Sustainable Canadian Agricultural Partnership

Competitive. Innovative. Resilient.

Demonstrating hybrid brown mustard and composite yellow mustard response to soil test fertility recommendations

Amber Wall, Wheatland Conservation Area

SASK MUSTARD
SASKATCHEWAN MUSTARD DEVELOPMENT COMMISSION

Saskatchewan

Canada

Demonstrating hybrid brown mustard and composite yellow mustard response to soil test fertility recommendations (ADOPT)

Amber Wall, Wheatland Conservation Area

WHEATLAND CONSERVATION AREA

IHARF INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION

SOUTH EAST RESEARCH FARM

Mustard 21 Canada inc.

Micronutrients

Elements required in very small amounts, but still essential

Zinc

- Involved in electron transport, enzyme activation, hormone regulation
- Not mobile in the soil

Boron

- Cell wall extension, division at growing points, especially affects reproduction ie: pollination.
- Mobile in the soil

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SOUTH EAST RESEARCH FARM
Mustard 21 Canada inc.

Objectives: The purpose of this project is to help mustard growers understand the fertility requirements of hybrid and composite mustard. This project should help mustard growers to increase their yields and profitability.

Locations:

- Swift Current
- Indian Head
- Redvers

Experimental design:

- Split plot
- 4 replicates

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Mustard 21 Canada inc.

Treatments

2 Varieties:

- AAC Brown 18 hybrid brown mustard
- AAC Yellow 80 composite yellow mustard

6 treatments:

1. Fertilized to 0% of soil test recommendations for macronutrients
2. Fertilized to 50% of soil test recommendations for macronutrients
3. Fertilized to 100% of soil test recommendations for macronutrients
4. Fertilized to 100% of soil test recommendations for macronutrients plus 5 lbs/acre (actual) of boron
5. Fertilized to 100% of soil test recommendations for macronutrients plus 5 lbs/acre (actual) of zinc
6. Fertilized to 125% of soil test recommendations for macronutrients

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Basic Soil Nutrients

Depth	pH	OM%	CEC (meq/100g)	N (lbs/ac)	P (lbs/ac)	S (lbs/ac)	B (ppm)	Zn (ppm)
----------Swift Current 2023----------								
0-6"	7.0	2.6	16	6	22	8	**0.3 (VL)**	**0.52 (L)**
6-24"	7.9	-	-	12	-	24	-	-
----------Indian Head 2023----------								
0-6"	7.6	6.1	37.7	4	12	20	1.3 (H)	0.66 (M)
6-24"	8.1	-	-	9	-	72	-	-
----------Redvers 2023----------								
0-6"	8.1	2.8	33	8	4	14	1 (M)	**0.34 (L)**
6-24"	8.7	-	-	15	-	72	-	-

Operations and data

Nexus granular Granubor

- Boron (B) 15%
- sidebanded @33lbs/ac

Nexus granular Zinc Sulphate

- Zinc (Zn) 35.5%
- Sulphur (S) 18%
- sidebanded @ 14lbs/ac

Data collection

- Residual soil nutrients
- Plant Density
- Lodging
- DTM
- Seed Yield

Location	Swift Current	Indian Head	Redvers
Year	----------2023----------		
Stubble	Durum	Canary Seed	Barley
Seed Date	15-May	19-May	31-May
Row Spacing	8.25 inches	12 inches	12 inches
Seed Rate	target **237 seeds/m2** (AAC Brown 18: 8.4 lbs/ac, AAC Yellow 80: 11.6 lbs/ac)		
Fertility	100% rate based on AgVise recommendations **(all sidebanded)**		
	SC: Target 35 bu/ac for Brown & 25 bu/ac for Yellow, **IH & RD:** Target 40 bu/ac for Brown and 30 bu/ac for Yellow		
	Zinc provided as **Nexus ZnSO4** @5lbs/ac (14lbs product/ac)		
	Boron provided as **Nexus Granubor** @5lbs of Zn/ac (33lbs product/ac)		
Plant Density	13-Jun	09-Jun	15-Jun
Herbicide	Centurion/Amigo	Contender II/1% IPCO MSO	Arrow All In
Herbicide	-	Muster	-
Insecticide	Decis	Decis	-
Fungicide	-	Lance WDG	-
Lodging ratings	21-Aug	09-Aug	01-Sep
Desiccation	-	Roundup Weathermax	-
Harvest Dates	24-Aug	16-Aug	Brown: Sept-02, Yellow: Sept-06

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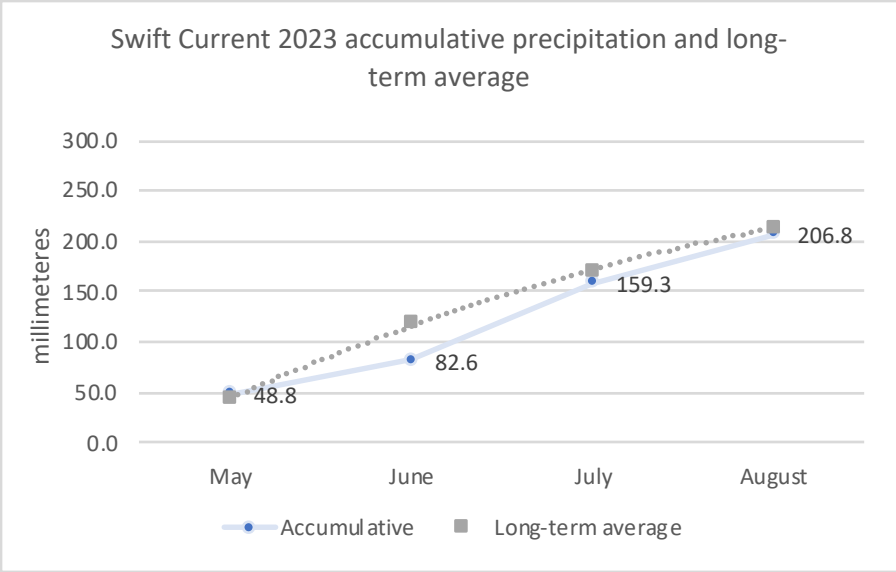
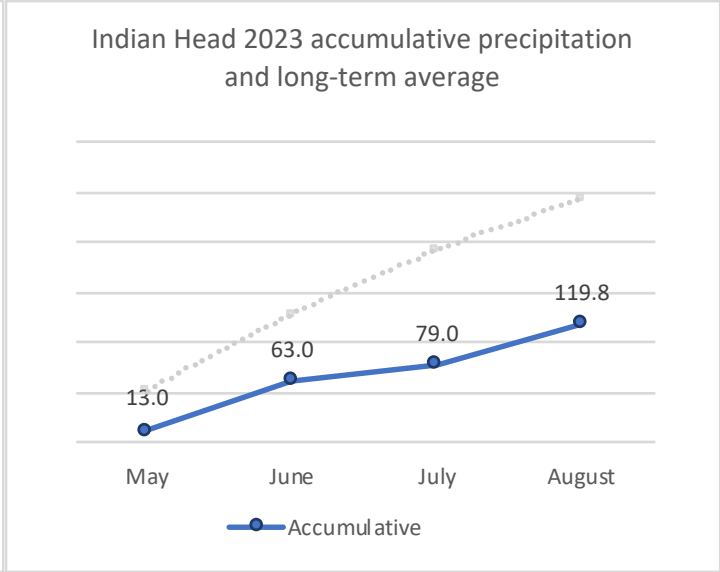
Mustard 21 Canada inc.

