

Giant Ragweed Management in Roundup Ready Systems

Bill Johnson
Associate Professor of Weed Science

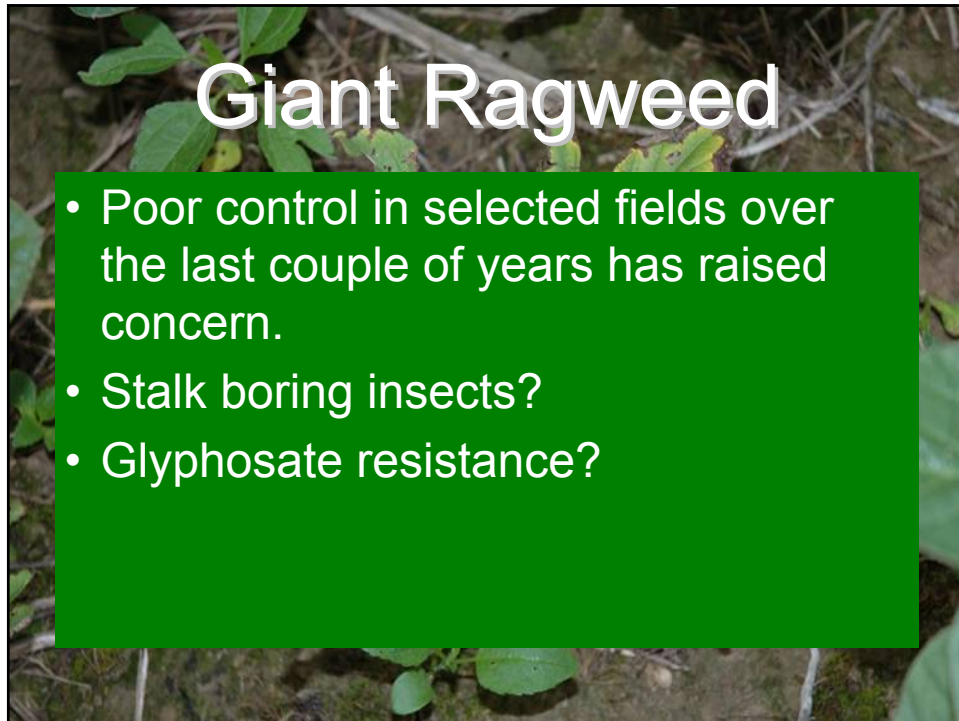


www.btny.purdue.edu/weedscience

Level of Resistance to ALS-inhibitors and Glyphosate

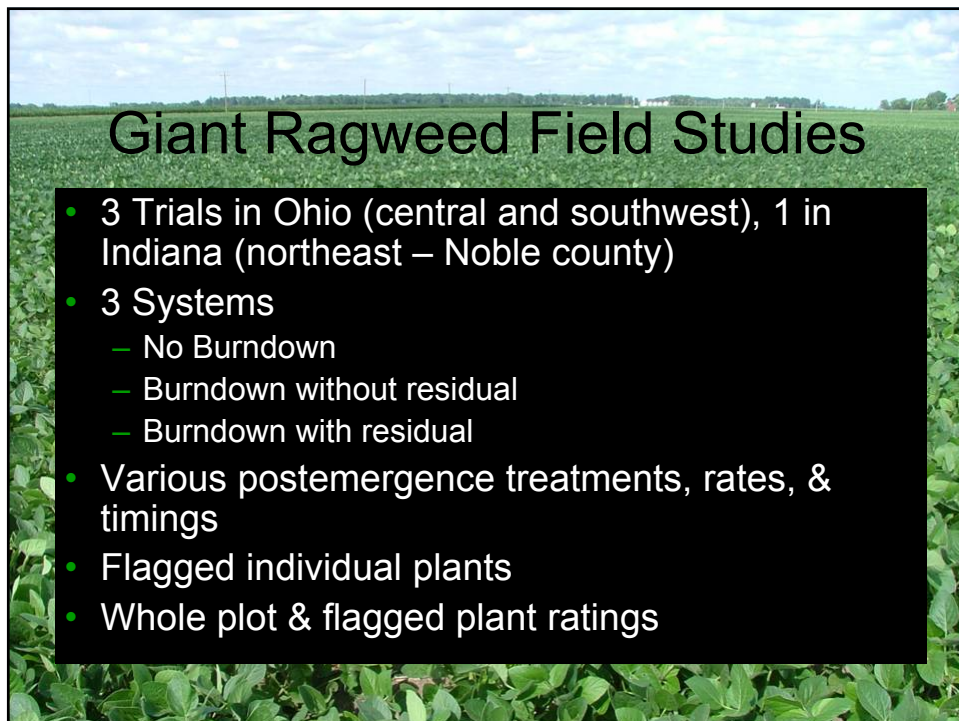
R/S ratio = ratio of herbicide rates required to control resistant
versus susceptible biotypes

