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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

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Saskatchewan

Canada

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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

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

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	-	-	-	-	-	-	-

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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

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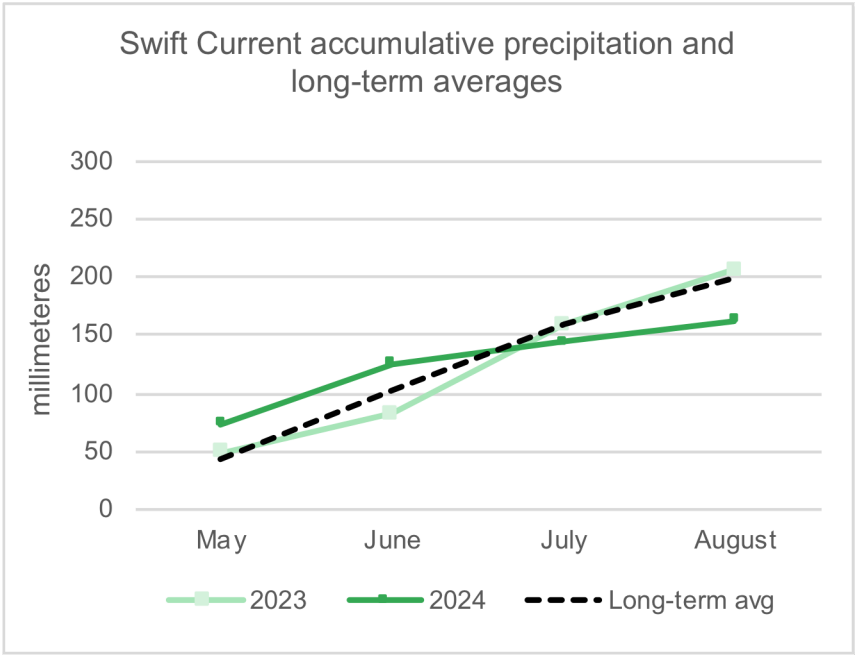
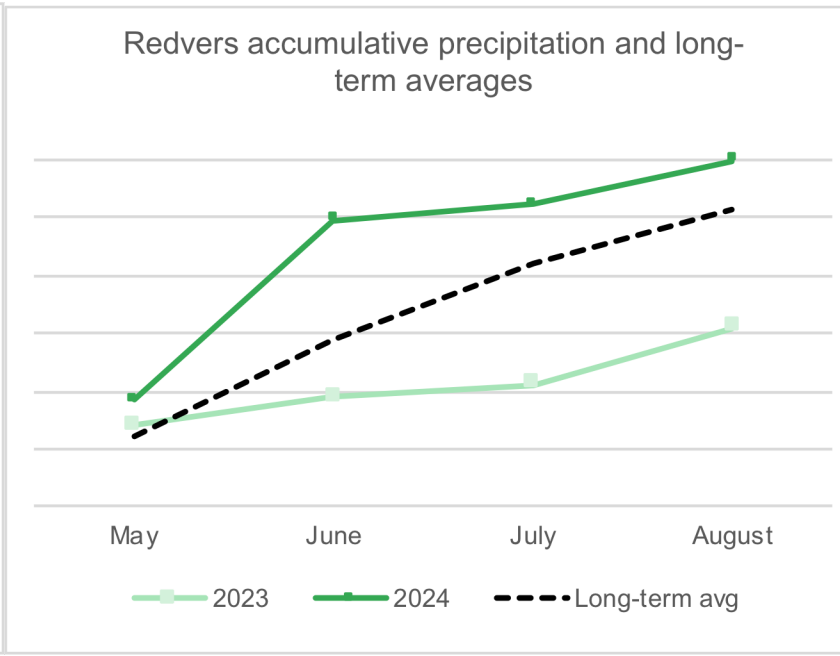
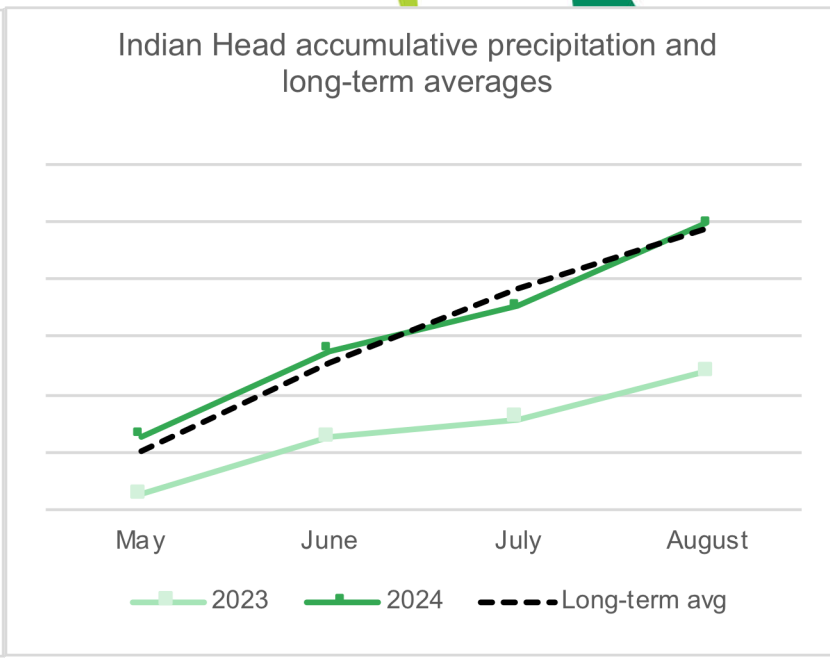
General Conditions







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

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

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

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Seed Rate Treatments

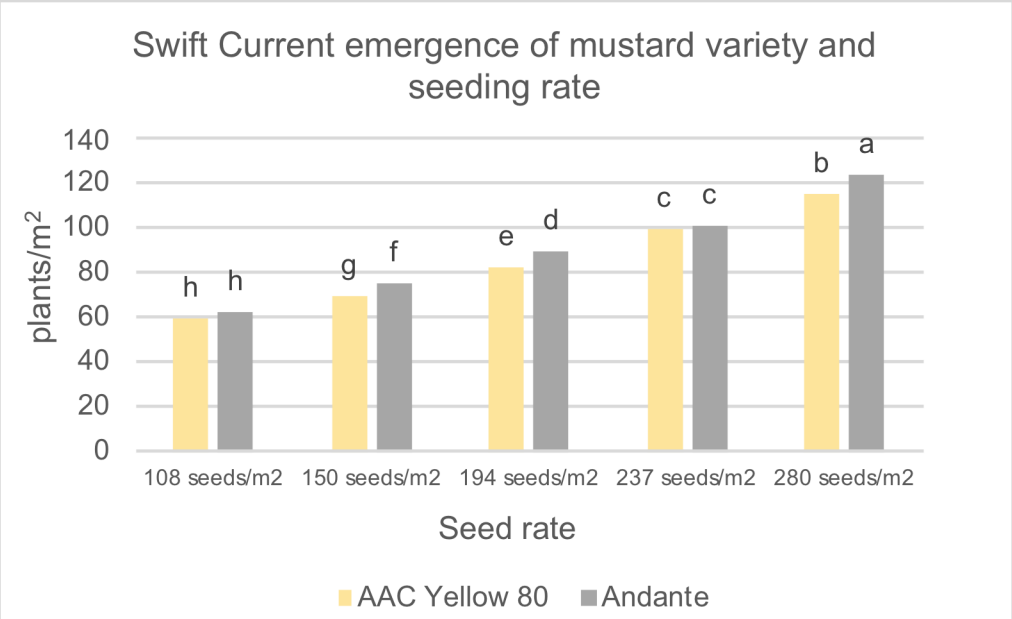
2 Varieties:

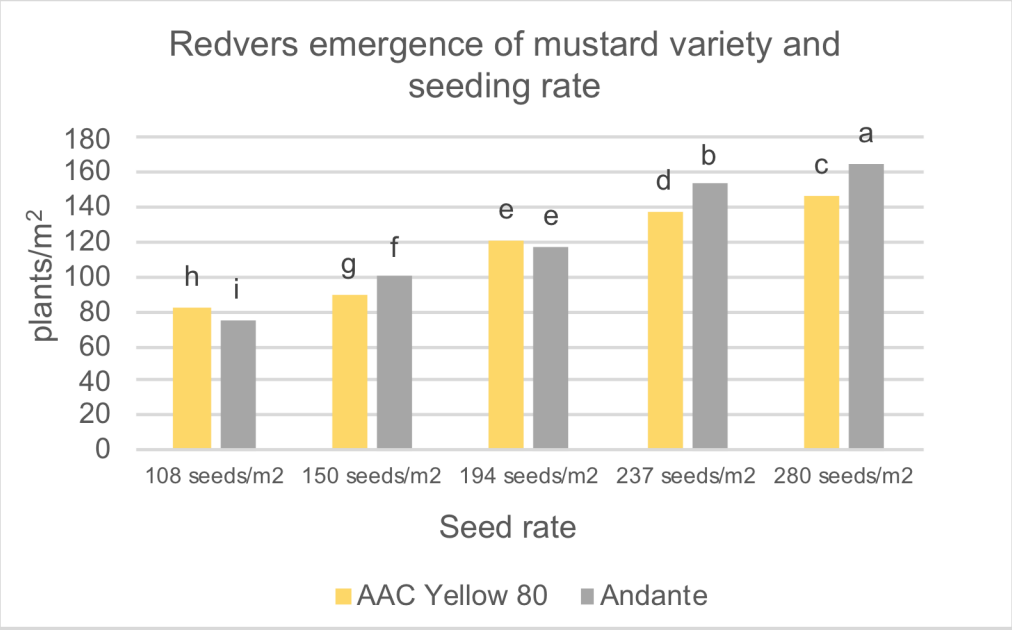
- AAC Yellow 80 composite yellow mustard
- Andante yellow mustard

5 Seed Rates

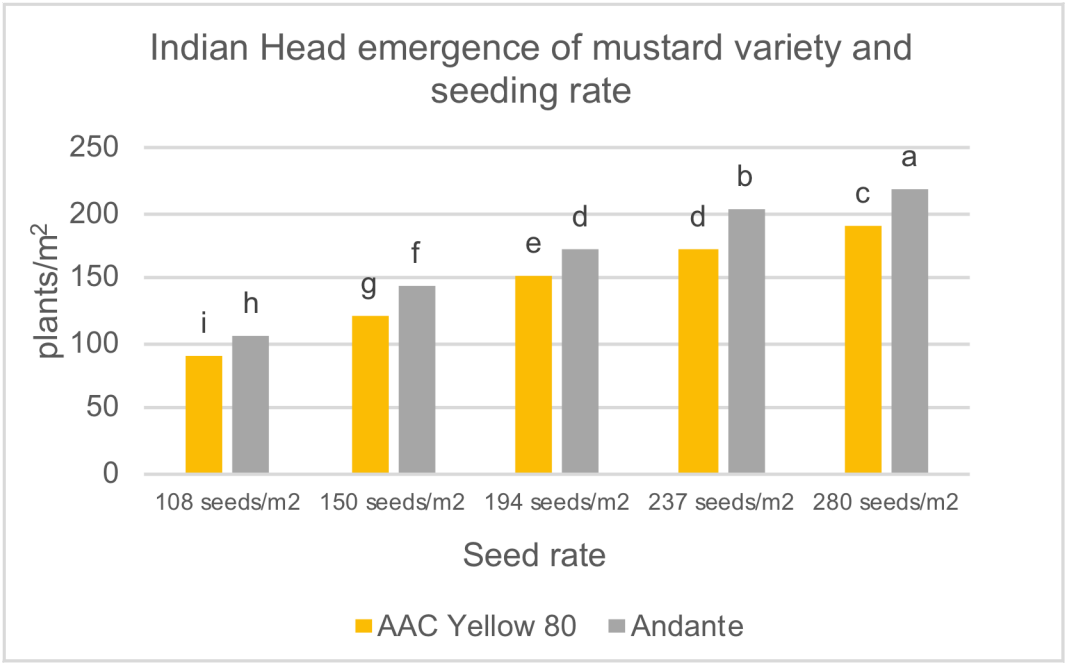
Andante (TSW=6.3 grams, or 0.0138891 lbs/1000 seeds)										
Target plant stand		**Seed rate (assuming 50% emergence)**								**Seed weight per acre**
5	plants/ft2	10	seeds/ft2	or	108	seeds/m2	or	437,061	seeds/ac	6.1 lbs/ac
7	plants/ft2	14	seeds/ft2	or	150	seeds/m2	or	607,029	seeds/ac	8.4 lbs/ac
9	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 (2 site years)





