

Weed Resistance: Manage it or it will Manage You!

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Weed/herbicide resistance

- 1. Definitions & examples**
- 2. Current status & extent**
- 3. Impress you with seriousness**
- 4. Why it is important for RECs**
- 5. Risk and cost of ignoring**
- 6. Strategy for solving**
- 7. Implications beyond weeds.....**

Weed Resistance Defined

Weed resistance is the inherited ability to survive and reproduce following exposure to a dose of herbicide that would normally be lethal to the wild type.

What are some examples?

Conyza canadensis (horseweed)

Amaranthus palmeri (Palmer
amaranth)

Ambrosia trifida (giant ragweed)

Amaranthus tuberculatus (common
waterhemp)

Poa annua (annual bluegrass)

Lolium multiflorum (Italian ryegrass)

Eleusine indica (Goosegrass)

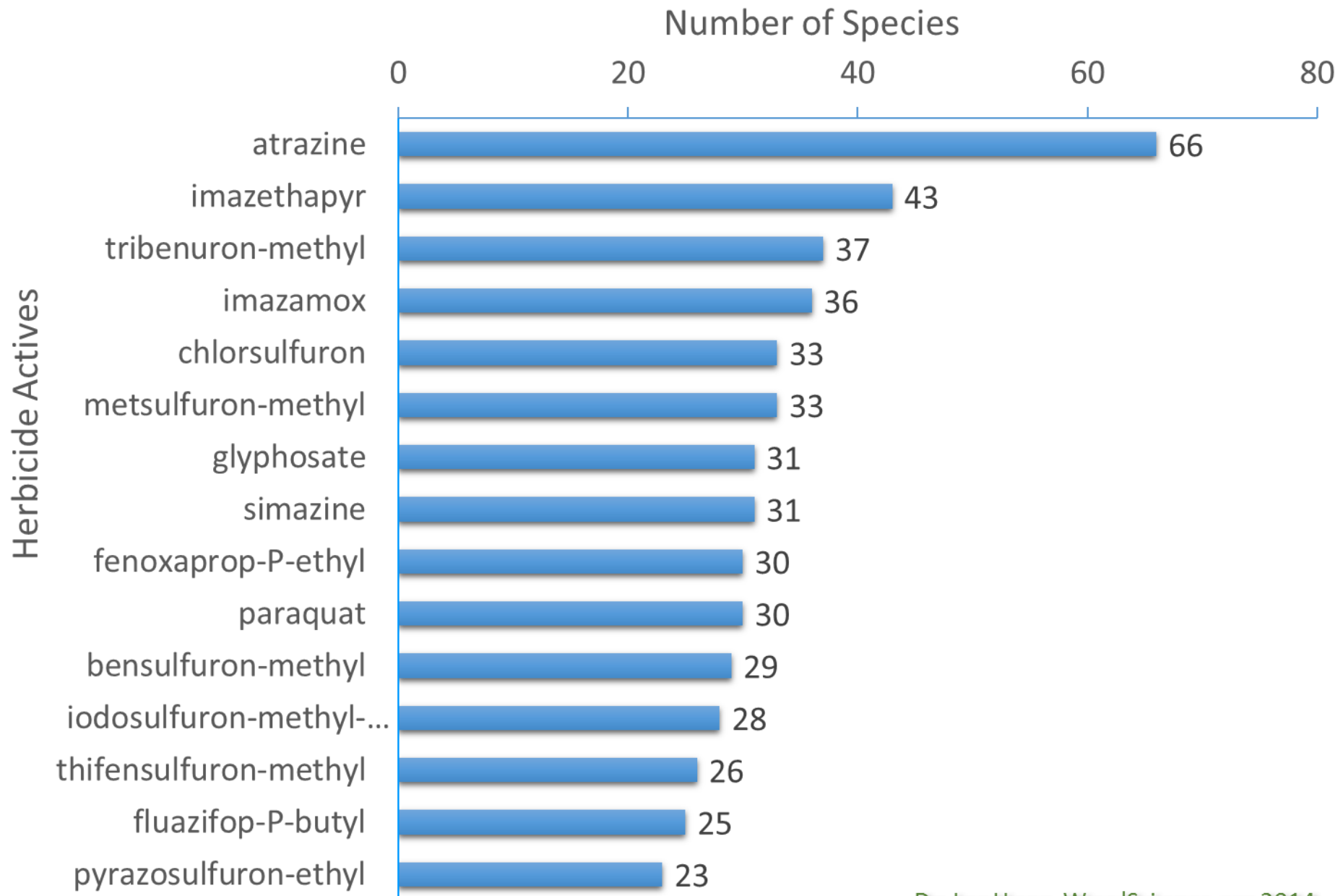
Palmer Amaranth



Waterhemp

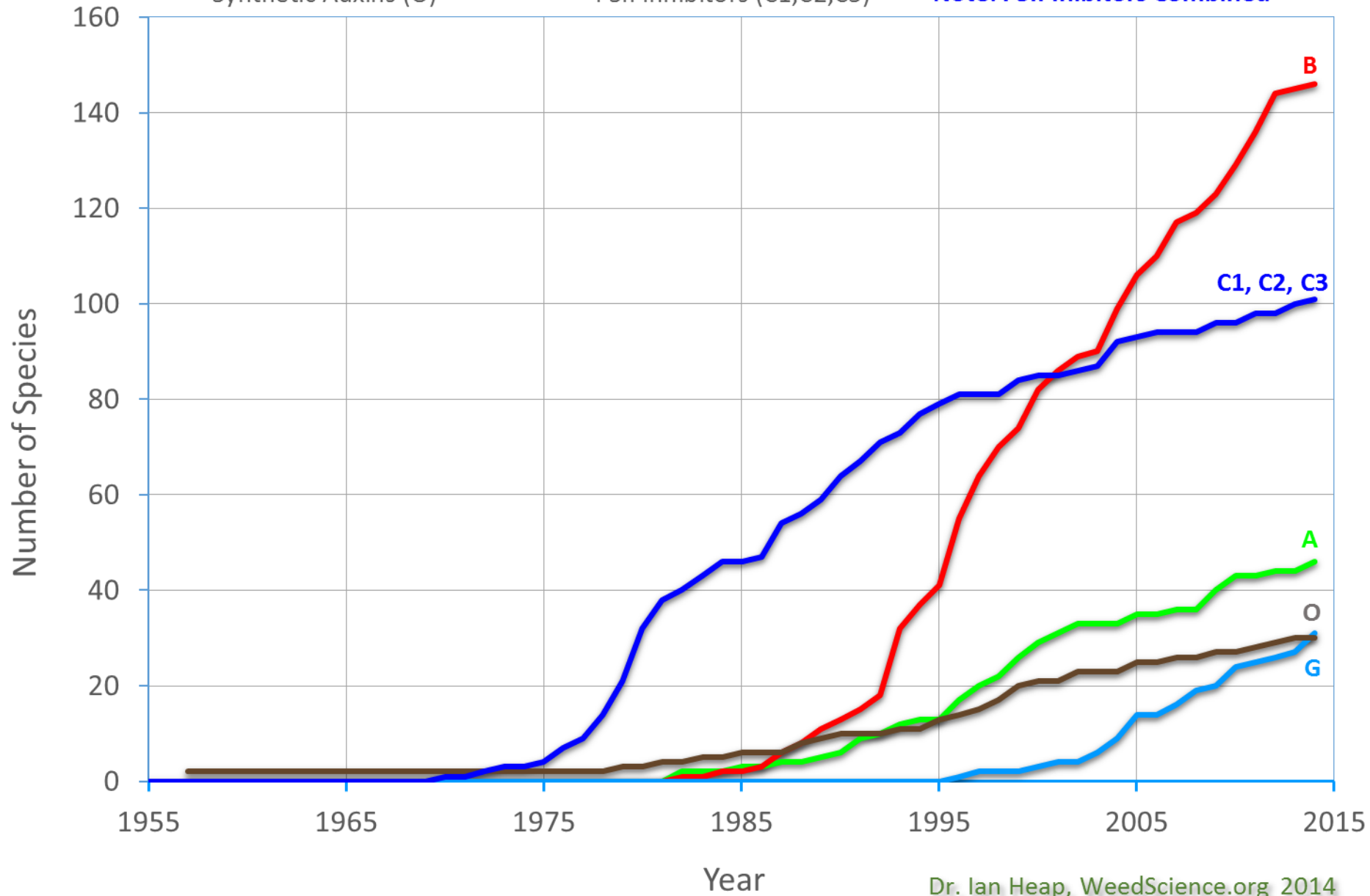


Number of Resistant Species to Individual Active Herbicides (Top 15)



Number of Resistant Species for Several Herbicide Sites of Action (HRAC Codes)

- ACCase Inhibitors (A)
- ALS Inhibitors (B)
- EPSP Synthase Inhibitors (G)
- Synthetic Auxins (O)
- PSII Inhibitors (C1,C2,C5)
- Note: PSII Inhibitors Combined**