	R/S ratio
ALS resistant	
Marestail	32 - 943
Common ragweed	>1000
Giant ragweed	>1000
Glyphosate insensitive/resistant	
Marestail	8 - 44
Waterhemp	5-10
Common ragweed	10
Lambsquarters	2-5
Giant ragweed	2-7



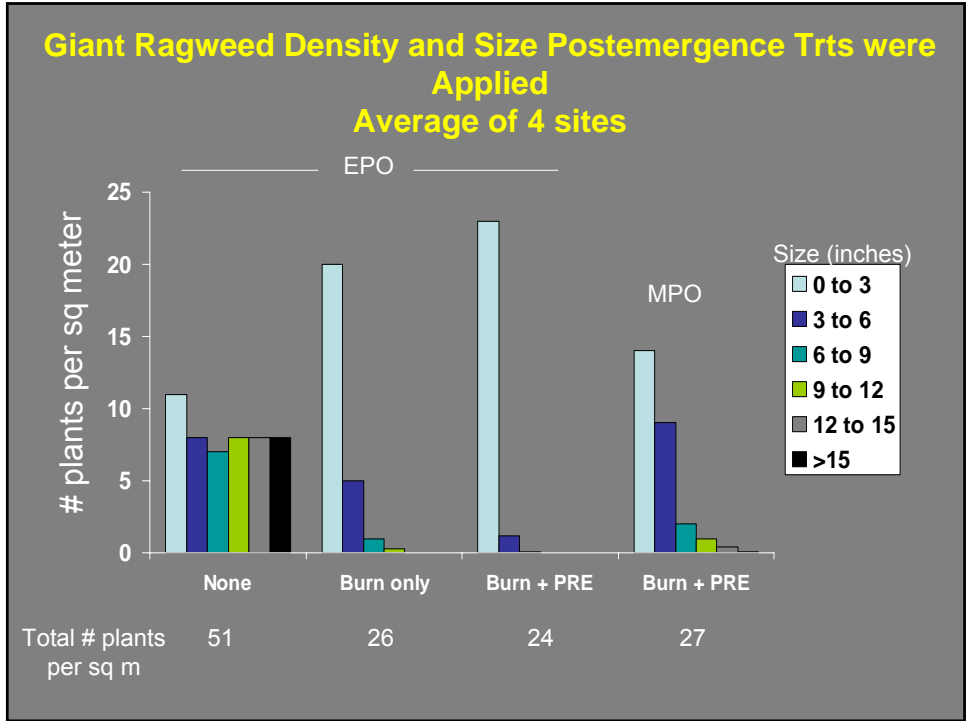
Giant Ragweed

- Poor control in selected fields over the last couple of years has raised concern.
- Stalk boring insects?
- Glyphosate resistance?



Giant Ragweed Field Studies

- 3 Trials in Ohio (central and southwest), 1 in Indiana (northeast – Noble county)
- 3 Systems
 - No Burndown
 - Burndown without residual
 - Burndown with residual
- Various postemergence treatments, rates, & timings
- Flagged individual plants
- Whole plot & flagged plant ratings



No Burndown

Herbicide	Rate	Lic 04	Lic 05	But 05	Nob 05
	lb ae/A	%	%	%	%
Glyphosate	0.75	20 b	63 b	28 b	30 b
Glyphosate	1.5	23 b	63 b	34 b	-
Glyphosate	0.75 fb 0.75	69 a	99 a	58 a	73 a
Glyphosate	1.5 fb 0.75	71 a	100 a	60 a	-

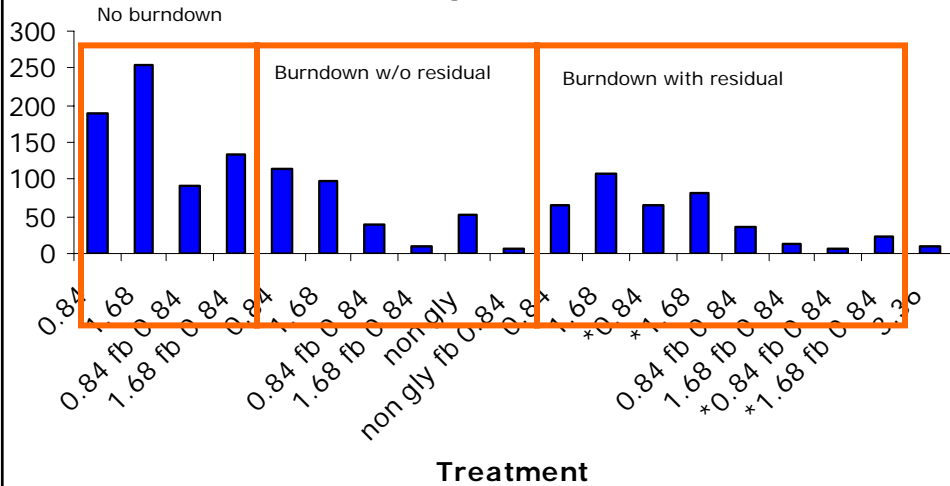
Means within a column followed by the same letter are not statistically different (P≤0.05).

