



# **Corn and Sorghum Weed Control Update 2010**

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**Extension Weed Science**



# What's New for Corn

- **Balance Flex**
- **Corvus**
- **Capreno**
- **Prequel**
- **Kixor Technology**
  - **Sharpen**
  - **Integrity**
- **Optimum GAT Corn**
- **DHT Corn**

## ***Balance Flexx in corn (Bayer Crop Science)***

- 2.0 lbs / gallon Isoxaflutol (*Balance*) + cyprosulfamide (Safener) for broadleaf and grass control
- Timing of application
  - Preplant surface or incorporated up to 30 days prior to planting (with COC or MSO)
  - Preemergence (with COC or MSO)
  - Early post – up through 2-If (collars) corn –can be mixed with atrazine only, adjuvants or other herbicides may increase the risk of crop injury.
- Use rates depended upon soil type & OM

# ***Balance Flexx – Application rate***

<b>Applic. Timing</b>	<b>Fluid oz /acre</b>				
	<b>Coarse Sand, Loamy sand, Sandy loam</b>		<b>Medium Loam, Silt loam, Silt, Sandy clay loam</b>		<b>Fine Silty clay loam, Clay loam, Sandy Clay, Silty clay, Clay</b>
	<b>1.5% OM or less</b>	<b>&gt;1.5% OM</b>	<b>1.5% OM or Less</b>	<b>&gt;1.5% OM</b>	
<b>Early Preplant Surf or Inc 8 to 30 days preplt</b>	<b>4.0</b>	<b>5.0</b>	<b>6.0</b>	<b>6.0</b>	<b>6.0</b>
<b>Preplant Surf or Inc 0 to 7 days preplant OR Preemergence OR Early postemergence</b>	<b>3.0</b>	<b>4.0</b>	<b>5.0</b>	<b>6.0</b>	<b>6.0</b>

# ***Balance Flexx* (Cautions and Restrictions)**

- Do not use on fields when the water table is less than 25 feet below the ground surface.
- Do not use on sandy loam, loamy sand, or sand surface soils and sub soils when the organic matter in the top 12 inches is less and 2%
- Do not apply in the following 11 Kansas counties, SG, HV, MP, RN, RC, PR, SF, BA, KW, ED, PN
- Crop rotation restrictions: wheat 4 months, soybean, sweet corn, popcorn, grain sorghum, and sunflower 6 months, alfalfa 10 months, drybeans 18 months

# Restricted soil types if depth to water table is unknown~!

- Albion, Aline, Anselmo, Attica, Bankard, Bayard, Boel
- Canadian, Carr, Cass, Cleora, Crisfield, Darr, Dillwyn
- Dix, Dorrance, Dune Land, Dwyer, Els, Elsmere, Eva,
- Gerlane, Glenberg, Goltry, Goodnight, Gracemont,
- Gracemore, Happyditch, Haxtun, inavale, Kanza,
- Kingsdown, Krier, Las Animas, Likes, Lincoln, Manter,
- Meadin, Optima, Ortello, Otero, Platte, Plevna, Pratt,
- Sarpy, Schamber, Simeon, Thurman, Tivoli, Valent
- Valentine, Vona, Waldeck, Wann, Yahola

## ***Corvus* in corn, (Bayer Crop Science)**

- Isoxaflutol (1.88 lb/gal)+thiencarbazone-methyl (0.75 lb/gal) (ALS inhibitor grass product)+Cyprosulfamide (Safener)
- Use rate 3.33 to 5.6 fl oz/a (check label)
  - Sand, Loamy sand, Sandy Loams 2% OM or less use 3.33 oz
  - Sand, Loamy sand, Sandy loams greater than 2%OM or medium and fine textured soils use up to 5.6 oz
  - Best tank mixed with atrazine

# *Corvus* for Corn

- Timing of application
  - Early Preplant up to 30 days prior to planting
  - Pre-emergence
  - Early post – up through 2-If (collars) corn
    - Mix with atrazine only, no adjuvants or other herbs.
  - USE COC or MSO for burndown of weeds before corn emergence
- Broadleaf and improved grass control over *Balance Flexx*
- Same area restrictions as *Balance Flexx*



