



Group 2 resistant Cleavers Control in Peas



Ken Sapsford *PAg*

Dept. Plant Sciences, University of Saskatchewan

Background

- imidazolinone herbicides (Group 2) - most widely used broadleaf weed control herbicides in peas
- Cleavers (*Galium spurium*) and possibly (*Galium aparine*) have evolved resistance to Group 2 herbicides
- Cleavers have increased in ranking from the 43rd most abundant weed in the 1970's to the 9th most abundant weed in 2000's. ("Prairie Weed Survey 1970's to the 2000's" Leeson et.al 2005)
- Research trials have been conducted at a number of locations across Saskatchewan to evaluate herbicides with alternative modes of actions to control cleavers in field peas.

Top 10 weeds in the Prairies

- Wild oat*
- Green foxtail*
- Wild buckwheat*
- Canada thistle
- Lamb's-quarters
- Chickweed*
- Stinkweed*
- Redroot pigweed*
- Cleavers*
- Kochia*

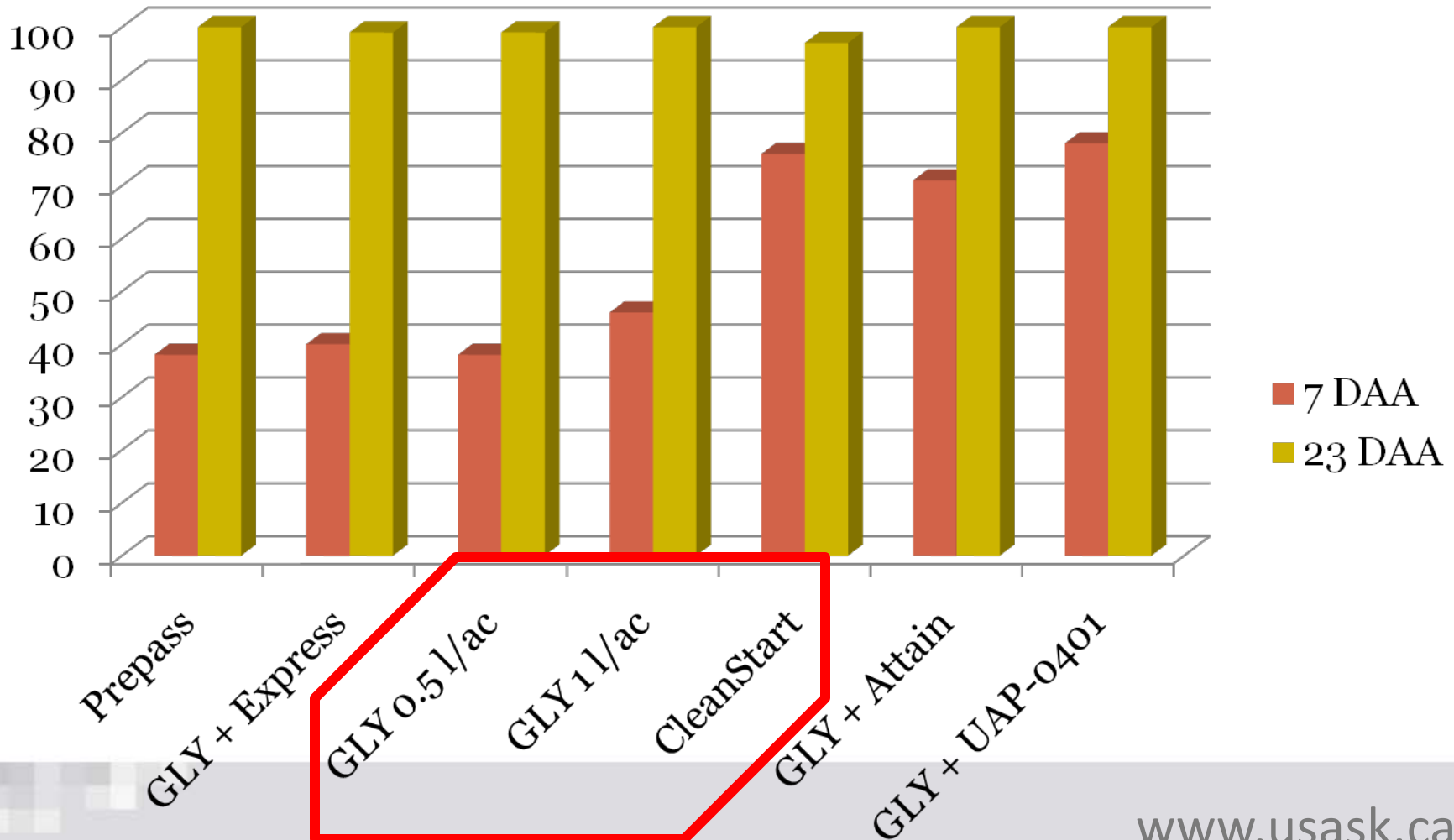
*Known resistant populations

Over Winter Cleavers



Size of Cleavers at application

Winter annual Cleaver Control



Group 2 Resistant Cleavers

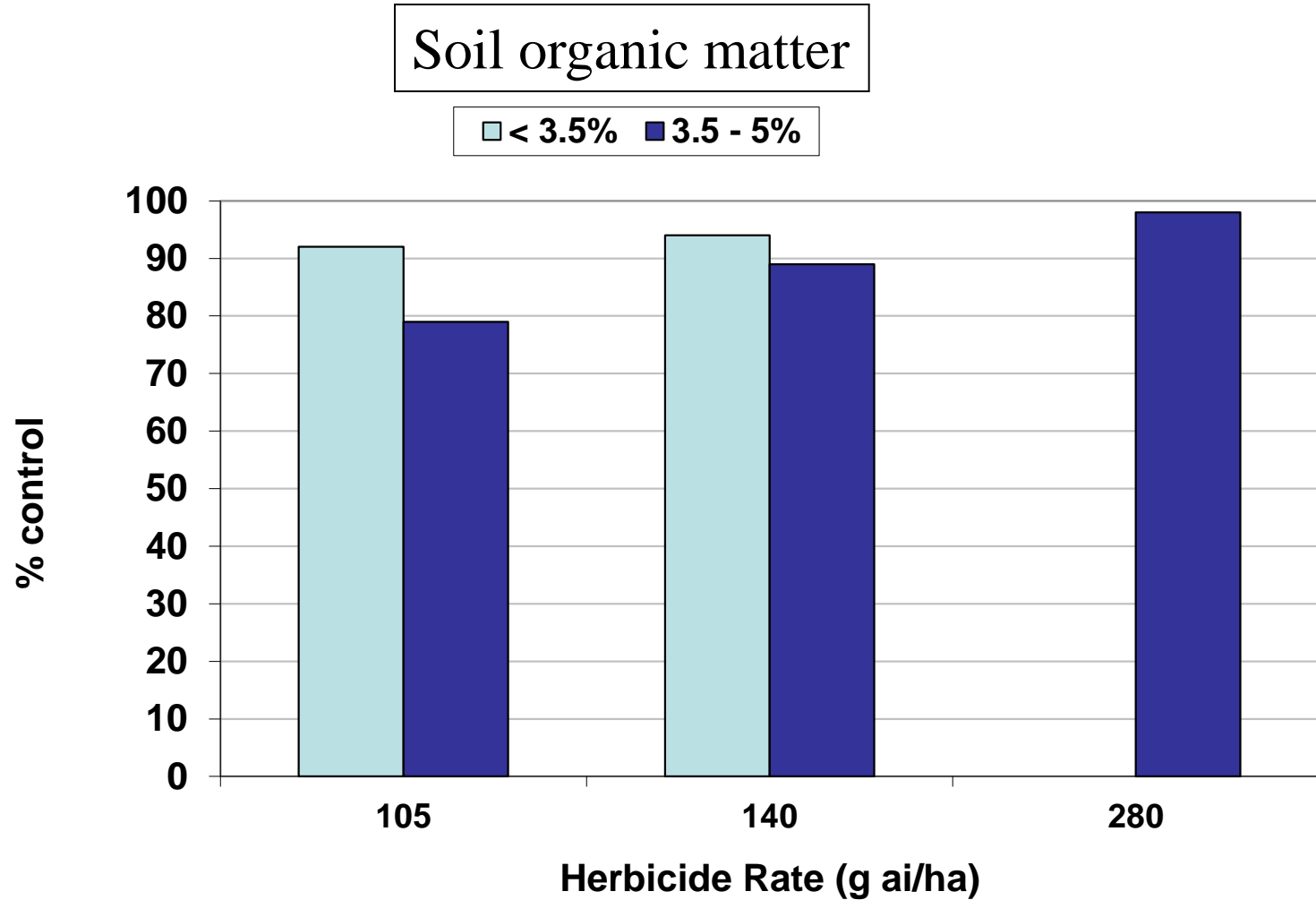


Group 2 Resistant Cleavers Control in Peas

- Sulfentrazone (Authority)
 - Registered in field pea, chickpea, flax, sunflower. Lentils are sensitive.
 - Effective on kochia, wild buckwheat, lambs-quarters, redroot pigweed
 - **Investigating efficacy on cleavers**

