Pesticide Risk Reduction Strategies for Soybean Production in Ontario

Elroy Cober, Eastern Cereal and Oilseed Research Centre, AAFC, Ottawa ON

Andy Hammermeister, OACC, Nova Scotia Agricultural College, Truro NS

Rod McRae, Food Policy Consulting, Toronto ON

Darren Robinson, Dept. Plant Agriculture, Univ. of Guelph, Ridgetown Campus

Department of Plant Agriculture

University of Guelph Ridgetown Campus

Objective

- 3 weed management strategies
  - Conventional, IWM, Organic (transition)

- Pesticide & other input use
- Time required for management
- Energy use
- Effectiveness of weed control
- Crop yield and quality

Methods

- 5 fields in SW Ontario (Palmyra, Blenheim, two west of Chatham, and Fairview.
- Direct-seeded soybean (175,000 seeds $ha^{-1,}$ - 75 cm rows)
- Conventional: two applications of glyphosate (900 g a.e. ha^{-1} each) made to soybeans at the 1st and 4th trifoliate leaf stage.
- IWM: in-crop banded glyphosate (1st trifoliate) plus interrow cultivation at the 4-5th trifoliate stage of the soybeans.
- Organic: interrow cultivation and hand-weeding at the 1st and 3rd trifoliate leaf stages.

Data collection – weed control

- Visual weed control (28 and 56 days after treatment (DAT)
- Weed biomass (three 1-m^2 quadrats per plot at 28 DAT)
- Harvested innermost three rows of each plot

Weed control and yields were greater in the conventional treatments on farms that traditionally relied on herbicide inputs

Litwin Farm	Weed control (56 DAT)	Weed biomass (56 DAT)	Yield (T/ha)	Handweeding time (min/plot)	EIQ
CONVENTIONAL	90A	0.0B	3.4A	0C	30.6A
IWM	72B	0.8B	3.5A	24B	10.2B
ORGANIC	68B	1.5A	2.9B	51A	0.0C
STD. ERROR	*2*	*0.2*	0.2	*11.2*	*8.1*

Weed control and yields were similar on farms that had already been put into transition

Ridgetown Farm	Weed control (56 DAT)	Weed biomass (56 DAT)	Yield (T/ha)	Handweeding time (mins/plot)	EIQ
CONVENTIONAL	100A	0.0A	2.7A	0C	30.6A
IWM	97A	0.1A	2.9A	8B	5.1B
ORGANIC	85B	0.4A	2.5A	16A	0.0C
STD. ERROR	*12*	*0.2*	*0.2*	*4.1*	*3.1*

Weed control and yields were greater in the IWM treatments on farms that already used tillage and herbicide inputs

Gladstone Farm	Weed control (56 DAT)	Weed biomass (g/m2)	Yield (T/ha)	Handweeding time (mins/plot)	EIQ
CONVENTIONAL	76B	19.6A	2.9AB	0C	30.6A
IWM	97A	0.0C	3.3A	14B	15.3B
ORGANIC	83AB	9.3B	2.1B	28A	0.0C
STD. ERROR	*14*	*0.83*	*0.49*	*0.7*	*9.9*

Pesticide Risk Reduction Strategies

- Farmers hesitant to reduce inputs in field crops
  - Challenges in weed management, despite premiums
- Soybean in particular can be a difficult crop to grow during transition phase:
  - Weed pressure often increases in years 2 & 3 of transition
- Priority: need for a systems approach to weed management in transition soybean.

