

WHAT IS UP WITH SOME NEW AND OLD HERBICIDES

Dr. Bill Johnson



Presentation Topics

- “New” corn and soybean premixes
- How do we improve the durability of these new premixes
- Weed shifts in Enlist E3 systems

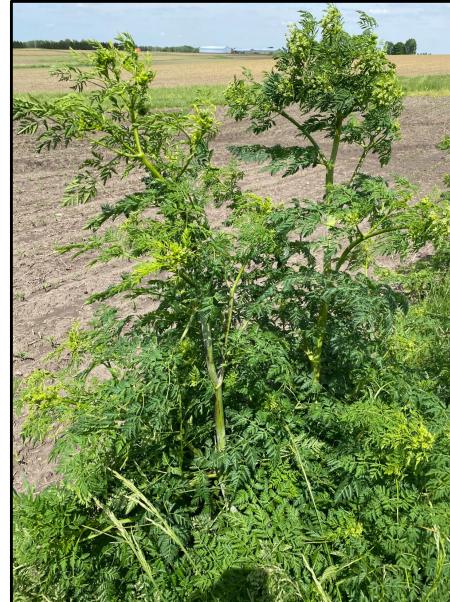
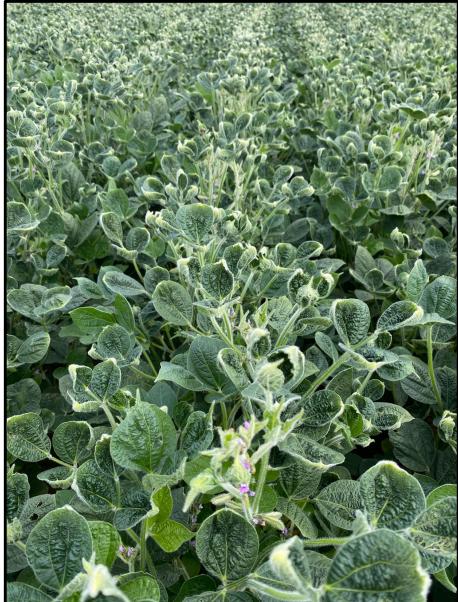


Table 3. Weed Response to Preplant/Preemergence Herbicides in Corn—Grasses

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables. See pages 21–22 for additional information on site of action classification.

	Site of Action	Crop Tolerance	Grasses											
			Barnyardgrass	Crabgrass	Fall Panicum	Field Sandbur	Giant Foxtail	Yellow Foxtail	Shattercane	Rhizome Johnsongrass	Quadriflora	Wooly Cogongrass	Yellow Nutsedge	
Preplant or Preemergence														
Acetochlor ¹	15	1	9	9	8	7	9	9	-	-	-	7+	8	
Acetochlor + atrazine ¹	5/15	1	9	9	8	7	9	9	-	-	6	7+	8	
Acuron	5/27/15	1	9	9	8+	6	9	9	-	-	6	7	8	
Acuron Flexi /Storen	15/27	1	8	9	8+	6	9	9	-	-	-	7	8	
Anthem Flex/Maxx	14/15	1	8	8	8	6	9	8	-	-	-	6	-	
Atrazine	5	0	8	-	-	6	7	7	-	-	8	-	7	
Atrazine + mesotrione + metolachlor	5/27/15	1	9	9	8+	6	9	9	-	-	6	7	8	
Balance Fllex	27	1	7	7	7	6	7	6	6	-	8	-	-	
Corvus	2/27	1	8	8+	8+	6	8+	8+	7	7	-	7	7	
Coyote	15/27	1	8	9	8+	6	9	9	-	-	-	7	8	
Fierce EZ ^{2,3}	14/15	1	8	8	8	6	8	8	-	-	-	6	-	
Fierce MTZ ²	5/14/15	1	8	8	8	6	8	8	-	-	-	6	-	
Flumioxazin ³	14	1	-	-	-	-	-	-	-	-	-	-	-	
Harness Max	15/27	1	9	9	8	7	9	9	-	-	-	7+	8	
Hornet	2/4	2	-	-	-	-	-	-	-	-	-	-	-	
Maverick	4/15/27	1	8	8	8	6	9	8	-	-	-	6	-	
Mesotrione	27	1	-	6	-	-	-	-	-	-	-	-	-	
Metolachlor ¹	15	1	8	9	8+	6	9	9	-	-	-	7	8	
Metolachlor + atrazine ¹	5/15	1	9	9	8	6	9	9	-	-	6	7	8	
Outlook, Armezon PRO	15, 15/27	1	8	8+	8	6	8+	8+	-	-	7	8	-	
Prequel ²	2/27	2	8	7	8	-	8	7	6	6	-	6	-	
Python	2	2	-	-	-	-	-	-	-	-	-	-	-	
Resicore/Resicore XL	4/15/27	1	9	9	8	7	9	9	-	-	-	7+	8	
Resolve Q/Crusher	2	1	7	6	6	-	7	7	-	-	-	-	-	
Sharpen ²	14	1	-	-	-	-	-	-	-	-	-	-	-	
Simazine	5	0	8	7	7	6	8	8	-	-	6	-	-	
SureStart/TripleFlex/Threesidual ²	2/4/15	2	8	8	8	-	8	8	-	-	6	7	-	
Trivolt	2/25/27	1	9	8	8	7	9	9	-	-	-	-	-	
Verdict ²	14/15	1	8	8	8	6	8	8	-	-	7	-	-	
Zidua	15	1	8	8	8	6	9	8	-	-	-	6	-	
Preemergence														
Lorox/Linx	7	2	-	-	-	-	-	-	-	-	-	-	-	
Pendimethalin	3	2	8	8	8	7	8	8	6	6	-	8	-	

¹SureStart/TripleFlex, Verdict, Sharpen, Fierce, and Prequel are intended for use in planned preemergence followed by postemergence programs, and ratings indicate early-season effectiveness, not full-season control. PRE application of these products should be followed with a POST application of Liberty, glyphosate, or other herbicides as necessary.

²Must be applied at least 7 days before corn planting. Use only in no-till fields.

Table 4. Weed Response to Preplant/Preemergence Herbicides in Corn—Broadleaf Weeds

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables. See pages 21–22 for additional information on site of action classification.

	Site of Action	Crop Tolerance	Broadleaf Weeds																
			Annual Morning Glory	Eastern Black Nightshade	Burcucumber	Coclebur	Common Ragweed	Common Ragweed (group 2-R)	Giant Ragweed	Giant Ragweed (group 2-R)	Jimsonweed	Kodia	Lambsquarters (group 5-R)	Palmer Amaranth (group 2-R)	Pigweed (indroot/smooth)	Smartweed	Velvetleaf	Waterhemp (group 2-R)	Waterhemp (group 2-27-R)
Preplant or Preemergence																			
Acetochlor ¹	-	8+	-	-	6	6	6	-	-	-	7	7	8	8+	-	-	7+	7+	
Acetochlor + atrazine ¹	8	9	6	8	9	9	9	8+	8+	9	9	9	9	9	9	9	8	9	8
Acuron	8	9	7	8+	9	9	9	8+	8+	9	9	9	9	9	9	9	9	9	8+
Acuron Flexi /Storen	6	9	7	7	7	7	6	6	-	6/7	9	9	8	9	9	9	9	9	7/8
Anthem Flex/Maxx	-	8	-	-	7	7	-	-	-	7+	8	8	8	8	8	-	7	8	8
Atrazine	8	9	6	8	9	9	8	8	8	9	9	9	-	8	9	9	8	8	8
Atrazine+mesotrione + metolachlor	8	9	7	8	9	9	8	8	8	9	9	9	9	9	9	9	9	9	8+
Balance Fllex	-	9	7	-	9	9	6	6	6	9	9	9	9	8	9	8	9	8	-
Corvus	-	9	7	-	9	9	6	6	6	9	9	9	9	8	9	8	9	8	-
Coyote	6	9	7	7	7	7	6	6	-	6	9	9	8	9	9	9	9	9	7
Fierce EZ ^{2,3}	7	9	-	-	8	8	-	-	-	7	9	9	8	9	7	7	8	8	8
Fierce MTZ ²	7	9	-	-	8	8	-	-	-	8	9	9	8	9	8	7	7	8	8
Flumioxazin ³	7	9	-	-	7	7	-	-	-	7	9	9	8	9	7	7	8	8	8
Harness Max	6	9	7	7	7	7	6	6	-	6	9	9	9	9	9	9	9	9	9
Hornet	6	8+	-	8	8+	8+	7	7	8	8	9	9	-	9	8+	9	-	9	-
Maverick	6	9	7	8	9	9	8	8	8	7	9	9	9	8	9	9	9	9	8
Mesotrione	6	9	7	7	7	7	6	6	-	6	9	9	7	9	9	9	7	-	-
Metolachlor ¹	-	8	-	-	-	-	-	-	-	-	6	7	8	-	-	7	7	-	-
Metolachlor + atrazine ¹	8	9	6	8	9	9	8	8	8	9	9	9	6	8+	9	9	8	8+	8+
Outlook, Armezon PRO	-	8+	-	-	-	-	-	-	-	-	6	6	7+	8	-	-	7+	7+	-
Prequel ²	7	8	7	-	8	8	6	6	8	9	9	9	8	9	8	9	8	9	-
Python	-	8	-	7	7	-	-	-	-	7	7	9	9	-	9	8+	7	-	-
Resicore/Resicore XL	6	9	7	8	9	9	8	8	8	7	7	9	9	8	9	9	9	9	7+
Resolve Q/Crusher	7	-	-	-	7	-	-	-	-	7	8	7	7	-	7	7	6	-	-
Sharpen ²	8	8	-	8	8	8	7	7	8	8	9	9	8	9	8	9	8	8	8
Simazine	7	9	6	7	9	9	7	7	8	-	9	-	8	9	8+	7	8	8	8
SureStart/TripleFlex/Threesidual ²	6	8+	-	8	8+	8+	7+	7+	8	9	9	7	9	8+	8+	7	7	7	7
Trivolt	-	9	-	9	9	9	6	6	9	9	9	9	8	9	9	9	9	9	9
Verdict ²	8	9	-	8	9	9	8	8	8	8	9	9	9	9	9	9	9	9	9
Zidua	-	8	-	7	7	-	-	-	-	7+	8	8	8	8	8	8	-	7	8
Preemergence																			
Lorox/Linx	-	7	-	6	8	8	-	-	6	6	9	9	7	9	9	6	7	7	
Pendimethalin	-	-	-	-	-	-	-	-	7	8	8	7	9	-	-	7	-	7	

¹SureStart/TripleFlex, Verdict, Sharpen, Fierce, and Prequel are intended for use in planned preemergence followed by postemergence programs, and ratings indicate early-season effectiveness, not full-season control. PRE application of these products should be followed with a POST application of Liberty, glyphosate, or other herbicides as necessary.