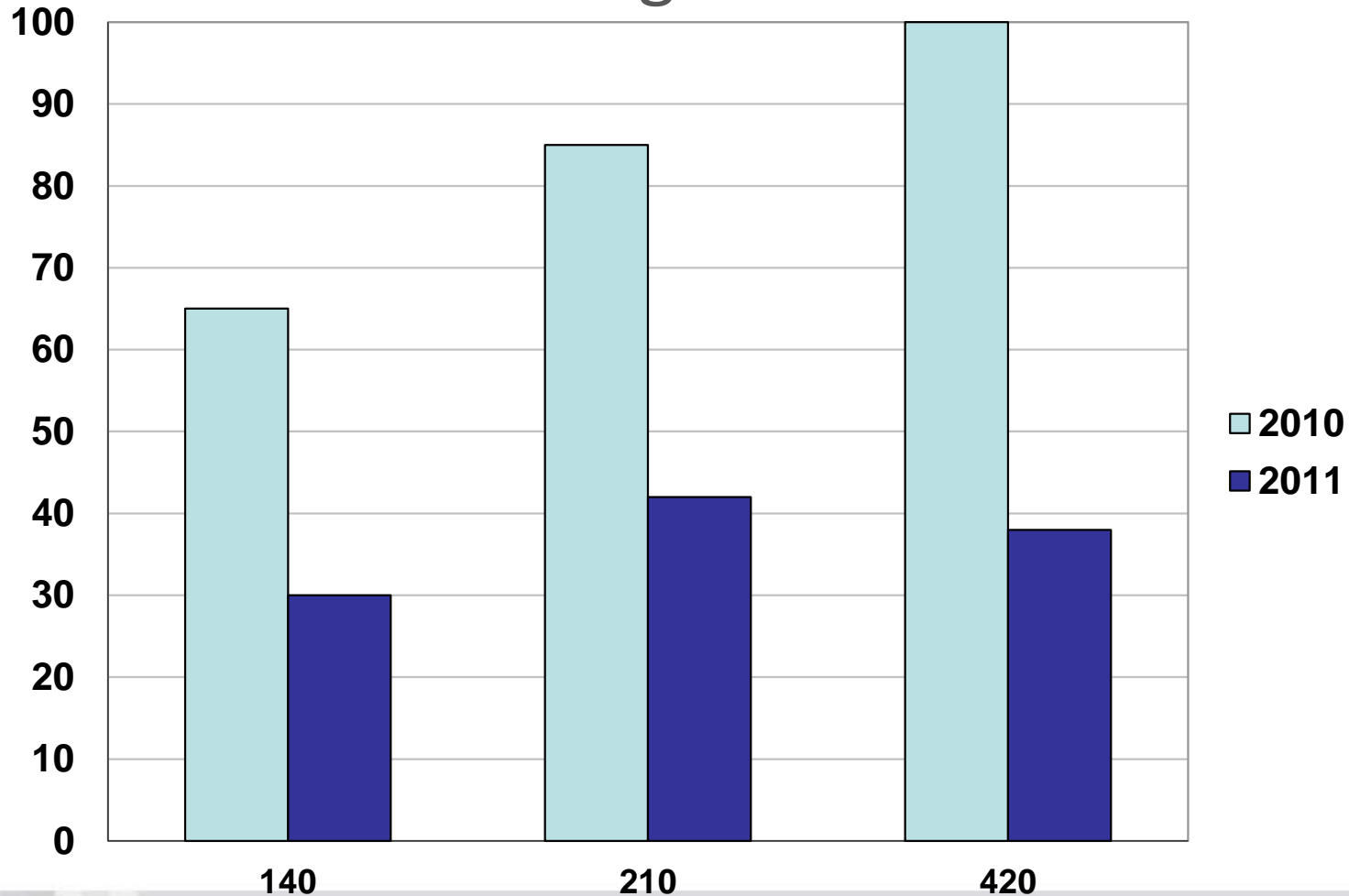


Sulfentrazone for cleavers control, 2010-11



