

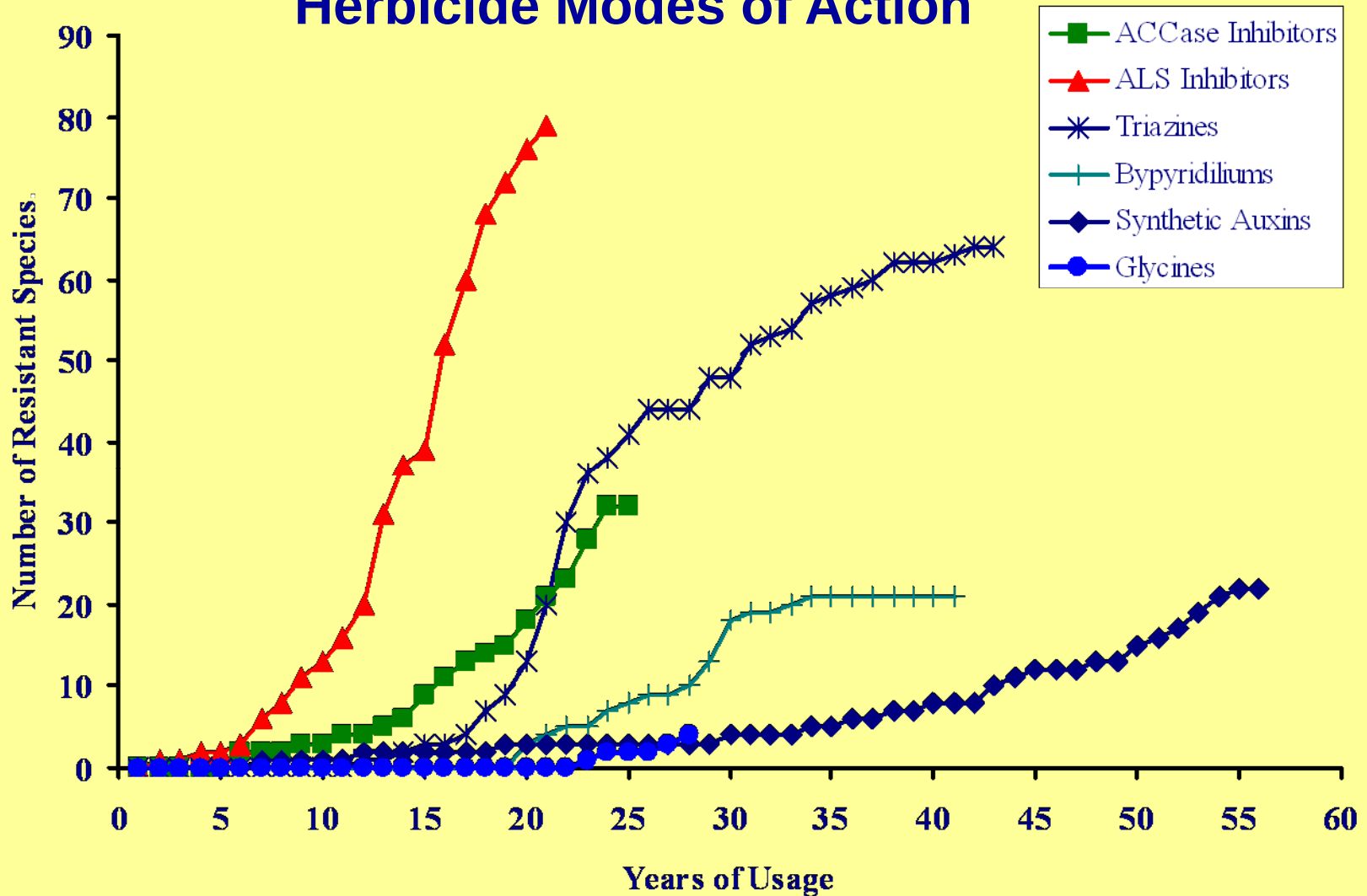
Glyphosate Resistant Weeds

August 2009 Update

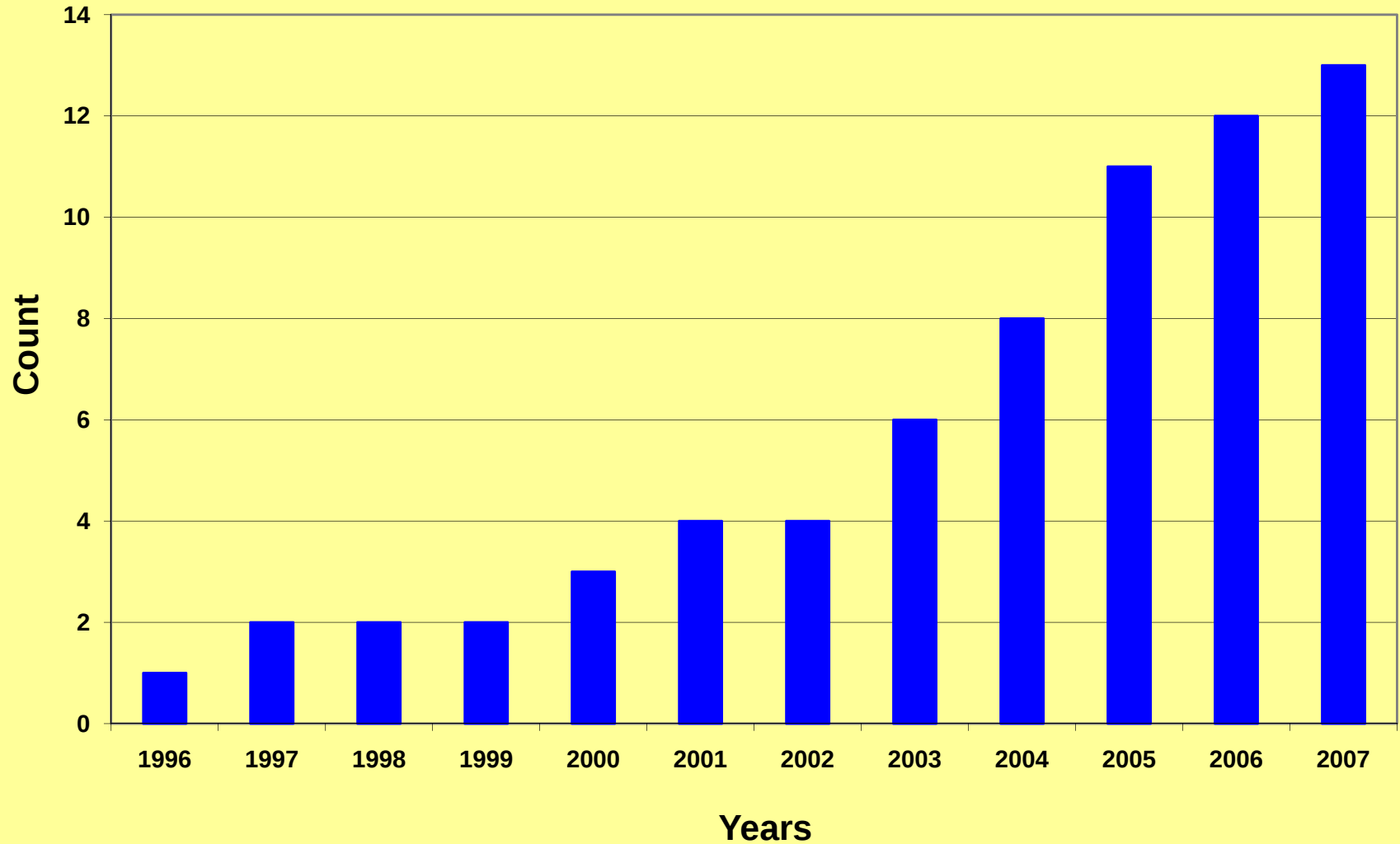
R. L. Nichols



Cumulative Summary of Weed Species Resistant to Herbicide Modes of Action



Number of Glyphosate-Resistant Species



