

Sustainable Canadian Agricultural Partnership

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SFP Establishing nitrogen and seeding rate recommendations for composite yellow mustard production in Saskatchewan

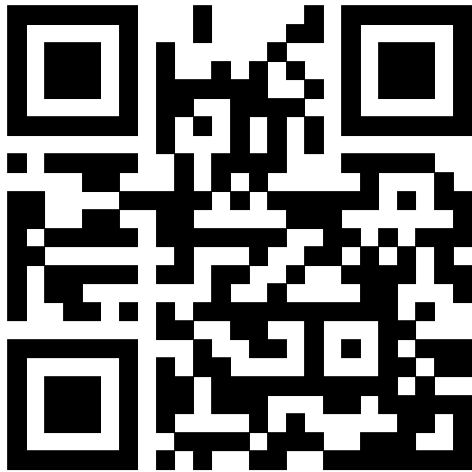
Amber Wall, Wheatland Conservation Area

SK Mustard AGM, January 16, 2025



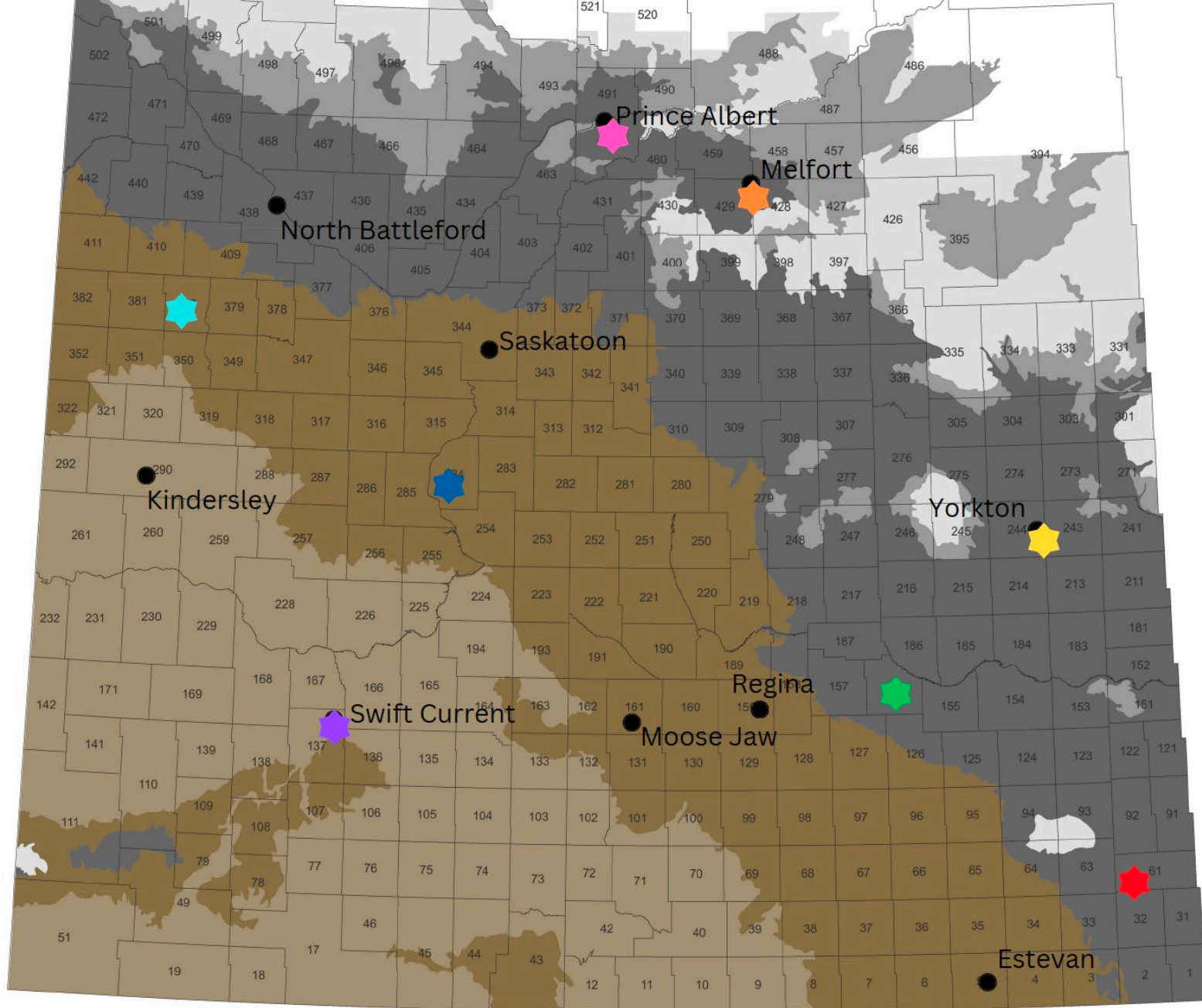
AgriARM Locations

Applied Research Management



-  **CLC - Prince Albert**
Conservation Learning Centre
-  **NARF - Melfort**
Northeast Agriculture Research Foundation
-  **WARC - Scott**
Western Applied Research Corporation
-  **Irrigation Saskatchewan - Outlook**
Irrigation Saskatchewan
-  **IHARF - Indian Head**
Indian Head Agricultural Research Foundation
-  **SERF - Redvers**
South East Research Farm
-  **ECRF - Yorkton**
East Central Research Foundation
-  **WCA - Swift Current**
Wheatland Conservation Area





2025 Annual Summer Tour

- Thursday, July 17, 2025

Partners

- Government Funded
- Industry Partners
- Commodity Groups
- AAFC
- Universities

Local Summer Students



**WHEATLAND
CONSERVATION AREA**



SFP Establishing nitrogen and seeding rate recommendations for composite yellow mustard production in Saskatchewan

Amber Wall, Wheatland Conservation Area



Objectives:

- Establish nitrogen and seeding rate recommendations for composite yellow mustard in Saskatchewan.
- To understand nitrogen requirements for composite yellow mustard compared to Andante (open-pollinated) yellow mustard.
- To specify the required seeding rate the producers can use to maximize yield, keeping seed costs in mind.

Locations:

- Swift Current
- Indian Head
- Redvers

Experimental design:

- RCBD
- 4 replicates

Years:

- 2023-2025



Site visit to WCA from the Agriculture Research Branch,
Saskatchewan Ministry of Agriculture on July 3, 2024

Nitrogen (N)

- Nitrogen is essential needed in the greatest amount compared to the other macronutrients.
- Nitrogen uptake and utilization takes place throughout the entire growth cycle.
- The highest response to added N occurs when moisture is not limiting.



**WHEATLAND
CONSERVATION AREA**



IHARF
INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION



Mustard 21
Canada inc.

Basic Soil Nutrients

Depth	pH	OM%	CEC (meq/100g)	N (lbs/ac)	P (lbs/ac)	K (ppm)	S (lbs/ac)	Cl (lbs/ac)	B (ppm)	Zn (ppm)	Cu (ppm)
-----Swift Current 2023-----											
0-6"	7.0	2.6	16	6	22	239	8	16	0.3	0.52	0.56
6-24"	7.9	-	-	12	-	-	24		-	-	-
-----Swift Current 2024-----											
0-6"	6.9	2.4	16.9	10	20	275	6	20	0.3	0.7	0.7
6-24"	8.1	-	-	54	-	-	18		-	-	-
-----Indian Head 2023-----											
0-6"	7.6	6.1	44.2	9	14	611	20	32	1.3	0.82	2.2
6-24"	8	-	-	13	-	-	40		-	-	-
-----Indian Head 2024-----											
0-6"	8	3.9	48.6	10	8	462	4	19.9	1.2	0.21	2.1
6-24"	8.2	-	-	24	-	-	12		-	-	-
-----Redvers 2023-----											
0-6"	7.6	4.0	33	16	14	254	20	-	-	1.62	-
6-24"	8.1	-	-	36	-	-	-	-	-	-	-
-----Redvers 2024-----											
0-6"	7.7	3.9	-	19	18	298	92	-	-	0.98	-
6-24"	8.1	-	-	36	-	-	-	-	-	-	-



Operations and data

Data collection

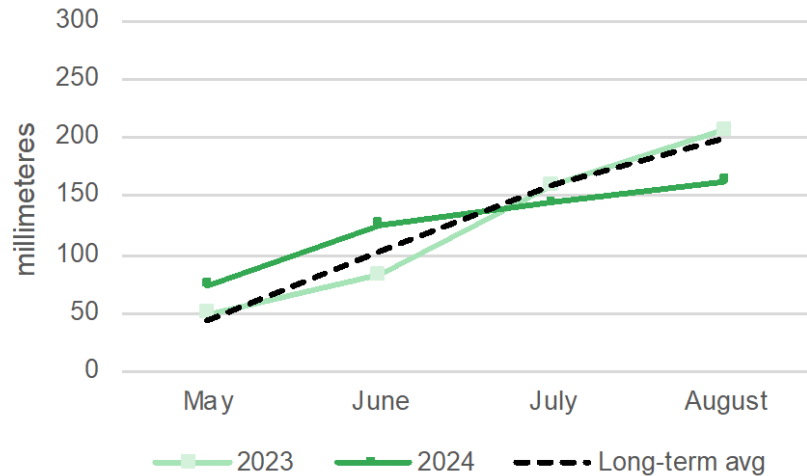
- Plant Density
- Height
- Lodging
- Maturity
- Seed Yield
- Weather and Soil

Location	Swift Current	Indian Head	Redvers
Year	-----2023-----		
Seed Date	15-May	24-May	31-May
Row Spacing	8.25 inches	12 inches	12 inches
Seed rate trial	100N - 62P - 0K - 49S	120N - 36P - 10K - 10S	110N - 20P - 0K - 10S
	Seed rate varied by treatment from 108-280 seeds/m ²		
Nitrogen rate trial	62P - 0K - 49S	36P - 10K - 10S	38P - 10K - 15S
	Nitrogen rate varied by treatment. All plots seeded at 237 seeds/m ²		
Herbicide	Centurion/Amigo	Contender II/1% IPCO MSO	Arrow All In
Harvest Dates	24-Aug	16-Aug	01-Sep
Year	-----2024-----		
Seed Date	11-May	17-May	May 17 (NR), May 21 (SR)
Seed rate trial	100N - 50P - 35K - 30S	120N - 36P - 10K - 10S	100N - 60P - 0K - 49S
	Seed rate varied by treatment from 108-280 seeds/m ²		
Nitrogen rate trial	50P - 35K - 30S	36P - 10K - 10S	31P - 0K - 0S
	Nitrogen rate varied by treatment. All plots seeded at 194 seeds/m ²		
Herbicide	Assurell/Suremix	Poast Ultra/Merge	Arrow All In
Harvest Dates	08-Aug	19-Aug	30-Aug



