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 15, 2026

WHEATLAND CONSERVATION AREA

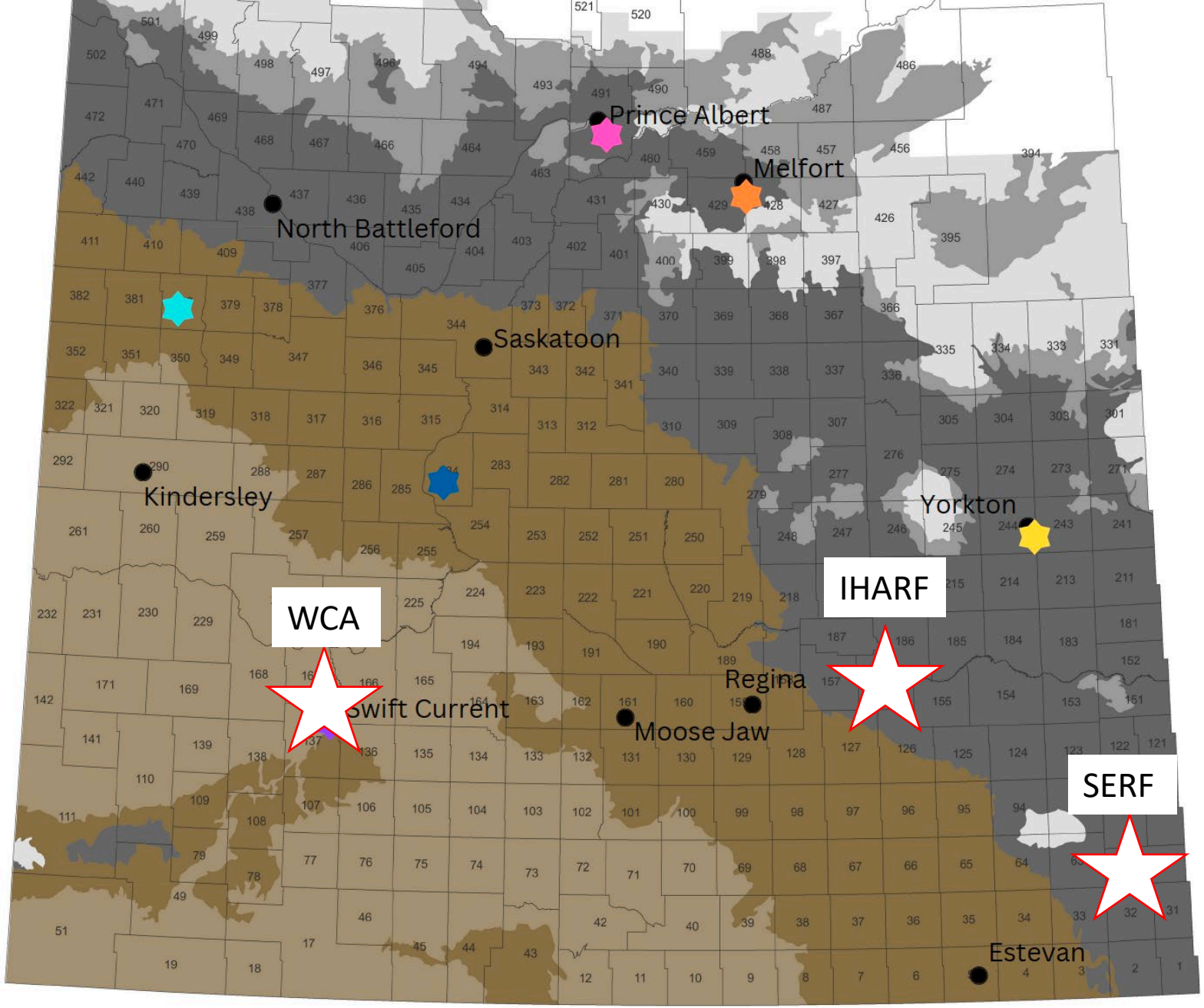
Saskatchewan

Canada

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

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IHARF INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION

SOUTH EAST RESEARCH FARM

Mustard 21 Canada inc.

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

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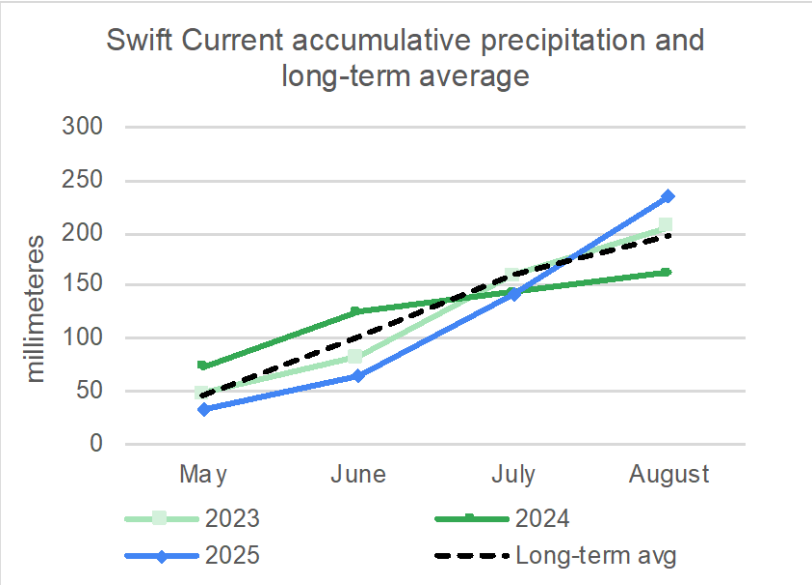
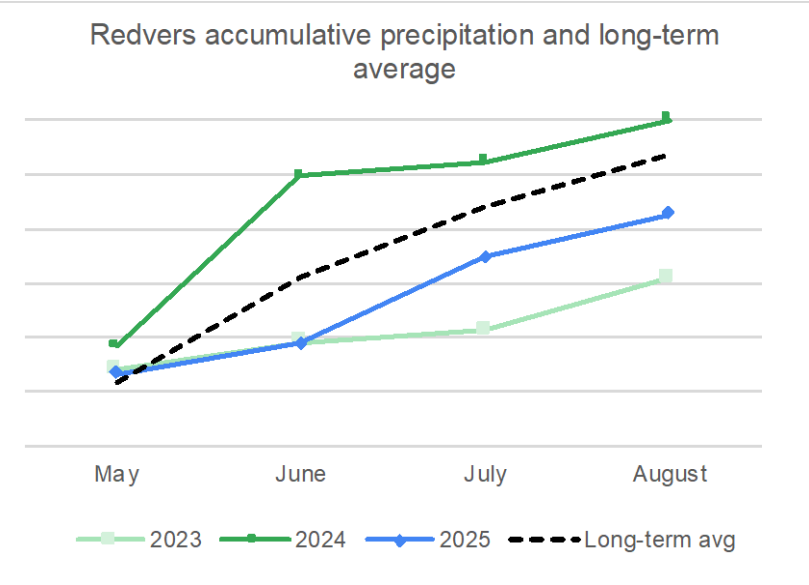
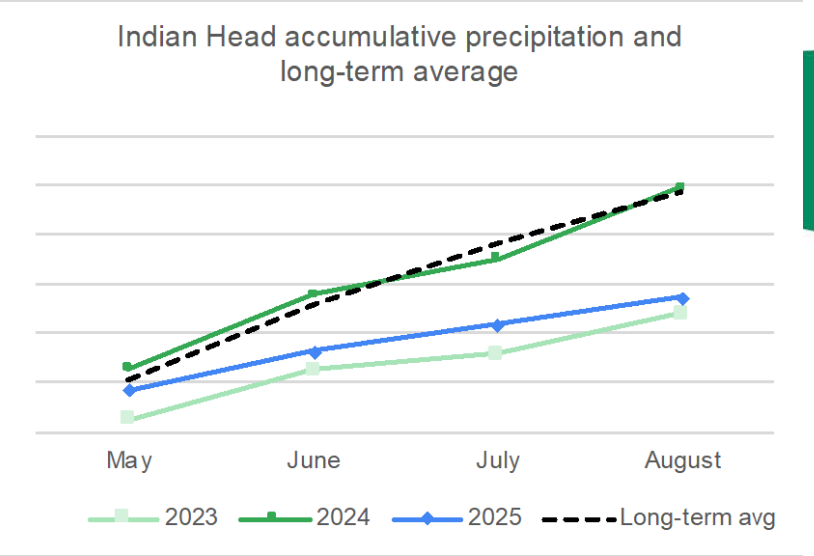
Basic Soil Nutrients

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

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Seed Rate Treatments

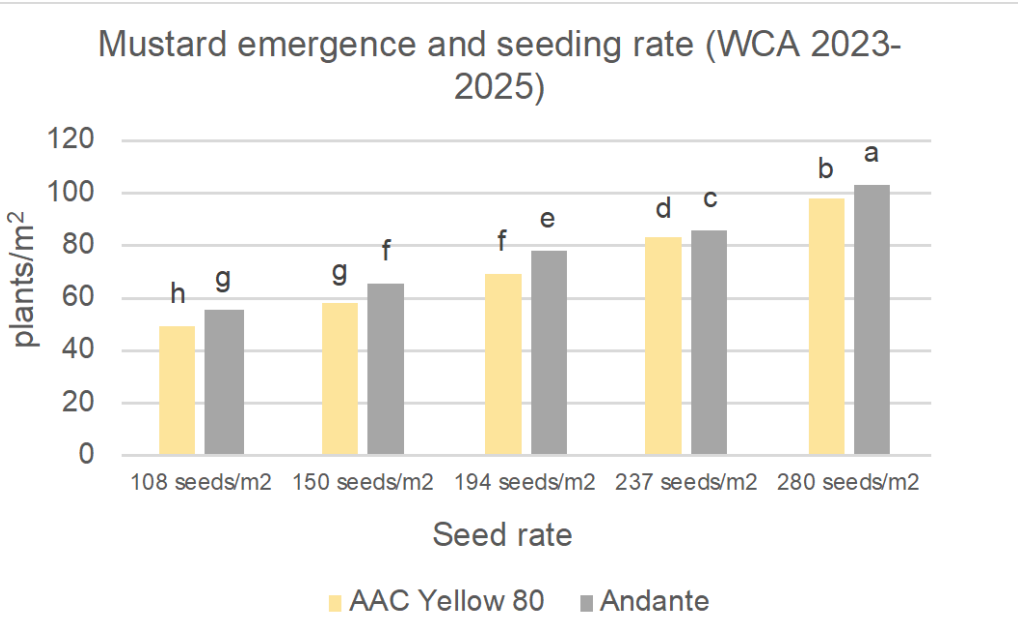
2 Varieties:

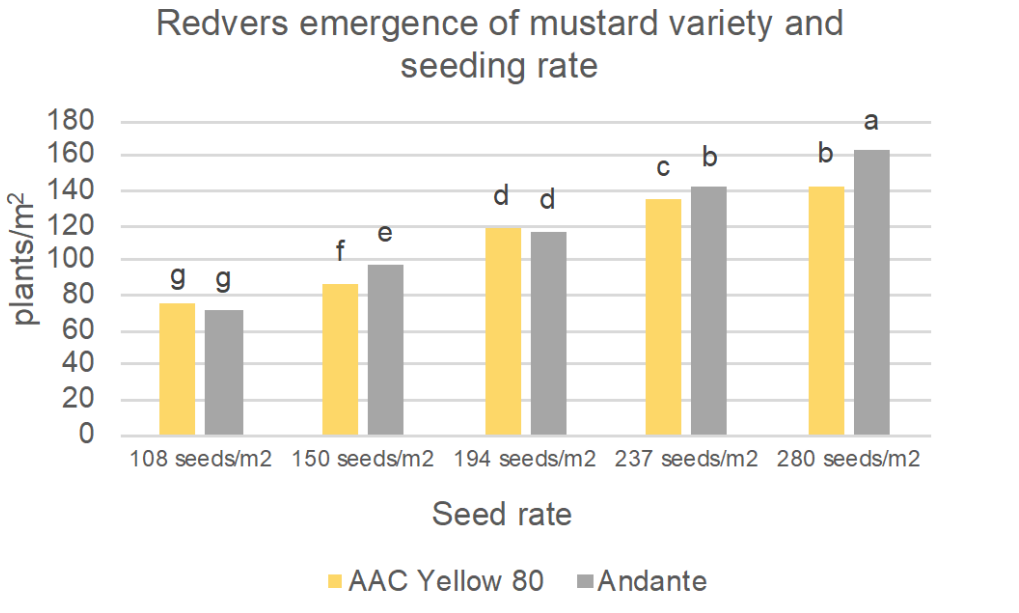
- AAC Yellow 80 composite yellow mustard
- Andante yellow mustard