Numbers of Glyphosate Weed Species by Continent

North America – 9

South America – 6

Europe – 4

Africa – 3

Australia – 3

Asia – 1

Number of Glyphosate-Resistant Species by Plant Family

Graminaceae – 9

Compositae – 4

Amaranthaceae – 2

Plantaginaceae – 1

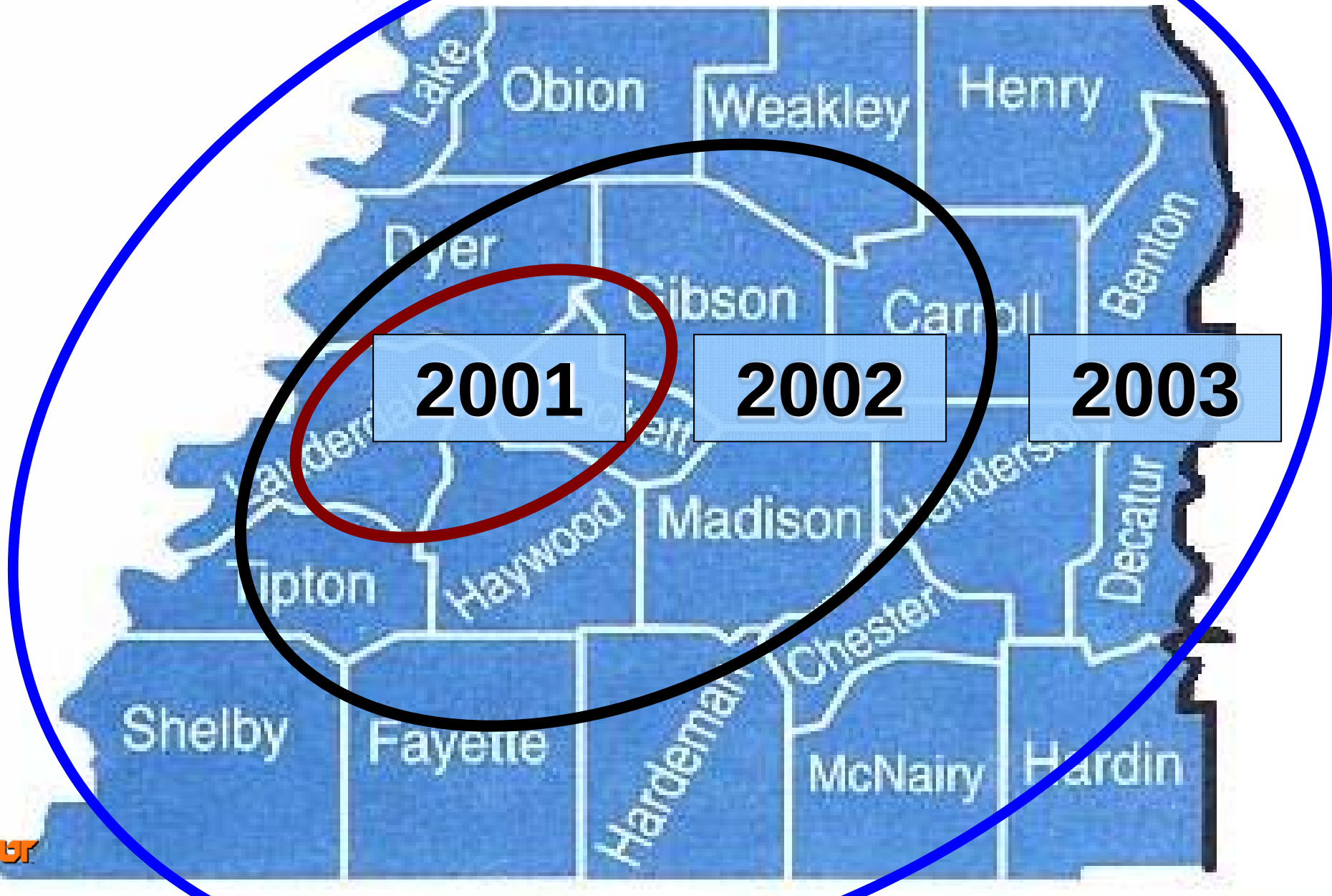
