

# Agent Agronomy Update NE and SE Corn and Sorghum Weed Management

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# **Agronomy Department Update**

- **Gary Cramer, Hutchinson Field manager will retire end of December, 2017**
- **Thompson, Extension Weed Science, will retire, last day of employment July 18, 2018 – yes will still do meetings**
- **Hiring is frozen at the moment: position openings**
  - **Vice Mengel – research, teaching, and extension in nutrient management**
  - **Vice Cramer – Hutchinson Field Manager**
  - **Vice Thompson – Extension/Research Weed management in field crops, corn and sorghum**
- **New weed scientist hired at Hays, Dr. Vipen Kumar**
  - **Strong background in herbicide resistant weeds, kochia, winter wheat. Comes to us from Montana State Univ.**

# **Corn and Sorghum Update 2018**

- **Enlist Duo – we now have corn hybrids**
- **New dicamba products**
- **Liberty rate increase for corn**
- **Mesotrione off patent**
- **Harness Max**
- **Anthem formulation changes**
- **Anthem Flex**
- **Halex GT for sorghum**
- **Controlling weeds in sorghum (salvage scenario)**
- **Inzen Z sorghum (do I have to)**

**Herbicide registered for Enlist corn, Enlist soybean (lack Chinese approval for import), and Enlist cotton**



GROUP	4	9	HERBICIDES
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# Enlist Duo Herbicide for Enlist Corn Hybrids

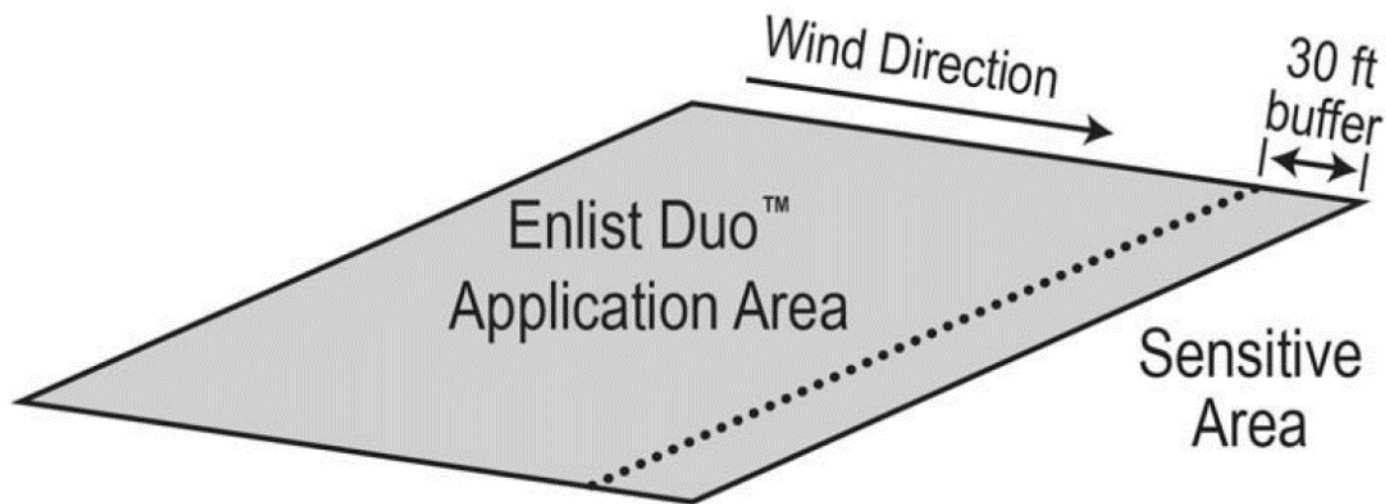
- **Contains 1.7 lbs glyphosate acid (9) and 1.6 lbs of 2,4-D ae (4).**
  - **Colex-D technology: Dimethylamine salt of glyphosate and a choline salt of 2,4-D.**
- **Use 3.5 to 4.75 pts /acre to corn no larger than V8 or 30 inches tall.**
- **Make 1 to 2 post applications with a minimum of 12 days between applications.**
- **May be used PRE or POST, however, total application can not exceed 14.25 pints of Enlist Duo / acre / use season**
- **DO NOT aerially apply Enlist Duo**

### Nozzle Selection

The following chart details nozzles and pressure that are allowable for use when applying Enlist Duo herbicide. Do not use any nozzle and pressure combination not specifically allowed in the chart.

Manufacturer Model		Maximum Operating Pressure (psi)												
		10	20	30	40	50	60	70	80	90	100	110	120	
ABJ Agri	ABJ11004				MAX 40									
	ABJ10006			MAX 30										
GreenLeaf	TDXL11003				MAX 40									
	TDXL11004				MAX 45									
	TDXL11006								MAX 75					
	TDXL11003-D										MAX 90			
	TDXL11004-D										MAX 90			
	TDXL11006-D											MAX 100		
	TDXL11008-D									MAX 80				
Hypro	ULD12004									MAX 70				
	ULD12006					MAX 50								
Lechler	ID11004				MAX 40									
	ID11005							MAX 60						
TeeJet	AI11004							MAX 60						
	AI11006							MAX 60						
	AI11008								MAX 70					
	AITTJ60-11006				MAX 40									
	AIXR11003			MAX 30										
	AIXR11004				MAX 40									
	AIXR11006				MAX 40									
	TT11004									MAX 85				
Wilger	MR11006						MAX 60							
	MR11008						MAX 60							

# Protection of sensitive areas or state restrictions which ever is most restrictive



At the time of application, the wind cannot be blowing toward adjacent commercially grown tomatoes or other fruiting vegetables (EPA crop group 8), cucurbits (EPA crop group 9), grapes, or cotton.

## **New *Dicamba* (4) products labeled for corn and sorghum.**

- **Xtendimax and FeXapan (Clarity with vapor grip technology to minimize volatility).**
  - **Corn 11 to 22 fl oz/a applied PRE or post**
  - **Sorghum up to 11 fl oz/a PRE (10 days before planting) or POST 2 to 5 leaf stage but before it's 8 inches tall**
- **Engenia (BAPMA salt)**
  - **Corn; 6.4 to 12.8 fl oz applied PRE or post**
  - **Sorghum; up to 6.4 fl oz PRE (10 days before planting) or POST 2 to 5 leaf stage but before it's 8 inches tall**



# ***Liberty* (10) label changes for corn**

- Use 22 to 43 fl oz / acre to Liberty Link corn up through the V6 stage.
- Maximum Liberty / acre / season is 87 fl oz.

## ***Mesotrione (27) for PRE and POST in corn or PRE to sorghum***

- **Mesotrione is the active in Callisto and is off patent.**
- **Generics and Callisto currently are all 4 lb ai/gallon.**
- **Callisto was > \$5 / fl oz**
- **Current price of mesotrione generics < \$2 / fl oz**
- **Incinerate, BL4, Explorer, Tenacity, Bridle, Willowood Mesotrione and many others!**
- **\$8 to \$12 / acre (4 to 6 fl oz) of mesotrione added to a chloroacetamide+atrazine will provide much improved control of broadleaf weeds compared to the chloroacetamide+atrazine alone. Will enhance control of pigweeds, velvetleaf, kochia, and others**

# ***Harness Max, for all corn, Monsanto***

- **Acetochlor (15) (3.52 lb) + mesotrione (27) (0.33 lb) per gallon**
- **1.72 to 2.75 qt/a**
  - **Acetochlor - 1.5 to 2.4 lb/a (27.4 to 44 fl oz Harness)**
  - **Mesotrione – 0.142 to 0.227 lb/a (4.5 to 7.2 fl oz Callisto)**
- **PRE**
- **Coarse        55 to 64 fl oz**
- **Medium        64 to 75 fl oz**
- **Fine            64 to 75 fl oz < 3% OM, else 75 to 88 fl oz**
- **POST – up to 11 inch tall corn**
- **Coarse        40 to 55 fl oz**
- **Medium        55 to 64 fl oz**
- **Fine            55 to 64 fl oz < 3% OM, else 64 to 75 fl oz**

## ***Anthem* formulation changes FMC**

- ***Anthem Maxx***
- **Pyroxasulfone (15) 4.174 lb/gal**
- **Fluthiacet-methyl (14) 0.126 lb/gal**
- **Total ai 4.3 lb/gal**
- ***(Old) Anthem***
- **Pyroxasulfone 2.087 lb/gal**
- **Fluthiacet-methyl 0.63 lb/gal**
- **Total ai 2.15 lb/gal**

# ***Anthem Flex*, FMC, for corn, cotton, wheat**

- **Pyroxasulfone (15) 3.733 lb + Carfentrazone (14) 0.267 lb/gal**
- **Use 3.5 to 7.3 fl oz early preplant 15 to 45 days before corn planting**
- **Or 2.75 to 7.3 fl oz prior to corn emergence (no post use)**
- **FL oz/a use rate for all field corn, popcorn, or on sweetcorn planted on medium soils with >2.0% OM or on fine soils.**

• OM%	Coarse	Medium	Fine
• <1%	2.75-3.5	3.0-4.5	3.5-4.5
• 1-3%	3.0-4.0	3.5-5.5	4.5-6.0
• >3%	4.0-5.0	4.5-6.0	5.5-7.28

# Halex GT, Syngenta

- Now labeled Preemergence on grain sorghum
- Use rates are 4 to 6 pints/acre

	<b>mesotrione</b>	<b>S-metolachor</b>	<b>atrazine</b>
• Rate / acre	-----	lb ai/a	-----
• Hx GT 4pt	<b>0.105</b>	<b>1.05</b>	<b>0</b>
• Hx GT 6pt	<b>0.157</b>	<b>1.57</b>	<b>0</b>
• LmxEZ2.7qt	<b>0.168</b>	<b>1.68</b>	<b>0.63</b>
• LxrEZ 3.0 qt	<b>0.165</b>	<b>1.30</b>	<b>1.30</b>

# **Atrazine registration!**

- **Continues to be on track**
- **Off target movement into watersheds may change requirements on the label. Remains to be seen.**
- **Will not be completed for the 2018 season.**

# **Best Management Practices for Atrazine**

**KSU publication MF-2182**

- **Incorporation reduces losses 67%**
- **Apply atrazine prior to April 15, reduce losses 50%**
- **Split applications, 2/3 rate in March and remainder after planting. Reduce losses by 33%**
- **Use to low atrazine rate PREmixes. Ie “Lite” formulations**
- **Use POST vs PRE applications of atrazine. Lower rates used POST. Can reduce losses by 67%**
- **Reduce PRE atrazine rates to 1 pound or less followed by POST 0.5 lb if needed. Combined applications improve control.**
- **Use other herbicides without atrazine. Can reduce losses by 100%**
- **Vegetative filter strips reduce flow rate and reduce losses by 50%**
- **Buffer zones. Avoid applications near water sources and environmentally sensitive areas.**



**Effect of herbicide programs applied late to sorghum 15 to 18”, on sorghum yield and weed control. 7 year avg. Thompson and Peterson.**

Treatment	Rate	Yield	Palmer	VELE	MOGY	SUNF
	product/a or (%v/v)	Bu/a	% control 4 wks after POST			
Atrazine+COC	1.5qt + 1 % v/v	38	57	45	67	70
Huskie + atrazine + NIS + AMS	16floz+1lb+0.25%+2lb	72	86	99	86	100
Aim + NIS	0.5floz+0.25%	21	37	97	56	35
Aim + atrazine + NIS	0.5floz+1.5qt+0.25%	44	56	94	71	66
2,4-D LV ester	1 pt	53	68	85	88	89
2,4-D LV ester + atrazine	1pt + 1pt	64	71	84	88	87
Ally + 2,4-D amine	0.05oz + 8 floz	48	62	65	76	71
Yukon+ atrazine + COC	6 oz+ 1 qt + 1%	66	64	69	71	80
Dicamba + atrazine	9 floz + 1.1pt	66	67	68	77	79
Untreated		10				
LSD 0.05		24	9	13	11	14

**Effect of herbicide programs applied late to sorghum 38 to 45 cm tall, on grain yield and weed control. 7 year avg. Thompson and Peterson.**

Treatment	Rate	Yield	Palmer	VELE	MOGY	SUNF
	g ha <sup>-1</sup>	t/ha <sup>-1</sup>	% control 4 wks after POST			
Atrazine+COC	1680 + 1 % v/v	2.39	57	45	67	70
Pyrasulfotole&bromoxynil + atrazine + NIS + AMS	288+ 1120+0.25% v/v+2240	4.55	86	99	86	100
Carfentrazone + NIS	8.75+0.25% v/v	1.31	37	97	56	35
Carfentrazone + atrazine + NIS	8.75 + 1680+ 0.25%v/v	2.77	56	94	71	66
2,4-D LV ester	280	3.34	68	85	88	89
2,4-D LV ester + atrazine	280 + 627	4.02	71	84	88	87
Metsulfuron + 2,4-D amine	2.1 + 280	3.02	62	65	76	71
Halosulfuron & dica + atra + COC	284 + 1120 + 1% v/v	4.17	64	69	71	80
Dicamba + atrazine	315 + 594	4.11	67	68	77	79
Untreated		0.60				
LSD 0.05		1.52	9	13	11	14



## **Acuron™ For corn (grain or silage), Syngenta**

- **Atrazine 1.0 + bicyclopyrone 0.06 + mesotrione 0.24 + S-metolachlor 2.14 lb/gallon**
- **Use rate 2.5 qt on soils < 3% OM and 3 qt on 3% OM or more with a maximum of 3 qt / year.**
- **Apply from 28 days prior to planting to 11 (prior to 12) inch tall corn.**
- **If applied POST to corn and weeds, used NIS at 0.25% v/v. COC can be used up to 1% v/v but will increase the risk of crop injury. DO NOT use MSO, AMS, or UAN.**



**Acuron<sup>®</sup> Flexi**

**For corn (grain, silage, seed, sweet, and yellow pop), Syngenta**

- **Bicyclopyrone 0.08 + mesotrione 0.32 + S-metolachlor 2.86 lb/gallon**
- **Use rate 2.0 qt on soils < 3% OM and 2.25 qt on soils with 3% OM or more with a maximum of 2.25 qt / year.**
- **Apply from 28 days prior to planting postemergence from emerged to 30 inches tall or up to the 8-leaf stage on field, silage, and seed corn only.**
- **If applied POST to corn and weeds, used NIS at 0.25% v/v. COC can be used up to 1% v/v but will increase the risk of crop injury. DO NOT use MSO, AMS, or UAN. Do not apply postemergence to sweet or pop corn!**

## ***Anthem Maxx/Anthem Flex (FMC) for all corn types***

- **Anthem Maxx – pyroxosulfone (15) + Fluthiacet (14)**
  - 45 days before planting up to 4 visible collars
  - 2.5 to 6.5 fl oz
- **Anthem FLEX – pyroxosulfone (15) + Carfentrazone (14)**
  - 45 days before planting up to postplant preemergence
  - 3.0 to 7.7 fl oz

## ***Armezon PRO (BASF) for all Corn***

- **Dimethenamid-P (Outlook-15) 5.25 lb + topramezone (Armezon-14) 0.1 lb / gallon**
- **Apply PRE or POST to corn up to V8 or 30 inches tall. Use directed application when corn is 12 to 30 inches tall.**
- **USE rates are 14 to 24 fl oz/a depending on soil texture (coarse vs Med & Fine) and organic matter less than 3% or 3% and greater. 14 to 16, 16 to 20, 16 to 20, 20 to 24.**
- **When applying POST use MSO, COC, HSOC at 0.5 to 1% v/v or NIS at 0.25 to 0.5% v/v. Add a nitrogen fertilizer UAN at 1.25 to 2.5% v/v or AMS at 8.5 to 17 lb/100 gal**
- **Can be tankmixed with other corn herbicides. Will be synergized by atrazine.**
- **Did observe crop injury with oil type adjuvants and atrazine**

## Weed management in Liberty Link Corn, Manhattan KS, 2016 1606corn, Thompson and Peterson.

Treatment	Time	Rate	Yield	Palmer	VELE	MOGY	SUNF
	App.	Prod. / acre	Bu/a	% control 6 wks after POST			
Balance Flexx+Atra	PRE	3 fl oz + 1 pt	130	85	100	87	23
Balance Flexx+Atra Liberty 280+AMS	PRE POST	3 fl oz + 1 pt 22 fl oz + 8.5 lb	164	95	100	93	100
Balance Flexx+Atra Liberty 280+AMS	PRE POST	3 fl oz + 1 pt 29 fl oz + 8.5 lb	163	92	100	83	100
Balance Flexx+Atra Liberty 280+atra+AMS	PRE POST	3 fl oz + 1 pt 22 oz + 1 pt+8.5	154	97	100	95	100
Balance Flexx+Atra Liberty 280+atra+AMS	PRE POST	3 fl oz + 1 pt 29 oz+ 1pt + 8.5	150	96	100	94	100
Balance Flexx+Atra Lib+atra+Diflexx+AMS	PRE POST	3 fl oz + 1 pt 22+1pt+10oz+8.5	150	100	100	93	100
Balance Flexx+Atra Lib+atra+Diflexx+AMS	PRE POST	3 fl oz + 1 pt 29+1pt+10oz+8.5	161	100	100	91	100
Balance Flexx+Atra Lib+atra+Laudis+AMS	PRE POST	3 fl oz + 1 pt 22oz+1pt+3oz+8.5	163	100	100	86	100
Balance Flexx+Atra Lib+atra+Capreno+AM	PRE POST	3 fl oz + 1 pt 22oz+1pt+3oz+8.5	153	98	100	93	100
<b>Untreated</b> /LSD 0.05		LSD 0.05	<b>22/46</b>	3	1	7	1

# Weed management in Irrigated corn with DiFlexx Duo, 2016, 1609cornTR, Thompson and Schlegel. ALL POST!

Treatment	Rate	Yield	Palmer	kochia	VELE	LSSBur
	Prod. / acre	Bu/a	% control 7 wks after POST			
DiFlexx Duo (DD) + atra +Destiny HC+AMS	24 fl oz+ 1 pt + 1% v/v + 8.5 lb	192	96	100	99	35
DD+atra+Destiny HC+AMS	32 fl oz + 1pt + 1% v/v+8.5 lb	195	96	100	99	39
DD+RPM+atra+Destiny HC+AMS	24+32 fl oz+ 1pt+ 1%v/v + 8.5 lb	203	91	98	100	86
DD+Liberty280+atra+Destiny HC+AMS	24+22 fl oz+ 1pt+ 1%v/v + 8.5 lb	198	96	100	100	41
Capreno+RPM+atra+Superb HC + AMS	3 fl oz + 32 oz +1pt +0.5% + 8.5 lb	211	96	99	100	90
Halex GT + atraz + NIS + AMS	3.6 pt + 1 pt + .25% + 8.5 lb	208	100	98	100	92
Armezon + atra +Status + NIS + AMS	0.57 oz + 1 pt + 3 oz + .25% + 8.5 lb	198	94	90	100	51
Armezon + atra +Status + RPM+ NIS + AMS	0.57 oz + 1 pt + 3 oz + 32 +.25% + 8.5 lb	204	95	96	100	96
Armezon + atra + RPM + Outlook + RPM+ NIS + AMS	0.57 oz + 1 pt + 32 + 14oz +.25% + 8.5 lb	209	98	97	99	94
LSD 0.05		16	4	3	1	14



Weed management in conventionally tilled irrigated Corn,  
Tribune KS, 2014 1410cornTR, Thompson and Schlegel.

