Factors to Consider for Straight-Combining Canola Successfully

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Soil & Crop Management Seminar
February 1, 2012
Melville Communiplex, Melville, SK
WHAT ARE GROWERS DOING?

2009 CCC Agronomy Survey says...

- 14.6% straight-combine
- 13.8% want to increase straight-combined acres

Why aren’t more straight-combining?

- RISK!!!
- Conflicting reports from researchers & growers with no clear answer as to which practice is better
### STRAIGHT-COMBINED VERSUS SWATHED (SMALL PLOT TRIALS)

<table>
<thead>
<tr>
<th>Site-Year</th>
<th>IH-09</th>
<th>IH-10</th>
<th>SC-09</th>
<th>SC-10</th>
<th>ME-09</th>
<th>ME-10</th>
<th>SW-09</th>
<th>SW-10</th>
<th>ALL</th>
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<tbody>
<tr>
<td>Grain Yield (kg/ha)</td>
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<tr>
<td>SWATHED</td>
<td>96%</td>
<td>82%</td>
<td>112%</td>
<td>110%</td>
<td>78%</td>
<td>92%</td>
<td>101%</td>
<td>119%</td>
<td>98%</td>
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<tr>
<td>STRAIGHT-CUT</td>
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</tbody>
</table>

**Notes:**
- IH: Indian Head
- SC: Saskatchewan
- ME: Manitoba
- SW: Swift Current
OBSERVED SEED LOSS
(TIME OF HARVEST)

Site-Year

Seed Yield Loss (%)

IH-09  IH-10  SC-09  SC-10  ME-09  ME-10  SW-09  SW-10  ALL

- 0.8%
- 14%
- 0.5%
- 1.0%
- 22%
- 7.1%
- 3.5%
- 14%
- 5.9%

ALL TREATMENTS
OBSERVED SEED LOSS
(2-3 WEEKS PAST HARVEST)

Site-Year

Seed Yield Loss (%)

IH-09  IH-10  SC-09  SC-10  ME-09  ME-10  SW-09  SW-10  ALL

27.8%  24.4%  5.8%  2.0%  16.8%  21.8%  16.4%
What About Pod Sealants?

• Available in W. Canada since 2008
  1. Pod Ceal DC (formerly Brett Young)
  2. Pod-Stik (United Agri-Products)
  3. Desikote Max (Engage Agro)

• Designed to reduce pod shattering & make shatter-prone crops better suited for straight-combining
POD SEALANT EFFECTS ON YIELD (ALL TREATMENTS STRAIGHT-COMBINED)

Contrast - Treated vs Untreated
ns: not significant
* $P = 0.05-0.10$
** $P = 0.01-0.05$
*** $P < 0.01$
POD SEALANTS EFFECTS ON SEED LOSS
(TIME OF HARVEST)

Contrast - Treated vs Untreated
ns: not significant
*  P = 0.05-0.10
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*** P < 0.01
# POD SEALANTS EFFECTS ON SEED LOSS

(2-3 WEEKS PAST HARVEST)

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<th>AVG</th>
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<tr>
<td>Seed Yield Loss (%)</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
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Contrast - Treated vs Untreated

- ns: not significant
- * $P = 0.05-0.10$
- ** $P = 0.01-0.05$
- *** $P < 0.01$
Is Cultivar Important?

• Polish types & canola quality *juncea* recognized as more resistant to shattering & better suited for straight-combining than Argentine canola

• Early field trials showed large differences in yield loss amongst Argentine canola varieties straight-combined 1 month after maturity (Wang et al. 2007. Plant Breed. 126:588-595)

• 5 cultivars including a canola quality *juncea* type were evaluated in previous study & varietal differences being further explored in current research
CULTIVAR EFFECTS ON SEED LOSS
(TIME OF HARVEST)

Seed Yield Loss (%)

Contrast - *napus* vs *juncea* (8571)
ns: not significant
*  $P = 0.05-0.10$
** $P = 0.01-0.05$
*** $P < 0.01$

Site-Year

IH-09  IH-10  SC-09  SC-10  ME-09  ME-10  SW-09  SW-10  AVG

5440 LL  4362 RR  45H26 RR  5020 LL  8571 CL
CULTIVAR EFFECTS ON SEED LOSS
(2-3 WEEKS PAST HARVEST)

Contrast - *napus vs juncea* (8571)

ns: not significant
* $P = 0.05-0.10$
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<td>Seed Yield Loss (%)</td>
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</table>
Cultivar Effects on Seed Loss (Averaged Across Site-Years)

