer Applied (actual lbs)**
*N	47 lbs/acre (low)	68
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate

** Analysis by Agvise Laboratories

Results and Discussion

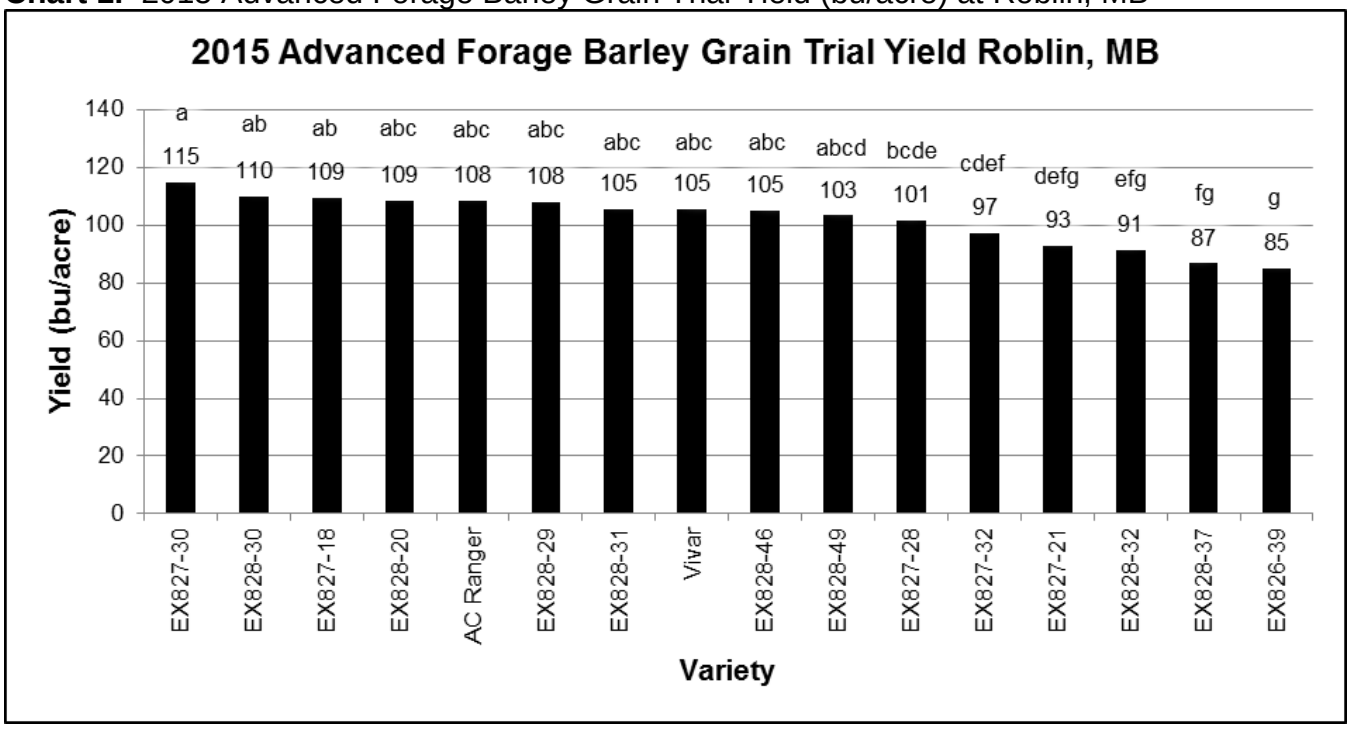
Table 3. 2015 Advanced Forage Barley Grain Trial Results at Roblin, MB

Variety	**Yield (kg/ha)**	**Plant Counts (pl/m^2)**	**Days to Heading***	**Disease (1-9)***	**Days to Maturity***	**Height (cm)**	**Lodging (1-9)***
EX827-30	6164	283	56	3	91	83	1
EX828-30	5911	292	59	3	92	88	1
EX827-18	5879	236	55	4	91	92	1
EX828-20	5839	256	58	3	92	83	1
AC Ranger	5832	236	56	3	93	74	1
EX828-29	5817	281	58	3	94	87	1
EX828-31	5672	244	59	4	93	90	1
Vivar	5664	275	57	4	93	71	1
EX828-46	5639	283	57	4	90	89	1
EX828-49	5555	272	57	4	92	87	1
EX827-28	5453	267	55	4	91	90	1
EX827-32	5229	267	56	4	91	91	1
EX827-21	4989	289	56	4	92	89	1
EX828-32	4916	261	56	4	91	88	1

EX828-37	4661	200	56	4	92	92	1
EX826-39	4564	231	54	4	90	94	1
Grand Mean	5487	261	57	3.6	92	87	1
% CV	6.7	15.7	1.7	11.4	1.4	4.4	23.5
LSD 5%	610.4	68.4	1.6	0.7	2.1	6.3	0.4
Significant Difference	Yes	Yes	Yes	Yes	Yes	Yes	No

Days to Heading* = Days from Seeding to 50% of Plants Headed
Disease (1-9)* = 1 - No Disease, 9 - Severe Disease
Days to Maturity* = Days from Seeding to 50% of Plants Mature
Lodging (1-9)* = 1 – Plants Fully Erect, 9 – Plants Completely Flat

Chart 1. 2015 Advanced Forage Barley Grain Trial Yield (bu/acre) at Roblin, MB



At the 2015 Roblin site, eight out 14 barley lines had similar or higher grain yield than the check cultivars, AC Ranger and Vivar. The best grain yielding barley line at Roblin was EX827-30. This barley line recorded 6% grain yield increase over check cultivar AC Ranger and 9% over Vivar (Table 3). Under Roblin growing conditions, this line also presented a higher dry matter yield than both check cultivars (for more details please refer to the summary on "Advanced Forage Barley Forage Trial" in this report on page 108). If EX827-30 consistently performs at the other testing locations with respect to forage and grain yield and has acceptable feed and forage quality, which at the moment are unknown, then it will be entered for extensive evaluation in the 2016 Western Cooperative Forage Barley Registration Test.

Conclusions

In general, barley is an excellent feed grain in forage-based diets. However, there might be considerable dissimilarities, mostly in starch content and rumen fermentation patterns, between some barley cultivars [1]. Knowledge of these differences will help farmers to select and feed the most appropriate varieties that optimize production without compromising rumen and host animal health [2].

Acknowledgements

This research was supported in part by funding from the Western Grains Research Foundation.

For technical assistance, we gratefully thank R. Von Hertzberg and B. Graham from the Brandon Research Center, MB, Canada and PCDF for continued support with growing and caring for the field trials.

References

[1] Silveira C, Oba M, Beauchemin KA, Helm J. (2007) Effect of grains differing in expected ruminal fermentability on the productivity of lactating dairy cows. J Dairy Sci, 90:2852–2859;

[2] Nikkhah A. (2012) Barley grain for ruminant: A global treasure or tragedy. J Anim Sci Biotech, 3: 22-30

Schedule

PCDF will conduct the Advanced Forage Barley Grain trial in 2016.

Saskatchewan Variety Performance Group Barley Variety Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperators: Saskatchewan Variety Performance Group (SVPG)
Manitoba Crop Variety Evaluation Team (MCVET)

Background

The Saskatchewan Variety Performance Group (SVPG), an industry-government partnership, administers regional varietal tests on wheat, durum, malt and feed barley, oats and flax. This regional testing provides producers with valuable information on the agronomic performance of different varieties and crop types under various agro-climatic conditions (Government of Saskatchewan January).

The SVPG is made up of representatives from individual organizations with an interest in varietal testing. An entry fee system, in which the variety owners or companies with distribution rights to specific varieties pay a portion of the cost of testing, is used to help fund the testing program. The Saskatchewan Seed Growers' Association, Saskatchewan Wheat Development Commission, Saskatchewan Barley Development Commission and SaskFlax collectively provide $75,000 to the program (Government of Saskatchewan January). Agriculture and Agri-Food Canada, Saskatchewan Crop Insurance Corporation and The Western Producer provide technical and in-kind support.

Results from the trials are reviewed by the Saskatchewan Advisory Council on Grain Crops. In order to provide sound comparisons to a commonly grown check variety, a long-term database is kept and maintained. This database includes data on yield, various agronomic factors and certain market related traits. The data collected is published each year in Seed Manitoba and the Saskatchewan Seed Guide.

Canadian barley is a diverse grain with many types, varieties and end-uses. Western Canada's breeding programs have bred and developed varieties that are well adapted for growing in our unique prairie climate. This adaptability provides producers an opportunity to grow excellent quality seed that can be used for malting, feed and human food products. Barley is the only food grain with the highest fibre quality, lowest glycemic index and has all forms of vitamin E plus B vitamins, iron, calcium, potassium, phosphorus, magnesium, manganese, zinc and antioxidants. Regular consumption of barley products can aid in weight and cholesterol management, cardiovascular disease, Type 2 diabetes and certain cancers. Barley has a subtle nutty flavor that makes it appealing in baked goods, soups, cereals and snack bars. Barley can be processed into a number of forms such as pearled, pot, hulless and flakes to name a few. Canadian barley is very versatile and easy to process in both the malt

[1] PCDF, Roblin

house and the brewery. Malt barley has ample foam, rich flavours and more color than other malts. Canada's rigorous crop registration and food safety standards ensure label integrity. (Canada 2015)

The SVPG barley trial is comprised of barley varieties from all classifications. A list of entries and their corresponding classification can be found in Table 3. Malting barley varieties are classified into two groups. Malting: Acceptance – Recommended are varieties with market acceptance and are listed in the Canadian Malt Barley Technical Centre (CMBTC) publication. Malting: Other includes varieties not currently on the CMBTC list but markets may exist.

Objective

To evaluate different varieties of barley for the Saskatchewan Variety Performance Group.

Procedure and Project Activities

Treatments:	14 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 14
Fertilizer applied:	All actual lbs./acre Side Band - 68 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4 Seed Placed - 15 lbs. P_2O_5
Pesticide applied:	May 15 – Roundup Weathermax® June 11 - Prestige XC® and Axial BIA®
Harvest date:	September 1
Product handling:	Each individual plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC and Axial BIA to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included plant counts (plants/m²), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

Prior to harvest the plots were sprayed with Reglone® to help with dry down and ease of harvest. All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded.

Table 1. 2015 SVPG Barley Trial Varieties at Roblin, MB*

AAC Synergy	CDC Maverick	TR12135*
AC Metcalfe	CDC PlatinumStar	TR12733*
Amisk	CDC PolarStar	TR12735*
Canmore	TR10214*	TR13740*
CDC Clear	CDC Bow (TR11127)	

* Varieties that have been supported for registration with class to be determined by the Canadian Grain Commission.

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	**Fertilizer Applied (actual lbs)**
*N	47 lbs/acre (low)	68
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

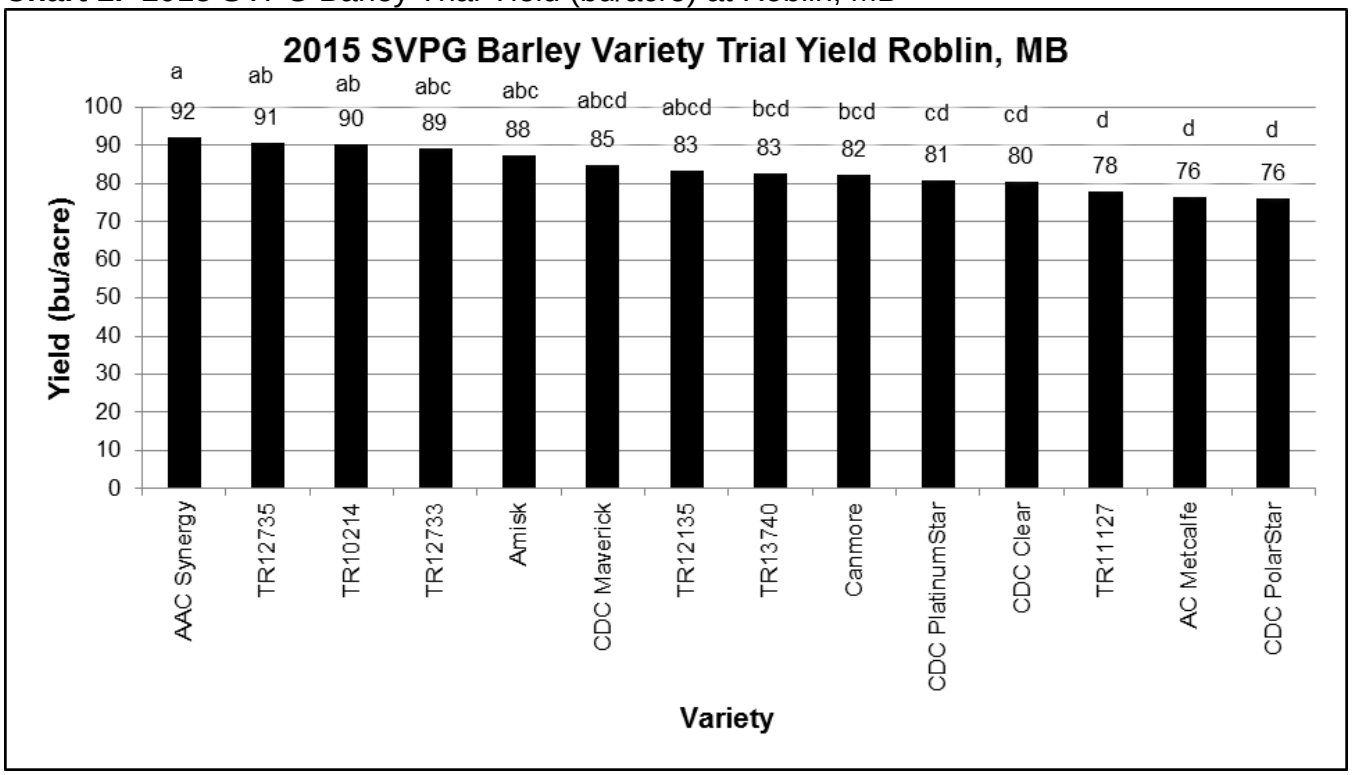
Table 3. 2015 SVPG Barley Trial Yield (kg/ha) at Roblin, MB

Variety	**Classificaton**	**Yield (kg/ha)**
AAC Synergy	2R - Malt acceptance - recommended	4961
TR12735	2R - Food and Feed	4884
TR10214	2R - Malting	4852
TR12733	2R – Food and Feed	4797
Amisk	6R - Food and Feed	4709
CDC Maverick	2R - Food and Feed	4558
TR12135	2R – Malting	4489
TR13740	2R – Food and Feed	4453
Canmore	Value added end use	4421
CDC PlatinumStar	2R Malt (IP)	4341
CDC Clear	Hulless – Malting	4320
CDC Bow (TR11127)	2R – Malting	4193
AC Metcalfe	2R Malt acceptance – recommended	4111
CDC PolarStar	2R Malt (IP)	4085
Grand Mean		4512
% CV		6.4
LSD 5%		482
Significant Difference		Yes

Yield data is summarized in Table 3 and Chart 1. Yields ranged from 76 to 92 bushels/acre and this is half of 2014 yields. (Kostuik, McEachern and Melynchenko 2015) Roblin had an early growing season drought with only 66.5 mm of rainfall from April 1 to July 10. According to classifications, AAC Synergy was the highest yielding variety of the test and for 2R Malt Acceptance varieties on CMBTC's recommended list, it was significantly higher yielding than

AC Metcalfe. TR12735 was the highest yielding 2R Food and Feed variety but it was not significant. TR10214 was the highest yielding 2R Malting variety and it was significantly higher than CDC PolarStar, CDC Bow and CDC PlatinumStar. Amisk was the only 6R Food and Feed variety in the test and it performed fifth overall when compared to the other variety classifications. Canmore is the only value added end use classified variety and it performed in the bottom third of the test. CDC Clear, hulless malting type, performed in the bottom third as well.

Chart 1. 2015 SVPG Barley Trial Yield (bu/acre) at Roblin, MB



Conclusions

Saskatchewan Variety Performance Group (SVPG) coordinates testing opportunities similar to Manitoba's MCVET testing for barley breeders and distributors. PCDF provided a site in the Parkland region and data was published in Seed Manitoba and the Saskatchewan Seed Guide.

Barley has a diverse group of classifications that are affiliated to end use markets. SVPG barley trial had entries from six classifications. Yields were 50% lower than 2014 and this was due to an early season drought.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.

- SVPG and MCVET for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

References

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Government of Saskatchewan. "Varieties of Grain Crops 2015." *Government of Saskatchewan.* 2015 January. http://www.agriculture.gov.sk.ca/Varieties-Grain-Crops-2015 (accessed January 13, 2015).

Kostuik, Jeff, Susan McEachern, and Angel Melnychenko. *Parkland Crop Diversification Foundation 2014 Annual Report.* February 2015. https://www.gov.mb.ca/agriculture/innovation-and-research/diversification-centres/pubs/annual-report-pcdf.pdf (accessed January 27, 2016).

Schedule

PCDF will continue to be a site for SVPG's barley trial.

Western Cooperative Six-Row Barley Registration Test

Susan M[c]Eachern[1], Angel Melnychenko[1] and Ana Badea[2]

Site Information

Location: Roblin, Manitoba
Cooperators: Dr. Ana Badea – Barley Breeder, AAFC Brandon
Rudy Von Hertzberg – Research Technician, AAFC Brandon

Background

The Western Cooperative Six-Row Barley Registration Test (6RWCOOP) is a registration trial grown across the Northern Great Plains, which is officially recognized by the Variety Registration Office (VRO) of the Canadian Food Inspection Agency (CFIA). The test is run under the auspices of the Prairie Recommending Committee for Oat and Barley (PRCOB).The PRCOB is a VRO-recognized recommending body of over 80 experts on barley research, development, production and marketing. More information on the PRCOB can be found at http://www.pgdc.ca/committees_ob.html .

Dr. Ana Badea and Rudy von Hertzberg of Agriculture and Agri-Food Canada – Brandon Research Centre (AAFC-BRC) at Brandon, MB act as the coordinators for the 6RWCOOP. In that capacity, Ana and Rudy coordinate the supply of seed to each of the cooperators while the cooperators are running the trials.

Each year the test consists of between 16 to 20 entries, including checks, replicated three times and grown at around 20 locations. This test provides most of the data required to determine merit in consideration for registration of new six-row malt and feed barley varieties.

PCDF is in its eighth year of this very important test being grown at Roblin. The 2015 6RWCOOP trial consists of 4 checks (AC Ranger, Vivar, CDC Mayfair and Celebration) and 21 new entries for a total of 25 entries.

Objective

To evaluate six-row malt or feed barley lines for further registration.

[1] PCDF, Roblin
[2] AAFC, Brandon

Procedure and Project Activities

Treatments:	25 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 14
Fertilizer applied:	All actual lbs./acre
	Side Band - 67 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4
	Seed Placed - 15 lbs. P_2O_5
Pesticide applied:	June 11 – Prestige XC® and Axial BIA®
Harvest date:	September 10
Product handling:	Each individual plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. The trial was sprayed at the 2 to 4 leaf stage with Prestige XC and Axial BIA to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included early season plant counts (plant/m^2), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded. A 1 kg composite sample was sent to AAFC Brandon for further quality analysis.

Table 1. 2015 Western Cooperative Six-Row Barley Registration Test Varieties at Roblin, MB*

AC Ranger (EX467)	SR14317	SR15320	SR15473	SR15504
Vivar (SD516)	SR14318	SR15469	SR15474	SR15505
CDC Mayfair (SR412)	SR14500	SR15470	SR15321	SR15506
Celebration (BT980)	SR14501	SR15471	SR15322	SR15507
SR14465	SR15319	SR15472	SR15323	SR15508

* Numbered entries are advanced lines that are under evaluation for possible registration

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24” Depth at the Roblin, MB Site **

	Estimated Available Nutrients	**Fertilizer Applied (actual lbs)**
*N	47 lbs/acre (low)	68
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate

** Analysis by Agvise Laboratories

Results and Discussion

The Prairie Grain Development Committee (PGDC), which oversees the testing and registration recommendations for potential new Western Canada crop varieties, does not permit the publication of results from registration trials, in order to protect any proprietary information, as well as prevent any conflicting information prior to officially publishing the outcome of PGDC deliberations on new cultivars.

The official site at Roblin provides crucial data for a large area of the Parkland regions that would otherwise be unavailable. Past tests have shown that six-row malting barley is very well-suited to this region.

Conclusions

The 6RWCOOP test is critical for evaluating and providing data for the registration of new varieties. The test grown at Roblin provides an opportunity for producers to see how potential new varieties are performing in the Parkland region.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Prairie Recommending Committee for Oat and Barley.
- Dr. Ana Badea and Rudy von Hertzberg for cooperating in the trial.

Schedule

PCDF will continue to be a test site for the Western Cooperative Six-Row Barley Registration Test.

Western Canada Forage Barley Coop Grain Trial

Susan M[c]Eachern[1], Angel Melnychenko[1] and Pat Juskiw[2]

Site Information

Location:	Roblin, Manitoba
Cooperators:	Dr. Patricia Juskiw – Barley Breeder, Lacombe Field Crop Development Center Susan Lajeunesse – Research Technician, Lacombe Field Crop Development Center

Background

The Western Canada Forage Barley Coop Forage Trial is run under the auspices of the Prairie Recommending Committee for Oat and Barley (PRCOB). More information on the PRCOB can be found at http://www.pgdc.ca/committees_ob.html. The purpose of the PRCOB is to generate data for oat and barley lines for the purpose of evaluation and recommendation of lines for registration by the Varieties Office of the Canadian Food Inspection Agency (CFIA).

