

Glyphosate Resistant Weed Management In American Crystal Growing Area

Agenda

- Before RR Resistant Crops
- RR Resistant Weeds in ACSC
- Corn, Soybeans, Canola & Beets are Weeds
- What You Can Do
- Summary

Resistance Before Roundup

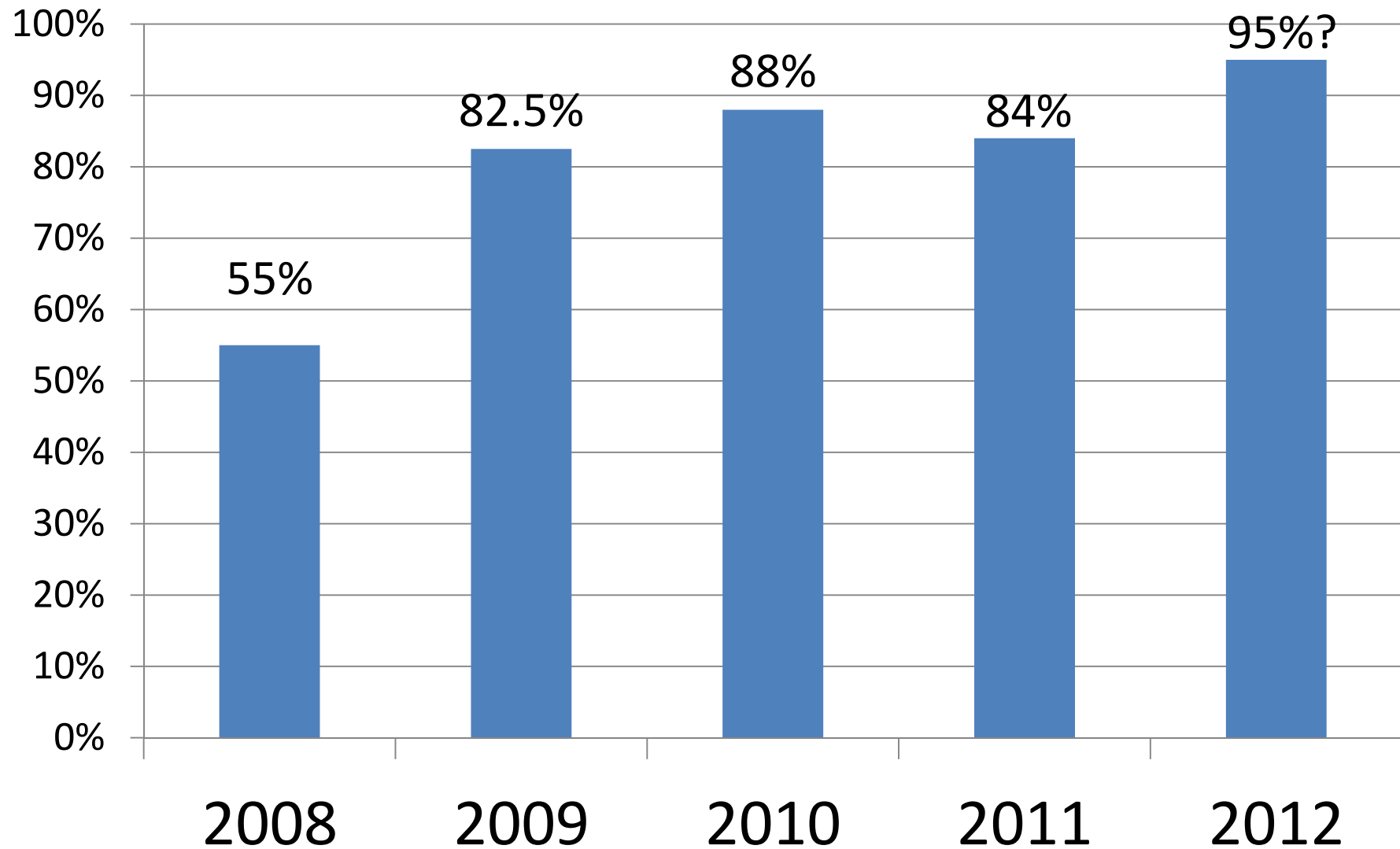