Increase in Glyphosate-Resistant Weeds Worldwide

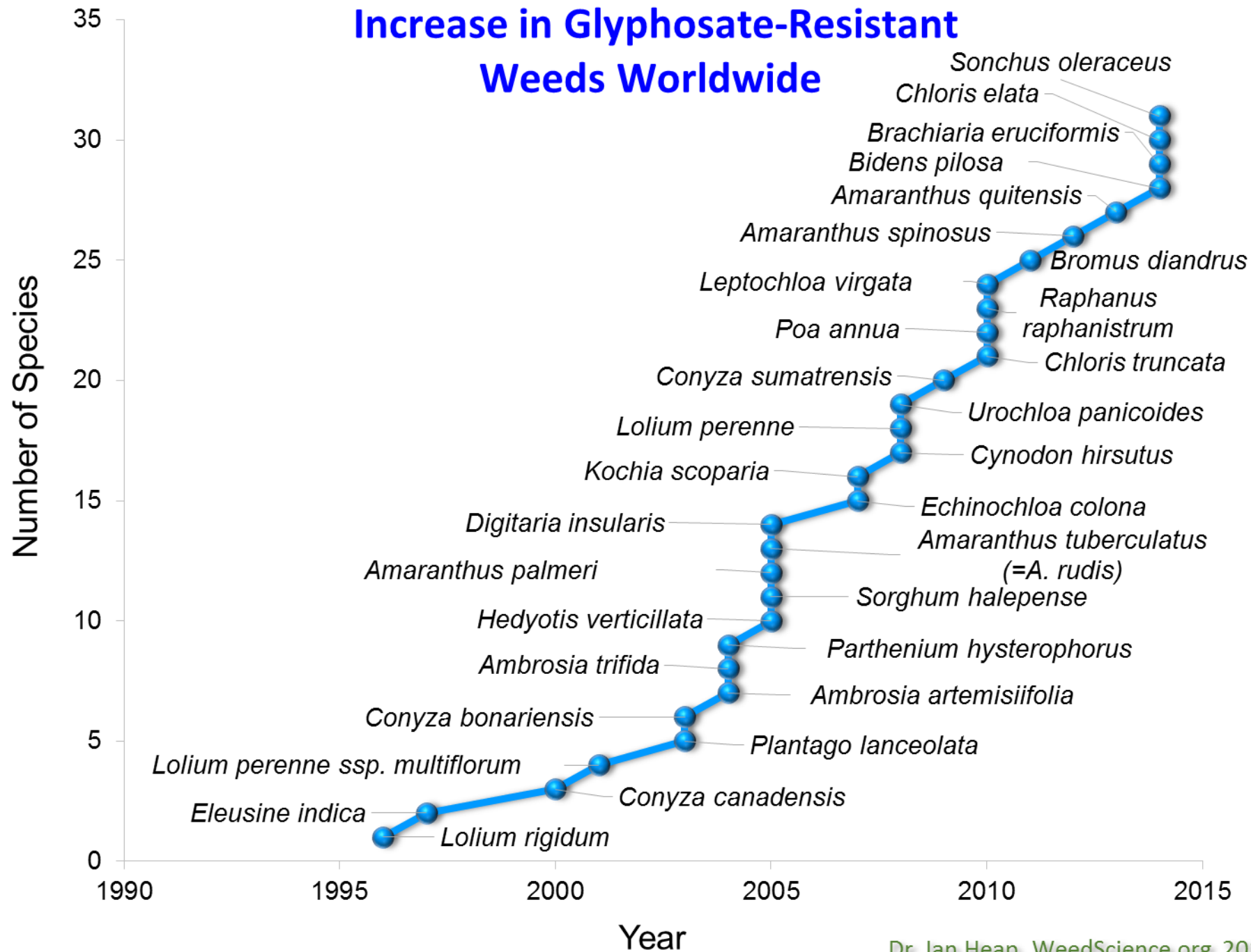
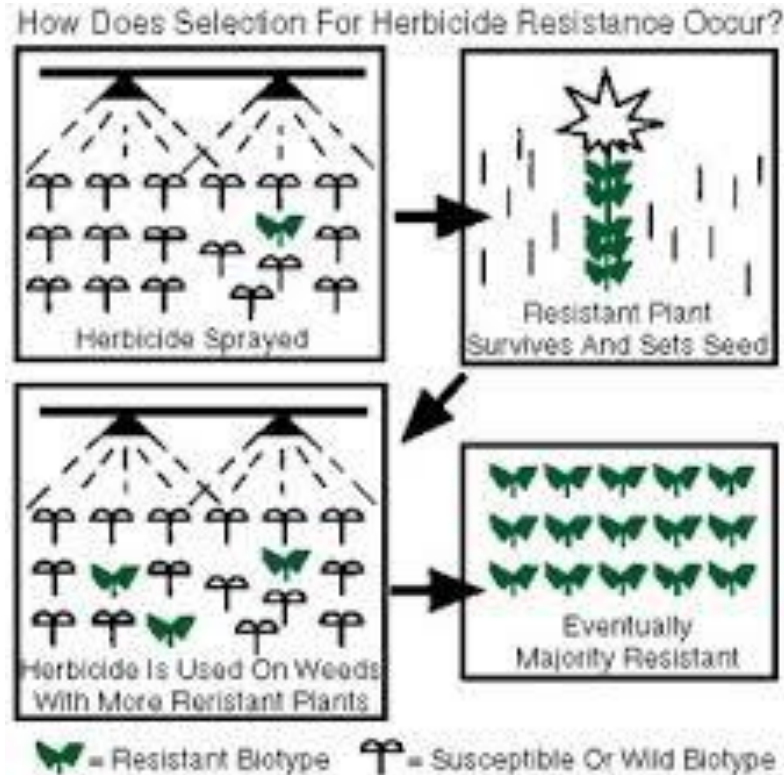


Table 1. Summary of resistant weeds by site of action (<http://www.weedscience.org>) as of February 1, 2012.

Herbicide Group	Group #	Example Herbicide	Total
ALS inhibitors	2	Resolve Q	116
Triazine	5	Atrazine	69
ACCase inhibitors	1	Fusilade	41
Synthetic Auxin	4	2,4-D	29
Bipyridilium	22	Gramoxone	25
Ureas and Amides	7	Lorox	22
Glycine	9	Roundup	21
Dinitroaniline, etc.	3	Prowl	11
Thiocarbamate, etc.	8	Eptam	8
Triazole	11	Amitrole	5
Chloroacetamide, etc.,	15	Dual II Magnum	5
PPO inhibitors	14	Sharpen	4
Nitriles and others	6	Buctril	4
Carotenoid inhibitors	12	Zorial	2
Others	-	-	10
Total Herbicide Resistant Biotypes			372

How so we get herbicide resistant weeds?