Dr. Pat Juskiw and Susan Lajeunesse of the Field Crop Development Centre (FCDC) at Lacombe, AB act as the coordinators for the Forage Barley Coop. In that capacity, Pat and Susan coordinate the supply of seed to each of the cooperators. The 2015 test consisted of 16 entries and 4 checks. There were eight forage and seven grain sites.

Objective

To evaluate different forage barley lines for grain quality characteristics.

Procedure and Project Activities

Treatments:	20 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 12
Fertilizer applied:	All actual lbs./acre Side Band – 68 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4 Seed Placed – 15 lbs. P_2O_5
Pesticide applied:	May 15 – Roundup Weathermax® June 11 – Prestige XC® and Axial BIA®
Harvest date:	September 1
Product handling:	Each individual plot was harvested with weight and moisture recorded

[1] PCDF, Roblin
[2] FCDC, Lacombe

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC and Axial BIA to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

Prior to harvest the plots were sprayed with Reglone® to help with dry down and ease of harvest. All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded. A cleaned composite sample of each entry was sent to FCDC Lacombe for further quality analysis.

Table 1. 2015 Western Canada Forage Barley Coop Grain Trial Varieties at Roblin, MB*

AC Ranger	FB019	FB457	FB462
CDC Austenson	FB451	FB020	FB463
Gadsby	FB453	FB459	FB464
Vivar	FB454	FB460	FB465
FB018	FB455	FB461	FB466

* Numbered varieties are advanced lines that are under evaluation for possible registration.

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	**Fertilizer Applied (actual lbs)**
*N	47 lbs/acre (low)	68
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate

** Analysis by Agvise Laboratories

Results and Discussion

Table 3 summarizes the data parameters collected for the trial and Chart 1 illustrates yield data. Grain yield ranged from 79 to 124 bushels/acre and this is significantly lower than 2014, 136 to 208 bushels/acre (Kostuik, McEachern and Melnychenko 2015). Check varieties included AC Ranger, CDC Austenson, Vivar and Gadsby. FB461, FB020 and FB454 were higher yielding than all the checks. FB461 was significantly higher except in comparison to AC Ranger, whereas FB020 and FB454 were only significantly higher yielding than Vivar and Gadsby. FB461, FB020 and FB454 were in the top 7 highest yielding forage barleys this year which makes them appealing as a dual purpose barley type for producers (see 2015 Western Canada Forage Barley Coop Forage Trial).

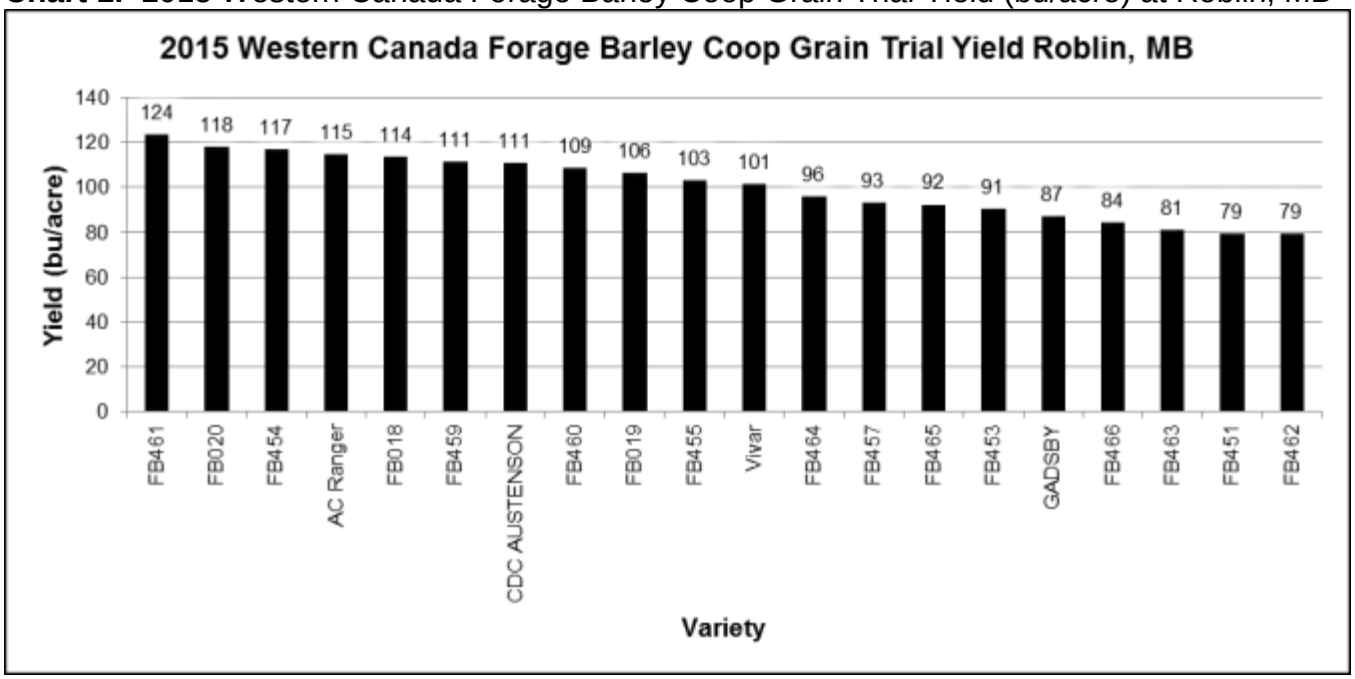
Plant emergence and establishment was acceptable for this trial. Days to heading and maturities ranged from 56 to 66 days and 91 to 98 days, respectively. FB461, FB020 and FB454 had a suite of days to maturity ranging from 98, 91 and 93 days, respectively.

Table 3. 2015 Western Canada Forage Barley Coop Grain Trial Results at Roblin, MB

Variety	Yield (kg/ha)	Plant Counts (plants/m^2)	Days to Heading*	Days to Maturity*
FB461	6649 a	228	56	98
FB020	6347 ab	211	56	91
FB454	6300 ab	267	56	93
AC Ranger	6178 abc	183	57	96
FB018	6113 abc	217	57	96
FB459	5983 bcd	208	56	93
CDC AUSTENSON	5962 bcd	217	62	95
FB460	5844 bcd	236	56	96
FB019	5717 bcde	231	56	95
FB455	5553 cdef	197	58	93
Vivar	5446 defg	222	56	95
FB464	5164 efgh	247	60	91
FB457	5016 fgh	219	59	91
FB465	4967 fghi	228	58	93
FB453	4874 ghij	206	62	92
GADSBY	4683 hij	194	66	93
FB466	4540 hij	211	65	96
FB463	4345 ij	211	61	93
FB451	4261 j	244	58	92
FB462	4261 j	228	60	93
Grand Mean	5410	220	59	94
% CV	7.3	15.7	1.5	1.5
LSD 5%	649.2	57.3	1.5	2.3
Significant Difference	Yes	Yes	Yes	Yes

Days to Heading* = Days from Seeding to 50% of Plants Headed
Days to Maturity* = Days from Seeding to 50% of Plants Mature

Chart 1. 2015 Western Canada Forage Barley Coop Grain Trial Yield (bu/acre) at Roblin, MB



Conclusions

The Western Canada Forage Barley Coop Grain Trial is conducted across the Prairies to evaluate the performance of various barley cultivars under a range of growing conditions. The data collected from this trial is compiled with other sites and used to request support for registration. Barley is an important crop for grain and forage production.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Dr. Patricia Juskiw and Susan Lajeunesse for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

References

Kostuik, Jeff, Susan McEachern, and Angel Melnychenko. *Parkland Crop Diversification Foundation 2014 Annual Report.* February 2015. https://www.gov.mb.ca/agriculture/innovation-and-research/diversification-centres/pubs/annual-report-pcdf.pdf (accessed January 27, 2016).

Schedule

PCDF will continue to play a role in evaluating barley cultivars for the Western Canada Forage Barley Coop Grain trial.

FP Genetics Fall Rye Fertility and Seed Rate Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperator: Denise Schmidt – National Sales Manager, FP Genetics

Background

Fall rye has been considered a cheap crop to grow. It requires low inputs and is usually grown on less productive land because it can generally yield enough to make a profit. With the introduction of fall rye hybrids, producers may have to change their management practices. Current hybrids are shorter in height, have better lodging resistance and out yield conventional varieties by 25%. These traits give producers the opportunity to apply more fertilizer and include fungicide treatments.

As seen with other crop types such as canola, hybrid seed means higher seed costs - about $50 per acre more (Arnason 2015). Seed costs are generally higher because seed production is more costly with a hybrid system. In order to maximize profits, producers need to know if they can balance a reduction in seeding rate with increased fertility to maximize yield. This prompted FP Genetics and PCDF to conduct a trial with two target plant populations and three nitrogen fertility targets.

Seeding rates can impact production in a number of ways. For example, higher seeding rates/plant stands can increase yield, give better weed control through high competition and earlier and more even maturity. Increasing plant stands reduces number of tillers and most of the yield is concentrated on the main stem. Higher plant stands may increase lodging susceptibility and smaller seed size. (Weir 2015)

Brasetto is distributed by FP Genetics and was the variety chosen for this trial. Brasetto's 2015 seeded acreage was targeted for 11,000 to 15,000 in Manitoba. FP Genetics is focusing on Manitoba acreage because it has an American miller interested in Brasetto. Millers like Brasetto's high falling number, indicative of low sprout damage. (Arnason 2015)

Objective

To study different fertility and seeding rates on Brasetto production.

[1] PCDF, Roblin

Procedure and Project Activities

Treatments:	6 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Split-Plot Design
Seeding date:	September 24, 2014
Fertilizer applied:	Various
Pesticide applied:	September 16, 2014 – Roundup Weathermax® May 5, 2015 – Buctril M®
Harvest date:	August 18, 2015
Product handling:	Each individual plot was harvested. Weight and moisture were recorded after the harvest operation.

Prior to seeding, the plot was heavy harrowed and then sprayed with a glyphosate burn-off. The trial was direct seeded into canola stubble with various amounts of fertilizer side banded. Fertilizer rates equal total nitrogen, existing soil amounts plus applied at seeding. The trial was sprayed with Buctril M early in the spring to control winter annual weeds. Data was recorded throughout the growing season and included counts (plants/m^2), heading (days from seeding to 50% of plants headed), height (cm) and maturity date (days from seeding to 50% of plants mature).

All plots were harvested with a small plot combine. Each treatment was individually bagged. Weight and moisture were recorded manually once all plots were harvested.

Table 1. 2015 FP Genetics Fall Rye Fertility and Seed Rate Trial Treatments at Roblin, MB*

188 pl/m^2, 80N	250 pl/m^2, 80N
188 pl/m^2, 100N	250 pl/m^2, 100N
188 pl/m^2, 120N	250 pl/m^2, 120N

Table 2. 2014 Fall Soil Nutrient Analysis from 0-12” Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	37 lbs/acre (low)	Various
*P	13 ppm (high)	
*K	186 ppm (high)	
*S	30 lbs/acre (low)	

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate

** Analysis by Agvise Laboratories

Results and Discussion

Table 3. 2015 FP Genetics Fall Rye Fertility and Seed Rate Trial Results at Roblin, MB

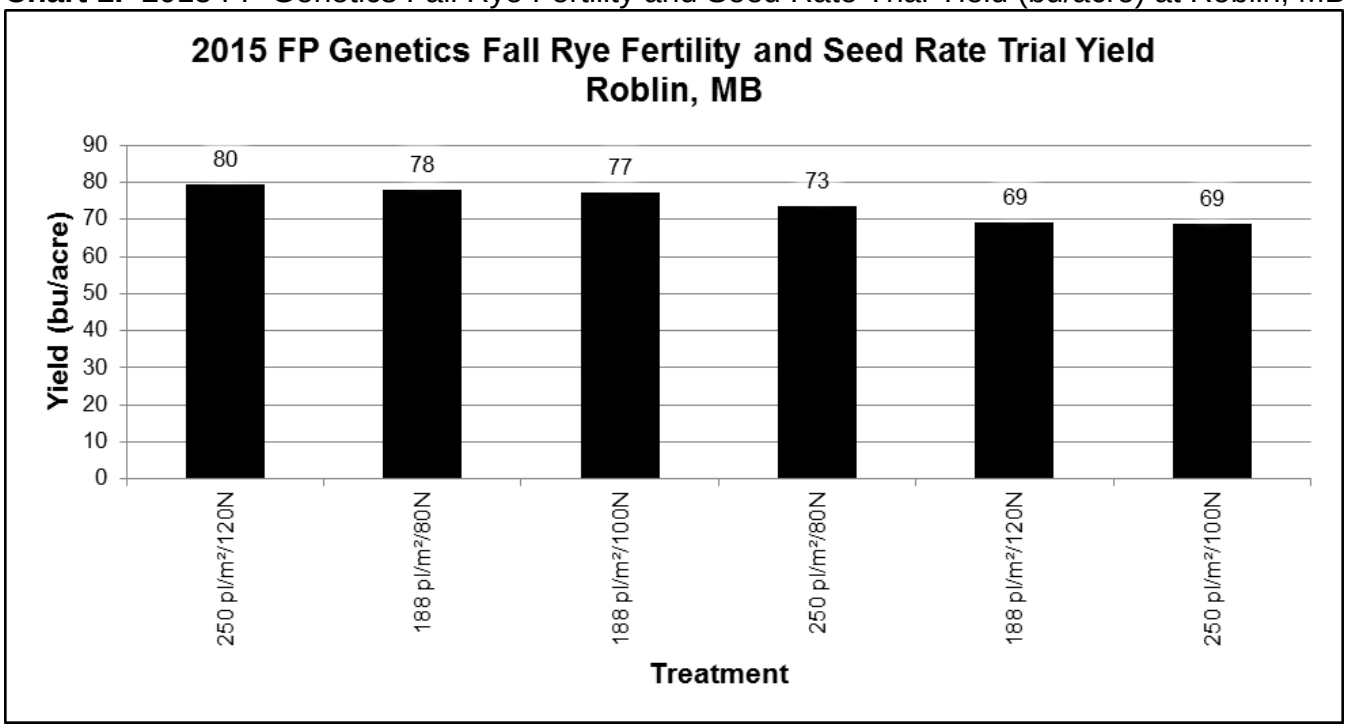
Treatment	Yield (kg/ha)	Plants/m^2	Days to Heading*	Height (cm)	Days to Maturity*
250 pl/m^2. 120N	4994	208	255	86	308
188 pl/m^2, 80N	4886	231	255	82	310
188 pl/m^2, 100N	4840	136	255	85	310
250 pl/m^2, 80N	4608	239	256	84	312
188 pl/m^2, 120N	4350	186	255	80	309
250 pl/m^2, 100N	4305	231	255	83	308
Grand Mean	4664	205	255	83	310
% CV	10.6	8.1	0.2	3.8	0.3
LSD 5%	896.4	30.3	0.9	5.8	1.8
Significant Difference	No	Yes	Yes	Yes	Yes

Days to Heading* = Days from Seeding to 50% of Plants Headed
Days to Maturity* = Days from Seeding to 50% of Plants Mature

The data presented in this report is from one station and one year of testing. Trends were observed but more testing is required before recommendations can be given.

Table 3 summarizes all data parameters collected and Chart 1 illustrates yield data. There were no significant differences in yield amongst the treatments. Roblin experienced an early season drought and received 66.5 mm of rain from April 1 to July 10. This may have impacted yield potential of the treatments. Plants/m^2 did vary according to treatments with the exception being 188 plants/m^2 and 80 lbs/acre actual N having higher than expected plant population. Days to heading and height data were similar for all treatments. Days to maturity varied with some correlation to plant stands and fertility applied.

Chart 1. 2015 FP Genetics Fall Rye Fertility and Seed Rate Trial Yield (bu/acre) at Roblin, MB



Conclusions

Hybrid fall rye varieties are changing the way producers manage their production. Yield potential is much higher, lodging resistance improved and milling end users are interested in the high falling numbers of Brasetto. Seed costs are higher by $50/acre. This has prompted an interest in researching the interaction between seeding rate and fertility. FP Genetics and PCDF collaborated together and conducted the first year of testing. Further testing is required to quantify the real impact of plant stand and fertility.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Denise Schmidt of FP Genetics for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

References

Arnason, Robert. "U.S. millers favour Brasetto's low sprout damage level." *The Western Producer*, August 6, 2015.

Weir, Tom. "Seeding by plant population? Don't get too hung up on it." *The Western Producer*, April 9, 2015: 94-95.

Schedule

The second year of testing was planted September 2015. PCDF will continue this trial for one more year and review the results with FP Genetics. Further testing beyond year 2 will be determined at that time.

Manitoba Crop Variety Evaluation Team Fall Rye Variety Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperator: Manitoba Crop Variety Evaluation Team (MCVET)

Background

Fall Rye has often been referred to as a poor man's crop, a niche market, prehistoric or a weed. At one time Prairie farmers had seeded a million acres to fall rye. Canadian acreage declined to 218,000 acres in 2014 with a slight increase to 234,000 acres in 2015 (Statistics Canada 2015). It thrives well on sandier and drier soils, germinates easier with minimal moisture, is very winter hardy, yields well with minimal inputs, has good disease resistance and is allelopathic, emits toxins to inhibit the growth of other plants such as weeds. The toxins break down in a few weeks after harvest so there is no impact to the next crop. The allelopathic compounds in rye are the same as those used in some cancer-fighting medicine, but there is limited information regarding the utilization of rye for pharmaceutical applications and if it would provide additional value to the rye industry. (Weigum 2014)

Fall Rye does have a few challenges such as plant and seed uniformity issues from open pollination, volunteer plants up to three to four years from postharvest, ergot, tall straw and lodging and producers need to research marketing opportunities. Market opportunities can range from selling seed for cover crop utilization in U.S. or Asia, human food in other countries and Canadian distillers (Weigum 2014). Great strides have been made in research and breeding to address uniformity, lodging and disease concerns. Scientists Jamie Larsen and Kelly Turkington have developed an ergot nursery to test for ergot resistance. Research scientist Brian Beres has included fall rye in his plant growth regulator (PGR) trials. The biggest news in rye breeding is the development and release of two rye hybrid varieties, Brasetto and Guttino. Both varieties were developed from a German breeding company KWS. FP Genetics and SeedNet distribute Brasetto and Guttino, respectively.

The introduction of hybrid rye varieties will change the way growers manage their production. Both varieties have shorter straw and less susceptible to lodging, so fertility can be increased. Because it is a hybrid, the yield potential is much higher than conventional rye varieties. Preliminary testing has shown a twenty-five percent yield increase over open pollinated rye varieties. Fungicide applications and disease control will need to be considered with higher yield potential (Weigum, Rye, oh rye: the second part 2014). Seed cost per acre is higher. Research is being done with respect to planting densities and nitrogen levels to find the optimum balance between target plant stands and maximizing yield.

[1] PCDF, Roblin

Objective

To evaluate different varieties of fall rye grown in the Parkland region.

Procedure and Project Activities

Treatments:	4 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	September 15, 2014
Fertilizer applied:	All actual lbs./acre Side Band – 120 lbs. N, 36 lbs. P_2O_5
Pesticide applied:	September 16, 2014 – Roundup Weathermax® May 5, 2015 – Buctril M®
Harvest date:	August 18, 2015
Product handling:	Each individual plot was harvested. Weight and moisture were recorded after the harvest operation.

Prior to seeding, the plot was heavy harrowed and then sprayed with a glyphosate burn-off. The trial was direct seeded into canola stubble with various amounts of fertilizer applied. The trial was sprayed with Buctril M early in the spring to control winter annual weeds. Data such as plant counts (plants/m^2), heading (days from seeding to 50% of plants headed), height (cm) and maturity data (days from seeding to 50% of plants mature) was recorded throughout the growing season.

All plots were harvested with a small plot combine. Each treatment was individually bagged. Weight and moisture were recorded manually once all plots were harvested.

