Weed Control in a Mixed Trait World

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MISSISSIPPI STATE UNIVERSITY...

DELTA RESEARCH AND EXTENSION CENTER

Acknowledgment

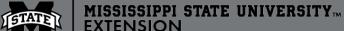
- ADAMA USA
- AMVAC Chemical
- BASF Corporation
- Bayer CropScience
- Crop Production Services
- Dow Agrosciences LLC
- DuPont Crop Protection



- FMC Corporation
- Gowan Company
- Jimmy Sanders, Inc.
- Horizon Ag
- Monsanto
- Riceco LLC
- Syngenta Crop Protection
- United Phosphorus, Inc.
- Valent USA Corporation







Herbicide Technologies in Soybean

- Conventional
- Roundup Ready
- ROUNDUP READY 2 YIELD SOYBEANS



ROUNDUP READY 2

SOYBEAN

- LibertyLink
- Roundup Ready 2 Xtend
- Enlist
- Balance GT
- MGI











Trait Summary

	Roundup Ready.		LIBERTY LINK®		Enlist Weed Control System		ROUNDUP READY® TEND CROP SYSTEM	
	Cotton	Soybean	Cotton	Soybean	Cotton	Soybean	Cotton	Soybean
Glyphosate	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Glufosinate	No	No	Yes	Yes	Yes	Yes	Yes	No
Dicamba	No	No	No	No	No	No	Yes	Yes
2,4-D	No	No	No	No	Yes	Yes	No	No





Wrong Resistance Trait

Cotton



Soybean





Application Timings

Fleystar GT.

- ICAStai	<u> </u>			
Preplant	PRE	Minimum-POST	Maximum-POST	Weed size
Yes	Yes	Emergence 45 d PHI		Range
Liberty 2				
Preplant	PRE	Weed size		
Yes Yes Emergence < R1 growth sta		< R1 growth stage	Range	
XtendiMa				

Preplant	PRE	Minimum-POST	Maximum-POST	Weed size
Yes	Yes	Emergence	R1 growth stage	≤ 4 inches

Enlist Duo, Enlist One:

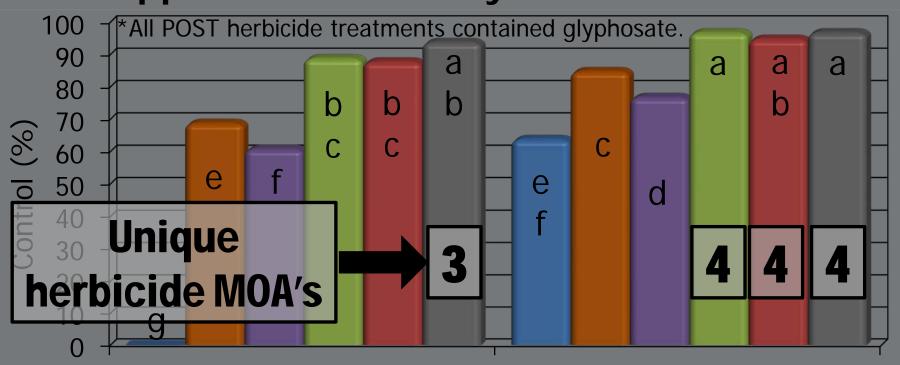
Preplant	PRE	Minimum-POST	Maximum-POST	Weed size
Yes	Yes	Emergence	R2 growth stage	3-6 inches





Application Timings

Palmer amaranth control 14 d after final POST application to V6 soybean in 2016 and 2017



