

Canola On-Farm Research Program

2023 Report



**Sustainable Canadian
Agricultural Partnership**



**Manitoba
Canola
Growers**

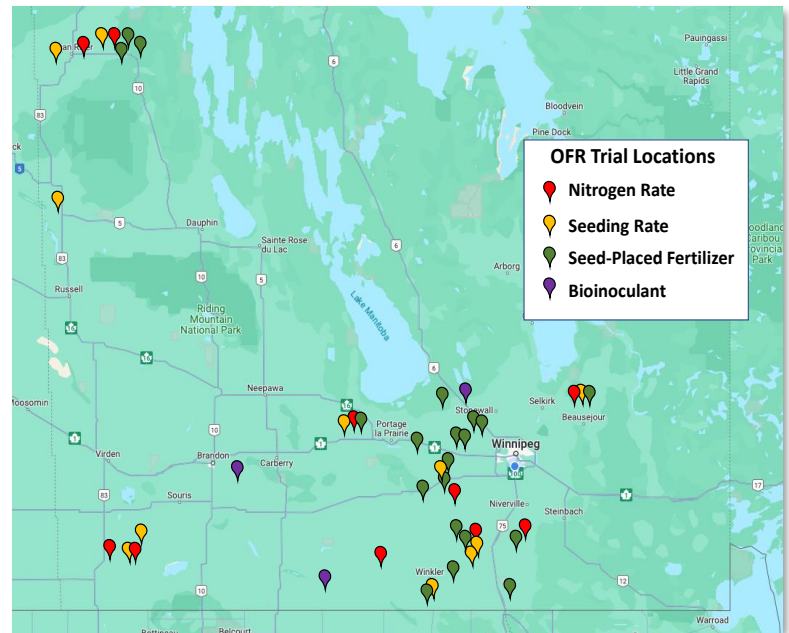
Canola On-Farm Research Program

Manitoba Canola Growers On-Farm Research Program began in 2022 with nitrogen rate, seeding rate and bioinoculant trials. In 2023, an additional seed-placed fertilizer toxicity trial launched and a cover crop for flea beetle management trial is planned to start in the 2024 field season.

Number of Locations by Trial Type

Trial Type	2022	2023	2024 (target)
Nitrogen Rate	5	5	5
Seeding Rate	4	7	5
Bioinoculant	3	-	-
Seed-placed Fertilizer	-	20*	30*
Cover Cropping for Flea Beetle Management	-	-	3

*Replicated by location (1 rep per location)



MCGA On-Farm Research Program aims to collaborate with farmers, agronomists and researchers to provide the most relevant and valuable information to our members.

Canola Growers: If you are interested in participating in, or have a trial idea for our on-farm program

Agronomists: MCGA contracts agronomists from across the province to work with farms to establish, manage and harvest research trials. If you are interested in working with MCGA as an Agronomic Partner

Researchers: If you are interested in collaborating with the Canola On-Farm Research Program to complement your research program.

2023 Agronomic Partners:

- Antara Agronomy Service Ltd.
- Tone Ag Consulting Ltd.
- New Era Ag Research
- A1 Agronomy Inc.
- Field 2 Field Agronomy Inc.
- Ag Advantage Ltd. (Meadows)

Please contact Amy Delaquis at (204) 384-1196 or Amy@CanolaGrowers.com



Canola Nitrogen Rate Trials

2022 – 2023 Summary

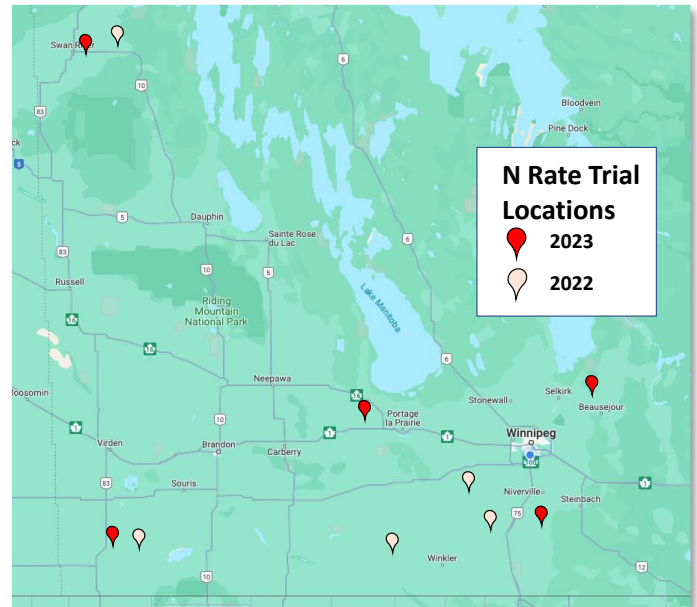
Research Question: Are N rates being used on canola across Manitoba sufficient for optimizing yield and nitrogen efficiency?

Treatments

1. Reduced N Rate (75%)
2. Standard N Rate (100%)
Farm Normal for Field
3. High N Rate (125%)

Trial Setup: Randomized complete block, each treatment was one equipment width x field length, with 4 replicates per locations (12 strips per location)

Data Collection: Plant Counts, Tissue N (bolting), Yield, Protein, Oil Content



Trial ID (year)	RM	Standard N Rate (100%)		Reduced N Rate (75%)	High N Rate (125%)	CV
		N Applied (soil residual N)	Yield	Change in Yield from Standard Rate		
		lbs. N/ac	bu/ac	bu/ac	bu/ac	%
NR_01 (2022)	Swan Valley West	113 (76)	47.1	-0.4	+1.6	1.8
NR_02 (2022)	Macdonald	122 (55)	52.0	+2.3	+3.9*	4.1
NR_03 (2022)	Lorne	138 (60)	35.4	+0.9	+0.1	5.5
NR_04 (2022)	Morris	120 (53)	58.6	-4.2*	+0.4	4.5
NR_05 (2022)	Two Borders	118 (79)	42.0	-3.3	+0.9	11.9
NR_06 (2023)	Minitonas-Bowsman	113 (18)	55.5	-5.3*	-0.5	5.2
NR_08 (2023)	North Norfolk	135 (25)	58.0	-2.5	+4.2	9.2
NR_09 (2023)	Brokenhead	137 (30)	61.7	-0.9	+3.0	4.2
NR_10 (2023)	Two Borders	130 (50)	51.4	+2.3	+3.3	7.6
NR_11 (2023)	De Salaberry	158 (127)	22.8	-1.3	-0.1	5.5
COMBINED		129 (57)	48.4	-1.3	+1.6*	24

*Significantly (p-value < 0.05) different from standard N rate

- Average farm standard N rate was 128 lbs. N/ac (fert) and **186 lbs. N/ac** (fert + soil residual), ranging from 113 – 158 lbs. N/ac (fert) and **131 – 285 lbs. N/ac** (fert + soil residual).

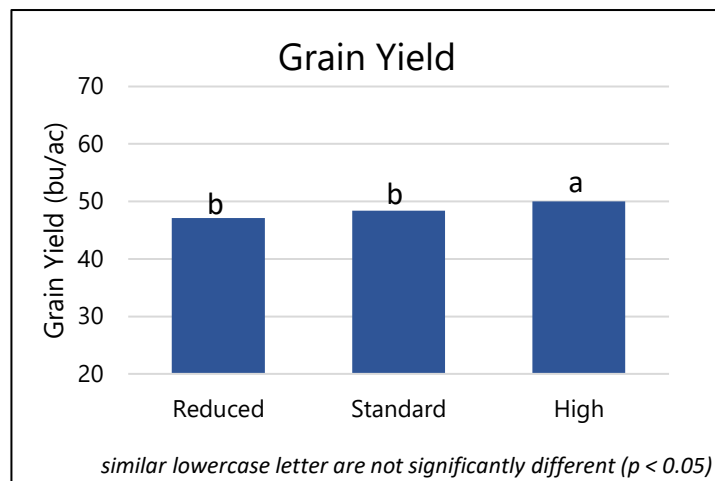


Canola Nitrogen Rate Trials

2022 – 2023 Summary

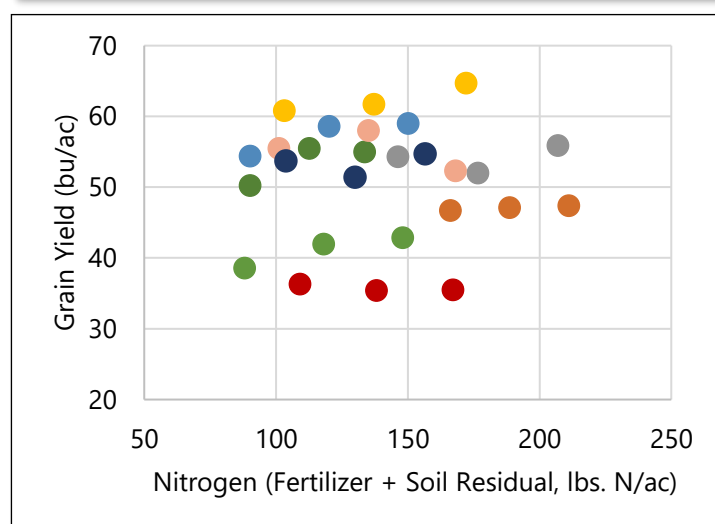
Grain Yield

- Average grain yield across all trial locations when the farm normal rate of N fertilizer was applied was **48 bu/ac**, ranging from **23 – 62 bu/ac**.
- Overall, there was a significant 1.6 bu/ac increase in yield when an additional 25% N fertilizer was applied to the farm standard N rate.
- 2 of 10 locations had a significant yield reduction of -4.2 and -5.3 bu/ac when N was reduced by 25%.
- 1 of 10 locations had a significant yield increase of 3.9 bu/ac when N fertilizer was increased by 25%.