Euphorbiaceae – 1

Glyphosate Resistant Weeds in U.S. Cotton

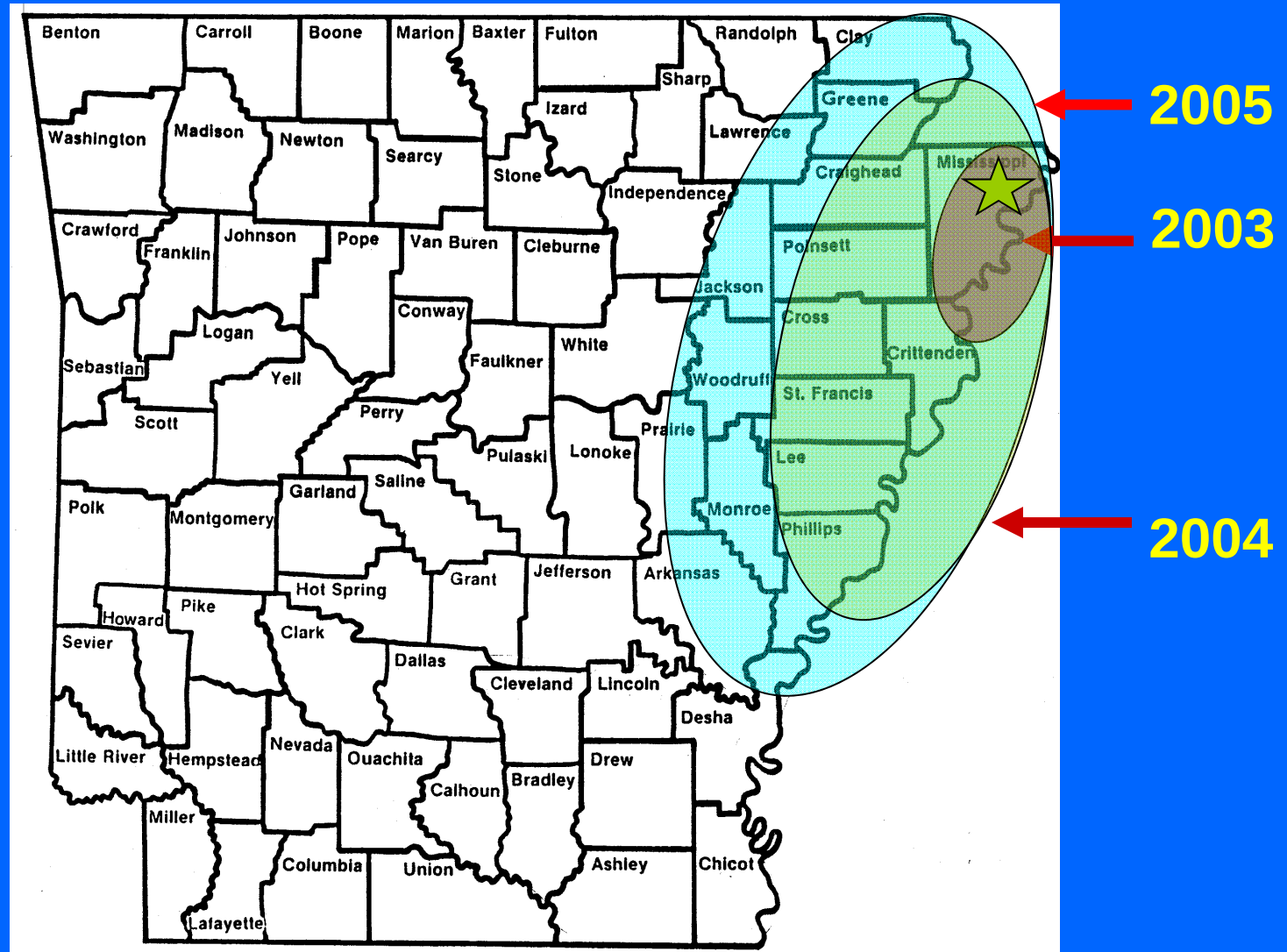
- Horseweed – 2000 (DE)
- Palmer amaranth – 2004 (GA)
- Giant Ragweed – 2005 (AR)
- Water Hemp – 2005 (MO)
- Ryegrass – 2005 (MS)
- Johnsongrass – 2007 (AR)



