



2016 FERTILIZER TRIALS POTATOES – REDUCED PHOSPHORUS AND POTASSIUM FIELD SPECIFIC RESULTS

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FIELD A: REPLICATED TRIAL (YUKON GOLD)

Soil Details

Samples taken pre-trial, in April 2016. Samples taken at 0-15 cm depth. P and K ratings specific to potatoes in the Lower Mainland, developed by BC AGRI.

Field	pH	OM (%)	Kelowna P (ppm)	P-rating	Kelowna K (ppm)	K-rating
A	5.5	4.0	150	Very High	134	Medium

Fertilizer Treatments

Field	Fertilizer Treatment	Total Applied N lb/acre	Total Applied P ₂ O ₅ lb/acre	Total Applied K ₂ O lb/acre	Fertilizer Rates and Application Methods
A	Farm rate	85	140	215	500 lb/ac broadcast (12-5-23) 500 lb/ac in-furrow (5-23-20)
	Reduced rate	90	25	115	500 lb/ac broadcast (12-5-23) 65 lb/ac broadcast (46-0-0)

Planting Date

May 19, 2016

Harvest Date

September 2, 2016

Trial Size

Three plots per treatment, each plot 24 ft (8 rows) by 200 ft

Results

There was no difference in mean total yield between Farm rate vs. Reduced rate treatments (Fig. 1). There were also no differences between treatments for foliar N, P, K or post-harvest soil P and K (results not shown). Mean post-harvest soil nitrate (0-30 cm) was higher under Reduced rate (58 kg/ha) compared to Farm rate (30 kg/ha) – possibly a result of inefficient delivery of N to the crops via broadcast urea application in the Reduced rate plots.

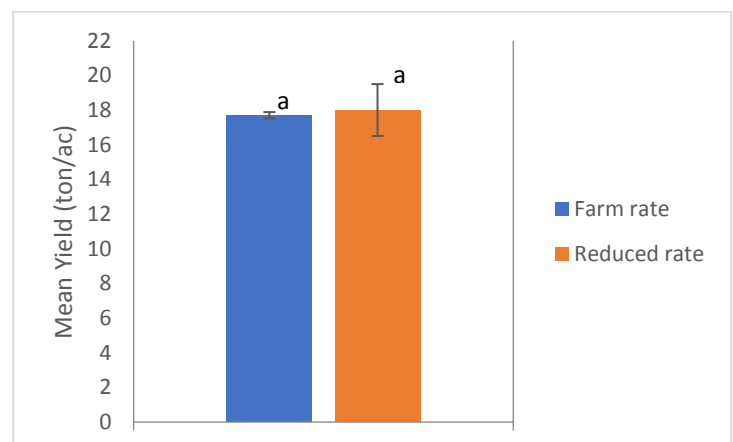


Figure 1. Mean potato yield (ton/ac) under Farm rate and Reduced rate fertilization treatments for Field A. Error bars represent standard error of the mean (n = 3). Bars with the same letter are not significantly different ($P < 0.05$).

FIELD B: REPLICATED TRIAL (YUKON GOLD)

Soil Details

Samples taken pre-trial, in May 2016. Samples taken at 0-15 cm depth. P and K ratings specific to potatoes in the Lower Mainland, developed by BC AGRI.

Field	pH	OM (%)	Kelowna P (ppm)	P-rating	Kelowna K (ppm)	K-rating
B	5.7	3.9	144	Very High	261	Very High

Fertilizer Treatments

Field	Fertilizer Treatment	Total Applied N lb/acre	Total Applied P ₂ O ₅ lb/acre	Total Applied K ₂ O lb/acre	Fertilizer Rates and Application Methods
B	Farm rate	84	189	231	1050 lb/ac in-furrow (8-18-22)
	Reduced rate	87	0	0	190 lb/ac broadcast (46-0-0)

Planting Date

May 19, 2016

Harvest Date

August 31, 2016

Trial Size

Three plots per treatment, each plot 24 ft (8 rows) by 200 ft

Results

There was lower mean total yield in the Reduced rate treatment compared to the Farm rate (Fig. 2). Observationally, the plants in Reduced rate plots appeared spindlier and to have less row closure compared to Farm rate plots – spindly plants can be an indication of insufficient P. However, there were no differences between treatments for foliar N, P, K or post-harvest soil P and K (results not shown). Mean post-harvest soil nitrate (0-30 cm) was higher under Reduced rate (59 kg/ha) compared to Farm rate (34 kg/ha) – possibly a result of inefficient delivery of N to the crops via broadcast urea application in the Reduced rate plots. Reduced rate plots did not receive any additional micro and macro nutrients in the fertilizer mix.

