Diagnosing Herbicide Resistant Weeds

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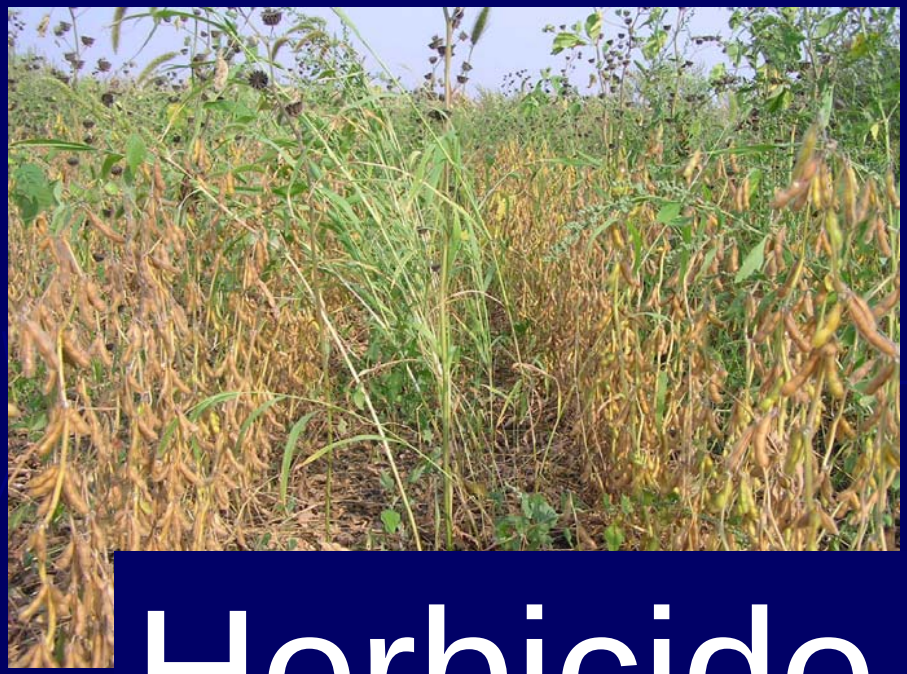


Herbicide Resistant?