Glyphosate + 2,4-D + Residual

Herbicide	Rate	Lic 04	Lic 05	But 05	Nob 05
	lb ae or ai/A	%	%	%	%
Glyphosate	0.75	45 c	64 bc	82 b	86 a
Glyphosate	1.5	58 bc	59 c	76 b	85 a
*Glyphosate	0.75	67 b	75 b	87 ab	73 a
*Glyphosate	1.5	74 b	74 b	99 a	91 a
Glyphosate	0.75 fb 0.75	96 a	99 a	99 a	88 a
Glyphosate	1.5 fb 0.75	97 a	98 a	98 a	98 a
*Glyphosate	0.75 fb 0.75	97 a	98 a	99 a	95 a
*Glyphosate	1.5 fb 0.75	98 a	100 a	99 a	94 a

Means within a column followed by the same letter are not statistically different (P≤0.05).
 * Delayed timing.

Average Total Seed per Plot for All Giant Ragweed Sites



Tankmix Study

- Giant ragweed population showed about a 2 fold level of glyphosate resistance.
- No-till soybeans
- Grower field in Tippecanoe county
- Burndown of glyphosate + 2,4-D applied April 20
- Post treatments applied June 7
 - V3-V4 soybeans
 - 12 to 24 inch tall giant ragweed
 - Approximately 6 plants/sq yard

Treatments

- Roundup OriginalMax at 0, 22 or 44 oz/A
- Flexstar at 0, 0.65 or 1.3 pt/A or Cobra at 6.25 or 12.5 fl oz/A
- FirstRate at 0, 0.15 or 0.3 oz/A
- AMS used with all treatments. No additional adjuvants.

Giant Ragweed Control on June 27

Tankmix partner	Roundup Omax 22 oz	Roundup Omax 44 oz
Nothing	92	94
Flexstar 0.65 pt	92	98
Flexstar 1.3 pt	97	97
Cobra 6.25 oz	91	96
Cobra 12.5 oz	95	92
LSD (0.05)		

Giant Ragweed Control on October 1

Tankmix partner	Roundup Omax 22 oz	Roundup Omax 44 oz
Nothing	85	90
Flexstar 0.65 pt	95	88
Flexstar 1.3 pt	95	96
Cobra 6.25 oz	79	89
Cobra 12.5 oz	86	88
LSD (0.05)		

Giant Ragweed Control on October 1 (control after an additional 22 oz/A of OMAX about 3 weeks after the initial post treatment on back half of the plots)

Tankmix partner	Roundup Omax 22 oz	Roundup Omax 44 oz
Nothing	85 (90)	90 (97)
Flexstar 0.65 pt	95 (99)	88 (97)
Flexstar 1.3 pt	95 (99)	96 (99)
Cobra 6.25 oz	79 (94)	89 (98)
Cobra 12.5 oz	86 (99)	88 (97)
LSD (0.05)		

Adjuvant Study

- Giant ragweed population showed about a 2 fold level of glyphosate resistance.
- No-till soybeans
- Grower field in Tippecanoe county
- Burndown of glyphosate + 2,4-D applied April 20
- Post treatments applied June 7
 - V3-V4 soybeans
 - 12 to 24 inch tall giant ragweed
 - Approximately 6 plants/sq yard

Treatments

- Roundup OriginalMax at 22 oz/A + either
 - FirstRate at 0.15 or 0.3 oz/A or
 - Flexstar at 0.65 or 1.3 pt/A or
 - Cobra at 6.25 or 12.5 fl oz/A
- Adjuvants
 - AMS added to all treatments + either
 - Nothing or
 - NIS (0.25% v/v) or
 - MSO (1% v/v)

Giant Ragweed Control on June 27

Roundup OMAX 22 oz +	No adjuvant	NIS	MSO
FirstRate 0.15 oz	90	93	96
FirstRate 0.3 oz	98	89	85
Flexstar 0.65 pt	90	85	91
Flexstar 1.3 pt	93	84	86
Cobra 6.25 oz	86	83	89
Cobra 12.5 oz	85	96	90
LSD (0.05)			

Giant Ragweed Control on October 1

Roundup OMAX 22 oz +	No adjuvant	NIS	MSO
FirstRate 0.15 oz	85	91	95
FirstRate 0.3 oz	98	92	88
Flexstar 0.65 pt	91	93	93
Flexstar 1.3 pt	94	93	67
Cobra 6.25 oz	91	80	85
Cobra 12.5 oz	74	95	81
LSD (0.05)			

Giant Ragweed Field Study Results

- Most effective control of resistant giant ragweed biotypes in no-till soybeans requires the following:
 1. Preplant application of glyphosate plus 2,4-D plus a residual herbicide with activity on giant ragweed;
 2. Two POST applications:
 - glyphosate at 1.5 lb ae/A followed by 0.75 lb ae/A
 - Or
 - Reflex or Cobra followed by glyphosate
- Even the most effective herbicide treatments did not completely prevent seed production at all resistant sites.

