

Weed Resistance



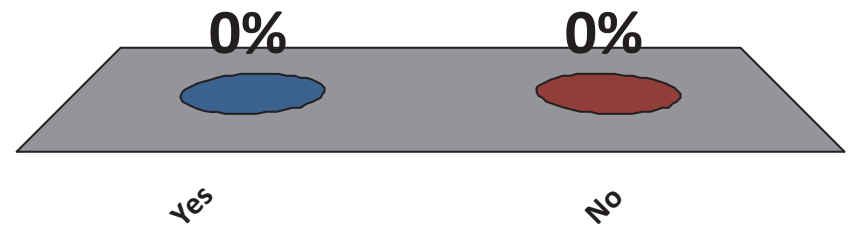
Agenda

- Survey
- Resistant Maps
- Maximizing Glyphosate Performance
- Controlling Resistant Weeds in Rotation Crops
- Obtaining ACSC Sugarbeet Mix/Phen-Des and B & B Plus

Do you have weed resistance on your farm?

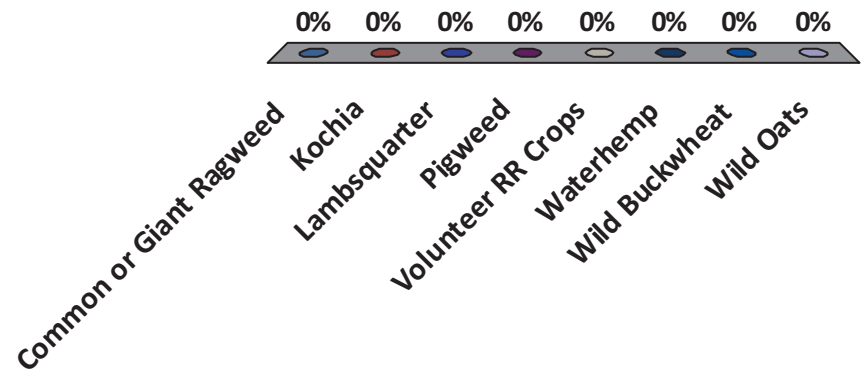
A. Yes

B. No



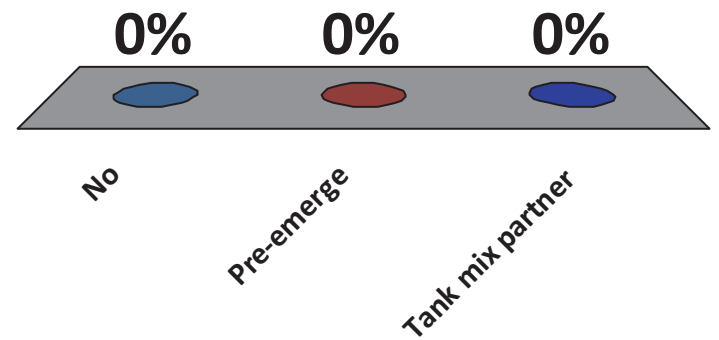
What weeds are difficult to control on your farm? (choose all that apply)

- A. Common or Giant Ragweed
- B. Kochia
- C. Lambsquarter
- D. Pigweed
- E. Volunteer RR Crops
- F. Waterhemp
- G. Wild Buckwheat
- H. Wild Oats



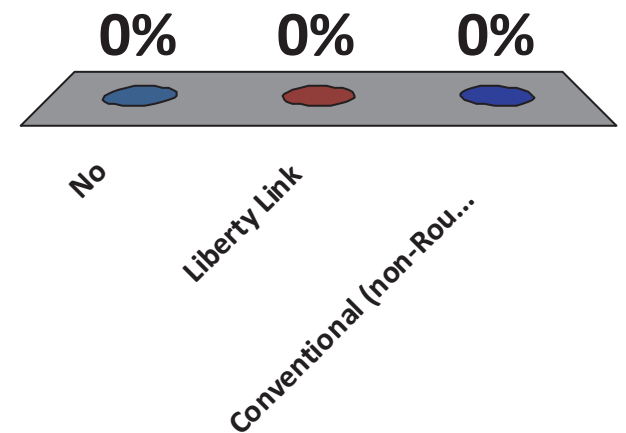
Are you using a second Mode of Action
with your RoundUp technology in
corn/soybeans? (choose up to 2)

- A. No
- B. Pre-emerge
- C. Tank mix partner



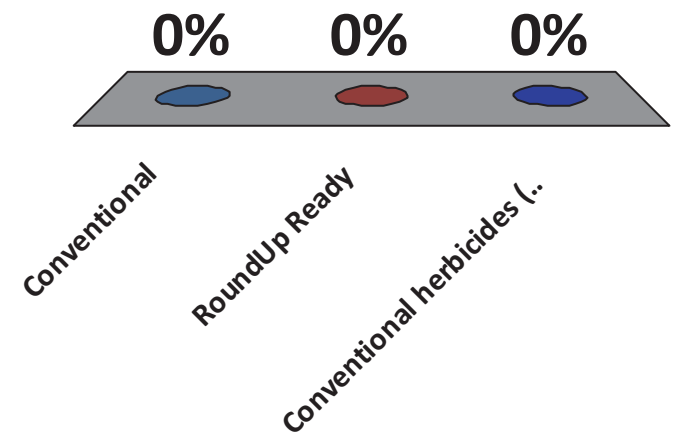
Are you using Liberty Link or conventional seed trait's in your rotation? (choose up to 2)

- A. No
- B. Liberty Link
- C. Conventional (non-RoundUp)



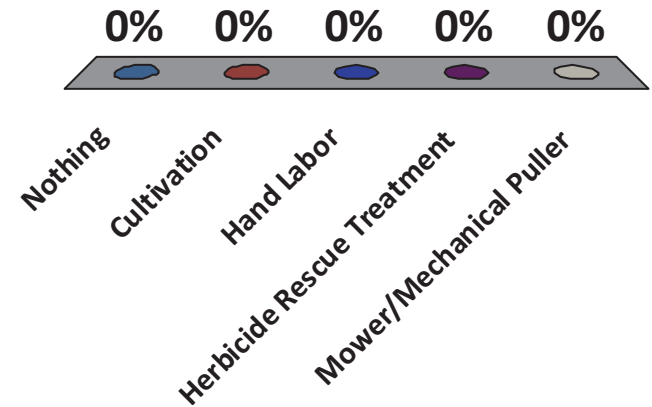
In sugarbeets, what technology do you use for weed control?