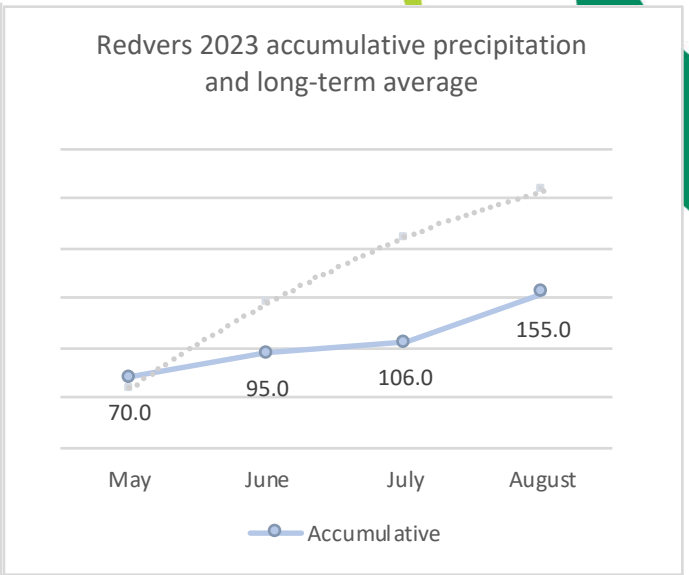
General Conditions



- Narrow strip of hail July 22nd
- 1.6°C above avg. temperature
- Low weed and insect pressure
- 97% of avg. growing season precipitation



- 1.4°C above avg. temperature
- Some hand weeding
- 49% of avg. growing season precipitation
- Some residual soil moisture



- 1.4°C above avg. temperature
- Low weed and insect pressure
- 60% of avg. growing season precipitation
- Residual soil moisture

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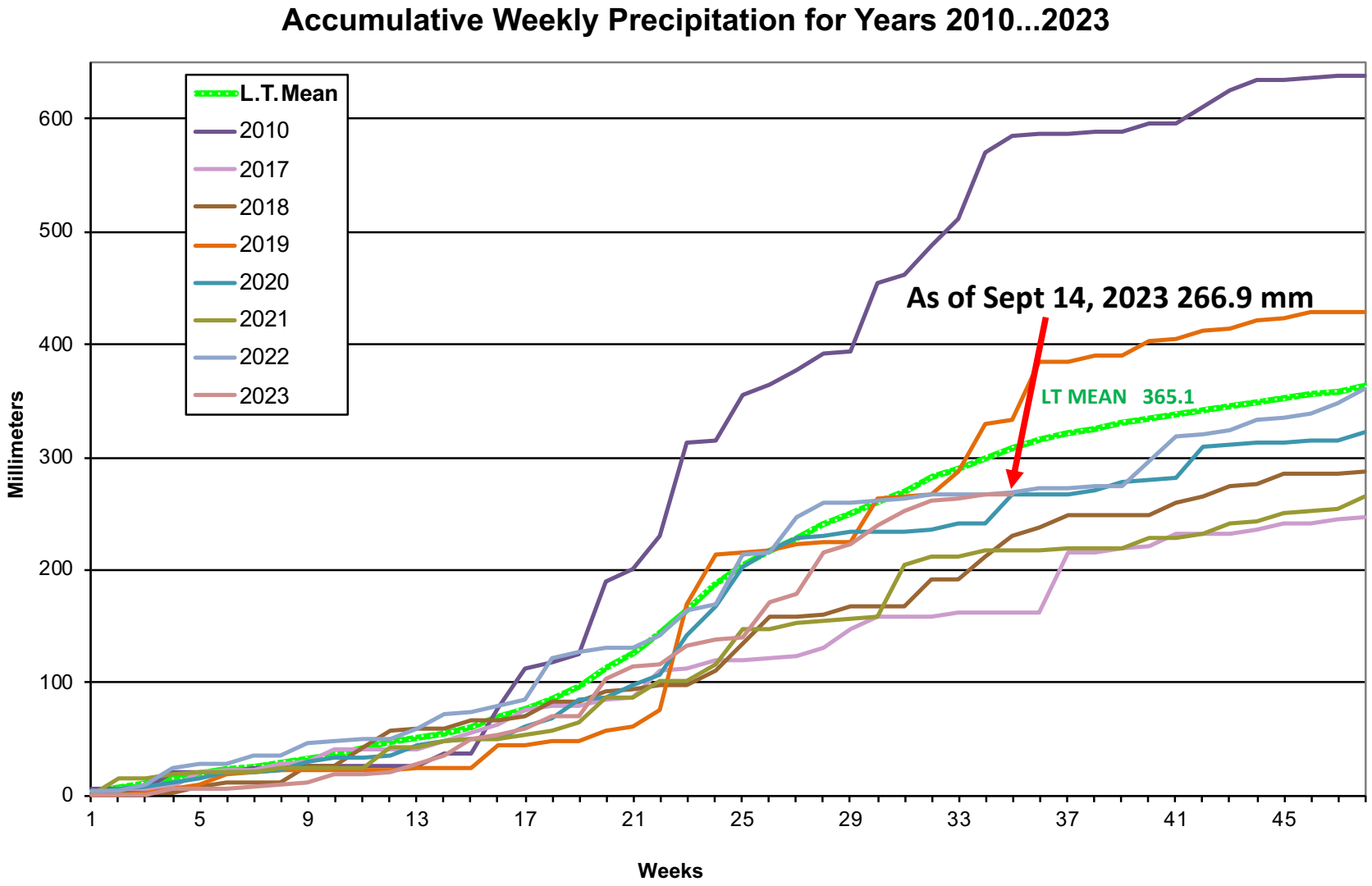

Agriculture and Agri-food Canada, Swift Current, September 14, 2023

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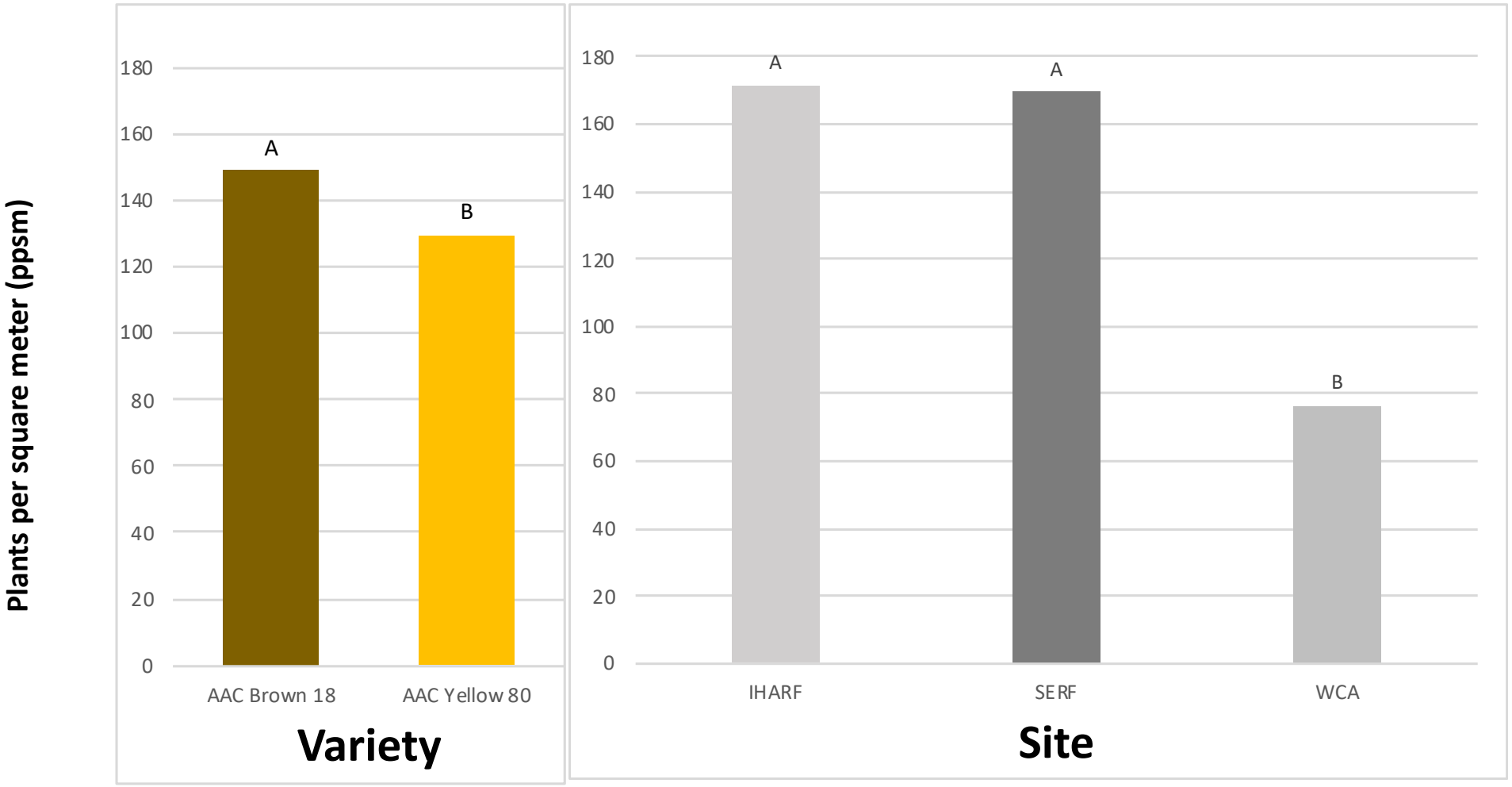
SOUTH EAST RESEARCH FARM

Mustard 21 Canada inc.