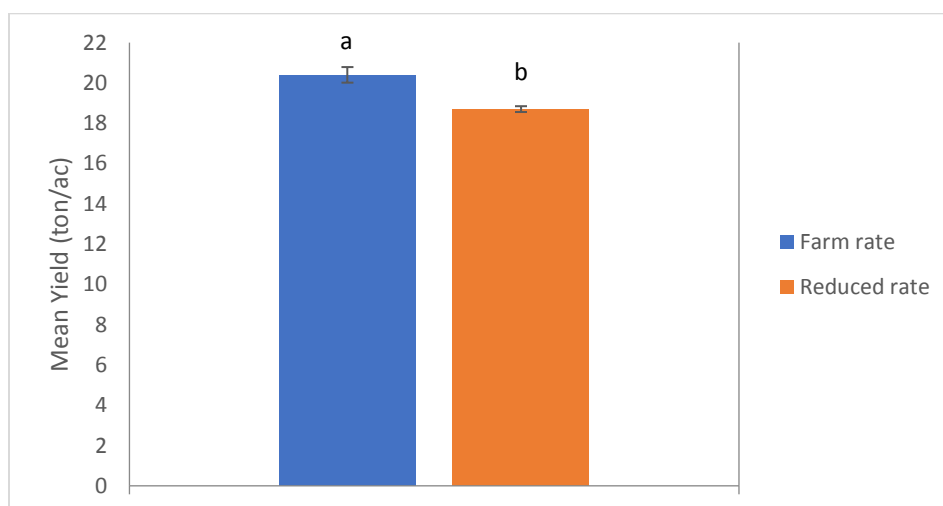


Figure 2. Mean potato yield (ton/ac) under Farm rate and Reduced rate fertilization treatments for Field B. Error bars represent standard error of the mean (n = 3). Bars with the same letter are not significantly different ($P < 0.05$).

UNREPLICATED TRIALS: FIELD C (RUSSETS)**FIELD D (WHITES)****FIELD E (REDS)****Soil Details**

Samples taken pre-trial, in May 2016. Samples taken at 0-15 cm depth. P and K ratings specific to potatoes in the Lower Mainland, developed by BC AGRI.

Field	pH	OM (%)	Kelowna P (ppm)	P-rating	Kelowna K (ppm)	K-rating
C	5.2	6.1	133	Very High	289	Very High
D	5.9	4.4	63	High	175	High
E	5.3	3.4	202	Very High	271	Very High

Fertilizer Treatments

Field	Fertilizer Treatment	Total Applied N lb/ac	Total Applied P ₂ O ₅ lb/acre	Total Applied K ₂ O lb/acre	Fertilizer Rates & Application Methods
C	Farm rate	100	180	220	1000 lb/ac in-furrow (10-18-22)
	Reduced rate	86	0	0	188 lb/ac broadcast (46-0-0)
D	Farm rate	110	149	259	1100 lb/ac in-furrow (10-13.5-23.5)
	Reduced rate	87	0	0	190 lb/ac broadcast (46-0-0)
E	Farm rate	88	198	242	550 lb/ac broadcast (8-18-22) 550 lb/ac in-furrow (8-18-22)
	Reduced rate	85	99	121	550 lb/ac broadcast (8-18-22) 90 lb/ac in-furrow (46-0-0)

Field C**Planting Date**

May 18, 2016

Harvest Date

September 16, 2016

Trial Size

One plot per treatment, each plot 24 ft (8 rows) by 200 ft

Field D**Planting Date**

May 25, 2016

Harvest Date

September 26, 2016

Trial Size

One plot per treatment, each plot 24 ft (8 rows) by 200 ft

Field E**Planting Date**

May 21, 2016

Harvest Date

September 19, 2016

Trial Size

One plot per treatment, each plot 24 ft (8 rows) by 300 ft

Results

In Field C, the overall distribution of mean total yield data appeared similar between fertilizer treatments (Fig. 3). There was a wider overall range of yield under Reduced rate (contained highest and lowest yielding subsamples in the field). No soil or foliar nutrients appeared to be deficient (data not shown).

