Wheatland Conservation Area Inc
Southwest Agri-ARM Site

Agri-ARM Research Update 2013

ADOPT Project
“Demonstrating the Salt Tolerance of Hybrid Canola”
Presentation Outline

- Wheatland Conservation Area / Agri-ARM background
- ADOPT program
- Project introduction
- 2012 Project findings
- AAFC Salt Lab result summary
- Wrap up and acknowledgements
Wheatland Brief History

- Non-profit / producer run since 1982.
- Applied research
- Agri-ARM (8 sites)
- Trials
  - large and small plots
  - Commodity Groups
  - Governments
  - Industry and Universities
  - extension
- ADOPT projects
The purpose of the ADOPT program is to accelerate the transfer of knowledge to Saskatchewan producers and ranchers. The ADOPT program will provide funding to help producer groups evaluate and demonstrate new agricultural practices and technologies at the local level. The results of successful trials can then be adopted by farming operations in the region.
Project Introduction (ADOPT #20110295)

“Demonstrating the Salt Tolerance of Hybrid Canola”

- The objective of this project is to demonstrate the option of growing canola in saline conditions giving producers an agronomic alternative for saline fields with an economic advantage to barley.
- Use this demonstration as a venue to present results found by Dr. Harold Steppuhn in the AAFC Salt Lab.
- Demonstrated more varieties.
Relevance to Producers

• The excessive rainfall and snow melt we have experienced over the past few years has resulted in saturated rooting zones and leaching, factors that contribute to soil salinity.

• With these conditions prevalent, there is potential for areas of moderate salinity to expand, limiting seeding options for producers to lower value cereals.
2012 Accumulative Precipitation

The graph shows the 2012 accumulative weekly precipitation with a specific note indicating the lowest recorded precipitation in history for a three-month period for July, August, and September of 2012.
Salinity Estimates

- Agri-Food Canada estimates approximately 5.52 million acres (approximately 11.2 per cent) of agricultural land in Saskatchewan are at moderate to high risk of salinization.
- Saskatchewan Assessment estimates that 600,000 of these acres have zero production. (You only see the “Tip of the Iceberg”)

[Map showing distribution of land classes]
Causes and Affects of Soil Salinity

Schematic
Why do plants not grow in salts

Plants take on water and nutrients through the cell walls in the plant roots through osmotic pressure.
Why do plants not grow in salts

There is often lots of moisture and nutrients in saline seeps, however, the plants are unable to utilize them and starve.
How did we set up the demonstration

- Develop a relative salinity contour map of the study area using an EM 38 to measure soil conductivity.

- Canola varieties, a canola quality mustard, and Harrington barley were be seeded in strips down the saline gradient ranging from non-saline areas to relatively high saline areas.
EM 38 Salinity Map

**EC Readings**

- Dark Green < 80 (Non-Saline)
- Light Green 80-100 (Low Salinity)
- Yellow 100-130 (Low to Moderate)
- Dark Yellow 130-160 (Moderate to High)
- Red >160 (Relatively High Salinity)
Demo Design: Crops

1. Invigor 5440 LL
2. Invigor L150
3. 45H29 RR
4. DK73-75RR
5. 45H75 CL
6. BY 5525 CL
7. XCEED Oasis CL (B. Juncea)
8. VT 500
9. Harrington Barley (Check)
Pictures
Demo Observations

Canola Establishment at Increasing Levels of Salinity (EM 38)

% Plant Establishment vs. EM 38 Reading

- Invigor 5440
- Invigor L150
- 45H29 RR
- DK73-75RR
- 45H75 CL
- BY 5525 CL
- XCEED Oasis CL
- VT 500 RR
- Barley

Key observations:
- DK73-75RR and XCEED are more tolerant to salinity.
- BY 5525 CL shows lower establishment at high EM 38 readings.
Pictures (9 treatments)

- 1. Invigor 5440 LL
- 2. Invigor L150
- 3. 45H29 RR
- 4. DK73-75RR
- 5. 45H75 CL
- 6. BY 5525 CL
- 7. XCEED Oasis CL (B. Juncea)
- 8. VT 500
- 9. Harrington Barley (Check)
Move from the field into the AAFC Salt Lab

These demonstrations are often not replicated and with the level of soil variability within a saline site it is difficult to come up with concrete data in the field.

Look at results from Dr. Harold Steppuhn comparing Harrington barley to Hybrid canola.
Plants grown in a silica sand media and irrigated with a solution of equal nutrients and various salt concentrations.

Six levels of salinity (EC 1.6 – 27 dS m⁻¹)

Measurements include emergence and survival, yield.
Plant emergence is delayed as saline levels increase.

Plant stand density decreases as saline levels increase.

As a result, plant maturity is delayed as saline levels increase.
Plant Maturity Delayed
Not all Brassicas react the same.

Camelina does not appear to tolerate saline soils as well as some Hybrid canolas.
Summary / Conclusion

It appears from our demonstration and from results in AAFC Salt lab that some Hybrid canolas have similar salinity tolerances to that of barley.

Hybrid canola can produce similar grain yields to that of Harrington barley provided the plant stand in the saline seedbed can maintain an acceptable plant density. Such densities might be assured by increased seeding rates in saline areas.

Producers should be able to rotate from barley to canola crops in saline areas without sacrificing grain yield providing economic and rotational benefits.
Acknowledgement

- ADOPT & Sask. Ministry of Agriculture
- Dr. Harold Steppuhn & AAFC Salt Lab
- WCA Staff.

2013 Croppportunities Conference, March 12
2013 Wheatland Annual Tour July 11, 2013
www.wheatlandconservation.ca
Improved Straight Cutting Techniques in Oilseeds

• Can we reduce harvest losses enough to straight cut Argentine canola?

Three headers
- BISO header extension.
- Draper header.
- Rigid straight cut header.
BISO Header Extension

Header from Robert Breckner, Grandview, Manitoba
BISO Header Extension

- Reel above plate
- Cutter bar forward
- Crop has no problem feeding
- Seeds caught by ridged plate
Seed trapped on terraced plate
Draper Header Results ’06, ’07

Header Losses and Yield 2006

Header Losses and Yield 2007
2013 Cropopportunities Conference, March 12
2013 Wheatland Annual Tour July 11, 2013
www.wheatlandconservation.ca