Treatment	Time	Rate	Herbicide	Yield	Kochia	Palmer
	App.	Prod. / acre	Cost/A	Bu/a	% control	
Corvus+atrazine	PRE	3 oz + 1 qt	21.57+4.75	114	85	81
Anthem ATZ	PRE	2 pt	27.5	106	84	90
Anthem ATZ/ Solstice+RPM+atra	PRE POST	2 pt 3.15+32+1 pt	27.50/ 16.79+7.25+2.38	142	90	85
Harness Xtra/ Roundup Pmax	PRE POST	3.2 pt 32 oz	22.88/ 7.25	131	91	83
Harness Xtra RPM+Imact+Atra	PRE POST	3.2 pt/ 32+1.0oz+1pt	22.88/ 7.25+25.20+2.38	158	100	92
Harness Xtra Impact+At+Status	PRE POST	3.2 pt/ 1.0+1pt+3 oz	22.88/ 25.20+2.38+11.5	160	100	90
Solstice+RPM+atra	POST	3.15+32+16 oz	16.75+7.25+2.40	99	78	74
Status+RPM	POST	5 oz + 32 oz	19.25+7.25	84	48	59
Halex GT	POST	3.6 pt	26.08	103	60	91
Untreated/LSD 0.05		LSD 0.05		40/31	9	9

POST trts applied with 1.0% COC (Solstice) or MSO (Impact) + 17 lb AMS/100 gal

## ***Resicore* (Dow AgroSciences) for all Corn**

- **Acetochlor (15) 2.8 lb/gal + mesotrione (27) 0.30 lb/gal + clopyralid (4) 0.19 lb ae/gal**
  - Rates are 2.25 to 3.0 qt/a PRE to field, silage, seed, and popcorn 28 days before planting up to emergence
  - Used at 1.5 to 3.0 qts/acre to field, silage or seed corn early post up to corn 11 inches tall
- **Add NIS at 0.25% v/v or COC up to 1% v/v to enhance postemergence activity. Do not use MSO or adjuvants containing nitrogen if corn has emerged. The exception is 1.5 qts of Resicore may be applied postemergence with glyphosate (on glyphosate resistant corn) or glufosinate (on Liberty Link corn) and AMS at 8.5 lb/100 gallon + NIS at 0.25% v/v.**

## Weed management in corn with PRE herbicides, Ashland Bottoms, Manhattan KS, 2016, 1605corn, Thompson and Peterson

Treatment	Timing	Rate	Yield	Palmer	Vele	Mogy
		Prod. / acre	Bu/a	% control, July 14, 70 DAA		
Acuron	Pre	2.5 qt	157	98	100	96
Acuron Flexi	Pre	2 qt	159	95	98	80
Zemax	Pre	2 qt	151	93	97	71
Resicore	Pre	2.5 qt	151	98	98	92
Resicore+atrazine	Pre	2.5 + 0.63 qt	168	94	100	96
SureStart II	Pre	1.25 qt	146	95	38	69
SureStart II+atrazine	Pre	1.25 +0.63 qt	148	98	35	76
Degree Xtra	Pre	3 qts	138	97	47	82
Corvus	Pre	5.6 fl oz	140	97	100	56
Corvus+atrazine	Pre	5.6 fl oz + 0.63 qt	148	96	100	64
Verdict	Pre	15 fl oz	158	96	81	88
Verdict+atrazine	Pre	15 fl oz + 0.63 qt	154	97	83	84
Untreated			22	-	-	-
		LSD (0.05)	24	7	16	8

Pre's = May 5

## Weed management in corn, Ashland Bottoms, Manhattan KS, 2015, 1506corn, Thompson and Peterson

Treatment	Timing	Rate	Yield	Palmer	Vele	Mogy
		Prod. / acre	Bu/a	% control, June 22		
Acuron	Pre	2.5 qt	161	100	97	88
Acuron+atrazine	Pre	2.5 + 1 qt	164	99	98	84
Acuron HalexGT+NIS+AMS	Pre fb Post	1.25 qt fb 3.6p+.25+2.5	173	100	99	97
Acuron Acuron+NIS+AMS	Pre fb Post	1.25 qt 1.25+.25+ 8.5	150	99	100	95
Acuron Callisto GT+AMS	Pre fb Post	1.25 qt 2 pt + 8.5 lb	164	100	100	89
Degree Xtra	PRE	3 qts	155	100	40	85
Harness Xtra 5.6L Impact+At+MSO+AMS	Pre fb Post	3.2 pt .75oz+.5+.5+8.5	151	100	97	92
Untreated			114	-	-	-
		LSD (0.05)	26	3	12	8

Pre's = Apr 22, Epost = May 12 at V2, Post= June 6 at V7

## Weed management in corn, Ashland Bottoms, Manhattan KS, 2015, 1506corn, Thompson and Peterson

Treatment	Timing	Rate	Yield	Palmer	Vele	Mogy
		Prod. / acre	Bu/a	% control, June 22		
SureStart II + Atazine	PRE	2.5 pt + 1 qt	151	97	93	83
SureStartII+atrazine Durango+AMS	Pre fb Post	2.5 pt+ 1 qt 1 qt	163	100	98	89
SureStartII+atrazine+Du	EPost	2pt+1+1q+8.5	148	98	95	88
Resicore+atra Durango+AMS	Pre fb Post	2.5+1 qt 1 qt + 8.5 lb	153	100	97	92
Resicore+atra Res+atra+Dur+AMS	Pre fb Post	1.5+1 qt 1.5+.5+1+8.5	159	100	100	95
Corvus+atra RPM+atr+Diflexx+Adj	PRE fb Post	3.3 oz + 1 qt 22oz+1+8oz	142	100	97	88
HalexGT+Atra+Diflexx+NIS+ AMS	Epost	3.6+1 qt +8oz +.25+8.5 lb	165	99	95	91
Untreated			114	-	-	-
		LSD (0.05)	26	3	12	8

Pre's = Apr 22, Epost = May 12 at V2, Post= June 6 at V7

## Weed management in corn, Ashland Bottoms, Manhattan KS, 2015, 1506corn, Thompson and Peterson

Treatment	Timing	Rate	Yield	Palmer	Vele	Mogy
		Prod. / acre	Bu/a	% control, June 22		
SureStart II + Atazine	PRE	2.5 pt + 1 qt	151	97	93	83
SureStartII+atrazine Durango+AMS	Pre fb Post	2.5 pt+ 1 qt 1 qt	163	100	98	89
SureStartII+atrazine+Du	EPost	2pt+1+1q+8.5	148	98	95	88
Resicore+atrazine Durango+AMS	Pre fb Post	2.5+1 qt 1 qt + 8.5 lb	153	100	97	92
Resicore+atrazine Res+atra+Dur+AMS	Pre fb Post	1.5+1 qt 1.5+.5+1+8.5	159	100	100	95
Corvus+atrazine RPM+atr+DiFlexx+Adj	PRE fb Post	3.3 oz + 1 qt 22oz+1+8oz	142	100	97	88
Corvus+atrazine RPM+LaudisFlexx+At+adj	Epost	3.6+1 qt +8oz +.25+8.5 lb	147	100	99	91
Untreated			114	-	-	-
		LSD (0.05)	26	3	12	8

Pre's = Apr 22, Epost = May 12 at V2, Post= June 6 at V7

# Weed management in sorghum



Weed management in sorghum, Ashland Bottoms,  
Manhattan KS, 2014, 1428sorg, Thompson and Peterson

Treatment	Timing	Rate	Herbicide	Yield	Palmer	VELE
		Prod. / acre	Cost/A	Bu/a	% control	
Lumax EZ	Pre	2.7 qt	\$50	110	99	100
Huskie+atrazine	POST	13oz + 1 pt	\$13.88	100	84	100
H+A+2,4-D LV4	POST	13+1+4 oz	\$14.57	88	89	100
H+A+Starane Ultra	POST	13+1+6.4 oz	\$28	105	93	100
H+A+Clarity	POST	13+1+4 oz	\$17	108	90	100
Starane NXT+Atra	POST	14 fl oz+1pt	\$10.83	76	77	87
Dual II Magnum/ Huskie+atrazine	Pre POST	1.3 pt 13+1 pt	\$20 \$13.88	105	100	100
Dual II Magnum/ Clarity+Atrazine	Pre POST	1.3 pt/ 8 oz+ 1 pt	\$20 \$8.67	105	89	85
Dual II Magnum/ Aim EC+Atrazine	Pre POST	1.3 pt/ 0.5 oz+1 pt	\$20 \$5.88	103	97	94
Untreated				5	--	--
		LSD (0.05)		16	8	4

Huskie trts applied with 0.25% NIS + 1 lb / a of dry AMS (\$1.05+\$0.40/acre)



# Weed management in sorghum, Ashland Bottoms, Manhattan KS, 2015, 1524sorg, Thompson and Peterson

Treatment	Timing	Rate	Yield	Palmer	VELE	MOGY
		Prod. / acre	Bu/a	% control 4 wks after POST		
Lumax EZ	Pre	2.7 qt		97	100	100
Fultime NXT	Pre	3 qt		98	55	77
Degree Xtra	Pre	2.9 qt		94	47	70
Bicep II Magnum	Pre	2.1 qt		89	57	87
Verdict+atrazine	Pre	10 oz + 1 qt		97	100	98
Verd+Outlook+Atra	Pre	10+12.8oz+1qt		100	100	100
Lumax EZ/ Banvel+Atra	Pre POST	2.7 qt 4 fl oz+1 pt		100	100	100
Huskie+Atrazine + NIS+AMS	POST	16 oz + 1 pt + .25% v/v+1 lb		89	100	97
Huskie+Atra+2,4-D +NIS+AMS	POST	13 oz+1 pt+4fl oz+.25%+1 lb		90	100	100
Untreated						
		LSD (0.05)		11	17	16

June 27, 2015 POST trts applied 6 collar sorghum, 2 to 6" Palmer, 3-6" VELE, 2-4" Mogy

# Introducing a New Weed Control Technology for Grain Sorghum



**Curtis Thompson**

**Extension Weed Science**

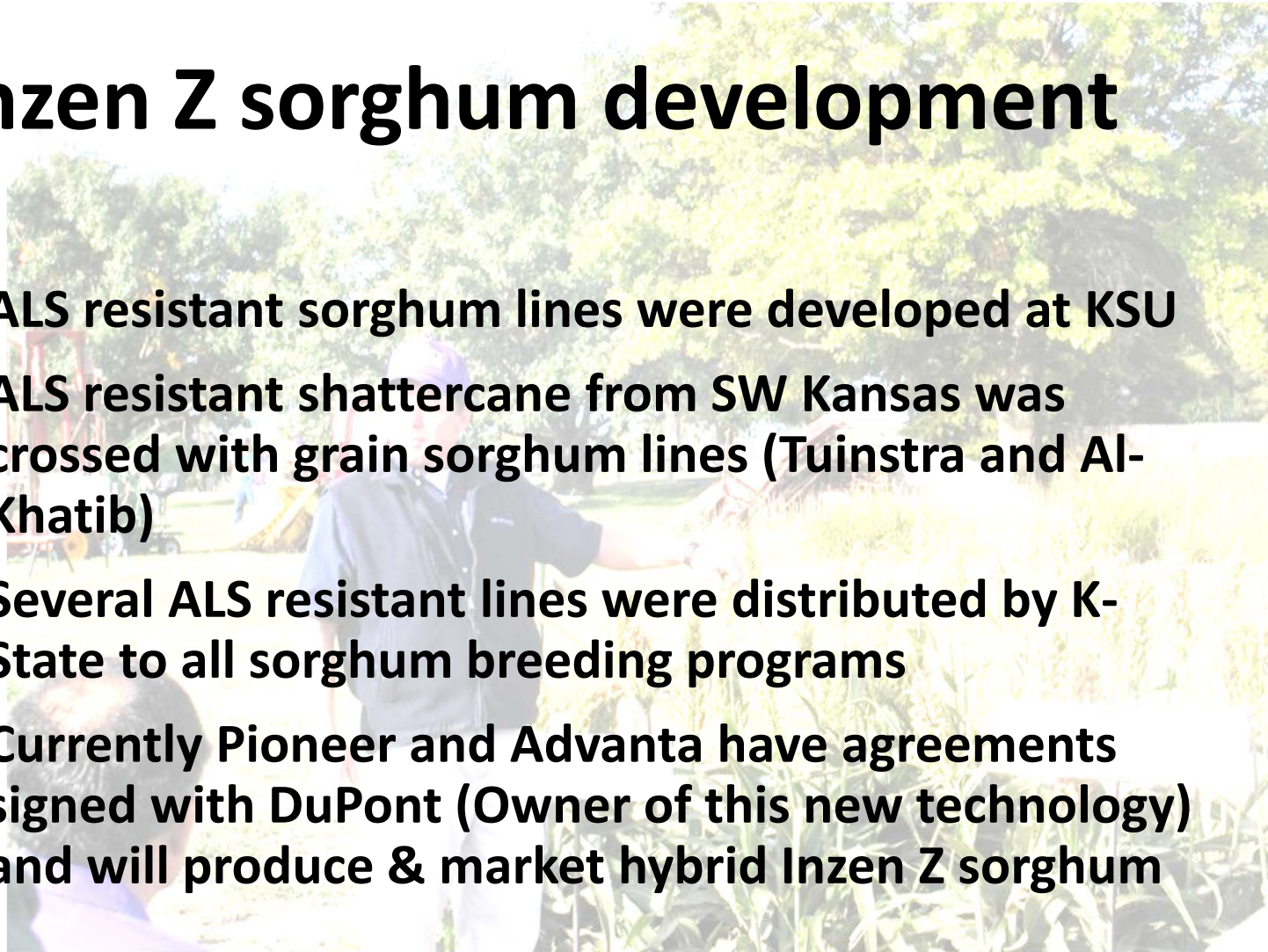
**KSU Agronomy**

**Twitter: @KStateAgron, @cthompso56**

**[Email: cthompso@ksu.edu](mailto:cthompso@ksu.edu)**

# Inzen Z sorghum development

- **ALS resistant sorghum lines were developed at KSU**
- **ALS resistant shattercane from SW Kansas was crossed with grain sorghum lines (Tuinstra and Al-Khatib)**
- **Several ALS resistant lines were distributed by K-State to all sorghum breeding programs**
- **Currently Pioneer and Advanta have agreements signed with DuPont (Owner of this new technology) and will produce & market hybrid Inzen Z sorghum**



# ***Zest WDG (DuPont) for Inzen sorghum***

- **Nicosulfuron 75% WDG, 0.67 to 1.33 oz prod./a**
- **0.25 to 0.5% v/v NIS or 1% v/v COC**
- **2 qt/a UAN or 2 lb/a AMS**
- **Apply to sorghum 5 collar to flagleaf visible, 4 to 20 inch sorghum.**
- **Annual grass control varies with species and size of the grass at application.**
- **Start with an effective PRE applied herbicides.**
  - **Zest should be the second part of a two pass system.**

# Maximum grass species height

## WEEDS CONTROLLED IN INZEN™ GRAIN SORGHUM

Weeds controlled with 0.67 ounces (0.032 pounds of nicosulfuron active ingredient) ZEST™ WDG herbicide.

Grasses	Maximum Height or Diameter
Barnyardgrass†	4"
Broadleaf signalgrass	2"
Crabgrass (large)*	2"
Foxtails (bristly, giant†, green†, yellow†)	4"
Itchgrass	6"
Panicum (Texas, browntop)	3"
fall	4"
Ryegrass (Italian, perennial) †	6"
Sandbur (field, longspine)*	3"
Wild oats†	4"
Wild proso millet	4"
Witchgrass	6"

† Naturally occurring resistant biotypes are known to occur. If weed escapes occur, treat with an herbicide having a mode of action other than Group 2 and/or use non-chemical methods to remove escapes, as practicable, with the goal of preventing further seed production.

\* Refer to Specific Weed Instructions Section of this Label

## ***Zest WDG Restrictions***

- **Can be tankmixed with 2,4-D LV, dicamba, atrazine, Starane Ultra, and Ally XP, 1/20 oz.**
- **DO NOT USE COC when tankmixing 2,4-D or dicamba.**
- **DO NOT tankmix with Huskie herbicide as significant grass antagonism may result.**
- **Rotation back to sorghum is 18 months**
  - **NOT CONTINUOUS SORGHUM!**

# Zest WDG Rotation Restrictions

The following rotational intervals should be observed when using ZEST™ WDG at a maximum of 1.33 ounces:

## ZEST™ WDG ROTATIONAL CROP GUIDELINE - 1

### *No soil pH restrictions*

Rotational Crop	Interval in Months
Corn (field, seed)	Anytime
Corn (pop, sweet)*	10
Soybeans	0.5 (15 days)
Cereals, spring (barley, oats, rye, wheat)	8
Cereals, winter (barley, oats, rye, wheat)	4
Cotton	10
Dry Beans, Peas, Snap Beans	10
Alfalfa**	12
Red Clover**	12
Sorghum (All types including hybrids containing the INZEN™ trait)	18
Other Crops	See Rotational Crop Guidelines 2 and 3

\* Except the sweet corn varieties “Merit”, “Carnival”, and “Sweet Success”, for which the minimum time interval is 15 months.

\*\*Except for the state of Kansas east of Highway 75, for Minnesota east and south of the Red River Valley and for the states east of the line formed by the western borders of Iowa, Missouri, Arkansas, and Louisiana, where the minimum time interval is 10 months.

## ZEST™ WDG ROTATIONAL CROP GUIDELINE - 2

### *With soil pH ≤ 7.5 restrictions*

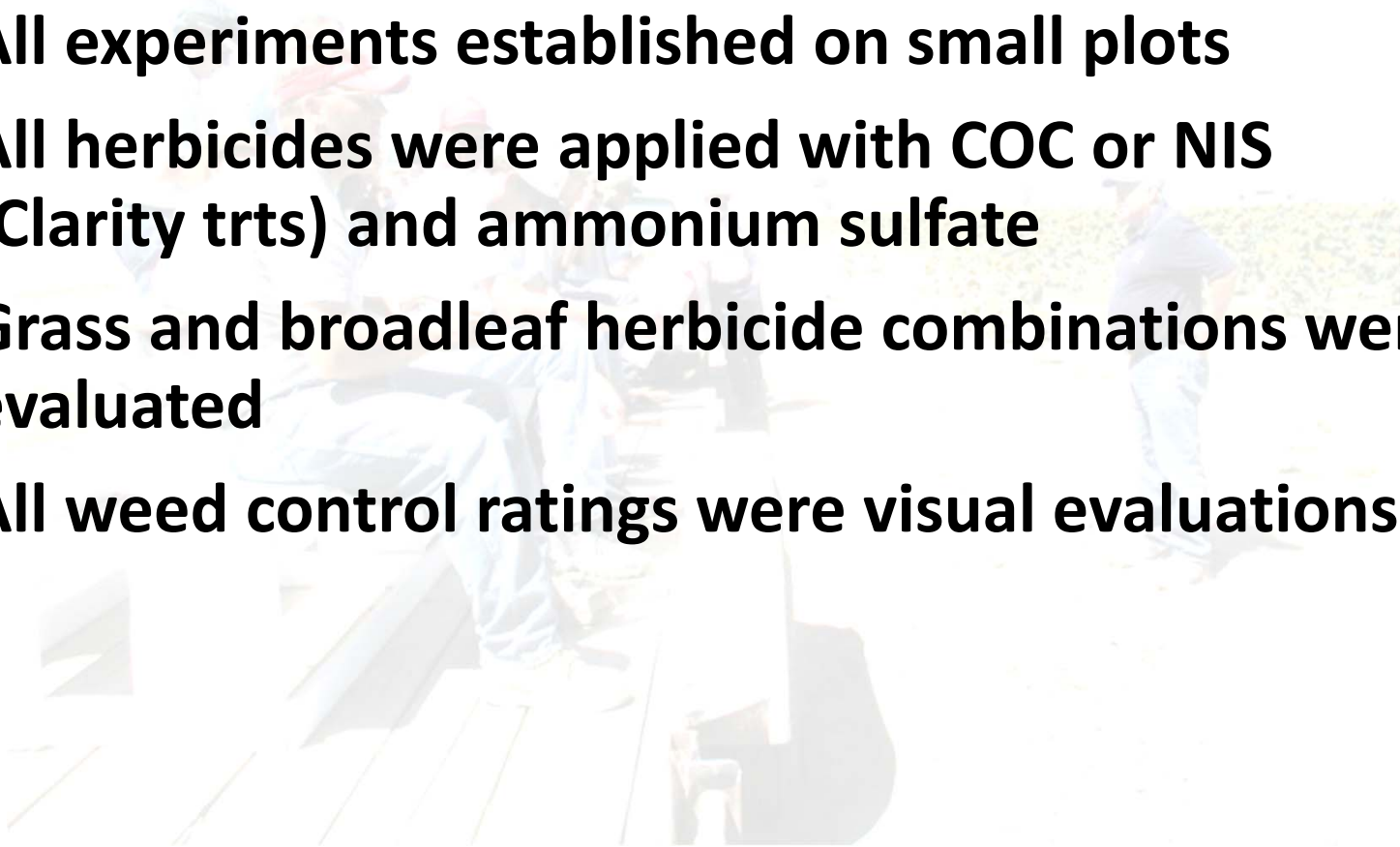
Crop	Rotational Interval in Months	
	pH 7.5	pH > 7.5
Sunflowers	11**	18
All other crops not listed in Rotational Guidelines 1 or 2	See Rotational Guideline 3	

\* Except in Texas and Oklahoma east of Highway 281, where the rotational interval is 10 months, regardless of pH.