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



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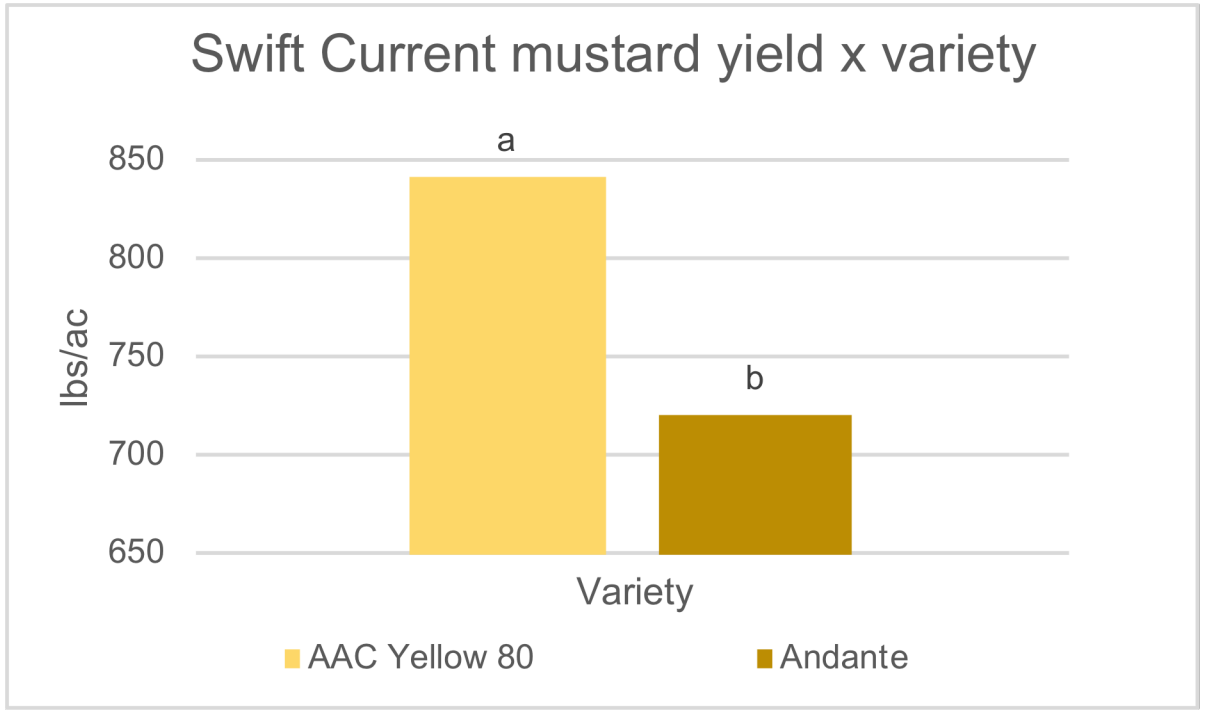
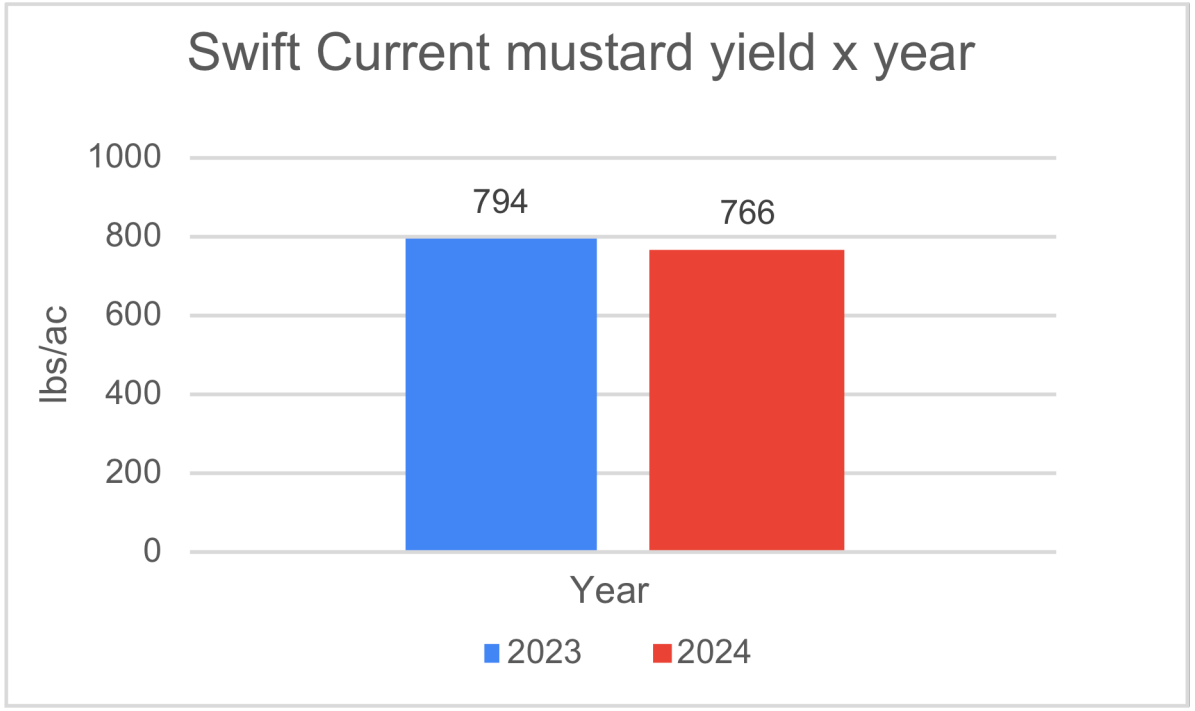
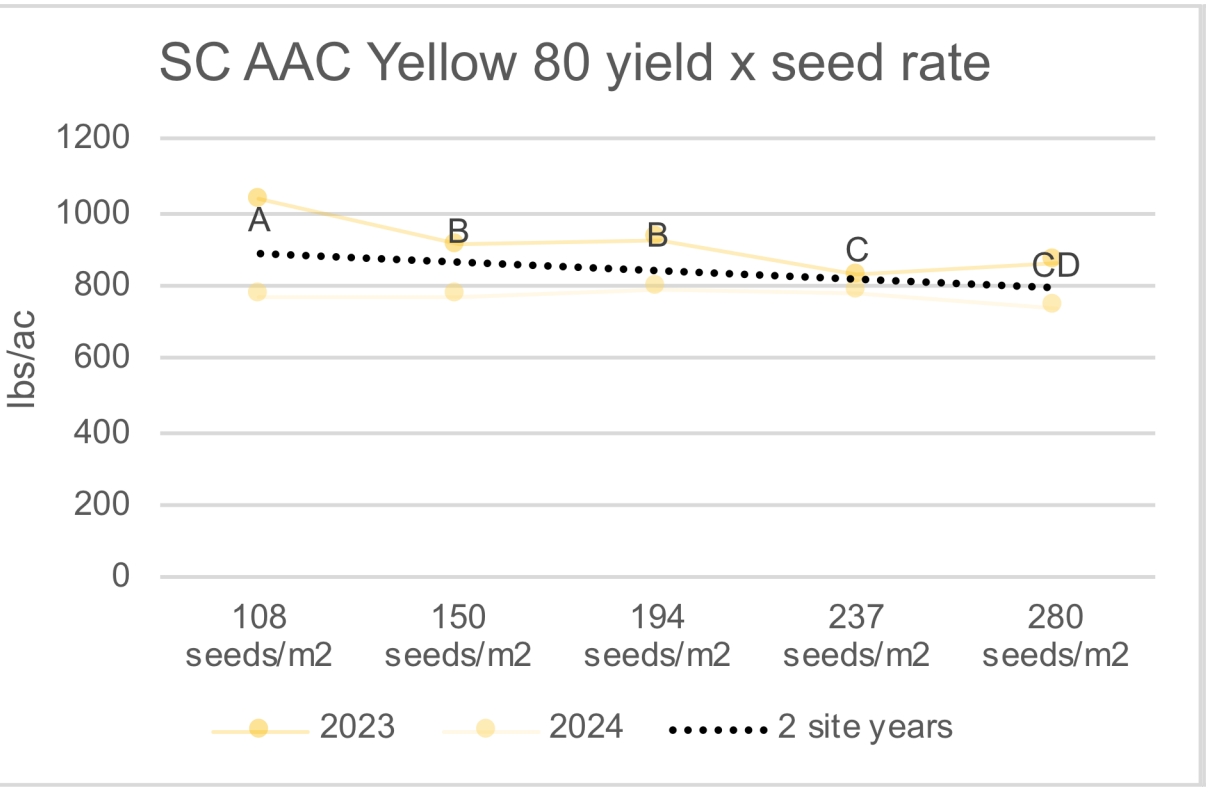
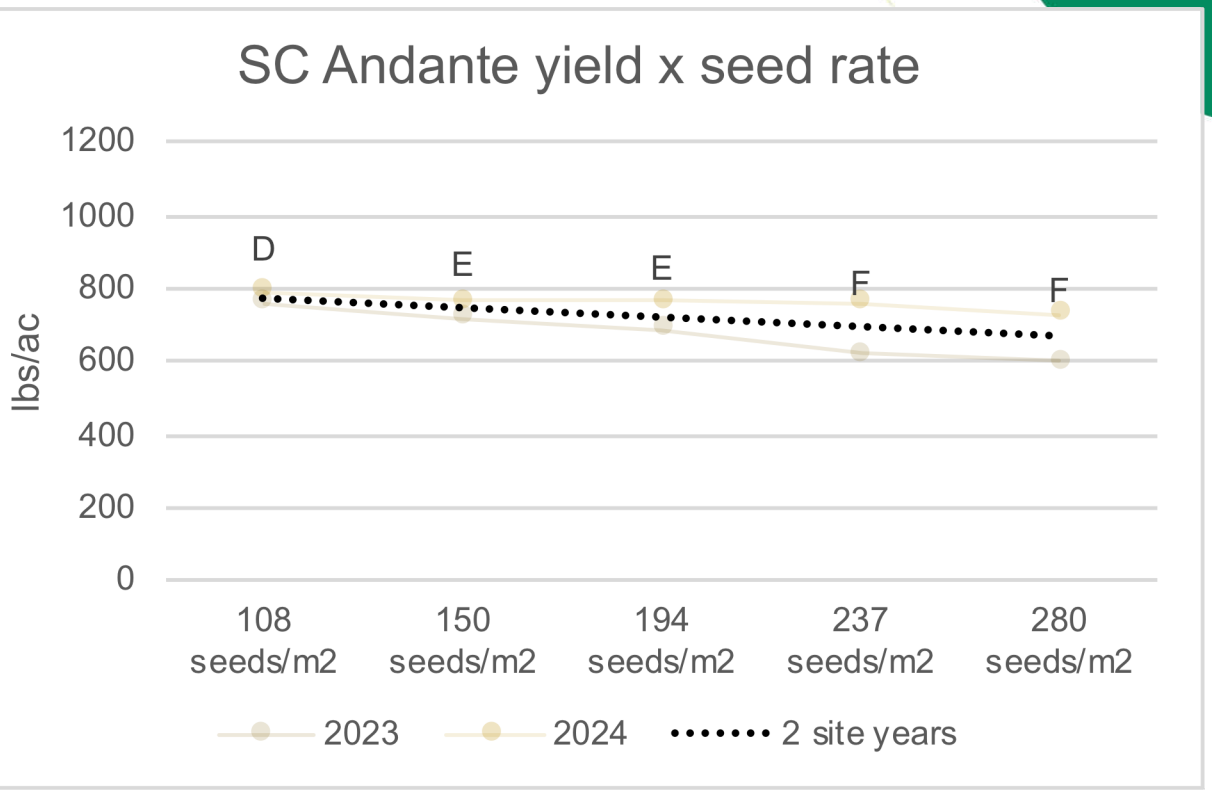
Swift Current seed rate yields (2 site years)



