



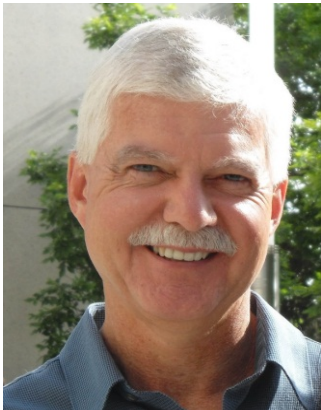


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Opener and seeding speed effects on canola emergence



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Background



- Canola seed is a substantial input cost
- Canola emergence is often only 40-70% of planted seed
- How important is seeding speed, seeding depth, and opener type on resulting canola emergence?

Study 1



- Experiments were established on cereal stubble in 2008, 2009 and 2010
- Agriculture Canada sites: Lethbridge, Lacombe, Scott, and Indian Head
- RR canola was seeded at 150 seeds/m² with a Conservapak drill (knife openers)
- Factorial combination of 8 treatments
 - 2 Cultivars: Hybrid or open-pollinated
 - 2 seeding depths: 1 and 4 cm
 - 2 Seeding speeds: 4 and 7 mph

Canola Emergence - Lacombe

(seeding rate - 150 seeds/m²)

Treatment	2008	2009	2010
	————— plants/m ² —————		
4 mph, 1 cm	101	52	59
4 mph, 4 cm	80	30	30
7 mph, 1 cm	79	43	63
7 mph, 4 cm	61	24	52
Rainfall (mm) 1 WBS - 2 WAS	26	9	38
Seeding date	May 5	May 1	May 11

Canola Emergence - Scott

Treatment	2008	2009	2010
	————— plants/m ² —————		
4 mph, 1 cm	37	52	89
4 mph, 4 cm	64	57	57
7 mph, 1 cm	20	70	96
7 mph, 4 cm	63	40	49
Rainfall (mm) 1 WBS - 2 WAS	10	16	91
Seeding date	May 16	May 15	May 14

Days to Emergence - Lacombe

Treatment	2008	2009	2010
	————— days —————		
4 mph, 1 cm	15	21	15
4 mph, 4 cm	17	31	17
7 mph, 1 cm	15	21	15
7 mph, 4 cm	16	30	15
LSD (0.05)	1	2	1

Days to Emergence – Indian Head

Treatment	2008	2010
	————— days —————	
4 mph, 1 cm	22	16
4 mph, 4 cm	31	18
7 mph, 1 cm	23	15
7 mph, 4 cm	33	18
LSD (0.05)	4	2

Yield - Lacombe



Treatment	2008	2009	2010
	t/ha		
4 mph, 1 cm	4.8	5.2	3.5
4 mph, 4 cm	4.4	4.3	3.6
7 mph, 1 cm	4.8	4.7	3.3
7 mph, 4 cm	4.7	4.8	3.5
LSD (0.05)	0.6	0.3	0.5

Yield– Indian Head

Treatment	2009	2010
	————— t/ha —————	
4 mph, 1 cm	2.7	2.4
4 mph, 4 cm	2.9	2.1
7 mph, 1 cm	2.7	2.1
7 mph, 4 cm	2.7	2.1
LSD (0.05)	0.3	0.9

% Green Seed – Indian Head

Treatment	2009	2010
	————— % —————	
4 mph, 1 cm	1	6
4 mph, 4 cm	2	7
7 mph, 1 cm	3	11
7 mph, 4 cm	2	14

Grade	Shade
#1	≤ 2
#2	>2, ≤ 6
#3	>6, ≤ 20
sample	> 20

Summary



- “Deep” seeding had the greatest negative effect on emergence (unless dry surface soils)
- Seeding speed had a less consistent effect
- Hybrid vs. OP usually had no effect
- Poor emergence does not always reduce canola yield, but can:
 - reduce weed competitiveness
 - require additional herbicide applications
 - delay maturity
 - reduce canola quality

Study 2 - Opener study - AgTech Centre

- Treatments:

- A) Opener type – various soil disturbance levels

- 1) single shank single shoot 0.5 inch narrow knife (low)
 - 2) disk - double shoot (low)
 - 3) single shank single shoot 3 inch spread tip (medium)
 - 4) double shank (medium)
 - 5) single shank double shoot 2 inch side band (medium to high)
 - 6) single shank double shoot 4.5 inch paired row (high)

- B) Seeding speed

- 1) 4 mph
 - 2) 6 mph

**All openers were evaluated on the same seed drill and on cereal stubble*

Study 2 - Opener study



- Locations:
 - Lethbridge (dark brown clay loam)
 - St. Albert (black loam)
 - Zealandia (brown sandy loam)
 - Indian Head (black heavy clay)
 - Brandon (black clay loam)
- Years:
 - 2011
 - 2012



Study 2 – 2011 results



- Good soil moisture at Lethbridge, St. Albert and Zealandia
- Excessively wet at Indian Head and Brandon (not seeded until July)
- Canola emergence varied from 47% at Indian Head to 89% at Brandon
- No differences among opener types at any site

Study 2 – 2011 results



- Canola densities were lower at 6 mph vs. 4 mph:
 - *20% of comparisons across opener types*
 - Single shank single shoot 0.5 inch knife (1 site)
 - Disk-double shoot (2 sites)
 - Single shank single shoot 3" spread tip (0 sites)
 - Double shank (0 sites)
 - Single shank double shoot 2" side band (2 sites)
 - Single shank double shoot 4.5" paired row (1 site)