http://www.ars.usda.gov/SP2UserFiles/Place/66570000/images/covercrops_sm

Rye-vetch cover crop mixture prior to stalk-chopping

Rye-vetch cover crop mixture after stalk-chopping

Rolled at 50% bloom

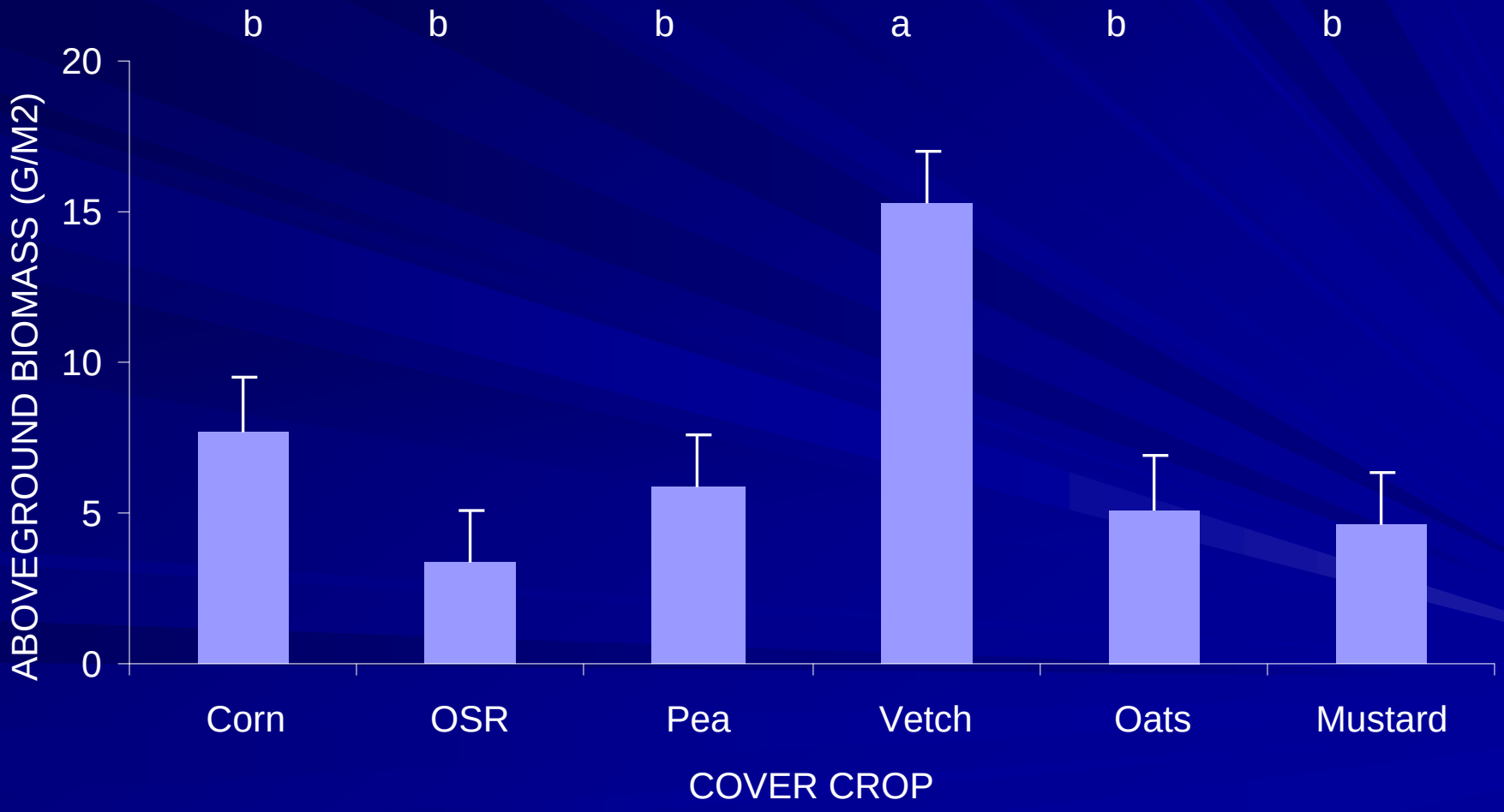
Rolled prior to bloom

Cover crop treatments

- 6 cover crops planted in early fall (2005/06) prior to processing cucumber:
  - Corn, Oilseed radish, Pea, Vetch, Oats, Mustard

- Measured weed density (by species) and weed biomass (2006/07)
  - Just prior to disking cover crops
  - 28 days after emergence of cucumbers

Effect of cover crop species on redroot pigweed biomass – June 2006/07




Oilseed radish – untreated check
Oilseed radish – clomazone (840 g ai ha-1)

Summary

- Oilseed radish
  - best at suppressing weeds present in the study,
  - good tolerance to clomazone residues when planted the fall after application,

Thank You!

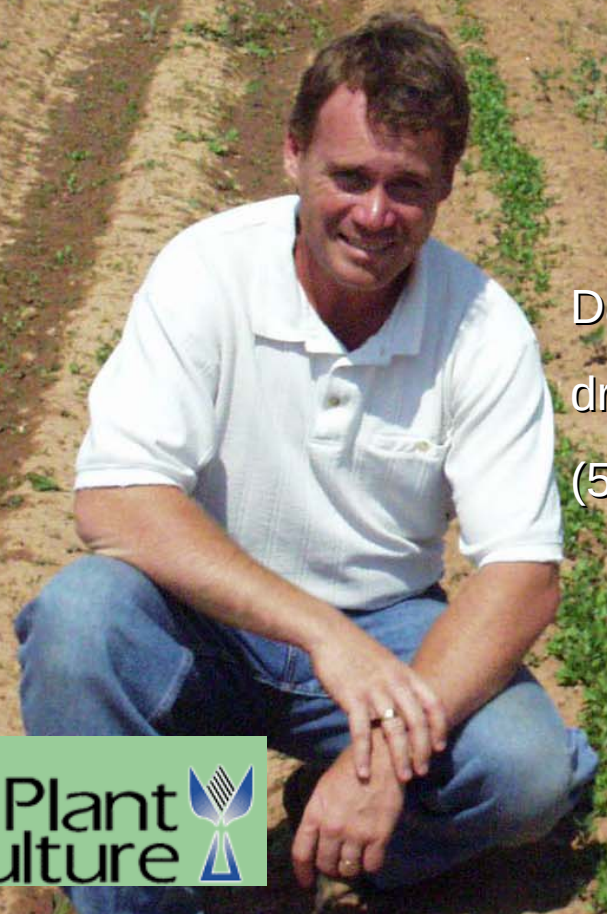
Support for this project was provided by:

Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada

Pesticide Risk Reduction Program
Pest Management Centre

www.agr.gc.ca/prrmup

Canada



Darren Robinson

drobinso@ridgetownc.uoguelph.ca

(519) 674-1604

Department of Plant Agriculture

University of Guelph Ridgetown Campus