



Cleavers Control Strategies for Southern Alberta

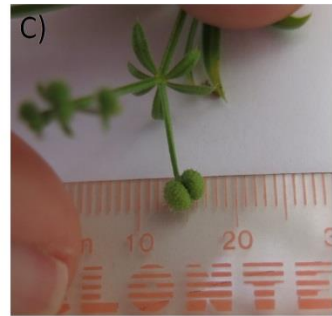
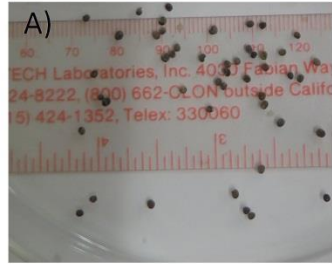
Eric Johnson, Ian Epp, Andrea De Roo and Chris Willenborg

Galium species of Canada

- *Galium borealis* L. (Northern Bedstraw)
- *Galium spurium* L. (False cleavers)
- *Galium aparine* L. (Catchweed Bedstraw)
(Cleavers)



False cleavers *Galium spurium*



Cleavers *Galium aparine*

Photos: Sara Martin
Thesis: Andrea De Roo

Northern Bedstraw



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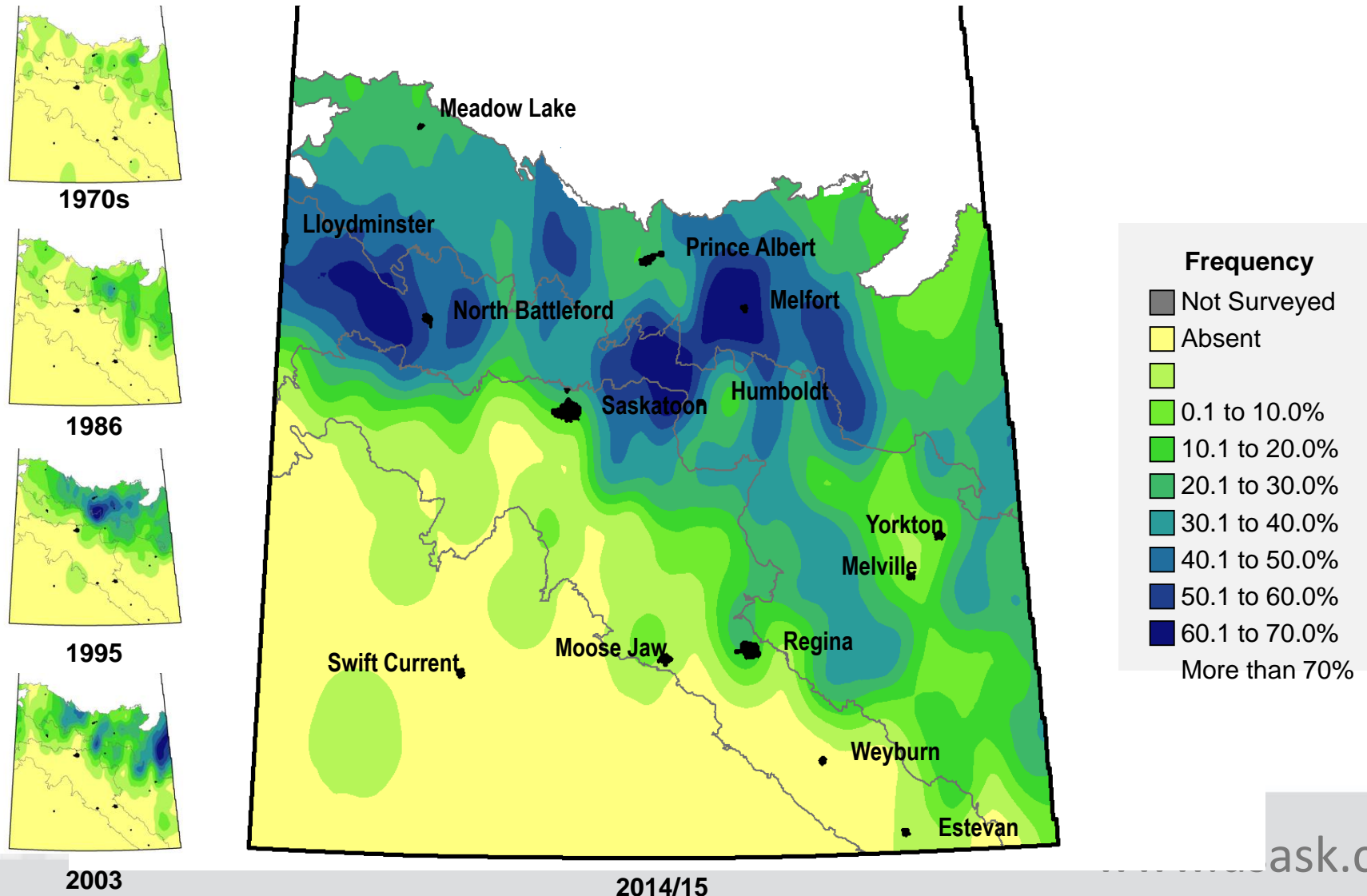
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Galium species

