CROP DIVERSIFICATION 2018

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Project duration May 2018 to Aug 2018

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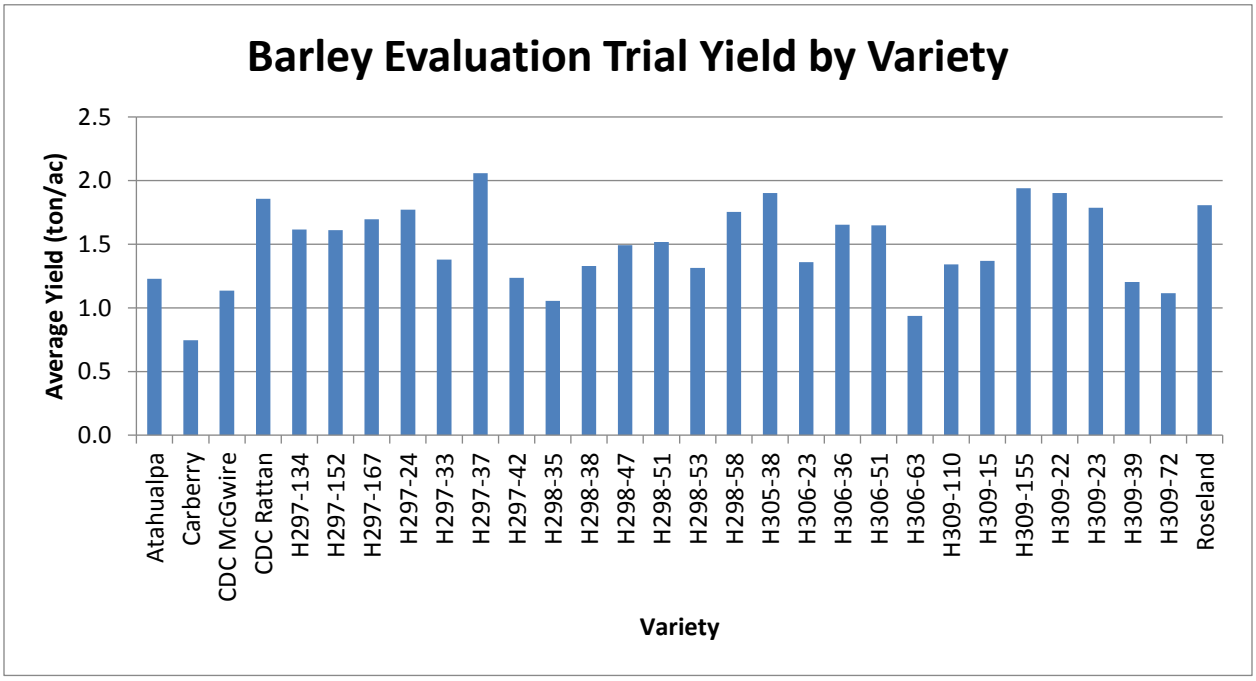
Collaborators Ana Badea – Barley Breeder, AAFC Brandon

Results 2018

Figure 1: RoundUp Ready soybean varieties and yield performance at Carberry in 2018.



Materials & Methods

Experimental Design	Randomized complete block design with 3 replicates
Seeding Date	May 28, 2018
Harvest Date	August 30, 2018
Fertility	91 lb/ac actual N (46-0-0); 30lb/ac actual Phos (11-52-0)
In Crop Weed Control	Tundra applied June 6, 2018 Achieve applied June 19, 2018
Fungicide	No fungicide applied

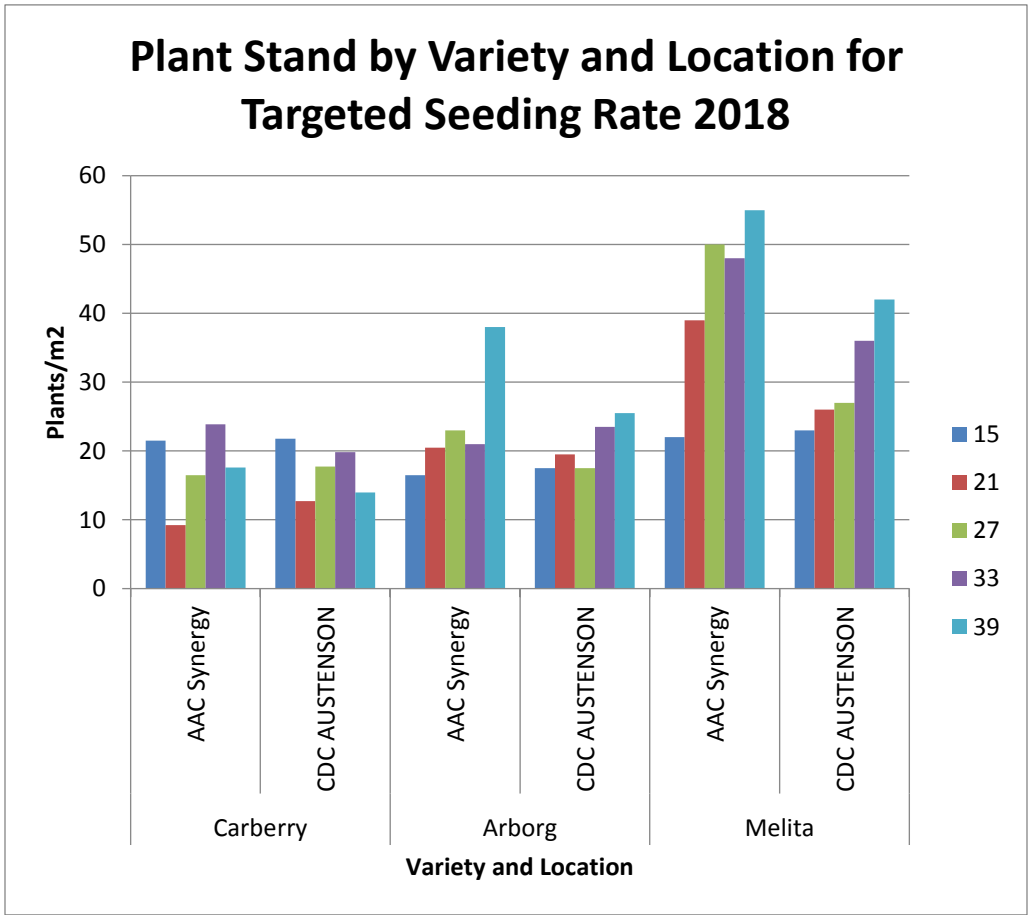
Determining Optimum Target Plant Stands Barley in Manitoba

Project duration	May 2017 – August 2018
Objectives	To determine if optimum seeding rates differ by crop type and for individual varieties and to assist producers with the annual question of what target plant stands and seeding rates to aim for regarding newer spring cereal varieties. This project was conducted at four Manitoba Agriculture diversification centres in Manitoba including at Carberry, Arborg, Roblin and Melita.
Collaborators	Anastasia Kubinec – Manager, Crop Industry Development, Manitoba Agriculture Anne Kirk – Crop Industry Development, Manitoba Agriculture Rejean Picard and Earl Bargen – Farm Production Extension

Results

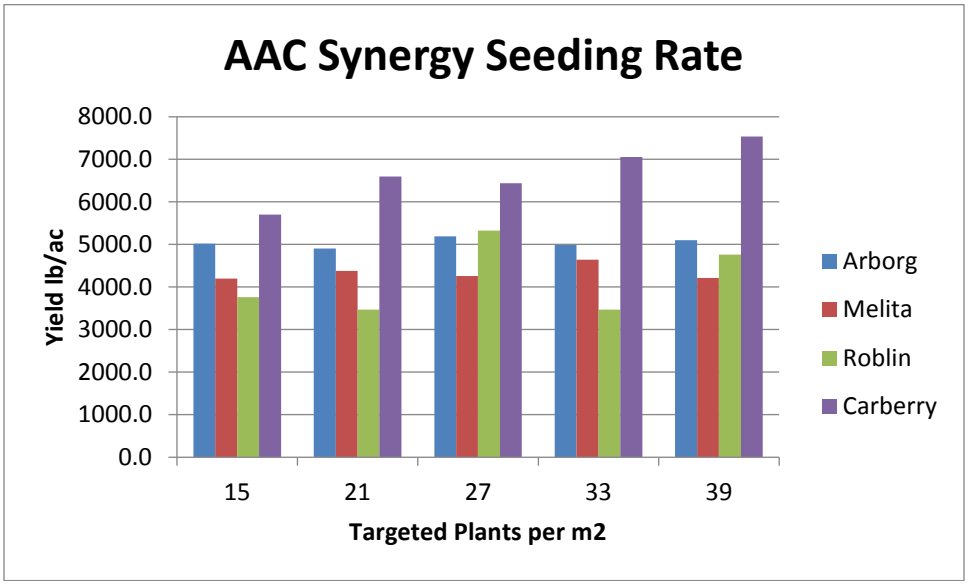
The cumulative results of the two years for this project will be available at a later date. This report concerns only the structure of the trial for 2018.

Figure 1: Diversification Centres comparative oats plant stand by variety and by seeding rate in 2018



Note: Roblin data excluded from plant stand due to error in plant counting

Figure 2: Yield demonstrated for variety AAC Synergy by seeding rate in 2018



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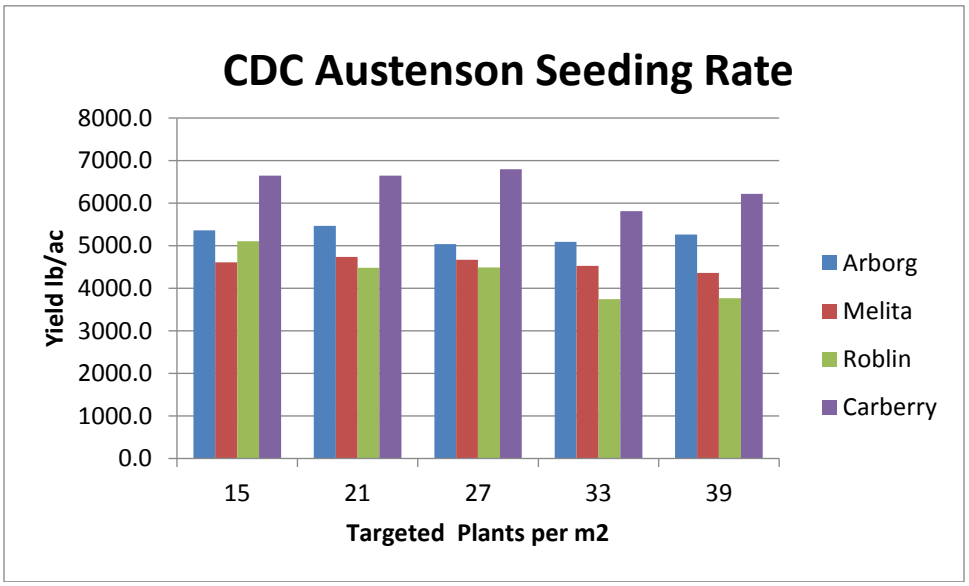


Background

This project was developed and implemented by Manitoba Agriculture.

Carberry Materials & Methods

Experimental Design	Random Complete Block Design
Entries	5 seeding rates x 2 varieties
Seeding	May 9
Harvest	Aug 21

(Carberry specific)

Data collected	**Date collected**
Emergence population	May 31
% Seed mortality	May 31
Head counts	Jul 10
Lodging	Aug 21
Yield and Moisture	Aug 21

Table 1: Carberry Spring 2018 Soil Test

	Available
N	18 lb/ac
P	20 ppm
K	257 ppm
S	24 lb/ac

Materials & Methods

Experimental Design	Randomized complete block design with 3 replicates
Seeding Date	May 28, 2018
Harvest Date	August 30, 2018
Fertility	91 lb/ac actual N (46-0-0); 10lb/ac actual Phos (11-52-0)
In Crop Weed Control	Tundra applied May 29, 2018
Fungicide	No fungicide applied

Determining Optimum Target Plant Stands for Oats in Manitoba

Project duration May 2017 – August 2018

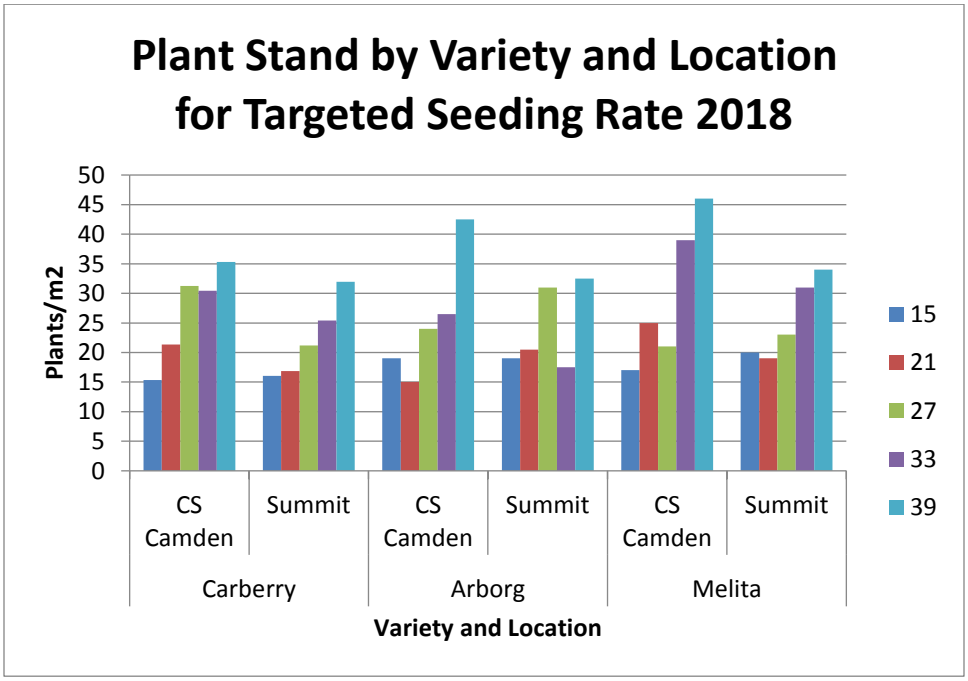
Objectives To determine if optimum seeding rates differ by crop type and for individual varieties and to assist producers with the annual question of what target plant stands and seeding rates to aim for regarding newer spring cereal varieties. This project was conducted at four Manitoba Agriculture diversification centres in Manitoba including at Carberry, Arborg, Roblin and Melita.