SU Resistant Kochia



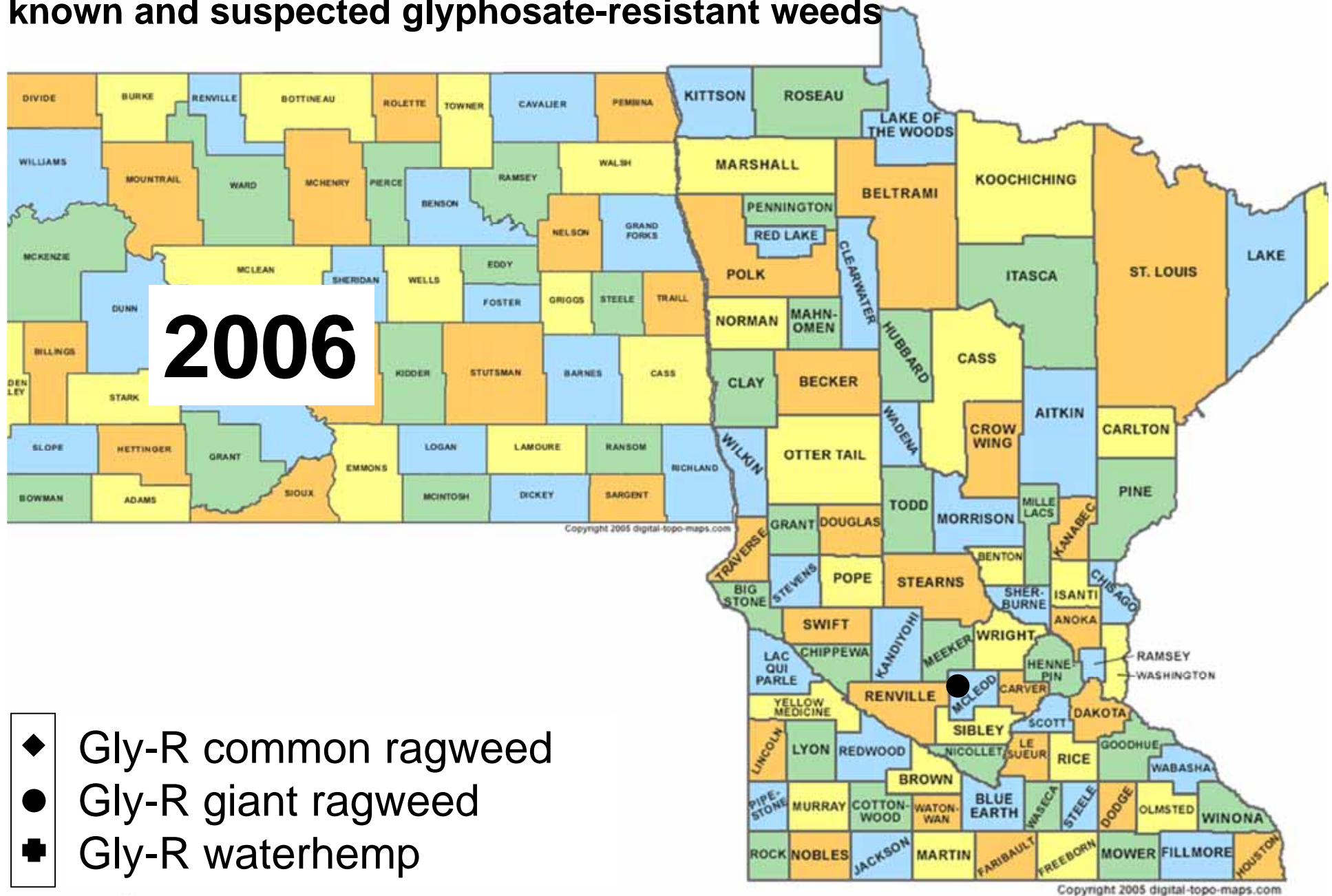
Conventional Herbicides

- Many times less than adequate control
- Timing an issue – extended rain events
- Labor intensive
 - Multiple sprays 3-5 times
 - Multiple Cultivations and Mechanical Control