- A. Conventional
- B. RoundUp Ready
- C. Conventional herbicides (in or with-same field)
RoundUp Ready
technology

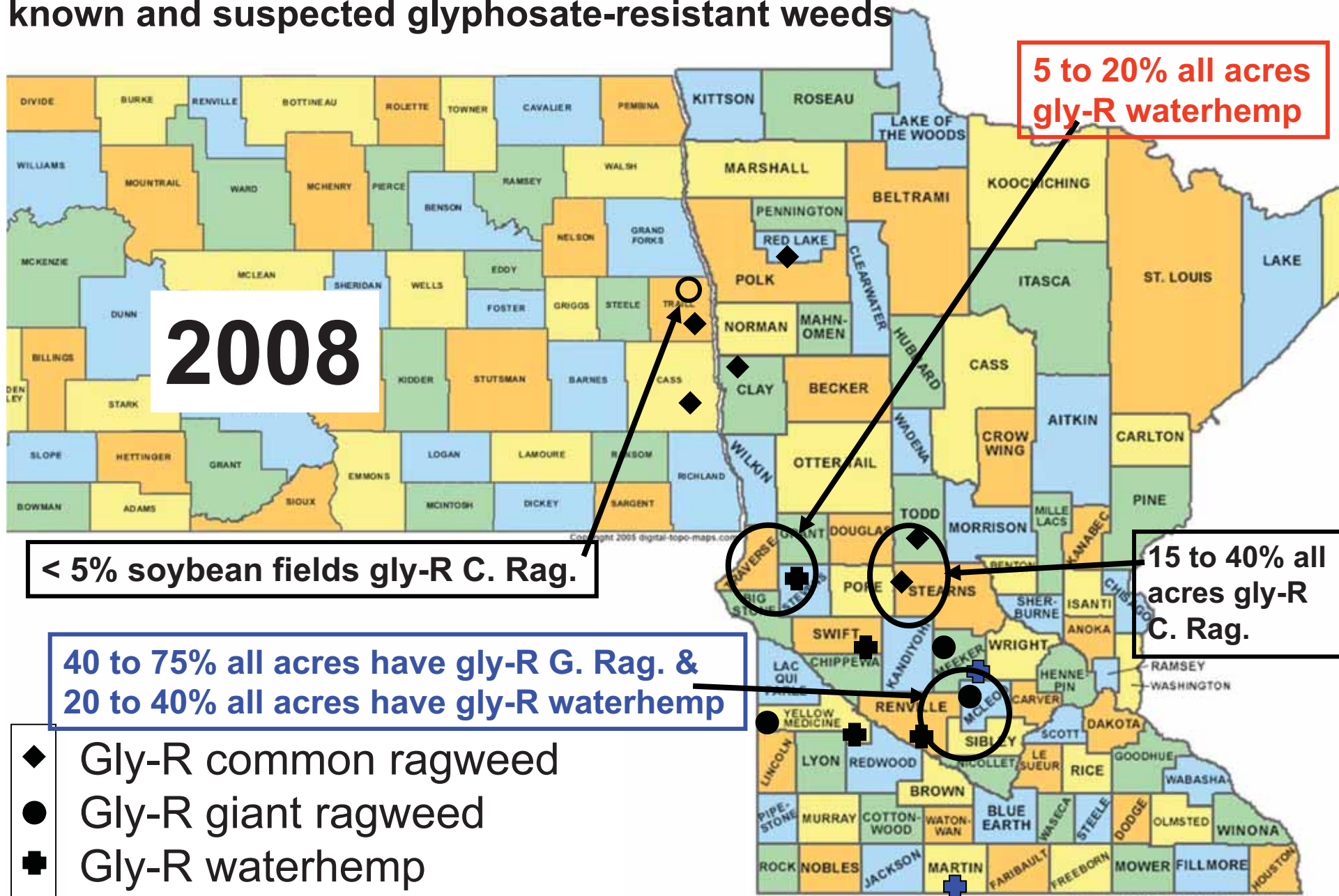


How do you manage “escaped” weeds? (choose all that apply)

