
Welcome to the 2019 Crop Opportunity Meeting!



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- Hemp Genetics International

What is WARC?

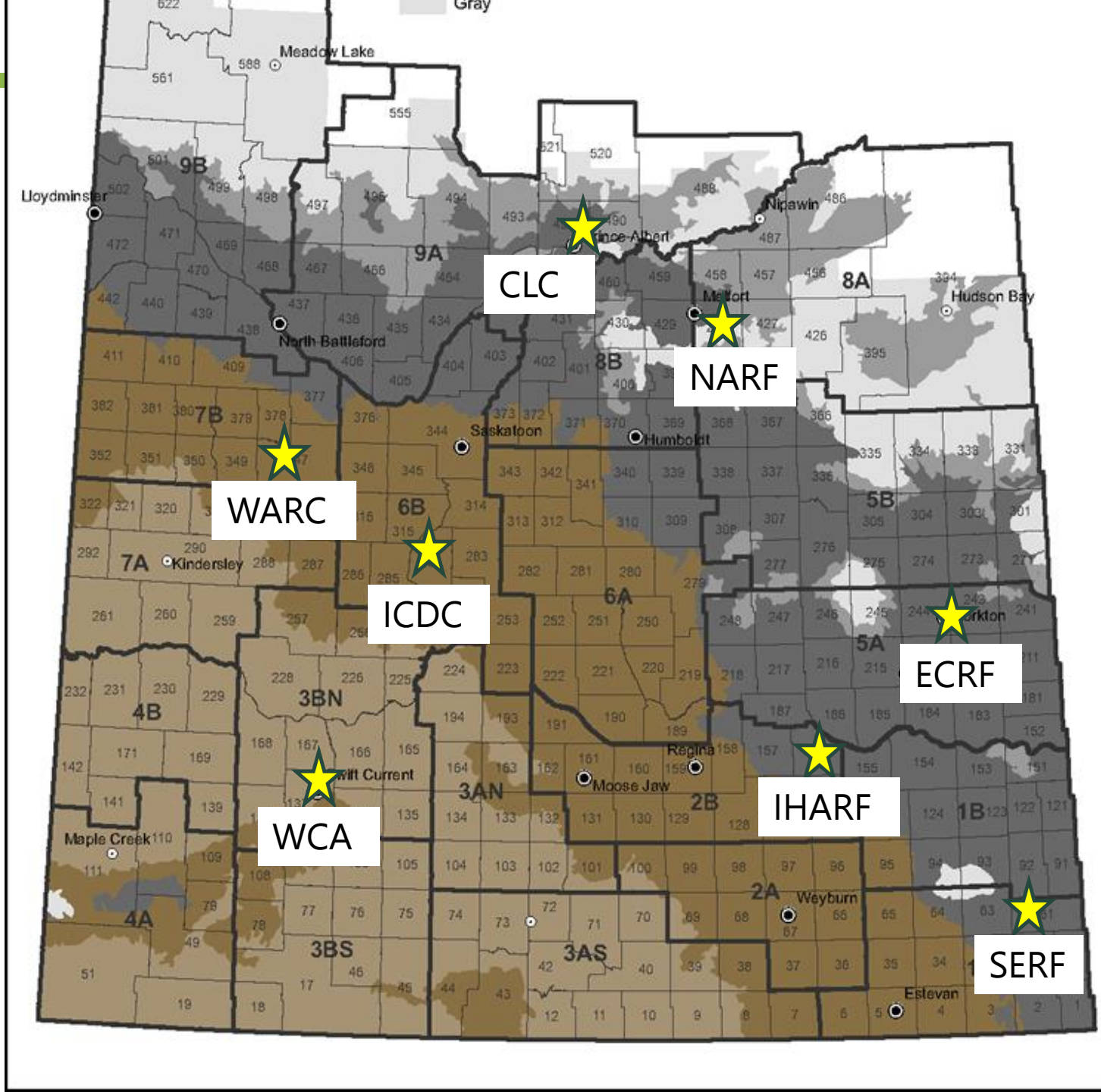


- Non-profit producer based organization
 - Board of Directors of local producers
 - Provide insight into current concerns and interests of local producers
- Who Funds Us?
 - Commodity groups
 - Saskatchewan Ministry of Agriculture
 - Canada-Saskatchewan Growing Forward 2 bi-lateral agreement
 - Private industry
- Independent organization that works in harmony with Agriculture and Agri-Food Canada at the Scott Research Farm

AgriARM

Applied Research Management

- Network of producer-directed applied research organizations
- Eight sites among Saskatchewan
- All operating individually



TYPE OF RESEARCH CONDUCT

- Can Farmer-Saved Seed of Wheat Perform as well as Certified Seed?
- Revisiting N Fertilizer Recommendations for SK: Are we measuring the right soil N pool?
- Peaola vs. Monocrop Seeding Rates and Fungicide Applications
- Dry Bean Inoculation and Fertilizer Strategies for Soil Seeded Production
- Production management strategies to improve field pea root health in aphanomyces contaminated soils
- Layering Pre & Post herbicides for managing Gr. 2 HR kochia and wild mustard in lentils
- Demonstrating new and traditional forage broadleaf and grass forage varieties

ENHANCING CANOLA PRODUCTION WITH IMPROVED PHOSPHORUS MANAGEMENT

Jessica Weber¹, Jessica Pratchler², Stu Brandt², Chris Holzapfel³

¹Western Applied Research Corporation, ²Northeast Agriculture Research Foundation, ³Indian Head Agricultural Research Foundation