Variety and site effect on mustard emergence



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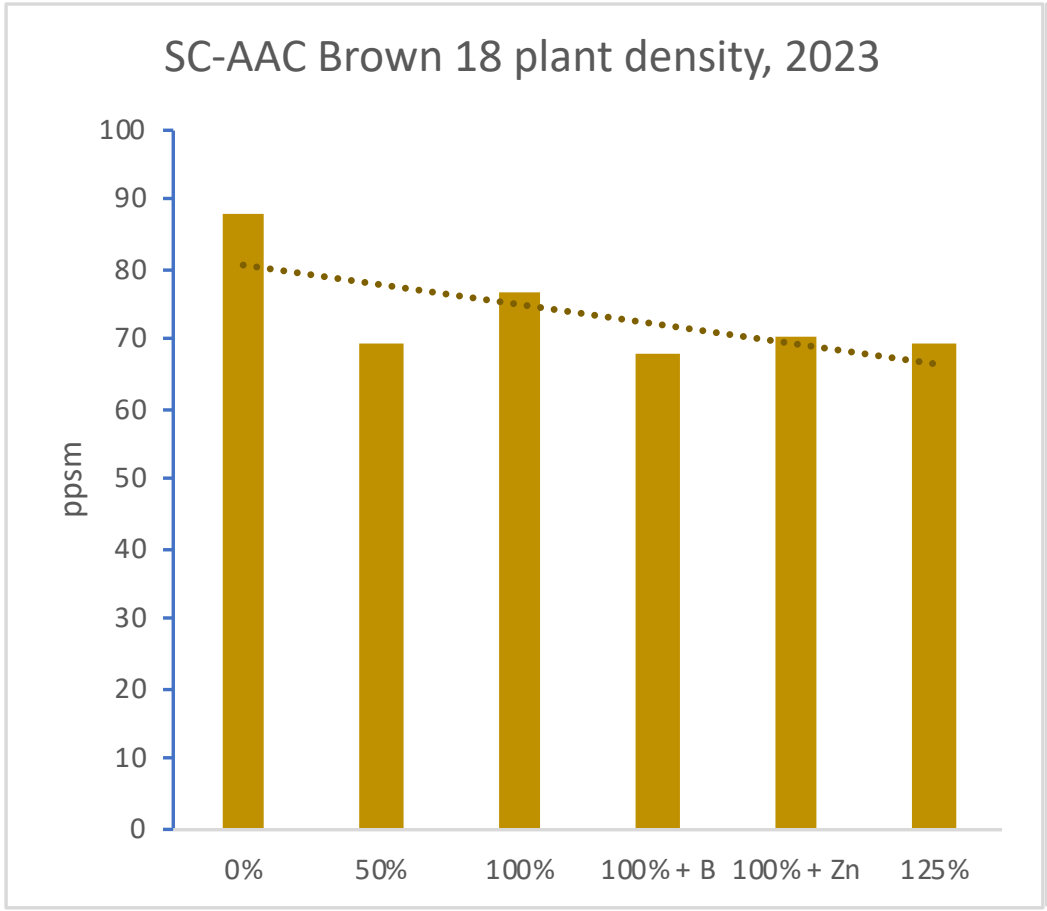
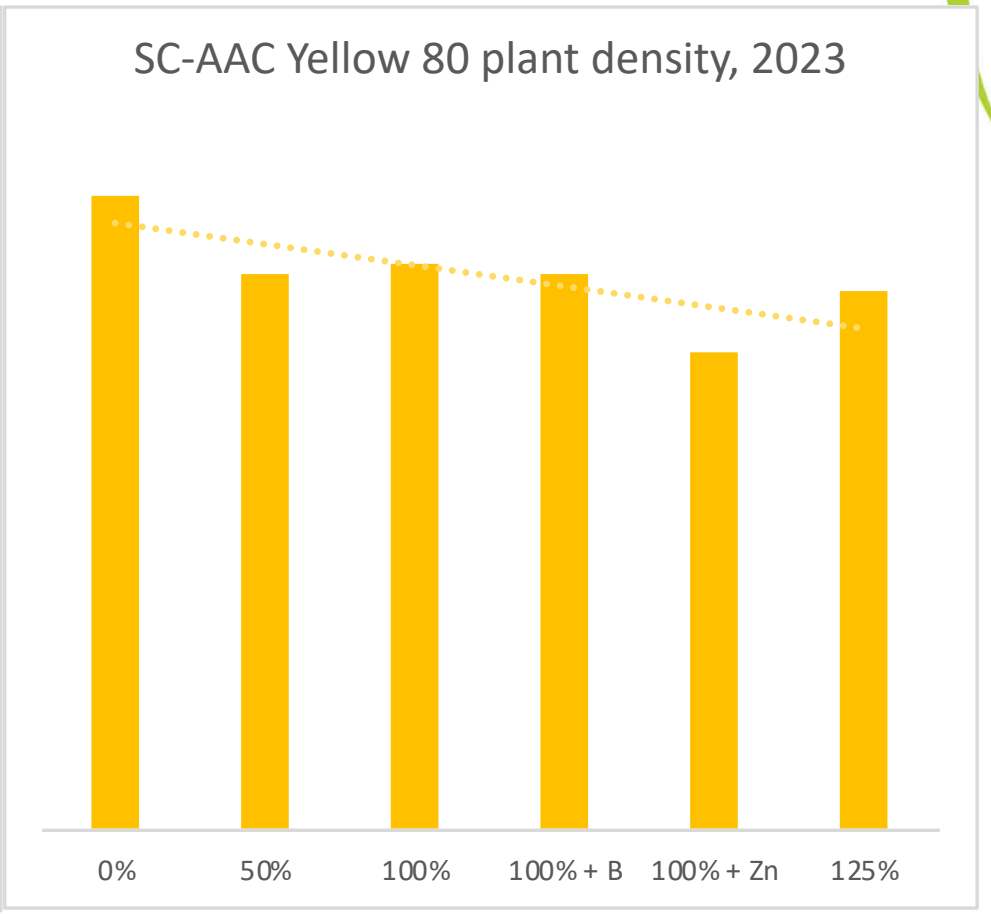
SOUTH EAST RESEARCH FARM
Mustard 21 Canada inc.