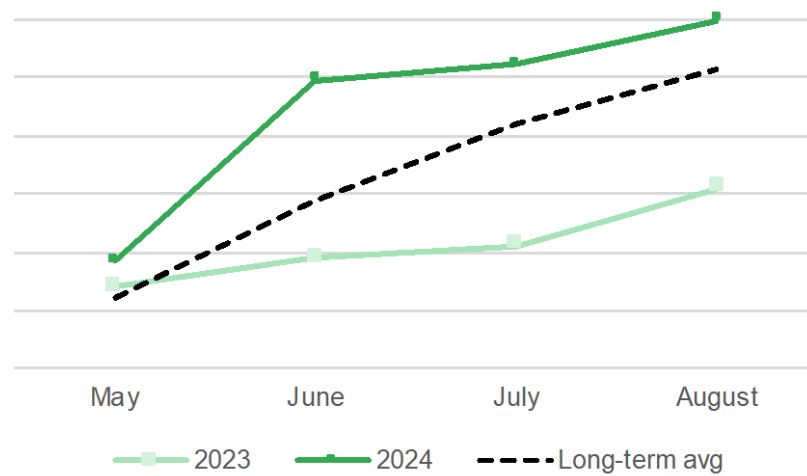
General Conditions

Swift Current accumulative precipitation and long-term averages



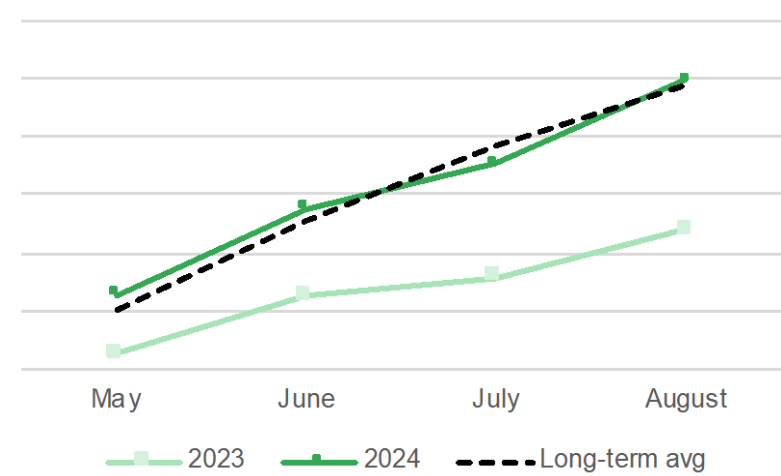
- Hail (2023, ~20% yield loss)
- Low weed and insect pressure
- Hot and dry

Redvers accumulative precipitation and long-term averages



- Low weed and insect pressure
- Residual soil moisture in 2023
- Drill Calibration error in 2024

Indian Head accumulative precipitation and long-term averages



- Some residual soil moisture in 2023
- Header losses in 2024

Seed Rate Treatments

2 Varieties:

- AAC Yellow 80 composite yellow mustard
- Andante yellow mustard

5 Seed Rates

Andante (TSW=6.3 grams, or 0.0138891 lbs/1000 seeds)

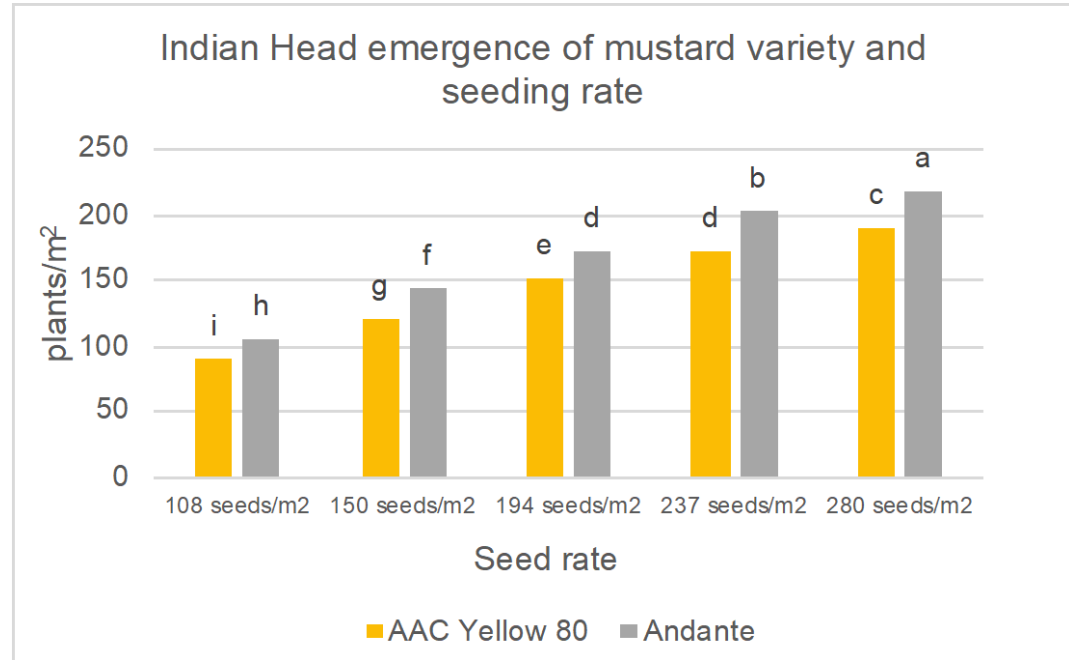
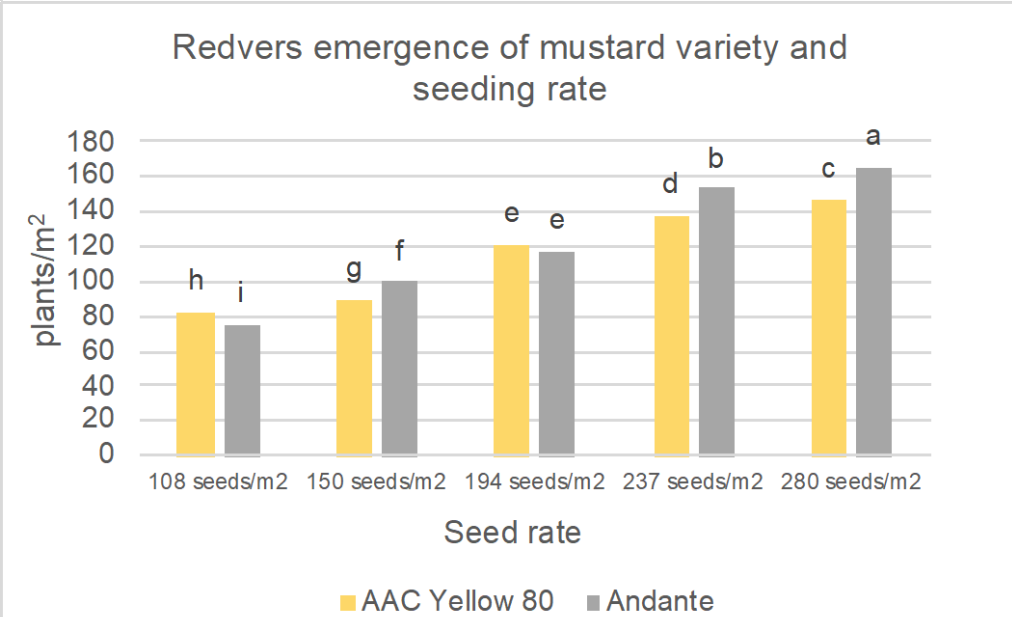
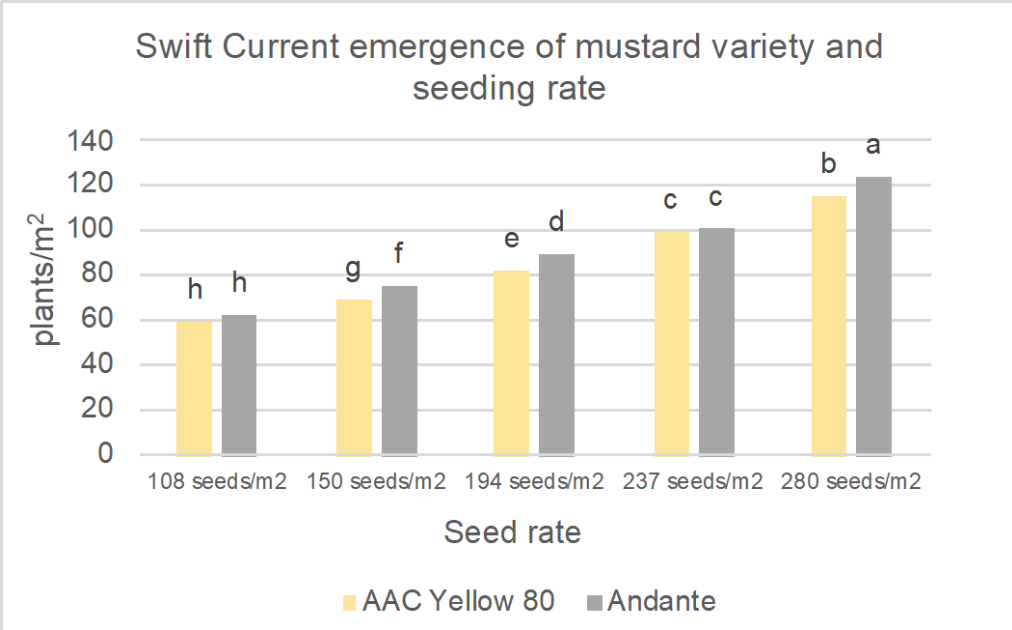
Target plant stand	Seed rate (assuming 50% emergence)				Seed weight per acre	
5 plants/ft2	10 seeds/ft2	or	108 seeds/m2	or	437,061 seeds/ac	6.1 lbs/ac
7 plants/ft2	14 seeds/ft2	or	150 seeds/m2	or	607,029 seeds/ac	8.4 lbs/ac
9 plants/ft2	18 seeds/ft2	or	194 seeds/m2	or	785,091 seeds/ac	10.9 lbs/ac
11 plants/ft2	22 seeds/ft2	or	237 seeds/m2	or	959,106 seeds/ac	13.3 lbs/ac
13 plants/ft2	26 seeds/ft2	or	280 seeds/m2	or	1,133,121 seeds/ac	15.7 lbs/ac

AAC Yellow 80 (TSW=5.5 grams, or 0.0121254 lbs/1000 seeds)

Target plant stand	Seed rate (assuming 50% emergence)				Seed weight per acre	
5 plants/ft2	10 seeds/ft2	or	108 seeds/m2	or	437,061 seeds/ac	5.3 lbs/ac
7 plants/ft2	14 seeds/ft2	or	150 seeds/m2	or	607,029 seeds/ac	7.4 lbs/ac
9 plants/ft2	18 seeds/ft2	or	194 seeds/m2	or	785,091 seeds/ac	9.5 lbs/ac
11 plants/ft2	22 seeds/ft2	or	237 seeds/m2	or	959,106 seeds/ac	11.6 lbs/ac
13 plants/ft2	26 seeds/ft2	or	280 seeds/m2	or	1,133,121 seeds/ac	13.7 lbs/ac

Seed Rate Effect on Mustard Emergence (2 site years)