No PRE

Boundary PRE

■ No POST

EXTENSION

- Dicamba at V6
- Dicamba + Dual Magnum at V3

- Dicamba at V3
- □ Dicamba at V3 fb V6
- Dicamba+Dual Magnum at V3 fb V6





Application Timings

Two applications of Liberty 280 at 29 OZ/A spaced 1 wk apart







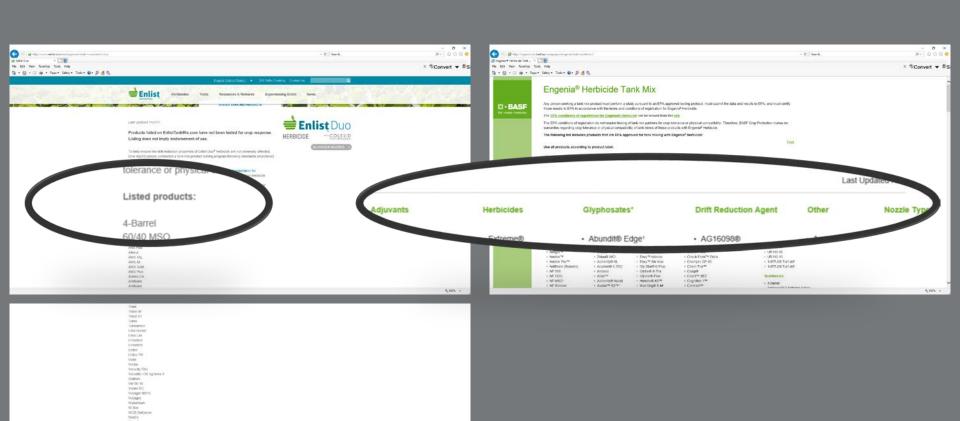
Initiated 2 WAP

Initiated 3 WAP

Initiated 4 WAP



Herbicide Mixtures/Additives







Contactive Crise Frader's News Hide Greener regellation and pro-

- beighteen

Herbicide Mixtures/Additives





Roundup PMAX + dicamba at V3





Warrant Ultra V3





Rainfall/Irrigation Free Period

Product	Rainfast
Flexstar GT	Rainfall shortly after application may reduce performance.

Product	Rainfast
Liberty 280	Liberty 280 is rainfast four hours after application.

Product	Rainfast	Rainfall free Period			
XtendiMax, FeXapan	4 hours	DO NOT make application if rain is expected in next 24 hours.			
Engenia	4 hours	DO NOT apply Engenia if rain is expected within 24 hours after application.			

Product	Rainfall	Irrigation
Enlist Duo, Enlist One	DO NOT make application if rain is expected in the next	DO NOT irrigate treated fields for at least 24 hours after
	24 hours.	application.





Rainfall/Irrigation Free Period

Dicamba runoff prior to planting

2,4-D runoff after crop emergence







Application Requirements

Product	Aerial apps.	Ground speed	Spray volume	Boom height	Nozzles	Pressure
		mph	GPA	in		PSI
Flexstar GT	Yes	≤ 10 suggested	15 to 20	Not specified	High flow rate	Not specified

Product	Aerial apps.	Ground speed	Spray volume	Boom height	Nozzles	Pressure
		mph	GPA	in		PSI
Liberty 280	Yes	≤ 10	≥ 10	Not specified	High flow rate	≥ 40





Application Requirements

Product	Aerial apps.	Ground speed	Spray volume	Boom height	Nozzles	Pressure
		mph	GPA	in		PSI
XtendiMax	No	≤ 15	≥ 15	≤ 24	26 listed	Range
Engenia	No	≤ 15	≥ 10	≤ 24	13 listed	Varied
FeXapan	No	≤ 15	≥ 15	≤ 24		

Product	Aerial apps.	Ground speed	Spray volume	Boom height	Nozzles	Pressure
		mph	GPA	in		PSI
Enlist Duo, Enlist One	No	Varied	10 to 15	Varied, but ≤ 24 in	23 listed	Range





Sprayer Cleanout

Damage from rinsate





Damage from contaminated boom







Off-target Movement









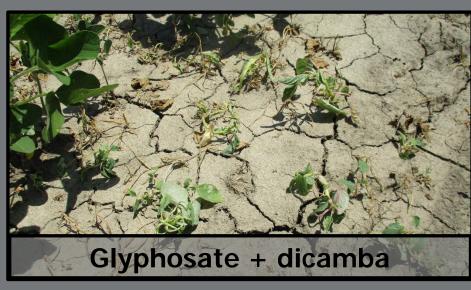




Efficacy/Selection Pressure













Concerns with New Technologies

- Crop injury
 - Physical drift
 - Tank contamination/cleanout
 - **✓** Volatility
- Technology management and stewardship
 - Managing different technologies in close proximity
 - Efficacy All require use in a herbicide program
 - Application over broad geography in short time
 - Rotation of technologies
 - -Herbicide resistance