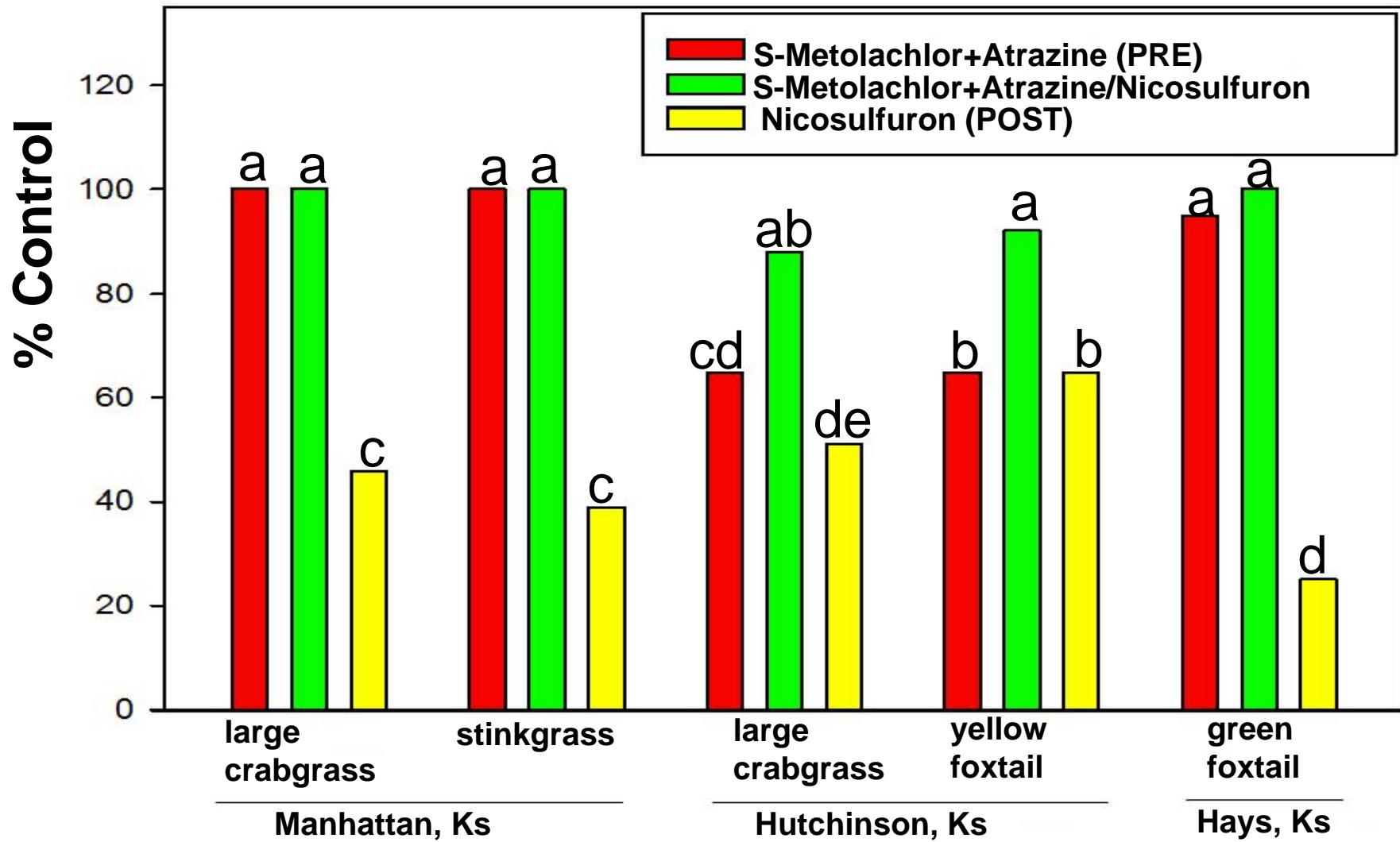
\*\*Precipitation following application must exceed 14” prior to planting sunflowers.

# Weed control in ALS sorghum

- **All experiments established on small plots**
- **All herbicides were applied with COC or NIS (Clarity trts) and ammonium sulfate**
- **Grass and broadleaf herbicide combinations were evaluated**
- **All weed control ratings were visual evaluations**



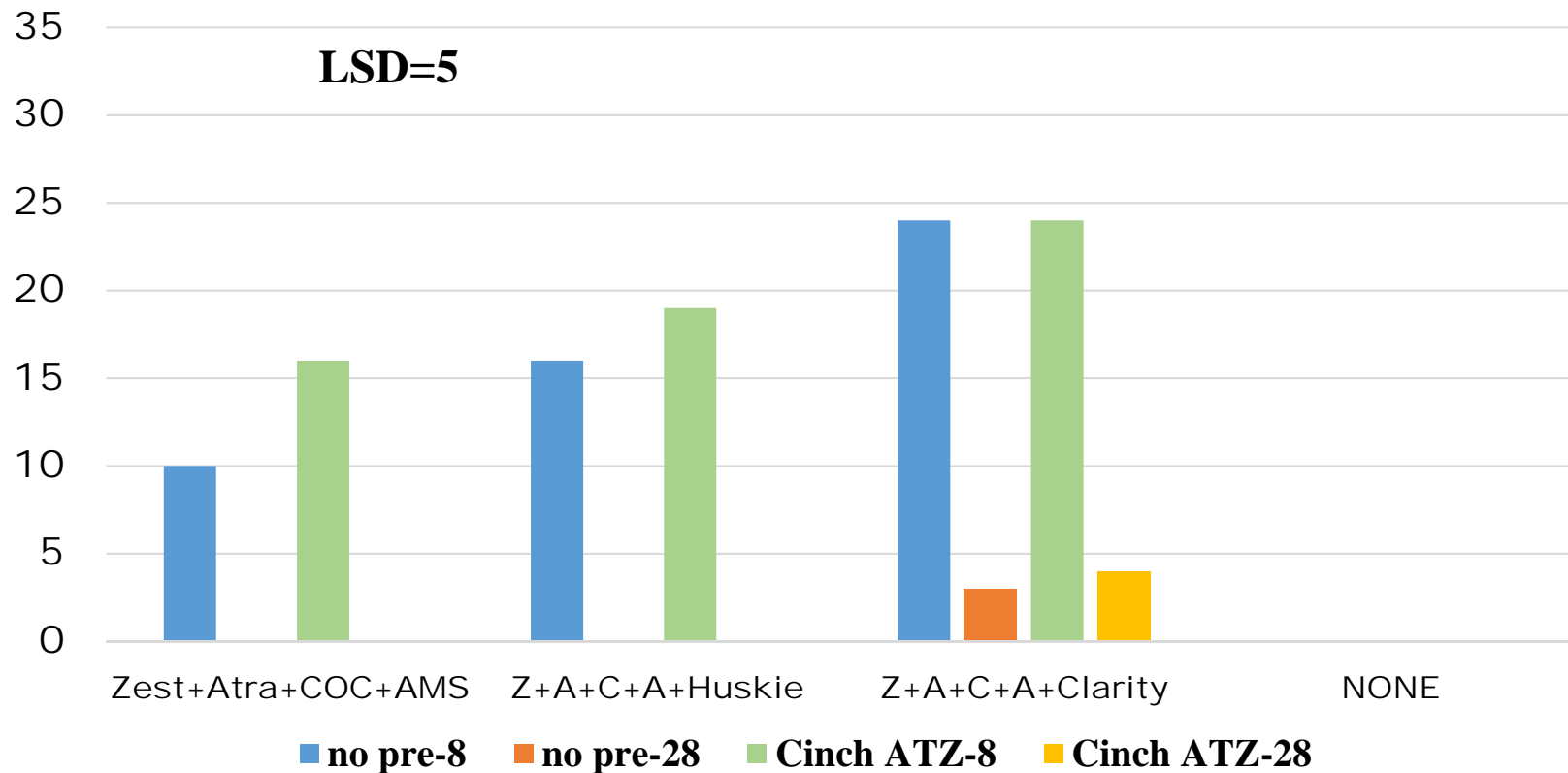




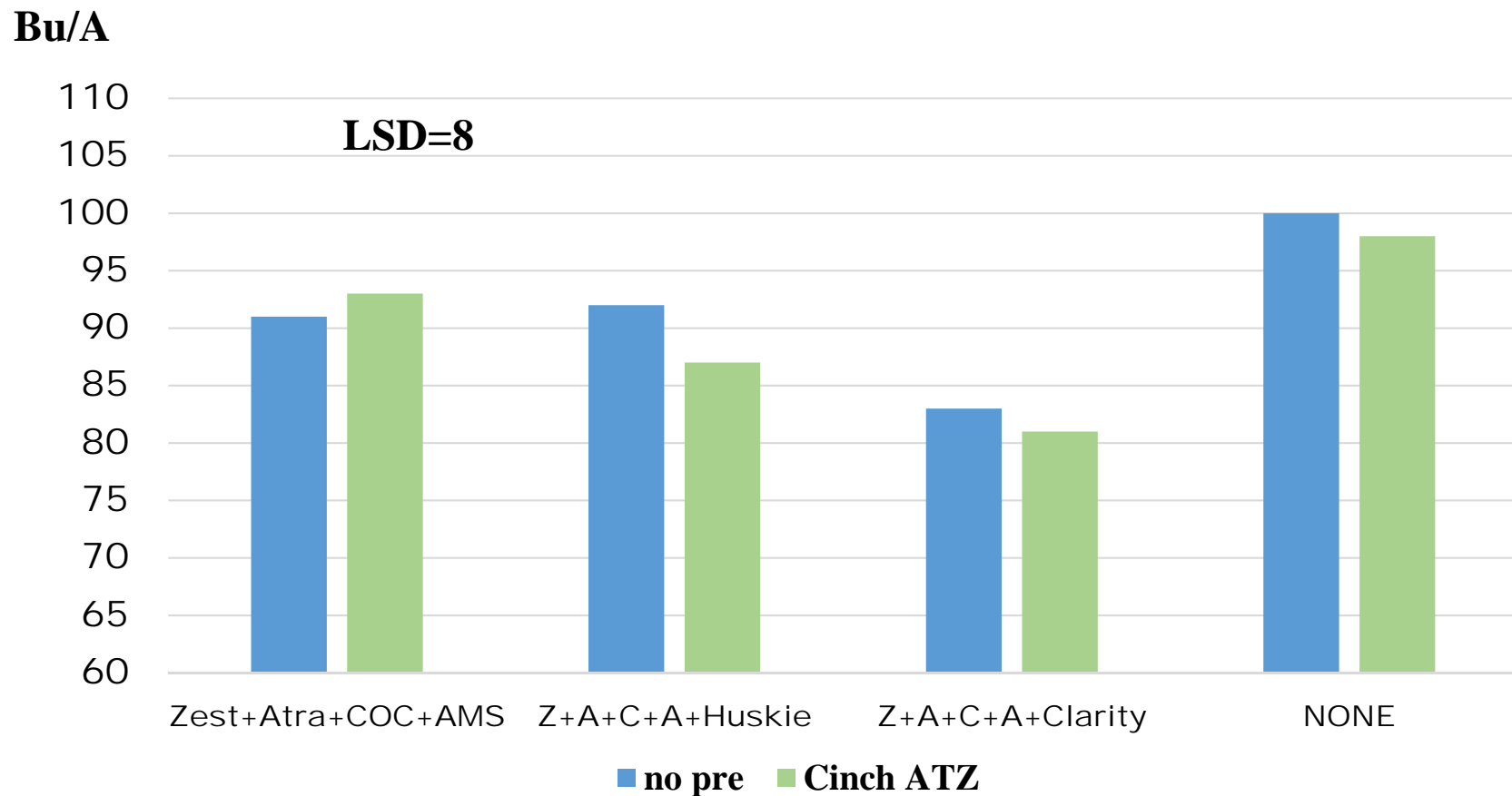
Annual grass control with 3 herbicide programs at 3 locations, Vanloenen et al 2015.

# Inzen sorghum injury 8 and 28 days after post treatment with different herbicide programs, Tribune KS. VanLoenan, Thompson, Schlegel, and Peterson. 1628sorgTR.

% Injury



# Inzen sorghum yield with different herbicide programs, Tribune KS. VanLoenan, Thompson, Schlegel, and Peterson. 1628sorgTR.



Yield potential of test cross hybrids resistant to ALS inhibitor herbicides as compared to commercial checks, 2015. Tesfaye Tesso and his group, Agronomy Department, K-State.

Entry	bu/acre	Yield as % of the top check
PR14/15-119 × PR14/15-199	132	101
PR14/15-143 × PR14/15-241	122	93
PR14/15-103 × PR14/15-175	134	103
PR14/15-149 × PR14/15-190	128	98
PR14/15-105 × PR14/15-181	134	103
PR14/15-119 × PR14/15-199	131	100
PR14/15-121 × PR14/15-190	122	93
PR14/15-121 × PR14/15-197	126	97
PR14/15-157 × PR14/15-217	119	91
Pioneer 84G62	130	-
Dekalb 54 00	129	-

## Zest effect on Inzen Z sorghum in 2014. Thompson, Schlegel, Crammer, and Peterson, Exp1425-27sorg.

		Manhat	Manhat	Tribune	Tribune	Hutch	Hutch
		7-4 DAT	4 WAT	20-8 DAT	6-4 WAT	5 DAT	4 WAT
<b>Treatment</b>	<b>Product rate</b>	----- (% Injury) -----					
Zest+Atrazine	0.5 oz + 0.75 lb	25	0	1	3	16	0
Zest+Atra+Huskie	0.5+0.75+13floz	25	0	0	0	20	0
Zest+Atra+Clarity	0.5+0.75+8 fl oz	25	0	0	0	34	6
Zest+Atra+24DLV	0.5+0.75+8 fl oz	22	5	9	0	36	9
Zest+Atra+Ally	0.5+0.75+0.05oz	27	0	0	0	15	0
Cinch ATZ PRE	3.2 pt/a	0	0	0	0	0	0
CZ+Zt+Az+24DLV	3.2/.5+.75+8floz	28	17	9	9	35	9
CZ+Zt+Az+Huskie	3.2/.5+.75+13oz	20	0	14	0	21	0
CZ+Zt+Az+Clarity	3.2/.5+.75+8floz	30	8	6	11	36	4
LSD (0.05)		6	5	4	5	4	3
All injury ratings are visual.							

## Zest effect on Inzen Z sorghum in 2014, SWREC Garden City, Currie and Geier.

	Product Rate	Appl.	Chlorosis		Epinasty		
			3 DAT	16-4 DAT	3 DAT	16-4 DAT	41-23DAT
Treatment	Lb / acre	time	(%)				
Zest+Atrazine	0.5 oz + 0.75 lb	Epost	24	0	10	0	0
Zest+Atra+Huskie	0.5+0.75+13floz	Epost	28	0	7	0	0
Zest+Atra+Clarity	0.5+0.75+8 fl oz	Epost	25	0	30	0	0
Zest+Atra+24DLV	0.5+0.75+8 fl oz	Epost	23	0	24	0	0
Zest+Atra+Ally+24D	0.5+0.75+0.05+8	Epost	24	0	24	2	0
Cinch ATZ PRE	3.2 pt/a	PRE	0	0	0	0	0
CZ+Zt+Az+24DLV	3.2/.5+.75+8floz	PRE/Post	0	0	0	14	0
CZ+Zt+Az+Huskie	3.2/.5+.75+13oz	PRE/Post	0	0	0	0	0
CZ+Zt+Az+Clarity	3.2/.5+.75+8floz	PRE/Post	0	0	0	15	0
LSD (0.05)			3	--	3	5	--
All injury ratings are visual.							

## Zest effect on Inzen Z sorghum in 2014, KSU Research Center Hays, Stahlman and Jester.

	Product Rate	Appl.	Chlorosis		Epinasty		
			6	13-7	21-15	29-23	36-30
Treatment	Lb / acre	time	(%)				
Zest+Atrazine	0.5 oz + 0.75 lb	Epost	20	0	0	0	0
Zest+Atra+Huskie	0.5+0.75+13floz	Epost	16	0	0	0	0
Zest+Atra+Clarity	0.5+0.75+8 fl oz	Epost	18	0	0	0	0
Zest+Atra+24DLV	0.5+0.75+8 fl oz	Epost	15	3	0	0	0
Zest+Atra+Ally+24D	0.5+0.75+0.05+8	Epost	25	10	10	5	0
Cinch ATZ PRE	3.2 pt/a	Pre	0	0	0	0	0
CZ+Zt+Az+24DLV	3.2/.5+.75+8floz	Pre/Post	0	3	20	10	3
CZ+Zt+Az+Huskie	3.2/.5+.75+13oz	Pre/Post	0	5	0	0	0
CZ+Zt+Az+Clarity	3.2/.5+.75+8floz	Pre/Post	0	8	30	10	0
LSD (0.05)			3	5	--	--	NS
All injury ratings are visual.							

## Zest effect on Inzen Z sorghum in 2014, NWREC Colby, Stahlman and Jester.

	Product Rate	Appl.	Chlorosis		Necrosis	
			16-10	35-29	16-10	35-29
Treatment	Lb / acre	time	(%)			
Zest+Atrazine	0.5 oz + 0.75 lb	Epost	1	0	0	0
Zest+Atra+Huskie	0.5+0.75+13floz	Epost	10	0	10	0
Zest+Atra+Clarity	0.5+0.75+8 fl oz	Epost	3	0	0	0
Zest+Atra+24DLV	0.5+0.75+8 fl oz	Epost	3	0	0	0
Zest+Atra+Ally+24D	0.5+0.75+0.05+8	Epost	0	0	0	0
Cinch ATZ PRE	3.2 pt/a	Epp	1	0	0	0
CZ+Zt+Az+24DLV	3.2/.5+.75+8floz	Epp/Post	10	0	0	0
CZ+Zt+Az+Huskie	3.2/.5+.75+13oz	Epp/Post	30	0	20	0
CZ+Zt+Az+Clarity	3.2/.5+.75+8floz	Epp/Post	1	0	0	0
LSD (0.05)			1	--	--	--
All injury ratings are visual.						





# Huskie Injury on conventional sorghum



## Weed control in Inzen Z sorghum in 2014, Manhattan, Thompson & Peterson, Exp1425sorg.

		gift	bygr	shcn	wht	vele	sunf	paam
Treatment	Product rate	----- (% control 7WAP, 4WAPOST) -----						
Zest+Atrazine	0.5 oz + 0.75 lb	100	99	100	100	75	65	80
Zest+Atra+Huskie	0.5+0.75+13floz	98	97	100	100	99	100	88
Zest+Atra+Clarity	0.5+0.75+8 fl oz	100	99	100	100	92	99	87
Zest+Atra+24DLV	0.5+0.75+8 fl oz	98	95	100	100	98	100	87
Zest+Atra+Ally	0.5+0.75+0.05oz	100	97	100	100	100	88	85
Cinch ATZ PRE	3.2 pt/a	100	100	3	60	72	7	100
CZ+Zt+Az+24DLV	3.2/.5+.75+8floz	100	100	100	100	100	93	100
CZ+Zt+Az+Huskie	3.2/.5+.75+13oz	100	100	100	100	100	100	100
CZ+Zt+Az+Clarity	3.2/.5+.75+8floz	100	100	100	99	100	93	100
LSD (0.05)		3	5	3	10	20	22	9

gift = giant foxtail, bygr = barnyardgrass, shcn = shattercane, wht = volunteer wheat, vele = velvetleaf, sunf = common sunflower, paam=palmer amaranth, Research conducted at Ashland Bottoms near Manhattan, 2014.

## Weed control in Inzen Z sorghum in 2014. Thompson, Schlegel, Cramer Exp 1426sorgTR & 1427sorgHU.

Treatment	Product rate	Trib	Trib	Trib	Trib	Hutch	Hutch
		Tupw	Stgr	Wigr	GrSo	Paam	Shca
		----- (% control 9 WAP, 4 or 6 WAPOST) -----					
Zest+Atrazine	0.5 oz + 0.75 lb	100	79	100	100	76	100
Zest+Atra+Huskie	0.5+0.75+13floz	96	84	100	100	75	100
Zest+Atra+Clarity	0.5+0.75+8 fl oz	99	85	100	100	93	100
Zest+Atra+24DLV	0.5+0.75+8 fl oz	100	81	100	100	91	100
Zest+Atra+Ally	0.5+0.75+0.05oz	100	73	100	100	81	100
Cinch AT7 PRE	3.2 pt/a	98	99	98	0	99	0
CZ+Zt+Az+24DLV	3.2/.5+.75+8floz	100	98	99	100	100	100
CZ+Zt+Az+Huskie	3.2/.5+.75+13oz	100	99	99	98	100	100
CZ+Zt+Az+Clarity	3.2/.5+.75+8floz	99	100	100	100	100	100
LSD (0.05)		3	17	3	3	14	1

Tupw = tumble pigweed, Stgr = stinkgrass, Wigr = witchgrass, GrSo = Grain sorghum - conventional, Paam=palmer amaranth, Shca = shattercane, Trib = KSU SWREC-Tribune, Hutch = KSU Agronomy Field at Hutchinson.