Swift Current mustard emergence





Percent soil test recommendation for NPKS

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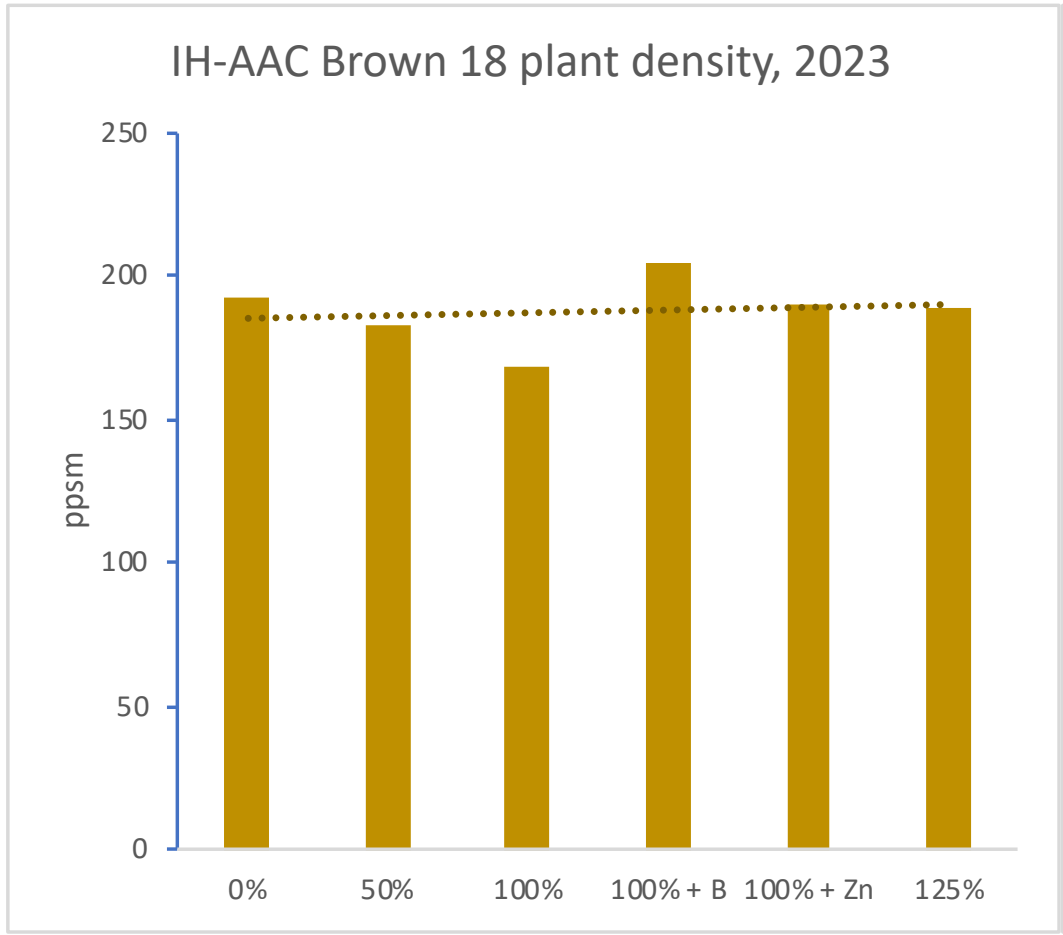
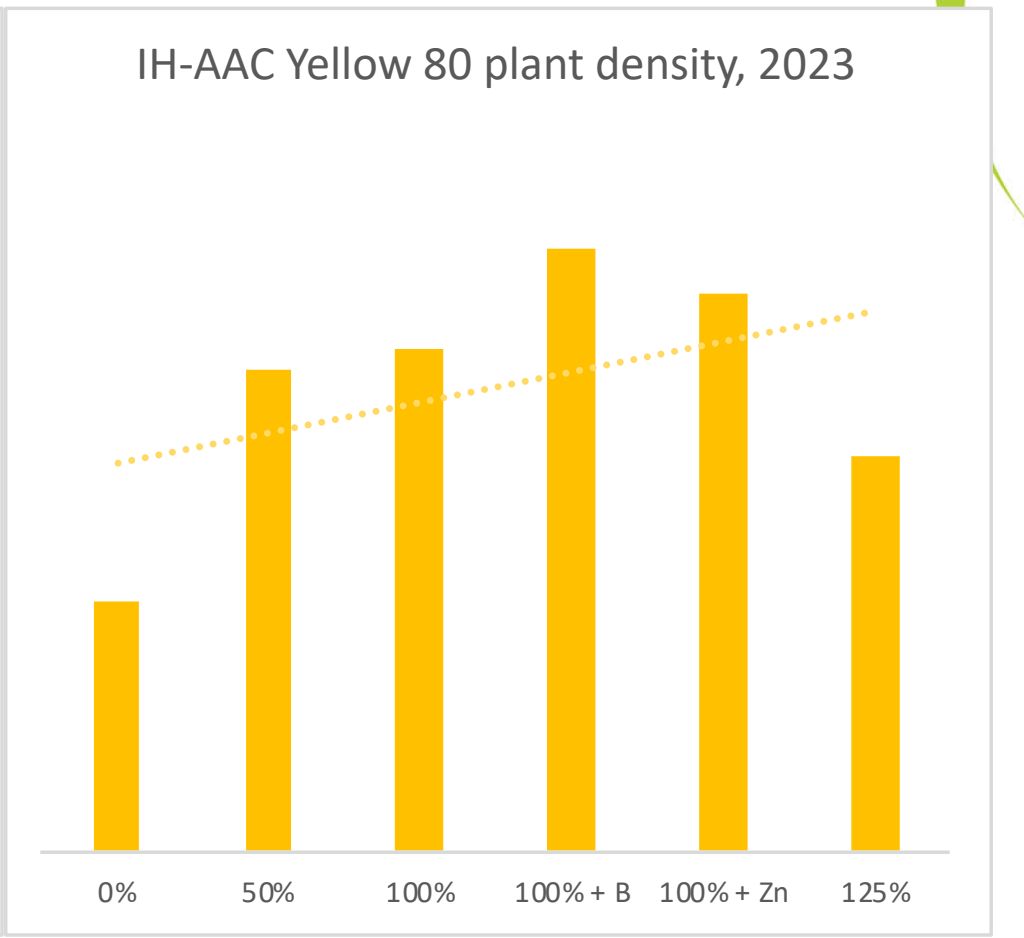
Mustard 21 Canada inc.

Indian Head mustard emergence





Percent soil test recommendation for NPKS

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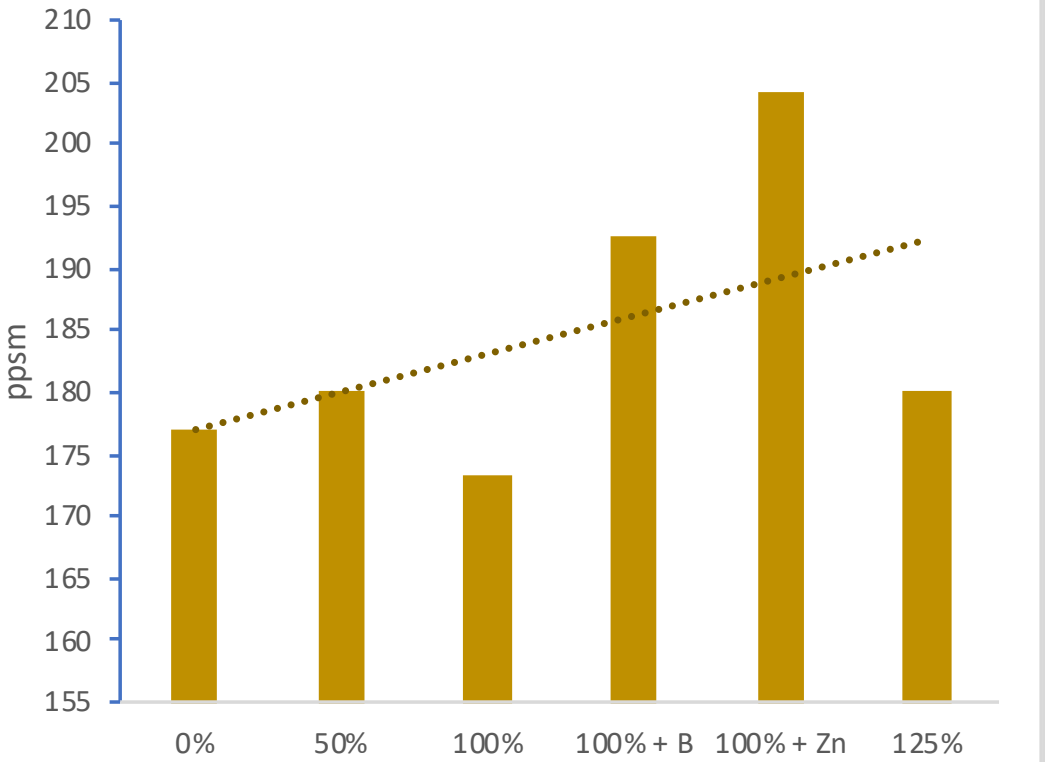
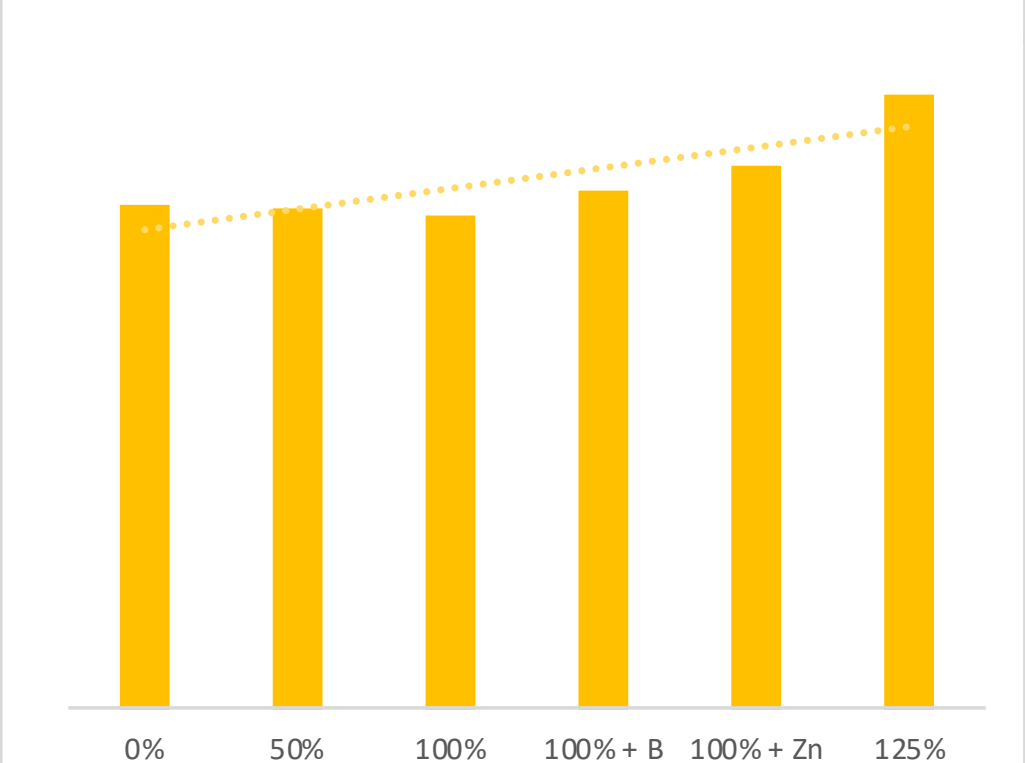
Mustard 21 Canada inc.

