

Weed Topics...

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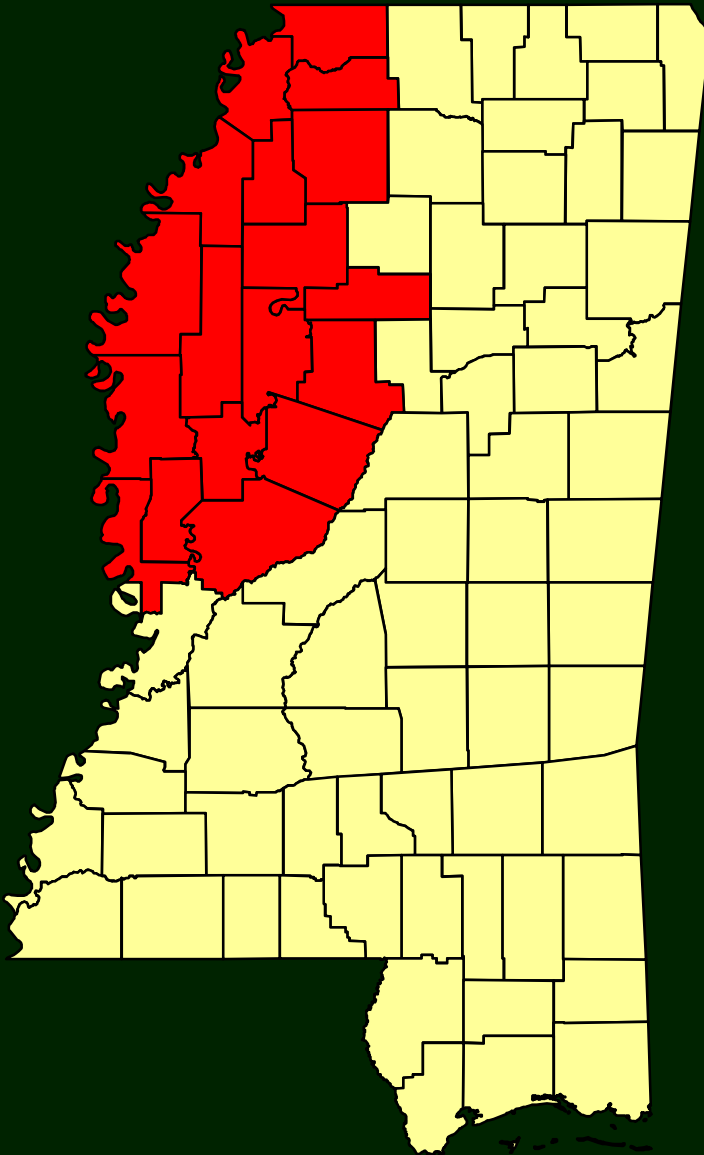


Topics for Discussion

- Herbicide resistance
- Herbicide mode of action
- Soil seedbank
- Outcrossing
- Advantages of residual herbicide activity



Rice Production in MS



- 2001 to 2011:
 - Harvested acres = 240,000 A/yr
 - Average yield = 6,750 lb/A
- Majority clay soil; some silt loam
- Abundant groundwater
- 99% drill-seeded
- 80% precision-leveled
- 95% in rotation with soybean
- 65% Clearfield in 2011

Resistance in MS

- Annual bluegrass – atrazine, simazine
 - **Barnyardgrass – ALS, propanil, quinclorac**
 - Common cocklebur – ALS, MSMA
 - Giant ragweed – glyphosate
 - Goosegrass – glyphosate, Prowl, Treflan
 - **Horseweed – glyphosate, paraquat**
 - **Italian ryegrass – ALS, glyphosate**
 - Johnsongrass – ACCase inhibitors, glyphosate, Prowl
 - **Palmer amaranth – ALS, glyphosate**
 - **Rice flatsedge – ALS**
 - Waterhemp – glyphosate
- Source: Ian Heap, www.weedscience.org

Resistance in MS Rice

Rice flatsedge



Italian ryegrass



Palmer amaranth



Barnyardgrass

Rice Flatsedge



Bolivar Cty, 2010
Permit at 0.67 OZ/A +
Regiment at 0.5 OZ/A fb
Permit at 0.67 OZ/A



Tallahatchie Cty, 2010
Newpath at 5 FL OZ/A +
Halomax at 1 OZ/A fb
Newpath at 5 FL OZ/A +
Halomax at 1 OZ/A

Rice Flatsedge



- Populations from Bolivar and Tallahatchie counties survived Permit at 2 OZ/A in greenhouse
- Seed to seed in 4 to 6 wk is typical
- Seed to seed in ≤ 4 weeks when crowded or days are short
 - Mature plant may have many spikelets or a single spikelet
- Susceptible plants in reasonable population easy to control
- Dense populations can be very competitive with rice

Source: Charles Bryson, USDA-ARS

2%



Permit at 1 OZ/A

76%



RiceShot at 4 QT/A

89%



**RiceShot at 4 QT/A +
Basagran at 1.5 PT/A**

77%



RiceBeaux at 4 QT/A

Rice Flatsedge Summary

- Suspected resistant populations in Bolivar, Leflore, and Tallahatchie counties in Mississippi
 - Also present in Arkansas and Louisiana
 - ALS-resistant yellow nutsedge identified in Arkansas
- Do not assume populations resistant to Permit will be controlled by Grasp, Londax, Newpath, Regiment, or Strada
- Mixtures with propanil + Basagran are best
- Multiple applications will be necessary
- Scout; spray early
- Do not mix Basagran with Clincher or Ricestar HT

