Yield, Nitrogen and Phosphorus Uptake by Four Fababean Varieties at Four Sites in Saskatchewan

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Western Canadian Fababean Acres

- Crop Insurance Acreage (70-85% of acres grown)
  - 2014
    - AB – 80,000
    - SK – 20,000
    - MB –
  - 2015
    - AB – 110,000
    - SK – 62,000
    - MB – 9,000

Source: Phelps, S. 2015. Faba Bean Agronomy. SPG Webinar.

Objective

Assess yield, nutrient uptake by modern fababean varieties under SK conditions

- Measure:
  - Grain and straw yield
  - Nutrient (macro&micro) concentration
  - Nutrient uptake

Hypothesis

Different varieties of fababean will ***differ*** in their nutrient ***uptake*** potential and ***response*** to added fertilizer in different environments.

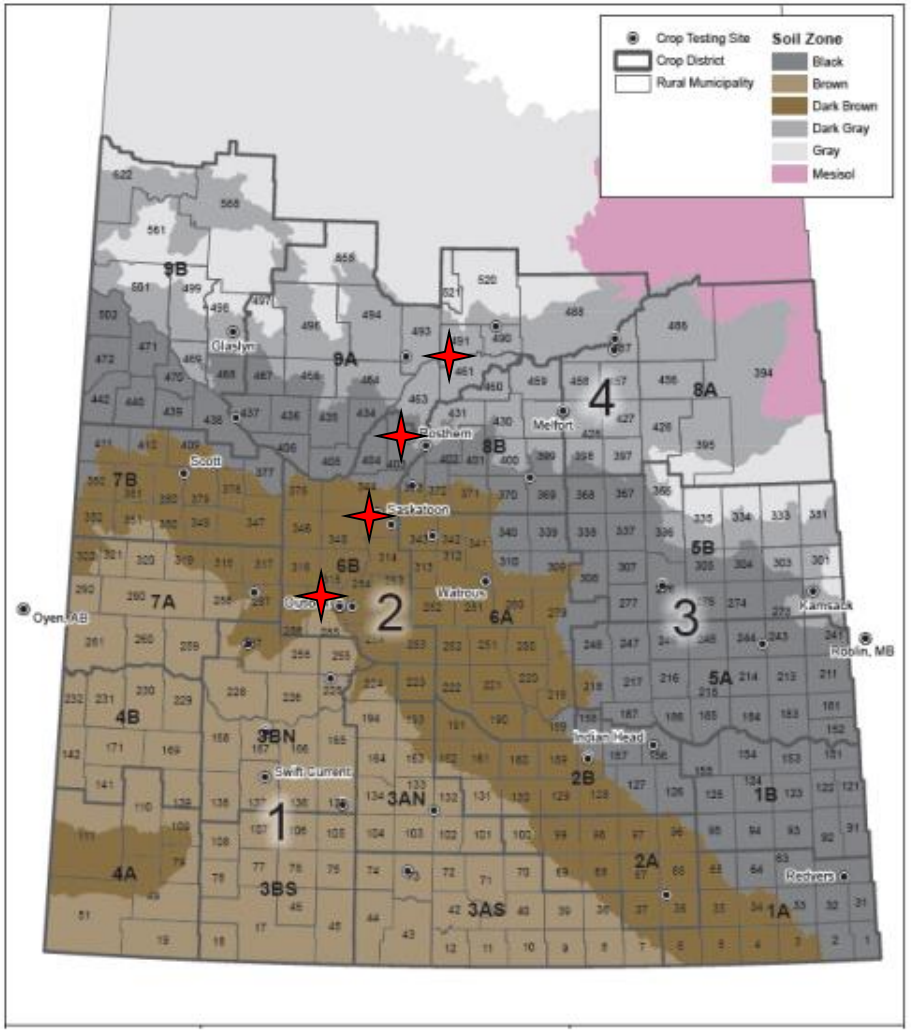
Purpose of Study

- Improve
  - Fertilizer recommendations
  - Crop nutrition planning
- Meet nutrient requirements

Nutrient Uptake Field Study 2016

- 4 Site locations
  - Saskatoon (Dark Brown)
  - Outlook (Dark Brown)
  - Rosthern (Black)
  - Meath Park (Dark Gray)

- Experimental Design
  - Split Plot Design



Source: Gov. of Sask. Varieties of Grain Crops 2017.

