

Sustainable Canadian Agricultural Partnership

Competitive. Innovative. Resilient.

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

Amber Wall, Wheatland Conservation Area

SK Mustard AGM, January 15, 2026



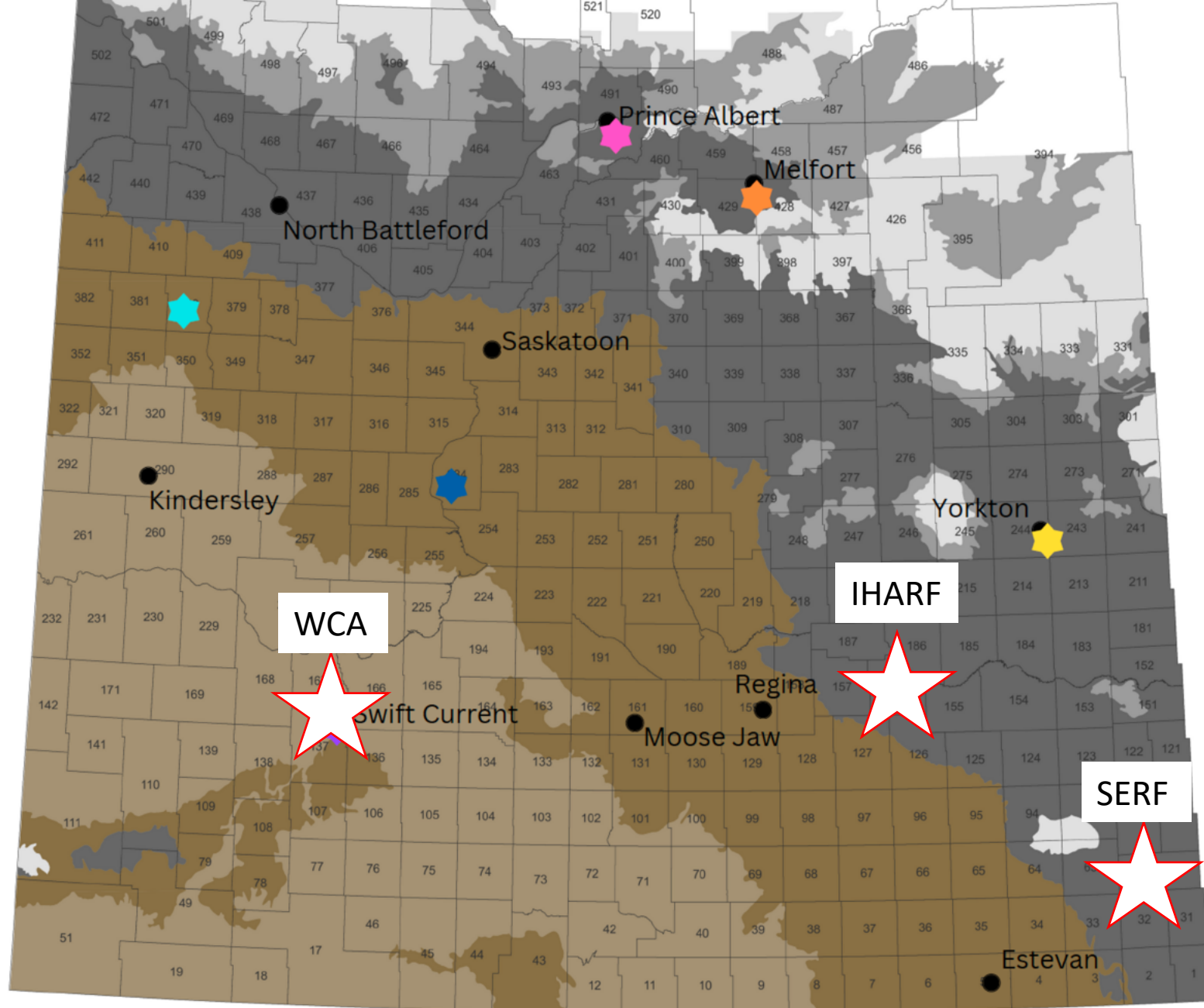
AgriARM Locations

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





2026 Annual Summer Tour

• Thursday, July 17, 2025

Partners

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

Local Summer Students



Establishing nitrogen and seeding rate recommendations for composite yellow mustard production in Saskatchewan (2023-2025)

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



Rick Mitzel speaking to producers at Wheatland Conservation Area Annual Field Day on July 17, 2025

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.



Operations and data

Data collection

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

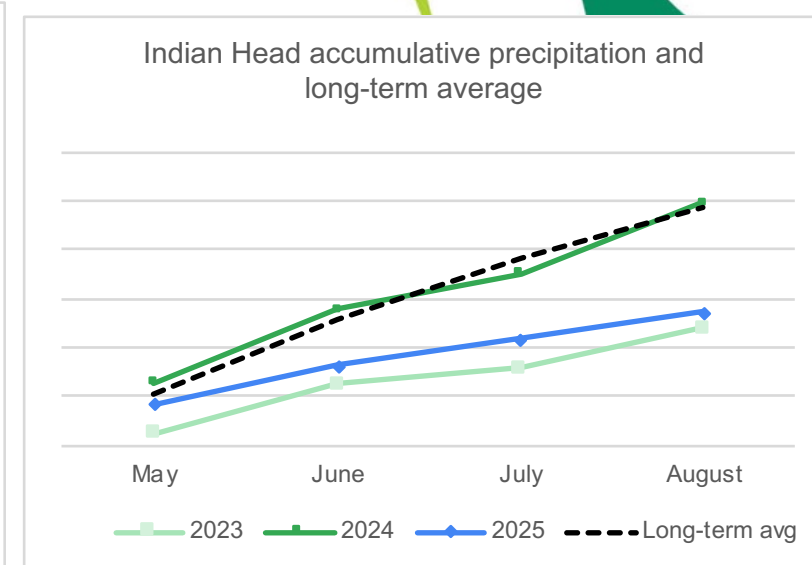
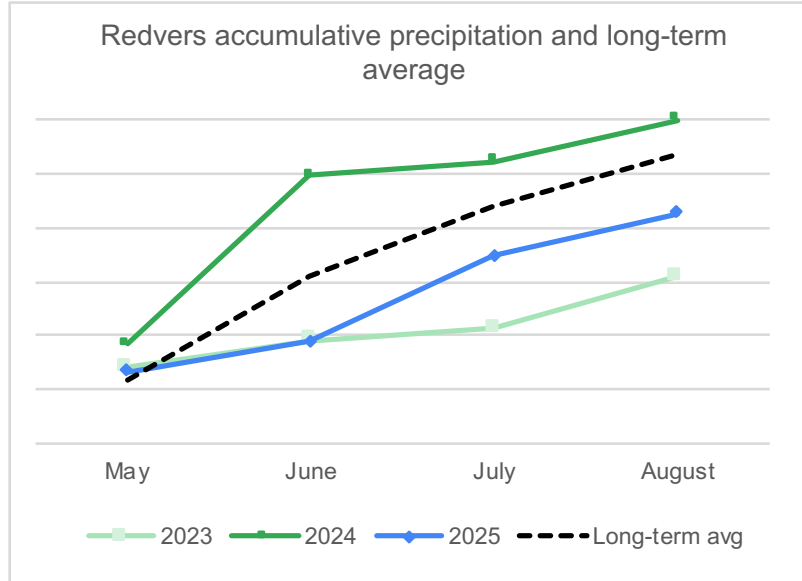
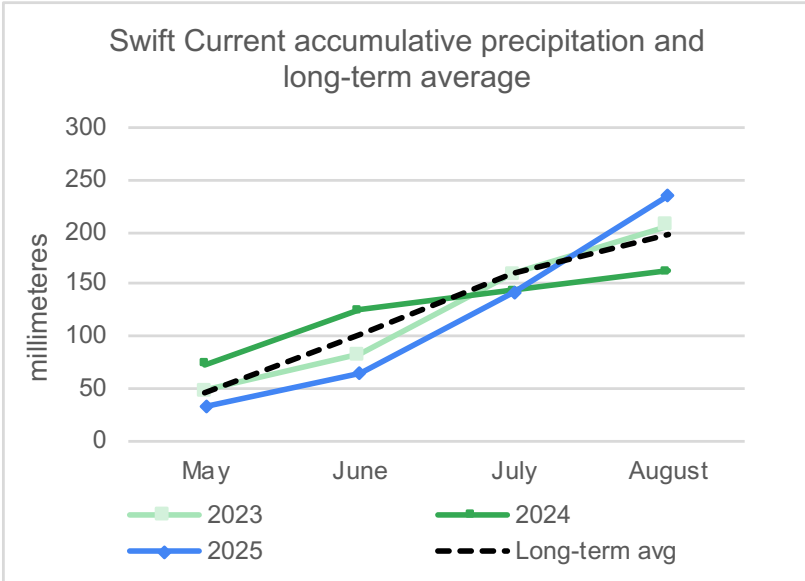


AAC Yellow 80

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		-	-	-
Swift Current 2025											
0-6"	5.9	2.4	15.7	8	54	303	12	12	0.3	0.54	0.76
6-24"	7.8	-	-	48	-	-	30		-	-	-
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	-	-	-	-	-	-	-
Redvers 2025											
0-6"	8.2	2.7	-	5	10	227	26	-	-	0.56	-
6-24"	8.5	-	-	9	-	-	-	-	-	-	-
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		-	-	-
Indian Head 2025											
0-6"	8	4.5	50.1	9	10	593	8	48	1.5	0.42	2.4
6-24"	8.2	-	-	15	-	-	24		-	-	-

General Conditions



- Hail (2023, ~20% yield loss)
- Low weed and insect pressure
- Generally hot and dry
- 2025 late season precipitation

- Low weed and insect pressure
- Residual soil moisture in 2023

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

Seed Rate Treatments

2 Varieties:

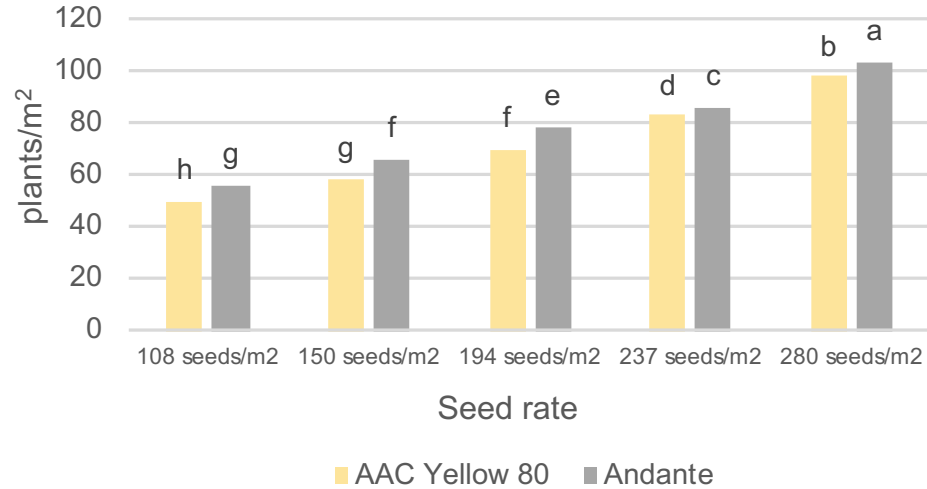
- AAC Yellow 80 composite yellow mustard
- Andante yellow mustard