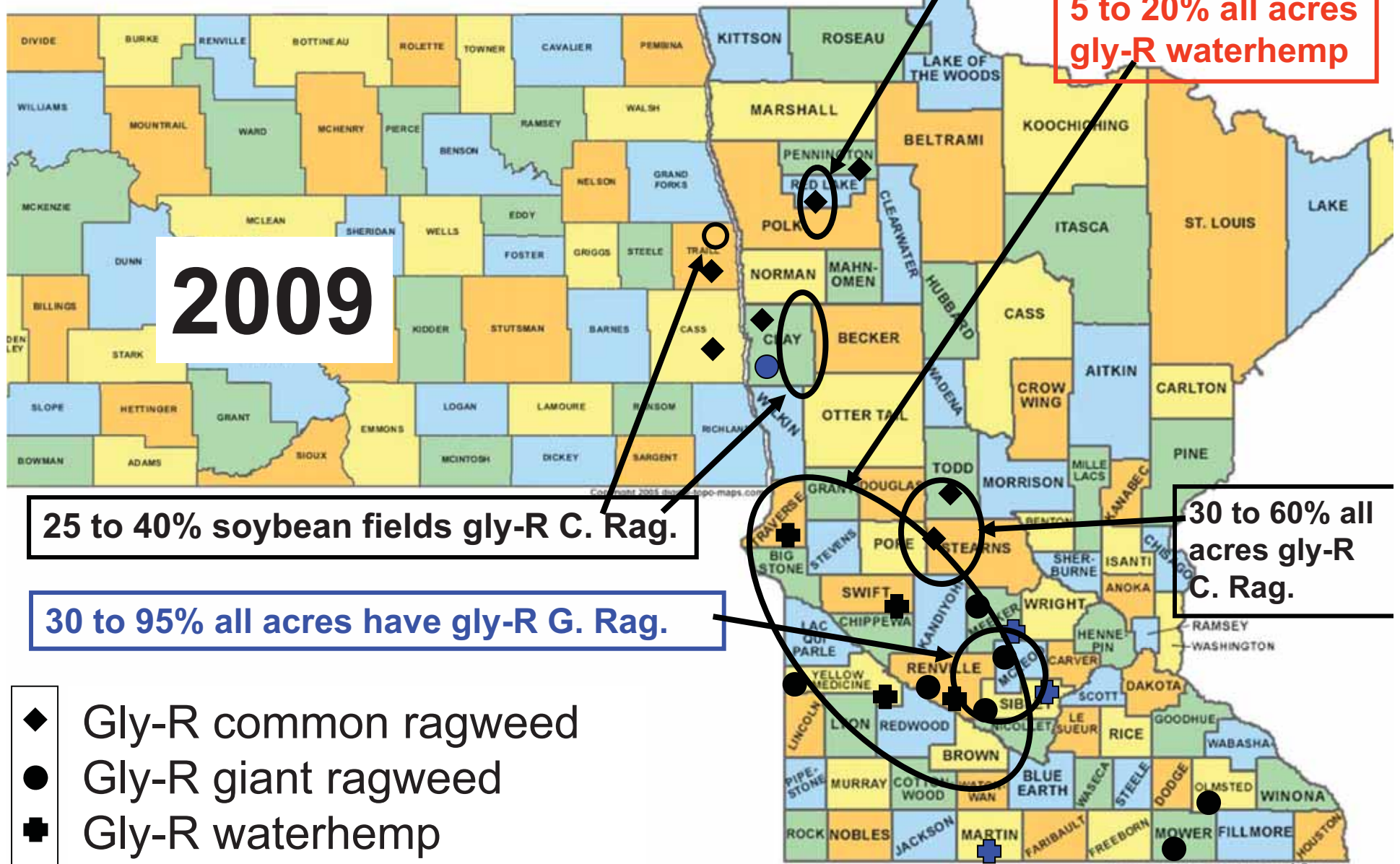
- A. Nothing
- B. Cultivation
- C. Hand Labor
- D. Herbicide Rescue Treatment
- E. Mower/Mechanical Puller



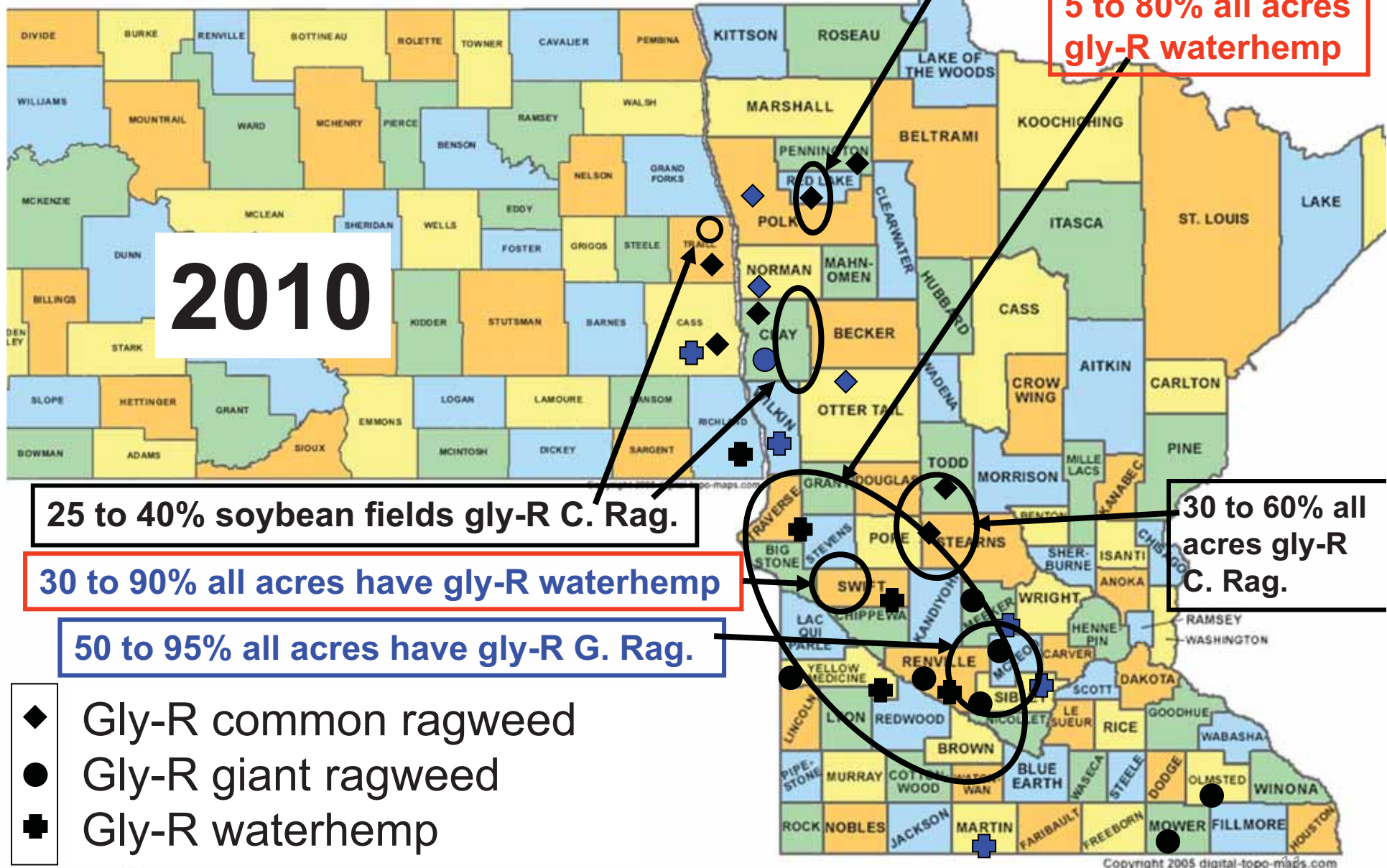
Areas and counties of ND and MN having known and suspected glyphosate-resistant weeds



