
Fall-seeded Canola in Southwest Saskatchewan: Interactions between Seeding Dates and Seed Coating

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Introduction

Seeding canola in the fall allows the crop to use soil moisture in the spring more efficiently than when the crop is planted in the spring. In southwestern Saskatchewan, fall-seeded canola usually flowers one to three weeks earlier than spring-seeded canola, enabling the crop to avoid midsummer heat stress that normally occurs during the flowering period of spring seeded canola. However, fall-seeded canola normally germinates early in the spring when the soil is cold, which may result in poor emergence and thin crop stands that often limit seed yield. The success of fall-seeded canola depends on seeding the crop at an optimum date in the fall or using seeds coated with a substance that inhibits germination until it is degraded early in the following spring.

The objectives of this study were to i) determine the optimum date for fall seeding of canola in the dry Brown soil zone of the Canadian prairies, ii) investigate the influence of seeding dates and seed coating on plant establishment, maturity, and seed yields of fall-seeded canola, and iii) examine the overall response of fall-seeded canola to the growing conditions of southwestern Saskatchewan.

Methodology

Canola seeds, coated with a polymer or non-coated, were planted directly into wheat stubble, at four seeding dates between October 9 and November 16 at Swift Current (Table 1). The study was conducted from 1998 to 2001. Roundup-ready cultivars were used in the study, for the convenience of weed control in the spring. Prior to seeding, seed was treated with Apron or Vitavax RS at the recommended rates. Seed was placed at a depth of 2 to 3 cm. Plots were managed using agronomic practices (such as fertilization, pest control) that are recommended for canola production in the Brown soil zone.

Results and Discussion

In the wet years (such as 1999 and 2000), canola grown from coated seeds produced consistently higher plant stands than canola grown from non-coated seeds at any of the seeding dates (Fig. 1a). Delayed seeding in the fall significantly increased canola plant densities for both coated and non-coated canola. However, in the dry years (such as 1998 and 2001), there existed a significant interaction between seed coat and seeding date (Fig. 1b). When seeded earlier in the fall, non-coated seeds produced no plants, while coated seeds produced higher plant stands than non-coated seed. When seeded late in the fall, non-coated seed produced an equivalent or higher

plant density than the coated seed.

Table 1. Seeding dates and soil temperatures at seeding of canola in the fall at Swift Current

| Seeding Date | <u>Growing season</u> | | | |
|--------------|-----------------------|-----------|-----------|-----------|
| | 1998 | 1999 | 2000 | 2001 |
| Date 1 | Oct.22/97 | Oct.09/98 | Oct.12/99 | Oct.16/00 |
| Date 2 | Oct.29/97 | Oct.19/98 | Oct.19/99 | Oct.23/00 |
| Date 3 | Nov.05/97 | Oct.26/98 | Oct.26/99 | Oct.30/00 |
| Date 4 | Nov.12/97 | Nov.06/98 | Nov.03/99 | Nov.15/00 |

| Seeding Date | <u>Soil temperature (C) at seeding</u> | | | |
|--------------|--|------|------|------|
| | 1998 | 1999 | 2000 | 2001 |
| Date 1 | 2 | 12 | 7 | 6 |
| Date 2 | 1 | 4 | 6 | 7 |
| Date 3 | 1 | 9 | 9 | 5 |
| Date 4 | -3 | 1 | 2 | -4 |

Averaged across five years (1998-2001), canola seeded just before freeze-up in the fall (October 26 to November 12) matured 2 to 5 days earlier than canola that was seeded earlier (2 to 3 weeks before freeze-up) in the fall (Fig. 2). Canola seeded earlier in the fall usually had low plant density with large number of branches produced per plant. Later-emerged branches delayed the maturity for the whole plant.

Non-coated canola produced low to zero yields when seeded early in the fall (October 9 to 26) (Fig. 3). As seeding was delayed, seed yields with non-coated seed increased substantially. Highest yields were obtained when the canola was seeded just before freezing. In years with favourable soil moisture, the later-fall-seeded canola yielded as good as spring-seeded crop (data not shown), but in dry years fall-seeded canola yielded higher than the spring-seeded crop.

In years when the soil moisture in the spring were near to or higher than average, canola grown from coated seeds produced significantly higher seed yields than the non-coated canola (Fig. 3a). Under the good moisture conditions, coated canola planted early in the fall (before October 26) yielded as well as that planted later in the fall (after October 26). However, when conditions were dry (i.e., soil moisture below average such as 1998 and 2001), the coated seed planted earlier in the fall produced higher seed yields than non-coated canola (Fig. 3b), but when seeded later in the fall, coated canola produced lower seed yields than the non-coated canola. The lower yield of the coated canola when seeded late in the fall was mainly due to low plant stands (Fig. 1b).