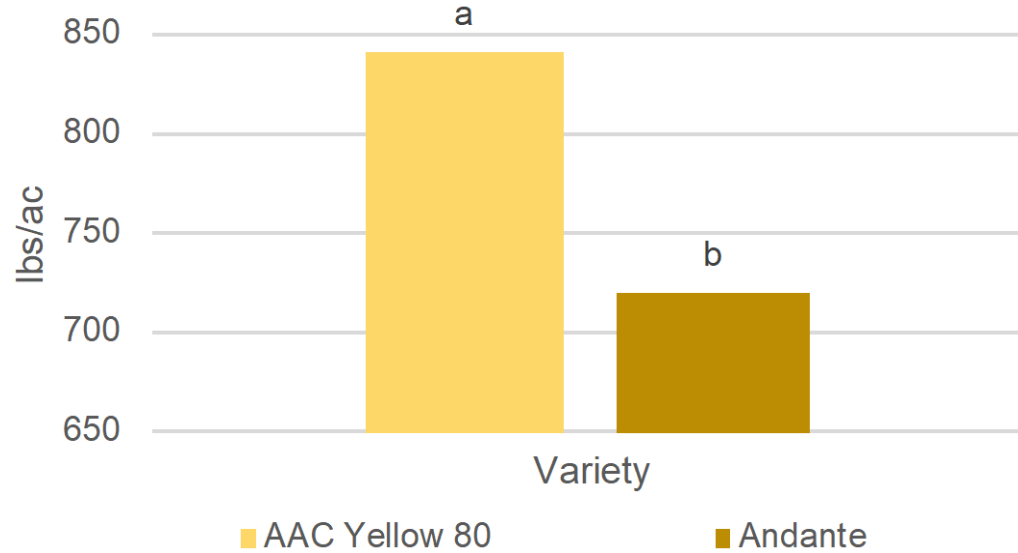
- Andante > AAC Yellow 80
- SC < RD < IH
- Plant stand increased with seeding rate



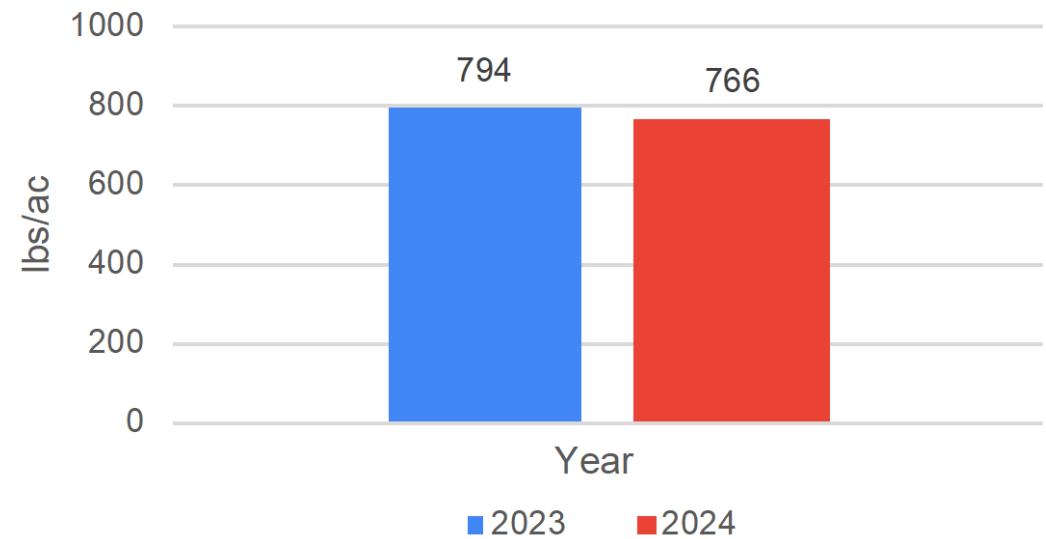
Swift Current seed rate yields (2 site years)



Swift Current mustard yield x variety



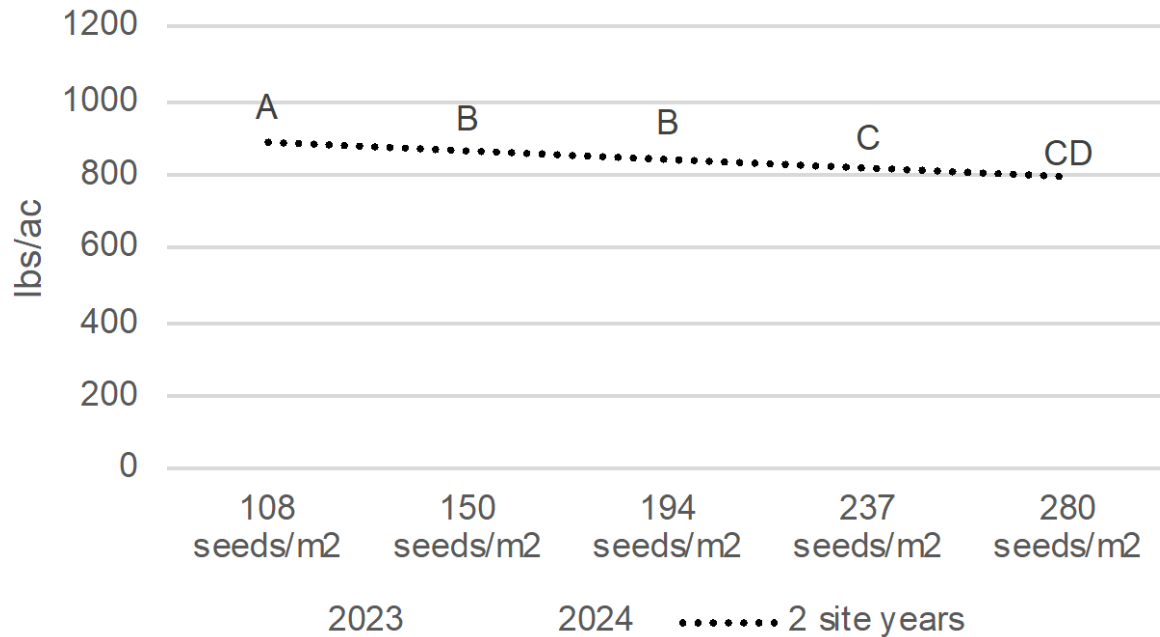
Swift Current mustard yield x year



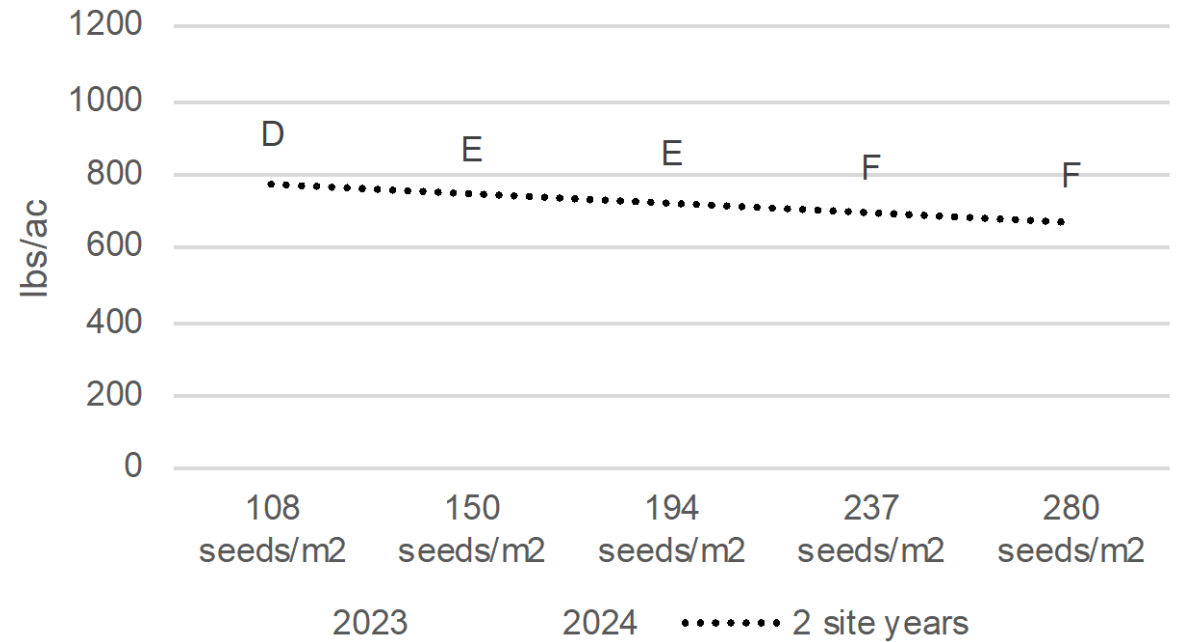
mustard yield x seed rate



SC AAC Yellow 80 yield x seed rate



SC Andante yield x seed rate



AAC Yellow 80 emergence



59 plants/m² (5 plants/ft²)

Seeded 108 seeds/m² (10 seeds/ft²)
5lbs/ac
6lbs/ac



83 plants/m² (8 plants/ft²)

Seeded 194 seeds/m² (18 seeds/ft²)
10lbs/ac
11lbs/ac



115 plants/m² (11 plants/ft²)

Seeded 280 seeds/m² (26 seeds/ft²)
14lbs/ac
16lbs/ac

Andante emergence



62 plants/m² (6 plants/ft²)



90 plants/m² (9 plants/ft²)

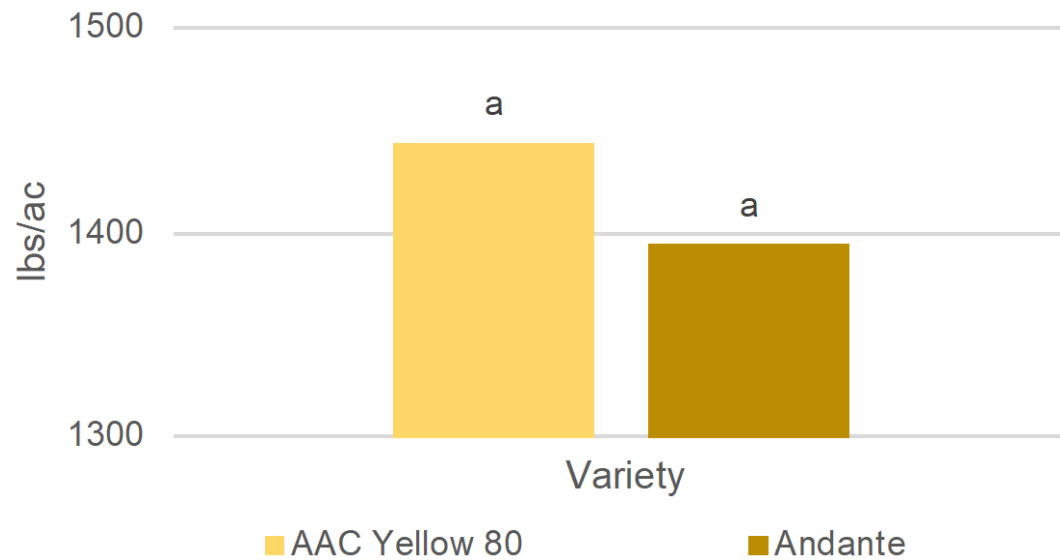


124 plants/m² (12 plants/ft²)