West Tennessee



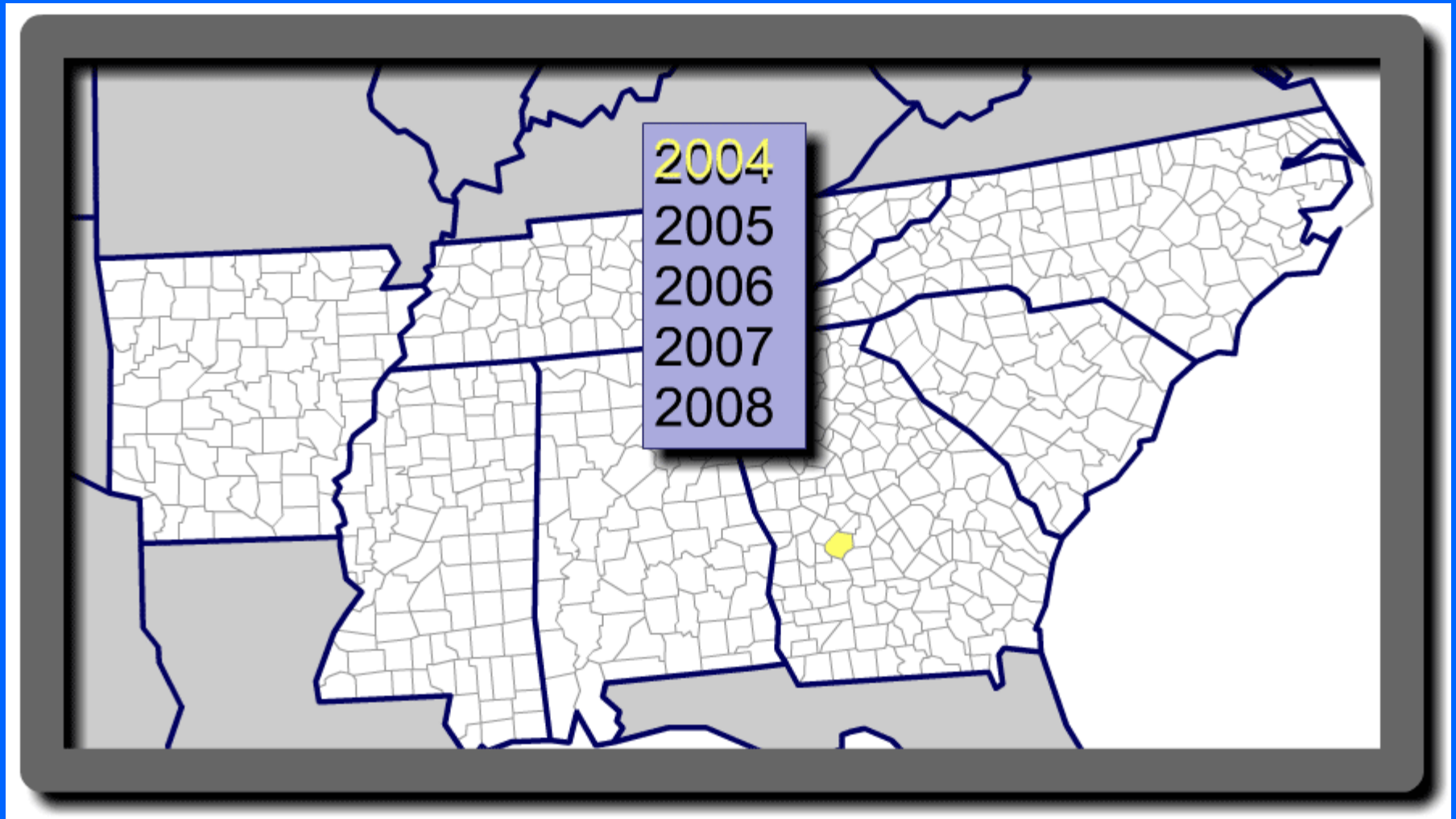
Glyphosate Resistant Horseweed



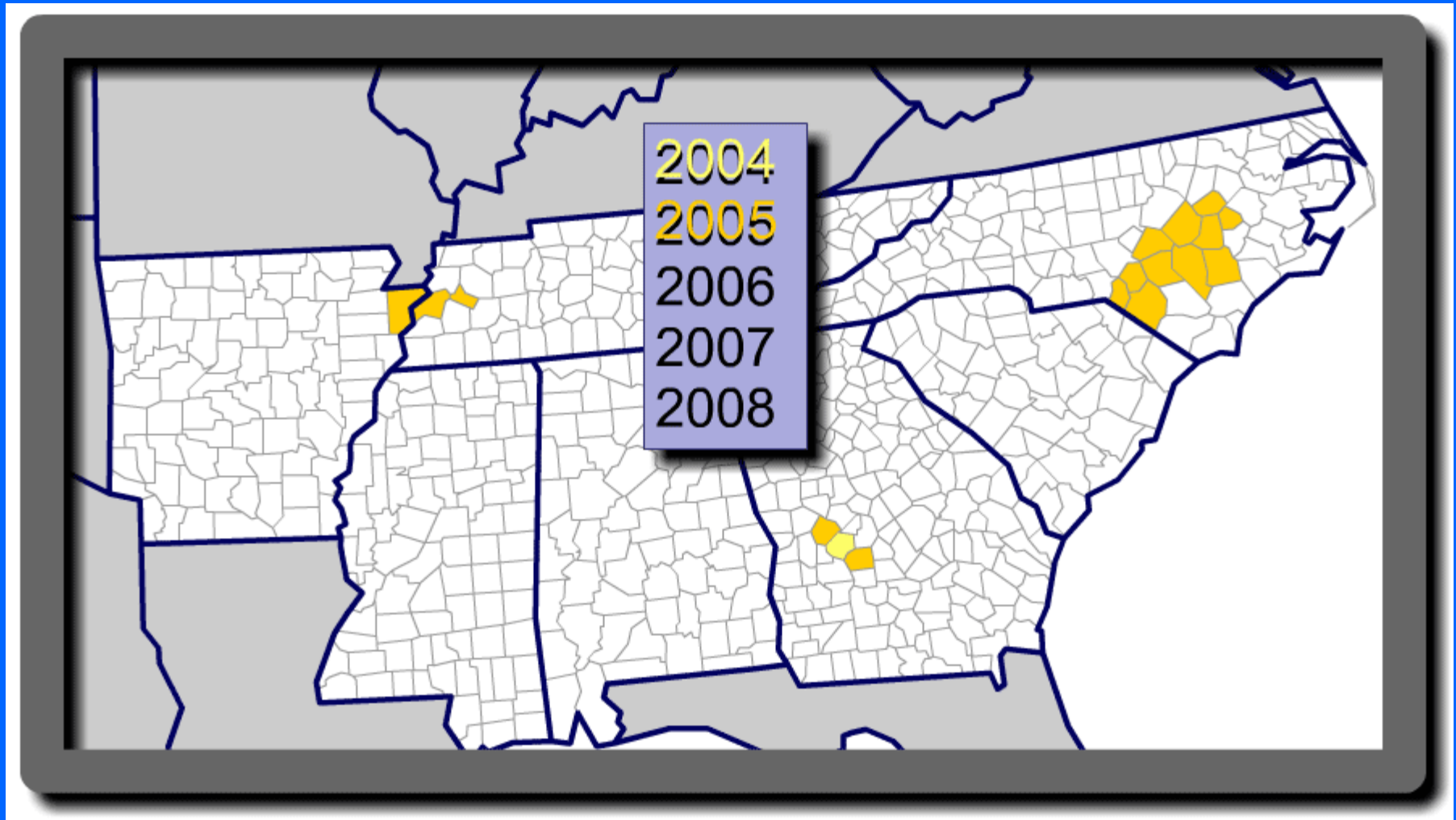