QT Roundup PM fb QT Roundup PM



DELTA FARM PRESS

Palmer pigweed attack 'like a sci fi, horror movie'

Johnny Larson, Aug 29th 2011



Hand Weeding



Hand Weeding





Photo by Charlie Burmester

Glyphosate Resistant Goosegrass



Steckel 2011



Glyphosate-Resistant Ryegrass



Steckel 2012

Why are GR weeds so important?

- 1. Widespread**
- 2. Limited options for control**
- 3. Options are less effective**
- 4. Options are more expensive**
- 5. Risk of options developing resistance**
- 6. Conservation compliance issues**

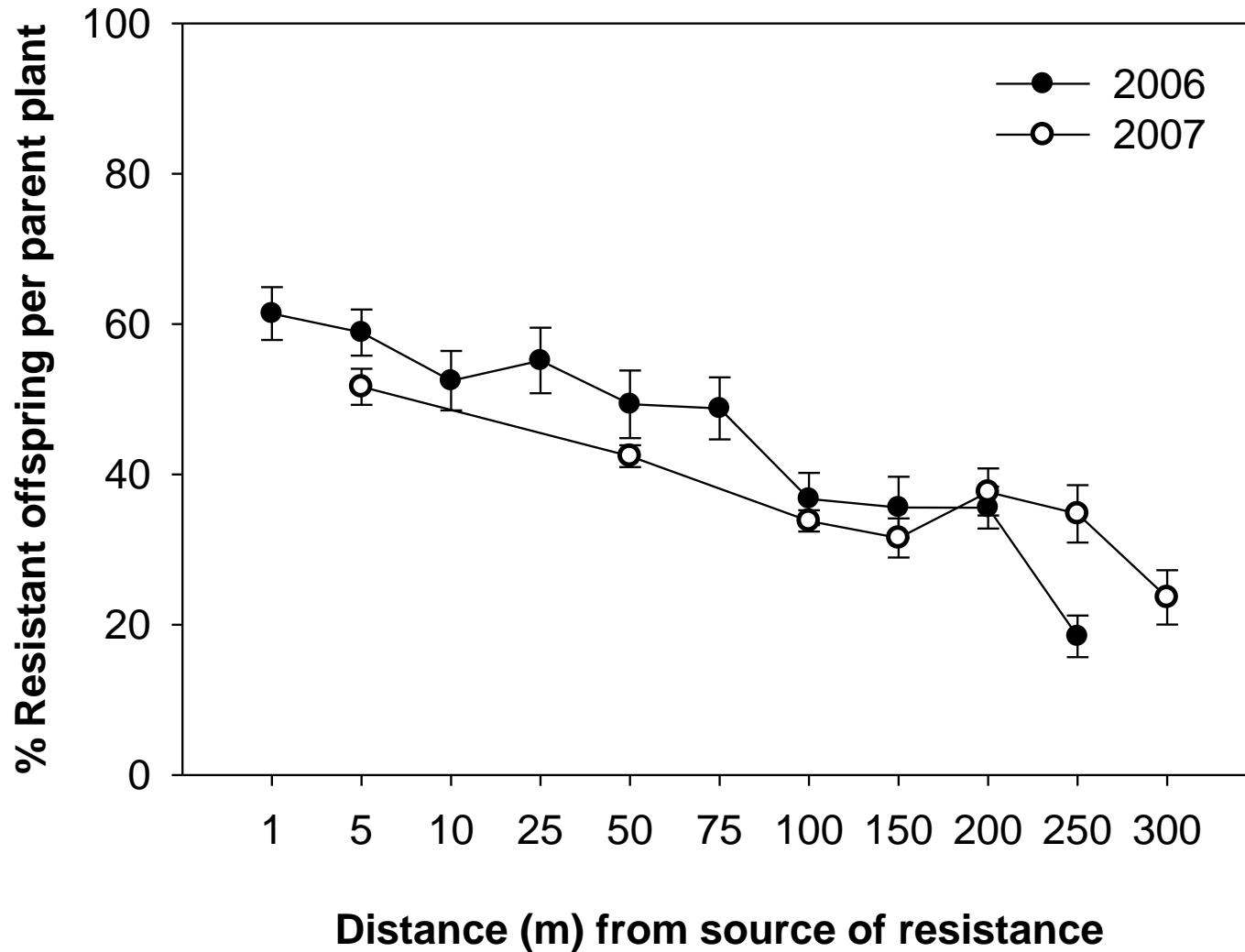
Palmer/ Ryegrass /Horseweed





**Taproot of
*A. Palmeri***

In-field pollen movement



Why is it so important for RECs?

- 1. Leader in management**
- 2. Reputation in community**
- 3. Options sometimes limited**
e.g. Atrazine RUP; carryover, etc
- 4. Increased costs**
- 5. Limit use of resources**
- 6. Impact research data**

Prevention and Early Detection are Essential!!!!



GR Weed Cost to TN Growers 2014

Increase in herbicide cost from 2006:

- **Cotton \$100 to \$120/A up from about \$60/A**
- **Soybean \$80 to \$100/A up from about \$ 30/A**
- **Corn \$60 to \$70/A up from about \$ 30/A**