Redvers mustard emergence





Percent soil test recommendation for NPKS

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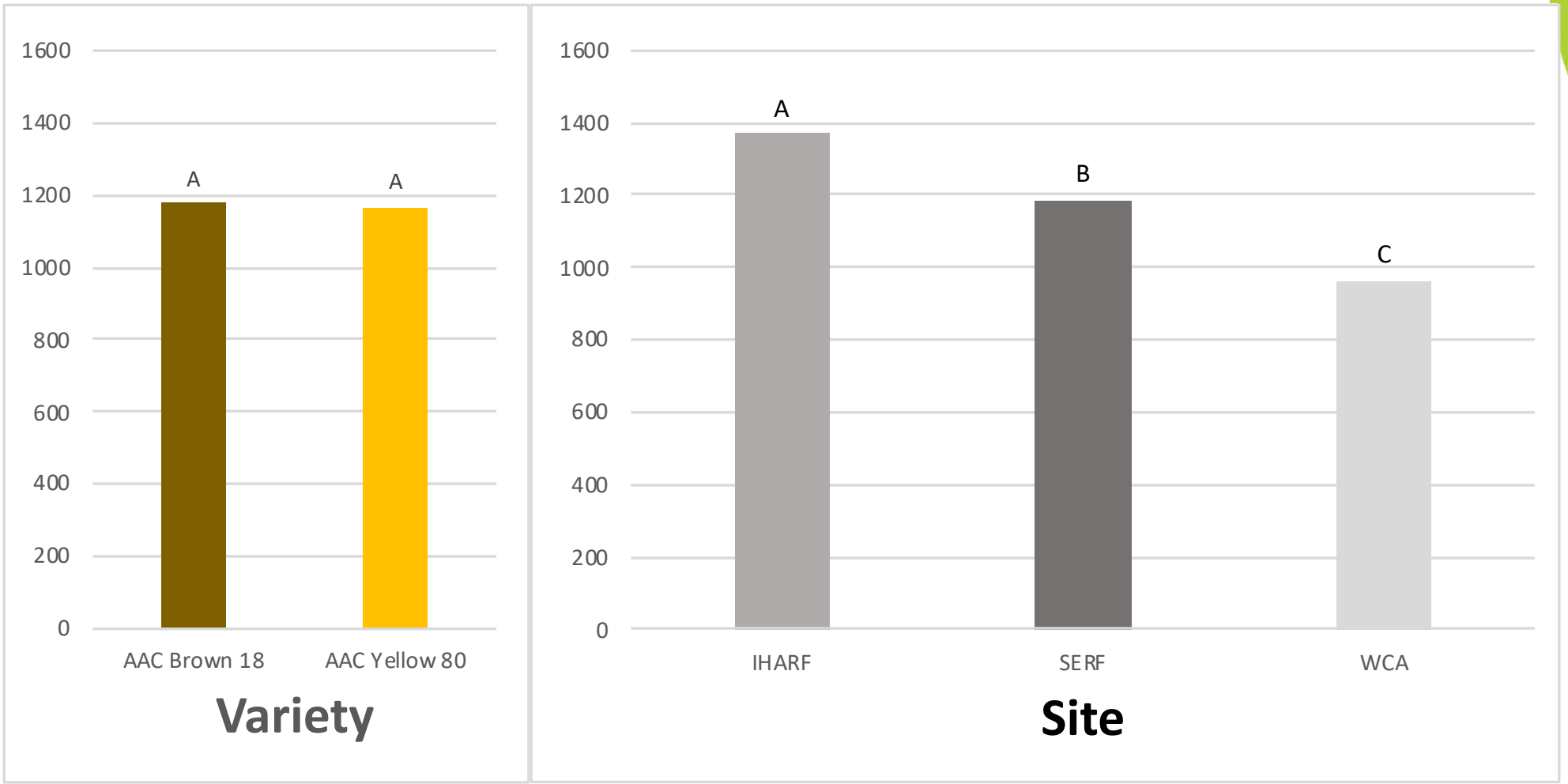
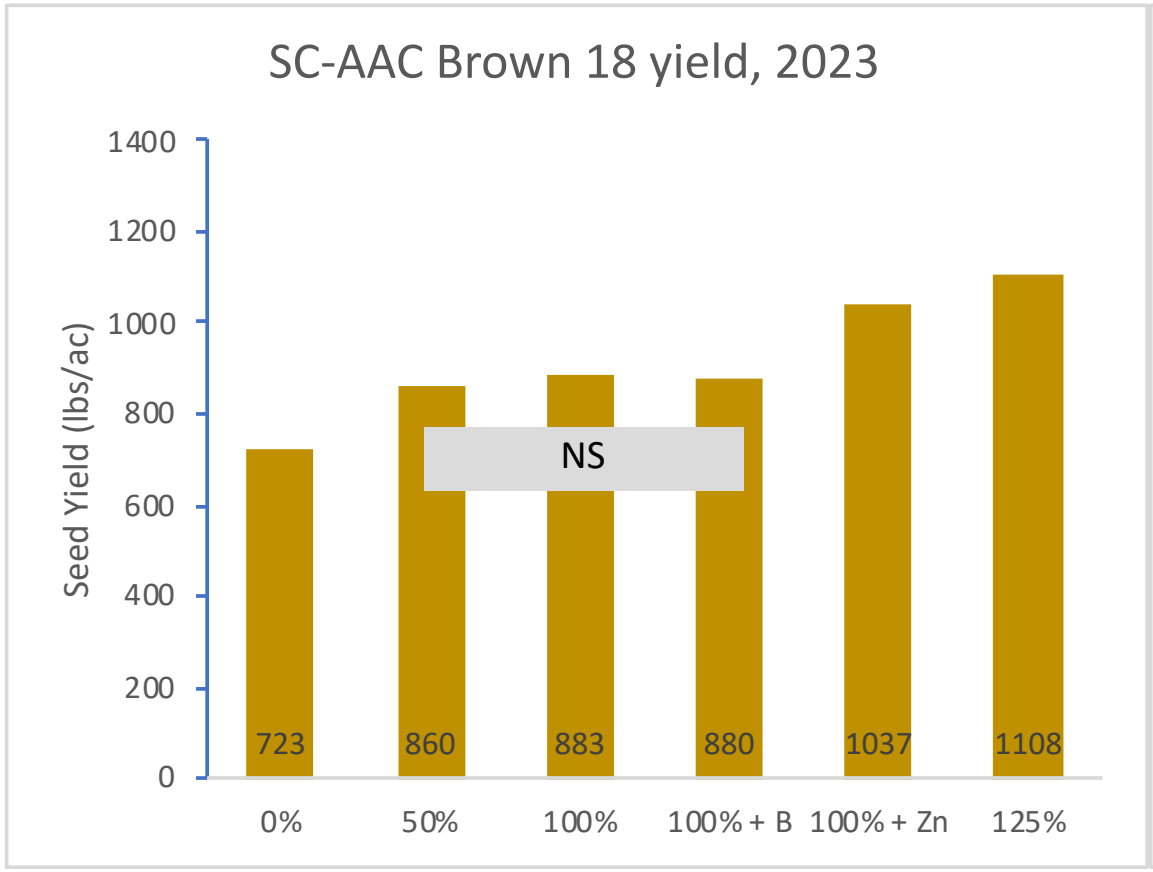
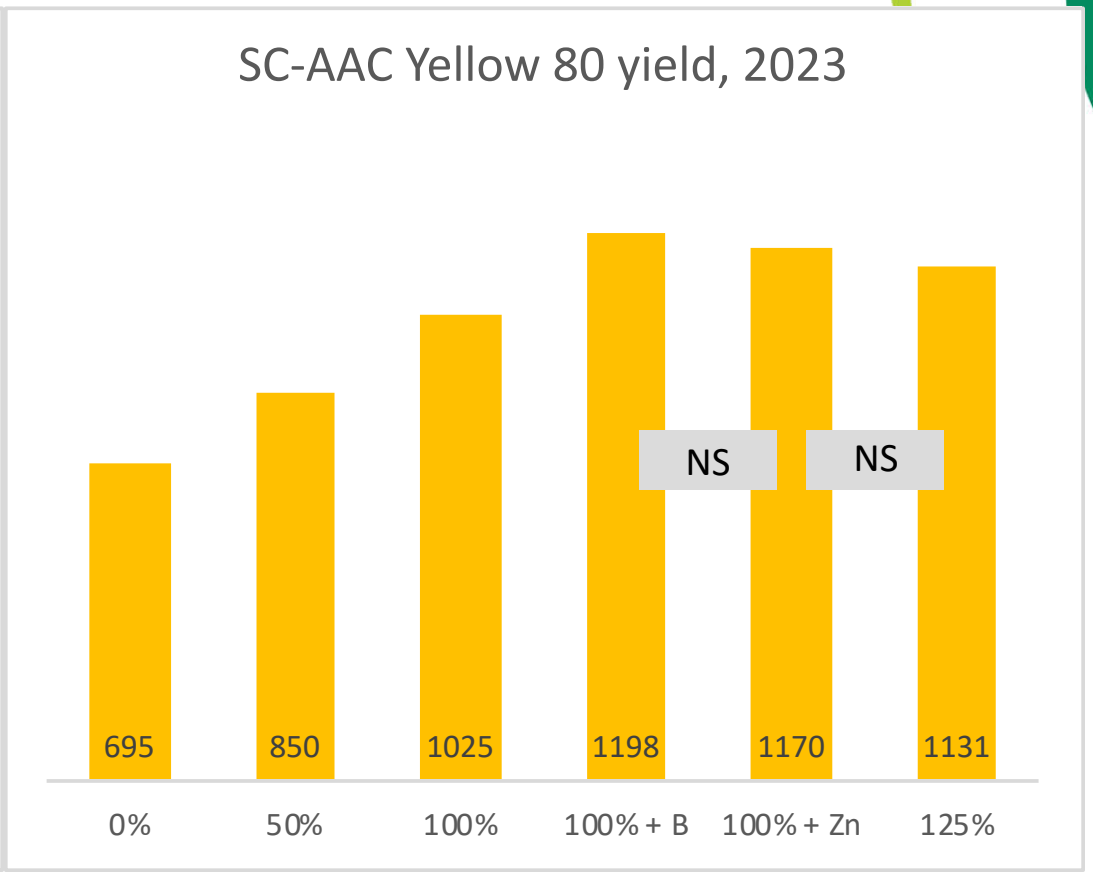
Site and variety effects on seed yield