Palmer Amaranth



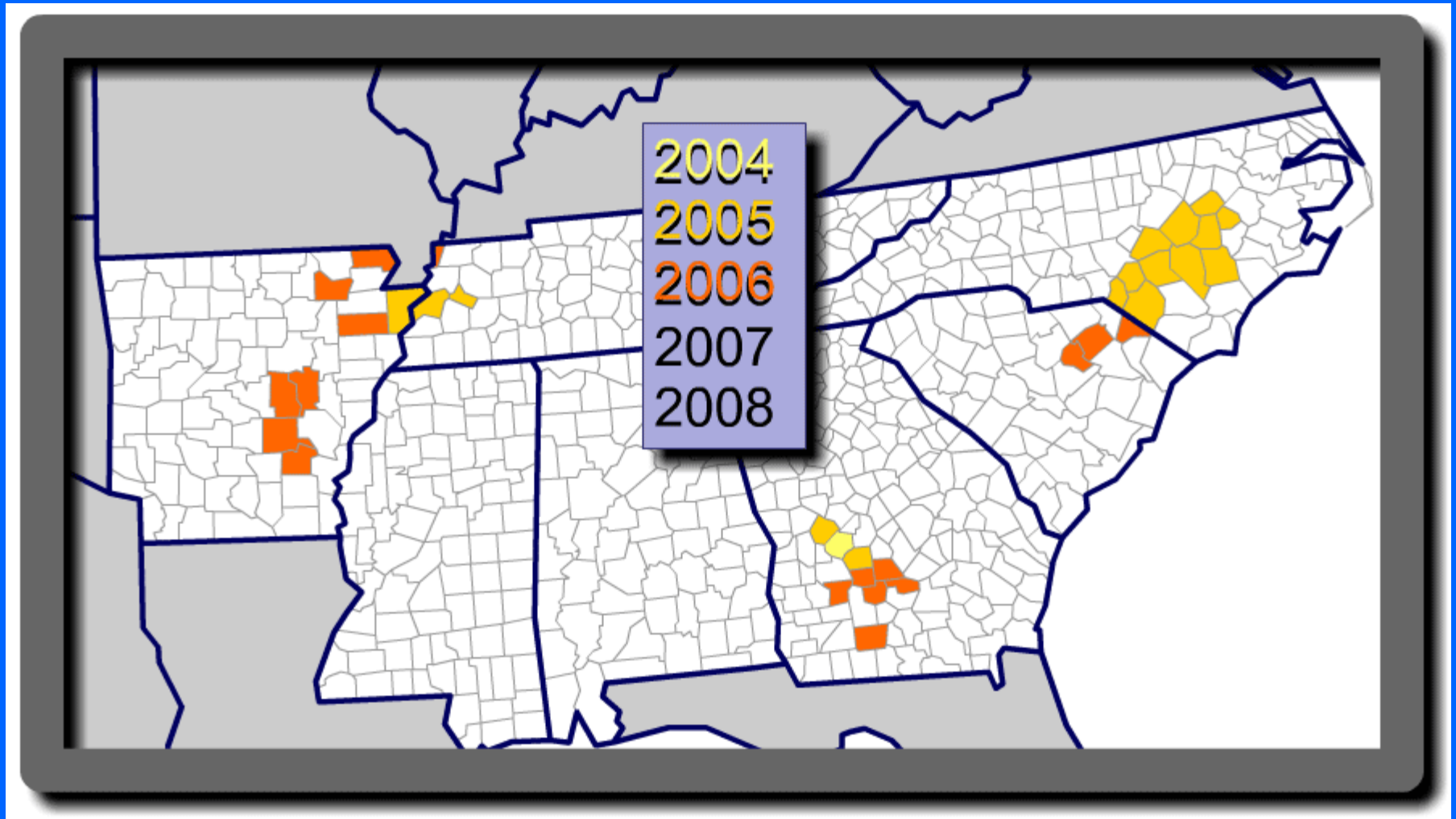
Counties Affected by Glyphosate-Resistant Palmer Amaranth – 2004