5 Seed Rates

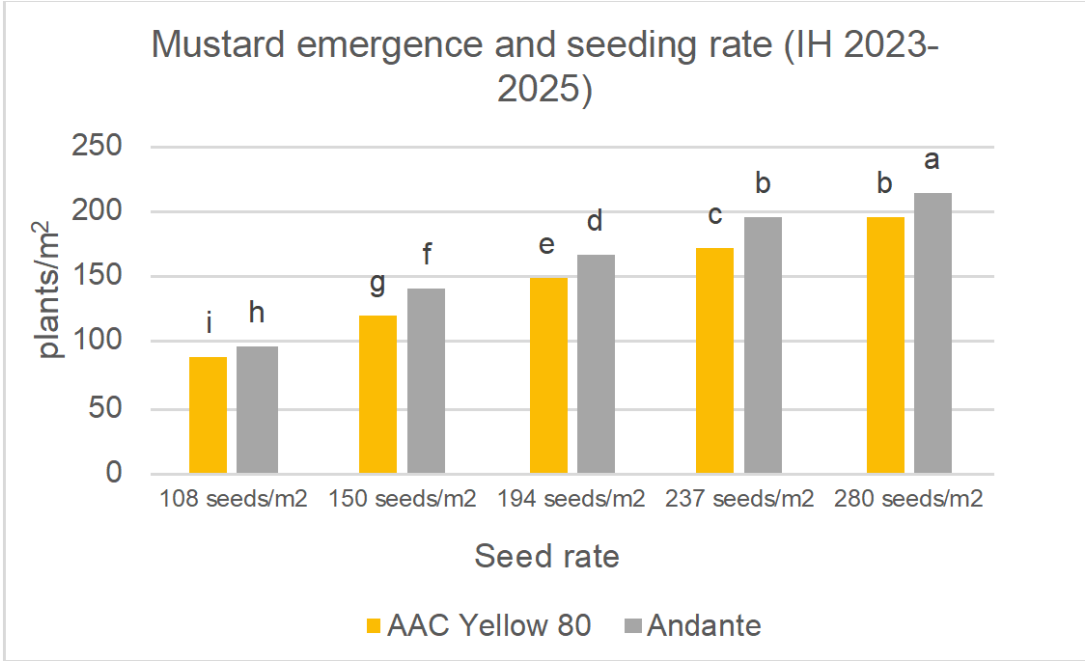
Andante (TSW=6.3 grams, or 0.0138891 lbs/1000 seeds)										
Target plant stand	**Seed rate (assuming 50% emergence)**									**Seed weight per acre**
5 plants/ft2	10	seeds/ft2	or	108	seeds/m2	or	437,061	seeds/ac		6.1 lbs/ac
7 plants/ft2	14	seeds/ft2	or	150	seeds/m2	or	607,029	seeds/ac		8.4 lbs/ac
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





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



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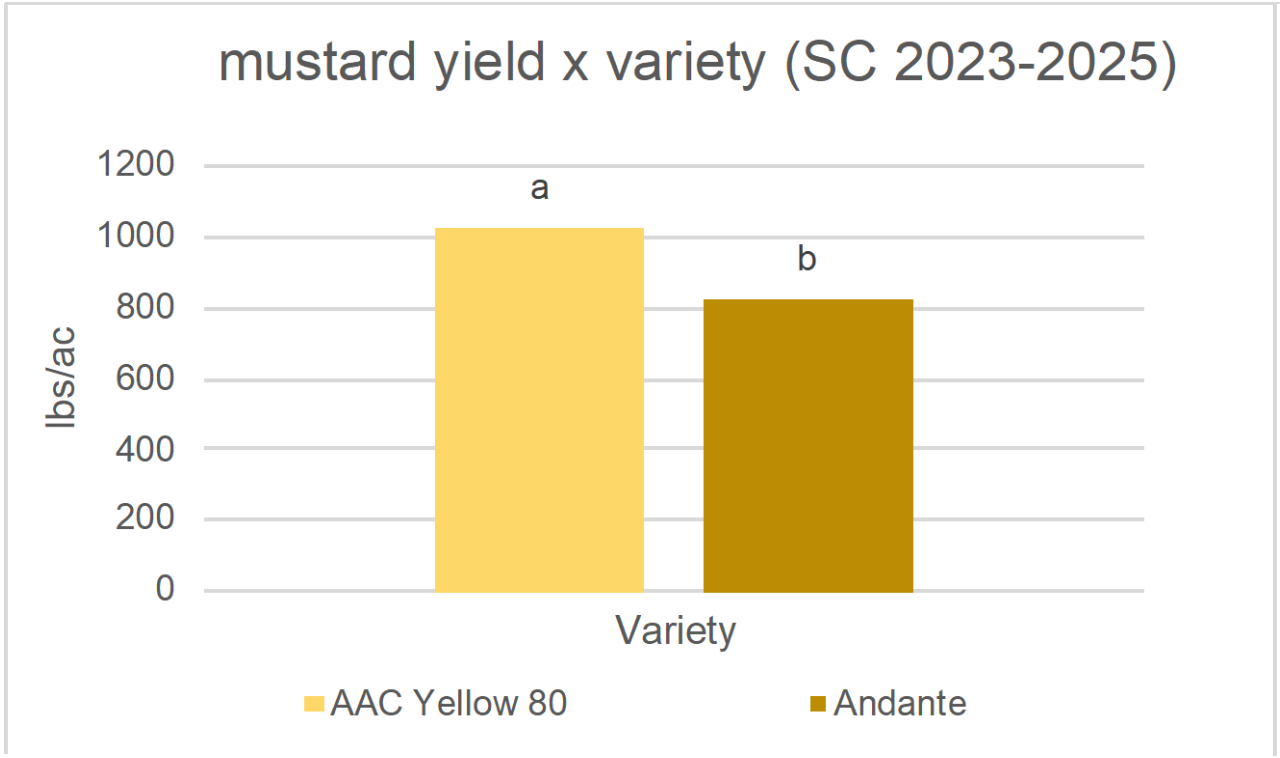
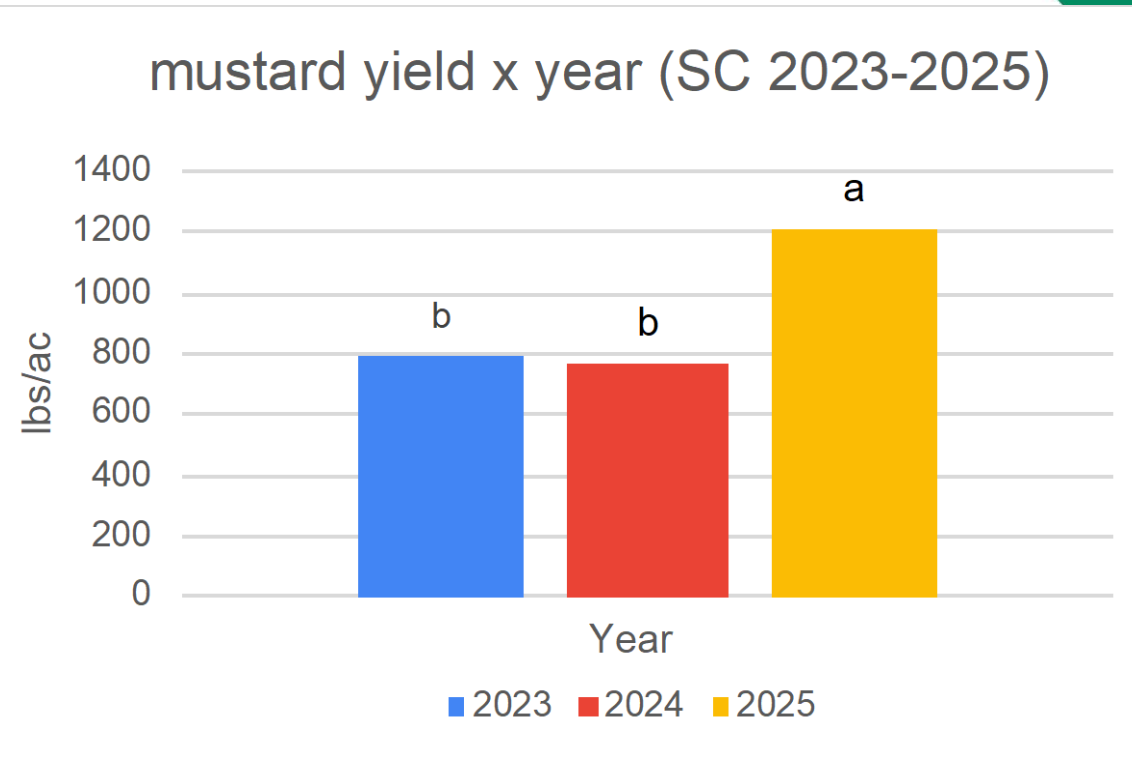
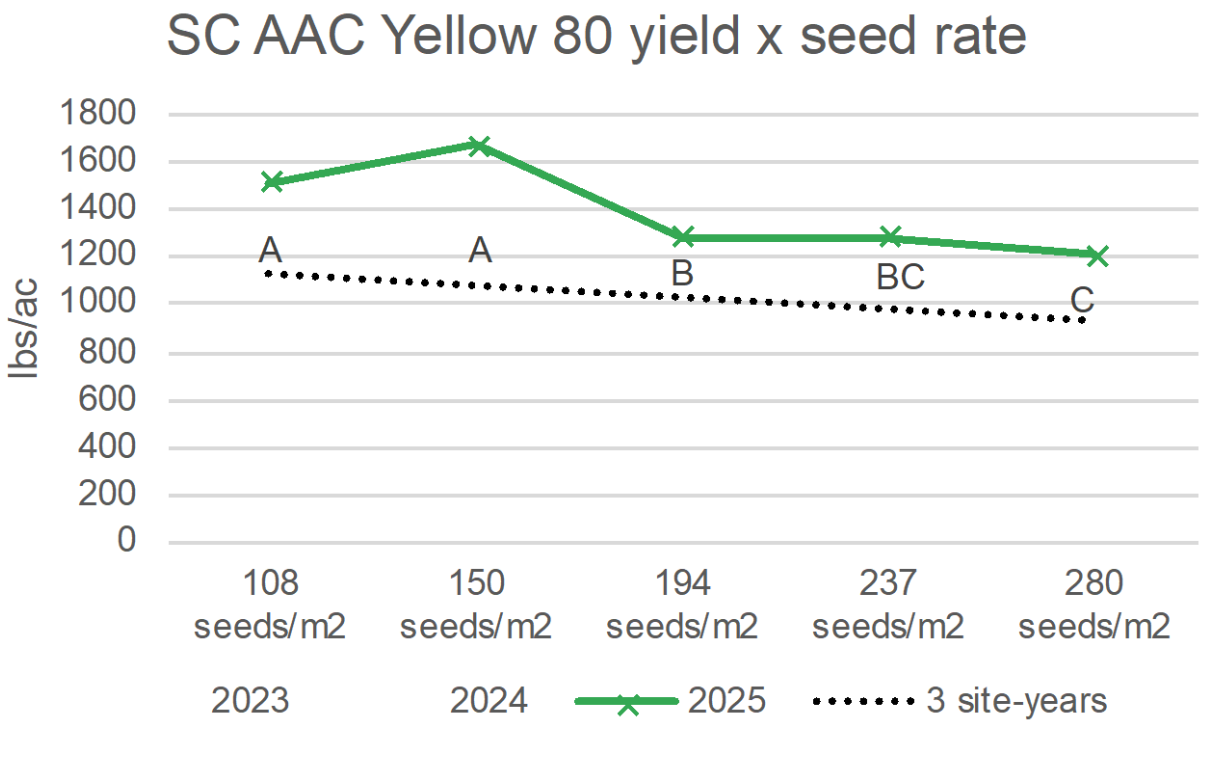
Swift Current variety and year effect (3 site-years)