Nitrogen Fertilizer Efficiency

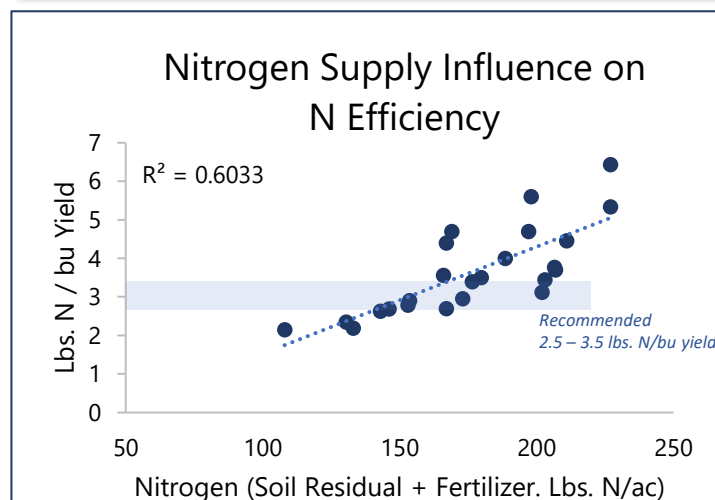
- The current N fertilization recommendation for canola in Manitoba is to provide canola with 2.5 to 3.5 lbs. N (soil + fertilizer) per bushel of yield targeted (Canola Council of Canada and Manitoba Agriculture). Example: for a target yield of 50 bu/ac recommended N would be from 125 to 175 lbs. N/ac (soil + fertilizer).
- N provided to the crop per bushel at farm standard N rate ranged from 2.4 to 5.6 in this trial.
- As the amount of fertilizer supplied to the crop increases the efficiency of N was reduced → more N used per bushel of yield.



Economic considerations will vary farm-to-farm depending on buying price of N fertilizer, canola price and standard N rates.

In Summary

- All results presented are preliminary as this trial will continue in 2024 and 2025 field seasons.
- Farms that saw a decrease in yield with reduced N rates achieved high grain yield (>55bu/ac) with modest N fertilization (2.4 and 2.9 lbs. N/bu yield)
- The significant combined increase in grain yield of 1.6 bu/ac for could be sufficient to cover the added cost of 32 lbs. N/ac (\$0.76 lbs. N and \$16 canola)
- Grain protein and oil content pending



For full individual trial reports with all data collected please visit Canolagrowers.com



Canola Nitrogen Rate – NR_06

Research Question: Are N rates being used on canola across Manitoba sufficient for optimizing yield and nitrogen efficiency?

Site Information

R.M.	Minitonas-Bowsman
Residual N (0-24')	18 lbs. N/ac
Seeding Date:	May 24, 2023
Seeding Equipment:	Versatile Air Drill
Variety:	L340PC
Harvest Date:	Sept 18, 2023

Nitrogen Application

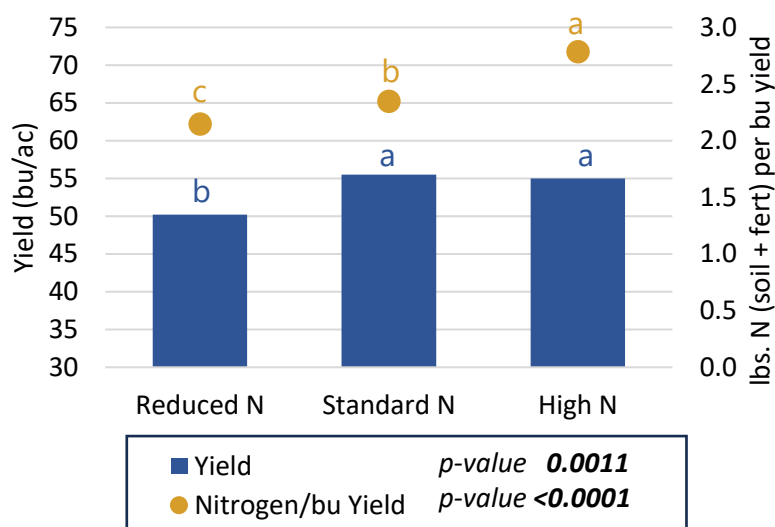
Source:	46-0-0
Placement:	Banded
Timing:	Spring Pre-Seed

Summary

- **Plant Establishment:** N rate had no influence on plant counts in this trial.
- **Tissue N:** N rate had no significant influence on N tissue content at bolting in this trial.
- **Grain Moisture:** Nitrogen rate had no influence on grain moisture in this trial.
- **Grain Yield:** There was a significant reduction in grain yield from the standard farm practice when N was reduced. There was no increase in yield as N rate increased from the standard to the high N rate.
- **Nitrogen Efficiency:** The reduced N treatment was most efficient with N supply, using 2.1 lbs. N per bushel of grain yield produced.
- The high N treatment produced the same yield as the farm standard N practice but reduced N efficiency from 2.3 to 2.8 lbs. N per bushel of grain yield produced.

Treatment	Fertilizer N	Total N (Soil + Fert)
<i>lbs. N / ac</i>		
1 Reduced N Rate	90	108
2 Standard N Rate	112.5	125.5
3 High N Rate	135	153

Grain Yield



	Plant Counts at 4 Leaf (ft ²)	N Tissue at Bolting (%)	Harvest Grain Moisture (%)
1. Reduced N	6.4	6.4	8.4
2. Standard N	6.3	6.4	8.3
3. High N	6.3	6.5	8.4
<i>p-value</i>	0.9539	0.5907	0.3944

The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	36.5	18.6	40.6	39.7	54	189
% of Normal Rainfall	108%	33%	45%	42%	69%	47%
Avg Daily Temp (C)	-0.3	14	19	17	18	

Agronomic support for this trial provided by:



Canola Nitrogen Rate – NR_08

Research Question: Are N rates being used on canola across Manitoba sufficient for optimizing yield and nitrogen efficiency?

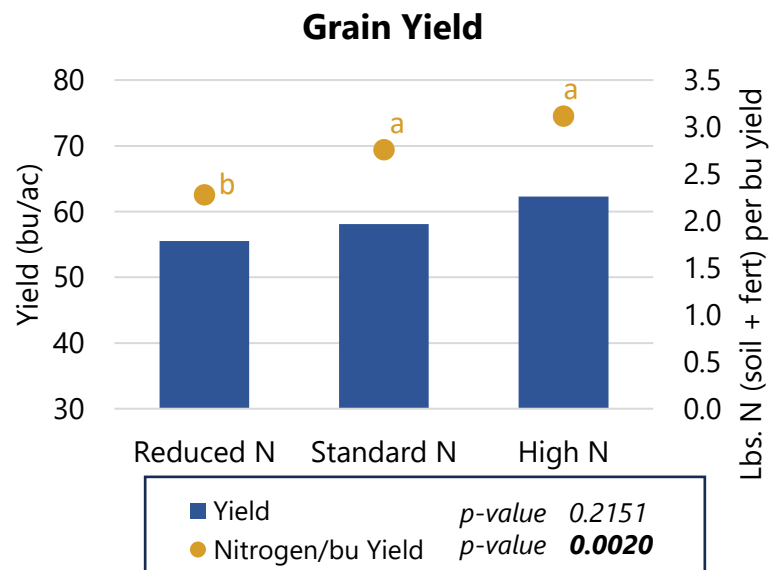
Site Information	
R.M.	North Norfolk
Residual N (0-24')	25 lbs. N/ac
Seeding Date:	May 16, 2023
Seeding Equipment:	1790 JD planter
Variety:	L345PC
Harvest Date:	

Nitrogen Application	
Source:	28-0-0
Placement:	Surface Applied
Timing:	Pre-seed

Summary

- **Plant Establishment:** N rate had no influence on plant counts in this trial.
- **Tissue N:** The high rate of N significantly increased N content of the plant at bolting compared to the standard and reduced N rate.
- **Grain Moisture:** Nitrogen rate had no influence on grain moisture in this trial.
- **Grain Yield:** There was no significant differences in yield in this trial. There was an insignificant trend of increased yield as N rate increased.
- **Nitrogen Efficiency:** The reduced N treatment was most efficient with N supply, using 2.3 lbs. N per bushel of grain yield produced.
- The high N treatment produced statistically the same yield as the farm standard N practice but reduced N efficiency from 2.8 to 3.1 lbs. N per bushel of grain yield produced.

Treatment	Fertilizer N	Total N (Soil + Fert)
<i>lbs. N / ac</i>		
1 Reduced N Rate	101	126
2 Standard N Rate	135	160
3 High N Rate	168	193



	Plant Counts at 4 Leaf (ft ²)	N Tissue at Bolting (%)	Harvest Grain Moisture (%)
1. Reduced N	7.5	5.1ab	8.8
2. Standard N	6.9	4.8b	8.7
3. High N	6.7	5.2a	8.9
<i>p-value</i>	0.1136	0.0177	0.6058

The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	20	19	35	30	30	134
Avg Daily Temp (C)	0.9	16	21	19	19	



Canola Nitrogen Rate – NR_09

Research Question: Are N rates being used on canola across Manitoba sufficient for optimizing yield and nitrogen efficiency?