Collaborators: Anastasia Kubinec – Manager, Crop Industry Development, Manitoba Agriculture
Anne Kirk – Crop Industry Development, Manitoba Agriculture
Rejean Picard and Earl Bargen – Farm Production Extension

Results

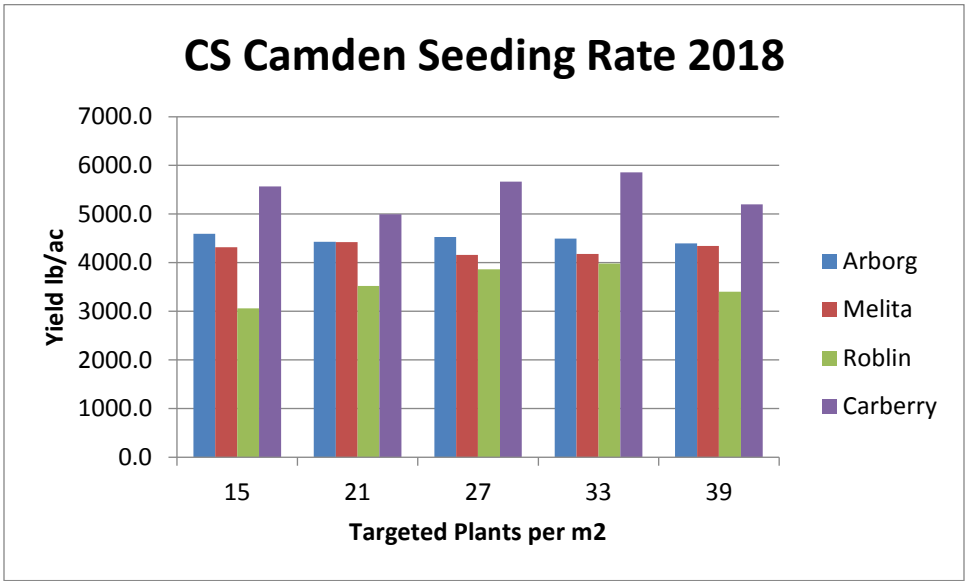
The cumulative results of the two years for this project will be available at a later date. This report concerns only the structure of the trial for 2018, but results are illustrated across the four Diversification Centres in Roblin, Carberry, Melita and Arborg.

Figure 1: Diversification Centres comparative oats plant stand by variety and by seeding rate in 2018



Note: Roblin data excluded from plant stand due to error in plant counting

Figure 2: Yield demonstrated for variety CS Camden by seeding rate in 2018



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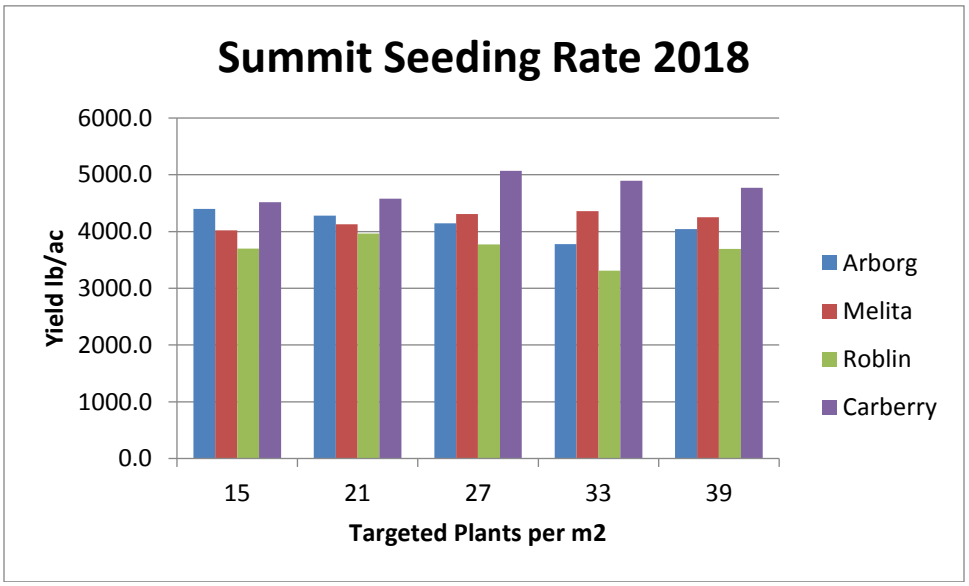


Background

This project was developed and implemented by Manitoba Agriculture.

Carberry Materials & Methods

Fertility	91 lb/ac actual N (46-0-0); 10lb/ac actual Phos (11-52-0)
In Crop Weed Control	Buctril M applied May 29, 2018
	Reglone Applied August, 2018

Fungicide	No fungicide applied
Experimental Design	Random Complete Block Design
Entries	10 entries for each cereal
Seeding	May 9
Harvest	Aug 21

Data collected	**Date collected**
Emergence	May 9
% Seed mortality	May 31
Head counts	Jul 12
Lodging	Aug 21
Yield	Aug 21
Moisture	Aug 21

Table 1: Carberry Spring 2018 Soil Test

	Available
N	18 lb/ac
P	20 ppm
K	257 ppm
S	24 lb/ac

Determining Optimum Target Plant Stands for Spring Wheat in Manitoba

Project duration May 2017 – August 2018

Objectives To determine if optimum seeding rates differ by crop type and for individual varieties and to assist producers with the annual question of what target plant stands and seeding rates to aim for regarding newer spring cereal varieties. This project was conducted at four Manitoba Agriculture diversification centres in Manitoba including at Carberry, Arborg, Roblin and Melita.

Collaborators Anastasia Kubinec – Manager, Crop Industry Development, Manitoba Agriculture
Anne Kirk – Crop Industry Development, Manitoba Agriculture
Rejean Picard and Earl Bargen – Farm Production Extension

Results

The cumulative results of the two years for this project will be available at a later date. This report concerns only the structure of the trial for 2018.

Figure 1: Diversification Centres comparative barley plant stand by variety and by seeding rate in 2018

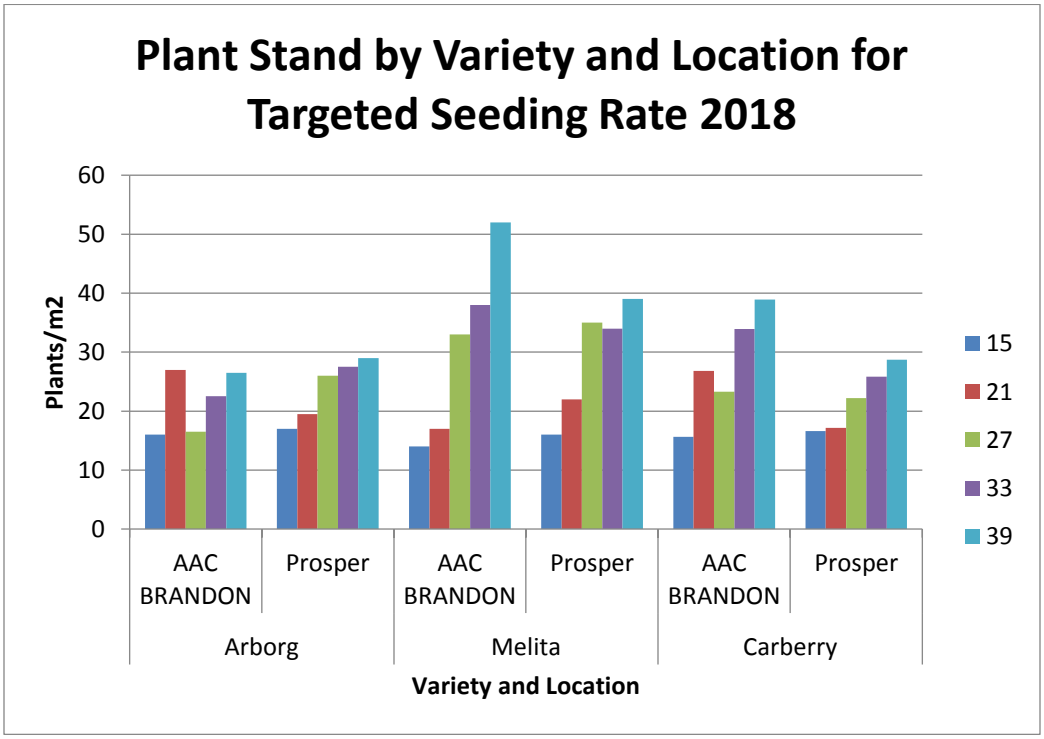


Figure 2: Yield demonstrated for variety AAC Brandon by seeding rate in 2018

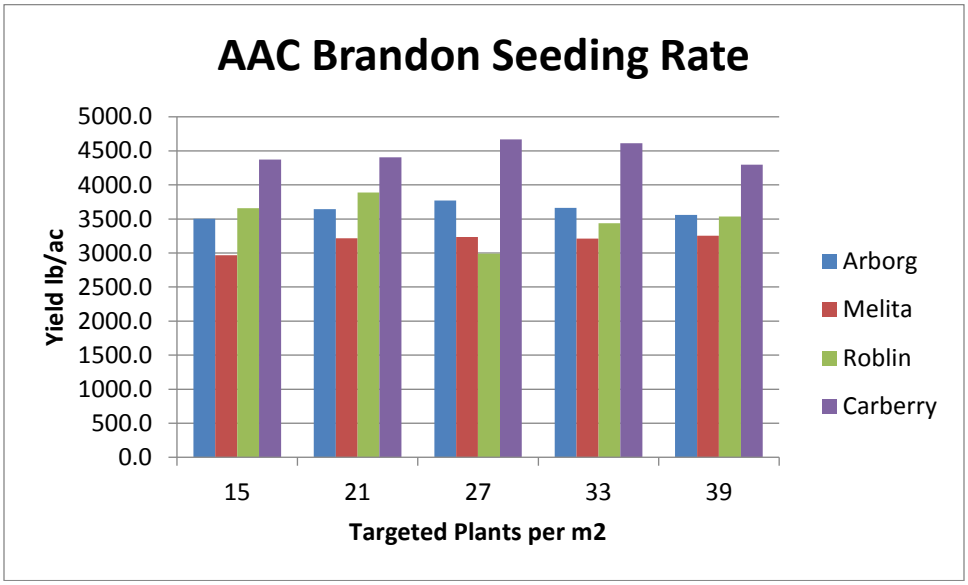
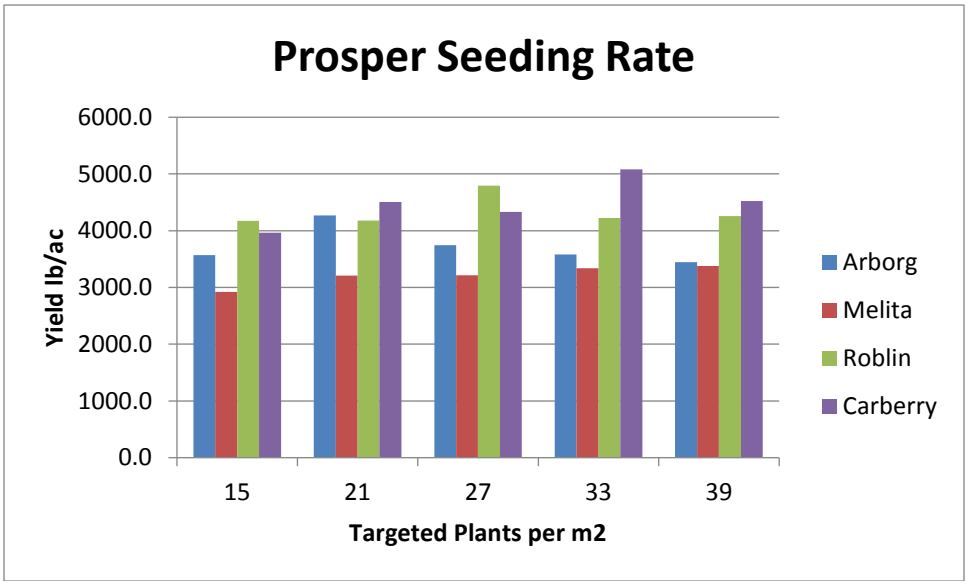


Figure 3: Yield demonstrated for variety Prosper by seeding rate in 2018



Background

This project was developed and implemented by Manitoba Agriculture.

Carberry Materials & Methods

Experimental Design	Random Complete Block Design
Entries	2 varieties x 5 seeding rates
Seeding	May 9
Harvest	Aug 21
Fertility	132 lb/ac actual N (46-0-0)

In Crop Weed Control	Tundra applied May 29, 2018 Achieve applied June 19, 2018 Reglone Applied August, 2018

Data collected	**Date collected**
Emergence population	May 31
% Seed mortality	May 31
Head counts	July 11
Lodging	Aug 21
Yield and Moisture	Aug 21

Table 1: Carberry Spring 2018 Soil Test

	Available
N	18 lb/ac
P	20 ppm
K	257 ppm
S	24 lb/ac

Manitoba Agriculture Wheat Fusarium Head Blight Risk Model

Project duration	May 2018 – August 2018
Objectives	To increase understanding of resulting Fusarium Head Blight (FHB) infection for wheat and barley based on the current model.
Collaborators	Holly Derksen – Field Pathologist, Crop Industry Development Anne Kirk – Cereal Specialist, Crop Industry Development Rejean Picard and Earl Bargen – Farm Production Extension

Results

Grain samples were sent away for Fusarium specific analysis, but no report for these results has yet been generated. PCDF will post a link when this report is available. Other collected data and yield results for the Carberry site are included below.

