# Contents

# Introduction

This year, Parkland Crop Diversification Foundation (PCDF) marks its twentieth year in the field. In the first annual report we described our purpose: “To evaluate, demonstrate and facilitate the use of new crops, technologies and value-adding opportunities for a sustainable agriculture.” Twenty years later, those words still ring true.

The agricultural landscape, however, has changed drastically over the past two decades—markets have shifted and new technologies have been introduced. For example, in 1996, PCDF demonstrated three herbicide tolerant canola varieties which had only been developed the year before by the University of Manitoba, reporting that “the development of herbicide tolerant canola has the significant potential to change the canola production practices in the Parkland region.” Another important demonstration at PCDF in 1996 showed the use of “the new technology of the Global Positioning System and how it can be incorporated to optimize production inputs.” Now, in 2016, herbicide tolerant canola and computer-guided precision farming are nearly ubiquitous. New changes and opportunities will continue to emerge, and PCDF remains committed to bringing those to the Parkland and Manitoba. Economic diversity, ecological resilience and vibrant rural communities remain central to our vision for agriculture.

PCDF is partnered with Manitoba Agriculture, and works closely with producers, industry and research institutions. Invaluable support has been provided by the Board of Directors and dedicated staff. PCDF specifically thanks Angel Melnychenko and Susan McEachern for their many years of service and wishes them all the best in their new endeavours. Similarly, PCDF welcomes the addition of James Frey as Diversification Specialist with Manitoba Agriculture and Jessica Frey as Research Technician for PCDF. Very little would have been possible without PCDF’s summer staff: Jordan Randell, Riley Scott, and Roblin’s own Mackenzie Kozak. Additional thanks go out to Elizabeth Nernberg of Manitoba Agriculture, Livestock Industry Branch, who provided timely help with many field activities.

Funding and financial and in-kind contributions are what make PCDF’s continued activities possible. Substantial funding is received from the Growing Forward 2 and Agriculture Sustainability Initiative programs. Additional support is received from trial cooperators, producers, and members of the local community.

PCDF looks forward to another successful twenty years, trusting that a retrospective glance will show we were on the right track, “evaluating, demonstrating and facilitating” for the future of a sustainable agriculture in Manitoba, the Prairies, and across Canada.

PCDF is always open to project ideas and learning about the production concerns of local producers, so please feel free to contact us with any project proposals.

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# PCDF Board of Directors 2016

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# Cooperators

Parkland Crop Diversification Foundation gratefully acknowledges the following organizations and their staff that have teamed with us to either conduct trials or help us with various tasks.

| | |
|---|---|
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| Jack Keown | Roblin, MB |
| Keith Watson, Parkland Industrial Hemp Growers | Dauphin, MB |
| Ken Gross, Ducks Unlimited Canada | Brandon, MB |
| Elmer Kaskiw, Ducks Unlimited Canada | Shoal Lake, MB |

| | |
|---|---|
| Mike Thiele | Shoal Lake, MB |
| Patti Rothenburger, Manitoba Crop Variety Evaluation Team | Manitoba |
| Jennifer Bell, Composites Innovation Centre | Winnipeg, MB |
| Percy Phillips, Phillex Ltd. | Portage la Prairie, MB |
| Adam Merlington, PepsiCo-Quaker Oats | Plano, TX |
| Town of Roblin | Roblin, MB |
| Saskatchewan Variety Performance Group | Saskatchewan |
| Mazergroup | Roblin, MB |

**Special thanks goes out to the following individuals and businesses:**

- Elizabeth Nernberg for her immeasurable help during seeding and harvest.
- Cynthia Nerbas for help throughout the year.
- Rachel Evans for helping to seed the FCC flax trials.
- Elmer Kaskiw for providing support and assistance.
- FP Genetics for co-sponsoring the lunch at this year's field day.
- Hemp Genetics International for co-sponsoring the lunch at this year's field day.
- Jack Keown for helping out wherever was needed.
- John Heard for providing assistance and guidance.
- Richard Dereniwski of Parkway Coop for preparing fertilizer blends.
- Rod Fisher of Fisher Seeds Ltd. for supplying buckwheat for the trials.
- WD Livestock for providing straw bales for this year's field day.
- And of course, the summer students, Jordan, Mackenzie and Riley.

# Meteorological Information for 2016

The majority of the growing season in Roblin was ideal: good moisture and unusually warm temperatures at seeding (33.1˚ C on May 5) resulted in good germination of crops. Precipitation and temperatures were higher than normal throughout most of the growing season (119% and 110%, respectively), resulting in earlier harvests for winter cereals and other spring-seeded grain crops. This allowed producers in the area to complete some of the harvest before October and the beginning of an extended period of heavy precipitation (447% normal). With above average moisture and heat units, PCDF's trials performed well, although harvest for some crops, such as soybean and fababean was delayed until early November.

**Table 1.** Manitoba Diversification Centres Rainfall Summary (mm), Apr 1 to Oct 30, 2016[1]

| | Arborg | Carberry | Melita | Roblin |
|---|---|---|---|---|
| **April** | 52 | 43 | 24 | 15 |
| **May** | 87 | 73 | 96 | 55 |
| **June** | 42 | 92 | 72 | 97 |
| **July** | 66 | 59 | 78 | 71 |
| **August** | 79 | 39 | 32 | 72 |
| **September** | 20 | 43 | 79 | 59 |
| **October** | 48 | 90 | 84 | 117 |
| **Total** | **399** | **443** | **467** | **489** |
| **% Normal[2]** | **106** | **122** | **117** | **140** |

**Table 2.** Daily Weather Summary for Dauphin, May 1 to Sept 30, 2016[1]

| | Actual | Normal[2] | Normal % |
|---|---|---|---|
| **Number of Days** | 153 | -- | -- |
| **Growing Degree Days** | 1658 | 1494 | 111 |
| **Crop Heat Units** | 2743 | 2523 | 109 |
| **Total Precipitation** | 316 | 324 | 97 |

**Table 3.** Daily Weather Summary for Grandview, May 1 to Sept 30, 2016[1]

| | Actual | Normal[2] | Normal % |
|---|---|---|---|
| **Number of Days** | 153 | -- | -- |
| **Growing Degree Days** | 1616 | 1494 | 108 |
| **Crop Heat Units** | 2685 | 2523 | 106 |
| **Total Precipitation** | 432 | 324 | 133 |

**Table 4.** Daily Weather Summary for Roblin AUT, May 1 to Sept 30, 2016[1]

| | Actual | Normal[2] | Normal % |
|---|---|---|---|
| **Number of Days** | 153 | -- | -- |
| **Growing Degree Days** | 1541 | 1396 | 110 |
| **Crop Heat Units** | 2588 | 2376 | 109 |
| **Total Precipitation** | 355 | 300 | 119 |

[1] Reproduced from MB Agriculture Past Daily Reports http://tgs.gov.mb.ca/climate/SeasonalReport.aspx.
[2] Normals are based on a 30-year average

# Extension Activities

### 2016 Tours at PCDF

| | | |
|---|---|---|
| PCDF Field Day | July 27, 2016 | 100 attendees |
| Self-Guided Tour | All Season | 40-50 attendees |

### Annual Field Day

The PCDF Annual Field Day was held on July 27. The event began with a complimentary meal, sponsored by FP Genetics and Hemp Genetics International. Ice cream was served with sauce prepared by the summer students using haskaps picked from PCDF's bushes. The speakers and topics covered were as follows:

| Speaker | Topic |
|---|---|
| James Frey | Fababean agronomy |
| Rachel Evans | Flax demonstrations |
| Rod Fisher | Buckwheat agronomy |
| Justice Zhanda | Corn phenology |
| Aaron Glenn | Soybean seeding date, temperature and effect of crop stubble |
| Mitchell Timmerman | Simulated effect of rainfall on crops |
| John Heard | Nitrogen management in wheat |
| Jeff Kostuik | Hemp agronomy and marketing |
| Percy Phillips | Quinoa agronomy |
| Laryssa Grenkow | Soybean agronomy |
| Denise Schmidt | Fall rye and hybrid fall rye |
| Elmer Kaskiw, Mike Thiele | Winter wheat and plant growth regulators |

### Brandon Ag Days

PCDF took part as an exhibitor with the other Manitoba Diversification Centres at Ag Days from January 17-19, 2016. Common topics of conversation included variety performance of various crop types, agronomy and intercropping systems.

### Amazing Agriculture Adventure

The Amazing Agriculture Adventure provides hands-on and interactive information about agriculture primarily to children in grades four to six. PCDF participated in the event in April at Russell and September at Kelburn Farm, near Winnipeg, speaking about hemp and the many products that can be made from the grain and fibre.

### Goose Lake High School, Roblin

In May, PCDF shared information about its research activities at the local high school's agriculture class.

# 2016 Exclusive Trials at PCDF

PCDF is equipped to implement trials for clients under contract, enabling the evaluation of new methods, varieties, or products. The results of these trials are not disclosed by PCDF, and remain the property of the client. Some trials occur over a period of more than one growing season, and the results remain unpublished by the client until the conclusion of the agreement.

One exclusive trial was implemented at PDCF's field site in 2016.

**Pepsi-Co/Quaker Trial**

This was the fifth year an oat variety trial was implemented in cooperation with Pepsi-Co/Quaker at Roblin. The objective of the trial is to evaluate quality and yield parameters of various oat cultivars for human consumption. Seasonal and harvest data, as well as subsamples of harvest material, were provided to Quaker Oats for analysis. PCDF will conduct this trial again in 2017.

# CEREALS

## Ducks Unlimited Winter Wheat Plant Growth Regulator Demonstration

James Frey[1], Jessica Frey[2]

## Site Information

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

## Background

Winter wheat can provide growers, the public, and the environment in general with numerous benefits. In the Prairie Provinces, yields for winter wheat over the last four years have exceeded those for Canada Western Red Spring wheat by 19.9% on average [1]. Return on investment can be more than two times higher than for spring wheat. In addition to providing an effective tool to manage pests, nutrients and moisture, winter wheat can improve crop rotations and distribute cropping activities, enhancing timeliness of operations. By minimizing spring field activities and providing early vegetation, winter wheat also reduces disturbance to wildlife, such as waterfowl and upland game birds [2].

Management-intensive systems have the potential to greatly enhance winter wheat production. Fertility management can increase yields and maintain protein levels for milling and feed. Timing is important: in Manitoba, spring application of N has resulted in good yields and protein content, with minimal losses of nitrogen (N). However, split applications in fall and spring may provide even better results, especially if more stable forms of N or urease inhibitors are used for fall applications. N at 80 to 120 pounds per acre, with proper management, can increase yield potential [3].

However, higher yields can cause winter wheat to lodge. Currently, short-straw varieties are not available, and breeding programs are working with longer-straw varieties [4]. A plant growth regulator (PGR) can be used to achieve a shorter straw length, and may minimize lodging. Different varieties of winter wheat appear to respond differently to PGR, possibly due to differences in growth rates.

This winter wheat intensive management trial was conducted for Ducks Unlimited Canada at all four Diversification Centres. It is the first year of the trial to include PGRs.

## Objective

To evaluate plant growth regulator applications on different varieties of winter wheat.

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

## Procedure and Project Activities

| | |
|---|---|
| Treatments: | 7 (Table 1) |
| Replication: | 1 |
| Plot size: | 1.2m x 19m |
| Test design: | Demonstration/Split Plot Design |
| Seeding date: | September 11, 2015 |
| Fertilizer applied: | 46-0-0, 11-52-00 |
| Pesticide applied: | June 6 – Manipulator (PGR)<br>August 5 – Roundup WeatherMax |
| Harvest date: | August 18, 2016 |
| Product handling: | Each individual plot was harvested with weight and moisture recorded. |

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. A pre-emergence application of Express SG at 6g/acre and Roundup at 0.5 L/acre was applied, as well as in-crop applications of Manipulator at 0.70 L/ac. Fall and spring plant counts (plants/$m^2$) were conducted at appropriate times.

Prior to harvest, the plots were sprayed with a pre-harvest application of Roundup WeatherMax (all others) to enhance dry-down of the crop and to increase ease of the harvest. The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2015 soil nutrient analysis at the field site.

**Table 1**. 2016 Ducks Unlimited High Yielding Winter Wheat Treatment, Roblin, Manitoba

| | | |
|---|---|---|
| 1 Time Emerson | Split App Moats | Untreated Moats |
| 1 Time Moats | Untreated Emerson | |
| Split App Emerson | Untreated Gateway | |

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 48 lbs/acre (low) | 156 |
| P | 5 ppm (low) | 58 |
| K | 151 ppm (high) | 0 |
| S | 134 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Yield was the primary data parameter collected for this trial. The yield results are shown in Table 3. The mean yield was 6147 kg/ha, or 91 bu/ac.

**Table 3.** 2016 Ducks Unlimited Winter Wheat Trial Results, Roblin, Manitoba*

| Treatment | Plants/$m^2$ | Yield (kg/ha) |
|---|---|---|
| 1 Time Emerson | 367 | 5753 |
| 1 Time Moats | 467 | 5353 |
| Split App Emerson | 400 | 6229 |
| Split App Moats | 467 | 6271 |
| Untreated Emerson | 275 | 6457 |
| Untreated Gateway | 392 | 6604 |
| Untreated Moats | 367 | 6364 |
| **Mean** | **391** | **6147** |

*The demonstration included only one replication.

## Conclusions

Winter wheat holds in important place in crop rotations on the Canadian prairie. More work is needed to identify best management practices that can maximize yield and increase profitability for producers. For a comprehensive outline of management practices, as well as other general information, see the Western Winter Wheat Initiative's online publication, *Grow Winter Wheat*, found here: http://www.growwinterwheat.ca/wp-content/uploads/2016/12/WWWI-Grower-Guide-20161013JF_Approved-Web-Ready.pdf

## Acknowledgements

PCDF thanks Ken Gross, Elmer Kaskiw and Mike Thiele for their assistance in conducting the trial and during the 2016 Field Day.

## Schedule

A trial with Ducks Unlimited will be conducted at PCDF in 2016-2017. However, the design of the trial will differ from the one conducted in 2015-2016.

## References

[1] Statistics Canada, CANSIM, Table 001-0017. http://www5.statcan.gc.ca/cansim/a47
[2] Western Winter Wheat Initiative. Grow winter wheat. http://www.growwinterwheat.ca/wp-content/uploads/2016/12/WWWI-Grower-Guide-20161013JF_Approved-Web-Ready.pdf
[3] Manitoba Agriculture. Winter wheat production and management. https://www.gov.mb.ca/agriculture/crops/production/winter-wheat.html
[4] Elmer Kaskiw, Ducks Unlimited Canada. Personal communication. December 16, 2016.

# FP Genetics Fall Rye Fertility and Seed Rate Trial

James Frey[1] and Jessica Frey[2]

## Site Information

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

## Background

Although fall rye may be seen by some producers as a second choice to other cereal crops, recent varietal improvements, especially in hybrid rye, have made the crop an agronomic and economic contender. It is a resilient crop with relatively low nutrient and moisture requirements, and the potential for high yields. As a winter cereal, it can increase the resiliency of crop rotations by disrupting pest cycles, utilizing late and early season moisture, and distributing labour across non-peak periods. The crop is also recognized for its excellent weed suppressing characteristics [1].

Hybrid rye provides additional benefits: a shorter stem length results in better lodging resistance and allows producers to apply higher rates of nitrogen, increasing yields. Further, whereas producers do not typically see economic benefits to spraying fungicide on open-pollinated varieties of rye, genetic uniformity in hybrid plants results in more even maturity, allowing fungicide to be applied with tangible economic benefits [2].

Seeding rates for hybrid rye can also be lower than for open pollinated varieties, resulting in more tillering. This feature provides greater stand resilience to severe weather and lodging. Importantly, it also reduces the cost to producers of purchasing hybrid seed. Current hybrids have been shown to outyield open-pollinated varieties by up to 25% [2]. More research is necessary to determine optimal seeding and fertility rates for hybrid fall rye.

## Objective

To evaluate different seeding and fertility rates for hybrid fall rye production.

## Procedure and Project Activities

Treatments: 12 (Table 1)
Replication: 3
Plot size: 1.2m x 5m
Test design: Split-Plot Design
Seeding date: September 24, 2015
Fertilizer applied: Various

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation – Roblin, Manitoba

Pesticide applied: August 5 – Roundup WeatherMax
Harvest date: August 18
Product handling: Each individual plot was harvested. Weight and moisture from each plot was recorded during the harvest operation

Prior to seeding, the plot was sprayed with glyphosate. The trial was direct seeded into barley silage stubble. An application of Roundup was applied prior to harvesting with a small plot combine. All plots were harvested with a small plot combine. Table 1 shows the treatments for the trial and Table 2 shows the 2015 spring soil nutrient analysis and fertilizer applied.