Nutrient Uptake Field Study 2016

1. 2 fertilizer treatments
   - No fertilizer
   - N, P, K, S containing blend
     - K_2SO_4 (0-0-44-17) @ 100 kg/ha
     - MAP (11-52-0) @ 100 kg/ha

Nutrient Uptake Field Study 2016

2. 4 recent fababean varieties

Smaller seeded

- Snowbird
- CDC Snowdrop

Larger seeded

- CDC 219-16
- Tabasco

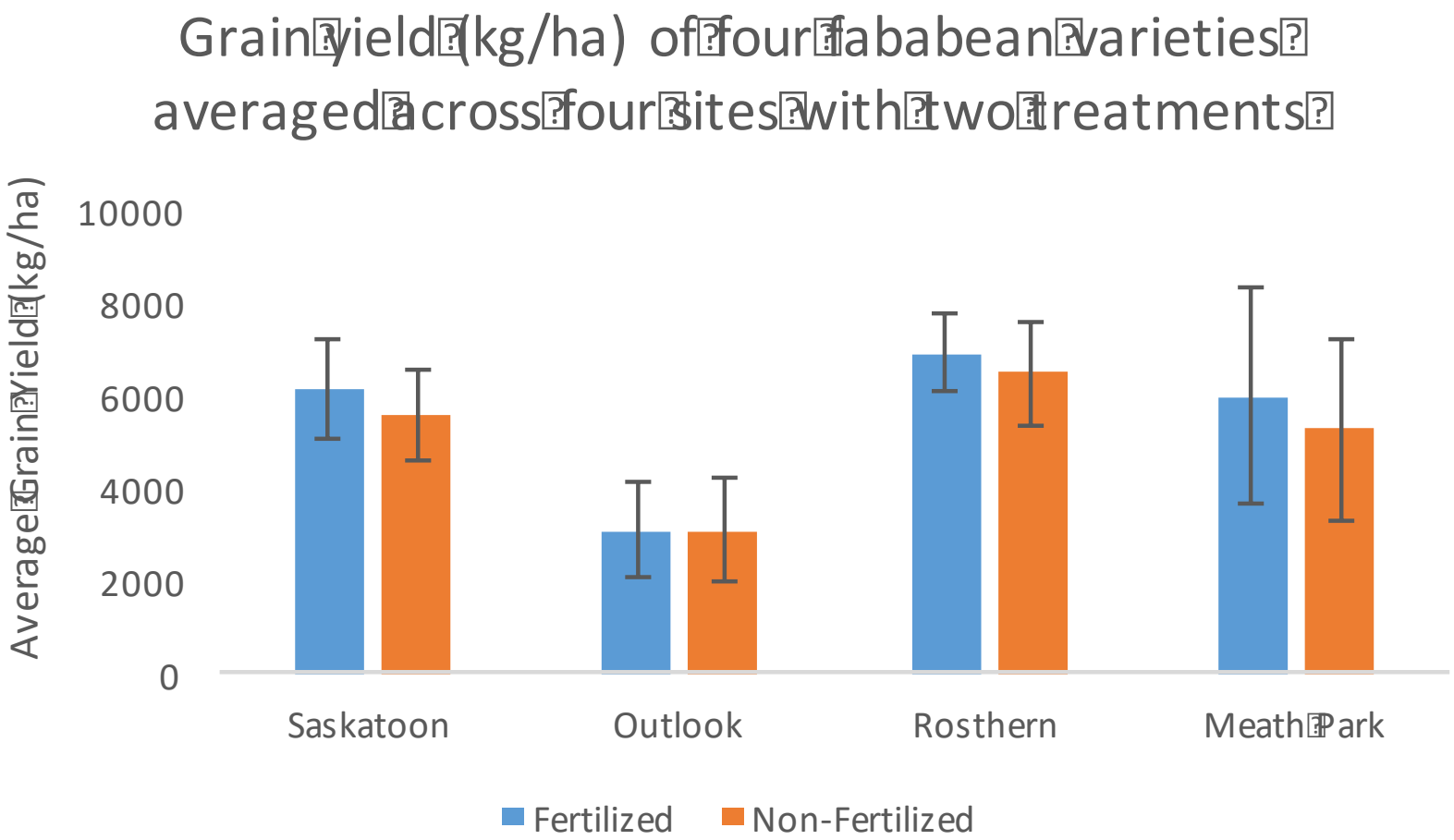
Spring 2016 Soil Fertility

Table 1 Available nutrient concentrations (kg ha^{-1}), pH and EC at 0-15 cm soil depth prior to seeding at four field sites in spring 2016.