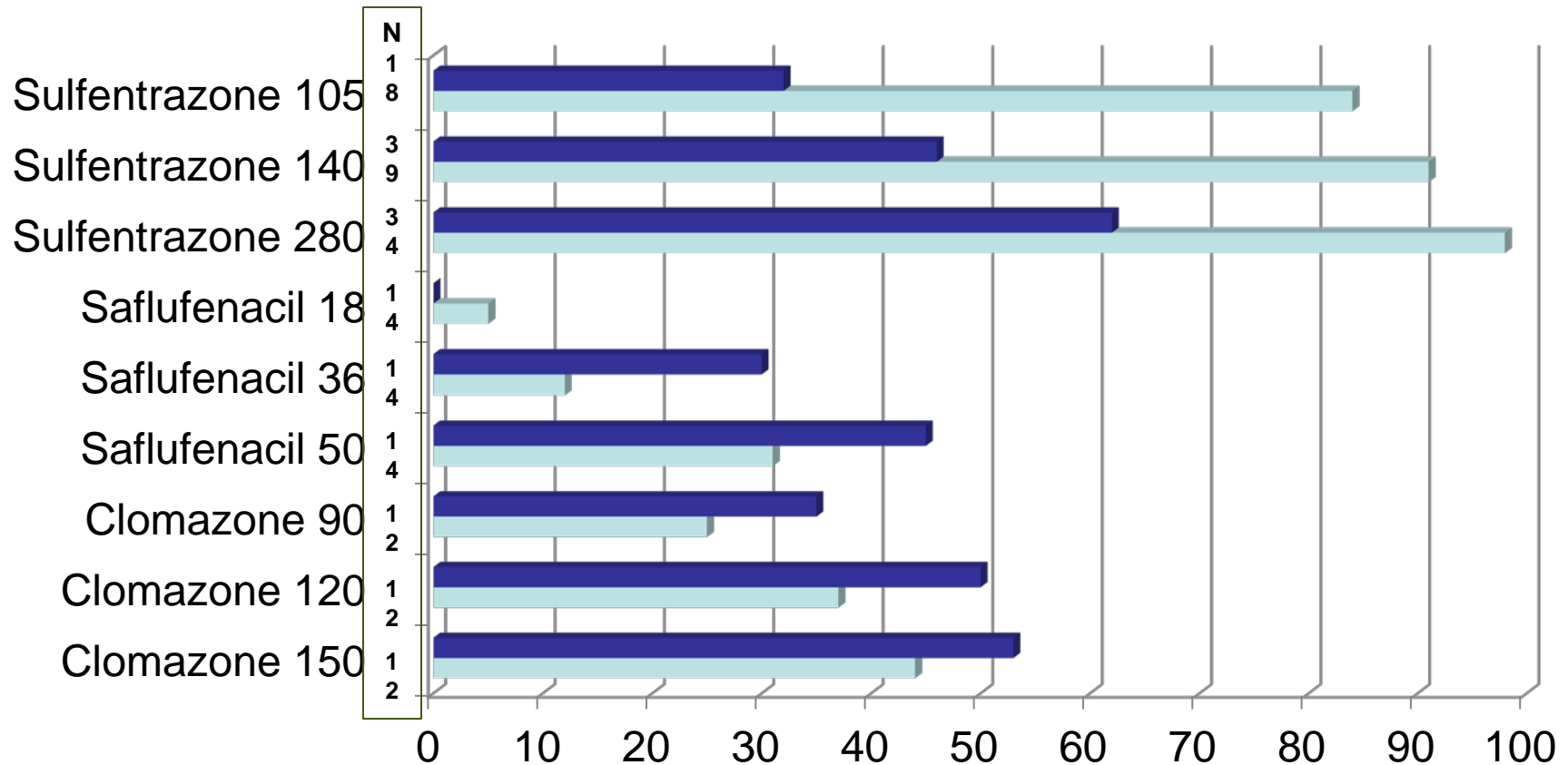
Sulfentrazone for cleavers control, Melfort