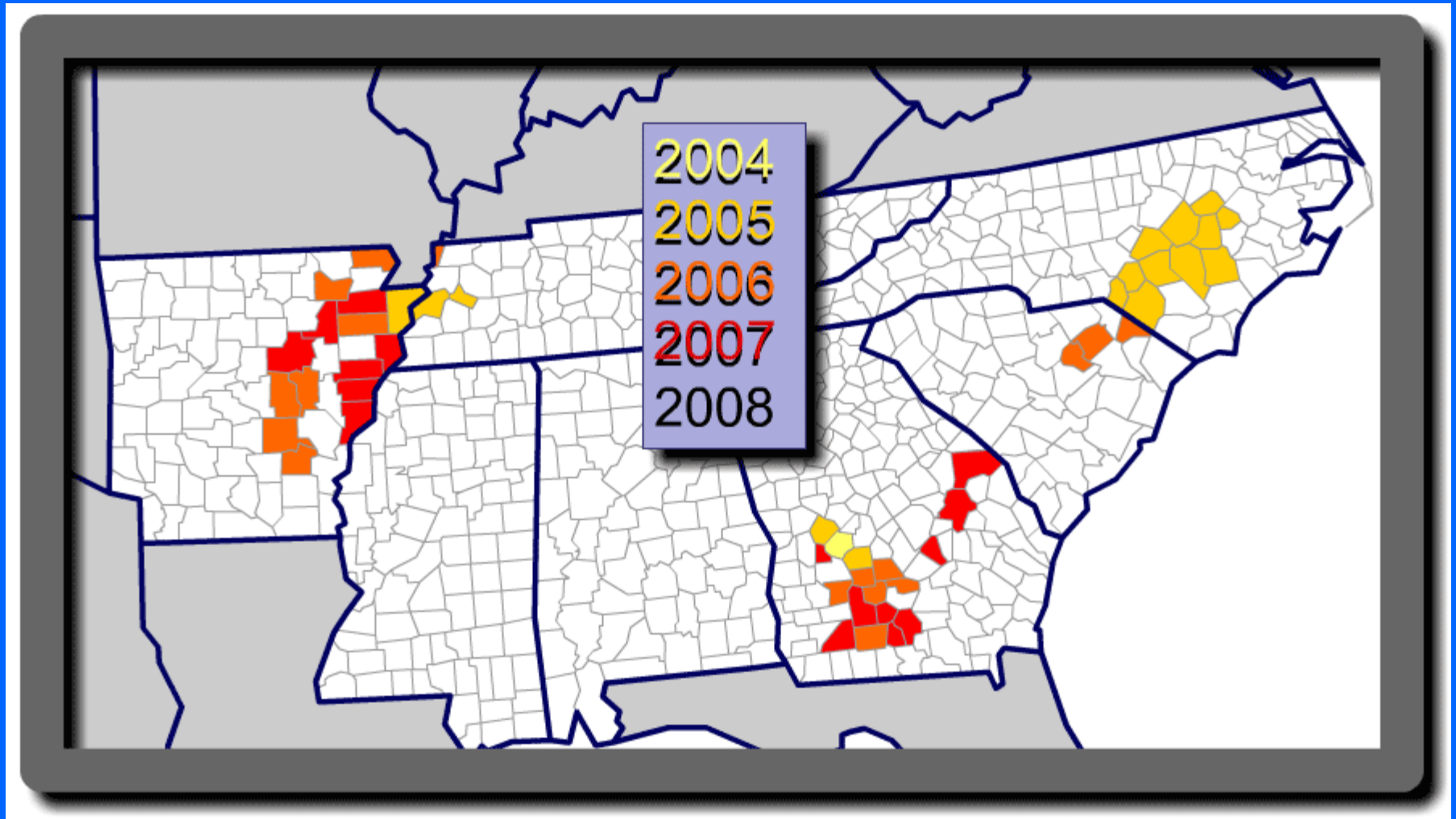
Counties Affected by Glyphosate-Resistant Palmer Amaranth – 2005