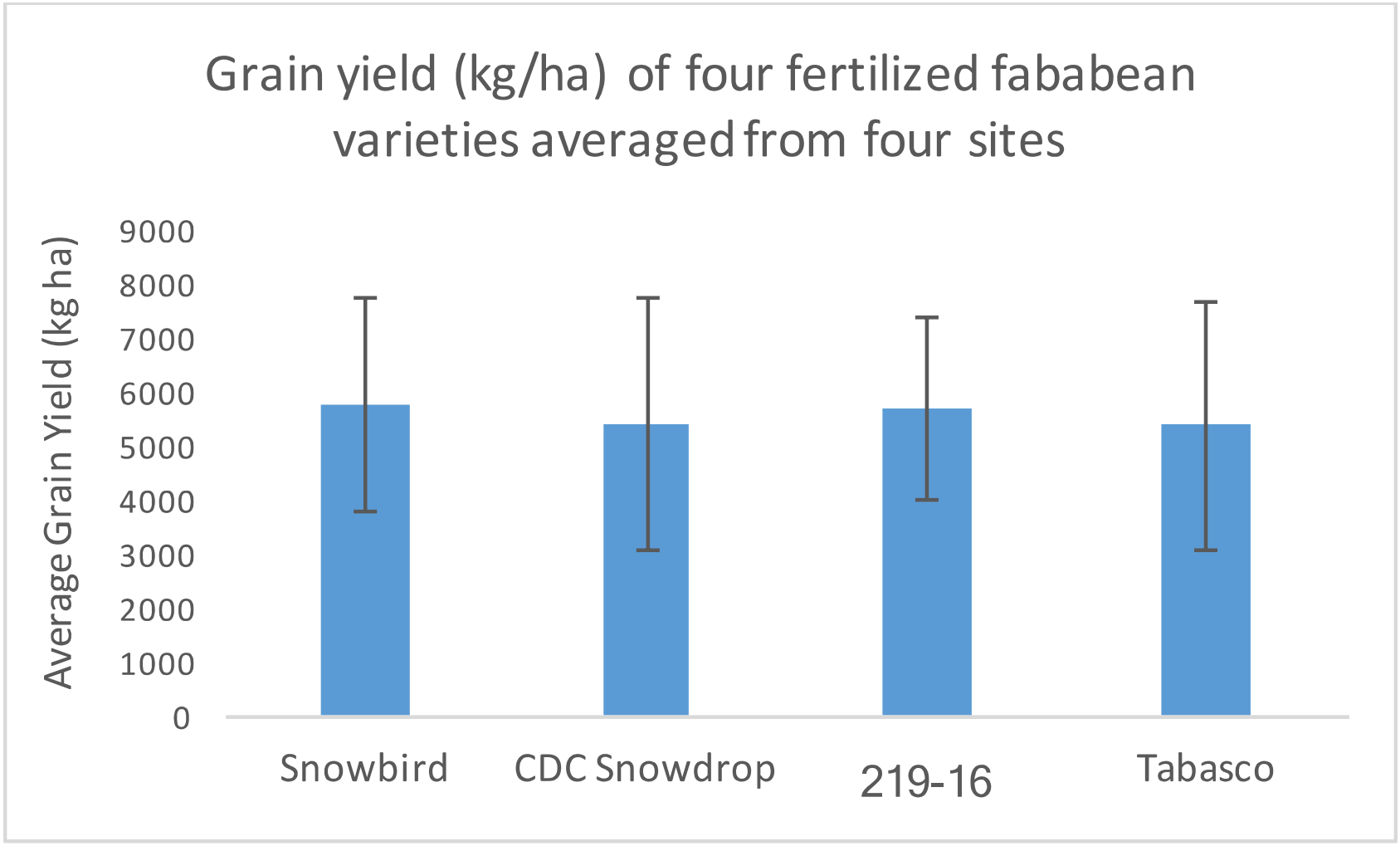
Site	NO_3-N	P	K	SO_4-S	pH	EC
	kg ha^{-1}	kg ha^{-1}	kg ha^{-1}	kg ha^{-1}		
Saskatoon	19	47	868	9	6.4	0.1
Outlook	5	32	282	4	7.6	0.1
Rosthern	15	30	333	8	6.7	0.1
Meath Park	4	54	484	6	6.3	0.1