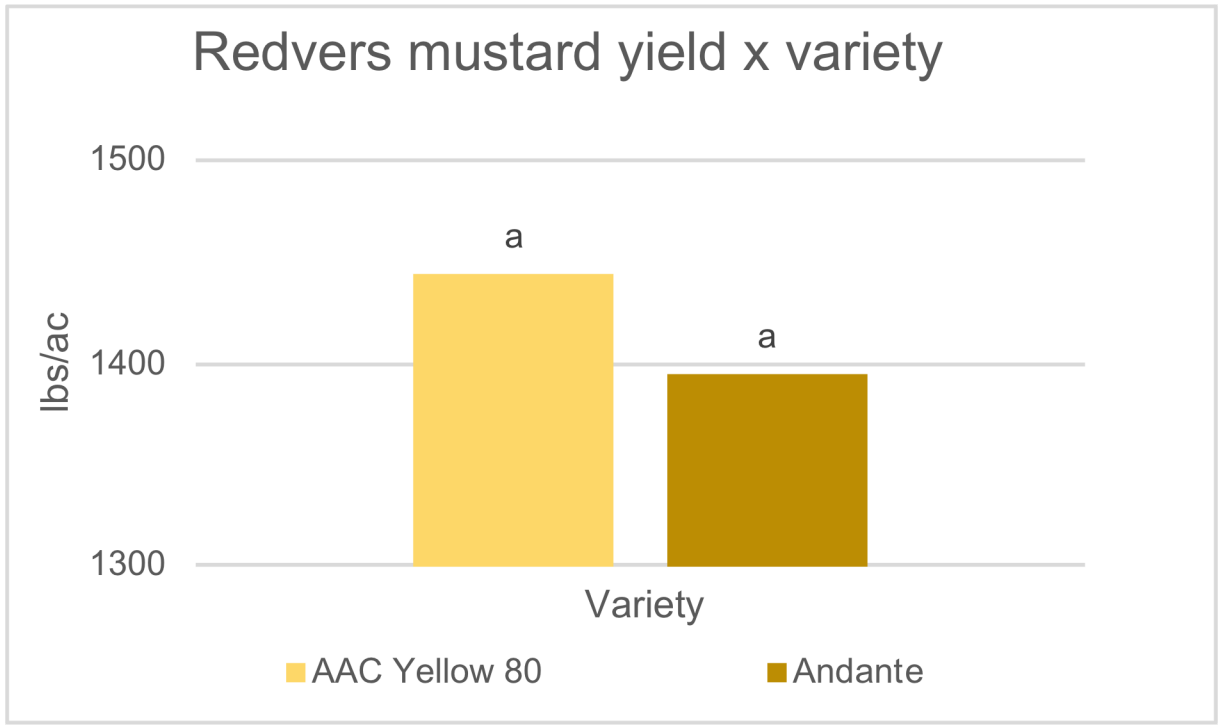


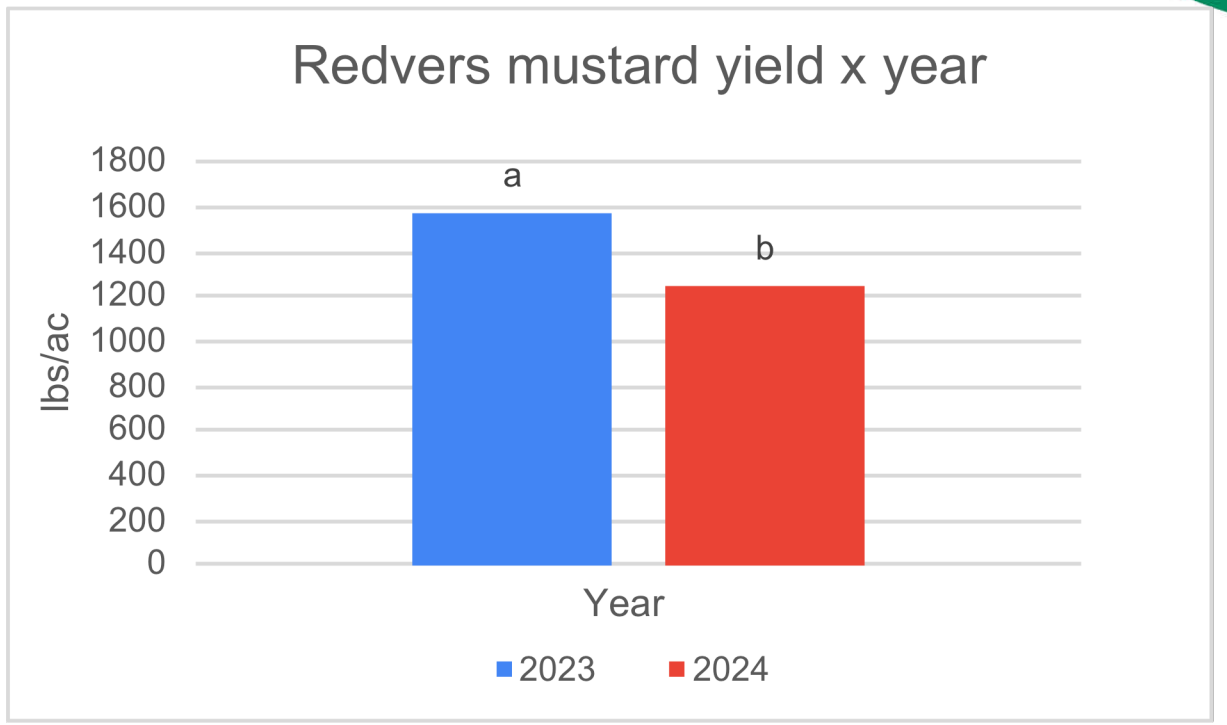
mustard yield x seed rate



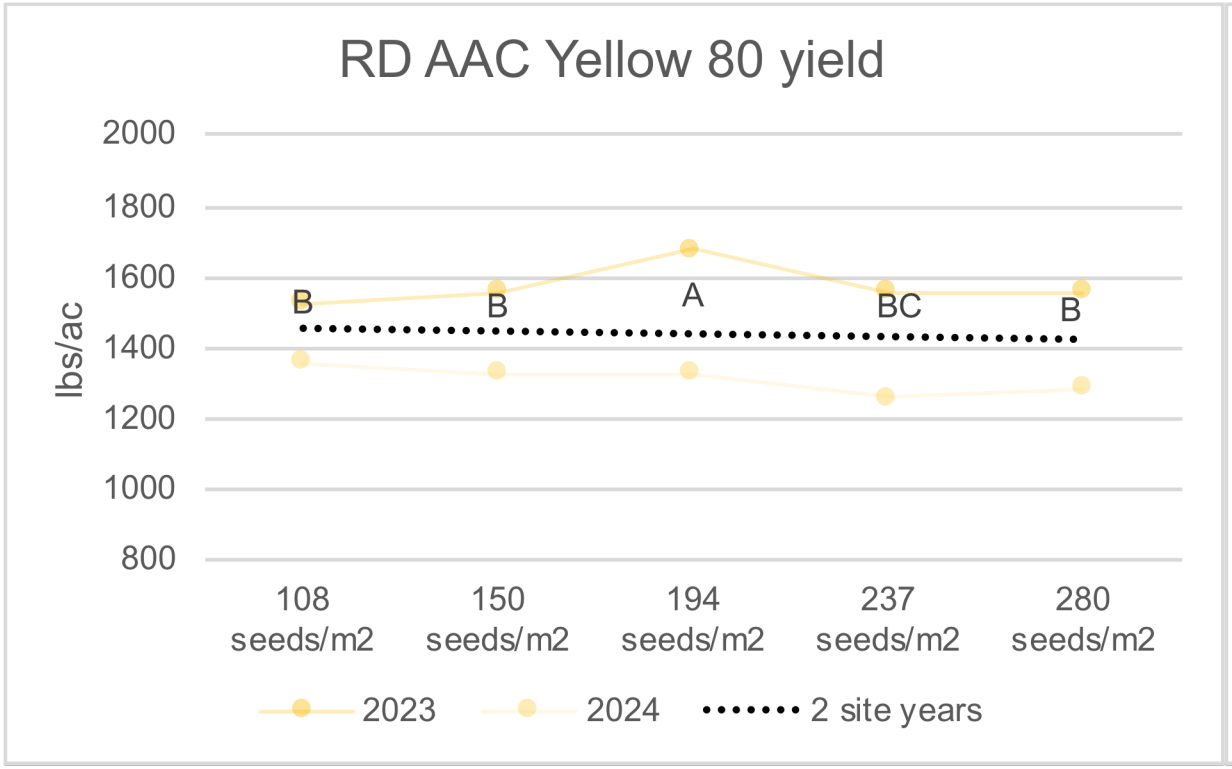


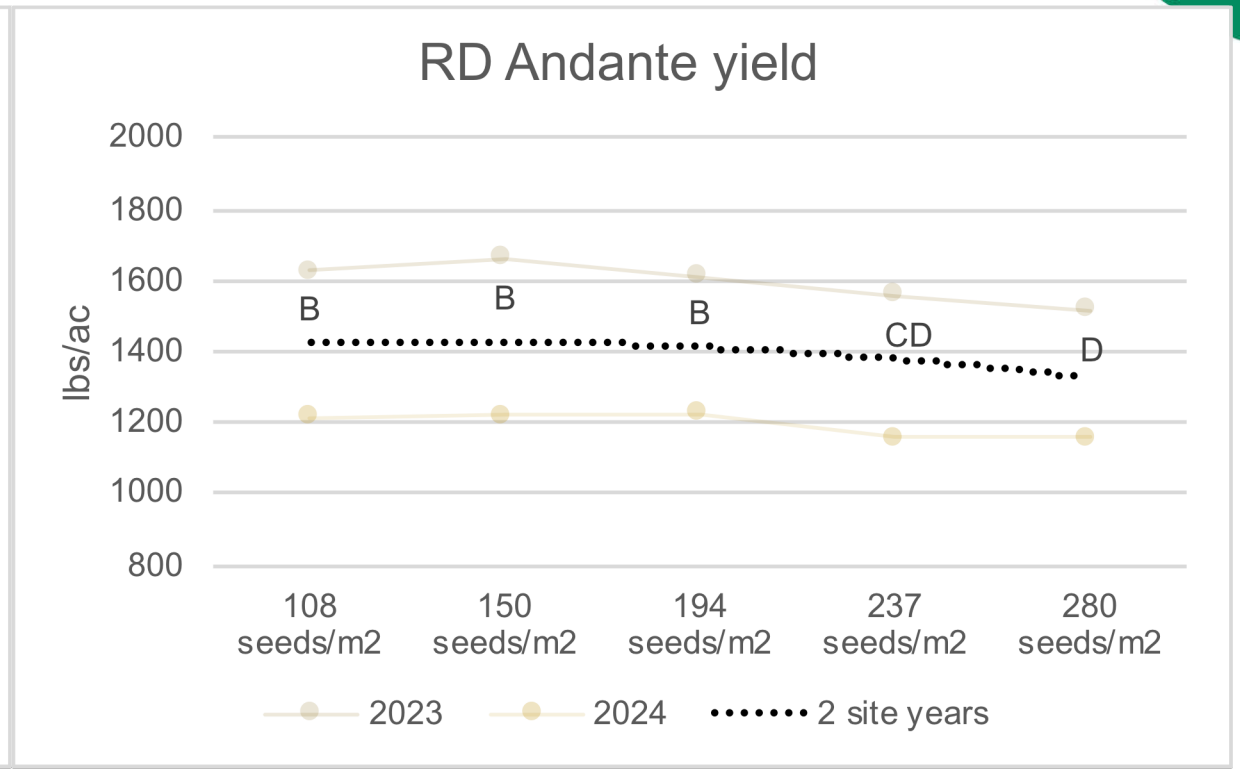
Redvers seed rate yields (2 site years)