Figure 1: Yield by Location and Timing of Fungicide Application for AAC Brandon

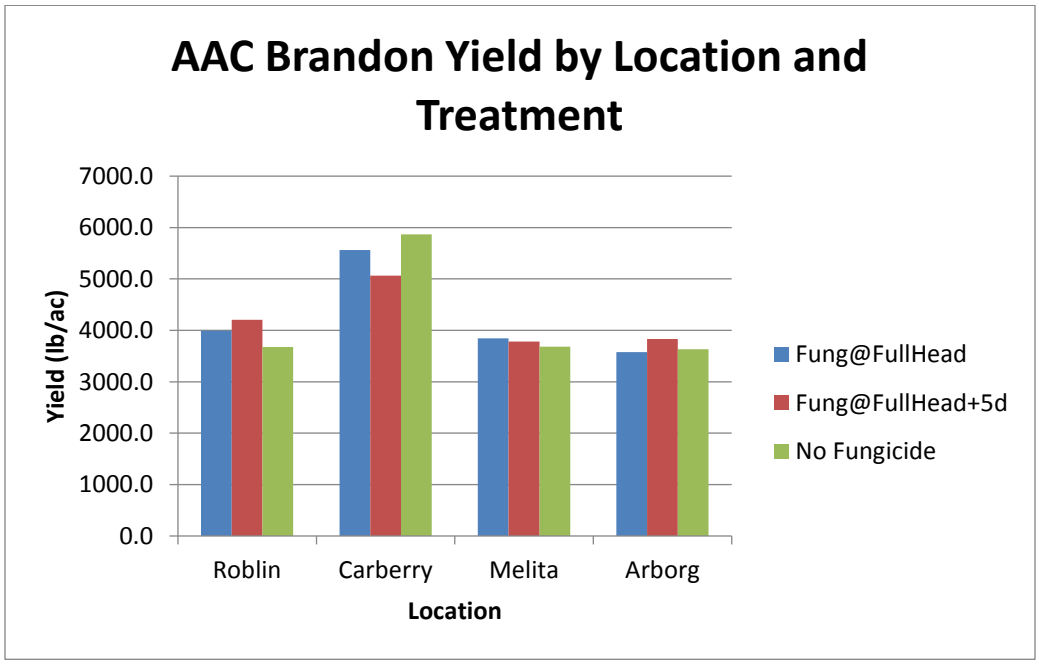


Figure 2: Yield by Location and Timing of Fungicide Application for AAC Tenacious

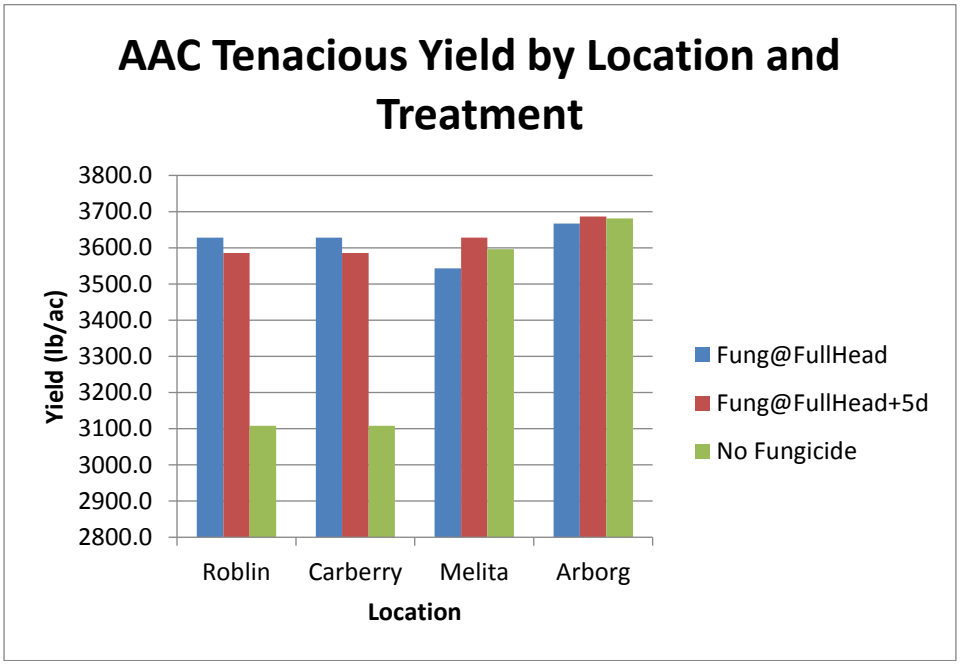
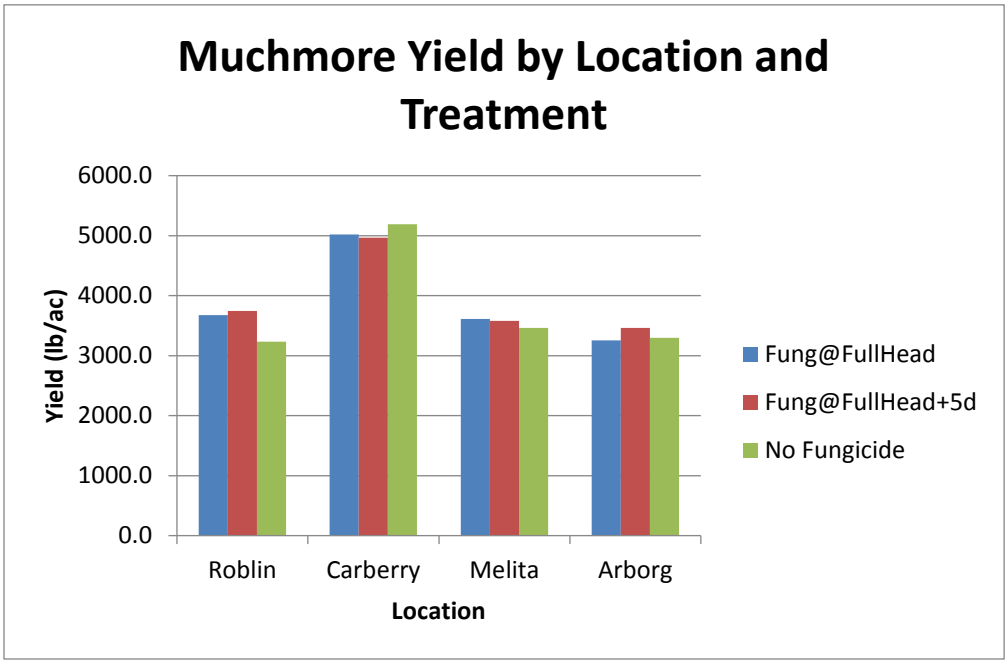


Figure 3: Yield by Location and Timing of Fungicide Application for Muchmore



Background

Farmers need improved decision-making tools in order to assess the local risk of Fusarium Head Blight (FHB). Better tools would improve judgement on whether or not to use fungicide and how to time application. The project recognizes that the current model for predicting the presence of FHB is

insufficient and is gathering data across the province for different treatment plans using known fusarium resistant or fusarium susceptible varieties.

Carberry Materials & Methods

Experimental Design	Random Complete Block Design
Entries	9 (3 varieties x 3 treatments)
Seeding	May 15
Harvest	Aug 30
Varieties	AAC Tenacious
	AAC Brandon
	Muchmore
Fertility:	132 lb/ac actual N (46-0-0)
In Crop Weed Control:	Tundra applied May 29, 2018
	Achieve applied June 19, 2018
	Roundup Applied August, 2018
Fungicide	Prosaro applied according to treatments
Target population	30 plants/ft2 assuming 15% seedling mortality
Treatments	No fungicide
	Fungicide at full head emergence/early anthesis
	Fungicide five days after full head emergence/early anthesis

Data collected	**Date collected**
Emergence	Jun 5
Yield	Sept 17
Moisture	Sept 17

Samples sent away to analyze for fusarium damaged kernels and kernel accumulation of DON

Table 1: Carberry Spring 2018 Soil Test

	Available	Needed for Wheat
N	18 lb/ac	150 lb/ac
P	10 ppm	20 lb/ac
K	257 ppm	0 lb/ac
S	24 lb/ac	0 lb/ac

Manitoba Agriculture Barley Fusarium Head Blight Risk Model

Project duration May 2018 – August 2018

Objectives To increase understanding of resulting Fusarium Head Blight (FHB) infection for wheat and barley based on the current model.

Collaborators Holly Derksen – Field Pathologist, Crop Industry Development
Anne Kirk – Cereal Specialist, Crop Industry Development
Rejean Picard and Earl Bargen – Farm Production Extension

Results

Grain samples were sent away for Fusarium specific analysis, but no report for these results has yet been generated. PCDF will post a link when this report is available. Other collected data and yield results for the Roblin site are included below.

Figure 1: Yield by Location and Timing of Fungicide Application for AAC Synergy

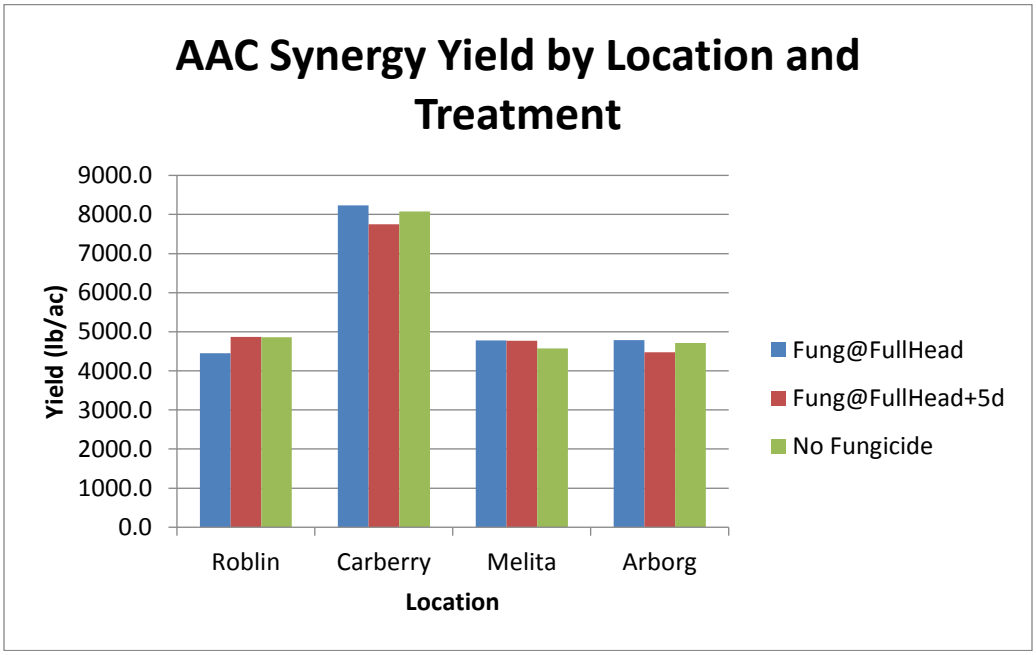


Figure 2: Yield by Location and Timing of Fungicide Application for CDC Austenson

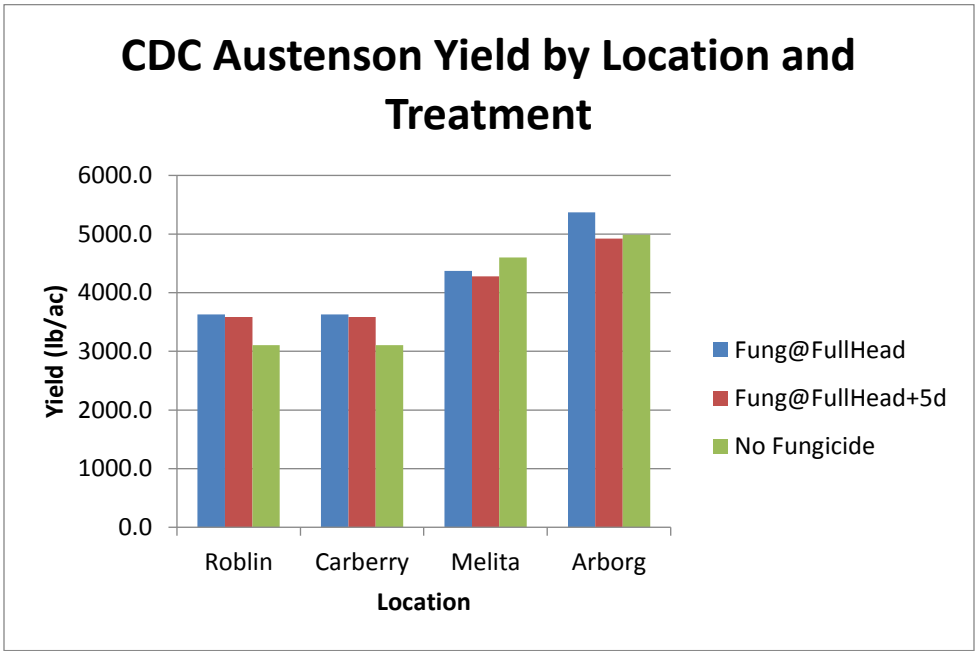
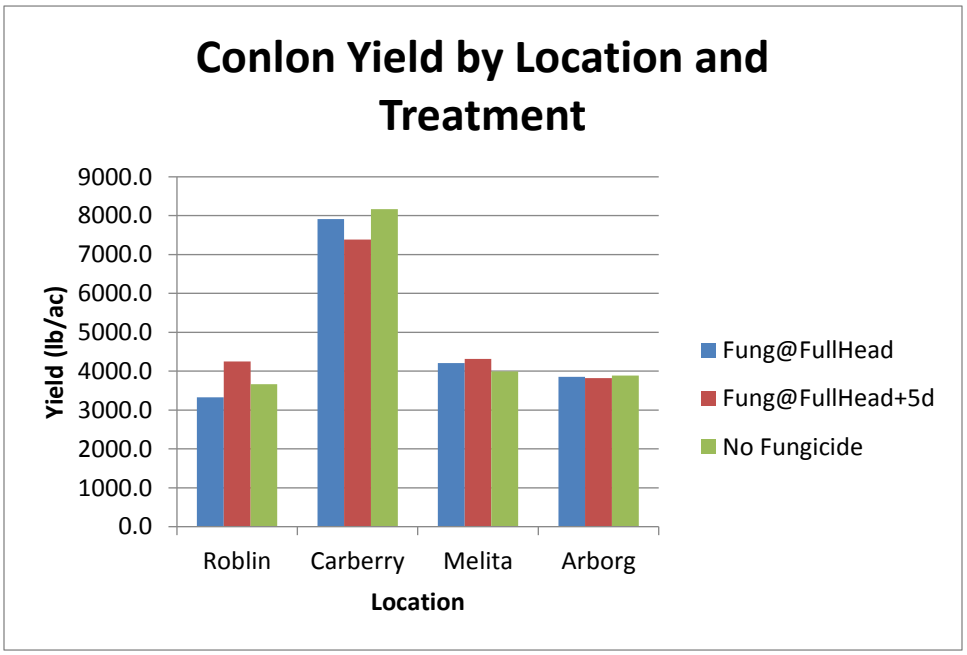


Figure 3: Yield by Location and Timing of Fungicide Application for Conlon



Background

Farmers need improved decision-making tools in order to assess the local risk of Fusarium Head Blight (FHB). Better tools would improve judgement on whether or not to use fungicide and how to time application. The project recognizes that the current model for predicting the presence of FHB is

insufficient and is gathering data across the province for different treatment plans using known fusarium resistant or fusarium susceptible varieties.