Italian Ryegrass

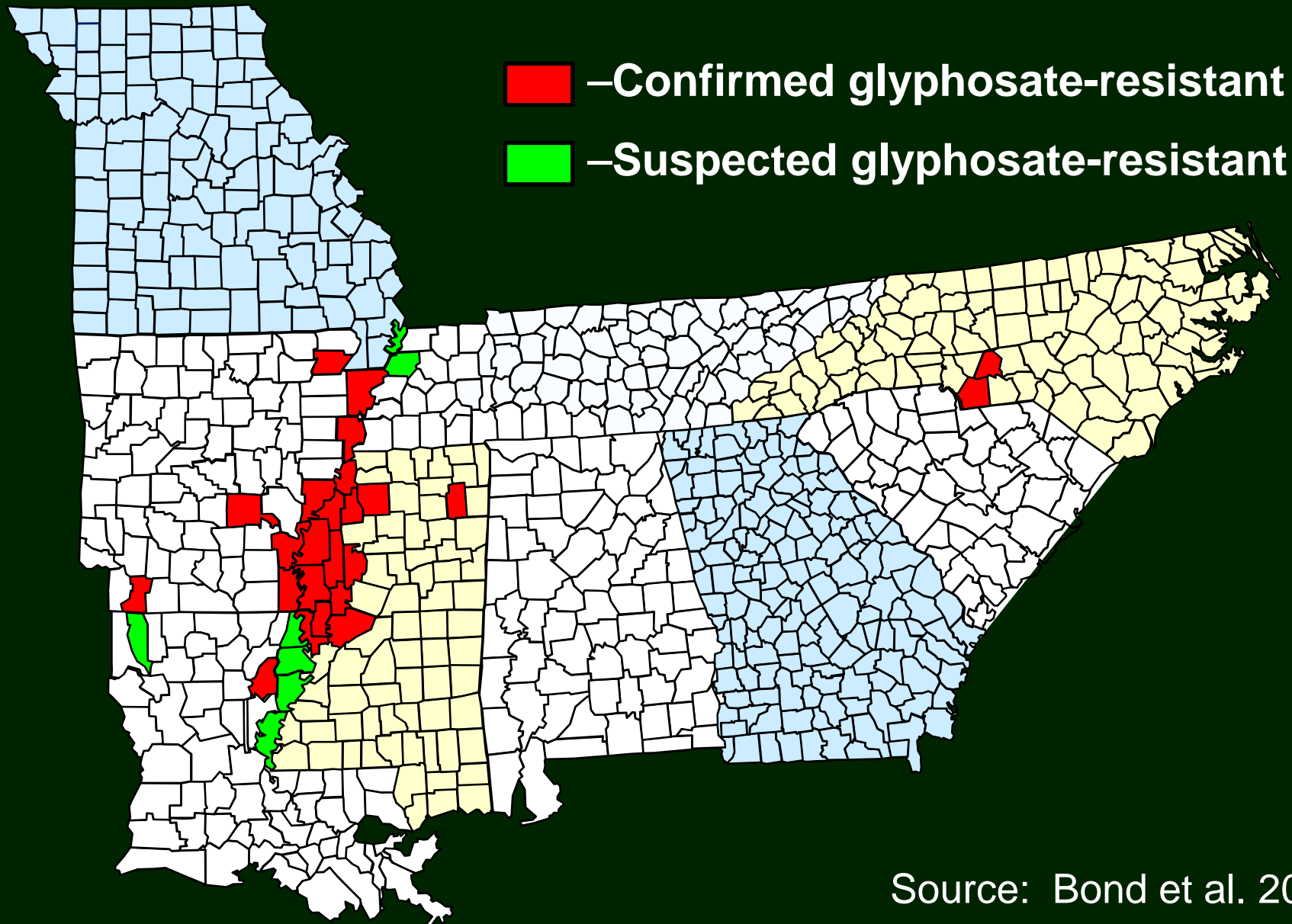








GR Italian Ryegrass



Source: Bond et al. 2012

Italian Ryegrass

- Compromises efficacy of burndown programs
- No in-season herbicide options



Gramoxone at 4 PT/A, 7 DPP

Density: 18 plants/ft², 14 DAE
Height: 4 inches, 21 DAE
50% heading: 91 to 96 DAE
Yield: 169 bushels/A



No Italian ryegrass

Density: 23 plants/ft², 14 DAE
Height: 6 inches, 21 DAE
50% heading: 84 DAE
Yield: 201 bushels/A

Nontreated



Command at 2 PT/A



Zidua at 2.77 at OZ/A



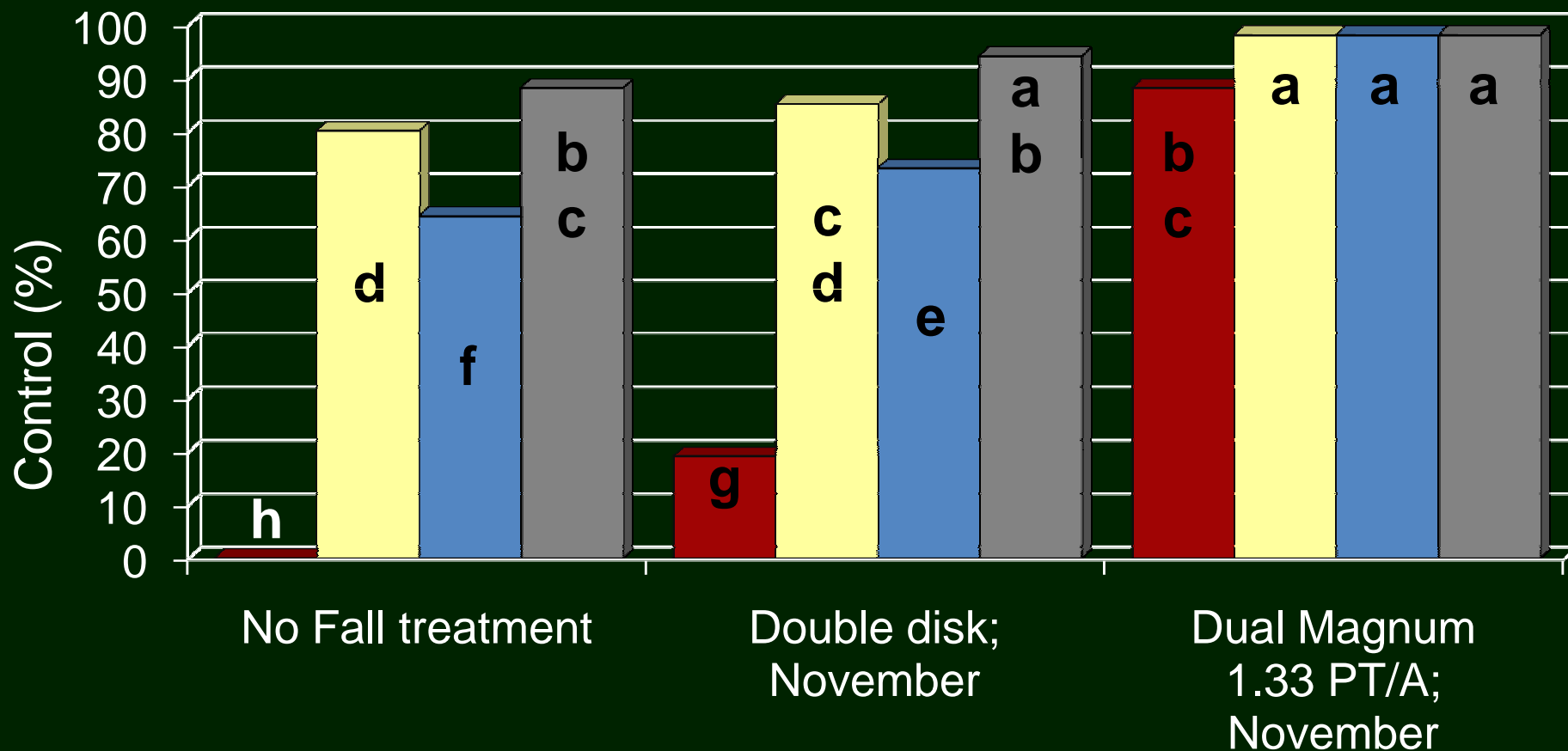
Dual Mag. at 1.33 PT/A



Source: R. C. Bond et al. 2008

Fall-Spring Programs

GR Italian Ryegrass Control on March 24, 2011



■ No POST

■ Select Max 16 OZ/A; January

■ Gramoxone Inteon 4 PT/A; February

■ Select Max fb Gramoxone Inteon

No fall treatment



No POST



Select Max 16 OZ/A; Jan.



Gramoxone Inteon 4 PT/A; Feb.



Select Max fb Gramoxone Inteon

March 24, 2011

Double disk; November



No POST



Select Max 16 OZ/A; Jan.



Gramoxone Inteon 4 PT/A; Feb.



