Effect of Phosphorus Placement, Seeding Rate, and Row Spacing on Canola

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The adoption of direct seeding in recent years has led to the development of new fertilizer application techniques, such as mid-row banding. Mid-row banding usually involves adding an independent opener between every seed row or every second seed row. Some no-till drills with 7.5- or 10-inch row spacing have the capability to direct the seed to every other row while placing the fertilizer in the openers between the seed rows. The large distance between the seed and fertilizer allows any rate of fertilizer to be applied with no risk of seed damage. Since phosphorus is relatively immobile, the distance from the seedling root could be a problem for plant intake.

Projects were initiated at the Carrington Research Extension Center to evaluate the effectiveness of mid-row banding phosphorus fertilizer between every seed row and the yield response of canola planted in wider rows.

Canola flowering and height response to phosphorus rate and placement

Phosphorus Placement

Studies were established using conventional tillage practices at two locations (fields Q3 and Landon E) to compare the agronomic performance of different phosphorus rates and application methods. The application methods were in-row, mid-row band, in-row + mid-row band, and broadcast. The phosphorus rates were 0 lbs., 11.25 lbs., 22.5 lbs., and 45 lbs. phosphate /acre. A soil test the previous fall indicated 10 ppm (Olsen) phosphate at Q3 (medium) and 3 ppm (very low) at Landon E. Canola 'Invigor 4870' was seeded May 16, 2005, (Q3) and May 18 (Landon E) at a rate of 8 pure lives seeds/ft^2 in 14 inch rows. The in-row and mid-row band applications were applied at seeding. The broadcast application was incorporated prior to seeding. The trials were harvested August 15.

The phosphorus rate, independent of placement, had the most impact on crop performance. At Q3 seed yields increased with the phosphorus rate to 22.5 lbs./acre, and then leveled off (Table). The 1000 kernel weight decreased as the phosphorus rate increased. For plant height, there was an interaction between the phosphorus rate and placement. Plant height averaged 39.5 inches with no phosphorus fertilizer, 47 inches when the phosphorus was applied broadcast incorporated, and 42 inches with a mid-row band, regardless of phosphorus rate. When phosphorus was applied in-row + mid row banded, the plant height increased from 42 inches with 11.25 lbs. phosphate to 48 inches with 45 lbs. phosphate (LSD =4). There were no differences in days to bloom, bloom duration, days to physiological maturity, test weight or oil content at either location (data not shown).

Table 1. Canola reponse to phosphorus levels.

	Landon E		Q3
Phospate	1000	Seed	Seed
Rate	KWT	Yield	Yield
lb/ac	gram	lb/ac	lb/ac
0	3.15	1171	1215
11.25	3.09	1434	1385
22.5	3.02	1585	1546
45	2.96	1914	1560
LSD (P=.05)	0.13	153	85

Under the conditions of these trials, phosphate fertilizer placement had no effect on yield, allowing flexibility in reducing passes over the field. Current phosphorus recommendations seem appropriate.

Row Spacing

A trial was initiated to study the effect of row spacing and seeding rate in two canola hybrids with contrasting plant types. 'Invigor 4870' and 'Hyola 357 Magnum' were seeded April 25 in 7 or 14 inch rows at a rate of 7 or 14 live seeds/ft^2. The trial was harvested August 2.

Bloom duration, days to physiological maturity, plant lodging, seed weight, and test weight were similar. Hyola 357 Magnum bloomed five days earlier than Invigor 4870. For seed yield, there was a hybrid by row spacing interaction. Yields averaged 1967 lbs./acre for Invigor 4870 planted in 7- or 14-inch rows and Hyola 357 planted in 7-inch rows compared to 1601 lbs./acre when Hyola 357 was planted in 14-inch rows. When averaged over row spacing and variety, seed yield increased 152 lbs. when the seeding rate was increased from 7 to 14 live seeds/ft^2.

In summary, yields increased as the row spacing decreased from 14 to 7 inches with the smaller plant type (Hyola 357 Magnum). With a larger plant type (Invigor 4870), yields were similar with 7- or 14-inch row spacing. However, only one variety of each plant type was evaluated, so generalizations to other varieties cannot be made. Yields for both hybrids increased 12% as the seeding rate increased from 7 to 14 live seeds/ft^2.