Postemergence Weed Management in Roundup Ready Corn

- Concerns of a Weed Scientist
 - Is the system too simple?
 - Importance of proper timing
 - Lack of appreciation for what residuals do in soybeans.....and now corn
 - *Underestimation of the impact of early season weed competition on corn yield*

Early Season Corn and GRW N Accumulation

N timing	Corn	Giant ragweed
	-----Lb/A-----	
BPLT	27	11
SPLIT	28	16
SIDE	19	15
LSD (0.05)	3	4

Late Season Corn and GRW N Accumulation

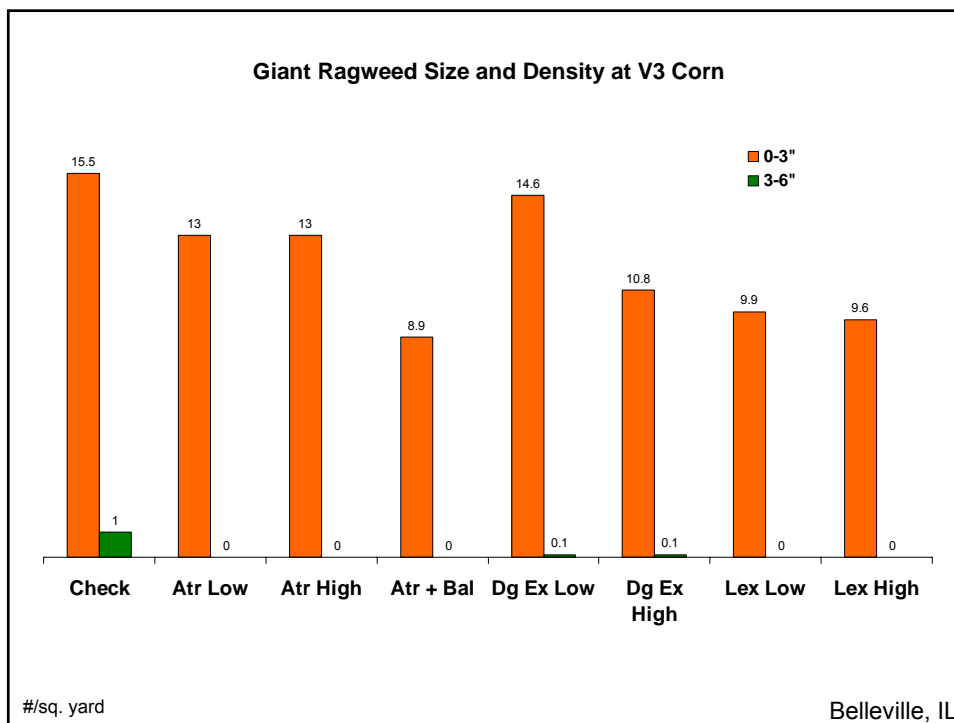
	Corn	Giant ragweed
	-----Lb/A-----	
BPLT	109	65
SPLIT	91	64
SIDE	88	101
LSD (0.05)	10	24