Select Max fb Gramoxone Inteon

March 24, 2011

Italian Ryegrass Summary

- At least 2 applications required for >95% control
 - Command in Nov. fb Gramoxone Inteon in Feb.
 - Command in Nov. fb Select Max in Jan.
 - Double disk in Nov. fb Select Max in Jan. fb Gramoxone Inteon in Feb.
- Spring tillage will require multiple passes due to root volume of Italian ryegrass
- **Avoid multiple applications of clethodim**
- Spot treatments can be effective
- **Target 100% control prior to planting**

Palmer Amaranth





- All areas of the MS Delta infested with glyphosate-resistant Palmer amaranth and/or waterhemp
- Becoming major problem in rice
- Seedbank from soybeans effects rice rotation



Palmer Amaranth



- Propanil at 4 QT/A + Grandstand at 0.75 PT/A most consistent.
- Will not survive flood, but need to spray early to avoid competition.
- Prevent seed production on levees.





Injured plants will die relatively soon after flood



Palmer amaranth plants left uncontrolled on levees will produce seed that will impact soybean and rice crops in following years.



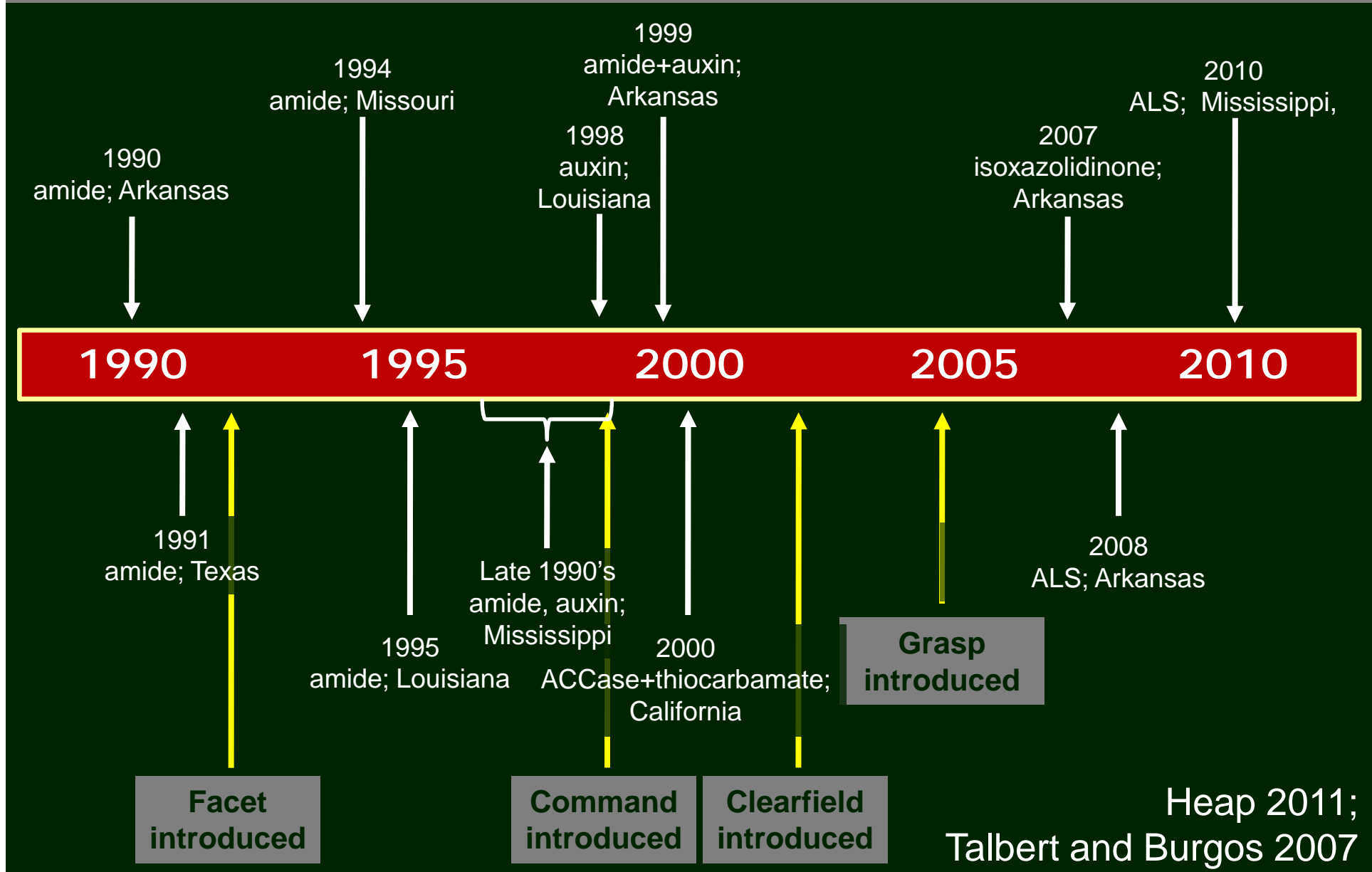
Management Suggestions

- **Start clean!!**
 - Palmer amaranth begins germinating when soil temperature reaches approximately 65 F
 - Paraquat may be required at planting to control emerged Palmer amaranth/waterhemp
 - No residual herbicides effective
- Propanil, propanil + Grandstand or Broadhead most consistent treatments
- Manage levees for following year's soybean crop

Barnyardgrass



Barnyardgrass Resistance in U.S. Rice



Barnyardgrass in MS

- Propanil and quinclorac resistance observed since late 1990's.
- Reports of Newpath failures since 2005.
- Annual complaints concerning Clincher efficacy.
- 39% of growers suspect resistance in barnyardgrass (Nandula and Bond 2010)

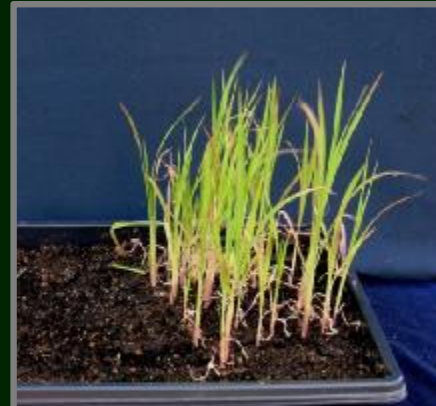


Barnyardgrass in MS

Summary 2007 to 2009:

- 45% resistant to propanil
- 20% resistant to Facet
- 15% multiple resistant to propanil + Facet
- Barnyardgrass response to Clincher is variable, with control ranging from 58 to 97%
- Resistance suspected to Newpath, Beyond, and Grasp
- Regiment still effective against MS barnyardgrass