**Table 2.** 2016 FP Genetics Fall Rye Fertility and Seed Rate Trial Treatments, Roblin, MB

| **Variety** | Bono | | | | | | Brasetto | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Seeding Rate (pl/m$^2$)** | 188 | | | 250 | | | 188 | | | 250 | | |
| **Nitrogen Rate (lb/ac)** | 80 | 100 | 120 | 80 | 100 | 120 | 80 | 100 | 120 | 80 | 100 | 120 |

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| **Nutrient[2]** | **Estimated Available Nutrients** | **Fertilizer Applied (actual lbs)** |
|---|---|---|
| N | 47 lbs/acre (low) | various |
| P | 14 ppm (high) | 35 |
| K | 241 ppm (high) | 0 |
| S | 108 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

The 2016 growing season provided ideal conditions for fall rye, with an average yield for all plots at 9254 kg/ha, or 147.2 bu/ac. Table 3 summarizes the results of the trial for yield, plants per m$^2$, and height. The data presented here is for one site year, and should be examined with additional site years (2015, 2017) for trends before conclusions can be made. Yield in bu/ac for the trial is shown in Figure 1.

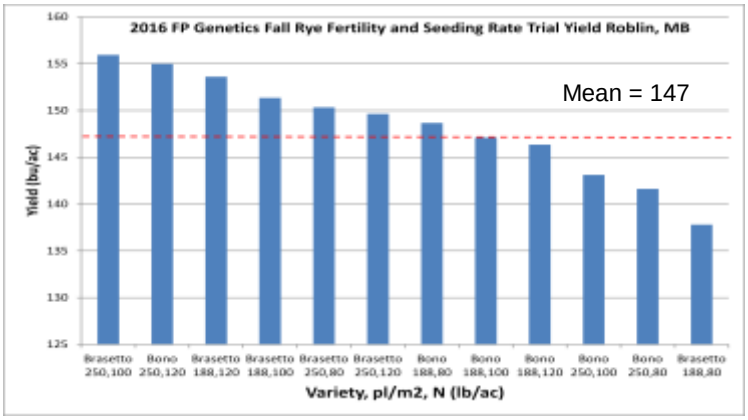



**Figure 1.** 2016 FP Genetics Fall Rye Fertility and Seeding Rate Trial Yield (bu/ac), Roblin, Manitoba

**Table 3.** 2016 FP Genetics Fall Rye Fertility and Seed Rate Trial Results, Roblin, MB

| Treatment | | | Yield (kg/ha) | pl/m$^2$ | Height (cm) |
|---|---|---|---|---|---|
| Variety | pl/m$^2$ | N (lb/ac) | | | |
| Bono | 188 | 80 | 9347 | 194 | 89 |
| | | 100 | 9249 | 189 | 93 |
| | | 120 | 9202 | 236 | 99 |
| | 250 | 80 | 8905 | 261 | 96 |
| | | 100 | 8999 | 258 | 97 |
| | | 120 | 9745 | 236 | 97 |
| Brasetto | 188 | 80 | 8664 | 181 | 99 |
| | | 100 | 9516 | 247 | 93 |
| | | 120 | 9658 | 181 | 97 |
| | 250 | 80 | 9452 | 258 | 95 |
| | | 100 | 9804 | 197 | 96 |
| | | 120 | 9409 | 247 | 94 |
| **Grand Mean** | | | 9254 | 224 | 96 |
| **% CV** | | | 8.35 | 19.47 | 7.75 |
| **LSD 5%** | | | 533.94 | 5.15 | 30.13 |
| **Significant** | | | No | Yes | No |

## Conclusions

Proper management is required to take advantage of the improved yield potential, resistance to lodging and milling characteristics of fall rye. Appropriate plant populations and fertility are important. However, further testing is required to determine optimum levels.

## Acknowledgements

PCDF thanks Denise Schmidt for cooperating with this trial and for assisting at the PCDF Field Day. Special thanks go out to Jeff Kostuik, Susan McEachern and Angel Melnychenko for establishing the trial in September 2015.

## Schedule

A third year of the FP Genetics fall rye trial will be conducted at the PCDF site in 2017. The material was seeded in September 2016.

[1] Manitoba Agriculture. Fall rye production and management. http://www.gov.mb.ca/agriculture/crops/production/rye.html#variety (accessed December 16, 2016).
[2] Chas Lambert, FP Genetics. Personal communication. December 16, 2016.

# Manitoba Crop Variety Evaluation Team Fall Rye Variety Trial

James Frey[1], Jessica Frey[2]

## Site Information

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

## Background

For a description of fall rye and hybrid characteristics, see *FP Genetics Fall Rye Fertility and Seed Rate Trial, Background*, p.11.

The MCVET fall rye trial evaluated three open-pollinated varieties (Danko, Hazlet and Prima) and three hybrid varieties (Bono, Brasetto and Guttino).

## Objective

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

## Procedure and Project Activities

| | |
|---|---|
| Treatments: | 6 (Table 1) |
| Replication: | 3 |
| Plot size: | 1.2m x 5m |
| Test design: | Randomized Complete Block Design |
| Seeding date: | September 11, 2015 |
| Fertilizer applied: | All actual lbs./acre<br>Side Band – 120 lbs. N, 36 lbs. $P_2O_5$ |
| Pesticide applied: | August 5 – Roundup WeatherMax |
| Harvest date: | August 19 |
| Product handling: | Material from all plots was measured for weight and moisture content. |

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. A pre-emergence application of Express SG at 6g/acre Roundup at 0.5 L/acre was applied. No in-crop pesticides were applied. Agronomic data, including plant counts (plants/$m^2$), maturity date (days from seeding to maturity, and lodging (1-9) were recorded throughout the growing season.

Prior to harvest, the plots were sprayed with a pre-harvest application of Roundup WeatherMax at 0.67L/ac to enhance dry-down of the crop and to increase ease of the harvest.

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Composite samples were sent for analysis to BioVision Seed Labs in Winnipeg, and for storage to PESAI in Arborg, MB.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2015 soil nutrient analysis at the field site.

**Table 3.** 2016 MCVET Fall Rye Variety Trial Treatments, Roblin, MB

| | | |
|---|---|---|
| Bono | Danko | Hazlet |
| Brasetto | Guttino | Prima |

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 48 lbs/acre (low) | 156 |
| P | 5 ppm (low) | 58 |
| K | 151 ppm (high) | 0 |
| S | 134 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Yield was the primary data parameter collected for this trial. The yield results are shown in Table 3. Yield in bu/ac for the trial is shown in Figure 1.

**Table 3.** 2016 MCVET Fall Rye Variety Trial Yield Results, Roblin, MB

| Treatment | Yield (kg/ha) |
|---|---|
| Bono | 9203 |
| Brasetto | 9718 |
| Danko | 8022 |
| Guttino | 9034 |
| Hazlet | 7619 |
| Prima[1] | - |
| **Grand Mean** | 8719 |
| **% CV** | 13.0 |
| **LSD 5%** | 2134 |
| **Significant Difference** | Yes |

[1] Prima was not included in statistical analysis.

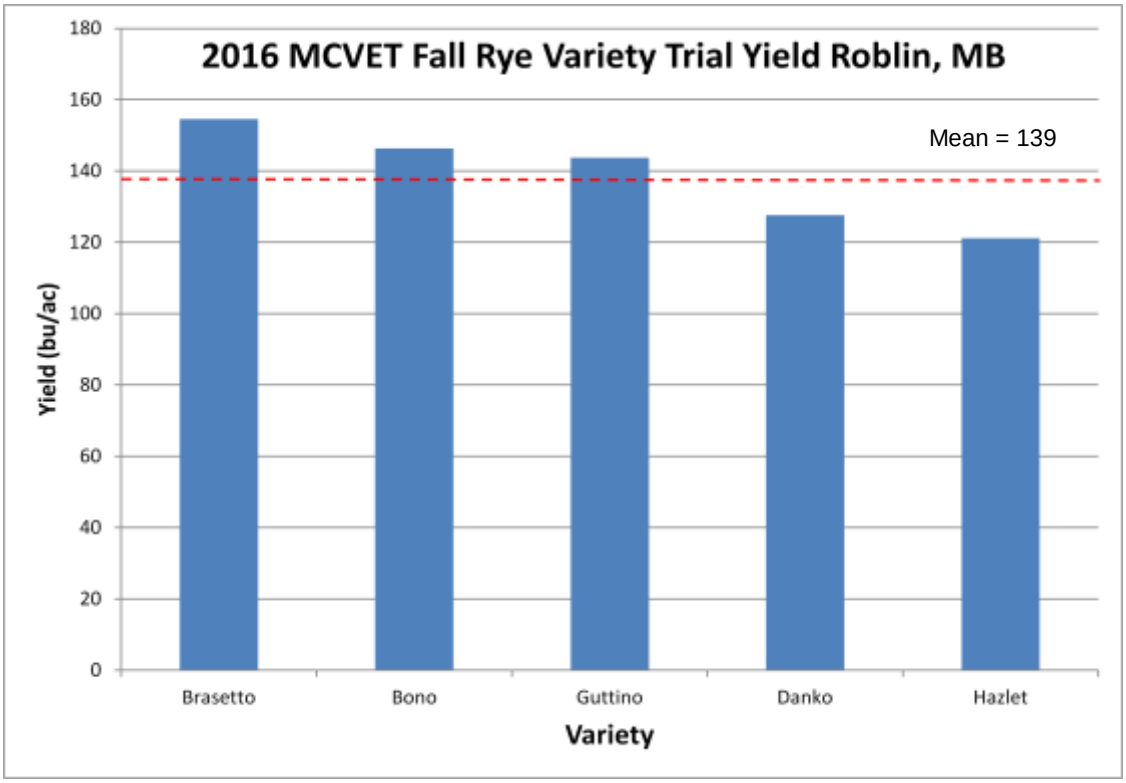



**Figure 1.** 2016 MCVET Fall Rye Variety Trial Yield (bu/ac), Roblin, Manitoba

## Conclusions

This trial was conducted for the Manitoba Crop Variety Evaluation Team. For a more comprehensive evaluation of the trial across multiple site years, see the 2017 SEED Manitoba guide for Roblin.

## Acknowledgements

PCDF thanks Patti Rothenburger and Craig Linde for their work in coordinating MCVET trials. Special thanks go out to Jeff Kostuik, Susan McEachern and Angel Melnychenko for establishing the trial in September 2015.

## Schedule

This trial will be conducted at PCDF in 2017. The material was seeded in September 2016.

# Manitoba Crop Variety Evaluation Team Winter Wheat Trial

James Frey[1], Jessica Frey[2]

## Site Information

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

## Background

Winter wheat varieties differ in agronomic terms, such as yield potential, days to maturity, disease resistance, and height, as well as their suitability for specific markets.

AAC Elevate and AAC Gateway demonstrate high yields, good winter survivability, good end-use quality, good straw strength, good protein and resistance to disease [1,2]. AAC Elevate has shorter straw than AAC Gateway. CDC Chase has high yield potential and excellent disease and pest resistance ratings [3]. CDC Falcon, with excellent yield potential and straw that is 17 cm shorter than CDC Chase [4], was reclassified in 2014 to Canadian Western General Purpose [5]. Emerson showed good yields in disease-prone environments, and has good winter survivability, acceptable end-use quality, good straw strength, good protein and resistance to disease [6]. 1303-132-2 and 2AFC-019C are under consideration for registration.

For additional information on the agronomic, economic and environmental benefits of growing winter wheat, see the *Ducks Unlimited High Yielding Winter Wheat Trial*, p. 8.

## Objective

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

## Procedure and Project Activities

Treatments: 7 (Table 1)
Replication: 3
Plot size: 1.2m x 5m
Test design: Randomized Complete Block Design
Seeding date: September 11, 2015
Fertilizer applied: At seeding
Pesticide applied: At seeding and pre-harvest
Harvest date: August 19
Product handling: Material from all plots was measured for weight and moisture content.

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. A pre-emergence application of Express SG at 6g/acre and Roundup at 0.5 L/acre was applied. Agronomic data, including emergence dates, plant counts (plants/$m^2$), heading and lodging (1-9) were recorded throughout the growing season.

Prior to harvest, the plots were sprayed with an application of Roundup to increase the ease of combining. The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried, cleaned, and measured for weight and moisture. Composite samples were sent for analysis to BioVision Seed Labs in Winnipeg and to PESAI in Arborg for storage.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2015 soil nutrient analysis at the field site.

**Table 4.** 2016 MCVET Winter Wheat Variety Trial Treatments, Roblin, Manitoba[1]

| | | |
|---|---|---|
| AAC Elevate | CDC Falcon | 2AFC-019C |
| AAC Gateway | Emerson | |
| CDC Chase | 1303-132-2 | |

[1] 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[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 48 lbs/acre (low) | 156 |
| P | 5 ppm (low) | 58 |
| K | 151 ppm (high) | 0 |
| S | 134 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results

**Table 3.** 2016 MCVET Fababean Tannin Variety Trial Results, Roblin, Manitoba

| Treatment | Yield (kg/ha) |
|---|---|
| CDC Falcon | 4075 |
| Emerson | 5993 |
| AAC Gateway | 5664 |
| AAC Elevate | 3932 |
| CDC Chase | 5902 |
| 2AFC-019C | 6654 |
| 1303-132-2 | 7040 |
| **Grand Mean** | 5608 |
| **% CV** | 6.5 |
| **LSD 5%** | 644 |
| **Significant** | Yes |

Yield was the primary data parameter collected for this trial. The yield results are shown in Table 3. Yield in bu/ac for the trial is shown in Figure 1.

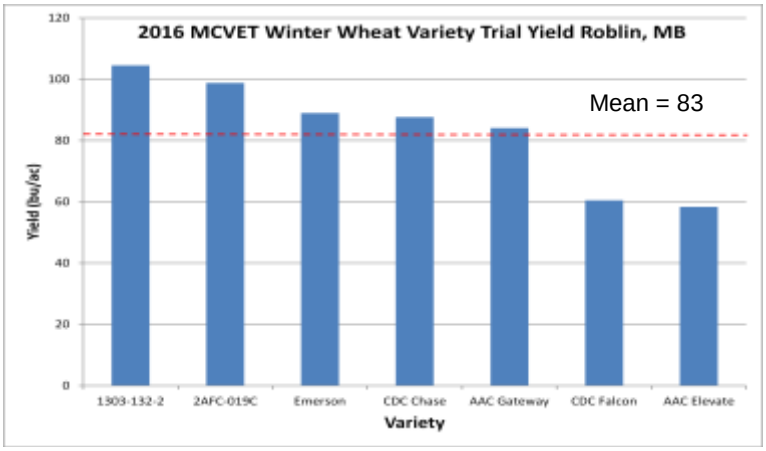



**Figure 1.** 2016 MCVET Winter Wheat Variety Trial Yield (bu/ac), Roblin, Manitoba

## Conclusions

This trial was conducted for the Manitoba Crop Variety Evaluation Team. For a more comprehensive evaluation of the trial across multiple site years, see the 2017 SEED Manitoba guide for Roblin.

## Acknowledgements

PCDF thanks Patti Rothenburger and Craig Linde for their work in coordinating MCVET trials. Special thanks go out to Jeff Kostuik, Susan McEachern and Angel Melnychenko for establishing the trial in September 2015.

## Schedule

This trial will be conducted at PCDF in 2017. The material was seeded in September 2016.

## References

[1] Graf, R. J., Beres, B. L., Randhawa, H. S., Gaudet, D. A., Laroche, A. and Eudes, F. (2015). AAC Elevate hard red winter wheat. Can. J. Plant Sci. 95: 1021–1027.
[2] Graf, R. J., Beres, B. L., Randhawa, H. S., Gaudet, D. A., Badea, A., Laroche, A., Eudes, F. and Pandeya, R. S. (2013). AAC Gateway hard red winter wheat. Can. J. Plant Sci. 93: 541-548.
[3] Fowler, D. B. (2014). CDC Chase hard red winter wheat. Can. J. Plant Sci. 94: 183186.
[4] Fowler D. B. (1999). CDC Falcon winter wheat. Can. J. Plant Sci. 79: 599–601.
[5] The Western Producer. New varieties aim to push CDC Falcon from its perch. http://www.manitobacooperator.ca/2013/03/28/new-varieties-aim-to-push-cdc-falcon-from-its-perch/ (accessed December 20, 2016).
[6] Graf, R. J., Beres, B. L., Laroche, A., Gaudet, D. A., Eudes, F., Pandeya, R. S., Badea, A. and Randhawa, H. S. (2013). Emerson hard red winter wheat. Can. J. Plant Sci. 93: 741748.

# Organic Oats Variety Trial

James Frey[1], Jessica Frey[2]

## Site Information

Location: Roblin, Manitoba
Cooperator: Jennifer Mitchell-Fetch, Agriculture and Agri-Food Canada (AAFC)

## Background

Organic farming systems are designed to enhance the quality of agro-ecosystems, recycle resources and rely on renewable inputs. Organic production systems for crops and livestock have been codified, and methods for pest and fertility management are restricted [1]. Common forms of fertility management include the application of animal and plant manures, as well as a number of commercially available inputs [2]. Strong consumer demand for organic products is reflected in higher prices, relative to conventionally managed products [3].