Results

Fall 2016 Grain Yield



Fall 2016 Grain Yield



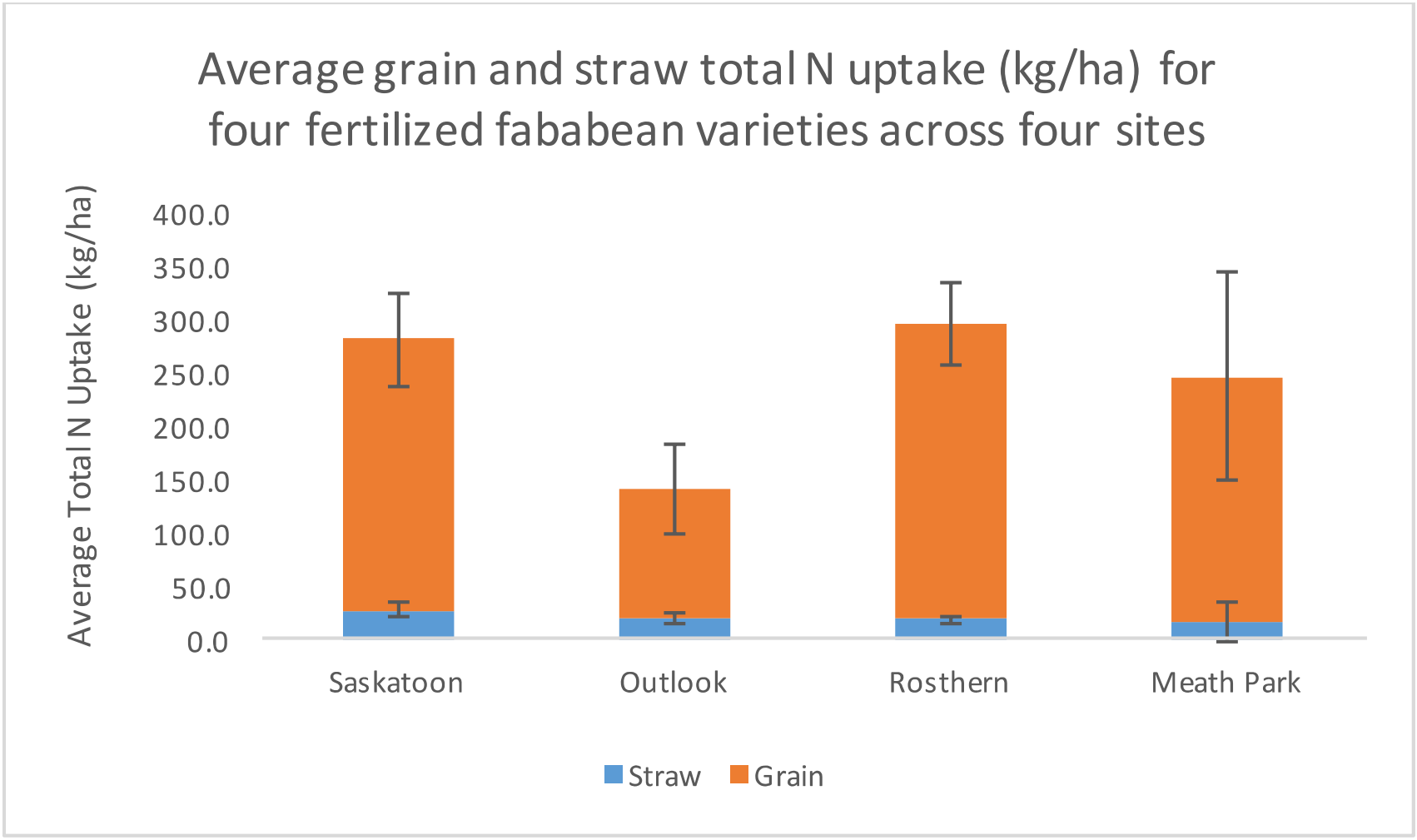
Fall 2016 Grain N and P Concentration

Table 2 Grain total N and P concentration (g kg^{-1}) of fertilized and non-fertilized fababean from four varieties averaged across four sites.