Percent Of Roundup Ready Sugarbeets In ACSC

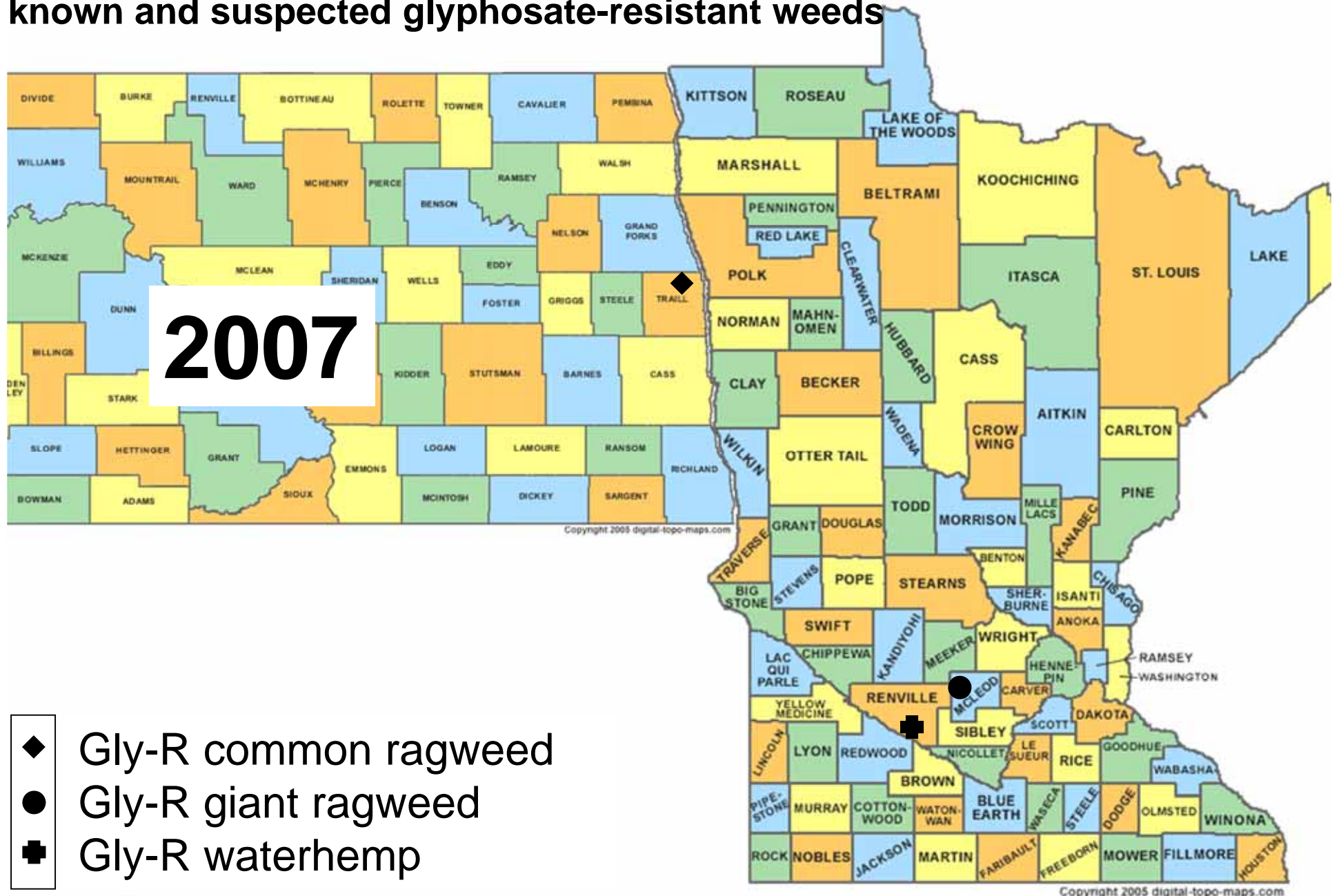


Areas and counties of ND and MN having known and suspected glyphosate-resistant weeds



