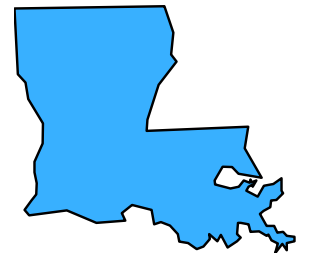


# Antagonism of Glyphosate by Command

Bill Williams

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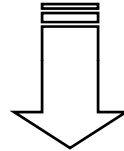


# Tank mixtures

Weed control spectrum

Time

Application cost



# Herbicide interaction

Synergistic

Additive

Antagonistic

➤ Antagonism is more prevalent than synergism

Zhang et al., 1995

➤ Antagonism more frequent in:

↳ Grassy weeds

↳ Herbicides from different families

➤ Antagonism more frequent in:

↳ Broadleaf weeds

↳ Herbicides from same families

Damalas, 2004

# Introduction

- Began working with preplant applications of Command and Permit in 2000
- Split application of Command
  - Reduced bleaching
  - Better grass control
  - Better yields
- Glyphosate antagonism
  - 2,4-D, MSMA and triazines

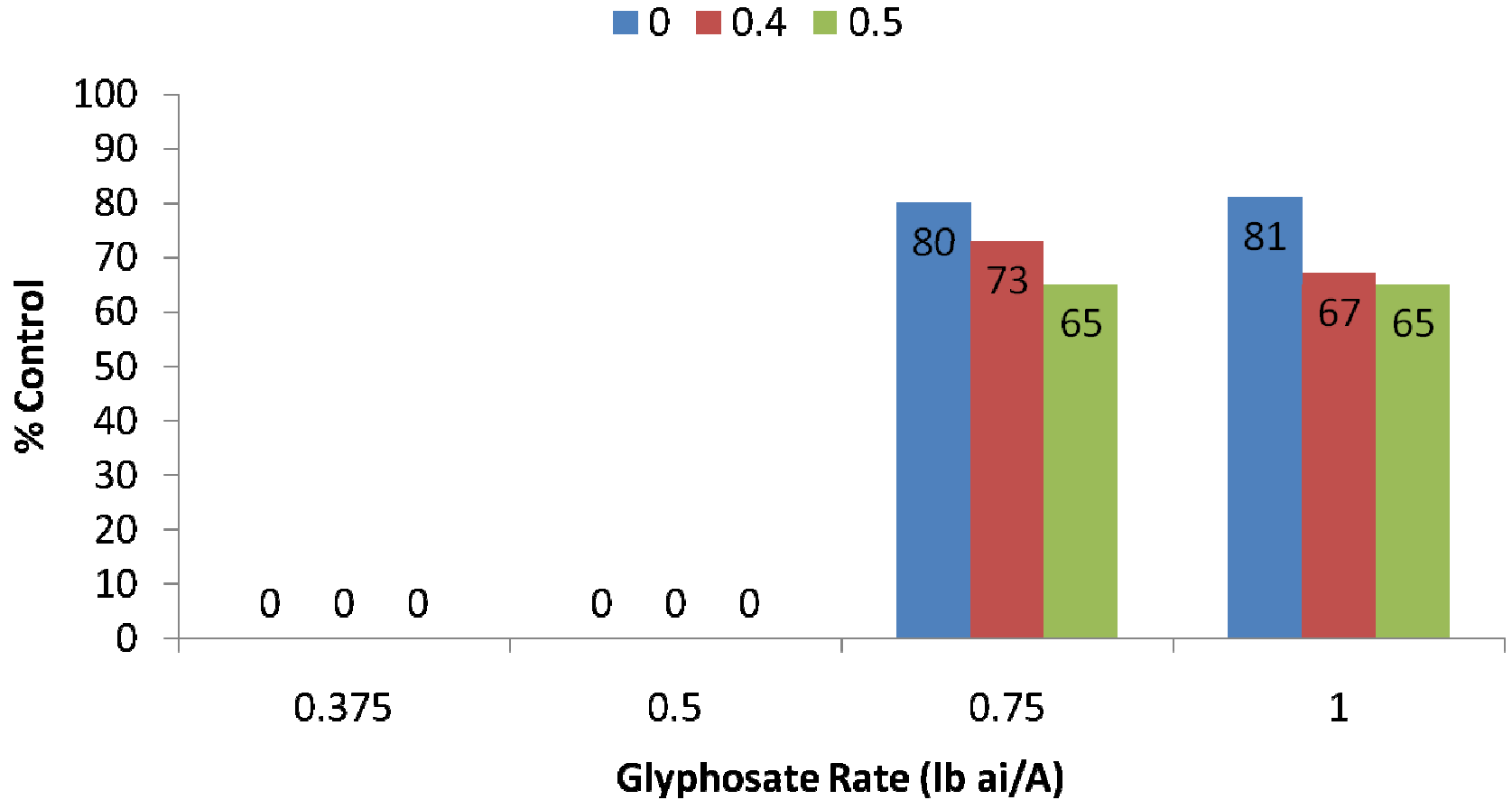
# Glyphosate + Command

- Several trials conducted between 2001 and 2003.
  - Atrazine and diuron in 2004, 2005 and 2006
- Macon Ridge and Northeast Research Stations.
- Backpack sprayed @ 15 GPA
- Air-induction tips
- No surfactant or AMS

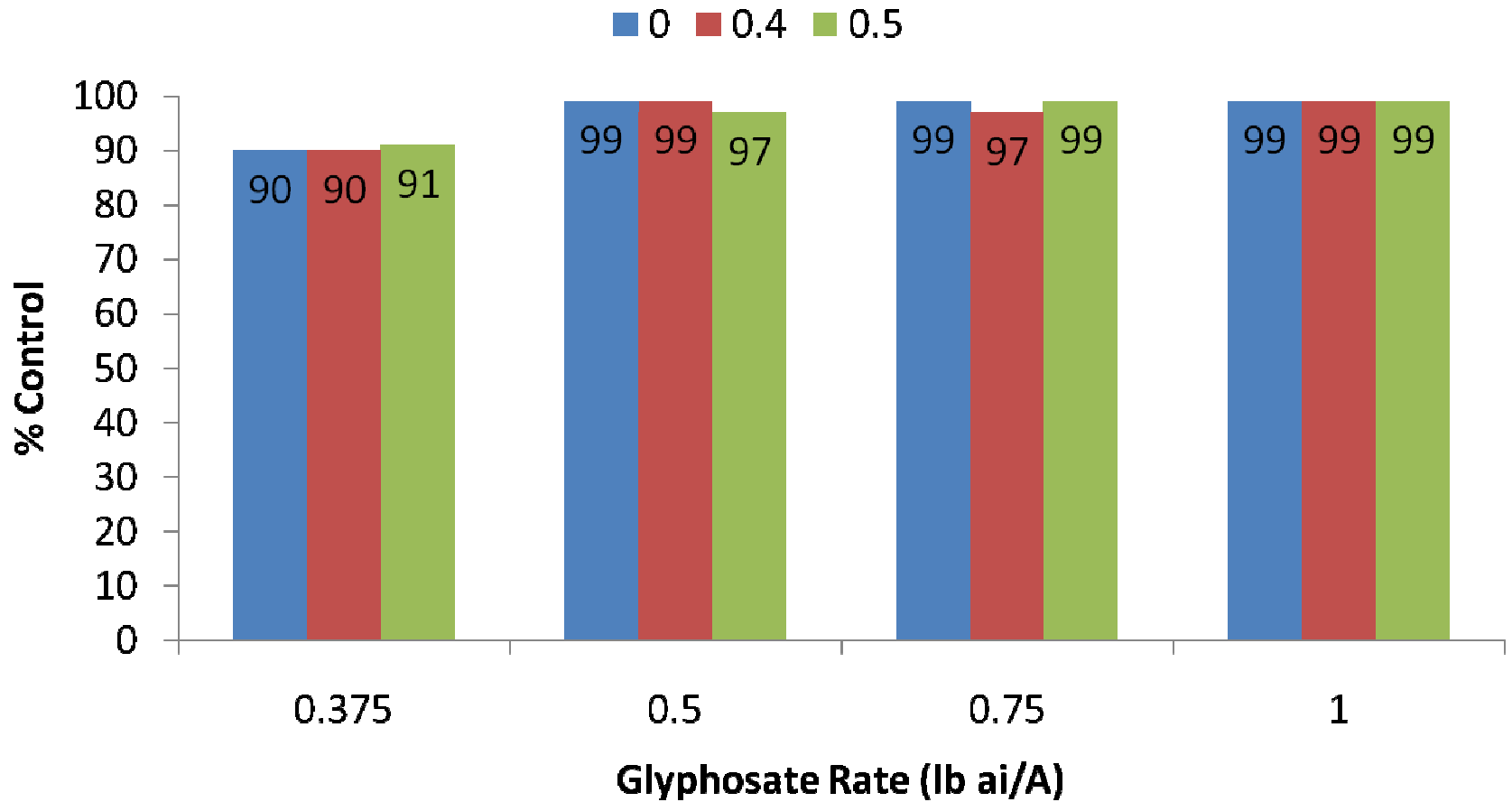
# Glyphosate + Command - 2001

- Northeast Research Station
- Factorial treat arrangement
- Glyphosate = 0.375, 0.56, 0.75 and 1.0 lb ai/A
- Command = 0, 0.4 and 0.5 lb ai/A
- Carolina foxtail, curly dock, swinecress, and primrose