## Weed control in Inzen Z sorghum in 2014, Garden City KS. Randall Currie and Pat Geier (14Currie Inzen).

Treatment	Product rate				
		AMAPA	DIGSA	SETVI	SORVU
		-----% control -----			
Zest+Atrazine	0.5 oz + 0.75 lb	70	83	100	100
Zest+Atra+Huskie	0.5+0.75+13floz	100	55	98	100
Zest+Atra+Clarity	0.5+0.75+8 fl oz	86	84	100	100
Zest+Atra+24DlV	0.5+0.75+8 fl oz	73	83	98	100
Zest+Atra+Ally	0.5+0.75+0.05oz	74	68	100	100
Cinch ATZ PRE	3.2 pt/a	68	83	100	100
<del>CZ+Zt+Az+24DlV</del>	<del>3.2/.5+.75+8floz</del>	<del>100</del>	<del>93</del>	<del>100</del>	<del>100</del>
CZ+Zt+Az+Huskie	3.2/.5+.75+13oz	100	94	100	100
CZ+Zt+Az+Clarity	3.2/.5+.75+8floz	100	93	100	100
LSD (0.05)		7	5	3	--

## Weed control in Inzen Z sorghum in 2014, NWREC Colby and Hays Research Center, Stahlman and Jester.

	Product Rate	Appl.	Colby (35-29)		Hays (36-30)	
			PUVI	PAAM	PUVI	TUPW
Treatment	Lb / acre	time	(% control)			
Zest+Atrazine	0.5 oz + 0.75 lb	Epost	94	65	100	100
Zest+Atra+Huskie	0.5+0.75+13floz	Epost	97	73	100	100
Zest+Atra+Clarity	0.5+0.75+8 fl oz	Epost	97	97	100	100
Zest+Atra+24DLV	0.5+0.75+8 fl oz	Epost	97	83	100	100
Zest+Atra+Ally+24D	0.5+0.75+0.05+8	Epost	98	90	100	100
Cinch ATZ PRE	3.2 pt/a	Epp	24	50	94	100
CZ+Zt+Az+24DLV	3.2/.5+.75+8floz	Epp/Post	98	92	100	100
CZ+Zt+Az+Huskie	3.2/.5+.75+13oz	Epp/Post	94	85	100	100
CZ+Zt+Az+Clarity	3.2/.5+.75+8floz	Epp/Post	97	96	100	100
LSD (0.05)			22	15	4	--
All control ratings are visual.						

# 2,4-D injury on sorghum



**Annual Grass and Velvetleaf control in Inzen Z sorghum in 2014  
in Manhattan, Thompson and Peterson.**

Treatment	Herbicide Rate	Appl.				
		Time	SETFA	ECHCG	TRZAW	ABUTH
	lb ai or ae/acre		% control			
Zest+atra	0.03 + 0.75	EPOST	100	99	100	75
Zest+Atra+Huskie	0.03+0.75+0.21	EPOST	98	97	100	99
Zest+Atra+Clarity	0.03+0.75+0.25	EPOST	100	99	100	92
Zest+Atra+24DLV	0.03+0.75+0.25	EPOST	98	95	100	98
Zest+Atra+Ally	0.03+0.75+0.002	EPOST	100	97	100	100
Cinch ATZ PRE	2.2	PRE	100	100	60	72
CZ/Zt+Az+24DLV	2.2/0.03+.75+0.25	PRE/Post	100	100	100	100
CZ/Zt+Az+Huskie	2.2/0.03+.75+0.21	PRE/Post	100	100	100	100
CZ/Zt+Az+Clarity	2.2/0.03+.75+0.25	PRE/Post	100	100	99	100
LSD (0.05)			3	5	10	20

Zest = nicosulfuron, Huskie = Pyrasulfotole&bromoxynil, Clarity = dicamba, Ally = metsulfuron, Cinch ATZ = S-metolachlor& atrazine



**Annual Grass control in Inzen Z sorghum in 2014, Randall Currie, Geier, Thompson, and Schlegel.**

Treatment	Herbicide Rate	Appl.	Garden City		Tribune	
		Time	SETVI	DIGSA	ERAME	PANCA
	lb ai or ae/acre		% control			
Zest+atra	0.03 + 0.75	EPOST	80	83	79	100
Zest+Atra+Huskie	0.03+0.75+0.21	EPOST	88	55	84	100
Zest+Atra+Clarity	0.03+0.75+0.25	EPOST	87	84	85	100
Zest+Atra+24DLV	0.03+0.75+0.25	EPOST	87	83	81	100
Zest+Atra+Ally+24D	0.03+0.75+0.002+.25	EPOST	85	68	73	100
Cinch ATZ PRE	2.2	PRE	100	83	99	98
CZ/Zt+Az+24DLV	2.2/0.03+.75+0.25	PRE/Post	100	93	98	99
CZ/Zt+Az+Huskie	2.2/0.03+.75+0.21	PRE/Post	100	94	99	99
CZ/Zt+Az+Clarity	2.2/0.03+.75+0.25	PRE/Post	100	93	100	100
LSD (0.05)			5	5	17	3

Zest = nicosulfuron, Huskie = Pyrasulfotole&bromoxynil, Clarity = dicamba, Ally = metsulfuron, Cinch ATZ = S-metolachlor& atrazine

**Shattercane and conventional sorghum control in Inzen Z sorghum in 2014, Currie, Geier, Thompson, Schlegel, Peterson, Cramer.**

Treatment	Herbicide Rate	Appl.	Garden City	Tribune	Manhattan	Hutchinson
		Time	Shattercane/conv. sorghum			
	lb ai or ae/acre		% control			
Zest+atra	0.03 + 0.75	EPOST	100	100	100	100
Zest+Atra+Huskie	0.03+0.75+0.21	EPOST	100	100	100	100
Zest+Atra+Clarity	0.03+0.75+0.25	EPOST	100	100	100	100
Zest+Atra+24DLV	0.03+0.75+0.25	EPOST	100	100	100	100
Zest+Atra+Ally+24D	0.03+0.75+0.002+.2	EPOST	100	100	100	100
Cinch ATZ PRE	5	PRE	100	0	3	0
CZ/Zt+Az+24DLV	2.2	PRE/Post	100	100	100	100
CZ/Zt+Az+Huskie	2.2/0.03+.75+0.25	PRE/Post	100	98	100	100
CZ/Zt+Az+Clarity	2.2/0.03+.75+0.21	PRE/Post	100	100	100	100
	2.2/0.03+.75+0.25					
LSD (0.05)			--	3	3	1

Zest = nicosulfuron, Huskie = Pyrasulfotole&bromoxynil, Clarity = dicamba, Ally = metsulfuron, Cinch ATZ = S-metolachlor& atrazine

**Puncturevine and Tumble pigweed control in Inzen Z sorghum in 2014, Stahlman, Jester, Thompson, and Schlegel.**

Treatment	Herbicide Rate	Appl.	Colby	Hays	Hays	Tribune
		Time	Puncturevine		Tumble pigweed	
	lb ai or ae/acre		% control		% control	
Zest+atra	0.03 + 0.75	EPOST	94	100	100	100
Zest+Atra+Huskie	0.03+0.75+0.21	EPOST	97	100	100	96
Zest+Atra+Clarity	0.03+0.75+0.25	EPOST	97	100	100	99
Zest+Atra+24DLV	0.03+0.75+0.25	EPOST	97	100	100	100
Zest+Atra+Ally+24D	0.03+0.75+0.002+.25	EPOST	98	100	100	100
Cinch ATZ PRE	2.2	PRE	24	94	100	98
CZ/Zt+Az+24DLV	2.2/0.03+.75+0.25	PRE/Post	98	100	100	100
CZ/Zt+Az+Huskie	2.2/0.03+.75+0.21	PRE/Post	94	100	100	100
CZ/Zt+Az+Clarity	2.2/0.03+.75+0.25	PRE/Post	97	100	100	99
LSD (0.05)			22	4	--	3
<p>Zest = nicosulfuron, Huskie = Pyrasulfotole&amp;bromoxynil, Clarity = dicamba, Ally = metsulfuron, Cinch ATZ = S-metolachlor&amp; atrazine</p>						

**Palmer amaranth control in Inzen Z sorghum in 2014, Currie, Geier, Stahlman, Jester, Thompson, Peterson, and Cramer.**

Treatment	Herbicide Rate	Appl.	Garden City	Colby	Manhattan	Hutchinson
		Time	Palmer amaranth			
	lb ai or ae/acre		% control			
Zest+atra	0.03 + 0.75	EPOST	70	65	80	76
Zest+Atra+Huskie	0.03+0.75+0.21	EPOST	100	73	88	75
Zest+Atra+Clarity	0.03+0.75+0.25	EPOST	86	97	87	93
Zest+Atra+24DLV	0.03+0.75+0.25	EPOST	73	83	87	91
Zest+Atra+Ally+24D	0.03+0.75+0.002+.2	EPOST	74	90	85	81
Cinch ATZ PRE	5	PRE	68	50	100	99
CZ/Zt+Az+24DLV	2.2	PRE/Post	100	92	100	100
CZ/Zt+Az+Huskie	2.2/0.03+.75+0.25	PRE/Post	100	85	100	100
CZ/Zt+Az+Clarity	2.2/0.03+.75+0.21	PRE/Post	100	96	100	100
	2.2/0.03+.75+0.25					
LSD (0.05)			7	15	9	14
<p>Zest = nicosulfuron, Huskie = Pyrasulfotole&amp;bromoxynil, Clarity = dicamba, Ally = metsulfuron, Cinch ATZ = S-metolachlor&amp; atrazine</p>						

# Untreated



**Zest+Atrazine, 0.5 oz ai + 0.75 lb/a**  
**All POST trts with COC 1% v/v+ AMS 13 lbs/100 Gal.**



**Cinch ATZ, 3.2 Pt/A PRE FB Zest + Atrazine + Huskie 0.5  
oz + 0.75 lb + 13 fl oz**



**Cinch ATZ, 3.2 Pt/A PRE**





## Weed control in Wheat and wheat stubble following harvest, SWREC Tribune 2014. Thompson, Schlegel, and Peterson. 1403whtTR

Treatment	Product Rate Lb / acre	Appl. time	Kochia in crop		Kochia in fallow	
			May 15	PreHarv	15 DAT	30 DAT
Clarity + 2,4-D/ <b>Clarity+2,4-D+NIS+AMS</b>	0.125+0.375/ <b>0.5+0.5+0.125%+2.5</b>	Prejnt <b>Fallow</b>	63	51	<b>55</b>	<b>64</b>
Clarity+2,4-D+Zidua/ <b>Clarity+2,4-D+NIS+AMS</b>	0.125+0.375+0.106/ <b>0.5+0.5+0.125%+2.5</b>	Prejnt <b>Fallow</b>	100	100	<b>98</b>	<b>98</b>
Clarity+Zidua/ <b>Clarity+atra+Sharpen+MSO+UAN</b>	0.125+0.106/ <b>0.5+1.0+.045+1%+2.5%v/v</b>	Prejnt <b>Fallow</b>	100	96	<b>100</b>	<b>100</b>
<b>N</b>	0.125+0.23+0.25%v/v / <b>1.0+.045+1%+2.5%v/v</b>	Prejnt <b>Fallow</b>	93	83	<b>99</b>	<b>95</b>
Clarity+Huskie+NIS/ <b>Atrazine+Sharpen+MSO+UAN</b>	0.147+0.5% v/v / <b>1.0+.045+1%+2.5%v/v</b>	Prejnt <b>Fallow</b>	68	65	<b>100</b>	<b>93</b>
Rave+NIS/ <b>Atrazine+Sharpen+MSO+UAN</b>	0.25/ <b>1.0+.045+1%+2.5%v/v</b>	Flglf <b>Fallow</b>		94	<b>100</b>	<b>100</b>
Widematch/ <b>Atrazine+Sharpen+MSO+UAN</b>			9	11	<b>7</b>	<b>8</b>
LSD (0.05)						

**Kochia control in wheat stubble with no in wheat crop treatment, SWREC Tribune 2014. Thompson, Schlegel, and Peterson. 1403whtTR**

	Product Rate	Appl.	Kochia in fallow	
			15 DAT	30 DAT
Treatment	Lb / acre	time		
Clarity+Sharpen+Linex+MSO+UAN	0.5+0.045+0.75+1%+2.5% v/v	Fallow	93	88
Clarity+Atrazine+COC	0.5+1.0+0.5%	Fallow	71	65
Clarity+atra+Sharpen+MSO+UAN	0.5+1.0+.045+1%+2.5%v/v	Fallow	98	94
Clarity+atra+Impact+MSO+UAN	0.5+1.0+.022+1%+2.5%v/v	Fallow	86	86
Atrazine+Impact+MSO+UAN	1.0+.022+1%+2.5%v/v	Fallow	84	78
Gramoxone SL+atra+COC	0.75+0.25+1% v/v	Fallow	99	85
Gramoxone SL+Linex+COC	0.75+0.75+1%	Fallow	100	88
Clarity+2,4-D+NIS+AMS	0.5+0.5+0.125%+2.5	Fallow	46	68
LSD (0.05)			7	8

# SWREC Tribune Advisory



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Office: 785-532-3444 cell: 785-477-4639

## ***DiFlexx Duo* (Bayer Crop) for all Corn and in fallow**

- Diglycolamine salt of dicamba 1.86 lb ae/gal + Laudis 0.27 lb/gal+ Safener - This CSA safener has soil and foliar activity
- Use 24 to 49 fl oz/A may be applied preplant, preemergence to field, silage, seed, and pop corn up through V7 stage. With drop nozzles can be applied up to corn at the V10 stage or 36 inch tall.
- At MSO or COC at 1% v/v when applied alone or tankmixed with atrazine.
- AMS or UAN is recommended in the label.
- **NOTE the addition of AMS or UAN will increase the risk of dicamba volatility!**

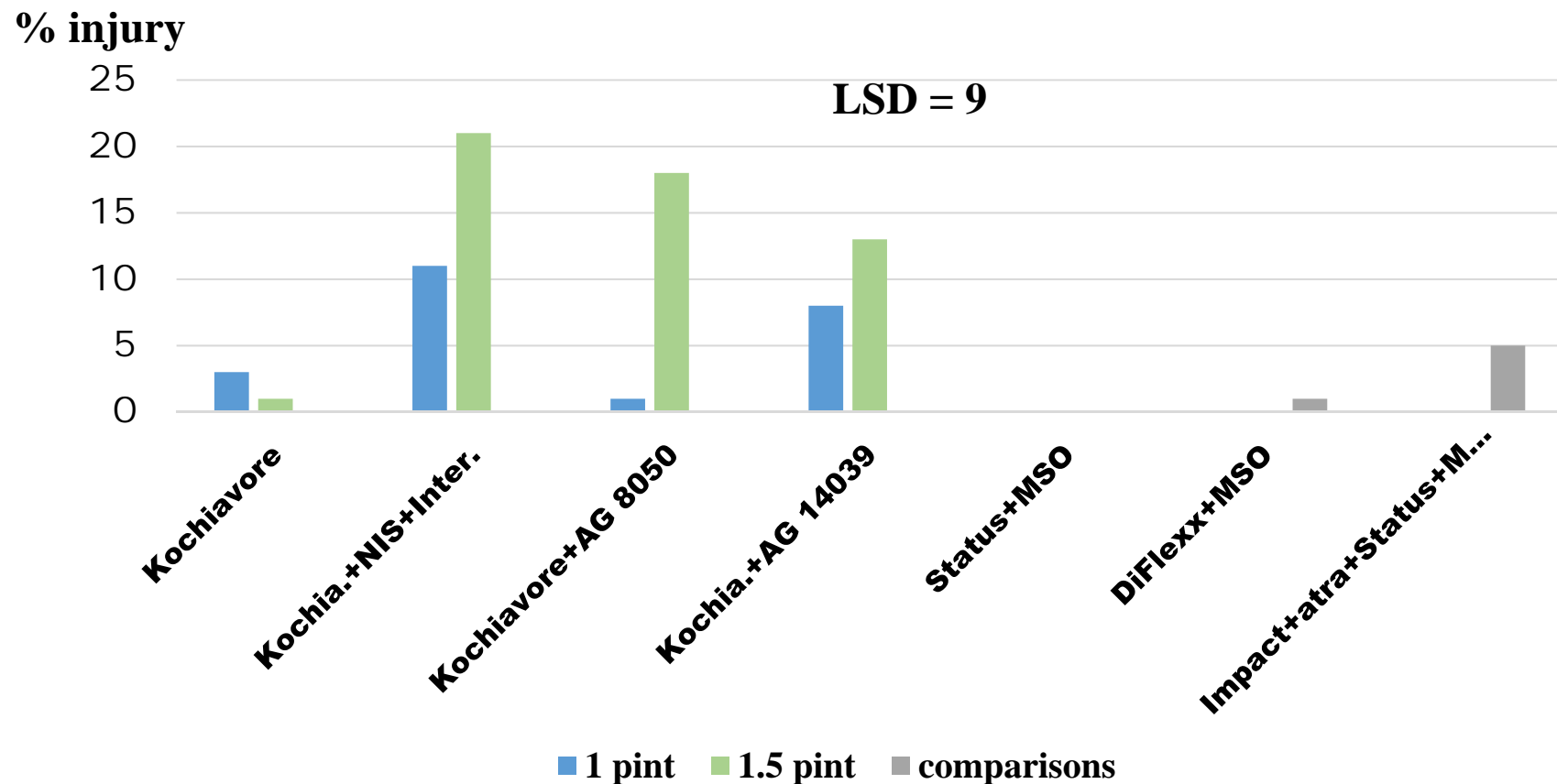
# Weed management in Irrigated corn with DiFlexx Duo, 2016, 1609cornTR, Thompson and Schlegel. ALL POST!

Treatment	Rate	Herb \$/a	Yield	PAAM	KOCZ	VELE	LSSB
	Prod. / acre		Bu/a	% control 7 wks after POST			
DiFlexx Duo (DD) + atra +Destiny HC+AMS	24 fl oz+ 1 pt + 1% v/v + 8.5 lb	23.90	192	96	100	99	35
DD+atra+Destiny HC+AMS	32 fl oz + 1pt + 1% v/v+8.5 lb	31.15	195	96	100	99	39
DD+RPM+atra+ Destiny HC+AMS	24+32 fl oz+ 1pt+ 1%v/v + 8.5 lb	29.60	203	91	98	100	86
DD+Liberty280+atra+ Destiny HC+AMS	24+22 fl oz+ 1pt+ 1%v/v + 8.5 lb	37.30	198	96	100	100	41
Capreno+RPM+atra+ Superb HC + AMS	3 fl oz + 32 oz +1pt +0.5% + 8.5 lb	29.90	211	96	99	100	90
Halex GT + atraz + NIS + AMS	3.6 pt + 1 pt + .25% + 8.5 lb	31.00	208	100	98	100	92
Armezon + atra +Status + NIS + AMS	0.57 oz + 1 pt + 3 oz + .25% + 8.5 lb	24.15	198	94	90	100	51
Armezon + atra +Status + RPM+ NIS + AMS	0.57 oz + 1 pt + 3 oz + 32 +.25% + 8.5 lb	29.90	204	95	96	100	96
Armezon + atra + RPM + Outlook + RPM+ NIS + AMS	0.57 oz + 1 pt + 32 + 14oz +.25% + 8.5 lb	45.65	209	98	97	99	94
LSD 0.05			16	4	3	1	14