Research suggests that selection of cereal crops specific to organic agriculture should be conducted on organically managed land [4,5]. Conventional management systems may mask or confound certain plant characteristics, resulting in selection of sub-optimal cultivars for organic production systems. Organic management conditions were for used for the trial at PCDF, although the site was not certified organic.

## Objective

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

## Procedure and Project Activities

| | |
|---|---|
| Treatments: | 25 |
| Replication: | 3 |
| Plot size: | 1.2m x 5m |
| Test design: | Randomized Complete Block Design |
| Seeding date: | May 25 |
| Fertilizer applied: | None |
| Pesticide applied: | None |
| Harvest date: | September 30 |
| Product handling: | Material from all plots was measured for weight and moisture content. |

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble. No fertilizers or pesticides were applied. Agronomic data were recorded throughout the growing season.

The organic oats were harvested without application of pre-harvest desiccants. The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Samples were sent for evaluation to the University of Manitoba.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2016 soil nutrient analysis at the field site.

**Table 5.** 2016 Organic Oats Variety Trial Treatments, Roblin, Manitoba[1]

| | | | | |
|---|---|---|---|---|
| AAC Oravena | 09P02-OA015 | 09P10-OA091 | 11P07A-207 | 11P18A-141 |
| AC Morgan | 09P02-OA036 | 11P02A-142 | 11P09A-257 | 11P19A-143 |
| CDC Dancer | 09P02-OA060 | 11P03A-085 | 11P09A-260 | 11P21A-258 |
| Leggett | 09P10-OA002 | 11P06A-204 | 11P12A-121 | 11P21A-280 |
| 08P14A-OA23 | 09P10-OA034 | 11P06A-243 | 11P14A-136 | 11P22A-177 |

[1] Numbered entries are advanced lines that are under evaluation for possible registration

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 0 |
| P | 15 ppm (high) | 0 |
| K | 224 ppm (high) | 0 |
| S | 144 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Warm weather and timely moisture provided optimal growing conditions for oats. The average yield for the trial was 6335 kg/ha, or 166 bu/ac. Because this project is conducted on an annual basis across multiple sites, it is not possible to provide conclusions. Detailed results for this trial by variety are not included in this report. For specific information about the overall project, contact Dr. Jennifer Mitchell Fetch, Research Scientist with Agriculture and Agri-Food Canada, Brandon Research & Development Centre.

## Acknowledgements

PCDF thanks Jennifer Mitchell Fetch for her assistance with the project.

## Schedule

The trial will occur at PCDF in 2017.

## References

[1] Government of Canada, Canadian General Standards Board (2011). Organic production systems general principles and management standards. http://www.tpsgc-pwgsc.gc.ca/ongc-cgsb/programme-program/normes-standards/internet/bio-org/documents/032-0310-2008-eng.pdf (accessed December 21, 2016).
[2] University of Manitoba, Natural Systems Agriculture. Organic crop production. http://umanitoba.ca/outreach/naturalagriculture/organic.html (accessed December 21, 2016).
[3] Organic Alberta. Organic grain prices 2016. http://organicalberta.org/resources-for-producers/pricing (accessed December 21, 2016).
[4] Reid, T., Yang, R.-C., Salmon, D. and Spaner, D. (2009). Should spring wheat breeding for organically managed systems be conducted on organically managed land? *Euphytica* 169:239-252.
[5] Dalhousie University, Organic Agriculture Centre of Canada. The crafting of organic oats. https://www.dal.ca/faculty/agriculture/oacc/en-home/about/about-oacc/documents/newspaper-articles/newsarticles-2012/newsarticles-2012-fetch.html (accessed December 21, 2016).

# Parkland Cooperative Wheat Trial

James Frey[1], Jessica Frey[2]

## Site Information

Location: Roblin, Manitoba
Cooperator: 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 resource for wheat breeders to generate data in support of registration of new Canada Western Red Spring varieties.

## Objective

To evaluate high yielding new hard red spring wheat lines for the parkland region.

## Procedure and Project Activities

| | |
|---|---|
| Treatments: | 30 (Table 1) |
| Replication: | 3 |
| Plot size: | 1.2m x 5m |
| Test design: | Lattice |
| Seeding date: | May 18 |
| Fertilizer applied: | 46-0-0, 11-52-0-0 |
| Pesticide applied: | May 20 – Roundup WeatherMax |
| | June 24 – Prestige XC and Axial BIA |
| Harvest date: | September 13 |

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. A pre-emergence application of Roundup WeatherMax was applied at 0.94L/ac was applied, as well as an in-crop application of Prestige XC B at 0.8 L/ac and Axial BIA at 0.48 L/ac.

Agronomic data, such as dates of emergence, heading, height and lodging (on a scale of 1-9) were all recorded throughout the growing season. Prior to harvest, the plots were sprayed with a pre-harvest application of Roundup WeatherMax at 0.67 L/ac to enhance dry-down of the crop and to increase ease of the harvest.

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Composite samples were sent for analysis to the University of Alberta in Edmonton

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2016 soil nutrient analysis at the field site.

**Table 6.** 2016 Parkland Cooperative Treatments, Roblin, Manitoba

| | | |
|---|---|---|
| AC Splendor | PT599 | PT252 |
| Carberry | PT649 | PT253 |
| Glenn | PT650 | PT487 |
| Parata | PT778 | PT488 |
| PT472 | PT782 | PT489 |
| PT479 | PT783 | PT651 |
| PT485 | PT784 | PT652 |
| PT595 | PT785 | PT653 |
| PT596 | PT5001 | PT786 |
| PT598 | PT251 | PT787 |

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 95 |
| P | 15 ppm (high) | 20 |
| K | 224 ppm (high) | 0 |
| S | 166 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results

Yield was the primary data parameter collected for this trial. The yield results are shown in Table 3. Yield in bu/ac for the trial is shown in Figure 1.

**Table 3.** 2016 Parkland Coop Wheat Variety Trial Results, Roblin, Manitoba[1]

| Treatment | Yield (kg/ha) |
|---|---|
| AC Splendor | 3986 |
| Carberry | 4487 |
| Glenn | 4241 |
| Parata | 4659 |
| PT251 | 5640 |
| PT252 | 5311 |
| PT253 | 5335 |
| PT472 | 5223 |
| PT479 | 3873 |
| PT485 | 4296 |
| PT487 | 4944 |
| PT488 | 4997 |
| PT489 | 4659 |
| PT5001 | 4604 |
| PT595 | 4906 |
| PT596 | 4984 |
| PT598 | 4328 |
| PT599 | 4885 |
| PT649 | 4385 |
| PT651 | 4974 |
| PT652 | 5439 |
| PT653 | 5204 |
| PT778 | 3497 |
| PT782 | 4327 |
| PT783 | 4569 |
| PT784 | 4962 |
| PT785 | 4763 |
| PT786 | 4056 |
| **Grand Mean** | 4698 |
| **% CV** | 6.9 |
| **LSD 5%** | 533 |
| **Significant** | Yes |

[1] PT650 was not included in the statistical analysis.

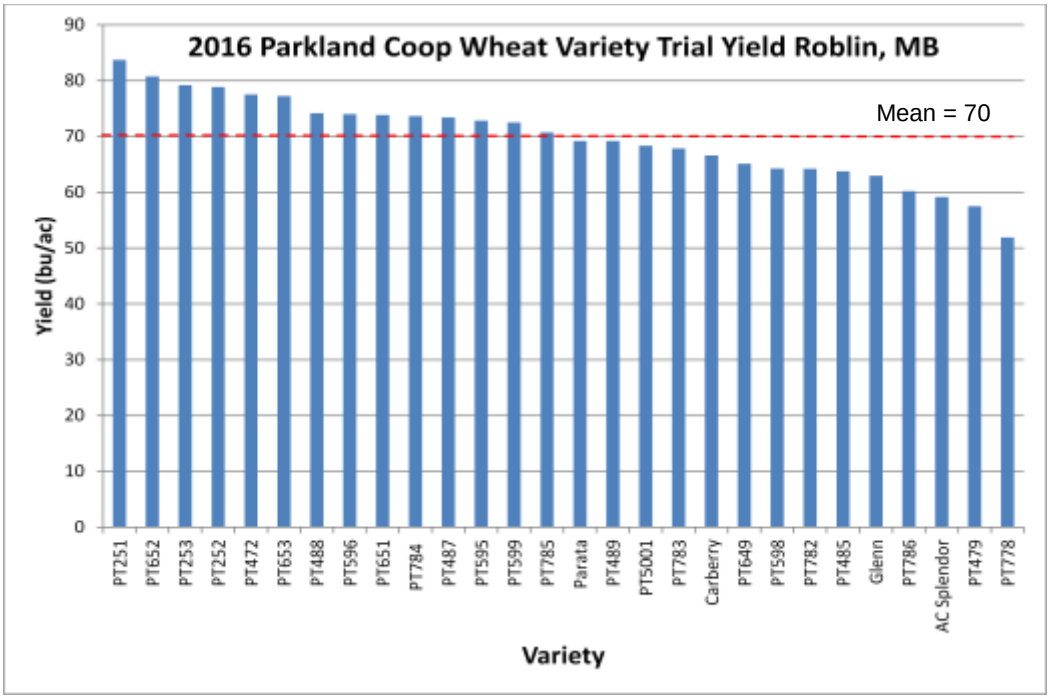



**Figure 1.** 2016 Parkland Coop Wheat Variety Trial Yield (bu/ac), Roblin, Manitoba

## Acknowledgements

PCDF thanks Dean Spanner and Klaus Strenze for cooperating with this trial.

## Schedule

This trial will be conducted at PCDF in 2017.

# Saskatchewan Variety Performance Group and Manitoba Crop Variety Evaluation Team Barley Variety Trial

James Frey[1], Jessica Frey[2]

## Site Information

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

## Background

The Saskatchewan Variety Performance Group (SVPG) is an informal industry-government partnership which administers post-registration regional performance testing of varieties of wheat, durum, malt and feed barley, oats and flax. The data from these tests are published in Varieties of Grain Crops and SaskSeed Guide [1]. For this trial, entries from the MCVET were included also.

## Objective

To evaluate different varieties of barley for the SVPG and MCVET.

## Procedure and Project Activities

Treatments: 18 (Table 1)
Replication: 3
Plot size: 1.2m x 5m
Test design: Randomized Complete Block Design
Seeding date: May 18
Fertilizer applied: 46-0-0, 11-52-0-0
Pesticide applied: May 20 – Roundup WeatherMax
June 24 – Prestige XC B and Axial BIA
August 16 – Roundup WeatherMax
Harvest date: August 22
Product handling: Material from all plots was measured for weight and moisture content.

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. A pre-emergence application of Roundup WeatherMax was applied at 0.94 L/ac was applied, as well as an in-crop application of Prestige XC B at 0.8 L/ac and Axial BIA at 0.48 L/ac. Agronomic data, such as dates of

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

emergence, plant count, height and lodging (on a scale of 1-9) were all recorded throughout the growing season.

Prior to harvest, the plots were sprayed with a pre-harvest application of Roundup WeatherMax at 0.67 L/ac to enhance dry-down of the crop and to increase ease of the harvest. The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Composite samples were sent for analysis to BioVision Seed Labs in Winnipeg. A final sample was sent to PESAI in Arborg, MB for storage.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2016 soil nutrient analysis at the field site.

**Table 7.** 2016 SVPG Barley Variety Trial Treatments, Roblin, MB

| | | |
|---|---|---|
| AAC Connect | CDC PlatinumStar | TR10214 |
| AAC Synergy | Cerveza | TR12135 |
| AC Metcalfe | Claymore | TR13606 |
| Amisk | HB13324 | TR13609 |
| Canmore | Muskwa | TR13740 |
| CDC Bow | Oreana | TR14928 |

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 55 |
| P | 15 ppm (high) | 19 |
| K | 224 ppm (high) | 0 |
| S | 166 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Warmer than normal temperatures and timely moisture provided ideal growing conditions for barley at the PCDF site. Yield was the primary data parameter collected for this trial. The yield results are shown in Table 3. The mean yield was 5963 kg/ha, or 111 bu/ac. Yield in bu/ac for the trial is shown in Figure 1.

**Table 3.** 2016 SVPG Barley Variety Trial Yield and % Seed Moisture, Roblin, MB

| Treatment | Yield (kg/ha) |
|---|---|
| Amisk | 7708 |
| Cerveza | 7359 |
| AAC Synergy | 7294 |
| TR12135 | 7034 |
| AAC Connect | 6925 |

| | |
|---|---|
| Muskwa | 6494 |
| CDC Bow | 6188 |
| Canmore | 5996 |
| Oreana | 5925 |
| TR13740 | 5804 |
| Claymore | 5747 |
| TR10214 | 5518 |
| HB13324 | 5379 |
| CDC PlatinumStar | 5010 |
| TR14928 | 4864 |
| TR13606 | 4805 |
| AC Metcalfe | 4722 |
| Amisk | 7708 |
| **Grand Mean** | **5963** |
| **% CV** | **6.5** |
| **LSD 5%** | **647** |
| **Significant Difference** | **Yes** |

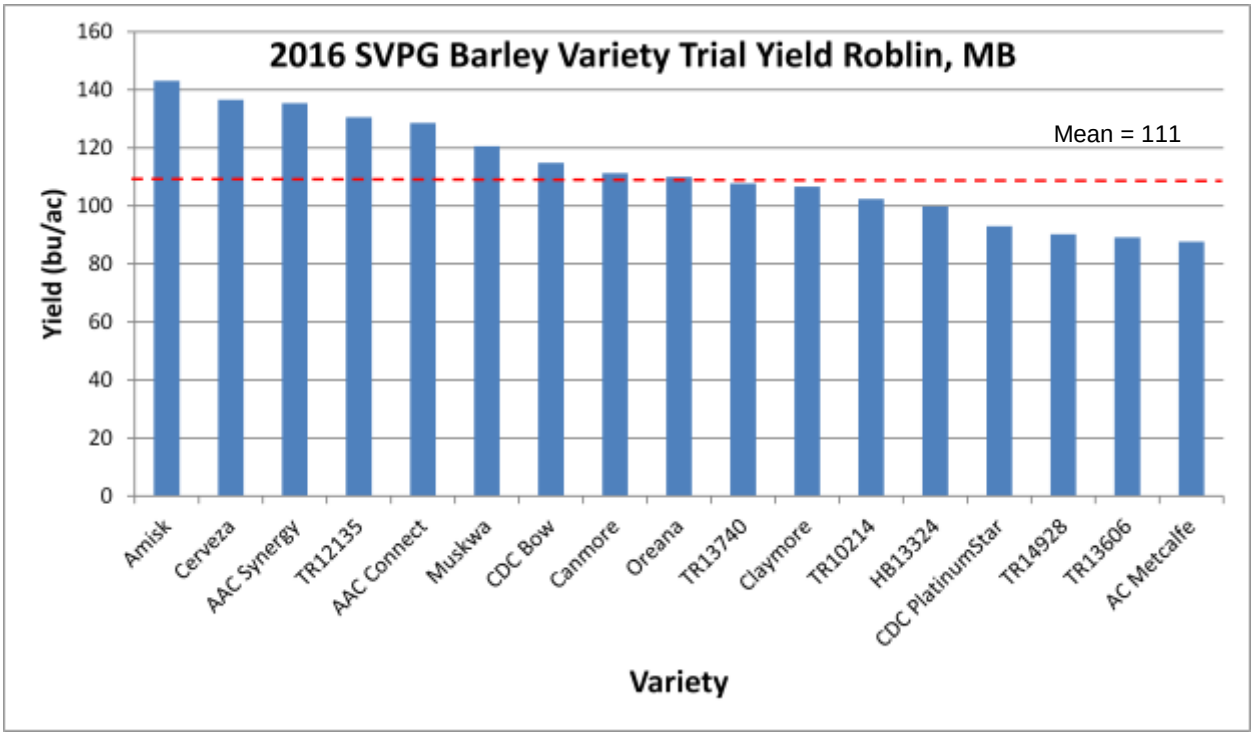



**Figure 1.** 2016 SVPG Barley Variety Trial Yield (bu/ac), Roblin, Manitoba

## Conclusions

This trial was conducted for the Saskatchewan Variety Performance Group and Manitoba Crop Variety Evaluation Team. For a more comprehensive evaluation of the trial across multiple site years, see the 2017 SaskSeed Guide and 2017 SEED Manitoba guide.

## Acknowledgements

PCDF thanks Patti Rothenburger and Craig Linde for their work in coordinating MCVET trials.

## Schedule

This trial will be conducted at PCDF in 2017.