²Must be applied at least 7 to 14 days before corn planting depending upon rate. Use only in no-till fields.

“OLD” Corn Herbicides for the Preemergence Residual Market

- Bicep II Magnum 5.5 L
 - 2.1 qt/A
 - 1.3 pt Dual II Magnum 7.64 EC
 - 1.6 lb ai atrazine
- Harness Xtra 5.6 L
 - 2.4 qt/A
 - 1.86 lb ai acetochlor
 - 1.5 lb ai atrazine

“OLD” Corn Herbicides for the Preemergence Residual Market

- Bicep II Magnum 5.5 L + Balance, Hornet, or Callisto
 - 2.1 qt/A
 - 1.3 pt Dual II Magnum 7.64 EC
 - 1.6 lb ai atrazine
- Harness Xtra 5.6 L + Balance, Hornet or Callisto
 - 2.4 qt/A
 - 1.86 lb ai acetochlor
 - 1.5 lb ai atrazine
- Lexar 3.7 L
 - 3 qt/A
 - 1.35 pt Dual II Magnum 7.64 EC
 - 1.3 lb ai atrazine
 - 5.3 oz mesotrione 4L
- Acuron 3.44 L
 - 3 qt/A
 - 1.7 pt Dual II Magnum 7.64 EC
 - 0.75 lb ai atrazine
 - 5.76 oz mesotrione 4L
 - 0.045 lb ai bycyclopyrone

“OLD” Corn Herbicides for the Preemergence Residual Market

- Bicep II Magnum 5.5 L
 - 2.1 qt/A
 - 1.3 pt of Dual II Magnum 7.64 EC
 - 1.6 lb ai atrazine
- Harness Xtra 5.6 L
 - 2.4 qt/A
 - 1.86 lb ai acetochlor
 - 1.5 lb ai atrazine
- Lexar 3.7 L
 - 3 qt/A
 - 1.35 pt of Dual II Magnum 7.64 EC
 - 1.3 lb ai atrazine
 - 5.3 oz mesotrione 4L
- Acuron 3.44 L
 - 3 qt/A
 - 1.7 pt of Dual II Magnum 7.64 EC
 - 0.75 lb ai atrazine
 - 5.76 oz mesotrione 4L
 - 0.045 lb ai bycyclopyrone
- Corvus 2.63 SC
 - 5.6 oz/A
 - 5.3 oz Balance Flexx 2L
 - 0.032 lb ai thiencarbazone
- SureStart 4.25 L
 - 2.5 pt/A
 - 1.17 lb ai acetochlor
 - 0.12 lb ai clopyralid
 - 0.7 oz Python 80 WDG
- Resicore 3.29 L
 - 2.5 qt/A
 - 1.75 lb ai acetochlor
 - 0.12 lb ai clopyralid
 - 6 oz/A mesotrione 4L
- Acuron Flexi 3.26 L
 - 2 qt/A
 - 1.5 pt of Dual II Magnum 7.64 EC
 - 5.1 oz mesotrione 4L
 - 0.04 lb ai bycyclopyrone

“New” Corn Herbicides for the Preemergence Residual Market

- Maverick 2.2L
 - Preplant, preemergence, postemergence up to V6 corn
 - 20 oz/A
 - 3.3 oz Zidua SC
 - 4.11 oz mesotrione 4L
 - 0.11 lb ai clopyralid
- TriVolt 3.65 SCV
 - Preplant, preemergence, postemergence up to V2 corn
 - 20 oz/A
 - 5.7 oz Balance Flex
 - 0.44 lb ai flufenacet
 - 0.036 lb ai thiencarbazone
- Storen 3.2 ZC
 - Preplant, preemergence, postemergence up to V8 corn
 - 2.1qt/A
 - 1.44 pt S. metolachlor
 - 2.4 oz Zidua SC
 - 5.2 oz mesotrione 4L
 - 0.039 lb ai/A of bicyclopyrone (half life of 20-357 days)
- Sustain 1.63 L
 - Preplant, preemergence, postemergence?
 - 14 oz/A
 - 3.3 oz Zidua SC
 - 3 oz Sharpen

“New” Corn Herbicides for the Preemergence Residual Market – enhancing grass control

- Maverick 2.2L
 - Preplant, preemergence, postemergence up to V6 corn
 - 20 oz/A
 - 3.3 oz Zidua SC
 - 4.11 oz mesotrione 4L
 - 0.11 lb ai clopyralid
- TriVolt 3.65 SCV
 - Preplant, preemergence, postemergence up to V2 corn
 - 20 oz/A
 - 5.7 oz Balance Flex
 - 0.44 lb ai flufenacet
 - 0.036 lb ai thiencarbazone
- Storen 3.2 ZC
 - Preplant, preemergence, postemergence up to V8 corn
 - 2.1qt/A
 - 1.44 pt S. metolachlor
 - 2.4 oz Zidua SC
 - 5.2 oz mesotrione 4L
 - 0.039 lb ai/A of bicyclopyrone (half life of 20-357 days)
- Sustain 1.63 L
 - Preplant, preemergence, postemergence?
 - 14 oz/A
 - 3.3 oz Zidua SC
 - 3 oz Sharpen

Table 3. Weed Response to Preplant/Preemergence Herbicides in Corn—Grasses

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables. See pages 21–22 for additional information on site of action classification.

	Site of Action	Crop Tolerance	Grasses											
			Barnyardgrass	Crabgrass	Fall Panicum	Field Sandbur	Giant Foxtail	Yellow Foxtail	Shattercane	Rhizome Johnsongrass	Quadriflora	Wooly Cogongrass	Yellow Nutsedge	
Preplant or Preemergence														
Acetochlor ¹	15	1	9	9	8	7	9	9	-	-	-	7+	8	
Acetochlor + atrazine ¹	5/15	1	9	9	8	7	9	9	-	-	6	7+	8	
Acuron	5/27/15	1	9	9	8+	6	9	9	-	-	6	7	8	
Acuron Flexi /Storen	15/27	1	8	9	8+	6	9	9	-	-	-	7	8	
Anthem Flex/Maxx	14/15	1	8	8	8	6	9	8	-	-	-	6	-	
Atrazine	5	0	8	-	-	6	7	7	-	-	8	-	7	
Atrazine + mesotrione + metolachlor	5/27/15	1	9	9	8+	6	9	9	-	-	6	7	8	
Balance Fllex	27	1	7	7	7	6	7	6	6	-	8	-	-	
Corvus	2/27	1	8	8+	8+	6	8+	8+	7	7	-	7	7	
Coyote	15/27	1	8	9	8+	6	9	9	-	-	-	7	8	
Fierce EZ ^{2,3}	14/15	1	8	8	8	6	8	8	-	-	-	6	-	
Fierce MTZ ²	5/14/15	1	8	8	8	6	8	8	-	-	-	6	-	
Flumioxazin ³	14	1	-	-	-	-	-	-	-	-	-	-	-	
Harness Max	15/27	1	9	9	8	7	9	9	-	-	-	7+	8	
Hornet	2/4	2	-	-	-	-	-	-	-	-	-	-	-	
Maverick	4/15/27	1	8	8	8	6	9	8	-	-	-	6	-	
Mesotrione	27	1	-	6	-	-	-	-	-	-	-	-	-	
Metolachlor ¹	15	1	8	9	8+	6	9	9	-	-	-	7	8	
Metolachlor + atrazine ¹	5/15	1	9	9	8	6	9	9	-	-	6	7	8	
Outlook, Armezon PRO	15, 15/27	1	8	8+	8	6	8+	8+	-	-	7	8	-	
Prequel ²	2/27	2	8	7	8	-	8	7	6	6	-	6	-	
Python	2	2	-	-	-	-	-	-	-	-	-	-	-	
Resicore/Resicore XL	4/15/27	1	9	9	8	7	9	9	-	-	-	7+	8	
Resolve Q/Crusher	2	1	7	6	6	-	7	7	-	-	-	-	-	
Sharpen ²	14	1	-	-	-	-	-	-	-	-	-	-	-	
Simazine	5	0	8	7	7	6	8	8	-	-	6	-	-	
SureStart/TripleFlex/Threesidual ²	2/4/15	2	8	8	8	-	8	8	-	-	6	7	-	
Trivolt	2/25/27	1	9	8	8	7	9	9	-	-	-	-	-	
Verdict ²	14/15	1	8	8	8	6	8	8	-	-	7	-	-	
Zidua	15	1	8	8	8	6	9	8	-	-	-	6	-	
Preemergence														
Lorox/Linx	7	2	-	-	-	-	-	-	-	-	-	-	-	
Pendimethalin	3	2	8	8	8	7	8	8	6	6	-	8	-	

¹SureStart/TripleFlex, Verdict, Sharpen, Fierce, and Prequel are intended for use in planned preemergence followed by postemergence programs, and ratings indicate early-season effectiveness, not full-season control. PRE application of these products should be followed with a POST application of Liberty, glyphosate, or other herbicides as necessary.

²Must be applied at least 7 days before corn planting. Use only in no-till fields.

Table 4. Weed Response to Preplant/Preemergence Herbicides in Corn—Broadleaf Weeds

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables. See pages 21–22 for additional information on site of action classification.