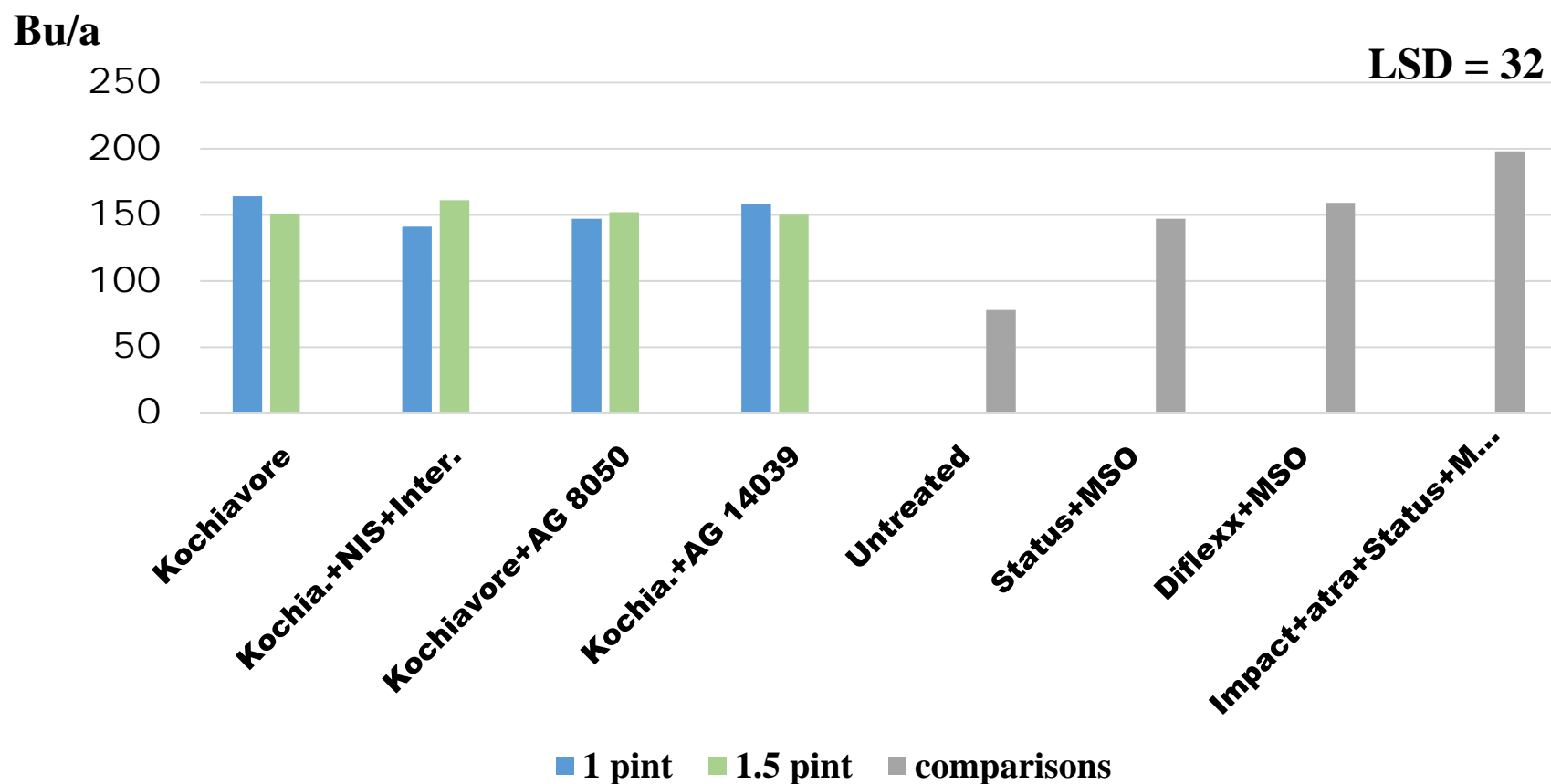
# ***Kochiavore* , Winfield Solutions**

- **2,4-D (4) LV 1.67 ae lb, bromoxynil (6) 1.67 lb, & Fluroxypyr (4) 0.67 ae lb/gallon**
- **Broadleaf weed control including kochia.**
- **Use 1 to 1.5 pints in corn Preplant, minimum of 7 days ahead of planting, or post plant preemergence to notill planted corn, or postemergence, v3 to v5. Postemergence to grain and forage sorghum v4 to the pre-boot stage. Kochiavore will cause crop injury. Can be applied up to 2.5 pints on fallow. Maximum is 3 pints/a for growing season.**
- **Do not feed or graze corn for 47 days following application or harvest grain for 90 days of application. Do not harvest grain within 70 days of application or allow meat or dairy animals to consume fodder, forage, or graze for 45 days following application to sorghum. Do not allow livestock to grazed fallow that has been treated with Kochiavore.**

# Corn injury 4 weeks after post applications, Tribune KS. Thompson, Schlegel, and Peterson. 1613cornTR.

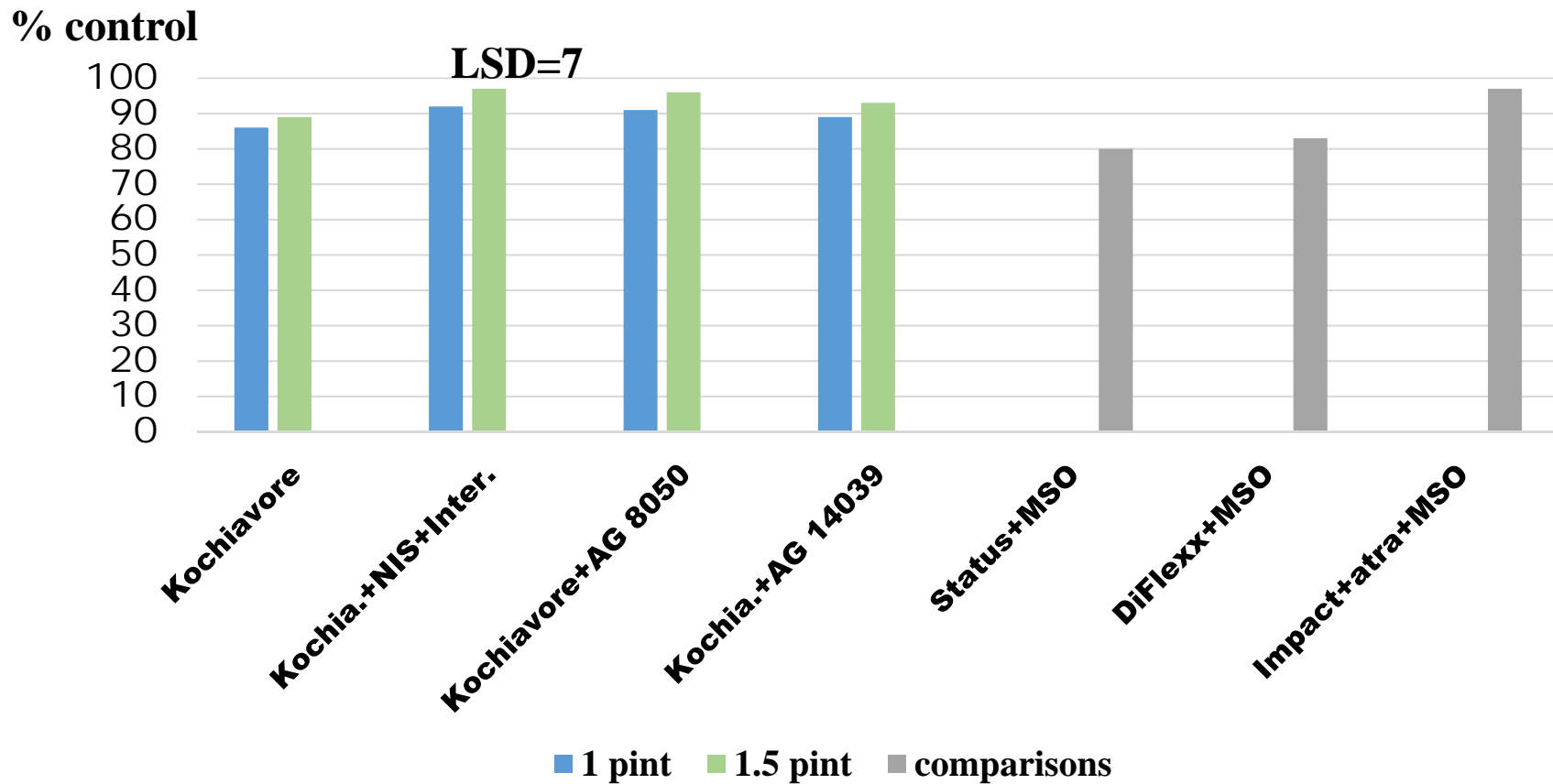


# Kochiavore effect on corn yield, Tribune KS. Thompson, Schlegel, and Peterson. 1613cornTR.

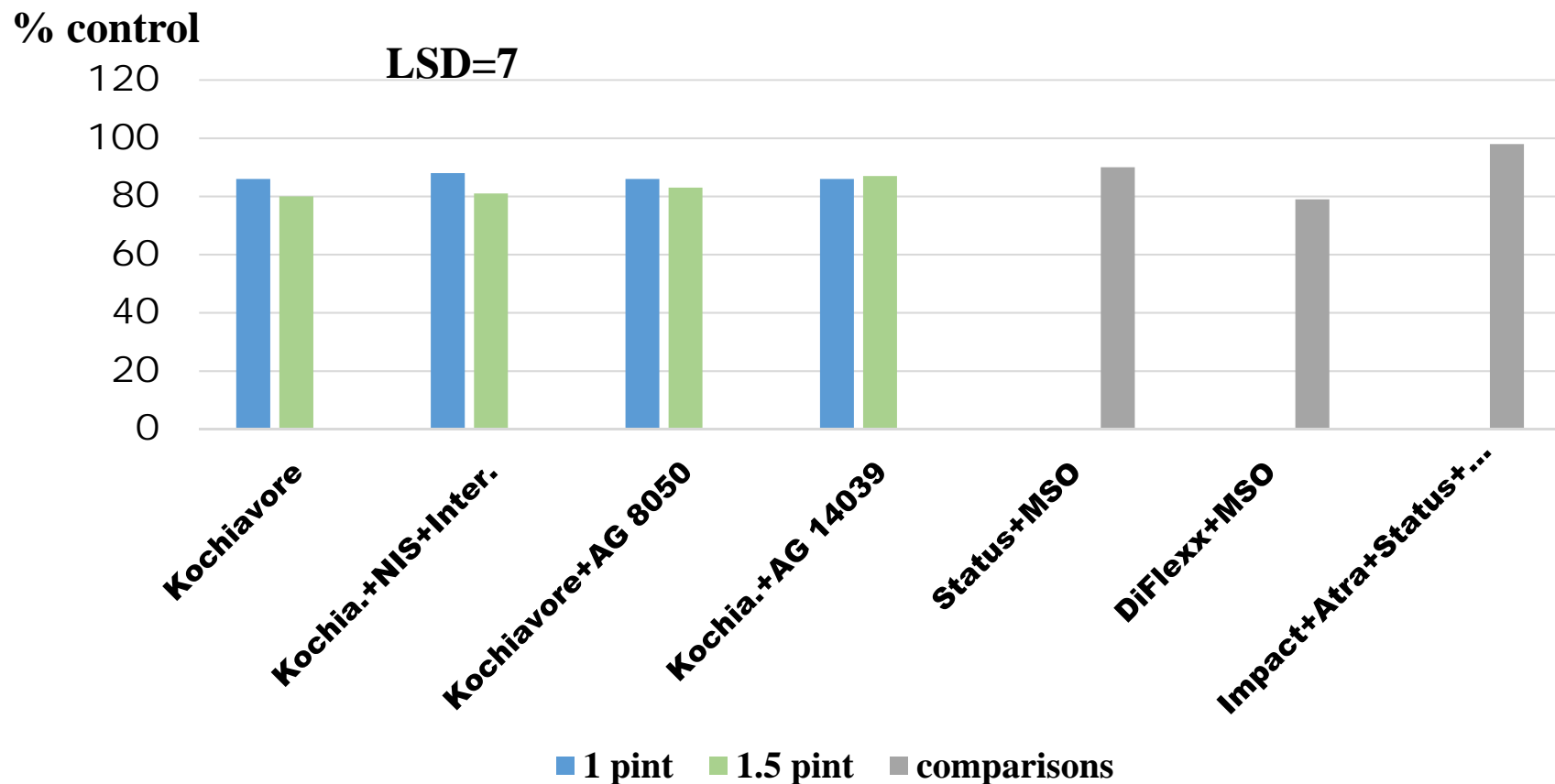




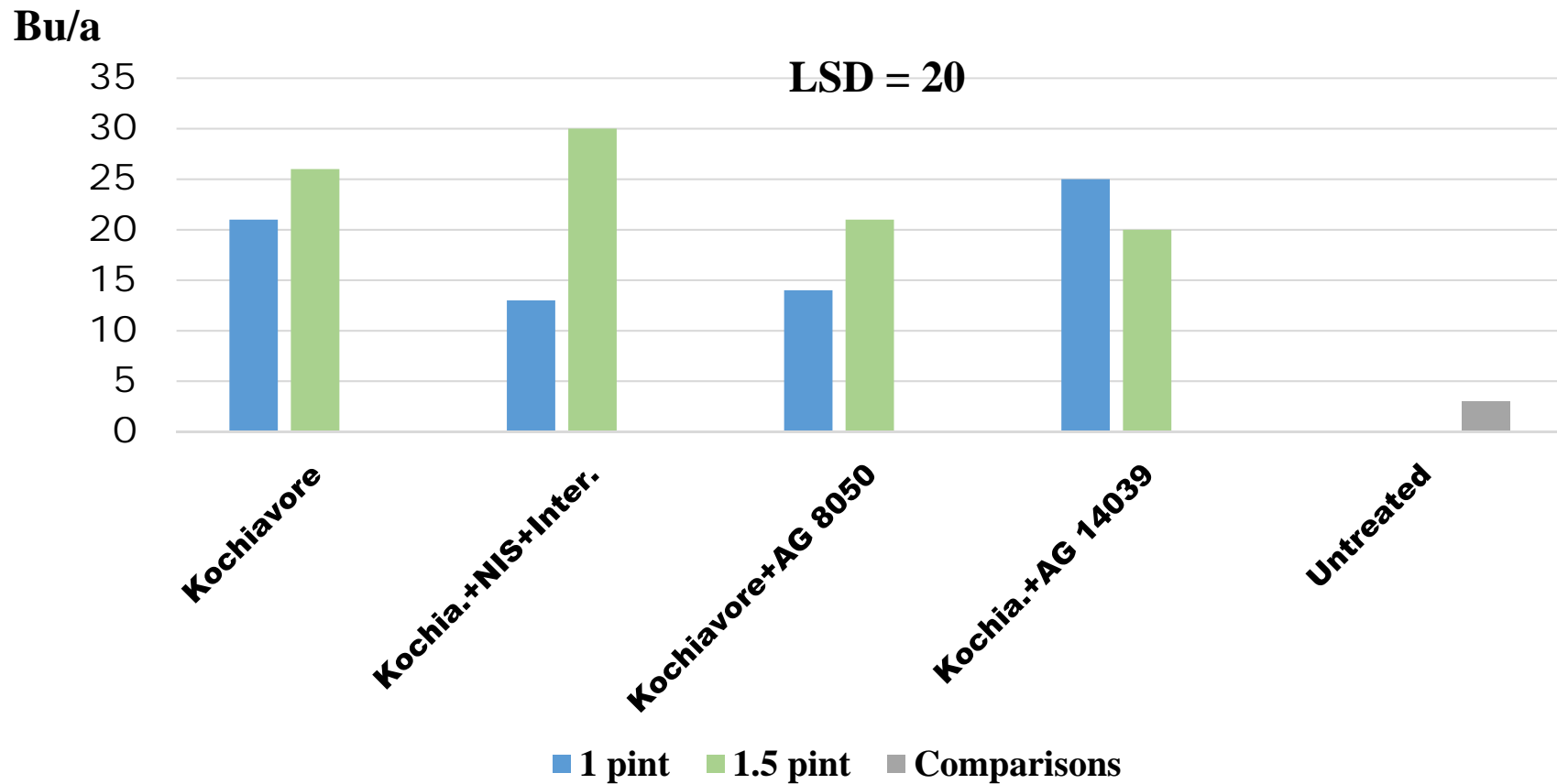
# Kochia control 4 weeks after post applications, Tribune KS. Thompson, Schlegel, and Peterson. 1613cornTR.



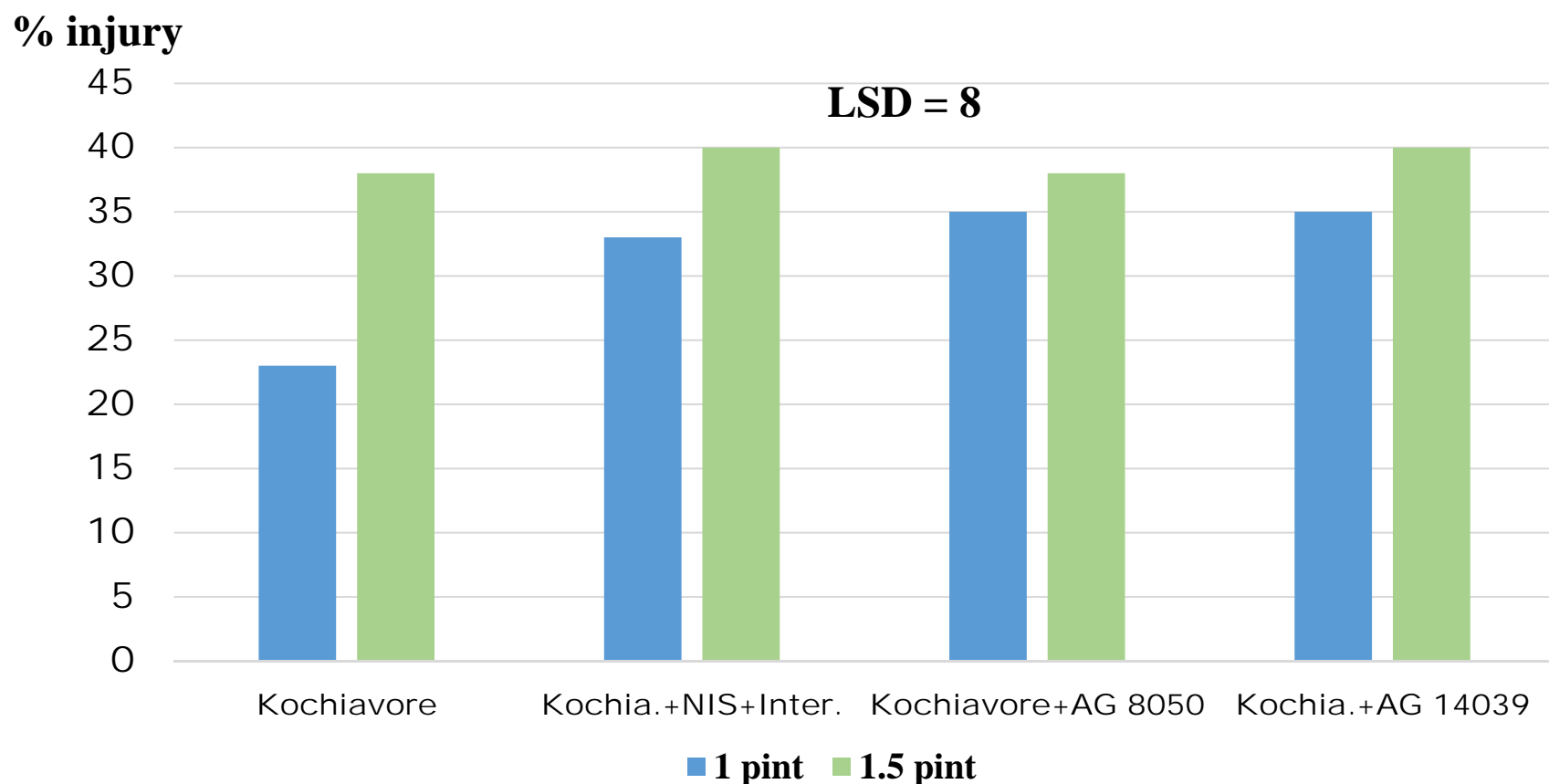
# Palmer amaranth control 4 weeks after post applications, Tribune KS. Thompson, Schlegel, and Peterson. 1613cornTR.