## References

[1] http://www.saskwheatcommission.com/frp/lorem-ipsum-dolor-sitte-amecon-secc-tetur-adipiscing-elivesti-18th-october-2014-1/

# Saskatchewan Variety Performance Group and Manitoba Crop Variety Evaluation Team Oat Variety Trial

James Frey[1], Jessica Frey[2]

## Site Information

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

## Background

The Saskatchewan Variety Performance Group (SVPG) is an informal industry-government partnership which administers post-registration regional performance testing of varieties of wheat, durum, malt and feed barley, oats and flax. The data from these tests are published in Varieties of Grain Crops and SaskSeed Guide [1]. For this trial, entries from the MCVET were included also.

## Objective

To evaluate different varieties of oats for the SVPG.

## Procedure and Project Activities

| | |
|---|---|
| Treatments: | 17 |
| Replication: | 3 |
| Plot size: | 1.2m x 5m |
| Test design: | Randomized Complete Block Design |
| Seeding date: | May 24 |
| Fertilizer applied: | 46-0-0, 11-52-0-0 |
| Pesticide applied: | May 26 – Roundup WeatherMax |
| | June 24 – Prestige XC B |
| Harvest date: | October 13 |
| Product handling: | Material from all plots was measured for weight and moisture content. |

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. A pre-emergence application of Roundup WeatherMax 0.94L/ac was applied, as well as an in-crop application of Prestige XC B @0.80 L/ac. Agronomic data, including emergence date, heading date and lodging scores (on a scale of 1-9) were recorded throughout the growing season.

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Composite samples were sent for analysis to Swift Current Research Station in Saskatchewan. A additional sample was sent to PESAI in Arborg, MB for storage.

**Table 8.** 2016 SVPG Oats Variety Trial Treatments, Roblin, MB[1]

| | | |
|---|---|---|
| AAC Justice | CDC Norseman | Leggett |
| AAC Nicholas | CDC Ruffian | OT6008 |
| Akina | CFA1207 | OT6009 |
| CDC Dancer | CFA1220 | OT6011 |
| CDC Haymaker | CS Camden | Summit |
| CDC Morrison | Kara | |

[1] Numbered entries are advanced lines that are under evaluation for possible registration

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 32 |
| P | 15 ppm (high) | 15 |
| K | 224 ppm (high) | 0 |
| S | 166 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Warmer than normal temperatures and timely moisture provided ideal growing conditions for oats at the PCDF site. Yield was the primary data parameter collected for this trial. The yield results are shown in Table 3. The mean yield was 5687 kg/ha, or 149 bu/ac. Yield in bu/ac for the trial is shown in Figure 1.

**Table 3.** 2016 SVPG Oats Variety Trial, Roblin, MB

| Treatment | Yield (kg/ha) |
|---|---|
| AAC Justice | 6587 |
| AAC Nicholas | 3719 |
| Akina | 6653 |
| CDC Dancer | 5974 |
| CDC Haymaker | 5421 |
| CDC Morrison | 2427 |
| CDC Norseman | 6298 |
| CDC Ruffian | 5480 |
| CFA1220 | 5620 |
| CS Camden | 6879 |
| Kara | 6133 |
| Kyron | 4901 |

| | |
|---|---|
| Leggett | 5814 |
| OT6008 | 6029 |
| OT6009 | 5441 |
| OT6011 | 6638 |
| Summit | 6665 |
| **Grand Mean** | **5687** |
| **% CV** | **11.4** |
| **LSD 5%** | **1081** |
| **Significant Difference** | **Yes** |

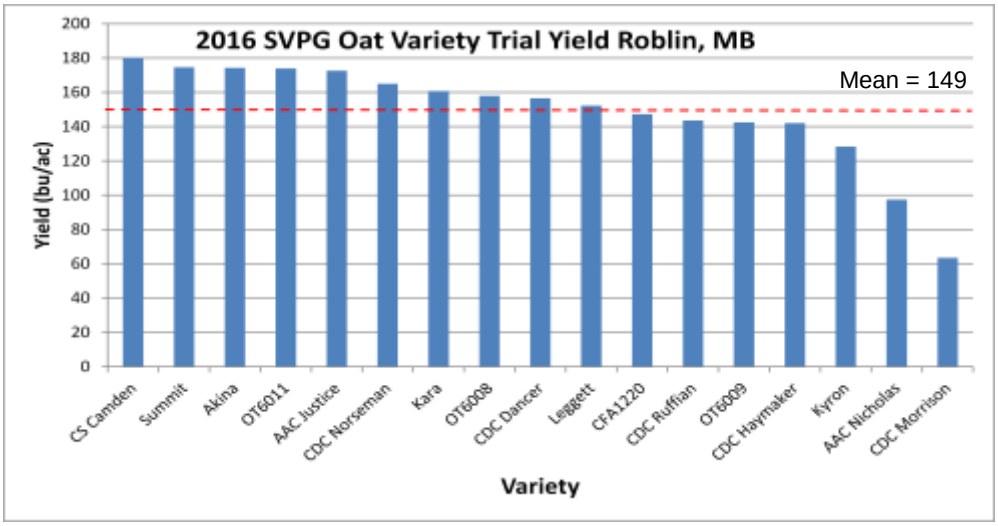



**Figure 1.** 2016 SVPG Oat Variety Trial Yield (bu/ac), Roblin, Manitoba

## Conclusions

This trial was conducted for the Saskatchewan Variety Performance Group and Manitoba Crop Variety Evaluation Team. For a more comprehensive evaluation of the trial across multiple site years, see the 2017 SaskSeed Guide and 2017 SEED Manitoba guide.

## Acknowledgements

PCDF thanks Patti Rothenburger and Craig Linde for their work in coordinating MCVET trials.

## Schedule

This trial will be conducted at PCDF in 2017.

## References

[1] http://www.saskwheatcommission.com/frp/lorem-ipsum-dolor-sitte-amecon-secc-tetur-adipiscing-elivesti-18th-october-2014-1/

# Saskatchewan Variety Performance Group and Manitoba Crop Variety Evaluation Team Wheat Variety Trials (1 & 2)

James Frey[1], Jessica Frey[2]

## Site Information

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

## Background

The Saskatchewan Variety Performance Group (SVPG) is an informal industry-government partnership which administers post-registration regional performance testing of varieties of wheat, durum, malt and feed barley, oats and flax. The data from these tests are published in Varieties of Grain Crops and SaskSeed Guide [1]. For this trial, entries from the MCVET were included also.

SVPG organized two spring wheat trials for 2016. The first, "Wheat 1", consists of 27 varieties, and the second, "Wheat 2", consists of 22 varieties.

## Objective

To evaluate different varieties of wheat for the SVPG and MCVET.

## Procedure and Project Activities

| | |
|---|---|
| Treatments: | 27 ("Wheat 1", Table 1)<br>22 ("Wheat 2", Table 2) |
| Replication: | 3 |
| Plot size: | 1.2m x 5m |
| Test design: | Randomized Complete Block Design |
| Seeding date: | May 18 |
| Fertilizer applied: | 46-0-0, 11-52-0-0 |
| Pesticide applied: | May 20 – RoundUp WeatherMax<br>June 24 – Prestige XC B and Axial BIA<br>August 23 RoundUp WeatherMax (pre-harvest) |
| Harvest date: | September 9 ("Wheat 1")<br>Sept 13 ("Wheat 2") |
| Product handling: | Material from all plots was measured for weight and moisture content. |

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. A pre-emergence application of Roundup WeatherMax was applied at 0.94L/ac was applied, as well as an in-crop application of Prestige XC B at 0.8 L/ac and Axial BIA at 0.48 L/ac. Agronomic data, such as dates of emergence, flowering, height and lodging (on a scale of 1-9) were all recorded throughout the growing season.

Prior to harvest, the plots were sprayed with a pre-harvest application of Roundup WeatherMax at 0.67 L/ac to enhance dry-down of the crop and to increase ease of the harvest. The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Composite samples were sent for analysis to BioVision Seed Labs in Winnipeg and Swift Current Research Station, Saskatchewan. A final sample was sent to PESAI in Arborg, MB for storage.

The varieties grown for "Wheat 1" and "Wheat 2" are shown in Table 1 and Table 2, respectively. Table 3 shows the results of the 2015 soil nutrient analysis at the field site. Fertilizer applied was the same for both trials.

**Table 9.** 2016 SVPG Wheat Variety Trial ("Wheat 1") Treatments, Roblin, Manitoba

| | | |
|---|---|---|
| 5060HR CL | AAC Redberry | CDC Bradwell |
| AAC Brandon | AAC Redwater | CDC Titanium |
| AAC Cameron | AAC Tradition | CDC Whitewood |
| AAC Connery | AAC Viewfield | Coleman |
| AAC Concord | AAC W1876 | Glenn |
| AAC Elie | AAC Whitefox | Go Early |
| AAC Iceberg | BW1005 | HW616 |
| AAC Jatharia VB | BW496 | SY479 VB |
| AAC Prevail | Carberry | Thorsby |

**Table 10.** 2016 SVPG Wheat Variety Trial ("Wheat 2") Treatments, Roblin, Manitoba

| | | |
|---|---|---|
| AAC Chiffon | AAC Proclaim | HY2003 |
| AAC Crusader | AAC Ryley | HY537 |
| AAC Entice | AAC Tenacious | Prosper |
| AAC Foray | Carberry | SY087 |
| AAC Indus | Elgin | SY995 |
| AAC Innova | Faller | WFT603 |
| AAC NRG097 | Glenn | |
| AAC Penhold | GP131 | |

**Table 3.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied[3] (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 95 |
| P | 15 ppm (high) | 20 |
| K | 224 ppm (high) | 0 |
| S | 166 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate
[3] Fertilizer applied was the same for both "Wheat 1" and "Wheat 2"

## Results and Discussion

Warmer than normal temperatures and timely moisture provided good growing conditions for wheat at the PCDF site. Yield was the primary data parameter collected for this trial. The yield results for "Wheat 1" and "Wheat 2" are shown in Table 4 and Table 5, respectively. The mean yield for "Wheat 1" was 3977 kg/ha, or 59 bu/ac. The mean yield for "Wheat 2" was 5248 kg/ha, or 78 bu/ac. Yield in bu/ac for "Wheat 1" and "Wheat 2" are shown in Chart 1 and Chart 2, respectively.

**Table 4.** 2016 SVPG Wheat Variety Trial ("Wheat 1") Results, Roblin, Manitoba

| Treatment | Yield (kg/ha) |
|---|---|
| Glenn | 4183 |
| Carberry | 3760 |
| AAC Prevail VB | 4179 |
| AAC Cameron VB | 4527 |
| AAC Jatharia VB | 4562 |
| AAC Tradition | 3331 |
| SY479 VB | 3439 |
| CDC Bradwell | 3976 |
| AAC W1876 | 3772 |
| AAC Connery | 4806 |
| Thorsby | 4144 |
| AAC Viewfield | 3867 |
| SY Slate | 3763 |
| AAC Redberry | 4168 |
| AAC Brandon | 4432 |
| AAC Elie | 4499 |
| AAC Redwater | 3595 |
| AAC Iceberg | 3669 |
| CDC Whitewood | 3025 |
| AAC Whitefox | 4461 |
| 5605HR CL | 4132 |
| CDC Titanium VB | 3790 |
| Coleman | 4213 |
| HW616 | 4020 |

| | |
|---|---|
| AAC Concord | 3446 |
| BW1005 | 3681 |
| Go Early | 3954 |
| **Grand Mean** | **3977** |
| **% CV** | **9.9** |
| **LSD 5%** | **644** |
| **Significant Difference** | **Yes** |

**Table 5.** 2016 SVPG Wheat Variety Trial ("Wheat 2") Results, Roblin, Manitoba

| **Treatment** | **Yield (kg/ha)** |
|---|---|
| Glenn | 4491 |
| AAC Penhold | 4778 |
| AAC Innova | 6799 |
| WFT603 | 5148 |
| Faller | 5220 |
| Prosper | 5373 |
| Elgin ND | 4884 |
| AAC Indus | 6404 |
| CDC Throttle | 5684 |
| HY537 | 4896 |
| Carberry | 4379 |
| AAC Proclaim | 5116 |
| AAC Ryley | 4493 |
| AAC Chiffon | 6711 |
| AAC Foray VB | 6257 |
| AAC Tenacious VB | 4957 |
| SY087 | 5538 |
| AAC NRG097 | 4518 |
| SY995 | 5103 |
| HY2003 | 4945 |
| AAC Entice | 4948 |
| AAC Crusader | 4819 |
| **Grand Mean** | **5248** |
| **% CV** | **7.8** |
| **LSD 5%** | **673** |
| **Significant** | **Yes** |

**Chart 1.** 2016 SVPG Wheat Variety Trial ("Wheat 1") Yield (bu/ac), Roblin, Manitoba

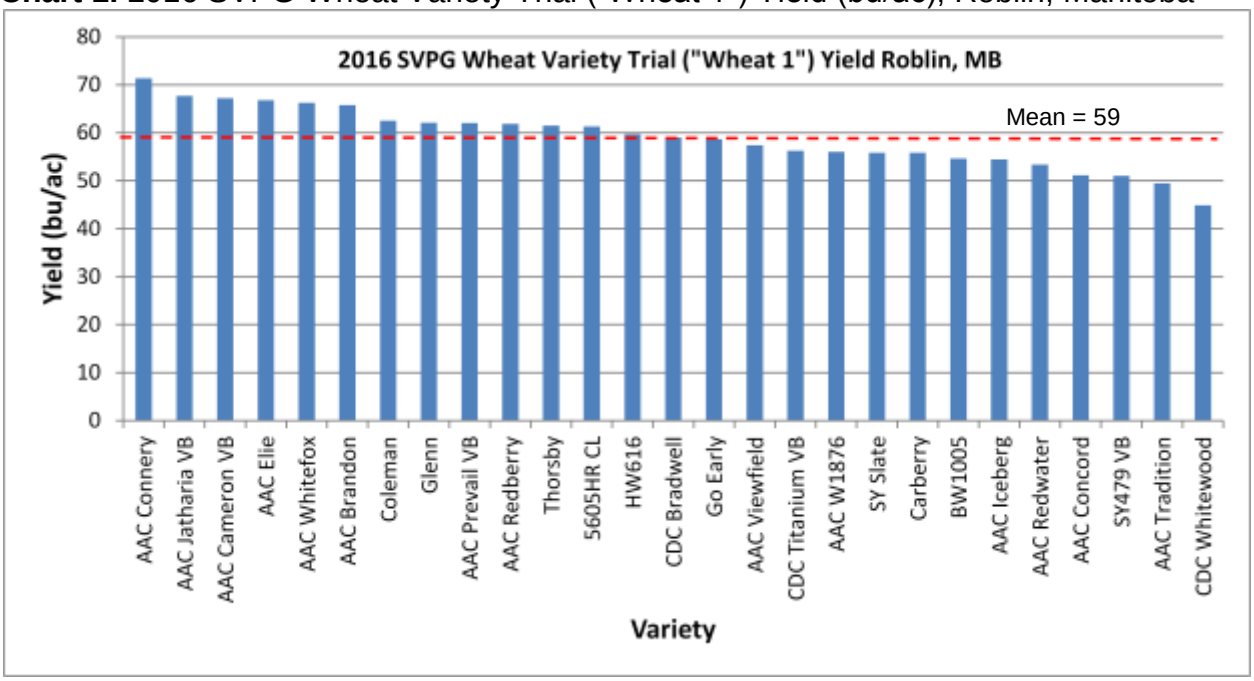
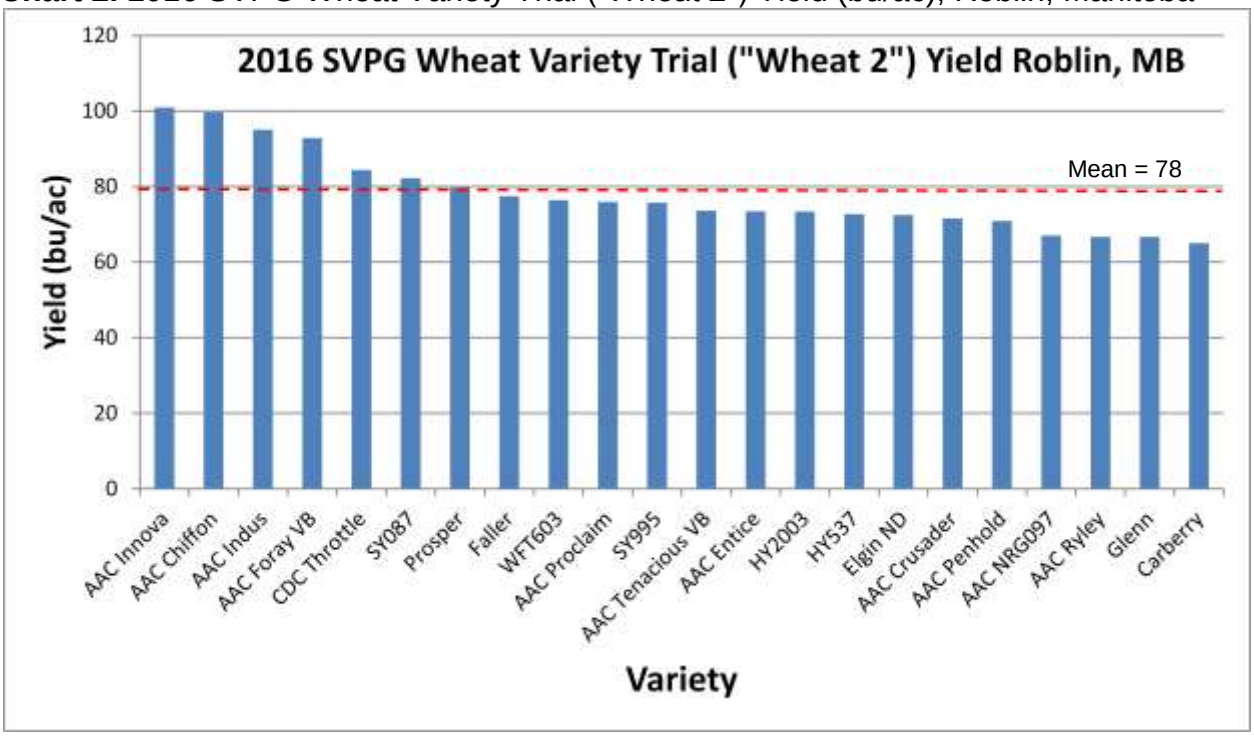



**Chart 2.** 2016 SVPG Wheat Variety Trial ("Wheat 2") Yield (bu/ac), Roblin, Manitoba




## Conclusions

This trial was conducted for the Saskatchewan Variety Performance Group and Manitoba Crop Variety Evaluation Team. For a more comprehensive evaluation of the trial across multiple site years, see the 2017 SaskSeed Guide and 2017 SEED Manitoba guide.