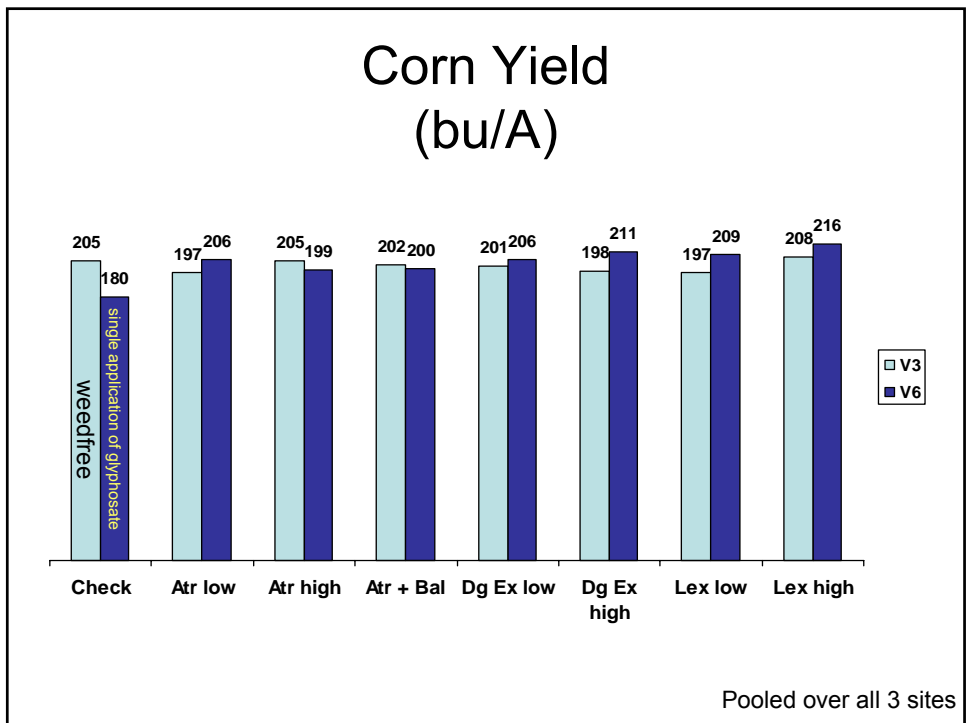
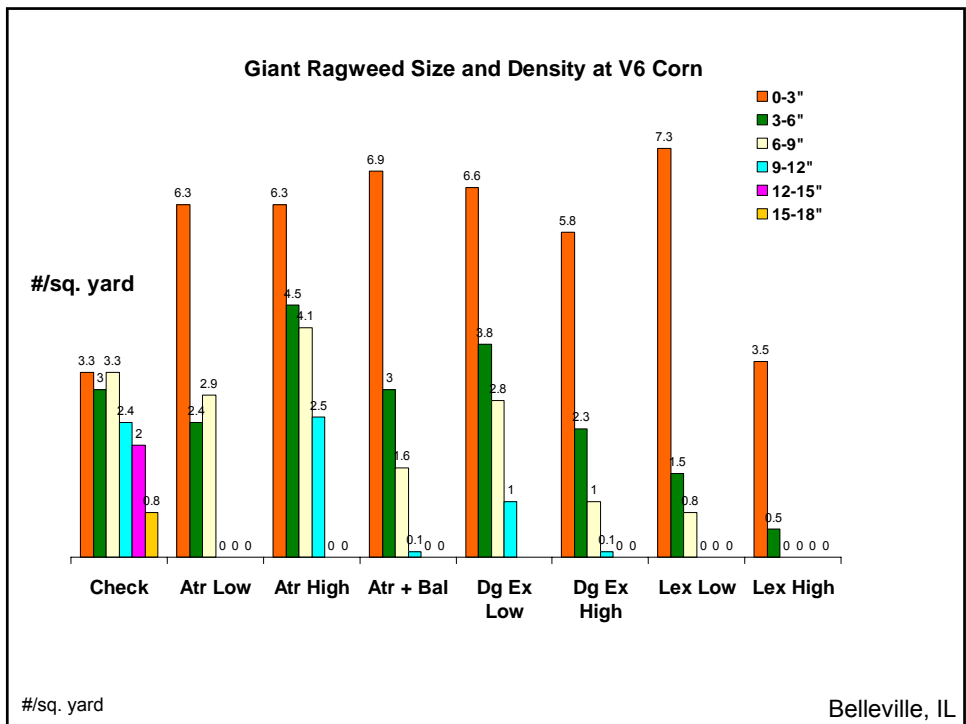
Corn Yield as Influenced by Giant Ragweed Interference Interval