SC variety effects on yield





Percent soil test recommendation for NPKS

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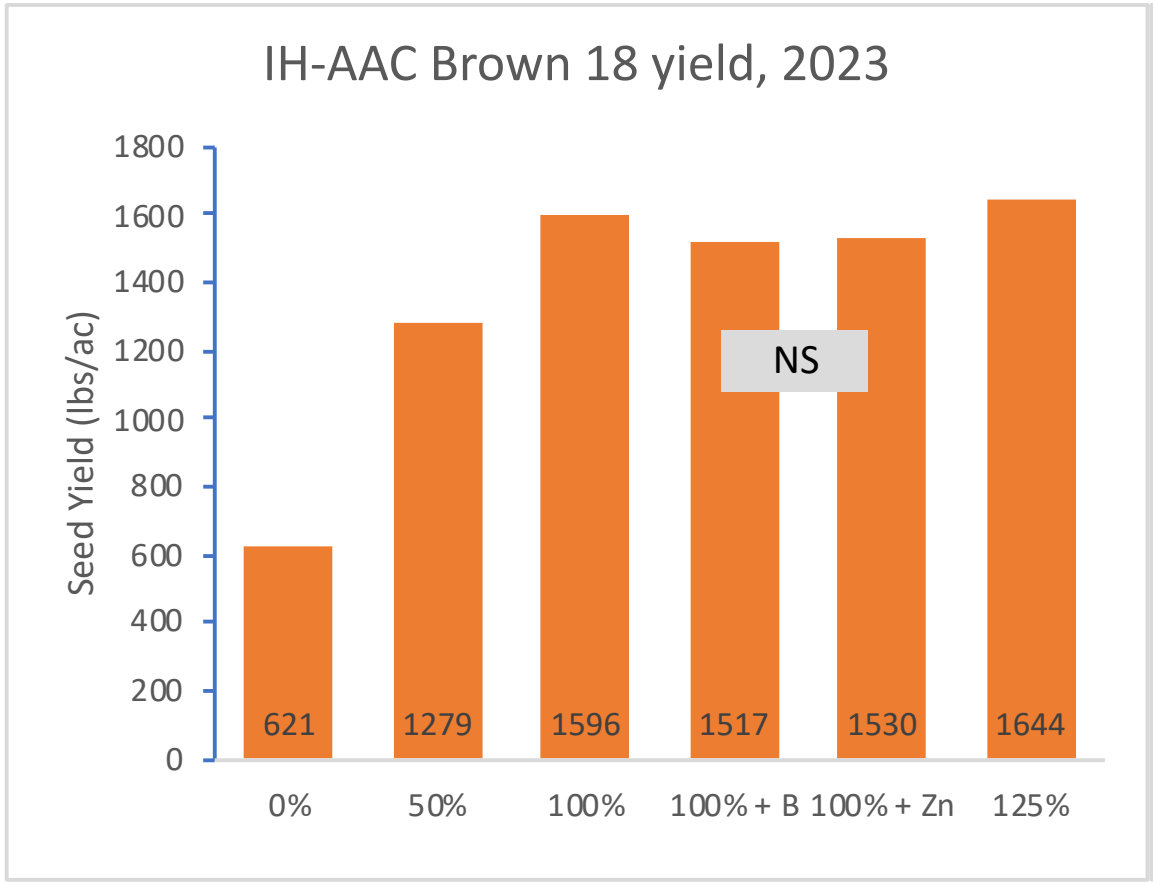
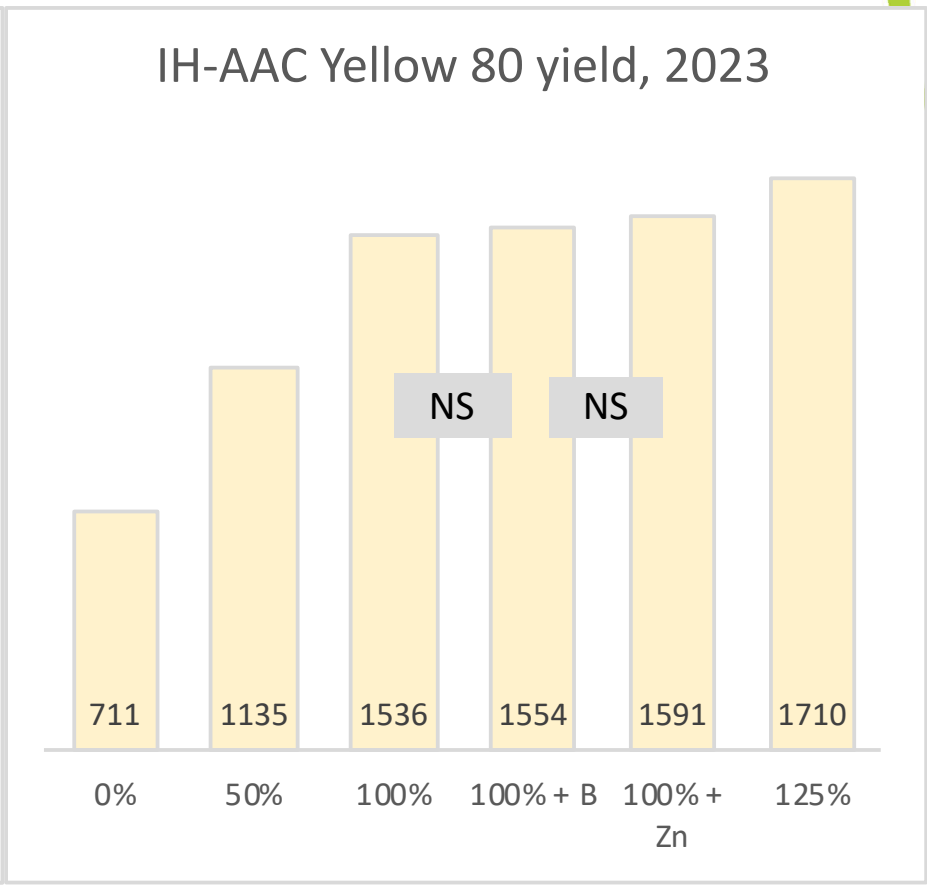
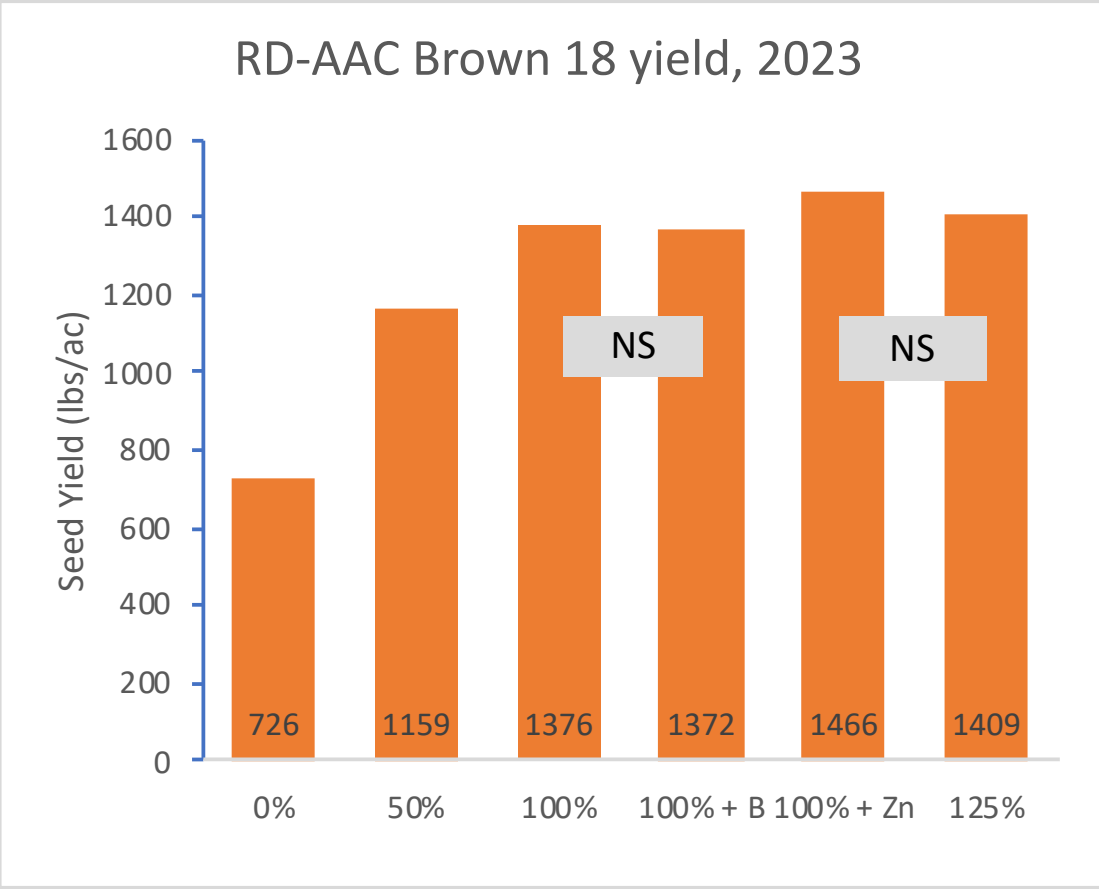
IH variety effects on yield

