

Swathing and Harvest Date Effects on Canola

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INTRODUCTION

Canola (*Brassica napus* L.) has become a major economic oilseed crop in North Dakota and northwestern Minnesota in recent years. Acreage has increased to 1.4 million in 2002. Many new growers have limited experience with the crop. Proper harvest management in terms of selecting the proper maturity stage for swathing and combining are very important. As a canola crop nears maturity, it may ripen very quickly. Selecting the correct time to swath and combine demands more observations and care than does small grains. Proper swathing and harvest management can result in reduced seed losses and green seed problems, and ensures top quality grade and price.

Green seed color in canola is caused by chlorophyll. When the seed is crushed the chlorophyll is extracted with the oil which increases the cost of refining the oil. Two percent green seed is the maximum allowed before discounted at the marketplace. Seed chlorophyll content is influenced by genotype and environment. Crop management practices including seeding rates, seeding dates, and swathing procedures are known to influence chlorophyll levels. Low seed chlorophyll levels can be achieved by seeding early and swathing at physiological maturity under conditions which allow for slow moisture loss from the seed in the field (Ward et al., 1992; Ward et al., 1994). Premature harvest, frost damage of immature plants (Cenkowski et al., 1989) and hot or windy weather at or after swathing also increases the production of green seeds (Canola Council of Canada, 1984). Present recommendations for swathing are when 30-40% of the seed on the main stem has changed or started to change color. Swathing can begin at 10-15% color change without significant yield losses (Canola Council of Canada, 1984).

OBJECTIVE

The objective of this study was to evaluate swathing and harvest date effects on canola under North Dakota and Minnesota growing conditions.

METHODS AND MATERIALS

Trials were conducted in 1996 and 1997 at Langdon, Carrington, and Minot, ND and Roseau, MN. Seed of the canola cultivar 'Sponsor' was used, except at Carrington in 1996 where 'Hyola 401' was used. Seeding rate was 17 seeds/ft². Planting dates ranged from 11 May to 29 May. Fertility was adequate for a yield goal of at least 1700 lb/a. Plots consisted of 6 or 7 rows, with 6 or 10 inch row spacing and varying plot lengths. Weeds were controlled by herbicides. The trials were planted with a plot seeder in a 3 x 3 factorial in a randomized complete block design with four replications. Plots were cut and formed into swaths to simulate field conditions. ADM Processing Plant, Velva, ND, determined percent green seed. Treatments included three swathing dates with three harvesting dates per swathing date (Table 1).

Table 1. Swath and harvest treatments.

TRT.	Percent seed color change(SCC) when swathed	Growing degree-day accumulations (GDD) between swathing and harvesting.
1	0-5	144-192
2	0-5	312-360
3	0-5	480-528
4	15-20	144-192
5	15-20	312-360
6	15-20	480-528
7	30-35	144-192
8	30-35	312-360
9	30-35	480-528

RESULTS AND DISCUSSION

Yields varied across locations but were generally the highest at the 15-20 and 30-35% SCC. When averaged across locations and years their yield was significantly higher than the 0-5% SCC (Fig. 1). The number of seeds/lb was the highest at the 0-5% SCC, which indicates a significant shrinkage in the seed size due to early swathing (Fig. 2). Percent oil increased slightly with later swathing dates (Fig 3). Percent green seed was significantly lower, and below 2%, when swathed later than the 0-5% SCC (Fig. 4).

Fig. 1. Effect of percent seed color change at swathing on yield performance of canola averaged across harvest dates and locations, 1996-1997

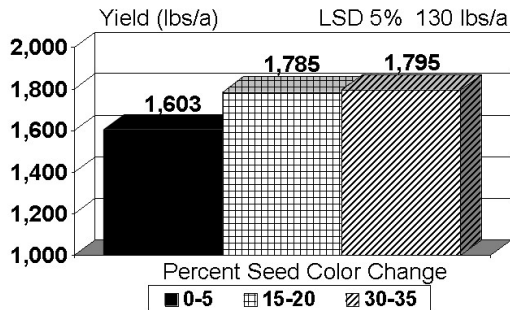


Fig. 2. Effect of percent seed color change at swathing on seeds/lb of canola averaged across harvest dates and locations, 1996-1997

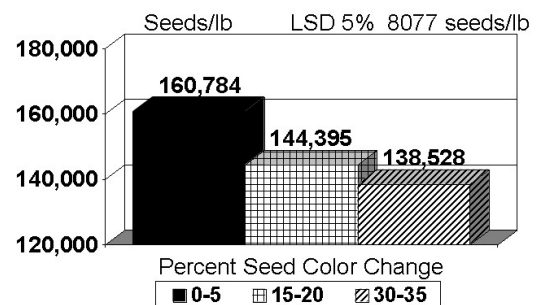


Fig. 3. Effect of percent seed color change at swathing on percent oil of canola averaged across harvest dates and locations, 1996-1997.

