



Mackenzie Applied Research Association
 P.O. Box 646, Fort Vermilion, Alberta T0H 1N0
 Tel: 780-927-3776, Fax: 780-927-4747;
 Email: manager@mackenzieresearch.ca www.mackenzieresearch.ca

Rates of seeding and fertilizer effects on Canola and Barley

Introduction: Seeding and nitrogen rates can influence crop establishment, seed yield and seed protein level. Optimizing these factors had also demonstrated enhanced crop competitiveness to weeds.

For barley, a plant population of 22 plants/ft² is generally considered the optimum for weed management and yield. The change in grain protein content of barley seeds influences malt quality. The optimum level of protein for malting barley is between 9.5 and 11.5 per cent.

For canola, plant population in a range of 7 to 17 plants/ft² normally had very little effect on the final yield. Also, over this wide range the crop competes very well with weeds. However, differences in days to maturity may be negatively affected and the effect on maturity may be more pronounced in the weather conditions of northern Peace region.

Objectives: To evaluate the effects of seeding and fertility rates on canola and malt barley seed quality and yield in northern Peace region.

Materials and Methods: The field scale (60 ft wide by 1 mile long) barley trial was set up as 2 factors factorial with 3 replicates. Factors were 4 N-P-K fertilizer rates (60-15-16, 60-30-15, 40-10-11, and 40-20-10 lbs/ac) and 2 barley seeding rates (88 and 132 lbs/ac).

The field scale (30 ft wide by 1 mile long) canola trial was set up as 2 factors factorial with 2 replicates. Factors were 2 rates of N-P-K-S fertilizers (80-25-17-14, and 50-25-10-8 lbs/ac) and 2 seeding rates of 3275 Roundup Ready canola (3 and 6, lbs/ac).

The crops were direct seeded (May 10 barley and May 24 canola), using a Flexicoil air drill with a shank spacing of nine inches and the openers as paired rows at three inches.

Fertilizers were seed placed and recommended practices were used for other agronomic operations.

Results and Discussion: Periodic visual inspections showed no weed, insect or disease problems, or lodging.

At the 2 to 3 leaf stage of barley, there was no interaction between fertilizer and seeding rates for plant count. The barley emergence averaged 12 and 15 plants/ft² at the seeding rates of 82 and 132 lbs/ac, respectively (Table 1). With respect to the fertilizer rate, the 40-10-11 lb/ac treatment had the highest plant population. The higher fertility rates lowered plant population, probably due to higher amount of fertilizer placed with the seed increasing plant mortality. Even though the higher fertilizer rate treatments had lower barley plant populations they resulted in the higher yields. The protein content of barley seeds tended to increase at higher nitrogen fertilizer rate while it tended to decrease at higher seeding rate (Table 1).

Table 1. Plant count, seed yield and protein content of barley for different treatments.

Seed lb/ac	N-P-K lb/ac	Plants #/sq. ft	Yield bu/ac	Protein %
88	60-15-16	11	111.2	12.7
	60-30-15	11	114.1	12.9
	40-10-11	13	108.5	12.3
	40-20-10	13	111.0	12.6
132	60-15-16	14	116.0	12.5
	60-30-15	15	117.7	12.4
	40-10-11	16	111.4	12.4
	40-20-10	15	112.0	12.1

For canola plant count, there was a negative interaction between fertilizer rate and seeding rate. The fertilizer rate of 80-25-17-14 and the seeding rate of 3 lbs/ac of canola had the lowest plant count (Table 2). The fertilizer rate of 50-25-10-8 and 3 lbs of canola seeding rate had

the highest plants count. Canola maturity was delayed at the fertilizer rate of 80-25-17-14 lbs/ac and seeding rate of 3 lb/ac. The seed yield of canola was higher at the higher seed rate. When the amount of fertilizer was increased, the yield tended to decline.

Table 2. Plant count and seed yield of canola for different treatments.

Seed lb/ac	N-P-K-S lb/ac	Plants #/sq. ft	Yield bu/ac
3	80-25-17-14	5	52.0
	50-25-10-8	8	52.8
6	80-25-17-14	9	56.1
	50-25-10-8	10	58.8

Conclusions: Higher seed placed fertilizer rates tended to reduce plant population but not seed yield of barley. Fertilizer (nitrogen) induced increase in protein content of barley seed can reduce quality for malting. Placing too much fertilizer with the seed had a negative effect on canola emergence and seed yield.

Acknowledgements: Funding by Reduced Tillage Linkages and Alberta Environmentally Sustainable Agriculture. Original report written by J. Salvador Lopez and Kelly Zeleny.

Summary by Kabal Gill, Res. Ext. Coordinator, with funds from Extension project of ARECA. For more information, please contact MARA.