Project Title: Canola Planting Date and Population Study – 2015.

Objective: To identify the optimum canola planting date and density for northwestern Montana.

Materials and Methods:

The factorial treatment arrangement consisted of two canola varieties, three seeding dates and three plant densities. The two varieties selected were DKL 30-03 and DKL 70-07, representing early and late maturity groups, respectively. The three seeding dates were April 21, May 8, and May 22. The first seeding date was the earliest date we could get into the field. Subsequent planting dates were targeted at increments of 300 growing degree days at base 32F (GDD32), which represents the number of GDD necessary for the first true leaves to emerge. 300 GDD separated the first and second seeding date and 272 GDD had accumulated between the second and third date. Targeted plant densities were 4, 8, and 16 plants per square foot. Seeding rates were calculated using the following formula: lb/A = (9.6 x desired plant density per sqft x thousand kernel weights) / percent survival (Table 1). The experimental design was a split plot randomized complete block with three replications, where the main plot factor was seeding date, and the sub plot factor consisted of plant density and variety combinations.

Soil test results showed 61-8-180-62 pounds of available nutrients and a fertilizer blend of 125-35-35-20 was broadcast and incorporated one day prior to each seeding date. Each seeding date was treated with glyphosate, Warrior II, and Quadris for the control of weeds, insects, and diseases, respectively.

An economic analysis was performed for each treatment by calculating adjusted gross returns (AGR). Adjusted gross returns were determined using a market price of $7.75/bu, multiplied by yield, minus the seed cost at $5.00/ lb.



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| Variety | TKW | Plant/sqft | Rate (lb/ac) |
| DKL 30-03 | 4.8 | 4 | 2.5 |
| DKL 30-03 | 4.8 | 8 | 4.9 |
| DKL 30-03 | 4.8 | 16 | 9.8 |
| DKL 70-07 | 5.1 | 4 | 2.6 |
| DKL 70-07 | 5.1 | 8 | 5.2 |
| DKL 70-07 | 5.1 | 16 | 10.4 |

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| DKL 30-03 | 4.8 | 16 | 9.8 |
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| DKL 70-07 | 5.1 | 8 | 5.2 |
| DKL 70-07 | 5.1 | 16 | 10.4 |

Results:

Varietal differences were significant for flowering, physiological maturity, lodging, height, yield, oil content, test weight, and adjusted gross returns (Table 2). DKL 30-03 was the earliest maturing variety, reaching flowering and physiological maturity about two days earlier than DKL 70-07. Although DKL 30-03 was the shortest variety, it had the greatest lodging. Biomass was similar between the two varieties, but DKL 70-07 out-yielded DKL 30-03 by 7.8 bu/A. At the same time, DKL 70-07 was the most profitable, generating an additional $59.00 per acre as compared to DKL 30-03.

The plant density counts were taken prior to bolt (STAND 1) and at pod fill (STAND 2). The populations obtained in the field were, on average, very close to the targeted populations of 4, 8, and 16 plants/sqft (Table 3). The main effect of plant density had significant effects on several variables. As density increased, flowering was delayed, plant height decreased, and lodging tended to increase. However, due to the plastic nature of canola, plant density provided no detectable differences in yield or biomass. The most profitable seeding rate was 8 plants/sqft, but this was not statistically significant.

Of the three main effects, seeding date had the greatest influence on canola emergence rate. As seeding date was delayed, emergence rate increased from a low of 20 days after planting (dap) at the first planting to a high of 6.8 dap at the third planting (Table 4). It is likely that soil temperature during germination influenced emergence rate. The average 2 inch soil temperature from time of seeding to 50% emergence for the three seeding dates were 48.9°F, 54.2°F, and 60.8° Fahrenheit.

Seeding date also had an effect of plant stand. The second seeding on May 8 provided the greatest average plant density at 13.7 plants/sqft, which is approximately 4 plants/sqft greater than either of the other two seeding dates.

The main effect of seeding date also influenced flowering, physiological maturity, stand, height, yield, biomass, test weight, and adjusted gross return (Table 4). As seeding date became later, plants matured and developed more quickly. However, plant height, biomass, yield, test weight and adjusted gross returns all decreased.

Summary:

In summary, the highest seed quality, greatest yield and adjusted gross return was afforded with the earliest seeding date despite the overall delay in crop development (Table 4). When faced with the decision of having to plant late or re-plant a field, one needs to know what the expected yield is for a particular field and estimate a yield reduction of approximately 30% for a late May seeding date.



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