

## **Effect of seed quality on the performance of hybrid Argentine canola in early- and late-seeded plots with conventional and minimum tillage**

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*The objective of this study was to investigate the effect of seed quality on the performance of hybrid Argentine canola in early- and late-seeded plots with conventional tillage and minimum tillage. Seed yields were 7-9 bu/acre higher in early-seeded plots than in late-seeded plots. Seed lots with low conductivity and high germination in the standard germination test (SGT) and pre-chill test (PCT) had the best stand establishment. Seed lots with 1000-seed weights above 5.0 g had the highest shoot weights. Seed lots with a vigour index above 5.0 in the SGT or PCT usually had the highest shoot biomass and highest seed yield.*

Seed quality has been shown to have a significant effect on the agronomic performance of open-pollinated Argentine canola. However, limited research has been conducted on the influence of seed quality on the performance of hybrid Argentine canola. The objective of this study was to investigate the effect of seed quality on the performance of hybrid seed lots grown under different environmental conditions and tillage practices. Experiments focused on identifying seed attributes that provide the best indication of stand establishment, shoot growth, shoot biomass and seed yield in early- and late-seeded plots with conventional tillage (CT) and minimum tillage (MT).

Laboratory and field tests were conducted on 14 seed lots of hybrid Argentine canola at AAFC-Saskatoon in 2005 and 2006. The quality and vigour of the seed lots was evaluated in the standard germination test (SGT), pre-chill test (PCT), controlled deterioration test (CDT) and electrical conductivity test (ECT). Green seed content and 1000-seed weights were also assessed. The vigour index of each seed lot was calculated from the 1000-seed weight and final % germination/100 in the SGT and PCT.

Seed lots treated with a commercial seed dressing were grown in summer fallow (termed CT) and tilled wheat stubble (termed MT) in 2005 and 2006. Seed lots were planted in early to mid May and in late May or early June. Assessments focused on flea beetle damage, seedling establishment, shoot growth, shoot biomass and seed yield. Shoot biomass was calculated from the number of seedlings/m-row and shoot weight. The quality of the seed lots in each laboratory test was correlated with data from each field test to identify seed attributes that provide the best indication of agronomic performance.

### **Seed quality tests**

Laboratory tests indicated that the 14 seed lots of hybrid canola differed in their 1000-seed weight (3.1-5.4 g), green seed content (0.4-5.2%), electrical conductivity (57-80  $\mu\text{S}/\text{cm/g}$ ) and final germination in the SGT (88-99%), PCT (90-99%) and CDT (60-98%). Vigour indices ranged from 3.1 to 5.1.

### **Flea beetle damage**

Flea beetle damage to the cotyledons was low in all field tests. Damage 21 days after seeding was higher in tests with CT (3-9% damage) than in tests with MT (1-2% damage).

### **Stand establishment**

Establishment of the seed lots differed in each test. Establishment also varied depending on the year, seeding date and tillage practice. In 2005, establishment of the seed lots in early- and late-seeded plots ranged from 82-96% in CT and from 58-82% in MT. Establishment was positively correlated with the germination of the seed lots in the SGT and PCT. Seed lots with the highest germination in the PCT (95-99%) and SGT (95-99%) had the best establishment in early- and late-seeded plots, respectively. In 2006, stand establishment ranged from 74-86% in CT and from 71-89% in MT. Seed lots with low conductivity in the ECT ( $<70 \mu\text{S/cm/g}$ ) had the best establishment.

### **Shoot growth**

Shoot weights differed among the seed lots after 14, 21 and 28 days in each test. Shoot weights on each sampling date were higher in late-seeded plots than in early-seeded plots. Shoot weights were positively correlated with 1000-seed weight in all tests. Seed lots with seed weights below 4.0 g had the lowest shoot weight whereas seed lots with seed weights above 5.0 g had the highest shoot weight. With a 1.0 g increase in 1000-seed weight, shoot weights in early- and late-seeded plots with CT or MT increased by 10-26%.

### **Shoot biomass and seed yield**

Shoot biomass and seed yield differed among seed lots in most tests. Biomass after 14, 21 and 28 days was consistently higher in late-seeded plots than in early-seeded plots. In contrast, seed yields in CT and MT were 25-35% higher when seed lots were seeded early rather than late. Shoot biomass and seed yield were positively correlated with the vigour index of the seed lots in the SGT or PCT. Seed lots with a vigour index below 4.0 had the lowest biomass and seed yield. Seed lots with a vigour index above 5.0 usually had the highest biomass and highest seed yield. With a 1.0 unit increase in the vigour index, shoot biomass increased by 9-29% whereas yield increased by 2-7%.

For information on related studies, go to:

Elliott.CARP2004-14.1. **Effect of neonicotinoid seed treatments on flea beetle damage and performance of Polish canola (*Brassica rapa*) in 2003-2005**

Elliott.CARP2004-14.2. **Effect of neonicotinoid seed treatments on flea beetle damage and performance of Argentine canola (*Brassica napus*) in 2003-2006**

Elliott.CARP2004-14.3. **Effect of seeding date and seeding rate on flea beetle damage and agronomic performance of open-pollinated and hybrid Argentine canola under different tillage practices in 2001-2006**

**Elliott.CARP2004-14.4. Effect of seeding rate on flea beetle damage and agronomic performance of sized seeds of open-pollinated and hybrid Argentine canola in 2004-2006**

**Elliott.CARP2004-14.6. Effect of production practices and seed quality on the performance of open-pollinated Argentine canola in conventional, minimum and zero tillage**