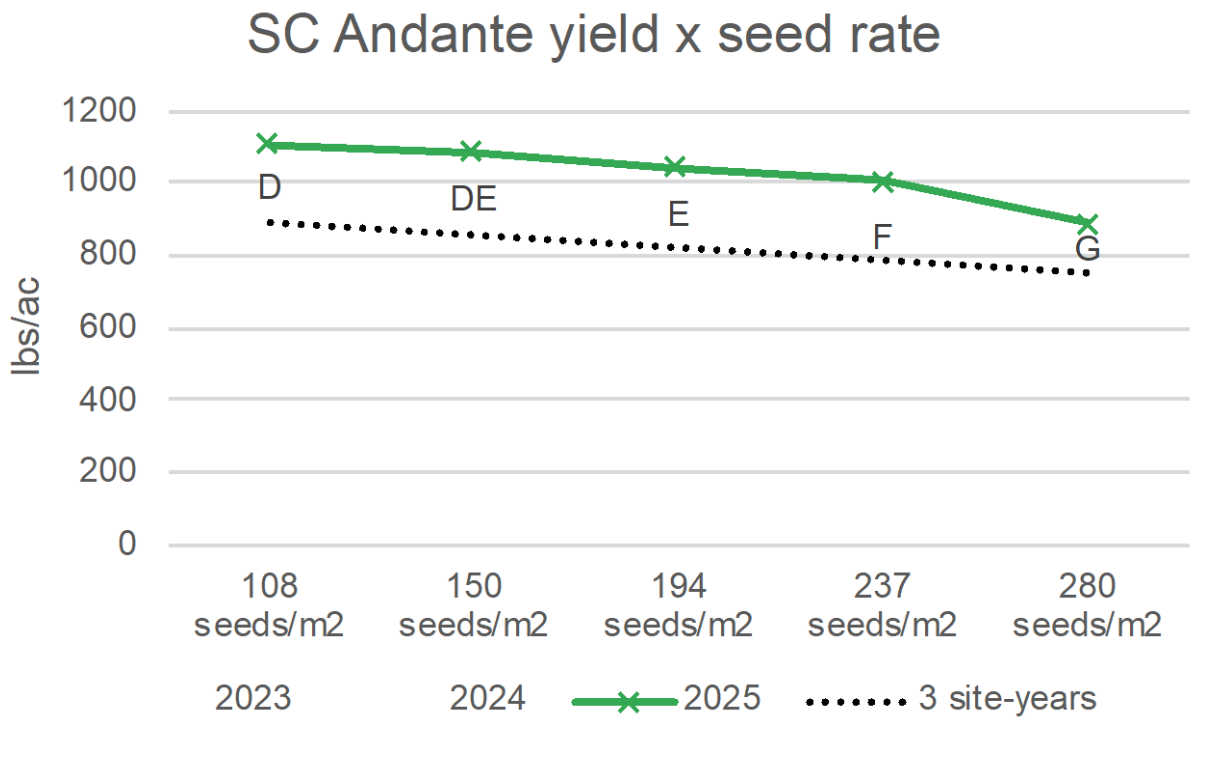




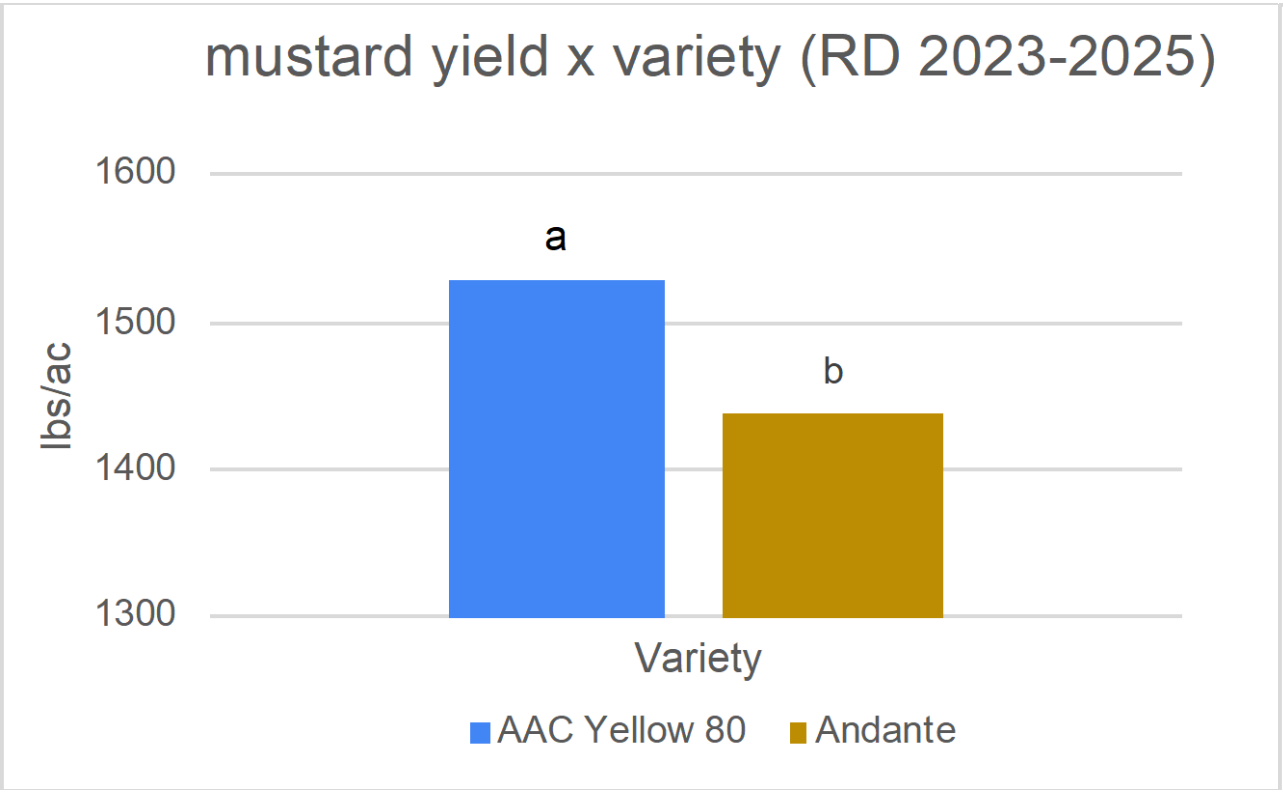
mustard yield x seed rate

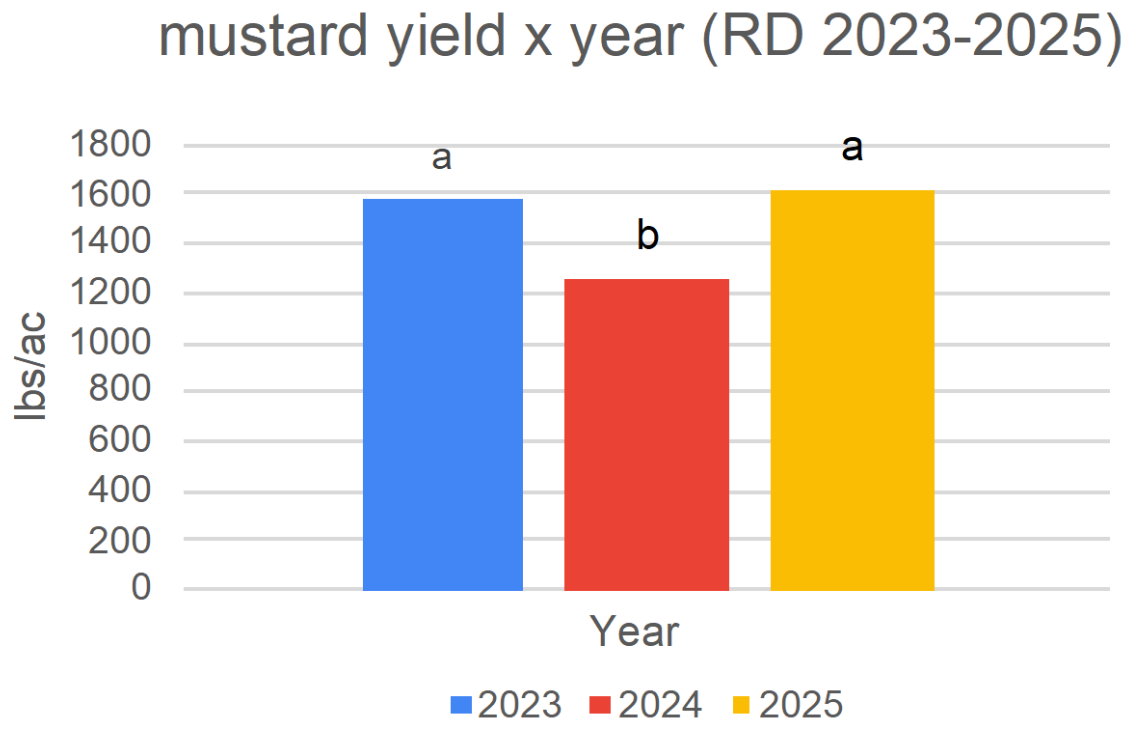
- Optimal yields were achieved at lower seed rates



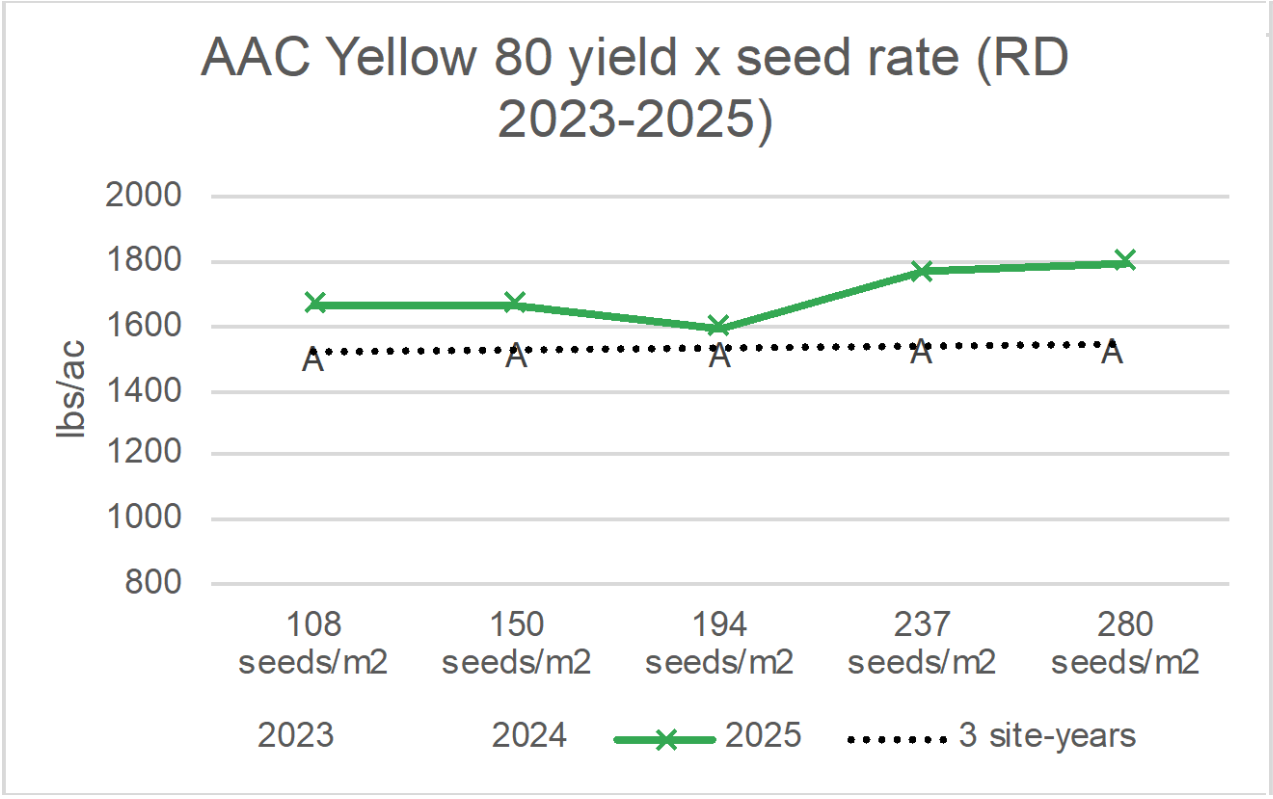


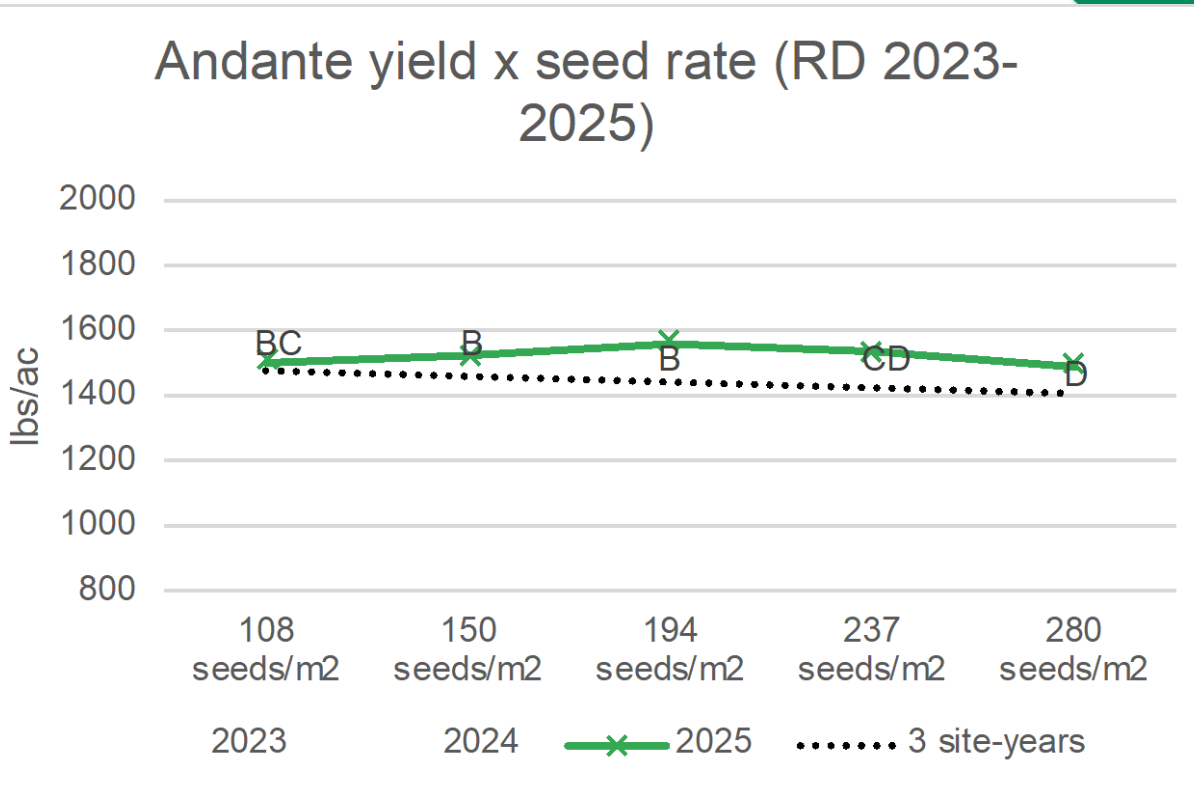
Redvers variety and year effect (3 site-years)