Funded by:



CURRENT RECOMMENDATIONS

Safe Rates of P_2O_5

**based on double disc opener*

- 15 to 20 lb P_2O_5 / ac
- 25 lb P_2O_5 / ac under good moisture

Removal Rates

- 1.3 to 1.6 lb P_2O_5 / ac > Safe Rate

**Mining soil for available
P**



Crop	Yield	P Removal	Seed Limit	Balance
	(bu/ ac)	----- lb P ₂ O ₅ / ac-----		
				-
Wheat	60	36	50	+ 14
Canola	40	40	20	- 20
Soybeans	35	28	10	- 18
Barley	80	38	50	+12
Flax	32	20	20	0
Peas	50	2038	20	-18
Oats	100	29	50	+ 21

Rates are



Safe rates of $\text{SO}_4\text{-S}$

- 10 lb S / ac



Typical Recommendation

- 13- 27 lb S / ac

Can ammonium sulphate be seed-

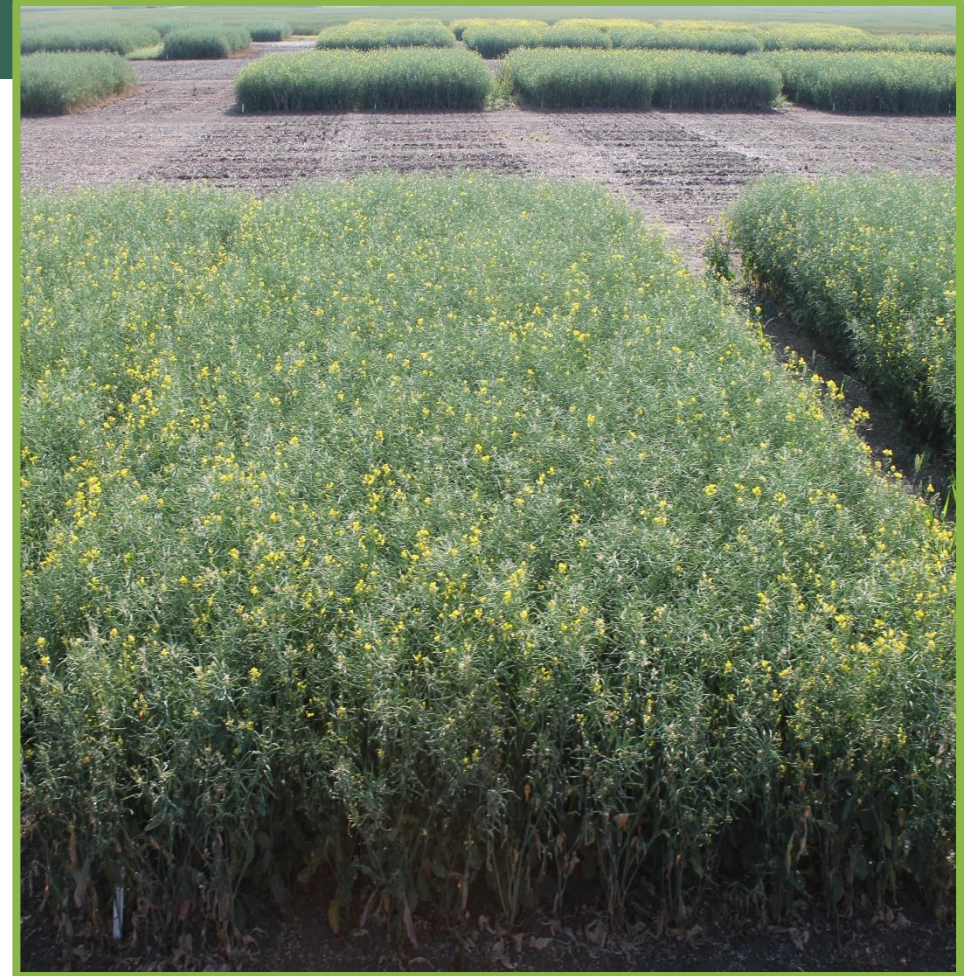
OBJECTIVES

- Are current P fertilizer recommendations adequate for high yielding cultivars?
- Does all fertilizer P need to be seed placed or is side banding equally effective?
- Are current recommendations regarding safe rates of P and S suitable for typical knife or hoe openers in use today?

EXPERIMENTAL DESIGN

3 Sites: Scott, Indian Head, & Melfort

- Trial Period: 2016, 2017, 2018
- RCBD 4 Replicates
- 2-Way Factorial
 - Rate: 0, 18, 36, 53, 71 P₂O₅ & 13 S lb/ ac
 - Placement: Sideband (SB) & Seed-Placed (SP)
- Data Collection
 - Plant Density: 2,4,6 WAP
 - Biomass: 6 WAP
 - Days to Maturity: 60% SCC
 - Yield
 - Green Seed & TKW



TREATMENT APPLICATION

Treatment #	lb/ ac P ₂ O ₅	Placement
1	0	SP
2	18	SP
3	36	SP
4	53	SP
5	71	SP
6	0	SB
7	18	SB
8	36	SB
9	53	SB
10	71	SB
11	0 & 13S	SP
12	18 & 13S	SP
13	36 & 13S	SP
14	53 & 13S	SP
15	71 & 13S	SP