Carberry Materials & Methods

Experimental Design	Random Complete Block Design
Entries	9 (3 varieties x 3 treatments)
Seeding	May 14
Harvest	Aug 15
Varieties	CDC Austenson
	Conlon
	AAC Synergy
Target population	30 plants/ft2 assuming 15% seedling mortality
Fertility	91 lb/ac actual N (46-0-0); 30lb/ac actual Phos (11-52-0)
In Crop Weed Control:	Tundra applied May 29, 2018
	Achieve applied June 19, 2018
Fungicide	Prosaro applied according to treatments
Treatments	No fungicide
	Fungicide at full head emergence/early anthesis
	Fungicide five days after full head emergence/early anthesis

Data collected	**Date collected**
Yield	Aug 15
Moisture	Aug 15

Samples sent away to analyze for fusarium damaged kernels and kernel accumulation of DON

Table 1: Carberry Spring 2018 Soil Test

	Available	Needed for Barley
N	29 lb/ac	120 lb/ac
P	10 ppm	40 lb/ac
K	222 ppm	
S	118 lb/ac	

Management Practices for High Yielding Spring Wheat

Project duration May 2018 – August 2018

Objectives The objective of project is to quantify the yield benefit of intensive management practices in spring wheat, and to determine if these management practices provide the same benefit to a variety of cultivars.

Collaborators Anastasia Kubinec – Manager, Crop Industry Development, Manitoba Agriculture
Anne Kirk and Rejean Picard – Crop Industry Development, Manitoba Agriculture

Results

The result on the protein analysis will be available at a later date. For yield results by treatment please see Figure 1 – Figure 5. For treatment outline please see Table 1.

Figure 1: Yield results by location and variety for Treatment 1

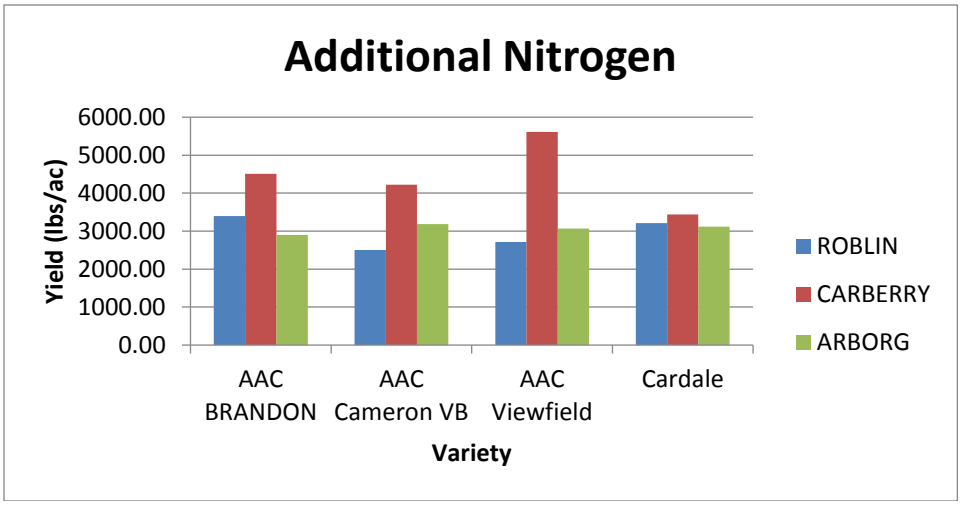


Figure 2: Yield results by location and variety for Treatment 2

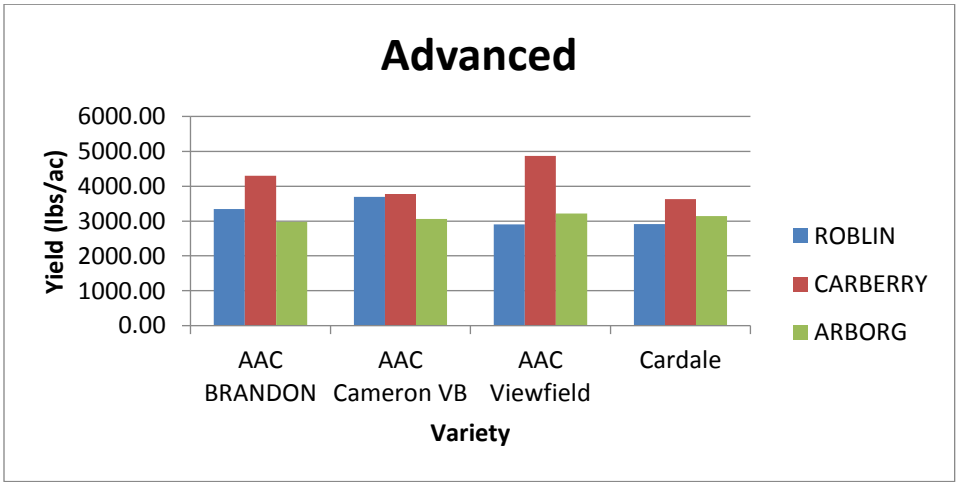


Figure 3: Yield results by location and variety for Treatment 3

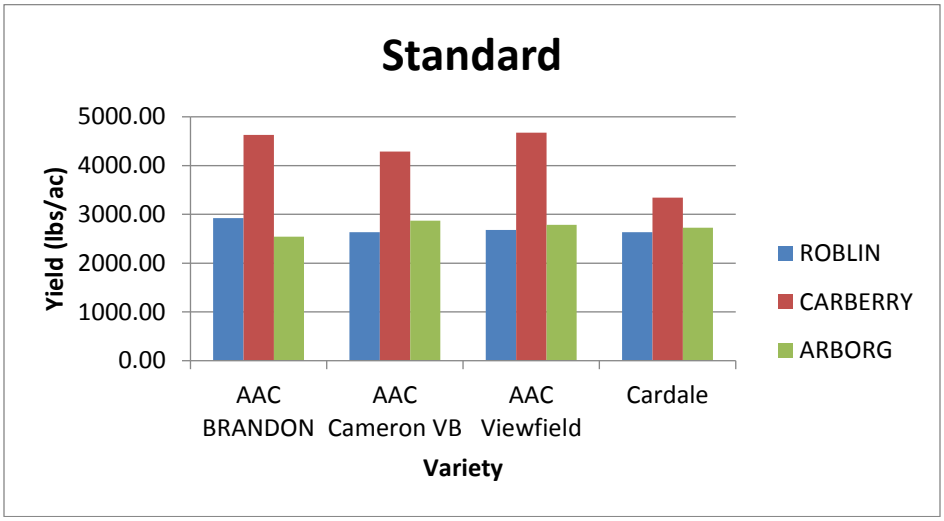


Figure 4: Yield results by location and variety for Treatment 4

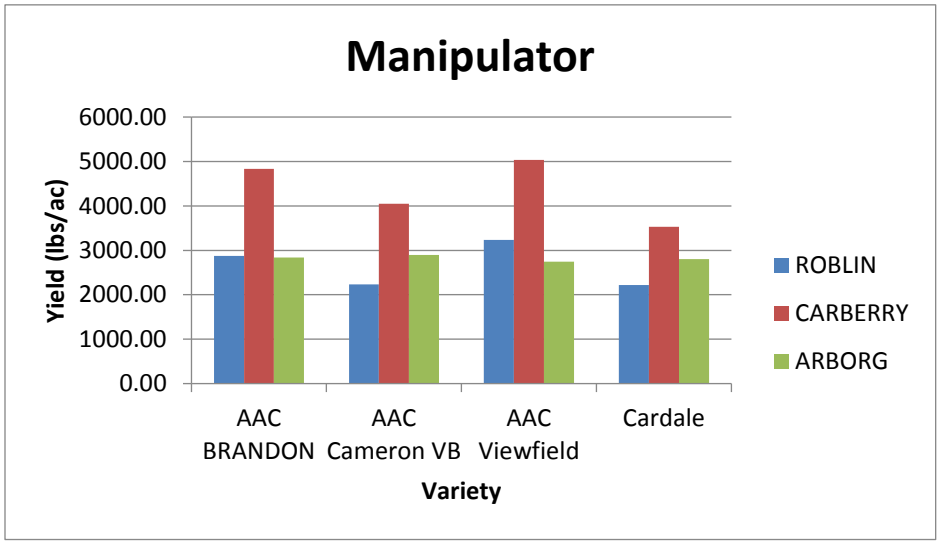
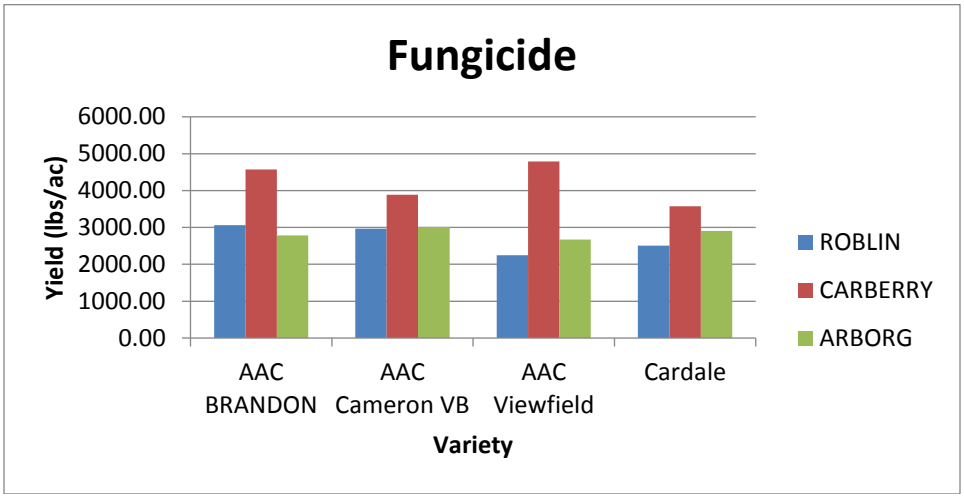


Figure 5: Yield results by location and variety for Treatment 5



Background

The focus of this project is on plant growth regulators (PGRs), fungicides, and higher nitrogen rates.

Targeting higher yields often means increasing nitrogen rates, which brings with it the increased risk of lodging. PGRs are used to improve crop standability, and may be a good fit for a management system with increased nitrogen rates. The PGR "Manipulator" (chlormequat chloride) is registered for use in Canada, but uptake has been limited due to the previous absence of an established maximum residue limit (MRL) for the USA. This limit was set in April of 2018, marking a change in the management practices that are open to Manitoban wheat growers.

Fungicides to control fusarium head blight (FHB) and leaf diseases are commonly used on spring wheat in Manitoba. Previous research has found some evidence of PGRs reducing protein content in spring wheat, but this is potentially not the case when PGRs are applied with fungicides.

The objective of this project is to quantify the yield benefit of intensive management practices in spring wheat, and to determine if these management practices provide the same benefit to a variety of cultivars. This information will help producers make decisions on where to focus their input dollars, and will provide an opportunity to highlight the effects of PGR's in spring wheat production.

Carberry Materials & Methods

Experimental Design	Random Complete Block Design
Entries	20 – 4 varieties x 5 treatments *(see Table 1)*
Varieties	AAC Brandon; AAC Viewfield; Cardale; AAC Cameron VB
Seeding	May 15
Harvest	Aug 30
Fertility	See Table 1
In Crop Weed Control	Tundra applied May 29, 2018 Achieve applied June 19, 2018 Roundup applied August, 2018
Plant Growth Regulator	Manipulator

Fungicide Prosaro applied according to treatments

Table 1: Treatments for Management of High Intensity Spring Wheat

Treatment	N application	Fungicide *(Acapella)*	PGR *(Manipulator)*
1	100 lbs/ac	None	None
2	150 lbs/ac	None	None
3	100 lbs/ac	None	Applied at flag leaf
4	100 lbs/ac	At flag leaf and anthesis	None
5	150 lbs/ac	At flag leaf and anthesis	Applied

N banded with seed according to treatments set out in Table 1; P side-banded to 10lb/ac

As demonstrated in Table 1, the treatments involved different combinations of fertilizer rates, with or without fungicide and with or without a PGR.

- Treatment 1 represented a very standard treatment with regards to fertility and no fungicide or PGR.
- Treatments 3 and 4 used the same baseline fertility, however Treatment 3 incorporated PGR (no fungicide) and Treatment 4 incorporated Fungicide (no PGR).
- Treatments 2 and 5 increased the fertility by 50%. Treatment 2 did not incorporate any PGR or Fungicide. Treatment 5, called "Advanced" incorporated all elements of the trial, using increased fertility, and applying both PGR and Fungicide.