Table 1. 2015 MCVET Fall Rye Variety Trial Varieties at Roblin, MB*

Brasetto	Guttino
Danko	Hazlet

Table 2. 2014 Fall Soil Nutrient Analysis from 0-12” Depth at the Roblin, MB Site **

	Estimated Available Nutrients	**Fertilizer Applied (actual lbs)**
*N	37 lbs/acre (low)	120
*P	13 ppm (high)	36
*K	186 ppm (high)	-
*S	30 lbs/acre (low)	-

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate

** Analysis by Agvise Laboratories

Results and Discussion

Table 3. 2015 MCVET Fall Rye Variety Trial Yield Results (kg/ha) at Roblin, MB

Variety	Yield (kg/ha)
Guttino	5818
Brasetto	5743
Hazlet	4407
Danko	3182
Grand Mean	4787
% CV	6.1
LSD 5%	580.7
Significant Difference	Yes

Chart 1. 2015 MCVET Fall Rye Variety Trial Yield (bu/acre) at Roblin, MB

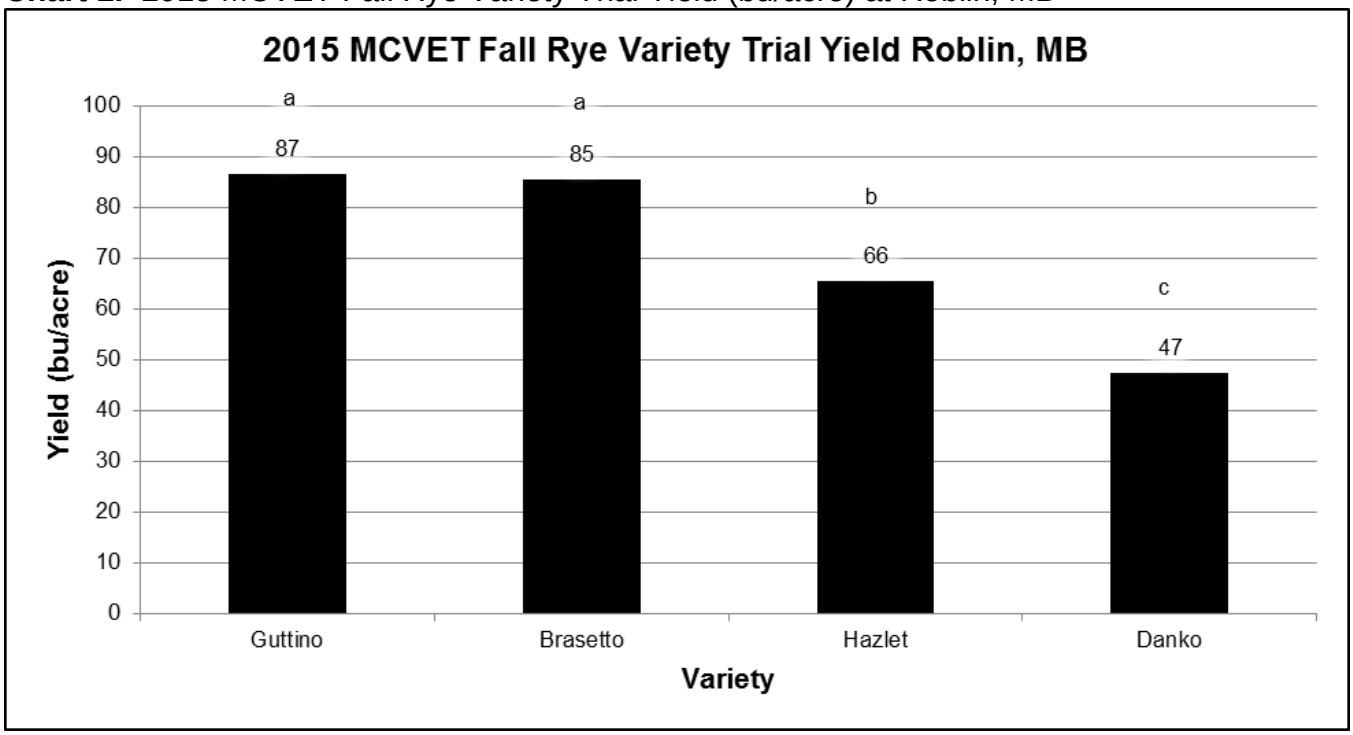


Table 3 and Chart 1 summarize yield data for the MCVET fall rye trial. Guttino and Brasetto were similar for yield in this trial. Guttino and Brasetto, two hybrid fall rye varieties, were higher yielding than Hazlet and Danko, conventional varieties, and it was significant. Guttino and Brasetto were 132% and 130% of Hazlet and 183% and 180% of Danko, respectively. Hazlet significantly out yielded Danko by 138%.

Conclusions

Fall rye has been considered a low input crop to be produced on marginal land. This was due to its attractive low input requirements, winter and drought hardiness, good disease tolerance and excellent ability to compete with weeds. Fall rye plant breeding and variety development has recently made progress with the release of two hybrid varieties Brasetto and Guttino. Yield advantage to growing hybrids was confirmed in this project with the hybrids out yielding the highest yielding conventional variety by 30%. Producers have the opportunity to change their management practices when growing hybrid rye since hybrids are more tolerant to lodging, higher fertility and seeding rates.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- MCVET for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

References

Statistics Canada. *Production of principle field crops, September 2015.* October 2, 2015. http://www.statcan.gc.ca/daily-quotidien/151002/dq151002a-eng.pdf (accessed January 25, 2016).

Weigum, Sarah. "Rye, oh rye: the second part." *Grainews*, September 10, 2014.

—. "Rye, oh rye?" *Grainews*, August 4, 2014.

Schedule

PCDF has continued its support for MCVET fall rye project with the project being seeded in September of 2015.

FP Genetics Oat Variety Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Russell, Manitoba
Cooperators: Denise Schmidt – National Sales Manager, FP Genetics
Mark Keating – Keating Seed Farms, Russell, Manitoba

Background

PCDF and FP Genetics conducted an oat variety trial at Keating Farms for the second year in 2015. The varieties included in the test for both years were AAC Justice, AC® Summit, CDC Minstrel and CDC Ruffian. AAC Justice, AC® Summit, CDC Minstrel and CDC Ruffian are all white milling oat varieties. AAC Justice is a high yielding variety with the best crown rust resistance available. It has a medium to later maturity with good harvest ability. AC® Summit is a high yielding variety with the best multi-gene crown rust resistance available. It is in high demand from millers, meaning maximized returns for growers. It has medium maturity and good harvest ability. CDC Minstrel has great yields, a comprehensive disease package and good nutritional qualities. It has medium to late maturity with excellent harvest ability and very strong straw. CDC Ruffian has excellent yield potential, competitive agronomics and its disease package is best suited to areas outside of the crown rust risk area of the Prairies. This variety is not available until 2017 and is expected to be popular with millers. It has medium to later maturity and short stature which makes it ideal to harvest. (FP Genetics Inc. 2014)

In the spring of 2014, FP Genetics and Grain Millers Inc. made an agreement for production contracts with the purchase of Certified AC® Summit. Denise Schmidt, Senior Territory Manager at FP Genetics states, “This agreement will promote the use of high quality certified seed by growers and ensure the highest quality production for the end user. Selling directly to the processor delivers the best return for our customers and in turn this brings high quality products to the end user.” Grain Millers Canada Corp. notes that AC® Summit has performed very well in the area and has good agronomics, milling quality and nutritional make-up, so the agreement was considered a win for everyone involved (Kostuik, McEachern and Melnychenko 2015). This partnership creates another value added opportunity for the growers of AC® Summit. AC® Summit was seeded into 24% of Manitoba’s 2015 oat acreage (Manitoba Agriculture Services Corporation 2015).

Objective

To evaluate different oat varieties for FP Genetics.

[1] PCDF, Roblin

Procedure and Project Activities

Treatments:	4 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 27
Fertilizer applied:	All actual lbs./acre Banded – 80 lbs. N, 20 lbs. P_2O_5 Seed Placed – 15 lbs. P_2O_5
Pesticide applied:	June 28 – Prestige XC®
Harvest date:	September 23
Product handling:	Each individual plot was harvested with weight and moisture recorded.

A spring application of nitrogen and phosphorus was applied. The trial was seeded into canola stubble with 15 lbs. P_2O_5 applied with the seed. Prestige XC was sprayed to control broadleaf weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded.

Table 1. 2015 FP Genetics Oat Variety Trial Varieties at Russell, MB*

AAC Justice	CDC Minstrel
AC® Summit	CDC Ruffian

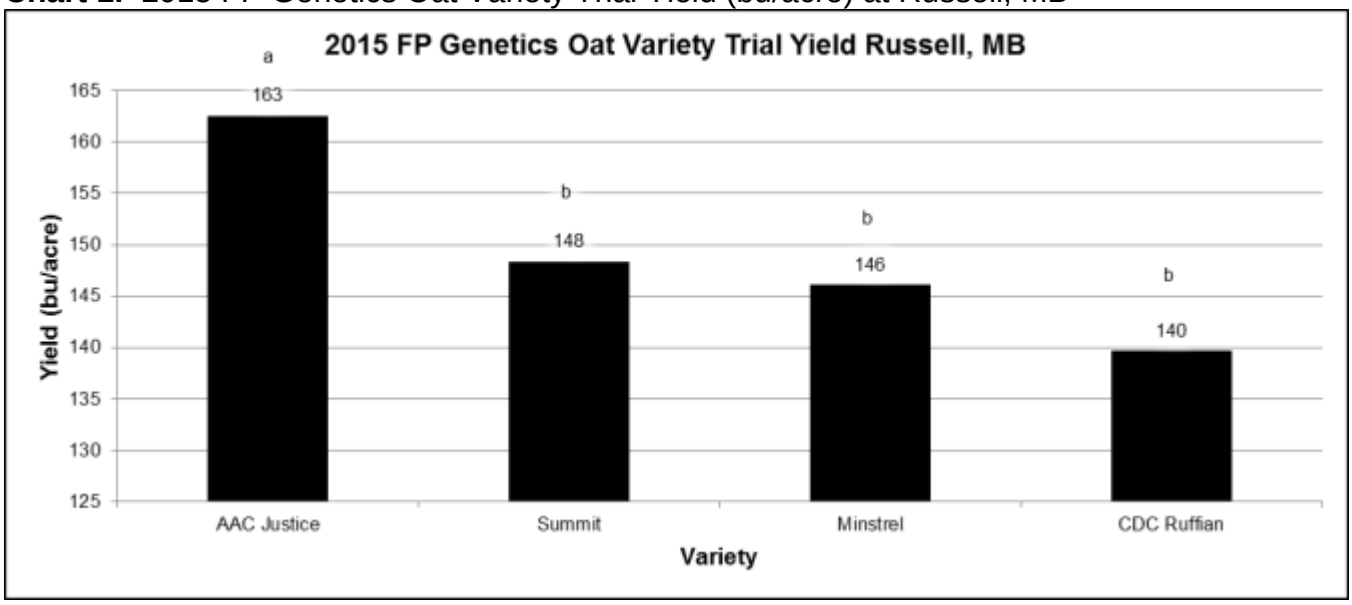
Results and Discussion

Table 2. 2015 FP Genetics Oat Variety Trial Results at Russell, MB

Variety	Yield (kg/ha)	Plants/m^2	Height (cm)	Days to Maturity*	Lodging (1-9)*
AAC Justice	5826	289	123	55	5
AC® Summit	5318	242	109	53	2
CDC Minstrel	5237	245	122	53	2
CDC Ruffian	5006	272	116	54	3
Grand Mean	5347	262	117	54	3
% CV	4.4	23.3	2.1	0.8	46.8
LSD 5%	465	122	5	0.9	2.9
Significant Difference	Yes	No	Yes	Yes	Yes

Days to Maturity* = Days from Seeding to 50% of Plants Mature
Lodging (1-9)* = 1 – Plants Fully Erect, 9 – Plants Completely Flat

Chart 1. 2015 FP Genetics Oat Variety Trial Yield (bu/acre) at Russell, MB



Yield data is summarized in Table 2 and Chart 1. AAC Justice was the highest yielding variety of the test and its significance ranged from 15 to 23 bushels/acre. AC® Summit, CDC Minstrel and CDC Ruffian were not significantly different in yield even though there was an 8 bushel/acre difference between CDC Ruffian and AC® Summit. In 2014, the yield results were opposite for AAC Justice and CDC Ruffian (Kostuik, McEachern and Melnychenko 2015)**.** AAC Justice and CDC Ruffian were the lowest and highest yielding varieties, respectively. Growing conditions between the two years may have impacted yield results.

Plant counts were very similar for all the varieties in 2015. Heights range from 109 cm for AC® Summit to 123 cm for AAC Justice. Maturities were similar and ranged from 53 to 55 days. The site received a few heavy rainfalls that gave rise to some lodging. AAC Justice had the most lodging and AC® Summit and CDC Minstrel had the least.

Conclusions

2015 was the second year for conducting an oat variety trial with FP Genetics and Keating Seed Farms. The same four white milling varieties were tested in both years. Yield performance was similar in both years for AC® Summit and CDC Minstrel. CDC Ruffian and AAC Justice were not consistent in yield ranking between the years and growing conditions may have contributed to this.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Denise Schmidt and FP Genetics for cooperating in the trial.
- Mark Keating of Keating Seed Farms for supplying the land for the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

References

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Schedule

Due to a shortage of resources at PCDF, this trial will not be continued in 2016.

Organic Oat Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperators: Dr. Jennifer Mitchell Fetch – Oat Breeder, AAFC Brandon
Karl Kreutner – Organic Producer, Roblin, Manitoba

Background

Organic production is gaining interest in Canada. Attractive prices, lower input costs and higher gross margins than conventional production is catching conventional growers attention. Converting to organic production requires three years before certification is acquired. During the three year period, growers do not receive premium prices that certified organic growers get. So there will be a cost and growers must be prepared for an initial decline in income.

Currently organic prices and demand for organic products is strong. Organic grains and oilseeds have been double or triple the price of conventional grains. Organic oats are selling at $7 a bushel which is 246 percent higher than conventional oats (Arnason 2016). Demand is exceeding supply and this is keeping prices high. U.S. organic processors and food manufacturers are desperate for prairie grain and oilseeds and they're willing to pay almost any price. (Arnason, U.S. a ready-made market for prairie organics 2015) Suppliers are importing organic feedstock from other countries to fill the demand. One supplier in Ontario is importing Romanian corn to supply feed to an egg producer near Montreal.

Organic production requires the same good stewardship as conventional production. Soil and weed management are still important. Soil fertility and organic matter must be addressed to maintain acceptable soil health. Fertility can be applied through other sources such as animal manure, green manure and starter fertilizer placed beside the seed. The www.organicinputs.ca website lists approved organic fertilizers, including bone meal which contains phosphorus and calcium. Fertility is very important to sustain yields. Reports have shown a 60 to 70 bushel variance from fertilizer to no fertilizer in organic corn production (Arnason, Do organic farmers need nutrients? 2015). Weed management can be addressed with crop rotations, weed competitive crop selection, green manure production and timely tillage operations.

PCDF has been working with Dr. Jennifer Mitchell Fetch for a number of years in organic oat variety development. PCDF provides an organic managed evaluation site with Karl Kreutner south of Roblin. Oravena, an oat variety bred for organic production systems, was registered in 2014 and a small amount of seed will be available for producers in 2016. Fedoruk Seeds in Kamsack is commercializing it and Grain Millers in Yorkton are buyers for their organic oat market.

[1] PCDF, Roblin

Objective

To test organic oat lines grown under organic management conditions for AAFC Brandon's organic breeding program.

Procedure and Project Activities

Treatments: 25 (Table 1)
Replication: 3
Plot size: 1.2m x 5m
Test design: Randomized Complete Block Design
Seeding date: May 27
Fertilizer applied: None
Pesticide applied: None
Harvest date: September 3
Product handling: Each individual plot was harvested with weight and moisture recorded.

The trial was seeded into organically certified summer fallowed ground. The plots did not receive any fertilizer or chemical applications. Weed intensity was monitored throughout the growing season and data such as plant counts (plants/m^2), height (cm), maturity date (days from seeding to 50% physiologically mature) and lodging (1-9) was recorded.

All plots were harvested with a small plot combine. Each treatment was individually bagged with weight and moisture recorded. A 750 gram cleaned composite sample was sent to AAFC Brandon for further quality analysis.

Table 1. 2015 Organic Oat Trial Treatments at Roblin, MB*

AAC Oravena	SA120525	09P03-OA039	09P10-OA019	09P10-OA080
AC Morgan	09P02-OA015	09P03-OA059	09P10-OA034	09P10-OA087
CDC Dancer	09P02-OA036	09P04-OA028	09P10-OA058	09P10-OA090
Leggett	09P02-OA060	09P05-OA061	09P10-OA066	09P10-OA091
SA120496	09P02-OA095	09P10-OA002	09P10-OA079	09P10-OA097

* Numbered entries are advanced lines that are under evaluation for possible registration.

Results and Discussion

Table 2. 2015 Organic Oat Trial Results at Roblin, MB

Variety	Yield (kg/ha)	Significant Difference Yield	Plants/m^2	Height (cm)	Days to Maturity*	Lodging (1-9)*
09P02-OA015	3447	a	242	116	84	1
SA120496	3348	ab	244	104	90	1
AAC Oravena	3201	abc	264	102	82	1
09P10-OA002	2964	abcd	222	113	85	1
09P10-OA019	2935	abcd	258	110	80	1
AC Morgan	2870	abcde	211	101	86	1

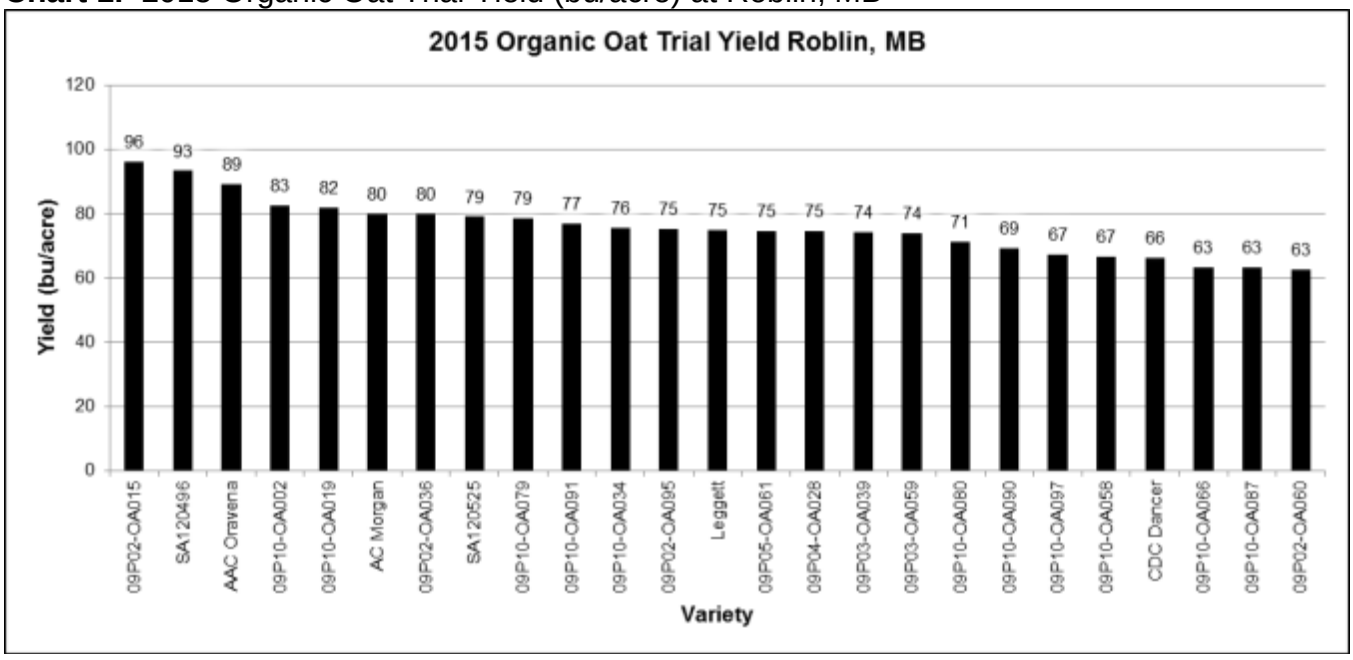
09P02-OA036	2862	abcde	231	99	87	2
SA120525	2834	abcde	269	89	87	1
09P10-OA079	2819	abcde	200	119	82	1
09P10-OA091	2761	bcde	292	88	84	1
09P10-OA034	2714	cde	272	94	81	1
09P02-OA095	2694	cde	233	112	85	1
Leggett	2682	cde	244	90	84	1
09P05-OA061	2677	cde	217	97	84	1
09P04-OA028	2673	cde	233	114	80	2
09P03-OA039	2662	cde	239	116	80	1
09P03-OA059	2647	cde	239	115	82	1
09P10-OA080	2553	de	231	115	81	1
09P10-OA090	2478	de	253	119	85	1
09P10-OA097	2413	de	256	119	81	1
09P10-OA058	2388	de	233	109	81	1
CDC Dancer	2370	de	244	102	83	1
09P10-OA066	2271	e	233	112	80	1
09P10-OA087	2265	e	194	116	83	1
09P02-OA060	2243	e	253	108	89	1
Grand Mean	2711	--	240	107	83	1
% CV	14.2	--	13.2	3.9	1.4	31.7
LSD 5%	630	--	52	9	2	0.6
Significant Difference	Yes	--	Yes	Yes	Yes	Yes

Days to Maturity* = Days from Seeding to 50% of Plants Mature
Lodging (1-9)* = 1 – Plants Fully Erect, 9 – Plants Completely Flat

Chart 1 graphically summarizes the yield data for this project. Table 2 summarizes all the data parameters collected at the site. Replication 3 was omitted from the analysis because there appeared to be a soil issue that affected plant growth. Bear damage had also occurred and the affected plots were noted for analysis. AAC Oravena is the organic oat check variety and it ranked third overall for yield. 09P02-OA015 was the highest yielding experimental line but it was not significantly different from AAC Oravena.

Majority of the plant stands were within the acceptable target range. Heights varied from 89 to 119 cm. Days to maturity ranged from 80 to 90 days. 09P02-OA015 matured in 84 days compared to 82 days for AAC Oravena. Early maturity is important for organic production since seeding is usually delayed for weed control. Minimal to no lodging occurred at the site. The area experienced low rainfall from spring to early summer.

Chart 1. 2015 Organic Oat Trial Yield (bu/acre) at Roblin, MB



Conclusions

Organic production in Canada is gaining interest due to high commodity prices, low input costs and higher gross margins in comparison to conventional production. Market demand is strong and supplies currently cannot meet demand, causing prices to stay high. PCDF has been conducting an organic oat evaluation site for Dr. Jennifer Mitchell Fetch – AAFC Brandon for a number of years. An organic oat variety, AAC Oravena, was registered in 2014 and is the check variety for the test. None of the experimental lines were significantly higher yielding than AAC Oravena.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Dr. Jennifer Mitchell Fetch for cooperating in the trial.
- Karl Kreutner for providing the land for the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

References

Arnason, Robert. "Do organic farmers need nutrients?" *The Western Producer*, February 15, 2015: 4.