Barnyardgrass in MS








Beyond



Newpath

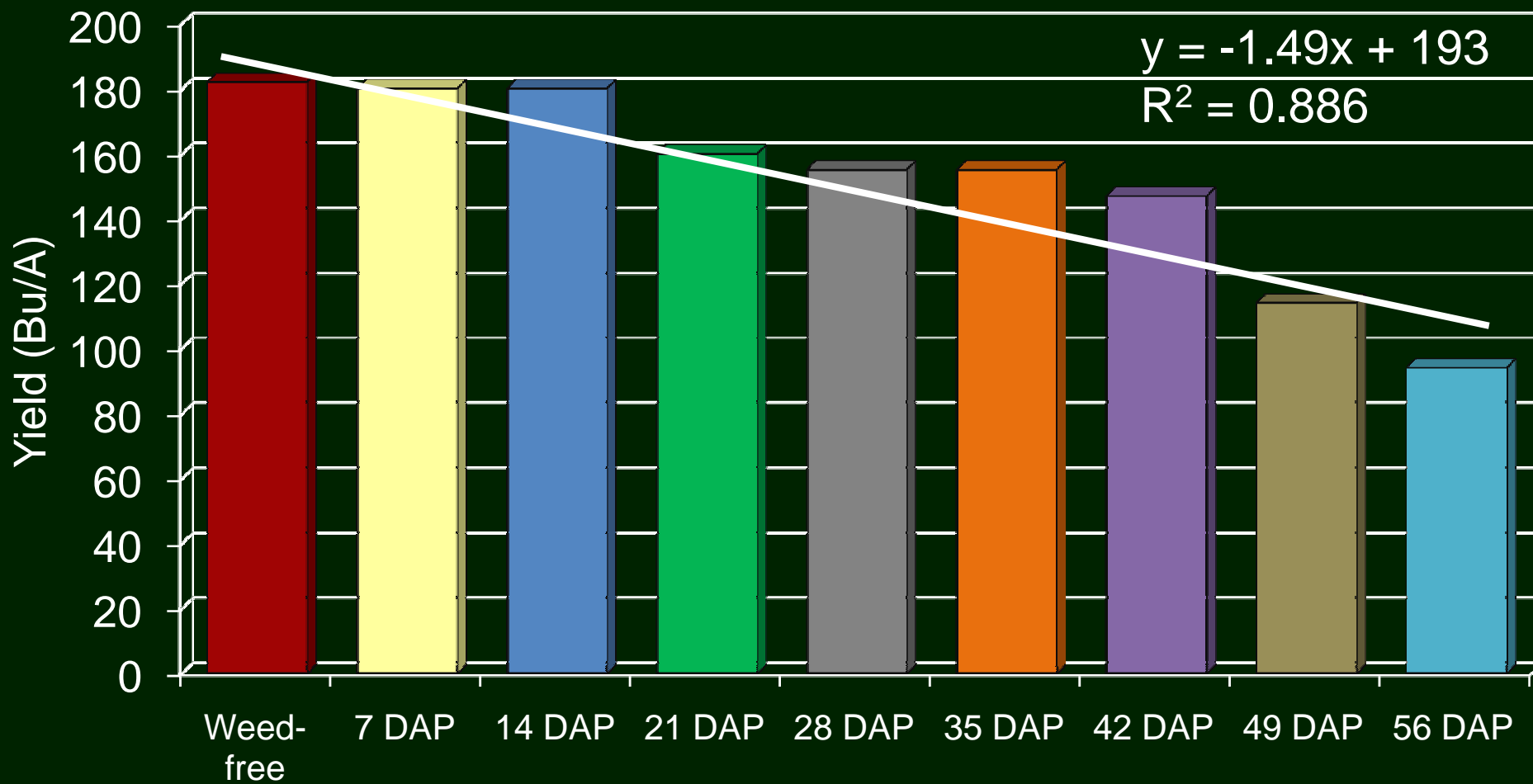
- 2010 – ALS-resistant barnyardgrass confirmed in MS
- Population from Sunflower County exhibits 4-, 3-, 2-, and 11-fold tolerance to Newpath, Beyond, Grasp, and Regiment, respectively
- Two additional suspected ALS-resistant populations in Bolivar County

Barnyardgrass Resistance

- ~~Corn and~~  Resistance in AR
- ~~Prowl~~  Resistance in AR, LA, MS
- Prowl
- Bolero
- ~~Procell~~  Resistance in AR, LA, MO, TX, MS
- Clincher/Ricestar HT  Resistant sprangletop in LA
- ~~Regiment~~
- ~~Green~~
- ~~Newpath/Beyond~~  Resistance in AR, MS

Critical Period for Rice

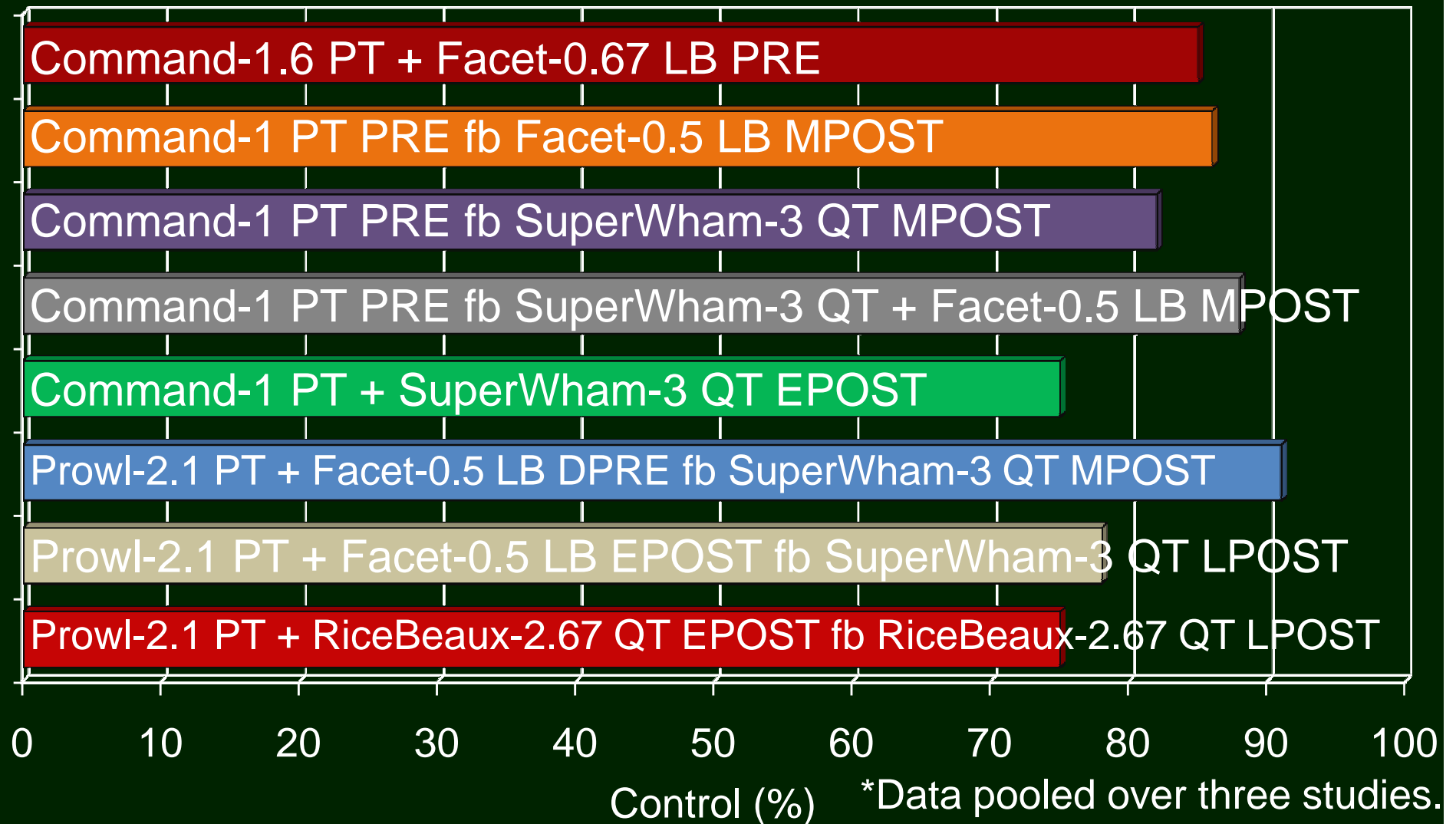
Rice Yield Affected by Herbicide Timing - 2011