## ***Corvus* restrictions**

- Do not use in the same season as Lorsban 15G, Counter 15G, or Counter 20 G
- Do not graze or harvest for forage within 45 days after application
- Can rotate to wheat in 4 months, soybean, and sorghum (if Corvus used at the 2.25 oz rate) in 9 months, and alfalfa, sorghum, sunflower, oats, canola, and all other crops in 17 months (30 inches of precip required during the 17 month period)

# ***Capreno* (Bayer Crop Science)**

## **postemergence on all types of corn**

- Tembotrione 2.88 lb/gal of (Laudis) + thiencazone-methyl 0.57 lb/gal (ALS inhibitor grass product)
- Use rate - 3.0 fl oz/a with COC 1% v/v and a nitrogen fertilizer source to corn 1 through 6 collar, best mixed with atrazine
- Broadleaf and grass control
  - Improved control of fall panicum compared to Laudis
- Can be tank mixed with glyphosate, atrazine, or Ignite.

## ***Capreno* restrictions**

- Do not use in the same season as Lorsban 15G, Counter 15G, or Counter 20 G
- Do not apply using liquid fertilizer as the carrier
- Do not graze or harvest for forage within 45 days after application
- Can rotate to wheat in 4 months, cotton soybean, and sorghum in 10 months, and alfalfa and sunflower in 18 months

## Weed control in corn with HPPD inhibitors– single pass, Manhattan, Thompson / Peterson, 0903corn

Treatment	Appli.	Rate	Yield	PAAM	VELE	IVMO	Sunf
		oz prod/a	Bu/a	6/5	6/5	6/5	6/5
Corvus+atrazine	PRE	5.6 + 32	209	97	99	95	100
Balance Flexx+atra	PRE	6 + 32	209	95	100	92	37
Bicep II Magnum	PRE	2.6 qt	221	96	83	87	53
Corvus+atrazine	EPOS	5.6+32	235	99	98	96	100
Balance	EPOS	6+32	203	99	100	94	97
Capreno+atra <sup>1</sup>	EPOS	3+32	217	99	100	96	92
Halex GT+atra <sup>2</sup>	EPOS	3.6 pt+32	241	100	100	97	100
Capreno+atra <sup>1</sup>	MPOS	3+32	228	100	99	97	99
Halex GT+atra <sup>2</sup>	MPOS	3.6 pt+32	227	100	100	98	100
Untreated			117				
LSD (0.05)			27	2	3	10	15

1 = applied with COC and AMS; 2 = applied with NIS and AMS

## Weed control in corn with HPPD inhibitors – pre/post, Manhattan, Thompson / Peterson, 0903corn

Treatment	Appli.	Rate	Yield	PAAM	VELE	IVMO	Sunf
		oz prod /a	Bu/a	6/5	6/5	6/5	6/5
Corvus+atrazine Laudis+atrazine	PRE Mpost	3 + 32 3+32	218	100	100	99	100
Balance Flexx+atra Laudis+atra	PRE Mpost	3+ 32 3+32	223	100	100	100	100
Corvus+atrazine Laudis+Ignite	PRE Mpost	3 + 32 2+22	224	100	99	98	100
Balance Flexx+atra Laudis+atra	PRE Mpost	3 + 32 2+22	223	100	100	100	100
Corvus+atrazine Capreno+atra	PRE Mpost	3+32 3+32	230	100	100	100	99
Balance Flexx+atra Capreno+atra	PRE Mpost	3+32 3+32	238	100	99	100	100
LSD (0.05)			27	2	3	10	15

Laudis applied with MSO and AMS; Capreno applied with COC and AMS

## Prequel (DuPont) for Field Corn

- *Prequel* contains: 15% rimsulfuron (*Resolve*) + 30% isoxaflutol (*Balance*)
- Use rate is 1.66 oz/a
  - 1 oz Resolve + 1 fl oz Balance Pro
  - Use MSO or COC 1% v/v for emerged weeds
- Rotational Restrictions: 4 mo – wheat, 6 mo – STS beans, 10 mo – alfalfa, sorghum, soybean, sunflower, sweet corn, popcorn, 18 mo – other crops
- DO NOT apply postemergence to corn
- Area/water table restrictions same as Balance