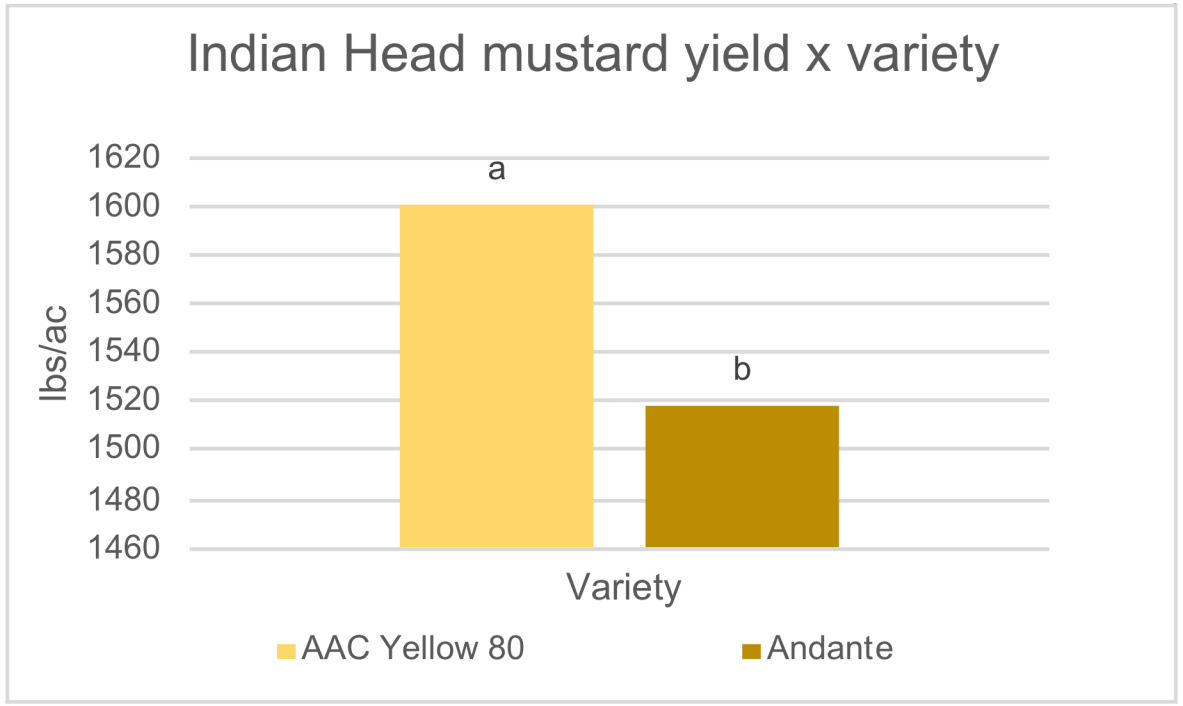


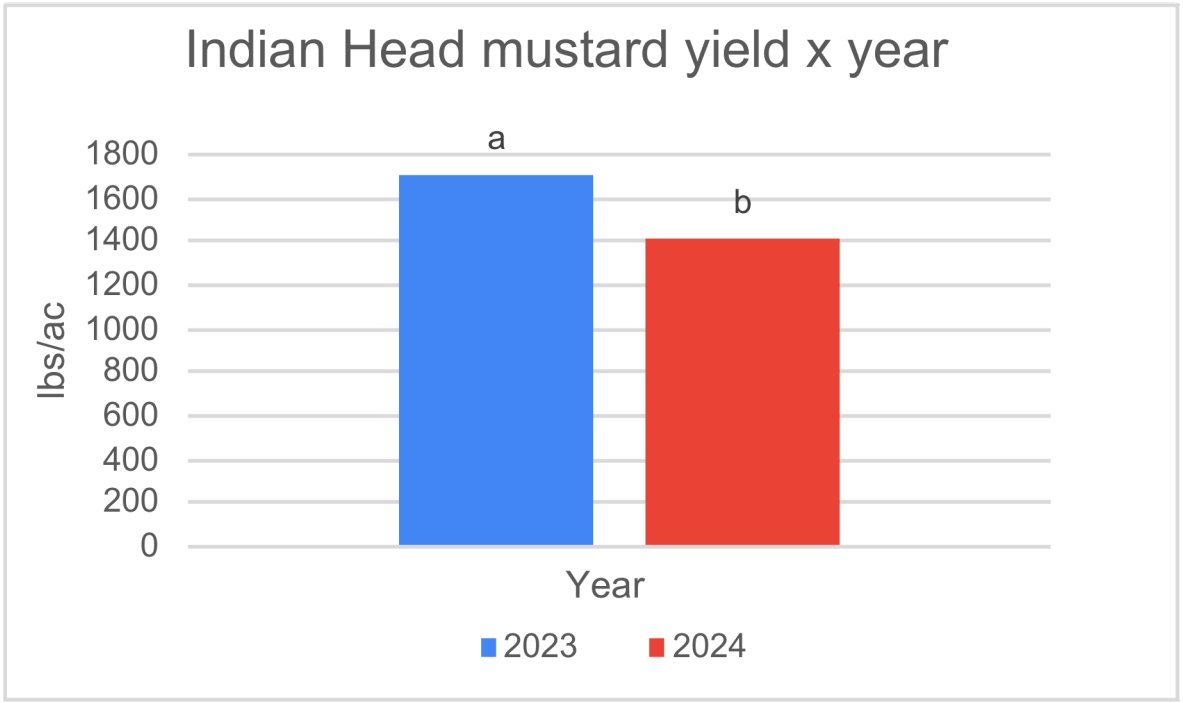
mustard yield x seed rate



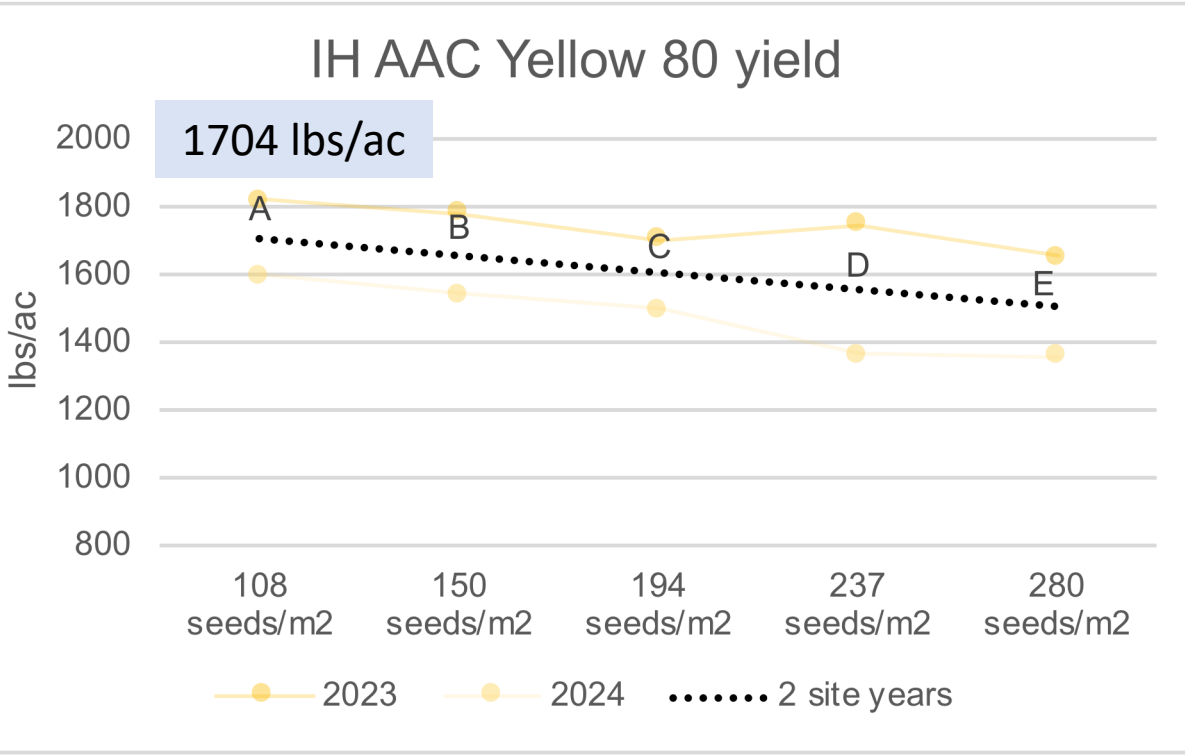


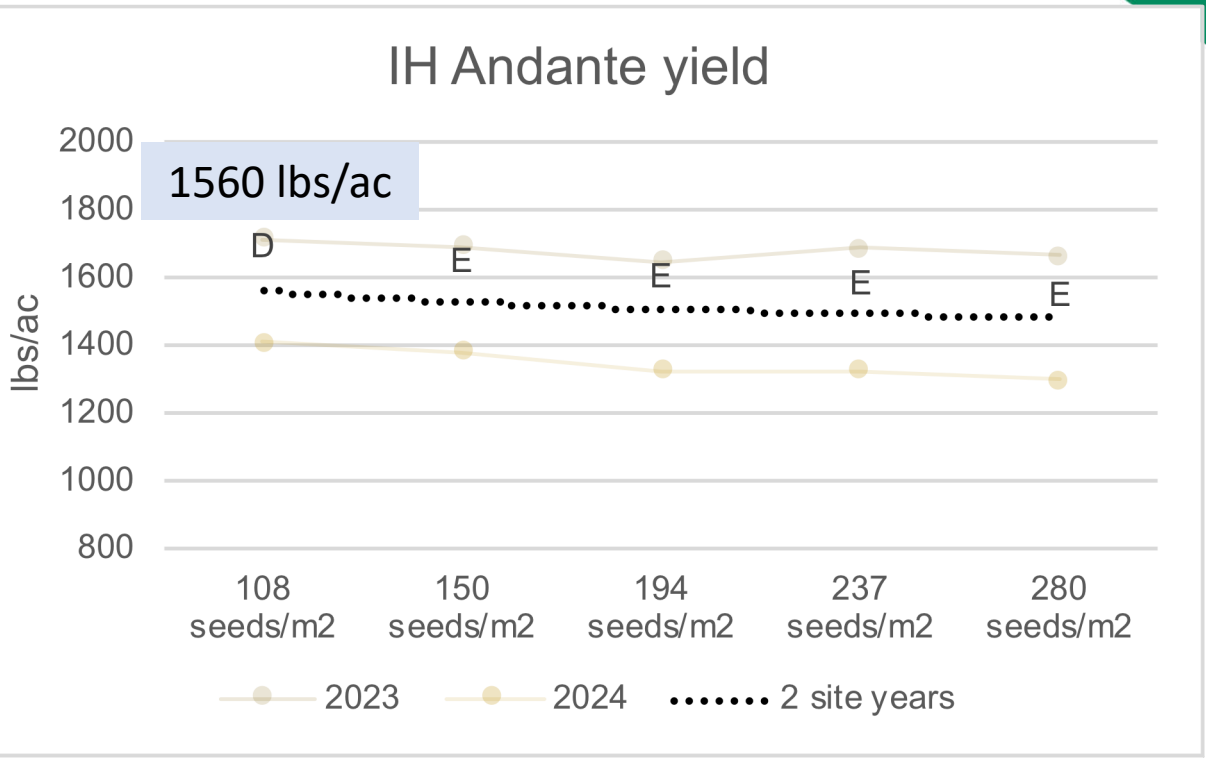
Indian Head seed rate yields (2 site years)





mustard yield x seed 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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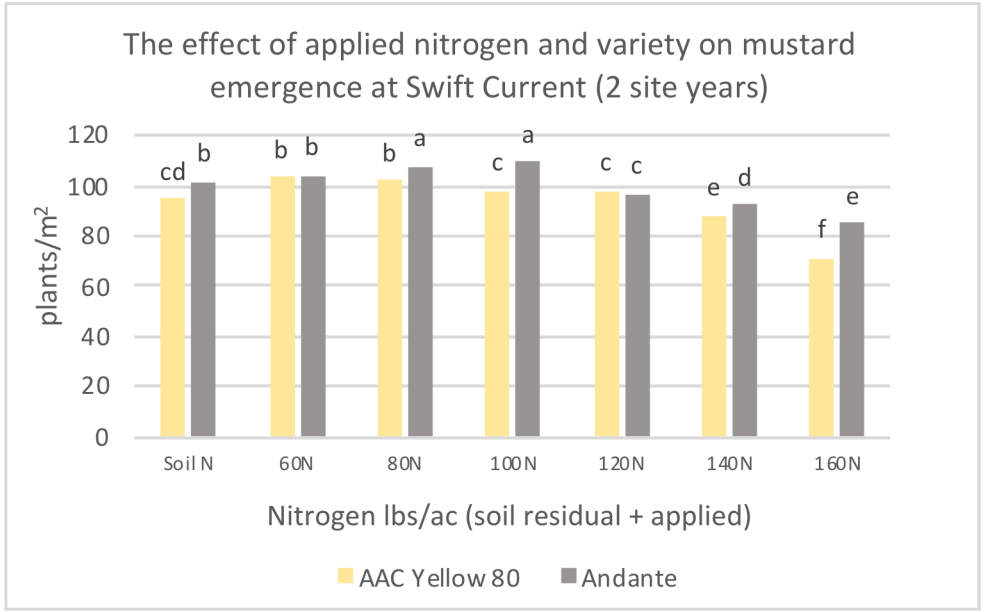
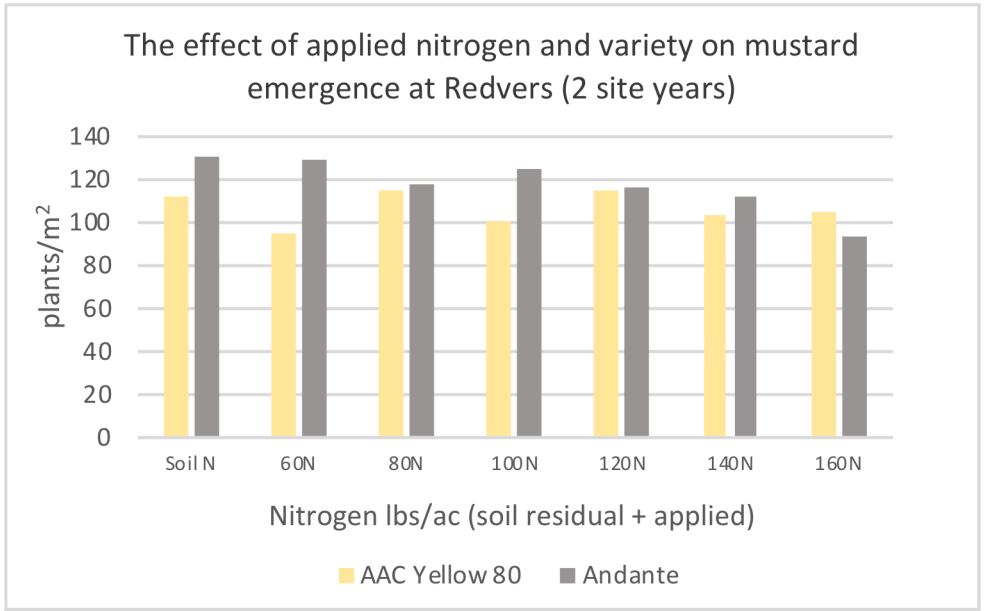
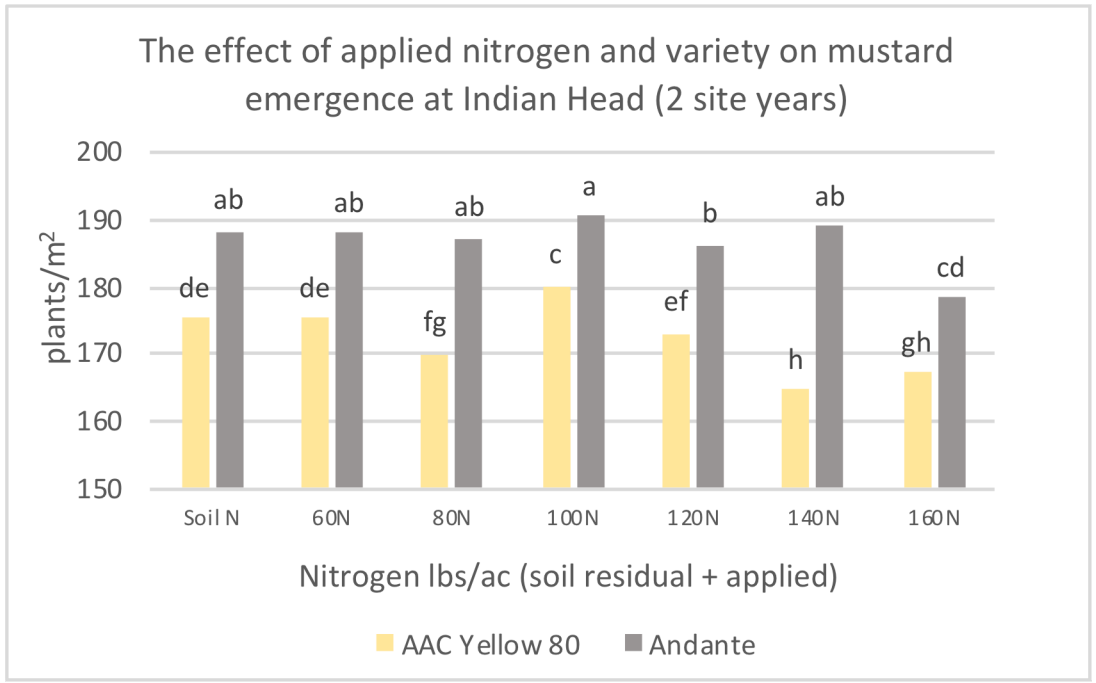
Nitrogen Rate Effect on Mustard Emergence