SITE INFORMATION

Scott

- SBU 10%
- Loam

SOIL TEST NUTRIENT LEVELS

Depth (inches)	NO ₃ -N	P	K	SO ₄ -S
0-6	13	>30	261	11
6-12	6			2
12-24	5	"low-med"		2

Indian Head

- SBU 6%
- Clay Loam

SOIL TEST NUTRIENT LEVELS

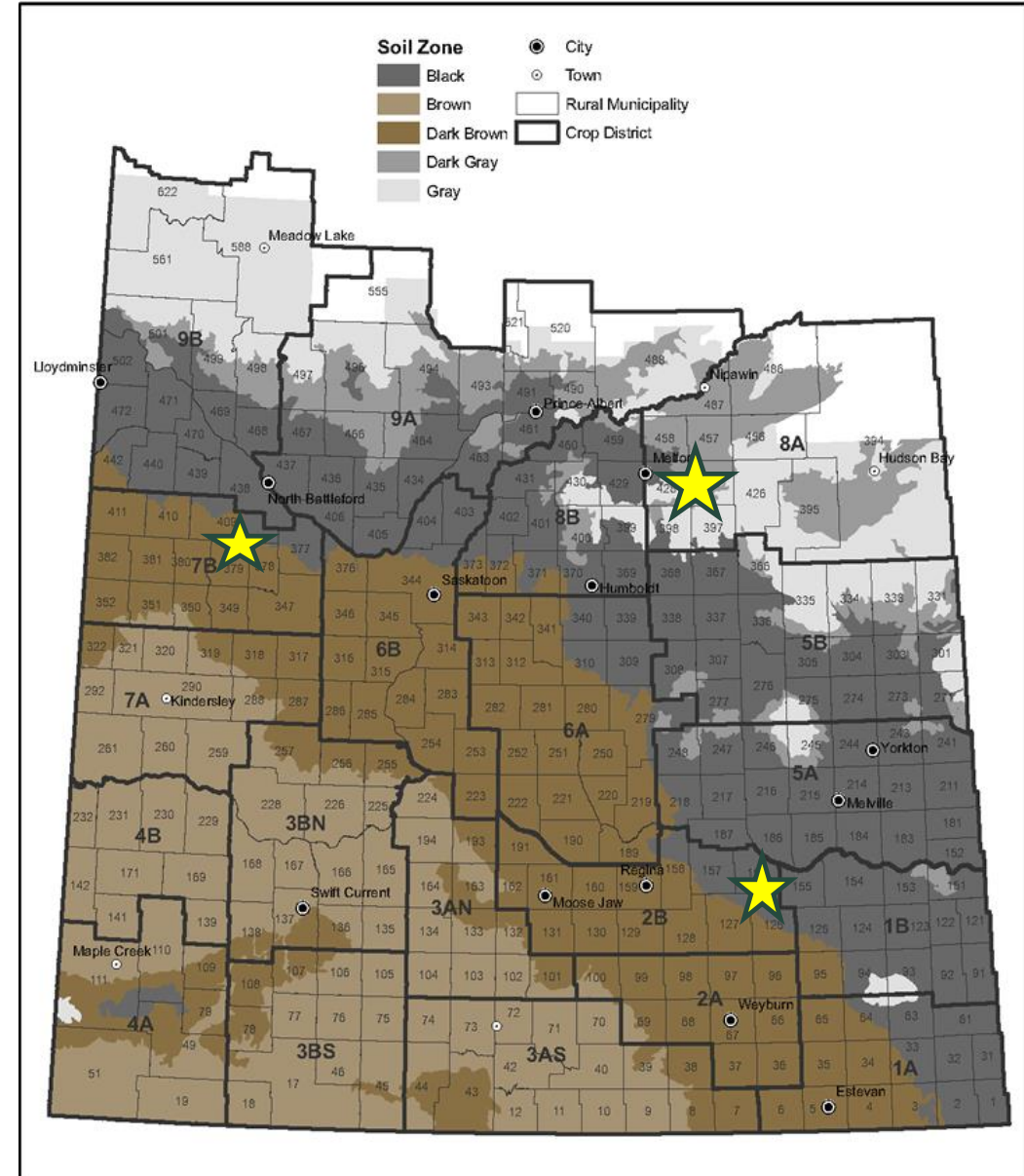
Depth (inches)	NO ₃ -N	P	K	SO ₄ -S
0-6	10	6	>540	9
6-24	11	"very low"		19

