EPA's current role and planned efforts to contribute to pesticide resistance management in agriculture

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EPA Objectives Regarding Resistance Management

- To reduce pesticide resistance
  - Results in more effective long-term pest control strategies
  - Reduces unnecessary or ineffective pesticide applications .
- To develop more effective resistance management strategies
  - Lengthens the useful life of existing registered pesticides
  - Reduces costs to farmers.

Heightened Interest in Pest Resistance

- There are many examples of significant resistance problems (mainly agriculture)
  - Palmer amaranth, diamondback moth, powdery mildew, and many more…
- Few new herbicides or insecticides with new modes of action (MOA) being registered
  - Relatively new pesticides with new MOA already showing resistance problems

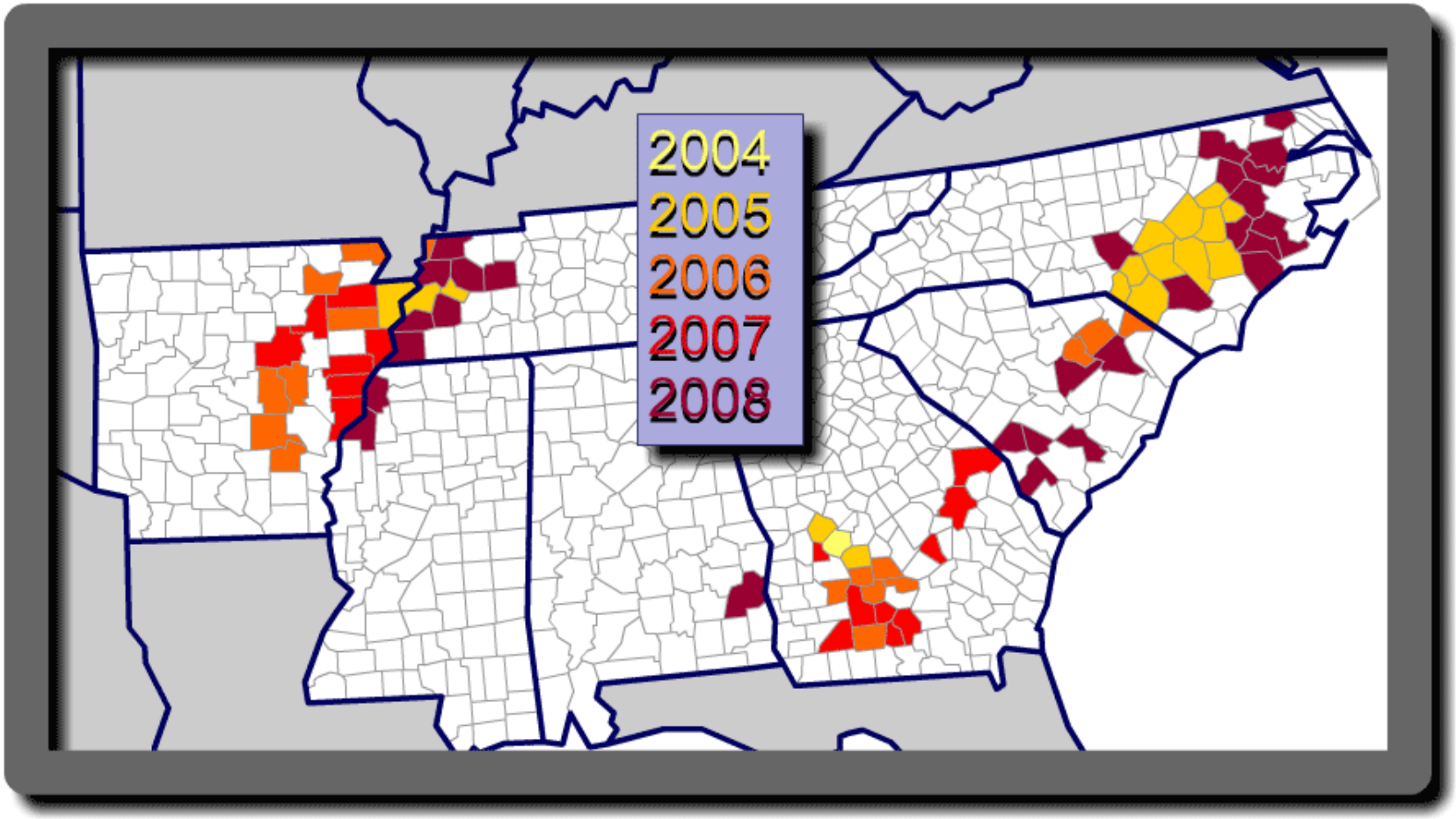
Heightened Interest in Pest Resistance (continued)

- Growing public concern and economic significance
- Resistance is considered an adverse effect and reportable under FIFRA Section 6(a)(2)
- There is wide interest in maintaining viability of registered products.