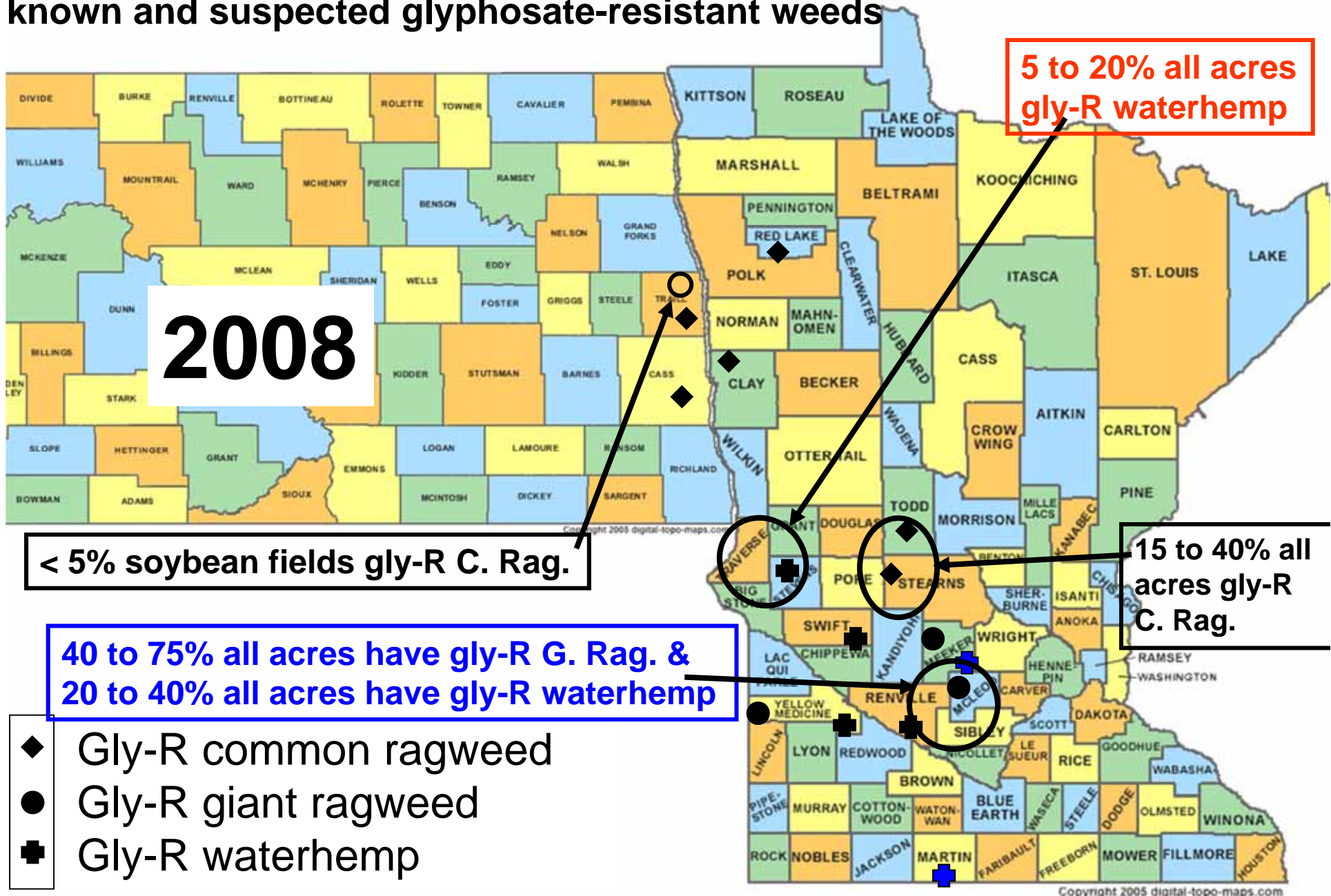
- ◆ Gly-R common ragweed
- Gly-R giant ragweed
- ⊕ Gly-R waterhemp

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



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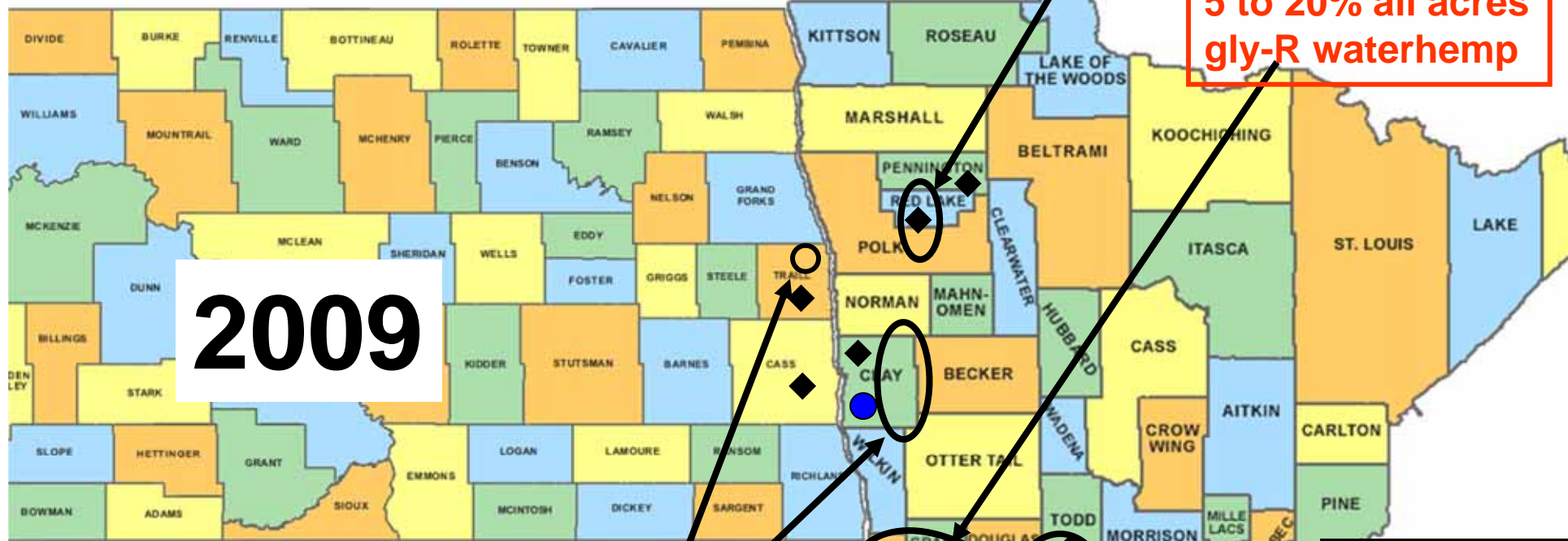
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Areas and counties of ND and MN having known and suspected glyphosate-resistant weeds