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

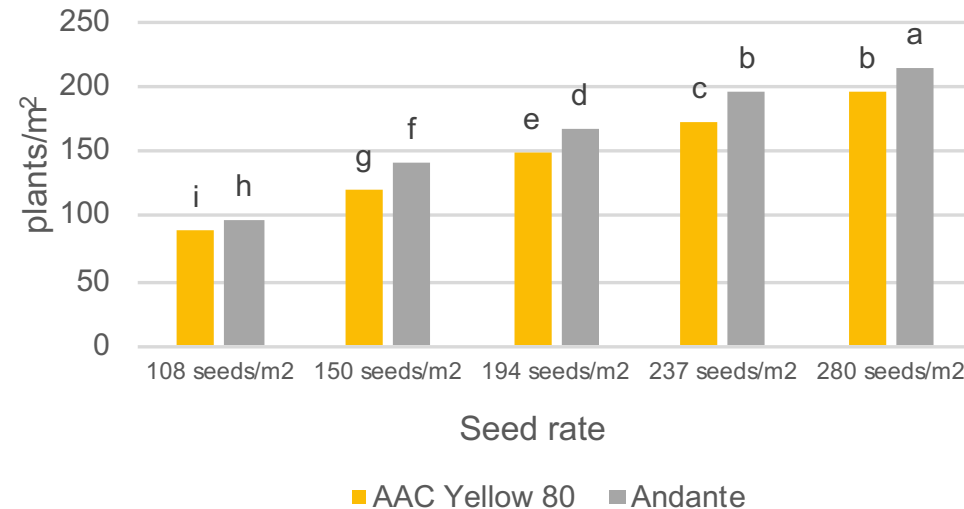
Seed Rate Effect on Mustard Emergence

Mustard emergence and seeding rate (WCA 2023-2025)

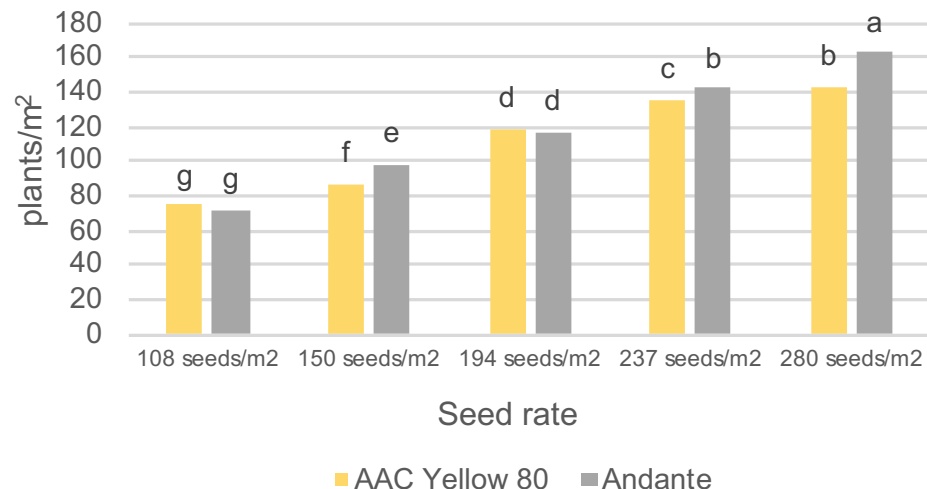


- Andante > AAC Yellow 80
- SC < RD < IH
- Plant stand increased with seeding rate

Mustard emergence and seeding rate (IH 2023-2025)



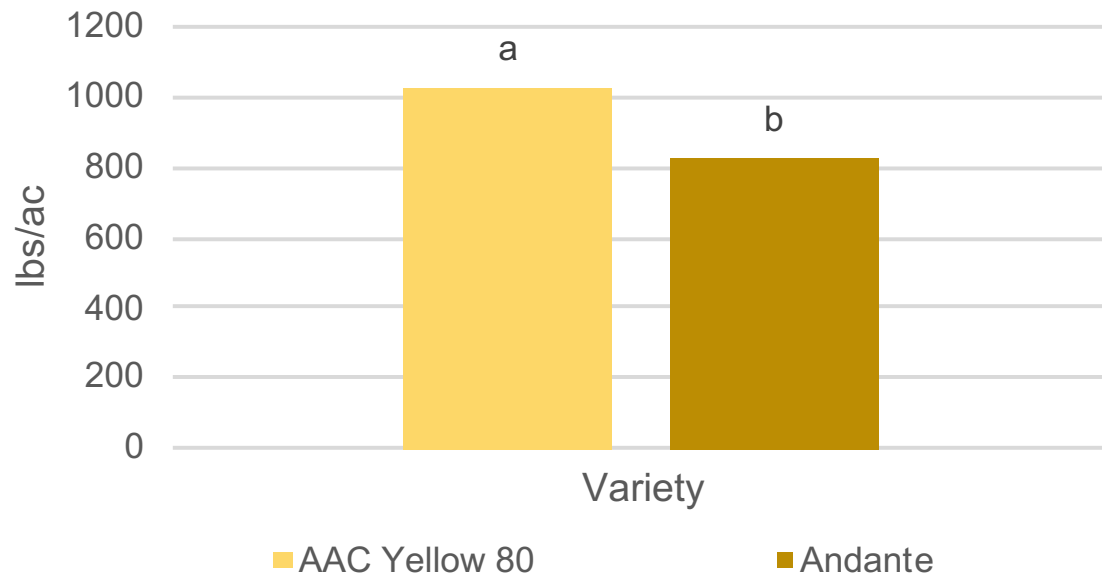
Redvers emergence of mustard variety and seeding rate



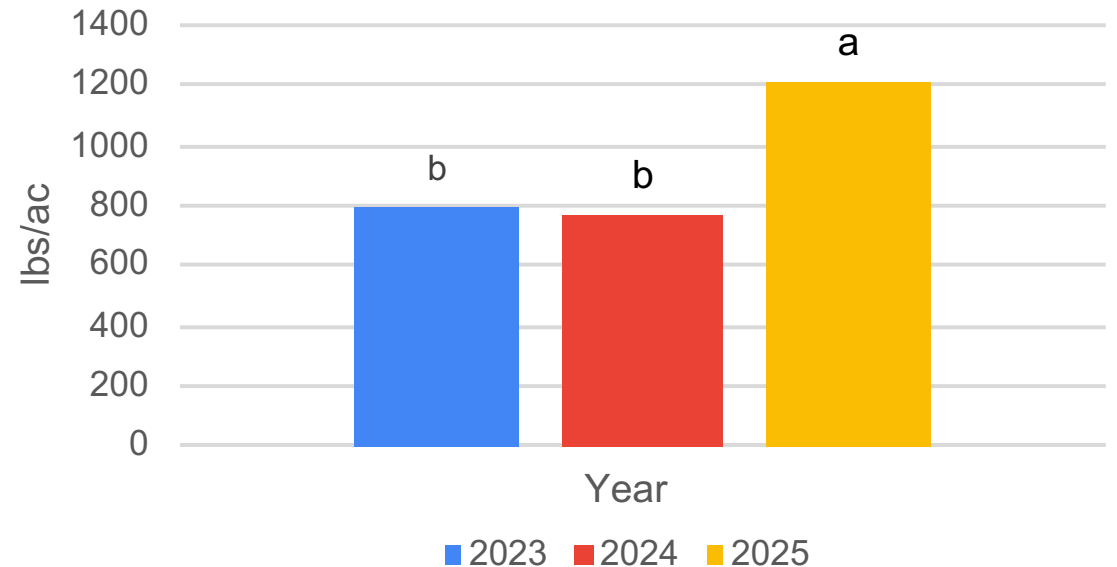
Swift Current variety and year effect (3 site-years)



mustard yield x variety (SC 2023-2025)

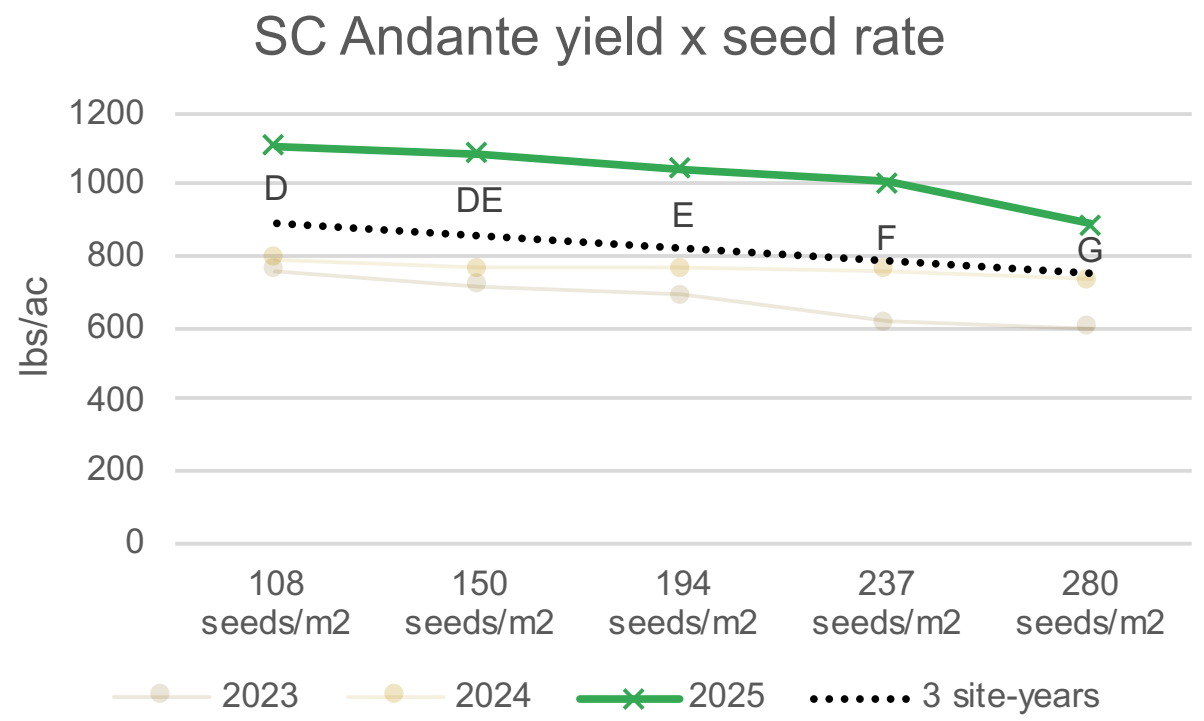
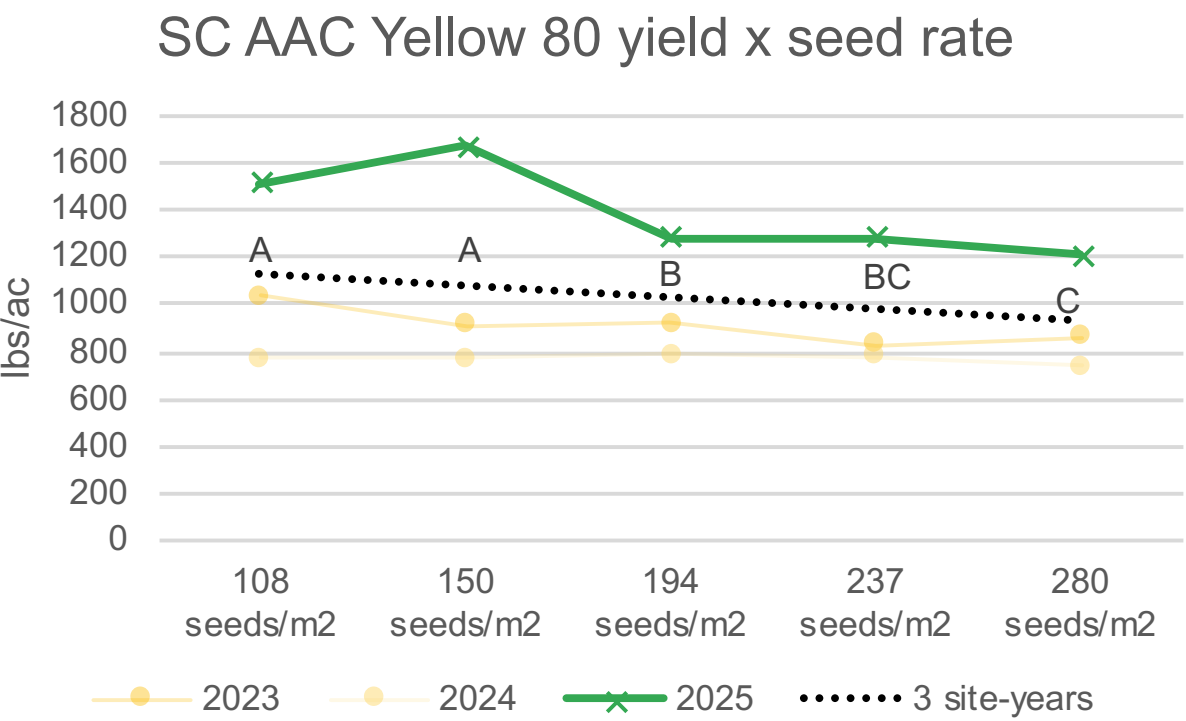