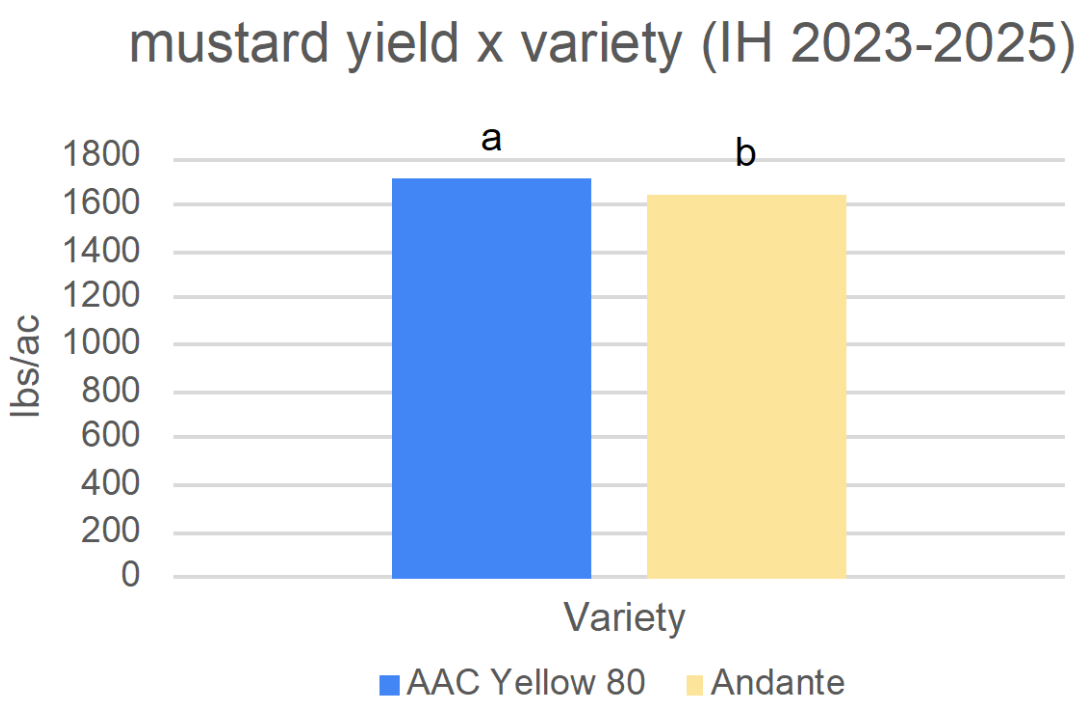


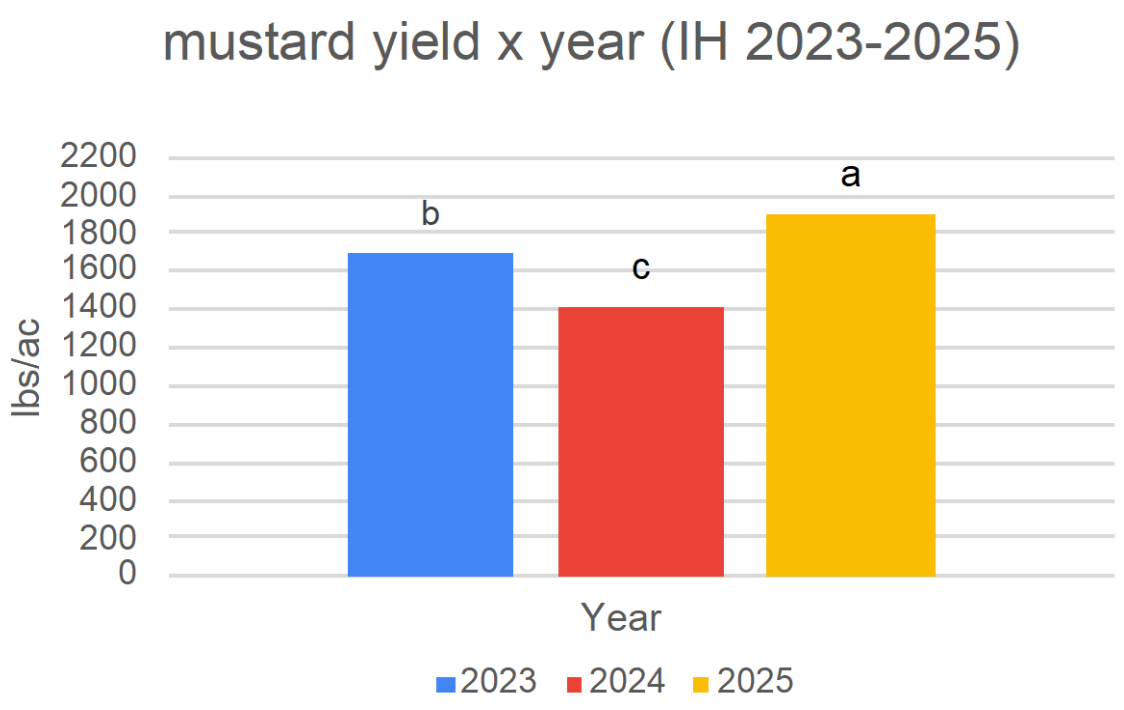
mustard yield x seed rate



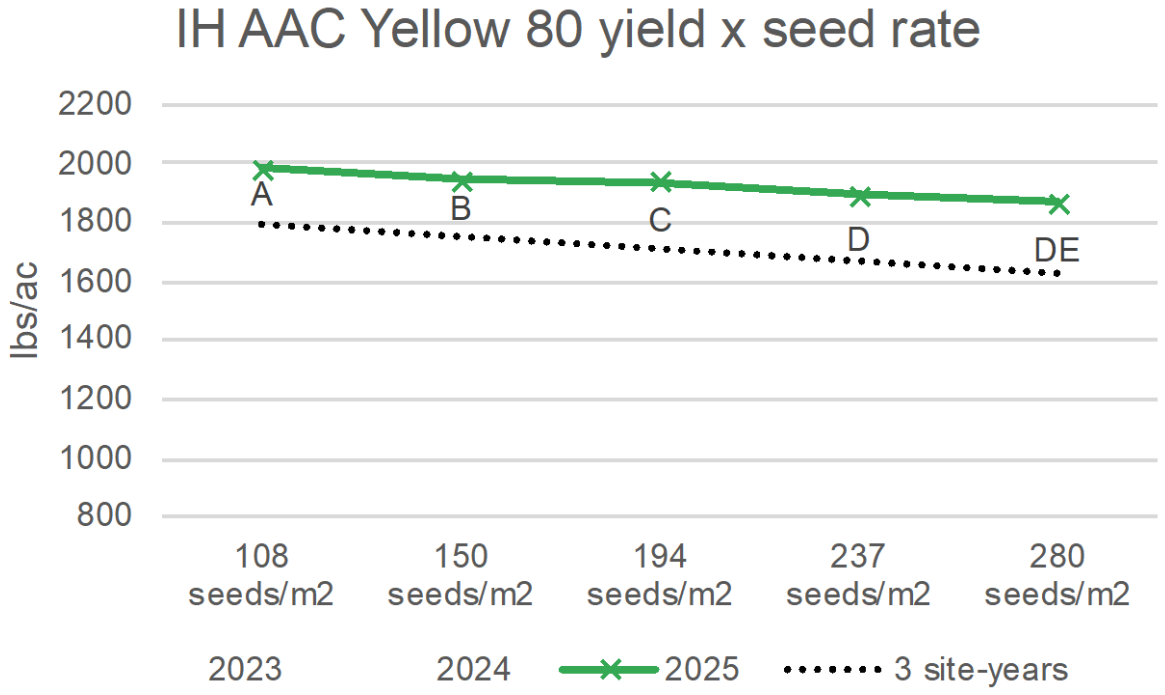


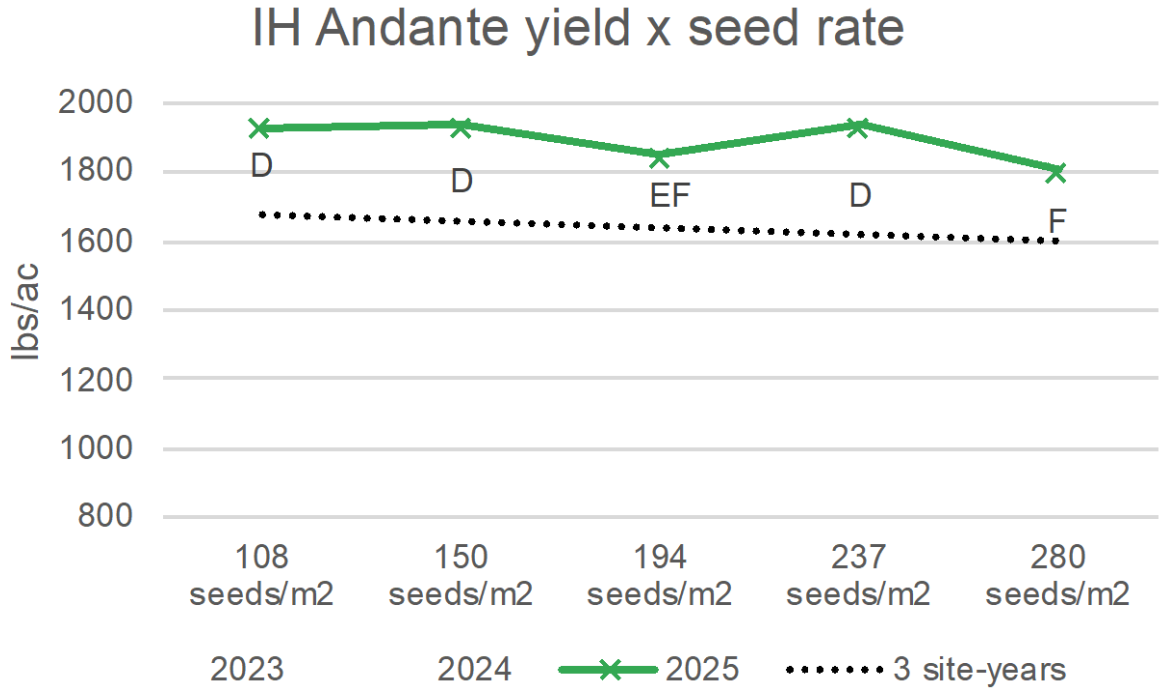
Indian Head variety and year effect (3 site-years)





mustard yield x seed rate





AAC Yellow 80 emergence

Andante emergence

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

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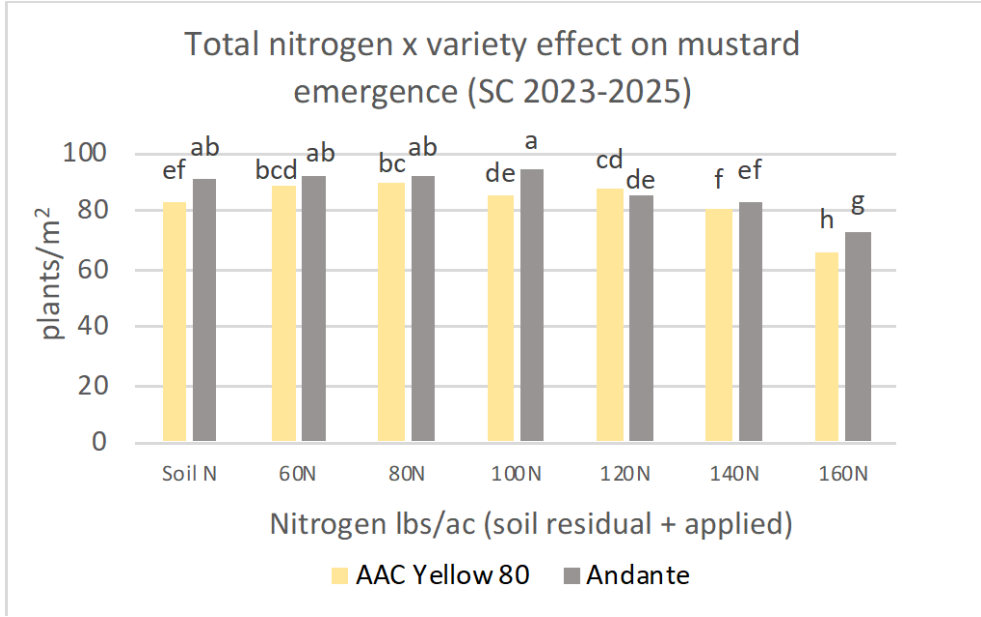
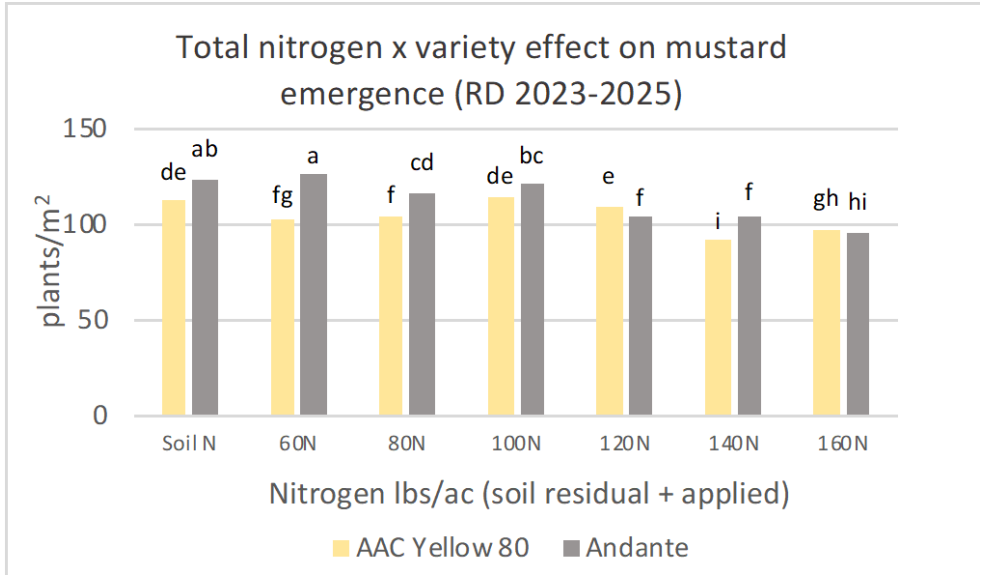
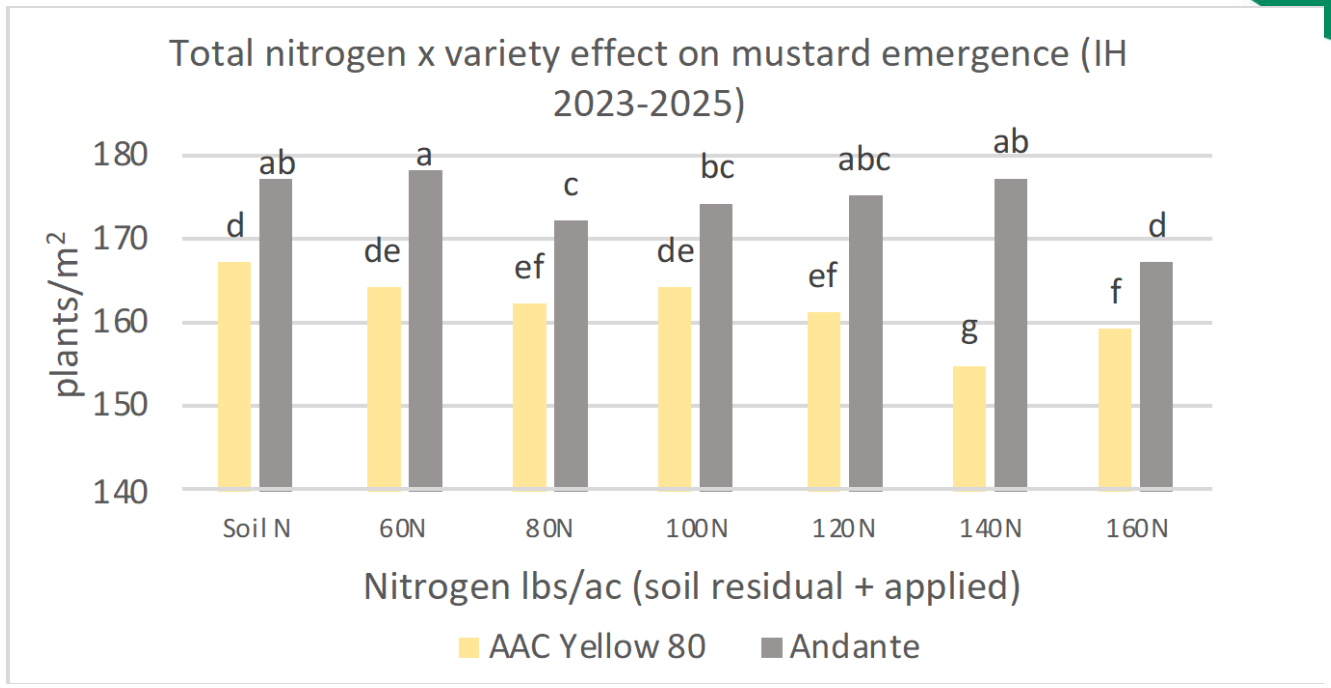
Nitrogen Rate Effect on Emergence