Role of EPA

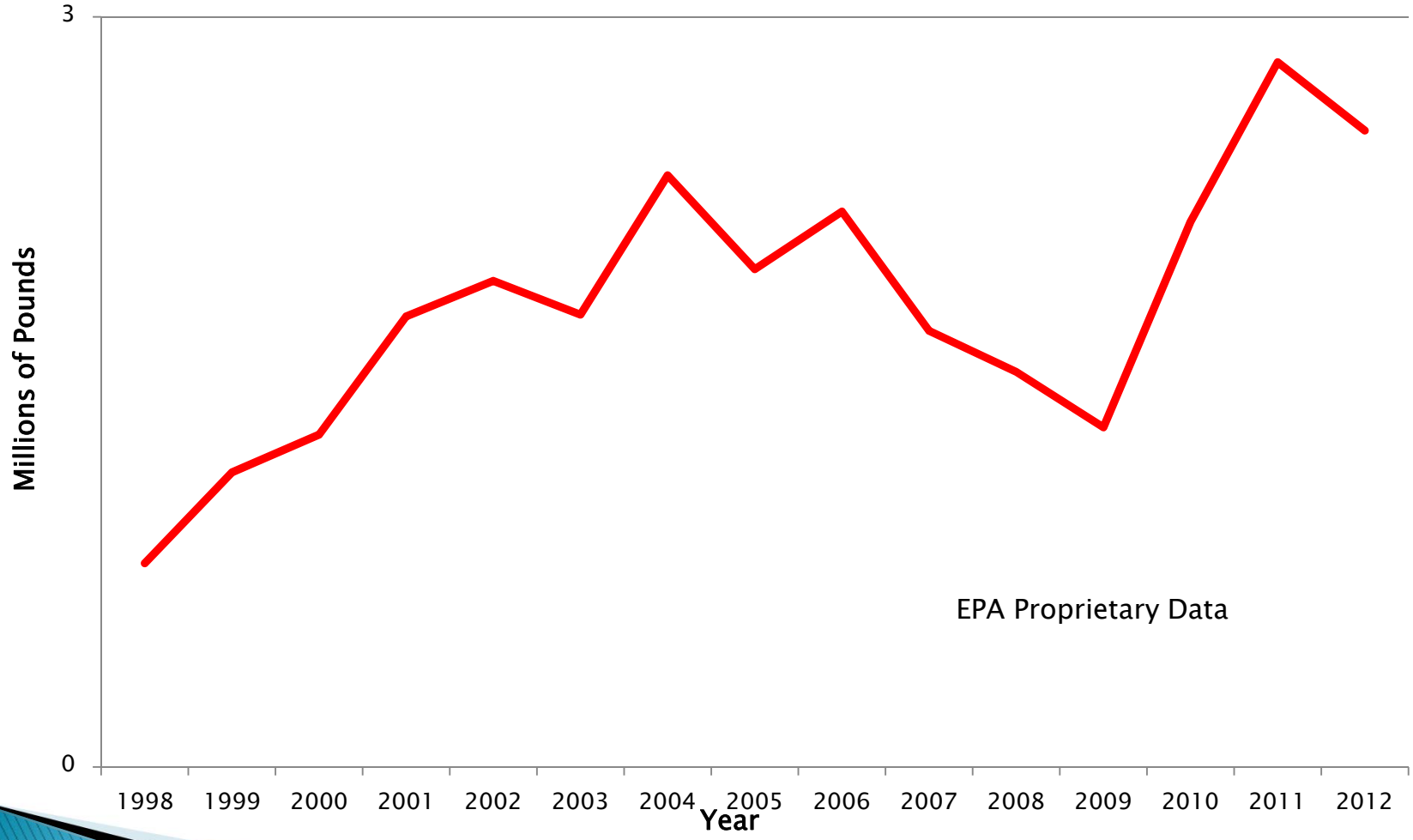
- Provides voluntary guidance to registrants on resistance management language to include on labels (currently in Pesticide Registration Notice 2001-5)
  - Include Mode of Action (MOA) and generic resistance management language on label
- Considers resistance management when evaluating pesticide benefits in various regulatory actions (e.g., Section 18 emergency exemptions, public interest findings for regulatory decisions)
- Work with other federal agencies and states to identify pesticide use patterns vulnerable to resistance problems