—. "More producers switching to organics." *The Western Producer*, January 28, 2016: 61.

—. "U.S. a ready-made market for prairie organics." *The Western Producer*, January 29, 2015: 28.

Schedule

PCDF plans to continue providing a site for Dr. Jennifer Mitchell Fetch as long as an organic site is available and there is staffing in place for 2016.

Saskatchewan Variety Performance Group Oat Variety Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperators: Saskatchewan Variety Performance Group (SVPG)
Manitoba Crop Variety Evaluation Team (MCVET)

Background

The Saskatchewan Variety Performance Group (SVPG), an industry-government partnership, administers regional varietal tests on wheat, durum, malt and feed barley, oats and flax. This regional testing provides producers with valuable information on the agronomic performance of different varieties and crop types under various agro-climatic conditions (Government of Saskatchewan January).

The SVPG is made up of representatives from individual organizations with an interest in varietal testing. An entry fee system, in which the variety owners or companies with distribution rights to specific varieties pay a portion of the cost of testing, is used to help fund the testing program. The Saskatchewan Seed Growers' Association, Saskatchewan Wheat Development Commission, Saskatchewan Barley Development Commission and SaskFlax collectively provide $75,000 to the program (Government of Saskatchewan January). Agriculture and Agri-Food Canada, Saskatchewan Crop Insurance Corporation and The Western Producer provide technical and in-kind support.

Results from the trials are reviewed by the Saskatchewan Advisory Council on Grain Crops. In order to provide sound comparisons to a commonly grown check variety, a long-term database is kept and maintained. This database includes data on yield, various agronomic factors and certain market related traits. The data collected is published each year in Seed Manitoba and the Saskatchewan Seed Guide.

Manitoba's 2015 oat acreage was 452,000 acres with Souris and Summit dominating the acreage respectively at 37% and 24% (Manitoba Agriculture Services Corporation 2015). This was an increase of 111,000 acres from 2014 (Manitoba Agricultural Services Corporation 2014). Manitoba is better situated geographically for accessing U.S. markets and oat growers generally see better per acre returns in oats than wheat at today's prices. The opposite scenario applies to Saskatchewan growers; wheat is more profitable than oats due to higher transportation costs and proximity to markets. Minneapolis is the core for North American oat processing and truck operators like oats as a back haul. Oat prices need to be more appealing so producers will plant more acreage in Manitoba and Saskatchewan. North American oat processors rely on Canadian production to meet their end-use demand. (White 2015)

[1] PCDF, Roblin

Recent changes in Manitoba's crown rust pathogen populations have seen virulence develop on a number of varieties. AAC Justice, CDC Morrison, HiFi, Souris and Stainless contain the Pc91 gene and have been redefined for crown rust resistance. (Manitoba Seed Growers Association 2015) This is the second year of testing SVPG oat varieties at Roblin.

Objective

To evaluate oat varieties for the Saskatchewan Variety Performance Group.

Procedure and Project Activities

Treatments:	12 (Table 1)
Replication:	3
Plot size:	1.2 m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 15
Fertilizer applied:	All actual lbs./acre Side Band – 43 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4 Seed Placed – 15 lbs. P_2O_5
Pesticide applied:	May 15 – Roundup Weathermax® June 10 – Prestige XC®
Harvest date:	September 21
Product handling:	Each individual plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC to control broadleaf weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

Prior to harvest the plots were sprayed with Reglone® to help with dry down and ease of harvest. All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded. A 1 kg composite cleaned sample was sent to PESAI in Arborg for storage.

Table 1. 2015 SVPG Oat Variety Trial Varieties at Roblin, MB*

AAC Justice	CS Camden
Akina	Kara
Bia	Leggett
CDC Dancer	Nice
CDC Haymaker	CDC Norseman (OT3066)
CDC Ruffian	Stride

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	47 lbs/acre (low)	43
*P	14 ppm (high)	35
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

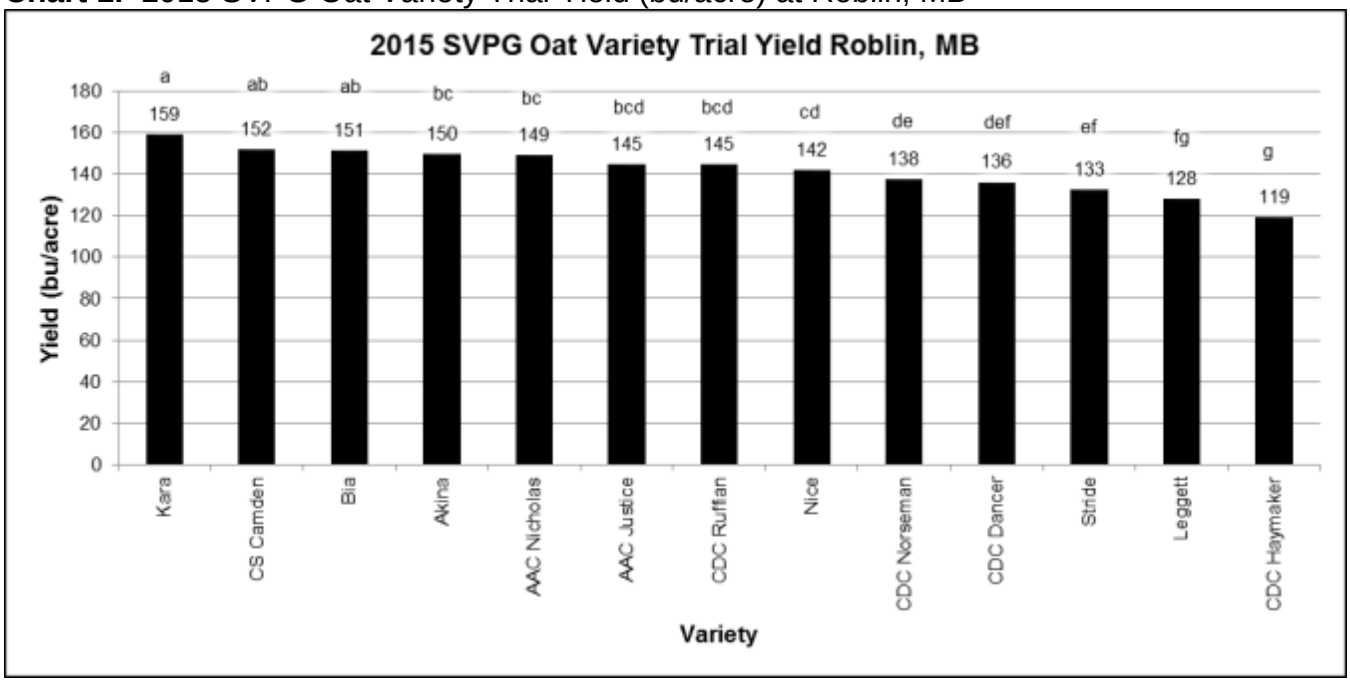
Table 3. 2015 SVPG Oat Variety Trial Yield (kg/ha) at Roblin, MB

Variety	Yield (kg/ha)
Kara	5704
CS Camden	5446
Bia	5427
Akina	5372
AAC Nicholas	5343
AAC Justice	5196
CDC Ruffian	5196
Nice	5091
CDC Norseman (OT3066)	4929
CDC Dancer	4880
Stride	4756
Leggett	4594
CDC Haymaker	4281
Grand Mean	5093
% CV	3.8
LSD 5%	322
Significant Difference	Yes

Yield data is summarized in Table 3 and Chart 1. Yields in 2015 ranged from 119 to 159 bushels/acre. This is significantly lower than 2014 when yields ranged from 247 to 322 bushels/acre (Kostuik, McEachern and Melnychenko 2015). Dry growing conditions early in the season impacted yields. Kara was the highest yielding oat variety in the test. Kara was significantly higher yielding than all the other varieties except for CS Camden and Bia. CS Camden and Bia continue to perform well at Roblin, they were in the top three for yield in 2014. CDC Haymaker is classified as a forage type and its grain yield was significantly lower than all the other varieties except for Leggett.

Kara, CFA1102, is a new variety developed by a Swedish company, Lantmännen SW Seed AB. La Coop Federee will be the distributor and no date has been set for seed availability. CS Camden is a new variety and Canterra Seeds is the distributor. CS Camden seed will be available in 2016. Bia was developed by Lantmännen SW Seed AB and distributed by La Coop Federee.

Chart 1. 2015 SVPG Oat Variety Trial Yield (bu/acre) at Roblin, MB



Conclusions

Manitoba's 2015 acreage rose 111,000 acres from 2014. The SVPG oat trial gives local producers the opportunity to evaluate potential oat varieties for their production region. Manitoba is the main producer of oats for milling companies in Minneapolis, MN. Manitoba's geographical location reduces transportation cost and oats are more cost effective for Manitoba than Saskatchewan growers. Newer varieties have dominated the group for yield ability with CS Camden and Bia performing in the top three for the second year in a row.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- SVPG and MCVET for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

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Schedule

PCDF plans to continue with SVPG's oat variety trial.

Canadian International Grains Institute Canadian Western Red Spring Wheat Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperators: Canadian International Grains Institute (Cigi), Winnipeg, Manitoba
Dale Alderson – Independent Seed Consultant, East St. Paul, Manitoba

Background

When China's state-owned agricultural trading company (COFCO) complained about the inconsistency and baking properties of Canadian wheat in the spring of 2013, the nation's grain industry responded. Huge progress has been made and the reaction from customers has been fantastic. Extensive research involving many sectors of Canada's wheat industry has gained better insight into the issue. (Arnason 2014)

Interaction between wheat variety and weather has been discovered as a factor of interest. Research conducted by the Canadian International Grains Institute (Cigi) has found that there are certain varieties of wheat that are resilient. Over a long range of environmental conditions they produce high gluten strength. Other varieties are more sensitive. Scientists are also studying the influence of herbicides and fungicides on wheat properties. Studies in 2013 showed that a pre-harvest glyphosate application caused some increase in gluten strength. The impact of fungicide is uncertain as it doesn't seem to cause a lot of weakness. These conclusions are preliminary because they are based on one year of data. (Arnason 2014) Replicated research was conducted in 2013, 2014 and 2015 with PCDF's Roblin site included in the test.

The federal government announced $5 million from the Agriinnovation Program (AIP) on June 6, 2014 to expand research at Cigi over the next five years. The funding allows efforts to put a specific focus on the functional properties of various wheat varieties to ensure customers are receiving the wheat gluten strength they require, gain better understanding of the regional differences of varieties and classes of wheat and to work with barley and pulse crops to develop other innovative products such as pulse flours. In depth, one of the activities Cigi will study is agronomic practices that may impact CWRS quality including gluten strength and other quality characteristics will be identified to understand effect on customers' food applications. This will be studied through the use of test plots, factors such as fungicide use, variety and growing location. (Candian International Grains Institute 2014) (Arnason 2014).

Cigi is an independent market development institute created in 1972. Cigi's mission is to create a global advantage for Canadian field crops through the delivery of technical expertise, support and customized training to the domestic industry and customers around the world. Cigi is

[1] PCDF, Roblin

funded by farmers, the Government of Canada (AAFC) and industry partners. (Candian International Grains Institute 2014)

Objective

To study the impact of fungicide and pre-harvest glyphosate applications on wheat variety interaction on gluten strength.

Procedure and Project Activities

Treatments:	18 (Table 1)
Replication:	2
Plot size:	1.2m x 5m
Test design:	Split Plot Design
Seeding date:	May 12
Fertilizer applied:	All actual lbs./acre Side Band – 115 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4 Seed Placed – 15 lbs. P_2O_5
Pesticide applied:	May 15 – Roundup Weathermax® June 11- Prestige XC® and Axial BIA® June 30 – Twinline® (prescribed treatments) August 19 – glyphosate (prescribed treatments)
Harvest date:	September 11
Product handling:	Each individual plot was harvested. Samples were dried down and then weight and moisture were recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC and Axial BIA to control broadleaf and grassy weeds. A fungicide application of Twinline was applied at flag leaf to the prescribed treatments.

A pre-harvest application of glyphosate was applied to the prescribed treatments. All plots were harvested with a small plot combine. Each treatment was individually bagged and dried down. Weight and moisture were recorded once the samples were dry. A 2 kg composite sample from each treatment was delivered to Cigi in Winnipeg for further quality analysis.

Table 1. 2015 Cigi Canadian Western Red Spring Wheat Trial Treatments at Roblin, MB*

Chemical Application	CWRS Variety	Chemical Application	CWRS Variety	Chemical Application	CWRS Variety
None	Carberry	Group 11 @ Flag	Carberry	Pre-Harvest Glyphosate	Carberry
	Glenn		Glenn		Glenn
	Muchmore		Muchmore		Muchmore
	Plentiful		Plentiful		Plentiful
	Stettler		Stettler		Stettler
	Utmost		Utmost		Utmost

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	47 lbs/acre (low)	115
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

Table 3. 2015 Cigi Canadian Western Red Spring Wheat Trial Yield (kg/ha and bu/acre) at Roblin, MB

CWRS Variety	Chemical Treatment	Yield (kg/ha)	Yield (bu/acre)	Significant Difference Yield (kg/ha)
Stettler	Group 11 @ Flag	3763	56	a
Glenn	Group 11 @ Flag	3689	55	a
Carberry	Group 11 @ Flag	3605	54	a
Utmost	Group 11 @ Flag	3574	53	ab
Muchmore	Group 11 @ Flag	3568	53	ab
Plentiful	Group 11 @ Flag	3537	53	ab
Glenn	Untreated	3226	48	bc
Glenn	Pre-Harvest Glyphosate	3092	46	cd
Utmost	Untreated	3076	46	cd
Carberry	Untreated	3014	45	cd
Muchmore	Untreated	3003	45	cd
Utmost	Pre-Harvest Glyphosate	2979	44	cd
Stettler	Pre-Harvest Glyphosate	2952	44	cd
Stettler	Untreated	2911	43	cd
Carberry	Pre-Harvest Glyphosate	2878	43	cd
Muchmore	Pre-Harvest Glyphosate	2844	42	d
Plentiful	Untreated	2816	42	d
Plentiful	Pre-Harvest Glyphosate	2772	41	d

Grand Mean (kg/ha): 3183
% CV: 5.6
LSD 5%: 369
Significant Difference: Yes

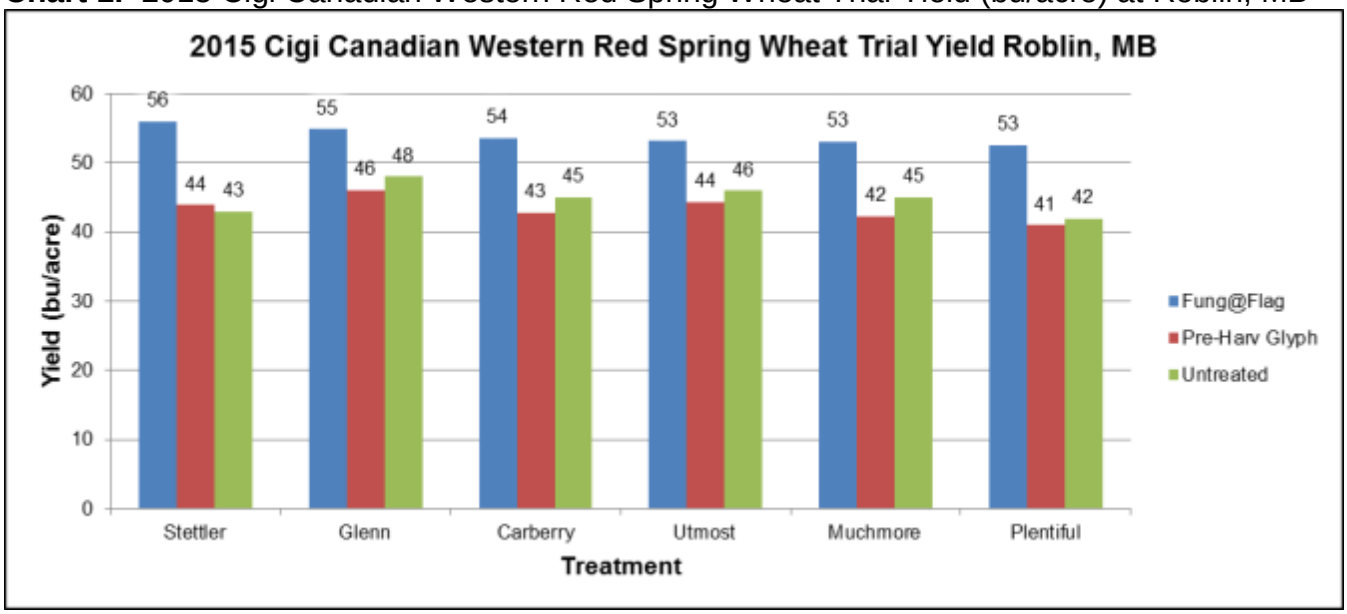
PCDF does not have access to the gluten strength data for this test so no results can be published in that regard.

One area of discussion is the agronomic benefit with the use of fungicides. This year only one fungicide, Twinline, was applied and one application stage, flag leaf. In 2015, the yield results in Table 3 and Chart 1 outline the significant benefit to fungicide application. All wheat varieties had yielded higher with the fungicide treatment versus untreated and it was significant. Yield increases ranged from 7 bushels/acre for Glenn and Utmost to 12 bushels/acre for Stettler.

PCDF has looked at yield response to fungicide applications the last 3 years with the Cigi project. Trends cannot be confirmed over the three year period because the results have been inconsistent. There are a number of factors contributing to disease pressure and the need for a fungicide. The best producers can do is review their situation annually and determine if a fungicide is beneficial for their production.

Untreated and glyphosate treatments are similar in yield for each variety and this is expected since no fungicide was applied on the glyphosate treatments.

Chart 1. 2015 Cigi Canadian Western Red Spring Wheat Trial Yield (bu/acre) at Roblin, MB



Conclusions

This was the third year for PCDF conducting a Canadian International Grains Institute (Cigi) trial regarding fungicide use and its effects on gluten strength. This was the first year for glyphosate treatments and its effect on gluten strength. PCDF does not have access to the gluten strength data so no results can be published in that regard. Fungicide use in 2015 resulted in significant yield increases for all the varieties in the test.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Cigi and Dale Alderson for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

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Schedule

PCDF's understanding is 2015 was the last year for the test.

Canadian Western Red Spring Wheat Variety Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Russell, Manitoba
Cooperators: Denise Schmidt – National Sales Manager, FP Genetics
Mark Keating – Keating Seed Farms, Russell, Manitoba

Background

This is the fifth year that PCDF has collaborated with Keating Seed Farms (Mark Keating) and FP Genetics (Denise Schmidt) to conduct a CWRS trial in the Russell area. The collaboration provides growers with a research site that generates agronomic data for selecting CWRS varieties that are more adapted to their Risk Areas (7 & 9) in the Parkland region. CDC Utmost VB, Harvest and Muchmore have been the main varieties included in the trial since induction and Glenn is in its second year of testing. In 2015, the four varieties acreage represented 30% and 33% for Risk Area 7 and Risk Area 9, respectively, and their yield ability for each risk area was average to above average (Manitoba Agriculture Services Corporation 2015). CDC Utmost VB is a midge resistant variety. Each year a few new varieties are included to go "head to head" with the existing four and give producers a firsthand look at their performance.

Another important component to the trial is the evaluation of seed quality attributes such as percent protein and percent midge damage to the seed. Higher protein content is required for good bread making properties. There are a number of factors that impact protein content such as genetics, fertility, growing conditions and crop rotations.

Wheat midge has been in Manitoba since the early 1900's. It became a pest in the 1950's and the first major outbreak occurred in Northeast Saskatchewan in 1983. 2015 marked the fifth anniversary for producers having access to midge-tolerant wheat varieties. There has been a strong uptake of the technology by producers in Western Canada, nearly four million acres grown in 2013 and 2014 (Lewis 2015). The number one benefit to growing midge tolerant varieties is no insecticide spraying is required and producers do not have to worry about their crop. It's protected with the Sm1 gene. Good stewardship practices are required to maintain the Sm1 gene. To preserve midge tolerance, producers who purchase midge tolerant seed must sign a stewardship agreement that limits the use of farm-saved seed to one generation past certified seed. This keeps the refuge blend at a desirable level and preserves tolerance longer than the initial 10 years. Producer audits have shown a 96% compliance rate with the stewardship agreement.

[1] PCDF, Roblin

Objective

To evaluate different varieties of Canadian Western Red Spring Wheat in terms of yield and quality in the Parkland region of Manitoba.

Procedure and Project Activities

Treatments:	7 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 27
Fertilizer applied:	All actual lbs./acre
	Banded – 80 lbs. N, 20 lbs. P_2O_5
	Seed Placed – 15 lbs. P_2O_5
Pesticide applied:	June 28 – Prestige XC® and Axial BIA®
Harvest date:	September 23
Product handling:	Each individual plot was harvested with weight and moisture recorded.

A spring application of nitrogen and phosphorus was applied. The trial was seeded into canola stubble with 15 lbs. P_2O_5 applied with the seed. Prestige XC and Axial BIA was sprayed to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded. A 750 gram non-cleaned composite sample was sent to Intertek Laboratory in Winnipeg for further quality analysis.