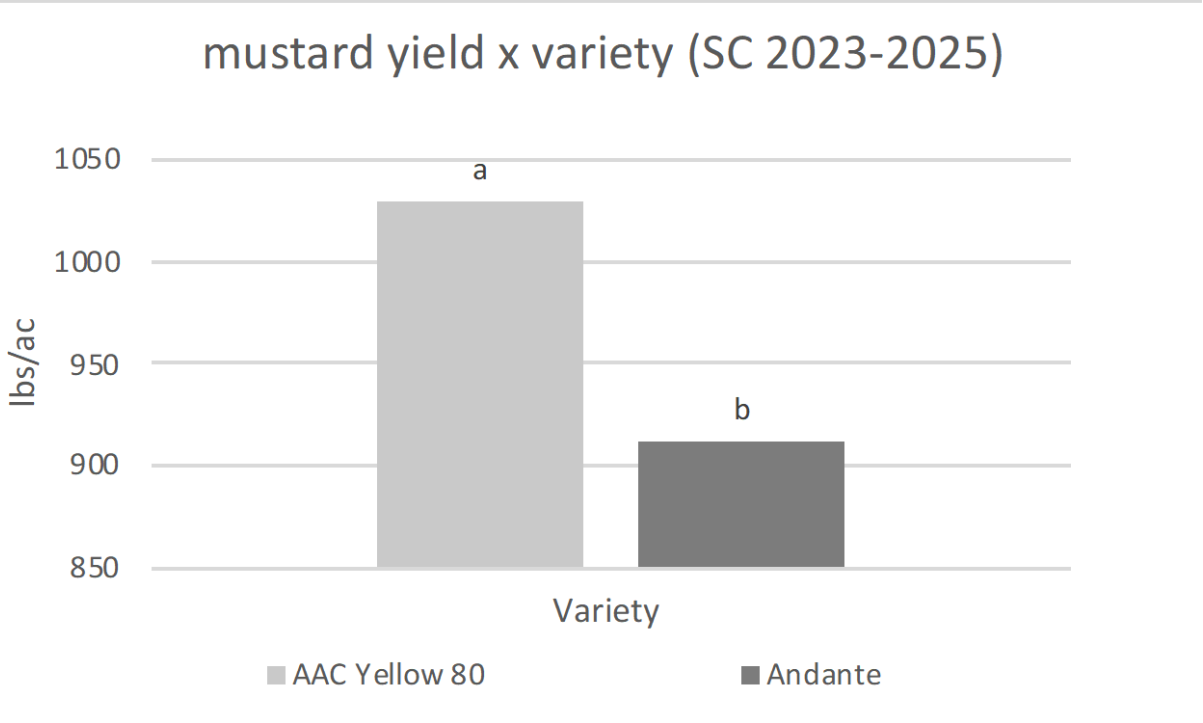


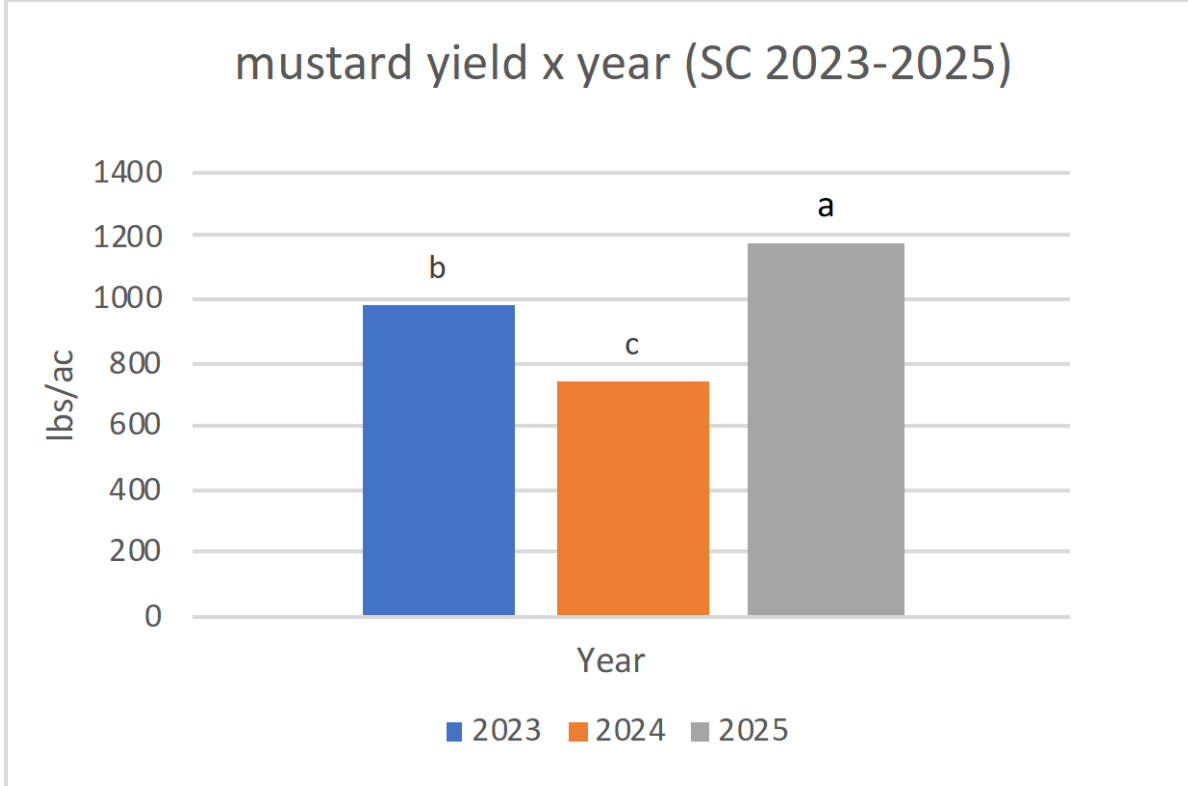


- Andante > AAC Yellow 80
- SC < RD < IH



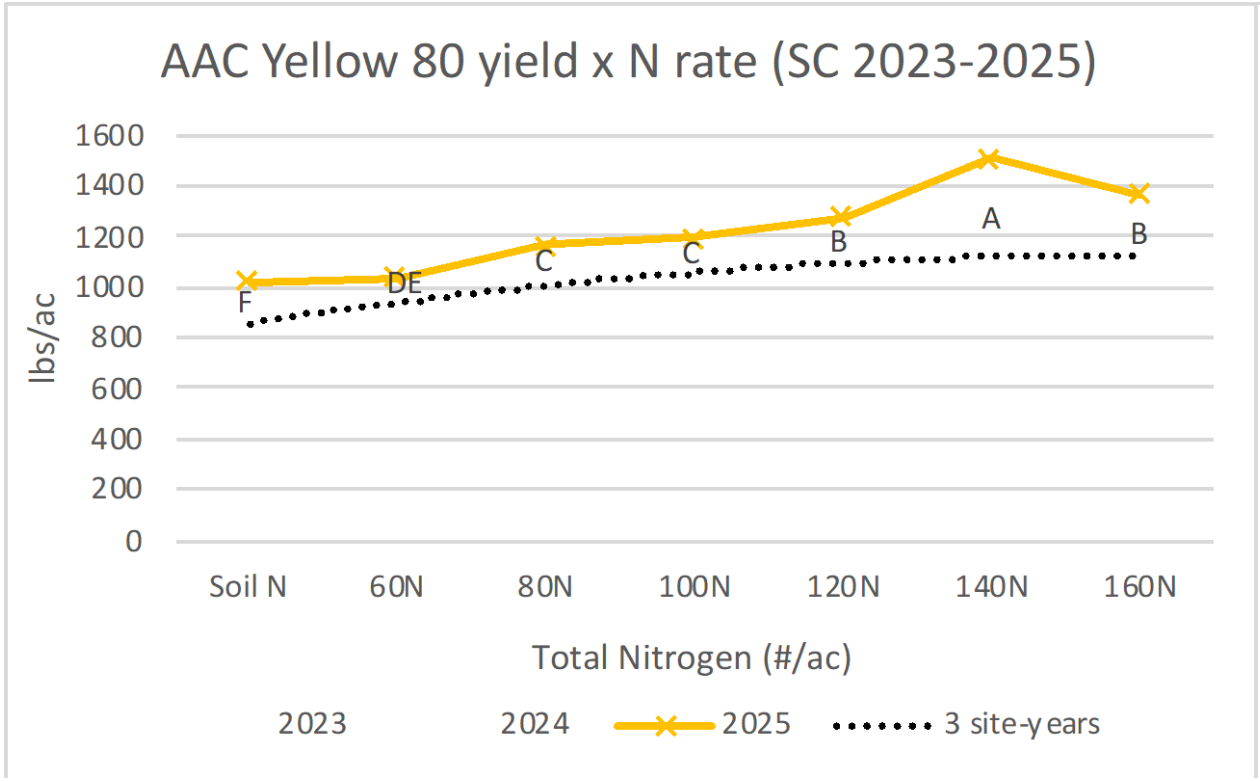
Swift Current variety and year effects (3 site-years)