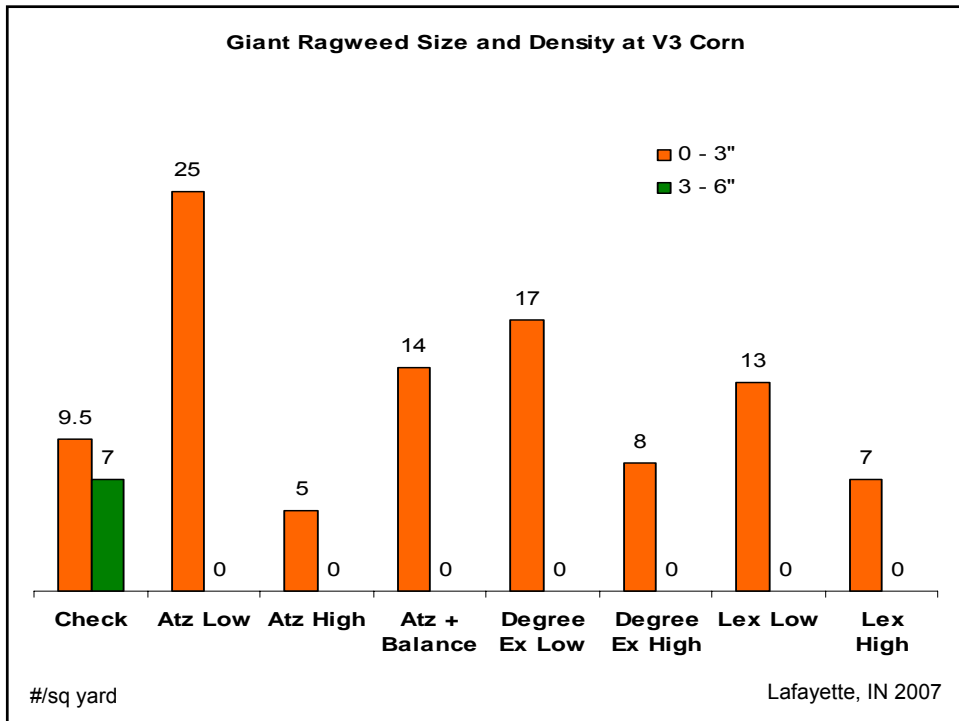
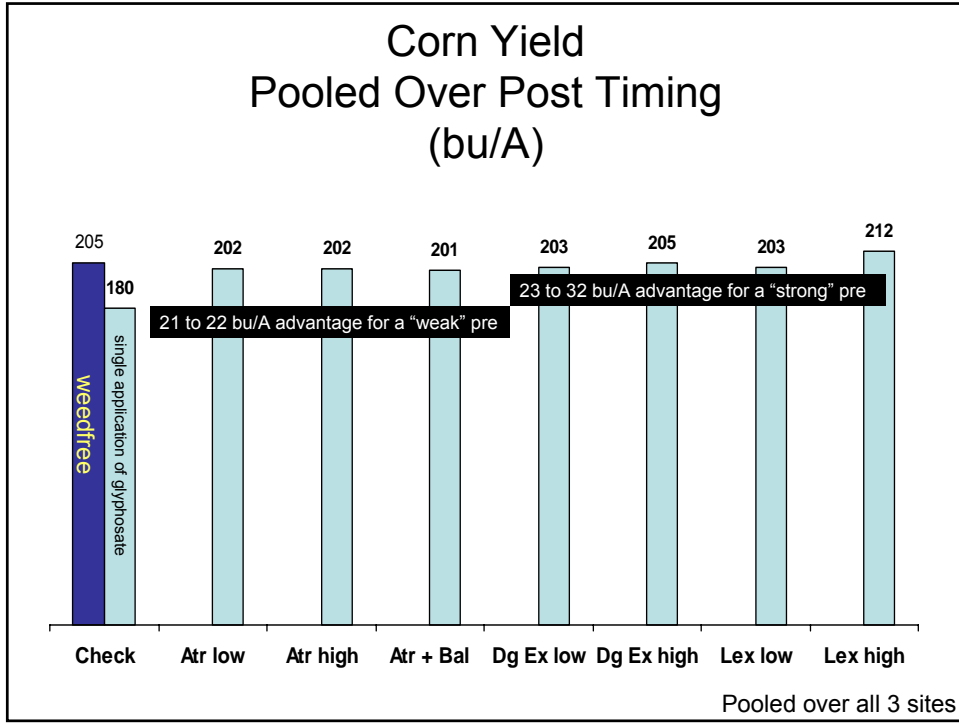
	Bu/A
Weed-free	183
Early-season interference	176
Season-long interference	149
LSD (0.05)	8

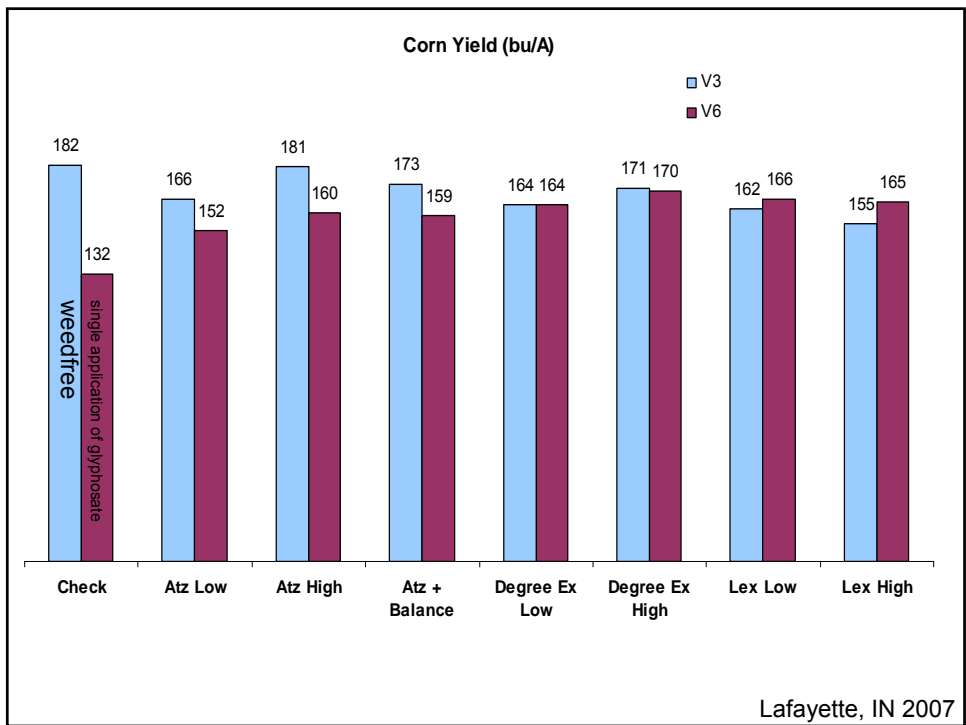
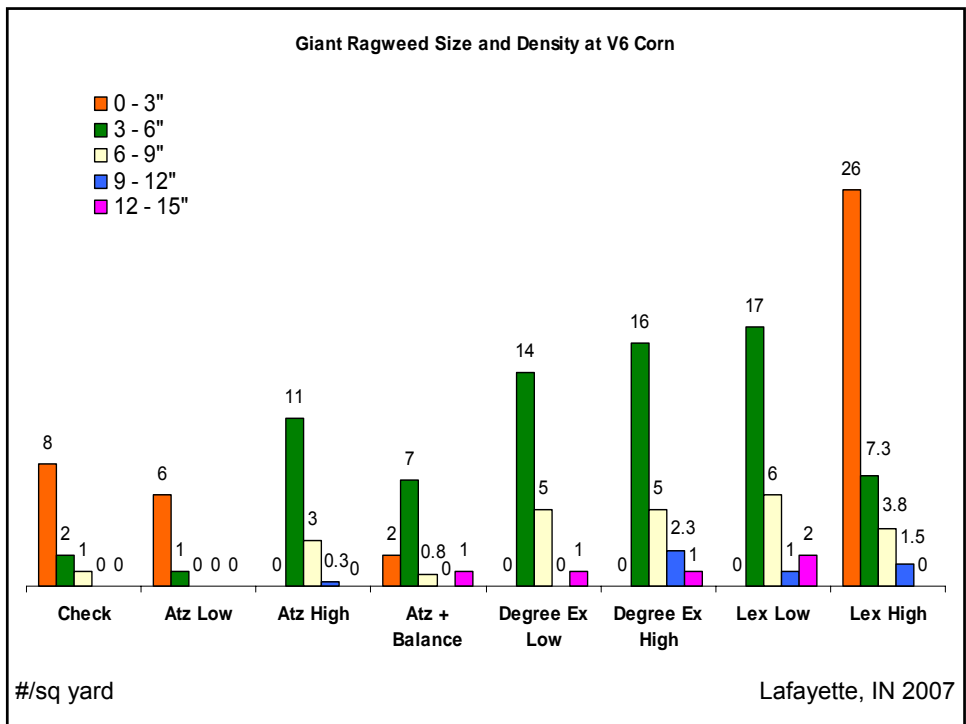
What is the role of the PRE herbicide?