Glyphosate-Resistant Palmer Amaranth Dominates Southeastern Coastal Plain and North Delta

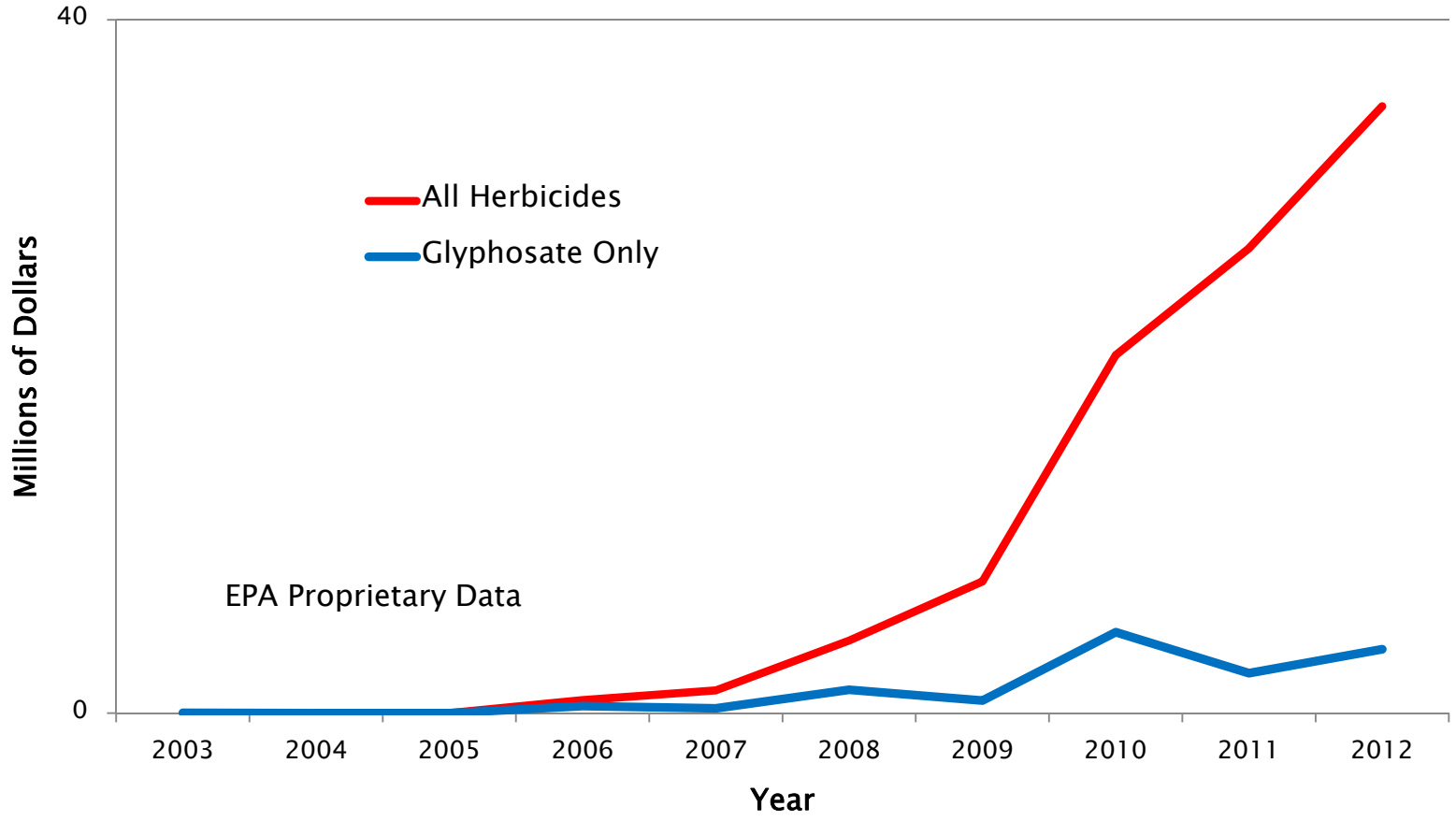


Nichols, Balkcom, Culpepper, Marshall, Monks, Patterson, Price, Steckel. 2010. Meeting the Challenge of Glyphosate-Resistant Palmer Amaranth in Conservation Tillage

