Impact Foliar Fertilization of Canola with a Nitrogen-Zinc Product
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Abstract
This study is a record of 40 experiments from the Westco annals that were carried out over a period of six years (1989-94) and involved application of a foliar product (NZn) on canola. This experiment at each experimental site was set as a split-plot design with and without application of NZn as the main plot and a variety of other treatments as sub-plots. In total, eleven different experimental designs were employed involving rates and method of application of nitrogen (N), phosphorus (P) and potassium (K) or their combination. Soil samples were obtained from 0 to 15 and 15 to 30 and 30 to 60 cm depths of all plots. Foliar application of NZn was employed at the flowering stage. Numerical, a response to the foliar application was obtained in 80% of the cases; however, statistically this occurred only in 60% of the cases. Statistically significant yield increases varied between 84 and 672 kg ha\(^{-1}\). These findings suggest that follow up tests with current canola cultivars should be conducted to ascertain the benefit of such a product in current agriculture.

Introduction
With canola prices reaching record levels, producers are looking for means to push their yields to the maximum and realize additional economic benefit. This study is a record of 40 experiments from the Westco annals that were carried out over a period of seven years (1989-95) and involved application of a foliar product (NZn) on canola. Although the cultivars involved in this study are no longer sown by producers, we felt that the awareness of the results of this series of experiments may induce curiosity into experimenting with this product with current cultivars. 

The objective of this study was to ascertain whether responses of canola to mid-season foliar application of N and Zn result in yield and economic benefits.

Materials and Methods

• Trials at each experimental site were set as a split-plot design with and without application of NZn as the main plot and a variety of other treatments as sub-plots. In total, eleven different experimental designs were employed involving rates and method of application of nitrogen (N), phosphorus (P) and potassium (K) or their combination. Soil samples were obtained from 0 to 15 and 30 to 60 cm depths of all plots. Foliar application of NZn was employed at the mid flowering stage at a rate of 4.45 L ha\(^{-1}\).

• Plots were 1.24 m wide by 6 m long and contained 7 rows at 17.8 cm spacing. At maturity an area of 0.71 m (4 rows) or 1.06 m (6 rows) by 3 m was harvested by hand from each plot and grain samples and straw were cleaned, dried to 10% moisture and weighed.

• Data for each NZn experiment were separately analyzed with the PROC MIXED procedure of SAS (Littell et al. 2006). The effects of the NZn and NPK treatments were considered fixed, and the effects of replicate, site (location by year combination), and site interactions with the treatments were considered random. A separate residual variance for each site was modeled for all variables. A corrected Akaike’s information criterion confirmed the benefit of heterogeneous residual variances. A combination of variance estimates size and statistical tests (variance estimates significantly different from 0) determined the importance of the random site by treatments interaction. Orthogonal polynomial contrasts were used, where applicable, to assess to effect of N or P fertilizer rates part of the NPK treatment. Otherwise, an LSD.05 was used to explore treatment differences and provided a measure of precision. All statistical tests were declared significant at P < 0.05.

Yield Data

• Numerically, a response to the foliar application was obtained in 80% of the time (Fig. 1); however, statistically this occurred only in 60% of the cases. Statistically significant yield increases varied between 84 and 672 kg ha\(^{-1}\). Economic benefits from application of this product would vary depending commodity and fertilizer prices. Without accounting for application costs, economic return using two arbitrary prices ($5 and $10/acre - $12.35 and $24.70 per hectare) is illustrated in Fig. 2 and 3 for three different prices for canola.

• We could not attribute these responses to any of the soil or crop characteristics

Conclusions

• These findings suggest that follow up tests with current (hybrid) canola cultivars should be conducted to ascertain the benefit of such a product in current agriculture.

References