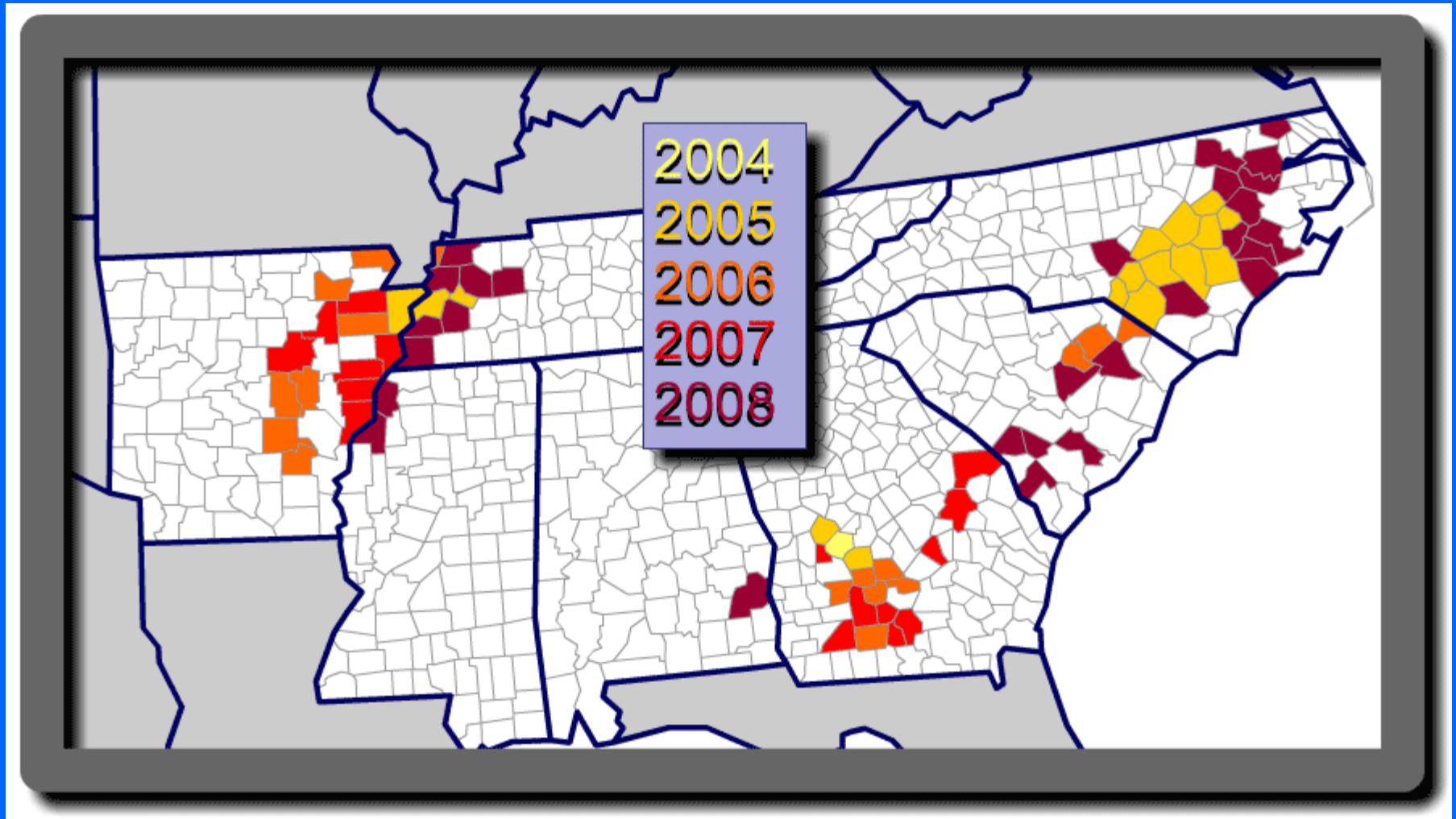
Counties Affected by Glyphosate-Resistant Palmer Amaranth – 2006