	Site of Action	Crop Tolerance	Broadleaf Weeds																
			Annual Morning Glory	Eastern Black Nightshade	Burcucumber	Coclebur	Common Ragweed	Common Ragweed (group 2-R)	Giant Ragweed	Giant Ragweed (group 2-R)	Jimsonweed	Kodia	Lambsquarters (group 5-R)	Palmer Amaranth (group 2-R)	Pigweed (indroot/smooth)	Smartweed	Velvetleaf	Waterhemp (group 2-R)	Waterhemp (group 2-27-R)
Preplant or Preemergence																			
Acetochlor ¹	-	8+	-	-	6	6	6	-	-	-	7	7	8	8+	-	-	7+	7+	
Acetochlor + atrazine ¹	8	9	6	8	9	9	9	8+	8+	9	9	9	9	9	9	9	8	9	8
Acuron	8	9	7	8+	9	9	9	8+	8+	9	9	9	9	9	9	9	9	9	8+
Acuron Flexi /Storen	6	9	7	7	7	7	6	6	-	6/7	9	9	8	9	9	9	9	9	7/8
Anthem Flex/Maxx	-	8	-	-	7	7	-	-	-	7+	8	8	8	8	8	-	7	8	8
Atrazine	8	9	6	8	9	9	8	8	8	9	9	9	-	8	9	9	8	8	8
Atrazine+mesotrione + metolachlor	8	9	7	8	9	9	8	8	8	9	9	9	9	9	9	9	9	9	8+
Balance Fllex	-	9	7	-	9	9	6	6	6	9	9	9	9	8	9	8	9	8	-
Corvus	-	9	7	-	9	9	6	6	6	9	9	9	9	8	9	8	9	8	-
Coyote	6	9	7	7	7	7	6	6	-	6	9	9	8	9	9	9	9	9	7
Fierce EZ ^{2,3}	7	9	-	-	8	8	-	-	-	7	9	9	8	9	7	7	8	8	8
Fierce MTZ ²	7	9	-	-	8	8	-	-	-	8	9	9	8	9	8	7	7	8	8
Flumioxazin ³	7	9	-	-	7	7	-	-	-	7	9	9	8	9	7	7	8	8	8
Harness Max	6	9	7	7	7	7	6	6	-	6	9	9	9	9	9	9	9	9	9
Hornet	6	8+	-	8	8+	8+	7	7	8	8	9	9	-	9	8+	9	-	9	-
Maverick	6	9	7	8	9	9	8	8	8	7	9	9	9	8	9	9	9	9	8
Mesotrione	6	9	7	7	7	7	6	6	-	6	9	9	7	9	9	9	7	-	-
Metolachlor ¹	-	8	-	-	-	-	-	-	-	-	6	7	8	-	-	7	7	-	-
Metolachlor + atrazine ¹	8	9	6	8	9	9	8	8	8	9	9	9	6	8+	9	9	8	8+	8+
Outlook, Armezon PRO	-	8+	-	-	-	-	-	-	-	-	6	6	7+	8	-	-	7+	7+	-
Prequel ²	7	8	7	-	8	8	6	6	8	9	9	9	8	9	8	9	8	9	-
Python	-	8	-	7	7	-	-	-	-	7	7	9	9	-	9	8+	7	-	-
Resicore/Resicore XL	6	9	7	8	9	9	8	8	8	7	7	9	9	8	9	9	9	9	7+
Resolve Q/Crusher	7	-	-	-	7	-	-	-	-	7	8	7	7	-	7	7	6	-	-
Sharpen ²	8	8	-	8	8	8	7	7	8	8	9	9	8	9	8	9	8	8	8
Simazine	7	9	6	7	9	9	7	7	8	-	9	-	8	9	8+	7	8	8	8
SureStart/TripleFlex/Threesidual ²	6	8+	-	8	8+	8+	7+	7+	8	9	9	7	9	8+	8+	7	7	7	7
Trivolt	-	9	-	9	9	9	6	6	9	9	9	9	8	9	9	9	9	9	9
Verdict ²	8	9	-	8	9	9	8	8	8	8	9	9	9	9	9	9	9	9	9
Zidua	-	8	-	7	7	-	-	-	-	7+	8	8	8	8	8	8	-	7	8
Preemergence																			
Lorox/Linx	-	7	-	6	8	8	-	-	6	6	9	9	7	9	9	6	7	7	
Pendimethalin	-	-	-	-	-	-	-	-	7	8	8	7	9	-	-	7	-	7	

¹SureStart/TripleFlex, Verdict, Sharpen, Fierce, and Prequel are intended for use in planned preemergence followed by postemergence programs, and ratings indicate early-season effectiveness, not full-season control. PRE application of these products should be followed with a POST application of Liberty, glyphosate, or other herbicides as necessary.

²Must be applied at least 7 to 14 days before corn planting depending upon rate. Use only in no-till fields.

“New” Corn Herbicides for the Preemergence Residual Market – enhancing giant ragweed, morningglory and burcucumber, waterhemp control

- Maverick 2.2L
 - Preplant, preemergence, postemergence up to V6 corn
 - 20 oz/A
 - 4.11 oz mesotrione 4L
 - 0.11 lb ai cropyralid
 - 3.3 oz Zidua SC
- TriVolt 3.65 SCV
 - Preplant, preemergence, postemergence up to V2 corn
 - 20 oz/A
 - 5.7 oz Balance Flex
 - 0.44 lb ai flufenacet
 - 0.036 lb ai thiencarbazone
- Storen 3.2 ZC
 - Preplant, preemergence, postemergence up to V8 corn
 - 2.1qt/A
 - 1.44 pt S. metolachlor
 - 2.4 oz Zidua SC
 - 5.2 oz mesotrione 4L
 - 0.039 lb ai/A of bicyclopyrone (half life of 20-357 days)
- Sustain 1.63 L
 - Preplant, preemergence, postemergence?
 - 14 oz/A
 - 3 oz Sharpen
 - 3.3 oz Zidua SC

Table 3. Weed Response to Preplant/Preemergence Herbicides in Corn—Grasses

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables. See pages 21–22 for additional information on site of action classification.

	Site of Action	Crop Tolerance	Grasses											
			Barnyardgrass	Crabgrass	Fall Panicum	Field Sandbur	Giant Foxtail	Yellow Foxtail	Shattercane	Rhizome Johnsongrass	Quadriflora	Wooly Cogongrass	Yellow Nutsedge	
Preplant or Preemergence														
Acetochlor ¹	15	1	9	9	8	7	9	9	-	-	-	7+	8	
Acetochlor + atrazine ¹	5/15	1	9	9	8	7	9	9	-	-	6	7+	8	
Acuron	5/27/15	1	9	9	8+	6	9	9	-	-	6	7	8	
Acuron Flexi /Storen	15/27	1	8	9	8+	6	9	9	-	-	-	7	8	
Anthem Flex/Maxx	14/15	1	8	8	8	6	9	8	-	-	-	6	-	
Atrazine	5	0	8	-	-	6	7	7	-	-	8	-	7	
Atrazine + mesotrione + metolachlor	5/27/15	1	9	9	8+	6	9	9	-	-	6	7	8	
Balance Fllex	27	1	7	7	7	6	7	6	6	-	8	-	-	
Corvus	2/27	1	8	8+	8+	6	8+	8+	7	7	-	7	7	
Coyote	15/27	1	8	9	8+	6	9	9	-	-	-	7	8	
Fierce EZ ^{2,3}	14/15	1	8	8	8	6	8	8	-	-	-	6	-	
Fierce MTZ ²	5/14/15	1	8	8	8	6	8	8	-	-	-	6	-	
Flumioxazin ³	14	1	-	-	-	-	-	-	-	-	-	-	-	
Harness Max	15/27	1	9	9	8	7	9	9	-	-	-	7+	8	
Hornet	2/4	2	-	-	-	-	-	-	-	-	-	-	-	
Maverick	4/15/27	1	8	8	8	6	9	8	-	-	-	6	-	
Mesotrione	27	1	-	6	-	-	-	-	-	-	-	-	-	
Metolachlor ¹	15	1	8	9	8+	6	9	9	-	-	-	7	8	
Metolachlor + atrazine ¹	5/15	1	9	9	8	6	9	9	-	-	6	7	8	
Outlook, Armezon PRO	15, 15/27	1	8	8+	8	6	8+	8+	-	-	7	8	-	
Prequel ²	2/27	2	8	7	8	-	8	7	6	6	-	6	-	
Python	2	2	-	-	-	-	-	-	-	-	-	-	-	
Resicore/Resicore XL	4/15/27	1	9	9	8	7	9	9	-	-	-	7+	8	
Resolve Q/Crusher	2	1	7	6	6	-	7	7	-	-	-	-	-	
Sharpen ²	14	1	-	-	-	-	-	-	-	-	-	-	-	
Simazine	5	0	8	7	7	6	8	8	-	-	6	-	-	
SureStart/TripleFlex/Threesidual ²	2/4/15	2	8	8	8	-	8	8	-	-	6	7	-	
Trivolt	2/25/27	1	9	8	8	7	9	9	-	-	-	-	-	
Verdict ²	14/15	1	8	8	8	6	8	8	-	-	7	-	-	
Zidua	15	1	8	8	8	6	9	8	-	-	-	6	-	
Preemergence														
Lorox/Linx	7	2	-	-	-	-	-	-	-	-	-	-	-	
Pendimethalin	3	2	8	8	8	7	8	8	6	6	-	8	-	

¹SureStart/TripleFlex, Verdict, Sharpen, Fierce, and Prequel are intended for use in planned preemergence followed by postemergence programs, and ratings indicate early-season effectiveness, not full-season control. PRE application of these products should be followed with a POST application of Liberty, glyphosate, or other herbicides as necessary.

²Must be applied at least 7 days before corn planting. Use only in no-till fields.

Table 4. Weed Response to Preplant/Preemergence Herbicides in Corn—Broadleaf Weeds

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables. See pages 21–22 for additional information on site of action classification.