mustard yield x year (SC 2023-2025)



mustard yield x seed rate

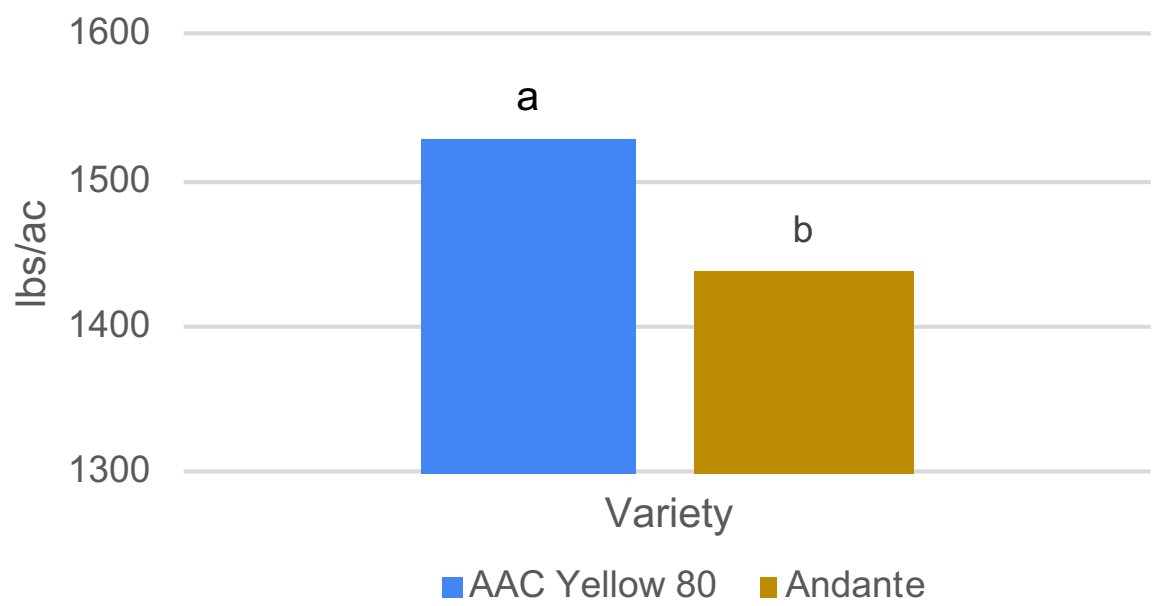
- Optimal yields were achieved at lower seed rates



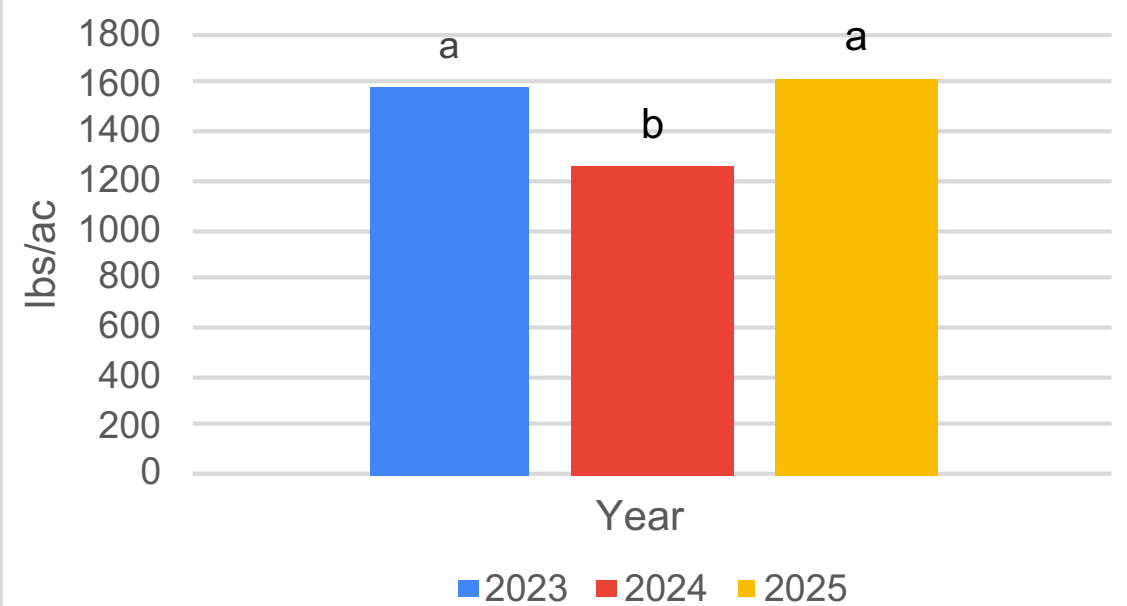
Redvers variety and year effect (3 site-years)



mustard yield x variety (RD 2023-2025)



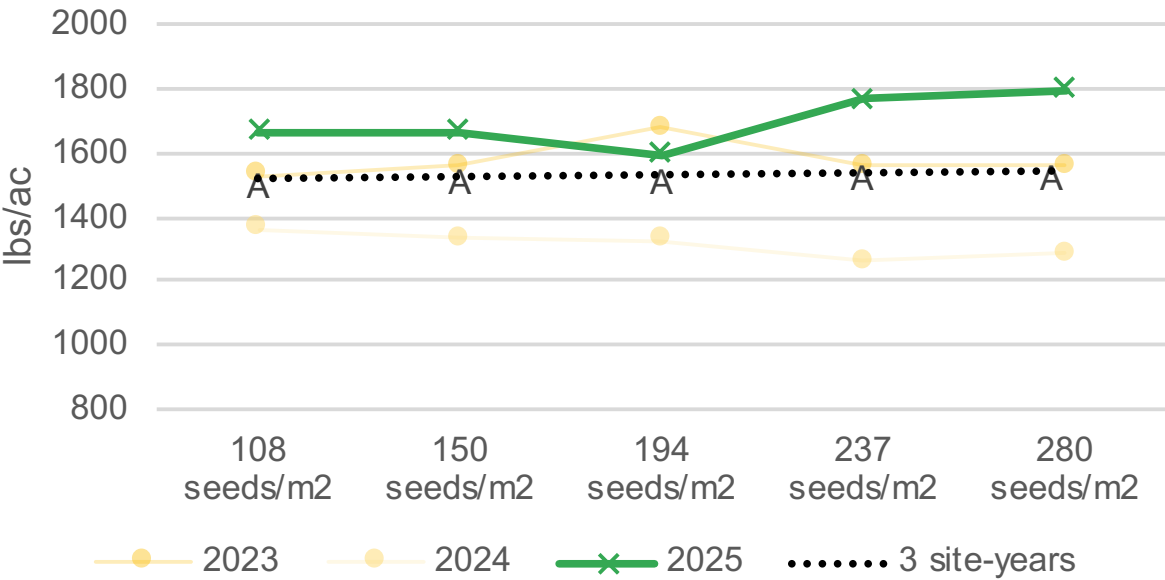
mustard yield x year (RD 2023-2025)



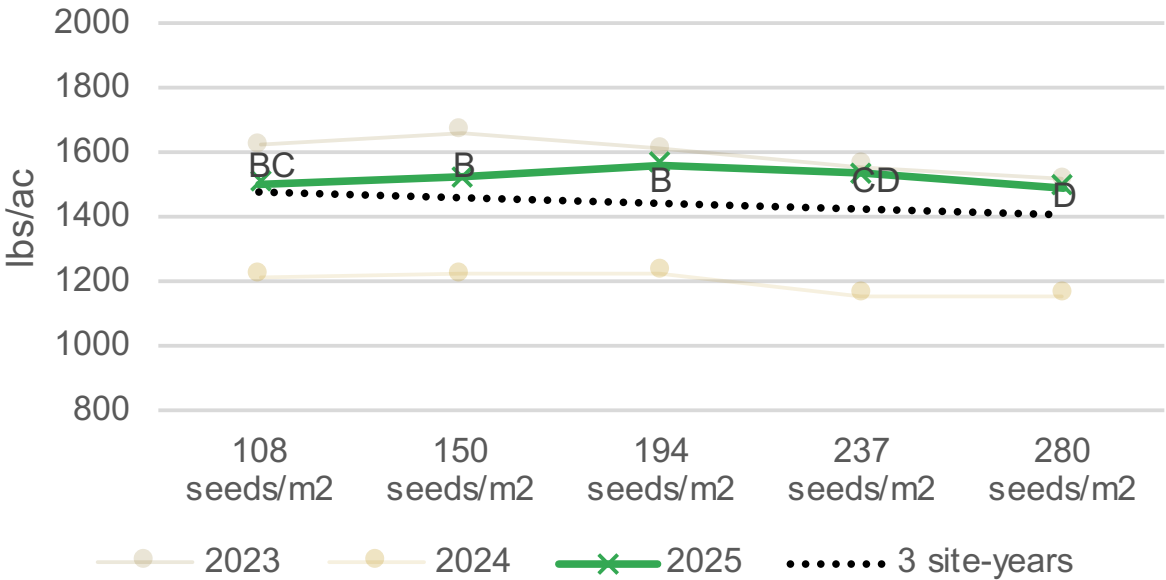
mustard yield x seed rate



AAC Yellow 80 yield x seed rate (RD 2023-2025)