## Acknowledgements

PCDF thanks Patti Rothenburger and Craig Linde for their work in coordinating MCVET trials.

## Schedule

This trial will be conducted at PCDF in 2017.

## References

[1] http://www.saskwheatcommission.com/frp/lorem-ipsum-dolor-sitte-amecon-secc-tetur-adipiscing-elivesti-18th-october-2014-1/

# FORAGE CROPS

## AC Yellowhead Alfalfa Demonstration

James Frey[1], Elizabeth Nernberg[2]

### Site Information

Location: Roblin, Manitoba
Cooperator: Elizabeth Nernberg – Manitoba Agriculture Farm Production Extension Specialist - Livestock

### Background

The benefits of including alfalfa in crop rotations or pasture swards are numerous. Agronomically, alfalfa can increase soil fertility and quality, improve water filtration and drainage, reduced weed and disease pressure, improved yields, and carbon sequestration [1]. For livestock producers, alfalfa also provides forage that is high in protein, energy, vitamins and minerals, although measures must be in place to control bloat.

However, late-season grazing or cutting of alfalfa can result in winterkill, due to insufficient energy being returned to the roots of the plant, as well as minimal snow trapping potential to protect roots from freezing temperatures. AC Yellowhead alfalfa was developed at Swift Current, SK for superior grazing tolerance and winter hardiness, resulting from earlier onset of winter dormancy [2]. It is also observed to have superior resistance to bacterial wilt and high yield potential [3].

A demonstration plot was established at PCDF on May 29, 2015.

### Objective

To evaluate AC Yellowhead alfalfa for grazing tolerance and winter hardiness in the Parkland area.

### Procedure and Project Activities

Treatments: 1
Replication: 1
Plot size: 12m x 5m
Test design: Demonstration
Seeding date: May 29, 2015
Fertilizer applied: Broadcast – 46-0-0; 11-52-0-0; 0-0-60; 21-0-0-24 (NPKS)

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Manitoba Agriculture, Livestock Farm Production Extension – Roblin, Manitoba

Pesticide applied: None
Harvest date: First cut sampled July 4, 2016, second cut various dates
Product handling: 0.25 $m^2$ samples were weighed with subsample taken to determine dry matter

Four 0.25$m^2$ clippings were taken for first cut yield measurements. The plot was mowed down on July 25. Second cuts of 0.25$m^2$ were taken Aug 22, Aug 29, Sept 12, Sept 27 and Oct 20. The samples were weighed and then a subsample was taken, dried down and weighed to determine dry matter yield. Table 1 shows the results for the 2016 soil nutrients analysis at the field site.

**Table 1.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 40 lbs/acre (low) | 16 |
| P | 17 ppm (high) | 15 |
| K | 214 ppm (high) | 38 |
| S | 52 lbs/acre (high) | 7 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

**Table 2**. 2016 AC Yellowhead Yield Data

| Harvest Date | First Cut | | Second Cut | | Total[1] | |
|---|---|---|---|---|---|---|
| | DM (t/ac) | Hay Equivalent[2] (t/ac) | DM (t/ac) | Hay Equivalent[2] (t/ac) | DM (t/ac) | Hay Equivalent[2] (t/ac) |
| July 6 | 5.9 | 6.9 | n/a | | 5.9 | 6.9 |
| Aug 22 | n/a | | 1.6 | 1.9 | 7.5 | 8.8 |
| Aug 29 | | | 1.6 | 1.9 | 7.5 | 8.8 |
| Sept 12 | | | 1.6 | 1.9 | 7.5 | 8.8 |
| Sept 27 | | | 1.3 | 1.5 | 7.2 | 8.4 |
| Oct 20 | | | 1.0 | 1.2 | 6.9 | 8.1 |

[1] Total is first cut plus second cut.
[2] Hay Equivalent Yield is expressed as 85% DM.

AC Yellowhead yielded exceptionally well this year, its first year after establishment. Keep in mind measuring yield with this method has little to no harvesting losses thus resulting in higher values than producers would experience in field conditions.

The five different dates of second cut harvest were chosen for different time frames around the critical fall harvest period-before, during and after. The critical fall harvest period is the five week period prior to a fall killing frost needed for the alfalfa to regrow and replenish its roots reserves necessary for winter survival. With the fall killing frost happening on October 6, 2016, the Aug 22 and 29 dates were prior to the critical fall harvest period, the Sept 12 and 27$^{th}$ dates were during it and the October 20 was after it. By intentionally stressing the plant and

harvesting it during the critical fall harvest period, it will simulate overgrazing during the sensitive period. As such, yields will be taken in 2017 in these areas to determine if AC Yellowhead indeed has superior grazing tolerance and winter hardiness.

## Conclusions

Data collected shows AC Yellowhead alfalfa performs exceptionally well in the Parkland area of Manitoba. Additional years of data and monitoring are needed to draw further conclusions about its performance such as winter hardiness and tolerance to heavy grazing.

## Schedule

PCDF and Manitoba Agriculture staff intend to continue to monitor this project to evaluate particularly the winter survivability of AC Yellowhead in this area.

## References

[1] Manitoba Agriculture. Selecting alfalfa varieties. http://www.gov.mb.ca/agriculture/crops/production/forages/selecting-alfalfa-varieties.html [accessed Jan 20, 2017].

[2] McLeod, J. G., Muri, R., Jefferson, P. G., Bittman, S. and McCartney, D. 2009. Yellowhead alfalfa. Can. J. Plant Sci. 89:653_655. Yellowhead is a cultivar of alfalfa (Medicago sativa L. Subsp. falcata);

[3] Bittman, S., Waddington, J. and McCartney, D. H. (1991) Performance of alfalfa strains grown in mixture with smooth bromegrass as affected by management. Can. J. Plant Sci. 71: 1029-1037

# OILSEEDS

## Effect of Crop Residue Management on Soybeans and Effect of Soil Temperature at Different Planting Dates on Soybean Growth, Yield and Quality Trials

James Frey[1], Ramona Mohr[2]

## Site Information

Locations: Brandon, Manitoba
Carberry, Manitoba
Portage, Manitoba
Roblin, Manitoba

Cooperator: Dr. Ramona Mohr, Research Lead – Research Scientist, AAFC Brandon
Dr. Aaron Glenn – Research Scientist, AAFC Brandon
Shirley Neudorf – Research Technician, AAFC Brandon
Clayton Jackson – Research Technician, AAFC Brandon
Craig Linde – Diversification Specialist, CMCDC, Carberry and Portage la Prairie

## Background

The introduction of early-maturing soybeans has significantly increased soybean production in many regions of Manitoba. However, soybean is inherently a cold-sensitive crop. Frost and near-freezing temperatures in spring and fall remain a risk for soybean production, particularly in "non-traditional" production areas. Potential may exist to reduce the risk associated with sub-optimal temperatures through management.

In 2016, small plot studies were conducted at each of Brandon, Carberry, Portage and Roblin. Study 1 ["Soybean Temp"] assessed the effect of three soil temperature treatments at two different planting dates on soybean growth, yield and quality. Study 2 ["Soybean Residue"] determined the effect of various residue management practices including tillage, straw removal and residue type (i.e. crop species) on the growth, yield and quality of a subsequent soybean crop. Information for both trials ("Soybean Temp" and "Soybean Residue") is included here.

## Objective

1) To determine the effect of residue management on growth, yield and quality of soybean.
2) To determine the effect of soil temperature at two planting dates on soybean growth, yield and quality

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Agriculture and Agri-Food Canada – Brandon, Manitoba

## Procedure and Project Activities (Roblin site only)

| | |
|---|---|
| Treatments: | 6 ("Soybean Temp", Table 1)<br>6 ("Soybean Residue", Table 2) |
| Replication: | 4 each |
| Plot size: | 1.2m x 5m |
| Test design: | Randomized Complete Block Design |
| Seeding date: | May 20 ("Soybean Temp" – Date 1)<br>June 2 ("Soybean Temp" – Date 2)<br>May 20 ("Soy Residue") |
| Fertilizer applied: | 11-52-0-0 |
| Pesticide applied: | May 20 – Roundup WeatherMax ("Soybean Temp" – Date 1 & "Soybean Residue")<br>June 2 – Roundup WeatherMax ("Soybean Temp" – Date 2)<br>June 22 – Roundup WeatherMax |
| Harvest date: | November 10 ("Soybean Temp" & "Soybean Residue") |
| Product handling: | Material from all plots was measured for weight and moisture content. |

"Soybean Temp" trial

To achieve the effect of different soil temperatures, plots were covered between snow melt and seeding with the following materials: (1) rigid foam insulation with a reflective upper surface ("cold treatment"); (2) black plastic ("warm treatment"); and (3) white plus clear plastic ("control"). The materials were removed before each of the two seeding dates.

"Soybean Residue" trial

Prior to seeding, the control plots were cultivated with a garden tiller and the other plots were not disturbed, according to the trial design.

Both trials

Soybeans were inoculated with the appropriate rhizobia, and phosphorus was side-banded. A pre-emergence application of Roundup WeatherMax was applied at 0.94 L/ac, as well as an additional in-crop application of Roundup WeatherMax at 0.94 L/ac. Agronomic data, such as dates of emergence, flowering, staging, height and lodging (on a scale of 1-9) were all recorded throughout the growing season. The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Composite samples were sent for analysis to AAFC in Brandon. A final sample was sent to PESAI in Arborg, MB for storage.

The treatments for "Soybean Temp" and "Soybean Residue" are shown in Table 1 and Table 2, respectively. Table 3 shows the results of the 2016 soil nutrient analysis at the field site.

**Table 11.** 2016 "Soybean Temp" Treatments, Roblin, Manitoba

| | | |
|---|---|---|
| Date 1, Control | Date 1, Cool | Date 2, Warm |
| Date 1, Warm | Date 2, Control | Date 2, Cool |

**Table 2.** 2016 “Soybean Residue” Treatments, Roblin, Manitoba

| | | |
|---|---|---|
| No residue, tilled (control) | Wheat residue, straw removed | Oat residue, straw removed |
| Wheat residue with straw | Oat residue with straw | Canola residue with straw |

**Table 3.** 2016 Spring Soil Nutrient Analysis from 0-24” Depth at the Roblin, MB Site[1,2]

| Nutrient[3] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 143 lbs/acre (med) | 0 |
| P | 21 ppm (high) | 10 |
| K | 226 ppm (high) | 0 |
| S | 30 lbs/acre (med) | 0 |

[1] For both trials
[2] Analysis by Agvise Laboratories
[3] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Study 1 - In 2016, soil coverings were effective in producing a range of soil temperatures at planting, but did not significantly influence volumetric moisture content. Later seeding dates generally had higher soil temperatures, and had or tended to have a higher soil moisture content except at Roblin where trends were reversed. Average days to emergence ranged across sites from 14 to 17 days for the earlier planting date, compared to 10 to 15 days for the later planting date. Delaying seeding from between May 18 to 25 to between May 30 and June 9 reduced average yield at all sites except Brandon which had seeding dates of May 19 and 30th (Fig. 1). Soil temperature treatments had no effect on yield at most sites. At Brandon, however, yields were higher in the warm than cold treatment, perhaps due in part to the warmer soil temperatures at planting in this treatment (Fig. 1). Preliminary results suggested that planting date affected grain quality more often than temperature treatments, with earlier seeding often resulting in statistical increases in thousand seed weight and % oil, and decreases in test weight.

Study 2 - In 2016, residue management influenced both soil temperature and moisture at planting. Soil temperatures in tilled treatments were 0.5 to 3 C higher than the average temperature in untilled treatments depending upon the site (Fig. 2). Although statistical differences in temperature were sometimes noted where straw was retained versus removed, temperatures in these treatments were often within 1 C. At 2 of 4 sites, soil moisture was slightly lower for tilled than untilled treatments and where straw was removed rather than retained. Despite these differences, residue management had no effect on plant stand or yield at most sites (Fig 2). The 2016 trials had been planted between May 18 and 25th, and soil temperature at planting was ≥15 C regardless of treatment or site, which likely limited potential differences in stand and yield. At Brandon, soybean yield was higher after canola than after wheat (straw removed), which may have been due partly to the higher soil temperature observed in the canola treatment although this treatment had also received a higher rate of fertilizer N in spring 2016 to compensate for its lower soil test N level.

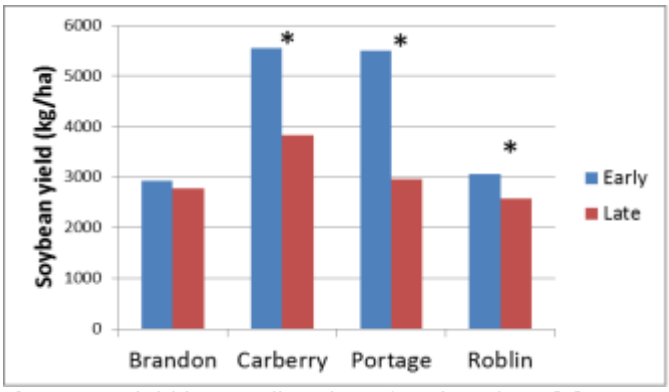



**Figure 1**: Yield by seeding date, four locations [1] locations [1] * Indicates significant differences

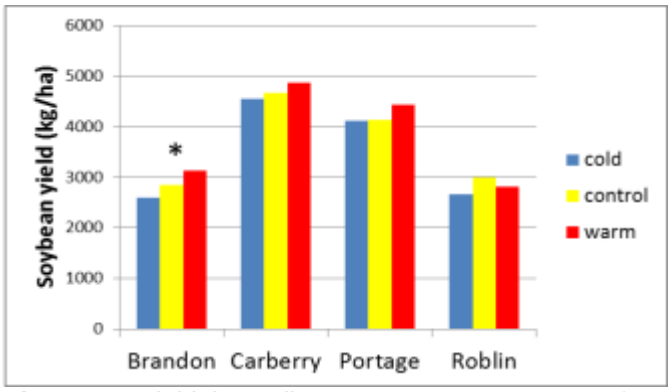



**Figure 2**: Yield by soil temperature treatments, four

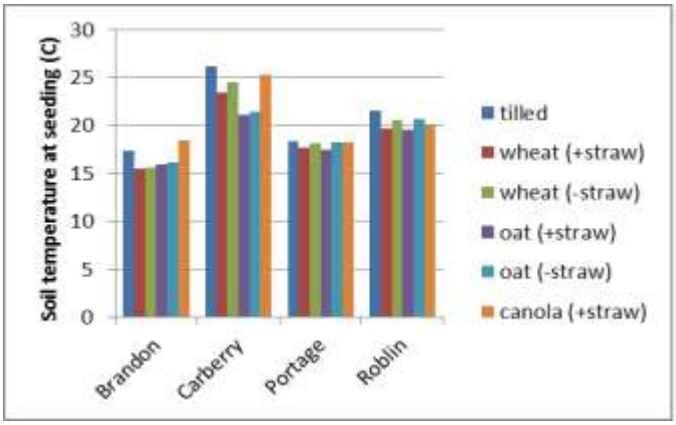



**Figure 3**: Soil temperature at seeding, four locations [1]

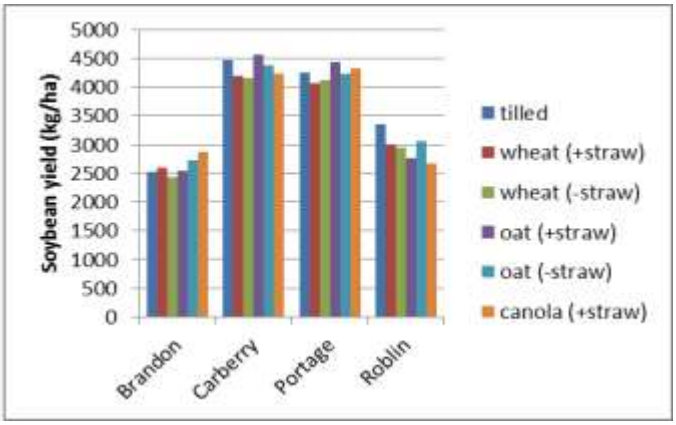



**Figure 4**: Yield by residue treatments, four locations [1]

## Conclusions

The data presented are preliminary findings from an ongoing study. The final year of field experiments will be conducted at all sites for 2017 in order to gain a better understanding of the impacts of management on soybean growth and yield under a range of Manitoba conditions.