	Site of Action	Crop Tolerance	Broadleaf Weeds																
			Annual Morning Glory	Eastern Black Nightshade	Burcucumber	Coclebur	Common Ragweed	Common Ragweed (group 2-R)	Giant Ragweed	Giant Ragweed (group 2-R)	Jimsonweed	Kodia	Lambsquarters (group 5-R)	Palmer Amaranth (group 2-R)	Pigweed (ind-root/smooth)	Smartweed	Velvetleaf	Waterhemp (group 2-R)	Waterhemp (group 2-27-R)
Preplant or Preemergence																			
Acetochlor ¹	-	8+	-	-	6	6	6	-	-	-	7	7	8	8+	-	-	7+	7+	
Acetochlor + atrazine ¹	8	9	6	8	9	9	9	8+	8+	9	9	9	9	9	9	9	8	9	8
Acuron	8	9	7	8+	9	9	9	8+	8+	9	9	9	9	9	9	9	9	9	8+
Acuron Flexi /Storen	6	9	7	7	7	7	6	6	-	6/7	9	9	8	9	9	9	9	9	7/8
Anthem Flex/Maxx	-	8	-	-	7	7	-	-	-	7+	8	8	8	8	8	-	7	8	8
Atrazine	8	9	6	8	9	9	8	8	8	9	9	9	-	8	9	9	8	8	8
Atrazine+mesotrione + metolachlor	8	9	7	8	9	9	8	8	8	9	9	9	9	9	9	9	9	9	8+
Balance Fllex	-	9	7	-	9	9	6	6	6	9	9	9	9	8	9	8	9	8	-
Corvus	-	9	7	-	9	9	6	6	6	9	9	9	9	8	9	8	9	8	-
Coyote	6	9	7	7	7	7	6	6	-	6	9	9	8	9	9	9	9	9	7
Fierce EZ ^{2,3}	7	9	-	-	8	8	-	-	-	7	9	9	8	9	7	7	8	8	8
Fierce MTZ ²	7	9	-	-	8	8	-	-	-	8	9	9	8	9	8	7	7	8	8
Flumioxazin ³	7	9	-	-	7	7	-	-	-	7	9	9	8	9	7	7	8	8	8
Harness Max	6	9	7	7	7	7	6	6	-	6	9	9	9	9	9	9	9	9	9
Hornet	6	8+	-	8	8+	8+	7	7	8	8	9	9	-	9	8+	9	-	9	-
Maverick	6	9	7	8	9	9	8	8	8	7	9	9	9	8	9	9	9	9	8
Mesotrione	6	9	7	7	7	7	6	6	-	6	9	9	7	9	9	9	7	-	-
Metolachlor ¹	-	8	-	-	-	-	-	-	-	-	6	7	8	-	-	7	7	-	-
Metolachlor + atrazine ¹	8	9	6	8	9	9	8	8	8	9	9	9	6	8+	9	9	8	8+	8+
Outlook, Armezon PRO	-	8+	-	-	-	-	-	-	-	-	6	6	7+	8	-	-	7+	7+	-
Prequel ²	7	8	7	-	8	8	6	6	8	9	9	9	8	9	8	9	8	9	-
Python	-	8	-	7	7	-	-	-	-	7	7	9	9	-	9	8+	7	-	-
Resicore/Resicore XL	6	9	7	8	9	9	8	8	8	7	7	9	9	8	9	9	9	9	7+
Resolve Q/Crusher	7	-	-	-	7	-	-	-	-	7	8	7	7	-	7	7	6	-	-
Sharpen ²	8	8	-	8	8	8	7	7	8	8	9	9	8	9	8	9	8	8	8
Simazine	7	9	6	7	9	9	7	7	8	-	9	-	-	8	9	8+	7	8	8
SureStart/TripleFlex/Threesidual ²	6	8+	-	8	8+	8+	7+	7+	8	9	9	7	9	8+	8+	7	7	7	7
Trivolt	-	9	-	9	9	9	6	6	9	9	9	9	8	9	9	9	9	9	7
Verdict ²	8	9	-	8	9	9	8	8	8	8	9	9	9	9	9	9	9	9	9
Zidua	-	8	-	7	7	-	-	-	-	7+	8	8	8	8	8	8	-	7	8
Preemergence																			
Lorox/Linx	-	7	-	6	8	8	-	-	6	6	9	9	7	9	9	6	7	7	
Pendimethalin	-	-	-	-	-	-	-	-	-	7	8	8	7	9	-	-	7	7	

¹SureStart/TripleFlex, Verdict, Sharpen, Fierce, and Prequel are intended for use in planned preemergence followed by postemergence programs, and ratings indicate early-season effectiveness, not full-season control. PRE application of these products should be followed with a POST application of Liberty, glyphosate, or other herbicides as necessary.

²Must be applied at least 7 to 14 days before corn planting depending upon rate. Use only in no-till fields.

“New” Corn Herbicides for the Postemergence Market

- Topyralate products
 - Shieldex 3.33L – topyralate alone
 - Group 27 (HPPD) – similar to Impact and Laudis
 - 1 – 1.35 oz/A
 - 1 oz = 0.026 lb ai/A
 - Apply up to V6 or 20 inch tall corn
 - Soil half life – 0.2 to 1.2 days, but a 9 month rotational restriction to soybean
 - MSO is the preferred adjuvant
 - Restraint 6.949L - topyralate + acetochlor
 - 30 oz/A
 - 0.84 oz Shieldex 3.33L
 - 1.5 lb ai/A acetochlor
 - Katagon 2L – topyralate + nicosulfuron
 - 3 oz/A
 - 0.9 oz Shieldex 3.33L
 - 0.69 oz Accent Q 54.5 DF

“New” Corn Herbicides for the Postemergence Market

- Kyro
 - 45 oz/a
 - 0.97 lb ai acetochlor
 - 0.7 oz Impact
 - 0.087 lb ai cropyralid
- Sinate 2.57 SL
 - 24 oz/A
 - 25 oz glufosinate 2.34 XL
 - 0.86 oz Impact 2.8SC

“New” Corn Herbicides for the Postemergence Market

- Halex GT vs Acuron GT
 - Halex GT
 - 3.6 pt/A
 - 1 pt Dual II Magnum 7.68 EC
 - 3 oz/A mesotrione 4L
 - 0.94 lb glyphosate acid eq.
 - Acuron GT
 - 3.75 pt/A
 - 1 pt Dual II Magnum 7.68 EC
 - 3 oz/A mesotrione 4L
 - 0.94 lb glyphosate acid eq.
 - 0.045 lb ai bycyclopyrone

Table 5. Weed Response to Postemergence Herbicides in Corn—Grasses

	Site of Action	Crop Tolerance	Grasses												Yellow Nutsedge
			Barnyardgrass	Crabgrass	Fall Panicum	Field Sandbur	Giant Foxtail	Yellow Foxtail	Shattercane	Seedling Johnsongrass	Rhizome Johnsongrass	Quackgrass	Woolly Cupgrass		
Postemergence															
2,4-D, Enlist One ³	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Auron GT ²	9/27/15	1	9	9	9	9	9	9	9	9	9	9	9	9	6
Aim/Longbow	14	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Atrazine	5	1	7	-	-	-	8	8	-	-	-	7	-	7	
Basagran	6	0	-	-	-	-	-	-	-	-	-	-	-	8	
Bromoxynil	6	1	-	-	-	-	-	-	-	-	-	-	-	-	
Bromoxynil + atrazine	5/6	1	-	-	-	-	-	-	-	-	-	-	-	-	
Calisto Xtra	5/27	1	-	7*	-	-	-	-	-	-	-	-	-	-	
Capreno	2/27	1	8	8	8	8	8+	9	8	8	7	7	6	-	
Clopyralid	4	0	-	-	-	-	-	-	-	-	-	-	-	-	
Dicamba	4	2	-	-	-	-	-	-	-	-	-	-	-	-	
Dicamba + atrazine	4/5	2	-	-	-	-	-	-	-	-	-	-	-	-	
DiFlexx DUO	4/27	0	8	8	-	6	7	9	8	8	7	7	7+	-	
Enlist Duo ³	4/9	0	8	8	8	9	9	9	9	9	9	9	9	9	6
Glufosinate ¹	10	0	6	8	8	7	8	6	8	8	7	6	8+	-	
Glyphosate ²	9	0	8	8	8	9	9	9	9	9	9	9	9	9	6-7
Halex GT ²	9/27/15	1	9	9	9	9	9	9	9	9	9	9	9	9	6
Halosulfuron	2	1	-	-	-	-	-	-	-	-	-	-	-	-	9
Hornet	2/4	1	-	-	-	-	-	-	-	-	-	-	-	-	
Impact/Impact Core/Armezon/ Armezon PRO	27	0	7	7	6	-	7+	7	6	7	-	-	6	-	
ImpactZ	27/5	0	8	8	6	-	8+	7+	6	7	-	-	6	-	
Katagon	2/27	1	7	-	7	6	7	7	7	7	-	-	7	-	
Katagon + atrazine	2/5/27	1	8	-	8	6	8	8	8	8	-	7	7	-	
Kyro	4/15/27	0	7	7	6	-	7+	7	6	7	-	-	6	-	
Laudis	27	0	8	8	-	6	7	9	8	8	7	7	7+	-	
Laudis + atrazine	27/5	0	8	8	-	6	8	9	8	8	7	7	7+	-	
Mesotrione	27	1	-	7*	-	-	-	-	-	-	-	-	-	-	
Nicosulfuron	2	1	8+	-	8+	8	9	9	9	9	9	9	8	6	
Realm Q	2/27	1	7	-	7	6	7	7	7	7	-	-	7	-	
Resolve Q	2	1	7	-	7	6	7	7	7	7	-	-	7	-	
Resource	14	2	-	-	-	-	-	-	-	-	-	-	-	-	

	Site of Action	Crop Tolerance	Grasses												Yellow Nutsedge
			Barnyardgrass	Crabgrass	Fall Panicum	Field Sandbur	Giant Foxtail	Yellow Foxtail	Shattercane	Seedling Johnsongrass	Rhizome Johnsongrass	Quackgrass	Woolly Cupgrass		
Postemergence															
Restraint	15/27	1	7	7	6	-	7+	7	6	7	-	-	6	-	-
Revelin Q	2/27	1	8+	7*	8+	8	9	9	9	9	9	9	9	8	6
Shieldex	27	0	7	7	6	-	7+	7	6	7	-	-	6	-	-
Shieldex + atrazine	5/27	0	8	8	6	-	8+	7+	6	7	-	-	6	-	-
Sinate1	10/27	0	8	8+	8+	7	8+	8	8+	8+	7	6	8+	-	-
Solstice	14/27	2	-	7*	-	-	-	-	-	-	-	-	-	-	-
Starane/Comet	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Status	4/19	1	6	6	6	-	6	6	-	-	-	-	-	-	-
Steadfast Q	2	1/2	8	-	8	8	9	9	9	9	8	8	7	-	-
WideMatch	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Yukon	2/4	2	-	-	-	-	-	-	-	-	-	-	-	-	9

¹Apply to glufosinate-resistant corn only - LibertyLink, Enlist, etc.²Apply to glyphosate-resistant corn only - Roundup Ready, Enlist, etc.³Apply to Enlist corn only (resistant to glyphosate and 2,4-D)

