The effect of nitrogen fertilizer on the yield of dry beans in Saskatchewan

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Nitrogen fertilizer is currently not recommended for dry land, dry bean production in Saskatchewan. However, there is evidence that dry beans may benefit from application of fertilizer nitrogen as many areas that produce dry beans including Manitoba, North Dakota, Ontario, Michigan and Colorado, recommend the addition of nitrogen fertilizer to dry beans. The objective of this research was to quantify the effect of nitrogen fertilizer on the yield of dry beans grown under dry land conditions in Saskatchewan.

The experiment was a three factor, factorial RCBD conducted at Saskatoon, Rosthern and Melfort, Saskatoon in 1999. The variables included variety, nitrogen rate and inoculation. Prior to seeding nitrogen fertilizer was banded at a rate of 0, 25, 50 and 75 kg ha⁻¹. The beans were planted in 30 cm rows at a target density of 60 plants m⁻² with and without granular inoculum in the seed row. Two varieties were seeded, CDC Expresso, a type I black bean and CDC Camino, a type I pinto type.

There was a 21% yield increase in response to inoculum at Melfort but not at Saskatoon or Rosthern. The lack of a yield response at the two sites may have been due to contamination from the inoculum in the uninoculated plots. N-15 analysis is being performed on samples to determine the amount of nitrogen that the plants fixed. Based on the results of these analyses it will be able to be determined if there was contamination.

Dry bean had a significant linear response to the addition of nitrogen fertilizer at all three locations with the exception of Expresso at Rosthern. At Rosthern the proximity of the nitrogen fertilizer band to the seed row resulted in very low rates of emergence giving non-typical responses, therefore the data is not discussed further. Adding 75 kg ha⁻¹ on nitrogen increased the bean yield by an average of 40 % (figure 1). The yield potential in 1999 was quite low as even under the high nitrogen treatment the average yield was 780 kg ha⁻¹. This is probably due to the relatively cold wet growing season.

The positive yield response to nitrogen fertilizer in this study is similar to that observed by Liebman et al. (1995) who found a positive yield response to nitrogen under two different tillage systems. Blaylock (1995) observed that nitrogen fertilizer increases the yield of navy bean. Although it is too early to make agronomic recommendations based on only three site years of data collected in one year, a tentative recommendation would be that producers in Saskatchewan should add nitrogen fertilizer to their dry beans. Two further years of trial will assess the validity of this recommendation.


**Figure 1. Effect of Nitrogen fertilizer on dry bean yield averaged over three locations in Saskatchewan**

![Graph showing the effect of nitrogen fertilizer on dry bean yield.](image-url)