Photo taken Saskatoon April 26, 2016



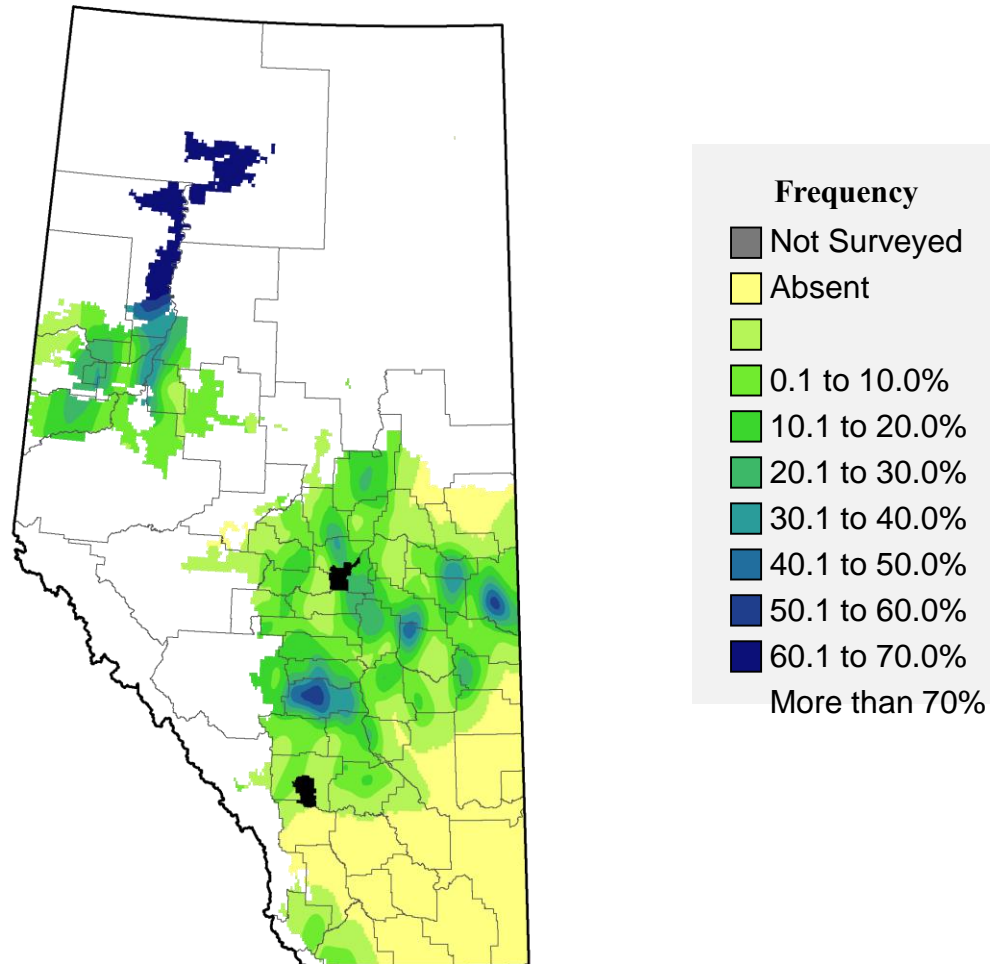
#7 False Cleavers

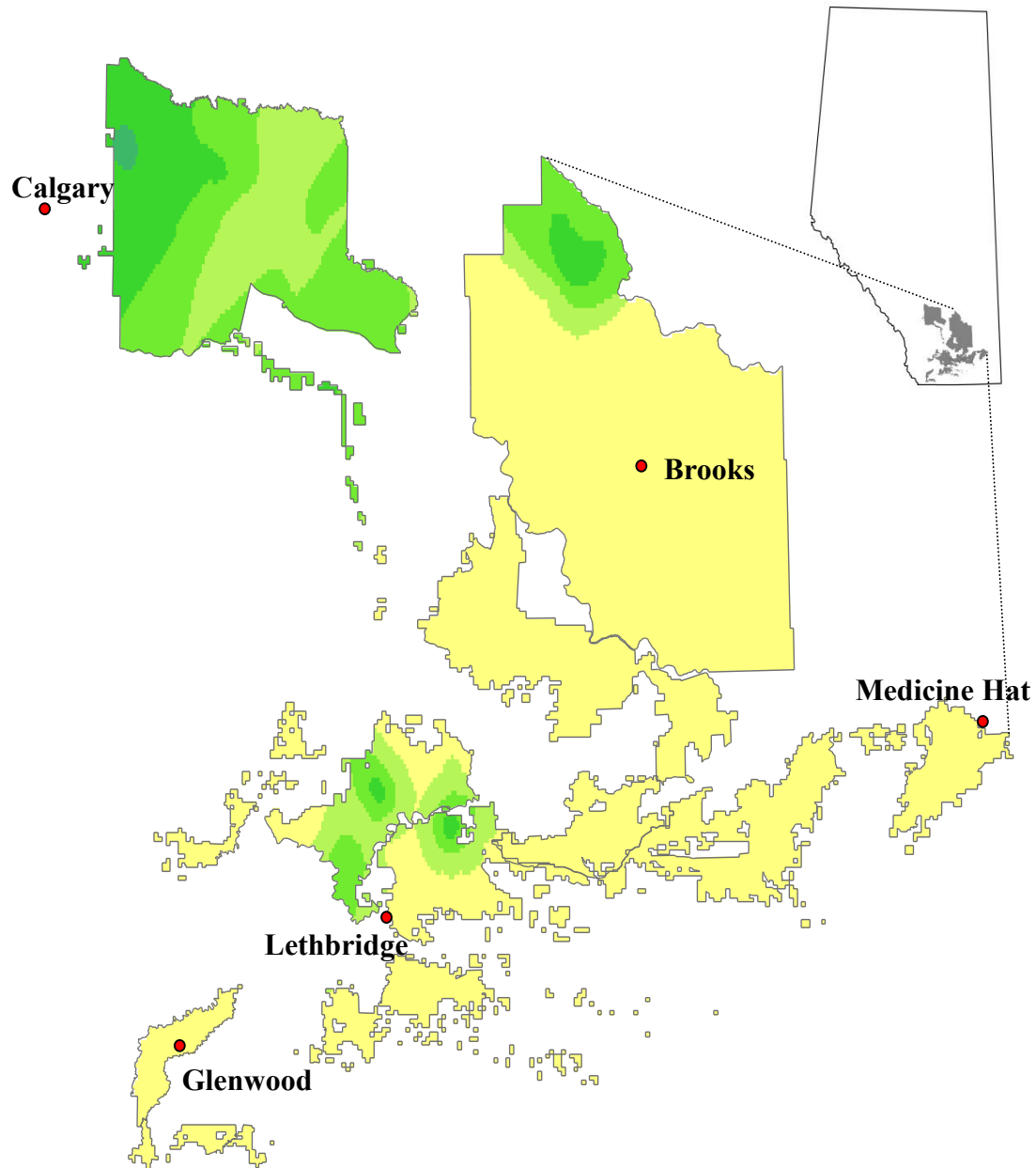


Species Shifts

	Change in Relative Abundance Rank				
	1970s to 1986	1986 to 1995	1995 to 2003	2003 to 2010s	1970s to 2010s
Cudweed species			37	67	104
Willowherb species	1	-30		101	72
Spiny annual sow-thistle		23	16	28	67
Cleavers	15	10	2	6	33
Broad-leaved plantain	-4	-4	-7	47	32
Foxtail barley	-26	28	14	10	26
Round-leaved mallow	7	-1	7	9	22
Barnyard grass	1	5	16	0	22
Canola	3	11	-3	10	21
Dandelion	-13	22	3	1	13
Flax	22	-8	5	-7	12
Narrow-leaved hawk's-beard	-11	2	9	11	11
Wheat	-2	6	11	-4	11
Chickweed	7	-5	-3	11	10
<i>Canada thistle</i>	1	5	1	-1	6
<i>Shepherd's-purse</i>	7	-3	-6	4	2
Kochia	-12	16	5	-7	2