Table 1. 2015 Canadian Western Red Spring Wheat Variety Trial Varieties at Russell, MB*

Brandon	Muchmore
Elgin ND	Plentiful
Glenn	Utmost VB
Harvest	

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Results and Discussion

Table 2. 2015 Canadian Western Red Spring Wheat Trial Report of Analysis**

Variety	Grade	Reason for Grade	Midge %	Protein %	Fusarium Damage %	Ergot %
Muchmore	CW Feed*	1.9% FUS DMG	0.3	15.0	1.9	0.000
Brandon	No. 3 CWRS*	1.4% FUS DMG	0.4	14.7	1.4	0.000
Plentiful	No. 3 CWRS*	1.2% FUS DMG	0.2	15.5	1.2	0.000
Utmost VB	No. 3 CWRS*	1.2% FUS DMG	0.4	15.4	1.2	0.000
Elgin ND	CW Feed*	1.8% FUS DMG	0.3	14.5	1.8	0.000
Glenn	No. 3 CWRS*	1.5% FUS DMG	0.1	14.7	1.5	0.000
Harvest	CW Feed*	2.2% FUS DMG	0.3	14.9	2.2	0.000

CW Feed* = Canadian Western Feed Wheat
CWRS* = Canadian Western Red Spring Wheat
FUS DMG* = Fusarium Damage

Table 2 summarizes the quality data analyzed by Intertek Laboratory. Midge damage levels ranged from 0.1 to 0.4%, lower than 2014 and 2012 and similar to 2013 and 2011. (Kostuik, McEachern and Melnychenko, Parkland Crop Diversification Foundation 2014 Annual Report 2015) (Kostuik, McEachern and Melnychenko, Parkland Crop Diversification Foundation Annual Report 2013 2014) Glenn had the lowest level of midge damage and Brandon and Utmost VB had the highest. Protein levels, 14.5 to 15.5%, were higher in 2015 when compared to 2014 and 2013 and similar to 2012 and 2011. Fusarium levels, 1.2 to 2.2%, were the highest in 2015 when compared to the previous three years. Plentiful and Utmost VB had the lowest levels of Fusarium damage whereas Harvest had the highest. No ergot was reported in the 2015 grain samples.

Table 3. 2015 Canadian Western Red Spring Wheat Trial Results at Russell, MB

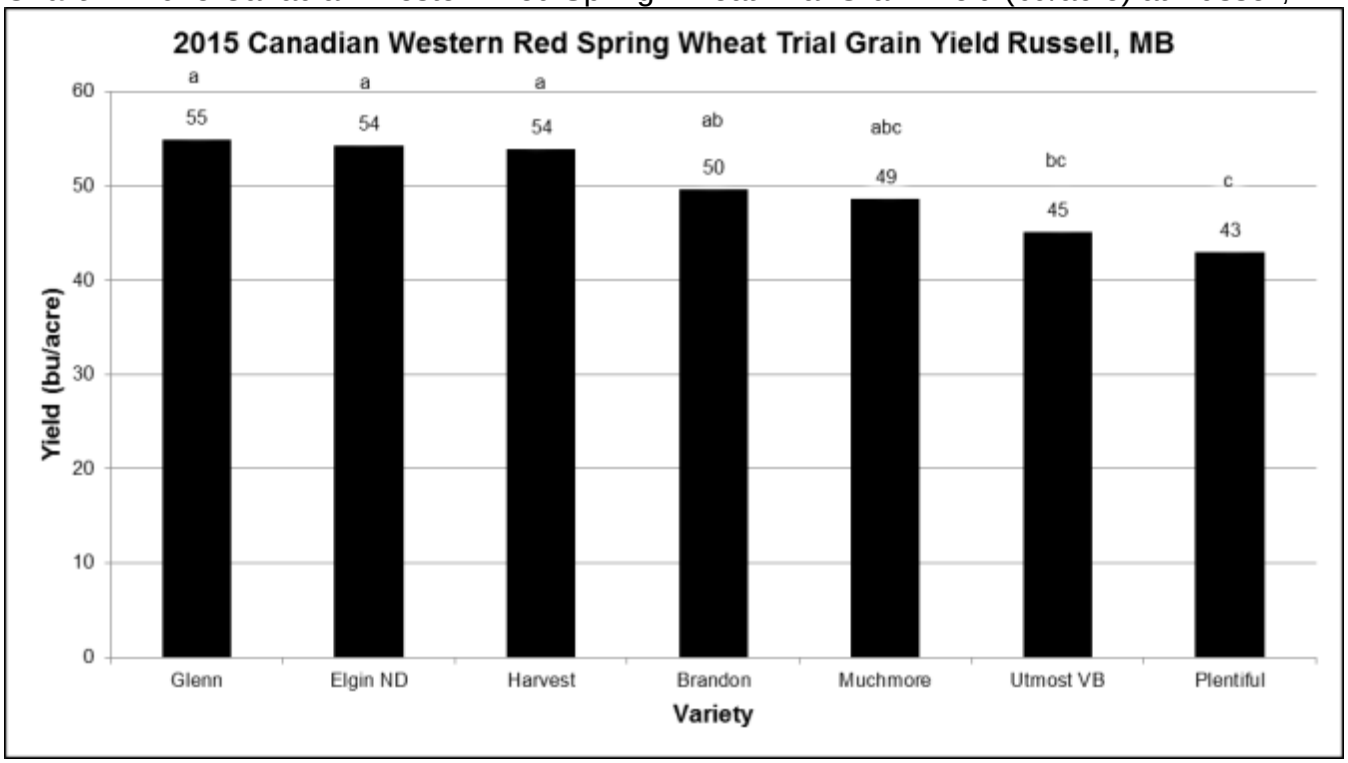
Variety	Yield (kg/ha)	Plants/ m^2	Days to Heading*	Disease (1-9)*	Height (cm)	Days to Maturity*	Lodging (1-9)*
Glenn	3693	261	48	3	95	103	1
Elgin ND	3651	289	50	4	99	102	2
Harvest	3620	286	47	5	98	101	2
Brandon	3339	308	49	4	85	104	2
Muchmore	3268	242	49	4	86	102	1
Utmost VB	3033	236	51	5	102	102	2
Plentiful	2888	236	51	4	98	102	2
Grand Mean	3356	266	49	4.2	95	102	2

% CV	7.3	11.7	1.2	9.6	2.4	0.4	31.2
LSD 5%	438	56	1	0.7	4	0.8	0.9
Significant Difference	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Days to Heading* = Days from Seeding to 50% of Plants Headed
Disease (1-9)* = 1 – No Disease, 9 – Severe Disease
Days to Maturity* = Days from Seeding to 50% of Plants Mature
Lodging (1-9)* = 1 – Plants Fully Erect, 9 – Plants Completely Flat

Table 3 summarizes all the agronomic data parameters collected over the growing season. Chart 1 graphically illustrates yield data results. Glenn, Elgin ND and Harvest were the highest yielding varieties in the test and they were significant in comparison to Utmost VB and Plentiful. Germination and seedling emergence was good with all the varieties achieving an acceptable level. Days to 50% headed out occurred over a 4 day period with Harvest being the earliest and Utmost VB and Plentiful being the latest. Harvest was the earliest to mature, 101 days, and Brandon was the latest at 104 days. Lodging was minimal at this site.

Chart 1. 2015 Canadian Western Red Spring Wheat Trial Grain Yield (bu/acre) at Russell, MB



Conclusions

This was the fifth year of testing for this project. CDC Utmost VB, Harvest and Muchmore have been the main varieties included in the trial since induction and Glenn is in its second year of testing. Testing midge tolerant and new CWRS varieties is important for producers in the region.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Denise Schmidt and FP Genetics for cooperating in the trial.
- Mark Keating of Keating Seed Farms for supplying the land for the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

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Schedule

Currently, there are no plans to continue this project in 2016.

Nitrogen Fertilization for High Yielding Wheat

Susan M[c]Eachern[1], Angel Melnychenko[1] and John Heard[2]

Site Information

Locations:	Arborg, Manitoba Beausejour, Manitoba Carberry, Manitoba Melita, Manitoba Portage la Prairie, Manitoba Roblin, Manitoba Sperling, Manitoba St. Adolphe, Manitoba
Cooperator:	John Heard – Crop Nutrition Specialist, MAFRD CMCDC – Carberry and Portage la Prairie, Manitoba PCDF – Roblin, Manitoba PESAI – Arborg, Manitoba Richardson Pioneer Research Station – St. Adolphe, Manitoba WADO – Melita, MB

Background

The recent introduction of very high yielding wheat has brought challenges. Our provincial guidelines only provide N recommendations for yields of 65 bu/ac. These high yielding wheat types are often producing low protein. The standard suggestion of 2.5 lb N/bu indicates that rates of 200 soil & fertilizer N are required for 80 bu/ac crops – a very high N rate.

The 4R approach is suggested in meeting these yield and protein requirements:

- Rates
- Timing/placement/source, especially for top-up strategies
- Development of decision tools for protein sufficiency

Objective

To evaluate high management practices with different applications of nitrogen on wheat yields and quality.

Procedure and Project Activities at Roblin, MB

Treatments:	Protein Trial – 12 (Table 1), Foliar Trial – 6 (Table 2)
Replication:	4

[1] PCDF, Roblin
[2] MAFRD, Carman

Plot size:	1.2m x 5m
Test design:	Split Plot
Seeding date:	May 12
Fertilizer applied:	All actual lbs./acre Protein Trial – Side Band (blend): 16 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4. Seed Placed: 15 lbs. P_2O_5. Various amounts of additional N were applied as a side band according to the treatment list. (Table 1) Foliar Trial – Side Band: 16 lbs N, 35 lbs P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4. Seed Placed: 15 lbs. P_2O_5. Additional fertilizer was side banded to achieve a baseline of 130 lbs/acre. Additional N was applied as a foliar application according to the treatment list. (Table 2)
Pesticide applied:	May 15 – Roundup Weathermax® June 11 – Prestige XC® and Axial BIA® June 30 – Twinline®
Harvest date:	September 1
Product handling:	Each individual plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and fertilizer was applied according to treatment list. Various data parameters were recorded throughout the growing season with different applications applied according to crop stage. Greenseeker NDVI readings were recorded at T1 and T2 crop stages. Flag leaf sampling was conducted at T2 crop stage and submitted for nitrogen analysis. Height measurements were conducted at T1 and T2 crop stages.

Prior to harvest the trial was sprayed with Reglone® to help with dry down and ease of harvest. Each plot was harvested and weight and moisture were recorded. Samples were analyzed for protein, moisture and test weight at Richardson Pioneer in Dauphin, MB.

Project Methods

Sites were selected at MAFRD research stations (Arborg, Beausejour, Melita and Roblin), CMCDC research stations (Carberry and Portage), Richardson Pioneer research station (St. Adolphe) and a producer field at Sperling (Silverwinds). Pre-plant soil sampling to 24" was done at each site in late April and early May, with several sites having very high nitrate N levels (Table 4). Soils were analyzed at Farmers Edge Laboratories. Two experiments were conducted at each site.

Experiment A: Wheat variety response to N.

Two popular high yielding wheat varieties were selected: AAC Brandon (CWRS) and Prosper (new Canada Northern Dark Red class) from NDSU. Nitrogen rates were added to base soil nitrate to produce 6 total N supplies: check (soil N only), 100, 130, 160, 190 and 220 lb N/ac. Base soil N at Arborg (157 lb N/ac) exceeded the lower levels so the first 4 rates (soil to 160) consisted of soil N only. Plots were seeded in a split plot design with main plots of N supply and sub plots as variety.

Nitrogen was applied as urea in subsurface bands during seeding.

Experiment B: Wheat response to in-season timings of N

Prosper wheat was seeded with a base rate of 130N (soil & fertilizer N). Supplemental N was applied as Agrotain treated urea at 30 and 60 lb N/ac at late tillering-stem elongation (T1) or full flag leaf emergence-boot stage (T2) or a post anthesis (PAN) foliar application of 30 lb N as UAN, diluted 50:50 with water.

Table 1. Experiment A Treatments

Check Brandon	Check
100 N Brandon	100 N Prosper
130 N Brandon	130 N Prosper
160 N Brandon	160 N Prosper
190 N Brandon	190 N Prosper
220 N Brandon	220 N Prosper

Table 2. Experiment B Treatments

130 N Prosper	Head-30 N Prosper
Mid-30 N Prosper	Head-60 N Prosper
Mid-60 N Prosper	Post-Anthesis-30 N

Table 3. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	**Fertilizer Applied (actual lbs)**
*N	47 lbs/acre (low)	Various
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Table 4. Site and Activity Descriptions for Roblin, MB

Site Soil Characteristics	**Roblin**
Soil Series	Erikson Clay Loam
Soil N lb Nitrate-N/ac	64
OM	5.6%
P ppm	12
K ppm	205
CEC	22
2015 Growing Season Weather	
Initial Gravimetric Soil Moisture to 4'	18.6%
May to August Rain (mm)	214
May to August Growing Degree Days	1284
Field Operations	
Seeded	May 12
Base N Application	At Seeding

Harvest	September 1
Experiment B Supplemental N Applications (days to rainfall)	
T1 = Stem Elongation N Application	June 10 (10)
T2= Flagleaf N Application	June 28 (13)
PAN Application	July 19 (4)
Max Temp. at PAN (°C)	22

* Note: Values in brackets are the days between N application and rainfall amounting to ½ >> or 12mm.

Results and Discussion

Table 5. N Supply by Variety at Roblin

N Supply (lb/ac)	Yield (kg/ha)	Yield (bu/ac)	Protein (%)	Test Weight (g/hl)	Height T1 (cm)	Height T2 (cm)	GS T1	GS T2	Flag Leaf N%
Check	4086	60.6	15.03	383.8	21.6	55.3	0.29	0.49	4.37
100 N	4094	60.7	15.46	376.1	21.3	54.3	0.26	0.48	4.42
130 N	4156	61.7	15.64	379.0	21.7	55.1	0.28	0.50	4.45
160 N	4262	63.2	15.23	376.5	22.2	54.7	0.28	0.51	4.53
190 N	4235	62.8	15.94	378.2	22.3	54.4	0.28	0.49	4.48
220 N	4055	60.1	15.91	371.6	22.3	53.2	0.29	0.47	4.36
Brandon	4006	59	15.4	383	22.7	55.3	0.30	0.51	4.57
Prosper	4290	64	14.4	371	21.1	53.7	0.26	0.47	4.30
CV %	3.1502	3.1502	1.74	1.1	4.0	2.8	10.3	3.2	1.6
N Rate									
Pr>F	0.3922	0.3922	0.0547	0.0549	0.4918	0.5721	0.6372	0.5146	0.4287
LSD (0.05)	NS	NS	0.66	7.2	NS	NS	NS	NS	NS
Variety									
Pr>F	0.0001	0.0001	0.0001	0.0001	0.0001	0.0027	0.0004	0.0001	0.0001
LSD (0.05)	277	4.1	0.17	2.55	0.532	0.93	0.017	0.0094	0.07
Variety x N Rate									
Pr>F	0.5434	0.5434	0.4109	0.4863	0.3973	0.8373	0.2029	0.1224	0.0684
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	0.174

* NS = No Significance

Low growing season rainfall reduced yields at Roblin (Table 5). There was no lodging observed.

1. Nitrogen tended to increase wheat protein and reduce test weight. Nitrogen had no impact on yield or other parameters.
2. All measured parameters were different between Prosper and Brandon. Prosper yielded 5 bu/ac more, was 1% lower protein, had lower test weight, height and biomass and flag leaf N than Brandon.

Table 6. N Supplementation at Roblin

N Supply (lb/ac)	Yield (kg/ha)	Yield (bu/ac)	Protein (%)	Test Weight (g/hl)	GS T1	GS T2	Height T1 (cm)	Height T2 (cm)	Flag Leaf N%
130N	4465	66.2	15.35	354.0	0.25	0.47	22.0	54.9	4.38
& 30N @ T1	4314	64.0	15.33	343.0	0.27	0.45	21.3	53.0	4.34
& 60N @ T1	4538	67.3	15.33	350.0	0.25	0.48	20.4	53.2	4.26
& 30N @ T2	4396	65.2	15.30	348.0	0.26	0.46	21.3	53.7	-
& 60N @ T2	4526	67.1	15.45	351.0	0.26	0.46	21.6	53.1	-
& 30N PAN	4141	61.4	15.50	348.0	0.27	0.46	21.5	53.5	-
% CV	5.0	5.0	0.8397	1.7372	7.6698	4.8468	5.7497	3.1697	1.9823
Pr>F	0.3066	0.3066	0.2309	0.4014	0.6721	0.4973	0.5644	0.6179	0.514
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS

* NS = No Significance

1. There was no lodging. The PAN treatment caused leaf burn of 33% and had the lowest yield but this was not statistically significant.
2. There was no impact of treatments measured parameters, generally because nitrogen was sufficient for the lower yield caused by lack of precipitation.
3. The scouting tools of biomass (NDVI by Greenseeker) or flag leaf N were not able to be assessed since protein was high and did not respond to supplemental applications.

Conclusions

This was one year and one site of data so no conclusions can be made. More testing is required. The reduced growing season rainfall, especially in the early part of the season, affected yields and protein content.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- John Heard for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

Schedule

This project will be conducted again in 2016.

Parkland Cooperative Wheat Trial

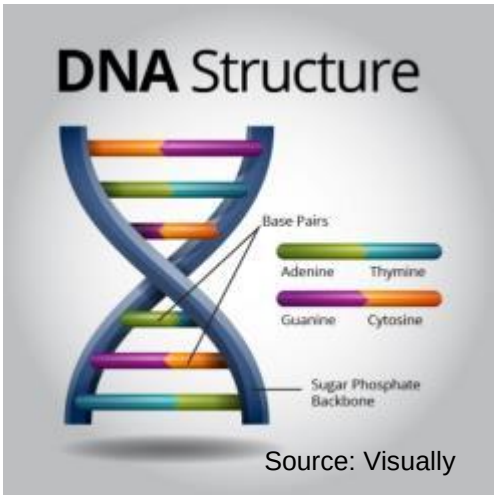
Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperators: Dr. Dean Spaner – Coordinator, University of Alberta Research Station
Klaus Strenzke – Research Technician, University of Alberta Research Station

Background

The Parkland Cooperative wheat trial is conducted across the Prairies as a data source for wheat breeders to request support for registration of their CWRS breeding lines. There are a number of data parameters that are evaluated to complete the data package. Genetic diversity is important in plant breeding and variety development. New wheat varieties should offer the industry enhanced agronomic and quality characteristics so that Canadian wheat remains competitive globally.



Source: Visually

Wheat genome mapping is one tool wheat breeders have to assist them. The International Wheat Genome Sequencing Consortium (IWGSC) announced January 6, 2016 that a "whole genome assembly" of bread wheat has been developed (Cross 2016). The wheat genome is believed to contain 17 billion base chemical pairings and one base pairing constitutes a single rung on the DNA ladder. This will provide wheat researchers with an exciting new resource to identify the most influential genes for wheat adaptation, stress response, pest resistance and improved yield. The genome map will allow plant breeders to develop new and improved wheat varieties with greater speed and accuracy. Specific genes can be targeted for specific end uses and agronomic performances. This advancement in technology and information is timely because it is estimated that global wheat production needs to increase by 1.6% a year for the next 35 years to keep up with future demand.

Objective

The objectives of the Parkland Cooperative Wheat Trial include:

1. To evaluate CWRS breeding lines for their adaptation to the Parkland and Peace River cultivation regions of Western Canada through field trials at selected locations.

[1] PCDF, Roblin

Agronomic data including grain yield, days to maturity, plant height and lodging is collected by site collaborators at each site.

2. To evaluate CWRS breeding lines for their resistance to leaf rust, stem rust, common bunt and fusarium head blight pathogens.
3. To test and evaluate the end use quality of CWRS breeding lines through the testing of composite grain samples generated from the Parkland Cooperative tests.
4. To provide the data to wheat breeders that can be used to request support for registration of CWRS breeding lines that demonstrate improved adaptation to the Parkland and Peace River cultivation regions.

Procedure and Project Activities

Treatments:	25 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Lattice
Seeding date:	May 12
Fertilizer applied:	All actual lbs./acre Side Band – 115 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4 Seed Placed – 15 lbs. P_2O_5
Pesticide applied:	May 15 – Roundup Weathermax® June 11 - Prestige XC® and Axial BIA®
Harvest date:	September 2
Product handling:	Each individual plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC and Axial BIA to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to 50% plants headed), height (cm), maturity date (days from seeding to 50% mature) and lodging (1-9).

Prior to harvest the plots were sprayed with Reglone® to help with dry down and ease of harvest. All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded. A 2.5 kg cleaned composite sample of each entry was sent to the University of Alberta for further quality analysis.

Table 1. 2015 Parkland Cooperative Wheat Trial Varieties at Roblin, MB*

AC Splendor	PT 479	PT 595	PT 649	PT 780
Glenn	PT 483	PT 596	PT 650	PT 782
Katepwa	PT 484	PT 597	PT 651	PT 783
PT 250	PT 485	PT 645	PT 772	PT 784
PT 472	PT 486	PT 648	PT 778	PT 785

* Numbered entries are advanced lines that are under evaluation for possible registration

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	47 lbs/acre (low)	115
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

Table 3 and Chart 1 summarize the data parameters collected. Yields ranged from 31 to 44 bushels/acre which is significantly lower than 2014, 76 to 104 bushels/acre (Kostuik, McEachern and Melnychenko 2015). Glenn, AC Splendor and Katepwa are the main varieties in this trial. Glenn was the highest yielding variety with PT782, PT250 and PT 648 out yielding it but not significant. PT250 is in its third year of testing.