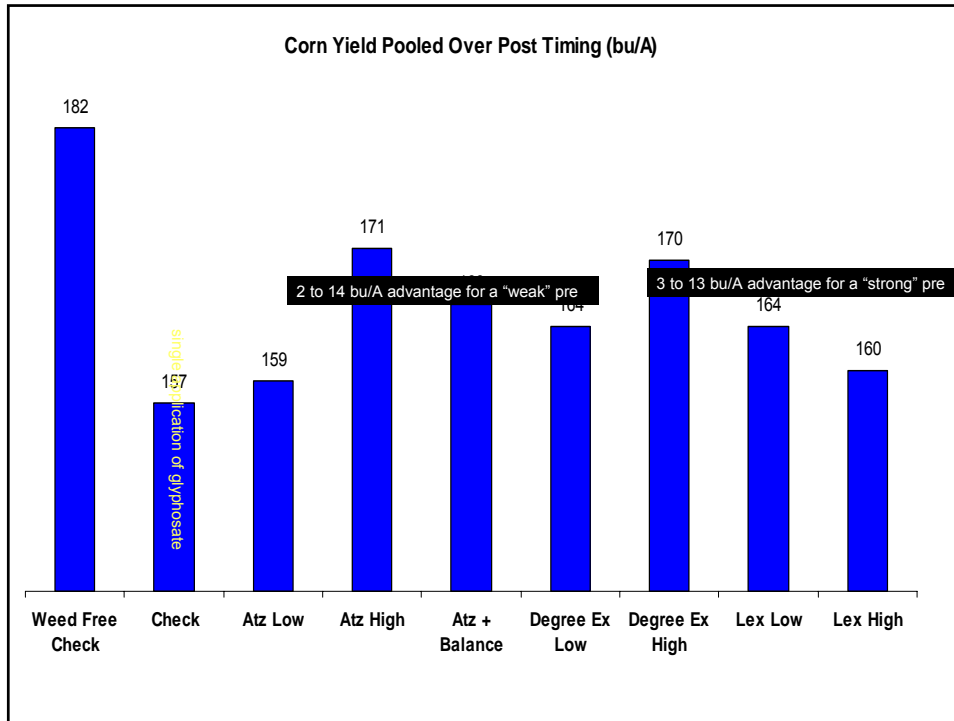
- Controls or suppresses the initial flush of weeds, which reduces competition with the crop
 - Protects yield
- Helps control weeds that emerge continuously
 - Residual helps with continuous emergers
 - POST app can be delayed to get late emergers
- Maximizes glyphosate activity
 - Weeds are smaller when POST applied
- Reduces selection pressure from glyphosate
 - Fewer weeds at time of POST application