- **Typical TN grower weed management cost increased 200 to 250%**

What should we do to manage it?

- 1. Increase awareness among staff**
- 2. Develop a resistance IWM plan**
 - a. Sanitation**
 - b. Rotation of MOA herbicides**
 - c. Scout and control escapes**
 - b. Prevent seed production**
 - c. Post-harvest management**
- 3. Realize short and long-term impact**

Soybeans Planted to Clean Soil on May 16



Picture Taken May 29

Liberty Application Time of Day; Morning Application; TN 2012

2 weeks after second Liberty application



1 hr before sunrise



At sunrise



1/2 hr after sunrise



1 hr after sunrise



2 hr after sunrise



4 hr after sunrise

Do you want this on your Center?



GR Palmer Amaranth Management in Soybean

Pre Emergence	<u>AND</u>	<u>AND/OR</u>
Valor products (Valor, Valor XLT, Gangster, Envive, etc.) or Dual Magnum products (Prefix, Boundary etc.) Pyroxasulfone based products (Zidua, Fierce, Anthem) Authority based products (Authority MTZ, Sonic) Recrop concerns with cotton!	16 oz Dual Magnum or 32 oz Prefix or 48 oz Warrant +/- glyphosate	Up to 3” Palmer Flexstar (mixed with glyphosate) Non Residual Options Ultra Blazer Cobra +/- glyphosate