Site Information

R.M.	Brokenhead
Residual N (0-24')	30 lbs. N/ac
Seeding Date:	May 20, 2023
Seeding Equipment:	Air Planter
Variety:	L356PC
Harvest Date:	Sept 26, 2023

Nitrogen Application

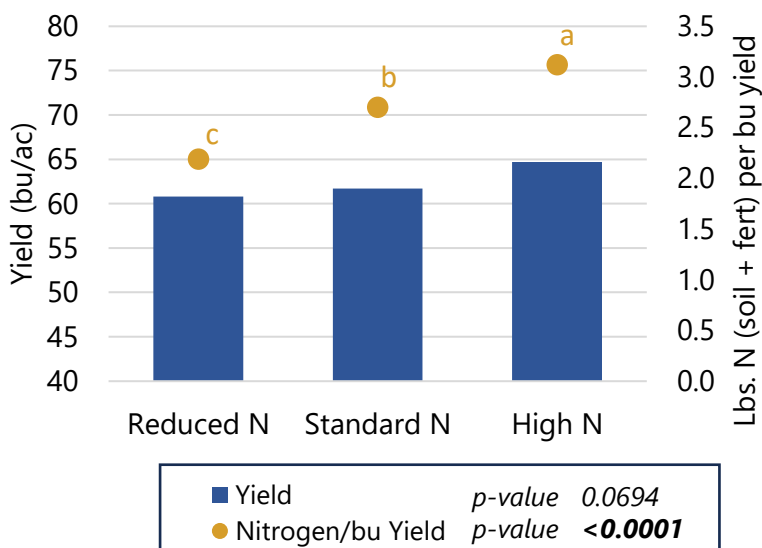
Source:	46-0-0
Placement:	Midrow Banded
Timing:	Planting

Summary

- **Plant Establishment:** N rate had no influence on plant counts in this trial.
- **Tissue N:** N rate had no significant influence on N tissue content at bolting in this trial.
- **Grain Moisture:** The reduced N rate significantly reduced grain moisture at harvest compared to the standard and high N rates.
- **Grain Yield:** N rate treatments did not significantly influence grain yield in this trial at the 95% confidence level, however at 90% confidence the high N rate did yield more than standard and reduced rate treatments.
- **Nitrogen Efficiency:** The reduced N treatment was most efficient with N supply, using 2.2 lbs. N per bushel of grain yield produced.
- The high N treatment statistically produced the same yield as the farm standard N practice but reduced N efficiency from 2.7 to 3.1 lbs. N per bushel of grain yield produced.

Treatment	Fertilizer N	Total N (Soil + Fert)
<i>lbs. N / ac</i>		
1 Reduced N Rate	103	133
2 Standard N Rate	137	167
3 High N Rate	172	202

Grain Yield



	Plant Counts at 4 Leaf (ft ²)	N Tissue at Bolting (%)	Harvest Grain Moisture (%)
1. Reduced N	4.7	5.8	9.6c
2. Standard N	4.8	5.6	10a
3. High N	4.4	6.0	9.8b
<i>p</i> -value	0.0501	0.6415	0.0017

The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	17	10	51	74	73	225
Avg Daily Temp (C)	0.9	16	20	17	18	

Agronomic support for this trial provided by:



Canola Nitrogen Rate – NR_10

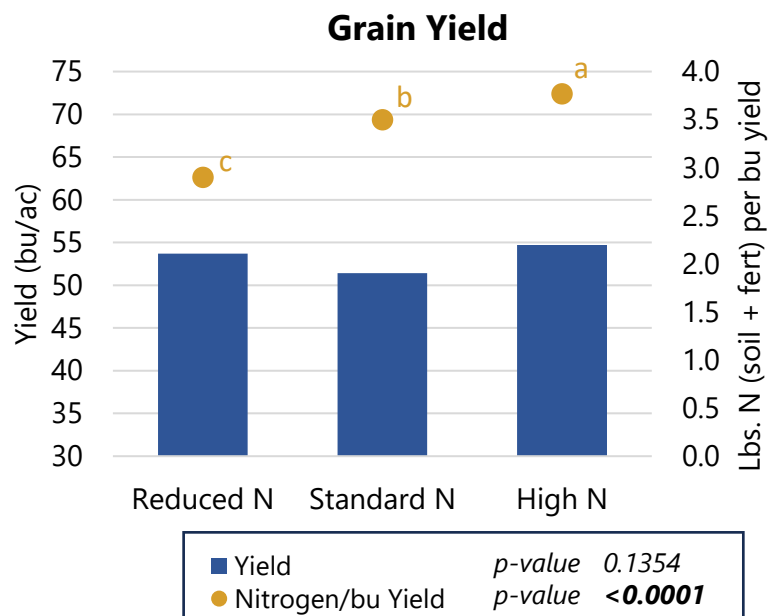
Research Question: Are N rates being used on canola across Manitoba sufficient for optimizing yield and nitrogen efficiency?

Site Information	
R.M.	Two Borders
Residual N (0-24')	50 lbs. N/ac
Seeding Date:	May 23, 2023
Seeding Equipment:	Vaderstad-Seed Hawk Hoe Drill
Variety:	L340
Harvest Date:	Sept 16, 2023
Nitrogen Application	
Source:	46-0-0
Placement:	Broadcast
Timing:	Spring Pre-Seed

Summary

- **Plant Establishment:** N rate had no influence on plant counts in this trial.
- **Tissue N:** N rate had no significant influence on N tissue content at bolting in this trial.
- **Grain Moisture:** Nitrogen rate had no influence on grain moisture in this trial.
- **Grain Yield:** There was no significant difference in grain yield between the three N rate treatments tested in this trial.
- **Nitrogen Efficiency:** The reduced N treatment was most efficient with N supply, using 2.9 lbs. N per bushel of grain yield produced.
- The high N treatment produced the same yield as the farm standard N practice but reduced N efficiency from 3.5 to 3.8 lbs. N per bushel of grain yield produced.

Treatment	Fertilizer N	Total N (Soil + Fert)
lbs. N / ac		
1 Reduced N Rate	80	130
2 Standard N Rate	106	156
3 High N Rate	133	183



	Plant Counts at 4 Leaf (ft ²)	N Tissue at Bolting (%)	Harvest Grain Moisture (%)
1. Reduced N	8.1	6.8	8.5
2. Standard N	7.7	7.1	8.7
3. High N	8.6	7.0	8.5
p-value	0.994	0.3586	0.7742

The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	28	64	114	20	23	249
% of Normal Rainfall	73	120	140	42	58	
Avg Daily Temp (C)	0.7	15	20	08	16	



Canola Nitrogen Rate – NR_11

Research Question: Are N rates being used on canola across Manitoba sufficient for optimizing yield and nitrogen efficiency?

Site Information	
R.M.	De Salaberry
Residual N (0-24')	127
Seeding Date:	May 15, 2023
Seeding Equipment:	Disc Drill
Variety:	P508 CL
Harvest Date:	Aug 28, 2023

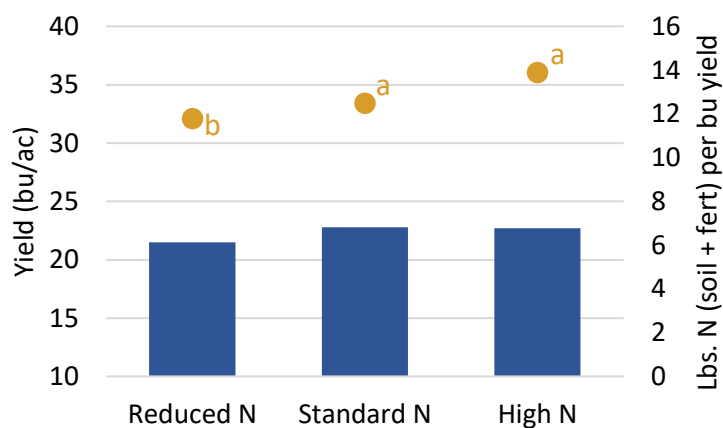
Nitrogen Application	
Source:	46-0-0
Placement:	Broadcast
Timing:	Spring, Pre-Emergence

Treatment	Fertilizer N	Total N (Soil + Fert)
lbs. N / ac		
1 Reduced N Rate	128	255
2 Standard N Rate	158	285
3 High N Rate	188	315

Summary

- **Plant Establishment:** N rate had no influence on plant counts in this trial.
- **Tissue N:** N rate had no significant influence on N tissue content at bolting in this trial.
- **Grain Moisture:** Nitrogen rate had no influence on grain moisture in this trial.
- **Grain Yield:** There was no significant effect of N rate treatments on grain yield in this trial. The high N available for all treatments and relatively low yields indicate yield limiting factors present resulting in sufficient N provided to the crop for yields being achieved for all treatments.
- **Nitrogen Efficiency:** High levels of N were available to the crop across all treatments, paired low yields being achieved resulted in a very high N use per bushel of yield ranging from 12 – 14 lbs. N.