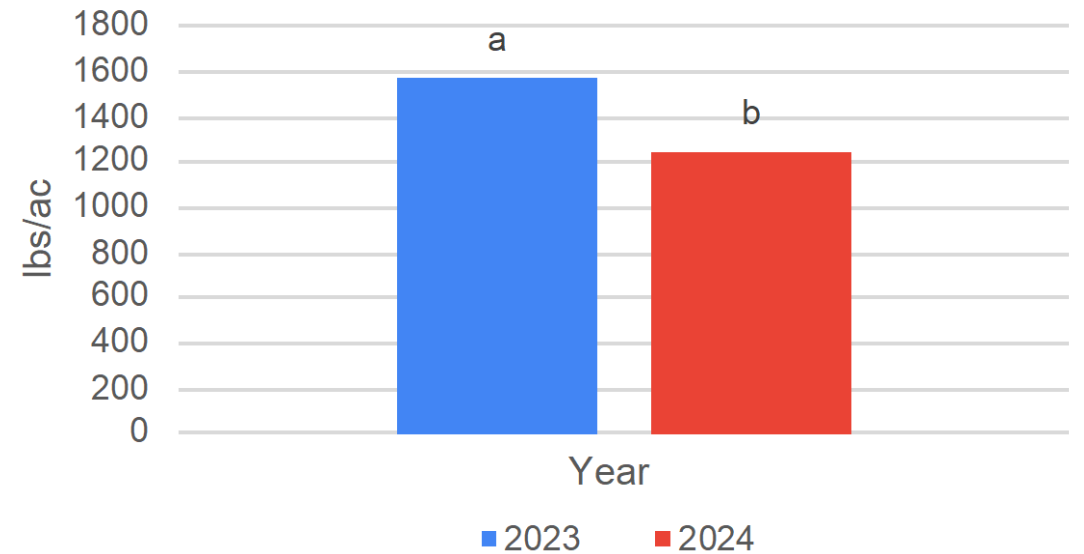
Redvers seed rate yields (2 site years)



Redvers mustard yield x variety



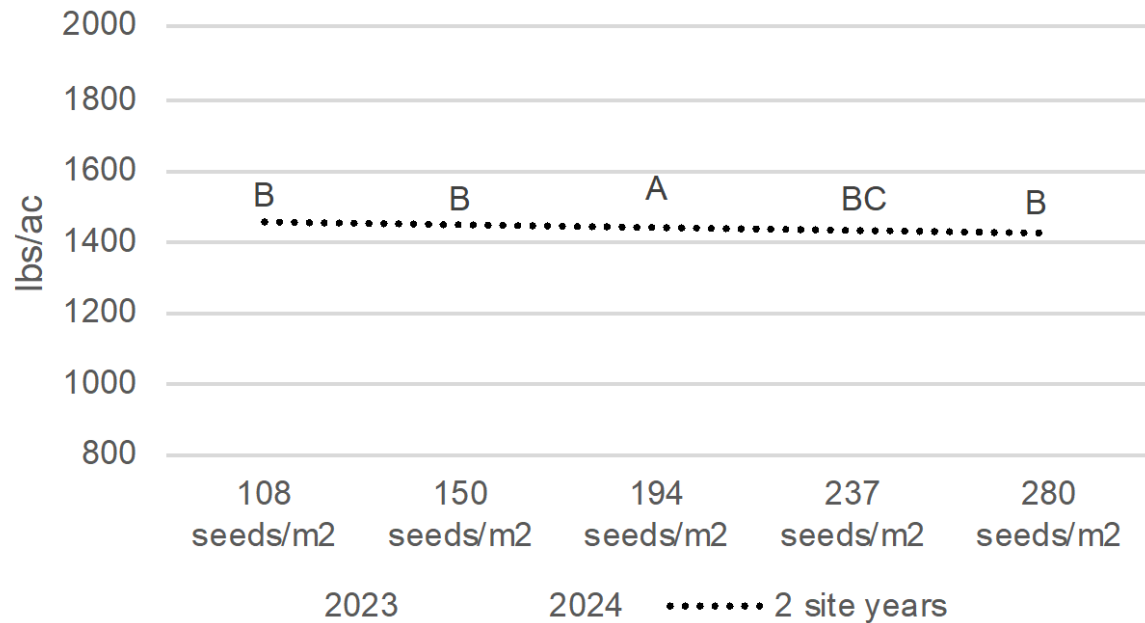
Redvers mustard yield x year



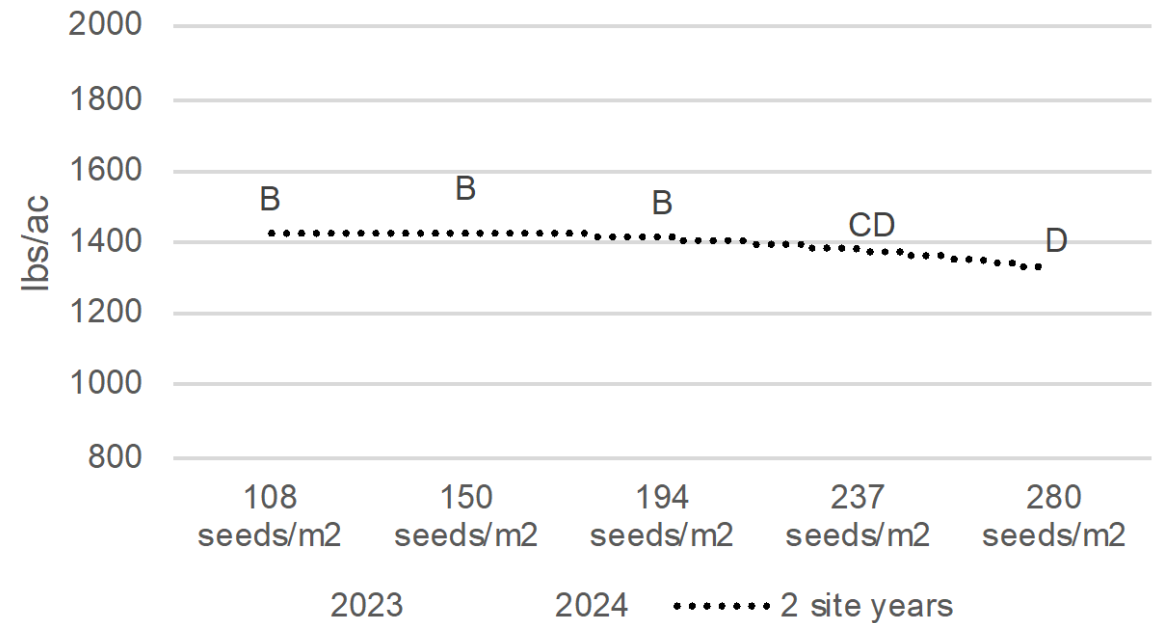
mustard yield x seed rate



RD AAC Yellow 80 yield



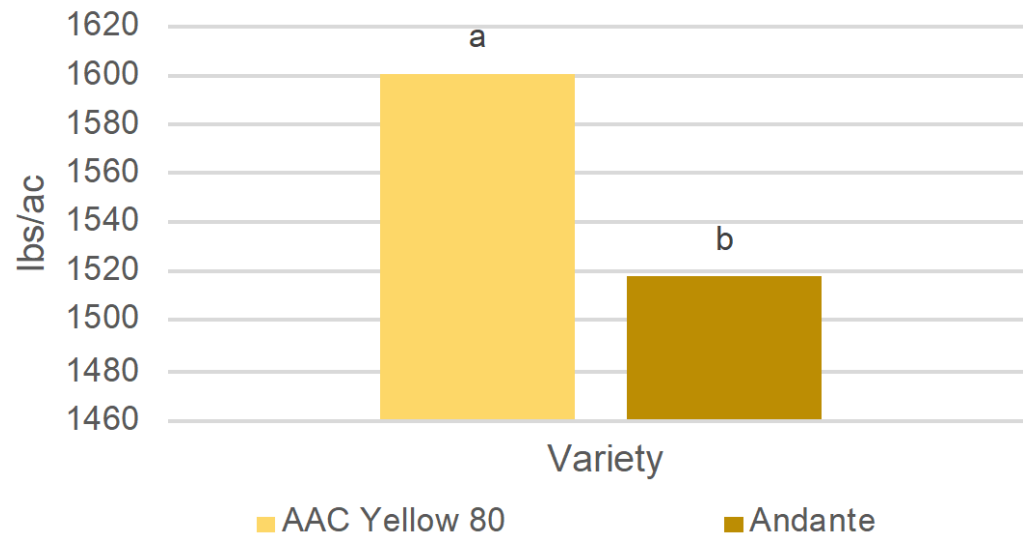
RD Andante yield



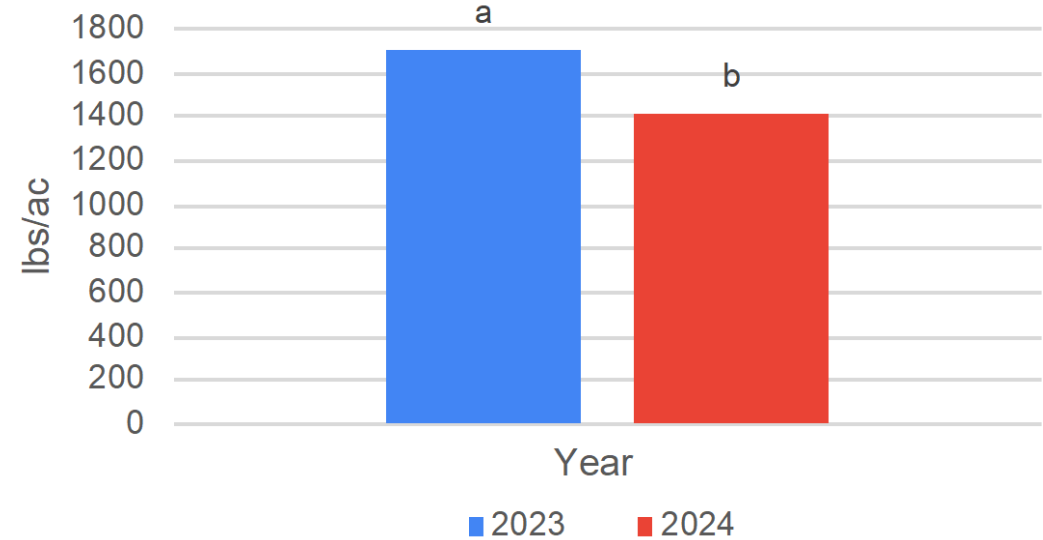
Indian Head seed rate yields (2 site years)