Conclusion

Our study indicates that planting date is critical for the success of fall-seeded canola. In southwest Saskatchewan, non-coated canola must be seeded late in the fall (October 26 to November 12) to

ensure that seeds remain dormant without sprouting in the fall. When coated with a polymer substance, canola can be planted as early as October 12 with minimal risk of fall sprouting in a normal year, resulting in an equivalent or higher seed yields than non-coated canola. If the soil is very dry in the following spring (such as in 2001), however, the polymer coating persists until late in the spring, producing thin, uneven plant stands and low seed yields.

Acknowledgment

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Fig 1. Plant population density of fall-seeded canola in wet and dry years in Swift Current.

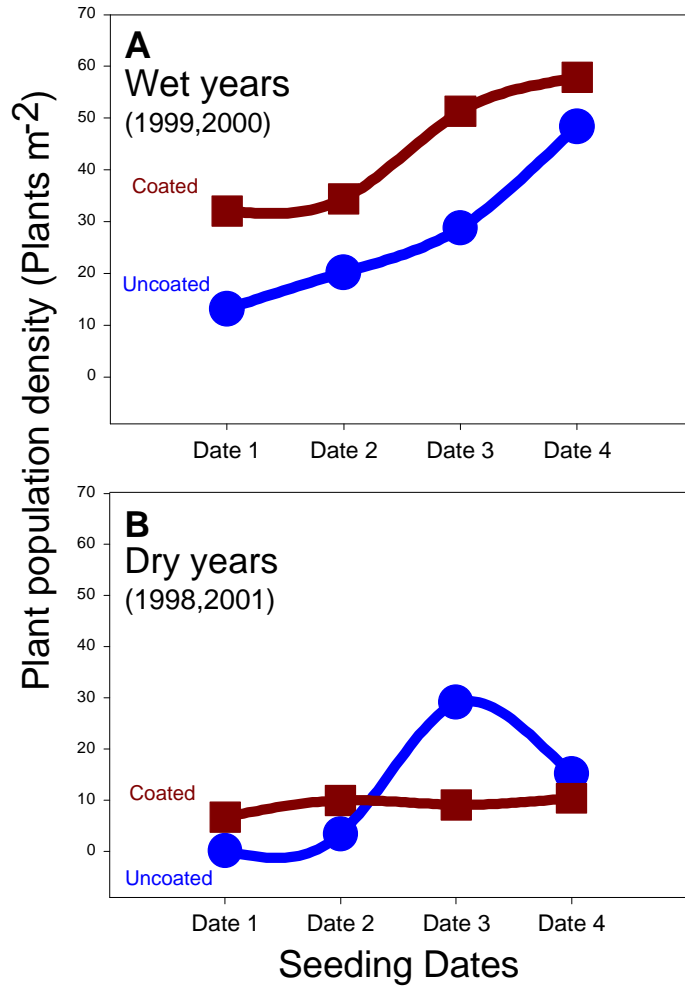


Fig 2. Days to maturity of fall-seeded canola (coated) at Swift Current.

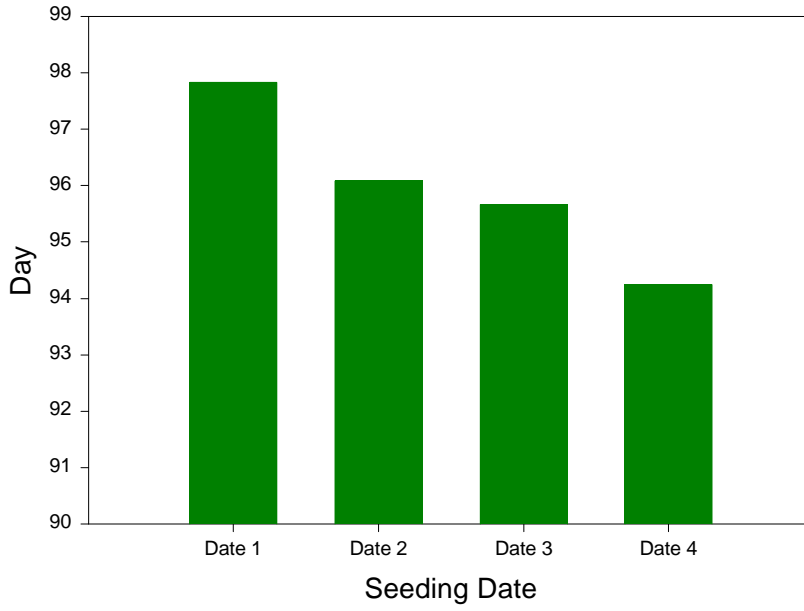


Fig 3. Seed Yields of fall-seeded canola in wet and dry years in Swift Current.