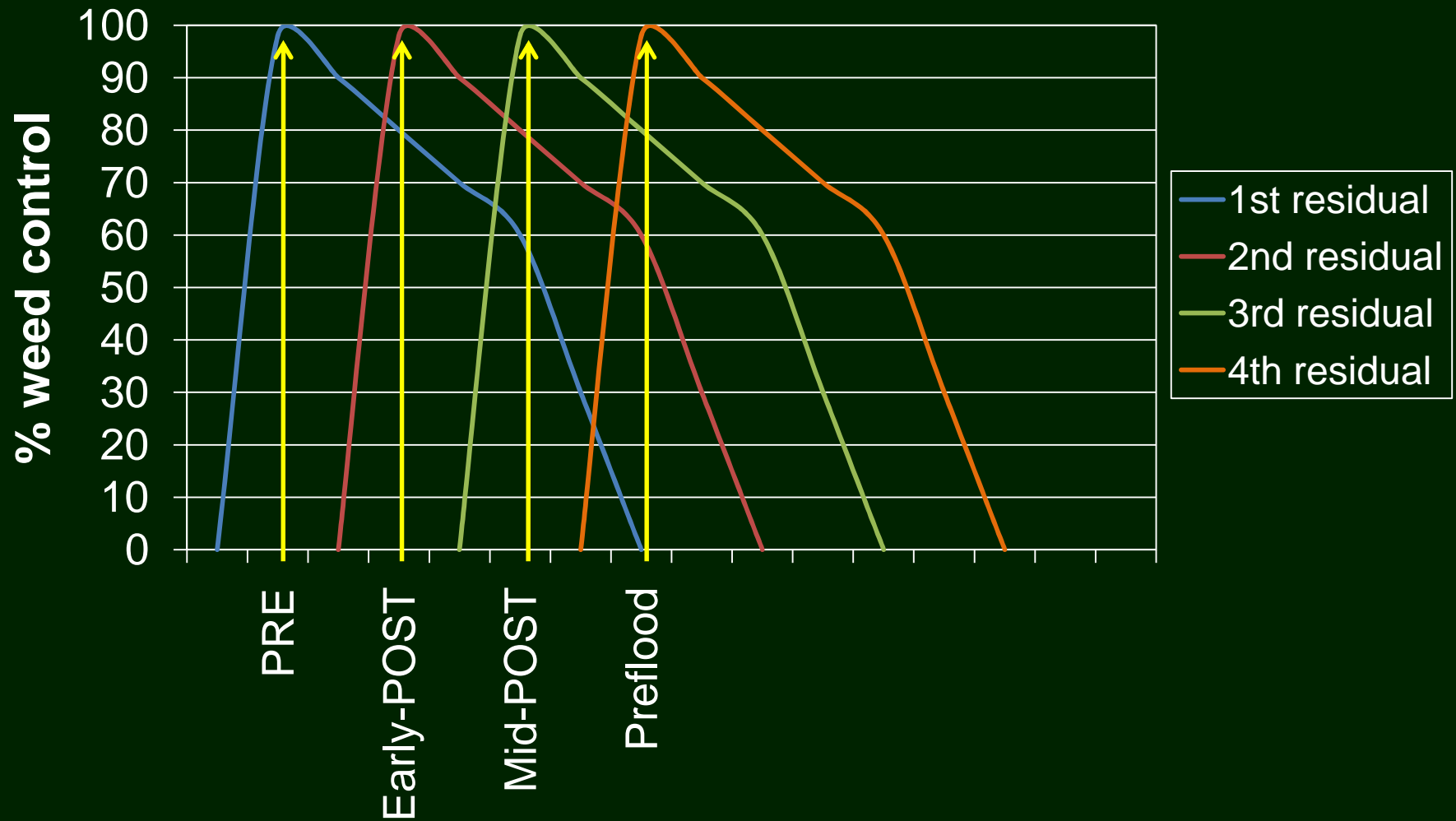
*Ricestar HT + Command applied at designated interval.

Barnyardgrass

Barnyardgrass Control 10 d After Flood (2009-2011)



Overlap Residual Herbicides



Rotate Herbicide MOA's

In-crop herbicide labeling by mode of action

Mode of action	Herbicide	Cotton	Soybean	Corn	Rice
Glycines	glyphosate	+	+	+	
Glutamine synthetase inhibitors	Ignite	+	+	+	
ALS inhibitors	Staple, Newpath	+	+	+	+
PS II inhibitors (WSSA Group 5)	atrazine, Sencor	+	+	+	
PS II inhibitors (WSSA Group 7)	Direx, Stam	+			+
PPOase inhibitors	Aim, Valor	+	+	+	+
Synthetic auxins	2,4-D, dicamba			+	+
HPPD inhibitors	Callisto, Laudis			+	
VLCFA inhibitors	Dual, Warrant	+	+	+	

Rotate Herbicide MOA's

BROADHEAD HERBICIDE

Groups **4+14+26** Herbicide

From **FMC**

ATTENTION
Although this label may appear similar to the label on a product you may have used, there may be important label differences. Users must read, understand and strictly follow all label directions, precautions and restrictions.
It is the user's responsibility to be sure the product is approved for use or use on the intended crop and for use in the specific geographic region.
It is the user's responsibility to be aware of and to follow all State or local provisions or restrictions not appearing on this product label. Prior to purchase or use of this product, read the Terms of Sale or

Intended for Use Only by Individuals/Firms Certified And/or Licensed as Pesticide Applicators

EPA Reg. No. 279-3386 EPA Est. 279-IL-1

GROUP **2** HERBICIDE

VALENT

LEAGUE HERBICIDE

FOR CONTROL AND/OR SUPPRESSION OF CERTAIN WEEDS IN RICE.

Active Ingredient Ey. Wt.
* Imazosulfuron 75.0%
Other Ingredients 25.0%
Total 100.0%

FIRST AID (continued)
If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.
HOT LINE NUMBER
Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact **800-892-0099** for emergency medical treatment information.

HERBICIDE MODE OF ACTION

HRAC group	Site of action	Chemical family	Active ingredient	WSSA group							
A	Inhibition of acetyl CoA carboxylase (ACCase)	Aryloxyphenoxy-propionate "POPY"	cloflorop-propargyl cylatolop-butyl diclofop-methyl fenoxapop-P-ethyl flazifop-P-butyl	1							
		Cyclohexanedione "DHMC"	delhalofop sulfosydin tralkoxydim								
		Phenylpyrazoline "DEN"	piraclofen								
B	Inhibition of acetylactate synthase ALS (acetohydroxyacid synthase AHAS)	Sulfonyleurea	chlorimuron-ethyl chlorsulfuron florasulfuron metolachlor-methyl metosulfuron mesosulfuron metolachlor-methyl metolachlor primisulfuron-methyl pyrasulfuron sulfosulfuron sulfentrazone thifensulfuron-methyl tribenuron-methyl trifluroxymethyl trifluralin	2							
			Imidazopyridine		imazapic imazamox imazapyr imazaquin imazetapyr						
					Triazolopyridazine	chlorazulon-methyl dithiopyr floroxulam florasulam pyrazosulfuron pyrazosulfuron					
						Pyrimidopyrimidinone	mesosulfuron-MN pyrazosulfuron-MN				
							C1	Inhibition of photosynthesis at photosystem II	Triazine	atrazine prometon propazine simazine	5
			Dinitroazole								
					Urea						

Source of Problem



Soil Seedbank:

- For every action, there is an equal and opposite reaction
- Failure to act is an action
- Weeds do NOT rest and neither can those who kill them



Barnyardgrass Summary

- **Start clean!!**
- Barnyardgrass needs to be treated early and often
- Utilize Command, Facet, Prowl H2O, and RiceBeaux along with Newpath in Clearfield rice
- Well-timed, early-season applications provide most consistent weed control
- Use multiple PRE and POST herbicides with different modes of action
- **Watch for escapes.** These may be an indication of problems.