All Site-Years Combined (EARLY)

Seed Yield Loss (%)

- Dropped Pods
- Shattered Pods

Cultivar:
- 5440 LL
- 4362 RR
- 45H26 RR
- 5020 LL
- 8571 CL

All Site-Years Combined (LATE)

Seed Yield Loss (%)

- Dropped Pods
- Shattered Pods

Cultivar:
- 5440 LL
- 4362 RR
- 45H26 RR
- 5020 LL
- 8571 CL

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• Field-Scale trial initiated at Indian Head (2010-11) to build upon results of small plot trials

• InVigor 5020 chosen for its moderate susceptibility to shattering

• Evaluated the effects of pod sealant applied with and without pre-harvest glyphosate on yields of swathed and straight-combined canola
FIELD-SCALE CANOLA HARVEST TRIAL TREATMENTS

Harvest Methods
1) Swathed
2) Straight-Combined

Foliar Treatments*
1) Untreated
2) Pod Sealant
3) Glyphosate
4) Pod Sealant + Glyphosate

*applied at 30-40% pod colour change
FIELD-SCALE CANOLA HARVEST TRIAL
UNTREATED VS SEALANT (STRAIGHT-COMBINED)

ns: not significant
*  P = 0.05-0.10
** P = 0.01-0.05
*** P < 0.01

Error bars are LSD values (Pr ≤ 0.05)
FIELD-SCALE CANOLA HARVEST TRIAL
UNTREATED VS GLYPHOSATE (STRAIGHT-COMBINED)

ns: not significant
* $P = 0.05-0.10$
** $P = 0.01-0.05$
*** $P < 0.01$

Error bars are LSD values ($Pr \leq 0.05$)

- IH-10: STRAIGHT-UNT 40, STRAIGHT-GLY 35
- IH-11: STRAIGHT-UNT 31, STRAIGHT-GLY 34
- ALL: STRAIGHT-UNT 35, STRAIGHT-GLY 35
FIELD-SCALE CANOLA HARVEST TRIAL
UNTREATED VS COMBO (STRAIGHT-COMBINED)

ns: not significant
*  $P = 0.05-0.10$
** $P = 0.01-0.05$
*** $P < 0.01$

Error bars are LSD values (Pr ≤ 0.05)
• Impact on grain yield not consistent, but pre-harvest glyphosate helps to even out maturity and can potentially accelerate harvest in addition to provided weed control benefits for the next season.
CULTIVAR & HARVEST METHOD

EFFECTS ON SEED SIZE

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CULTIVAR & HARVEST METHOD
EFFECTS ON GREEN SEED CONTENT

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Equipment Considerations

• Project completed at Swift Current (Wheatland Conservation Area Inc.) from 2005-2007) to evaluate header losses & seed yields from canola straight-combined using various header types

• The header types that were evaluated included a rigid header, draper header, stripper header & BISO extension
2005 Study Conclusions

• Stripper header was not a viable option for canola with high header losses & significant yield reduction

• BISO extension resulted in lowest header losses and a 2.6 bus/ac (9.4%) increase in seed yield over rigid header
Wheatland Canola Harvest Study (Swift Current 2006)

2006 Study Conclusions

- Stripper header treatment was replaced with draper header and study focused solely on Argentine canola.
- BISO extension resulted in lowest header losses and 5.2 bus/ac (16%) yield increase over rigid header with similar results between rigid and draper headers.
2007 Study Conclusions

- BISO extension resulted in lowest header losses and 4.2 bus/ac (17%) yield increase over rigid header
- Similar to 2006, slight advantage to draper header over rigid type but not statistically significant
Current Research

- Trials initiated in 2011 at Indian Head, Scott & Swift Current to further investigate importance of cultivar selection for straight combining
- Evaluating potential yield loss and measuring pod drop/shatter in 12 modern cultivars from various breeding programs / herbicide systems