> 5% Organic Matter

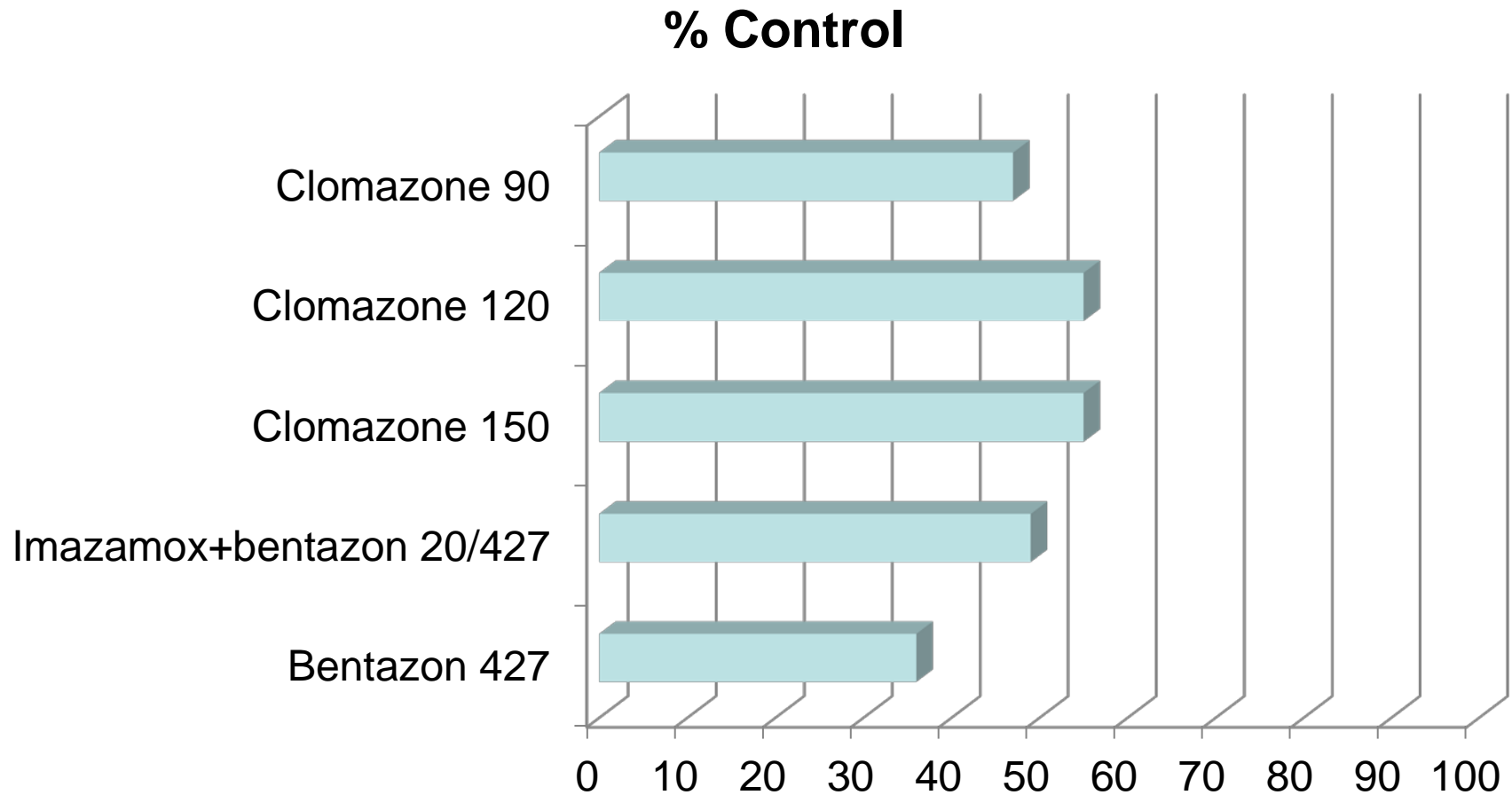


Cleavers Control with Pre-emerg Treatments

■ > 6% OM ■ < 6% OM



Cleavers Control with Post-emerg Treatments



Post-emergent Clomazone



Pre-emergent Clomazone



Results & Conclusions:

- Sulfentrazone (Authority[®]), will control Group 2-resistant cleavers on soil with less than 6% organic matter. FMC is applying for registration
- Control has been variable on soils with higher organic matter levels (black soil zone).