# Kochiavore effect on sorghum yield, Manhattan KS. Thompson and Peterson. 1739sorg.

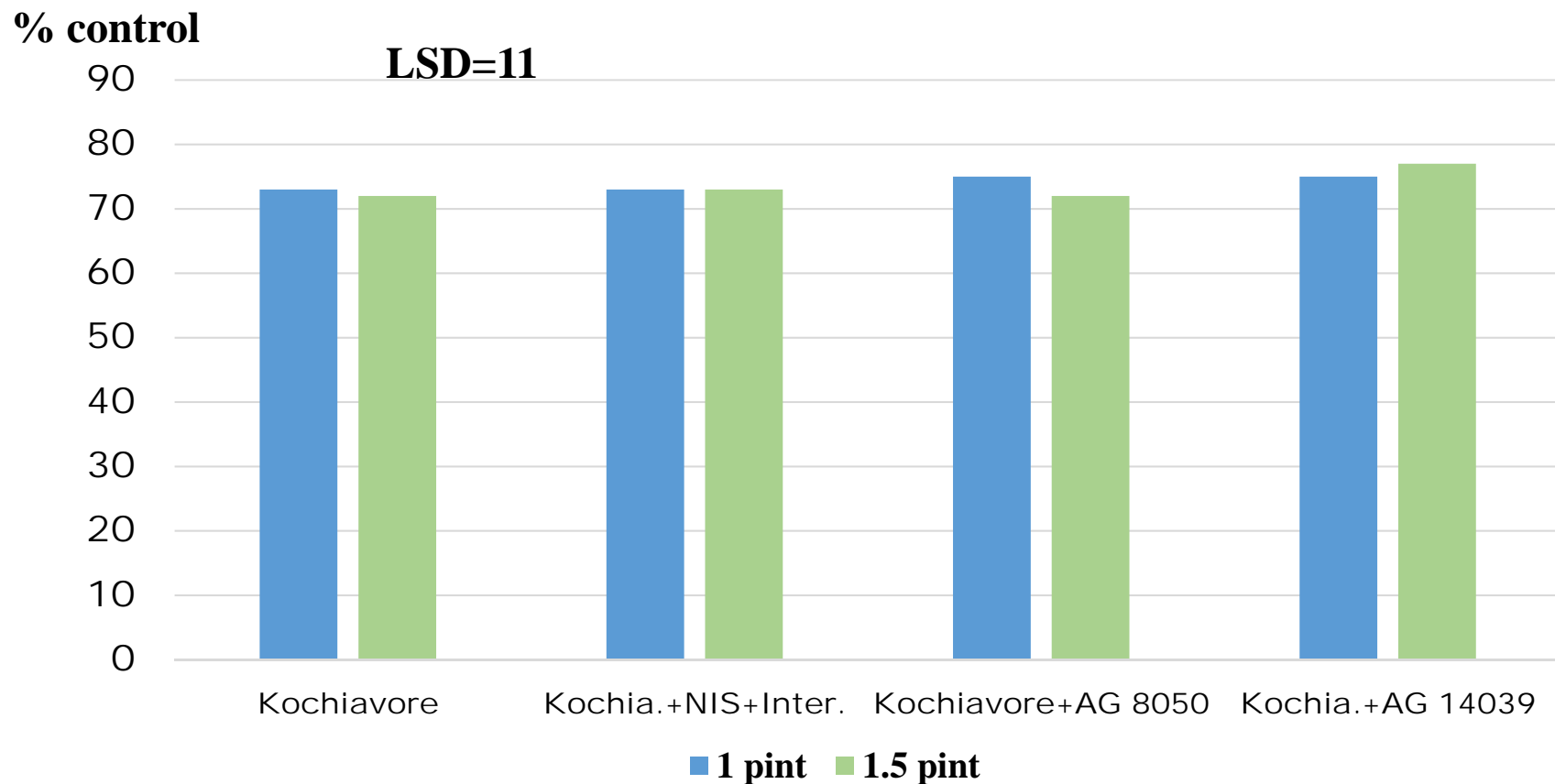


# Sorghum injury 2 weeks after post applications, Manhattan KS. Thompson and Peterson. 1739sorg.



**Four weeks after application injury was zero for all treatments.**

# Palmer amaranth control 4 weeks after post applications, Manhattan KS. Thompson and Peterson. 1739sorg.



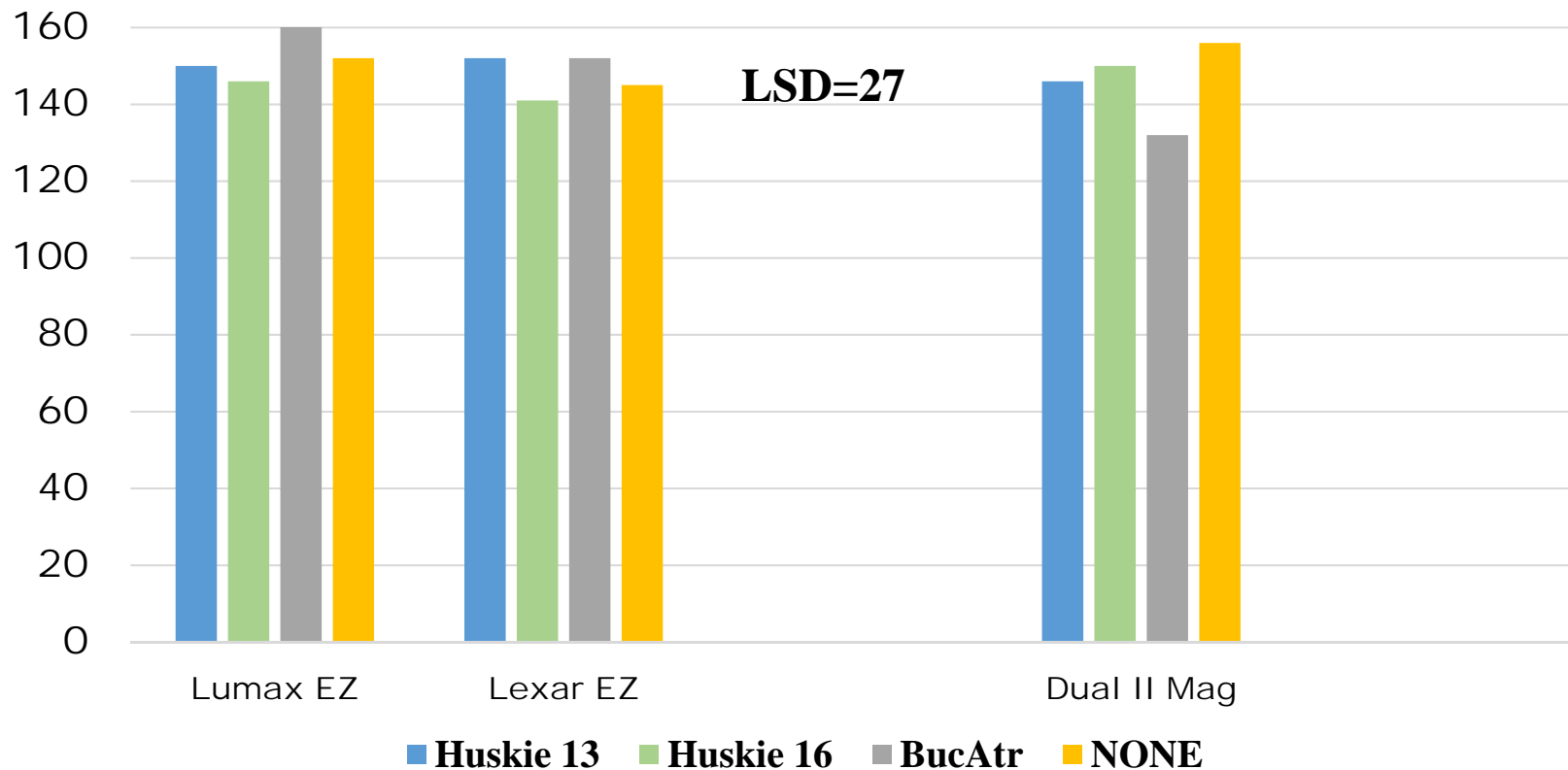
## **Statement in the Huskie label.**

- **Unacceptable crop response may occur if Huskie herbicide is applied to acreage that has been previously treated with an application of any product containing mesotrione (products such as Lumax or Lexar).**

# Effect of Huskie on sorghum previously treated with pre applied herbicides containing mesotrione, Manhattan KS. Menzer, Thompson, Schlegel, and Peterson. 1530sorg.

Scenario – Great activation, significant injury from Lumax and Lexar, Palmer heavy.

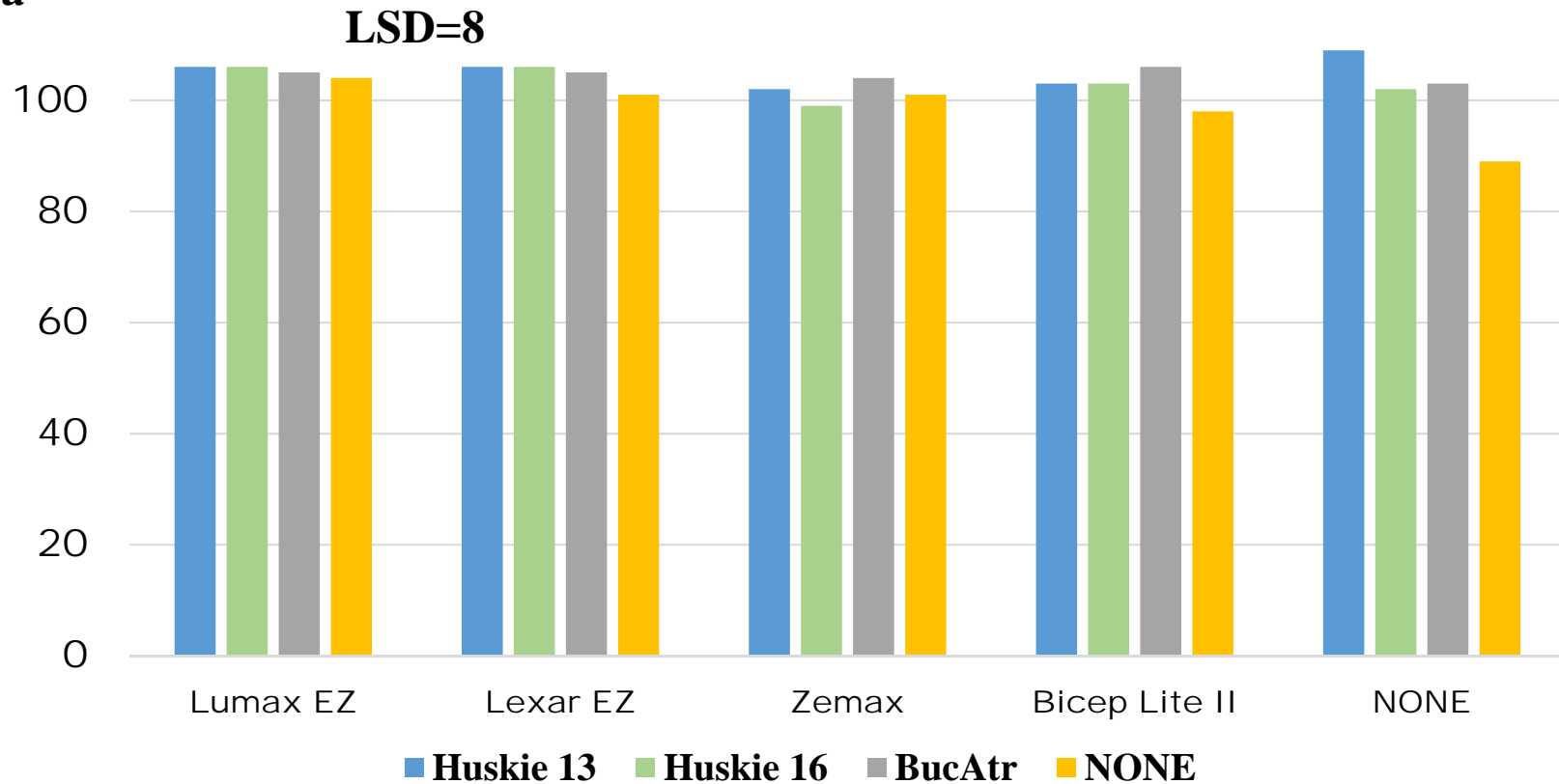
Bu/a



Funded by Kansas Grain Sorghum Commission

# Effect of Huskie on sorghum previously treated with pre applied herbicides containing mesotrione, Tribune KS. Menzer, Thompson, Schlegel, and Peterson. 1616sorgTR.

Scenario – Great activation, slight injury from Lumax and Lexar, no weeds.  
Bu/a

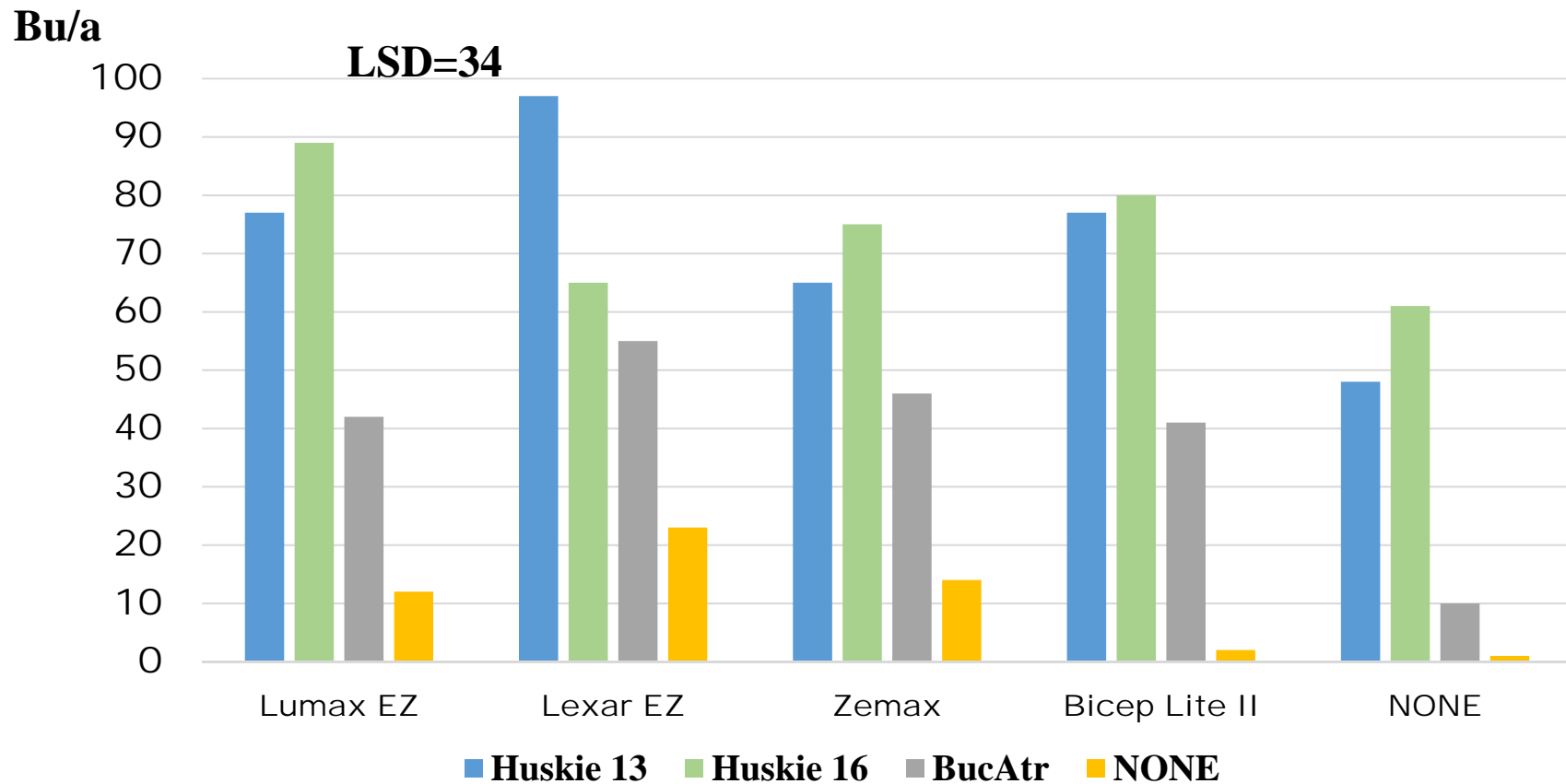


Funded by Kansas Grain Sorghum Commission



# Effect of Huskie on sorghum previously treated with pre applied herbicides containing mesotrione, Manhattan KS. Menzer, Thompson, Schlegel, and Peterson. 1615sorg.

Scenario – No activation, no injury from Lumax and Lexar, Palmer heavy.



Funded by Kansas Grain Sorghum Commission

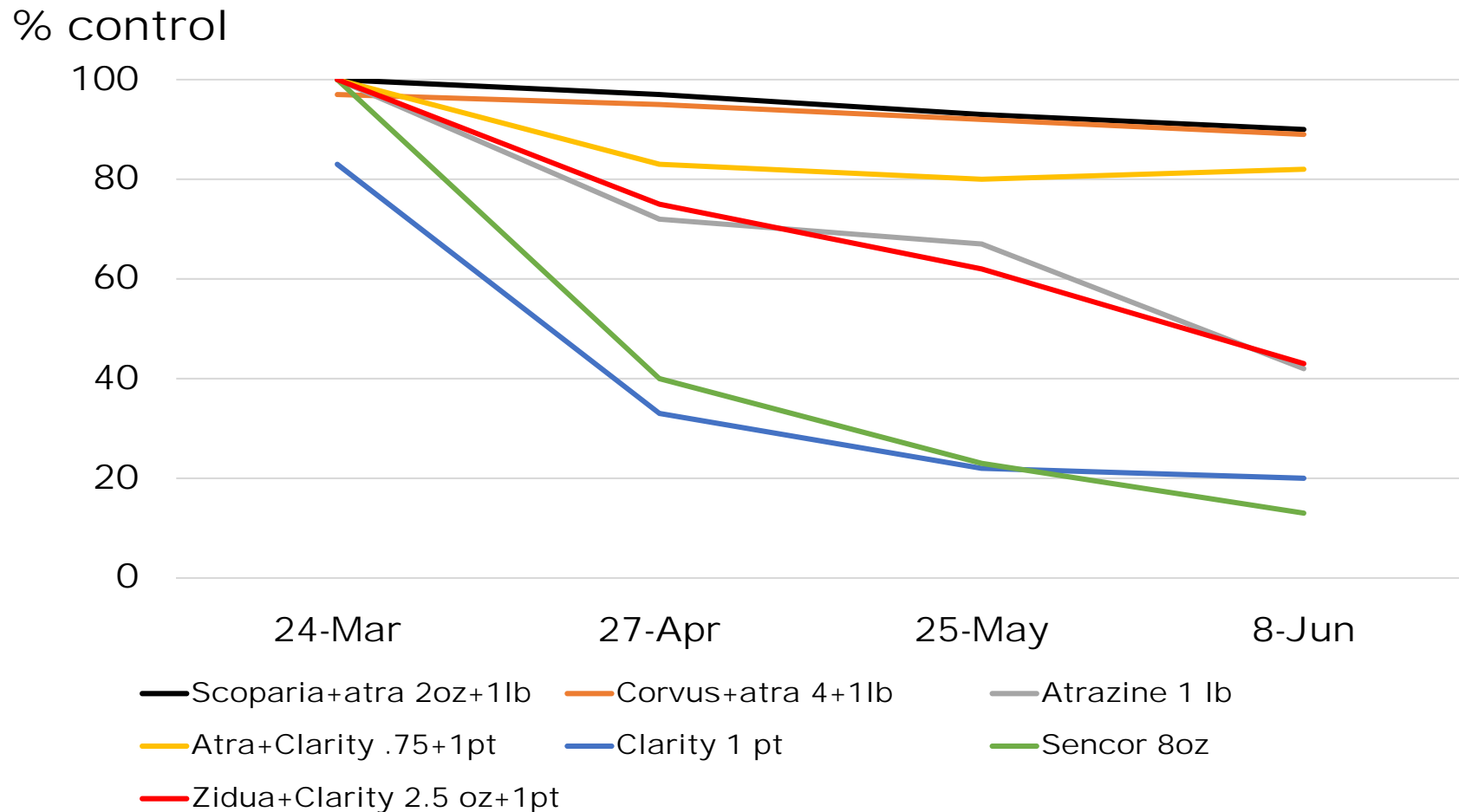
## **Summary of the Huskie on sorghum previously treated with PRE herbicides containing mesotrione.**

- PRE herbicide program did not appear to affect the level of Huskie injury to sorghum nor did the combination have any adverse affect on grain yield.**

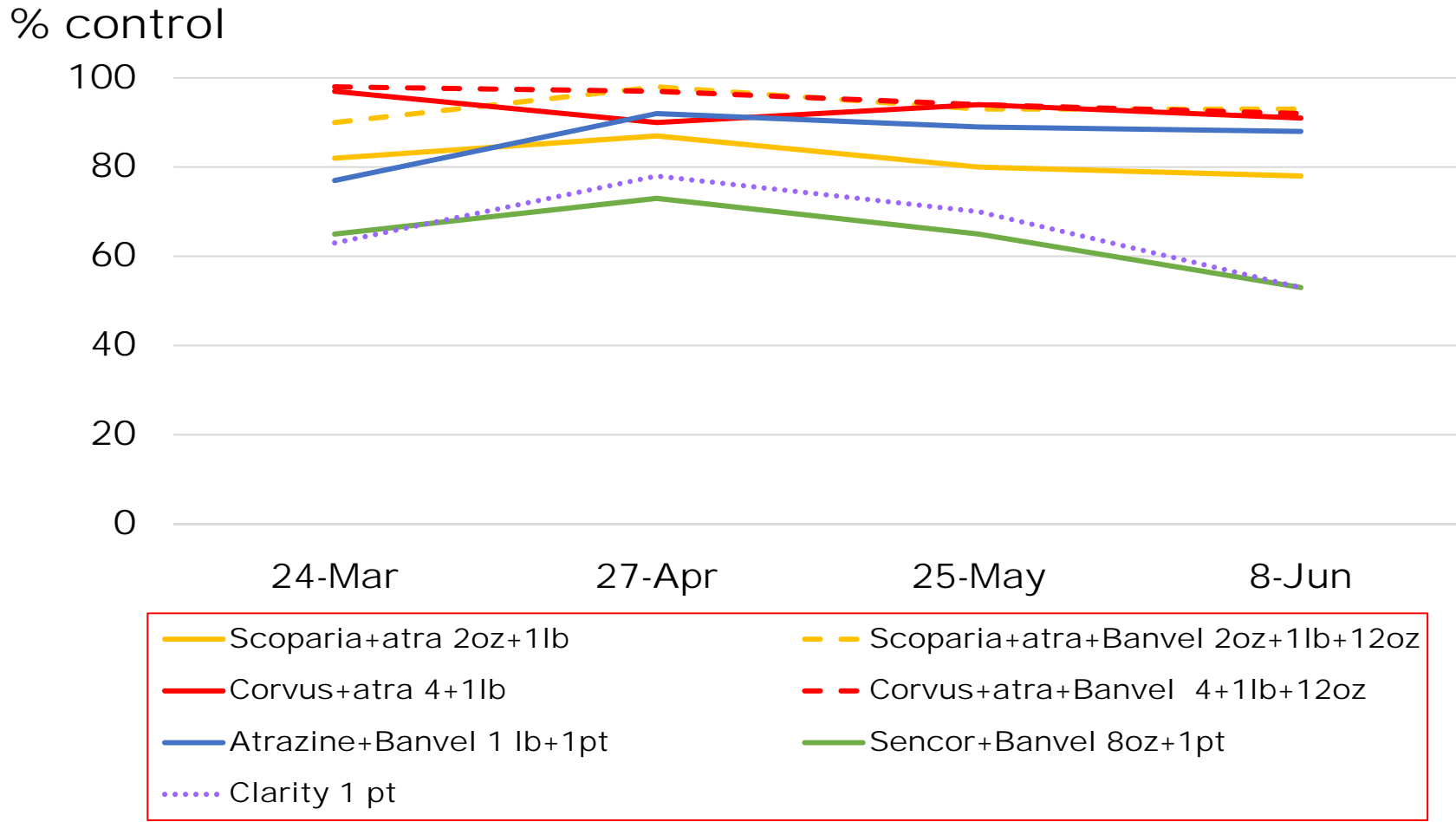
# Controlling kochia with PRE herbs.