Maturities ranged from 91 to 100 days which is about 10 days earlier than 2014. Heights were also significantly shorter than 2014. The reduced rainfall from May to mid-July and a warmer August may have impacted days to maturity, height and yield. Plant establishment was acceptable and there was minimal lodging in the trial.

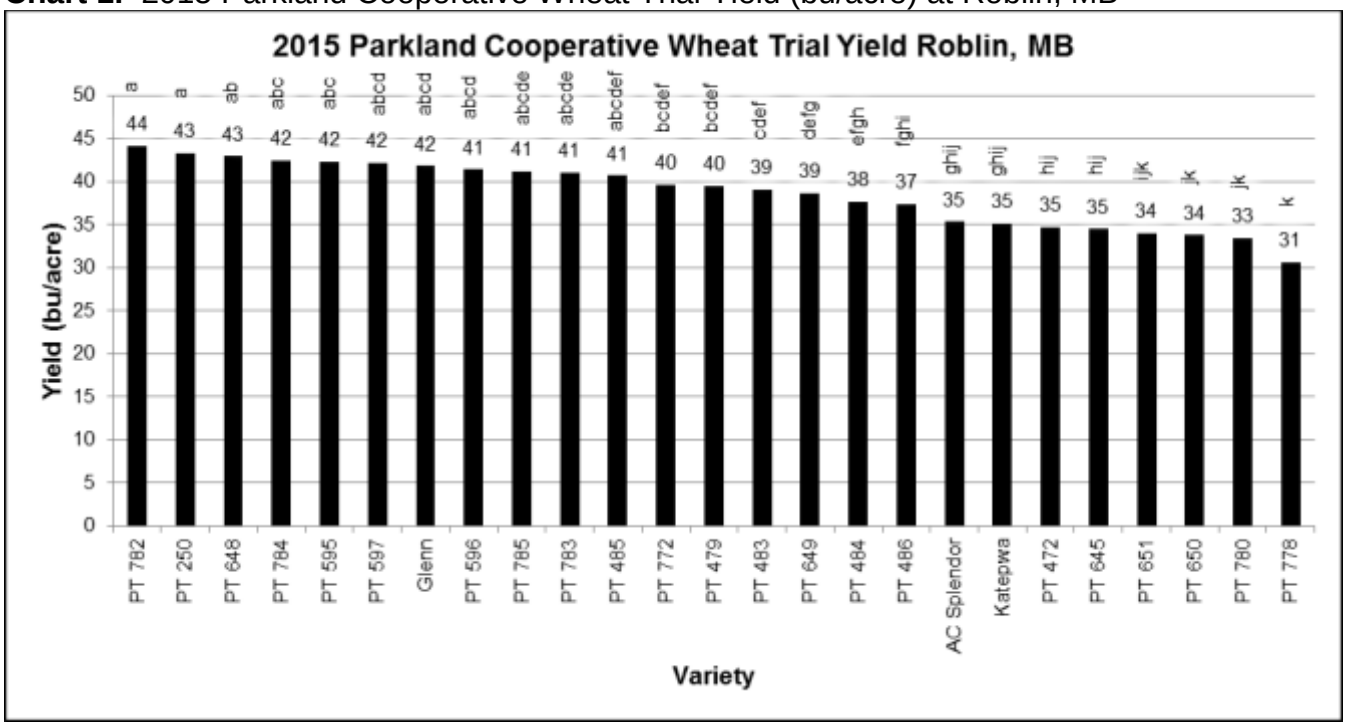
Table 3. 2015 Parkland Cooperative Wheat Trial Results at Roblin, MB

Variety	Yield (kg/ha)	Plants/m^2	Disease (1-9)*	Height (cm)	Days to Maturity*	Lodging (1-9)*
PT 782	2970	278	3	77	99	1
PT 250	2911	322	4	78	98	1
PT 648	2888	314	4	80	100	1
PT 784	2856	303	4	76	96	1
PT 595	2847	281	4	74	97	1
PT 597	2835	306	4	72	97	2
Glenn	2812	331	3	78	99	1
PT 596	2784	233	4	77	97	1
PT 785	2769	269	4	76	96	1
PT 783	2760	278	3	79	100	1
PT 485	2736	250	5	70	94	2
PT 772	2662	242	6	80	97	2
PT 479	2658	242	4	76	99	1
PT 483	2630	244	4	77	97	1
PT 649	2602	283	3	74	100	1
PT 484	2531	278	4	72	94	2
PT 486	2513	297	5	73	92	2
AC Splendor	2377	297	4	77	94	2
Katepwa	2364	331	4	86	96	3
PT 472	2335	294	4	78	94	1

PT 645	2320	294	4	82	96	1
PT 651	2289	269	4	74	100	2
PT 650	2272	286	4	71	98	1
PT 780	2250	308	5	74	91	2
PT 778	2061	311	5	83	96	3
Grand Mean	2601	286	4	76	97	2
% CV	5.6	16.5	13.8	4.8	1.3	28.2
LSD 5%	239.3	77.4	0.9	7.5	2.1	0.7
Significant Difference	Yes	Yes	Yes	Yes	Yes	Yes

Disease (1-9)* = 1 – No Disease, 9 – Severe Disease
Days to Maturity = Days from Seeding to Maturity
Lodging (1-9)* = 1 – Plants Completely Straight, 9 – Plants Completely Flat

Chart 1. 2015 Parkland Cooperative Wheat Trial Yield (bu/acre) at Roblin, MB



Conclusions

The Parkland C wheat evaluation trial is an important trial for providing plant breeders with the data package they require to request support for registration. Parkland C is grown across the Prairies and it gives breeders and producers a good snapshot of how the wheat cultivars perform under various growing conditions. This is important since wheat production needs to increase on a yearly basis to feed a constantly growing world population. New breeding tools will assist in meeting this goal.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Dr. Dean Spaner and Klaus Strenzke for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

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Schedule

PCDF will continue to conduct this trial as a valuable site in the Parkland region of Manitoba.

Saskatchewan Variety Performance Group Wheat Variety Trial (1)

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperators: Saskatchewan Variety Performance Group (SVPG)
Manitoba Crop Variety Evaluation Team (MCVET)

Background

The Saskatchewan Variety Performance Group (SVPG), an industry-government partnership, administers regional varietal tests on wheat, durum, malt and feed barley, oats and flax. This regional testing provides producers with valuable information on the agronomic performance of different varieties and crop types under various agro-climatic conditions (Government of Saskatchewan January).

The SVPG is made up of representatives from individual organizations with an interest in varietal testing. An entry fee system, in which the variety owners or companies with distribution rights to specific varieties pay a portion of the cost of testing, is used to help fund the testing program. The Saskatchewan Seed Growers' Association, Saskatchewan Wheat Development Commission, Saskatchewan Barley Development Commission and SaskFlax collectively provide $75,000 to the program (Government of Saskatchewan January). Agriculture and Agri-Food Canada, Saskatchewan Crop Insurance Corporation and The Western Producer provide technical and in-kind support.

Results from the trials are reviewed by the Saskatchewan Advisory Council on Grain Crops. In order to provide sound comparisons to a commonly grown check variety, a long-term database is kept and maintained. This database includes data on yield, various agronomic factors and certain market related traits. The data collected is published each year in Seed Manitoba and the Saskatchewan Seed Guide.

SVPG organized two spring wheat trials for 2015. This trial is the first one and consists of 39 varieties. There are a number of new varieties being evaluated. The Canadian Grain Commission is going to reclassify twenty-five CWRS varieties on August 1, 2018. (Canadian Grain Commission 2016) Lillian, Unity, Harvest and Kane are a few included in this reclassification. Decisions for reclassification were based on consultations with domestic and international stakeholders, including end-users because of raised concerns over inadequate gluten strength. It is uncertain at this time if the reclassified varieties will be moved into an existing class or if a new lower quality milling wheat class will be created. Discussions will continue with the industry to establish a decision. The newly classified varieties will likely command a lower price beginning in 2018-2019 crop year. Narrowing the range in gluten strength parameters is part of maintaining Canada's reputation for producing high quality

[1] PCDF, Roblin

wheat. Carberry and Glenn will be the standards for lower and upper thresholds, respectively. (Cross 2015)

Objective

To evaluate different varieties of CWRS wheat for the Saskatchewan Variety Performance Group.

Procedure and Project Activities

Treatments:	39 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 25
Fertilizer applied:	All actual lbs./acre Side Band – 115 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4 Seed Placed – 15 lbs. P_2O_5
Pesticide applied:	May 28 – Roundup Weathermax® June 11- Prestige XC® and Axial BIA®
Harvest date:	September 21
Product handling:	Each individual plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC and Axial BIA to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to 50% of plants headed), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

Prior to harvest the plots were sprayed with Reglone® to help with dry down and ease of harvest. All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded. Two 1 kg cleaned composite samples were composed with one being sent to BioVision for analysis and one to Arborg for storage.

Table 1. 2015 SVPG Wheat Variety Trial (1) Varieties at Roblin, MB*

AAC Bailey	CDC Bradwell (BW472)	Cardale	PT472*
AAC Brandon	BW479	CDC Plentiful	PT474*
AAC Cameron VB	AAC Jatharia (BW483)	CDC Titanium	PT588
AAC Connery	AAC Tradition (BW487)	CDC VR Morris	PT637*
AAC Elie	BW496*	CDC Whitewood	PT769
AAC Iceberg	BW963*	Coleman	Thorsby

AAC Prevail	BW965*	Glenn	Vesper VB
AAC Redwater	BW966*	HW037*	Whitehawk
AAC W1876	BW971	HW616	5605HR CL
AAC Whitefox	Carberry	PT468	

* Varieties that have been supported for registration with class to be determined by the Canadian Grain Commission

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	47 lbs/acre (low)	115
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate

** Analysis by Agvise Laboratories

Results and Discussion

Table 3. 2015 SVPG Wheat Variety Trial (1) Yield (kg/ha) at Roblin, MB

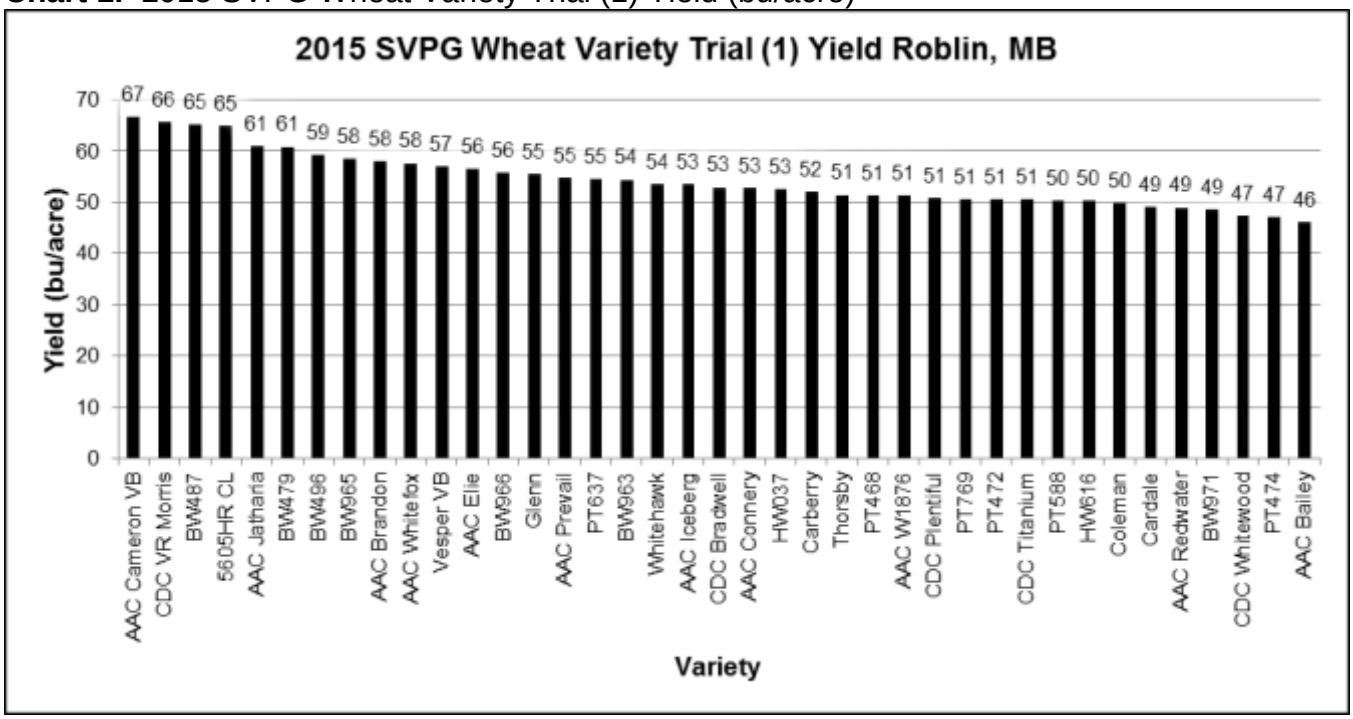
Variety	Yield (kg/ha)	Significant Difference
AAC Cameron VB	4474	a
CDC VR Morris	4410	a
BW487	4376	a
5605HR CL	4365	a
AAC Jatharia (BW483)	4090	b
BW479	4089	b
BW496	3981	bc
BW965	3931	bcd
AAC Brandon	3893	bcde
AAC Whitefox	3871	bcdef
Vesper VB	3833	cdef
AAC Elie	3794	cdefg
BW966	3751	defgh
Glenn	3724	defgh
AAC Prevail	3677	efghi
PT637	3670	fghij
BW963	3656	fghij
Whitehawk	3601	ghijk
AAC Iceberg	3595	ghijkl
CDC Bradwell (BW472)	3557	hijklm
AAC Connery	3555	hijklm
HW037	3536	hijklm
Carberry	3499	ijklmn
Thorsby	3456	ijklmno
PT468	3450	jklmno
AAC W1876	3422	klmno

CDC Plentiful	3420	klmno
PT769	3397	klmnop
PT472	3395	klmnopq
CDC Titanium	3395	klmnopq
PT588	3388	klmnopq
HW616	3377	lmnopq
Coleman	3343	mnopq
Cardale	3292	nopqr
AAC Redwater	3291	nopqr
BW971	3265	opqr
CDC Whitewood	3186	pqr
PT474	3173	qr
AAC Bailey	3103	r
Grand Mean	3649	--
% CV	3.7	--
LSD 5%	222	--
Significant Difference	Yes	--

Yield statistics were conducted on two of the three replications because of a seeding error in one of the reps. Table 3 and Chart 1 summarize yield data for SVPG Wheat Trial 1. Yield ranged from 46 to 67 bushels/acre. This is significantly lower than 2014 CWRS yields at PCDF, 76 to 115 bushels\acre (Kostuik, McEachern and Melnychenko, Parkland Crop Diversification Foundation 2014 Annual Report 2015). Drier growing conditions in 2015 and a later than desired seeding date may have contributed to the difference in yields from 2014. AAC Cameron VB, CDC VR Morris, AAC Tradition (BW487) and 5605HR CL were higher yielding than all the other entries and it was significant. AAC Cameron VB, CDC VR Morris and 5605HR CL are CWRS varieties. AAC Tradition was selected under an organic production system so its wheat classification is still pending from Canadian Grain Commission.

AAC Cameron VB is a varietal blend of midge resistance and susceptibility and it is distributed by Canterra Seeds. CDC VR Morris and 5605HR CL are distributed by CPS Canada Inc. CDC VR Morris has moderate resistance to immunity for Fusarium Head Blight. 5605HR CL is a Clearfield® wheat that offers producers another option for weed management. AAC Tradition is new this year and Canterra Seeds will have seed available in 2017.

Chart 1. 2015 SVPG Wheat Variety Trial (1) Yield (bu/acre)



Conclusions

Wheat classifications are being reviewed and modified to address gluten strength concerns from domestic and international stakeholders, including end-users. On August 1, 2018, twenty-five varieties will be reclassified. SVPG Wheat Trial-1 is the first of two trials coordinated by SVPG in 2015. There were 39 entries in this trial and a yield %CV of 3.9 was achieved. AAC Cameron VB, CDC VR Morris, AAC Tradition and 5605HR CL were the highest yielding varieties of the test and it was significant in comparison to the other entries. 2015 wheat yields were lower than 2014.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- SVPG and MCVET for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

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Schedule

PCDF will continue to cooperate with the SVPG and MCVET to host wheat variety trials.

Saskatchewan Variety Performance Group Wheat Variety Trial (2)

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperators: Saskatchewan Variety Performance Group (SVPG)
Manitoba Crop Variety Evaluation Team (MCVET)

Background

The Saskatchewan Variety Performance Group (SVPG), an industry-government partnership, administers regional varietal tests on wheat, durum, malt and feed barley, oats and flax. This regional testing provides producers with valuable information on the agronomic performance of different varieties and crop types under various agro-climatic conditions (Government of Saskatchewan January).

The SVPG is made up of representatives from individual organizations with an interest in varietal testing. An entry fee system, in which the variety owners or companies with distribution rights to specific varieties pay a portion of the cost of testing, is used to help fund the testing program. The Saskatchewan Seed Growers' Association, Saskatchewan Wheat Development Commission, Saskatchewan Barley Development Commission and SaskFlax collectively provide $75,000 to the program (Government of Saskatchewan January). Agriculture and Agri-Food Canada, Saskatchewan Crop Insurance Corporation and The Western Producer provide technical and in-kind support.

Results from the trials are reviewed by the Saskatchewan Advisory Council on Grain Crops. In order to provide sound comparisons to a commonly grown check variety, a long-term database is kept and maintained. This database includes data on yield, various agronomic factors and certain market related traits. The data collected is published each year in Seed Manitoba and Saskatchewan Seed Guide.

SVPG organized two spring wheat trials for 2015. This trial is the second trial and consists of 21 varieties. There are a few new varieties being evaluated in this trial. Variety development is changing and wheat and barley grower organizations from across Western Canada are moving forward with farmer involvement. Funds from transitional Western Canada wheat check-offs are set to expire in 2017. Majority of the proceeds from the levies goes to Western Grains Research Foundation for varietal development and other research on behalf of producers. Agriculture and Agri-Food Canada will not be increasing its investment into variety development and the implementation of new plant breeders' rights (PBR) in 2015 has given the opportunity to collect end-point royalties (EPR). (Heppner 2016)

[1] PCDF, Roblin

There are five possible funding scenarios that the Wheat and Barley Variety Development Working Group and JRG Consulting can analyze and determine a plan for variety development after 2017. The five scenarios include: 1) current approach with more coordination and information sharing (consistent private sector funding sources could be challenging), 2) eight provincial commissions involved in variety development research programs (similar to option one with higher administration costs and duplication of resources), 3) one non-profit producer body – Wheat and Barley West (WBW) (provincial organizations form a centralized body that would enter into partnerships with public and private sectored organizations and administer the collection and re-investing of royalties and license fees), 4) Australia North: separate partnerships for pre-breeding and breeding/finishing (modeled after variety development in Australia where in Canada the producer body and AAFC would enter a partnership for all pre-breeding activities and this entity would also partner with universities and private companies) 5) producer ownership in a cereal breeding company (producers would hold ownership shares in a prairie-wide cereal breeding company with equity based on levy contributions). (Group 2015)

Objective

To evaluate different varieties of CWRS wheat for the Saskatchewan Variety Performance Group.

Procedure and Project Activities

Treatments:	21 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 12
Fertilizer applied:	All actual lbs./acre Side Band – 115 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4 Seed Placed – 15 lbs. P_2O_5
Pesticide applied:	May 15 – Roundup Weathermax® June 11- Prestige XC® and Axial BIA®
Harvest date:	September 14
Product handling:	Each individual plot was harvested with weight and moisture recorded.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC and Axial BIA to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to 50% plants headed), height (cm), maturity date (days from seeding to 50% plants mature) and lodging (1-9).

Prior to harvest the plots were sprayed with Reglone® to help with dry down and ease of harvest. All plots were harvested with a small plot combine. Each treatment was individually

bagged and weight and moisture were recorded. Two 1 kg composite samples were composed with one being sent to BioVision for analysis and one to Arborg for storage.

Table 1. 2015 SVPG Wheat Variety Trial (2) Varieties at Roblin, MB*

AAC Chiffon	AAC Ryley	GP131*
AAC Foray	AAC Tenacious	HY537*
AAC Indus	Carberry	Pasteur
AAC Innova	Elgin ND	Prosper
AAC NRG097	Enchanct	SY087
AAC Penhold	Faller	SY995
AAC Proclaim	Glenn	WFT603

* Varieties that have been supported for registration with class to be determined by the Canadian Grain Commission.