Indian Head mustard yield x variety



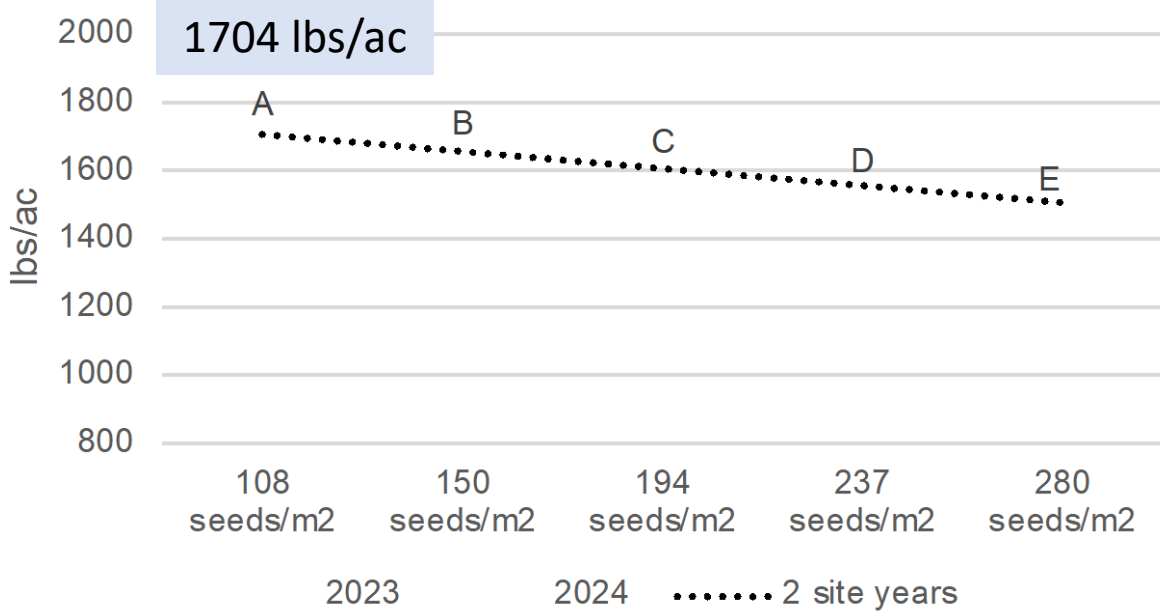
Indian Head mustard yield x year



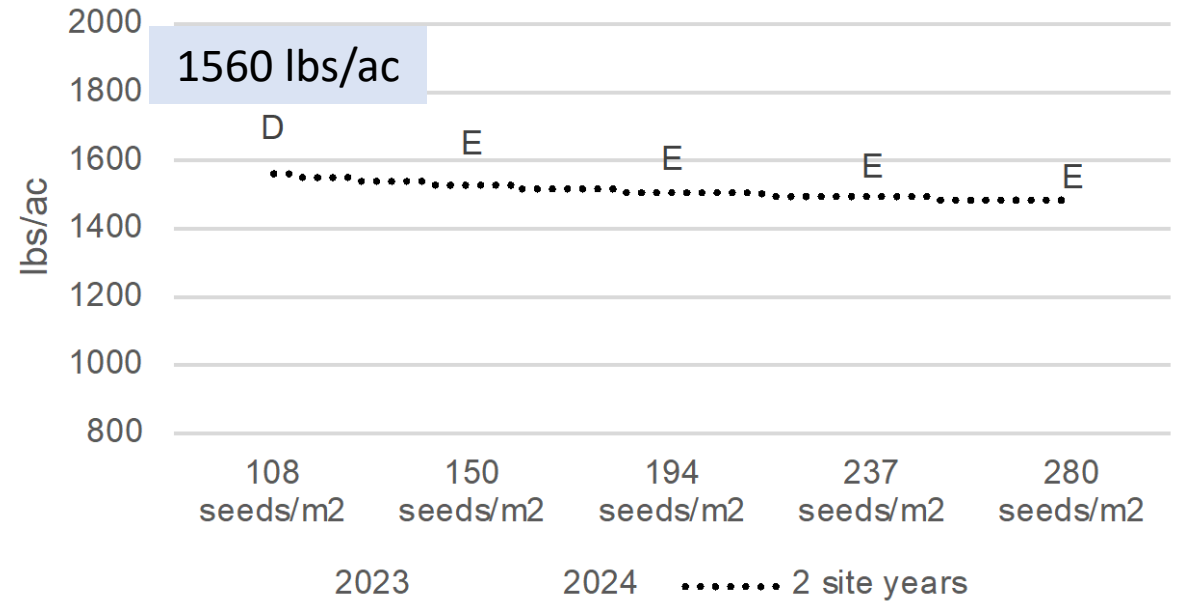
mustard yield x seed rate



IH AAC Yellow 80 yield



IH Andante yield



Nitrogen Rate Treatments

2 Varieties:

- AAC Yellow 80 composite yellow mustard
- Andante yellow mustard

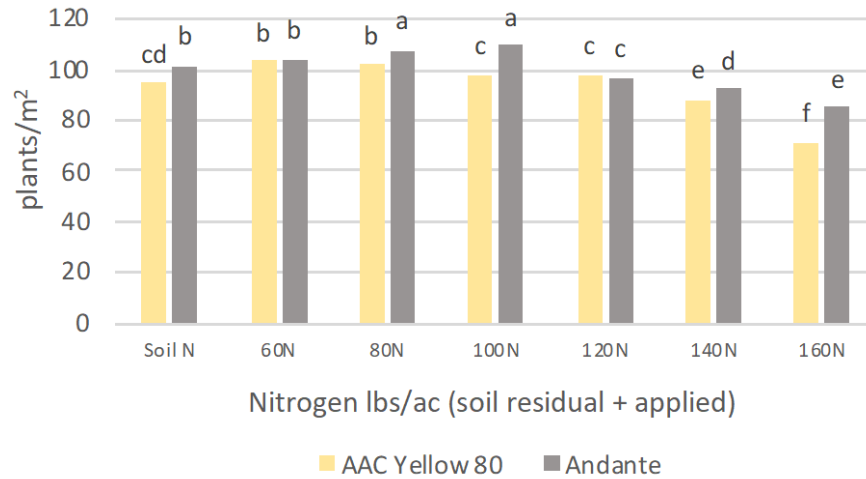
7 Nitrogen Rates:

- Soil N Only
- 60N
- 80N
- 100N
- 120N
- 140N
- 160N



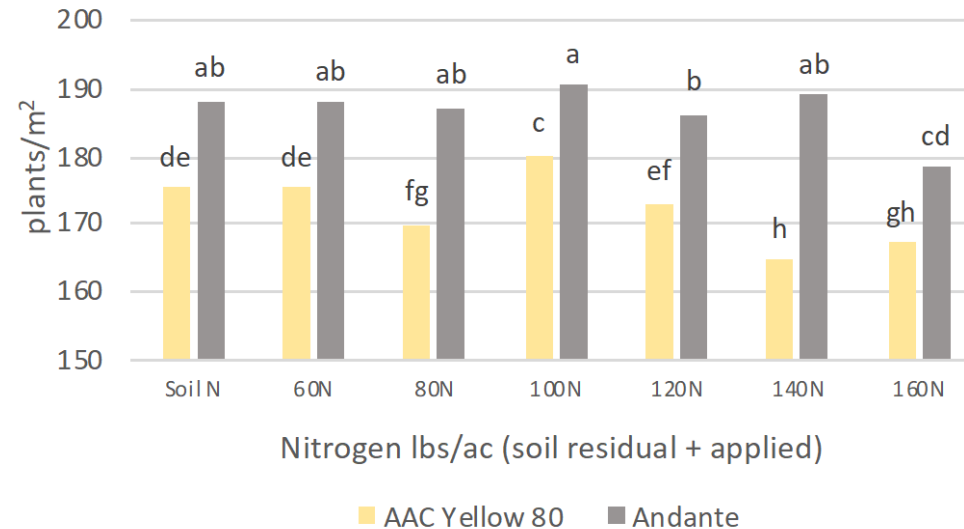
Nitrogen Rate Effect on Mustard Emergence

The effect of applied nitrogen and variety on mustard emergence at Swift Current (2 site years)

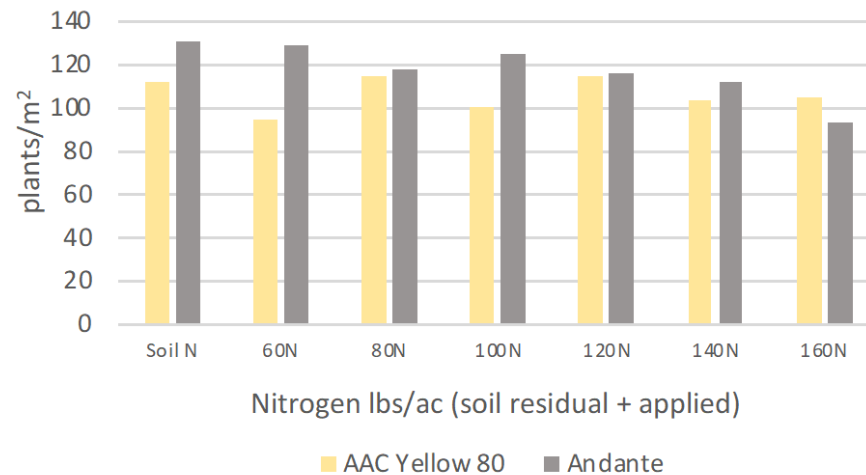


- Andante > AAC Yellow 80
- SC < RD < IH

The effect of applied nitrogen and variety on mustard emergence at Indian Head (2 site years)



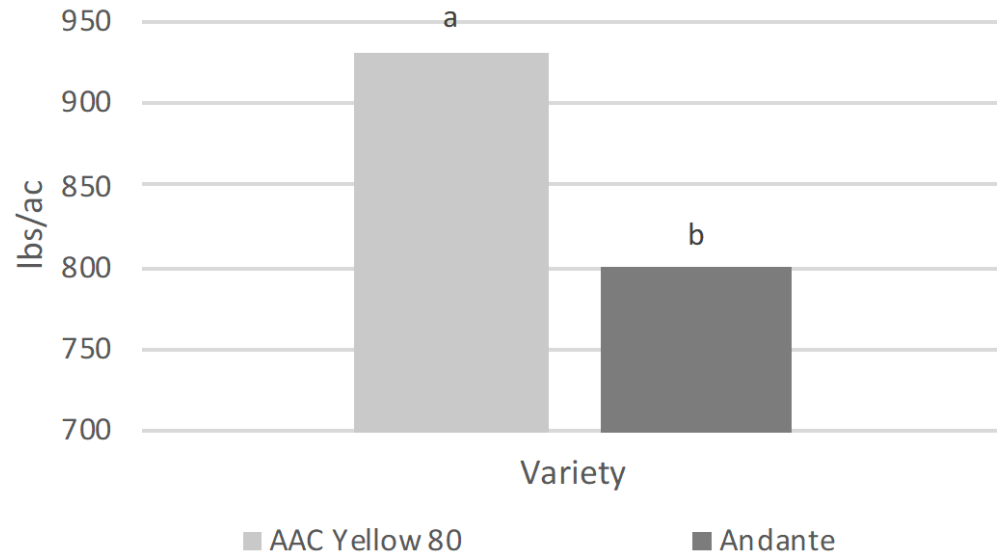
The effect of applied nitrogen and variety on mustard emergence at Redvers (2 site years)



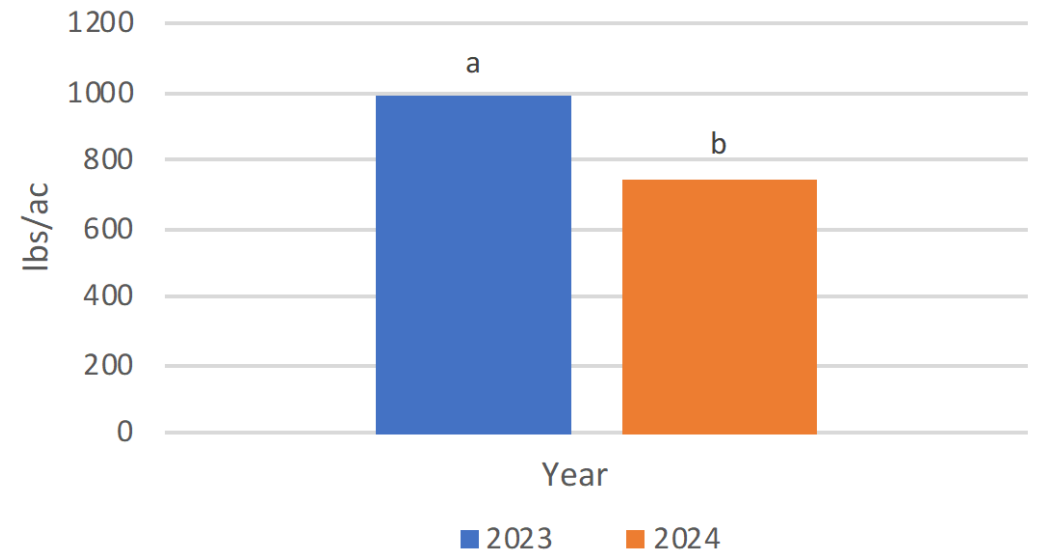
Nitrogen trial yields (2 site years)