Data collected	**Date collected**
Height	Aug 2
Lodging	Sept 17
Yield	Sept 17
Moisture	Sept 17

Table 2: Carberry Spring 2018 Soil Test

	Available	Needed
N	54 lb/ac	According to treatments
P	14 ppm	20 lb/ac
K	296 ppm	0 lb/ac
S	42 lb/ac	0 lb/ac

RR Soybean Adaptation Trials

Project duration	May 2018 to September 2018
Objectives	Evaluate soybean variety performance & adaptation to the Carberry and Portage la Prairie regions of the Central plains.
Collaborators	Manitoba Pulse & Soybean Growers (MPSG) Manitoba Crop Variety Evaluation Team (MCVET)

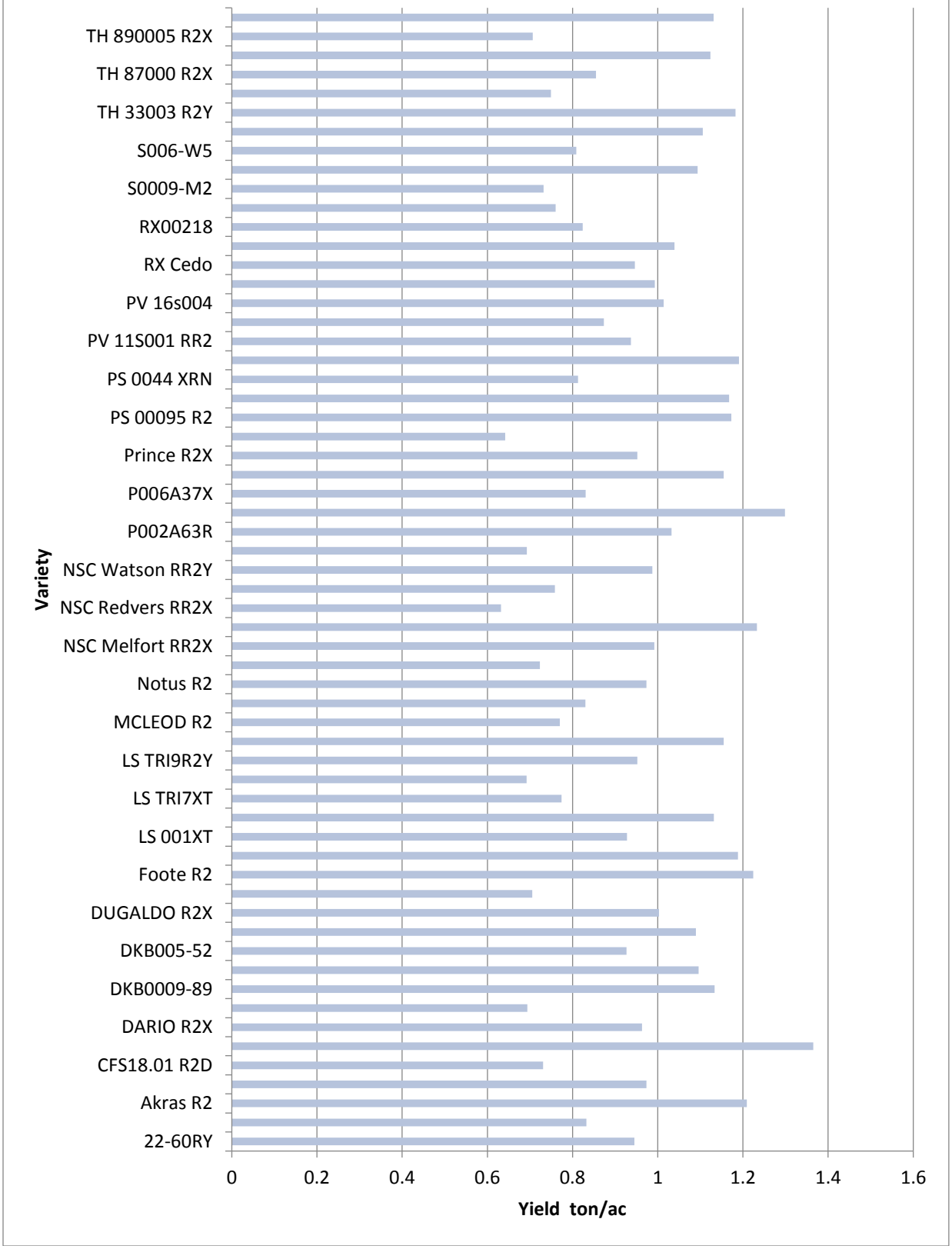
Results 2018

As new varieties are added each year assuming they are superior to previous lines is not always valid; especially if the said lines have not been tested intensively within the region of interest. Furthermore, even if a variety has been previously tested at the location of interest that testing will always be limited to the environmental (growing conditions) parameters of that period, which can be much different from the future testing period. Therefore, the best estimate of future performance is the examination of performance over as many years of data as possible (or even adjacent locations). This permits an understanding of sustained performance. Varieties that are consistently among the top performers across multiple years will most likely remain top performers in the near future, with the duration depending on the actual annual yield increase due to genetic improvement. For example, two varieties that appear to be stable performers from the short season category in Carberry include PS 0035 NR2 & 23-60RY with Lono R2 demonstrating consistent performance for the mid-season varieties.

For more custom comparisons of soybeans and other crops in Manitoba visit www.seedinteractive.ca.

Figure 1: RoundUp Ready soybean varieties and yield performance at Carberry in 2018.

RoundUp Ready Soybeans Average Yield



Background

Variety trials for all of Manitoba's major crops are conducted across the crop growing regions of Manitoba every year by the Manitoba Crop Variety Evaluation Team (MCVET). This performance data, along with variety characteristic information, is summarized in “SEED MANITOBA” and online at www.seedinteractive.ca. Both formats provide long term yield data as well as annual yield comparisons at various locations.

Carberry Materials & Methods

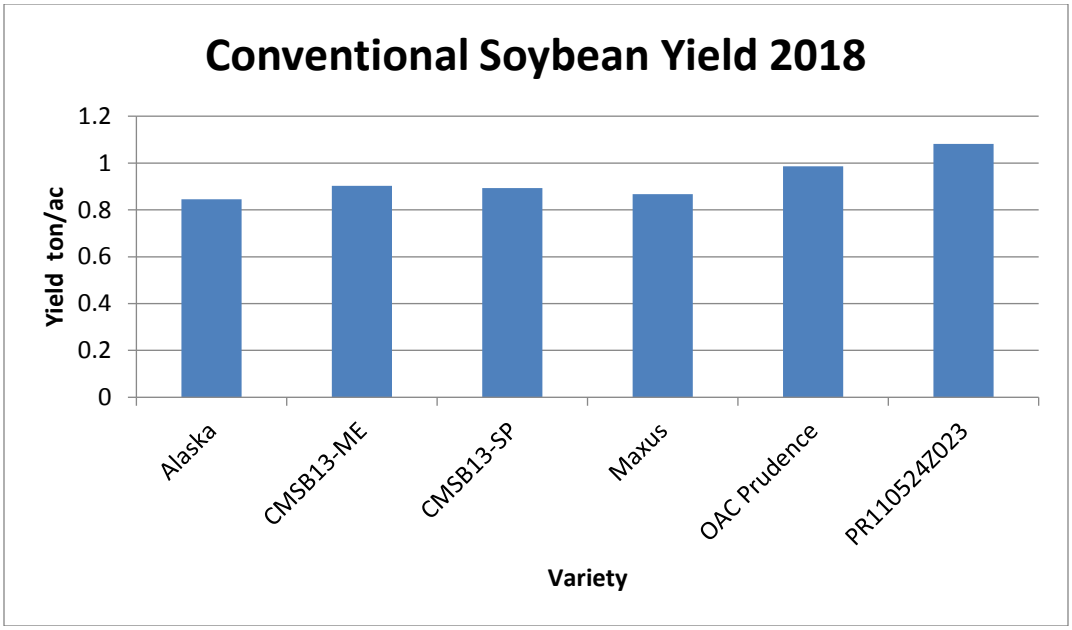
Experimental Design	Randomized complete block design with 3 replicates
Seeding Date	May 22, 2018
Harvest Date	October 11, 2018
Fertility	40lbs/ac actual Phos (11-52-0); 120 ppm K; 20 lb/ac actual Sulfur 20-0-0-24
In Crop Weed Control	Roundup Applied June 13, 2018
Fungicide	None applied

Convention Soybean Adaptation Evaluation

Project duration	May 2018 to September 2018
Objectives	Evaluate newly registered Conventional Soybean varieties for adaptation and yield performance in the Central Plains region of Manitoba.
Collaborators	Manitoba Pulse & Soybean Growers (MPSG) Manitoba Crop Variety Evaluation Team (MCVET)

Results

Figure 1: Conventional soybean varieties and yield performance at Carberry in 2018.



Background

Variety trials for all of Manitoba's major crops are conducted across the crop growing regions of Manitoba every year by the Manitoba Crop Variety Evaluation Team (MCVET). This performance data, along with variety characteristic information, is summarized in "SEED MANITOBA" and online at www.seedinteractive.ca. Both formats provide long term yield data as well as annual yield comparisons at various locations.

Materials & Methods

Experimental Design	Randomized complete block design with 3 replicates
Seeding Date	May 22, 2018
Harvest Date	September 12, 2018
Fertility	40lbs/ac actual Phos (11-52-0); 120 ppm K; 20 lb/ac actual S (20-0-0-24)
In Crop Weed Control	Roundup applied June 13, 2018
Fungicide	None applied

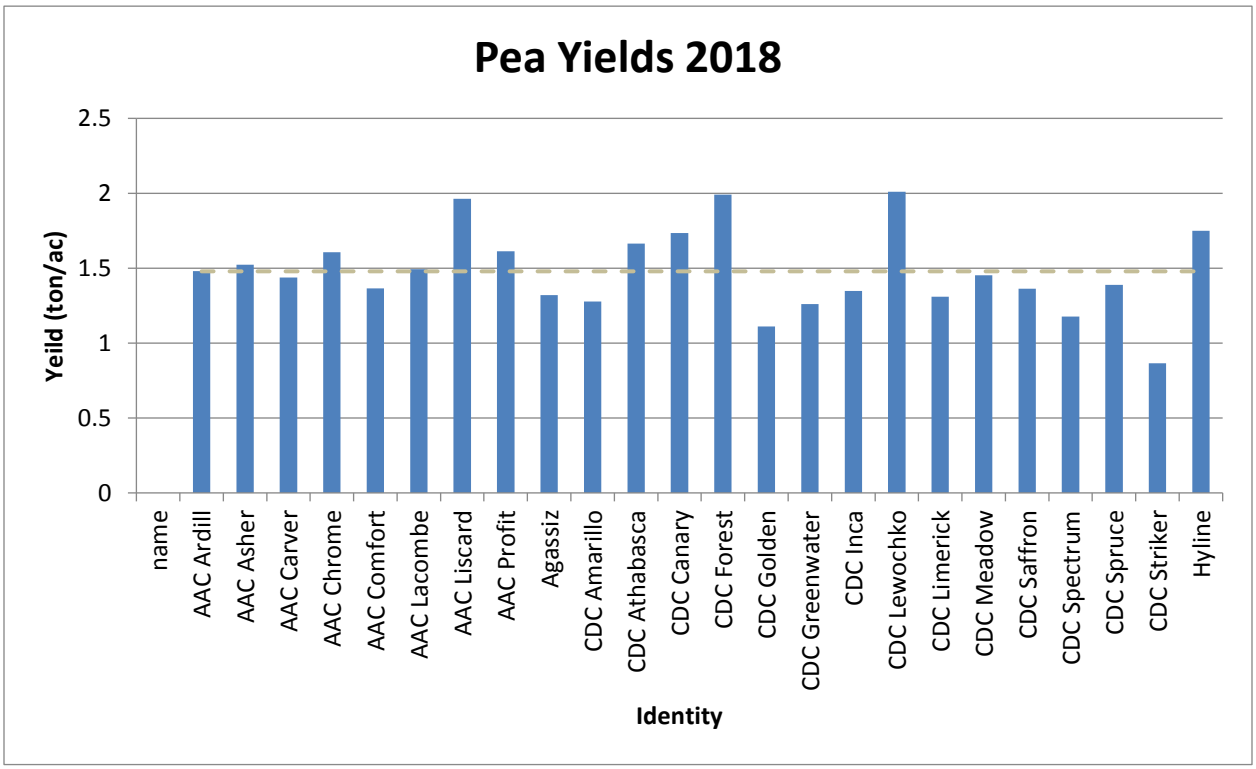
Pea Adaptation Evaluation

Project duration May 2018 to September 2018
Objectives Evaluate newly registered pea varieties for adaptation and yield performance in the Central Plains region of Manitoba.
Collaborators - Manitoba Crop Variety Evaluation Team (MCVET)

Results

For more custom comparisons of Pea varieties and other crops in Manitoba visit www.seedinteractive.ca.

Figure 1: Pea varieties and yield performance at Carberry in 2018.



Background

Variety trials for all of Manitoba's major crops are conducted across the crop growing regions of Manitoba every year by the Manitoba Crop Variety Evaluation Team (MCVET). This performance data, along with variety characteristic information, is summarized in "SEED MANITOBA" and online at www.seedinteractive.ca. Both formats provide long term yield data as well as annual yield comparisons at various locations.

Carberry Materials & Methods

Experimental Design Randomized complete block design with 3 replicates

Seeding Date	May 11, 2018
Harvest Date	August 31, 2018
Fertility	26lb/ac actual Phos (11-52-0); 4lb/ac actual Sulfur 20-0-0-24
In Crop Weed Control	Poast Ultra applied applied May 31, 2018
	Basagran applied June 13, 2018
	Reglone applied August 2018
Fungicide	None applied

Sunflower Adaptation Evaluation

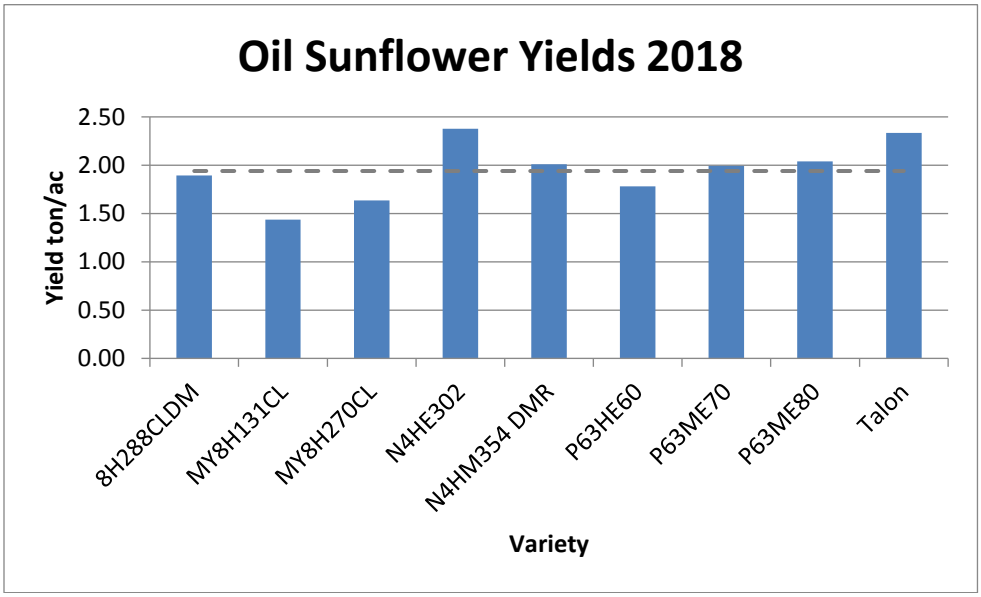
Project duration May 2018 to September 2018

Objectives Evaluate newly registered oil and confection type sunflower varieties for adaptation and yield performance in the Central Plains region of Manitoba. In 2018 CMCDC did not grow any confectionary sunflowers.