Questions?

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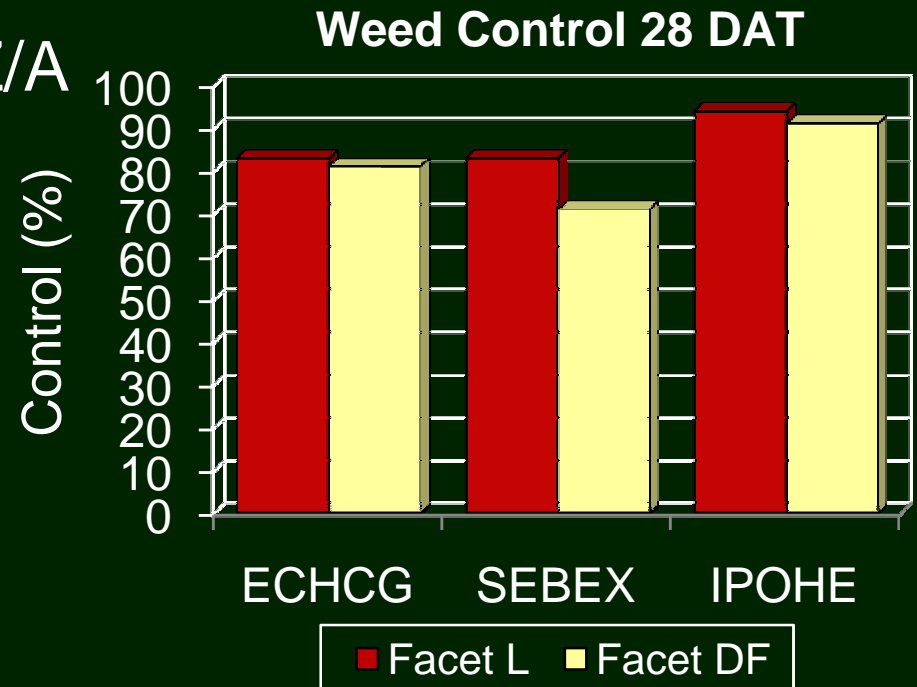
New Herbicides

Facet L

- Manufacturer: BASF
- Formulation: 1.5 L
- Common name: quinclorac
- Timings: Preplant to 40 days PHI
- Use rate: 21 to 42 FL OZ/A



Facet L at 32 FL OZ/A



Permit Plus

- **Manufacturer:** Gowan Company
- **Registration:** 24c in 2011
- **Formulation:** 75 WDG
- **Ratio:** 5.3:1 halosulfuron:thifensulfuron
- **Mode of action:** ALS inhibitor
- **Timings:** Preplant to 48 days PHI
- **Use rate:** 0.75 OZ/A = 0.67 OZ Permit +
0.125 OZ Harmony

- Similar to Permit
- Possibly better on spreading dayflower and Pennsylvania smartweed
- Rate should not be <0.75 OZ/A



League

- **Manufacturer:** Valent USA
- **Registration:** 2011
- **Common name:** imazosulfuron
- **Formulation:** 76 WDG
- **Mode of action:** ALS inhibitor
- **Use rate:** 0.15 to 0.19 LB AI/A
3.2 to 4 OZ/A
- **Timings:** 2-leaf rice until 2-inch IE
- **MS restrictions:** May not be applied PRE
12-month rotation to soybeans

League



League 3.25 OZ/A EPOST



**League 3.25 OZ/A +
SuperWham 3 QT/A EPOST**



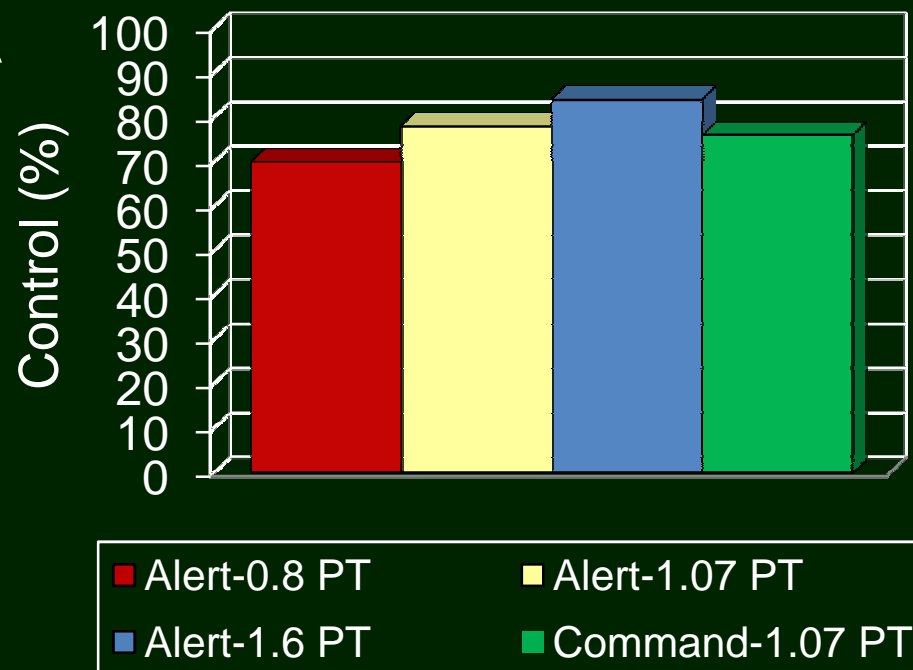
Alert

- Manufacturer: Cheminova
- Registration: 2011??? **Not likely**
- Common name: clomazone
- Formulation: 3 ME???
- Use rate: 1.125-1.6 PT/A



Alert at 1.07 PT/A

Barnyardgrass Control at Flood



F7436

- **Manufacturer:** FMC Corporation
- **Registration:** Fall 2011???
- **Formulation:** 2.4 EC
- **Ratio:** clomazone X.XX LB AI
quinclorac X.XX LB AI
- **Use rate:** 16 to 20 FL OZ/A
20 FL OZ/A = 15 OZ Clincher +
2.5 OZ Grasp
- **Timings:** PRE to EPOST