Herbicide-resistant Italian Ryegrass













Herbicide-resistant Italian Ryegrass













Weed Control in MS Row Crops

2018Weed Management Suggestions for
Mississippi Row Crops



2018 Weed Management Suggestions in Mississippi Row Crops

			w	ad Da				Weed						ergeno	.1								
	Ammanda (redoest)	Serryandgrass	Broadlanf signalgrass	Onlypnes	Decksalad	Ripto	Pall paricon	Glyphosate-resistant horseweed	Georgead	(coffeebear)	Mominggiony	Northern jointvoxh	Palmor amanumb	Peersy handa stranto ced	Red rice	Nico flats edge	Spilorush	Sprangletup (Amazon)	Sprangletop (hearded)	Spreading daythmer	lexassweed	Volunteer glyphosate- rosistant soyteem	Yellow natiodge
Clearfield Rice System																							
Beyond	8	8	9	2	2	6	7	100	8	3	3	3	6	- 5	9	5	100	5	5	6	5	0	w
Clearpeth	8	9	. 9	9	6	- 8	6		.0	2.	8	7.	5	6	8.	. 9		6	6	6	7	- A	8
Newpath (2 applications)	8	9	9	9	1	0	9	0.00	5	0	2	0	6	1.3	9	9	9	6	S	5	3	0	8
Provisin Rice System	7.5		-		- 50							7.7				7.5	1	100			7.50		
Provisia (2 applications)	9	9	9	9	0	0	9	0	0	0	0	0	0	0	9	0	.0	9	. 0	0	0	0	0
Postemergence (Before Flood)	133				-		1											333					
Aim	6	0	0	0	5	7	0	0.00		9	9	7	7	9	0	0	.0	0	0	7	6	2	0
Claucher SF	- 0	8	9	- 6	0	0	9	0	0	0	0	0	0	0	0	0	.0	8	9	.0	0	0	0
Grandstand	- 8	0	0	0	4	9	0	6	5	9	90	8		6	0	6	6	0	0	6	8	9	0
Grasp	7	-	-				-	-			-	-	-	-				-		-	-	-	
Grasp Xtra	7																						

2018 Weed Management Suggestions in Mississippi Row Crops

Rice Weed Management

Herbicide	Formulation	Sand, loamy sand	Sandy loam	Loam, silt, silt loam, sandy elay, sandy elay loam	Silty elay, clay loam, silty elay loam, elay
Clomozone	3 ME	Do not use	Do not use	0.8 to 1.125 pt/A	1.33 to 1.6 pt/A
Quinelorae	75 DF	Do not use	0.33 to 0.44 lb/A	0.44 to 0.5 lb/A	0.5 to 0.67 lb/A
	4 L	Do not use	0.5 to 0.67 pt/A	0.67 to 0.75 pt/A	0.75 to 1 pt/A
	1.5 L	Do not use	21 to 28 oz/A	28 to 32 oz/A	32 to 42 oz/A

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Preplant				
2,4-D amine - 0.5 to 1 lb/A	Various formulations (see product label for specific rates)	At least 30 days prior to planting	Armual and perennial broadleaf weeds	Do not apply by air after March 31. Do not apply more than 2.5 pints per growing season. 2.4-D may be mixed with glyphosate to improve grass and broadleaf control.
flumioxazin = 0.032 to 0.064 lb/A	Flumioxazin 51 WDG – 1 to 2.5 oz/A or 4 SC – 1 to 2.6 oz/A	At least 30 days before planting	Annual broadlesf weeds	Used in a burndown program will provide residual control of horseweed, henbit, chickweed, and dandelion. Will enhance control of cutleaf evening- primerose when applied in program with glyphosate, paraquat, and/or 2,4-D.
glyphosate = 1 to 1.5 lb/A	Various formulations (see product label for specific rates)	Preplant or preemergence	Aranual and perennial grasses and broadleaf weeds	Apply to actively growing weeds < 6 inches tall. Use higher rate for weeds > 6 inches tall. Olyphosate may be mixed with soil-applied herbicides for residual activity.
glyphosate + clomazone - I to 1.5 lb/A + 0.3 to 0.6 lb/A	Various formulations (see product label for specific rates) = clomazone (3 lb/gal formulations) = 0.8 to 1.6 pt/A	Preplant or preemergence	Armual and perennial grasses and broadleaf weeds plus residual control of annual grasses	See Special Instructions and Remarks for glyphosate and clomazone. The field must be free of standing water at of application. Antaporisis may occur in some vinations. Use the full rate of glyphosate. Sequential postenisergence grass berbiside application will be needed. See table at beginning of section for specific clomazone rates by self texture.
halosulfuron = 0.031 to 0.062 lb/A	Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	Preplant or preemergence	Yellow nutsedge, annual broadleaf weeds	Avoid off-site movement to soybean. Application is safe to rice when soil pH is less than 8.0. Do not make more than one preplication pergrowing season. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
halosulfuron + thifensulfuron = 0.024 + 0.0028 lb/A	Permit Plus 75 WG — 0.75 oz/A	Preplant or preemergence	Pennsylvania smartweed, yellow nutsedge, annual broadleaf weeds	Avoid off-site movement to soybean. Application is safe to rice when soil pH is less than 8.0. Do not make more than one proplant peremergence application per growing season. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 15% v/v.
paraquat = 0.5 to 1 lb/A	Various formulations (see product label for specific rates)	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	Avoid off-site movement to emerged vegetation. Clomazone at 0.3 to 0.6 pounds active ingredient per core may be added for residual control of grasses. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.

http://extension.msstate.edu/sites/default/files/publications/publications/p3171.pdf





Questions?

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