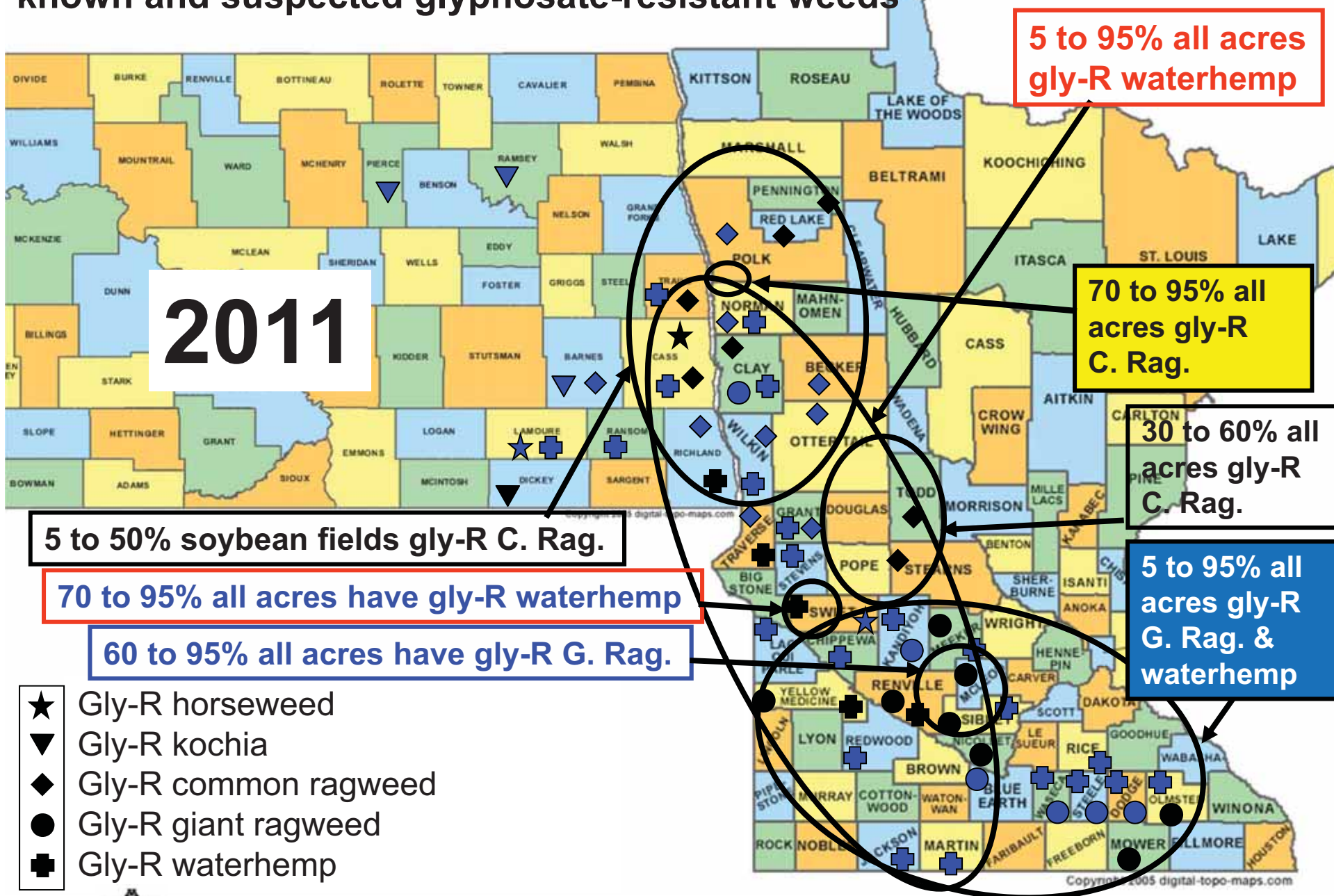
Areas and counties of ND and MN having known and suspected glyphosate-resistant weeds



Areas and counties of ND and MN having known and suspected glyphosate-resistant weeds



Areas and counties of ND and MN having known and suspected glyphosate-resistant weeds



Areas and counties of ND and MN having confirmed and suspected glyphosate-resistant weeds

15 to 90% soybean fields gly-R C. Rag.

5 to 95% all fields gly-R waterhemp

32% of 37 2012 kochia samples confirmed R

2012

70 to 95% all fields gly-R C. Rag.

30 to 60% all fields gly-R C. Rag.