# BASF Products for Corn

- *Kixor* Technology
  - Saflufenacil
  - New class of chemistry, pyrimidinedione
  - PPO inhibitor
  - Broadleaf burndown and residual control (rate dependant)

## *Sharpen (BASF) for Corn*

- Saflufenacil @ 2.85 lb/gal
- For burndown activity use 1 fl oz Sharpen + MSO or COC at 1% v/v and ammonium sulfate 8.5 to 17 lb/100 gal or liquid nitrogen at 1.25 to 2.5 gallon/100 gal
- Use rates for residual control:
  - 2 fl oz on coarse texture soils
  - 2.5 fl oz on medium texture soils
  - 3.0 fl oz on fine texture soils
- Can be tank mixed with other corn Herbicides
- Sharpen controls broadleaf weeds only



# Sharpen for Corn

- Rotational restrictions

Rotational Crop Interval (months of non-frozen soil after application)						
Crop	Sharpen Rate (fl oz/A)					
	1.0	2.0	3.0	4.0	5.0	6.0
Corn	0	0	0	0	0	0
Sorghum	0	0	0	0	1	1
Wheat	0	0	0	0	3	3
Soybean	0 to 1	1 to 2	2 to 3	4	6	6
Alfalfa	4	5	6	7	8	9
Sunflower	4	5	6	7	8	9
Cotton	1.5	3	4	6	6	9

Use the longer interval in listed range when on coarse soils with less than 2% OM

## ***Integrity* for Corn, grain, silage, popcorn**

- Saflufenacil @ 0.57 lb/gal + dimethenamid-P (Outlook) @ 1.0 lb/gal.
- Broadleaf and grass control
- Use rates: 10 to 16 fl oz
  - 10 fl oz on coarse texture soils
  - 13 fl oz on medium texture soils
  - 16 fl oz on fine texture soils
  - 16 fl oz = 3.1 oz Sharpen and 13.4 oz Outlook
- This is a low rate of Outlook. The Sharpen may give you 3+ weeks residual broadleaf control. These rates are lower than what was used in experiments conducted the past two years

# DuPont's Optimum<sup>®</sup> GAT<sup>®</sup> Trait

- **GAT = Glyphosate ALS Tolerance Corn & Soybean, Different glyphosate tolerant event**
  - Will have a pre-pack mixture of herbicides which include ALS inhibitors not used on Non-ALS tolerant corn or soybean
  - Looking for deregulation in corn soon and introduction into the market in 2011?? Has received approval in Canada
  - Excellent Crop Safety

# Optimum<sup>®</sup> GAT<sup>®</sup> Corn



# Optimum<sup>®</sup> GAT<sup>®</sup> Corn



# Dow AgroSciences DHT Corn

- DHT = Dow AgroSciences Herbicide Tolerant
- GMO trait –
  - Gene provides resistance to 2,4-D
  - Same gene provides resistance to aryloxyphenoxy propionic acids (FOPS)
  - Would allow 1 lb ae rates of 2,4-D, PRE and post not to exceed 3 lbs / growing season
  - Would allow a grass herbicide to control grassy weeds
  - Could be combined with a glyphosate tolerant gene
- Also developing DHT soybean and cotton. Gene is different than the gene in corn. Corn – 2012-13??