# Carolina Foxtail Control - 2 WAT



# Carolina Foxtail Control - 4 WAT

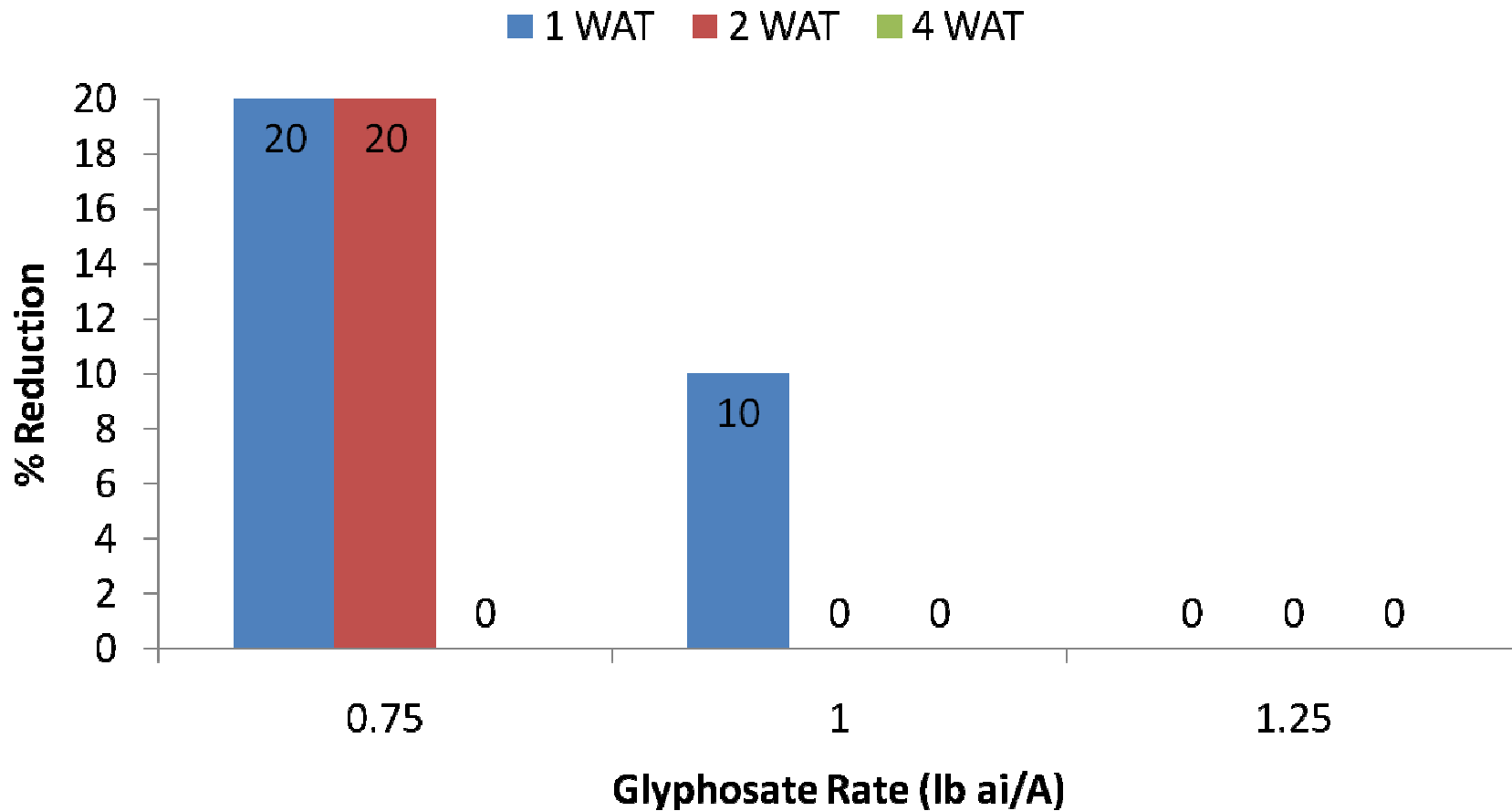




# Glyphosate + Command – 2002 & 2003

- Northeast Research Station
- Factorial treat arrangement
- Glyphosate = 0.75, 1.0 and 1.25 lb ai/A
- Command = 0, 0.3, 0.4 and 0.6 lb ai/A
- Bluegrass, swinecress, primrose,