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	47 lbs/acre (low)	115
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

Table 3. 2015 SVPG Wheat Variety Trial (2) Yield (kg/ha) at Roblin, MB

Variety	Yield (kg/ha)
GP131	4982
AAC Indus	4800
AAC Innova	4654
AAC Chiffon	4651
Pasteur	4483
Faller	4216
WFT603	4134
AAC Foray	4105
Prosper	4071
Elgin ND	4050
AAC Proclaim	4047
AAC NRG097	4030
HY537	3985
SY995	3969
AAC Penhold	3948
SY087	3934
Enchant	3731
Glenn	3677
AAC Ryley	3606

AAC Tenacious	3596
Carberry	3468
Grand Mean	4102
% CV	2.8
LSD 5%	190
Significant Difference	Yes

Chart 1. 2015 SVPG Wheat Variety Trial (2) Yield (bu/acre) at Roblin, MB

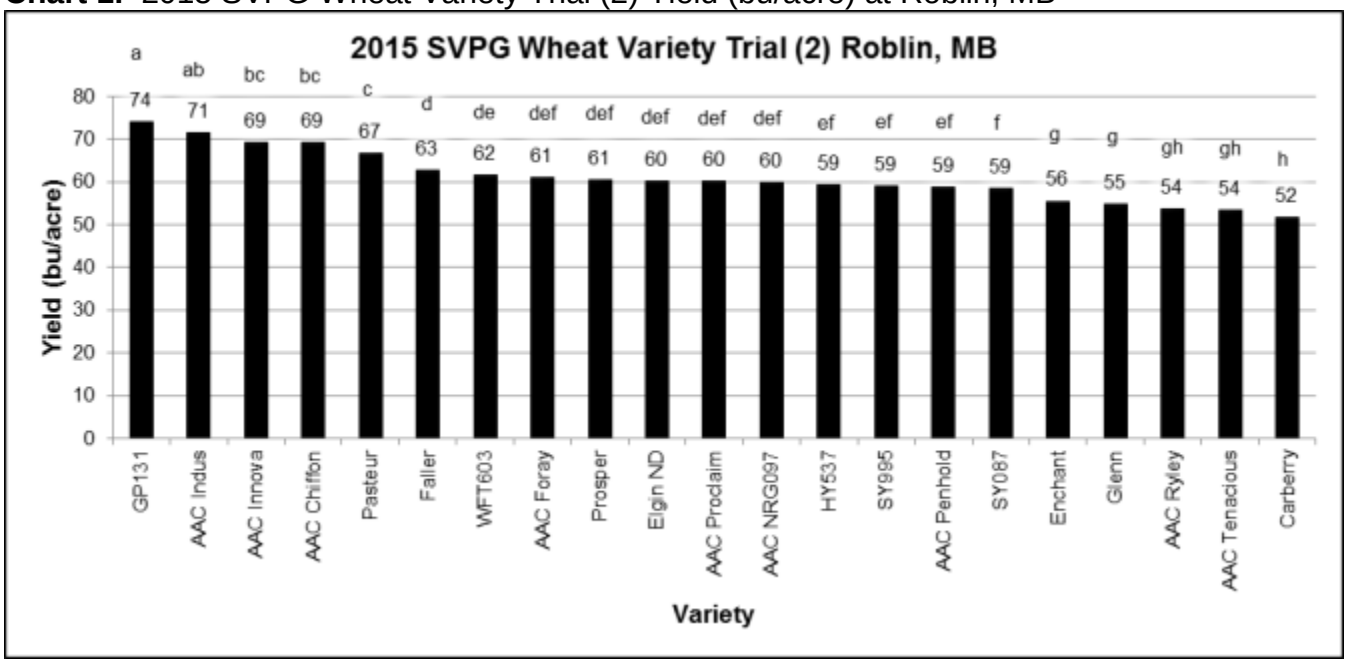

Table 3 and Chart 1 summarize the yield data for SVPG Wheat Trial (2). Yield results ranged from 52 to 74 bushel/acre and they are comparable to yield results for SVPG Wheat Trial (1). GP131 was the highest yielding variety and it was significantly higher than all the entries except for AAC Indus. Carberry was the lowest yielding variety for the trial.

GP131 is a general purpose wheat variety developed by Crop Development Centre and was supported for registration in 2015. Distribution rights and seed availability are unknown at this time. AAC Indus is a new Canadian Western Soft White Spring wheat (CWSWS) variety. CWSWS is a lower protein, soft wheat with weak dough properties. Flour milled from this wheat is suitable for producing cookies, cakes, biscuits and related products. Alone or in blends with stronger wheat, CWSWS wheat can also be used to produce crackers, flat bread, steamed bread and certain types of noodles (Canadian Grain Commission 2013). AAC Indus was developed at AAFC-Lethbridge with SeCan having distribution rights and seed availability in 2018. (Manitoba Seed Growers Association 2015)

Conclusions

This trial is the second SVPG wheat trial conducted at PCDF in 2015 and there were 21 varieties evaluated. A new general purpose variety GP131 was significantly higher yielding than all the other entries except for AAC Indus. Variety development is changing and wheat and barley grower organizations from across Western Canada are moving forward with farmer involvement. AAFC is not investing more into wheat variety development and Plant Breeders' Right changes will give the opportunity to collect end-point royalties (EPR). Wheat and Barley growers have till 2017 to develop a system that works effectively and is cost efficient for varietal development in Western Canada.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- SVPG and MCVET for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

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Schedule

PCDF will continue to support the SVPG and MCVET wheat variety trials.

Western Feed Grains Development Cooperative Variety Trial

Susan M[c]Eachern[1], Angel Melnychenko[1] and Matthew Yau[2]

Site Information

Location:	Roblin, Manitoba
Cooperators:	Dr. Matthew Yau – Plant Breeder, WFGD Co-op Western Feed Grains Development Cooperative

Background

The Western Feed Grain Development Co-op (WFGD Co-op) was established in December 2005 with the purpose of developing feed wheat varieties that are suitable for livestock feed and ethanol production in Western Canada. WFGD Co-op has recently assessed the breeding objectives of the program and has concluded that a breeding program focused on developing high yielding, fusarium head blight resistant, general purpose wheat varieties is still needed in Western Canada to compete with corn as a lower risk, lower production cost alternative for feed in the Canadian Prairies. The program's emphasis shifts from stringent disease screening to screening for yield and disease equally, meeting the requirement for registration for disease with an optimum yield on new varieties.

The WFGD Co-op is screening lines in numerous trial locations throughout the Prairies to gain agronomic data that may assist the Co-op in selecting wheat lines that are adapted to specific areas. Through such large scale testing, the Co-op has made significant gains to yield and disease resistance in the past. In 2013, the Co-op received approval for support for registration of the General Purpose Wheat variety WFT 603 from the Prairie Recommending Committee for Wheat, Rye and Triticale (PRCWRT). Certified seed of WFT 603 is available for commercial distribution in Manitoba.

Objective

To test newly developed lines of feed wheat on behalf of the WFGD Co-op.

Procedure and Project Activities

Treatments:	30 entries including different official checks (AC Andrew, 5702PR, Pasteur and Sadash) (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Lattice
Seeding date:	May 12
Fertilizer applied:	All actual lbs./acre

[1] PCDF, Roblin
[2] Ag Quest, Minto

Side Band – 115 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4
Seed Placed – 15 lbs. P_2O_5
Pesticide applied: June 11 – Prestige XC® and Axial BIA®
Harvest date: September 21
Product handling: Each individual plot was harvested, weighed and moisture recorded.

Prior to seeding the plot land was harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded plus 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC and Axial BIA to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included % plant stand, vigor (1-9), height (cm), maturity date (days from seeding to 50% of plants mature) and lodging (1-9).

Prior to harvest the plots were sprayed with Reglone® to help with dry down and ease of harvest. All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded.

Table 1. Entries of the 2015 Western Feed Grains Development Cooperative Variety Trial at Roblin, MB*

AC Andrew	WFT 1014	WFT 1103	WFT 1109	WFT 1115
Pasteur	WFT 1015	WFT 1104	WFT 1110	WFT 603
Sadash	WFT 1018	WFT 1105	WFT 1111	WFT 603RS
WFT 1001	WFT 1019	WFT 1106	WFT 1112	WFT 914
WFT 1006	WFT 1101	WFT 1107	WFT 1113	WFT 921
WFT 1012	WFT 1102	WFT 1108	WFT 1114	5702 PR

* Numbered entries are advanced lines that are under evaluation for possible registration

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24” Depth at the Roblin, MB Site **

	Estimated Available Nutrients	**Fertilizer Applied (actual lbs)**
*N	47 lbs/acre (low)	115
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

Results obtained from the trial at Roblin are presented in Table 3 and Chart 1. All entries had a good stand and vigorous growth. Diseases were moderate among the entries with few exceptions (Sadash, WFT1103 and WFT1105). As the season had received lower than average rainfall, the average maturity was 101 days after seeding. WFT1105 and 1106 were the two lines having earlier maturity while WFT603, 603RS and 1108 were late. The average plant height was 72 cm, which was on the shorter side. Most of the entries had a similar height as the checks. The tallest entry (WFT914) was an internal check for height comparisons. Lodging resistance was good to excellent, with a few exceptions (WFT1105 and 914). The

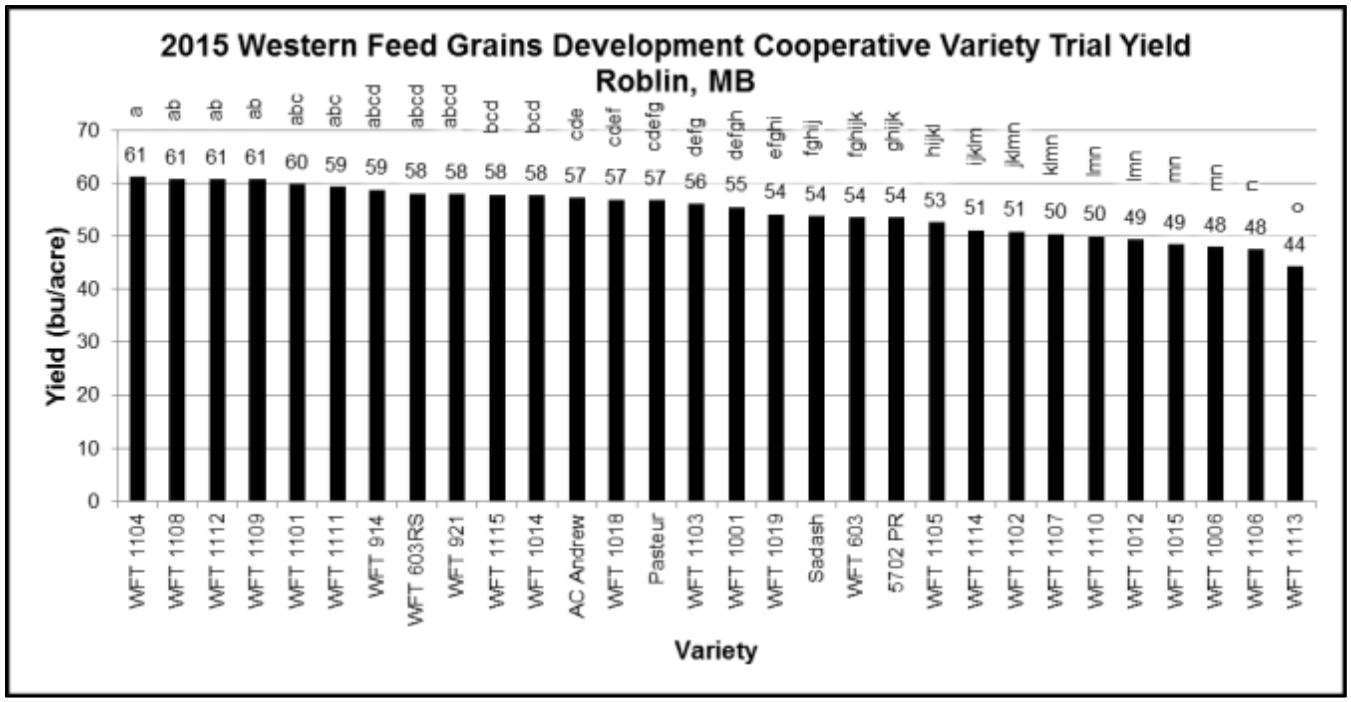
average yield was 3682 kg/ha, which was also below normal. AC Andrew was the highest yielding (3851 kg/ha) among the official checks. Among the 11 entries which gave higher yield than AC Andrew, four (WFT1104, 1108, 1112 and 1109) yielded significantly higher.

Table 3. 2015 Western Feed Grains Development Cooperative Variety Trial Results at Roblin, MB

Variety	Yield (kg/ha)	% Plant Stand	Vigour (1-9)*	Height (cm)	Disease (1-9)*	Days to Maturity*	Lodging (1-9)*
WFT 1104	4113	100	8	71	3	99	1
WFT 1108	4086	98	8	73	3	109	1
WFT 1112	4086	98	8	73	3	104	1
WFT 1109	4083	100	7	70	3	99	1
WFT 1101	4023	100	8	71	3	101	1
WFT 1111	3992	98	7	65	3	102	1
WFT 914	3950	100	8	82	4	102	3
WFT 603RS	3905	100	8	80	4	107	2
WFT 921	3893	100	8	75	4	102	2
WFT 1115	3887	100	8	72	4	102	1
WFT 1014	3882	100	8	73	4	101	1
AC Andrew	3851	98	7	69	4	102	1
WFT 1018	3823	98	7	73	3	101	1
Pasteur	3820	98	8	69	3	100	1
WFT 1103	3768	100	8	75	5	101	2
WFT 1001	3730	100	8	72	4	100	1
WFT 1019	3641	100	8	69	4	102	1
Sadash	3614	97	8	73	6	100	2
WFT 603	3604	100	8	79	4	111	2
5702 PR	3599	98	8	70	4	100	1
WFT 1105	3536	100	8	78	5	97	4
WFT 1114	3438	100	8	70	4	100	2
WFT 1102	3418	98	8	70	4	98	1
WFT 1107	3390	97	8	70	4	98	1
WFT 1110	3359	100	8	71	4	101	1
WFT 1012	3320	100	8	73	4	100	2
WFT 1015	3260	98	8	67	4	102	1
WFT 1006	3225	98	8	68	3	102	1
WFT 1106	3197	98	8	74	4	97	2
WFT 1113	2972	98	7	65	4	102	1
Grand Mean	3682	99	8	72	4	101	1
% CV	3.7	23.2	5.4	3.3	11.1	1.7	23.2
LSD 5%	221.6	2.7	0.7	3.9	0.7	2.9	0.5
Significant Difference	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Vigour (1-9)* = 1 – No Vigour, 9 – Very Vigorous
Disease (1-9)* = 1 – No Disease, 9 – Severe Disease
Days to Maturity* = Days from Seeding to Maturity
Lodging (1-9)* = 1 – Plants Fully Erect, 9 – Plants Completely Flat

Chart 1. 2015 Western Feed Grains Development Cooperative Variety Trial Yield (bu/acre) at Roblin, MB



Conclusions

The finding that 4 of the lines yielded significantly higher than the highest yielding check is encouraging. It tends to support the breeding efforts of the WFGD Co-op. A combined analysis of similar trials conducted across Western Canada has been carried out, and the most successful entries will be entered into the 2016 Special Purpose public co-op.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Dr. Matthew Yau of Ag Quest and the WFGD Co-op for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

Schedule

PCDF will not conduct this trial again in 2016 due to limited resources.

Ducks Unlimited High Yielding Winter Wheat Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, MB
Cooperator: Ken Gross – Ducks Unlimited Canada

Background

Manitoba winter wheat acreage has risen partially due to excess rainfall in some regions and large amounts of land being left unproductive over the summer growing season. Fall seeding of winter cereals gave producers an option to generate some revenue from this land base.

Incorporating winter wheat into crop rotations and options has its benefits. Workload is spread out for seeding, weed management and harvest. Risk management and land usage is optimized because if conditions are not favorable in the fall, spring planted crops can still be utilized the following spring. Winter crops also provide an excellent habitat for waterfowl because crop establishment is achieved early and nesting is left undisturbed. Target plant population for winter wheat is 300 plants/m^2.

Intense management systems are also possible for winter wheat production. Fertility management can give rise to higher yields and maintain protein levels for milling and feed. 80 to 120 pounds per acre of actual nitrogen is required to maximize yield potential for winter wheat (Manitoba Agriculture, Food and Rural Development 2015). Spring application of nitrogen generally gives the best results for yield and protein. Late fall surface applications of nitrogen have proven to be less efficient than spring application. Subsurface application of late fall N shows promise to minimize losses through run-off, volatilization and nitrification to nitrate forms.

A winter wheat intensive management trial was conducted for Ducks Unlimited at Roblin. Two seeding rates at three fertility levels were the treatments for the test. This was the first successful year in conducting this trial due to excellent winter survival at the site. The trial was conducted at all the Diversification Centres over a number of years.

Objective

To evaluate winter wheat grown under intense management conditions.

[1] PCDF, Roblin

Procedure and Project Activities

Treatments:	12 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Split-Plot
Seeding date:	September 15, 2014
Fertilizer applied:	Various
Pesticide applied:	September 16, 2014 – Roundup Weathermax® May 5, 2015 – Buctril M® June 16, 2015 - Folicur 250 EW®
Harvest date:	August 18, 2015
Product handling:	Each individual plot was harvested with weight and moisture recorded.

Prior to seeding, the plot was heavy harrowed and then sprayed with a glyphosate burn-off. The trial was direct seeded into canola stubble with various amounts of fertilizer side banded during the seeding operation. The trial was sprayed with Buctril M early in the spring to control winter annual weeds. A fungicide application of Folicur 250 EW was sprayed at early flower. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading (days from seeding to 50% of plants headed), height (cm) and maturity (days from seeding to 50% of plants mature).

All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded.

Table 1. 2015 Ducks Unlimited High Yielding Winter Wheat Trial Treatments at Roblin, MB*

Plants/m^2	Seed Treatment	Nitrogen Applied
250	Untreated	80 N
250	Raxil WW	80 N
250	Untreated	100 N
250	Raxil WW	100 N
250	Untreated	120 N
250	Raxil WW	120 N
450	Untreated	80 N
450	Raxil WW	80 N
450	Untreated	100 N
450	Raxil WW	100 N
450	Untreated	120 N
450	Raxil WW	120 N

Table 2. 2014 Fall Soil Nutrient Analysis from 0-12” Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	37 lbs/acre (low)	Various
*P	13 ppm (high)	
*K	186 ppm (high)	
*S	30 lbs/acre (low)	

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

Analysis is still being conducted on this trial from the multiple site locations and site years.

Conclusions

Winter wheat acreage has expanded with the change in weather patterns resulting in more favorable conditions for winter cereal production. Fertility and seeding rates are important best management tools to maximize yields and profits and manage costs. No data is currently available for this project. Please see the other Diversification Centre's annual reports to see data results and conclusions from past years. Check the website for updates including 2015 annual reports with the final data package for this project. (Diversification Centres 2015)

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Ken Gross of Ducks Unlimited Canada for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

References

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Schedule

PCDF is conducting a different winter wheat demonstration with Ducks Unlimited for 2016.

Manitoba Crop Variety Evaluation Team Winter Wheat Variety Trial

Susan M[c]Eachern[1] and Angel Melnychenko[1]

Site Information

Location: Roblin, Manitoba
Cooperator: Manitoba Crop Variety Evaluation Team (MCVET)

Background

Producers select winter wheat varieties based on yield potential, disease resistance, height, standability, maturity and end-use markets such as milling, ethanol and feed. Some winter wheat varieties have been reclassified in recent years and this has impacted their target end-use market and acreage.

CDC Falcon was reclassified in 2014 to Canada Western General Purpose. CDC Falcon, a popular variety due to its short straw and high yield, accounted for 67% of Manitoba's winter wheat acreage in 2013 (Dawson 2013). In 2015, CDC Falcon's acreage share had dropped to 20% (Corporation 2015).

A new emerging variety, AC™Emerson, has gained popularity and it accounted for 54% of Manitoba acreage in 2015 (Corporation 2015). AC™Emerson is rated R (resistant) for Fusarium Head Blight, similar yield to CDC Falcon, improved winter hardiness, medium maturity and Canadian Western Red Winter classification for milling (Seeds 2016). AAC Elevate (W495) was registered in 2015 and seed will be available in 2017. CDC Chase is another new variety and is considered a replacement for CDC Buteo and Radiant. AAC Gateway is a replacement for CDC Falcon and has higher protein than CDC Falcon (Cross 2015). 1303-132-2 has been supported for registration and its classification with Canadian Grain Commission is still to be determined. (Manitoba Seed Growers Association 2015)

Objective

To evaluate different varieties of winter wheat grown in the Parkland region.

Procedure and Project Activities

Treatments: 9 (Table 1)
Replication: 3
Plot size: 1.2m x 5m
Test design: Randomized Complete Block Design
Seeding date: September 15, 2014
Fertilizer applied: All actual lbs./acre

[1] PCDF, Roblin

Side Band – 120 lbs. N, 36 lbs. P_2O_5
Pesticide applied: September 16, 2014 – Roundup Weathermax®
May 5, 2015 – Buctril M®
Harvest date: August 18, 2015
Product handling: Each individual plot was harvested with weight and moisture recorded.

Prior to seeding, the plot was heavy harrowed and then sprayed with a glyphosate burn-off. The trial was direct seeded into canola stubble. The trial was sprayed with Buctril M early in the spring to control winter annual weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading (days from seeding to 50% of plants headed), height (cm) and maturity date (days from seeding to 50% of plants mature).

All plots were harvested with a small plot combine. Each treatment was individually bagged and weight and moisture were recorded.

