Factsheet: Fertility Requirements for Quinoa

Objective:

The objectives of this demonstration were**:**

1) to expose producers to quinoa production

2) to fine tune our understanding of quinoa's macronutrient requirements and

3) to determine if quinoa respond to micronutrients.

Methodology:

This demonstration was conducted at the AAFC Scott Research Farm in spring 2016. A randomized complete block design with four replications was used. There were 12 treatments in total. The plot size was kept small due to manual hand-weeding as the only in-crop weed management option. Phosphorous, potassium and sulphur were mid-rowed at seeding. All the micronutrients were applied through broadcast and plots seeded immediately afterwards. Soil analysis was done prior to seeding to get the residual nutrient. Following visible rows, spring plant densities were assessed for both crops to determine if there is a response on different nutrient rates on plant establishment.

Table 1: Demonstration treatment list for 2016 growing season

Treatment	N (lbs/ac)	P_2O_5 (lbs/ac)	K_2O (lbs/ac)	S (lbs/ac)	Micronutrient (lbs/ac)
1	0	0	0	0	0
2	0	30	20	15	0
3	30	30	20	15	0
4	60	30	20	15	0
5	90	30	20	15	0
6	120	30	20	15	0
7	150	30	20	15	0
8	120	15	20	15	0
9	120	0	20	15	0
10	120	30	0	15	0
11	120	30	20	0	0
12	120	30	20	15	Cu, Mn, Zn and B; Crop Max II @ 7 lbs/ac

Key Findings:

- Generally, there were no significant effects of different macro and micronutrients on both plant density and grain yield. The highest application of N (150 lbs/ac), P_2O_5 (30 lbs/ac), K_2O (20 lbs/ac) and S (15 lbs/ac) resulted in the highest plant density of 39 plants/m^2
- However, the highest plant stands did not translate into the highest yield. This may be attributed to the large standard error of the mean, which suggests a wide range of plant densities produce similar yields

The full report is available at www.warc.ca. Project was supported by the Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Canada-Saskatchewan Growing Forward 2 bi-lateral agreement
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- The highest grain yield relative to the control was recorded in treatments with N (60 or 120 lbs/ac), P_2O_5 (15 or 30 lbs/ac), K_2O (20 lbs/ac) and S (15 lbs/ac).
- The application of micronutrients in combination with the macronutrients: N (120 lbs/ac), P_2O_5 (30 lbs/ac), K_2O (20 lbs/ac) and S (15 lbs/ac), did not offer any advantage relative to other treatments on both plant density and grain yield. This may be due to the fact that none of the applied micronutrient had a deficient level from the residual soil test levels.
- Results from the study have shown that, quinoa plant stands were lower than the recommended plant population; however, yield was higher than most of reported values around the world and specifically in Saskatchewan and /or the prairies.
- From the yield obtained, the production of quinoa is feasible under NW Saskatchewan conditions, if appropriate early-maturing cultivars and agronomic practices to control weed and diseases are adapted.
- Despite the non-significant effects of fertilizer and rates in this study, further work should be carried out to determine the actual fertilizer requirements of quinoa

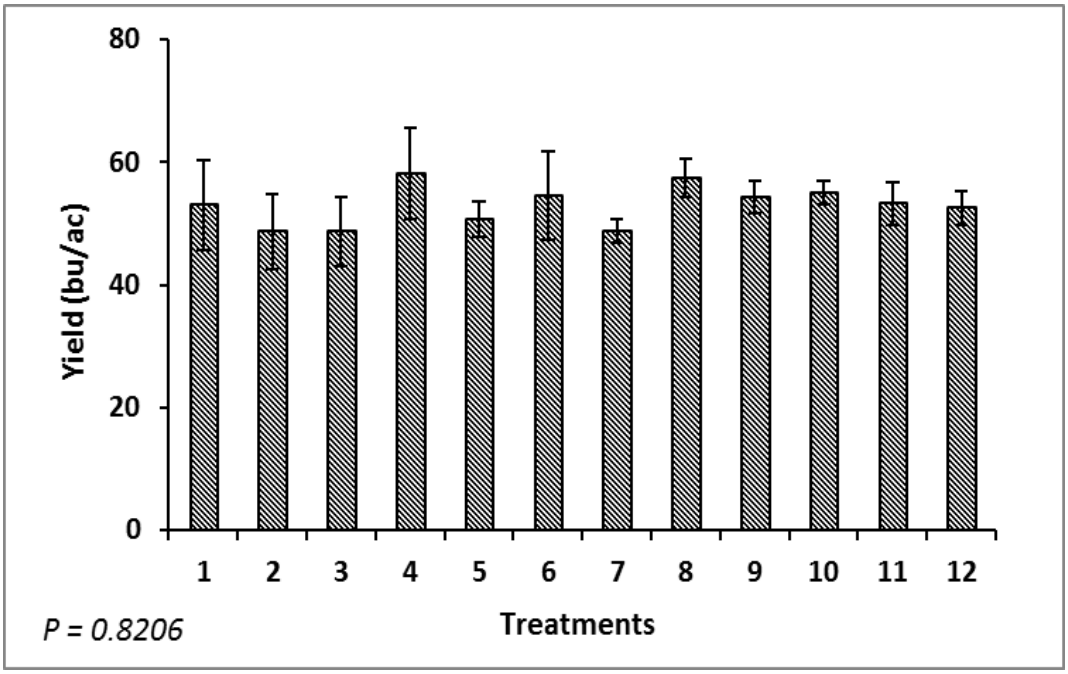

Figure 1: Effects of nutrient combinations on grain yield (bu/ac) in quinoa in 2016 growing season at Scott, SK.

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