

XVI OPTIMIZING CANOLA PRODUCTION TRIAL

Objective: Measure the individual and combined effects of varying levels of fertilization and crop protection on canola yield, quality and profitability.

Background: Research in the past has generally focused on a single component of canola production, be that a product or a management decision. While this allows the researcher to isolate the benefit of that single component, it is clear that benefits determined in this way cannot simply be added together to determine the overall benefit in a cropping system. Several small plot research trials are being conducted by a team of researchers, headed by Dr. Don Flaten at the University of Manitoba. The purpose of these experiments is to focus on the combined effects of varying levels of fertilization, crop protection and genetics, in order to determine how the choice of a certain level of one (eg. genetics) affects the profitability of different levels of the others (eg. fertility, crop protection levels).

While University of Manitoba experiments focused on three general “packages” of inputs including fertilization, crop protection and genetic yield potential, the trial at the Canola Production Centre focused only on the interaction between fertilization and crop protection levels. This allowed the trial to be conducted in the larger field scale format commonly used at the CPC site.

Methodology: The optimizing canola production trial consisted of six treatments in an RCB design. InVigor 2663 was used with the following treatments:

1. Medium level of crop protection, low level of fertilization
2. Medium level of crop protection, medium level of fertilization
3. Medium level of crop protection, high level of fertilization
4. High level of crop protection, low level of fertilization
5. High level of crop protection, medium level of fertilization
6. High level of crop protection, high level of fertilization

Each level of crop protection and fertilizer was conducted as follows:

Low level of fertilization = no fertilizer applied

Medium level of fertilization = fertilizer applied to 1750 lb/ac target yield

- Micronutrients foliar applied (Boron 0.15 lb/ac)
- Macronutrients soil applied (70 - 20 - 0 - 10; N - P - K - S)

High level of fertilization = fertilizer applied to 2500 lb/ac target yield

- Micronutrients foliar applied (Boron 0.15 lb/ac)
- Macronutrients soil applied (116 - 33 - 0 - 17; N - P - K - S)

Macronutrients were spread with two passes of a 12-foot drop spreader down the middle of the plot and then incorporated with a cultivator and harrow. The boron was foliar applied at the bolting stage.

Medium level of crop protection = Tribune (Syngenta fungicide) seed treatment, one application of Liberty (28 oz/ac) + Select (2 oz/ac) at the 3 to 4-leaf stage. No foliar fungicide applied. Foliar insecticide (Capture @ 1.5 oz/ac) applied at the 1-leaf stage for flea beetle control.

High level of crop protection = Helix Xtra seed treatment, two applications of Liberty (28 oz/ac @ 3 to 4-leaf stage and 6-leaf stage). Select (2 oz/ac) was applied along with the first application of Liberty. Fungicide was applied for sclerotinia control (Ronilan EG @ 12 oz/ac) at 30 to 50% bloom. Foliar insecticide was not applied to control flea beetles because damage was well below threshold levels.

Observations:

The trial was seeded on May 21 into good moisture. The fungicide seed treatment plots were at action threshold levels (25% leaf area damage) for flea beetle damage on June 4 and were sprayed with Capture (1.5 oz/ac). Plots with Helix Xtra had little flea beetle damage and were not sprayed. The low fertility treatments showed reduced height and delayed maturity throughout the season until swathing time. The excess moisture stress damaged many areas in the plots and created variability in height and maturity within each plot. At swathing time, maturity ranged from 20 to 50% seed color change across the whole trial with few discernable differences among treatments. The whole trial was swathed 90 days after planting with an accumulated 1286 growing degree-days.

Results:

OPTIMIZING CANOLA PRODUCTION TRIAL						
Thief River Falls, MN						
Treatment	Yield (%)	Yield (bu/ac)	Contribution Margin (\$/ac)	Oil (%)	Sclero. Infection (%)	Flea Beetle Rating*
Medium Level of Pest Control						
Low Fertility	1426	28.5	84.46	42.6	1.1	2.8
Medium Fertility	1528	30.6	72.23	42.3	3.2	2.8
High Fertility	1593	31.9	67.31	41.5	4.6	2.3
High Level of Pest Control						
Low Fertility	1334	26.7	31.28	42.9	0.9	0.8
Medium Fertility	1678	33.6	45.23	42.4	0.5	1.0
High Fertility	1590	31.8	23.81	41.5	1.2	1.0
LSD	119.6	2.39		0.76	2.15	0.73
CV%	6.3	6.3		1.5	89.6	33.5

*Note: Flea Beetle Rating on June 4; 0 = no injury, 9 = 90 to 100% leaf area damaged.

Discussion:

The highest yield came from the combination of medium fertility and high pest control. The highest contribution margin came from the combination of low fertility and medium pest control. This can likely be attributed to the fact that yield potential of the medium and high fertility treatments was limited by excess moisture (flooding and de-nitrification). Although sclerotinia infections were very low, there were significant differences between the low and high fertility levels in the medium pest control treatments. Higher fertility produced more sclerotinia. Fertility levels influenced oil content with the highest oil content at the lowest fertility levels within each level of pest control.