*Large crabgrass only

Table 6. Weed Response to Postemergence Herbicides in Corn—Broadleaf Weeds

Postemergence	Broadleaf Weeds																		
	Annual Morning Glory	Eastern Black Nightshade	Burcucumber	Cocklebur	Common Ragweed	Common Ragweed (group 2-R)	Giant Ragweed	Giant Ragweed (group 2-R)	Jimsonweed	Kochia	Lambsquarters	Lambsquarters (group 5-R)	Palmer Amaranth (group 2+9-R)	Palmer Amaranth (group 2+9-R)	Pigweed (redroot/smooth)	Smartweed	Velvetleaf	Waterhemp (group 2+9-R)	Waterhemp (group 2+9+27-R)
2,4-D, Enlist One ³	9	7	-	9	9	9	9	9	7	9	9	8	8	9	6	8	8	8	8
Auron GT ²	8	9	8	9	9	9	8+	8+	9	8	9	9	9	8	9	9	9	9	-
Aim/Longbow	8	8	-	-	6	6	-	-	7+	7	7	-	-	8+	-	9	-	-	-
Atrazine	9	9	8	9	9	9	8	8	9	9	9	-	8+	8+	9	9	8	8+	8
Basagran	-	-	-	9	7	7	6	6	9	7	6	6	-	-	-	9	8+	-	-
Bromoxynil	8	9	7	9	9	9	8	8	9	8	9	9	-	-	7	8	8	-	-
Bromoxynil + Atrazine	9	9	9	9	9	9	9	9	9	9	9	8	8	8	9	9	8	8	8+
Callisto Xtra	8	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7
Capreno	7	9	8	8	8	8	8	8	9	8+	9	9	8	8	9	8	9	8	-
Clopyralid	-	8	-	9	9	9	9	9	9	8	-	-	-	-	-	-	-	-	-
Dicamba	9	8	7	9	9	9	9	9	9	8	8	8	8	8	8	7+	8	8	8
Dicamba + atrazine	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
DiFlexx DUO	9	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Enlist Duo ³	9	8	8	9	9	9	9	9	9	8	9	9	9	8	9	9	9	8	8
Glufosinate ¹	8	9	8	9	9	9	9	9	9	8	7	7	8	8	8	9	8	8	8
Glyphosate ²	6	8	8	9	8+	8+	8+	8+	9	8	8+	8+	8	-	9	8	8	9	-
Halex GT ²	8	9	8	9	9	9	8+	8+	9	8	9	9	9	8	9	9	9	9	8
Halosulfuron	6	-	-	9	8	-	8	-	8	7	-	-	-	-	9	7	8	-	-
Hornet	7	7	6	9	9	9	9	9	7	7	7	7	-	-	7	9	8+	-	-
Impact/Impact Core/Armezon/ Armezon PRO	7	9	7+	8	7	7	7	7	9	8+	9	9	8	8	9	6	9	8	8
ImpactZ	8	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7
Katagon	9	7+	8	7	7	7	7	7	7	9	9	8+	8+	9	8+	9	8	8	-
Katagon + atrazine	8	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7
Kyro	7	9	7+	9	9	9	9	9	9	8+	9	9	8	8	9	6	9	8	8
Laudis	7	9	7	8	8	8	8	8	9	8	9	9	8	8	9	8	9	8	-
Laudis + atrazine	8	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7
Mesotrione	7	9	8	7+	7	7	8	8	9	8	9	9	8	8	8	9	9	8	8
Nicosulfuron	7	-	8	-	-	-	-	-	8	-	-	-	-	-	9	8	-	-	-
Realm Q	7	9	7+	8	8	7	8	8	9	8	9	9	8	8	9	9	9	8	8
Resolve Q	-	-	-	6	6	-	-	-	7+	7	7	-	-	8	6	7	-	-	-

Resource	Broadleaf Weeds																		
	Annual Morning Glory	Eastern Black Nightshade	Burcucumber	Cocklebur	Common Ragweed	Common Ragweed (group 2-R)	Giant Ragweed	Giant Ragweed (group 2-R)	Jimsonweed	Kochia	Lambsquarters	Lambsquarters (group 5-R)	Palmer Amaranth (group 2+9-R)	Palmer Amaranth (group 2+9-R)	Pigweed (redroot/smooth)	Smartweed	Velvetleaf	Waterhemp (group 2+9-R)	Waterhemp (group 2+9+27-R)
Restraint	-	-	-	7	7	7	-	-	7	7	7	7	9	8+	9	9	8+	9	8
Revolin Q	8	9	8	7+	7	7	8	8	9	8	9	9	9	9	9	9	9	9	8
Shieldex	7	9	7+	8	7	7	7	7	9	8+	9	9	9	9	9	9	8+	9	8
Shieldex + atrazine	8	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7
Sinate ¹	8+	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8
Solstice	8	9	8	8	7	7	8	8	9	8	9	9	9	9	9	9	8	9	9
Starane/Comet	9	7	7	8	9	9	-	-	7	9	-	-	-	-	-	7	8	-	-
Status	9	8	7	9	9	9	9	9	9	8	9	9	9	9	8	8	9	8	8
Steadfast Q	6	-	7	6	-	-	-	-	6	-	-	-	-	-	-	9	7	-	-
Tough + group 27 herbicide ⁴	8	9	8	9	8+	8+	9	9	9	8	9	9	9	9	9	9	9	9	9
WideMatch	9	7	7	9	9	9	9	9	9	8	9	9	9	9	9	-	7	8	-
Yukon	8	7	7	9	9	7	9	7	9	8	8	8	7+	7+	9	9	9	7+	7+

¹Apply to Liberty Link or Enlist (glufosinate-resistant) corn only.

²Apply to glyphosate-resistant (Roundup Ready, AgriGaur GT, etc.) corn only.

³Apply to Enlist corn only (resistant to glyphosate and 2,4-D).

⁴Group 27 herbicides include mesotrione, Impact/Armezon, Laudis, and Shieldex.

“New” Soybean Herbicides for the Preemergence Residual Market

- Intimidator

Intimidator 4.81L	S-metolachlor (3.39) metribuzin (0.75) fomesafen (0.67)	2.8 pt. =	1.24 pt. Dual II Magnum 7.64EC 5.6 oz. metribuzin 75DF 0.93 pt. fomesafen 2L
-------------------	---	-----------	--

- Fierce MTZ

Fierce MTZ 2.64L	flumioxazin (0.5) metribuzin (1.5) pyroxasulfone (0.64)	1 pt. =	2 oz. flumioxazin 51WDG 4 oz. metribuzin 75DF 1.5 oz. Zidua 85WDG
------------------	---	---------	---

- Tendovo

Tendovo 4.18L	cloransulam-methyl (0.065) metribuzin (0.642) S-metolachlor (3.47)	2.1 qt. =	0.65 oz FirstRate 84DF 7.2 oz metribuzin 75DF 1.9 pt. Dual II Magnum 7.64EC
---------------	--	-----------	---

- Trivence

Trivence 61.3WDG	chlorimuron (3.9%) flumioxazin (12.8%) metribuzin (44.6%)	8 oz. =	1.2 oz. Classic 25DF 2 oz. flumioxazin 51WDG 4.75 oz. metribuzin 75DF
------------------	---	---------	---

- Zidua Pro

Zidua PRO 4.09SC	saflufenacil (0.48) imazethapyr (1.33) pyroxasulfone (2.28)	6 oz. =	1 oz. Sharpen 2.85L + 4 oz. Pursuit 2L + 3.3 oz. Zidua 4.17SC
------------------	---	---------	---

Table 13. Weed Response to Preplant/Preemergence Herbicides in Soybeans—Grasses

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables. See pages 21–22 for more information on herbicide site of action classification and description of site of action groups.

Grasses													
Site of Action	Crop Tolerance	Barnyardgrass	Crabgrass	Fall Panicum	Field Sandbur	Giant Foxtail	Yellow Foxtail	Shattercane	Seedling Johnsongrass	Woolly Cupgrass	Yellow Nutsedge		
Preplant Incorporated Only													
Sonalan	3	1	9	9	9	8+	9	9	7	7	8+	-	
Trifluralin	3	1	9	9	9	8+	9	9	7	7	8+	-	
Preplant or Preemergence													
Alite 27 ¹	27	0	7	7	7	6	7	6	6	6	8	-	
Authority Edge/Supreme	14/15	2	8	8	8	6	8	8	-	-	6	-	
Authority First/Sonic	2/14	2	-	7	-	-	-	-	-	-	-	-	
Authority MAXX/XL, Zone Maxx	2/14	2	-	-	-	-	-	-	-	-	-	8	
Canopy Blend, Cloak DF	2/5	2	-	-	-	-	-	-	-	-	-	-	
Canopy/Cloak EX, Fallout	2	2	-	-	-	-	-	-	-	-	-	-	
Clomazone	13	0	9	9	9	7	9	9	6	6	7	-	
Envive/Enlite	2/14	2	-	-	-	-	-	-	-	-	-	-	
Fierce EZ	14/15	2+	8	8	8	6	8	8	-	-	6	-	
Fierce MTZ	5/14/15	2+	8	8	8	6	8	8	-	-	6	-	
Fierce XLT	2/14/15	2+	8	8	8	6	8	8	-	-	6	-	
FirstRate	2	0	-	-	-	-	-	-	-	-	-	-	
Flumioxazin	14	2	-	-	-	-	-	-	-	-	-	-	
Flumioxazin + metribuzin	5/14	2	6	-	6	-	6	6	-	-	-	-	
Intimidator	5/14/15	1	8	9	8+	6	8+	8+	-	-	7	8	
Latir	2/14	2	6	7	7	-	7	7	6	6	-	-	
Lorox	7	2	-	-	-	-	-	-	-	-	-	-	
Matador	2/5/15	1	9	9	8+	6	8+	8+	-	-	7	8	
Metolachlor/S-metolachlor	15	1	8	9	8+	6	8+	8+	-	-	7	8	
Metolachlor/metribuzin premix	5/15	2	8	9	8+	6	8+	8+	-	-	7	8	
Metribuzin >0.38 lb. ai/A	5	2	6	5	6	-	6	6	-	-	-	-	
Outlook	15	1	8	9	8	6	8	8	-	-	7	8	
Panther Pro	2/5/14	2	6	7	7	-	7	7	6	6	-	-	
Pendimethalin	3	2	8	9	9	8	8	8	7	7	8+	-	