## Acknowledgements

PCDF thanks Ramona Mohr and Shirley Neudorf for their cooperation with the trial. We also thank Clayton Jackson for his assistance with data collection, as well as Laryssa Grenkow of MPSG for her assistance during the PCDF Field Day.

## Schedule

The “Soybean Residue” trial will be conducted at PCDF in 2017; however, 2016 marks the end of the “Soybean Temperature” trial.

# Flax Council of Canada Agronomy Demonstration Trials Summary

James Frey[1], Jessica Frey[2]

## Site Information

Locations: Roblin, Manitoba – Parkland Crop Diversification Foundation (PCDF)
Portage la Prairie, Manitoba – Canada-Manitoba Crop Diversification Center (CMCDC)

Cooperators: Paul Dribnenki – Consultant for the Flax Council of Canada
Rachel Evans – Extension Agronomist, Flax Council of Canada
Brent Wright – President, ICMS Inc., Portage la Prairie, Manitoba

## Background

There is a sizeable gap between the yield potential of flax and the average yields observed in the Prairies. Whereas the 10-year average yield for Manitoba is 21 bu/ac [1], small plot yields at PCDF have ranged from 41-73 bu/ac (2013-2015). These figures are supported by small plot yields in 2013 of up to 76 bu/ac at Rosebank, MB [2].

In order to systematically obtain higher yields on a commercial scale, best management practices (BMPs) are required. Building on the results of 2015, four demonstration trials were conducted in 2016 to develop BMPs for the following elements: A) seed treatment and fertilizer rates; B) seeding date, rate and row spacing; C) herbicides and fungicide use; and D) crop stubble and flax production interaction. Additionally, plots of various crops were established to provide stubble for the crop stubble-flax interaction study in the 2017 growing season.

An "ideal plot" treatment was used in the trials to characterize optimal agronomic practices and inputs. The 16 factors associated with the "ideal" plot are as follows:

<u>Field selection</u>
1. Use well-drained soil with very little salt.
2. Seed on pulse or cereal stubble.

<u>Pre-seeding</u>
3. Test soil for macro and micro nutrients.
4. Apply pre-seeding herbicide (Authority® at 118 ml/acre; glyphosate at recommended rate for the corresponding formulation).
5. Treat seed with fungicide (Insure Pulse® at 300 ml/100 kg of seed).

<u>Fertility management</u>
6. Fertilize to 45 bu/ac yield target.
7. Optimize seed-placed fertilizer (15 lb/ac actual phosphate; zinc, if deficient, as Mosaic MicroEssentials Zinc®).

[1] Manitoba Agriculture, Applied Research Production – Roblin, MB
[2] Parkland Crop Diversification Foundation – Roblin, MB

8. Side-band or mid-band remaining fertilizer, if possible.

Seeding

9. Use a high yielding variety (CDC Glas)
10. Target seeding on May 15th.
11. Seed at 9.6" row-spacing or similar 'regular' commercial row-spacing.
12. Seed at 45 lb/ac.
13. Seed at <1" depth

Pest, disease and pre-harvest management

14. Priaxor® for pasmo control (120 ml/ac).
15. All recommended herbicides, as required.
16. Desiccate at maturity with glyphosate (360 g active ingredient/ac) or Reglone®.

For additional information about the FCC Agronomy Demonstration trials, see the 2015 PCDF Annual Report, pp. 170-205.

## Results

Adequate heat and timely moisture provided excellent growing conditions for flax at the PCDF site in 2016. The data for 2016 will be examined alongside data for subsequent trial years, allowing analysis of general trends and recommendations to be made across a greater number of sites and site years.

## Schedule

The trial will be continued in 2017 at PCDF.

## References

[1] Yield Manitoba 2016. Table: Manitoba average crop yields, p. 6. http://www.mmpp.com/mmpp.nsf/ym_2016_full_issue.pdf

[2] Manitoba Seed Growers Association. Seed Manitoba 2014. Annual, Winnipeg: Manitoba Co-operator, 2013.

# Saskatchewan Variety Performance Group and Manitoba Crop Variety Evaluation Team Flax Variety Trial

James Frey[1], Jessica Frey[2]

## Site Information

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

## Background

The Saskatchewan Variety Performance Group (SVPG) is an informal industry-government partnership which administers post-registration regional performance testing of varieties of wheat, durum, malt and feed barley, oats and flax. The data from these tests are published in Varieties of Grain Crops and SaskSeed Guide [1]. For this trial, entries from the MCVET were included also.

## Objective

To evaluate different varieties of flax for the SVPG and MCVET.

## Procedure and Project Activities

| | |
|---|---|
| Treatments: | 14 |
| Replication: | 3 |
| Plot size: | 1.2m x 5m |
| Test design: | Randomized Complete Block Design |
| Seeding date: | May 19 |
| Fertilizer applied: | 46-0-0, 11-52-0-0 |
| Pesticide applied: | May 20 – Authority Supreme and Roundup WeatherMax<br>June 7 – Amigo, Centurion and Curtail M |
| Harvest date: | September 20 |
| Product handling: | Material from all plots was measured for weight and moisture content. |

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. Pre-emergence pesticide applications included Roundup WeatherMax at 0.94L/ac and Authority at 0.118L/ac. In-crop pesticide applications included Centurion at 0.118L/ac, Amigo at 0.0015L/ac and Curtail M at 0.81 L/ac. Agronomic data, such as dates of emergence, flowering, height and lodging (on a scale of 1-9) were all recorded throughout the growing season.

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

A pre-harvest application of Reglone at 0.69 L/ac was applied to enhance dry-down of the crop and to increase ease of the harvest. The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Composite samples were sent to PESAI in Arborg, MB for storage.

**Table 12.** 2016 SVPG Flax Variety Trial Treatments, Roblin, MB

| | | |
|---|---|---|
| AAC Bravo | CDC Sorrel | FP2457 |
| CDC Bethune | FP2357 | NuLin VT50 |
| CDC Glas | FP2316 | Westlin 71 |
| CDC Neela | FP2388 | WestLin 72 |
| CDC Plava | FP2454 | |

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

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 36 |
| P | 15 ppm (high) | 16 |
| K | 224 ppm (high) | 0 |
| S | 166 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

**Table 3.** 2016 SVPG Flax Variety Trial Yield and % Moisture, Roblin, MB

| Treatment | Yield (kg/ha) |
|---|---|
| AAC Bravo | 2087 |
| CDC Bethune | 2046 |
| CDC Glas | 1935 |
| CDC Neela | 1841 |
| CDC Plava | 2008 |
| CDC Sorrel | 2328 |
| FP2357 | 1393 |
| FP2316 | 2099 |
| FP2388 | 2215 |
| FP2454 | 1807 |
| FP2457 | 2129 |
| NuLin VT50 | 1833 |
| Westlin 71 | 2024 |
| WestLin 72 | 2133 |
| **Grand Mean** | **1991** |
| **% CV** | **15.6** |
| **LSD 5%** | **520** |
| **Significant Difference** | **No** |

Yield was the primary data parameter collected for this trial. The yield results are shown in Table 3. The mean yield was 1991 kg/ha, or 31.7 bu/ac. Yield in bu/ac for the trial is shown in Figure 1.

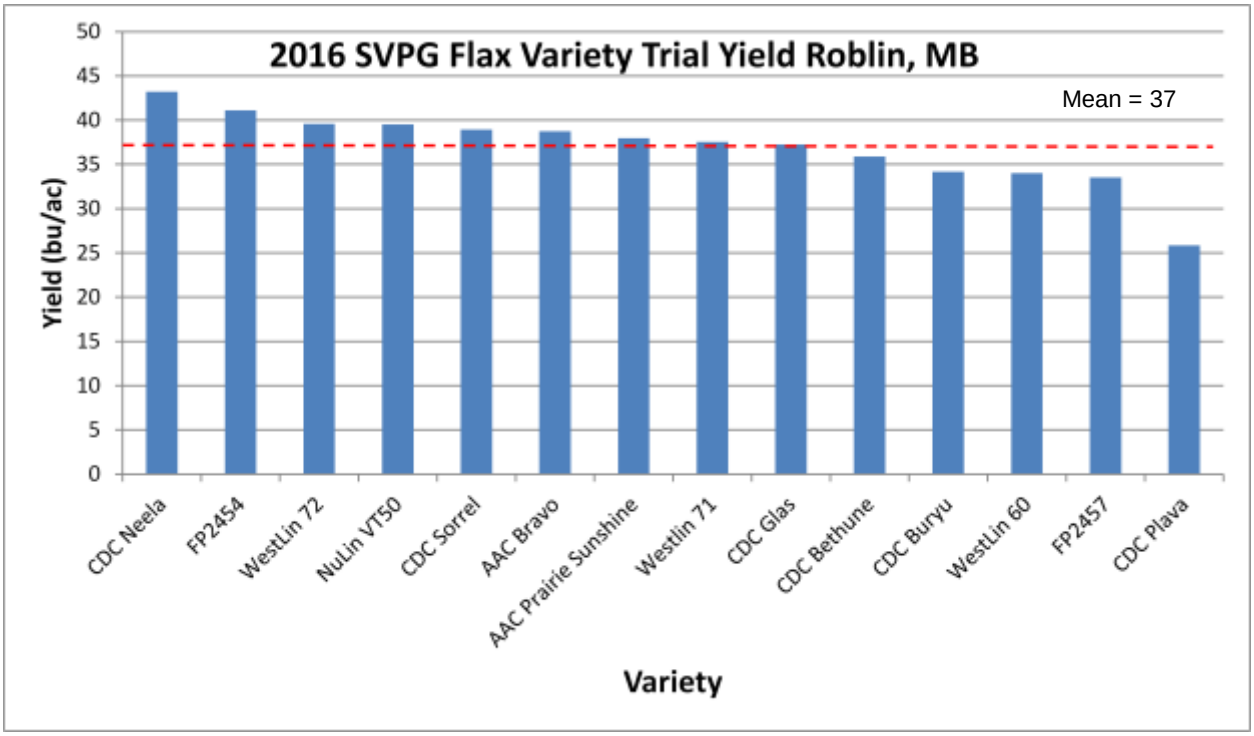



**Figure 1.** 2016 SVPG Flax Variety Trial Yield, Roblin, MB

## Conclusions

This trial was conducted for the Saskatchewan Variety Performance Group and Manitoba Crop Variety Evaluation Team. For a more comprehensive evaluation of the trial across multiple site years, see the 2017 SaskSeed Guide and 2017 SEED Manitoba guide.

## Acknowledgements

PCDF thanks Patti Rothenburger and Craig Linde for their work in coordinating MCVET trials.

## Schedule

This trial will be conducted at PCDF in 2017.

## References

[1] http://www.saskwheatcommission.com/frp/lorem-ipsum-dolor-sitte-amecon-secc-tetur-adipiscing-elivesti-18th-october-2014-1/

# Western Soybean Adaptation Trial

James Frey[1] and Jessica Frey[2]

## Site Information

Location: Roblin, Manitoba
Cooperator: Manitoba Crop Variety Evaluation Team (MCVET)
Parkland Crop Diversification Foundation (PCDF)
Dennis Lange – Farm Production Advisor – Pulses, Manitoba Agriculture
Manitoba Pulse Growers Association

## Background

The Parkland region is characterized by cooler temperatures and a shorter frost-free period than the southern and eastern areas of Manitoba. Improvements in soybean varieties have enabled production in this region, as has an improved understanding of regionally appropriate agronomy (especially seeding date and rate, fertility management and row spacing) [1]. Nevertheless, climatic risks for the grower remain, particularly early or late frosts and early snow cover that prevents harvest. These risks notwithstanding, ongoing varietal improvements are helping to establish the place of soybean in northern producers' crop rotations and increase economic opportunities.

## Objective

To evaluate different soybean varieties grown in the Parkland region.

## 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: 11-52-0-0
Pesticide applied: May 24 – Roundup WeatherMax
June 2 – Roundup WeatherMax
Harvest date: November 10
Product handling: Material from all plots was measured for weight and moisture content.

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and phosphorus was side-banded. Soybeans were inoculated with the appropriate rhizobia. A pre-emergence application of WeatherMax at 0.94 L/ac was applied,

[1] Manitoba Agriculture, Applied Production Research – Roblin, MB
[2] Parkland Crop Diversification Foundation – Roblin, MB

and the same was also used as an in-crop application. Agronomic data, including plant counts (plants/$m^2$), flowering date (days from seeding to 50% of plants flowering), heights (cm) and lodging (1-9) were recorded throughout the growing season.

Due to harvest delays due to the weather, no pre-harvest application was required. The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Samples were sent for analysis to Manitoba Agriculture in Altona and to Arborg for storage.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2016 soil nutrient analysis at the field site.

**Table 13.** 2016 Western Soybean Adaptation Treatments, Roblin, Manitoba

| | | |
|---|---|---|
| 22-60RY | LS SOLAIRE | P006T78R |
| 22-61RY | LS002R24N | PS 0035 NR2 |
| 23-11RY | Mahony R2 | PS 0055 R2 |
| 23-60RY | MCLEOD R2 | S0009-M2 |
| Akras R2 | NSC AUSTIN RR2Y | S001-B1 |
| Bishop R2 | NSC GLADSTONE RR2Y | S003-L3 |
| CFS16.3.01R2 | NSC LEROY RR2Y | S006-W5 |
| EXP 000917 R2 | NSC RESTON RR2Y | S007-Y4 |
| EXP TH 37004R2Y | NSC TILSTON RR2Y | TAMULA R2 |
| Hero R2 | NSC Watson RR2Y | TH 32004R2Y |
| HS 006RYS24 | P002T04R | TH 33003R2Y |
| Lono R2 | P005T13R | TH 33005R2Y |
| LS NorthWester | P006T46R | TH 35002R2Y |

**Table 14.** 2016 Spring Soil Nutrient Analysis from 0-24” Depth at the Roblin, MB Site **

| Nutrients * | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 4 |
| P | 15 ppm (high) | 20 |
| K | 224 ppm (high) | 0 |
| S | 144 lbs/acre (high) | 0 |

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

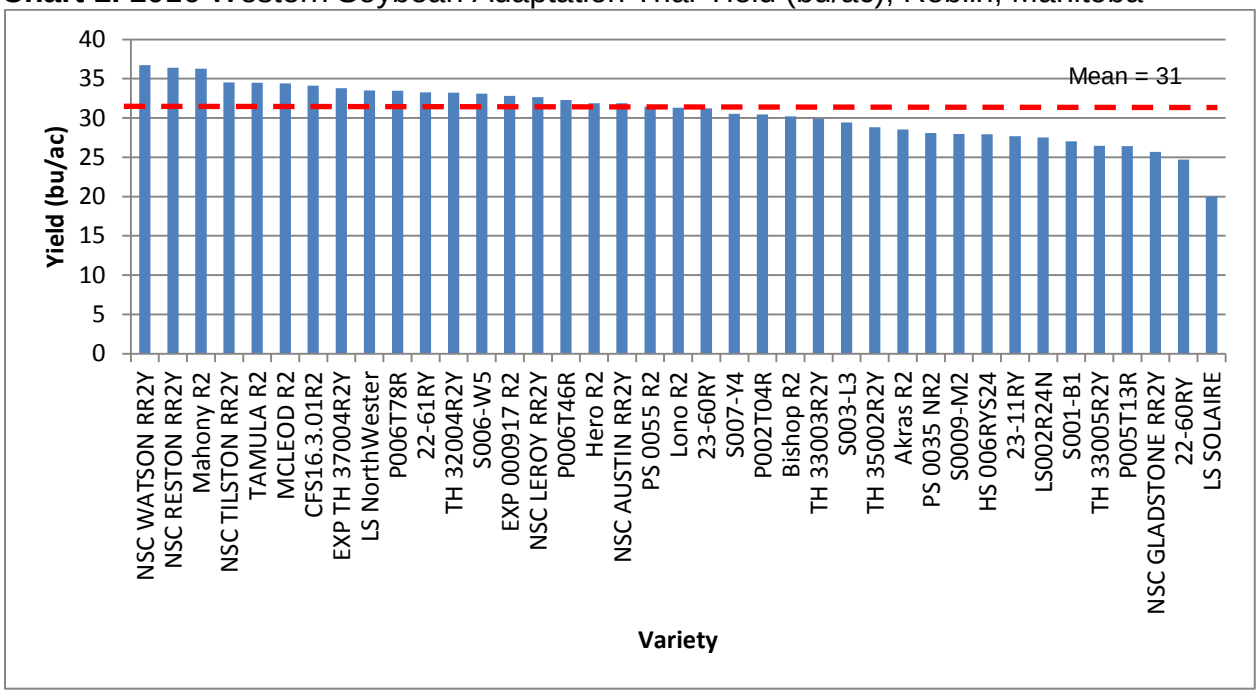
## Results and Discussion

Yield was the primary data parameter collected for this trial. Additional data included plant population, height and maturity ratings. The yield results are shown in Table 3. Chart 1 shows yield in bu/ac.