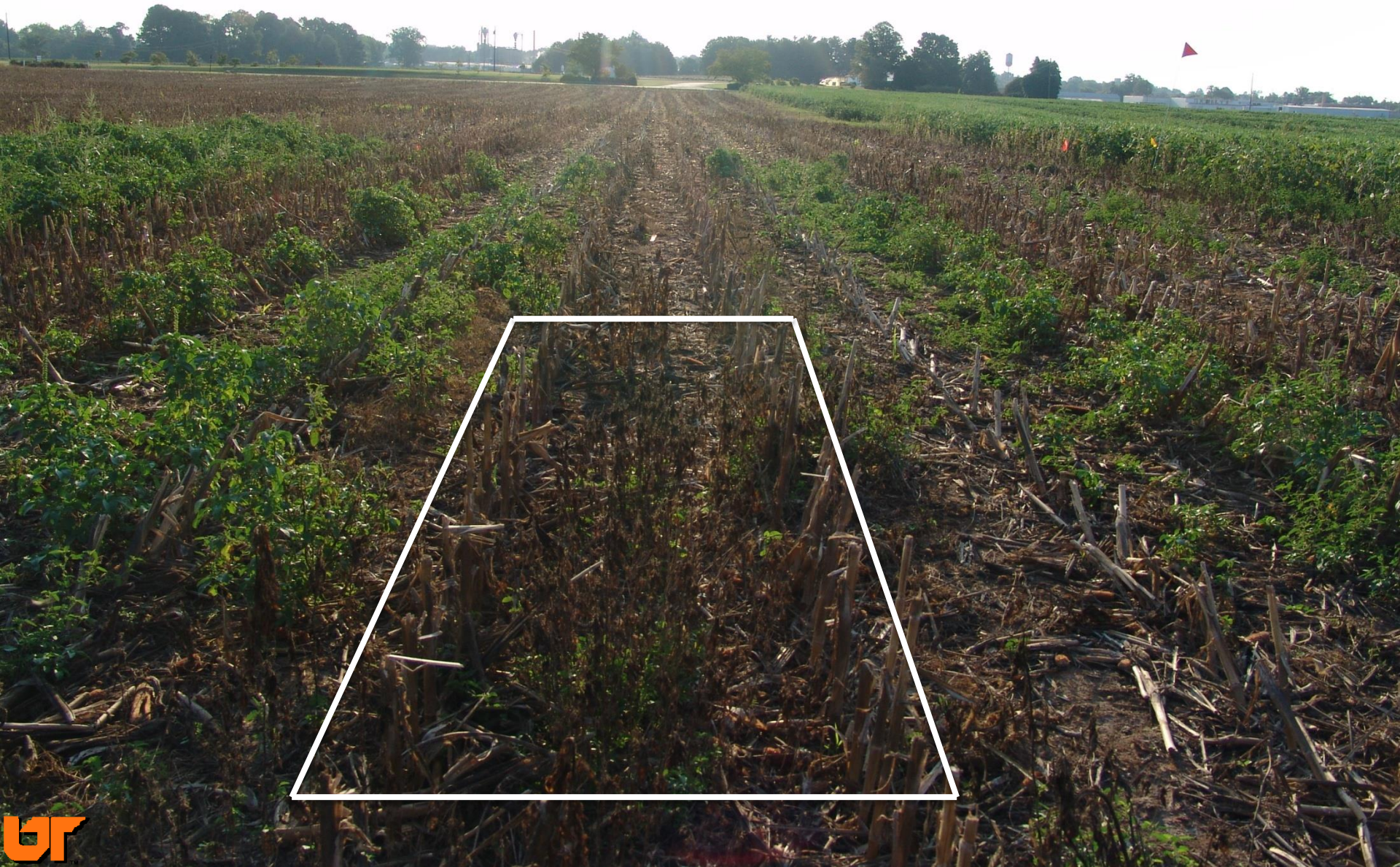




Post-harvest Palmer amaranth



paraquat



Seed Collection

- All treatments prevented seed production
- >6,000,000/A Palmer seeds produced in non-treated check

Cover Crops

A wide-angle photograph of a vast field of mature, golden-brown cover crops, possibly a grass or cereal rye. The plants are tall and dense, with long, thin blades and feathery seed heads. The field stretches to a flat horizon under a grey, overcast sky. In the far distance, a line of trees and some structures are visible. The text "Cover Crops" is overlaid in the center in a large, yellow, serif font.

Integrating Cover Crops

Positives

- Can be part of a herbicide resistance management program.
- Can greatly help on control of GR horseweed and help suppress GR Palmer amaranth.
- Could help reduce a herbicide application

Concerns

- Timing of fall sowing critical
- Could be nurse crop for GR ryegrass!

What are implications beyond weeds?

- 1. Insect Resistance Crops**
 - a. refuge requirements**
- 2. Pyrethroid insecticides**
- 3. Strobilurin fungicides**
 - a. frog-eye leafspot**
- 4. Soybean cyst nematodes**
- 5. What works today may not work tomorrow**

Thank You



Questions?

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