# Reduction in Annual Bluegrass 0.6 lb/A Clomazone



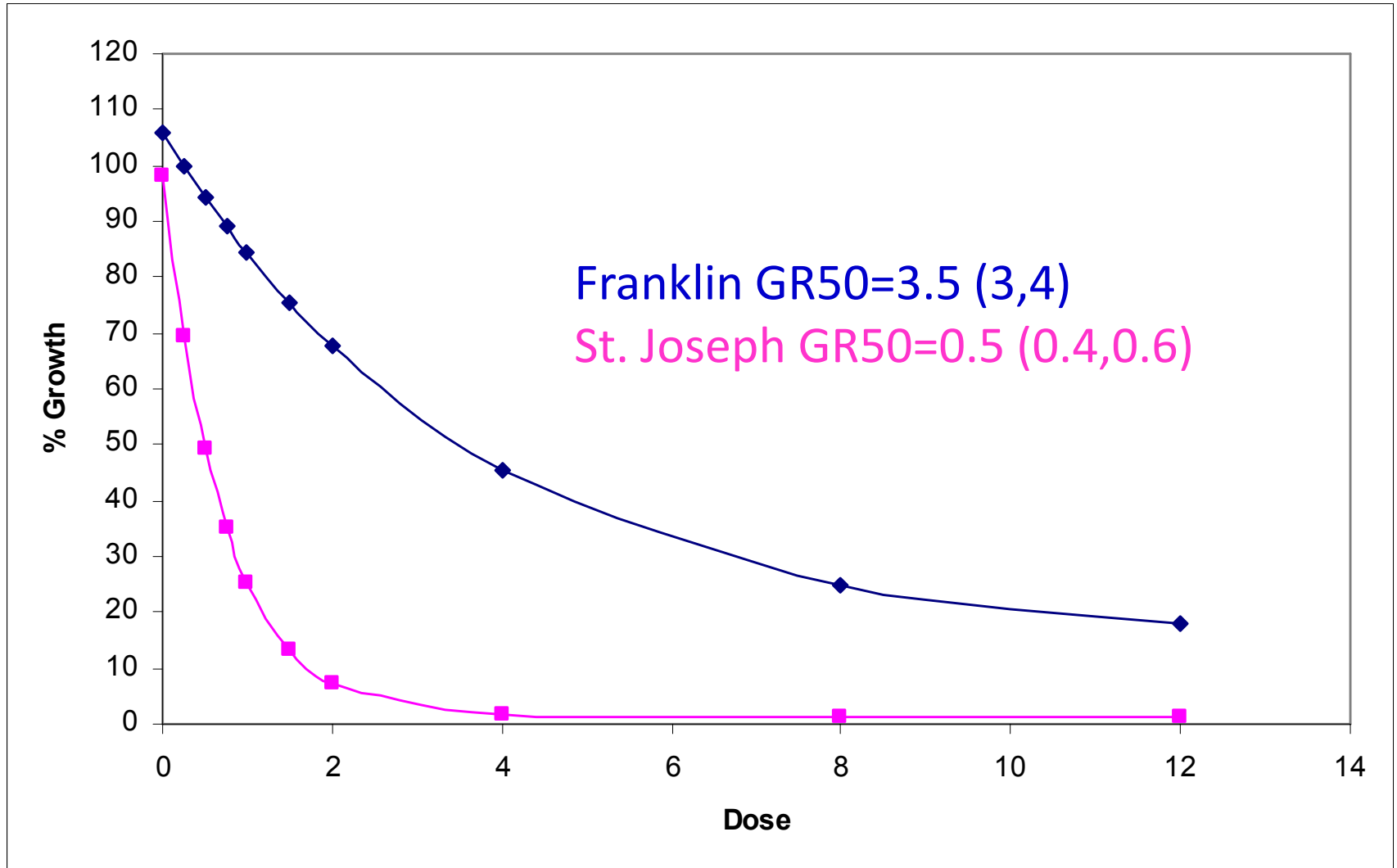
# Glyphosate + Command

- Some reduced control of foxtail and bluegrass at 2 WAT but not at 4 WAT.
- Similar trend with broadleaf weeds but was minimized by maintaining higher glyphosate rates (not shown).
- Control of dock, swinecress and primrose was not satisfactory.