Grain Yield



■ Yield	p-value 0.0662
● Nitrogen/bu Yield	p-value 0.0007

	Plant Counts at 4 Leaf (ft ²)	N Tissue at Bolting (%)	Harvest Grain Moisture (%)
1. Reduced N	6.8	3.8	9.4
2. Standard N	6.8	3.9	9.5
3. High N	7	4.1	9.6
p-value	0.9554	0.2247	0.2563

The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	47	39	59	50	56	251
Avg Daily Temp (C)	0.6	16	20	17	18	



Canola Seeding Rate Trials

2022 – 2023 Summary

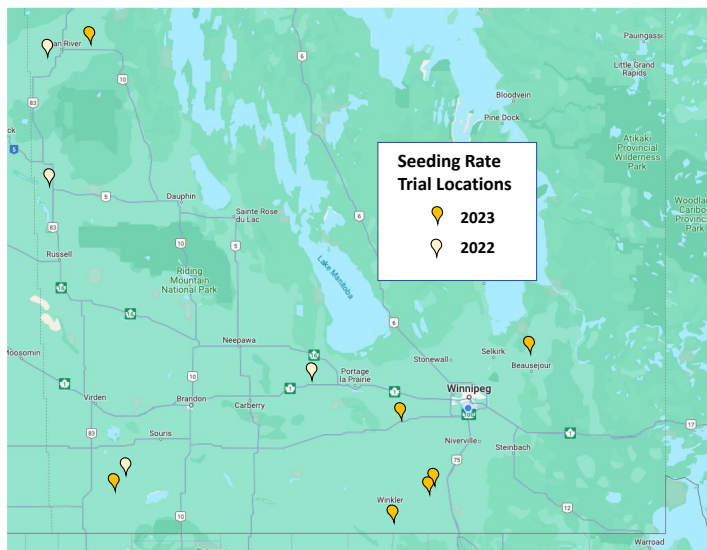
Research Question: Can Manitoba canola farms reduce their seeding rates without sacrificing yield to increase return on investment?

Treatments

1. Reduced Seeding Rate (75%)
2. Standard Seeding Rate (100%)
Farm Normal
3. High Seeding Rate (125%)

Trial Setup: Randomized complete block, each treatment was one equipment width x field length, with 4 replicates per locations (12 strips per location)

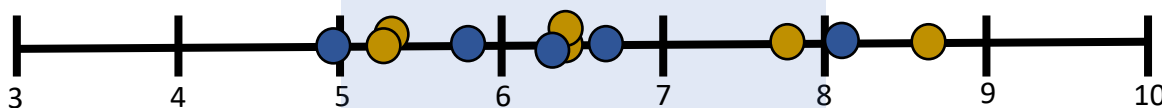
Data Collection: Plant Counts (4 leaf and Maturity), Grain Yield



Trial ID	RM	Plant Counts at 4-Leaf Stage			Change in Emergence from Standard Rate	
		Reduced	Standard	High	Reduced	High
		plants/ft ²			%	
SR_01 (2022)	Swan Valley West	5.1a ⁱ	5.3a	6.3a	+17	-3
SR_03 (2022)	Roblin	6.2b	6.4ab	6.8a	+16*	-9*
SR_04 (2022)	Brokenhead	5.1b	5.8b	7.4a	+21*	0
SR_05 (2022)	Two Borders	8.7b	8.7b	10.8a	+29	4
SR_06 (2023)	Minitonas-Bowsman	5.5b	6.4b	8.7a	+9	-5
SR_07 (2023)	Rhineland	6.1a	6.4a	7.4a	+23	-6
SR_08 (2023)	Grey	5.4b	6.6b	7.7a	+10	-7
SR_09 (2023)	Morris	4.5b	5.3b	6.6a	+7	0
SR_10 (2023)	Brenda-Waskada	8.3a	7.8a	9.1a	+32*	-5
SR_11 (2023)	Rhineland	6.1c	8.1b	11.1a	0	+8
SR_12 (2023)	Brokenhead	4.5a	4.9a	5.5a	+23	-9
COMBINED		5.9c	6.5b	8.0a	+17*	-1

ⁱSimilar lowercase letters in the same rows are not significantly different (p<0.05)
*indicates significantly (p-value < 0.05) different from standard seeding rate

Plant Establishment with Farm Standard Seeding Rate



		Emergence	Seeding Rate
Air Drill	●	51 – 89%	4 – 5 lbs./ac
Planter	●	89 – 100%	2.7 – 3.3 lbs./ac



Canola Seeding Rate Trials

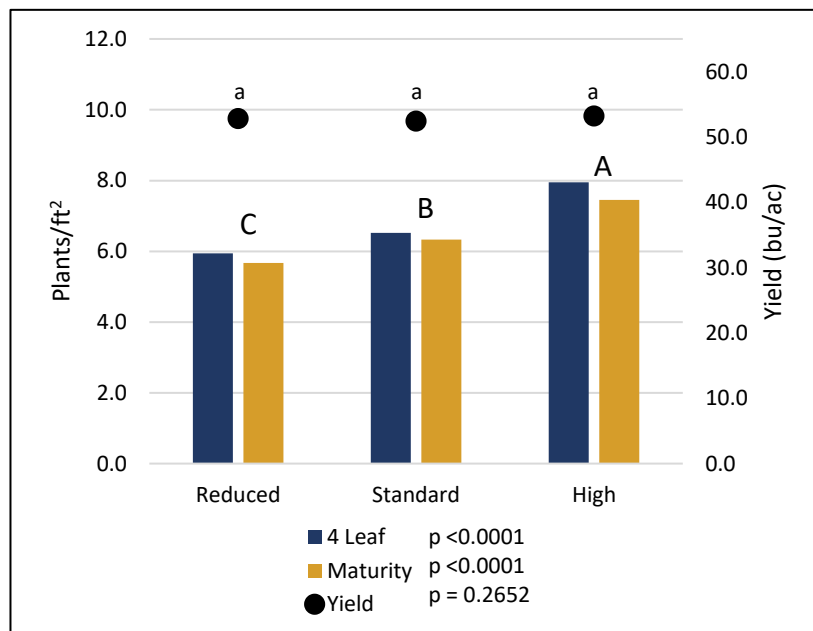
2022 – 2023 Summary

Plant Establishment

- Overall, high seeding rates increased plant counts, while reduced seeding rates lowered plant counts.
- Reduced seeding rates increased emergence by 17% overall.
- Seeding rate treatment did not influence plant survival from 4 leaf to maturity (93-96%)
- Trials that use planters generally had higher emergence than trials with air drills, allowing for reduced seeding rates. The number of plants established were similar.

Grain Yield

- **Grain yield was not significantly influenced by seeding rate** in this trial
- There was no significant relationship between plant counts and grain yield.

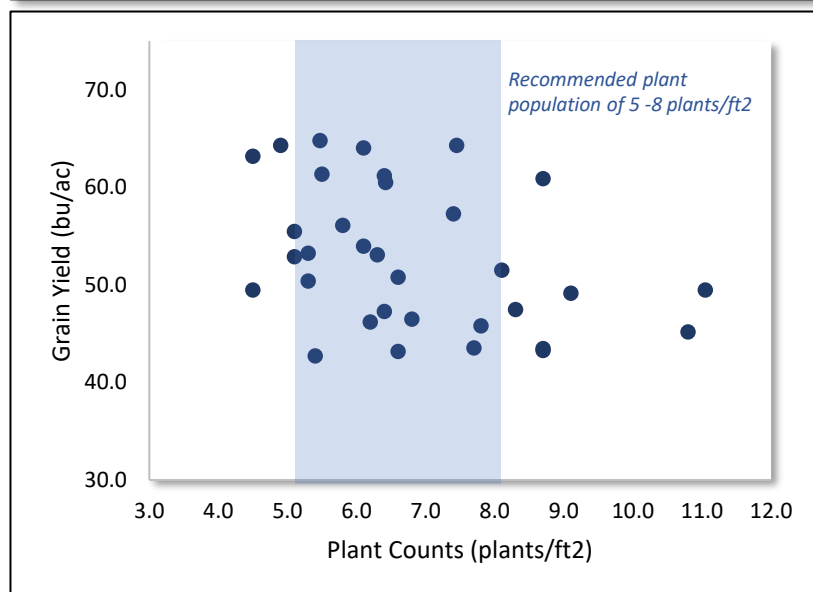


Economic Considerations

- Canola seed SRP for 2024 is approximately \$1000/bag (targeted to seed 10 acres @ 60% emergence), will vary with variety and seed treatment.
- Preliminary trial results indicate that reducing seeding rate by 25% did not decrease yield and could reduce seed costs by up to \$250/bag or \$25/ac compared to the recommended seeding rate.

In Summary

- All results presented are preliminary as these trials will continue in the 2024 and 2025 field seasons.
- Manitoba canola farmers are successfully achieving the recommended plant population of 5-9 plants per square foot.
- With no significant influence of seeding rate or plant stand on grain yield (within the range tested) there is opportunity for farms to reduce seeding rates to increase profitability per acre.
- Additional considerations: risks associated with low plant populations outside of the scope of this trial include reduced competitiveness against field pests.



For full individual trial reports with all data collected please visit Canolagrowers.com

Canola Seeding Rate – SR_06

Research Question: Can Manitoba canola farms reduce their seeding rates without sacrificing yield to increase return on investment?