10 to 30% soybean fields gly-R C. Rag.

5 to 20% all acres gly-R waterhemp



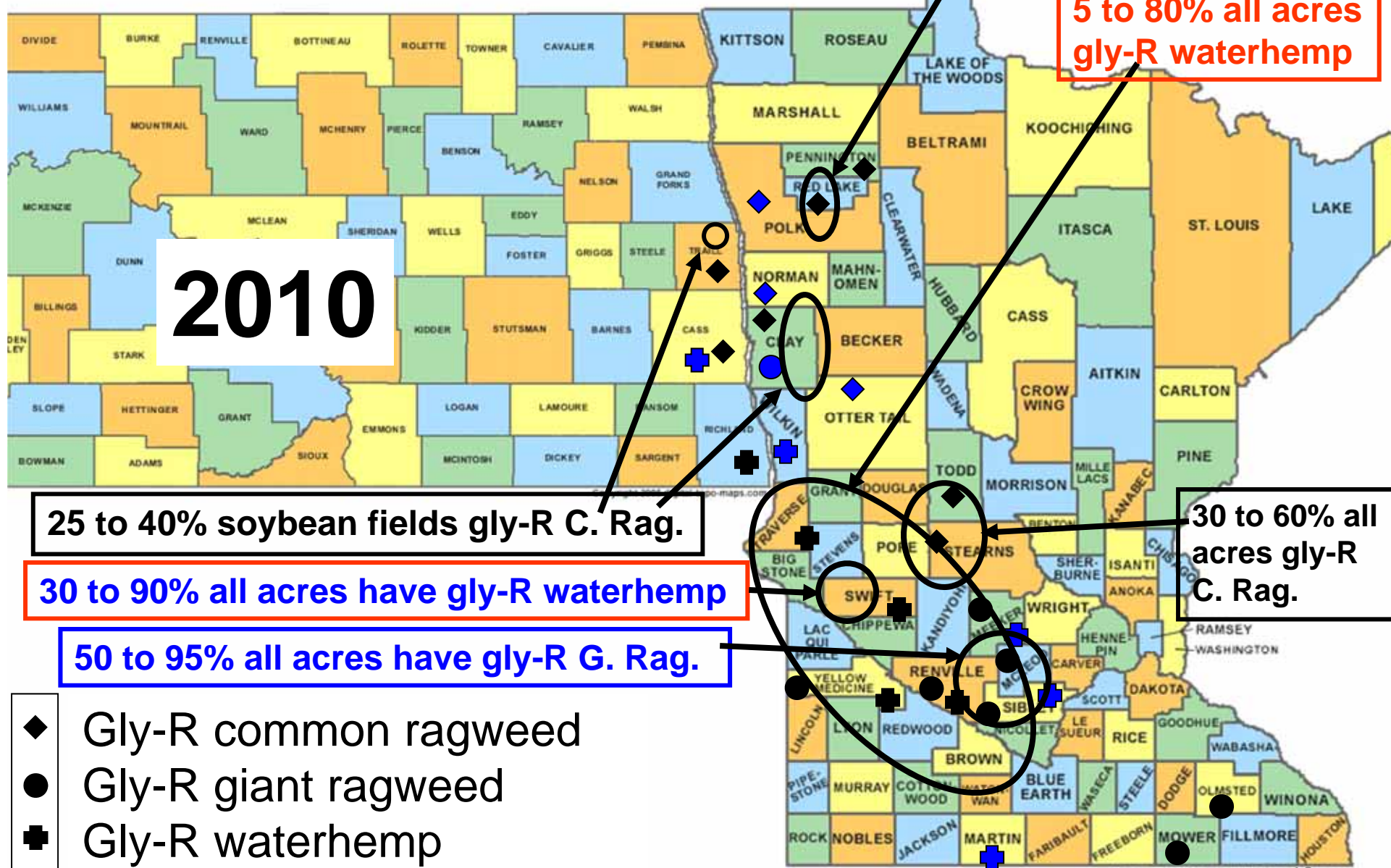
25 to 40% soybean fields gly-R C. Rag.