**Command 1 PT/A PRE fb
F7436 2.5 PT/A EPOST**



**Command 1 PT/A PRE
Broadhead 9 OZ/A EPOST**

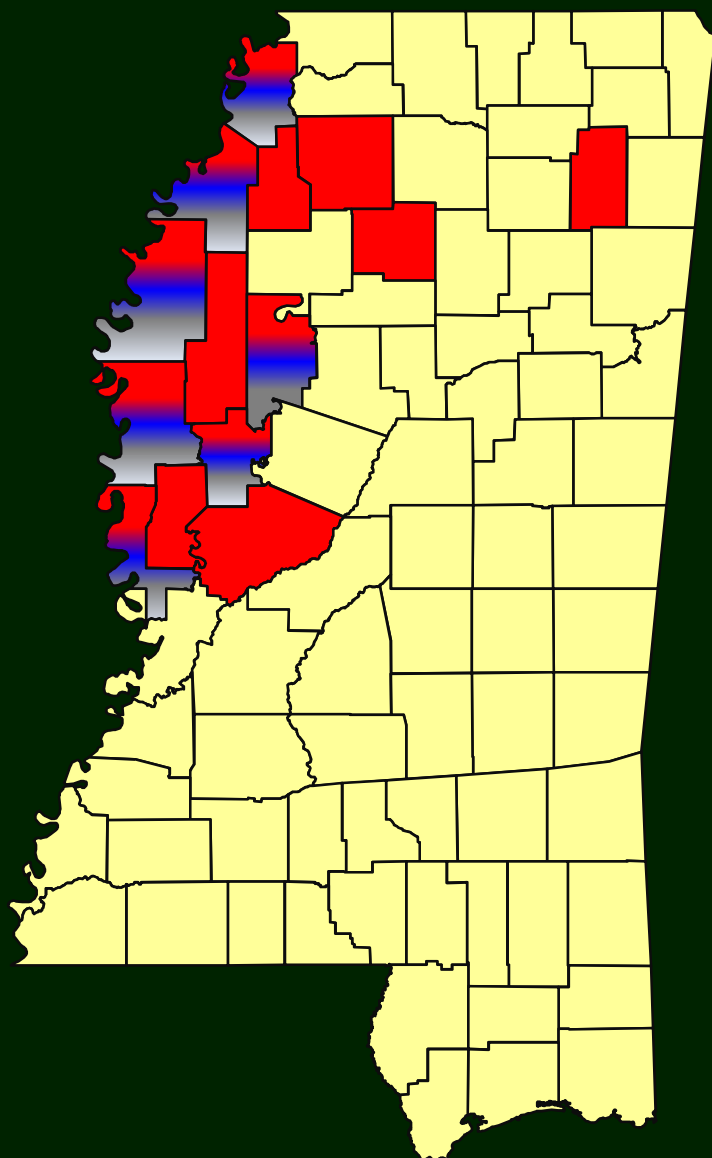


**Newpath + F7436 2.5 PT/A fb
Newpath**



Newpath fb Newpath

Italian Ryegrass Resistance in MS



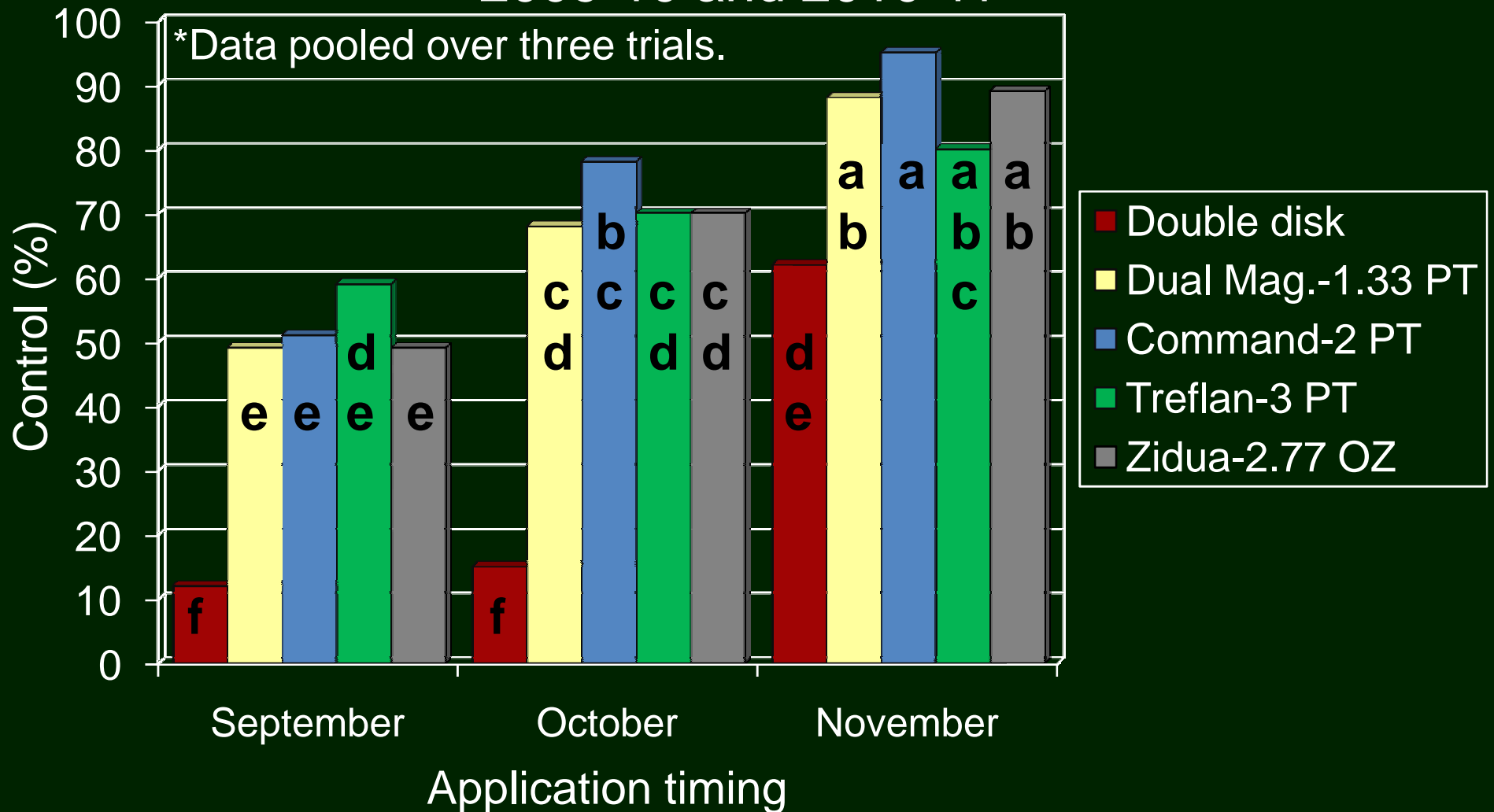
 Glyphosate resistance

 Multiple resistance

- Glycines – glyphosate
- ACCase inhibitors – diclofop, fluazifop and quizalofop
- ALS inhibitors – chlorsulfuron + metsulfuron, mesosulfuron, sulfometuron, and/or pyroxsulam