- Pre-emerge products saflufenicil (Heat[®]) and clomazone (Command[®]) and post-emerge product imazamox plus bentazon (Viper[®]) all had some activity on cleavers but none provided control of cleavers.
- Post-emergent clomazone injured cleavers, but caused too much injury to the peas.

Future work

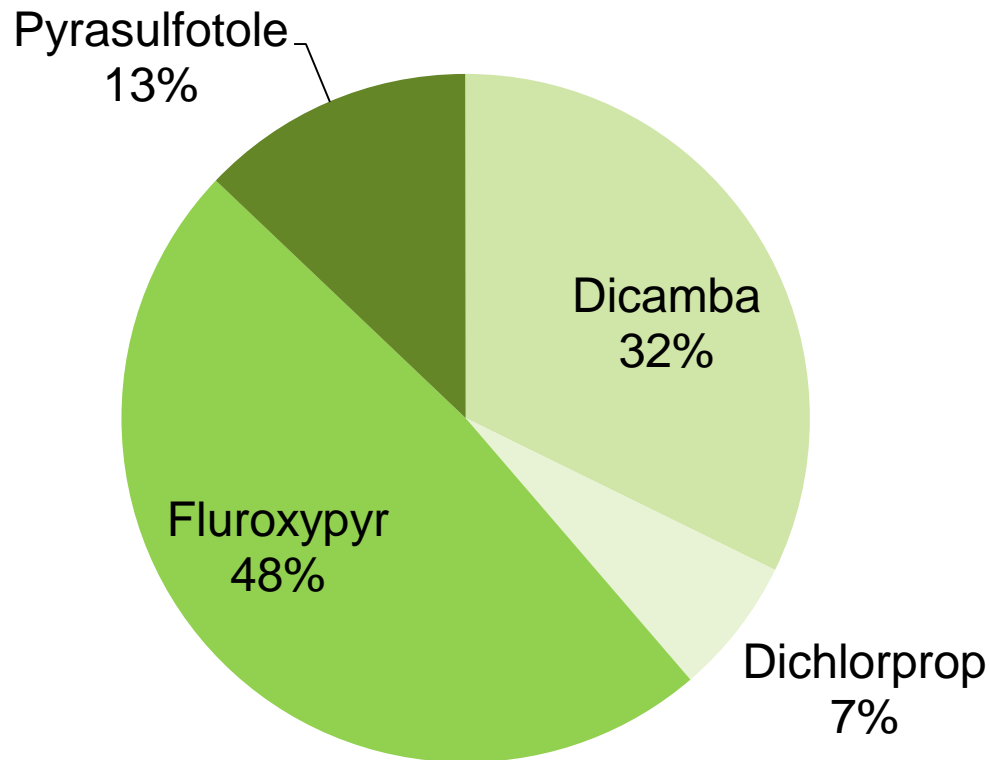
- Investigate sequential applications or combinations of these products to provide control of cleavers in the black soil zone.