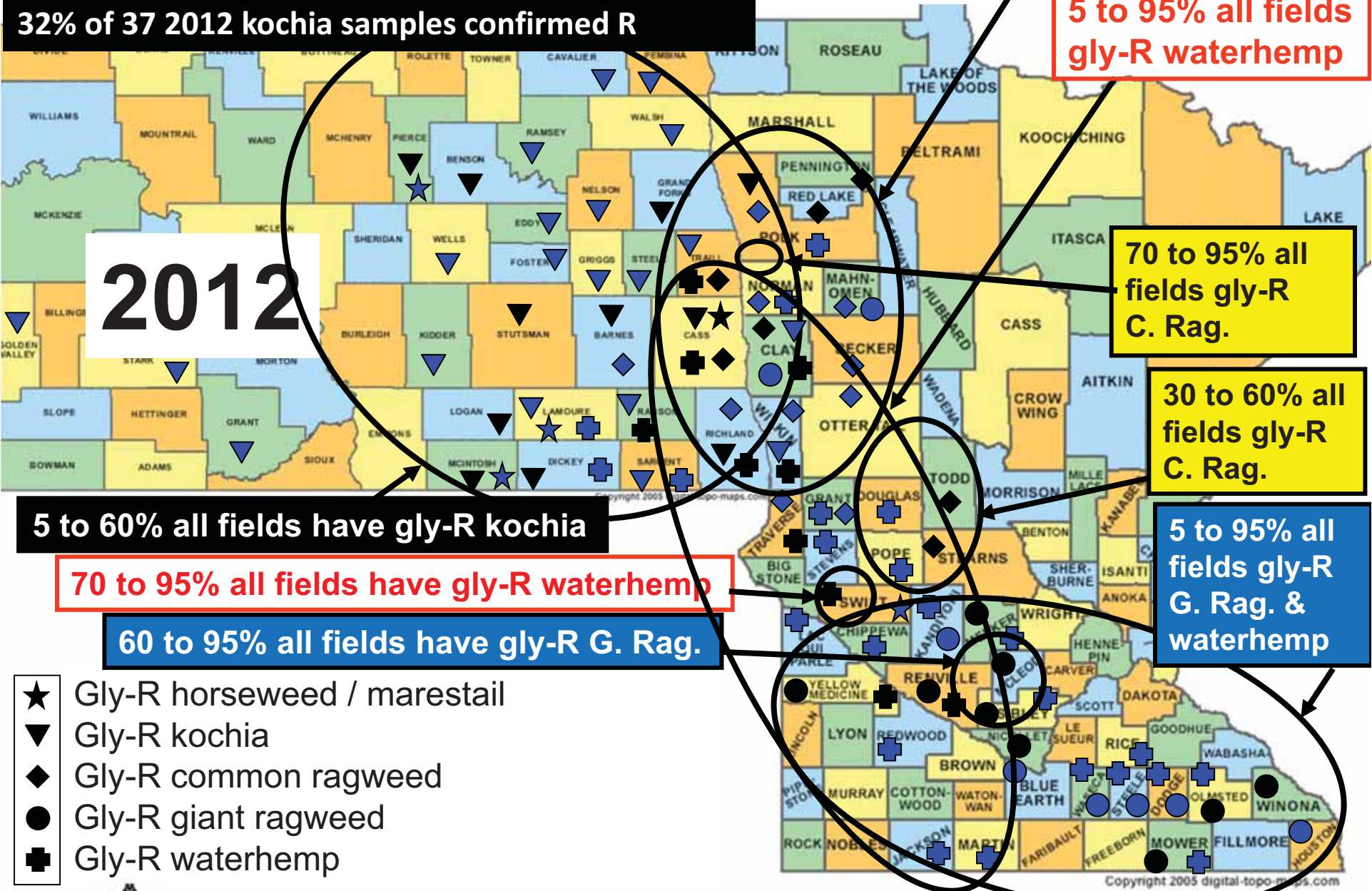
5 to 60% all fields have gly-R kochia

70 to 95% all fields have gly-R waterhemp

60 to 95% all fields have gly-R G. Rag.

5 to 95% all fields gly-R G. Rag. & waterhemp

- ★ Gly-R horseweed / marestalk
- ▼ Gly-R kochia
- ◆ Gly-R common ragweed
- Gly-R giant ragweed
- ⊕ Gly-R waterhemp



Managing Glyphosate to Maximize Performance

- Apply glyphosate at highest labeled rates to prevent weed escapes



Managing Glyphosate to Maximize Performance

- Know the surfactant load of the glyphosate product
 - Total NIS .5%-1% v/v
 - PowerMax = full surfactant load
 - Cornerstone = partial surfactant load
- Add proper amount of AMS
 - 8.5-17#/100 gal