30 to 95% all acres have gly-R G. Rag.

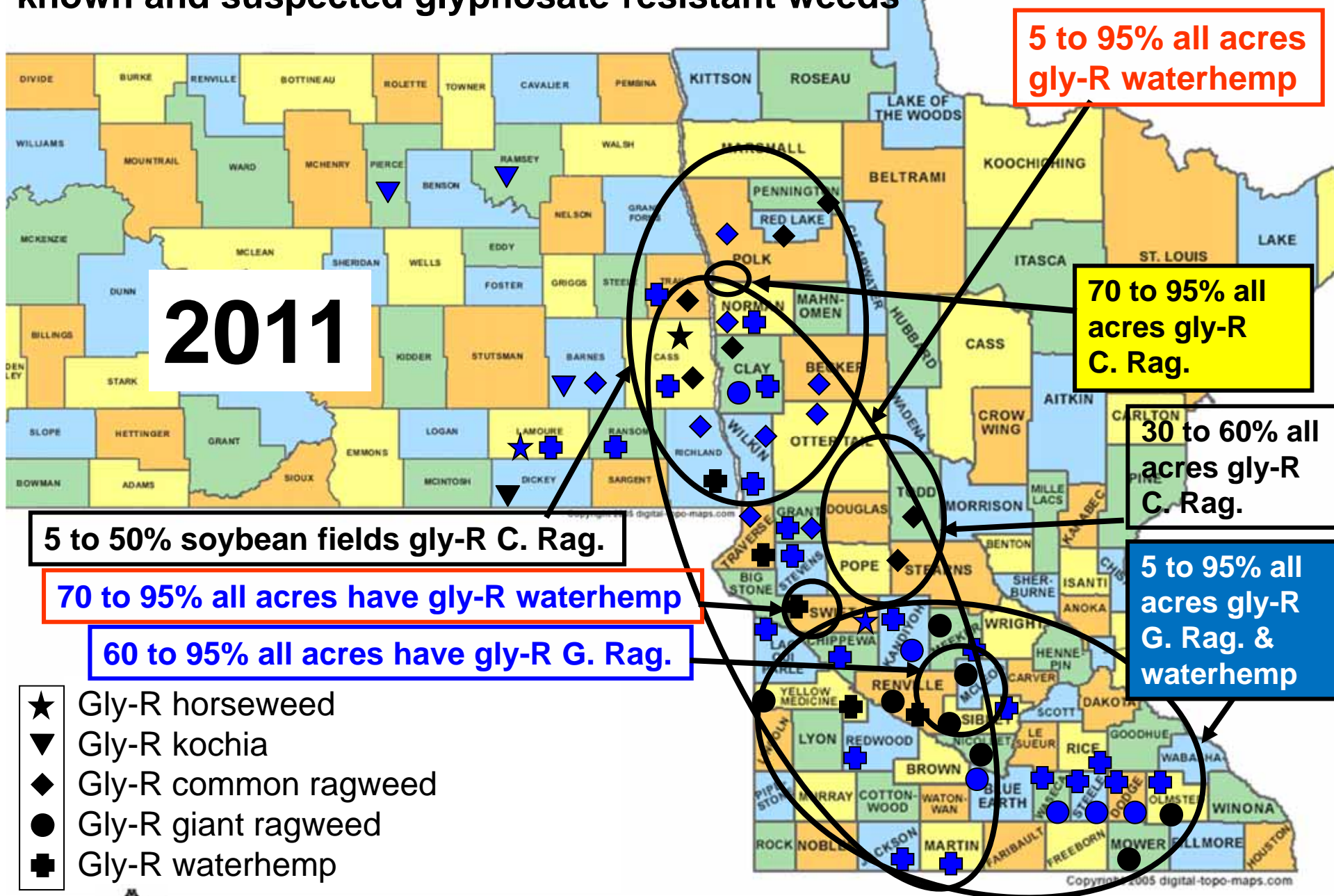
30 to 60% all acres gly-R C. Rag.

- ◆ Gly-R common ragweed
- Gly-R giant ragweed
- ⊕ Gly-R waterhemp

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





Glyphosate Resistant Weeds In MN & ND Sugarbeet Producing Counties.

- Common Ragweed
- Waterhemp
- Giant Ragweed
- Horseweed
- Suspect - Common Lambsquarters

Glyphosate Resistant Ragweed



Where's The Beans?