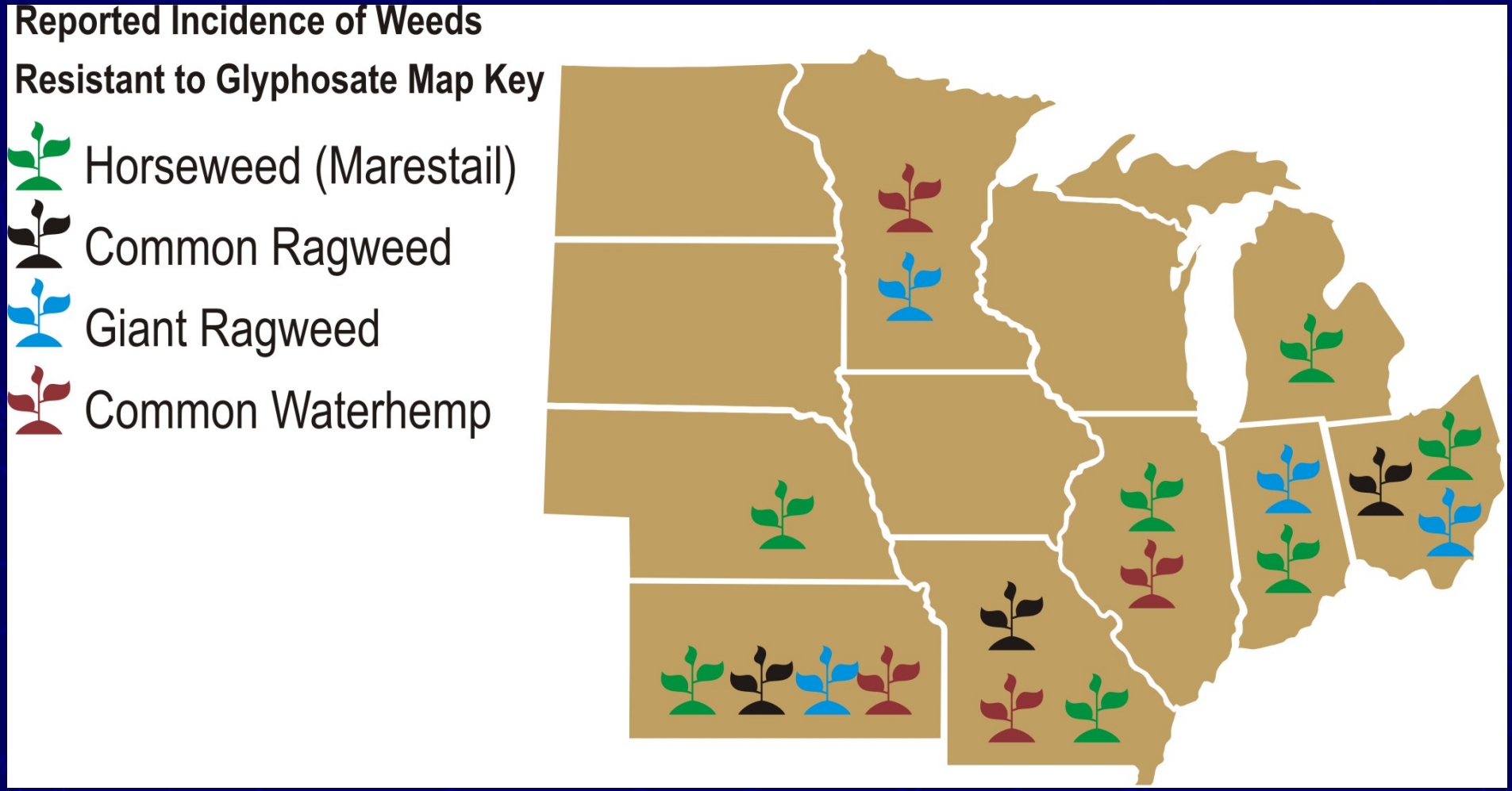
Keep in Mind That…

- ✓Weed control failures are usually not a sign of resistance development.
- ✓Other reasons must be investigated first.
- ✓Resistance should be considered only when other factors have been eliminated.

Resistant Weeds in Wisconsin

	PSII	ALS	ACCase
Common lambsquarters	✓		
Common ragweed		✓	
Eastern black nightshade		✓	
Giant foxtail		✓	✓
Giant ragweed		✓	
Green foxtail		✓	
Kochia	✓	✓	
Large crabgrass			✓
Shattercane		✓	
Smooth pigweed	✓		
Velvetleaf	✓		
Waterhemp		✓	

Current Status - Midwest



What Causes Resistance?

- Frequency of resistance traits in species
- Initial population of resistant weeds
- Herbicide selection intensity
- Inheritance of resistance traits
- Gene flow

Level of Resistance

- The level of resistance to a herbicide can make diagnosis of resistant weeds difficult.
  - Examples:
    - ALS resistant Foxtail => 20x
    - ALS resistant Eastern Black Nightshade => 138x
    - PSII resistant velvetleaf => 100x
    - Glyphosate resistance => 2x to 12x

Steps to Indentify Resistance

- Is the field at risk?
- Rule out application errors
  - Was the sprayer calibrated and in good order?
  - Did the herbicide match the weed spectrum and was the correct rate applied?
  - Was the escaped weed present at the time of postemergence application?
  - Was it applied at the proper weed growth stage?
  - Appropriate adjuvant used?

Steps to Indentify Resistance

- Rule out weather effects
  - What were the weather condition before, during and after herbicide application?
    - Dry conditions
      - reduce the activation of preemergence herbicides
      - reduce the absorption of postemergence herbicides.
    - Wet Conditions
      - excessive rain can leach herbicides and hasten breakdown
      - postemergence applications can be washed off

Weather Effect or Resistance?

Steps to Indentify Resistance

- Rule out weather effects
  - What were the weather condition before, during and after herbicide application?
    - Cold temperature/frost
      - Cold weather up to 7 days prior to application can reduce the efficacy of postemergence applications
    - Hot temperatures
      - Thicken plant cuticle resulting in less absorption of postemergence herbicides.
      - Dust!