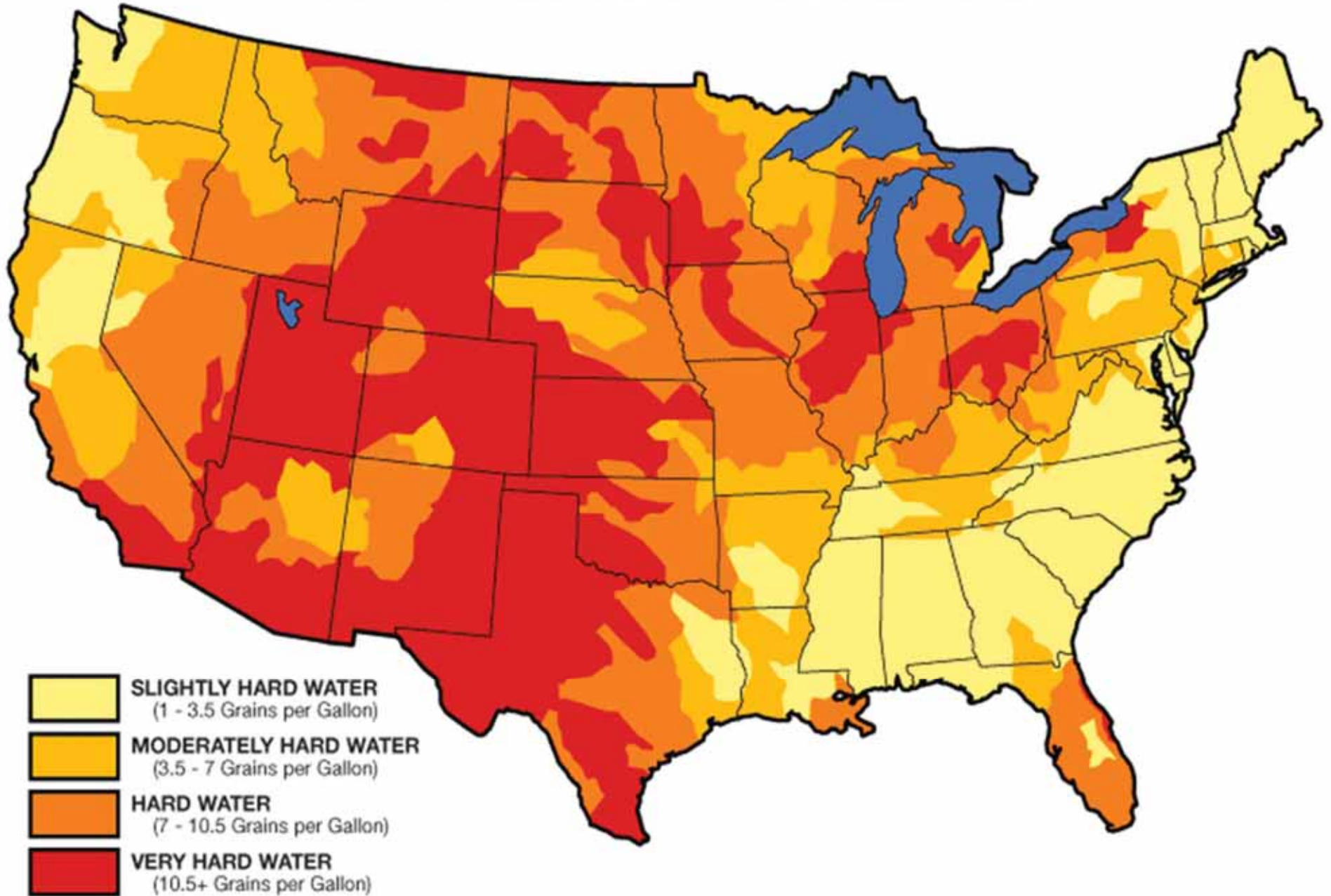
Know Your Products!

- Class Act NG recommended rate of 2.5% v/v is equivalent to 8.5 lbs AMS/100 gal of solution.
- Flame recommended rate is 0.5% v/v is equivalent to 0.6 lbs AMS/100 gal of solution.
- Check adjuvant labels for recommended rate and equivalences. Again, water hardness plays a big part in proper adjuvant and rate for optimum weed control potential.

AMS with Glyphosate

- Hard Water
 - Contains cations (Na, Ca, Mg, Fe) that inactivate glyphosate
 - AMS displaces these cations to prevent glyphosate from becoming inactive
- AMS aids in the absorption of glyphosate into the plant
 - Increases weed control under adverse growing conditions

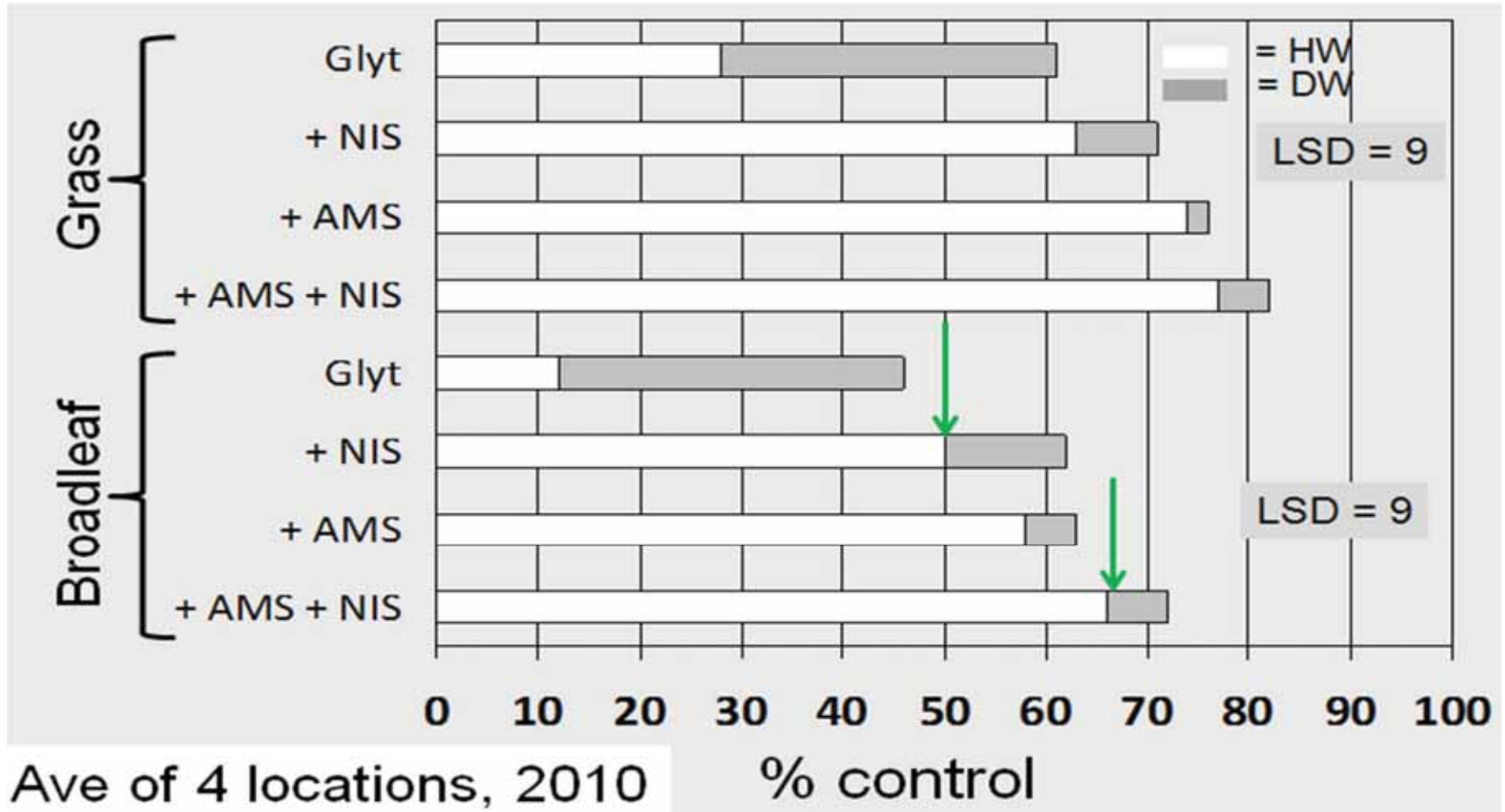
WATER HARDNESS AREAS IN THE UNITED STATES