# Kochia control with Dec 20<sup>th</sup> applied herbicide treatments. Tribune KS 2015-16. Thompson, Schlegel, and Peterson. 1601kocz.



# Kochia control with Feb 15<sup>th</sup> applied herbicide treatments. Tribune KS 2016. Thompson, Schlegel, and Peterson. 1601kocz.



**Weed control in Wheat and wheat stubble following harvest, SWREC Tribune 2014. Thompson, Schlegel, and Peterson. 1403whtTR**

	Product Rate	Appl.	Kochia in crop		Kochia in fallow	
			May 15	PreHarv	15 DAT	30 DAT
Treatment	Lb / acre	time	(% control)			
Clarity + 2,4-D/ <b>Clarity+2,4-D+NIS+AMS</b>	0.125+0.375/ <b>0.5+0.5+0.125%+2.5</b>	Prejnt <b>Fallow</b>	63	51	<b>55</b>	<b>64</b>
Clarity+2,4-D+Zidua/ <b>Clarity+2,4-D+NIS+AMS</b>	0.125+0.375+0.106/ <b>0.5+0.5+0.125%+2.5</b>	Prejnt <b>Fallow</b>	100	100	<b>98</b>	<b>98</b>
Clarity+Zidua/ <b>Clarity+atra+Sharpen+MSO+UAN</b>	0.125+0.106/ <b>0.5+1.0+.045+1%+2.5%v/v</b>	Prejnt <b>Fallow</b>	100	96	<b>100</b>	<b>100</b>
<b>N</b>	0.125+0.23+0.25%v/v / <b>1.0+.045+1%+2.5%v/v</b>	Prejnt <b>Fallow</b>	93	83	<b>99</b>	<b>95</b>
Clarity+Huskie+NIS/ <b>Atrazine+Sharpen+MSO+UAN</b>	0.147+0.5% v/v / <b>1.0+.045+1%+2.5%v/v</b>	Prejnt <b>Fallow</b>	68	65	<b>100</b>	<b>93</b>
Rave+NIS/ <b>Atrazine+Sharpen+MSO+UAN</b>	0.25/ <b>1.0+.045+1%+2.5%v/v</b>	Flglf <b>Fallow</b>		94	<b>100</b>	<b>100</b>
Widematch/ <b>Atrazine+Sharpen+MSO+UAN</b>						
LSD (0.05)			9	11	<b>7</b>	<b>8</b>

**Kochia control in wheat stubble with no in wheat crop treatment, SWREC Tribune 2014. Thompson, Schlegel, and Peterson. 1403whtTR**

	Product Rate	Appl.	Kochia in fallow	
			15 DAT	30 DAT
Treatment	Lb / acre	time		
Clarity+Sharpen+Linex+MSO+UAN	0.5+0.045+0.75+1%+2.5% v/v	Fallow	93	88
Clarity+Atrazine+COC	0.5+1.0+0.5%	Fallow	71	65
Clarity+atra+Sharpen+MSO+UAN	0.5+1.0+.045+1%+2.5%v/v	Fallow	98	94
Clarity+atra+Impact+MSO+UAN	0.5+1.0+.022+1%+2.5%v/v	Fallow	86	86
Atrazine+Impact+MSO+UAN	1.0+.022+1%+2.5%v/v	Fallow	84	78
Gramoxone SL+atra+COC	0.75+0.25+1% v/v	Fallow	99	85
Gramoxone SL+Linex+COC	0.75+0.75+1%	Fallow	100	88
Clarity+2,4-D+NIS+AMS	0.5+0.5+0.125%+2.5	Fallow	46	68
LSD (0.05)			7	8

# *Questions?*

*Curtis Thompson*

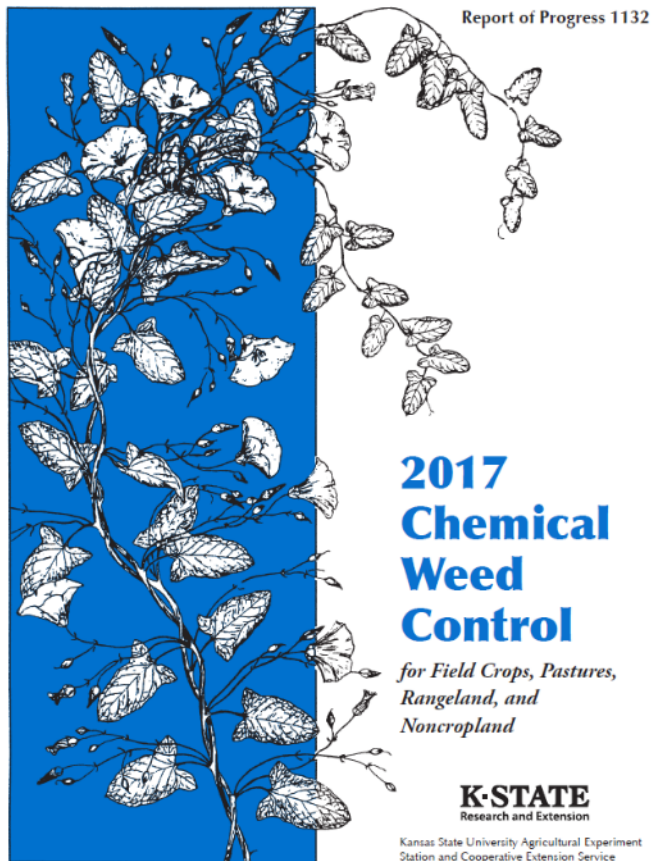
*[cthompso@ksu.edu](mailto:cthompso@ksu.edu)*

*[twitter] @cthompso56*

*[facebook] Curtis Robert Thompson*

*Office: 785-532-3444*

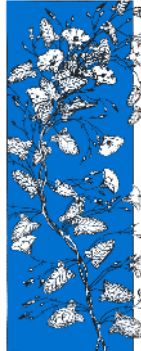




# Questions?

- Curtis Robert Thompson
- Extension Weed Specialist
- K-State Agronomy, @KStateAgron
- Cell 785 532-3444 or Of 785 477-4639
- <http://www.ksre.ksu.edu/bookstore/pubs/SRP1132.pdf> - new one in process

Report of Program 1122



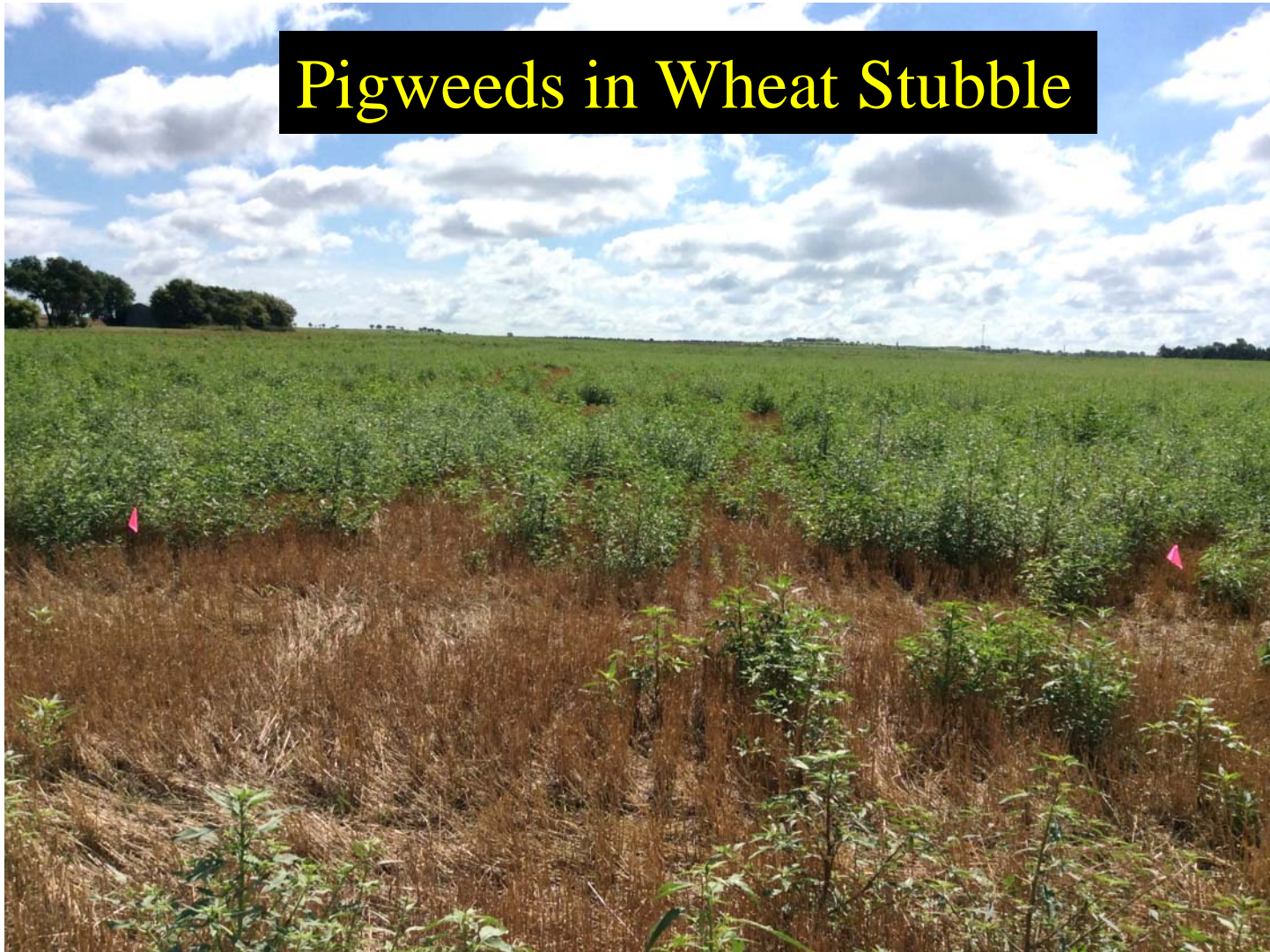
**2017  
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*For Field Crops, Pastures,  
Rangeland, and  
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## Pigweeds in Wheat Stubble



# **Glyphosate Resistant Pigweed Control in Wheat Stubble**

- **2,4-D and dicamba not as good as we thought on big pigweeds. Glyphosate was doing most of the work in tank-mixes.**
- **Timing and weed size just as important in wheat stubble as in POST treatments in crop.**
- **Consider Gramoxone as an alternative to glyphosate.**

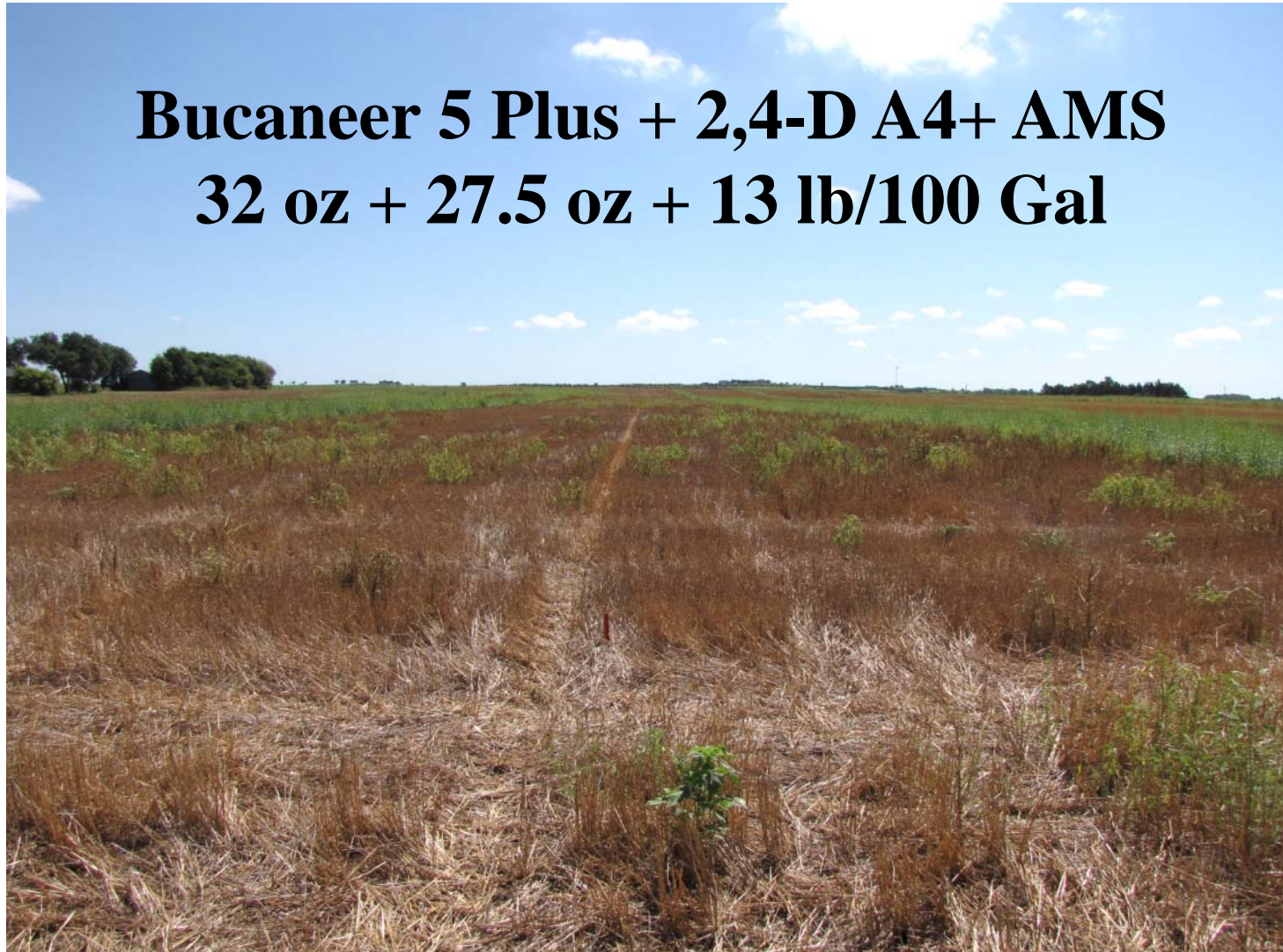
# Pigweed Control in Wheat Stubble Demonstration South of Solomon, KS



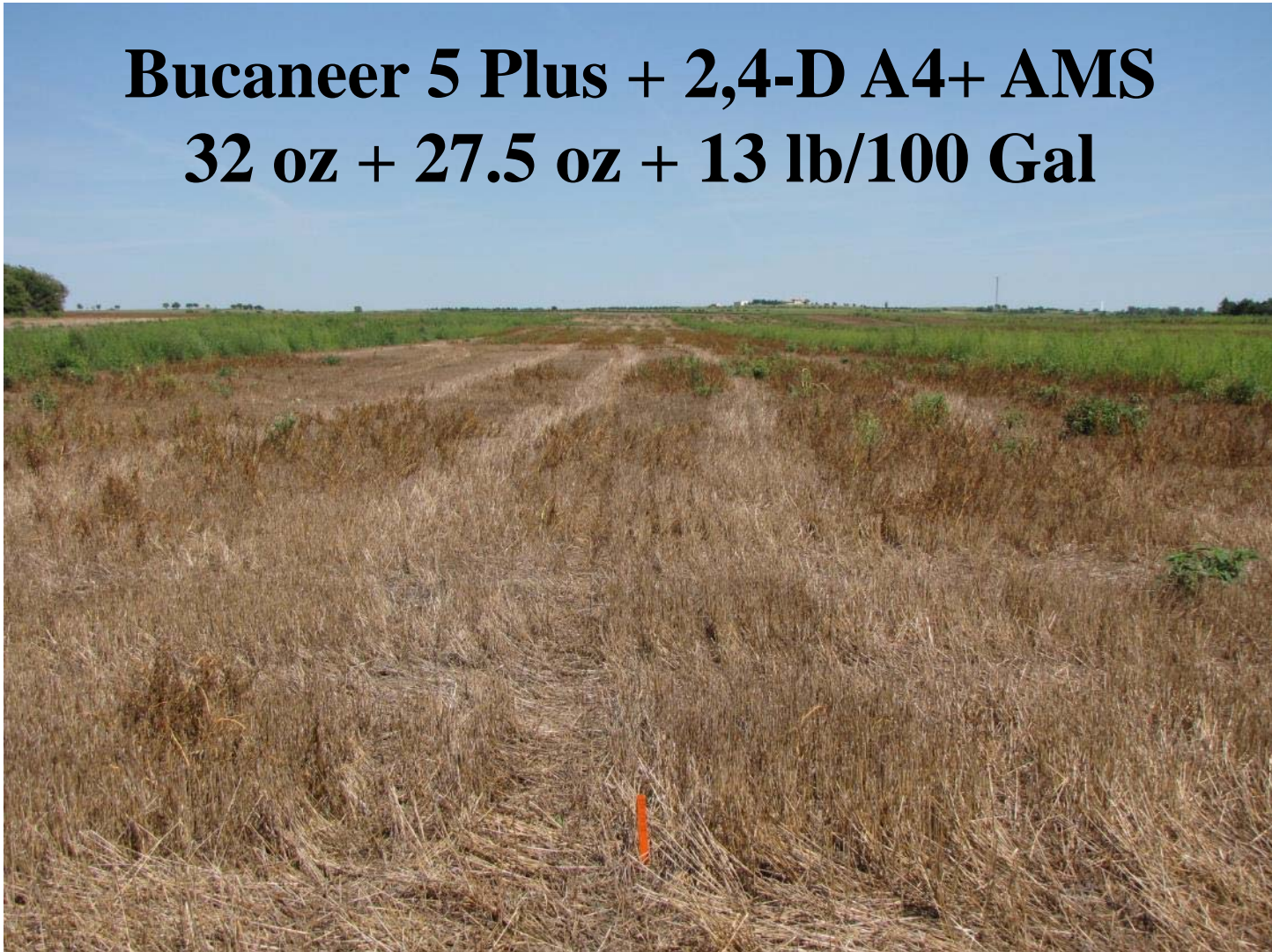
**Bucaneer 5 Plus + AMS**  
**32 oz + 13 lb/100 Gal**