In Field D, the Reduced rate plot had lower mean total yield compared to the Farm rate plot (Fig. 3). There was a wider and lower overall range of yield under Reduced rate. Foliar samples showed iron toxicity and manganese deficiency

concerns throughout both fertilizer treatment plots. Post-harvest soil sampling showed higher sodium in the Reduced rate plot (206.2 ppm) relative to the Farm rate plot (87.3 ppm), however, soil electroconductivity tests did not show much difference between trial plots. Patches of stunted plants were found throughout the field – soil and foliar nutrient sampling of these patches revealed further evidence of micronutrient problems: Mn deficiency, Fe toxicity, high Na, high Al. Reduced rate plots did not receive any additional micro and macronutrients in the fertilizer mix.

In Field E, the overall distribution of mean total yield data appeared similar between fertilizer treatments (Fig. 3). There was a wider overall range of yield under Reduced rate, with one particularly low subsample (15.1 t/ac) relative to the other Reduced rate subsamples. No soil or foliar nutrients appeared to be deficient (data not shown).

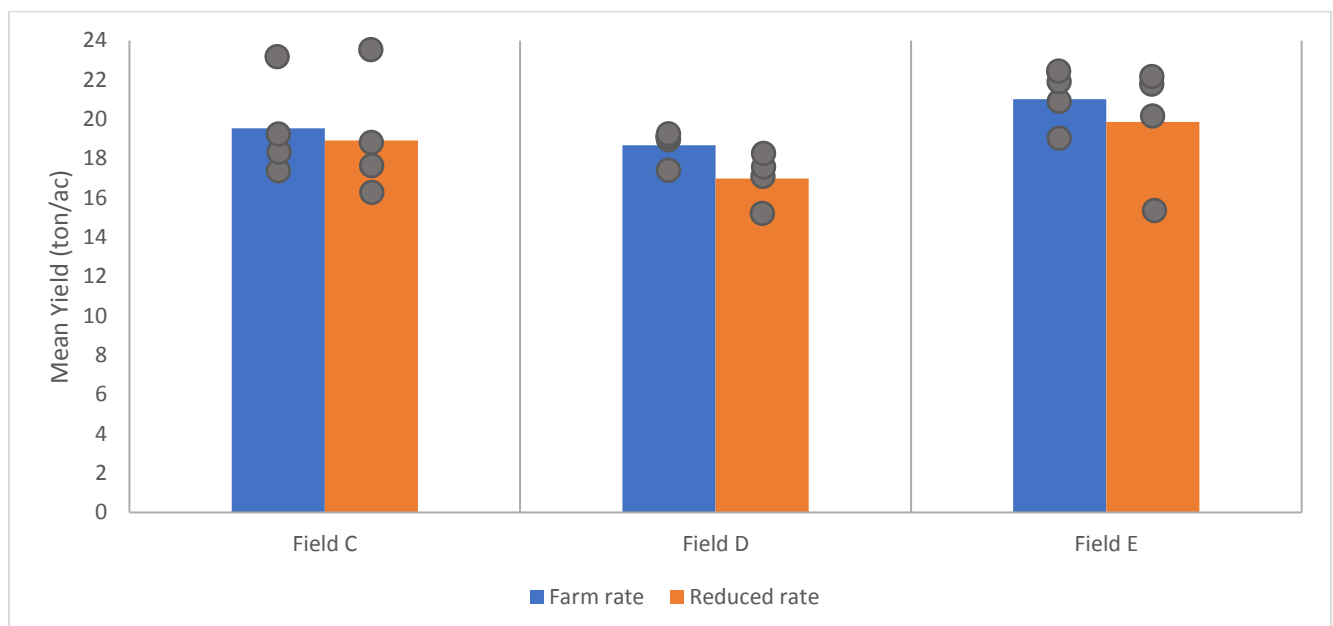


Figure 3. Mean potato yield (ton/ac) under Farm rate and Reduced rate fertilization treatments for unreplicated Fields C, D, and E. Circles represent the yield at each of the four subsamples within each trial plot to indicate distribution of data points.

Acknowledgements

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