Glyphosate Resistant Ragweed



2 Different Farmers With
2 Different Management Styles



Glyphosate Resistant Ragweed



Glyphosate Resistant Ragweed



Glyphosate Resistant Waterhemp



Glyphosate Resistant Horsetail



Suspected Glyphosate Resistance Or High Tolerance

- Common
Lambsquarters
- Wild Buckwheat
- Dandelion
- Common Mallow
- Horsetail
- Smartweed
- Clover
- Cinquefoil
- Kochia
- Nightshade
- Nutsedge
- Prickly Lettuce
- Waterhemp

Dandelion



Wild Buckwheat & Dandelion



Glyphosate Resistant Crops As Weeds In Beets



- Corn – Use Assure II or Select
- Soybeans – Use Stinger
- Canola – Use UpBeet

The use of these herbicides in beet fields will also help in controlling Glyphosate resistant weeds

RR Canola & RR Corn



Annual RR Beets As Weeds In Other Crops



Strategies to Combat Resistant Weeds

- Scout fields to identify escapes
- Herbicide tank mixes with multiple MOA
- Rotate different MOA in consecutive years
- Rotate crops to enable different MOA
- Use labor and mechanical weed control
- Prevent seed production

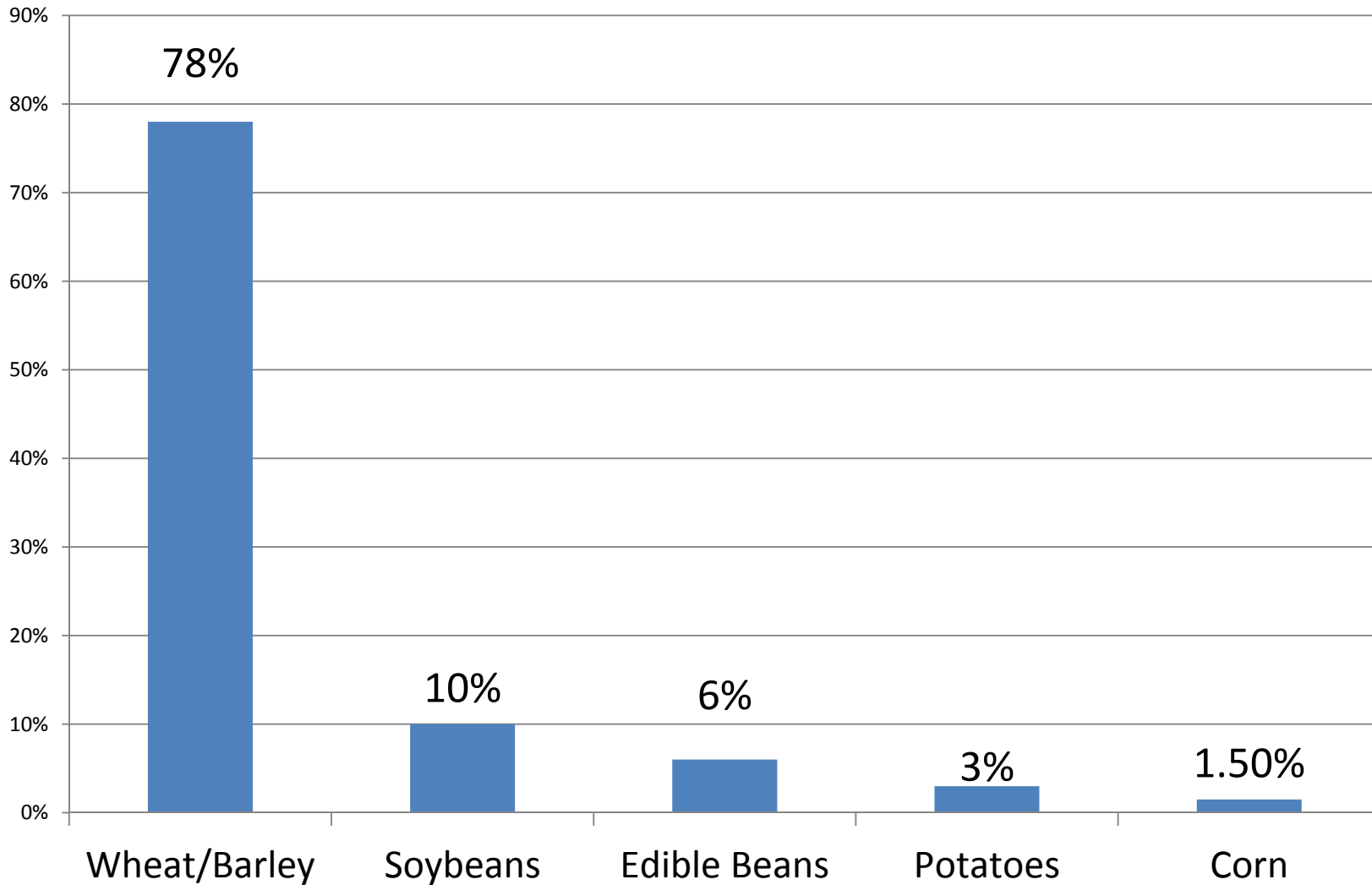
What Can You Do?