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



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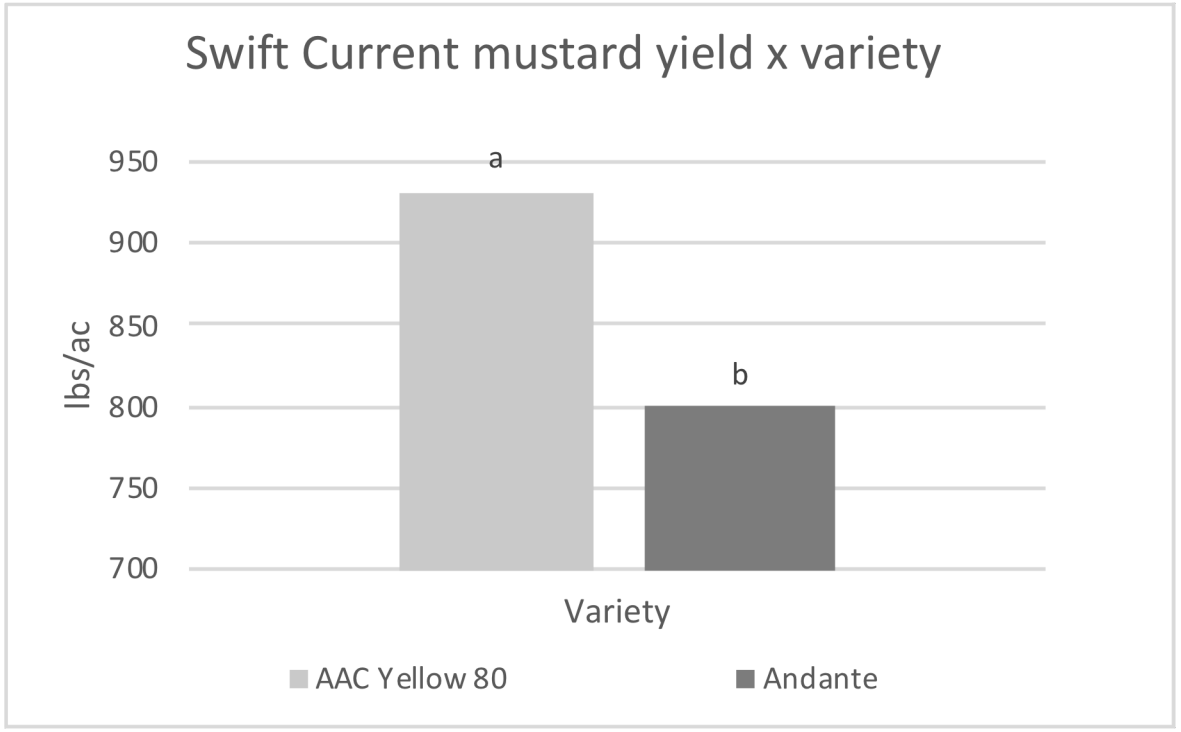
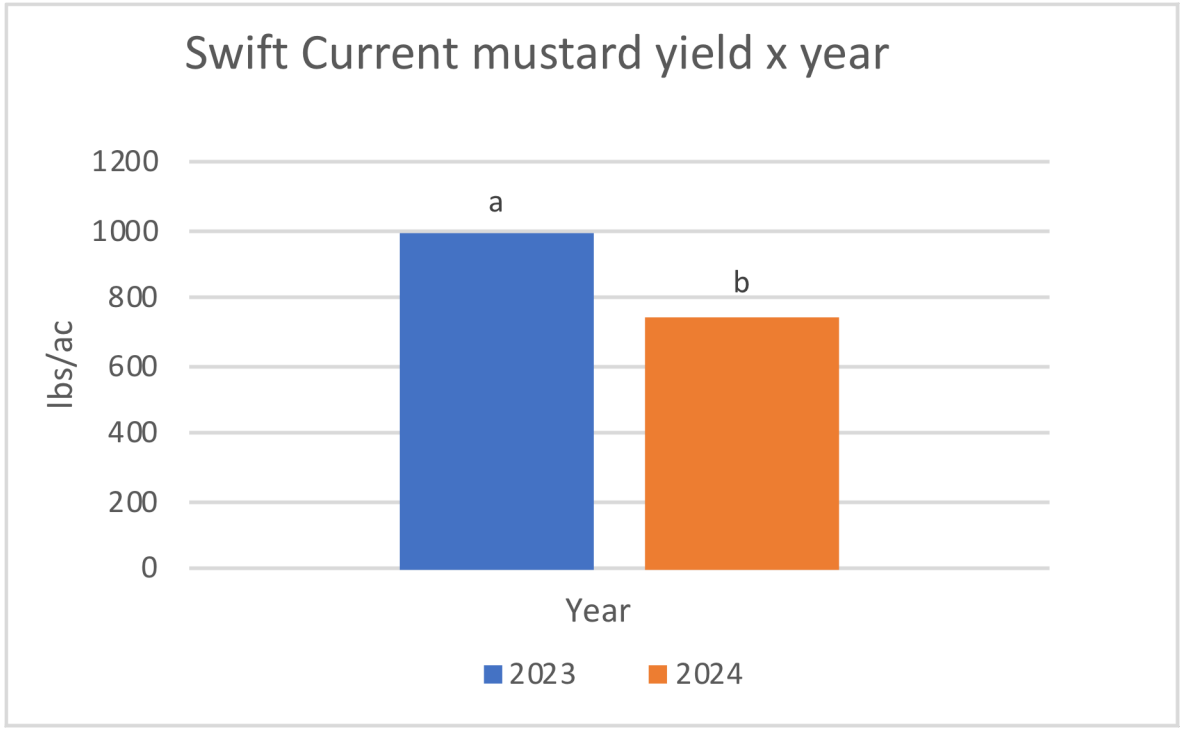
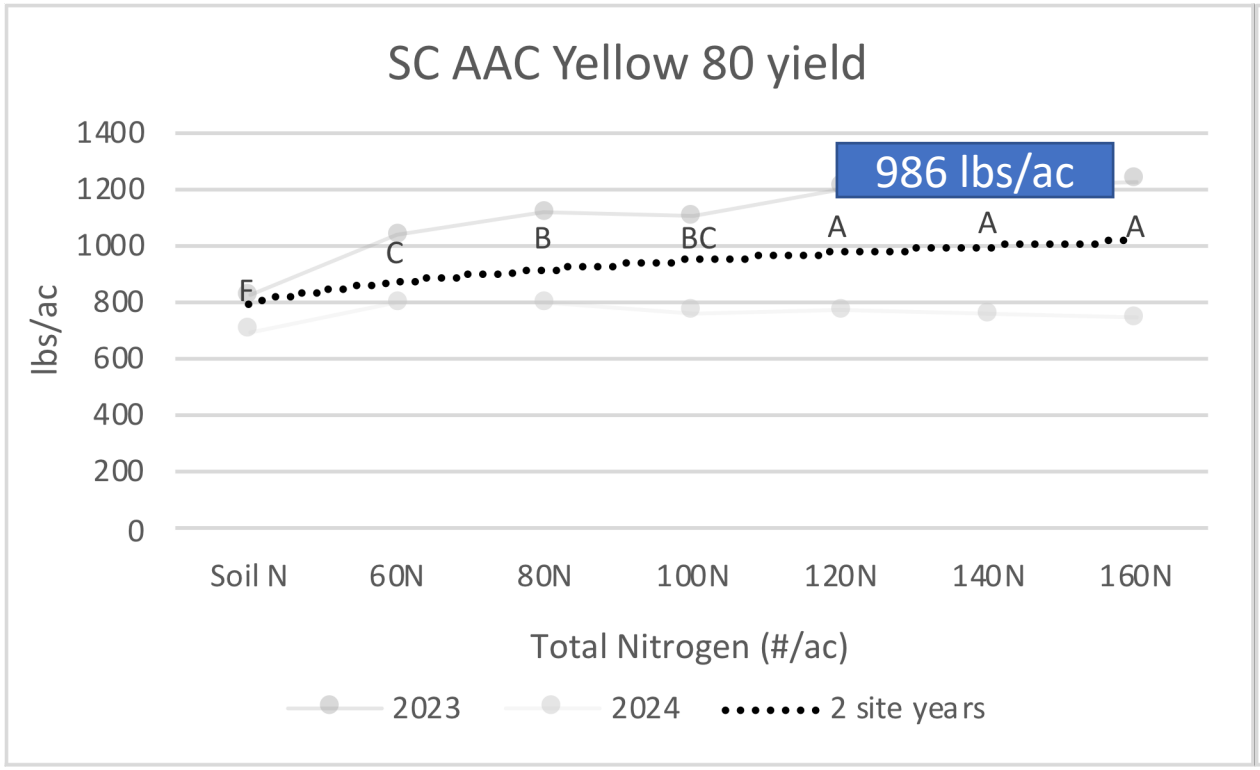
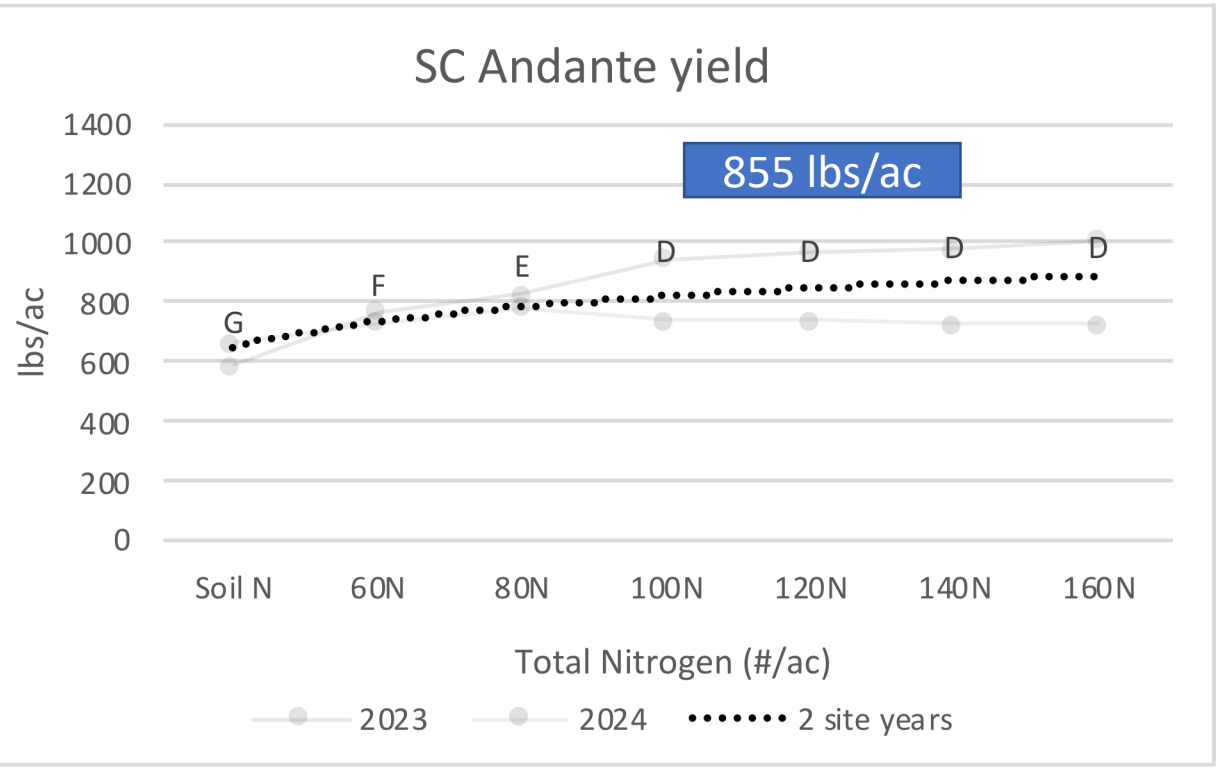
Nitrogen trial yields (2 site years)