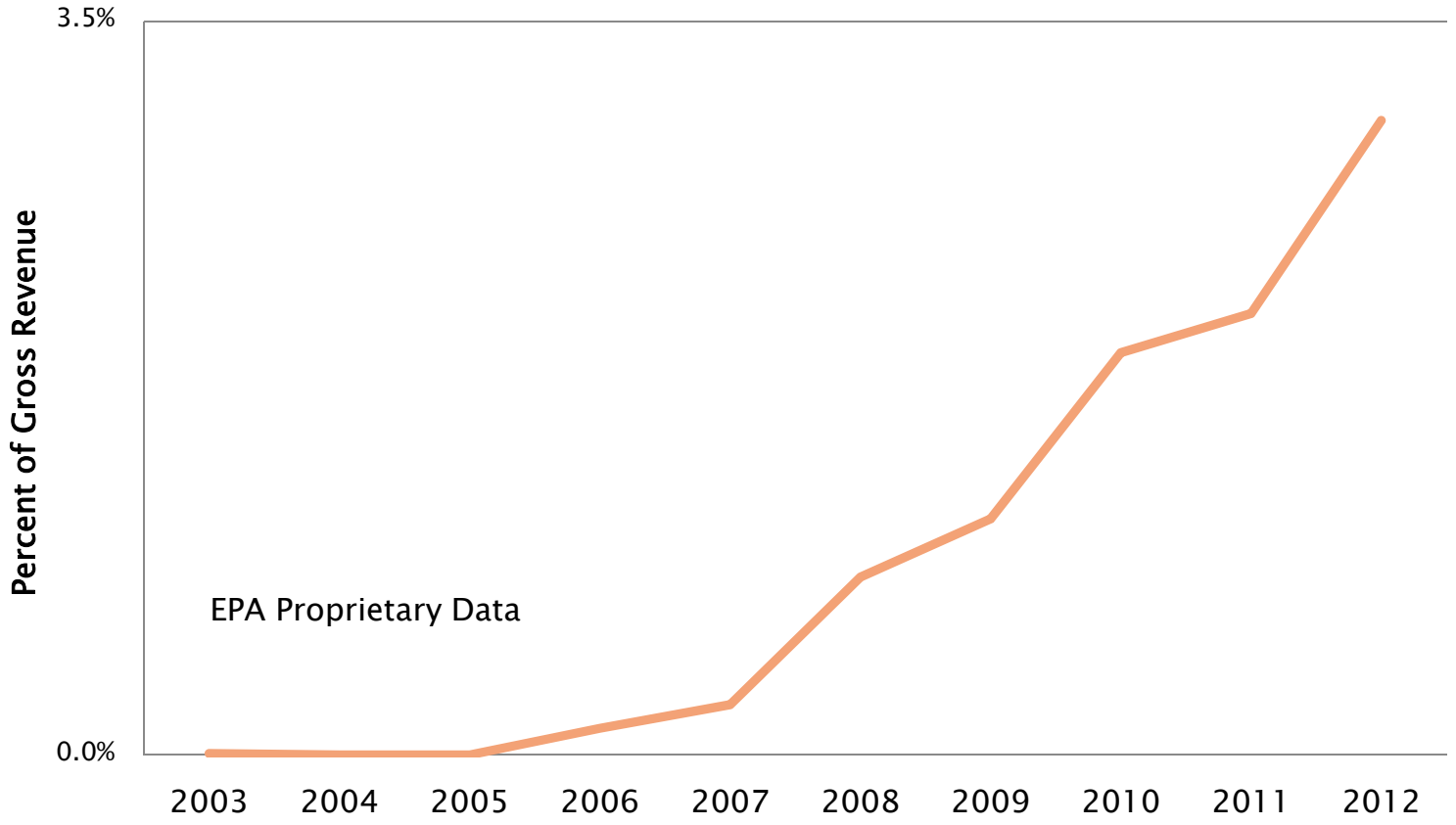
Glyphosate Use on Cotton in Georgia, Pounds AI: 1998-2012



Herbicide Expenditures to Control Palmer Amaranth in GA Cotton



Share of Gross Revenue Expenditures on Palmer amaranth Control



EPA's Approaches to Resistance Management

- Agency-approved labels are an important tool, but resistance management labeling is voluntary for conventional pesticides.
- EPA needs to continue to work with societies, registrants, growers and grower groups, researchers, educators, other federal agencies, and the general public to expand awareness and to promote the adoption of resistance management practices.