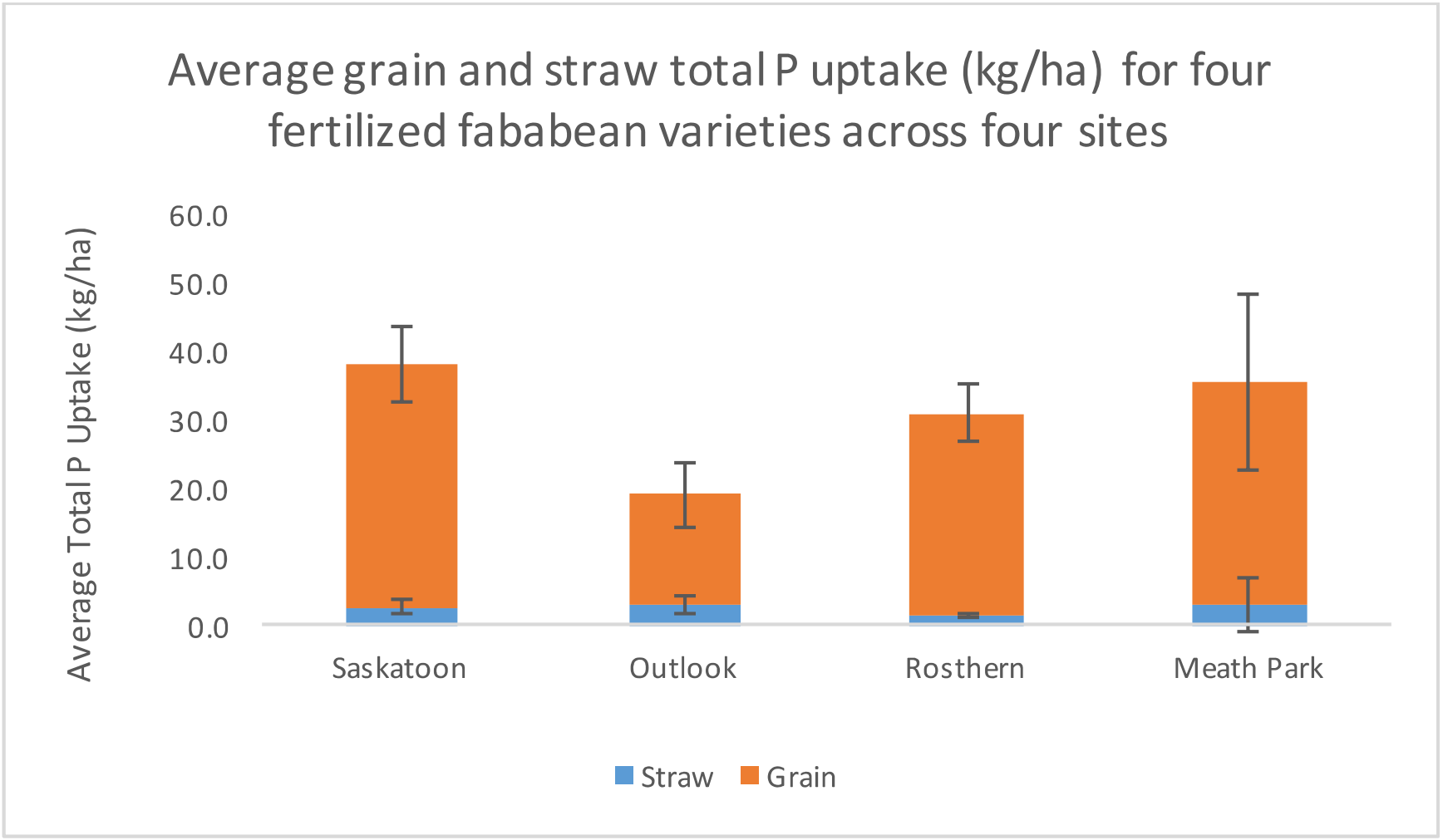
Sites	Total N Concentration		Total P Concentration	
	Fertilized	Non-Fertilized	Fertilized	Non-Fertilized
	g N kg^{-1}	g N kg^{-1}	g P kg^{-1}	g P kg^{-1}
Saskatoon	41.3 (1.2)	41.4 (1.4)	5.8 (0.4)	5.5 (0.5)
Outlook	39.4 (1.2)	39.1 (1.9)	5.2 (0.4)	5.2 (0.4)
Rosthern	40.0 (2.0)	39.9 (1.5)	4.3 (0.4)	4.0 (0.3)
Meath Park	38.0 (3.2)	38.5 (3.8)	5.4 (0.3)	5.0 (0.6)

Note: Mean concentration (Standard Deviation)

Grain and straw total **N** uptake



Grain and straw total **P** uptake



Conclusions

- *Modern fababean varieties*
  - Very good yield potential (unless too wet)
  - Limited response to fertilization
  - Large amounts of N in above ground biomass
  - High P requirement, found largely in grain

Future Work

- 2017 field season
- P fertilizer response in polyhouse study
- Estimate N_2 fixation contribution
  - Measure % ndfa using N-15

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Growing Forward 2

Saskatchewan Pulse Growers

Thank you!

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