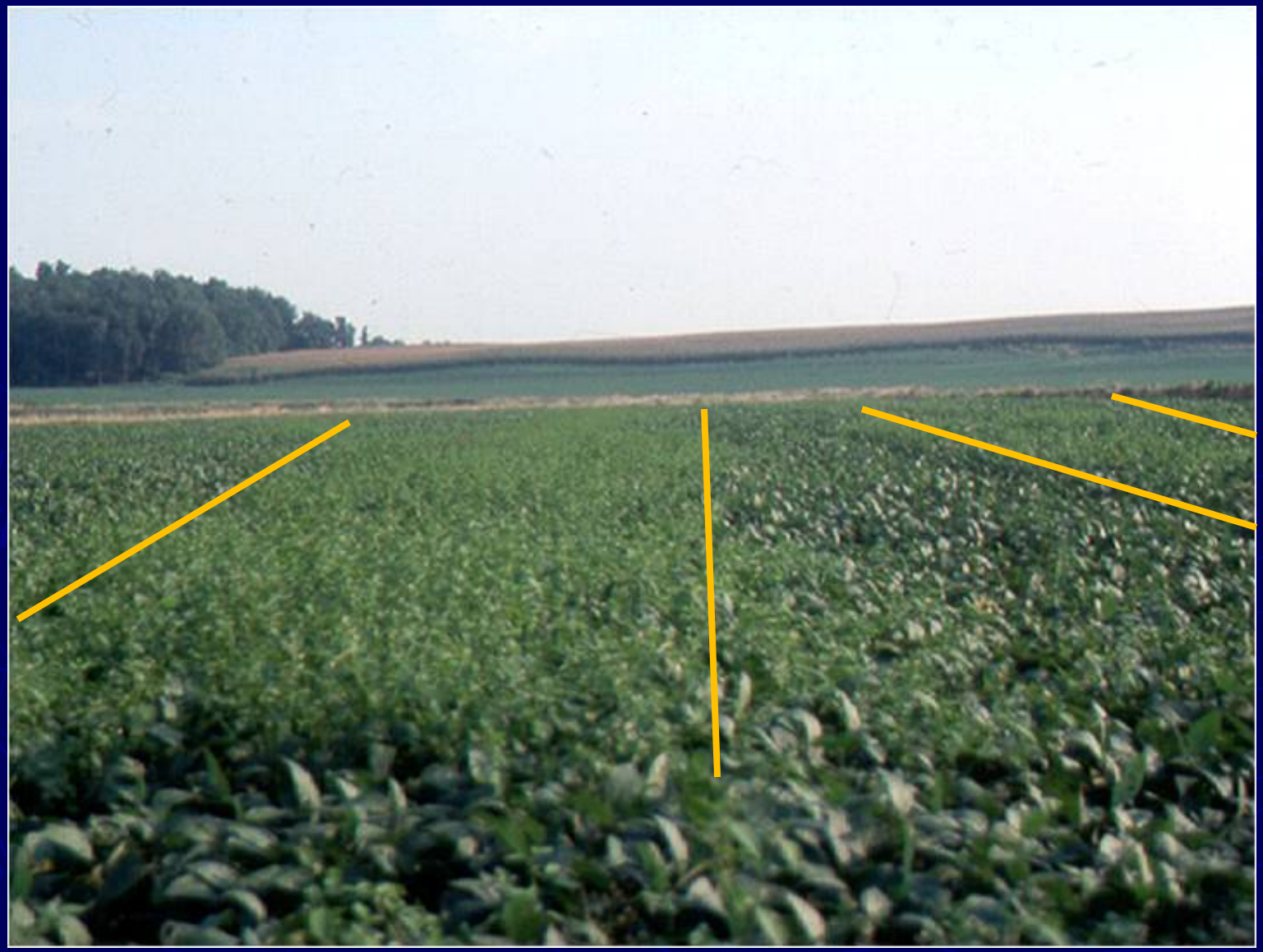
Steps to Indentify Resistance

- Field observations
  - Were the escapes actually a second flush of weeds emerging after the herbicide application?
  - Were the escaped weeds all the same species?
  - Are healthy weeds mixed with controlled weeds of the same species?
  - Was weed control good on other weed species?
  - Was the weed species controlled in the past with the same herbicide?

Steps to Indentify Resistance

- Field observations – continued
  - Have you noticed a decline in control in recent years?
  - Did the weeds appear in a irregular pattern in the field or in strips or some other linear pattern?
  - Does the patch appear in the same spot as previous years seems to be getting larger?
  - Are their confirmed cases of resistant weed species in the area?

Linear Pattern



Irregular Pattern

Steps to Indentify Resistance

- You suspect resistance – now what?

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  - Spot test:
    - spray the escaped weeds with the same herbicide
    - weeds should be in similar stage of growth
    - leave an unsprayed area of weeds as a comparison
    - observe the effects 7-10 days later.
  - Contact county Extension Agent, Extension Weed Specialist, and the appropriate company representative.
  - Keep weeds from producing seed!

Delaying Resistance Development

- Reduce selection pressure by rotating herbicide modes of action from year to year.
- Seriously consider using sequential herbicide programs.
- Always use a burndown in no-till systems.
- Consider tank mixes with 2 or more modes of action against the target weed species.
- Use cultivation.

Summary

- Resistance has and will happen again.
- Not all weed control failures are linked to the development of resistance.
- Other causes must be considered by careful investigation.
- If resistance is suspected contact University Extension, appropriate company, and retailer.

Summary

- Keep weeds from going to seed!
- Be proactive to lower the risk of resistance development. Practice good resistance management!


Not likely


Yes


Possible


No