Table 1. 2015 MCVET Winter Wheat Variety Trial Varieties at Roblin, MB*

AAC Gateway	CDC Falcon	Moats
CDC Buteo	Emerson	W495 (AAC Elevate)
CDC Chase	Flourish	1303-132-2*

* Variety supported for registration with class to be determined by Canadian Grain Commission

Table 2. 2014 Fall Soil Nutrient Analysis from 0-12" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	**Fertilizer Applied (actual lbs)**
*N	37 lbs/acre (low)	120
*P	13 ppm (high)	36
*K	186 ppm (high)	-
*S	30 lbs/acre (low)	-

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate
** Analysis by Agvise Laboratories

Results and Discussion

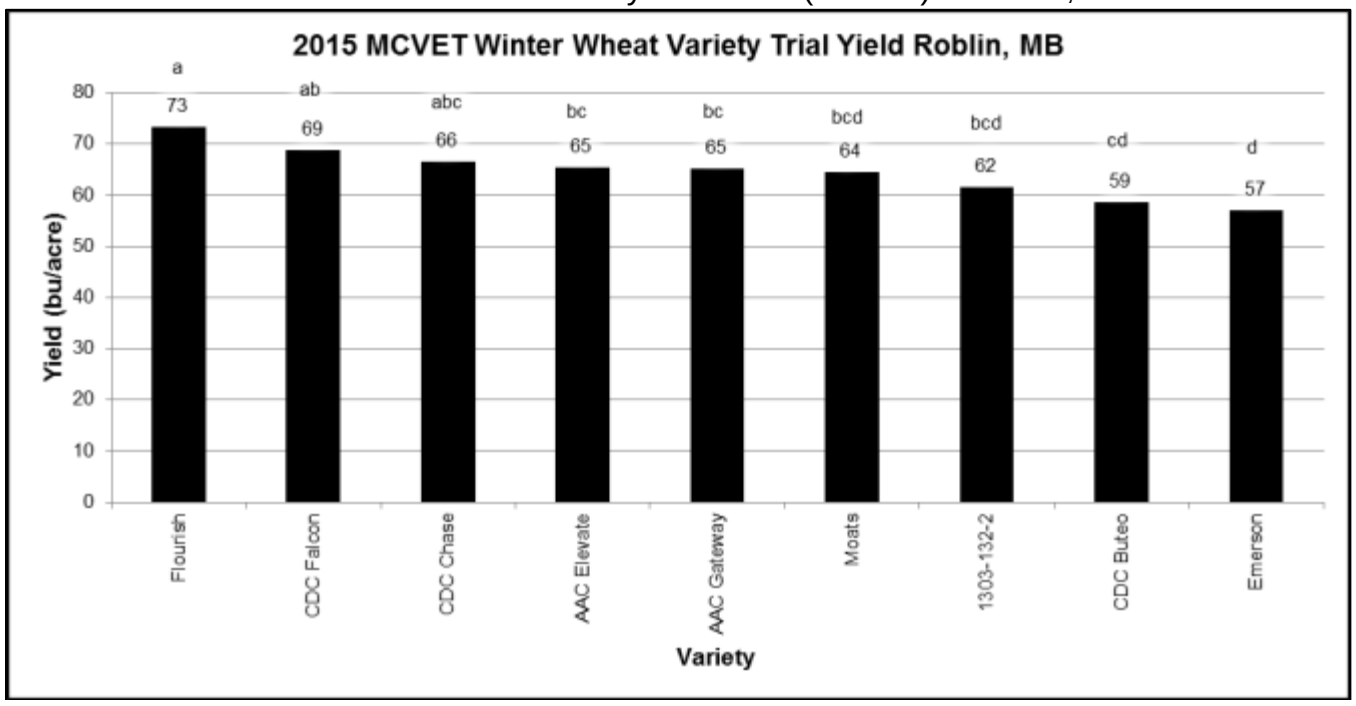
Table 3. 2015 MCVET Winter Wheat Variety Trial Yield (kg/ha) at Roblin, MB

Variety	**Yield (kg/ha)**
Flourish	4931
CDC Falcon	4625
CDC Chase	4463
AAC Elevate	4395
AAC Gateway	4379
Moats	4327
1303-132-2	4144
CDC Buteo	3937
AC™Emerson	3830
Grand Mean	4337
% CV	7.0
LSD 5%	530.9

Significant Difference	Yes

Table 3 and Chart 1 summarize yield data for the MCVET winter wheat trial at Roblin, MB. Flourish was the highest yielding variety and was significantly higher than all the other varieties except for CDC Falcon and CDC Chase. AC™Emerson was the lowest yielding variety for the trial. Bushel per acre yield ranged from 57 to 73. 2015 yields are comparable to 2012, the last time the trial survived overwintering and could be harvested.

Chart 1. 2015 MCVET Winter Wheat Variety Trial Yield (bu/acre) at Roblin, MB



Conclusions

The acreage breakdown and availability of winter wheat varieties has changed recently. CDC Falcon was reclassified to general purpose and its dominance in Manitoba has declined significantly. Fusarium Head Blight resistance has been improved with the introduction of AC™ Emerson. New varieties have been registered with improvements in yield, protein, standability and other disease resistance attributes.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- MCVET for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

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Schedule

PCDF will continue to be a site for MCVET winter wheat variety testing. The 2015/16 trial was seeded in September 2015.

Forage Crops

Advanced Forage Barley Forage Trial

Susan M[c]Eachern[1], Angel Melnychenko[1] and Ana Badea[2]

Site Information

Location:	Roblin, Manitoba
Cooperators:	Dr. Ana Badea – Barley Breeder, AAFC Brandon
	Rudy Von Hertzberg – Research Technician, AAFC Brandon

Background

Small grains such as barley, oats, triticale and wheat can be excellent forage crops in the form of pasture, hay and silage. Baron at al., 2012 reported that the use of barley forage is increasing in Western Canada, particularly for swath grazing, bale grazing and silage for back grounding and finishing beef cattle [1]. It was determined that swath grazing can reduce costs of winter feeding programs for beef cows by 40% [2]. This cost reduction is due to elimination of harvesting, hauling and feeding costs, as well as reducing manure spreading costs. In several comparative studies it was reported that barley is higher in crude protein than oat, triticale and wheat [3] and has superior forage quality [4].

Two registered cultivars, AC Ranger and Vivar, were grown at Roblin this year, as well as 14 numbered breeding lines (Table 1) for a total of 16 entries.

Objective

To test top forage barley lines from AAFC Brandon's barley breeding program for forage yield and quality characteristics.

Procedure and Project Activities

Treatments:	16 (Table 1)
Replication:	4
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 14
Fertilizer applied:	All actual lbs./acre
	Side Band – 68 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4
Pesticide applied:	June 11 – Prestige XC® and Axial BIA®
Harvest date:	July 29

[1] PCDF, Roblin
[2] AAFC, Brandon

Product handling: Total plot was weighed with subsample taken to determine dry matter.

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. The trial was sprayed with Prestige XC and Axial BIA at the 2 to 4 leaf stage to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to 50% of plants headed), height (cm) and lodging (1-9).

Each individual plot was harvested with a Mitsubishi rice harvester. Each treatment was weighed to give total plot weight and a subsample was taken, dried down and weighed to determine dry matter yield. The samples were then sent to AAFC Brandon for further quality analysis.

Table 1. 2015 Advanced Forage Barley Forage Trial Varieties at Roblin, MB*

AC Ranger	EX827-21	EX828-20	EX828-32
Vivar	EX827-28	EX828-29	EX828-37
EX826-39	EX827-30	EX828-30	EX828-46
EX827-18	EX827-32	EX828-31	EX828-49

* Numbered entries are advanced lines with potential advancement to the cooperative testing system.

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	Fertilizer Applied (actual lbs)
*N	47 lbs/acre (low)	68
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate

** Analysis by Agvise Laboratories

Results and Discussion

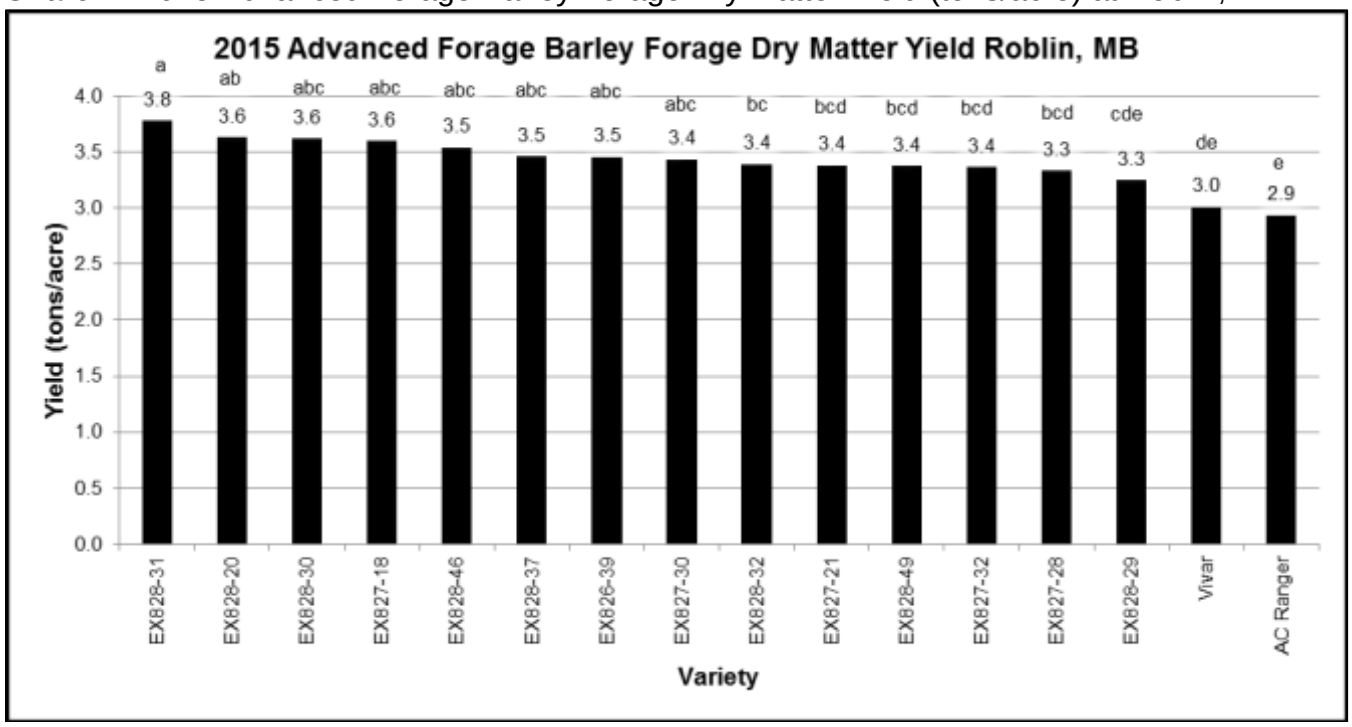
Table 3. 2015 Advanced Forage Barley Forage Trial Results at Roblin, MB

Variety	Dry Matter Yield (kg/ha)	Plant Counts (pl/m^2)	Days to Heading*	Height (cm)	Disease (1-9)*
EX828-31	8464	240	57	90	3
EX828-20	8141	235	59	86	3
EX828-30	8114	198	58	88	3
EX827-18	8058	252	54	95	3
EX828-46	7933	250	56	90	3
EX828-37	7750	225	55	94	3
EX826-39	7741	213	53	97	3
EX827-30	7690	225	54	88	3
EX828-32	7598	229	55	94	3
EX827-21	7578	217	55	95	3

EX828-49	7566	233	57	88	3
EX827-32	7540	256	55	95	3
EX827-28	7469	238	55	92	3
EX828-29	7284	231	56	83	3
Vivar	6749	210	56	72	2
AC Ranger	6583	233	55	74	2
Grand Mean	7641	230	55	89	3
% CV	7.6	11.0	1.6	4.2	13.7
LSD 5%	830.7	36.0	1.3	5.3	0.5
Significant Difference	Yes	Yes	Yes	Yes	Yes

Days to Heading* = Days from Seeding to 50% of Plants Headed
Disease (1-9)* = 1 – No Disease, 9 – Severe Disease

Chart 1. 2015 Advanced Forage Barley Forage Dry Matter Yield (tons/acre) at Roblin, MB



The trial had a good %CV (coefficient of variation) of 7.6. All the forage-feed breeding lines evaluated have shown higher dry matter yield than both checks cultivar AC Ranger and Vivar, range from 8 to 25% increase. The line EX828-31 had the highest dry matter yield of 8,464 kg/ha. (Table 3)

Conclusions

Forage barley has an excellent fit as an annual source of forage for livestock, especially in the Parkland and northern areas of Manitoba.

Acknowledgements

This research was supported in part by funding from the Western Grains Research Foundation.

For technical assistance, we gratefully thank R. Von Hertzberg and B. Graham from Brandon Research Center, MB, Canada and PCDF for continued support with growing and caring for the field trials.

References

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Schedule

PCDF will continue to cooperate with Dr. Badea to grow this trial in 2016.

Western Canada Forage Barley Coop Forage Trial

Susan M[c]Eachern[1], Angel Melnychenko[1] and Pat Juskiw[2]

Site Information

Location:	Roblin, Manitoba
Cooperators:	Dr. Patricia Juskiw – Barley Breeder, Lacombe Field Crop Development Center Susan Lajeunesse – Research Technician, Lacombe Field Crop Development Center

Background

The Western Canada Forage Barley Coop Forage Trial is run under the auspices of the Prairie Recommending Committee for Oat and Barley (PRCOB). More information on the PRCOB can be found at http://www.pgdc.ca/committees_ob.html. The purpose of the PRCOB is to generate data for oat and barley lines for the purpose of evaluation and recommendation of lines for registration by the Varieties Office of the Canadian Food Inspection Agency (CFIA).

Dr. Pat Juskiw and Susan Lajeunesse of the Field Crop Development Centre (FCDC) at Lacombe, AB act as the coordinators for the Forage Barley Coop. In that capacity, Pat and Susan coordinate the supply of seed to each of the cooperators. The 2015 test consisted of 16 entries and 4 checks. There were eight forage and seven grain sites.

Objective

To evaluate different lines of barley for forage analysis.

Procedure and Project Activities

Treatments:	20 (Table 1)
Replication:	3
Plot size:	1.2m x 5m
Test design:	Randomized Complete Block Design
Seeding date:	May 14
Fertilizer applied:	All actual lbs./acre Side Band – 68 lbs. N, 35 lbs. P_2O_5, 15 lbs. K_2O, 10 lbs. S_2O_4 Seed Placed – 15 lbs. P_2O_5
Pesticide applied:	May 15 – Roundup Weathermax® June 11 – Prestige XC® and Axial BIA®
Harvest date:	July 30
Product handling:	Total plot was weighed with subsample taken to determine dry matter.

[1] PCDF, Roblin
[2] FCDC, Lacombe

Prior to seeding the plot land was heavy harrowed. The trial was direct seeded into canola stubble and a fertilizer blend was side banded with 15 lbs. actual P_2O_5 applied with the seed. A pre-emerge application of glyphosate was applied. At the 2 to 4 leaf stage the trial was sprayed with Prestige XC and Axial BIA to control broadleaf and grassy weeds. Data was recorded throughout the growing season and included plant counts (plants/m^2), heading date (days from seeding to heading), height (cm) and lodging (1-9).

Each individual plot was harvested with a Mitsubishi rice harvester. Each treatment was weighed to give total plot weight and a subsample was taken, dried down and weighed to determine dry matter yield. The samples were then sent the Field Crop Development Center in Lacombe, Alberta for further quality analysis.

Table 1. 2015 Western Canada Forage Barley Coop Forage Trial Varieties at Roblin, MB*

AC Ranger	FB019	FB455	FB462
CDC Austenson	FB020	FB457	FB463
Gadsby	FB451	FB459	FB464
Vivar	FB453	FB460	FB465
FB018	FB454	FB461	FB466

* Numbered entries are advanced lines that are under evaluation for possible registration

Table 2. 2015 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site **

	Estimated Available Nutrients	**Fertilizer Applied (actual lbs)**
*N	47 lbs/acre (low)	68
*P	14 ppm (high)	50
*K	241 ppm (high)	15
*S	108 lbs/acre (high)	10

* N - Nitrate * P – Phosphorus (Olsen) * K - Potassium *S - Sulphate

** Analysis by Agvise Laboratories

Results and Discussion

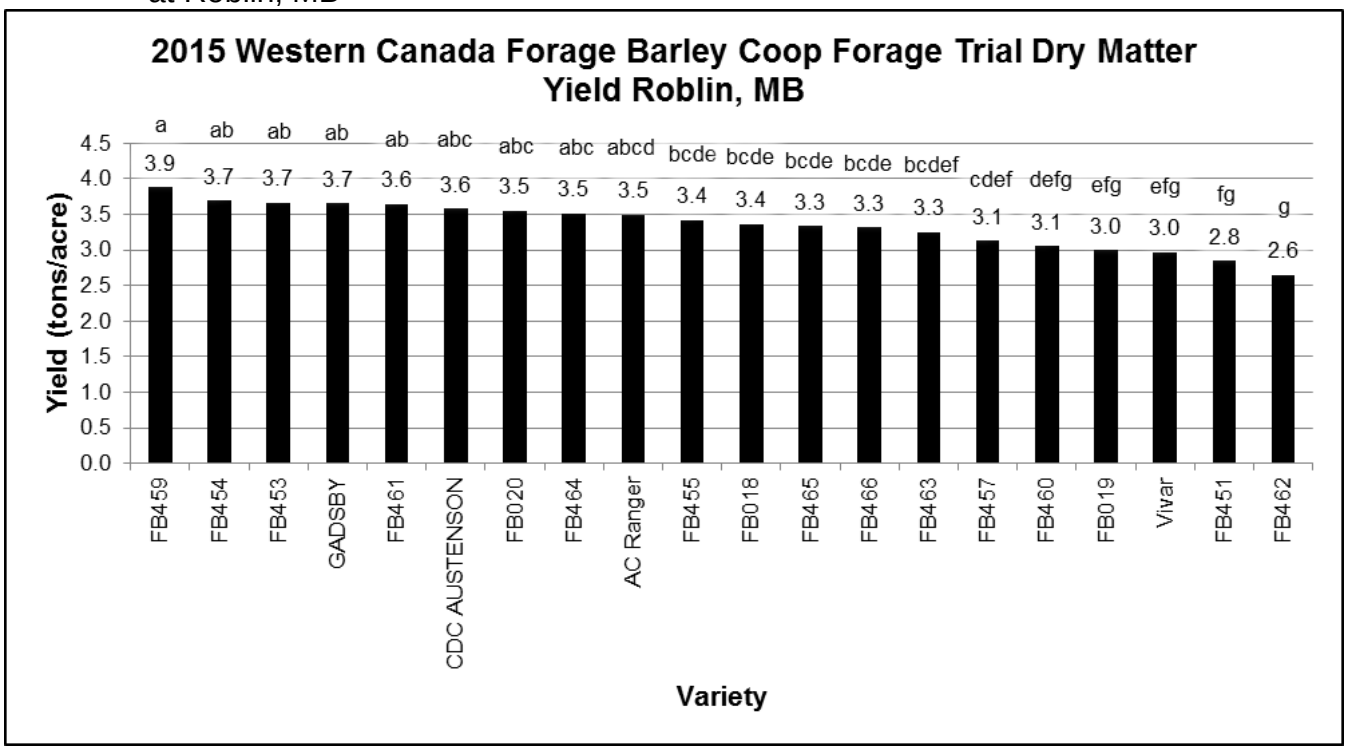
Table 3 summarizes all the data parameters and Chart 1 illustrates the yield tonnage per acre harvested from the plots. Yields ranged from 2.6 to 3.9 tons/acre and this is significantly lower than 2014, 7.4 to 8.9 tons/acre (Kostuik, McEachern and Melnychenko 2015). Check varieties in the test are Gadsby, CDC Austenson, AC Ranger and Vivar. FB459, FB454, FB453 were higher yielding than all the checks but only significantly higher than Vivar. Frost in late May coupled with significantly lower rainfall from May to mid-July would have impacted forage yields in 2015 at PCDF.

Table 3. 2015 Western Canada Forage Barley Coop Forage Trial Results at Roblin, MB

Variety	**Dry Matter Yield (kg/ha)**	**Plant Counts (plants/m^2)**	**Height (cm)**
FB459	8681	217	84
FB454	8269	256	89
FB453	8217	189	84
GADSBY	8184	178	83

FB461	8160	203	78
CDC AUSTENSON	8007	228	72
FB020	7951	206	84
FB464	7874	267	79
AC Ranger	7834	189	74
FB455	7659	233	79
FB018	7541	194	79
FB465	7461	225	80
FB466	7430	228	78
FB463	7285	194	80
FB457	7009	225	77
FB460	6848	234	70
FB019	6713	195	78
Vivar	6646	239	66
FB451	6385	234	79
FB462	5935	211	66
Grand Mean	7504	217	78
% CV	8.2	14.7	7.6
LSD 5%	1016.5	52.8	0
Significant Difference	Yes	Yes	No

Chart 1. 2015 Western Canada Forage Barley Coop Forage Trial Dry Matter Yield (tons/acre) at Roblin, MB



Conclusions

The Western Canada Forage Barley Coop Forage Trial is an important trial for evaluating barley cultivars across the Prairies and generating a data package to request support for registration. Potential barley varieties are tested for their attributes that would include forage and grain production. Forage production in 2015 was significantly lower than previous years due to uncontrollable environmental factors.

Acknowledgements

PCDF would like to acknowledge the following individuals and organizations:

- Growing Forward 2 funding contribution to make this research project possible.
- Dr. Patricia Juskiw and Susan Lajeunesse for cooperating in the trial.
- Craig Linde, MAFRD for conducting the statistical analysis.

References

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