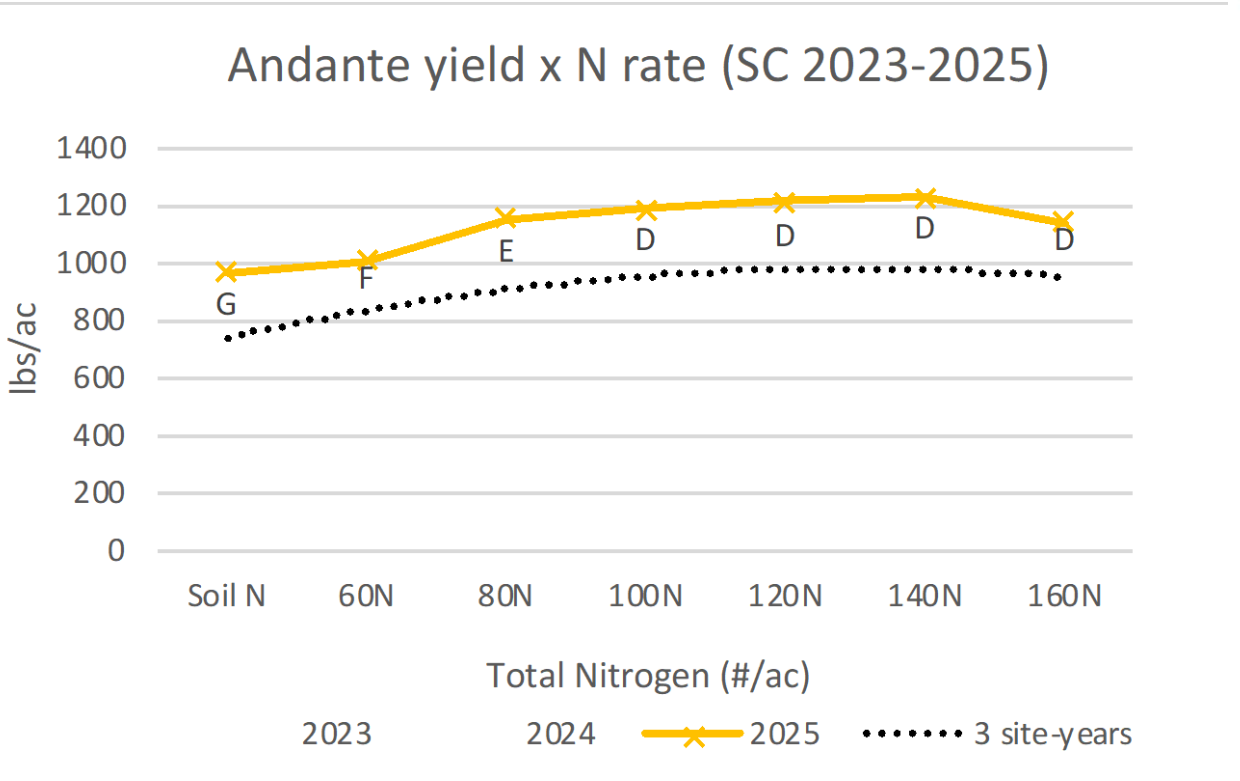




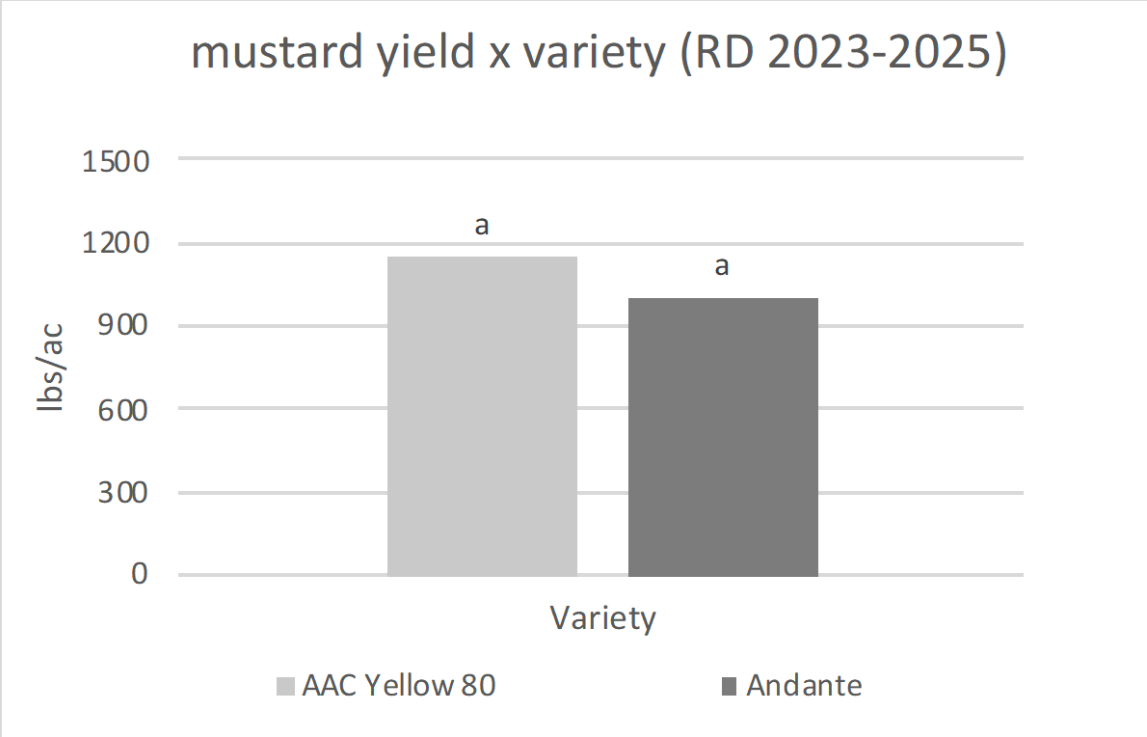
mustard yield x nitrogen rate

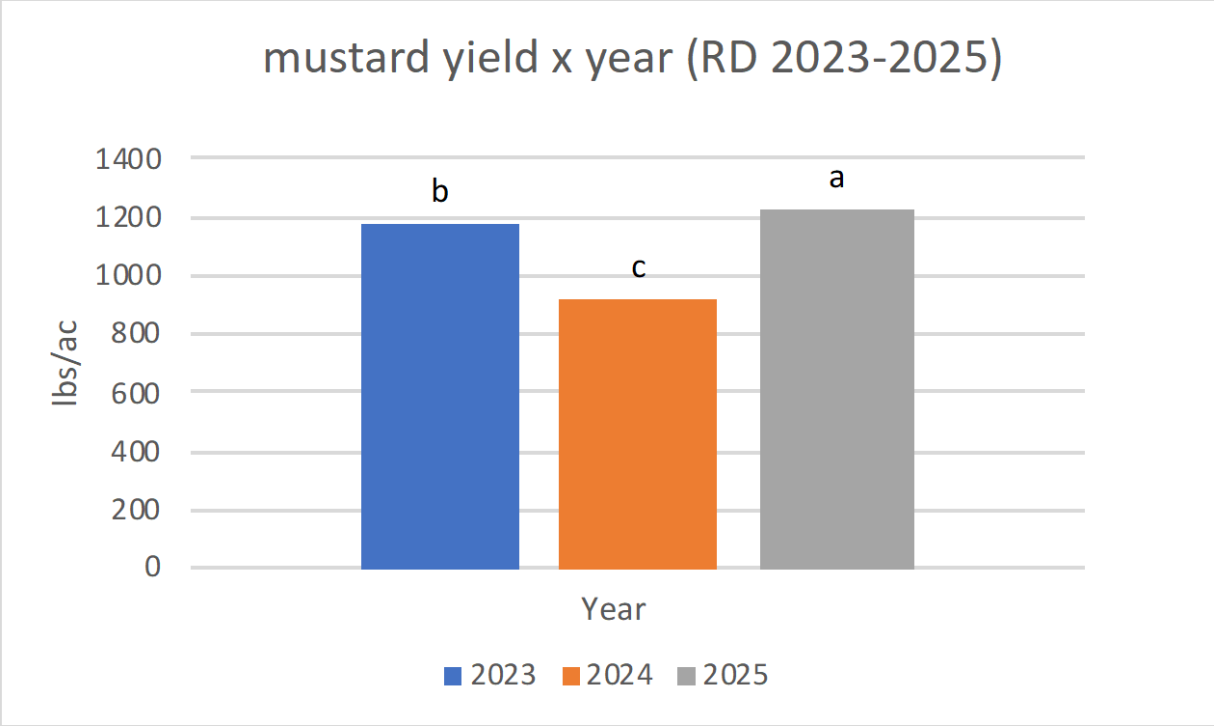
- Nitrogen rates above 120-140 lb N/ac did not provide consistent yield benefits



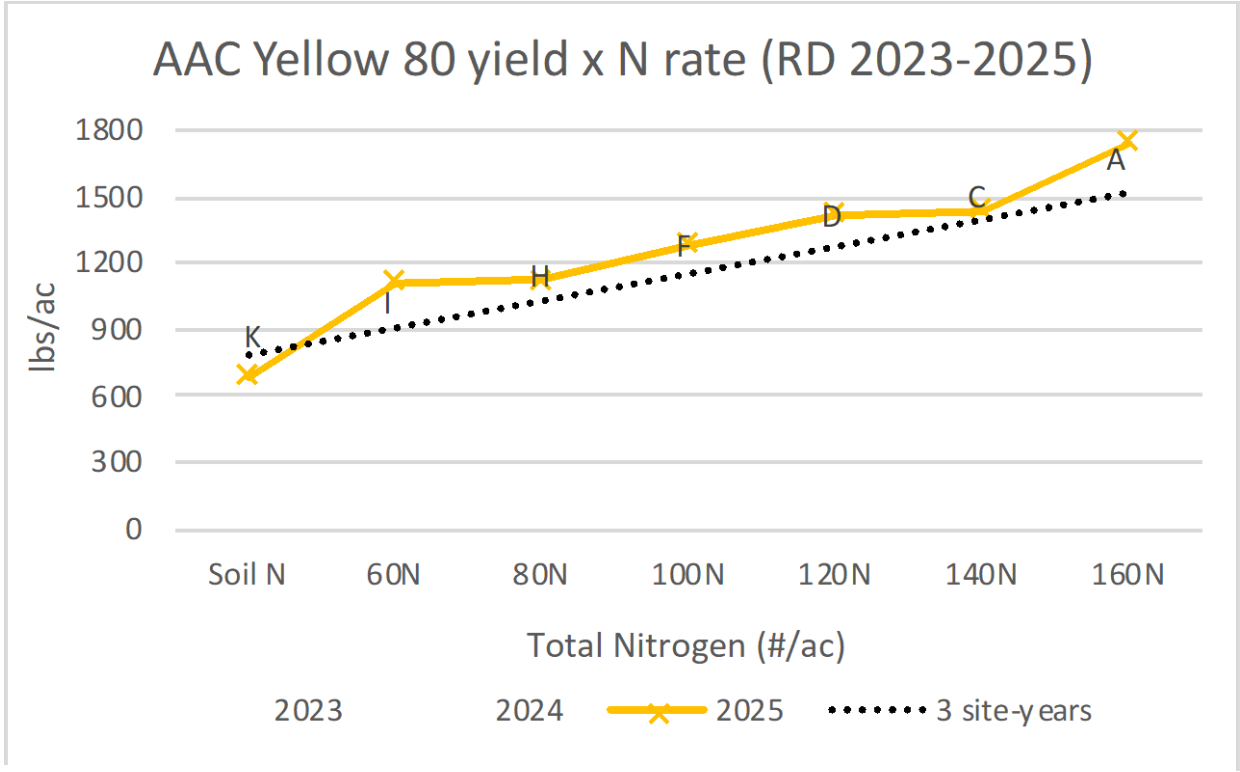


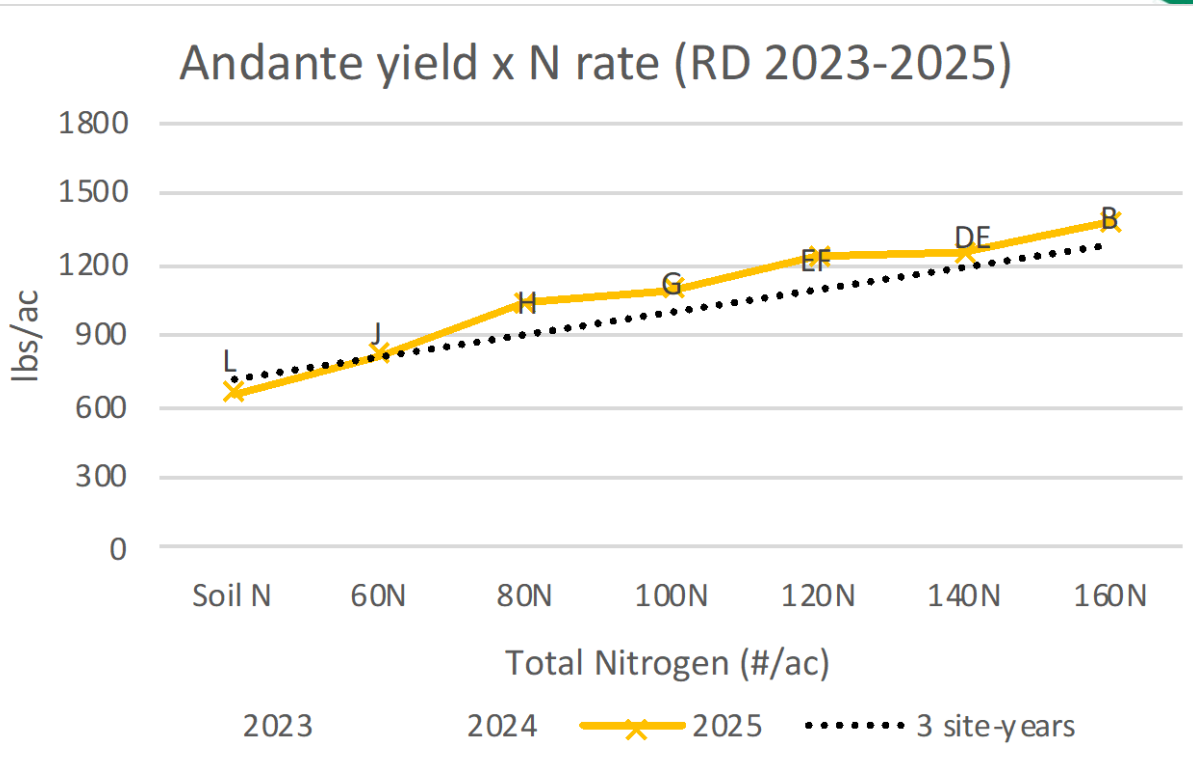
Redvers nitrogen rate yields (3 site-years)