Melfort

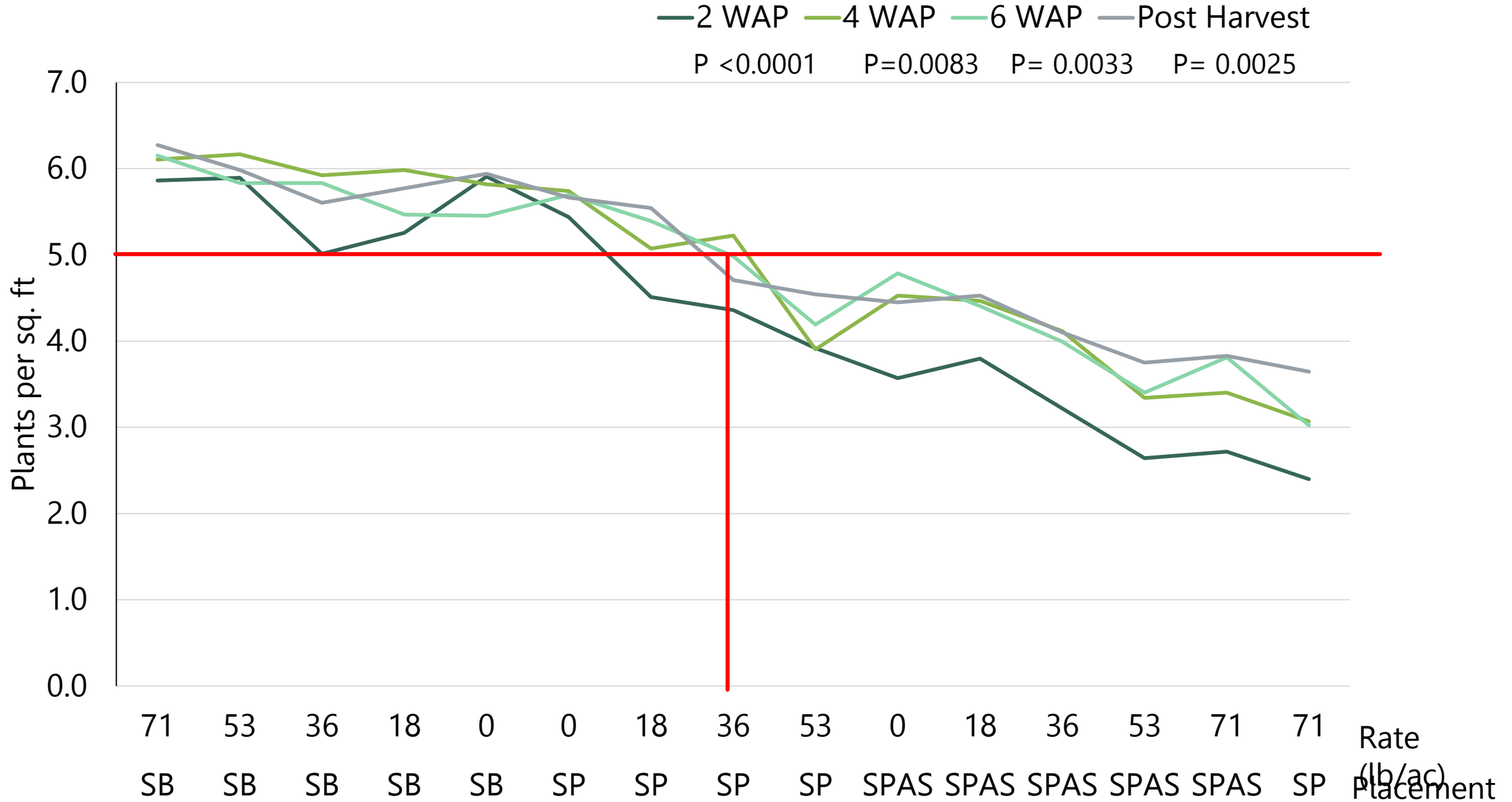
- SBU 8%
- Clay Loam

SOIL TEST NUTRIENT LEVELS

Depth (inches)	NO ₃ -N	P	K	SO ₄ -S
0-6	39	22	700	10
0-12	68	"low"		15



SCOTT, SK 2016-2018



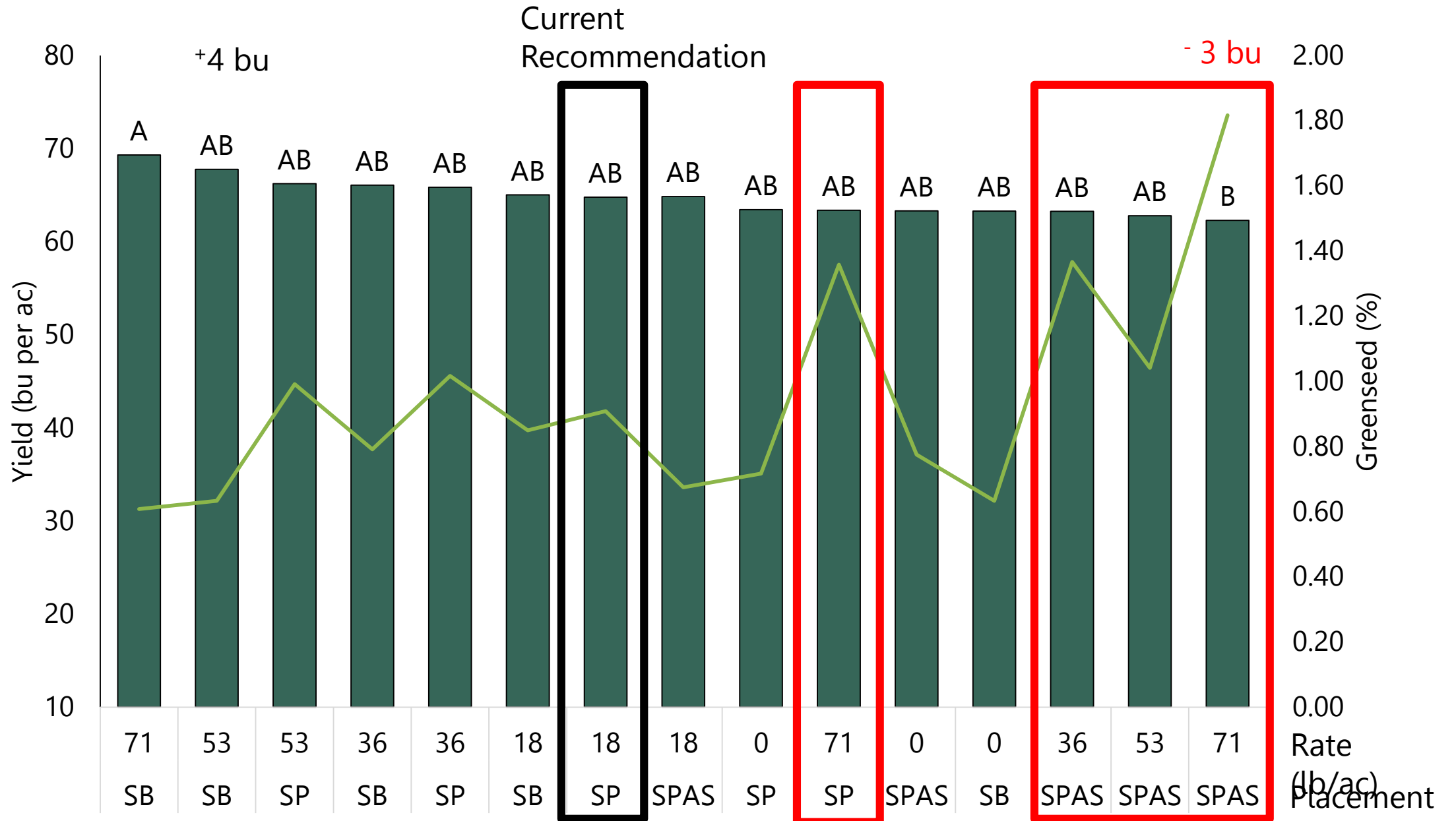


71 lb/ac Side Band

71 lb/ac Seed Placed

71 lb/ac + 13 AS Seed Placed

SCOTT, SK 2016-2018

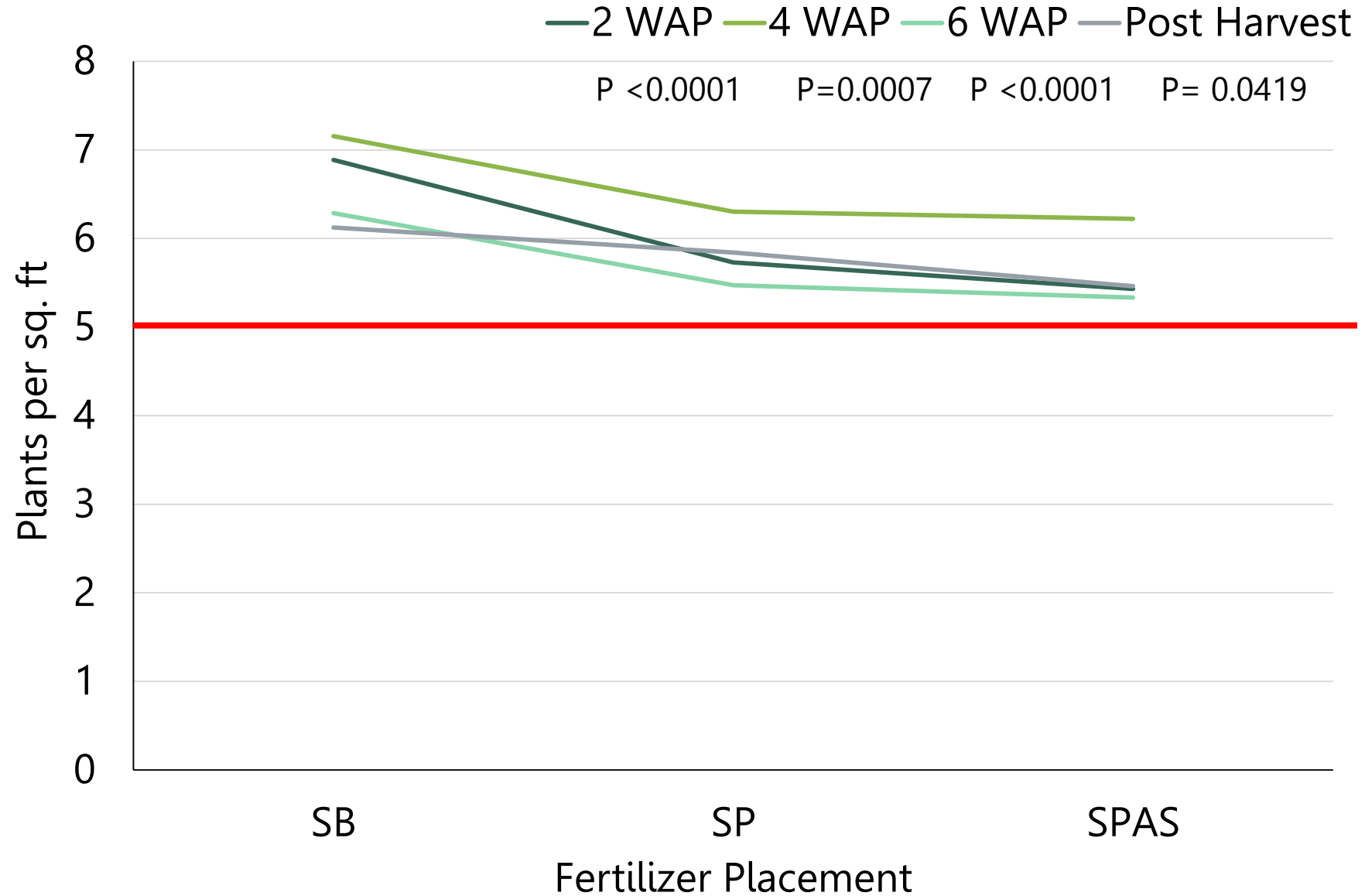


MELFORT & INDIAN HEAD, SK 2016-2018



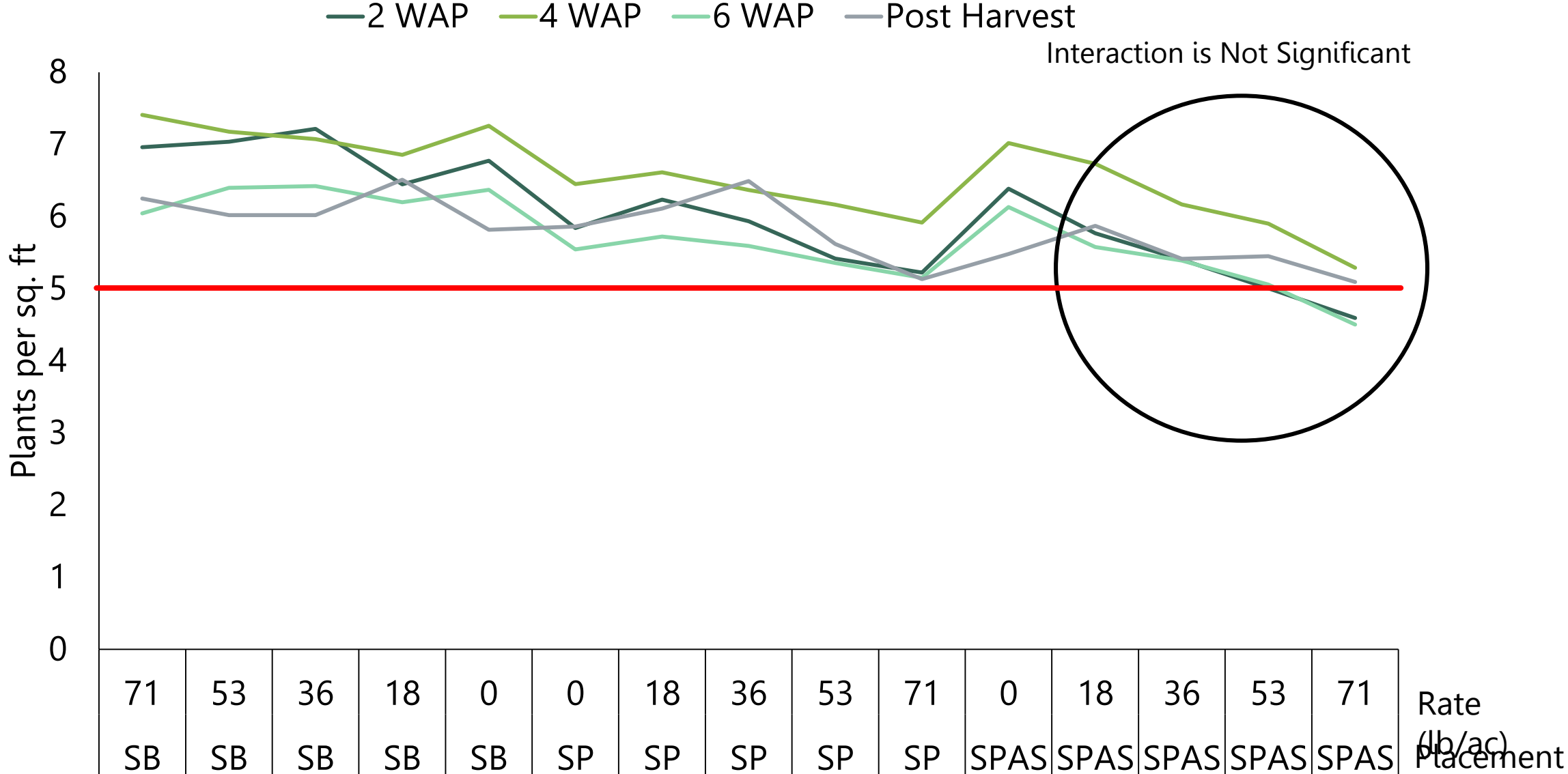
MELFORT & INDIAN HEAD, SK

2016-2018



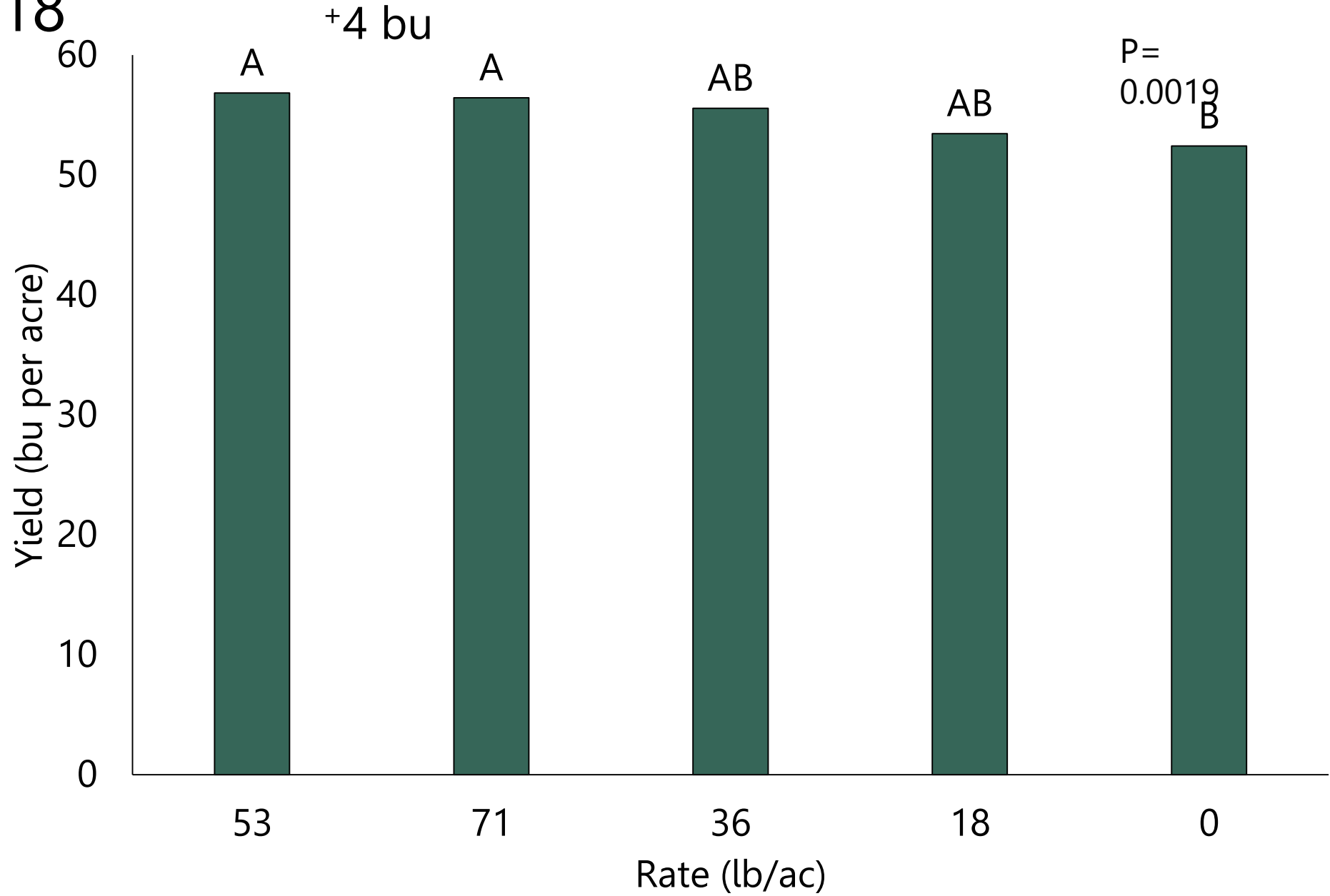
MELFORT & INDIAN HEAD, SK

2016-2018



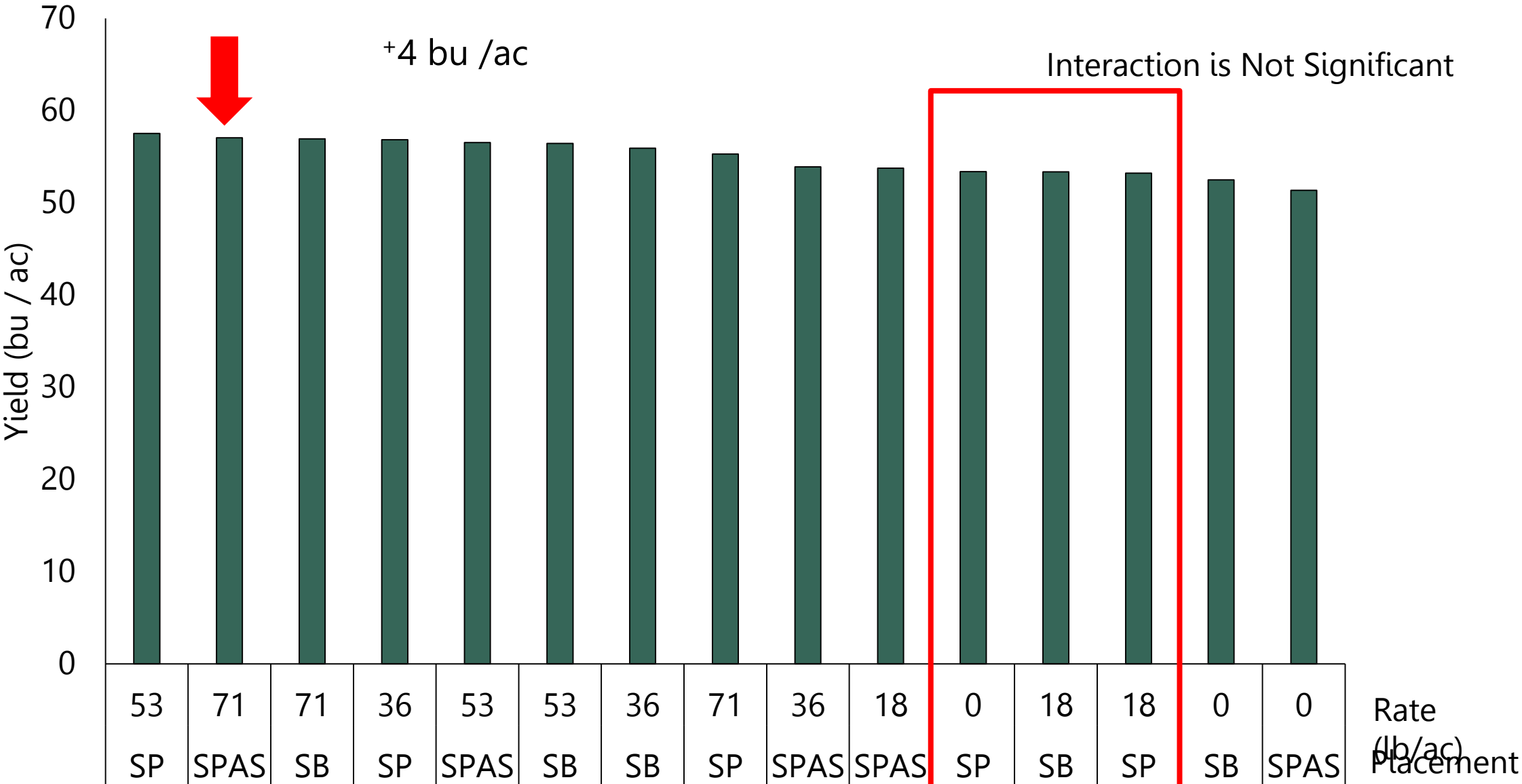
MELFORT & INDIAN HEAD, SK

2016-2018



MELFORT & INDIAN HEAD, SK

2016-2018



Effects of P & S were Site Dependent

Scott