Site Information

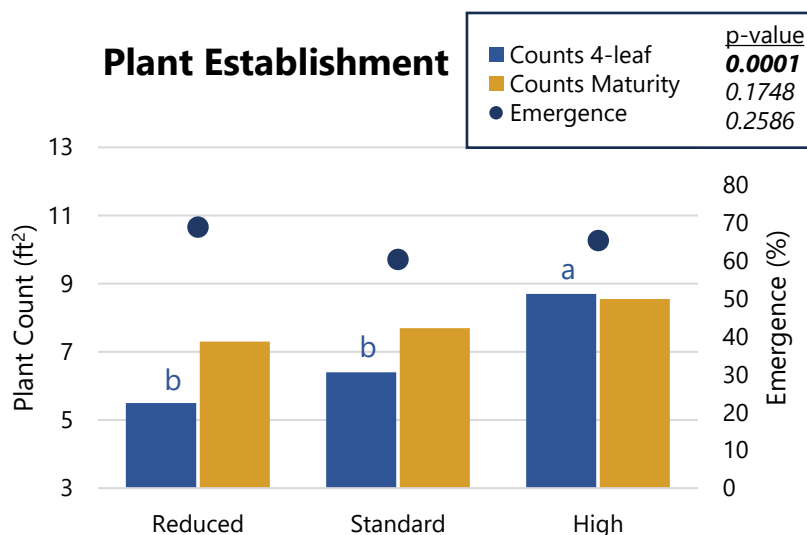
R.M.	Minitonas-Bowsman
Seeding Date:	May 21, 2023
Seeding Equipment:	Bourgault 5710 Air Drill
Variety:	L234PC
Seed Treatment:	Lumiderm
TKW:	4.7 g/1000 seeds
Row Spacing:	10"
Harvest Date:	September 13, 2023

Treatment	lbs./ac	Seeds/ac
1 Reduced Seeding Rate (75%)	3.6	347,438
2 Standard Seeding Rate (100%)	4.8	463,251
3 Hight Seeding Rate (125%)	6	579,063

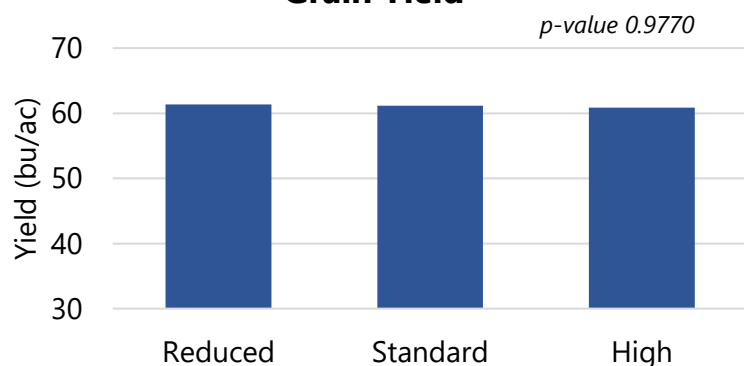
Summary

- **Plant Establishment:** High seeding rate significantly increase the amount of plants present at the 4-leaf stage compared to the other treatments (no difference in emergence % at 4 leaf). There were no differences between treatments for plant counts at maturity, indicating that there was likely a late flush of emergence after much of the crop was at 4 leaf stage due to dry May conditions.
- **Grain Yield:** There was no significant difference in grain yield between all seeding rates tested.
- **Economic Considerations:** The reduced seeding rate treatment resulted in the greatest return on investment in this trial. With no effect on yield the adoption of a lower seeding rate could reduce seed costs by 25%.
- 2024 SRP is approximately \$1000/bag of canola seed, indicating a potential cost reduction of \$250/bag.
- Additional considerations: risks associated with low plant populations outside of the scope of this trial include reduced competitiveness against field pests.

Plant Establishment



Grain Yield



The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	36.5	18.6	40.6	39.7	54	189
% of Normal Rainfall	108%	33%	45%	42%	69%	47%
Avg Daily Temp (C)	-0.3	14	19	17	18	

Agronomic support for this trial provided by:



Canola Seeding Rate – SR_07

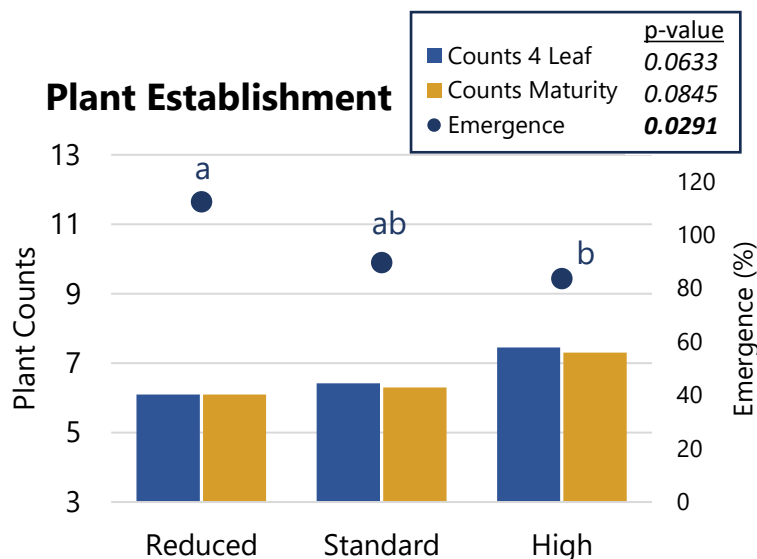
Research Question: Can Manitoba canola farms reduce their seeding rates without sacrificing yield to increase return on investment?

Site Information

R.M.	Rhineland
Seeding Date:	May 16, 2023
Seeding Equipment:	John Deere Planter
Variety:	L357
Seed Treatment:	Buteo
TKW:	4.8 g/1000 seeds
Row Spacing:	10"
Harvest Date:	September 1, 2023

Treatment	lbs./ac	Seeds/ac
1 Reduced Seeding Rate (75%)	2.5	347,438
2 Standard Seeding Rate (100%)	3.3	463,251
3 High Seeding Rate (125%)	4.1	579,063

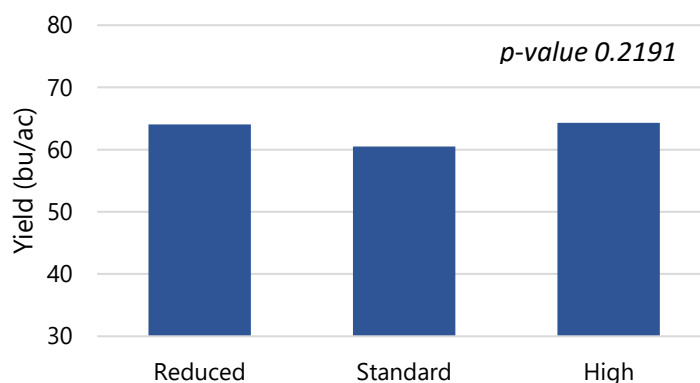
Plant Establishment



Summary

- Plant Establishment:** There was no significant difference between any of the seeding rate treatments for plant counts at 4 leaf or maturity. There was a significant increase in emergence % with the reduced seeding rate compared to the high seeding rate.
- Grain Yield:** There was no significant difference in grain yield between all seeding rates tested.
- Economic Considerations:** The reduced seeding rate treatment resulted in the greatest return on investment in this trial. With no effect on yield the adoption of a lower seeding rate could reduce seed costs by 25%.
- 2024 SRP is approximately \$1000/bag of canola seed, indicating a potential cost reduction of \$250/bag.
- Additional considerations: risks associated with low plant populations outside of the scope of this trial include reduced competitiveness against field pests.

Grain Yield



The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	30	19	61	18	30	159
Avg Daily Temp (C)	0.8	14	19	17	18	

Agronomic support for this trial provided by:



Canola Seeding Rate – SR_08

Research Question: Can Manitoba canola farms reduce their seeding rates without sacrificing yield to increase return on investment?

Site Information

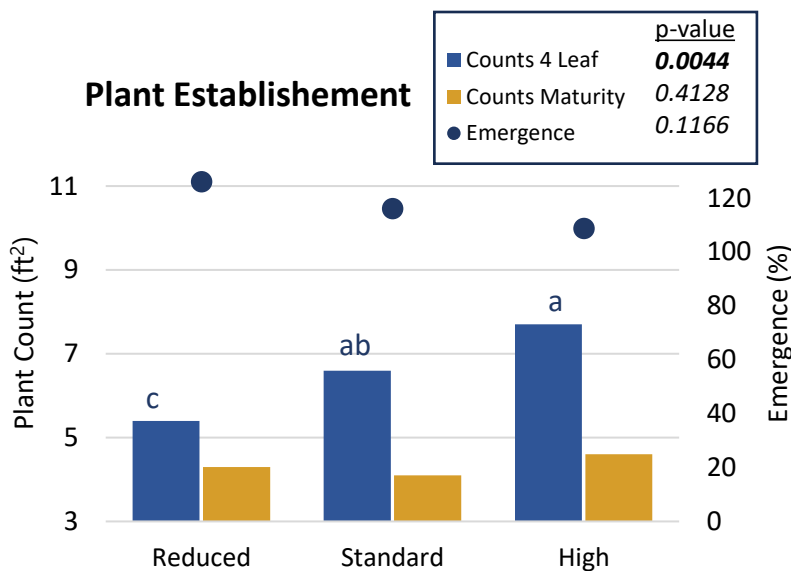
R.M.	Grey
Seeding Date:	May 13, 2023
Seeding Equipment:	Planter
Variety:	DKLL 83 SC
Seed Treatment:	Prosper Evergol
TKW:	5.5 g/1000 seeds
Row Spacing:	15"
Harvest Date:	Aug 25, 2023