Collaborators National Sunflower Association of Canada (NSAC)
Manitoba Crop Variety Evaluation Team (MCVET)

Results

Figure 1: Oil Sunflower yield performance at Carberry 2018



Background

Variety trials for all of Manitoba's major crops are conducted across the crop growing regions of Manitoba every year by the Manitoba Crop Variety Evaluation Team (MCVET). This performance data, along with variety characteristic information, is summarized in "SEED MANITOBA" and online at www.seedinteractive.ca. Both formats provide long term yield data as well as annual yield comparisons at various locations.

Carberry Materials & Methods

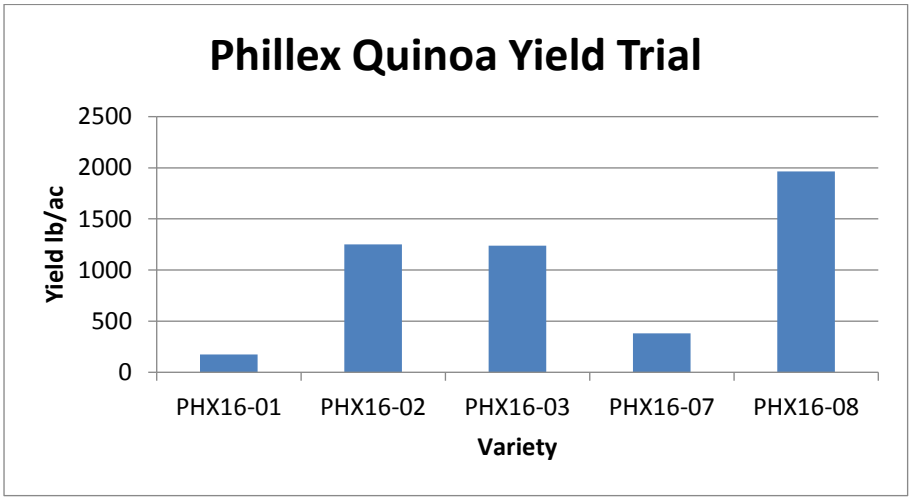
Experimental Design	Randomized complete block design with 3 replicates
Seeding Date	May 10, 2018
Harvest Date	Sept 24, 2018
Weed Control	Corogen applied July 20, 2018
	Avian Control applied Sept 5, 2018
	Avian Control applied Sept 14, 2018

Quinoa Adaptation Evaluation

Project duration	May 2018 to September 2018
Objectives	Evaluate quinoa lines/varieties for adaptation and yield performance in the Central Plains region of Manitoba.
Collaborators	Phillex Inc.

Results

Figure 1: Quina lines and yield performance at Carberry in 2018



Background

Quinoa is a broadleaf annual plant that producers small, round seeds with excellent nutritional qualities [1,2]. The crop can be grown in all agricultural regions of Manitoba. Phillex Ltd, based in Portage la Prairie, participated with all four Manitoba Diversification Centres to conduct the quinoa variety trial.

Carberry Materials & Methods

Experimental Design	Randomized complete block design with 3 replicates
Seeding	May 11
Harvest	Sep 10
Fertility	120lb/ac actual N (46-0-0); 26lb/ac actual Phos (11-52-0); 4lb/ac actual Sulfur (20-0-024)
In Crop Weed Control	May 31 Poast Ultra Assure II applied June13, 2018 Cygon applied July 6, 2018 Matador applied July 28, 2018
Fungicide	None Registered

Data collected	**Date collected**
Emergence Population	June 4
Yield	Oct 17
Moisture	Oct 17

National Industrial Hemp Fibre and Grain Variety Evaluation

Project duration May 2018 to September 2018
Objectives To evaluate hemp grain and fibre varieties for the Canadian Hemp Trade Alliance
Collaborators Canadian Hemp Trade Alliance

Results Grain yield results are available through the SEED Manitoba guide (2018). Graphical yield results for each of the four Manitoba research sites are displayed below according to grain and fibre yields.