Swift Current mustard yield x variety



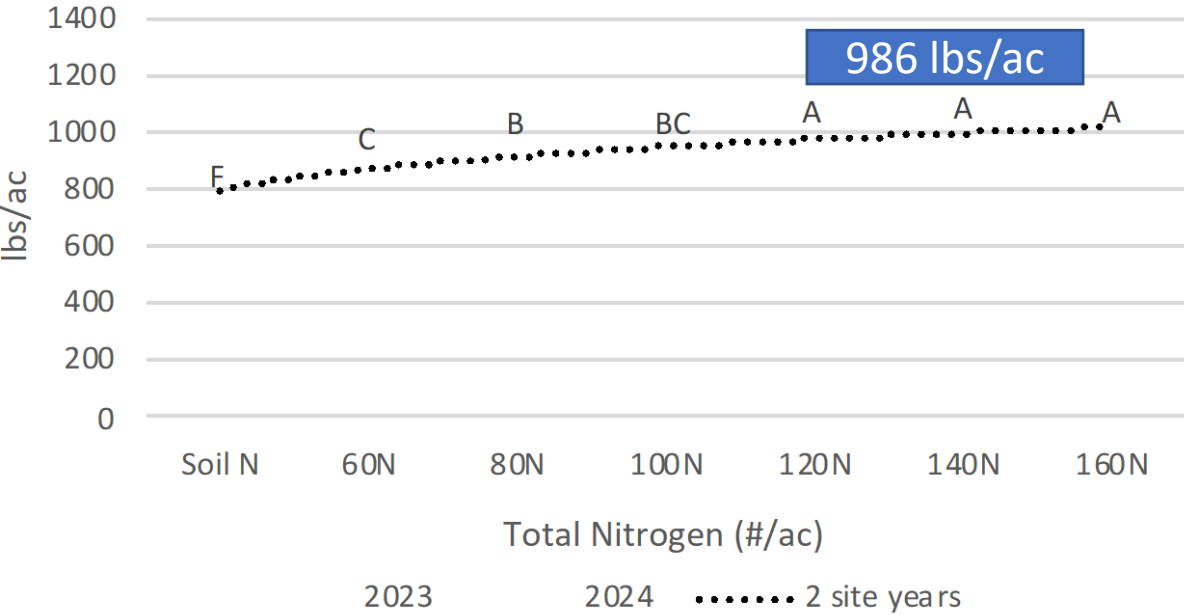
Swift Current mustard yield x year



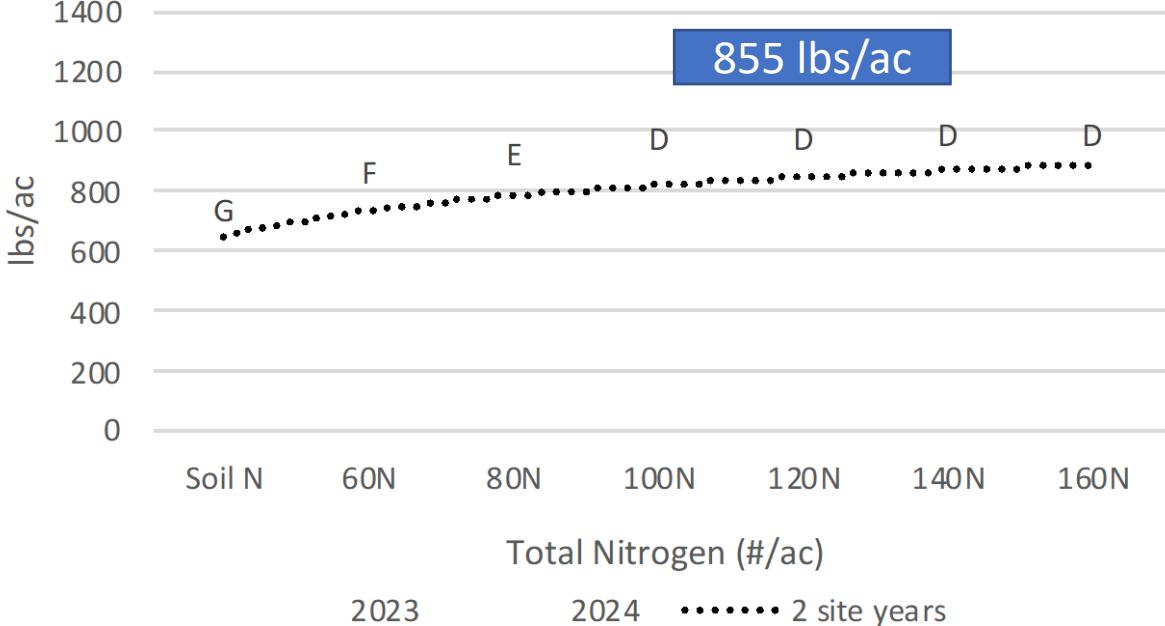
mustard yield x nitrogen rate



SC AAC Yellow 80 yield



SC Andante yield



Yield: 807 lbs/ac

Yield: 845-869 lbs/ac

80N

100N

120N

140N

160N

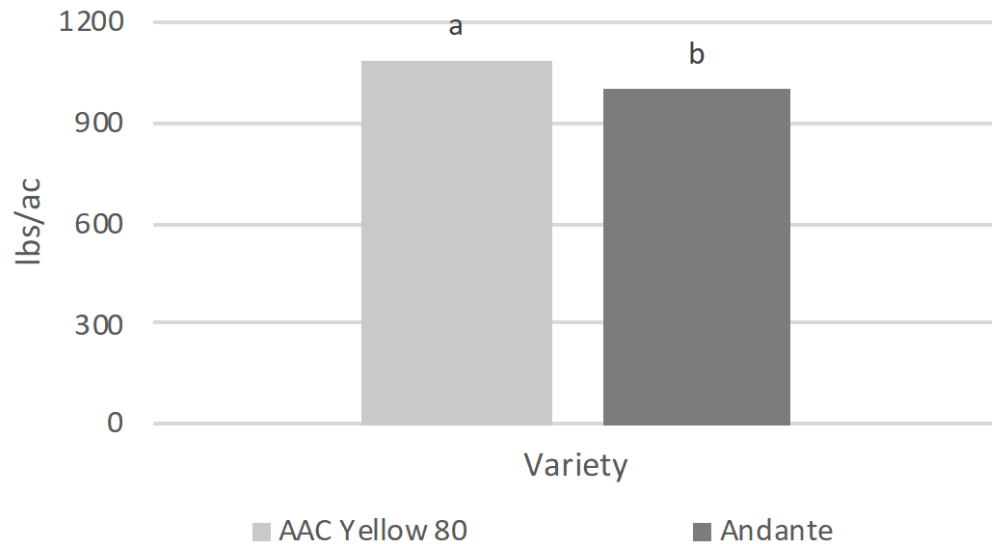
Yield: 933-955 lbs/ac

Yield: 986 lbs/ac

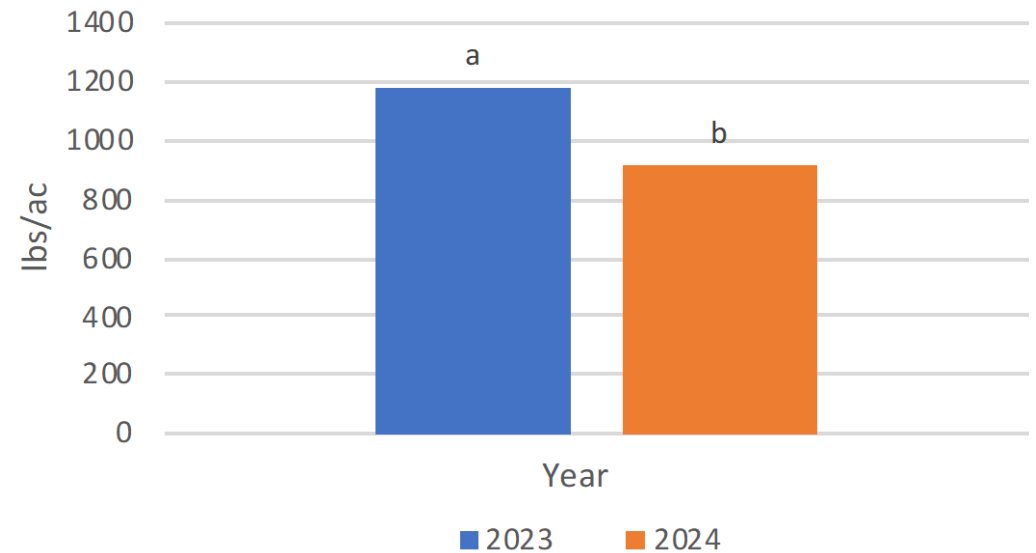
Redvers nitrogen rate yields (2 site years)