Treatment	lbs./ac	Seeds/ac
1 Reduced Seeding Rate (75%)	2.25	185,563
2 Standard Seeding Rate (100%)	3.0	247,418
3 High Seeding Rate (125%)	3.75	309,272

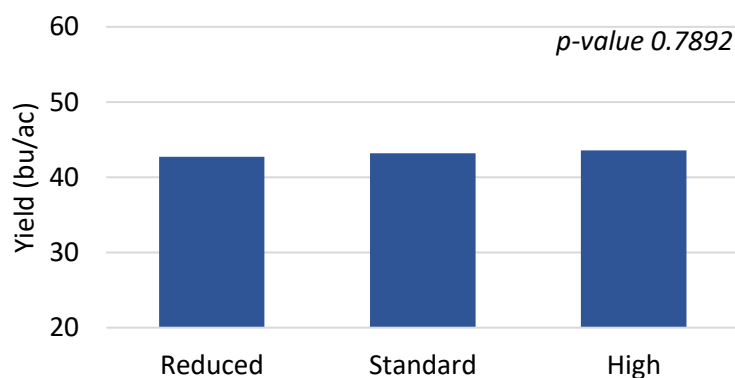
Summary

- **Plant Establishment:** High seeding rate significantly increase the number of plants present at the 4-leaf stage compared to the other treatments (no difference in emergence % at 4 leaf). There were no differences between treatments for plant counts at maturity with all seeding rates resulting in a final plant population of 4 – 4.5 plants/ft².
- **Grain Yield:** There was no significant difference in grain yield between all seeding rates tested.
- **Economic Considerations:** The reduced seeding rate treatment resulted in the greatest return on investment in this trial. With no effect on yield the adoption of a lower seeding rate could reduce seed costs by 25%.
- 2024 SRP is approximately \$1000/bag of canola seed, indicating a potential cost reduction of \$250/bag.
- Additional considerations: risks associated with low plant populations outside of the scope of this trial include reduced competitiveness against field pests.

Plant Establishment



Grain Yield



The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	31.1	17.4	25.1	23.9	59.1	157
Avg Daily Temp (C)	0.13	16	21	18	15	

Agronomic support for this trial provided by:



Canola Seeding Rate – SR_09

Research Question: Can Manitoba canola farms reduce their seeding rates without sacrificing yield to increase return on investment?

Site Information

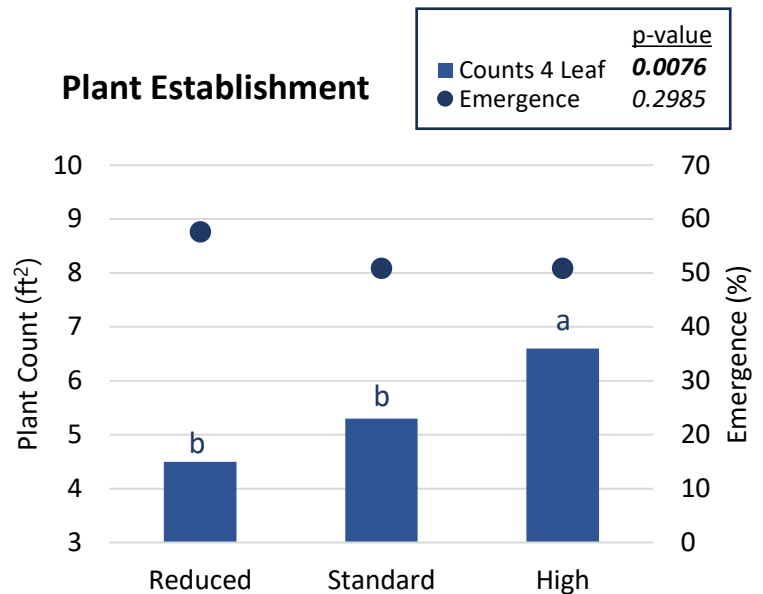
R.M.	Morris
Seeding Date:	May 15, 2023
Seeding Equipment:	Disc Drill
Variety:	L345PC
Seed Treatment:	Helix Vibrance
TKW:	4 g/1000 seeds
Row Spacing:	10"
Harvest Date:	Sept 11, 2023

Treatment	lbs./ac	Seeds/ac
1 Reduced Seeding Rate (75%)	3	340,200
2 Standard Seeding Rate (100%)	4	453,600
3 High Seeding Rate (125%)	5	567,000

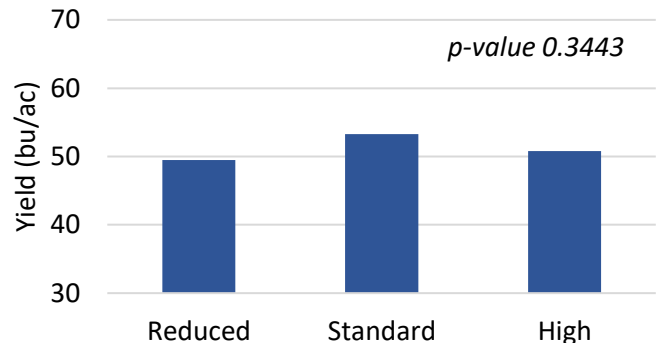
Summary

- **Plant Establishment:** The high seeding rate treatment had significantly more plants at the 4-leaf stage compared to the reduced rate and standard rate treatments. There was no significant differences between emergence which ranged between 50-60% for all treatments.
- **Grain Yield:** There was no significant difference in grain yield between all seeding rates tested.
- **Economic Considerations:** The reduced seeding rate treatment resulted in the greatest return on investment in this trial. With no effect on yield the adoption of a lower seeding rate could reduce seed costs by 25%.
- 2024 SRP is approximately \$1000/bag of canola seed, indicating a potential cost reduction of \$250/bag.
- Additional considerations: risks associated with low plant populations outside of the scope of this trial include reduced competitiveness against field pests.

Plant Establishment



Grain Yield



The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	16.4	17.3	15.8	61.3	26.8	138
Avg Daily Temp (C)	0.2	16.2	21	18.1	18.9	

Agronomic support for this trial provided by:



Canola Seeding Rate – SR_10

Research Question: Can Manitoba canola farms reduce their seeding rates without sacrificing yield to increase return on investment?

Site Information

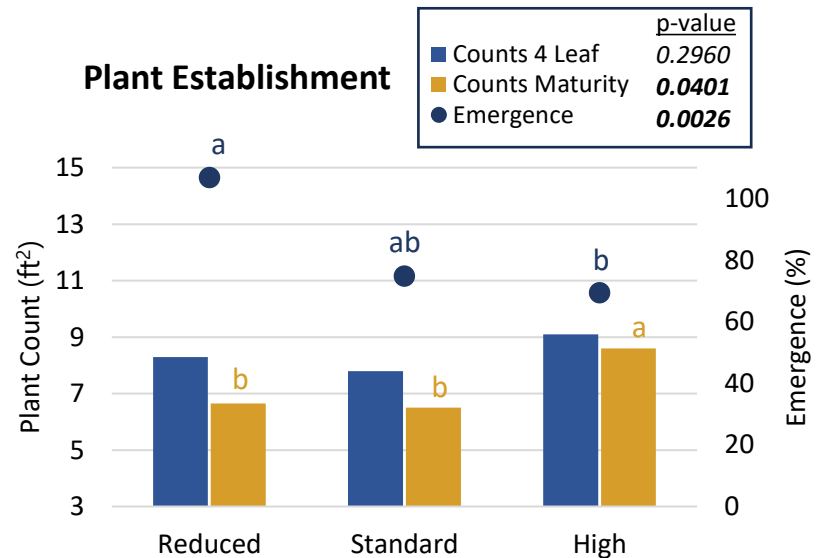
R.M.	Brenda-Waskada
Seeding Date:	May 28, 2023
Seeding Equipment:	Vaderstad Seed Hawk Hoe Drill
Variety:	L340
Seed Treatment:	Lumiderm
TKW:	5 g/1000 seeds
Row Spacing:	12"
Harvest Date:	Sept 16, 2023

Treatment	lbs./ac	Seeds/ac
1 Reduced Seeding Rate (75%)	3	272,160
2 Standard Seeding Rate (100%)	4	362,880
3 High Seeding Rate (125%)	5	453,600

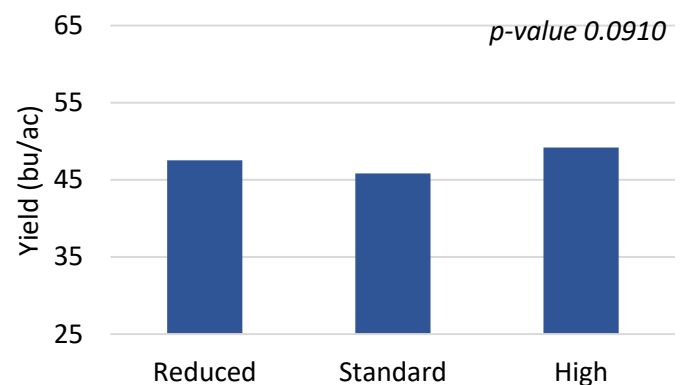
Summary

- Plant Establishment:** There was no significant difference between plant counts at the 4-leaf stage, however at maturity the high seeding rate had significantly more plants than other treatments. Indicating that there was likely some late emergence of plants in that treatment, Emergence was highest at the reduced seeding rate and lowest for the high seeding rate.
- Grain Yield:** There was no significant difference in grain yield between all seeding rates tested.
- Economic Considerations:** The reduced seeding rate treatment resulted in the greatest return on investment in this trial. With no effect on yield the adoption of a lower seeding rate could reduce seed costs by 25%.
- 2024 SRP is approximately \$1000/bag of canola seed, indicating a potential cost reduction of \$250/bag
- Additional considerations: risks associated with low plant populations outside of the scope of this trial include reduced competitiveness against field pests.