Figure 1: 2018 Hemp Fibre Yield Results at Roblin, 2018

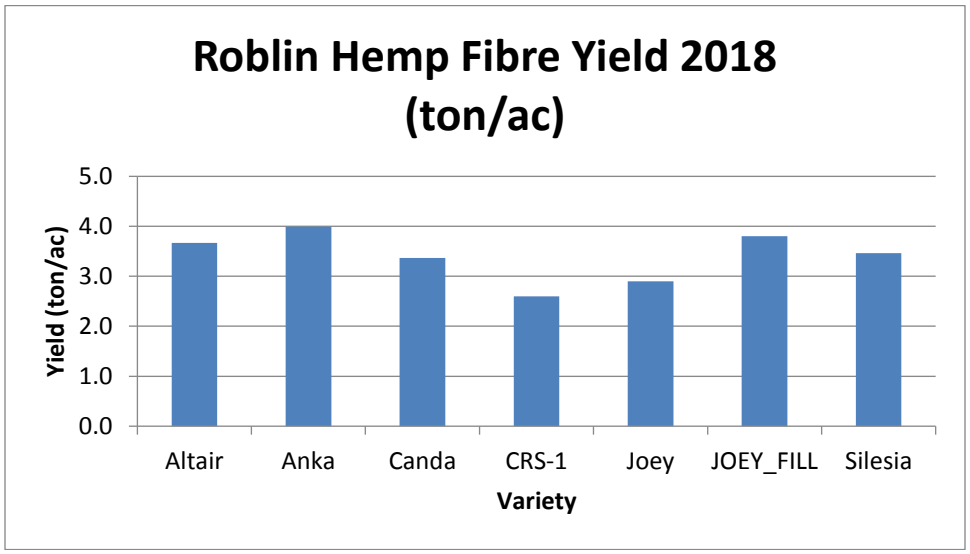


Figure 2: 2018 Hemp Grain Yield Results at Roblin, 2018

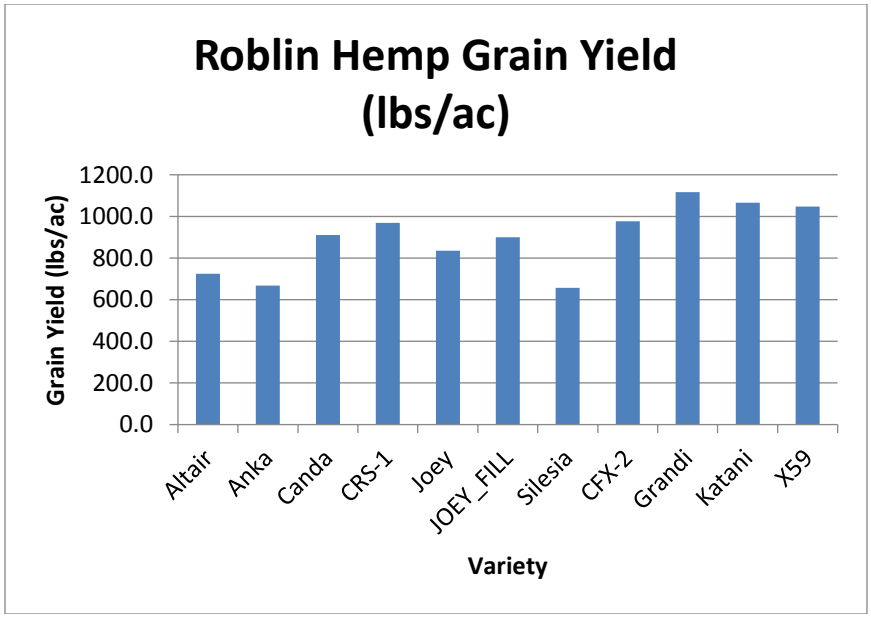


Figure 3: Hemp Fibre Yield Results at Carberry, 2018

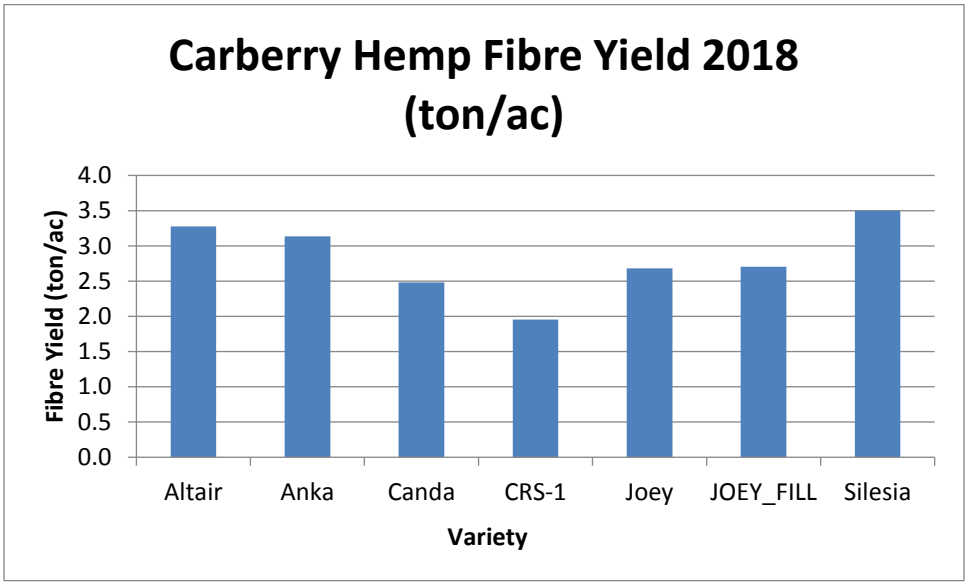


Figure 4: 2018 Hemp Grain Yield Results at Roblin, 2018

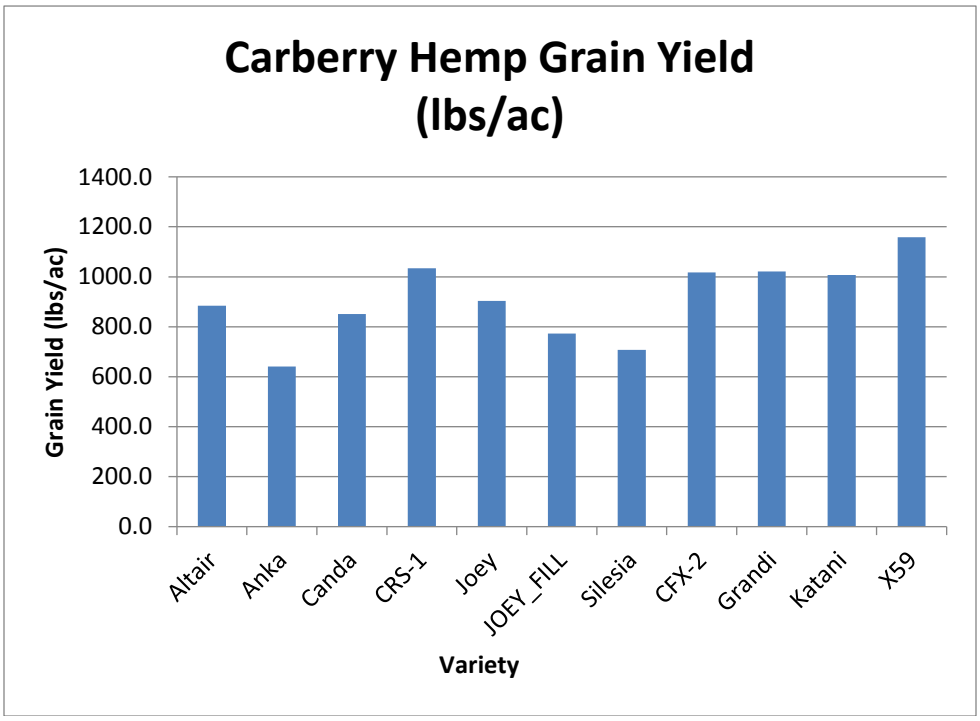


Figure 5: Hemp Fibre Yield Results at Arborg, 2018

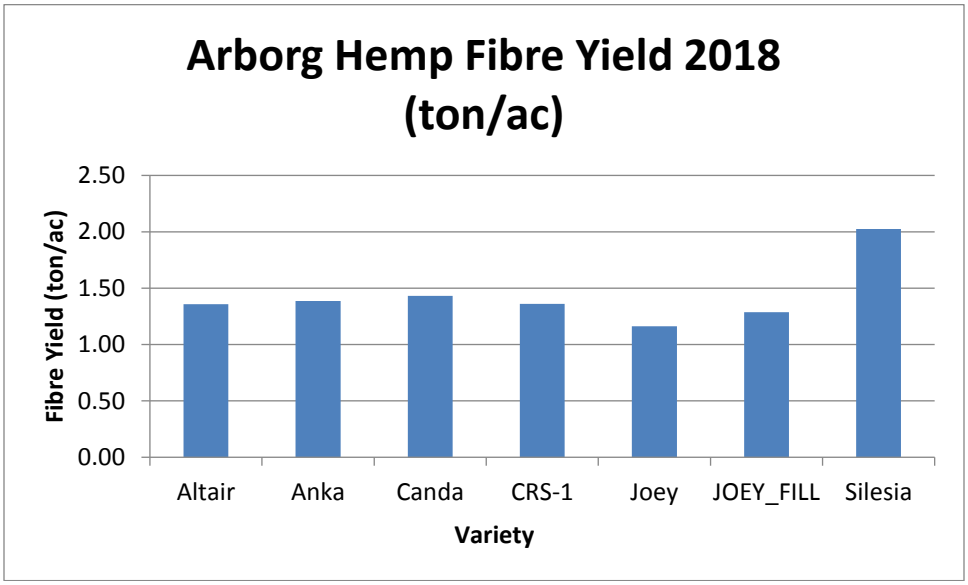


Figure 6: 2018 Hemp Grain Yield Results at Arborg, 2018

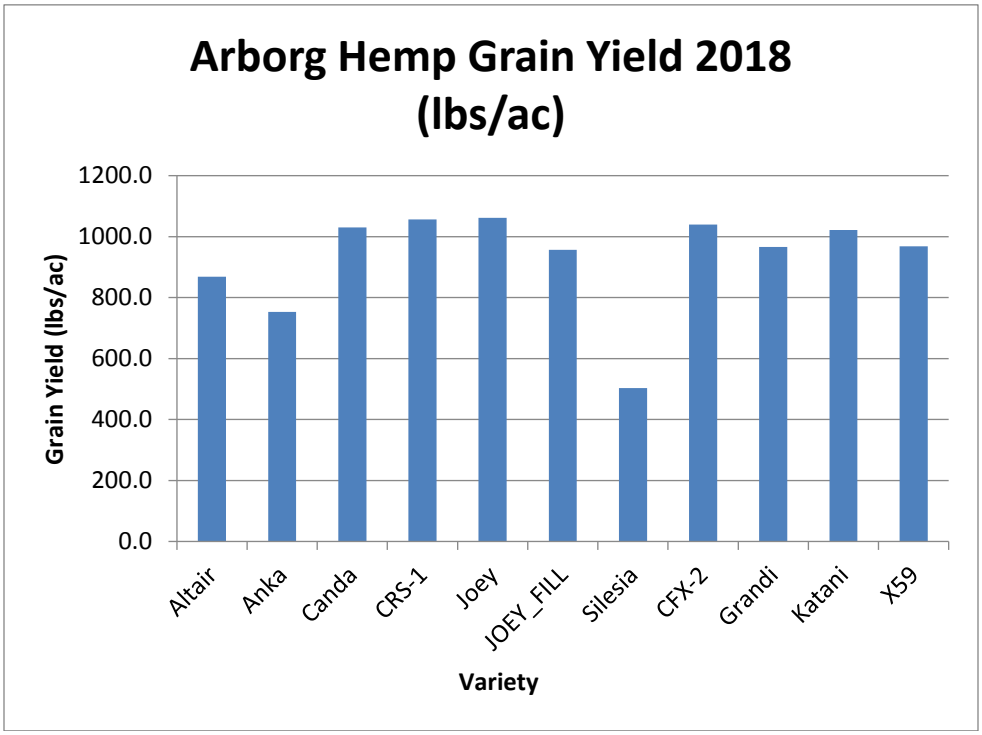


Figure 7: Hemp Fibre Yield Results at Melita, 2018

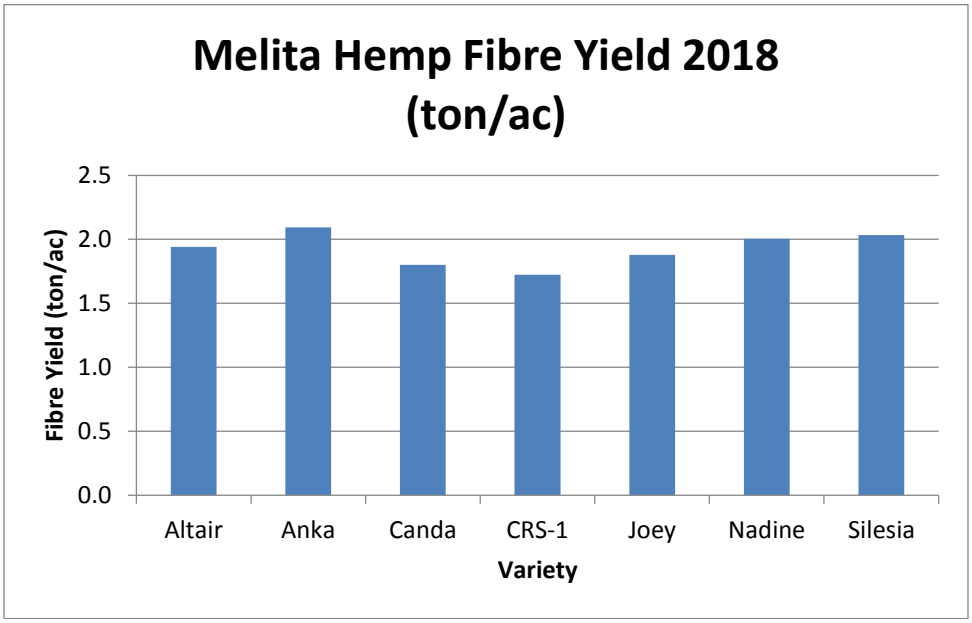
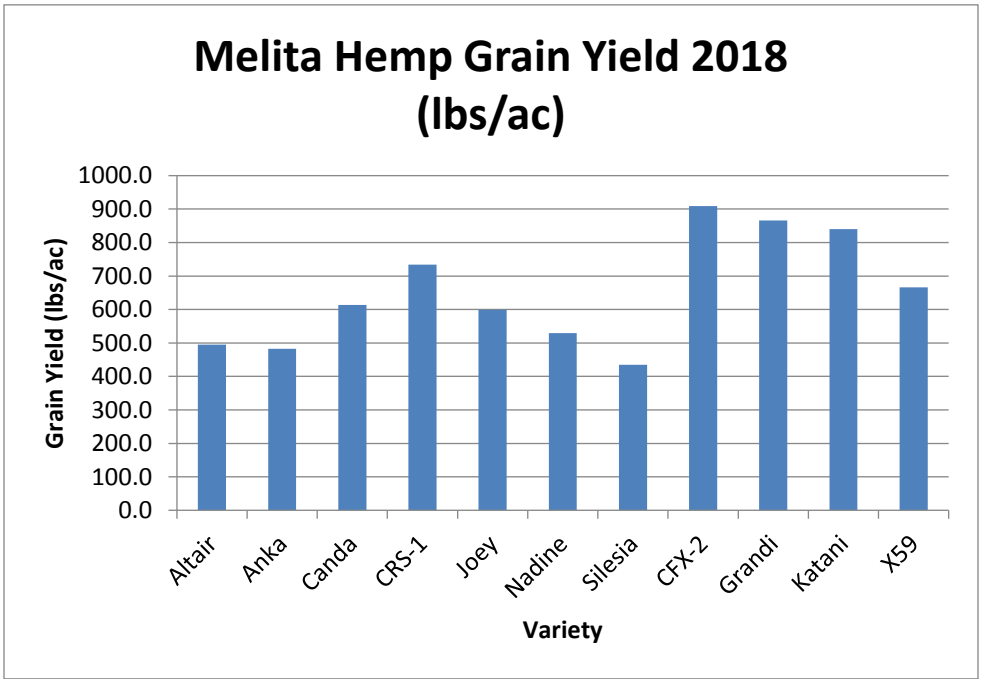


Figure 8: 2018 Hemp Grain Yield Results at Melita, 2018



Background

The Canadian Hemp Trade Alliance (CHTA) is a not-for-profit organization which represents over 260 growers across all 10 provinces as well as numerous processors, distributors, developers and researchers involved in Canada's rapidly growing industrial hemp industry.

There were a number of new developments in Canadian legislation in 2018 which very directly affects Canadian hemp growers. The CHTA website outlines these new developments, specifically the changes in Cannabis legislation as well as Health Canada's revision of Section 56 of the Controlled Drugs and Substances Act (CDSA). These changes now allow hemp farmers to immediately collect and store industrial hemp flower, bud and leaf material, a vital piece which was previously prohibited.

Jason Green, Head of Agriculture with Canopy Hemp and Director of the CHTA explains that this new permission allows hemp growers to learn more about the harvesting, drying and storing of their harvest materials, a key component in then bringing their product to market.

This trial looked at separate grain and fibre varieties of hemp.

Carberry Materials & Methods

Experimental Design	Randomized complete block design with 4 replicates
Seeding	May 17
Harvest	Aug 31
Fertility	130lb/ac actual N (46-0-0); 6lb/ac actual Phos (11-52-0)
In Crop Weed Control	May 31 Poast Ultra
	Assure II applied June13, 2018
Fungicide	None applied

Data collected	**Date collected**
Emergence Population	June 11
Vigor	June 19
Male/Female ratio	Aug 3
Height	Aug 3
Grain Yield	Aug 31
Stem Yield	Sept 28
Moisture	Aug 31

Table 1: Spring 2018 Soil Test

	Available	Needed
N	20 lb/ac	130 lb/ac
P	14 ppm	6 lb/ac
K	396 ppm	0 lb/ac
S	22 lb/ac	0 lb/ac

Project findings

Grain yield results are available through the SEED Manitoba guide (2018).

Background

The Canadian Hemp Trade Alliance (CHTA) is a not-for-profit organization which represents over 260 growers across all 10 provinces as well as numerous processors, distributors, developers and researchers involved in Canada's rapidly growing industrial hemp industry.

There were a number of new developments in Canadian legislation in 2018 which very directly affects Canadian hemp growers. The CHTA website outlines these new developments, specifically the changes in Cannabis legislation as well as Health Canada's revision of Section 56 of the Controlled Drugs and Substances Act (CDSA). These changes now allow hemp farmers to immediately collect and store industrial hemp flower, bud and leaf material, a vital piece which was previously prohibited.

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This trial looked at separate grain and fibre varieties of hemp.

Materials & Methods

Experimental Design	Randomized complete block design
Entries	12 varieties

The Effect of Seeding Date on Three Varieties of Industrial Hemp in Manitoba

Project duration	May 2017 – September 2018
Objectives	To understand the effect of seeding date by variety on industrial hemp grain yields.
Collaborators	Hemp Genetics, Parkland Industrial Hemp Growers, Manitoba Harvest

Adjusting Agronomic Practices in Industrial Hemp to Maximize CBD production

Project duration – *2018*
Objectives – *Gain a better understanding on the most economic way to produce CBD under field conditions in Manitoba.*

- Identification of stable, high CBD varieties adapted to Manitoba conditions.
- Identify optimal harvest timing for CBD production/extraction & yield.
- Quantify relationship between plant population and CBD content related to Genetics and Environment in Manitoba.

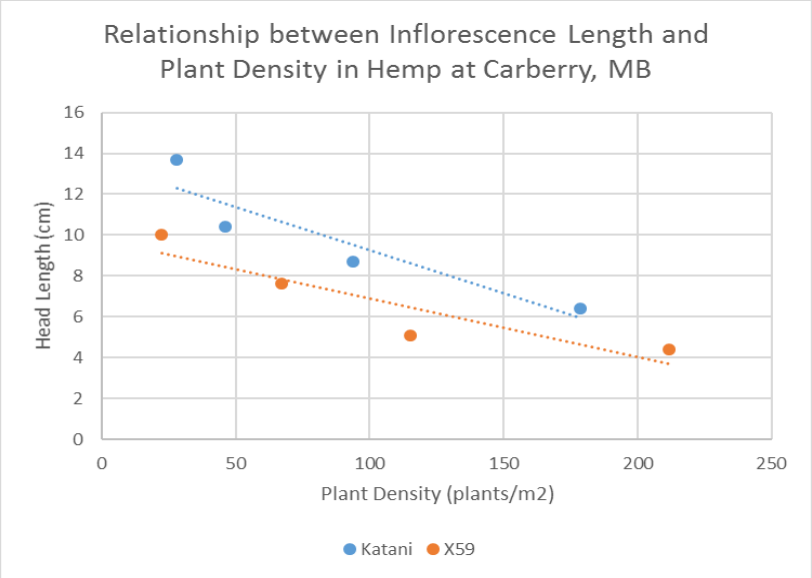
Collaborators – *Green Sky Labs, Canadian Isolates, HGI*

Results

Seeding Rate

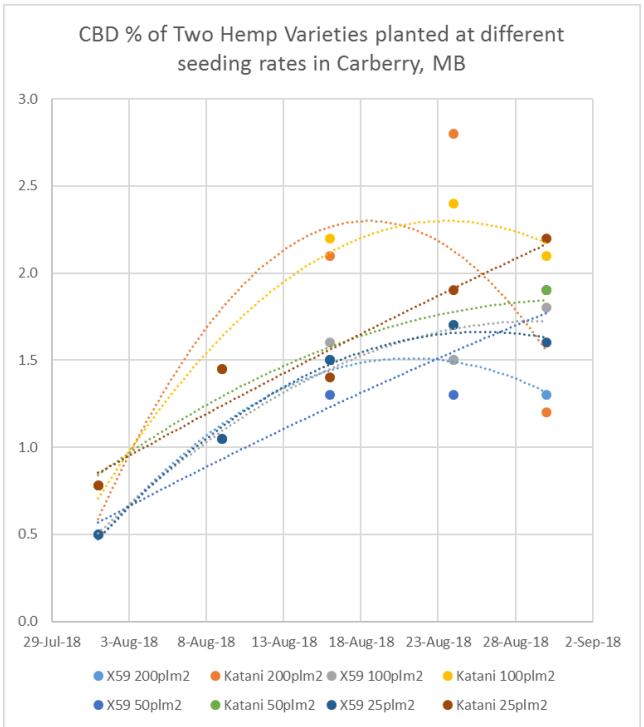
- Targeted planting densities were achieved for each variety.
- X59 was significantly taller than Katani.
- There was a reduction in canopy height as seeding rate increased although this was not significant.
- Average inflorescence length significantly decreased as seeding rate increased.

Figure 1: Relationship between Inflorescence, Length and Plant Density



The highest CBD contents were observed in the greatest seeding rates; however, levels also decreased for the highest seeding rate earlier in the fall than lower seeding rates. This is possibly due to slightly earlier or more consistent dry down.

Figure 2: Relationship between Inflorescence, Length and Plant Density



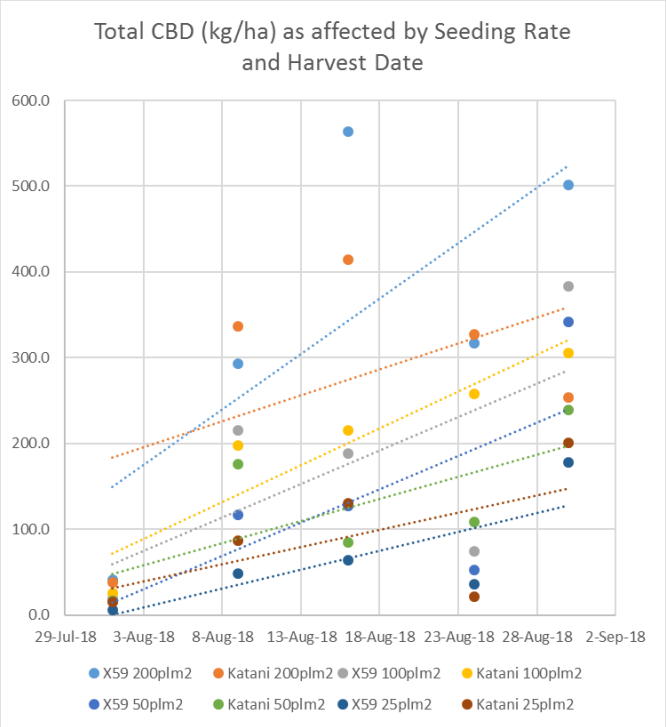
Arborg was different from Carberry with only the lowest seeding rate at the August 15 sampling date having a greater content than all other sample dates.