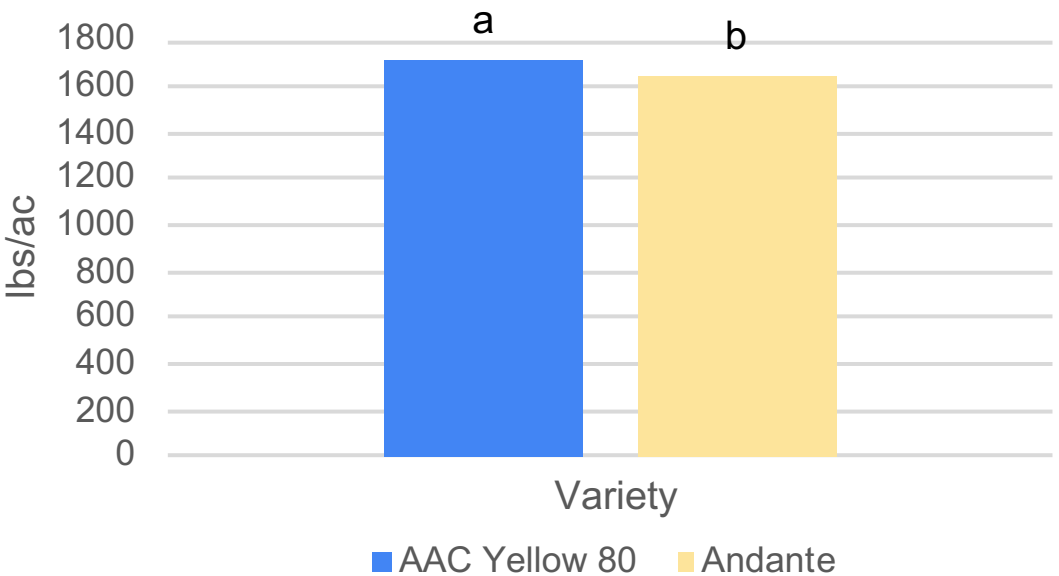
Andante yield x seed rate (RD 2023-2025)



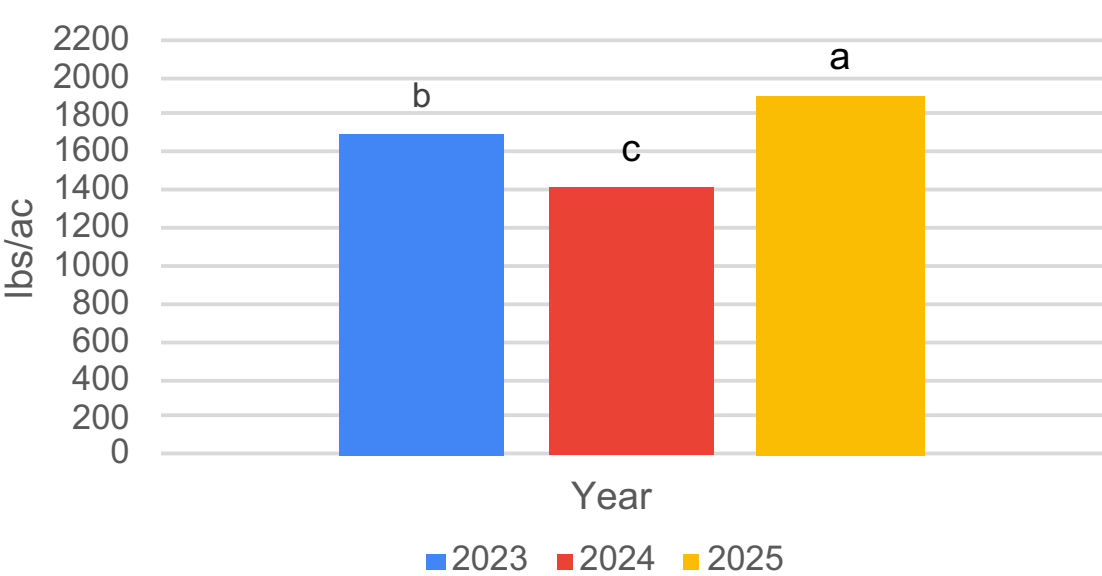
Indian Head variety and year effect (3 site-years)



mustard yield x variety (IH 2023-2025)



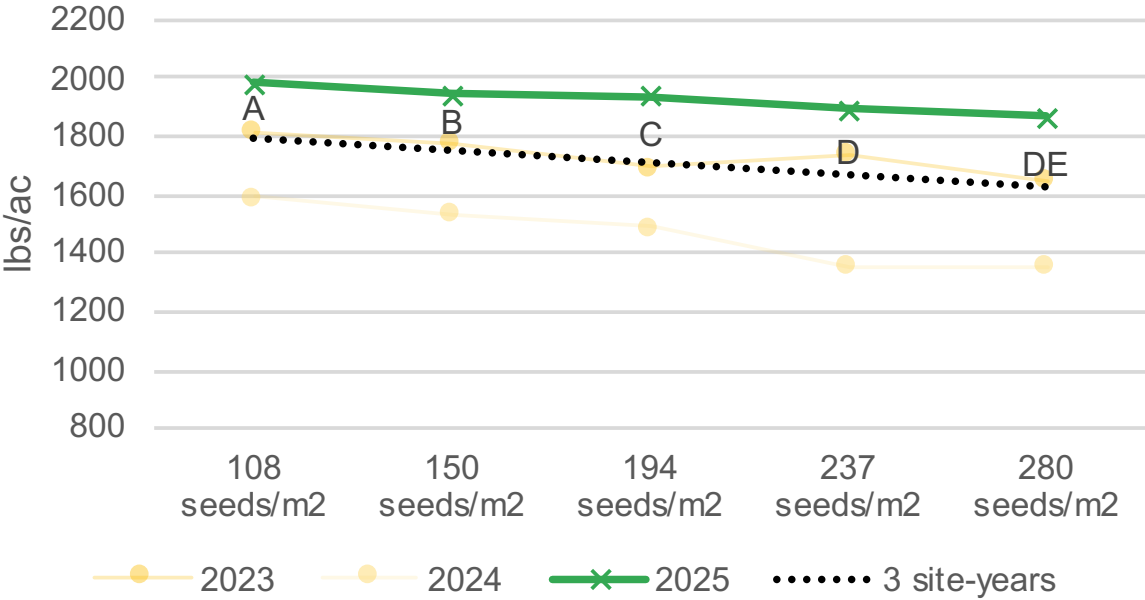
mustard yield x year (IH 2023-2025)



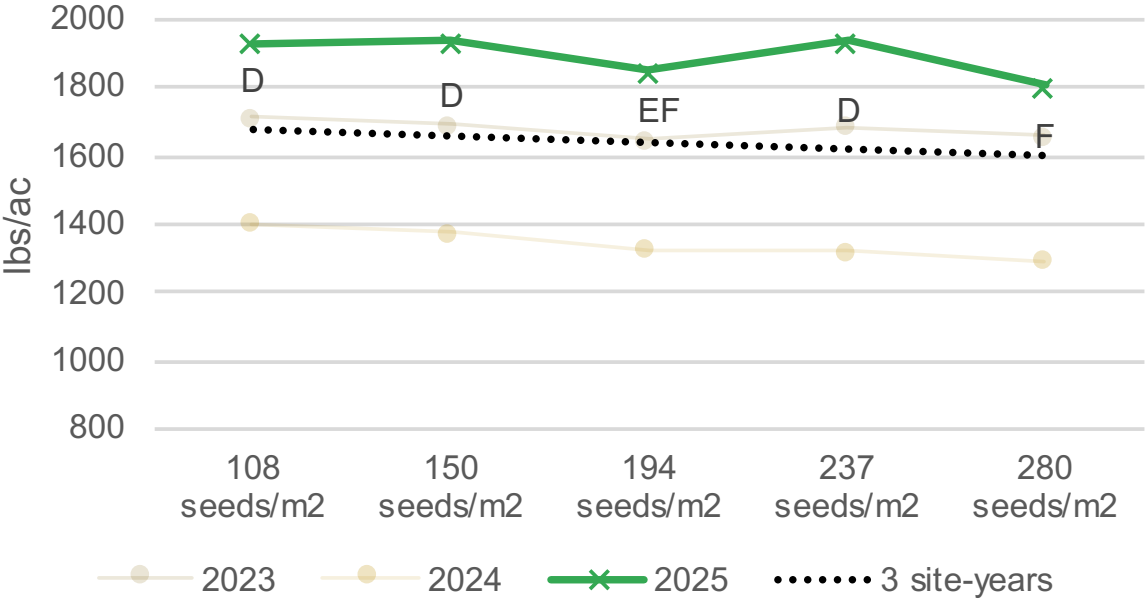
mustard yield x seed rate



IH AAC Yellow 80 yield x seed rate



IH Andante yield x seed rate



Low Rate



High Rate



Nitrogen Rate Treatments

2 Varieties:

- AAC Yellow 80 composite yellow mustard
- Andante yellow mustard

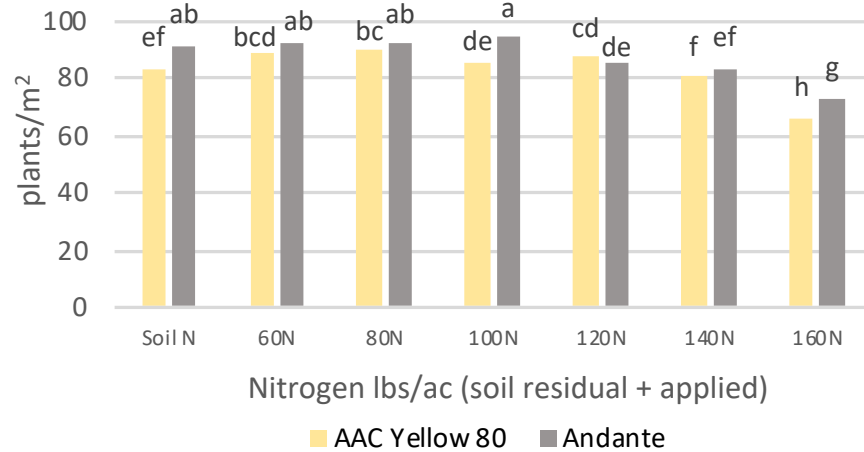
7 Nitrogen Rates:

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



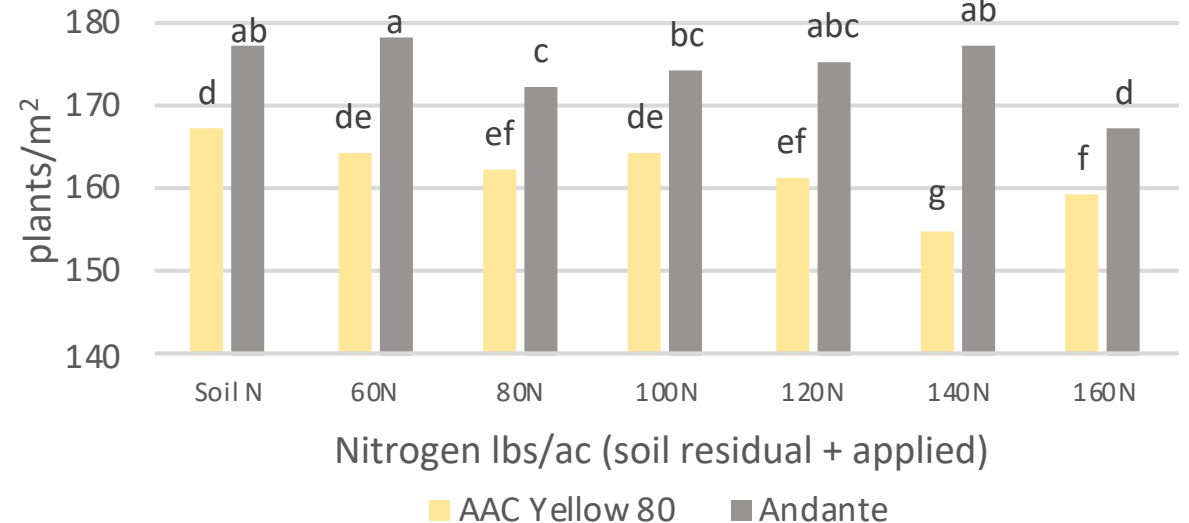
Nitrogen Rate Effect on Emergence

Total nitrogen x variety effect on mustard emergence (SC 2023-2025)