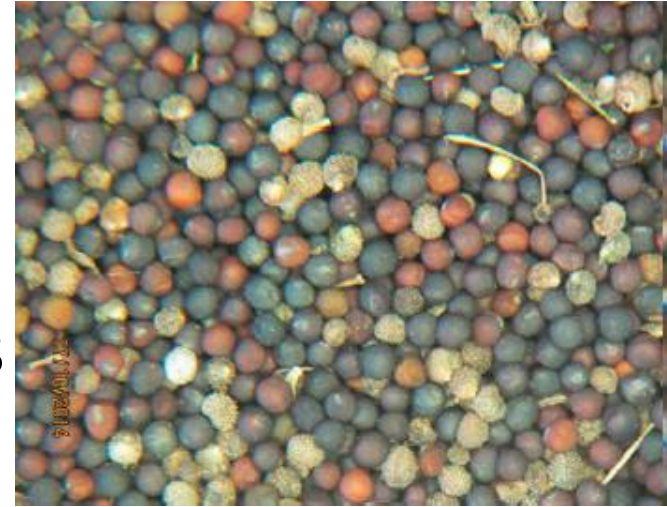
False Cleavers 2010 – Dryland crops





Cleavers in Canola

- Highly competitive at low densities
- Seed is difficult to remove from canola seed / damages rollers
- Significantly affect canola grading
- Increase harvest difficulty







Multiple Modes of Action for Managing Cleavers (*Galium spp.*) in Canola Systems

Ian Epp, Department of Plant Sciences
University of Saskatchewan

HT Herbicide Systems Used in Trials

- Glyphosate
 - Registered for control on plants up to 15cm
- Glufosinate ammonium
 - Variable Efficacy
- Imazamox + Imazapyr (Ares)
 - Group 2 resistance

Potential Herbicides

- Quinclorac (Clever, Facet)
 - Group 4
 - Issues with MRL's
- Clomazone (Trade Name: Command)
 - Group 13 / bleaching
 - Preplant, soil activated
 - Soybean, cotton, rice, tobacco, vegetables

Clomazone

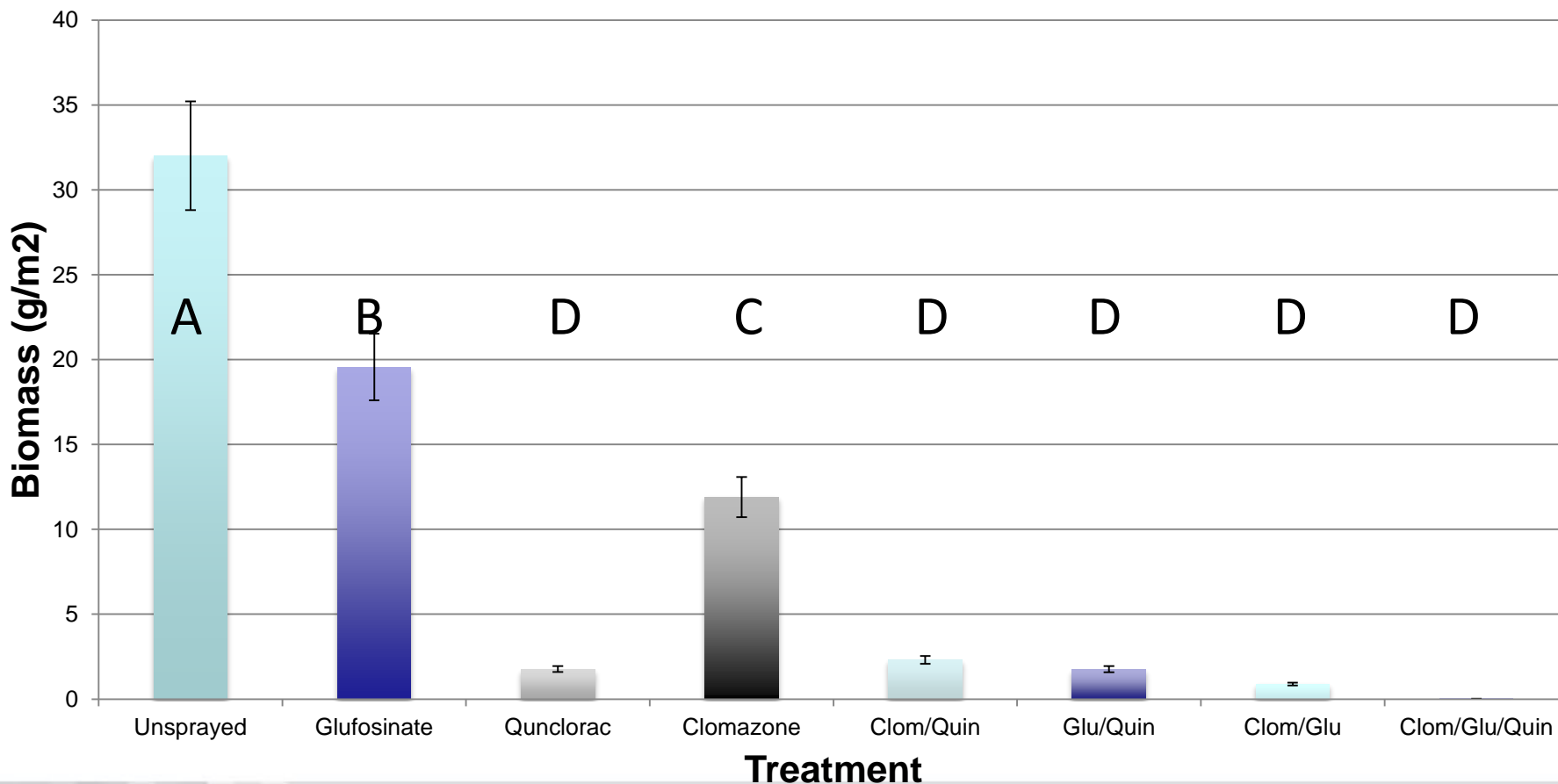
- Uptake and Translocation
 - Primarily absorbed through roots/ Xylem translocated
- Highly volatile
 - Formulation is micro-encapsulated to reduce vapor drift.
- Persistence
 - Short to moderate persistence / microbial degradation
 - Rate dependent / Soil $\frac{1}{2}$ life = 5 to 60 days
- No HR biotypes reported to date.