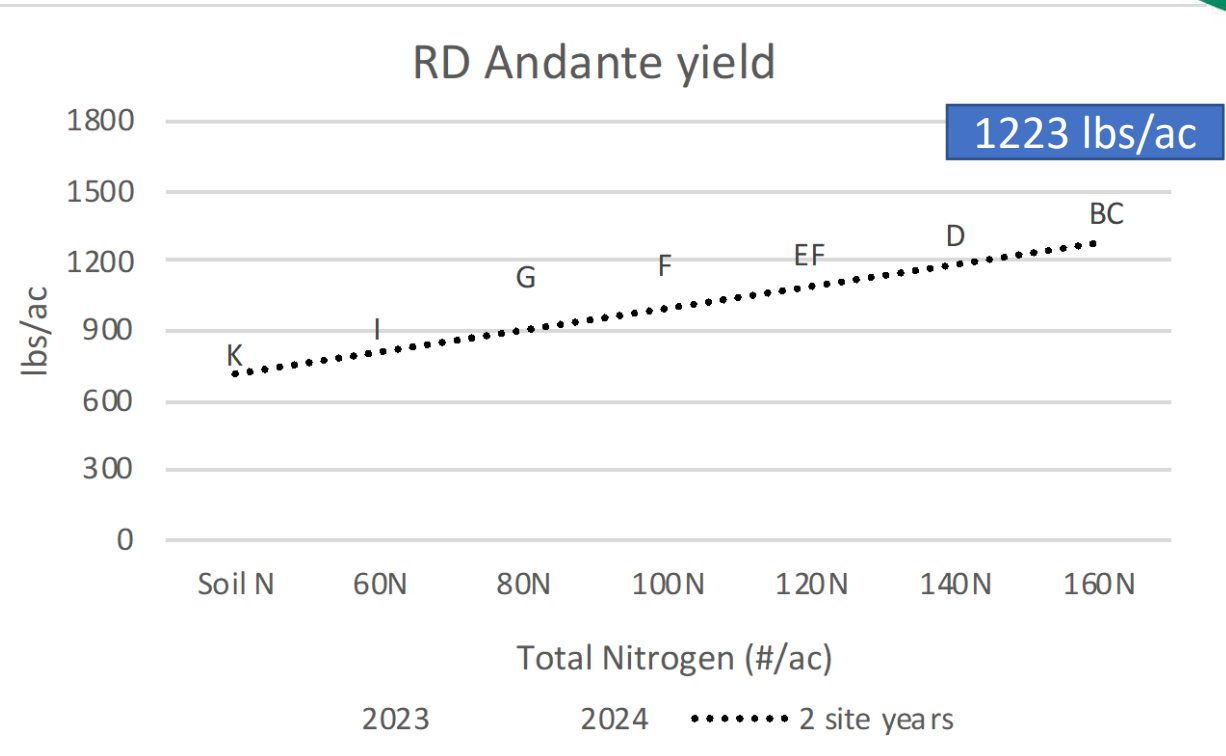
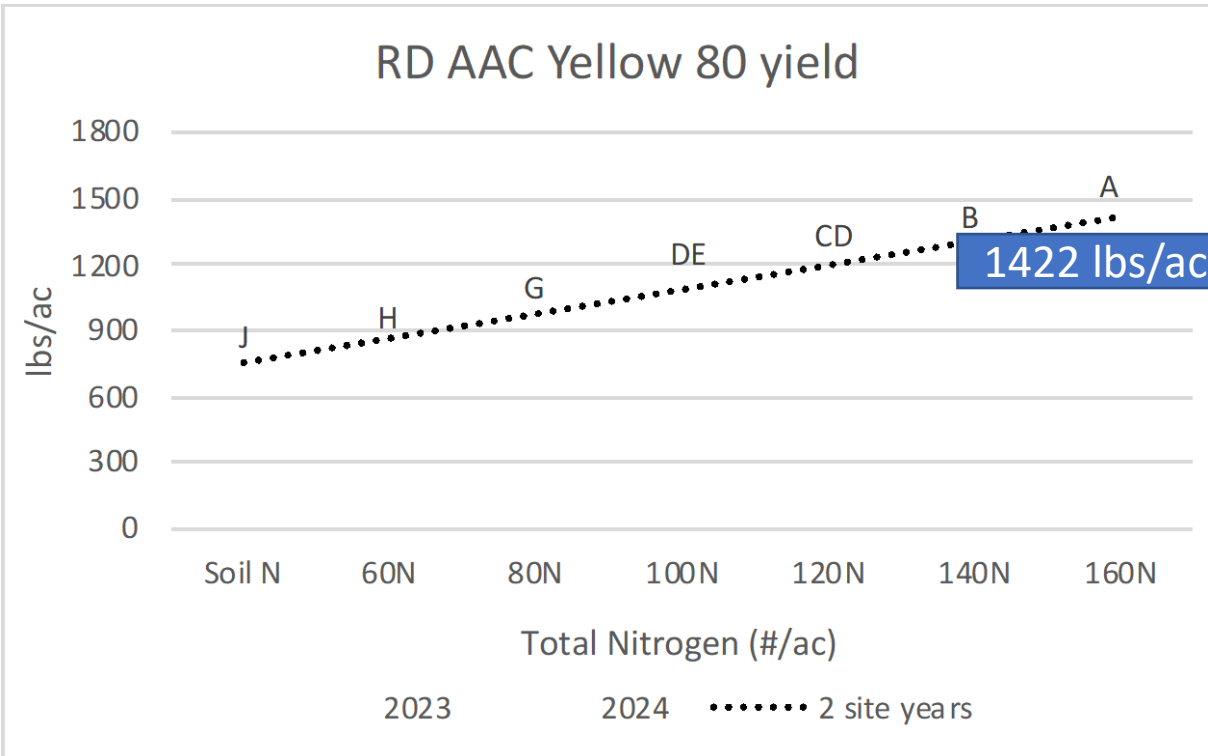
Redvers mustard yield x variety



Redvers mustard yield x year



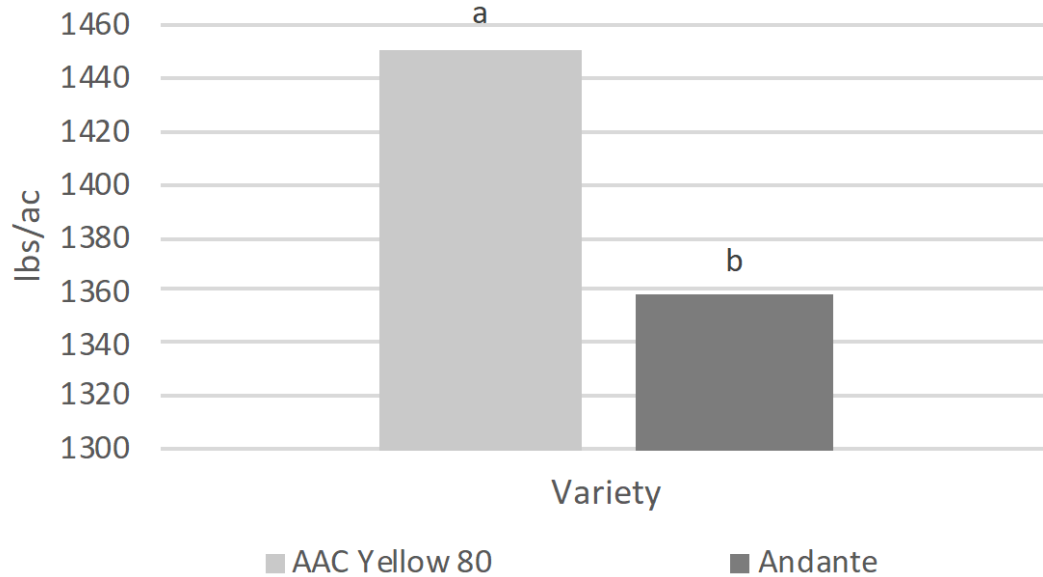
mustard yield x nitrogen rate



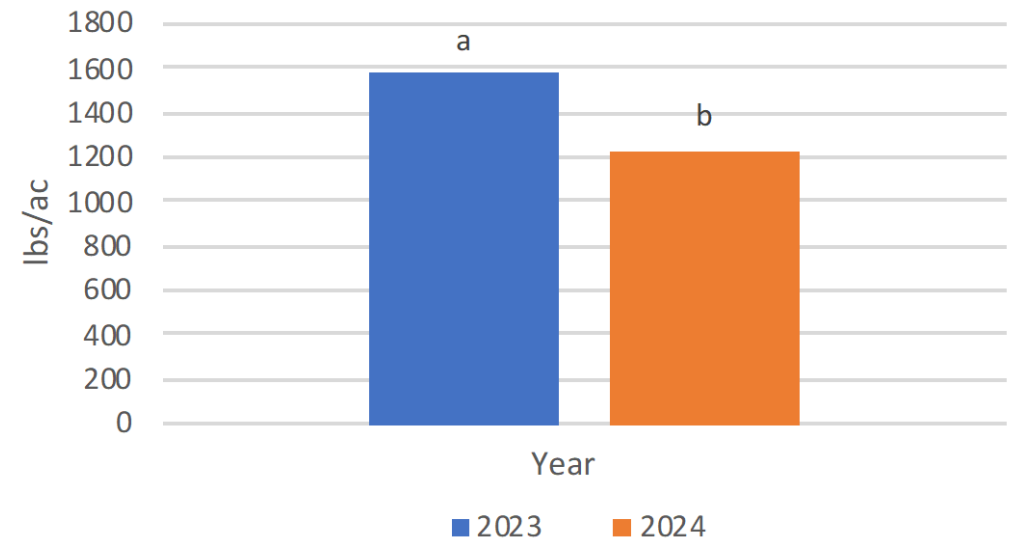
Indian Head nitrogen rate yields (2 site years)