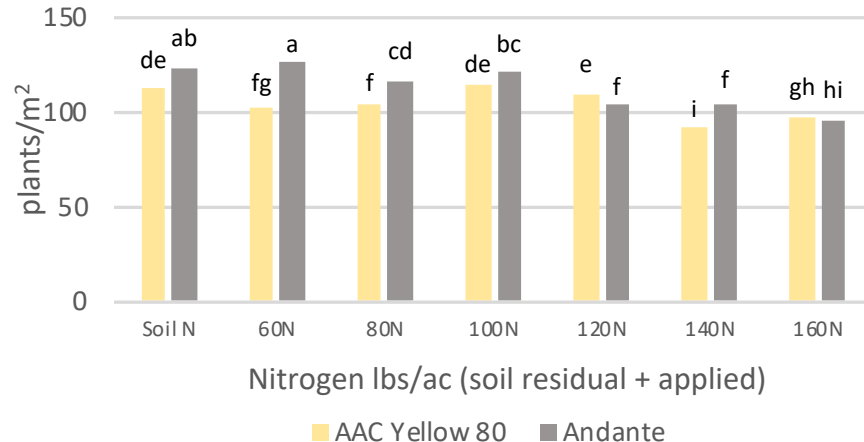


- Andante > AAC Yellow 80
- SC < RD < IH

Total nitrogen x variety effect on mustard emergence (IH 2023-2025)



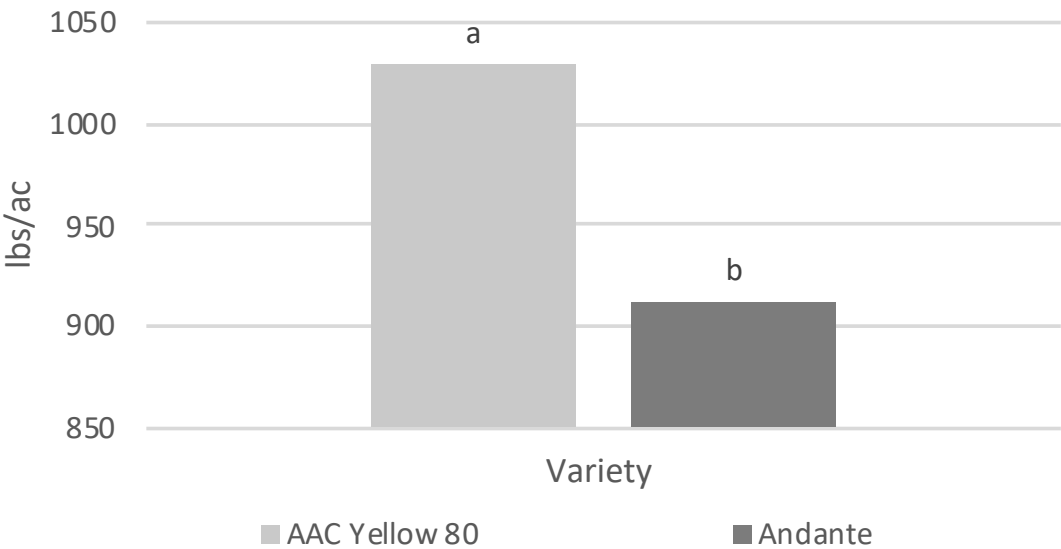
Total nitrogen x variety effect on mustard emergence (RD 2023-2025)



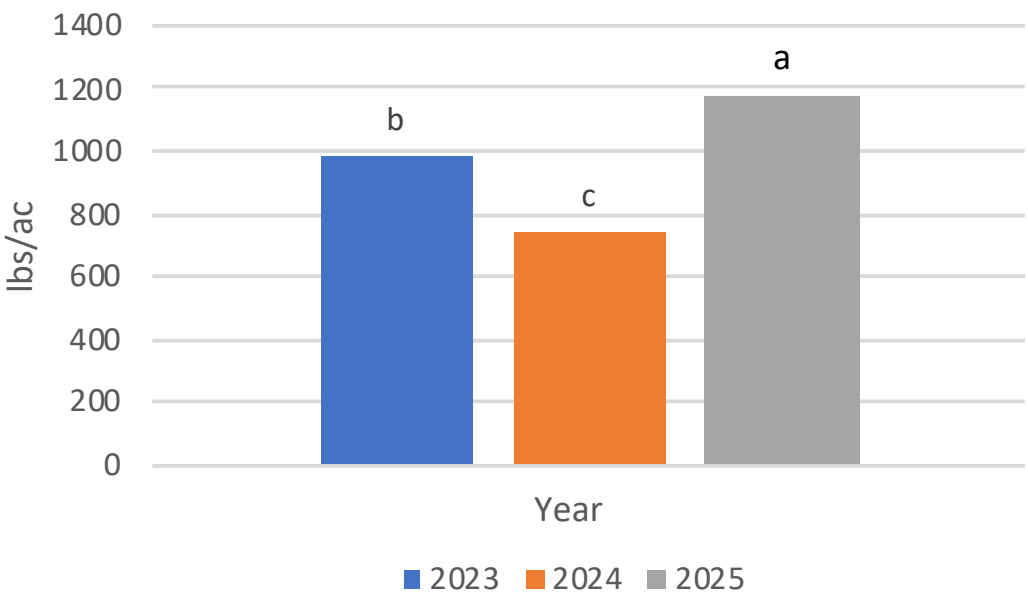
Swift Current variety and year effects (3 site-years)



mustard yield x variety (SC 2023-2025)

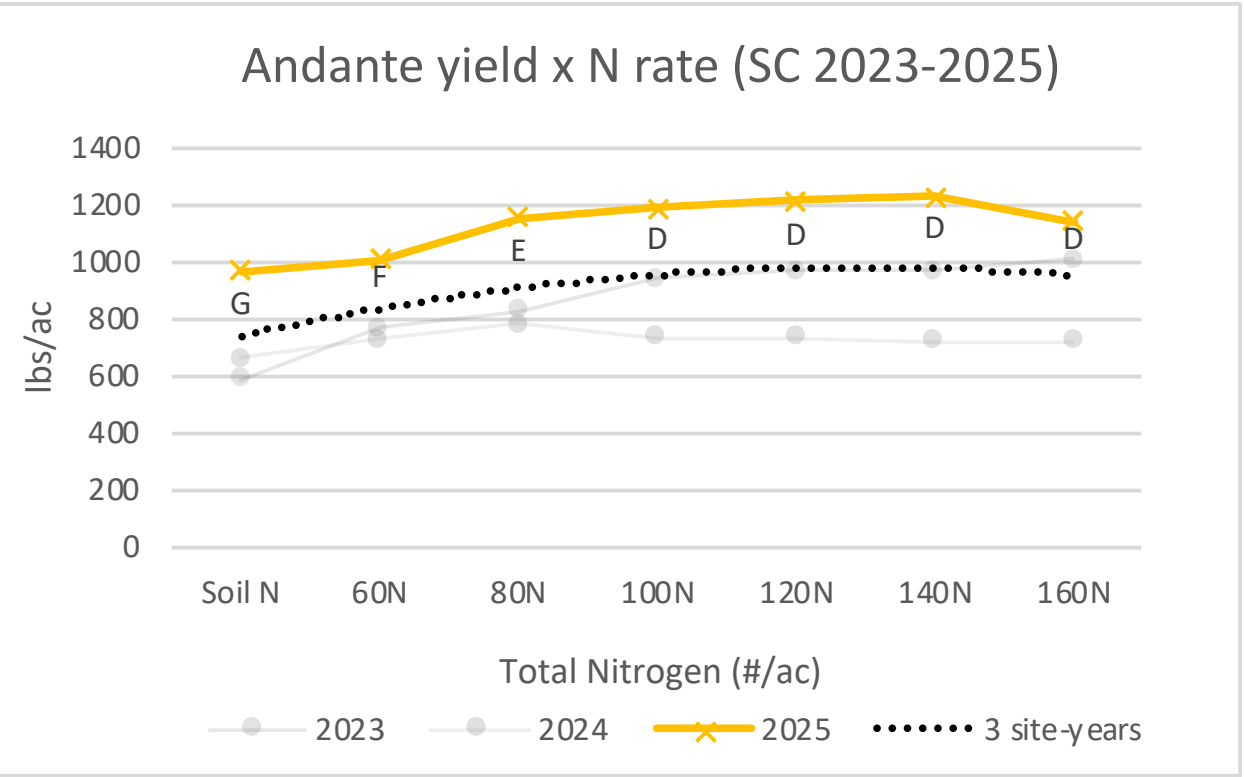
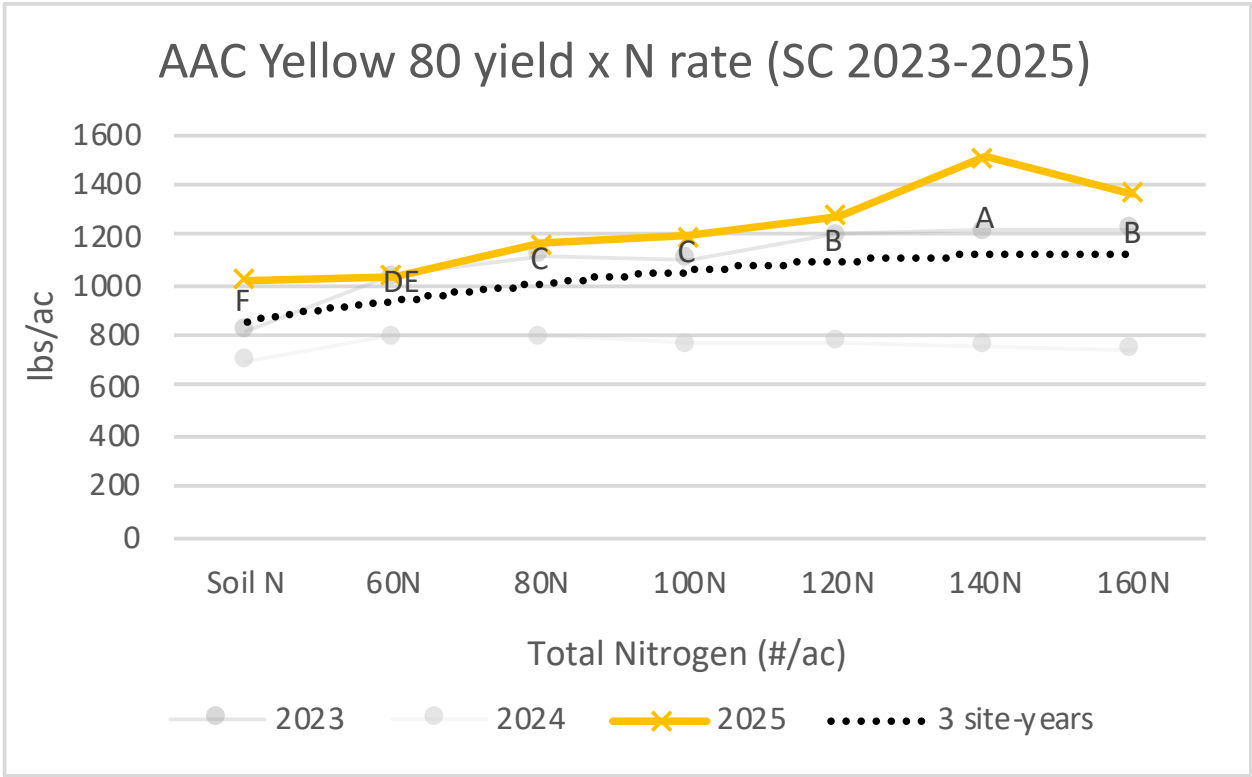