Field Trial – Treatment List

***FB = followed by**

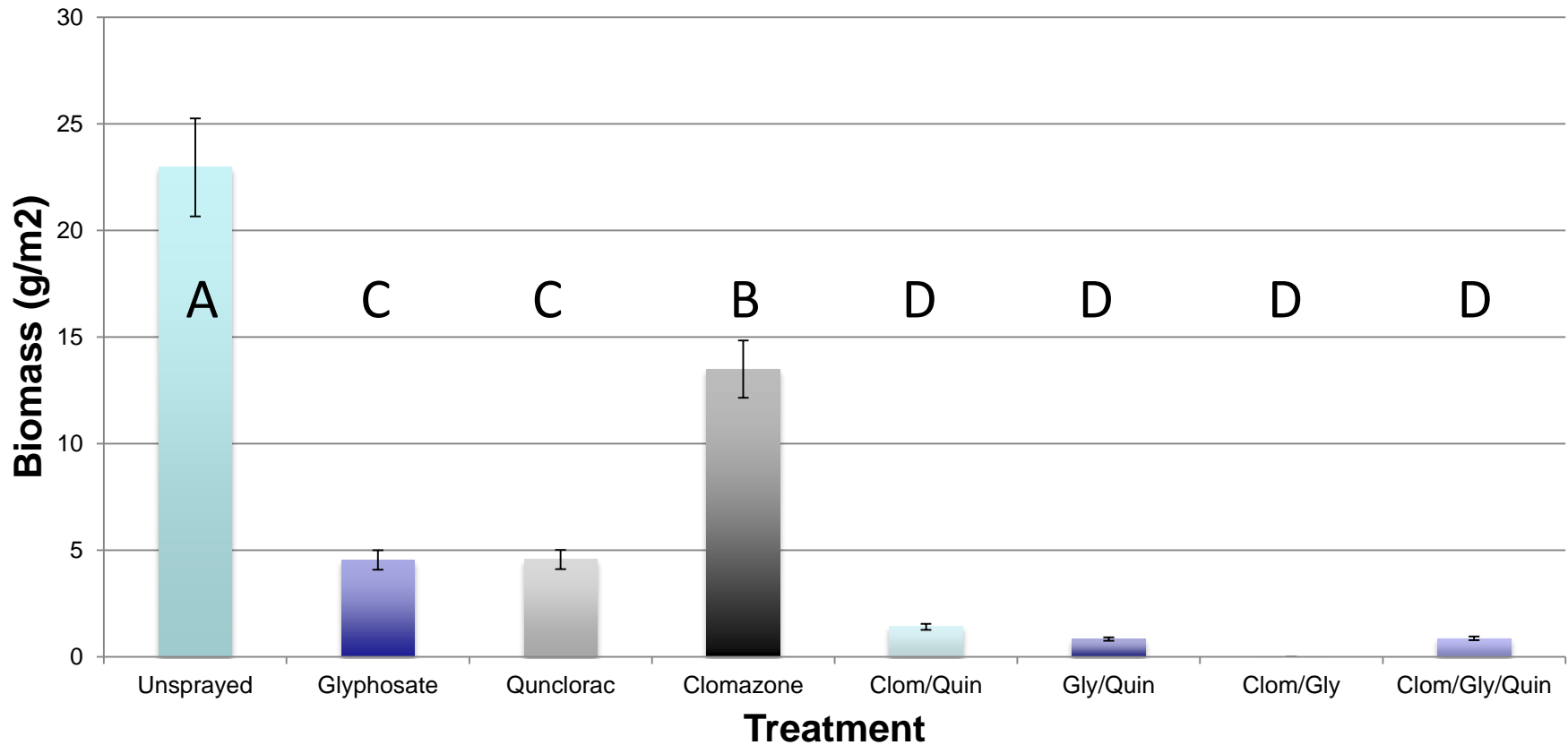
1	Control (untreated check)
2	HT Standard
3	Quinclorac alone (100g ai/ha) + Merge Adjuvant (0.5v/v)
4	Clomoaone Alone (120g ai/ha)
5	Clomoazone (120g ai/ha) FB quinclorac (100g ai/ha) + Merge Adjevant (0.5 v/v)
6	HT Standard (as above) FB quinclorac (50g ai/ha) + Merge Adjevant (0.5 v/v)
7	Clomoazone (120g ai/ha) HT Standard (as above)
8	Clomoazone (120g ai/ha) FB HT STandard (as above) + quinclorac (50g ai/ha) + Merge Adjuvant (0.5 v/v)

Cleavers biomass in glufosinate tolerant canola (2013 & 2014)



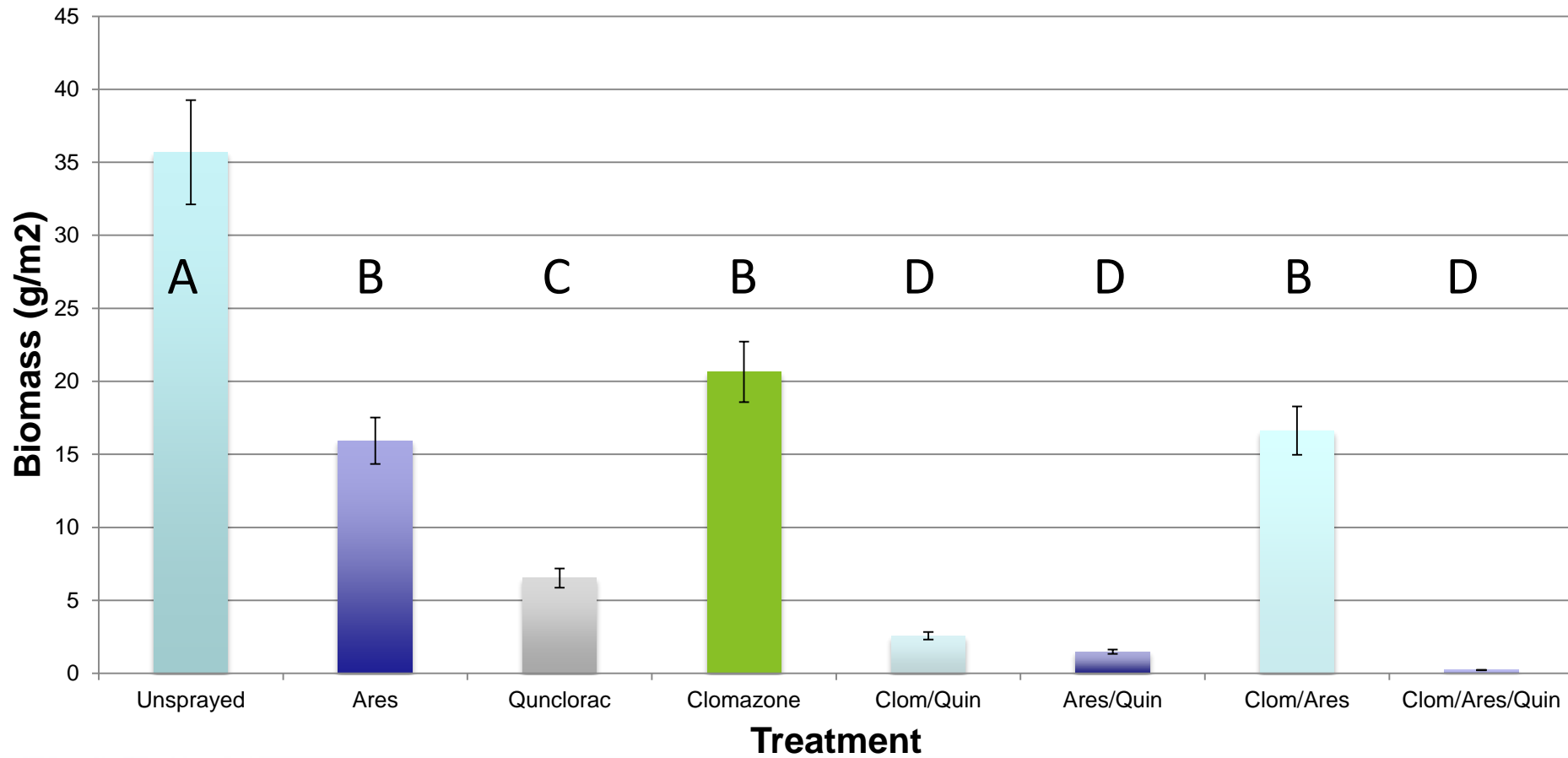
Note: Means with the same letter in the same row are not significantly different ($P > 0.05$). The multi-treatment comparisons using Tukey method. SEM = standard error of mean.