Soybeans

Prefix/Vise/Statement	14/15	1	Grasses								Yellow Nutsedge			
			Barnyardgrass	Crabgrass	Fall Panicum	Field Sandbur	Giant Foxtail	Yellow Foxtail	Shattercane	Seedling Johnsongrass	Woolly Cupgrass			
Pummel	2/15	1	9	9	9	6	9	9	9	9	9	-	7	8
Pursuit	2	1	6	7	7	-	7	7	6	6	6	-	-	-
Python	2	1	-	-	-	-	-	-	-	-	-	-	-	-
Scepter	2	1	-	-	-	-	-	-	-	-	-	-	-	-
Sulfentrazone	14	2	7	7	7	-	7	7	-	-	-	-	8	
Sulfentrazone + imazethapyr	14/2	2	6	7	7	-	7	7	6	6	6	-	8	
Sulfentrazone + metolachlor/s-metolachlor	14/15	2	8	9	8	6	8+	8+	-	-	-	7	8	
Sulfentrazone + metribuzin	5/14	2	-	-	-	-	-	-	-	-	-	-	7	
Surveil	2/14	2	-	-	-	-	-	-	-	-	-	-	-	-
Tendovo	2/5/15	2	8	9	8	6	8+	8+	-	-	-	7	8	
Torment	2/14	1	6	7	7	-	7	7	6	6	6	-	-	-
Tripzin ZC	3/5	2	8	9	9	9	9	9	7	7	8+	-	-	-
Trivence	2/5/14	2	-	-	-	-	-	-	-	-	-	-	-	-
Valor XLT	2/14	2	-	-	-	-	-	-	-	-	-	-	-	-
Warrant	15	1	8	8	8	7	8	8	-	-	-	7	7	
Warrant Ultra	15/14	1	8	8	8	7	8	8	-	-	-	7	7	
Zidua, Anthem Flex/Maxx	15	1	8	8	8	6	9	8	-	-	-	6	-	-
Zidua PRO	2/14/15	2	8	8	8	-	8	8	6	6	6	-	6	
Zone Defense	14	2	7	7	7	-	7	7	-	-	-	-	8	

¹Use Alite 27 only on soybeans resistant to isoxaflutole, or GT27 soybeans. Not labeled for use in Illinois and only in some counties of Ohio.

Table 14. Weed Response to Preplant/Preemergence Herbicides in Soybeans—Broadleaf Weeds

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may be better or worse than indicated in the table, due to weather or soil conditions or other variables. See pages 21–22 for more information on herbicide site of action classification and description of site of action groups.

Broadleaf Weeds																			
Weed control rating:										Crop tolerance rating:									
9 = 90% to 100% control										0 = Excellent									
8 = 80% to 90% control										1 = Good									
7 = 70% to 80% control										2 = Fair									
6 = 60% to 70% control										3 = Poor									
- = less than 60% control, not recommended.										Crop injury of 1 or less is rarely significant.									
Annual Morning Glory	Eastern Black Nightshade	Burcucumber	Cocklebur	Common Ragweed	Common Ragweed (group 2-R)	Common Ragweed group 2+14-R	Giant Ragweed	Giant Ragweed (group 2-R)	Kochia	Lambsquarters	Lambsquarters (group 5-R)	Marestail (group 9-R) ¹	Marestail (group 2+9-R) ¹	Palmer Amaranth (group 2-R)	Pigweed (redroot/smooth)	Smartweed	Velvetleaf	Waterhemp (group 2-R)	Waterhemp (group 2+14-R)
Sonalan	-	-	-	-	-	-	-	7+	8+	8+	-	-	8	9	-	-	8	8	
Trifluralin	-	-	-	-	-	-	-	7+	8+	8+	-	-	8	9	-	-	8	8	
Preplant Incorporated Only																			
Authority First/Sonic	8+	8	-	8	9	-	-	7	-	8	9	9	9	8	8+	9	8	8+	
Authority MAXX/XL, Zone Maxx	8+	8	-	8	9	-	-	7	-	9	9	9	9	8	8+	9	8	8+	
Authority Edge/Supreme	8	9	-	-	-	-	-	-	-	8	9	9	8	8	9	8	7	8	
Canopy Blend, Cloak DF	7+	-	6	8	9	-	-	7	-	9	7	9	9	6	6	9	9	6	
Canopy/Cloak EX, Fallout	7+	-	6	8	9	-	-	7	-	9	7	9	9	9	-	9	9	8+	
Clomazone	-	6	-	6	7	7	-	-	-	8	9	9	9	-	-	8	9	-	
Envive/Enlite	8	9	6	8	9	7	-	7	-	9	8	9	9	8	8+	9	9	8+	
Fierce EZ	7	9	-	-	8	8	6	-	-	7+	9	9	8	8	9	7	7	9	
Fierce MTZ	7	9	-	-	7	7	6	-	-	7	8	9	9	8+	8+	9	7	8+	
Fierce XLT	8	9	6	8	9	7	-	7	-	9	7+	9	9	8	9	9	8+	7	
FirstRate	7+	-	-	8	9	-	-	7	-	-	9	9	9	-	-	9	8	8+	
Flumioxazin	7+	9	-	-	7	7	-	-	-	7+	9	9	8	8	8+	9	7	8+	
Flumioxazin + metribuzin	7	9	-	-	7	7	6	-	-	7	8	9	9	8+	8+	9	7	8	
Intimidator	-	9	-	-	8	8	-	-	-	7+	9	7	6	6	8	9	6	8	
Latir	8	9	-	7	8	7	-	6	-	8	9	9	9	8	8+	9	9	8+	
Lorox	-	7	-	6	8	8	8	-	-	6	6	9	9	-	-	7	9	7	
Matador	7	9	-	7	7	-	-	-	-	8	8	9	9	6	-	7	9	7	
Metolachlor/metribuzin premix	-	8	-	-	6	6	6	-	-	6	-	8	6	6	6	8+	9	8	
Metolachlor/S-metolachlor	-	8	-	-	-	-	-	-	-	6	6	-	-	7	8	-	-	7	
Metribuzin >0.38 lb. ai/A	-	-	-	-	6	6	6	-	-	7	8	9	-	8	9	9	7	8	
Outlook	-	8	-	-	-	-	-	-	-	6	6	-	-	7+	8	-	-	7+	

Soybeans

Broadleaf Weeds																		
Annual Morning Glory										Eastern Black Nightshade								
Burcucumber										Cocklebur								
Common Ragweed										Common Ragweed (group 2-R)								
Common Ragweed group 2+14-R										Common Ragweed group 2+14-R								
Giant Ragweed										Common Ragweed group 2-R								
Panther Pro	8	9	-	-	7	8	7	6	6	-	8	9	9	9	8+	8+	8+	8+
Pendimethalin	-	-	-	-	-	-	-	-	-	-	7+	8+	8+	-	-	7	9	-
Prefix/Vise/Statement	-	8	-	-	8	8	-	-	-	-	7	7	-	-	8	8	-	8
Pummel	7	9	-	-	7	6	-	-	6	-	8	8	9	9	-	-	7	9
Pursuit	7	9	-	-	7	6	-	-	6	-	8	8	9	9	-	-	9	9
Python	-	8	-	-	7	7	-	-	-	-	7	8	9	9	-	-	8	8+
Scepter	7	9	6	8	8	-	-	7	-	9	-	9	9	-	-	9	9	7
Sulfentrazone	8	9	-	-	-	-	-	-	-	-	8+	9	9	8	8	8+	9	8
Sulfentrazone + imazethapyr	8+	9	-	-	7	6	-	-	-	-	8	9	9	9	8	8+	9	8
Sulfentrazone + metolachlor/S-metolachlor	8	9	-	-	-	-	-	-	-	-	8+	9	9	8	8	9	9	8
Sulfentrazone + metribuzin	7	8	-	-	-	-	-	-	-	-	6	9	9	9	9	9	9	8
Surveil	8	9	-	-	8	9	7	-	7	-	9	8	9	9	8	8+	9	8+
Tendovo	7+	8	-	-	8	9	6	6	7	-	7	8	9	9	8	8+	9	8+
Torment	7	9	-	-	7	8	8	-	6	-	8	8	9	9	-	-	6	9
Tripzin ZC	-	-	-	-	6	6	6	-	-	7	8	9	8+	8	8	8	9	8
Trivence	8	9	6	8	9	7	-	7	-	9	8+	9	9	9	8	9	9	8+
Valor XLT	8	9	6	8	9	7	-	7	-	9	7+	9	9	9	8	8+	9	8+
Warrant	-	8	-	-	-	-	-	-	-	-	8	8	-	-	8	8	6	-
Warrant Ultra	-	8	-	-	8	8	-	-	-	-	8	8	-	-	8	8	-	8
Zidua, Anthem Flex/Maxx	-	8	-	-	7	7	6	-	-	-	8	8	8	-	-	8	8	-
Zidua PRO	7	9	-	7	7	-	-	-	-	-	7	8	9	9	7	-	7	9
Zone Defense	8+	9	-	-	6	6	-	-	-	-	9	9	9	8+	8+	9	9	9

¹ Marestail ratings are for residual control only (not burndown), and are based on a weedfree start at planting through use of an effective burndown treatment.
² Use Alite 27 only on soybeans resistant to isoxabenphos, or GT27 soybeans—not labeled for use in Illinois and only in some counties in Ohio.