mustard yield x year (SC 2023-2025)



mustard yield x nitrogen rate

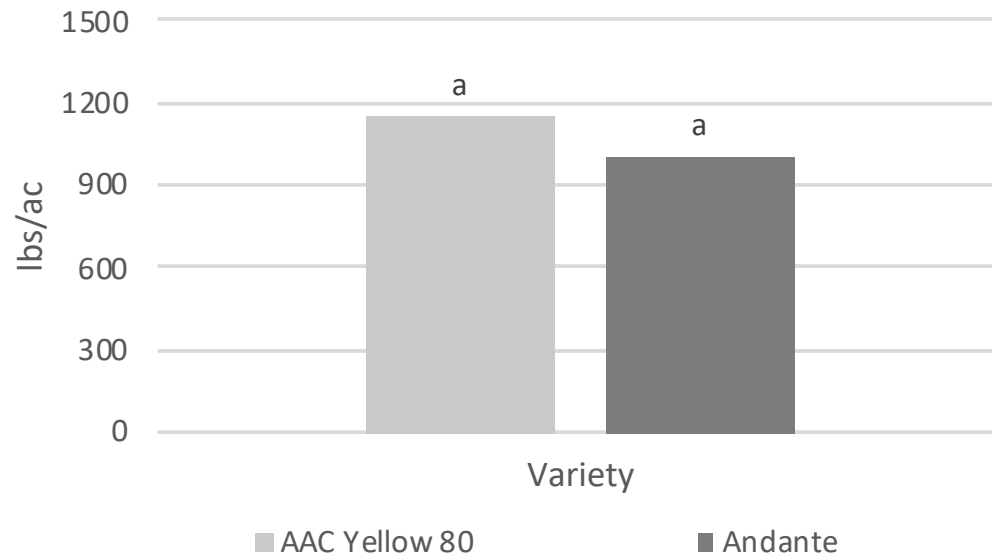
- Nitrogen rates above 120-140 lb N/ac did not provide consistent yield benefits



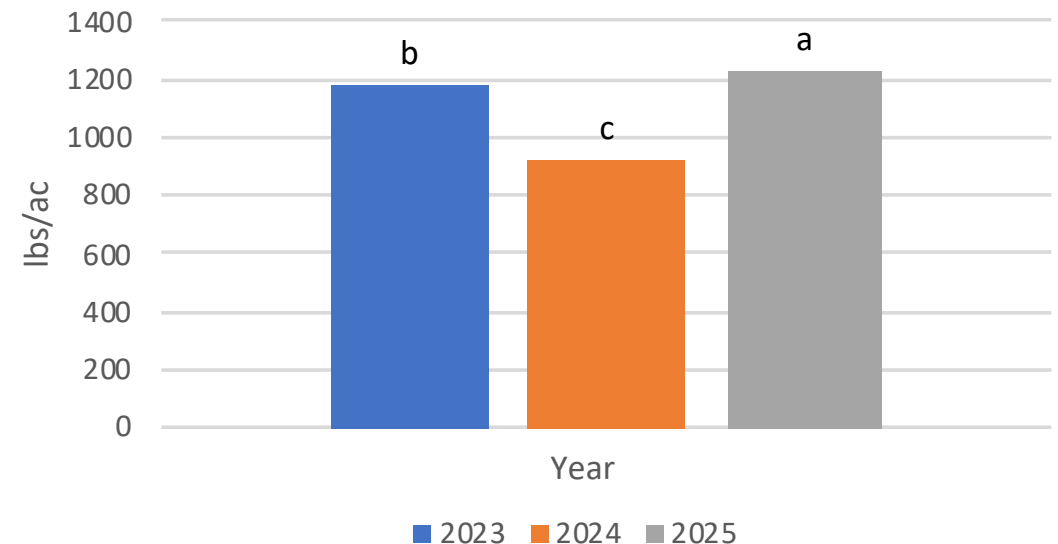
Redvers nitrogen rate yields (3 site-years)



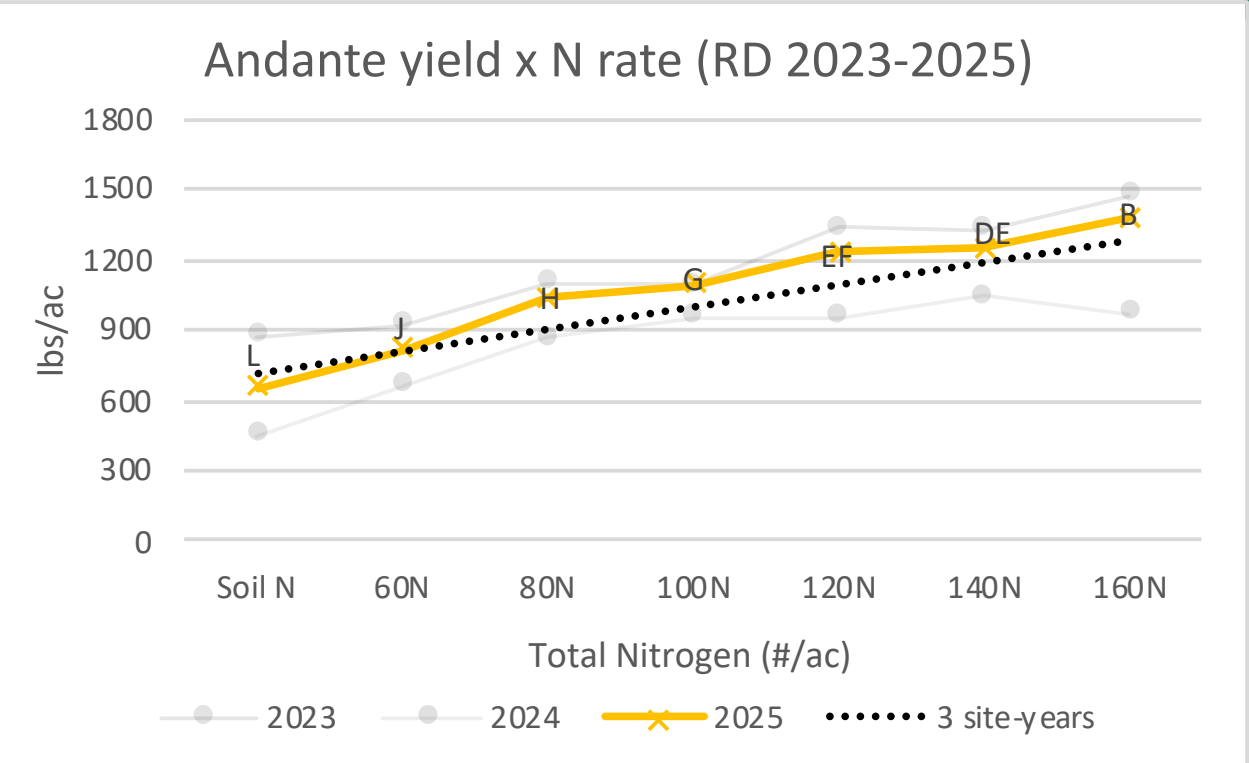
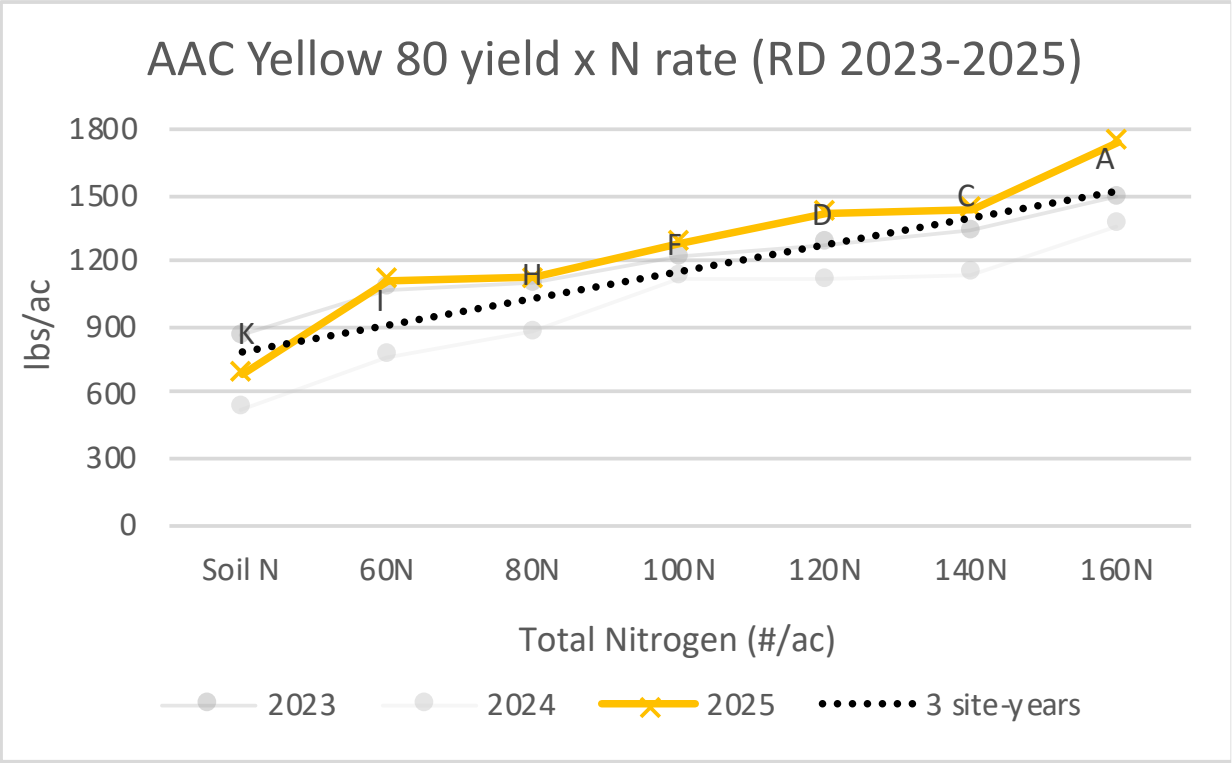
mustard yield x variety (RD 2023-2025)



mustard yield x year (RD 2023-2025)