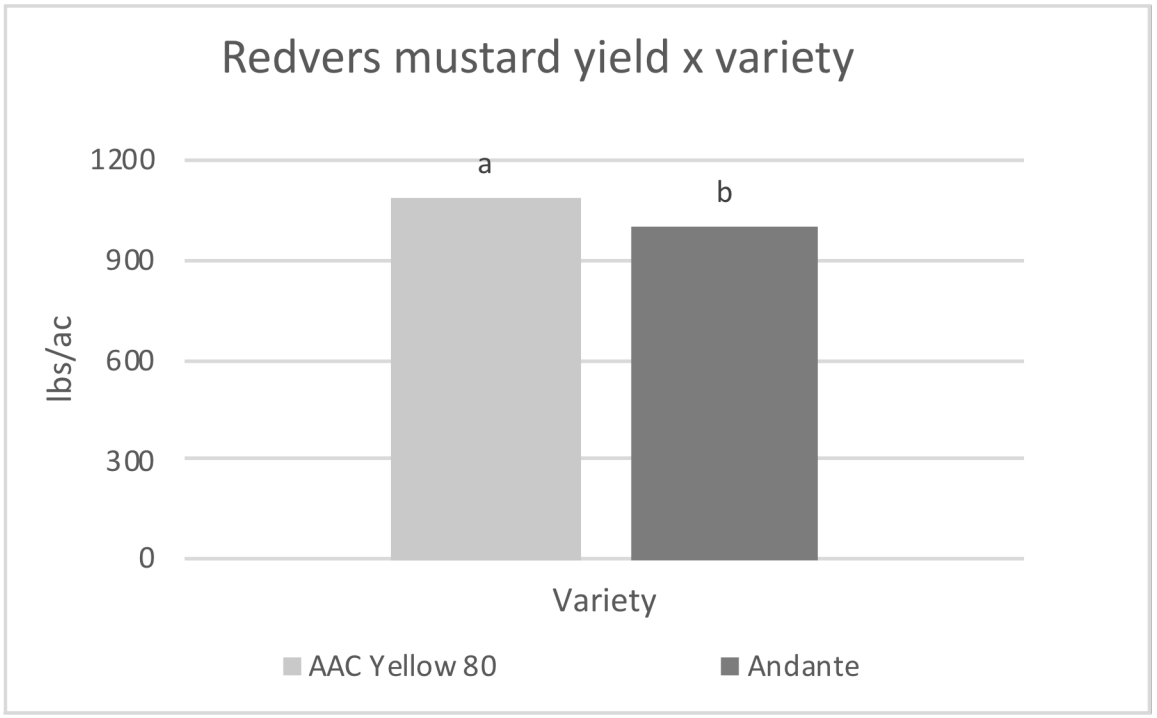


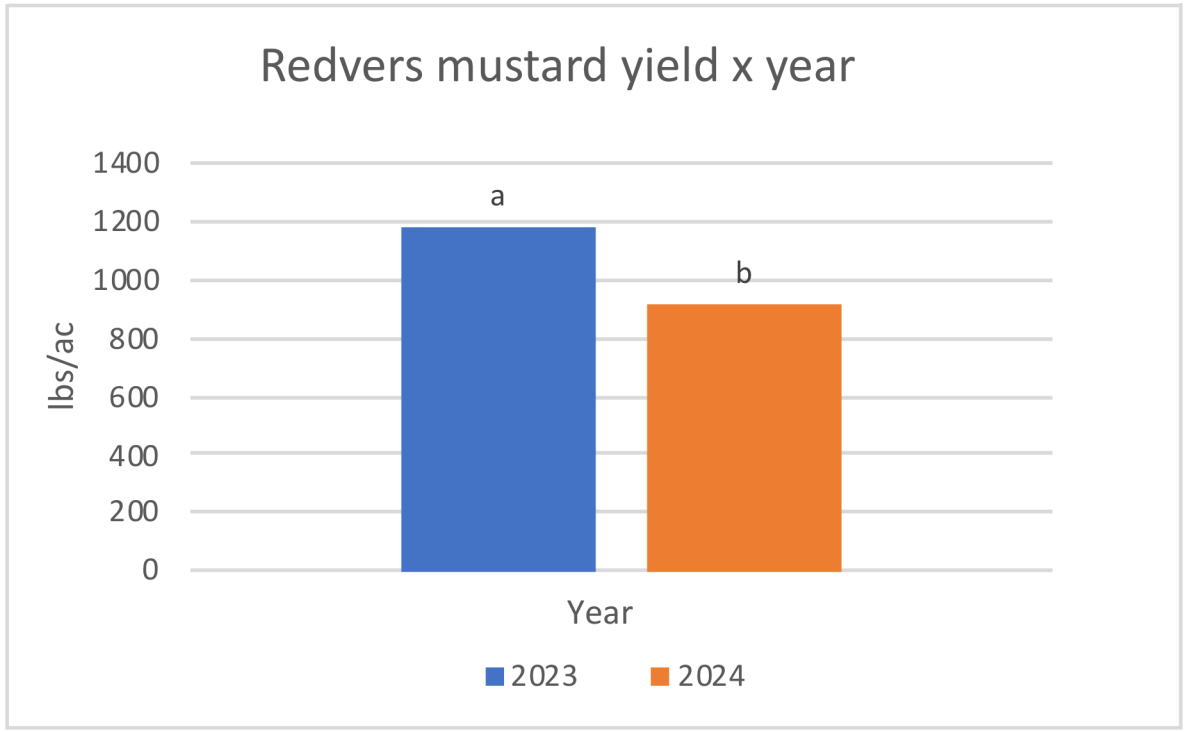
mustard yield x nitrogen rate



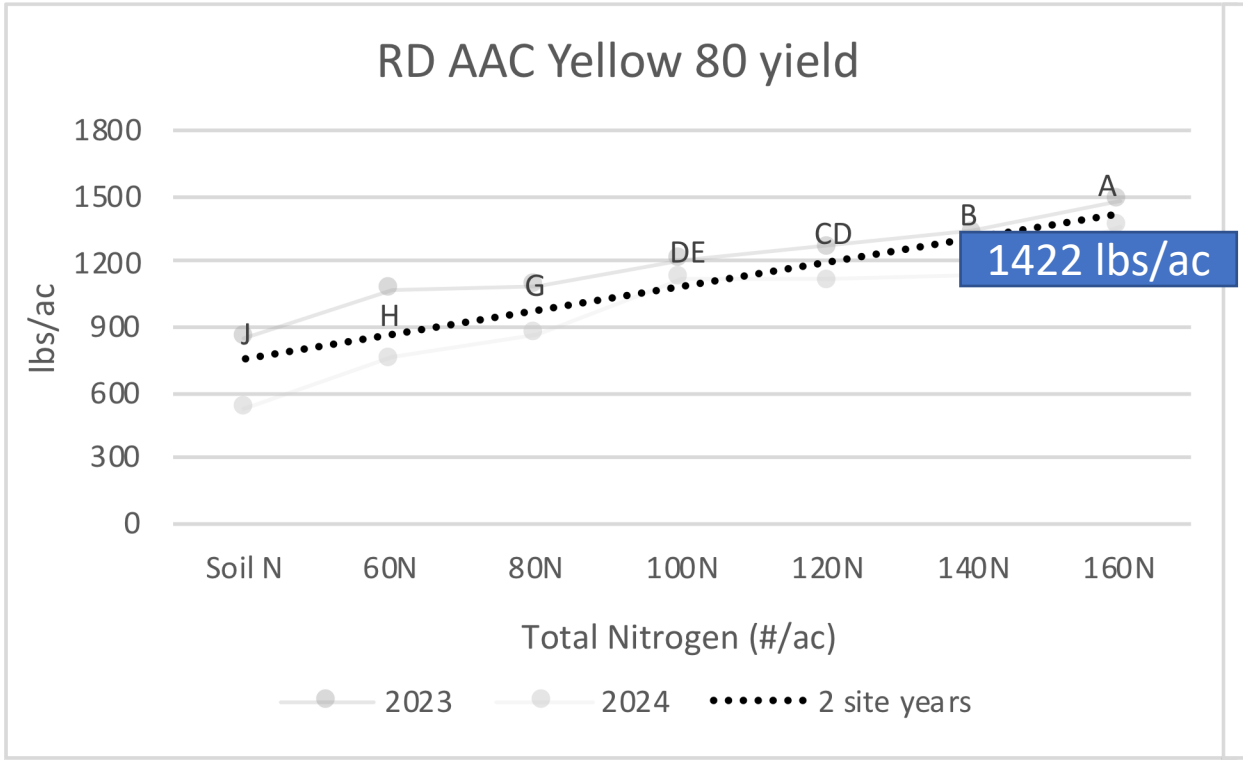


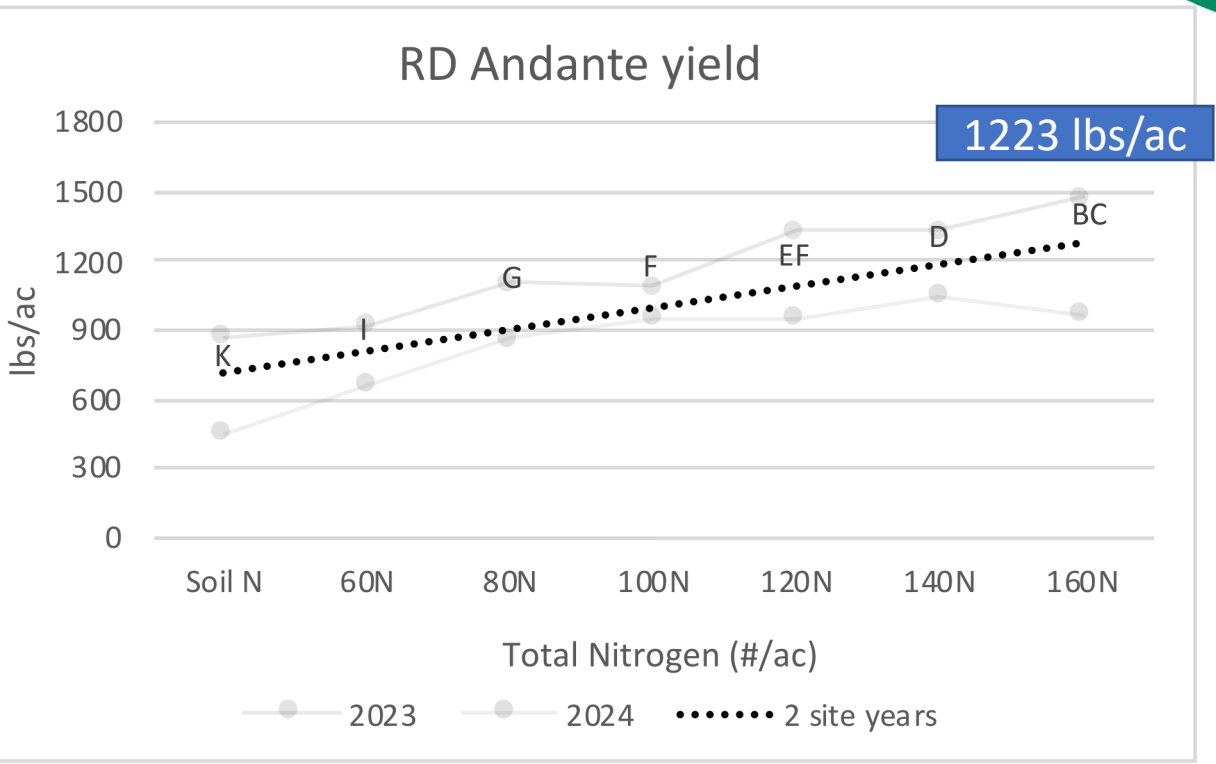
Redvers nitrogen rate yields (2 site years)