**Bucaneer 5 Plus + 2,4-D A4+ AMS  
32 oz + 27.5 oz + 13 lb/100 Gal**

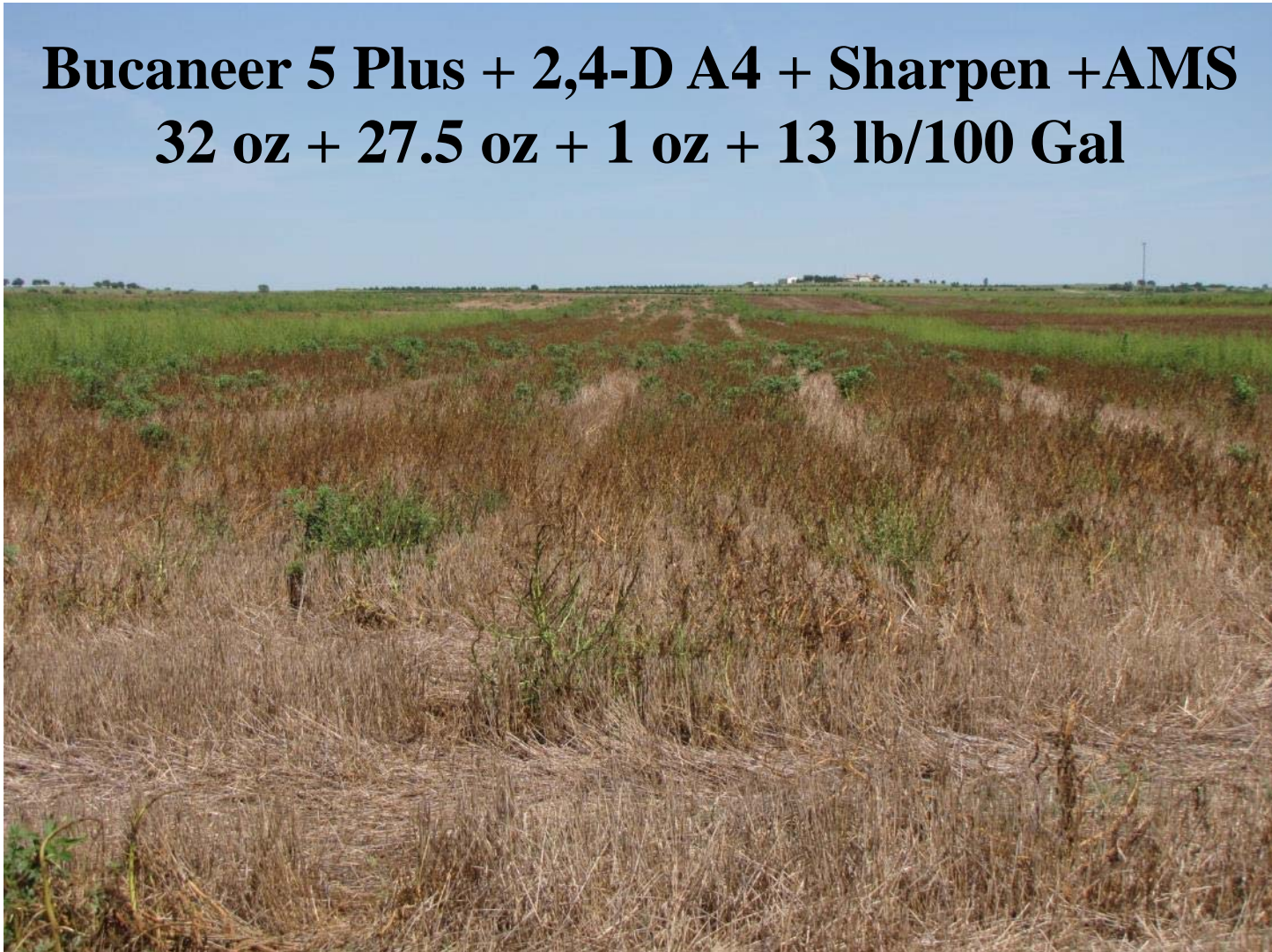


**Bucaneer 5 Plus + 2,4-D A4+ AMS  
32 oz + 27.5 oz + 13 lb/100 Gal**





**Bucaneer 5 Plus + 2,4-D A4 + Sharpen +AMS  
32 oz + 27.5 oz + 1 oz + 13 lb/100 Gal**



**Gramoxone 2LS + NIS**  
**3 pt + 1 qt/100 Gal**



# Gramoxone Performance

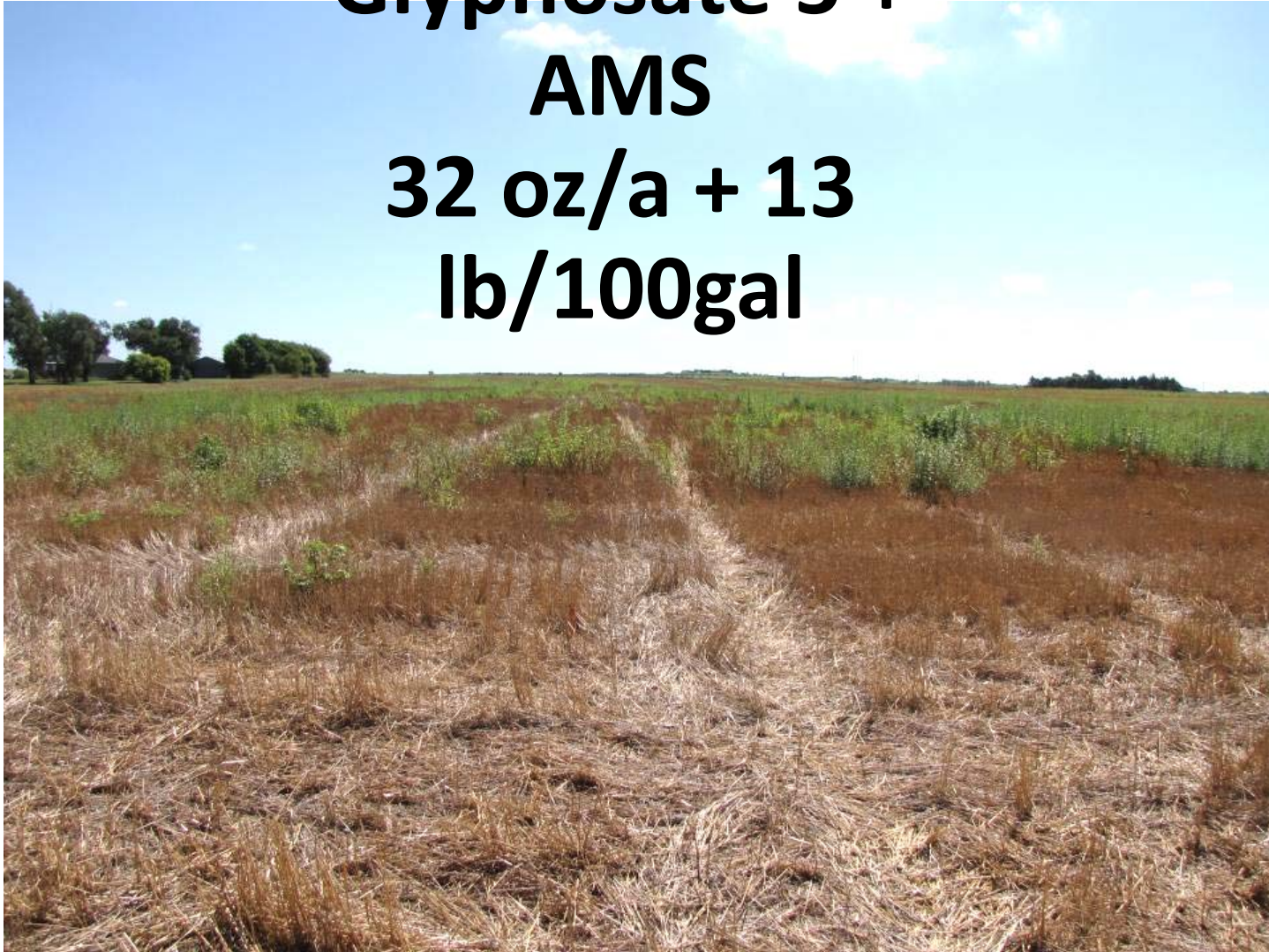
## Critical Factors

- Requires NIS or OC
- Spray coverage
  - Minimum 15 gpa
  - Avoid coarse spray
- Weed size, larger is more difficult to cover
- Enhanced by atrazine, metribuzin, or Sharpen
- Avoid spray drift

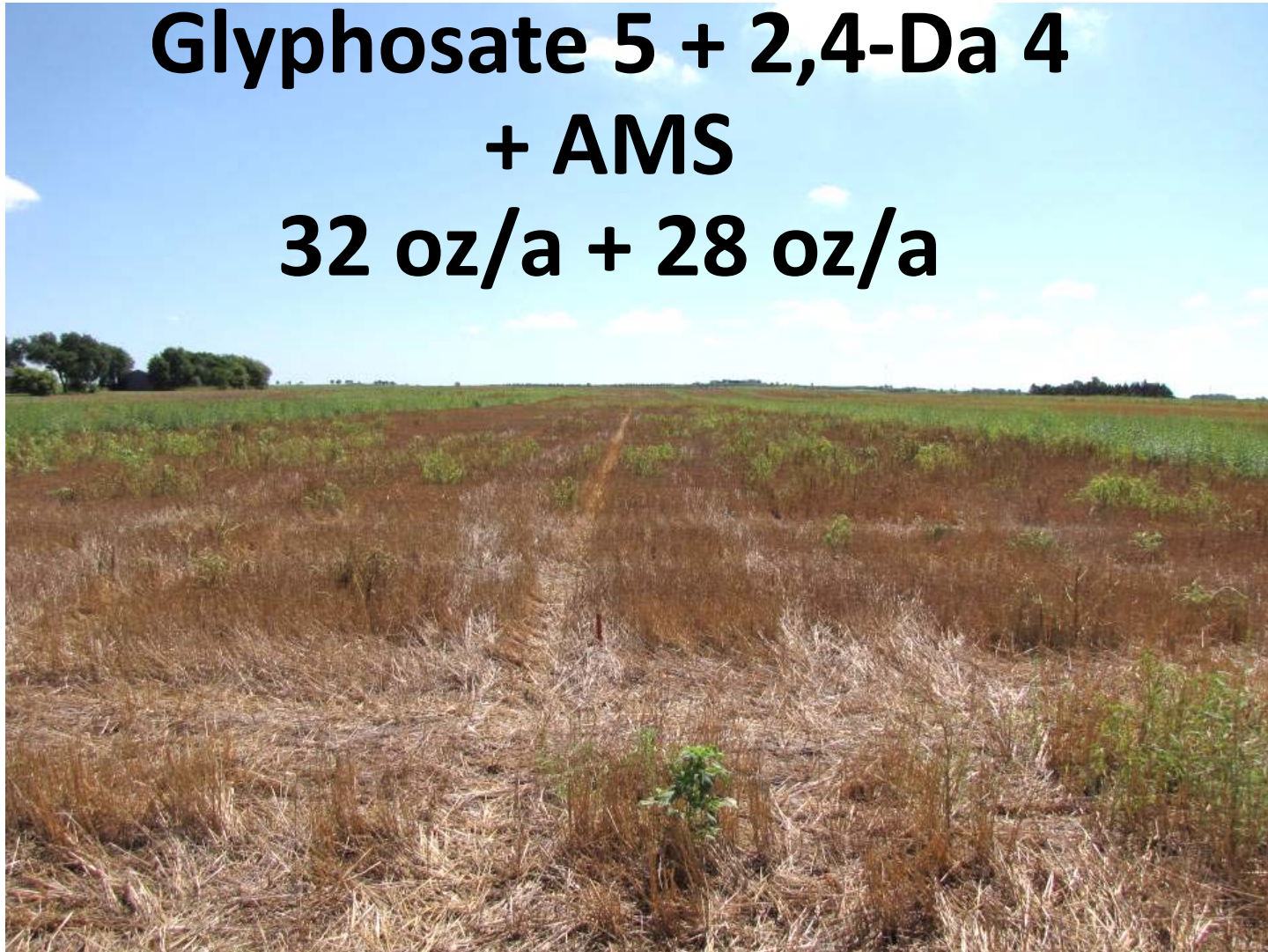




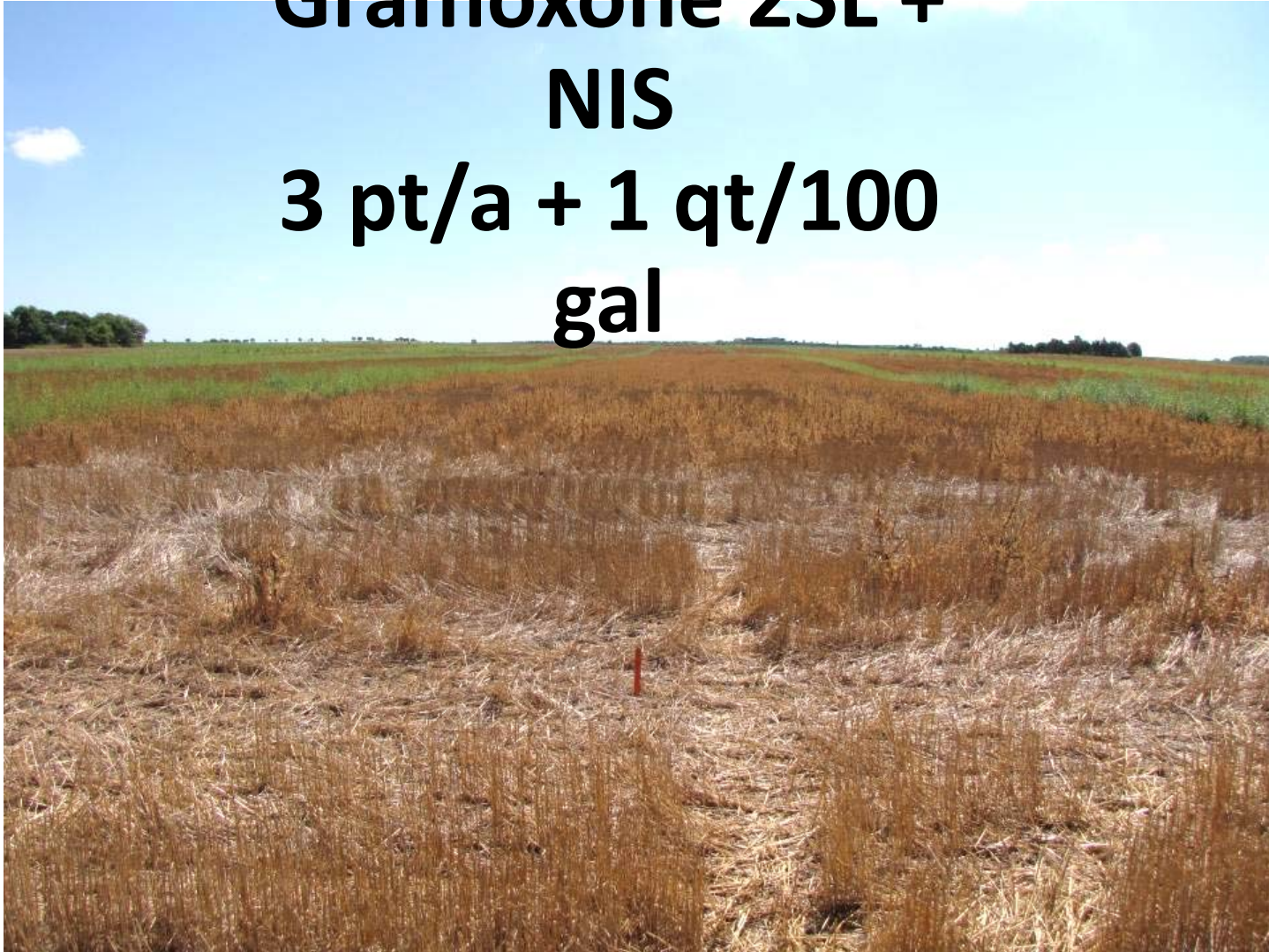
**Glyphosate 5 +  
AMS  
32 oz/a + 13  
lb/100gal**



**Glyphosate 5 + 2,4-Da 4  
+ AMS  
32 oz/a + 28 oz/a**



**Gramoxone 2SL +  
NIS  
3 pt/a + 1 qt/100  
gal**





# Weed Management Update for Wheat

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# Wheat Herbicide Update 2015

- **Sentrallas (DuPont)**
- **Travallas (DuPont)**
- **Quelex (Dow)**
- **Zidua**
- **Anthem Flex**

## ***Sentrallas* (DuPont) for winter wheat, barley, and oats**

- **Thifensulfuron 0.25 lb ai + fluroxypyr 1.3 lb ae / gallon**
- **Use 7 to 14 fl oz on wheat or 7 to 9 fl oz on oats or barley for single applications. Maximum of 14 fl oz may be used on wheat and barley and 9 fl oz on oats during the season.**
- **Apply from 2 leaf stage but before the flagleaf is visible.**
- **Do not graze for 7 days, hay 30 days, grain 45 days PHI.**
- **Corn or sorghum may be planted anytime after application. Other crops may be planted 120 days following application.**

## ***Travallas* (DuPont) for winter wheat and barley**

- **Metsulfuron 0.025 lb + thifensulfuron 0.25 lb ai + fluroxypyr 1.3 lb ae / gallon**
- **Single use rate of 7 fl oz**
- **Active ingredient oz ai In 7 fl oz    Max oz AI/season**

- metsulfuron	0.022	0.06
- thifensulfuron	0.22	0.75
- fluroxypyr	1.1	3.93
- **Apply from 2 leaf stage but before the flagleaf is visible.**
- **Do not graze for 7 days, hay 30 days, grain 45 days PHI.**
- **Rotation restrictions: sorghum 4 mo, corn 12 mo, STS beans 4 mo, conv. Beans 22-34 mo west of 183 or 12 mo east of 183**

# ***Quelex (Dow) for winter wheat***

- **New herbicide from Dow which is a premix of halauxifen (Arylex) and florasulam for postemergence control of broadleaf weeds.**
- **Rates:           0.75 oz/a**
- **Adds:NIS**
- **Timing:         Fall or spring postemergence**
- **Weeds:         Mustards, pennycress, henbit, marestail  
                      Weak on kochia**
- **Minimal Crop Rotation Restrictions**
  - 3 Mo: Corn, sorghum, soybean, cotton, sunflower**
  - 9 Mo: Alfalfa, canola, mustard, peas,**

**Broadleaf weed control with spring applied wheat herbicides,  
Manhattan, KS, 2013 (Peterson&Thompson,WH200806).**

Herbicide	Rate (oz/A)	Henbit -----(% control)-----	Flix- weed	Blue mustard
Quelex+NIS	0.71	100	98	100
Quelex+2,4-D+NIS	0.71+10.5	100	100	100
Finesse + 2,4-D+NIS	0.3+10.5	94	100	100
Ally+2,4-D+NIS	0.1+10.5	90	100	100
LSD (5%)		2	1	NS

# ***PowerFlex HL (Dow) use in wheat***

- **A new, more concentrated formulation of PowerFlex (pyroxsulam) from Dow AgroSciences.**
- **Rate: 2 oz/a compared to 3.5 oz/a of PowerFlex**
- **Weeds: Cheat, Japanese brome, downy brome (F), Italian ryegrass, and many broadleaf weeds. DOES NOT CONTROL CEREAL RYE.**
- **New Crop Rotation Restrictions**
  - **3 months for soybeans, sorghum, cotton, and sunflower**
  - **9 Months for most other crops.**
- **Can be applied with liquid nitrogen fertilizer as part of the carrier, but at a maximum of 50% of the carrier solution and no more than 30 lb of actual N per acre.**
- **Do not tank mix with products that contain dicamba (Banvel) or amine formulations of 2,4-D or MCPA or reduced grass control may occur.**

**Grass control in winter wheat at Manhattan, KS in 2012  
(Peterson and Thompson).**

<b>Herbicide</b>	<b>Rate</b>	<b>Timing</b>	<b>Downy brome</b>	<b>Cheat</b>	<b>Ryegrass</b>
	<b>(oz/a)</b>		<b>------(%)-----</b>		
<b>PowerFlex HL</b>	<b>2</b>	<b>FP</b>	<b>84</b>	<b>100</b>	<b>100</b>
<b>Olympus</b>	<b>0.9</b>	<b>FP</b>	<b>86</b>	<b>100</b>	<b>60</b>
<b>Maverick</b>	<b>0.67</b>	<b>FP</b>	<b>90</b>	<b>100</b>	<b>88</b>
<b>PowerFlex HL</b>	<b>2</b>	<b>SP</b>	<b>60</b>	<b>100</b>	<b>100</b>
<b>Olympus</b>	<b>0.9</b>	<b>SP</b>	<b>60</b>	<b>100</b>	<b>35</b>
<b>Maverick</b>	<b>0.67</b>	<b>SP</b>	<b>55</b>	<b>100</b>	<b>60</b>
<b>LSD (5%)</b>			<b>14</b>	<b>NS</b>	<b>14</b>



# ***Zidua (BASF) in wheat***

- **Now labeled for delayed preemergence or early postemergence application in wheat for residual control of Italian ryegrass and cheatgrass suppression.**
- **Rates:           0.7 to 1.25 oz/acre Delayed Pre 1 to 2 oz/acre Early Post**
- **Timing: after 80% of germinated wheat seedlings have ½ inch shoot through 4 tiller**
- **Does not control emerged weeds**
- **?possible residual control of early germinating kochia?**

## ***Anthem Flex (FMC) for wheat***

- **New premix of Zidua + Aim from FMC labeled for delayed preemergence or early postemergence application in wheat for residual control of Italian ryegrass and cheatgrass suppression and postemergence control of certain winter annual broadleaves.**
- **Rates: 2 to 4.5 oz/acre depending on soil type**
- **Timing: after 80% of germinated wheat seedlings have ½ inch shoot through 4 tiller**
- **Does not control emerged grasses**