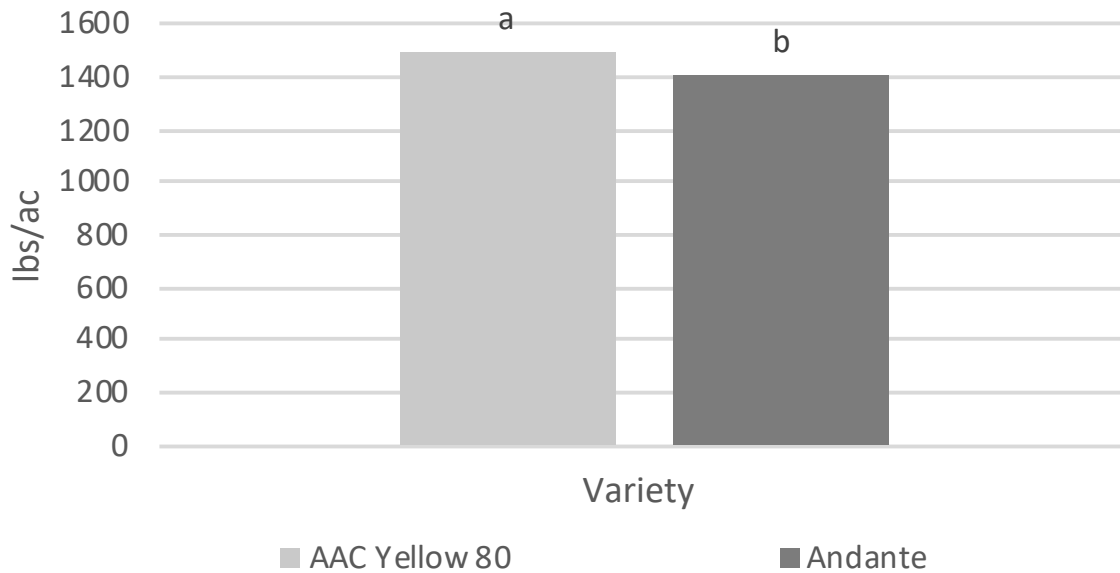
mustard yield x nitrogen rate



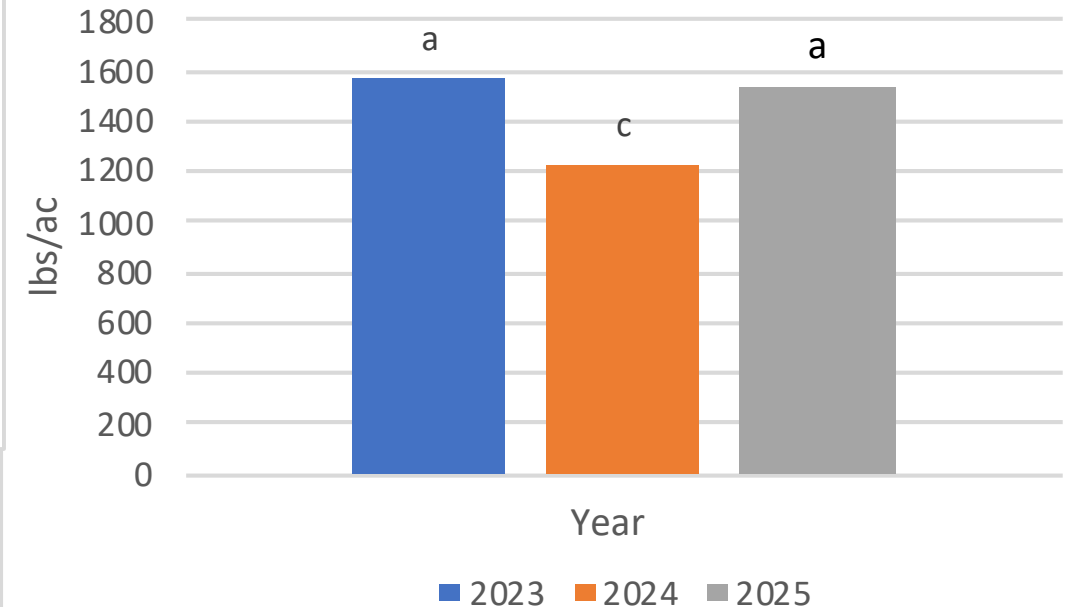
Indian Head nitrogen rate yields (3 site-years)



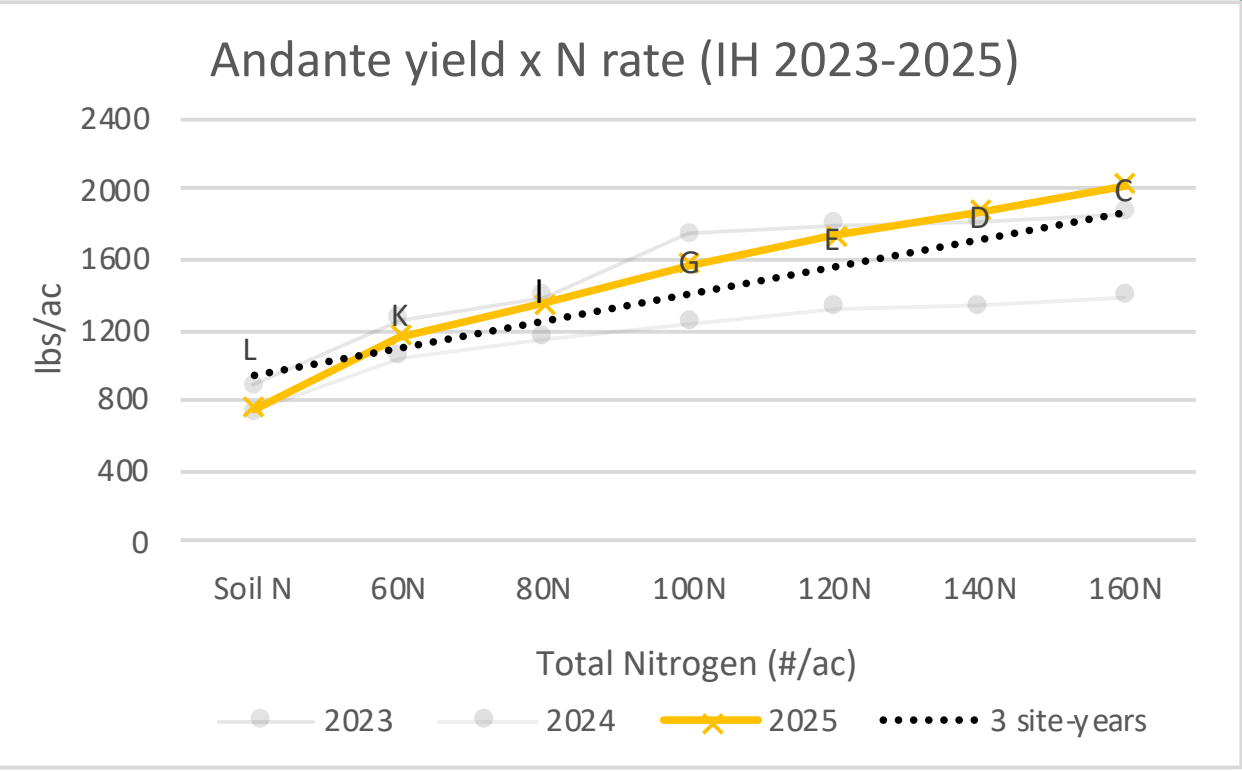
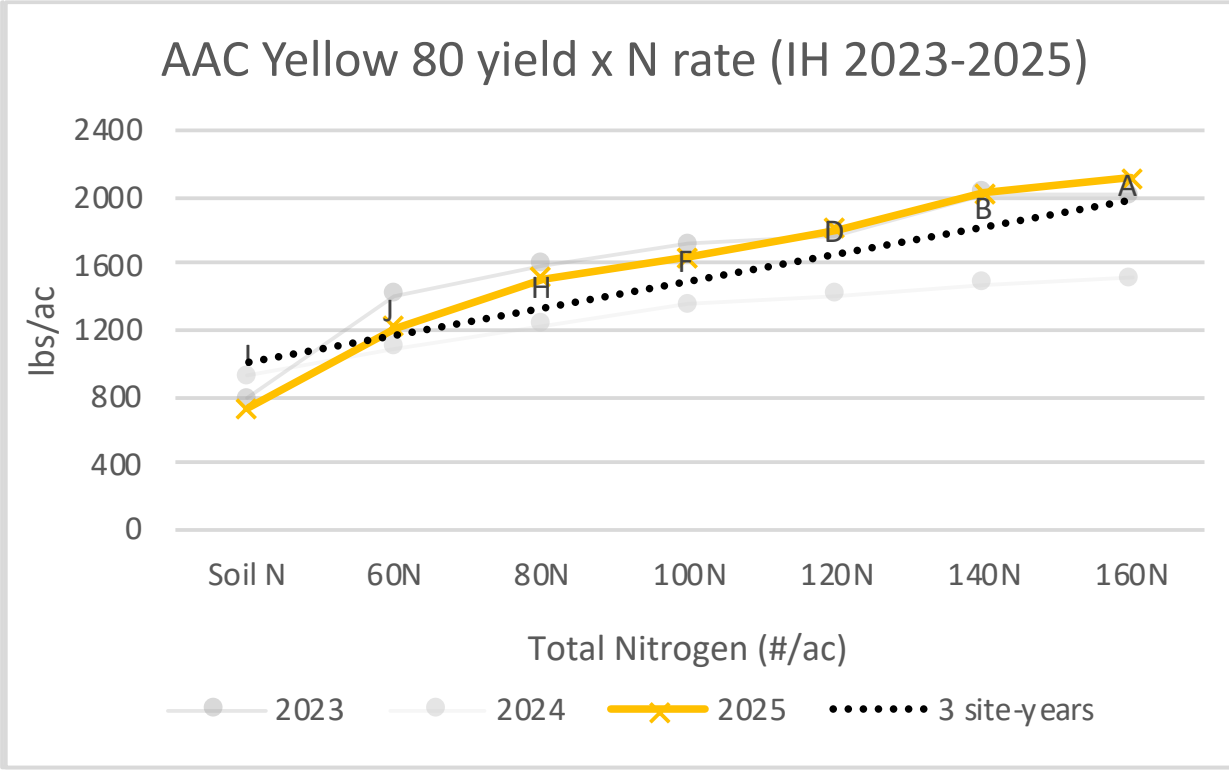
mustard yield x variety (IH 2023-2025)



mustard yield x year (IH 2023-2025)



mustard yield x nitrogen rate



Low Nitrogen



High Nitrogen

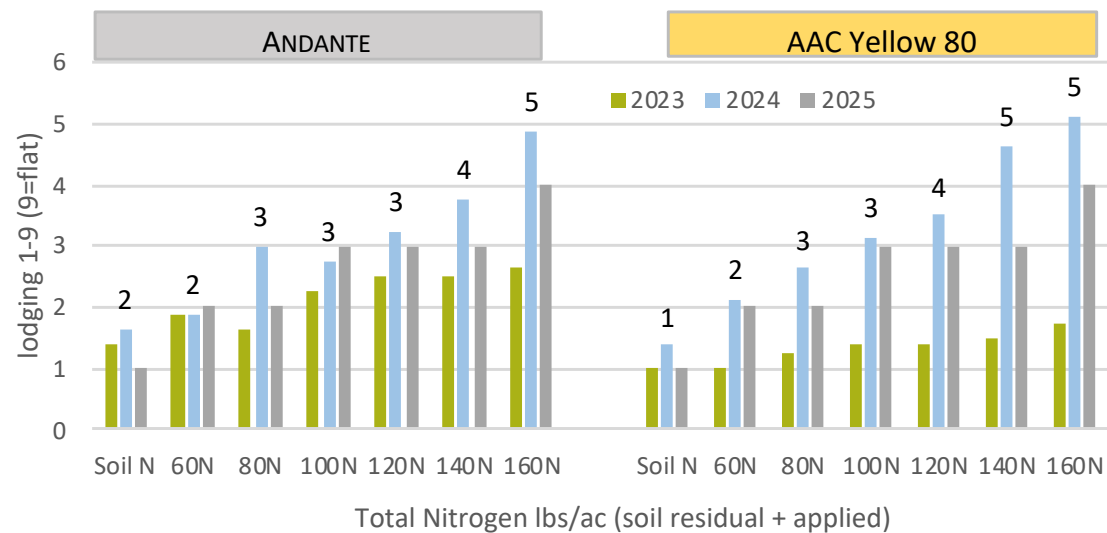


Lodging (1-9, 1=upright)