**Table 3.** 2016 Western Soybean Adaptation Trial Results, Roblin, Manitoba

| Treatment | Yield (kg/ha) |
|---|---|
| NSC WATSON RR2Y | 2473 |
| NSC RESTON RR2Y | 2453 |
| Mahony R2 | 2444 |
| NSC TILSTON RR2Y | 2325 |
| TAMULA R2 | 2323 |
| MCLEOD R2 | 2318 |
| CFS16.3.01R2 | 2297 |
| EXP TH 37004R2Y | 2276 |
| LS NorthWester | 2257 |
| P006T78R | 2254 |
| 22-61RY | 2240 |
| TH 32004R2Y | 2239 |
| S006-W5 | 2229 |
| EXP 000917 R2 | 2209 |
| NSC LEROY RR2Y | 2200 |
| P006T46R | 2174 |
| Hero R2 | 2147 |
| NSC AUSTIN RR2Y | 2146 |
| PS 0055 R2 | 2118 |
| Lono R2 | 2110 |
| 23-60RY | 2103 |
| S007-Y4 | 2058 |
| P002T04R | 2050 |
| Bishop R2 | 2036 |
| TH 33003R2Y | 2015 |
| S003-L3 | 1983 |
| TH 35002R2Y | 1941 |
| Akras R2 | 1923 |
| PS 0035 NR2 | 1891 |
| S0009-M2 | 1885 |
| HS 006RYS24 | 1881 |
| 23-11RY | 1865 |
| LS002R24N | 1855 |
| S001-B1 | 1822 |
| TH 33005R2Y | 1783 |
| P005T13R | 1780 |
| NSC GLADSTONE RR2Y | 1730 |
| 22-60RY | 1665 |
| LS SOLAIRE | 1347 |
| **Grand Mean** | **2073** |
| **% CV** | **12.7** |
| **LSD 5%** | **427** |
| **Significant Difference** | **Yes** |

**Chart 1.** 2016 Western Soybean Adaptation Trial Yield (bu/ac), Roblin, Manitoba




## Conclusions

Yield differences are apparent between soybean varieties, ranging from 20 to 37 bu/ac. Yields were generally lower than those observed at PCDF between 2013 and 2015. As soybean acres continue to climb in Manitoba and the Parkland region, additional soybean research, especially early maturing varieties, will allow producers to make informed decisions on variety selection.

Labour constraints prevented the collection of maturity notes for 2016. Further, due to very wet conditions that delayed harvest, the yield results from Roblin were not included in the SEED Manitoba guide. The results shown here are for one site year only. For more data see the 2017 SEED Manitoba guide.

## Acknowledgements

PCDF thanks Dennis Lange for his cooperation with the trial.

## Schedule

The trial will be conducted at PCDF in 2017.

## References

See the Manitoba Pulse and Soybean Growers soybean research:
http://www.manitobapulse.ca/research/soybeans/

# PULSES

## Manitoba Crop Variety Evaluation Team Fababean Low-Tannin Variety Trial

James Frey[1], Jessica Frey[2]

### Site Information

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

### Background

Although fababean has been cultivated for millennia, it is a relatively new crop to western Canada. It is suited to well-drained, alkaline soils with low levels of salinity. Yields are highest under irrigated conditions, or in areas that receive at least 10 inches of precipitation. If properly inoculated and with adequate moisture, fababean is one of the highest nitrogen-fixing legumes grown on the Prairies, with yields of up to 100 bu/ac [1].

Fababean can be divided into tannin and low-tannin varieties. Tannins interfere with digestibility of feed in monogastric livestock, such as poultry and swine, and at higher concentrations, may result in death [2]. Low-tannin varieties are suitable for livestock feed, producing white flowers and seed that is smaller and lighter coloured than tannin varieties. Smaller seed size corresponds to lower seed costs and easier harvest that does not require specialized equipment. However, low-tannin varieties are considered to be less hardy than tannin varieties [3].

### Objective

To evaluate and demonstrate low-tannin varieties of fababean as an alternative cash crop and high protein feed source.

### Procedure and Project Activities

Treatments: 18 (Table 1)
Replication: 3
Plot size: 1.2m x 5m
Test design: Randomized Complete Block Design
Seeding date: May 9
Fertilizer applied: 46-0-0, 11-52-0-0
Pesticide applied: June 1 – Basagran Forté

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation – Roblin, Manitoba

June 7 – Basagran Forté
June 21 – Assure ll and surfactant
Harvest date: November 11
Product handling: Material from all plots was measured for weight and moisture content.

Prior to seeding the plot land was heavy harrowed twice. The trial was direct-seeded into oat-barley silage stubble and a fertilizer blend was side-banded. Pre-emergence pesticides were not applied, but two in-crop applications of Basagran Forté were applied at 0.91L/ac and a later in-crop application of Assure ll + surfactant was applied at 0.3 + 0.5% L/ac. Agronomic data, including days to maturity, average height in centimeters and lodging (1-9) was recorded throughout the growing season.

The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Composite samples were sent to Altona for content analysis, to the University of Saskatchewan for a livestock feed trial and to Arborg for storage.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2015 soil nutrient analysis at the field site.

**Table 15.** 2016 MCVET Fababean Low Tannin Variety Trial Treatments, Roblin, Manitoba

| | | |
|---|---|---|
| 1052-5 | 667-5 | 826-21 |
| 1055-4 | 707-1-1 | NPZ 14.7310 |
| 1055-7 | 708-1 | NPZ 14.7330 |
| 1065-10 | 751-2 | NPZ 14.7340 |
| 219-16 | 795-2 | Snowbird |
| 656-657-3 | 826-18 | Snowdrop (FB34-2) |

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 41 |
| P | 15 ppm (high) | 20 |
| K | 224 ppm (high) | 0 |
| S | 144 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Yield was the primary data parameter collected for this trial. The yield results are shown in Table 3. The mean yield was 7733 kg/ha, or 115 bu/ac. One numbered variety yielded significantly higher than the check variety, Snowflake. Yield in bu/ac for the trial is shown in Figure 1.

**Table 3.** 2016 MCVET Fababean Low Tannin Variety Trial Results, Roblin, Manitoba

| Treatments | Yield (kg/ha) |
|---|---|
| Snowbird | 8225.0 |
| Snowdrop (FB34-2) | 7455.2 |
| 219-16 | 6805.0 |
| 708-1 | 6819.5 |
| 667-5 | 7999.7 |
| 795-2 | 7861.2 |
| 826-18 | 7983.0 |
| 826-21 | 7713.9 |
| 707-1-1 | 8294.6 |
| 751-2 | 8444.7 |
| 656/657-3 | 8199.0 |
| 1055-4 | 6639.8 |
| 1055-7 | 6501.0 |
| 1052-5 | 7175.0 |
| 1065-10 | 7195.3 |
| NPZ 14.7310 | 9848.8 |
| NPZ 14.7330 | 8873.3 |
| NPZ 14.7340 | 7164.5 |
| **Grand Mean** | **7733.2** |
| **% CV** | **6.2** |
| **LSD 5%** | **800.5** |
| **Significant Difference** | **Yes** |

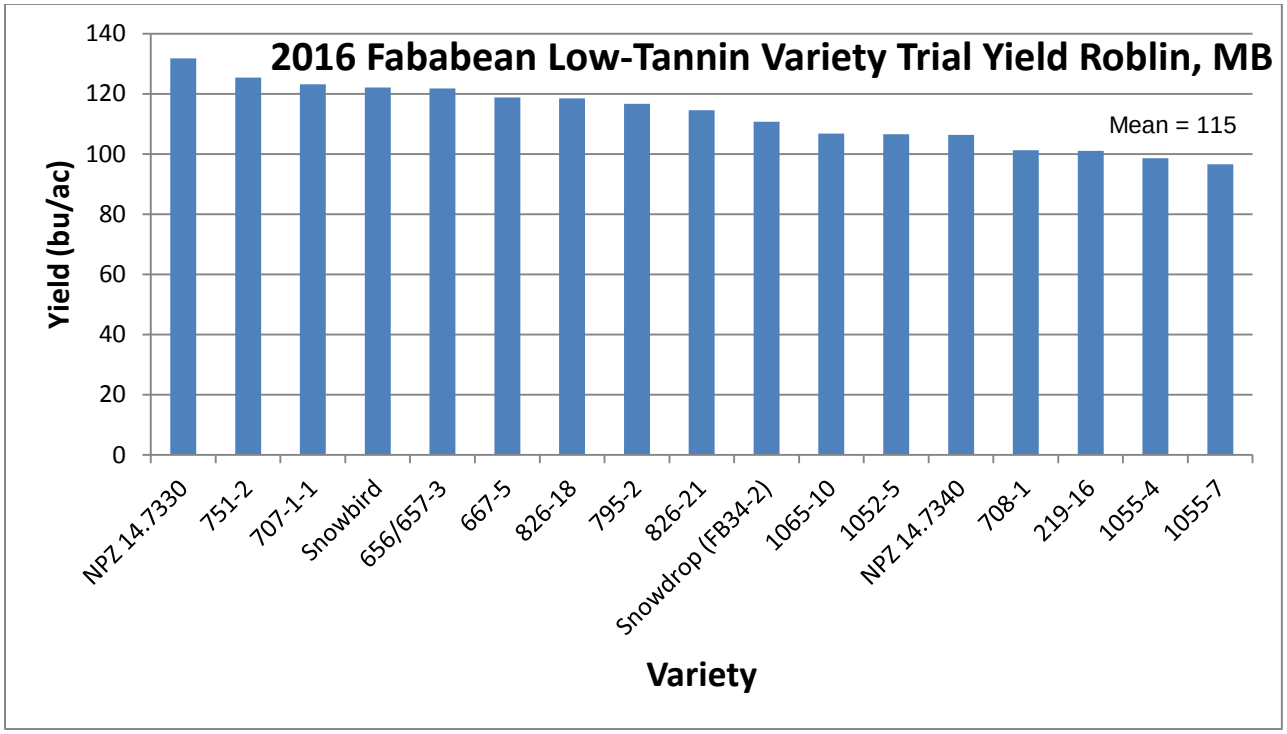



**Figure 1.** 2016 Fababean Low-Tannin Variety Trial Yield (bu/ac), Roblin, Manitoba

## Conclusions

As a high yielding crop with relatively low fertility requirements, fababean holds promise for the Parkland region. Weather patterns in the region are especially suited to production of this crop. Nevertheless, marketing of fababean poses a challenge, and improved economic structures are to support production. Introducing low-tannin varieties may be instrumental in increasing marketing opportunities through use as a livestock feed additive.

## Acknowledgements

PCDF thanks Jaret Horner for cooperating in this trial. Thanks also to Rod Fisher for lending his experience in fababean production.

## Schedule

This trial will be conducted at PCDF in 2017.

## References

[1] Saskatchewan Pulse Growers. Faba bean description and adaptation. http://saskpulse.com/growing/faba-beans/description-and-adaptation/ (retrieved December 16, 2016).
[2] Cornel University, Department of Animal Science. Tannins. http://poisonousplants.ansci.cornell.edu/toxicagents/tannin.html (retrieved December 16, 2016).
[3] Saskatchewan Pulse Growers. Faba bean variety report 2015/16. http://proof.saskpulse.com/files/general/151026_Faba_bean_variety_report.pdf (retrieved December 16, 2016).

# Manitoba Crop Variety Evaluation Team Fababean Tannin Variety Trial

James Frey[1], Jessica Frey[2]

## Site Information

| | |
|---|---|
| Location: | Roblin, Manitoba |
| Cooperator: | Manitoba Crop Variety Evaluation Team (MCVET)<br>Parkway Coop – Roblin, Manitoba |

## Background

For a description of fababean, see *Manitoba Crop Variety Evaluation Team Fababean Low-Tannin Variety Trial, Background*, p. 56.

Fababean can be divided into tannin and low-tannin varieties. Tannins interfere with digestibility of feed in monogastric livestock, such as poultry and swine, and at higher concentrations, may result in death [1]. However, tannin varieties can be used for human consumption. Quality standards for the human market are stringent, and economic returns are reduced for lower grades of seed. Appropriate pest control is important, as well as proper harvest, storage and handling methods [2].

## Objective

To evaluate and demonstrate tannin varieties of fababean as an alternative cash crop and high protein feed source.

## Procedure and Project Activities

| | |
|---|---|
| Treatments: | 24 (Table 1) |
| Replication: | 3 |
| Plot size: | 1.2m x 5m |
| Test design: | Randomized Complete Block Design |
| Seeding date: | May 9 |
| Fertilizer applied: | 46-0-0, 11-52-0-0 |
| Pesticide applied: | June 1 – Basagran Forté<br>June 7 – Basagran Forté<br>June 21 – Assure ll and Surfactant |
| Harvest date: | November 11 |
| Product handling: | Material from all plots was measured for weight and moisture content. |

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. No pre-emergence pesticides were applied but two early in crop application of Basagran Forte was applied at 0.91L/ac and a later in-crop application of Assure ll + Surfactant was applied at 0.3 + 0.5% L/ac. Agronomic data, including days to maturity, average height in centimeters and lodging (1-9) was recorded throughout the growing season.

The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture. Composite samples were sent to Altona for content analysis, to the University of Saskatchewan for a livestock feed trial and to Arborg for storage.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2016 soil nutrient analysis at the field site.

**Table 16.** 2016 MCVET Fababean Tannin Treatments, Roblin, Manitoba

| | | |
|---|---|---|
| 1007-1 | 687-8 | FB9-4 |
| 1007-4 | 688-8 | Laura |
| 1008-1 | 700-19 | LGFN 14943 |
| 1008-3 | 766-3 | RLS 57301 |
| 1013-8 | Boxer | Rodeo |
| 186-4 | CDC Fatima | Tiffany |
| 186S-11 | Fabelle | Trumpet |
| 551-4 | Fanfare | Vertigo |

* Numbered entries are advanced lines that are under evaluation for possible registration
For advanced trials: * Numbered entries are advanced lines with potential advancement to the cooperative testing system.

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 41 |
| P | 15 ppm (high) | 20 |
| K | 224 ppm (high) | 0 |
| S | 144 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Yield was the primary data parameter collected for this trial. The yield results are shown in Table 3. No variety yielded significantly better than the check variety, CDC Fatima. Yield in bu/ac for the trial is shown in Figure 1.