Side banding > Seed placed

Plant Density

- > 5 pl/ ft² SB (all rates) > SP (0, 18, 36 lb/ ac)
- < 5 pl/ ft² SP (53 & 71 lb/ ac) & all SP P₂O₅ & S

Yield

- SB @ 53 & 71 lb/ac greatest yields
- SB @ 71 lb/ac lower yields than 20 lb/ac
- SP P₂O₅ & AS always resulted in lowest yields

Melfort & Indian Head

Plant Density

- SB > SP > SP/ AS

Yield

- Rate effect on yield
- > 40 P₂O₅ greatest yield
- P₂O₅ alone > S applications

-
- Are current P fertilizer recommendations adequate for high yielding cultivars?
 - >36 lb/ ac P₂O₅
 - Does all fertilizer P need to be seed placed or is side banding equally effective?
 - Location dependent? Scott > Melfort > Indian Head
 - Are current recommendations regarding safe rates of P and S suitable for typical knife or hoe openers in use today?
 - 15 to 20 lb P₂O₅ / ac VS. >36 lb P₂O₅ / ac

Factors to Consider:

SOIL TEXTURE

SOIL MOISTURE

WHAT DOES THIS MEAN FOR YOU?

Best Case Scenario:

1. Side band rates targeted to replenish P_2O_5 reserves & seed place P_2O_5 for early season vigor

DUAL BANDING N AND P FERTILIZER

What are the consequences of dual banding at these high rates?

- P_2O_5 availability is increased by ammonium in the band
 - P_2O_5 availability is delayed when banded with high rates of N
 - Typical rates of N will delay P uptake for several weeks due to band toxicity
 - Greater than 75 lb/ ac of N
 - Some starter P should be placed in seed row when "dual banding" N & P
 - Enables early season access to P

WHAT DOES THIS MEAN FOR YOU?

