

Developing An Herbicide-Resistant Weed Management Plan

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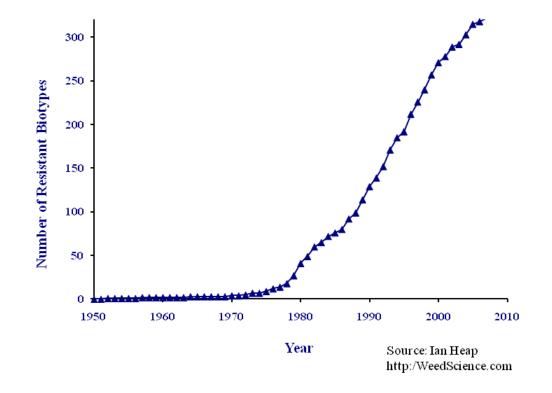
The university of georgia College of Agricultural \mathcal{E} Environmental Sciences

Evolution of Herbicide Resistant Weeds



- Repeated applications of herbicides with same site of action (i.e. selection pressure)
- n Annual weeds that.....
 - q occur in high populations
 - q are widely distributed
 - q are prolific seed producers
 - have efficient gene (seed or pollen) dissemination

Herbicide-resistance is not a new phenomenon! *Its been happening since 1968!*



Source: International Survey of Herbicide Resistant Weeds (http://www.weedscience.org/In.asp)

Hindrances to Resistance Management

- n Economics
- n Reluctance to Change
- n Denial
- Belief that chemical companies will develop "new" products



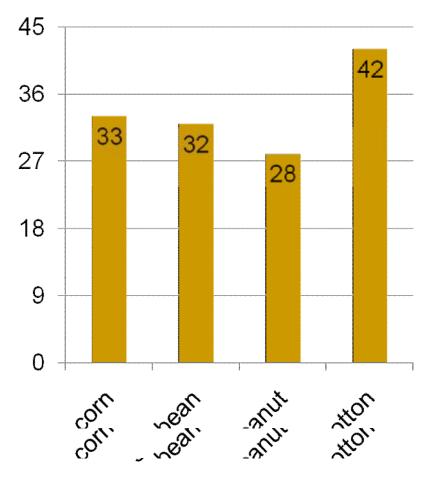
Herbicide Resistant Weed Management Plan

- 1. Other Control Tactics
- 2. Know Modes of Action
- 3. Rotating MOA
- 4. Tank-mixtures
- 5. Residuals
- 6. Escape Rogueing
- 7. Post-harvest
- 8. Future Resistance Concerns



Crop Rotation

Yield Loss (%) from 1 AMAPA/row meter





Tillage and/or Cultivation





Tillage and Pigweed



Bottom Plow

Chisel Plow

Source: Twiggs Co., April 22, 2010

Extreme Cover Crops









Row Spacing



Irrigation





Modes of Action



HERBICIDE BRAND NAMES, ACTIVE INGREDIENTS, CHEMICAL FAMILIES, AND MODES OF ACTION

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A long-term resistance plan?

Crop	PPI/PRE	POST1	POST2	MOA's
Peanut (No ALS)	DNA + Valor	Cadre	2,4-DB	4
Peanut (ALS)	DNA	Paraquat Basagran + Dual	Ultra Blazer + Dual	5
RR-Cotton	Reflex	Glyphosate + Staple	Direx + MSMA	5
RR-corn	Micro- Tech	Glyphosate + atrazine		3
RR- soybean	Boundary	Glyphosate + FirstRate		4
LL- soybean	Dual Magnum	Ignite + Reflex		3

Tank Mixtures/Pre-Mixtures







- n For herbicide mixtures to be the most effective in delaying the evolution of herbicide resistance they must have (ideally)
 - q Different sites of action
 - q Similar efficacy and persistence
 - qDifferent propensities for
selecting for resistance
 - n ALS/ACCase high
 - n Auxins/GS low

Residual Herbicides

Dual Magnum @ 1 pt/A (16 DAT)

- n Key to future survival
- Should be used on every acre!!!
- n 1 may not be enough!



Non-Selective Applicators



Hand-Weeding





Post-Harvest Pigweed Problems





- Decreasing daylight hastens
 flower and seed production
 - q Flowering (3-4 weeks)
 - q Seed production (2-3 weeks)
 - q Some germination at 41°F (8%)
- n Control Options
 - q *Mowing*
 - ₉ Tillage
 - q Herbicides
 - n Gramoxone + 2,4-D or dicamba
 - n Residuals i.e. Dual Magnum?
- When can we stop worrying about seed production?

Keeley et al. 1987. Weed Science 35:199-204 Steckel et al., 2004. Weed Science 52:217-221

PPO Herbicides





- Resistance has already been reported in other areas!!!
- Amaranthus quitensis – 2005 (Bolivia)
- Common waterhemp
 - 2001 (Kansas)
 - 2002 (Illinois)
 - 2005 (Missouri)
 - 2009 (Iowa)
- Common ragweed
 - 2005 (Delaware)
 - 2006 (Ohio)
- <u>Wild poinsettia</u> – 2004 (Brazil)

Is this already happening?

Crop	PPLNT	PRE	POST or PDIR	Harvest Aid
Soybean	Valor	Reflex	Cobra	Aim
Cotton	Valor	Reflex	Valor	Aim/ET
Corn	Valor	Sharpen	ET	Aim
Peanut	Valor	Valor	Ultra Blazer	Aim

In a 4 year rotation, we could use 16 PPO's!!!!

Ignite and LL Crops

Abuse of Ignite

- LL cotton, corn, soybeans
- may jeopardize future technologies (DHT, Dicamba)
- Current resistances
 - Italian ryegrass (Oregon)
 - Goosegrass (Malaysia)







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Questions?



www.gaweed.com