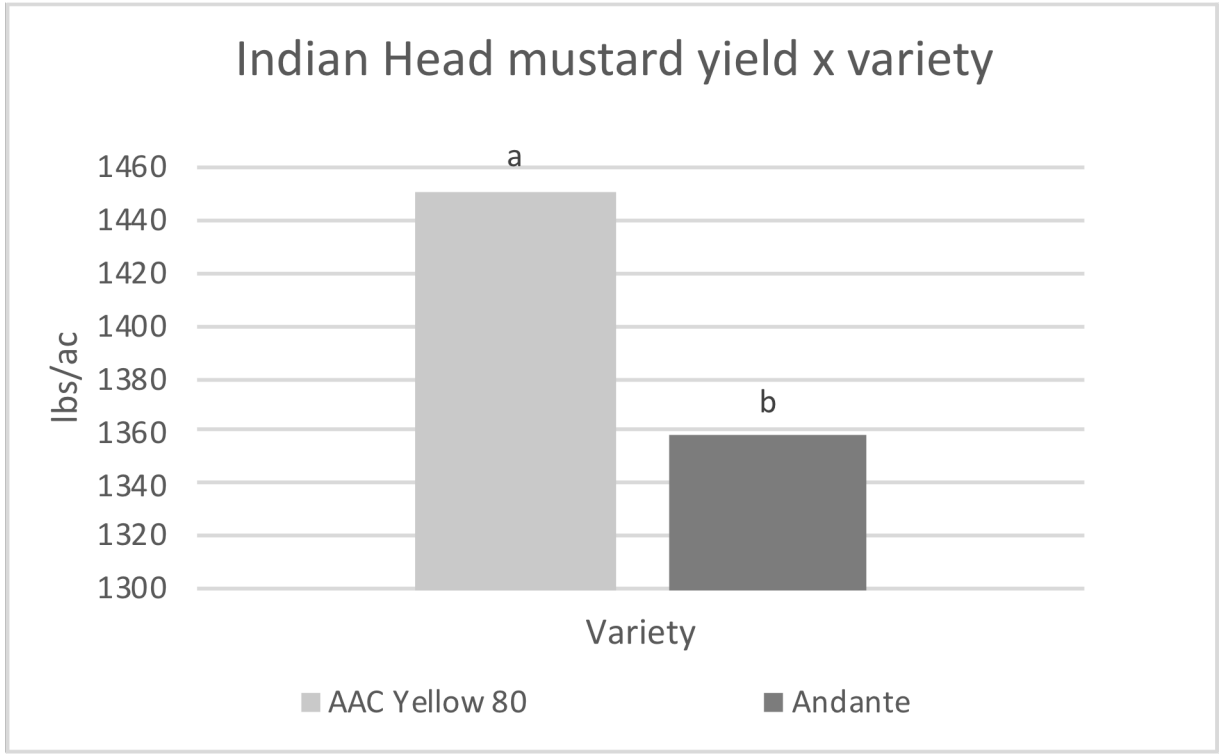


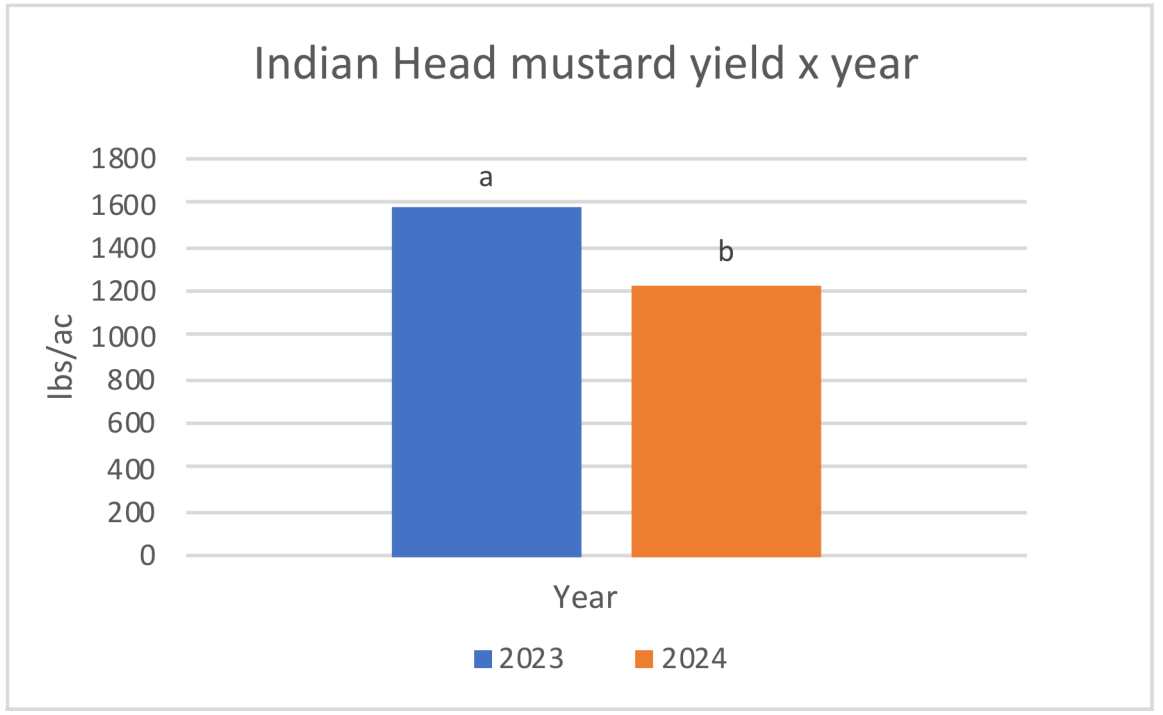
mustard yield x nitrogen rate



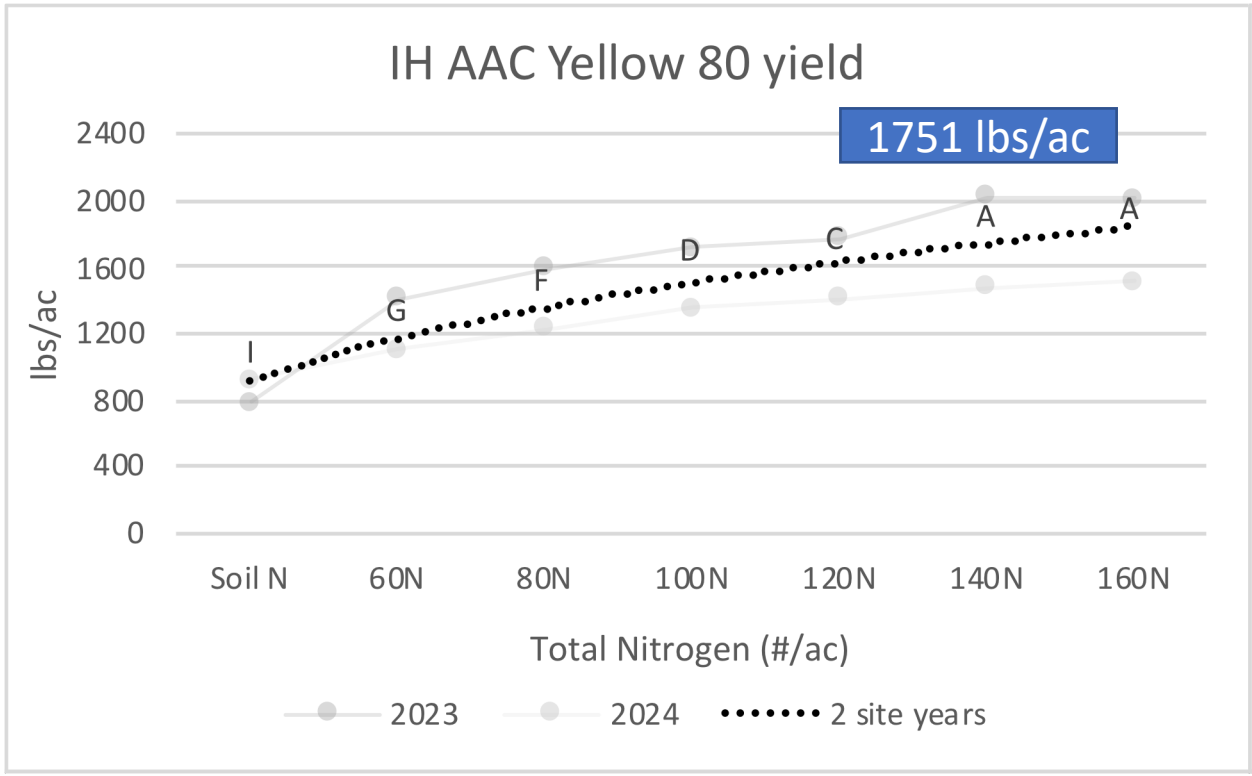


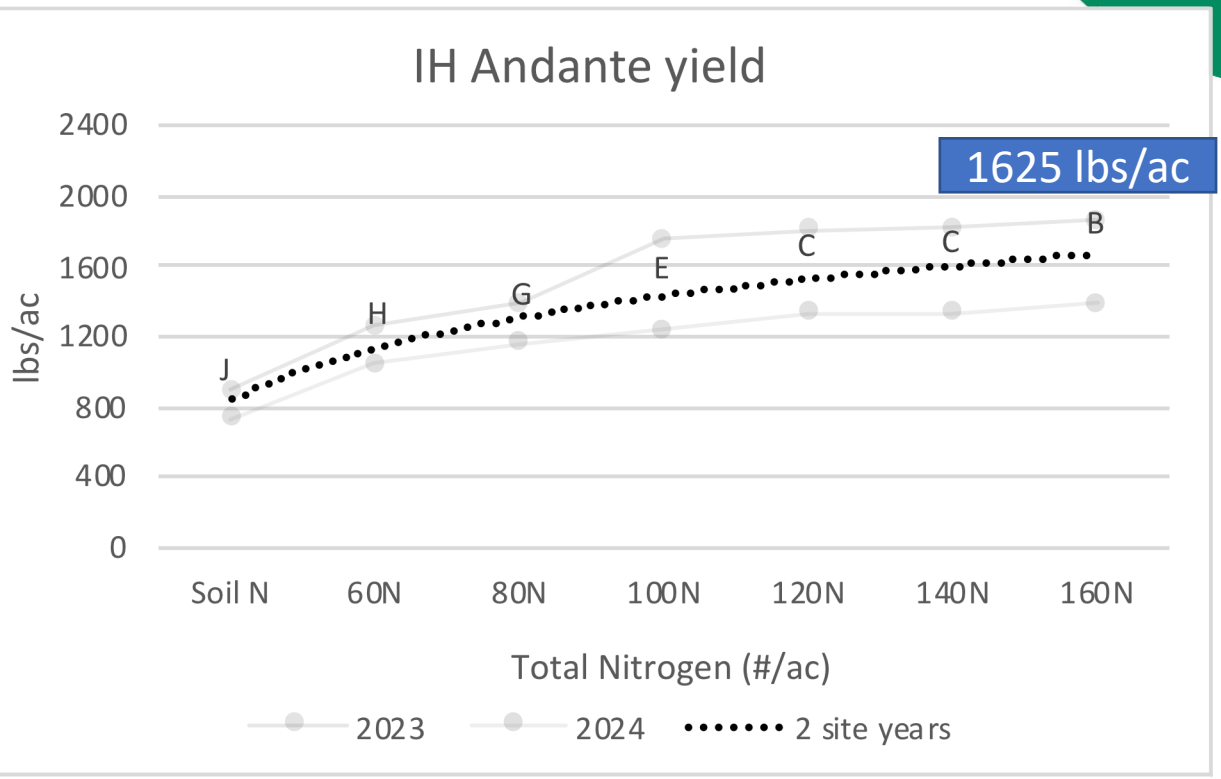
Indian Head nitrogen rate yields (2 site years)