<table>
<thead>
<tr>
<th>InVigor 5540</th>
<th>Pionner HiBred 45H29</th>
<th>Dekalb 73-45</th>
<th>Pioneer HiBred 46H75</th>
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</thead>
<tbody>
<tr>
<td>InVigor L130</td>
<td>Pionner HiBred 45H31</td>
<td>Brett Young 6060</td>
<td>Nexera 2012 CL</td>
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<tr>
<td>InVigor L150</td>
<td>Dekalb 73-75</td>
<td>Proven 9553</td>
<td>Brett Young 5525</td>
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</table>
Straight-Combined Seed Yield (early-optimal timing)

All Locations (2011)
Observed Seed Loss in Percent (early-optimal timing)

All Locations (2011)

Yield Loss (%)

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>5440 LL</th>
<th>L130 LL</th>
<th>L150 LL</th>
<th>45H29 RR</th>
<th>45H31 RR</th>
<th>T3-75 RR</th>
<th>T3-45 RR</th>
<th>6060 RR</th>
<th>9553 RR</th>
<th>46H75 CL</th>
<th>2012 CL</th>
<th>5525 CL</th>
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<tbody>
<tr>
<td>T1 - Shattered (LL)</td>
<td>a</td>
<td>a</td>
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<td>T1 - Dropped (LL)</td>
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<td>T1 - Shattered (RR)</td>
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<td>T1 - Dropped (RR)</td>
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<td>T1 - Dropped (CL)</td>
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</table>

Note: The bars with 'a' indicate statistically significant differences.
Straight-Combined Seed Yield (2-4 weeks past optimal timing)

All Locations (2011)

Cultivar

Seed Yield (kg/ha)

5440 LL  L 150 LL  45H29 RR  45H31 RR  T3-75 RR  T3-45 RR  6000 RR  9553 RR  46H75 CL  2012 CL  5525 CL

IHARF
INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION
Straight-Combined Seed Yield
(T1 – T2)

All Locations (2011)
Straight-Combined Seed Yield
(T1 – T2)

All Locations (2011)
Observed Seed Loss in Percent
(2-4 weeks past optimal timing)

All Locations (2011)
Percent Green Seed (early-optimal timing)

All Locations (2011)

- T1 - Green Seed (LL)
- T1 - Green Seed (RR)
- T1 - Green Seed (CL)


Legend: a, b, c, bc
Percent Green Seed
(2-4 weeks past optimal timing)

All Locations (2011)
Seed Size
(early-optimal timing)

All Locations (2011)

Cultivar

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Green Seed (%)</th>
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</thead>
<tbody>
<tr>
<td>5440 LL</td>
<td>c</td>
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<tr>
<td>L130 LL</td>
<td>c</td>
</tr>
<tr>
<td>L150 LL</td>
<td>c</td>
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<tr>
<td>45H29 RR</td>
<td>c</td>
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<tr>
<td>45H31 RR</td>
<td>c</td>
</tr>
<tr>
<td>T1 - TKW (LL)</td>
<td>c</td>
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<tr>
<td>T1 - TKW (RR)</td>
<td>b</td>
</tr>
<tr>
<td>T1 - TKW (CL)</td>
<td>b</td>
</tr>
<tr>
<td>2012 CL</td>
<td>c</td>
</tr>
<tr>
<td>5525 CL</td>
<td>c</td>
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</table>
Seed Size
(2-4 weeks past optimal timing)

All Locations (2011)
Take-Home Messages

• Growers should not be afraid to try straight-combining canola but must understand the risks
  – Harvesting at optimal stage critical relative to swathed canola
  – Limit straight-cut acres to what is manageable & swath the rest
  – Header extensions may be worthwhile investment for growers who are serious about straight-combining canola

• Variety matters!
  – Significant differences in shatter-resistance demonstrated amongst *napus* varieties
  – More information on relative shattering resistance of varieties would be useful to growers planning to straight-combine

• Pod sealants and/or desicants
  – Pod sealants unlikely to be cost effective over time but a yield benefit was observed 13% of the time *(leave a check-strip!!)*
  – Pre-harvest glyphosate is not a necessity but can accelerate harvest and provide weed control benefits into the next season
ACKNOWLEDGMENTS

AGRICULTURAL DEMONSTRATION OF TECHNOLOGIES & PRACTICES

SaskCanola
Manitoba Canola Growers
Saskatchewan Ministry of Agriculture
Growing Forward
Bayer CropScience
BrettsYoung
VITERRA
Pioneer
DEKALB
UAP
Dow AgroSciences
Thank You!

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