Know Your Products!

- Products that claim to replace AMS
 - Acidic AMS replacements generally made with denatured sulfuric acid
 - Lowers pH of spray solution (1.5-3pH) thus prevents salts from binding to glyphosate
 - Water Conditioning Agents (WCA)
 - Performance is inconsistent
 - Higher cost
- Straight AMS is cheap and it works!

Glyphosate + AMS + NIS = 65-72% broadleaf control



Courtesy of NDSU

Bottom Line

- Simply put, AMS+NIS works!
- Company's push new products exclusive to their own company
- Adjuvants and surfactants aren't regulated by EPA – know your products!

Use Different Modes of Action In Rotational Crops

By Using:

Pre-Emerge/PPI Herbicides

Tank Mixing Herbicides w/Glyphosate

Keeping Small Grains in Rotation

Liberty Link Technology

On The Following Slides Herbicides Were Selected Based On:

- No Pursuit or Atrazine Present
- Labeled in Both ND and MN
- Short Rotation Restriction to Sugarbeets
- Effectiveness
- Spur Discussion with your Local Ag Suppliers

Corn Pre & PPI Options

Pre-Emerge Herbicides for RR Corn	Sugarbeet Rotation Restrictions	Common Ragweed	Giant Ragweed	Lambsquarters	Kochia	Waterhemp
Verdict @ > 10 fl oz/A	NCS	G/E	G	G/E	G/E	G/E
Harness / Surpass	NCS	F	P	F/G	F	G/E
Fierce (apply 7-14 days b4 planting)	18mth	F/G	N/P	E	E	E
Callisto	18 mth	G/E	G	G/E	P	G/E

Verdict

- Product of Choice as a Pre/PPI
- Short Rotation Restriction to Sugarbeets
- Very Effective on Weeds that are High Risk for Resistance

Harness/Surpass

- 2nd most Popular
- Not enough activity on Ragweed & Kochia

Corn Post Tank Mix Options With Glyphosate

Post Tank Mixes with Glyphosate for RR Corn	Sugarbeet Rotation Restrictions	Common Ragweed	Giant Ragweed	Lambsquarters	Kochia	Waterhemp
Status	4 mth	G/E	G/E	G/E	E	G
Banvel /Clarity	NCS	G/E	G	G	G/E	G
Halex GT	18 mth	E	G	E	E	G/E
Impact/Armezon	18 mth	G	G	G/E	E	G/E
Laudis	18 mth see label	G	G	G/E	E	G/E
Callisto	18mth	F	G	G/E	P/F	E

Status

- Product of Choice as a Post Tank Mix partner with Glyphosate
- Short Rotation Restrictions to Sugarbeets
- Very Effective on weeds that are high risk for resistance

Notes on Corn products

- Verdict is the product of choice for a Pre/PPI
 - Combination of Sharpen and Outlook
- Status cannot be applied by air
 - Makes a Pre-Emerge much more important

Soybean Pre & PPI Options

Pre-Emerge Herbicides for RR Soybeans	Sugarbeet Rotation Restrictions	Common Ragweed	Giant Ragweed	Lambsquarters	Kochia	Waterhemp
Valor	NCS	N/F	N/P	G/E	G/E	G/E
Verdict @ 5 fl oz/A	NCS	P/F	P	P/G	P/F	F/G
Outlook	NCS	P	P	P/F	N/P	F/G
Boundary (Sencor+Dual)	18 mth	G	P/F	G	P	G/E

Hard to find All-Round Weed Activity with Short Rotation Restriction to Sugarbeets

Valor

- Very Good on some of the weeds with a high risk for resistance

Verdict

- For Increased Activity: Mix Verdict @ 5 oz/Acre and Outlook @ 5 oz/Acre

Soybean Post Tank Mix Options With Glyphosate

Post Tank Mixes with Glyphosate for RR Soybeans	Sugarbeet Rotation Restrictions	Common Ragweed	Giant Ragweed	Lambsquarters	Kochia	Waterhemp
Flexstar	18 mth	G/E	G	P/F	G	G/E
Cobra	NCS	G/E	G	P	P/F	G/E

Post Tank Mix options can cause Soybean injury like Bronzing of leaves. However, if you have a weed with resistance, it is better to control them than not at all.