Cleavers biomass in glyphosate tolerant canola (2013 & 2014)



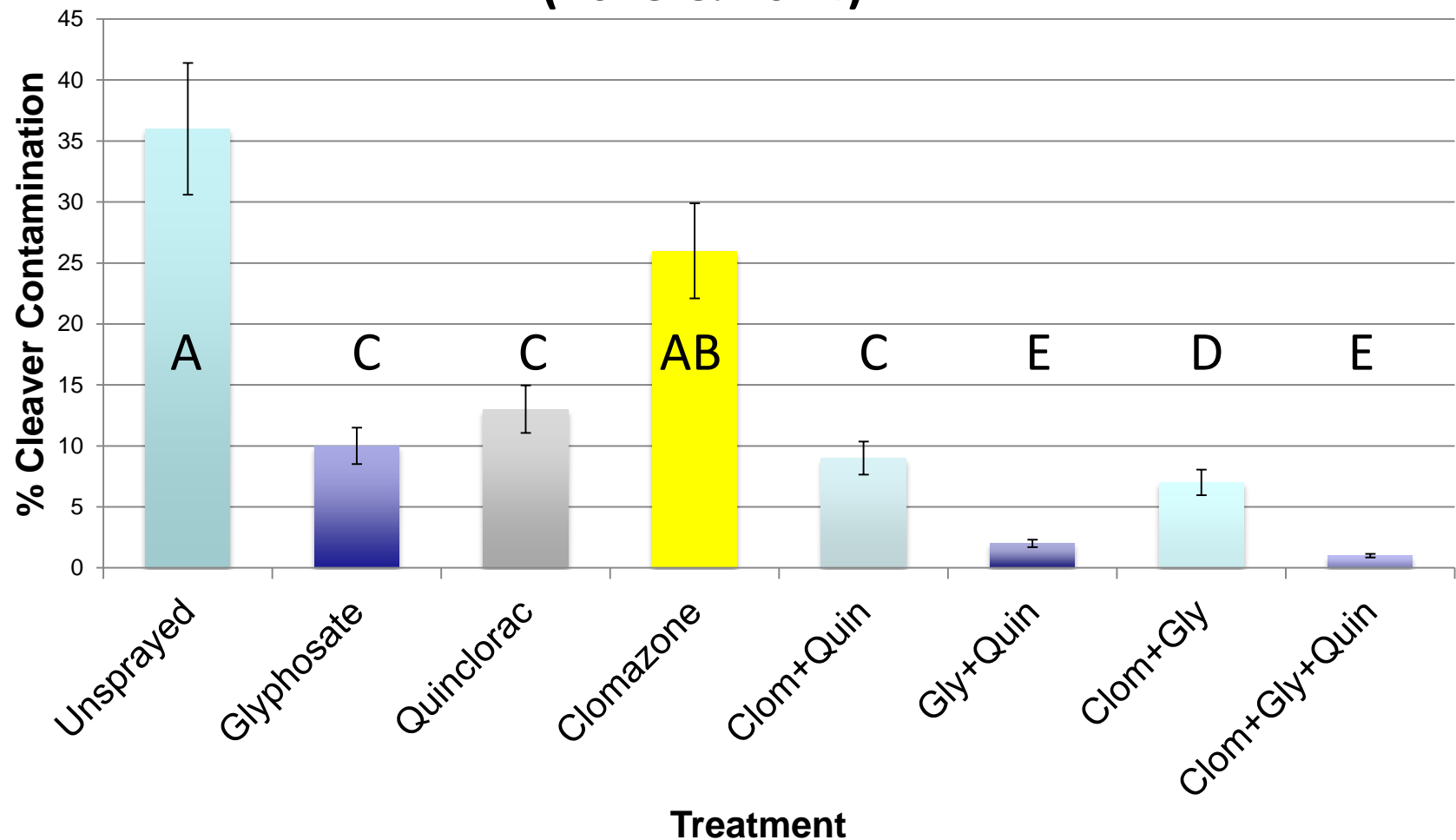
Note: Means with the same letter in the same row are not significantly different ($P > 0.05$). The multi-treatment comparisons using Tukey method. SEM = standard error of mean.

Cleavers biomass in imidazolinone tolerant canola (2013 & 2014)

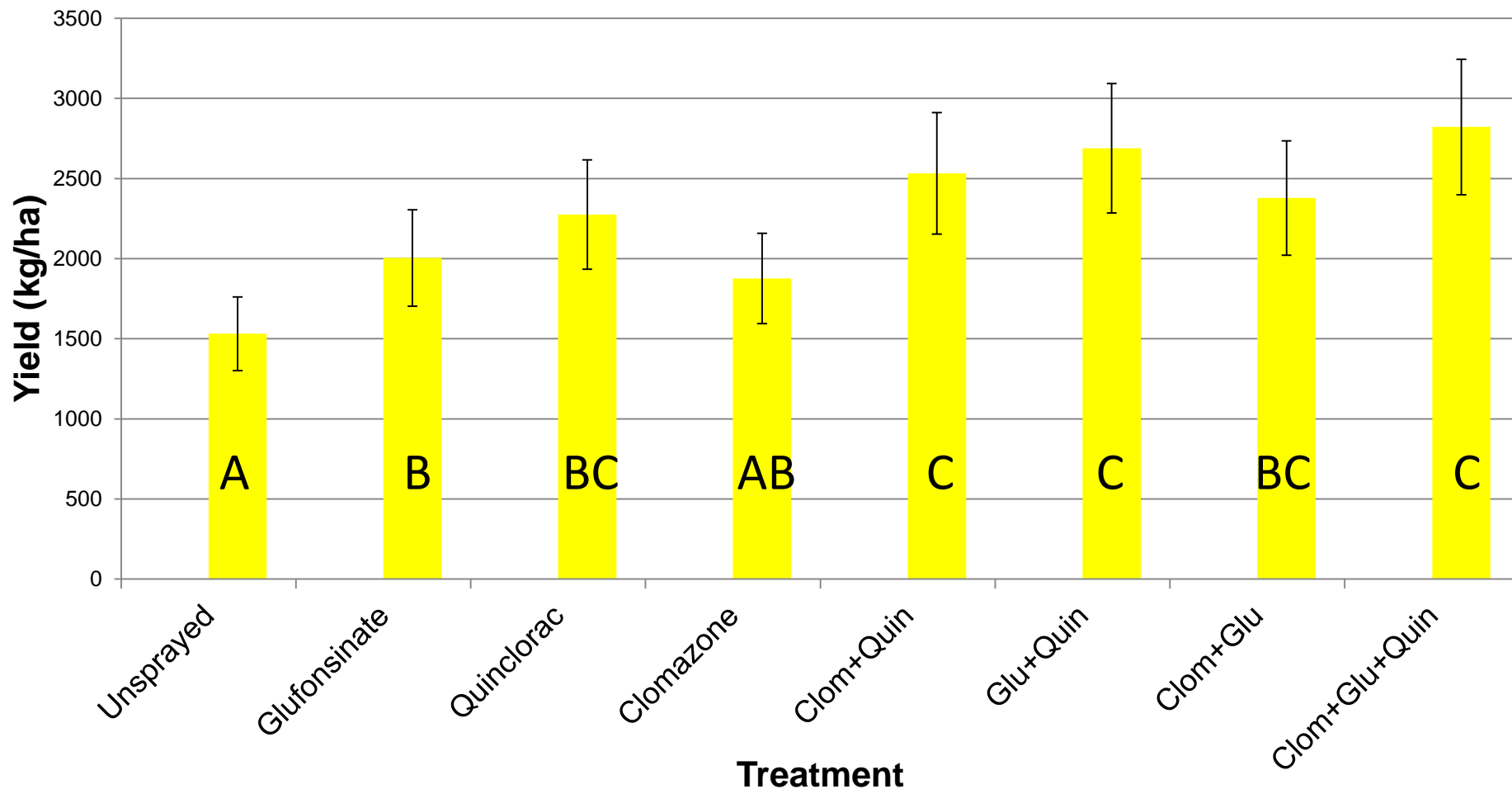


Note: Means with the same letter in the same row are not significantly different ($P > 0.05$). The multi-treatment comparisons using Tukey method. SEM = standard error of mean.

Cleaver contamination in glyphosate tolerant canola (2013 & 2014)

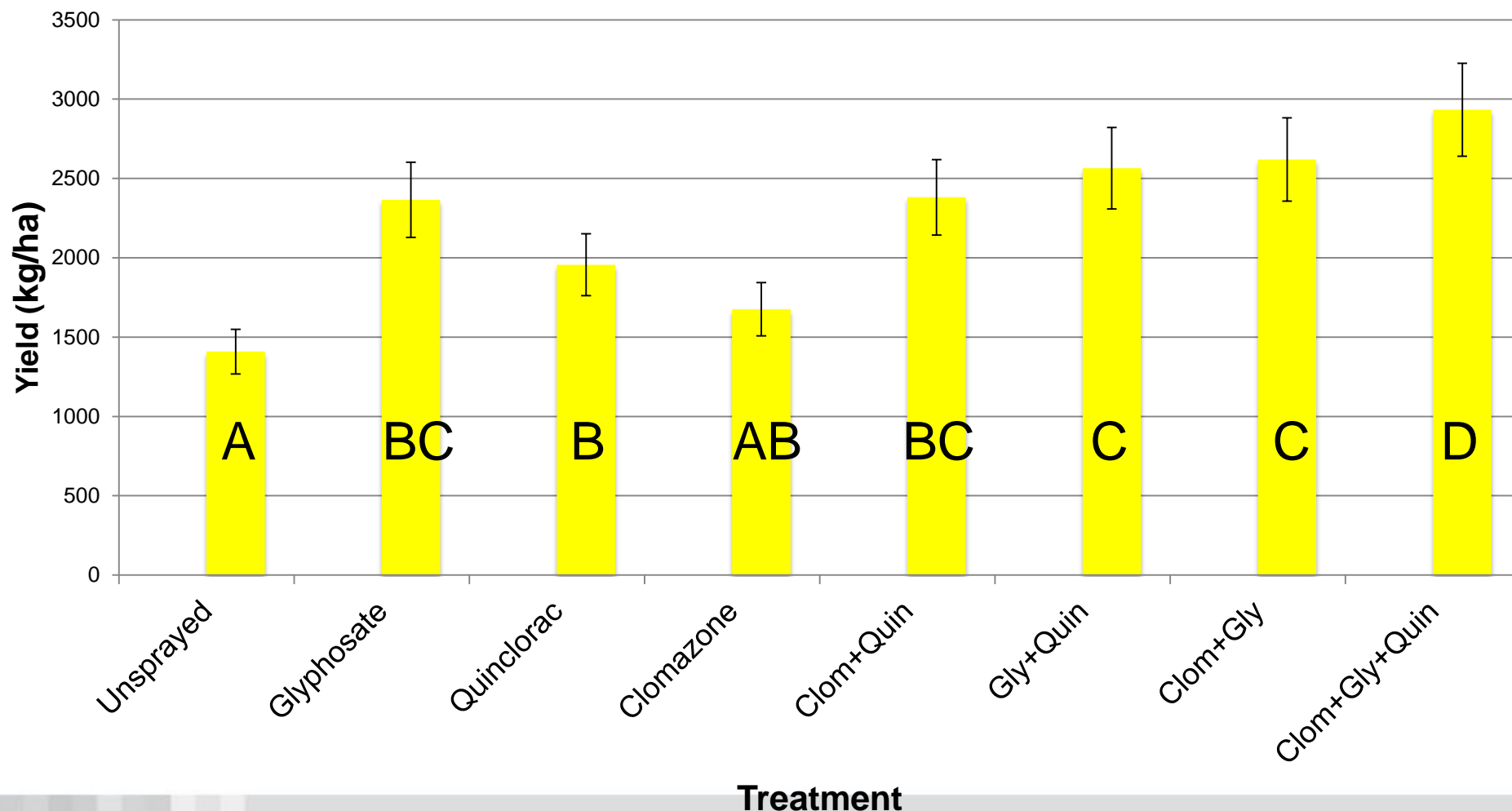


Effects of herbicide treatment on yield in glufonsiate tolerant canola 2013 & 2014



Note: Means with the same letter in the same row are not significantly different ($P > 0.05$). The multi-treatment comparisons using Tukey method. SEM = standard error of mean.

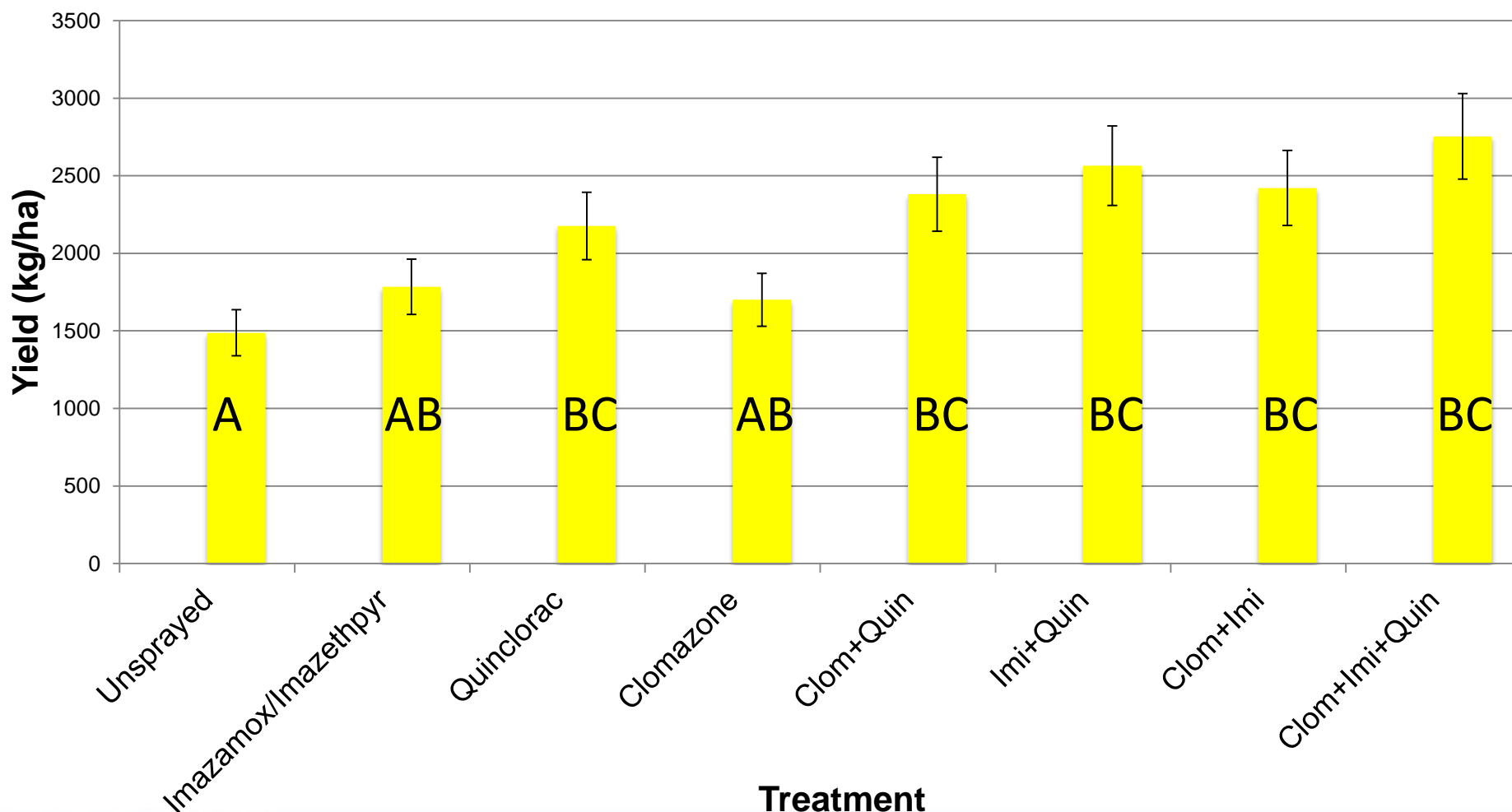
Effects of herbicide treatment on yield in glyphosate tolerant canola 2013 & 2014



Treatment

Note: Means with the same letter in the same row are not significantly different ($P > 0.05$). The multi-treatment comparisons using Tukey method. SEM = standard error of mean.

Effects of herbicide treatment on yield in imidazolinone tolerant canola 2013 & 2014



Note: Means with the same letter in the same row are not significantly different ($P > 0.05$). The multi-treatment comparisons using Tukey method. SEM = standard error of mean.