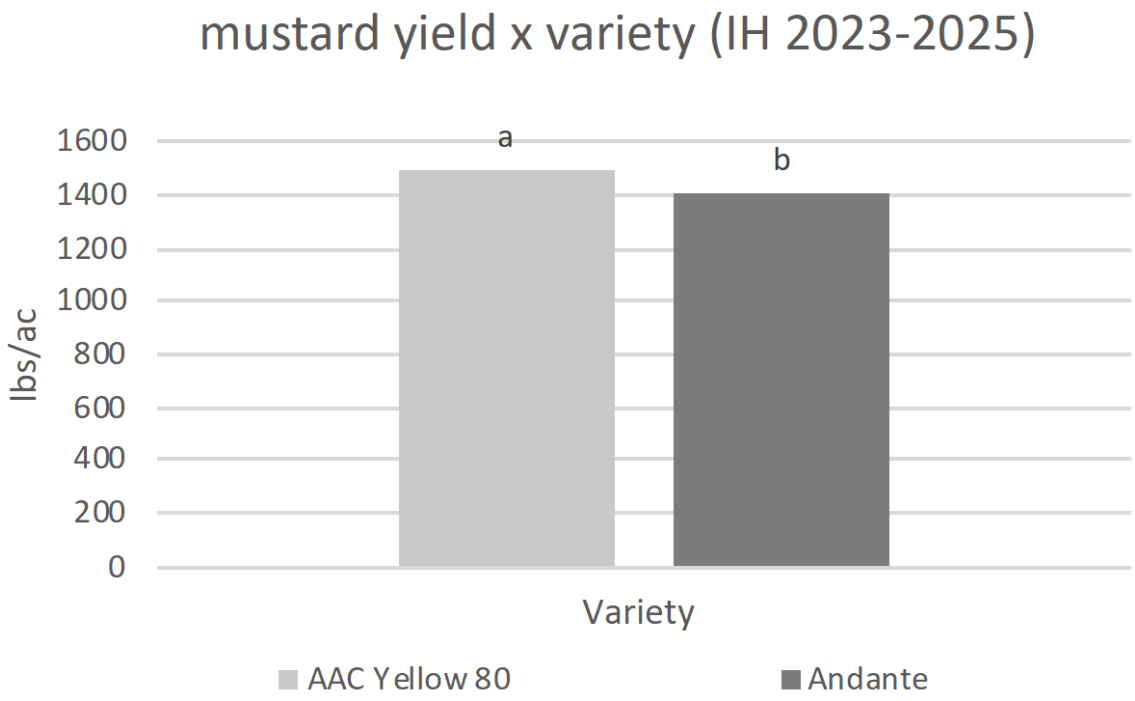


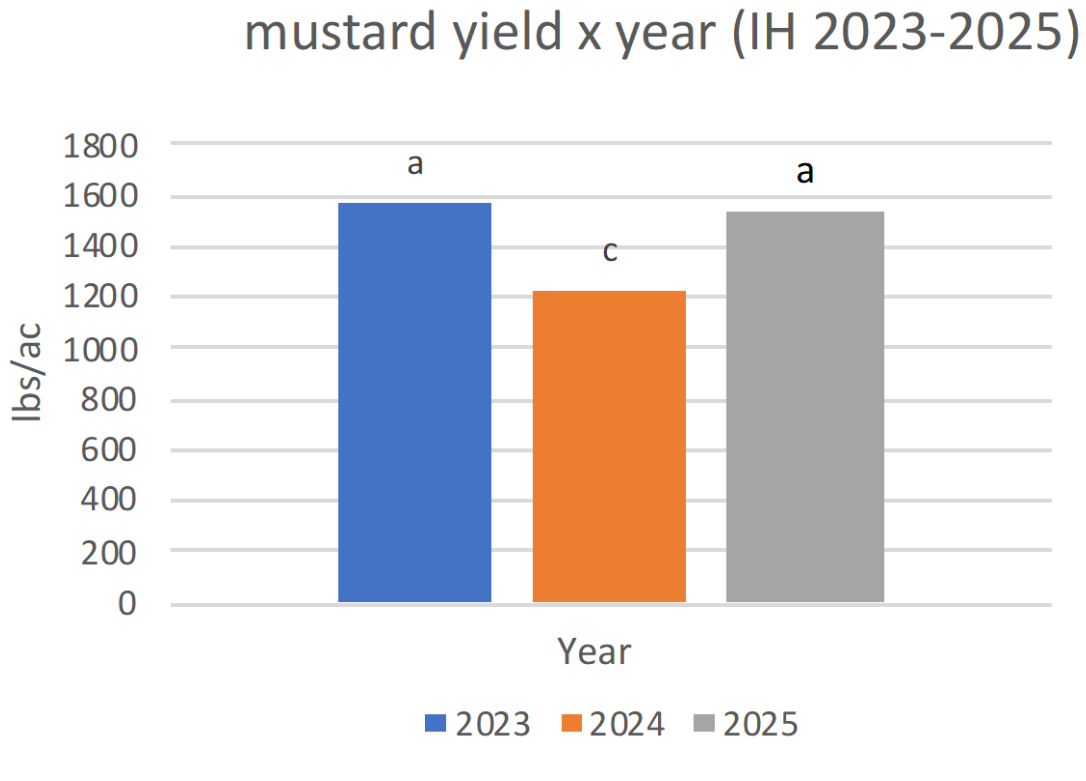
mustard yield x nitrogen rate



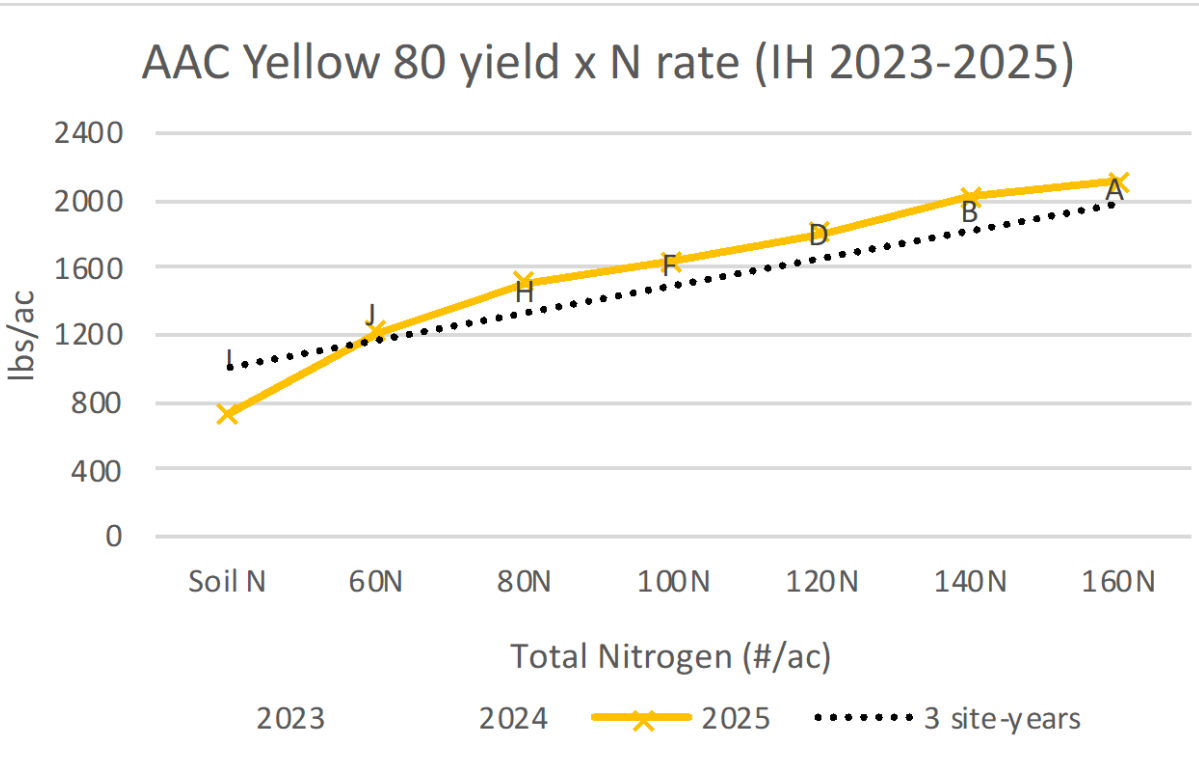


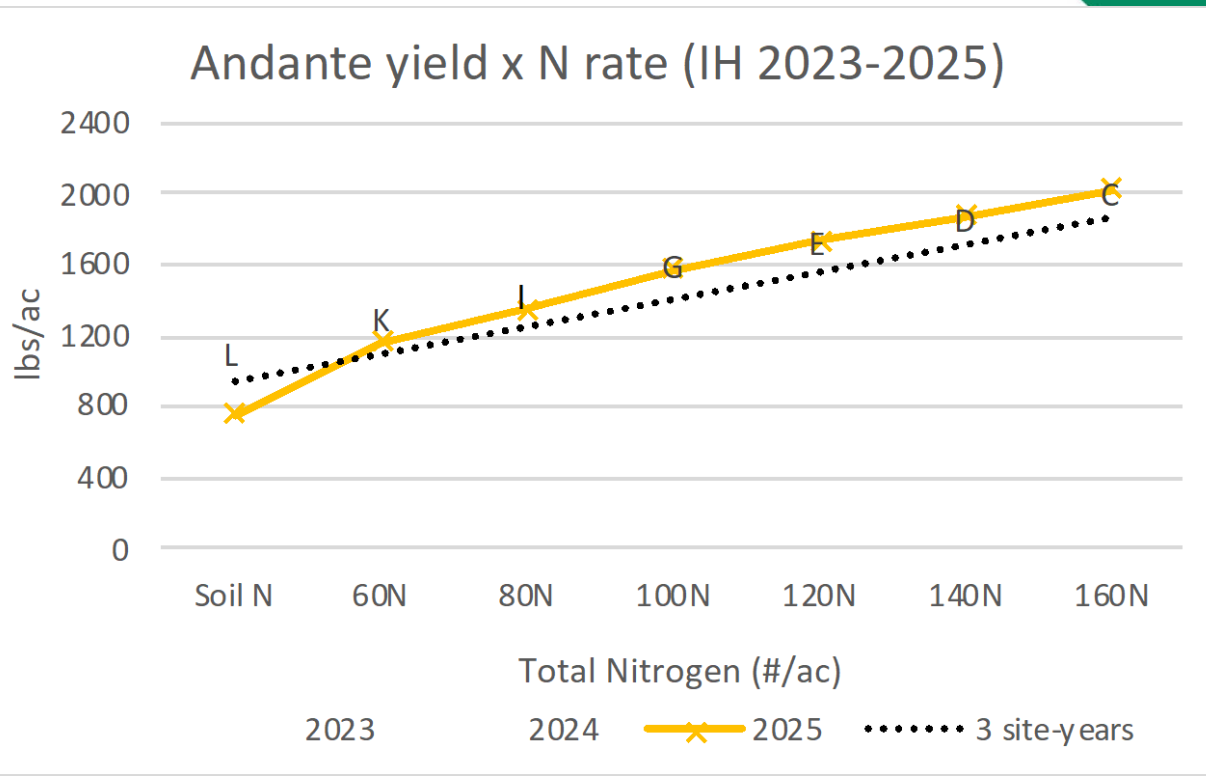
Indian Head nitrogen rate yields (3 site-years)