Liberty Link Technology

- In soybeans and corn
- Some varieties now have a combination of both RR and LL Tolerance
- Provides new mode of action to cropping system
- Liberty needs ideal hot days and high rates and possible tank mixes for good control
- Minimum 15 gal/a ground and 10 gal/a air

Other Weed Problems

Starane Resistant Kochia

- Industry is using Huskie as the solution
- Has 9 month rotation restriction to sugarbeets

Work With Ag Suppliers

- Work with your local Ag Supplier to help you develop a plan for Roundup Resistance Management in your rotational crops
- Many have been talking with their customers already

Resistant Waterhemp Management in Sugarbeet

- 1st Post-cotyledon sugarbeets
 - RoundUp (28 to 32 oz/a) + Betamix (12 oz/a) + Ethofumesate (4 oz/a) + HSMOC (1.5 pt/a) + AMS (1.5#/a)
 - If resistant ragweed is present add Stinger (1.3 oz/a)
- 2nd Post-10 to 14 DAT
 - RoundUp (24 to 28 oz/a) + Betamix (16 oz/a if 4 If sgbt) + Ethofumesate (4 oz/a) + Outlook (14 to 21 oz/a) or Dual (1.5pt/a) + HSMOC (1 pt/a) + AMS (1.5#/a)
 - If resistant ragweed is present add Stinger (1.3 oz/a)

Resistant Waterhemp Management in Sugarbeet

- 3rd Post-8 leaf sugarbeet
 - RoundUp (22 oz/a) + Betamix (24 oz/a) + Ethofumesate (4 oz/a) + Outlook (0 to 10 oz/a) or Dual (0 to 1 pt/a) + HSMOC (1 pt/a) + AMS (1.5#/a)
 - If resistant ragweed is present add Stinger (1.3 to 2 oz/a)
 - 90 day PHI for Ethofumesate
- 4th Post-10 to 21 DAT (If needed)
 - RoundUp (22 oz/a) + Betamix (32 to 48 oz/a) + AMS (1.5#/a)
 - 75 day PHI for Betamix

Resistant Kochia Management in Sugarbeet

- Apply Ethofumesate (6 to 7.5 pt/a) Pre or PPI
- 1st Post-1 leaf kochia
 - RoundUp (28 to 32 oz/a) + Betamix (12 oz/a) + Ethofumesate (4 oz/a) + HSMOC (1.5 pt/a) + AMS (1.5#/a)
 - If resistant ragweed is present add Stinger (1.3 oz/a)
- 2nd Post-10 to 14 DAT, 1 leaf kochia
 - RoundUp (24 to 28 oz/a) + Betamix (16 oz/a if 4 lf sgbt) + Ethofumesate (4 oz/a) + HSMOC (1 pt/a) + AMS (1.5#/a)
 - If resistant ragweed is present add Stinger (1.3 oz/a)

Resistant Kochia Management in Sugarbeet

- 3rd Post-8 leaf sugarbeets
 - RoundUp (22 oz/a) + Betamix (24 oz/a) + Ethofumesate (4 oz/a) + HSMOC (1 pt/a) + AMS (1.5#/a)
 - If resistant ragweed is present add Stinger (1.3 to 2 oz/a)
 - 90 day PHI for Ethofumesate
- 4th Post-10 to 21 DAT (If needed)
 - RoundUp (22 oz/a) + Betamix (32 to 48 oz/a) + AMS (1.5#/a)
 - 75 day PHI for Betamix

Resistant Ragweed Management in Sugarbeet

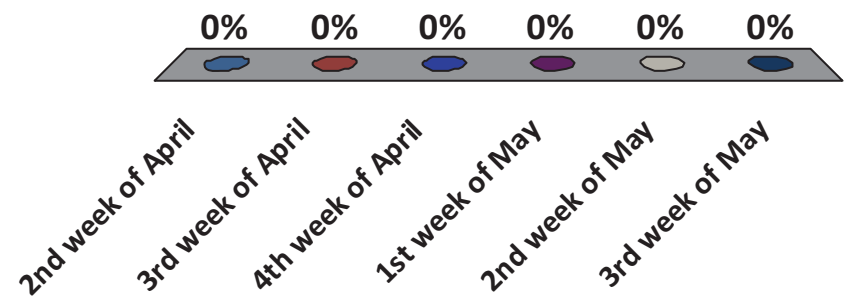
- 1st Post-cotyledon sugarbeets
 - RoundUp (28 to 32 oz/a) + Stinger (1.3 to 4 oz/a) + AMS (1.5#/a)
- 2nd Post-10 to 14 DAT
 - RoundUp (24 to 28 oz/a) + Stinger (1.3 to 4oz/a) + AMS (1.5#/a)
- 3rd Post-8 leaf sugarbeet
 - RoundUp (22 oz/a) + Stinger (1.3 to 4 oz/a) + AMS (1.5#/a)
- 4th Post-10 to 21 DAT (If needed same as 3rd)
 - 45 day PHI for Stinger
 - Do not exceed 10.7 oz/a per season

ACSC Chemical

- All retailer/distributors have availability to ACSC chemical
 - Sugarbeet Mix (Generic Betamix)
 - Phen-Des 8+8 (Generic Betamix)
 - B & B Plus (Generic Progress)
- Stored at AgDepot in Grand Forks
- No Deliveries
- Full Pallet Only (180 gals)
- No Returns

What week do you think the bulk of the acres will be planted?

- A. 2nd week of April
- B. 3rd week of April
- C. 4th week of April
- D. 1st week of May
- E. 2nd week of May
- F. 3rd week of May





Any Questions?