Counties Affected by Glyphosate-Resistant Palmer Amaranth – 2007



Counties Affected by Glyphosate-Resistant Palmer Amaranth – 2008



Distribution of Glyphosate Resistant Weeds in U.S. Cotton

Horseweed – Widespread, AR, TN, NC

Waterhemp – East TX

Palmer amaranth – Southeast & Mid-South

Ryegrass – Delta

Giant Ragweed – West TN

Johnsongrass – suspected in Delta

Economic Losses

First year is usually worst,
if occurrence is not expected

Subsequent years, increased weed
management costs

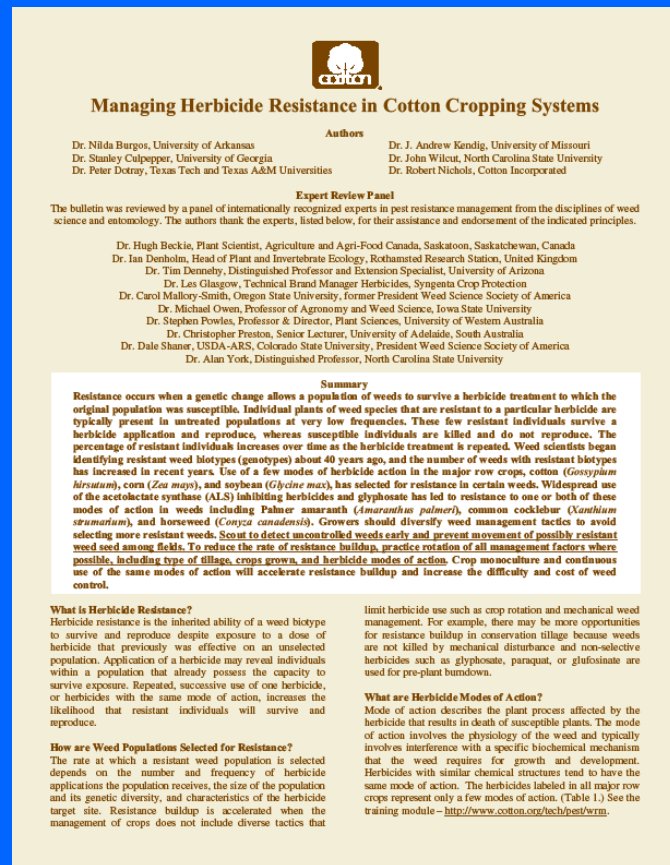
Can force change in cultural practices

Why Don't We Practice Resistance Management?

- The Usual Problem:
- Costs of Post-Resistance Management Remain Unknown, until Resistance Develops
- Therefore, Additional Current Costs are Rejected, and the Risks of Unknown Future Costs are Accepted

- The New Problem:
- We Do Not Have the Next Mode of Action
- A New Mode of Action, if Discovered Today, Would Probably Not be Registered in the U.S. for 7-10 Years

Weed Resistance Management



- Guidelines to Scout for Resistant Weeds
- Principles of Resistance Management
- Herbicide Recommendations for Cotton, Soybean, and Corn