

XVI CANOPY MANIPULATION TRIAL

Objective: To compare the effects of various seeding dates and rates on yield, maturity and disease on *B. napus* canola.

Background: European research (Scott et al, 1999) indicates that canola yields can be related to canopy structure after flowering. Thinner canopies allow more light to penetrate lower pods resulting in increased yield due to translocation of photosynthetic light from pod hulls. Also, excessive vegetative growth can deplete soil moisture in dry conditions resulting in poor pod formation and filling.

Seeding rate studies have been carried out throughout western Canada under various weed and disease pressures. The introduction of herbicide tolerant canola varieties has improved weed control, which lessens the need for higher plant populations. Weather conditions often contribute to increased lodging and sclerotinia. Reducing plant stands may lessen the risk of these factors. However lower plant densities bring higher risks due to later maturity, green seed and insects (ex. root maggots).

Recent seeding date research indicated that early spring or fall dormant seeded canola results in fewer and shorter plants. This often leads to lower disease pressure due to a more open canopy, which may result in increased yields.

Methodology: This trial consisted of two main plot treatments and three sub-plot treatments. InVigor 2663 was the variety used.

- A) Normal planting date @ 1.0 lb/ac
- B) Normal planting date @ 1.0 lb/ac @ 30% SCC whole plant
- C) Normal planting date @ 3.0 lb/ac
- D) Normal planting date @ 5.0 lb/ac
- E) Late planting date @ 1.0 lb/ac
- F) Late planting date @ 3.0 lb/ac
- G) Late planting date @ 5.0 lb/ac

The 1 lb/ac and 3 lb/ac seeding rates were bulked up by using corn cob grit (\$18.00/50 lb bag). Weeds were controlled at the 3-leaf stage with Liberty (34 oz/ac).

Swathing commenced when the main stem was at 30 to 40 % seed colour change (SCC). The second normal planting date @ 1.0 lb/ac treatment was swathed when the SCC was 30 % over the whole plant. Treatments A and B were analyzed as a randomized complete block, separately from the rest of the trial. All treatments other than B were analyzed as a split-plot with planting date as the main plot.

Observation: This trial had two planting dates, May 14 and June 5. Good soil moisture was present on each date. No secondary weed flushes were evident in

the delayed canopy closure of the 1 lb/ac seeding rate. There was more lodging in the late planting date than the normal planting date. However, there was little difference in lodging among the seeding rates within a planting date. This trial was not sprayed with a fungicide. Petal tests indicated 9 % and 7 % infection for the normal and late planting date, respectively. Sclerotinia levels were expected to be low for the normal planting date due to the hot, dry weather up to the end of flowering. Sclerotinia was expected to be high for the late planting date due to high moisture levels during flowering of those treatments. As it turned out, disease levels were opposite from expected.

Results: (a) Swath Staging Comparison

CANOPY MANIPULATION Thief River Falls, MN								
System	Yield (lb/ac)	Yield (bu/ac)	Contribution Margin (\$/ac)	Oil (%)	1000 Kernel Weight (g)	Growing Degree Days	Days To Swathing	Green Seed (%)
Swath Staging Comparison								
1lb/ac @ 30-40% SCC main stem	1530	30.6	14.54	40.1	3.7	1143	84	0.1
1lb/ac @ 30-40% SCC whole plant	1599	32.0	20.65	40.1	4.0	1196	87	0.1
LSD	112.3	2.25		0.65	1.69		0.7	0.38
CV%	4.3	4.3		1.0	26.6		0.5	230.9

Results: (b) Plant stand measurements

CANOPY MANIPULATION Thief River Falls, MN							
System	Emergence Counts Plants/ft²	Harvest Counts Plants/ft²	Plant Height (inches)	Canopy Closure (DAP)	Infected Plants (%)	# Primary Branches	# Secondary Branches
Normal Planting Date							
1 lb/ac	2.0	2.2	50.1	43	39	10.5	10.2
3 lb/ac	4.9	5.1	50.6	31	23	6.9	1.4
5 lb/ac	8.8	7.8	48.6	29	29	6.0	1.0
Late Planting Date							
1 lb/ac	1.8	1.8	56.7	37	5	12.1	15.9
3 lb/ac	5.1	4.4	55.4	24	4	6.5	4.1
5 lb/ac	9.1	8.2	53.0	21	3	5.2	1.4
LSD1	0.90	1.04	2.12	0.5	14.4	1.13	2.61
LSD2	0.80	1.10	2.50	0.6	6.3	0.80	1.93
CV%	12.1	17.7	3.8	1.6	28.9	8.1	27.0

Note: LSD1 - LSD (0.10) between any two treatments.

LSD2 - LSD (0.10) between any two seeding rates within a planting date.

Results: (c) Yield and Quality Data

CANOPY MANIPULATION Thief River Falls, MN								
System	Yield (lb/ac)	Yield (bu/ac)	Contribution Margin (\$/ac)	Oil (%)	1000 Kernel Weight (g)	Growing Degree Days	Days To Maturity	Green Seed (%)
Normal Planting Date								
1 lb/ac	1530	30.6	13.10	40.1	3.65	1164	85	0.1
3 lb/ac	1675	33.5	14.92	40.1	3.95	1143	84	0.1
5 lb/ac	1661	33.2	2.62	40.4	4.00	1143	84	0.2
Late Planting Date								
1 lb/ac	1744	34.9	18.85	41.5	4.05	1248	83	5.8
3 lb/ac	1987	39.7	30.15	41.8	4.30	1248	83	5.6
5 lb/ac	2035	40.7	24.36	41.9	3.95	1248	83	5.2
LSD1	130.2	2.61		1.25	0.69		2.3	1.84
LSD2	121.9	2.44		0.44	0.69		0.5	1.63
CV%	5.5	5.5		0.8	13.7		0.42	46.0

Note: LSD1 - LSD (0.10) between any two treatments.

LSD2 - LSD (0.10) between any two seeding rates within a planting date.

Discussion:

The main stems of the 1 lb/ac delayed swathed plots were at 70 % SCC when the whole plant reached 30 to 40 % SCC. Delaying swathing three days in the 1 lb/ac seeding rate did not increase yield or seed weight significantly. Oil content was the same for both swathing dates. The later swathing date was swathed with a heavy dew so very little shattering occurred. The contribution margin was slightly higher for the delayed swathing due to the added yield.

The 5 lb/ac seeding rate had the shortest plants. Canopy closure in the 1 lb/ac seeding rate was nearly two weeks after the 3 and 5 lb/ac seeding rates. Sclerotinia levels were the highest at the 1 lb/ac seeding rate for both planting dates. For both planting dates, the number of primary and secondary branches increased significantly as seeding rate decreased from 3 lb/ac to 1 lb/ac. The tremendous increase in branches from the 3 lb/ac to 1 lb/ac seeding rates did not compensate enough to provide similar yields. The 1 lb/ac seeding rate was significantly lower yielding than the 3 and 5 lb/ac seeding rates for both planting dates. Contribution margins were highest for the 3 lb/ac seeding rate for both planting dates due to the high yield and lower seed cost compared to the 5 lb/ac rate. Contribution margins reflect differences in yield, grade and seed costs.