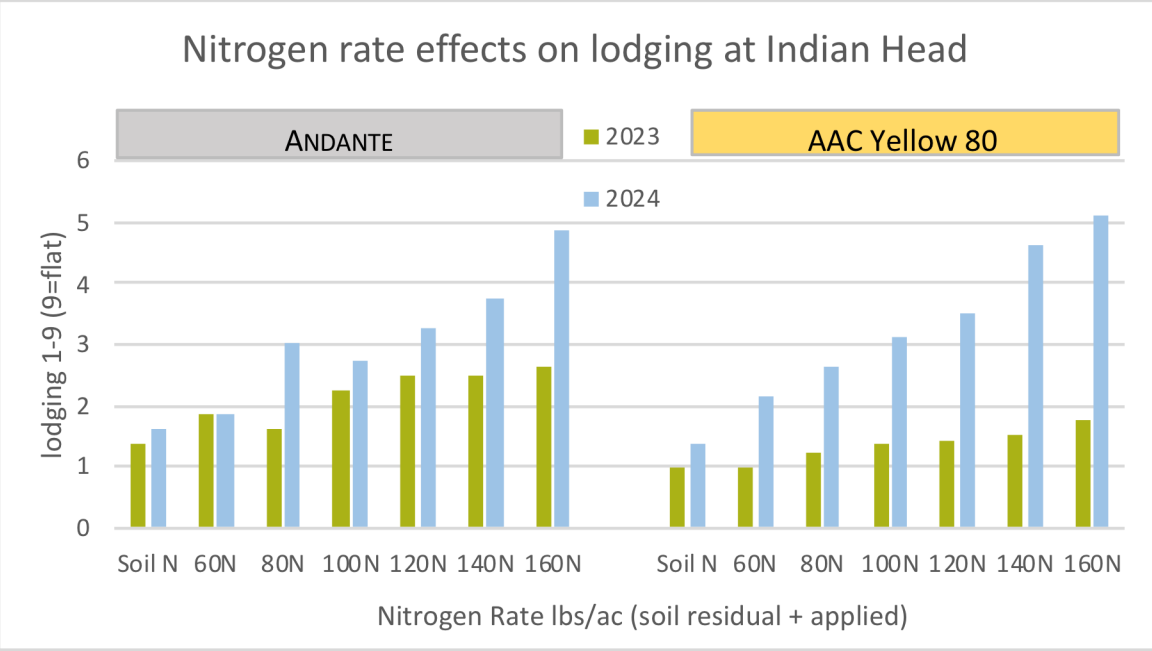
mustard yield x nitrogen rate

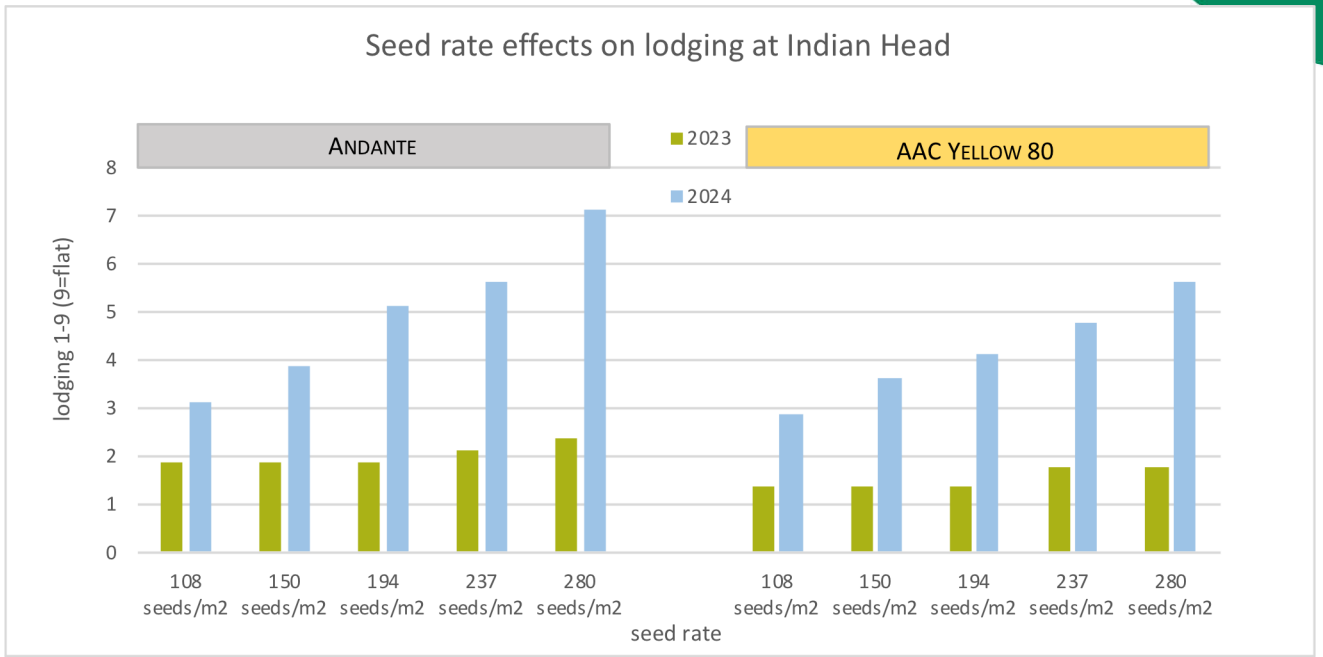




Lodging (1-9, 1=upright)

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

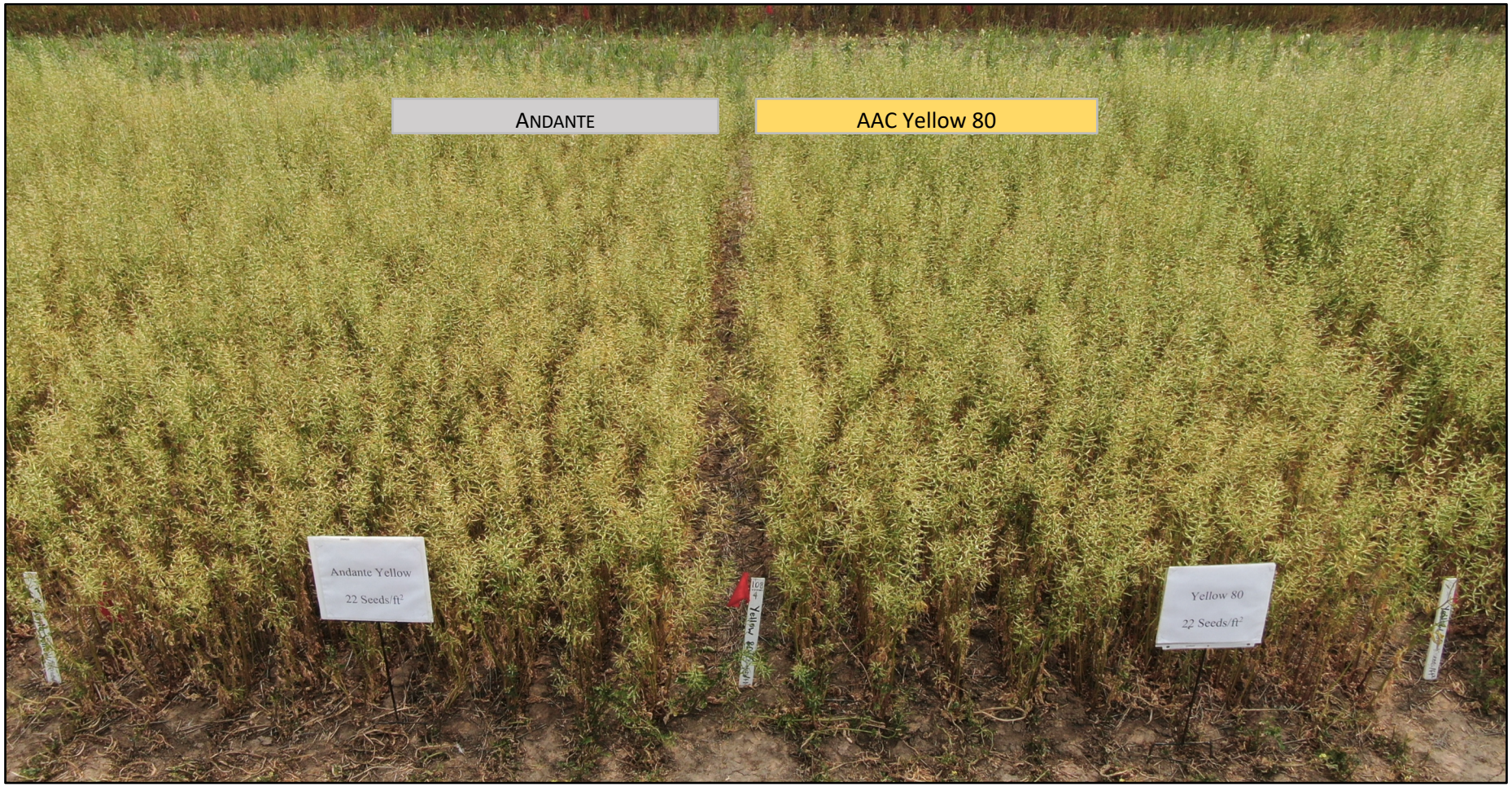




Higher lodging in 2024 (mainly from wind damage) resulted in header losses at Indian Head and negatively impacted yield

Height (cm)

AAC Yellow 80 > Andante



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

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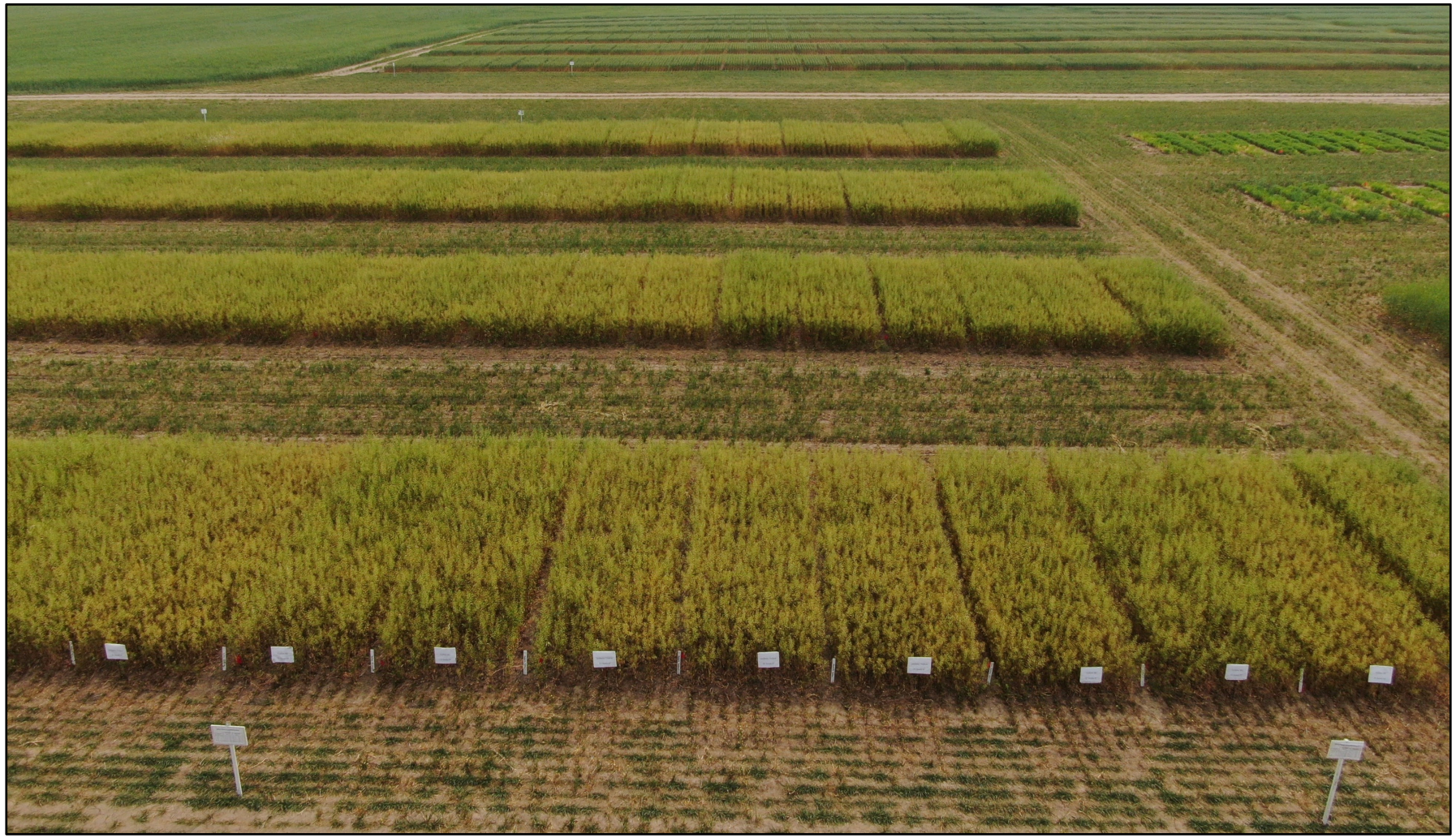
Days to Maturity (DTM)

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

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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

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Sustainable Canadian Agricultural Partnership

SASK MUSTARD
SASKATCHEWAN MUSTARD DEVELOPMENT COMMISSION

Saskatchewan

Canada