Plant Establishment



Grain Yield



The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	28	64	114	20	23	248
% of Normal Rainfall	73	120	141	42	58	
Avg Daily Temp (C)	0.7	15	20	18	16	

Agronomic support for this trial provided by:



Canola Seeding Rate – SR_11

Research Question: Can Manitoba canola farms reduce their seeding rates without sacrificing yield to increase return on investment?

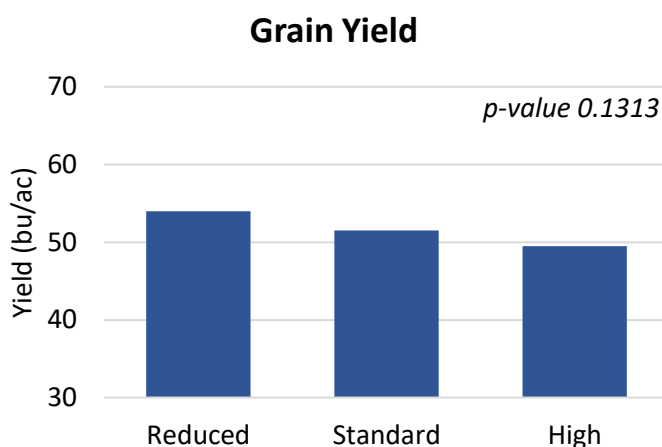
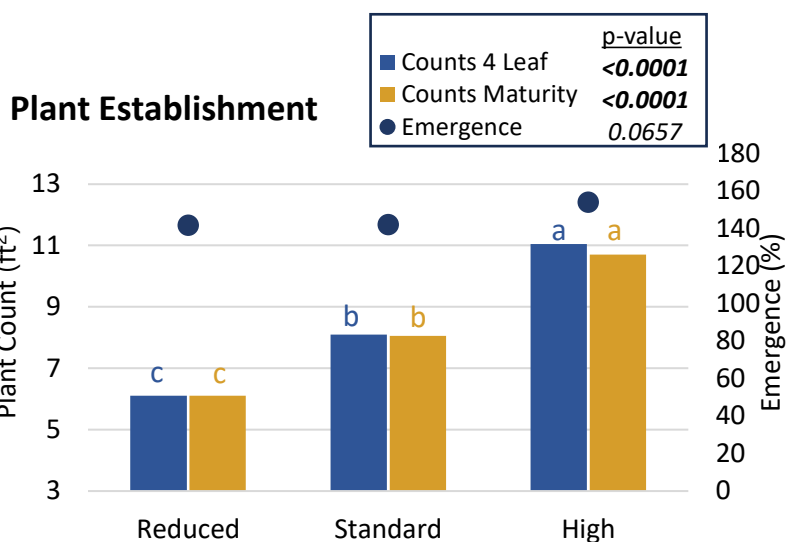
Site Information

R.M.	Rhineland
Seeding Date:	May 22, 2023
Seeding Equipment:	Horsch Maestro
Variety:	L350PC
Seed Treatment:	Helix Vibrance Buteo
TKW:	4.35 g / 1000 seeds
Row Spacing:	20"
Harvest Date:	Sept 12, 2023

Treatment	lbs./ac	Seeds/ac
1 Reduced Seeding Rate (75%)	1.8	187,500
2 Standard Seeding Rate (100%)	2.4	250,000
3 Hight Seeding Rate (125%)	3.0	312,500

Summary

- **Plant Establishment:** The high seeding rate resulted in the highest plant population at both 4-leaf and maturity, with the reduced rate treatment being the lowest. Emergence % was not significantly influenced in this trial.
- **Grain Yield:** There was no significant difference in grain yield between all seeding rates tested.
- **Economic Considerations:** The reduced seeding rate treatment resulted in the greatest return on investment in this trial. With no effect on yield the adoption of a lower seeding rate could reduce seed costs by 25%.
- 2024 SRP is approximately \$1000/bag of canola seed, indicating a potential cost reduction of \$250/bag.
- Additional considerations: risks associated with low plant populations outside of the scope of this trial include reduced competitiveness against field pests.



The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	22	12	24	32	27	117
Avg Daily Temp (C)	0.4	16	21	19	17	



Canola Seeding Rate – SR_12

Research Question: Can Manitoba canola farms reduce their seeding rates without sacrificing yield to increase return on investment?

Site Information

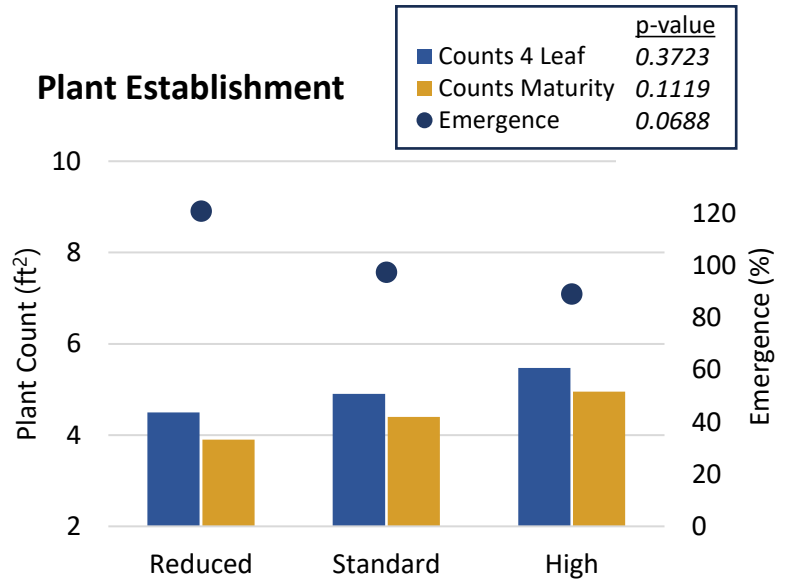
R.M.	Brokenhead
Seeding Date:	May 20, 2023
Seeding Equipment:	Air Planter
Variety:	L356PC
Seed Treatment:	Lumiderm
TKW:	5.6 g / 1000 seeds
Row Spacing:	10"
Harvest Date:	Aug 26, 2023

Treatment	lbs./ac	Seeds/ac
1 Reduced Seeding Rate (75%)	2	162,000
2 Standard Seeding Rate (100%)	2.7	218,700
3 High Seeding Rate (125%)	3.3	267,300

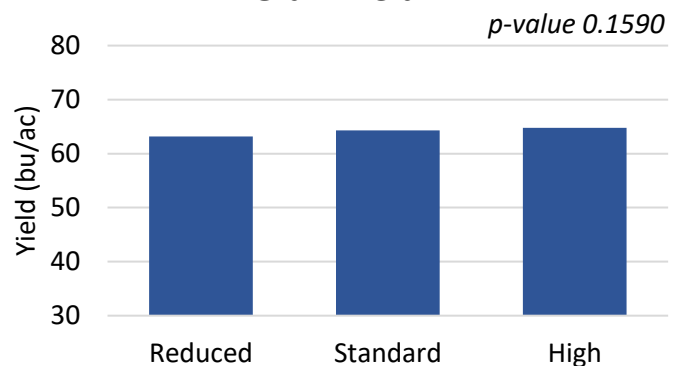
Summary

- **Plant Establishment:** There was no significant difference between any of the seeding rate treatments for plant counts at 4 leaf or maturity. Emergence was highest at the reduced seeding rate and lowest for the high seeding rate, though insignificant.
- **Grain Yield:** There was no significant difference in grain yield between all seeding rates tested.
- **Economic Considerations:** The reduced seeding rate treatment resulted in the greatest return on investment in this trial. With no effect on yield the adoption of a lower seeding rate could reduce seed costs by 25%.
- 2024 SRP is approximately \$1000/bag of canola seed, indicating a potential cost reduction of \$250/bag.
- Additional considerations: risks associated with low plant populations outside of the scope of this trial include reduced competitiveness against field pests.

Plant Establishment



Grain Yield



The absence of lowercase letters for any data type indicates no significant differences between treatments.

	Apr	May	June	July	Aug	Total
Rainfall (mm)	17	10	51	74	73	225
Avg Daily Temp (C)	0.9	16	20	17	18	



Canola Seed-Placed Fertilizer Trials

Research Question: Are seed-placed fertilizer (SPF) applications being used across Manitoba safe for canola plant establishment and what are the major factors influencing seed safety?

Treatments

1. No Seed-Placed Fertilizer
2. Standard Seed-Placed Fertilizer Rate (100%)
Farm Normal
3. High Seed-Placed Fertilizer Rate (150%)

Trial Setup: In this trial each location has one replicate of each treatment.