“New” Soybean Herbicides for the Preemergence Residual Market – *enhancing giant ragweed control*

- Intimidator

Intimidator 4.81L	S-metolachlor (3.39) metribuzin (0.75) fomesafen (0.67)	2.8 pt. =	1.24 pt. Dual II Magnum 7.64EC 5.6 oz. metribuzin 75DF 0.93 pt. fomesafen 2L
-------------------	---	-----------	--

- Fierce MTZ

Fierce MTZ 2.64L	flumioxazin (0.5) metribuzin (1.5) pyroxasulfone (0.64)	1 pt. =	2 oz. flumioxazin 51WDG 4 oz. metribuzin 75DF 1.5 oz. Zidua 85WDG
------------------	---	---------	---

- Tendovo

Tendovo 4.18L	cloransulam-methyl (0.065) metribuzin (0.642) S-metolachlor (3.47)	2.1 qt. =	0.65 oz FirstRate 84DF 7.2 oz metribuzin 75DF 1.9 pt. Dual II Magnum 7.64EC
---------------	--	-----------	---

- Trivence

Trivence 61.3WDG	chlorimuron (3.9%) flumioxazin (12.8%) metribuzin (44.6%)	8 oz. =	1.2 oz. Classic 25DF 2 oz. flumioxazin 51WDG 4.75 oz. metribuzin 75DF
------------------	---	---------	---

- Zidua Pro

Zidua PRO 4.09SC	saflufenacil (0.48) imazethapyr (1.33) pyroxasulfone (2.28)	6 oz. =	1 oz. Sharpen 2.85L + 4 oz. Pursuit 2L + 3.3 oz. Zidua 4.17SC
------------------	---	---------	---

“New” Soybean Herbicides for the Preemergence Residual Market – *enhancing morningglory and burcucumber control*

- Intimidator

Intimidator 4.81L	S-metolachlor (3.39) metribuzin (0.75) fomesafen (0.67)	2.8 pt. =	1.24 pt. Dual II Magnum 7.64EC 5.6 oz. metribuzin 75DF 0.93 pt. fomesafen 2L
-------------------	---	-----------	--

- Fierce MTZ

Fierce MTZ 2.64L	flumioxazin (0.5) metribuzin (1.5) pyroxasulfone (0.64)	1 pt. =	2 oz. flumioxazin 51WDG 4 oz. metribuzin 75DF 1.5 oz. Zidua 85WDG
------------------	---	---------	---

- Tendovo

Tendovo 4.18L	cloransulam-methyl (0.065) metribuzin (0.642) S-metolachlor (3.47)	2.1 qt. =	0.65 oz FirstRate 84DF 7.2 oz metribuzin 75DF 1.9 pt. Dual II Magnum 7.64EC
---------------	--	-----------	---

- Trivence

Trivence 61.3WDG	chlorimuron (3.9%) flumioxazin (12.8%) metribuzin (44.6%)	8 oz. =	1.2 oz. Classic 25DF 2 oz. flumioxazin 51WDG 4.75 oz. metribuzin 75DF
------------------	---	---------	---

- Zidua Pro

Zidua PRO 4.09SC	saflufenacil (0.48) imazethapyr (1.33) pyroxasulfone (2.28)	6 oz. =	1 oz. Sharpen 2.85L + 4 oz. Pursuit 2L + 3.3 oz. Zidua 4.17SC
------------------	---	---------	---

“New” Soybean Herbicides for the Preemergence Residual Market – *enhancing waterhemp and palmer control*

- Intimidator

Intimidator 4.81L	S-metolachlor (3.39) metribuzin (0.75) fomesafen (0.67)	2.8 pt. =	1.24 pt. Dual II Magnum 7.64EC 5.6 oz. metribuzin 75DF 0.93 pt. fomesafen 2L
-------------------	---	-----------	--

- Fierce MTZ

Fierce MTZ 2.64L	flumioxazin (0.5) metribuzin (1.5) pyroxasulfone (0.64)	1 pt. =	2 oz. flumioxazin 51WDG 4 oz. metribuzin 75DF 1.5 oz. Zidua 85WDG
------------------	---	---------	---

- Tendovo

Tendovo 4.18L	cloransulam-methyl (0.065) metribuzin (0.642) S-metolachlor (3.47)	2.1 qt. =	0.65 oz FirstRate 84DF 7.2 oz metribuzin 75DF 1.9 pt. Dual II Magnum 7.64EC
---------------	--	-----------	---

- Trivence

Trivence 61.3WDG	chlorimuron (3.9%) flumioxazin (12.8%) metribuzin (44.6%)	8 oz. =	1.2 oz. Classic 25DF 2 oz. flumioxazin 51WDG 4.75 oz. metribuzin 75DF
------------------	---	---------	---

- Zidua Pro

Zidua PRO 4.09SC	saflufenacil (0.48) imazethapyr (1.33) pyroxasulfone (2.28)	6 oz. =	1 oz. Sharpen 2.85L + 4 oz. Pursuit 2L + 3.3 oz. Zidua 4.17SC
------------------	---	---------	---

***WEED SHIFTS IN A 7 YEAR ENLIST
E3™ CROPPING SYSTEMS TRIAL
WITH VARIED RELIANCE ON 2,4-D
AND OTHER HERBICIDE SITES OF
ACTION***

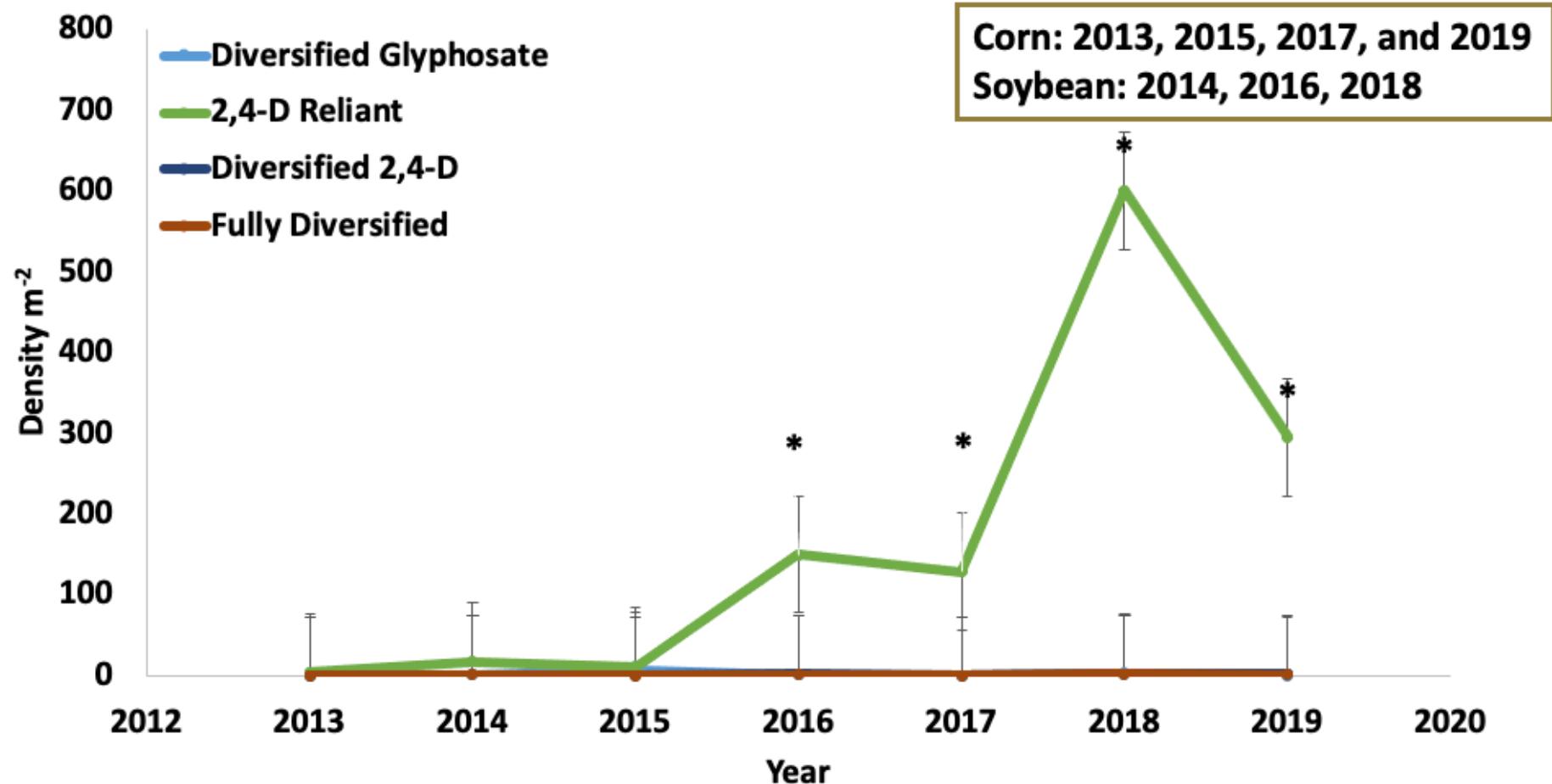
Bill Johnson - Professor of Weed Science

