Lentil Response to Varying Rates and Combinations of Potassium and Sulfur Fertility

Objective:

To demonstrate, for a range of Saskatchewan environments, the yield and quality response of small red lentils to varying rates and combinations of potassium (K) and sulfur (S) fertilizer.

Trial Design:

- Sites included Swift Current, Scott, and Indian Head.
- Treatments consisted of three potassium (K) rates (0, 22, and 45 kg K2O/ha) and three sulfur (S) rates (0, 11, and 22 kg S/ha) along with two additional control treatments.

Results:

- There were no significant responses for plant density, seed weight, or seed protein to K and S fertility at any location.
- At Indian Head, the unfertilized control yielded 2469 kg/ha while the fertilized treatments averaged 2709 kg/ha (p=0.006).
- At Swift Current, the values were 1170 kg/ha and 1320 kg/ha for the control and fertilized treatments, respectively (p=0.049). At Swift Current, the contrast comparing the treatments with and without KCl was marginally significant (P = 0.088), which may have partly explained the overall response to fertilization.
- The only significant contrast at Scott suggested lower yields (P = 0.017) with AMS (3685 kg/ha) than without (3948 kg/ha); however, this was attributed to the relatively high, and largely random, variability. Furthermore, the low versus high AMS rate comparison showed a trend for higher yields at the higher S rate (P = 0.089), which would not be expected if there was a genuine negative response to this product.

Conclusions:

Despite the hail at Swift Current and drier than average weather at Indian Head and Scott, the first year of this project provided valuable information regarding lentil response, or lack thereof, to K and S fertilizer applications. Currently, K and S fertilizer are not commonly specifically recommended for lentil production; however, small, or modest amounts of either nutrient may be frequently applied as part of longer-term or rotation wide nutrient management plans. Although this project will be repeated in the 2024 growing season, our results to date would not justify refining the current fertility recommendations for small red lentil production in Saskatchewan.

Table 1. Results of the pre-determined contrast comparisons for seed yield (kg/ha) in lentil K and S fertility demonstrations at Indian Head, Scott, and Swift Current (2023). P-values ≤ 0.05 indicate that difference between means was significant.

Contrast Comparison	Indian Head	Scott	Swift Current
No Fertilizer (1) vs	2469 B	3849 A	1170 B
Fertilizer (2-11)	2709 A	3764 A	1320 A
Pr > F (p-value)	0.006	0.587	0.049
No KCl (2,5,6) vs	2678 A	3736 A	1257 A
KCl (3,4,7,8,9,10)	2710 A	3791 A	1346 A
Pr > F (p-value)	0.563	0.607	0.088
Low KCl (3,7,9) vs	2709 A	3810 A	1354 A
High KCl (4,8,10)	2712 A	3771 A	1339 A
Pr > F (p-value)	0.962	0.749	0.796
No AMS (2,3,4) vs	2728 A	3948 A	1313 A
AMS (5,6,7,8,9,10)	2685 A	3685 B	1318 A
Pr > F (p-value)	0.439	0.017	0.916
Low AMS (5,7,8) vs	2681 A	3579 A	1313 A
High AMS (6,9,10)	2689 A	3791 A	1323 A
Pr > F (p-value)	0.896	0.089	0.858

The full report is available at www.warc.ca. This project was supported by the Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Canadian Agricultural Partnership bi-lateral agreement between the federal government and the Saskatchewan Ministry of Agriculture.
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