Pesticide Labels – A Key Factor in Resistance Management

- Pesticide product labels provide important information on how to safely handle and use pesticide products.
- Many labels still lack Mode of Action (MOA) and resistance management information.
- EPA believes that compliance with voluntary resistance management labeling on U.S. products can be improved.
  - In Canada, nearly all labels contain the MOA designation
- Improving labels is a major focus of EPA activities in resistance management

A Role in Resistance Management is Considered a Benefit for a Pesticide

- Registration – Resistance management is a factor for a:
  - Public Interest Findings in some regulatory decisions
  - Extension of Exclusive Use of data (a role in resistance management may help a company keep exclusive use of data for up to 3 additional years for minor uses)
- Pesticide Re-Evaluation (Registration Review)
  - Resistance problems or potential for use in resistance management are considered during re-evaluation
- *Bt* Plant-Incorporated Protectants (PIPs)
  - EPA places a high value on preserving the significant agricultural and environmental benefits of *Bt* PIPs
  - EPA requires an Insect Resistance Management (IRM) plan for each registered *Bt* crop.

EPA Resistance Management Workgroup Activities

- Developing update to Pesticide Registration Notice 2001-5 on resistance management labeling
- Considering resistance management webpages to present information to stakeholders
- Discussed efforts with USDA–APHIS & USDA's Office of Pest Management Policy (OPMP) to encourage education and outreach
- Collaborating with Resistance Action Committees (RACs), which provided
  - Lists of key resistant pests
  - Best Management Practices for resistance management

OPP RM Workgroup Activities (continued)

- Collaborating with experts in professional societies such as American Phytopathological Society (APS), Entomological Society of America, Weed Science Society of America (WSSA); activities included:
  - APS and WSSA resistance symposia, WSSA Summit on Resistant Weeds
  - Resistance definitions comparing terminology used by plant pathologists, entomologists, and weed scientists
  - WSSA has distributed generic training modules on resistance management
- Recently began interaction with:
  - Crop Consultant organizations
  - North Central Agriculture and Natural Resource (ANR) Extension leaders

Herbicide Resistance
Best Management Plan for Growers

- Prepared by the Herbicide Resistance Action Committee (HRAC) in association with the WSSA leadership team and CropLife America's Regulatory Committee
- Most elements go beyond the use of an herbicide
- 18 elements to the plan
  - Develop a diversified weed management program, plant into weed free fields, prevent weed seed production, etc.
- Only 3 elements talk about herbicides
  - Use multiple MOA for resistant prone weeds
  - Apply at correct rate and timing
  - Record weed size to ensure proper application timing

Herbicide Tolerant Crops

- Herbicide tolerant crops have raised concerns
  - Glyphosate resistant weeds are becoming widespread
  - Corn , cotton, and soybean lines are being developed with multiple herbicide resistance genes
- EPA discusses resistance management with the pesticide registrant as they come in with these new herbicide tolerant crops
  - This would provide long terms benefits to the environment, growers, and registrants

Can We Improve Ongoing Efforts

- Continue to promote active cooperation among all groups interested in resistance management
- Continue to actively promote resistance management as part of pesticide stewardship for fungicides, herbicides, and insecticides
- Enhance collaboration among the WSSA, APS and ESA in resistance management
  - EPA can promote this through working with liaisons from WSSA, ESA & APS
- Promote the placement of MOA on all labels
- Promote resistance management on proposed labels that target pests with resistance problems
- Work with states that apply for Section 18 emergency exemptions for resistant pests

Can We Improve Ongoing Efforts (continued)

- Education
  - Continue to emphasize resistance management as a priority in existing educational programs
  - Develop resistance training modules (e.g., WSSA)
- Encourage land-owners to promote proactive resistance management (many growers lease land and have limited control of cropping patterns that can help manage resistance)
- Share your ideas openly with all who are interested in this very important area
  - If you have ideas on how EPA can improve its work in resistance management (or anything else) let us know.

For More Information on EPA and Pesticides….

http://www.epa.gov/pesticides/