**Travis Legleiter and Connor Hodgkiss - Weed Science
Graduate Students**

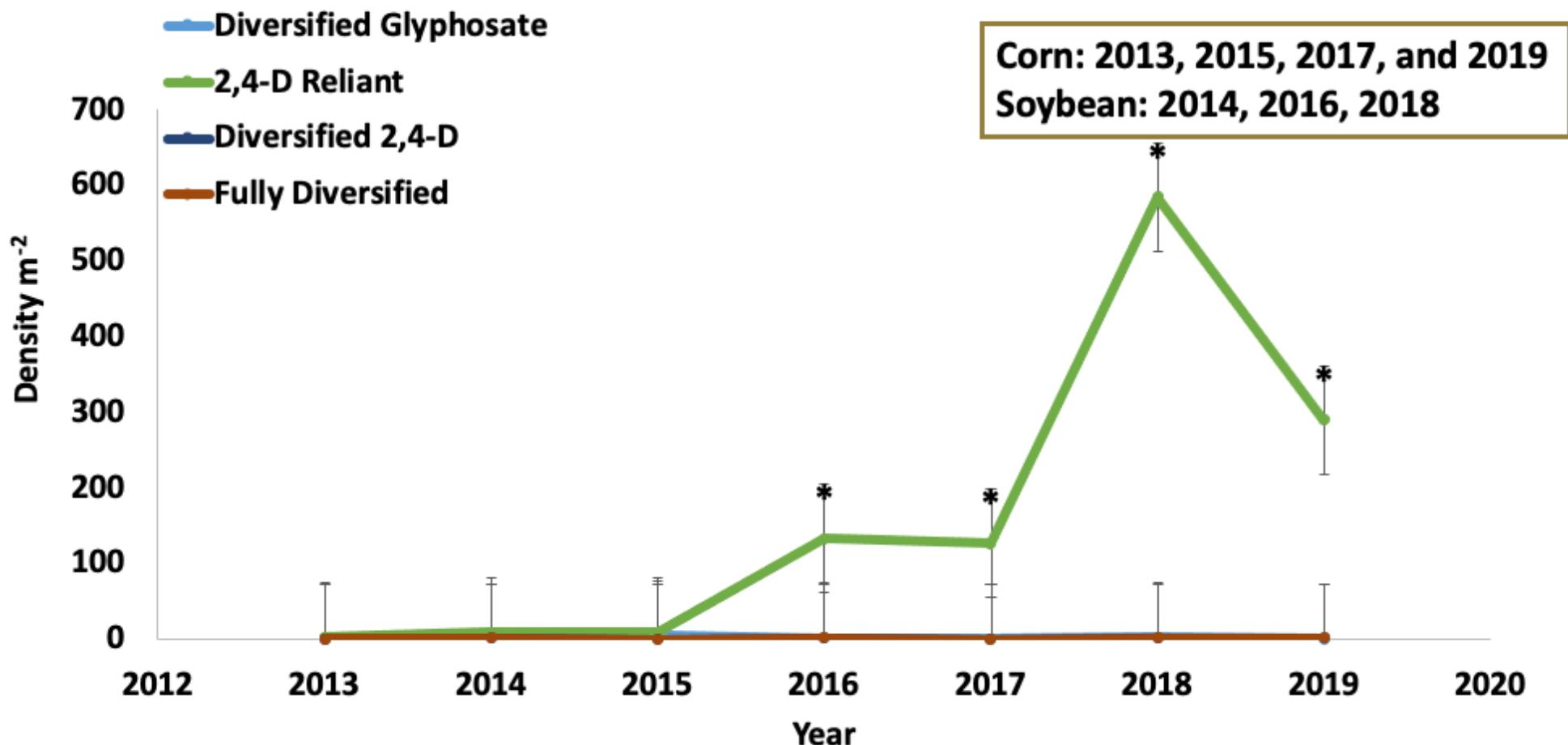
METHODS

- Conventional Till – fall chisel plow, spring field cultivation
- 2013 – 2019
 - Corn – 2013, 2015, 2017, 2019
 - Soybeans - 2014, 2016, 2018
- Four herbicide “systems” evaluated
 - **Fully diversified** – Pre residual fb post glyphosate + a residual + a broadleaf herbicide (*8 sites of action*)
 - **Diversified 2,4-D** – Pre residual fb glyphosate + 2,4-D (*7 sites of action*)
 - **Diversified glyphosate** - Pre residual fb post glyphosate + residual + a broadleaf herbicide (*6 sites of action*)
 - **2,4-D reliant** (*3 sites of action*)
 - Corn – Pre atrazine fb glyphosate + 2,4-D
 - Soybeans – post glyphosate + 2,4-D fb a 2nd post glyphosate + 2,4-D

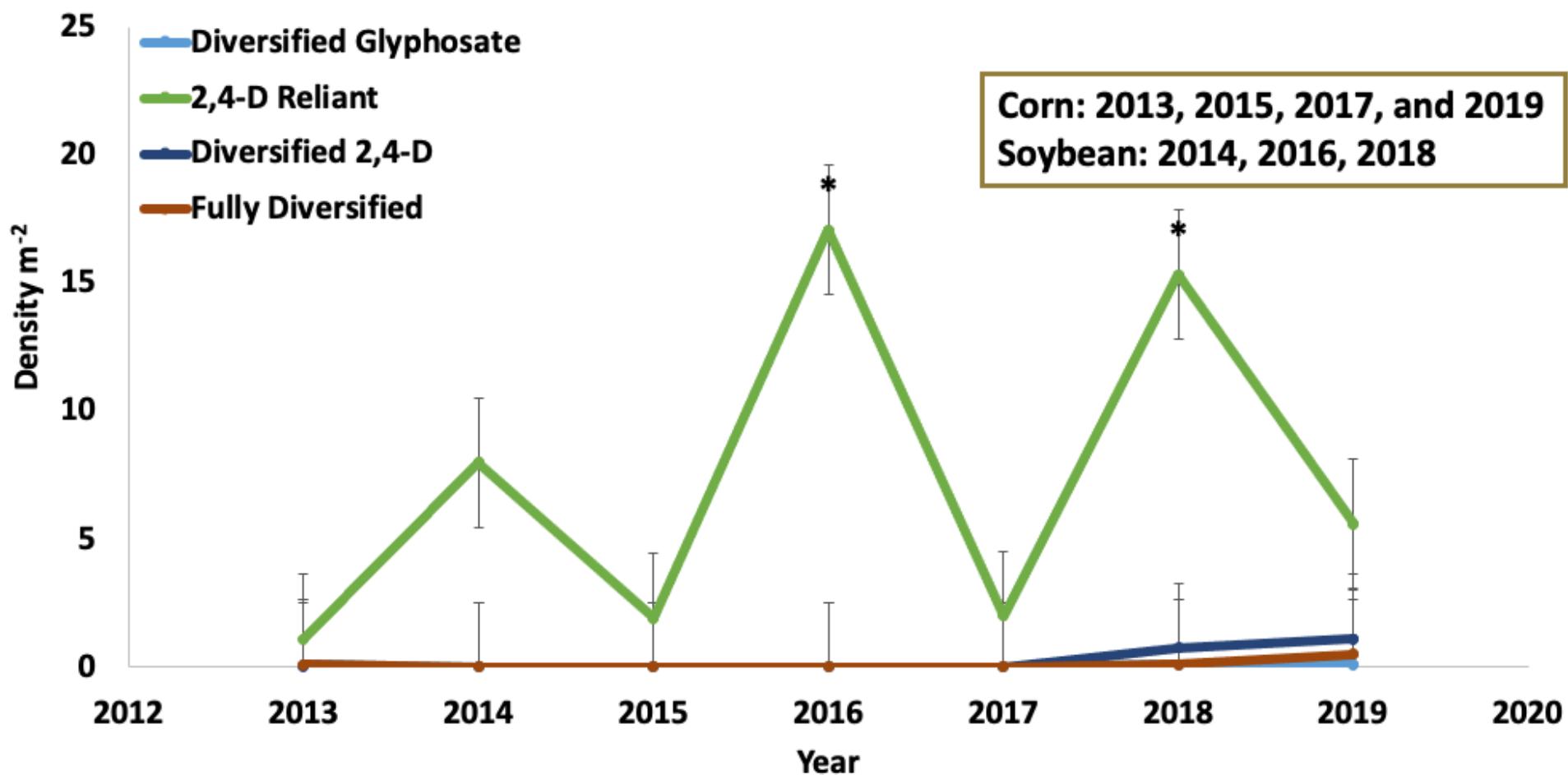
2,4-D (Enlist) Cropping Systems Trial - Total Weed Density



2,4-D (Enlist) Cropping Systems Trial - Monocot Density



2,4-D (Enlist) Cropping Systems Trial - Dicot Density



TPAC - 2,4-D (ENLIST) CROPPING SYSTEMS TRIAL

	Total weed species	Dicot weed species	Monocot weed species	Total weed species	Dicot weed species	Monocot weed species
—————Density m ⁻² ————				————Species Richness m ⁻² ————		
Diversified Gly	8 B	4 B	5 B	2.6 B	1.6 AB	1.0 B
2,4-D Reliant	126 A	10 AB	117 A	4.2 A	2.2 A	2.1 A
Div. 2,4-D.	25 B	18 A	10 B	2.9 B	1.8 AB	1.1 B
Fully Div.	6 B	2 B	4 B	2.2 B	1.2 B	1.1 B



CONCLUSIONS

- Wonderful technology....just like IT/IR, SR (sethoxydim resistant corn), STS (sulfonylurea resistant soybeans), Roundup Ready, and Liberty Link, but we will break it if we treat it like we did these traits!
- Pretty easy to predict what weeds will become more problematic
 - Grasses will be come more abundant because 2,4-D can antagonize grass control with Roundup, and the other post grass herbicides.
 - Horseweed (marestail), waterhemp, Palmer will evolve resistance and spread quickly. These weeds were marginally controlled with 2,4-D at the outset and have developed resistance to every other herbicide used on them.
- How to avoid weed shifts and herbicide resistant weeds
 - Diversity in herbicides and practices
 - Additional sites of action pre and post
 - Full labeled rates of herbicides for the worst weed problems
 - Tillage, cover crops, crop rotation (3rd crop – wheat, hay, specialty crops), something that doesn't use the same herbicides

2024

OHIO, INDIANA, ILLINOIS,
AND MISSOURI

WEED CONTROL GUIDE



ANR-789 / WS-16 / IL15 / M171

Contents

Weed Control Principles	1
Burndown Herbicide Programs for Corn and Soybeans	23
Burndown Herbicides in No-Tillage Corn and Soybeans	29
Corn	
Corn Herbicide Management Strategies	36
Preplant or Preemergence	44
Postemergence/Residual Premixes	57
Postemergence/Contact	59
Postemergence/Systemic	61
Glufosinate-Resistant Corn	71
Glyphosate-Resistant Corn	72
Enlist Corn	74
Corn: Harvest Aid	75
Popcorn and Sweet Corn	
Popcorn and Sweet Corn Weed Management	84
Preplant or Preemergence	89
Postemergence/Residual Premixes	97
Postemergence/Contact	98
Postemergence/Systemic	100
Popcorn: Harvest Aid	106
Attribute Bt11 (glufosinate-resistant) Sweet Corn	107
Glyphosate-Resistant Sweet Corn	108
Soybeans	
Soybean Herbicide Management Strategies	109
Preplant or Preemergence	117
Postemergence/Residual Premixes	133
Postemergence/Contact	135
Postemergence/Systemic	138
Enlist Soybeans	143
Glufosinate-Resistant Soybeans	144
Glyphosate-Resistant Soybeans	145
Xtend/XtendFlex Soybeans	147
Soybeans: Selective Application of Glyphosate	149
Soybeans: Harvest Aid	150
Small Grains	
Weed Management Strategies for Small Grains	154
Underseeded With Legumes	167
Wheat: Harvest Aid	168
Forages	
Managing Weeds in Legumes	170
Forage Legumes	173
Roundup Ready Alfalfa	179
Management Strategies for Permanent Grass Pastures/CRP/Grass Hay	180
Permanent Grass Pasture/CRP/Grass Hay	182
Control of Problem Weeds	192
Managing Marestail in No-Till Soybeans	233
Herbicide Programs for Non-GMO Soybeans	235
Poison Information Centers	237

Table Listing on Back Cover

THANK YOU!

Dr. Bill Johnson | wgj@purdue.edu

Phone: (765) 494-4656

 @BillJohnson53

Purdue Weed Science Website