Best Case Scenario:

1. Side band rates targeted to replenish P_2O_5 reserves & seed place P_2O_5 for early season vigor
2. Side- band at higher rates (71 lb /ac)

HIGHER P RATES = GRADUAL SOIL P INCREASE

- Most soils are largely depleted of P
- Target Olson P 15 ppm is a healthy goal for your soils to maintain
 - Build levels in cereal years with side or mid-row band applications
 - Apply sufficient P in side- band or midrow bands to match crop removal on annual basis

Cindy, G. and D. Flaten. Review of P fertilizer management research in the Northern Great Plains. Soils & Crops Symposium. March 2019.

WHAT DOES THIS MEAN FOR YOU?

Best Case Scenario:

1. Side band rates targeted to replenish P_2O_5 reserves & seed place P_2O_5 for early season vigor
2. Side- band at higher rates (71 lb /ac)
3. Seed place do not exceed < 36 lb/ ac
 - At this rate you will not rejuvenate soil P levels

EXCESS SEED-PLACED MONOAMMONIUM PHOSPHATE CAN CAUSE SEEDLING DAMAGE IN CANOLA

- Toxicity is related to salt effect from N portion of MAP fertilizer
- Toxicity is affected by soil characteristics and weather
- Seed bed utilization affects concentration and therefore toxicity
 - Wider SBU = higher rates
- Reducing concentration in soil solution will reduce toxicity

FUTURE RESEARCH

- Examine higher rates of P side banded
- Look at struvite alternatives (slow release P) and coated MAP
- Triple shoot opener capacities?

ACKNOWLEDGEMENTS



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada