Glyphosate-resistant Weed Management in Sunflower

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Weeds in Sunflower

- Palmer amaranth consistently is the most common weed in the central and southern Great Plains

- Kochia also is common throughout the region

Hans Kandel, 2012

Weed Interference

- Generally affected more by time of emergence than weed density

- In Kansas, moderate densities of Palmer amaranth can cause >50% yield loss

Cheyenne Co. KS

Wichita Co. KS

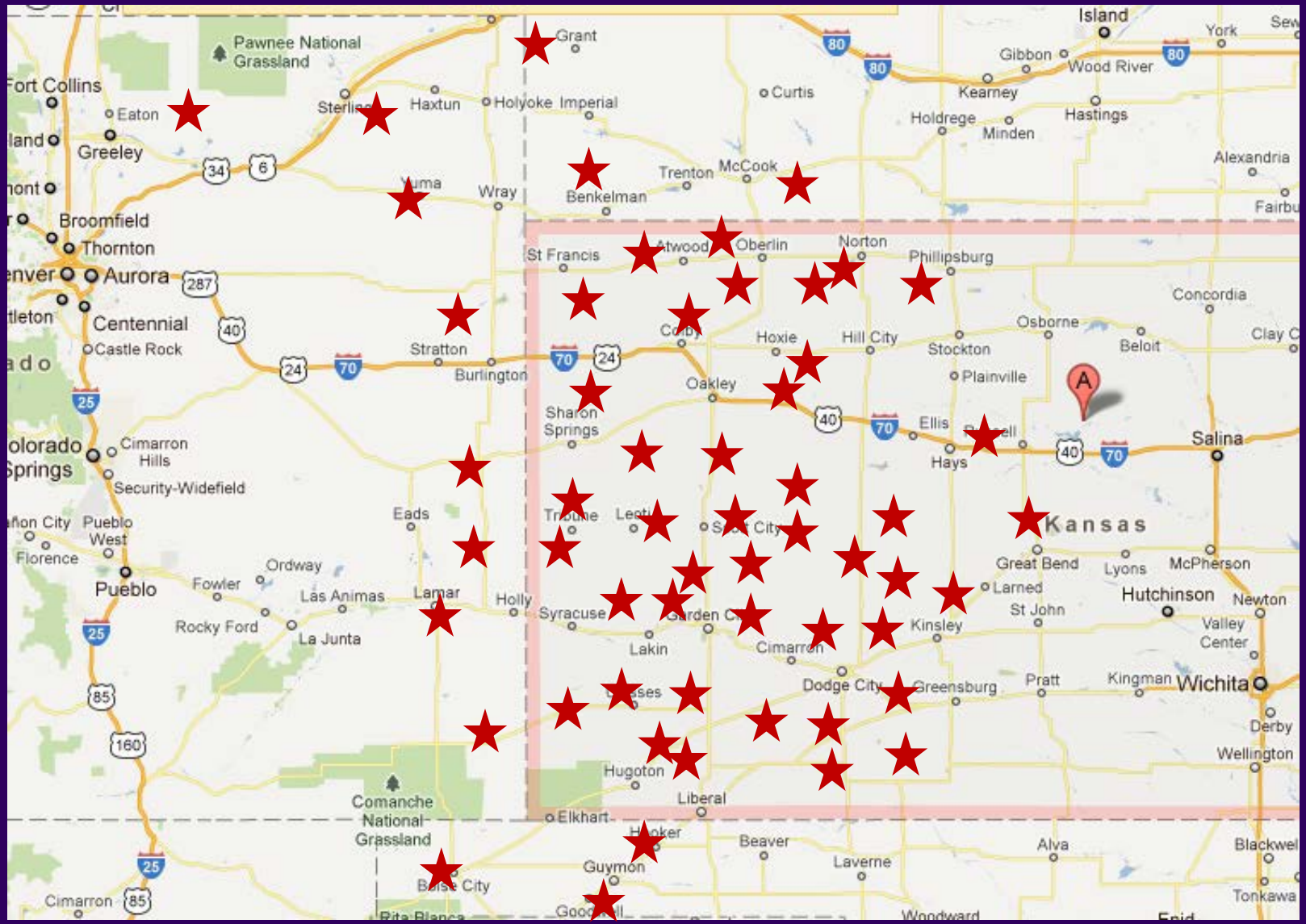
Weed Interference

- In Manitoba, kochia emerging with sunflower reduced yields up to 76%
- The 5% action threshold for early emerging kochia was four plants per m^2
- Kochia emerging after the four-leaf crop stage did not affect crop growth or yield

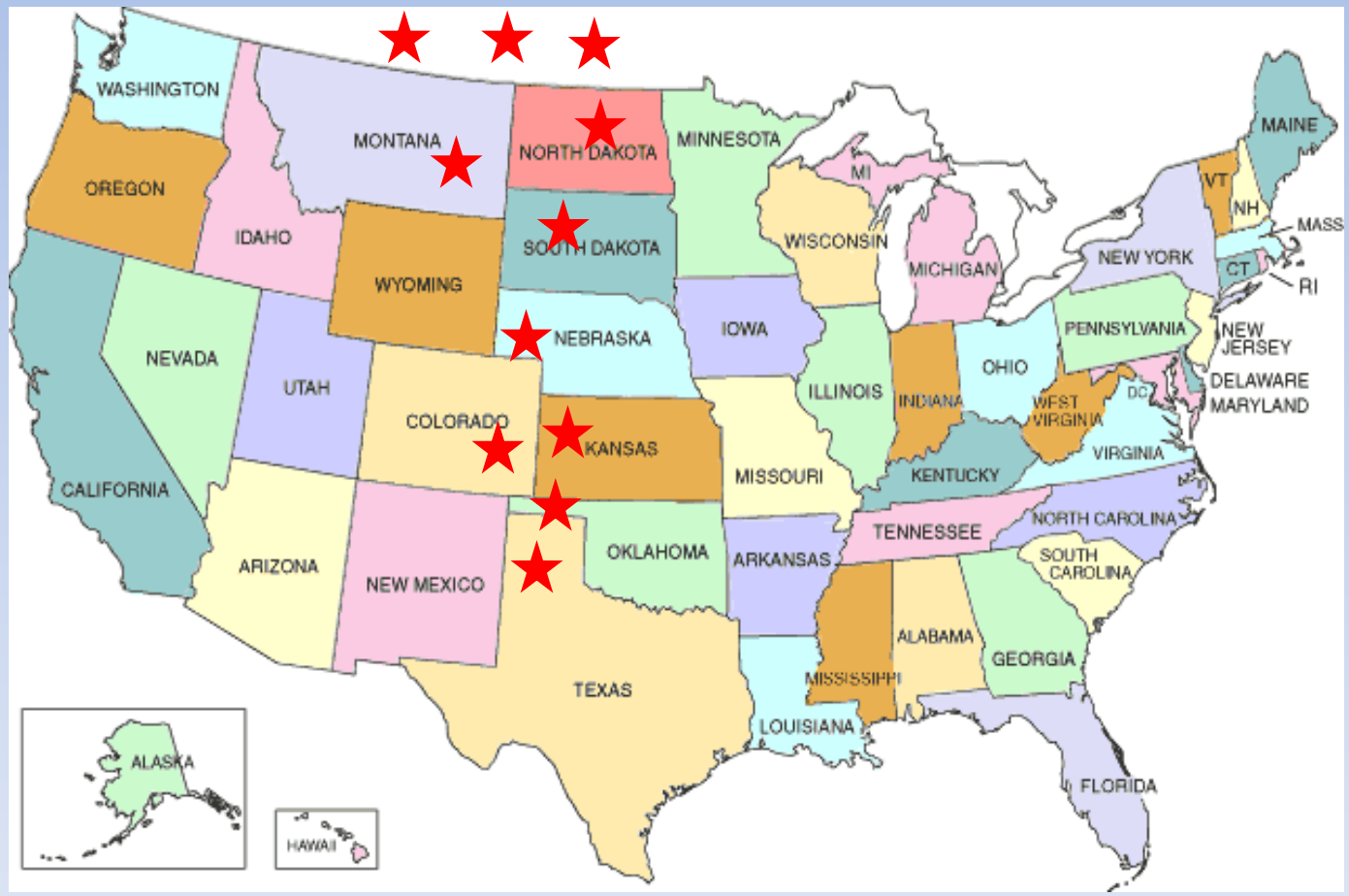
Lewis and Gulden, 2013

Confirmed Glyphosate-resistant Palmer amaranth in Kansas, 2012

Confirmed GR Kochia, 2012

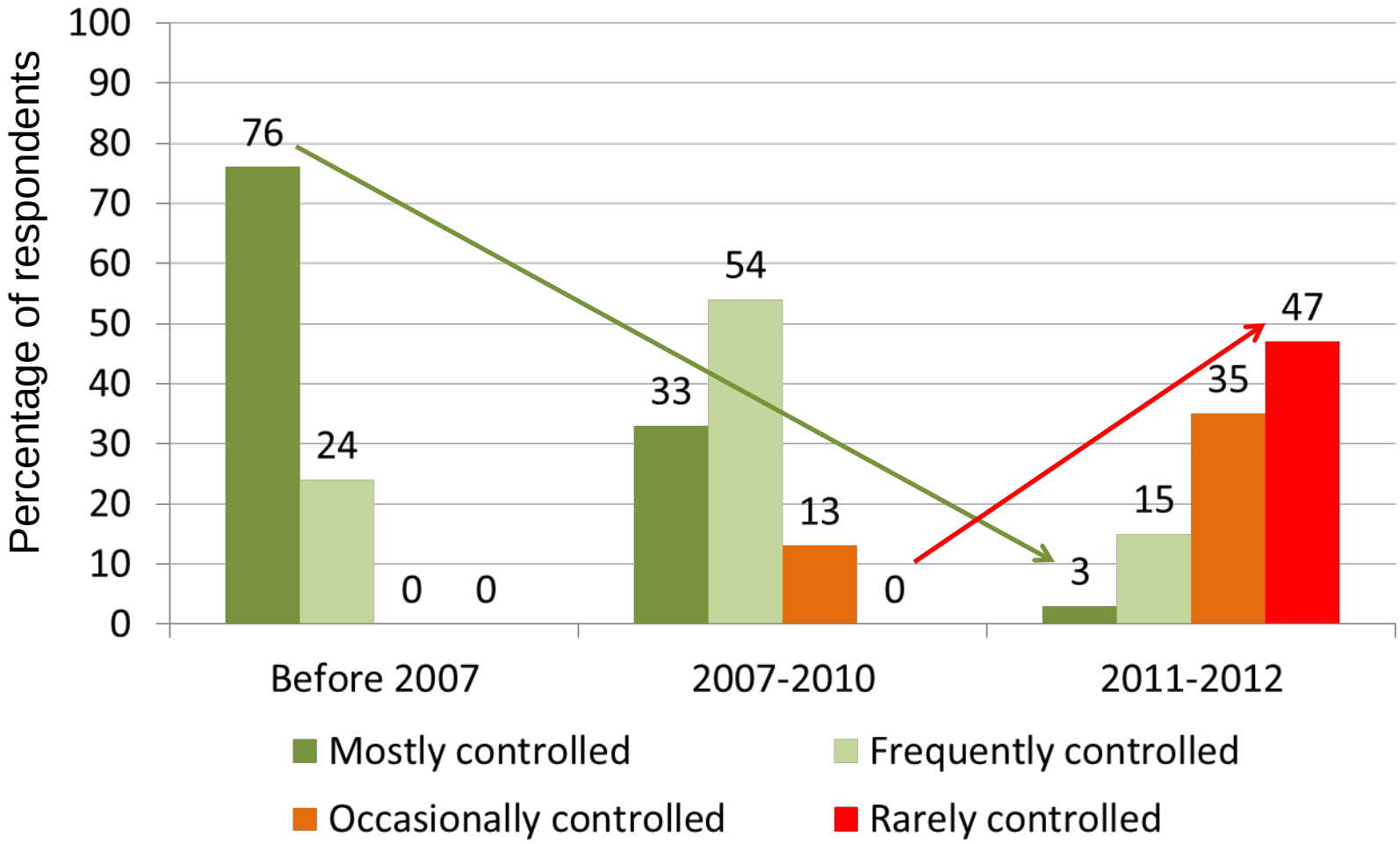


Currently Eight States and Three Canadian Provinces with Confirmed Glyphosate Resistance in Kochia



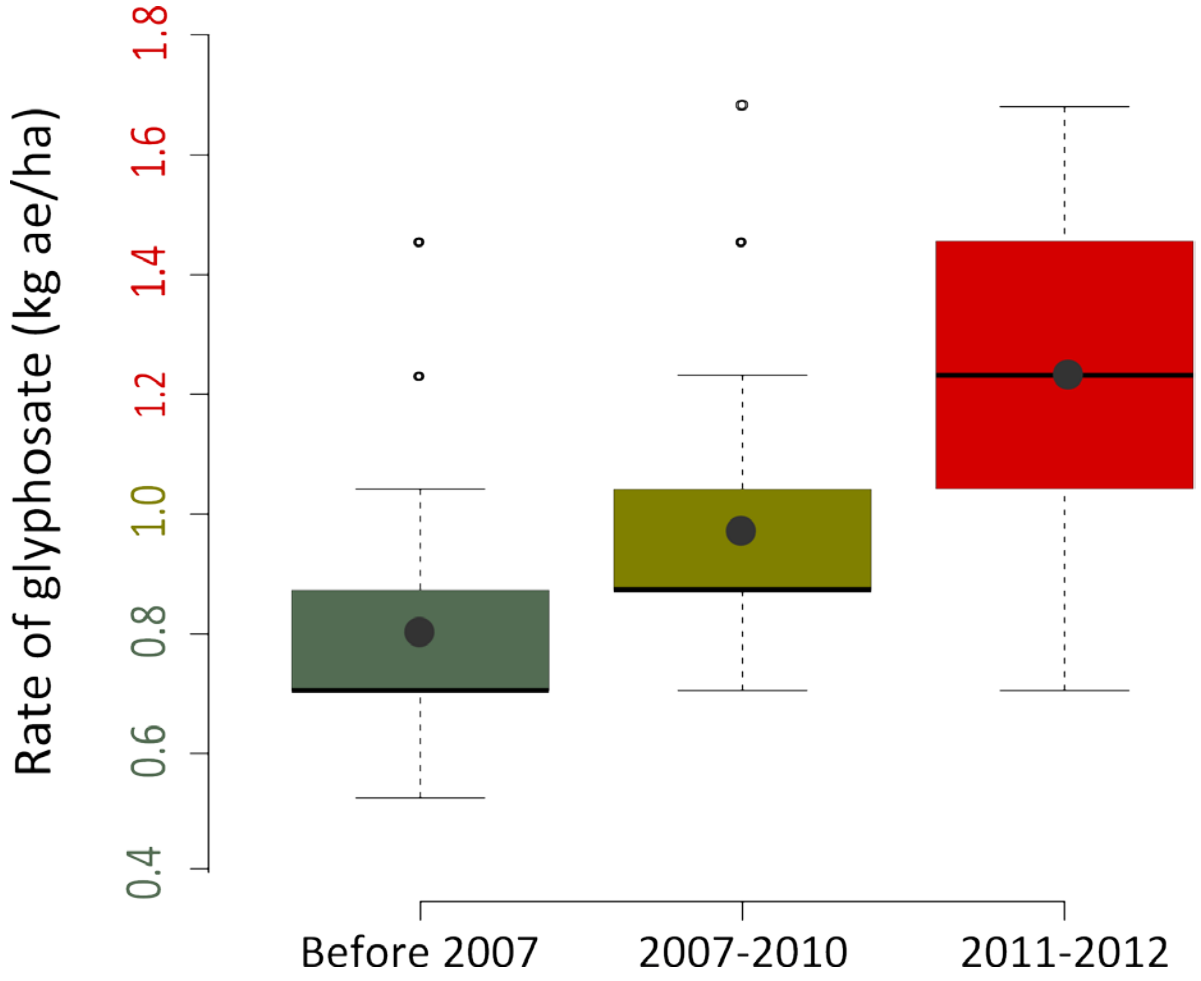
Survey Results

Effectiveness of glyphosate for kochia control in RR crops

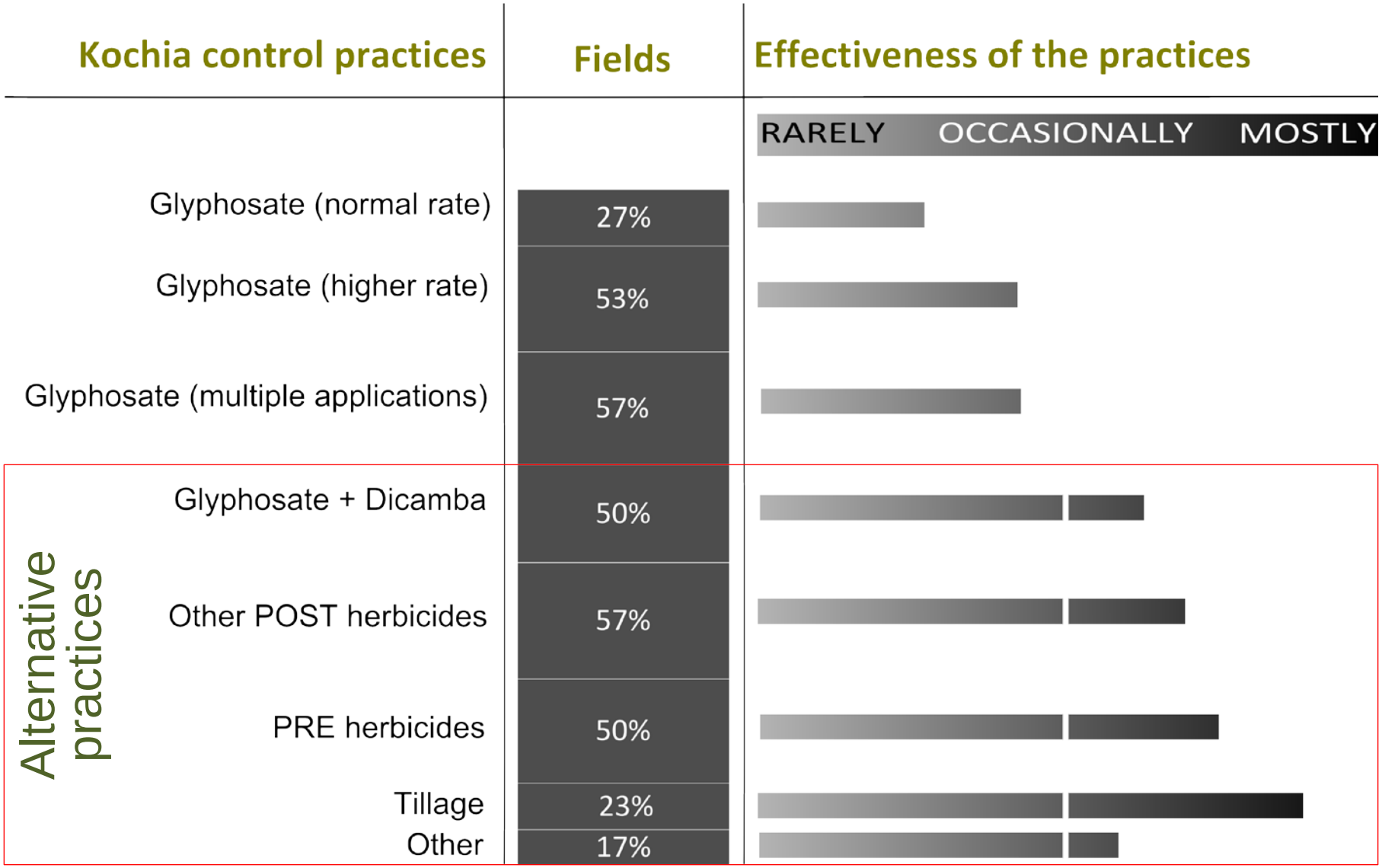


Survey Results

What was the most common acid equivalent (ae) rate of glyphosate in fallow fields?



In what percentage of the fields were the following practices used in 2011-2012 and how effective were those practices?



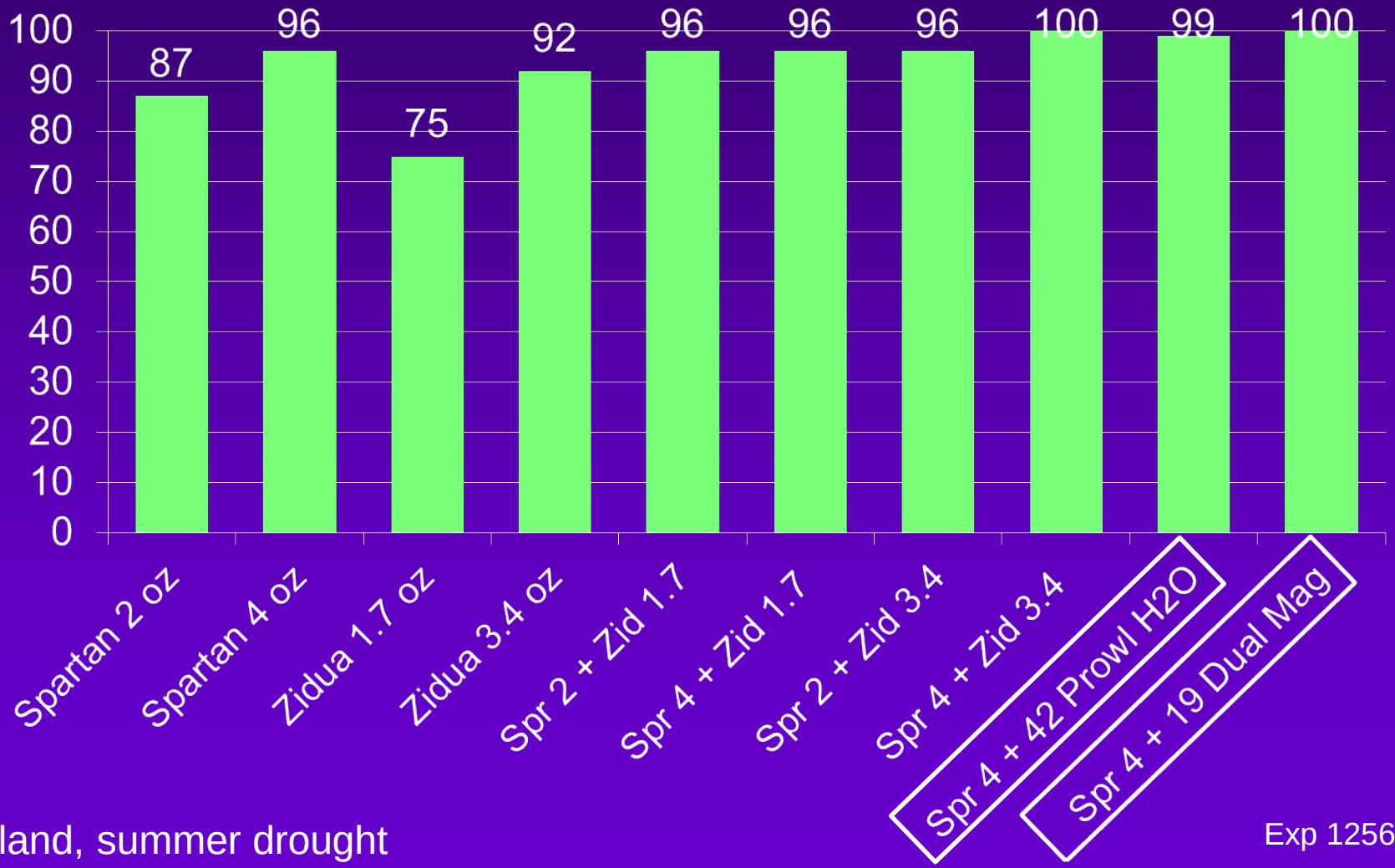
Objectives

- Evaluate the weed control efficacy of pyroxasulfone alone and in combination with other herbicides in sunflower
- Multiple studies and sites
  - dryland vs irrigated
  - preplant vs PRE
  - PRE *fb* POST
  - POST tank mixtures

Zidua™ Herbicide

- Pyroxasulfone (Zidua) inhibits synthesis of VLCFA; seedling growth inhibitor
- Registered in corn & soybeans; sunflower registration is pending
- Longer residual control than *s*-metolachlor, dimethenamid-*p*, or acetochlor
- Tank mix for improved weed control

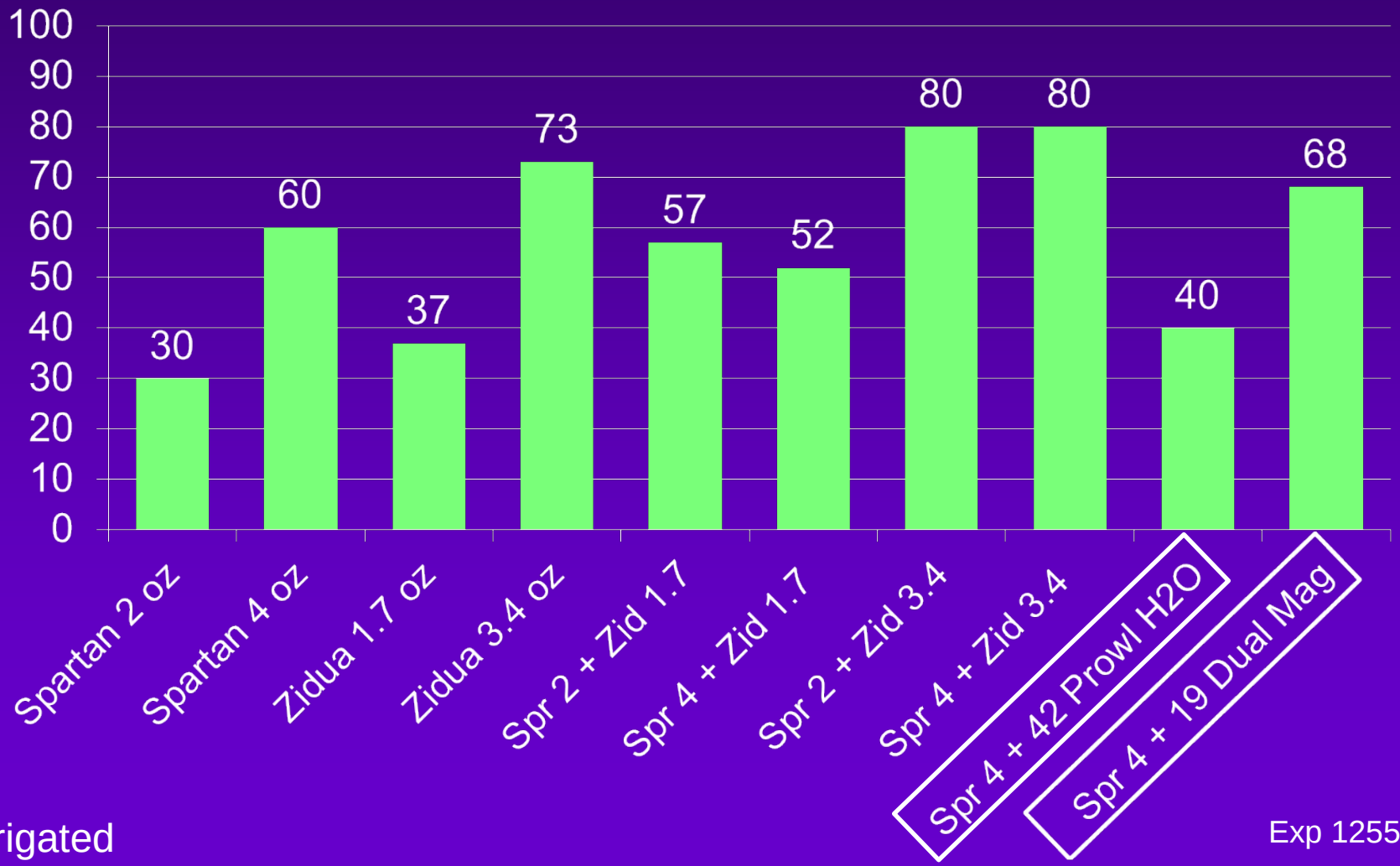
Palmer amaranth control 42 DAT PRE, Hays, KS, 2012



Dryland, summer drought

Exp 1256

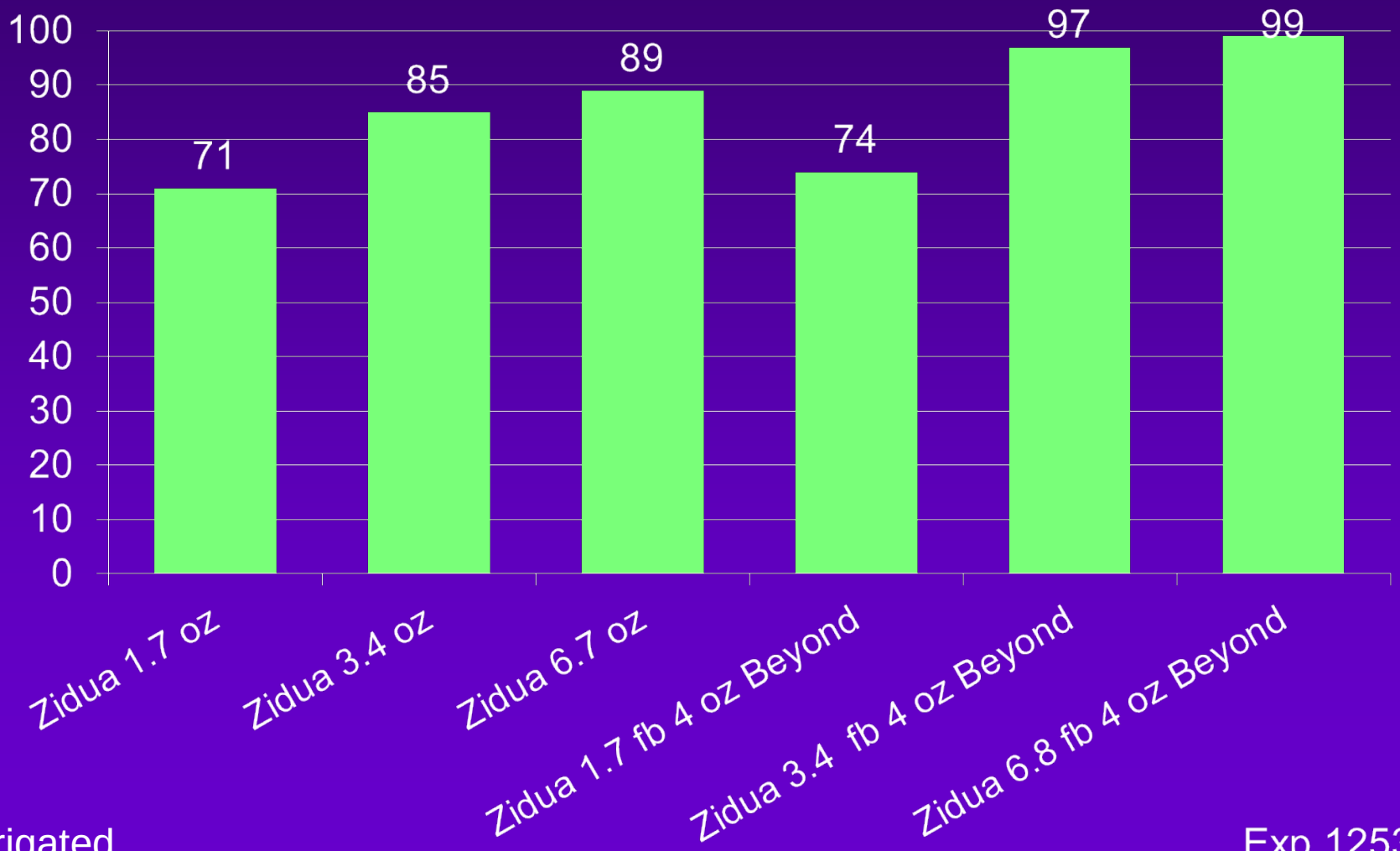
Palmer amaranth control 51 DAT PRE, Colby, KS, 2012



Irrigated

Exp 1255

Palmer amaranth control 29 DAT POST, Colby, KS, 2012



Irrigated

Exp 1253

Palmer amaranth control 58 DAT, Colby, KS, 2013

		w/o Beyond POST		*fb* 4 oz Beyond POST	
Herbicide	Rate	14 DPP	PRE	14 DPP	PRE
		- - - - - - - - - - % - - - - - - - - - -			
Dual Magnum	1.25 pt	89	82	96	97
Prowl H2O	3 pt	85	74	89	99
BroadAxe	20 oz	100	93	100	100
Spartan + Prowl H2O	3 oz + 2.4 pt	95	85	98	100
Zidua	2.5 oz	97	79	98	97
LSD 0.05		- - - - - - - - - - - - 16 - - - - - - - - - - - -			

Dryland, Exp 1353

Palmer amaranth control 37 DAT, Hays, KS, 2013

		w/o Beyond POST		*fb* 4 oz Beyond POST	
Herbicide	Rate	14 DPP	PRE	14 DPP	PRE
		- - - - - - - - - - % - - - - - - - - - -			
Dual Magnum	1.25 pt	26	89	98	100
Prowl H2O	3 pt	73	86	100	100
BroadAxe	20 oz	93	81	99	99
Spartan + Prowl H2O	3 oz + 2.4 pt	99	79	96	100
Zidua	2.5 oz	88	91	98	98
LSD 0.05		- - - - - - - - - - 12 - - - - - - - - - -			

Dryland, Exp 1354

Kochia control 58 DAT, Colby, KS, 2013

		w/o Beyond POST		*fb* 4 oz Beyond POST	
Herbicide	Rate	14 DPP	PRE	14 DPP	PRE
		- - - - - - - - - - % - - - - - - - - - -			
Dual Magnum	1.25 pt	58	93	97	100
Prowl H2O	3 pt	81	100	96	98
BroadAxe	20 oz	99	100	99	100
Spartan + Prowl H2O	3 oz + 2.4 pt	99	99	99	97
Zidua	2.5 oz	88	100	99	100

Green-shaded NSD

Exp 1353, dryland

Summary

- Good-excellent herbicidal control of major broadleaf weeds, including HR biotypes, is possible.
- Soil-applied herbicides are dependent on timely rainfall or irrigation.
- Mixtures of at least two active ingredients are most effective.
- Herbicide cost is a deterrent to highly effective weed control in sunflower.

Questions?