This is to allow for a wider range of testing environments (soil/rainfall), equipment (row spacing, opener type, seed bed utilization) and agronomic practices (seed-placed fertilizer sources, rates, blends). Allowing for examination of the relationships between these testing factors and seed safety (emergence).

Data Collection: Plant Counts (4 leaf), Emergence %



Supporting Data:

Seed Bed Utilization (SBU) is the amount of seedbed over which fertilizer has been spread and reflects the relative concentration of the fertilizer with the seed. Low SBU (<20%) will pose a higher risk than high SBU (>20%) for seed toxicity.

$$\text{Seedbed Utilization (\%)} = \left(\frac{\text{Opener Width}}{\text{Row Spacing}} \right) \times 100$$

Recommendations from Manitoba Agriculture and Canola Council of Canada indicate a maximum of 20-25 lbs. P₂O₅/ac and 10 lbs. S/ac (SBU 15, good moisture) should be applied in the seed row to limit seedling toxicity. There is currently not clear recommendations addressing seed safety of new sources of P and S fertilizers in Manitoba.

Rates of urea fertilizer (lbs. N/ac) safely applied with cereal and canola seed if seedbed soil moisture is good to excellent. (Manitoba Agriculture)

Soil Texture	1 in. spread [†]			2 in. spread [†]			3 in. spread [†]		
	(disc or knife) [‡]			(spoon or hoe)			(sweep)		
	Row spacing								
	6"	9"	12"	6"	9"	12"	6"	9"	12"
	SBU								
	17%	11%	8%	33%	22%	17%	50%	33%	25%
CANOLA SEED									
Light (sandy loam)	0	0	0	10	0	0	20	10	0
Medium (loam to clay loam)	0	0	0	20	10	0	30	20	10
Heavy (clay to heavy clay)	10	0	0	30	20	10	40	30	20



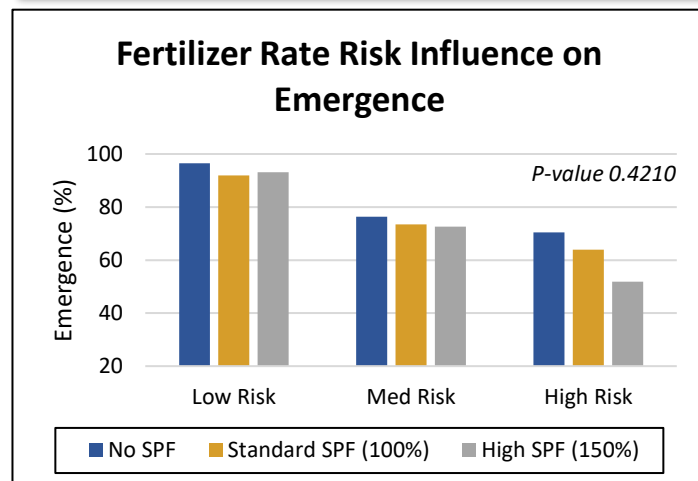
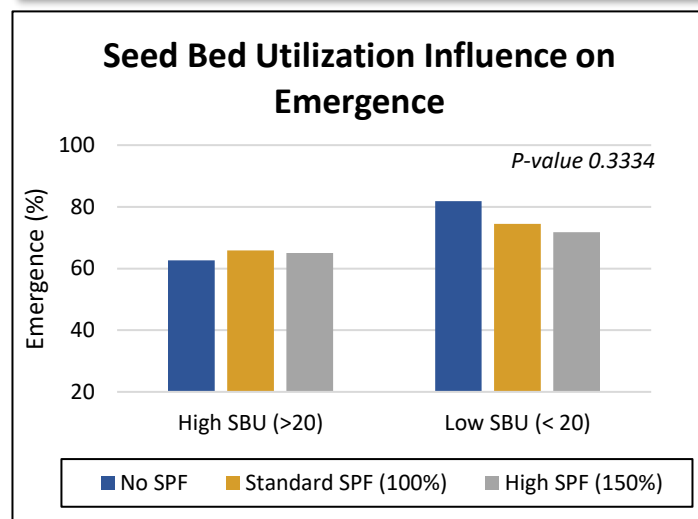
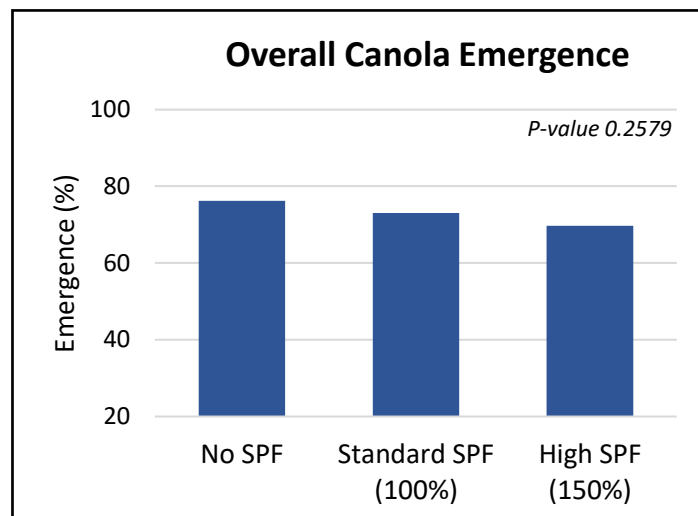
Canola Seed-Placed Fertilizer Trials

Preliminary Results (Year 1)

The goal of this trial is to be able to use a large data set (target n=100 over 4 years) to examine relationships between emergence and the factors that influence seed toxicity in canola, such as, spring soil moisture, soil texture, SBU and seed-placed fertilizer rate and sources. After year one we saw that many farms are pushing what are considered "safe" seed-placed fertilizer rates with low SBU. Testing locations in 2023 were concentrated in the Red River Valley with plans to increase testing locations in central and western Manitoba in the following years.

$$\text{Emergence(\%)} = (\text{Plants per acre at 4-leaf stage} / \text{seeds planted per acre}) \times 100$$

- Overall, there was a slight, non-significant, reduction in emergence as seed-placed fertilizer increased from zero to the high rate of 150% of the farms standard practice.
- Locations with low SBU (<20%) included all of the sites that were seeded using planters, resulting in higher initial emergence than locations with high SBU (>20%) when no SPF was applied.
- When SBU was low (<20%) increases in SPF showed a trend of increased seed toxicity (reduced emergence) compared to when SBU high (>20%).
- Each location was categorized based on the farm's standard SPF rates as low, med, or high fertilizer rate risk based on current recommendations for seed safety.
 - High risk = N, P, and S rates are all over the recommended safe levels.
 - Medium risk = N, P, or S rates are over the recommended safe levels.
 - Low risk = N, P, and S are within the recommended safe level.
- As fertilizer rate risk increase from low to high the overall emergence trended lower.
- The largest reductions in emergence with increased SPF rates were seen at locations that fell into the high fertilizer rate risk category.



Agronomic support for this trial provided by:

- Antara Agronomy Service Ltd.
- Tone Ag Consulting Ltd.
- New Era Ag Research
- A1 Agronomy Inc.
- Field 2 Field Agronomy Inc.
- Ag Advantage Ltd. (Meadows)



Canola Seed-Placed Fertilizer Trials

Summary of 2023 Testing Locations

Trial ID	Location	Seeding Equipment	SBU	Standard SPF Rates (lbs./ac)				SPF Source
				%	N	P ₂ O ₅	K ₂ O	
SPF_01	Katrimie	1790 JD Planter	5	12	40	0	0	10-34-0*(side-banded)
SPF_02	Sperling	JD 4530F Disc Drill	10	18	17	0	17	6-30-0/17-0-0-20
SPF_03	Beausejour	Air Planter	10	4	20	0	0	11-52-0
SPF_04	Arnaud	JD 1870 Hoe Drill	20	19	50	0	20	S15/11-52-0
SPF_05	Horndean	JD 1830	26	15	30	0	10	21-0-0-24/11-52-0
SPF_06	Rosengart	JD N542 Disc Drill	10	13	33	0	15	S15
SPF_07	Rosengart	JD N542 Disc Drill	10	13	33	0	15	S15
SPF_08	Altona	Bourgault 6500	20	15	37	0	17	S15
SPF_10	Swan River	Bourgault 3320	17	8	40	20	0	11-52-0/0-0-60
SPF_11	Swan River	Vanderstadd Drill	7.5		40	15	20	
SPF_12	Swan River	Bourgault 5810	20	27	45	0	20	11-52-0/21-0-0-24/Elemental S
SPF_18	St. Claude	JD 1890 Disc Drill	13	15	40	0	18	S15
SPF_19	Culross	Bourgault 3320 Disc Drill	10	16	50	0	13	S15
SPF_20	Elm Creek	Concord Hoe Drill	30	17	45	0	20	S15
SPF_22	Oakville	JD 1870 Hoe Drill	25	13	33	0	15	S15
SPF_23	Rosser	Bourgault 3820	10	13	20	0	10	21-0-0-24/11-52-0
SPF_24	Meadows	Bourgault 3820	10	13	20	0	10	21-0-0-24/11-52-0
SPF_25	Meadows	Bourgault 8810	20	20	30	0	18	21-0-0-24/11-52-0
SPF_26	St. Francois Xavier	JD Disc Drill	10	6	26	0	15	21-0-0-24/11-52-0
SPF_27	St. Francois Xavier	Case PD 500	13	9	41	0	0	11-52-0