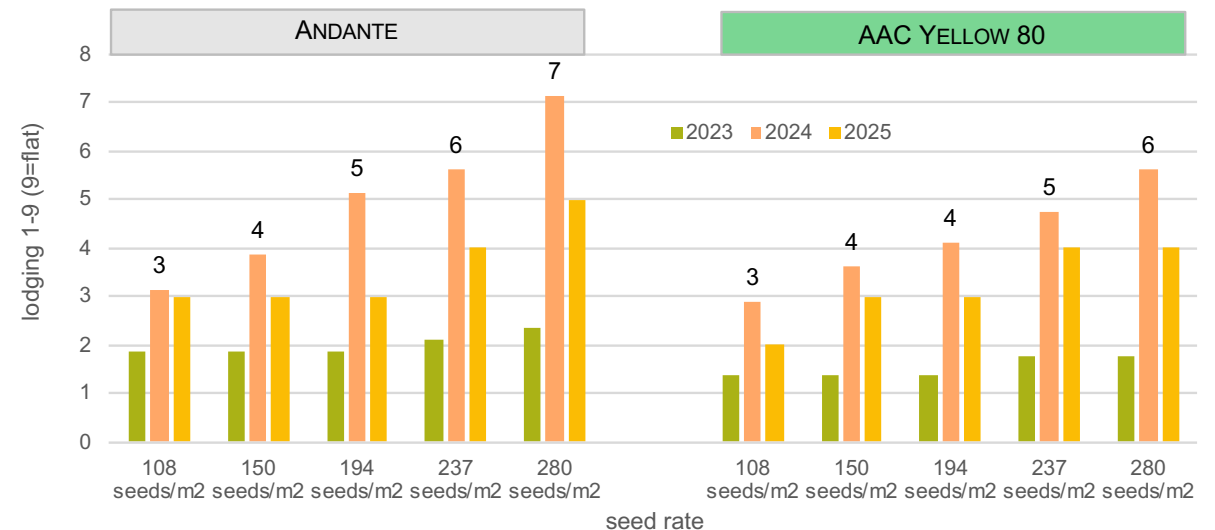
- Minimal lodging effect at Swift Current, or Redvers
- At Indian Head lodging increased with fertility and seed rate



Nitrogen rate effects on lodging at Indian Head



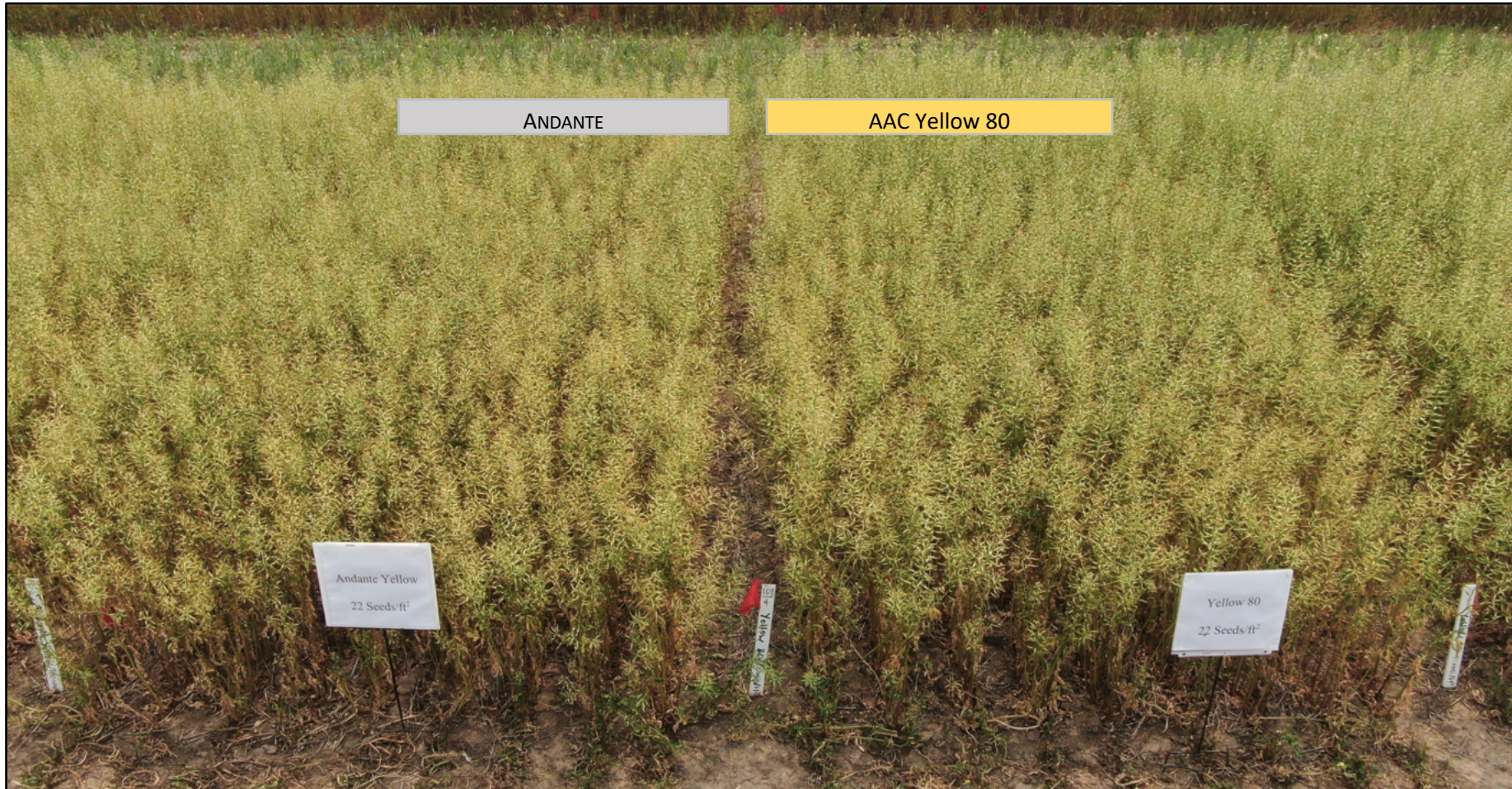
Seed rate effects on lodging at Indian Head



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

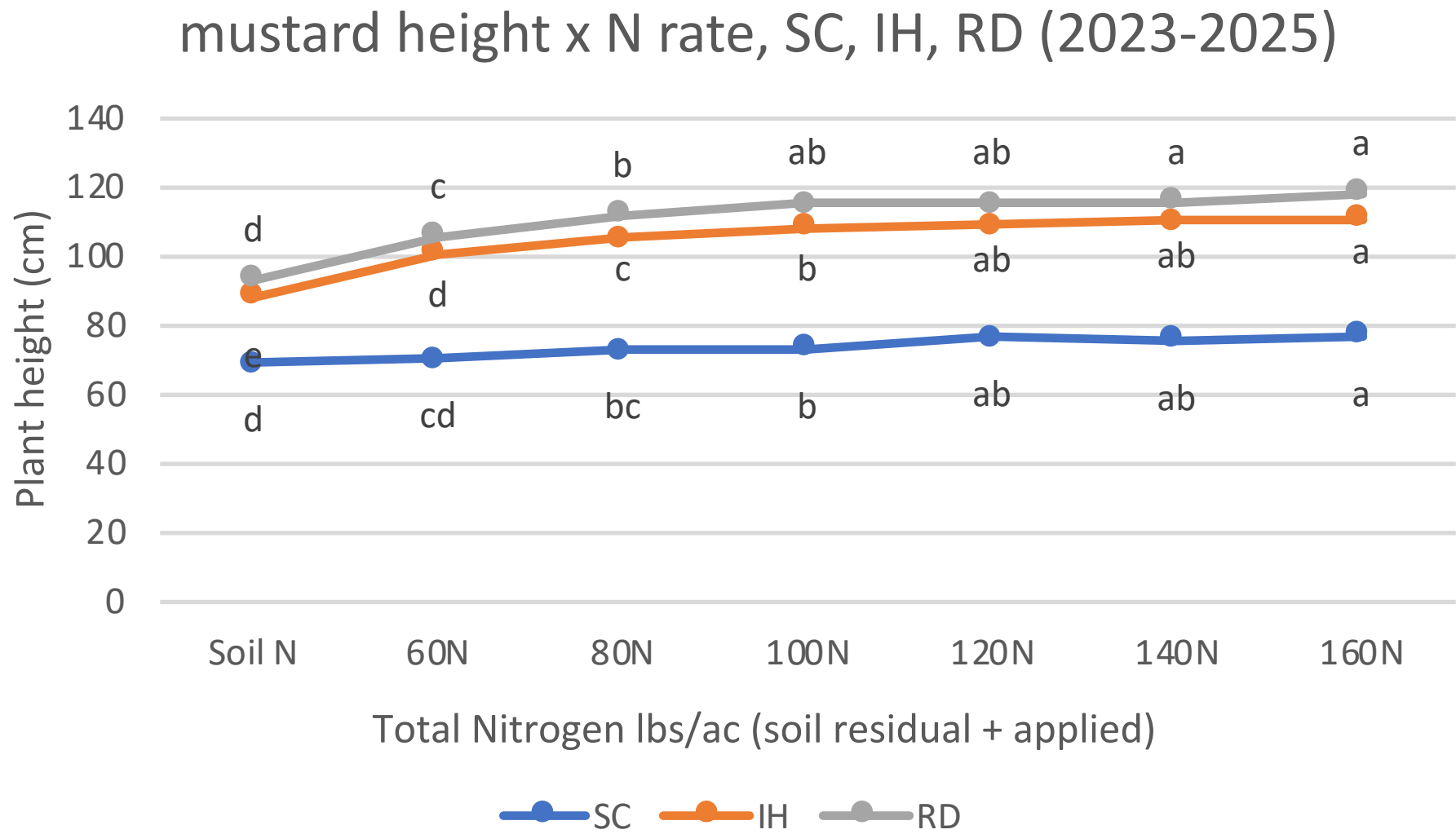
Height (cm)

AAC Yellow 80 > Andante



- Plant height decreased as seed rate increased

Height increased with nitrogen up to moderate rates



Days to Maturity (DTM)

Minor differences (1-2 days)



- Dry site years matured rapidly
- Highest Nitrogen rates delayed maturity
- DTM decreased with increasing seeding rate

Summary (2023-2025)

- AAC Yellow 80 composite yellow mustard demonstrated higher yield potential and nitrogen use efficiency than Andante.
- Optimal nitrogen requirements varied by site and year, with highest yields achieved at total nitrogen rates of 120–160 lb N/ac under average moisture conditions, and 80–100 lb N/ac under drought stress.
- Optimal seeding rates for AAC Yellow 80 are likely lower than current recommendations for open-pollinated mustard.
- Higher seeding rates increased plant mortality, lodging risk, and moisture competition without providing yield benefits.
- The inclusion of 2025 data strengthens confidence in recommending reduced seeding rates and site-specific nitrogen management for composite yellow mustard in Saskatchewan.

- The same seed lot was used for all 9-site years of this study
- Does mortality increase, as seed size decreases?

AAC Yellow 80 @ 5.3 lbs/ac

$$\frac{108 \text{ seeds}}{\text{m}^2} \times \frac{5.5 \text{ grams}}{1000 \text{ seeds}} \times 0.0089$$

Andante @ 6.1 lbs/ac

$$\frac{108 \text{ seeds}}{\text{m}^2} \times \frac{6.3 \text{ grams}}{1000 \text{ seeds}} \times 0.0089$$

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 12, 2026

Annual field tour July 16, 2026

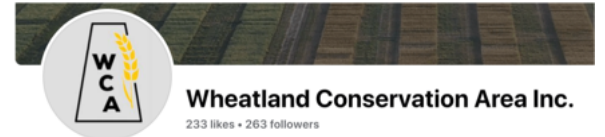


**Crop Diagnostic School
July 29th-30th**

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