Study 2 – 2012 canola emergence (plants/m²)

--- Seeding rate was 100 seeds/m² at all sites ---

Seed drill opener	Disturbance	Lethbridge (2012)	St Albert (2012)
Single shank single shoot 0.5 inch knife	Low	61 a	75 a
Disk-double shoot	Low	58 a	65 b
Single shank single shoot 3 inch spread tip	Medium	50 b	61 b
Double shank	Medium	52 b	73 a
Single shank double shoot 2 inch side band	Medium to High	49 b	75 a
Single shank double shoot 4.5 inch paired row	High	45 b	66 b
Mean % emergence		53%	69%

Study 2 – 2012 canola emergence (plants/m²)

Seed drill opener	Disturbance	Zealandia (2012)	Indian Head (2012)	Brandon (2012)
Single shank single shoot 0.5 inch knife	Low	68 a	78 a	75 a
Disk-double shoot	Low	58 b	69 b	72 a
Single shank single shoot 3 inch spread tip	Medium	66 a	69 b	76 a
Double shank	Medium	70 a	74 a	70 a
Single shank double shoot 2 inch side band	Medium to High	57 b	77 a	76 a
Single shank double shoot 4.5" paired row	High	60 b	74 a	71 a
Mean % emergence		66%	75%	74%

Study 2 – Seeding speed (2012)

- Canola densities were lower at 6 mph vs. 4 mph:
 - *33% of comparisons across opener types*
 - Single shank single shoot 0.5 inch knife (3 sites)
 - Disk double shoot (1 site)
 - Single shank single shoot 3” spread tip (1 site)
 - Double shank (2 sites)
 - Single shank double shoot 2” side band (1 site)
 - Single shank double shoot 4.5” paired row (2 sites)

Study 3 - Field scale study

- Strip trials on farm fields
- Used farmer's own equipment
- Base ground speed of 3-4 mph and then asked to seed at higher speeds in adjacent strips
- Canola emergence determined 3 weeks after planting
- Conducted in 2011 and 2012
- Organized by Farming Smarter and Battle River applied research groups in Alberta
- Sherrilyn Phelps and Shannon Urbaniak with Saskatchewan Agriculture and Stu Brandt with NARF in Saskatchewan (ADOPT funding)

Study 3 – Alberta field scale canola emergence

Seed drill	Speed (mph)	% reduction (2011)	% reduction (2012)
JD 1895 disc drill (10" rows)	4	0	0
	6	17	2
	8	17	9
	9.5	26	--
Flexicoil 6000 with pillar laser openers (10" rows)	4	0	0
	6	10	13
	8	21	19
Morris 425 with paired row openers (10" rows)	4	0	0
	6	2	28
	8	11	--

Study 3 – Alberta canola emergence

Seed drill	Speed (mph)	% reduction (2011)	% reduction (2012)
Bourgault with narrow hoe openers (9.8" rows)	4	0	--
	5	4	--
	6	11	--
JD ConservaPak (10" rows)	4	--	0
	5	--	13
	6	--	40

Study 3 – Saskatchewan field scale study

- 2011
 - 16 farms; seeding speeds of 3 to 9 mph
 - Good to excess soil moisture
 - Bourgault Knife, Seed Hawk, JD Air Disc, Bourgault Atom Jet, Ezee-On Atom Jet, JD ConservaPak, Bourgault Paralink, Flexicoil Paired Row, Morris Atom Jet, Concorde Spoon
 - 2 of 16 sites had reduced canola emergence with higher speeds
- 2012
 - 11 farms, speeds of 3 to 7 mph, excellent soil moisture
 - JD ConservaPak Paired Row, Seed Hawk 1" knife, Ezee On Atom Jet, Bourgault Parelink, Flexicoil Paired Row, JD Disc, Bourgault 1" knife, Concorde 4" Sweep
 - Average canola emergence over all sites was 47% (23-68%)
 - 2 of 11 farms had reduced canola emergence with higher speeds

Study 3 – SK field scale canola emergence

Seed drill	Speed (mph)	% reduction (2011)
John Deere Air Disc	4.5	0
	5.5	14
	6.5	23
	7.5	20
	8.5	24
Morris Atom Jet	3.5	0
	4.5	10
	5.5	19
	6.5	44

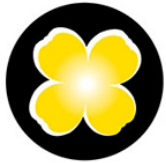
Study 3 – SK field scale canola emergence

Seed drill	Speed (mph)	% reduction (2012)
JD ConservaPak Paired Row	3	0
	4	4
	5	12
	6	15
Bourgault Paralink	3	0
	4	0
	5	6
	6	10
	7	19

Summary



- **Opener type:**
 - No differences in canola emergence in 2011
 - Significant differences in 4 of 5 sites in 2012
 - Inconsistent results in terms of a superior opener
 - All openers usually performed well!
- **Seeding speed (6 vs. 4 mph):**
 - Reduced emergence in 20% of cases in 2011
 - Reduced emergence in 33% of cases in 2012
- **Farm trials:**
 - General trend of reduced canola emergence with higher seeding speeds in Alberta
 - 13% of farms in 2011 and 18% of farms in 2012 had reduced emergence with higher speeds in Saskatchewan
 - Excellent soil moisture may have been the great equalizer in these studies



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