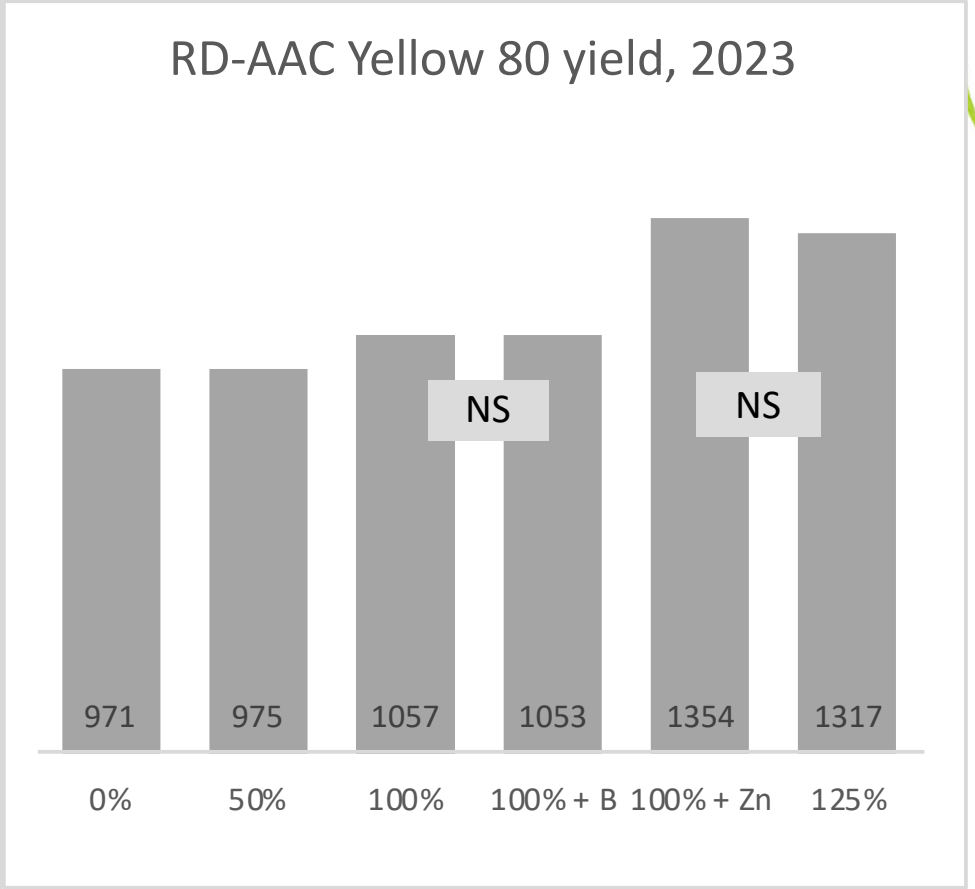




Percent soil test recommendation for NPKS

RD variety effects on yield





Percent soil test recommendation for NPKS

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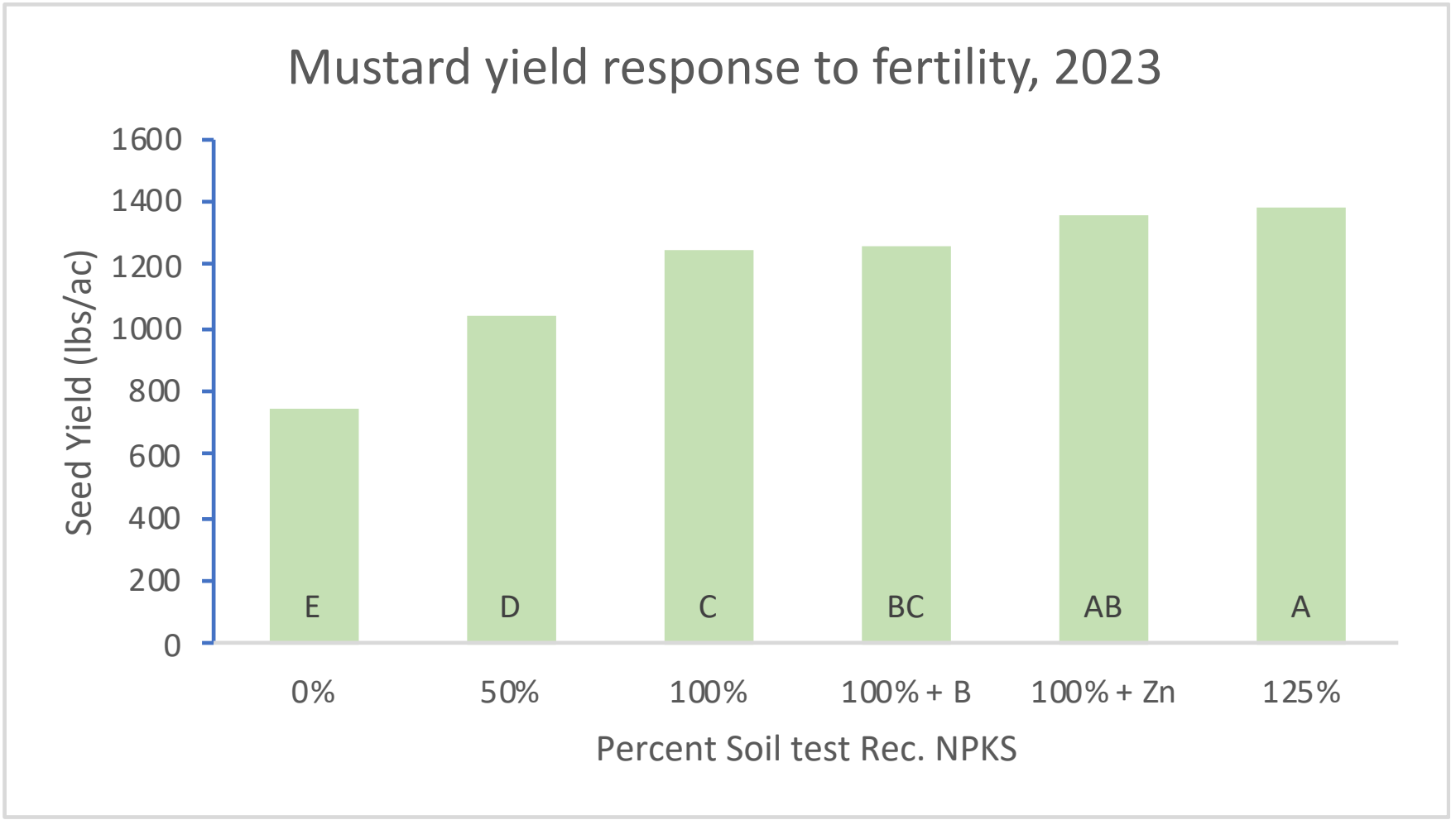
Yield response to Zn (3 site average)



	OM%
SC	2.6
	-
IH	6.1
	-
RD	2.8
	-

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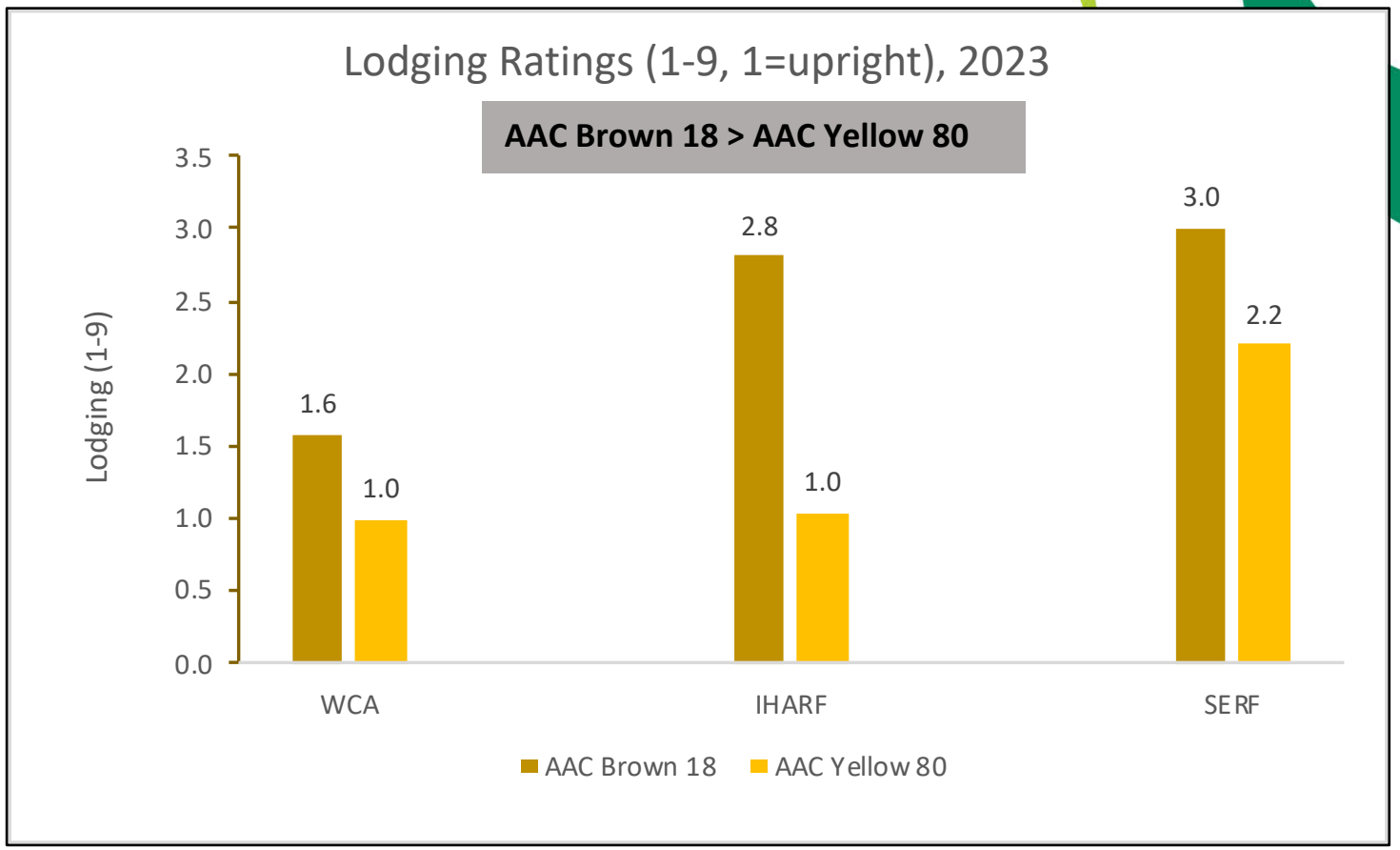
Lodging (1-9)

Lodging Ratings (1-9) where 1=upright						
Class	WCA		IHARF		SERF	
AAC Brown 18	1.6	a	2.8	a	3.0	a
AAC Yellow 80	1.0	b	1.0	b	2.2	b
SE	0.2		0.1		0.2	
LSD	0.3		0.2		0.4	

- AAC Brown 18 > AAC Yellow 80
- Increased with fertility
- SERF>IHARF>WCA



Days to Maturity

Days to Maturity (60% SCC)						
Class	WCA		IHARF		**SERF**	
AAC Brown 18	77	a	76	a	**74**	**a**
AAC Yellow 80	77	a	76	a	**73**	**b**
SE	1.2		0.2		0.8	
LSD	**NS**		**NS**		1	

- AAC Brown 18 = AAC Yellow 80
- Slight increase with fertility at IHARF and SERF
- WCA>IHARF>SERF

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Summary

Mustard yield response to Zinc in most cases

Yellow 80 yield response to Boron where soil levels were **VERY LOW**

Mustard yield response to Nitrogen and Sulphur where soil levels were **LOW, but not always significantly different than the addition of Zinc**

Limitations:

- Moisture
- Limitations in macronutrients more likely the major factor holding back yield than a micronutrient deficiency in most Saskatchewan soils

Micronutrients should be considered as part of the overall balance of nutrients required to optimize yield and economic return.

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Thank you!

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

Shannon Chant, Crops Extension Specialist, Saskatchewan Ministry of Agriculture

Rick Mitzel, Executive Director, Saskatchewan Mustard Development Commission

Mustard 21, seed for AAC Brown 18 and AAC Yellow 80

Nexus Bio Ag, Zinc and Boron products

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