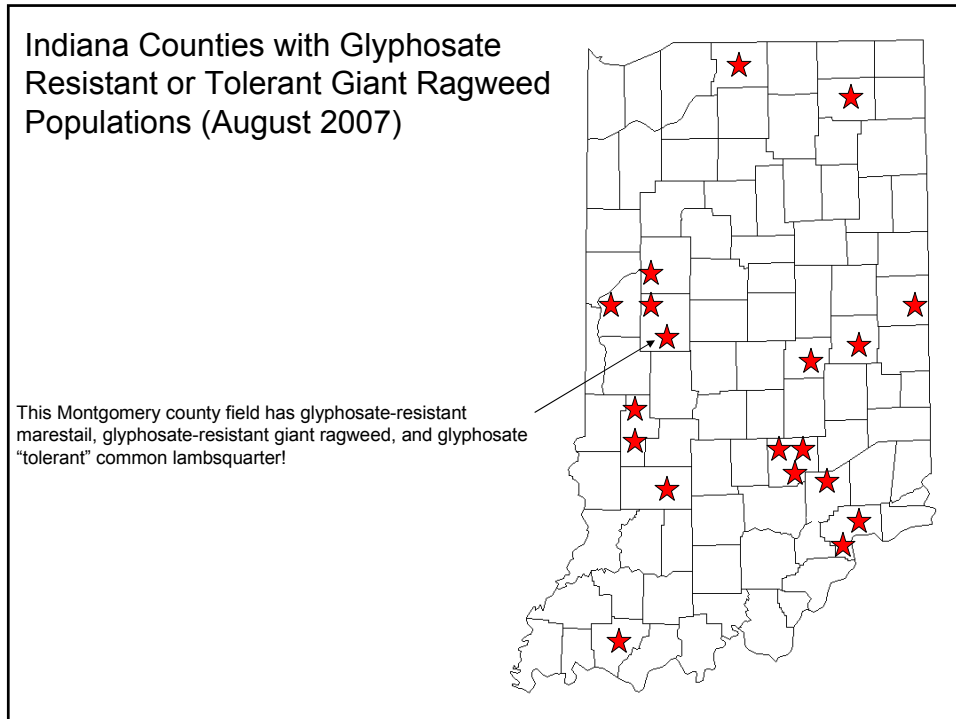


What is the best post application timing in RR corn?

- Conventional till experiment in Tippecanoe county
- Planted and pre's applied on April 24
 - None
 - Aatrex 1 qt
 - Bicep 1.2 qt
 - Lexar 3 qt
- Post glyphosate (0.75 lb ae/A) applied
 - May 29 or
 - June 5 or
 - June 15

Pre herbicide	Post timing		
	12 inch corn (May 29)	14 inch corn (June 5)	30 inch corn (June 15)
	# of giant ragweed/sq. meter at harvest		
None	3.8	1.3	0.5
Aatrex 1qt	2.3	2.3	0
Bicep 1.2 qt	4.8	1.3	0
Lexar 3 qt	1.3	0.5	0

Pre herbicide	Post timing		
	12 inch corn (May 29)	14 inch corn (June 5)	30 inch corn (June 15)
	Corn yield (bu/A)		
None	206	153	165
Aatrex 1qt	209	177	150
Bicep 1.2 qt	212	198	198
Lexar 3 qt	232	204	194



Montgomery County Field

- Weed Management Strategy for Soybean
 - Preplant
 - Glyphosate (1 qt) + 2,4-D (1 pt) + a residual herbicide for lambsquarter (Gangster, Canopy DF, Valor XLT)
 - \$6 + \$2 + \$11 = \$19/A
 - Postemergence
 - Glyphosate (2 qt) fb glyphosate (1 qt)
 - \$12 + \$6 = \$18/A
 - Total cost is now roughly \$37/A, up from \$18/A!

Cost of Glyphosate-Resistant Giant Ragweed in Soybean

- High yield loss potential (30-80%)
- No-tillers will need 2,4-D in the burndown = \$2/A
- Low level of glyphosate resistance can be managed with higher rates and more timely glyphosate treatments = \$4-8/A
- Preplant residual herbicides in soybeans = \$8-11/A
 - ALS products (FirstRate, Classic, Scepter) = alone \$8-9/A
 - Authority First, Canopy DF, Envive, Gangster, Sonic, Valor XLT = \$8-11/A
- Use of PPO's postemergence = \$13-15/A
- Use of ALS products postemergence = \$4-8/A
- Liberty Link soybeans = \$17/A (technology not available yet)

Purdue Weed Management Tools

- Purdue Weed Science Website
 - <http://www.btny.purdue.edu/weedscience>
- Weed Control Guide for Ohio and Indiana (WS-16)
 - <http://ohioline.osu.edu/b789/index.html>
 - Ph. 614 292-1607 (\$8.25 per copy)
 - 2008 Edition should be printed by the Indiana CCA Conference (3rd week in December).