Indian Head mustard yield x variety



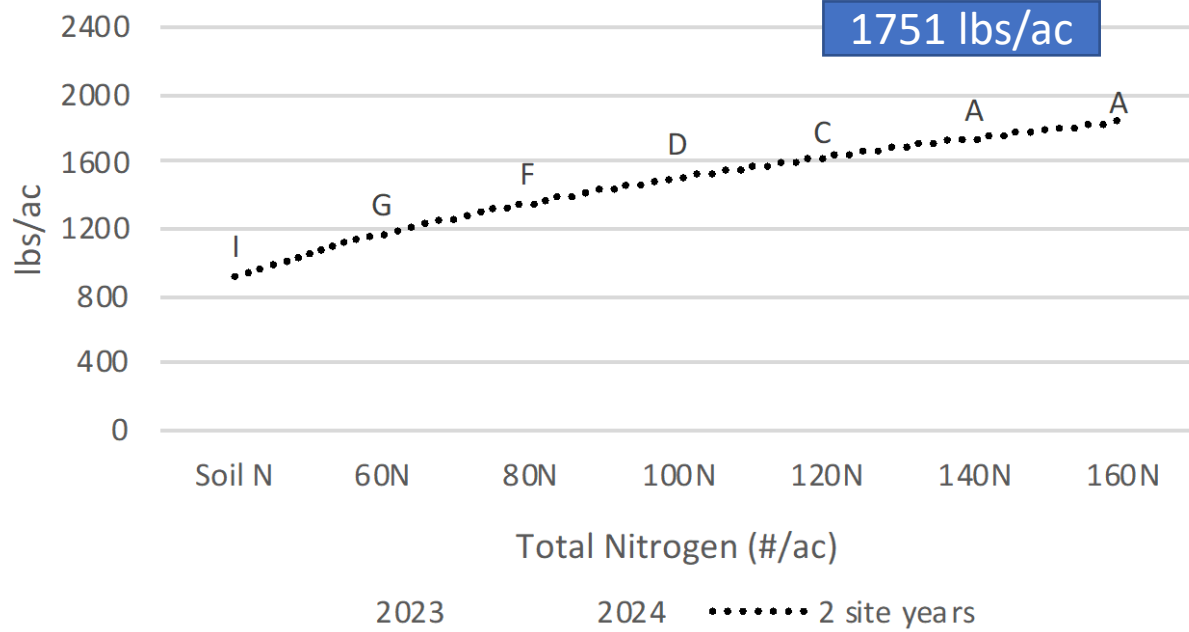
Indian Head mustard yield x year



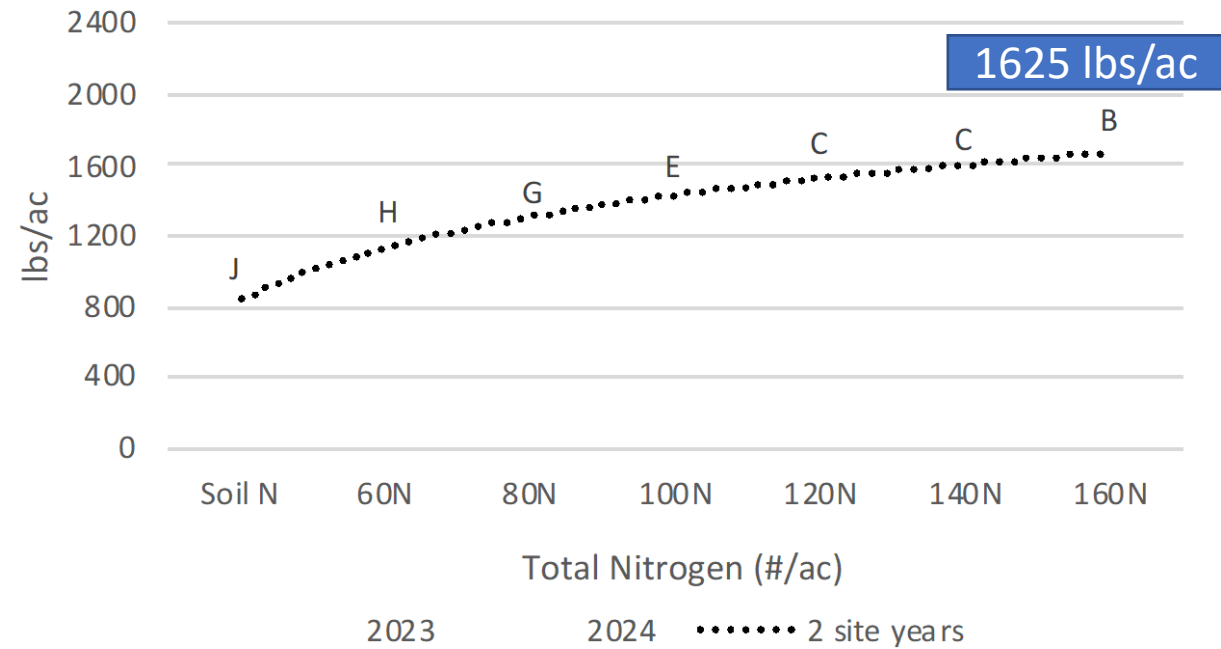
mustard yield x nitrogen rate



IH AAC Yellow 80 yield



IH Andante yield

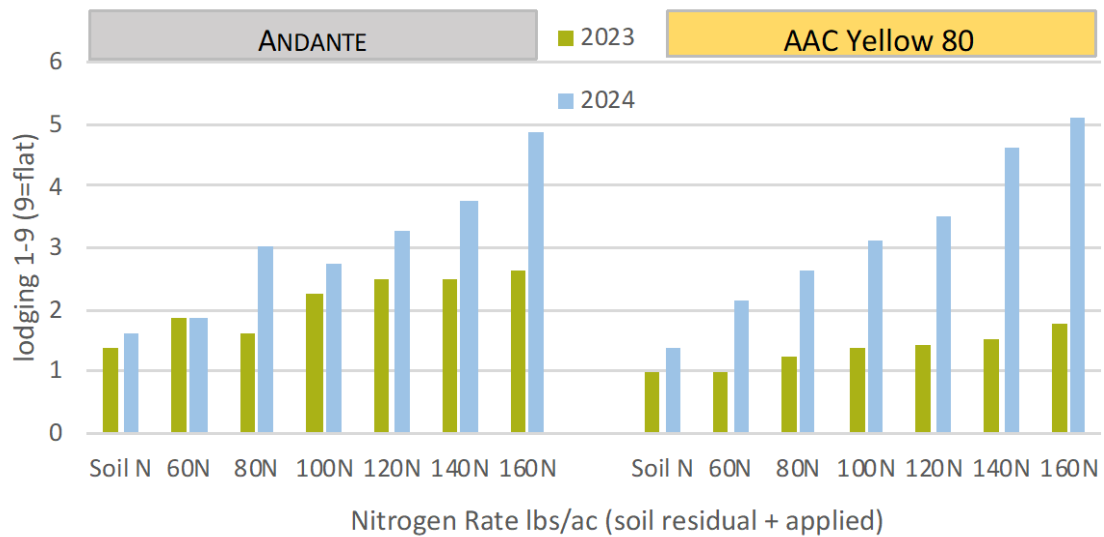


Lodging (1-9, 1=upright)

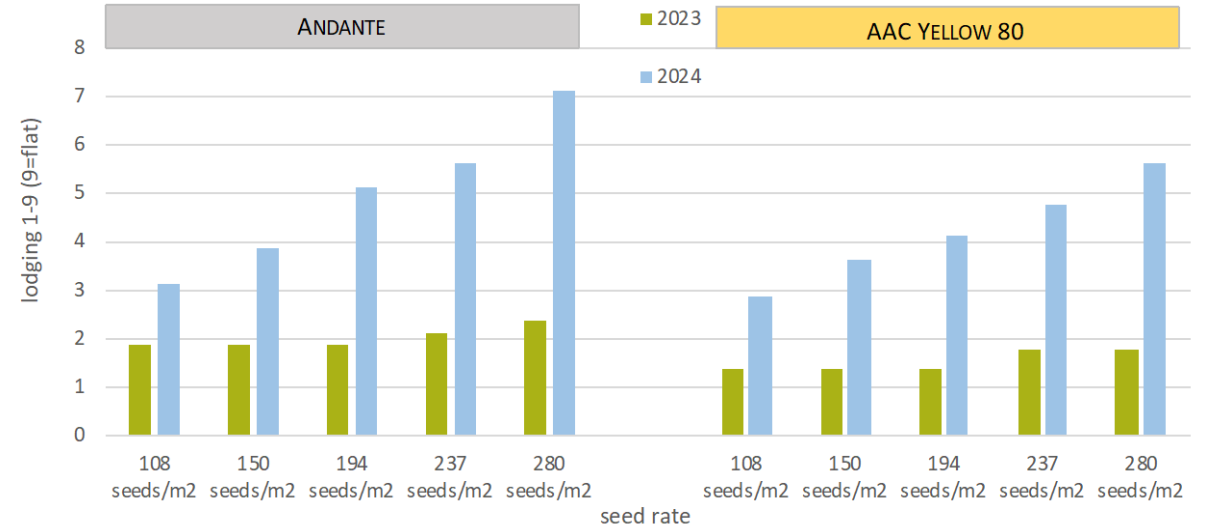
- No lodging effect at Swift Current, or Redvers
- At Indian Head lodging increased with fertility and seed rate



Nitrogen rate effects on lodging at Indian Head



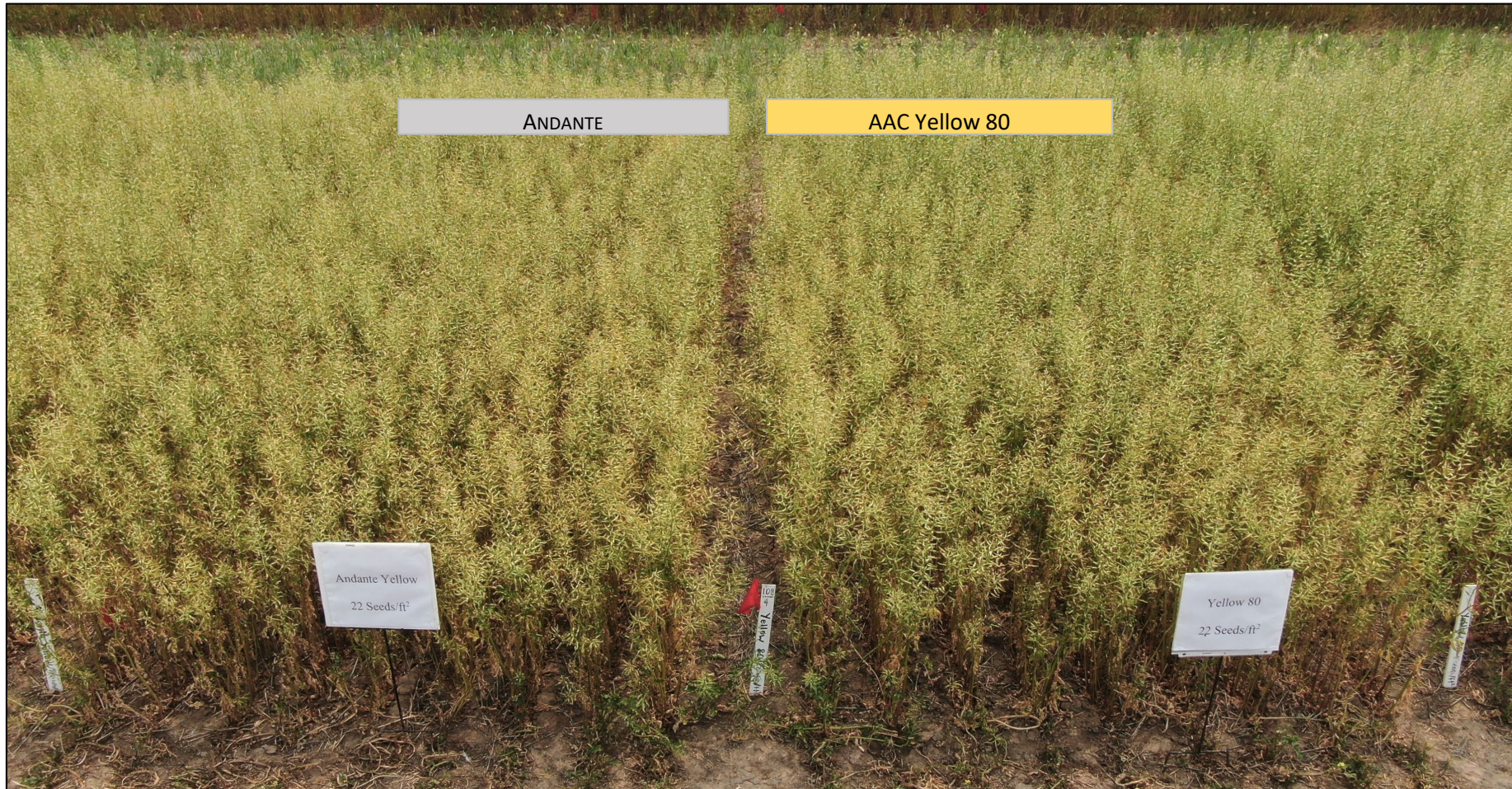
Seed rate effects on lodging at Indian Head



Higher lodging in 2024 (mainly from wind damage) resulted in header losses at Indian Head and negatively impacted yield

Height (cm)

AAC Yellow 80 > Andante



- Height decreased with increasing seeding rate
- Height increased with nitrogen up to moderate rates.

Days to Maturity (DTM)

Small differences (1-2 days)



- Dry site years were earlier maturing
- In some cases Yellow 80 > Andante
- DTM increases with increasing nitrogen
- DTM decreases with increasing seeding rate

Emergence: Andante > AAC Yellow 80

Seed Yield: Andante < AAC Yellow 80

- Seed rates toward the lower end of the recommended rate have shown to be optimal, but more robust data is required to make a conclusion.
- Nitrogen rates toward the lower end of the recommended rate will be adequate in dry years, but should still target 100-120N total in the dry brown soil zone. Other regions that receive more moisture show yield increases when applying 140-160N.
- Micronutrients should be considered in the overall picture as well and a composite soil test is very important.

Thank you!

Cory Jacob, Provincial Specialist, Oilseed Crops with the Saskatchewan Ministry of Agriculture

Shannon Chant, Crops Extension Specialist, Saskatchewan Ministry of Agriculture

Sam Marcino, Acting Crops Extension Specialist, Saskatchewan Ministry of Agriculture

Rick Mitzel, Executive Director, Saskatchewan Mustard Development Commission

Mustard 21, AAC Yellow 80



Croportunities March 13, 2025**Annual field tour July 17, 2025**

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