- Keep small grains in you crop rotation
- Use Pre-Emerge Herbicides in rotational crops (corn and soybeans)
- Tank-mix other Herbicides with Glyphosate
- Use Liberty Link Technology in corn & soybeans

Small Grains in the Rotation



ACSC 2011 Top 5 Preceding Crops



Sugarbeet 1st Two Roundup Applications Up To 8-Leaf Stage

- Roundup PowerMax[®]
1st Two Sprays:
Use 28 oz./A (0.98 lbs./A Acid Equivalent)
-OR-
1st Spray: Use 32 oz./A (1.125 lbs./A AE)
2nd Spray: Use 24 oz./A (0.84 lbs./A AE)
- Tank-mix 3 oz./A of Stinger
 - Do not mix if using Quadris in Roundup tank-mix
- Refer to Roundup[®] label to maximize control



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

Pre-Emerge In Corn & Soybeans

Corn Pre-Emerge:

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
Callisto	18 mth	G/E	G	G/E	P	G/E

Soybean Pre-Emerge:

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
Boundary (Sencor+Dual)	18 mth	G	P/F	G	P	G/E

Tank-mixes In Corn & Soybeans

Corn Post Tank-Mixes:

		Common	Giant			
Post Tank Mixes with Glyphosate for RR Corn		Ragweed	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
Impact	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

Soybean Post Tank-Mixes:

Post Tank Mixes with Glyphosate for RR Soybeans						
Flexstar	18 mth	G/E	G	P/F	G	G/E
Cobra	NCS	G/E	G	P	P/F	G/E

More Options In Corn

- As you can see corn herbicides provide the most effective options

Liberty Link Technology

- In soybeans or corn
- Provides new mode of action to cropping system
- Liberty needs ideal hot days and high rates and possible tank mixes for good control



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

Summary

- ACSC is seeing some resistant cases
- ACSC is encouraging growers to adopt resistant breaking strategies
- Growers best option is in controlling resistance in rotational crops
- Continue a large percentage of small grain production
- Corn has the most resistance options
 - Due to more effective & economical herbicides

AGRONOMY GOLD STANDARDS

Tips to Keep Roundup® Ready Technology Working In Your Sugarbeet Fields



Above photos show Roundup Ready Resistant Common Ragweed in sugarbeets and soybeans.

Strategies to Combat Resistant Weeds

- Scout fields to identify escapes.
- Tank mix herbicides with multiple MOA (Modes Of Action).
- Rotate different MOA in consecutive years.
- Rotate crops to enable different MOA.
- Use labor and mechanical weed control.
- Prevent weed seed production.

What You Can Do

- Keep small grains in your rotation.
- Use Pre-Emerge Herbicides in Rotational Crops (corn & soybeans).
- Tank-mix other herbicides with Glyphosate/Roundup®.
- Use Liberty Link corn and/or soybean varieties.

1st Two RR Beet Sprays Up To 8-leaf Stage

- Use 28 oz./A Roundup PowerMax® Rate (0.98 lbs./acre Acid Equivalent).
OR
Use 32 oz./A 1st spray and 24 oz./A 2nd spray Roundup PowerMax®.
(1.125 lbs./acre and 0.84 lbs./acre Acid Equivalents) .
- Tank-mix 3 oz./Acre of Stinger.
- Refer to Roundup® label for ways to maximize control.



February 2012

Pre-Emerge & Post Herbicide Options in RR Corn

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
Callisto	18 mth	G/E	G	G/E	P	G/E

Post Tank Mixes with Glyphosate for RR Corn

Status	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
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Laudis	18 mth see label	G	G	G/E	E	G/E
Callisto	18mth	F	G	G/E	P/F	E

Pre-Emerge & Post Herbicide Options in RR Soybeans

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
Boundary (Sencor+Dual)	18 mth	G	P/F	G	P	G/E

Post Tank Mixes with Glyphosate for RR Soybeans

Flexstar	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

NCS = Next Cropping Season 2CS = Two Cropping Seasons
N = None P = Poor F = Fair G = Good E = Excellent

As shown, there are more effective options in Corn.

Liberty Link® Corn and Soybeans Varieties are Options also.





Main Message:

Keep Glyphosate Working
In
Sugarbeets!

Your Comments & Questions