**Table 3.** 2016 MCVET Fababean Tannin Variety Trial Results, Roblin, Manitoba

| Treatment | Yield (kg/ha) |
|---|---|
| CDC Fatima | 8438.3 |
| Fabelle | 8749.7 |
| FB9-4 | 6483.4 |
| 186S-11 | 8794.8 |
| 186-4 | 8007.6 |
| 551-4 | 7840.7 |
| Vertigo | 8924.2 |
| 688-8 | 7008.7 |
| 1007-1 | 7385.8 |
| 1008-3 | 7952.0 |
| 1013-8 | 7569.4 |
| 700-19 | 8355.5 |
| 766-3 | 8476.0 |
| 687-8 | 7650.4 |
| Rodeo | 8606.6 |
| LGFN 14943 | 7924.8 |
| 1007-4 | 8045.8 |
| 1008-1 | 8381.9 |
| Boxer | 9358.5 |
| Laura | 9082.0 |
| Trumpet | 8650.1 |
| Tiffany | 8849.6 |
| RLS 57301 | 8268.4 |
| Fanfare | 7937.9 |
| **Grand Mean** | 8197.6 |
| **% CV** | 11.8 |
| **LSD 5%** | 1597.4 |
| **Significant** | Yes |

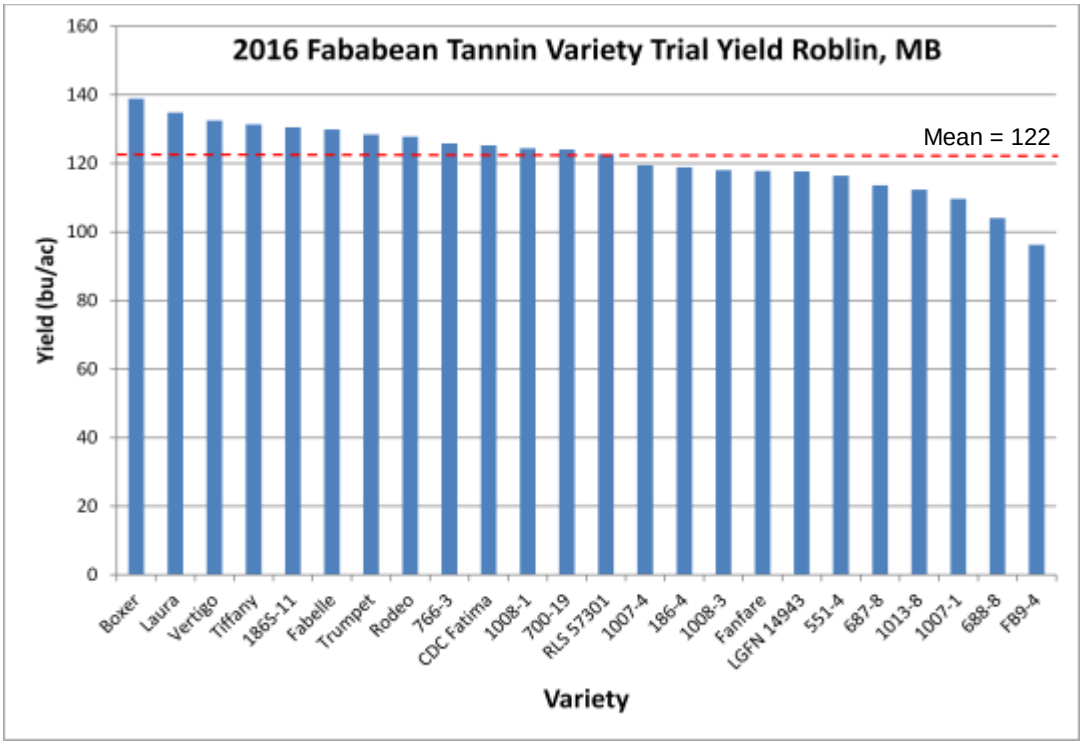



**Figure 1.** 2016 Fababean Tannin Variety Trial Yield (bu/ac), Roblin, Manitoba

## Conclusions

As a high yielding crop with relatively low fertility requirements, fababean holds promise for the Parkland region. Weather patterns in the region are especially suited to production of this crop. Nevertheless, marketing of fababean poses a challenge, and improved economic structures are to support production.

## Acknowledgements

PCDF thanks Jaret Horner for cooperating in this trial. Thanks also to Rod Fisher for lending his experience in fababean production.

## Schedule

This trial will be conducted at PCDF in 2017.

## References

[1] Cornel University, Department of Animal Science. Tannins. http://poisonousplants.ansci.cornell.edu/toxicagents/tannin.html (retrieved December 16, 2016).
[2] Manitoba Agriculture. Fababean production and management. http://www.gov.mb.ca/agriculture/crops/production/fababeans.html (retrieved December 16, 2016).

# SPECIAL CROPS

## Modelling Corn Hybrid Phenology: Do Corn Heat Units Work for the Prairies?

James Frey[1], Jessica Frey[2]

## Site Information

Location: Roblin, Manitoba

Cooperator: Justice Zhanda – University of Manitoba
Dr. Paul Bullock – AAFC, Brandon
Manitoba Corn Growers Association

## Background

Corn production in Canada for grain occurs predominantly in Ontario and Quebec, with just 7% of production occurring in the Prairie Provinces (2011) [1]. Cooler temperatures and shorter frost-free periods on the Prairies result in lower total corn heat unit (CHU) accumulation. However, in recent years, the potential for grain corn production has increased, due to the development of suitable hybrids, as well as changes to weather patterns. In addition to expanding economic opportunities for producers, increased adoption of corn has the potential to improve producers' crop rotations by reducing overall pest and disease pressure [2].

The CHU system was developed by Brown [3], based on climatic conditions that prevail in eastern Canada, and may be less applicable for Prairie climate conditions. The study detailed here comprises research designed to examine whether the CHU system is appropriate for the Prairies. A comparison of CHUs with other indices that are used in the predicting phenological development of corn was also made. These indices include: growing degree days (GDD), general thermal index (GTI) and thermal leaf units (TLU). The research aims to provide information which will help producers select regionally appropriate varieties and assist producers in developing hybrids [4].

## Objective

To evaluate the consistency of CHU accumulation at defined phenological stages of five different CHU ratings at various locations in western Canada.

## Procedure and Project Activities

Treatments: 5 (Table 1)

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation – Roblin, Manitoba

Replication: 3
Plot size: 2.25m x 8m
Test design: Randomized Complete Block Design
Seeding date: May 22
Fertilizer applied: Side-banded: May 25 – 46-0-0, 83 lb/ac; 11-52-0-0, 19 lb/ac
Top-dressed: July 15 – 46-0-0, 40 lb/ac
Pesticide applied: May 20 – Basagran Forté and Roundup WeatherMax
June 24 – Accent
July 15 – Accent and Basagran Forté
Harvest date: Nov 2
Product handling: A 1 $m^2$ whole-plant (stalk plus ear) sample was harvested, weighed, chopped, dried and weighed again to determine moisture content.

Prior to seeding the plot area was cultivated once, and then once heavy harrowed. Fertilizer was banded in a different pass than the seed, which was planted using a Wintersteiger corn planter. A pre-emergence application of RoundUp WeatherMax (0.94 L/ac) and Basagran Forté (0.91 L/ac) were applied. In-crop herbicide applications were applied (Accent, granular [13.5 g/ac], and Accent granular [13.5 g/ac] plus Basagran Forté [0.91 L/ac]). A garden tiller was used for mid-season tillage. An in-crop top-dressing of 40 lb/ac of actual N was applied.

Due to excessive soil moisture and high grain moisture levels at harvest time, the decision was made not to harvest the corn for grain. Instead, a 1 $m^2$ whole-plant (stalk plus ear) sample was harvested, weighed and chopped to simulate silage harvest. The sample was then dried and weighed to determine original moisture content.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2016 soil nutrient analysis at the field site. Table 3 shows the frost free period at the trial site for 2016.

**Table 17.** 2016 Corn Heat Unit Trial Treatments, Roblin, Manitoba

| | |
|---|---|
| CM105xCL30 | P7958AM |
| CO450xCl30 | Pride A4408G2 |
| CO450xCO442 | |

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 123 |
| P | 15 ppm (high) | 19 |
| K | 224 ppm (high) | 0 |
| S | 144 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

**Table 3.** 2016 Seeding Date, First Frost Date and Frost Free Days for CHU Trial at Roblin, MB

| Seeding Date | First Frost Date | Frost Free Days | CHUs |
|---|---|---|---|
| 05/22/16 | 10/6/16 | 137 | 2344 |

## Results and Discussion

Warmer than normal temperatures and timely moisture provided good growing conditions for corn at the PCDF site. However, errors in plot spacing made weed management a challenge for the trial. Weed pressure likely reduced crop performance. High grain moisture levels and excessive late season soil moisture also made harvest difficult.

Silage yield was the primary data parameter collected for this trial. The yield results are shown in Table 4. The mean yield for silage was 9.3 dry matter t/ac.

**Table 4.** 2016 Silage CHU Trial Results at Roblin, MB

| Treatment | Yield, Wet (tons/ac) | Yield, Dry (tons/ac) |
|---|---|---|
| Pride A4408G2 | 19.1 | 8.8 |
| P7958AM | 19.9 | 9.9 |
| CM105xCL30 | 15.9 | 7.7 |
| CO450xCO442 | 19.1 | 9.3 |
| CO450xCL30 | 20.9 | 10.8 |
| **Grand Mean** | **19.0** | **9.3** |

## Conclusions

Developments in corn genetics have allowed the crop to be grown in cooler climates with shorter frost-free periods, such as the Parkland region. This creates new economic opportunities for producers, and also has the potential to improve agronomic factors such as rotation, nutrient and pest management.

## Acknowledgements

PCDF is grateful for the funding provided by the Manitoba Corn Growers Association, and thanks AAFC for providing seed. We further thank Paul Bullock, Justice Zhanda and his assistants for their cooperation in this trial.

## Schedule

This is the final year of the trial.

## References

[1] http://www.statcan.gc.ca/pub/96-325-x/2014001/article/11913-eng.htm
[2] http://www.gov.mb.ca/agriculture/crops/production/small-management-decision.html
[3] Brown, D.M. (1969). *Heat units for corn in southern Ontario*. Ontario Department of Agriculture and Food, Toronto, Ontario Information Leaflet 111/31.
[4] Justice Zhanda, University of Manitoba. Personal communication.

# Hemp Fibre and Grain Variety Trial

James Frey[1], Jessica Frey[2]

## Site Information

Location: Roblin, Manitoba
Cooperator: Parkland Crop Diversification Foundation (PCDF)

## Background

Since 1998, the first year hemp production was legalized in Canada, PCDF has played a central role in establishing an agronomic framework for hemp cultivation on the Prairies. The crop is remarkably versatile, capable of producing large yields of both fibre and grain. Varieties grown primarily for fibre are typically taller than grain varieties, although dual-purpose varieties are also available.

Recent changes to legislation around hemp production are designed to simplify the process for growers. For a detailed list of those changes, see the Health Canada Notice to Industry, Section 56 Class Exemption in Relation to the Industrial Hemp Regulations [1]. It is expected that the changes will enhance the industry's production and market development goals [2].

An important market development in 2016 was a major increase in the volume of shelled hemp seed to South Korea, with exports to that destination increasing by 6354% [2]. Additionally, a new company, Hemp Sense, will be setting up a hemp fibre processing plant in Gilbert Plains, Manitoba. The plant will buy fibre left after the grain harvest, and will also process hemp grain. The plant is targeting production for 2017.

Contact Hemp Sense Inc at info@hempsense.net for details.

For additional information on hemp fibre and grain production, as well as market information, see the 2015 PCDF Annual Report, pp. 125-169.

## Objective

To evaluate different varieties of hemp for fibre and grain quality.

## Procedure and Project Activities

Treatments: 12
Replication: 4
Plot size: 1.2m x 5m
Test design: Randomized Complete Block Design

[1] Manitoba Agriculture, Applied Production Research – Roblin, MB
[2] Parkland Crop Diversification Foundation – Roblin, MB

Seeding date: May 24
Fertilizer applied: 46-0-0, 11-52-0-0
Pesticide applied: May 20 – Roundup WeatherMax
Harvest date: Fiber harvested August 12, Grain harvested October 14
Product handling: Material from all plots was measured for weight and moisture content.

Prior to emergence, the plot was sprayed with glyphosate. The trial was direct seeded into barley silage stubble, and a fertilizer blend was side-banded. Fibre samples were harvested for each plot, dried and sent to the Composites Innovation Centre in Winnipeg. Due to unusually wet conditions at harvest time, it was not possible to harvest the plots with a small plot combine. A 1 $m^2$ subsample was harvested from each plot. The subsamples were passed through a small plot combine and weight and moisture was recorded.

Table 1 shows the varieties grown for the trial, and Table 2 shows the results of the 2016 soil nutrient analysis at the field site.

**Table 18.** 2016 Hemp Fibre and Grain Variety Trial Treatments, Roblin, MB

| | | |
|---|---|---|
| Canda | Debbie | Katani |
| CFX-1 | Delores | Picolo |
| CFX-2 | Grandi | Silesia |
| CRS-1 | Joey | X59 |

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 72 |
| P | 15 ppm (high) | 20 |
| K | 224 ppm (high) | 0 |
| S | 144 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Fibre samples were taken from each plot, using a crop binder. The samples were dried and sent to the Composites Innovation Centre in Winnipeg for analysis. Testing for THC levels was also conducted for each variety.

Due to unusually wet weather conditions during the harvest period, the hemp trial was not harvested in time for the site data to be included in the 2017 SEED Manitoba guide. See that publication (p. 102) for grain yield data for Carberry and Melita.

## Acknowledgements

PCDF thanks Jeff Kostuik of Hemp Genetics International for his help in facilitating the trial, as well as assisting during the PCDF Field Day.

## Schedule

The trial will occur at PCDF in 2017.

## References

[1] Heath Canada (2016). Notice to industry regarding *Section 56 Class Exemption in Relation to the Industrial Hemp Regulations.* http://files.constantcontact.com/c90c7f21401/15d47c8d-1dde-48b9-8012-ece14544f9a3.pdf (accessed December 20, 2016).
[2] Canadian Hemp Trade Alliance (2016). CHTA AGM president's report. November 14, 2016, Saskatoon, SK.

# Quinoa Variety Trial

James Frey[1], Jessica Frey[2]

## Site Information

Location: Roblin, Manitoba
Cooperator: Percy Phillips – Phillex Ltd., Portage la Prairie, Manitoba
Craig Linde – CMCDC, Carberry, Manitoba

## Background

Quinoa, meaning "mother grain" in the Inca language, is a broadleaf annual plant that produces small, round seeds with excellent nutritional qualities [1,2]. Building on the promising results of collaboration between Phillex Ltd. and PCDF in 2014 and 2015, Phillex Ltd. entered five quinoa varieties for a trial with PCDF.

## Objective

To evaluate five varieties of quinoa grown in the Parkland region.

## Procedure and Project Activities

Treatments: 5 (Table 1)
Replication: 3
Plot size: 1.2m x 5m
Test design: Randomized Complete Block Design
Seeding date: May 18
Fertilizer applied: 46-0-0, 11-52-00
Pesticide applied: May 20 – Roundup WeatherMax
Harvest date: October 14
Product handling: Material from all plots was measured for weight and moisture content.

Prior to seeding the plot land was heavy harrowed twice. The trial was direct seeded into oat-barley silage stubble and a fertilizer blend was side-banded. A pre-emergence application of RoundUp WeatherMax was applied at 0.71 L/ac but no in-crop herbicides were applied.

The plots were harvested with a Wintersteiger small plot combine. Material from each plot was dried and cleaned, and measured for weight and moisture.

**Table 19.** 2016 Quinoa Variety Trial Treatments at Roblin, Manitoba

| | | | | |
|---|---|---|---|---|
| PHX16-01 | PHX16-02 | PHX16-03 | PHX16-07 | PHX16-08 |

[1] Manitoba Agriculture, Applied Production Research – Roblin, Manitoba
[2] Parkland Crop Diversification Foundation – Roblin, Manitoba

**Table 2.** 2016 Spring Soil Nutrient Analysis from 0-24" Depth at the Roblin, MB Site[1]

| Nutrient[2] | Estimated Available Nutrients | Fertilizer Applied (actual lbs) |
|---|---|---|
| N | 69 lbs/acre (med) | 70 |
| P | 15 ppm (high) | 10 |
| K | 224 ppm (high) | 0 |
| S | 166 lbs/acre (high) | 0 |

[1] Analysis by Agvise Laboratories
[2] N = Nitrate; P = Phosphorus (Olsen); K = Potassium; S = Sulphate

## Results and Discussion

Due to confidentiality and the proprietary rights of Phillex Ltd., the variety names have been coded.

Examination of the seed panicles at the end of the growing season showed that seed set had been poor, with little mature seed. Yields across all varieties were negligible, with some plots yielding no seed. It is surmised that this result was likely caused by the sterilization of pollen and flowers due to high temperatures during the forming of pollen tubes by the quinoa plants [2]. Nevertheless, the yield potential for quinoa remains high (see PCDF 2014 and 2015 quinoa variety trials). A better understanding of the adverse abiotic factors affecting quinoa, as well as of cultivation methods that minimize or overcome those factors in Manitoba, is required.

## Conclusions

Previous years' experience with quinoa at PCDF demonstrates its potential as a commercial crop in Manitoba. Results for the top yielding variety (PHX-01) were 2158 lb/ac in 2014 and 1352 lb/ac in 2015. More research is required to identify appropriate varieties and cultivation methods for Manitoba's climate.

## Acknowledgements

PCDF thanks Percy Phillips for cooperating with this trial and for assisting at the PCDF Field Day.

## Schedule

This trial will be conducted at PCDF in 2017.

## References

[1] University of Wisconsin, University of Minnesota (1992). Alternative Field Crops Manual: Quinoa. https://www.hort.purdue.edu/newcrop/afcm/quinoa.html (accessed December 28, 2016).
[2] Jacobsen, S., Mujica, A. and Jensen, C. (2003). The resistance of quinoa (*Chenopodium quinoa* Willd.) to adverse abiotic factors. Food Reviews International, 19-1&2, 99-109. http://inspirationsdag.ku.dk/arkiv/2009/materialer/abiotic.pdf (accessed December 28, 2016).

## PCDF – Year in Pictures

The PCDF summer crew.

Enjoying the lunch at the PCDF Field Day.

Jessica works in the cold with the combine.

James holds the last bag of 2016. Hurray!

James and Mackenzie harvest barley.


The Diversification Centres at Ag Days.