Clomazone on Cleavers



Symptoms from clomazone (Command) on *Brassica* – Group 13



Herbicide Options for Group 2 R cleavers in Pulses

- PRE

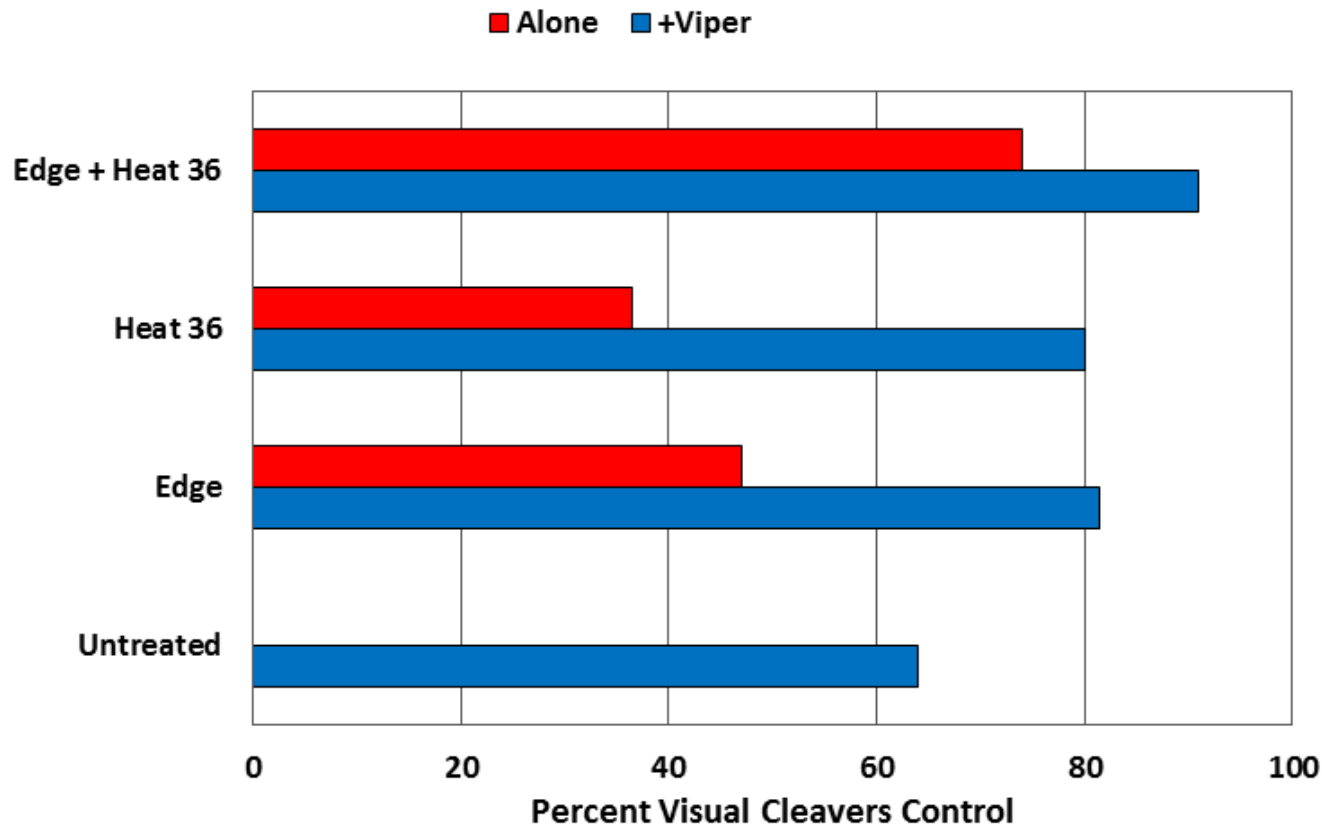
- Field pea – Edge (fall applied, helps to incorporate with heavy harrow), Authority, Heat, Command*, Focus*
- Lentil – Edge (same as above), Heat, Focus*.

- POST

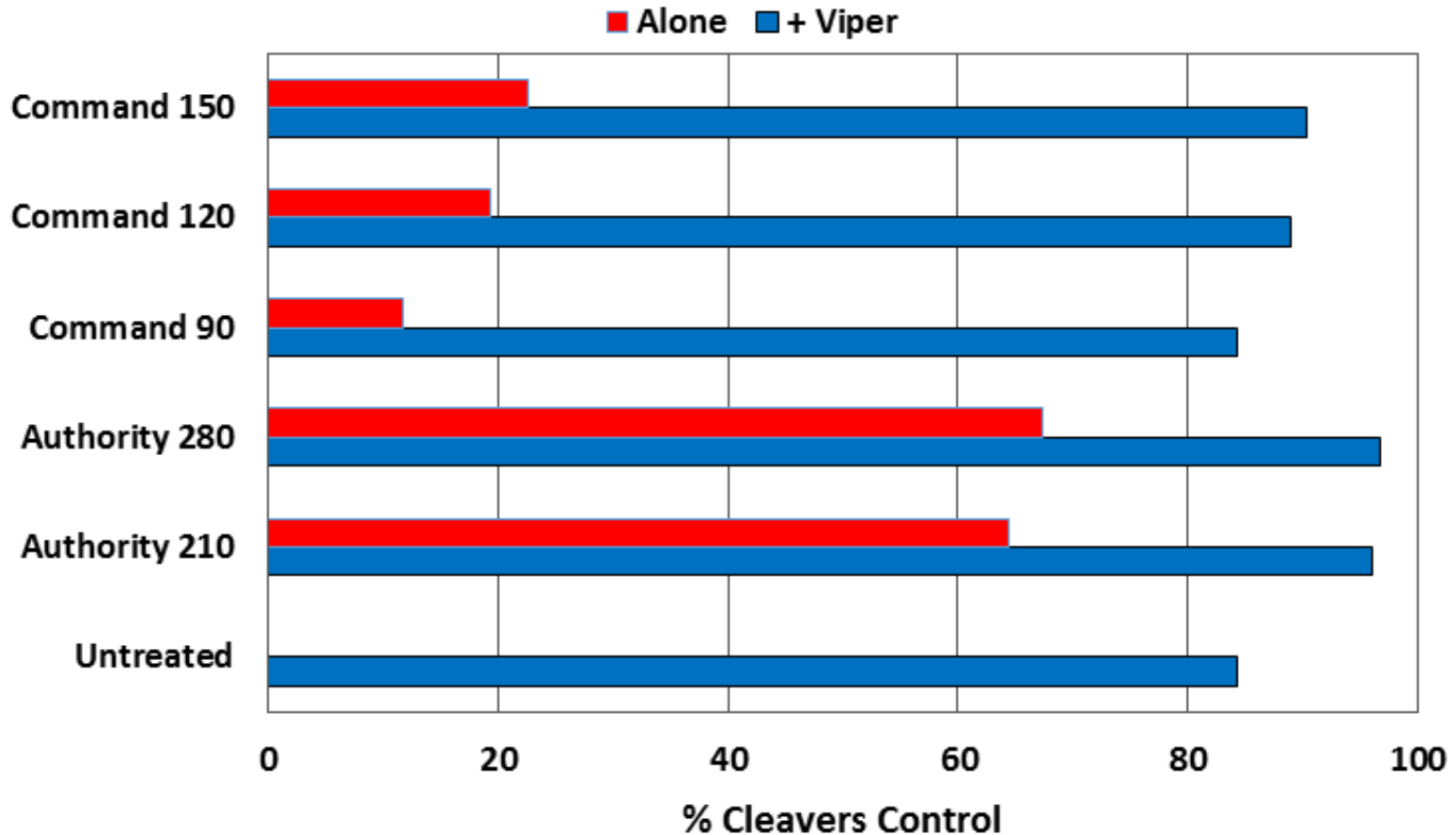
- Field pea – Viper, Basagran
- Lentil – nothing

*Not yet registered

Group 2 Resistant cleavers control Average of 2 Years (2014-2015). SOM > 6% . Rosthern, SK.



Group 2 Resistant cleavers control
Average of 3 Years (2013-2015). SOM > 6% .
Melfort (2013), Rosthern (2014-15)



QUESTIONS ??