Controlling Cleavers in Cereals

- Two main products added to herbicide mixes for cleavers control:
 - Fluroxypyr
 - Dicamba
- Low rates of fluroxypyr and dicamba used in mixes to control Group 2 resistant kochia will not control cleavers

Kochia control in Cereals

Product in mix to control Kochia



Predicting weeds at risk for glyphosate resistance

- Currently 23 glyphosate-resistant weed species worldwide, but only three in Canada – giant ragweed and Canada fleabane in Ontario and kochia in Western Canada
- In the Grassland region, the top three weeds predicted at greatest potential risk of glyphosate resistance are **kochia, wild oat, then green foxtail**
- In the Parkland region the top three species are, **wild oat, green foxtail, and cleavers**

GR kochia in southern Alberta: 10 locations

South West Saskatchewan: 3 locations



<http://www.weedtool.com>

- Objectives:
- (1) tool for producers to assess their risk of glyphosate resistance on a field-by-field basis;
- (2) raise awareness for proactive resistance management in western Canada
- Producer answers 10 questions related to crop production system, tillage system, and glyphosate usage (each question with four possible answers)
- Tool indicates relative risk of glyphosate resistance based on the 10 responses

Resistant management

- Strong statistical association between weed resistance and **lack of crop rotation diversity**
- Recent study indicates **3 or more crop types significantly reduce the risk** of weed resistance vs. 2 or fewer crop types

Palmer amaranth

Male

Female



A.G. Hager



UNIVERSITY OF
SASKATCHEWAN



Hand Weeding

Palmer Amaranth



10 Ways Australian Farmers can fight Herbicide Resistance

1. Act now to stop weed seed set
2. Capture weed seeds at harvest
3. Rotate crops and herbicide mode of action
4. Test for resistance
5. Aim for 100% control and monitor every spray event
6. Don't automatically reach for glyphosate
7. Never cut on-label herbicide rate
8. Plant clean seed into clean fields
9. Use the double knock technique
10. Employ crop competitiveness to combat weeds

Harvest Weed Seed Control



Harrington Seed Destructor



Herbicide Resistant Strategies

- **IPM – Integrated Pest Management**
 - Include Crop rotation
 - Herbicide Mixes – with multiple modes of action
 - Tillage may have a place?
- **Specific Weeds of concern:**
 - Wild oat – Group 1 and 2 resistance
 - Cleavers – Group 2 resistance
 - Chickweed – Group 2 resistance
 - Kochia – Group 2 and 9 resistance
- **Few or No New modes of action in the pipeline**

Funding supplied by

and Pulse Cluster

SASKATCHEWAN
pulse
Growers



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada

Thank you for the technical support from:

Gerry Stuber, Ryan Regush, Herb Schell, Cindy Gampe and
Scott Sherriff

Questions