# SUMMARY

- In most situations I don't expect problems with timely applications of glyphosate plus Command
- Key is to use at least 1 lb ai/A of glyphosate and wait at least 2 weeks
- Not every weed has been evaluated and based on work with atrazine and diuron problems are more likely with difficult weeds like ryegrass

# Ryegrass 4 WAT



**Table 1.** Effectiveness of selected herbicides and/or herbicide combinations for controlling winter vegetation<sup>1,2</sup>. For more specific examples, rates, and updates, refer to the burndown section for each commodity in the Louisiana Suggested Chemical Weed Control Guide<sup>3</sup>.

	Paraquat	Paraquat + Goal	Paraquat + FirstShot	Paraquat + Clarity	Paraquat + 2,4-D	Glyphosate	Glyphosate + Goal	Glyphosate + FirstShot	Glyphosate + Clarity	Glyphosate + 2,4-D	Clarity	2,4-D	Glyphosate + Valor	Ignite 280
Annual bluegrass (2-6")	90	90	90	90	90	90	90	90	90	90	0	0	90	90
Ryegrass <sup>4</sup> (6-10")	40	50	50	40	40	70	70	70	70	70	0	0	70	60
Carolina foxtail (2-6")	80	90	80	80	80	90	90	90	80	90	0	0	90	90
Little barley (2-6")	90	90	90	90	90	90	90	90	90	90	0	0	90	90
Buttercups <sup>4</sup> (2-6")	90	90	90	90	90	90	90	90	90	90	-	90	90	90
Geranium spp. <sup>4</sup> (2-6")	90	90	90	90	90	50	60	80	70	80	50	60	60	90
Chickweeds <sup>4</sup> (2-4")	90	90	90	90	90	90	90	90	90	90	30	30	90	90
Curly dock (6-8")	40	50	70	70	70	60	70	90	80	90	80	70	80	80
Cutleaf eveningprimrose (6-10")	40	70	80	80	90	40	60	70	80	90	80	90	60	80
Cutleaf eveningprimrose (2-5")	40	70	80	80	90	50	80	70	80	90	80	90	80	90
Clovers/medics <sup>4</sup> (2-6")	60	80	90	80	80	50	70	80	90	90	90	90	-	90
Dandelion (4-6")	80	90	90	90	90	90	90	90	90	90	90	90	90	90
Groundsel (2-4")	70	90	90	90	90	90	90	90	90	90	-	90	90	90
Henbit (6-8")	80	90	90	80	80	60	90	90	80	70	60	50	90	90
Marestail (4-10")	50	70	70	60	60	90	90	90	90	90	90	60	90	90
Smartweed spp. <sup>4</sup> (2-6")	40	70	90	80	60	70	80	90	90	80	80	60	90	-
Purslane speedwell (2-4")	70	80	90	80	80	90	90	90	90	90	-	50	90	-
Shepherd's purse (6-10")	90	90	90	90	90	90	90	90	90	90	90	90	90	80
Smallflower bittercress (6-10")	90	90	90	90	90	90	90	90	90	90	70	70	90	-
Swinecress (2-4")	20	30	70	60	60	70	80	90	80	80	70	60	80	90
Legume cover crops (6-8")	60	80	90	90	90	50	70	80	90	90	90	90	70	90
Virginia pepperweed (4-6")	20	70	70	90	90	90	90	90	90	90	-	30	90	-
Wheat (8-12")	70	80	70	60	60	90	90	90	80	90	0	0	90	70

<sup>1</sup> Ratings reflect control 28 days after treatment in mid-March. The average range for weed sizes are listed in parenthesis following each weed; consult labels for optimum rates and weed sizes. <sup>2</sup> Paraquat at 0.47-0.63 lb ai/A (1.5-2 pts/A Gramoxone Extra), glyphosate at 0.75-1.0 lb ai/A (1.5-2 pts/A Roundup Ultra, Touchdown IQ, 1.2-1.6 pts/A Touchdown 5, Roundup Ultra Max), Goal 2XLat 0.2-0.25 lb ai/A (0.8-1.0 pts/A), Harmony Extra at 0.014-0.023 lb ai/A (0.3-0.5 oz/A), Clarity at 0.25-0.5 lb ai/A (0.5-1 pt/A), and 2,4-D at 0.75-1.0 lb ai/A (0.5-1 pt/A). Ignite 280 at 0.5 lb ai/A (32 oz/A). <sup>3</sup> The "Louisiana Suggested Chemical Weed Management Guide" is updated annually and available online at [www.lsuagcenter.edu](http://www.lsuagcenter.edu). <sup>4</sup> This group of weeds has two or more species found in Louisiana.

# SUMMARY

- Command has not improved the postemergence control of weeds evaluated
- The effect on other problem weeds like henbit is not known at this time
- Other research has shown similar results
  - reduced glyphosate rates should be avoided
  - AMS may help but results have been inconsistent

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