CBD levels sampled from increasing plant densities at Arborg, 2018

Katani		02-Aug	15-Aug
Average		1.11%	1.22%
Plant Density (pl/m2)	25	0.93%	1.83%
	50	1.02%	1.07%
	100	1.37%	1.03%
	200	1.08%	1.11%

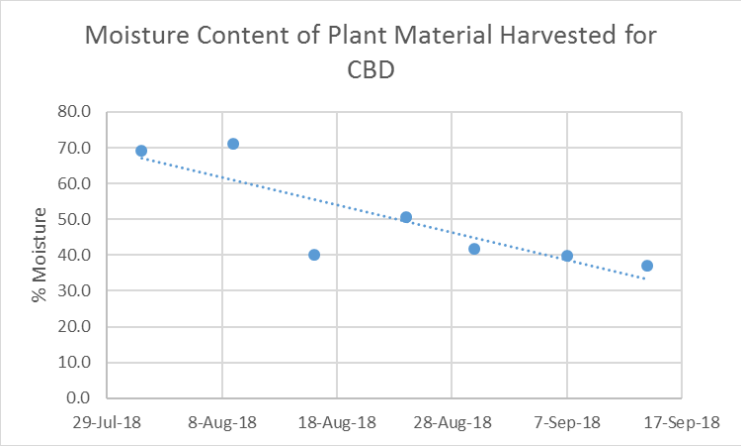
When adjusted for moisture and plant density, the two highest seeding rates still resulted in the greatest amount of CBD on a kg/ha basis.

Figure 3: Variety Seeding Rates and Dates affect on CBD



Later season harvest would increase harvest efficiency with regard to biomass hauling/handling due to lower moisture content. There would also at this time be an opportunity to recover a percentage of grain.

Figure 3: Relationship between Moisture content and CBD

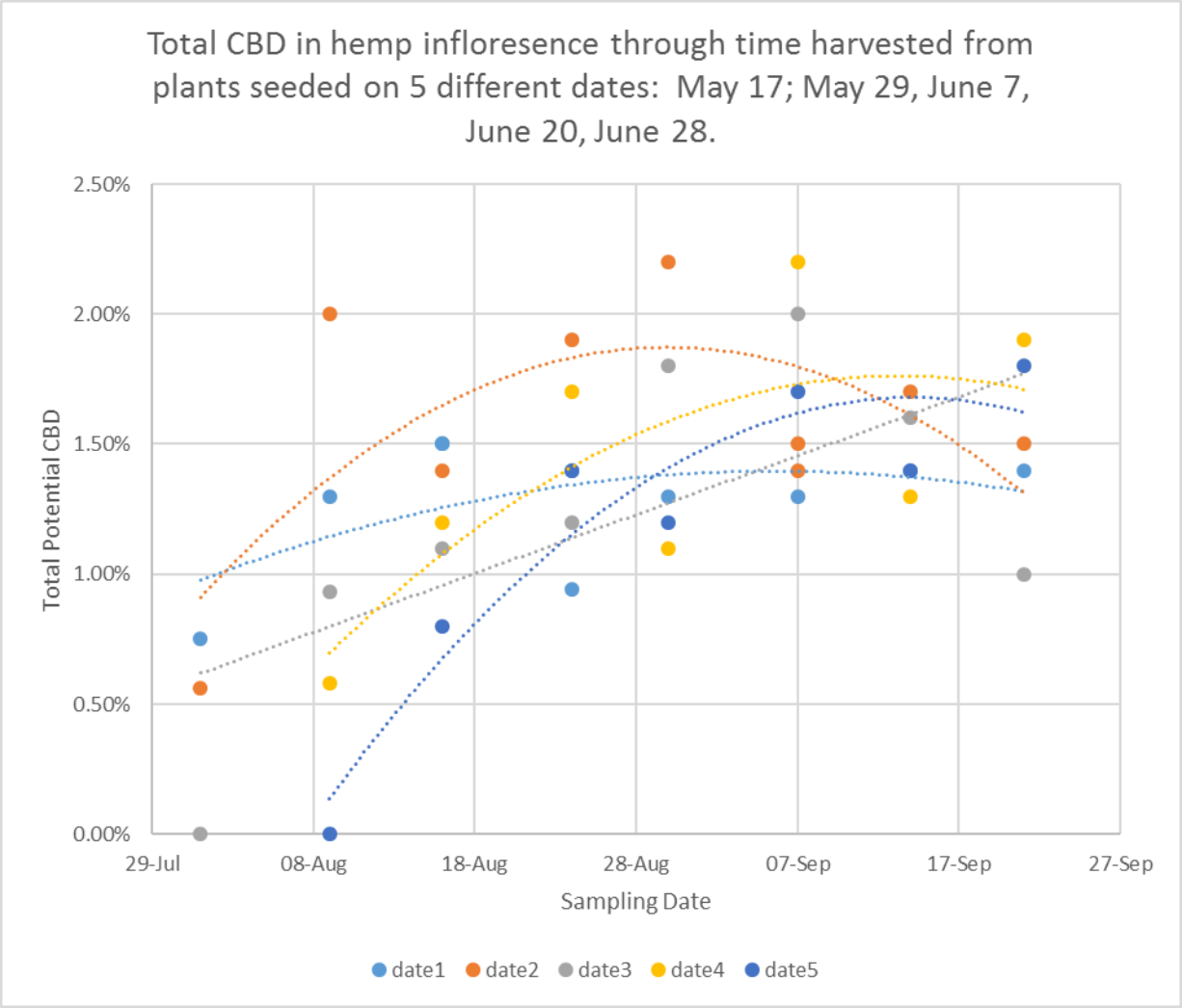


At the August 16th sampling date some additional plants were harvested. Additional testing (lowest seeding rate – large inflorescence) was performed on the inflorescence partitioning it into 1/3s. The top 1/3 of the plant had the highest CBD content (2.5%); followed by the mid 1/3 at 1.4% and the lower third at (0.89%) – overall average 1.6%.

Seeding Date

- Seedling recruitment (final plants/m2) was greater for the earliest seeding dates and declined slightly from seeding date 3 – date 5 (not significant); however, plant density was still in acceptable range (average 110 plants/m2).
- Mid June and late June seeding dates were also shorter by 10cm (p 0.1).
- Total CBD was the lowest for all studies at early August; increasing until grain harvest in early September; although there was evidence of a small peak the final week of August. The seeding date trial showed a shift in peak CBD content with later seeding dates further supporting the tie to physiological maturity; however, due to the lower biomass production maximum yield was still the lowest for the later seeding dates.

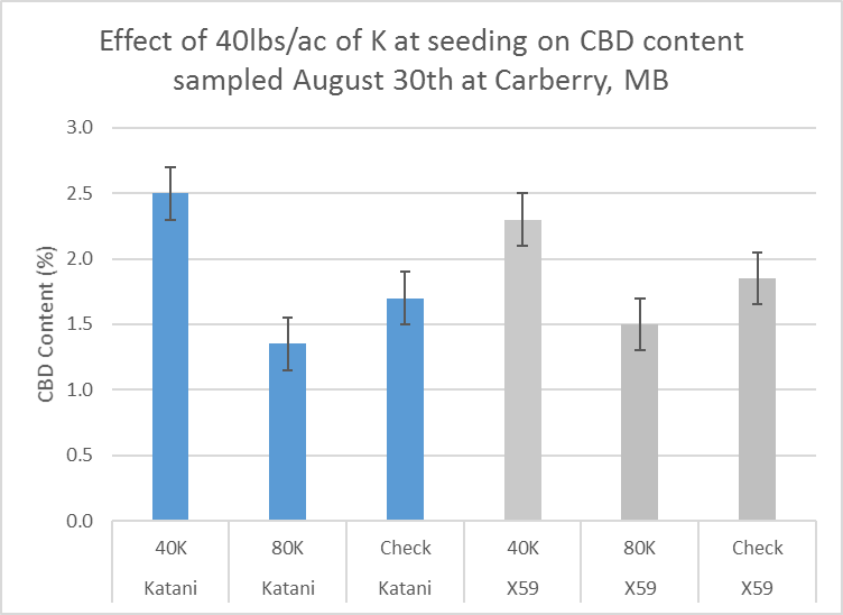
Figure 4: Relationship between CBD content in hemp inforesence and and harvest dates



Potassium

- Additional potassium had no effect on height (Katani – 131cm; X59 – 138cm) or plants/m2 (average 160 pl/m2).
- Additional potassium at seeding had no effect on total CBD levels until the last sampling date (August 30). At this date the highest 80K rate had the lowest CBD content overall. This may suggest there is an upper limit for which additional K may have a negative effect or alternatively, some additional potassium may extend the maximum CBD content period later into the fall; more research is required, especially under potassium deficient conditions. The Carberry site typically tests high for K; the hemp site was no exception testing 396ppm.

Figure 5: Relationship between K application at seeding and CBD content



Project findings:

- Katani out performed X59 in most situations with regard to overall CBD content; however, X59 produced more biomass. Variety selection would therefore depend on extraction efficiencies.
- Maximum CBD content related directly to the level of maturity of the plant.
- CBD concentration increases as you move from bottom to the top of the inflorescence.
- CBD concentration seems to reach a maximum faster in higher seeding rates possibly due to a more rapid and even maturity.
- Greater seeding rate result in small heads but more of them (greater density/m2) resulting in the greatest amount of CBD harvested per hectare.
- Optimal harvest timing for CBD content is during last week of August, but may be extended into early September, especially for late seeded crops. The lower biomass associated with later seeding negates any content gains; however, later seeding may slightly extend harvest harvest window to spread logistical risk.
- Additional Potassium did not impact CBD levels.
- More research is required.

Background/References/Additional Resources

With the October 17th legalization of recreational marijuana and deregulation of industrial hemp, CBD, a cannabinoid found in both marijuana and hemp has become a sought after agriculture commodity. This is mainly due to the perception that CBD can be more economically produced in the field while, for various quality control (hemp and marijuana) and security reasons, high THC marijuana varieties are currently best grown indoors. At present, CBD levels in the industrial hemp varieties commercially available range from 0.5-2%. Understanding how to maximize CBD production has not been a focus until now; preliminary information suggests large environmental and genetic variability exists.

Materials & Methods*:*

Experimental Design: RCBD

Treatments:

Seeding Date Trial: 5 Seeding Dates - May 17, May 29, June 7, June 19, June 28
Plant Density Trial: Target population - 25pl/m2, 50pl/m2, 100pl/m2, 200pl/m2
Added Potassium Trial: Actual K added at Seeding: 0, 40 & 80lbs/ac

Data collected and date collected:

Plant Density
Height
CBD – content
10 heads from each plot were cut weighed, leaves and stems separated, leaves/flowers air dried at less than 35C to 10% moisture then homogenized using a food processor and refrigerated at 8C. Samples were evaluated on an Orange Photonics light analyzer using a custom method consisting of 200mg sub-samples, 10ml of solvent.

Sample Dates for CBD:

Arborg Plant Population: August 1, 15
Carberry Plant Population: August 1, August 9, August 16, August 24, August 30
Carberry Potassium Rate: August 1, August 9, August 16, August 24, August 30
Carberry Seeding Date: August 1, August 9, August 16, August 24, August 30, Sept 7, Sept 14, Sept 21.

Agronomic info

Carberry/Arborg were both seeded into Wheat Stubble
Fertilizer applied:
Nitrogen and Phosphorus Fertility: for all trials a baseline of 130lbs/ac of Nitrogen was side banded with 30lbs of seed placed Phosphorus at seeding. For potassium trial, K was banded just prior to seeding.
Pesticides applied
Edge was applied at label rate on May 6th at the Carberry site.
Assure II was applied at label rate.

Agriculture Agri-Food Canada Corn Variety Evaluation

Project duration May 2018 – November 2018
Objectives To develop and release early maturing cold tolerant corn inbreds with emphasis on the 1800-2000 CHU market.

Collaborators Lana Reid Ph.D – AAFC Research Scientist Ottawa Research and Development Centre
Manitoba Corn Growers Association

Results
This project is part of a long-term, multi-site study led by Lana Reid. Research findings will be made available by Lana Reid and team.

Background
The objective will be achieved using conventional corn breeding methodology enhanced by double haploid inbred production and specialized screening techniques for cold tolerance and disease resistance. The trial is being conducted at sites across five Canadian provinces. The anticipated impact of developing earlier maturing, cold tolerant corn will expand the acreage of corn production in Canada.

Project findings
These data were generated for AAFC; however, due to intellectual property issues pertaining to Plant Breeders' Rights, results for individual lines are not provided in this report. For more information on this variety trial

Materials & Methods

Experimental Design	Random Complete Block Design
Entries	30 varieties
Seeding	May 25
Harvest	Nov 15
Fertility	163lb/ac actual N (46-0-0); 50lb/ac actual Phos (11-52-0); 20lb/ac actual Sulfur
In Crop Weed Control	Roundup applied May 29 Option 2.25 applied June 8, 2018
Fungicide:	None applied

Data collected	**Date collected**
Stalk Lodging	-
Root Lodging	-
Yield	Nov 7
Moisture	Nov 7

Table 1: Spring 2018 Soil Test

	Available	Needed
N	20 lb/ac	200 lb/ac
P	24 ppm	50 ppm
K	-	-
S	14lb/ac	50lb/ac

Other Trials

Demonstrations

Brett Young

Canola Speed Trial

Terminated Trials

MCVET Winter Cereals

Ducks WW

Linseed Flax

Edible Beans

Goss's Corn Nursery

Quinoa Minor Use