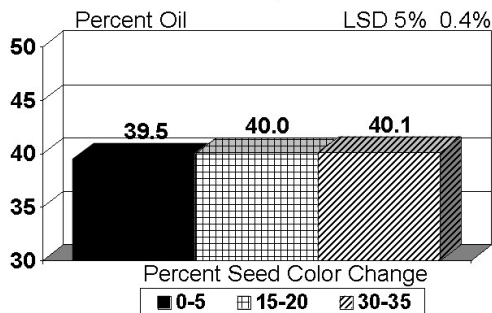
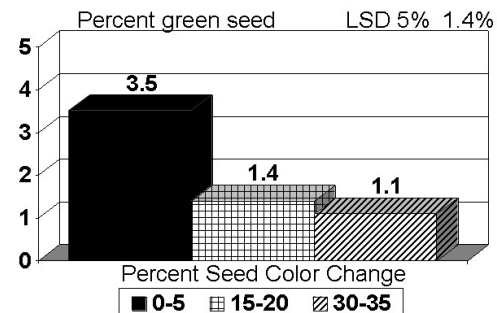


Fig. 4. Effect of percent seed color change at swathing on percent green seed of canola averaged across harvest dates and locations, 1996-1997.



Yield decreased with later harvest dates, likely a result of shattering in the swath (Fig. 5). Percent green seed levels were the highest at the earliest harvest date (Fig. 6). Harvest date had no significant effect on seeds/lb or percent oil.

Seed moisture was generally higher than the allowable 9% for long term storage, when swathed and harvested at the earliest dates (data not shown).

Canola producers can increase their economic return by approximately \$25/acre by swathing at the proper time (Table 2).

Fig. 5. Effect of harvest date on yield performance of canola averaged across percent seed color change at swathing and locations, 1996-1997.

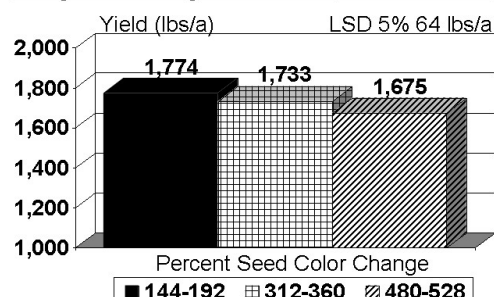


Fig. 6. Effect of harvest date on percent green seed of canola averaged across percent seed color change at swathing and locations, 1996-1997.

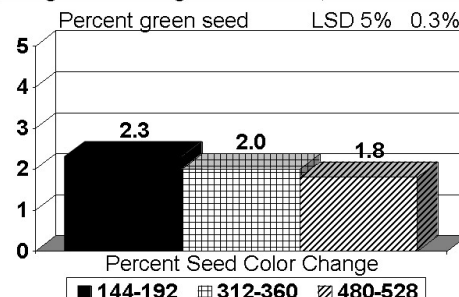


Table 2. Effect of percent seed color change at swathing on yield, percent green seed, and \$return/acre averaged across harvest dates and locations, 1996-1997.

Percent seed color change	Yield (lbs/a)	% Green seed	\$ return/a
0-5	1603	3.5	171
15-20	1785	1.4	196
30-35	1796	1.1	197

Based on \$0.11/lb and \$0.30/cwt discount for 3.1-4.0% seed. No discount below 2%

SUMMARY

- Proper swathing and harvest management can result in good economic returns to the canola producer.
- Swathing at 15-20 or 30-35% SCC resulted in higher yields, larger seeds, higher percent oil and lower percent green seeds than when swathed at the 0-5% SCC.
- Harvesting at the 312-360 GDD harvest date (approximately 13-15 days after swathing) resulted in the highest yield with appropriate moisture levels and 2% or lower green seed.
- Percent green seed must always be checked by the producer prior to harvest.

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