mustard yield x nitrogen rate





AAC Yellow 80

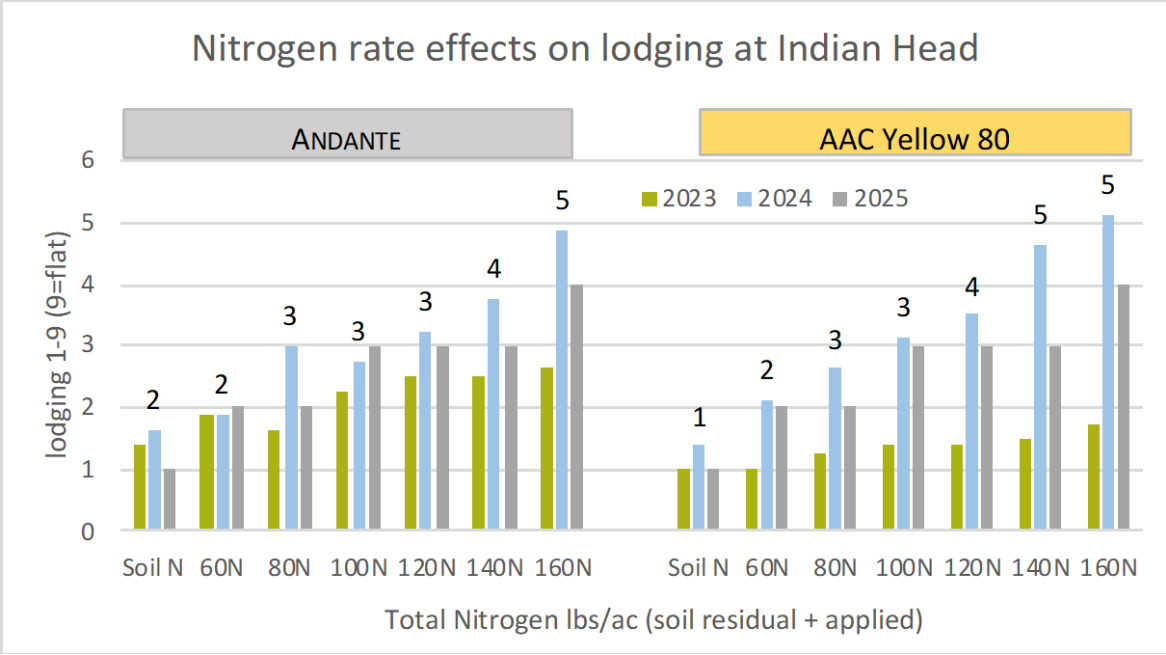
Andante

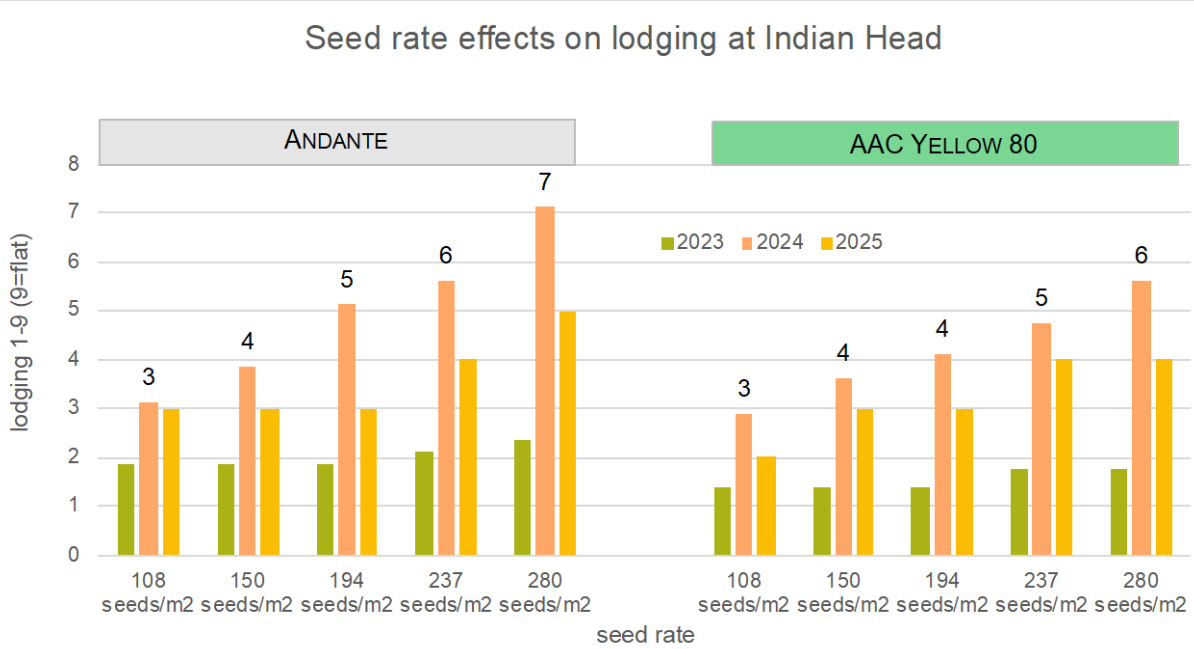
Low Nitrogen

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

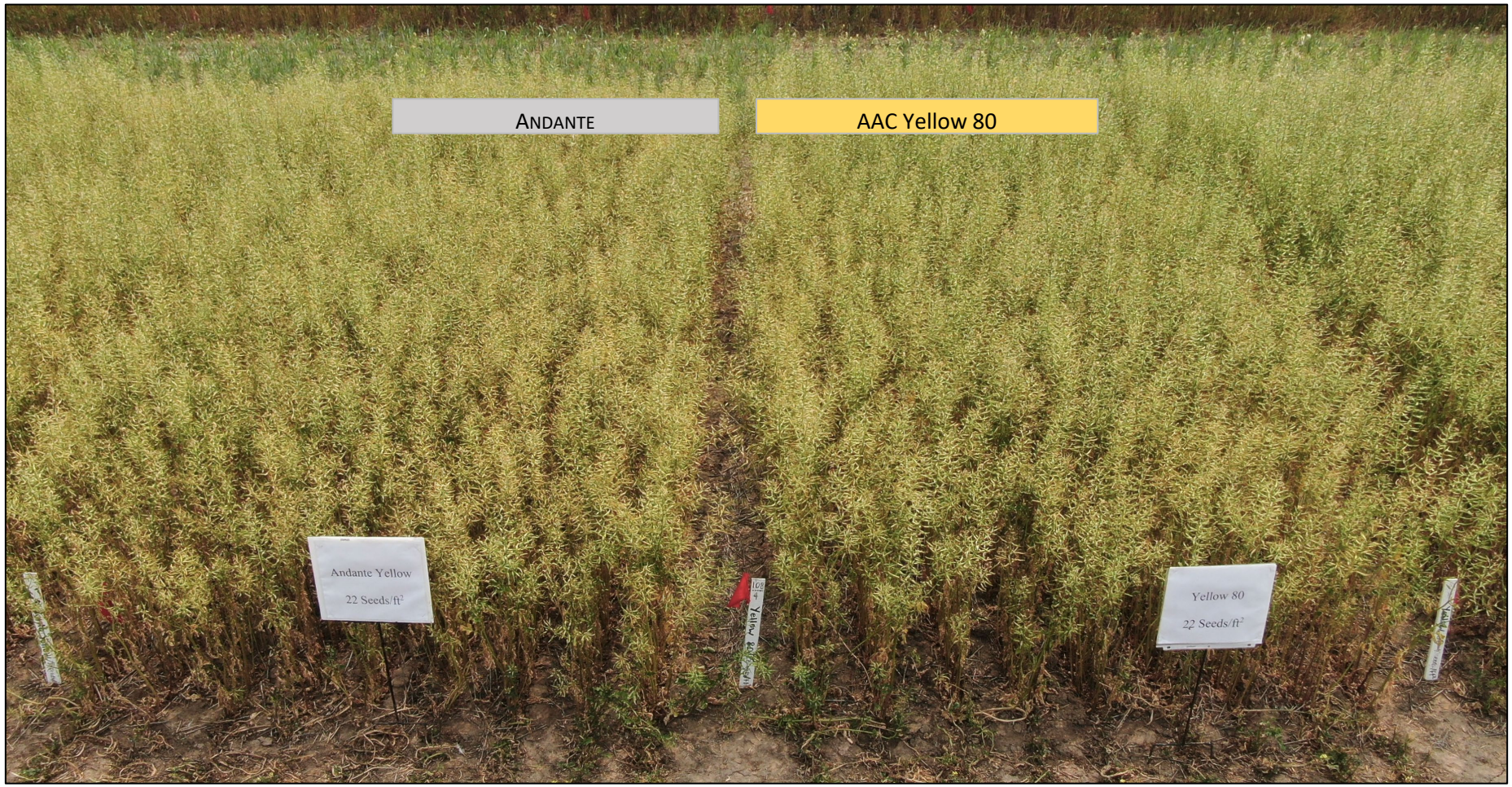




Higher lodging in 2024 (mainly from wind damage) resulted in header losses at Indian Head and negatively impacted yield

Height (cm)

AAC Yellow 80 > Andante



- Plant height decreased as seed rate increased

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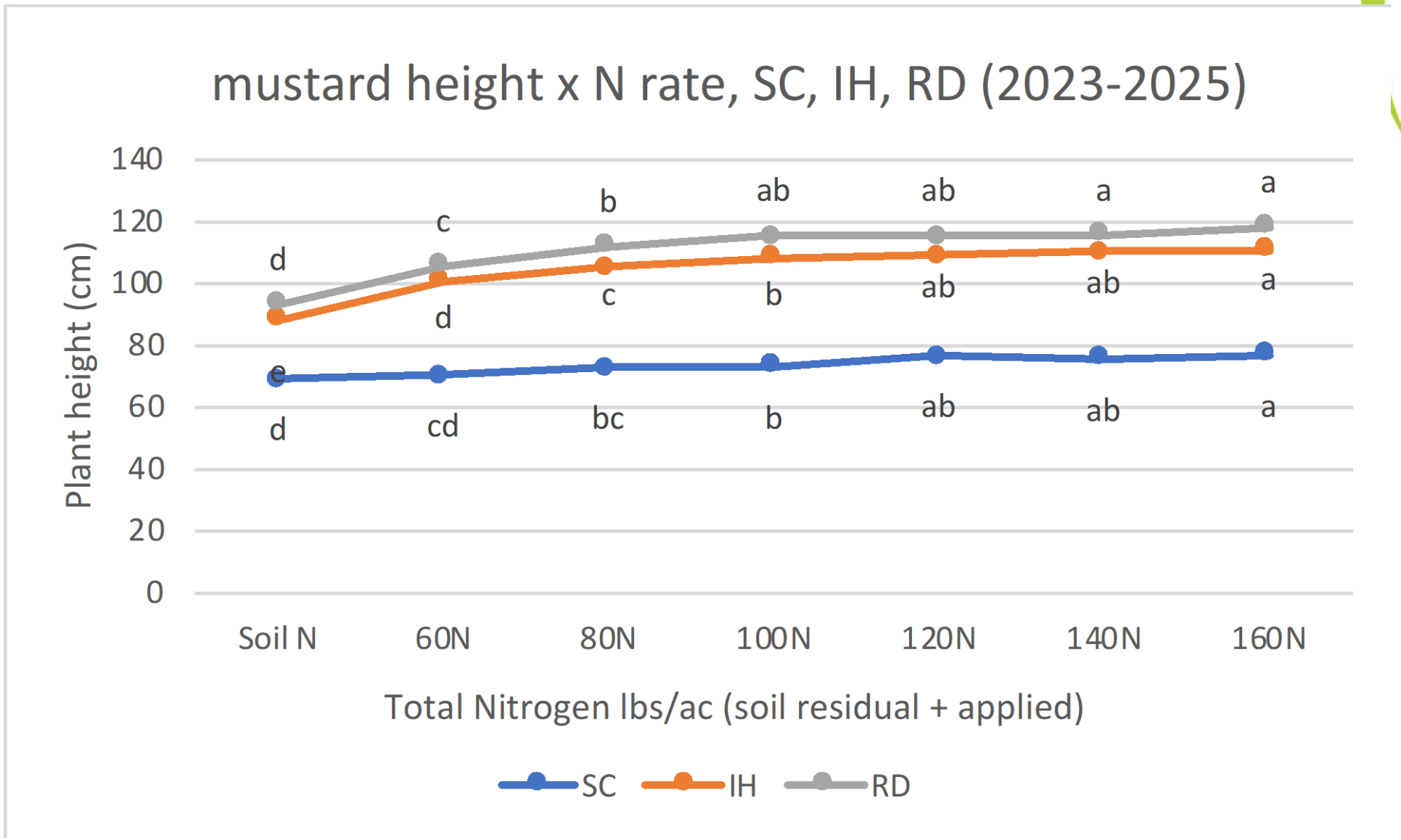
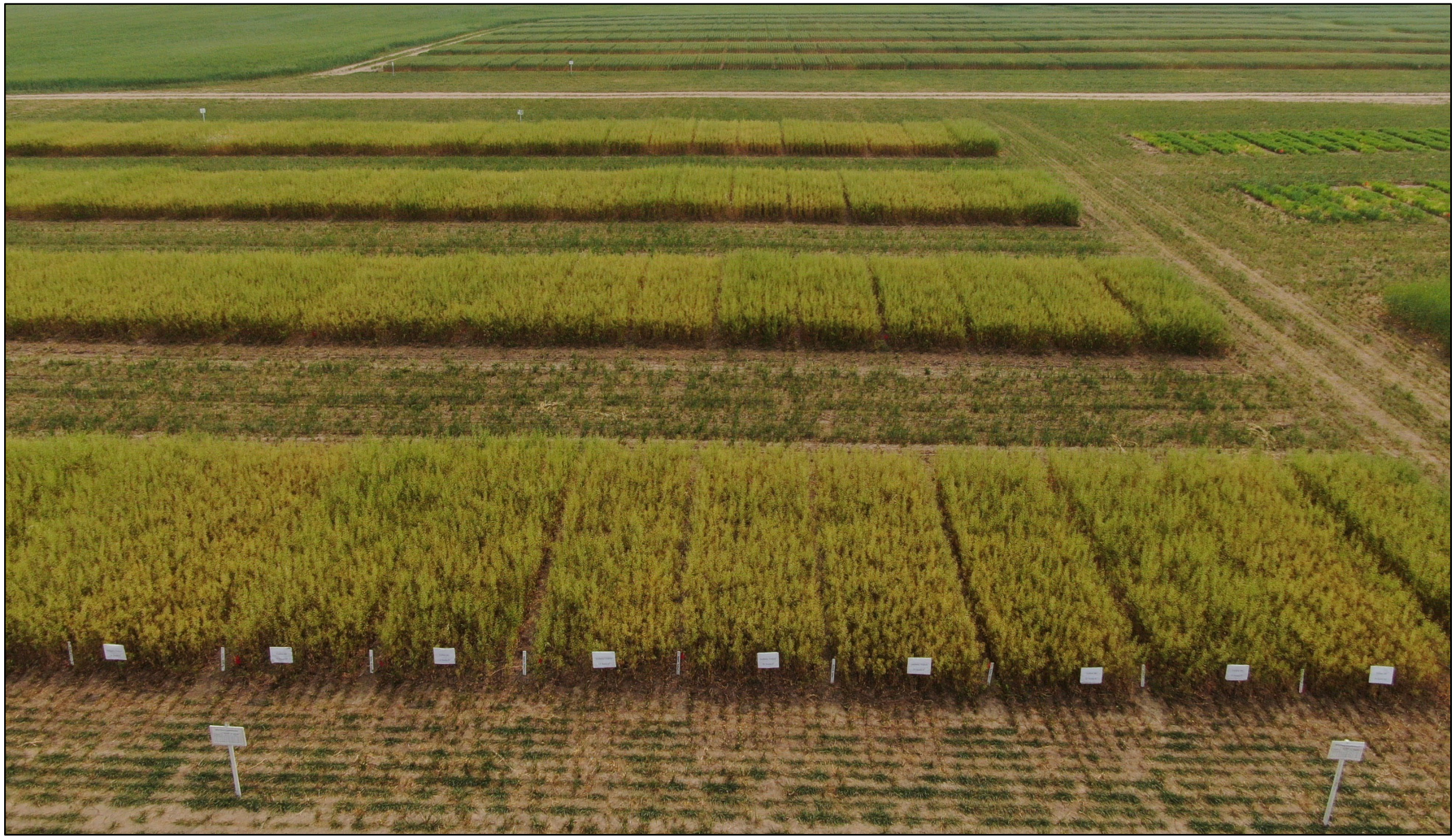
Height increased with nitrogen up to moderate rates



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

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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

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

Andante @ 6.1 lbs/ac

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

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

WHEATLAND CONSERVATION AREA

IHARF
INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION

SOUTH EAST RESEARCH FARM

Mustard 21
Canada inc.

Sustainable Canadian Agricultural Partnership

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Mustard 21 Canada inc.

THANK YOU!

wcawall@sasktel.net

Cropportunities March 12, 2026

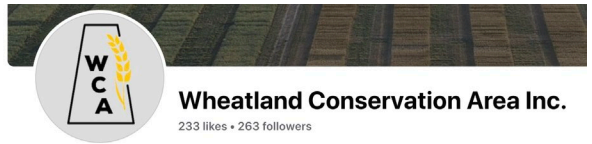
Annual field tour July 16, 2026

Crop Diagnostic School
July 29th-30th

www.wheatlandconservation.ca

X: @wheatlandsask

Facebook: Wheatland Conservation Area



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