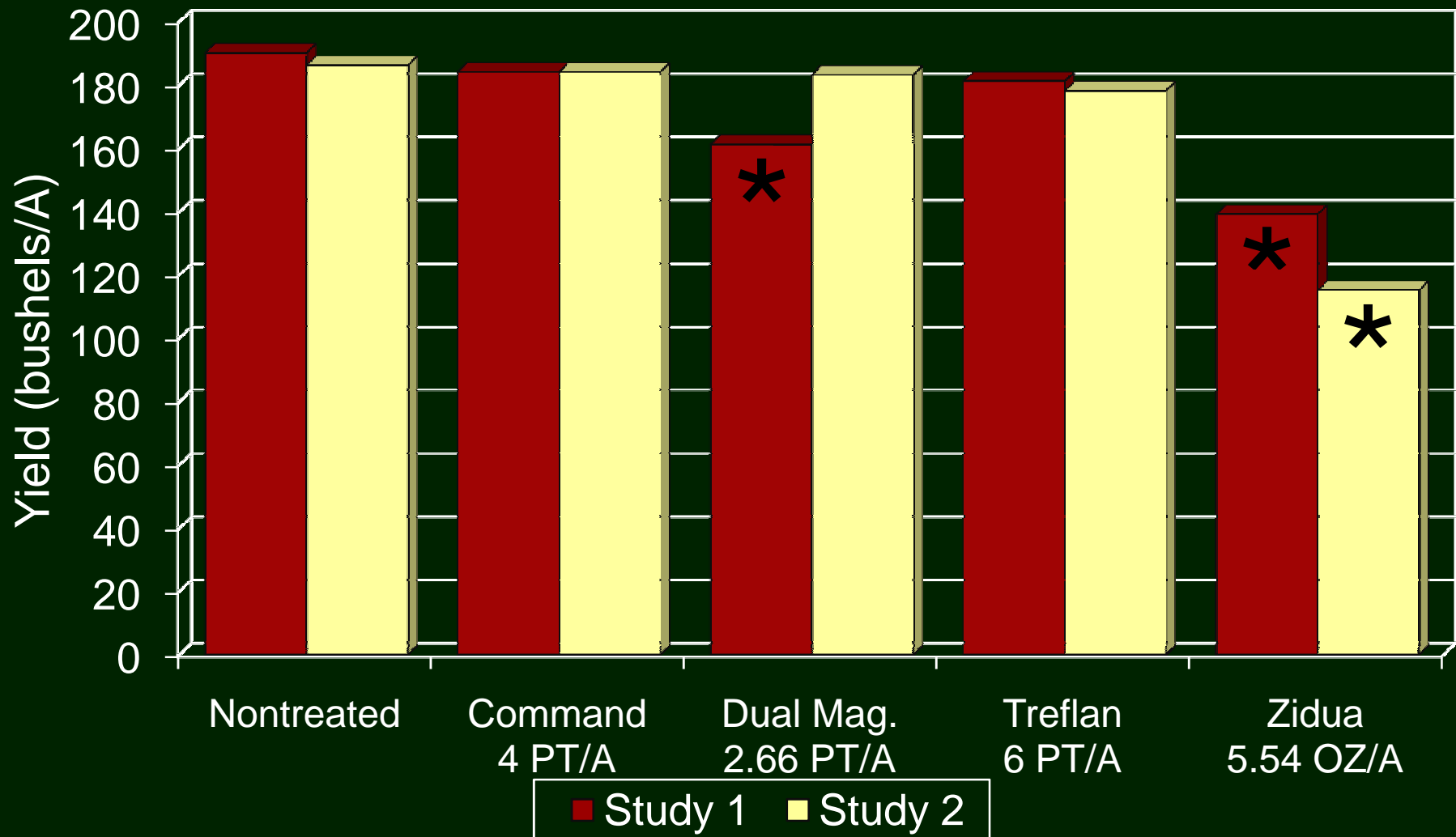
Residual Herbicide Timing

GR Italian Ryegrass Control in Early-March 2009-10 and 2010-11



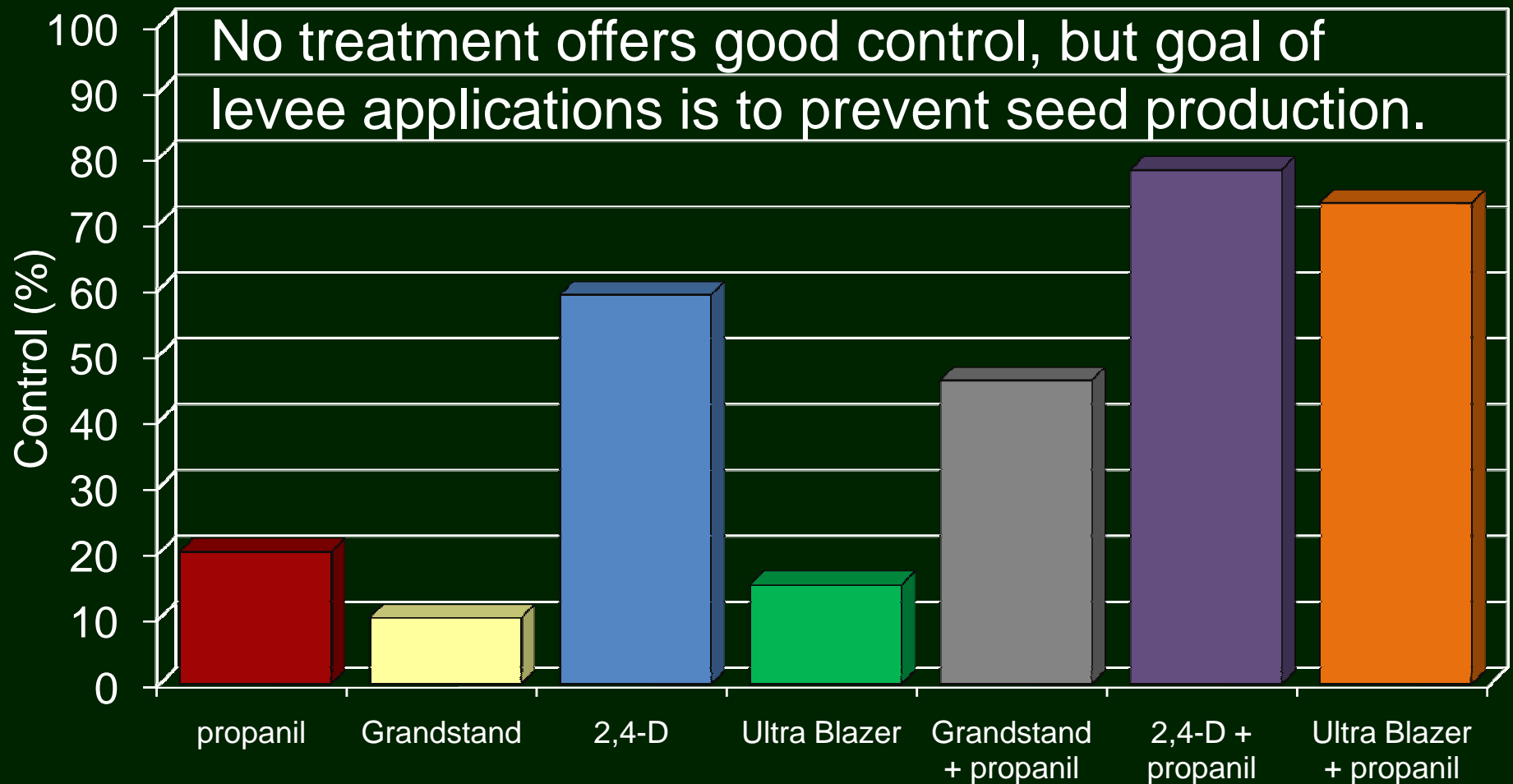
Rice Response

Rice Yield Following Fall Herbicide Treatments



Control on Levees

Palmer Amaranth Control 4 Weeks After Treatment



Source: Norsworthy et al. 2010