# What's New for Sorghum

- *Lexar*
- *Degree Xtra*
- *Sharpen*
- *Integrity*
- *Huskie??*
- *ALS sorghum??*
- *ACCCase sorghum??*

## ***Lexar* (Syngenta) for Use in Sorghum**

- Use rate: 3.0 qt Lexar/acre
  - (1.4 pts Dual II Mag+5.3 oz Callisto+1.3 qt atrazine)
  - must use *Concept* treated seed
- Timing: From 21 day preplant through preemergence
- Preplant/preemergence split application can be made. Apply 1.5 to 1.75 qt 7 to 21 DBP and 1.25 to 1.5 qt/a post-plant preemergence
- Do NOT use on Sand, sandy loam, or loamy sand soil
- Do NOT use on forage sorghum, sweet sorghum, sudangrass, or any dual purpose sorghum





**Sorghum  
plant showing  
about 15%  
injury**

# *Degree Xtra (Monsanto)*

- Acetochlor 2.7 lb + Atrazine 1.34 lb / gallon
- Grass and broadleaf weed control
- Use rates: Dependent on soil characteristics
- 2 qts = 1.35 lbs acetochlor (2.8 pts Degree) + 0.67 lb atrazine

	Degree Xtra rate in quarts /acre	
	Less than 1.5% OM	1.5% OM or more OM
Coarse soil	2.0 to 2.5	2.3 to 2.9
Medium	2.0 to 2.5	2.3 to 3.7
Fine	2.0 to 2.9	2.5 to 3.7

# *Degree Xtra (Monsanto)*

- Application timing
  - Preplant surface or incorporated
  - Preemergence
  - Postemergence up to 11 inch sorghum

# *Sharpen* (BASF) for Sorghum

- *Sharpen* contains saflufenacil 2.85 lb/gal
- Use 1 to 2 fl oz on all soil types
- For burndown activity add MSO or COC at 1% v/v and ammonium sulfate 8.5 to 17 lb/100 gal or liquid nitrogen at 1.25 to 2.5 gallon/100 gal to kill emerged weeds
- Controls broadleaf weeds only
- Sorghum forage can be harvested, fed, or grazed 70 days or more after application
- Do NOT apply to emerged sorghum
- These rates are lower than experimental work!

# *Integrity (BASF)* for grain sorghum

- *WAITING FOR A REGISTRATION*
- *Integrity* contains saflufenacil 0.57 lb/gal + dimethenamid-P (Outlook) 1.0 lb/gal.
- Broadleaf and grass control
- Use rates: ???
  - Expecting a label soon (rates not provided at this time)

# Preemergence sorghum weed control

**Untreated**



**Lumax 2.5 qts**



**Integrity 20 oz**



**Bicep II Magnum 2.1 qts**



**Sharpen + Guardsman Max  
3 oz + 3 pints**



# Huskie (Bayer) in Sorghum **NOT REGISTERED**

- Huskie will be the first post-emergence HPPD inhibitor in grain sorghum
- Huskie will control ALS and Triazine resistant pigweed, kochia, and other broadleaf weeds
- Huskie should be applied with
  - Atrazine
  - Ammonium sulfate
  - 2,4-D (still exploring rates and formulation)
- Expect to see some crop injury, 3 – 14 day

# Weed control in sorghum with late salvage herbicides, Manhattan, Thompson / Peterson, 0903corn

Treatment	Rate	Yield	injury	PAAM	VELE	Sunf
	Prod/a	Bu/a	7/14	14DAT	14DAT	14DAT
Atrazine+COC	1.5+1%v/v	72	0/0	73	75	100
Aim EC+ NIS	.5oz+.25%	55	23/7	40	100	57
Aim+Atra+NIS	.5oz+1.5+.25	65	28/10	60	96	87
Rage D-Tech+NIS	.5pt+0.25%	68	38/18	80	100	93
2,4-D ester	16 oz	109	13/5	77	95	92
2,4-D ester+atra	8oz+.56lb	98	17/7	82	98	96
Ally + 2,4-D amine	.05oz+8oz	82	12/10	79	75	88
Permit+Atra+COC	.67oz+1lb+1%	76	2/0	82	68	94
Yukon+atra+COC	6 oz+1lb+1%	112	7/5	82	77	95
Marksman	2 pt	99	10/5	88	88	95
Untreated		19				
LSD (0.05)		30	9		10	15



A photograph of a grain sorghum field. The plants are mostly golden-brown, indicating maturity. A single row of green plants runs through the center of the field, likely representing a different variety or a specific treatment. The text is overlaid on the upper portion of the image.

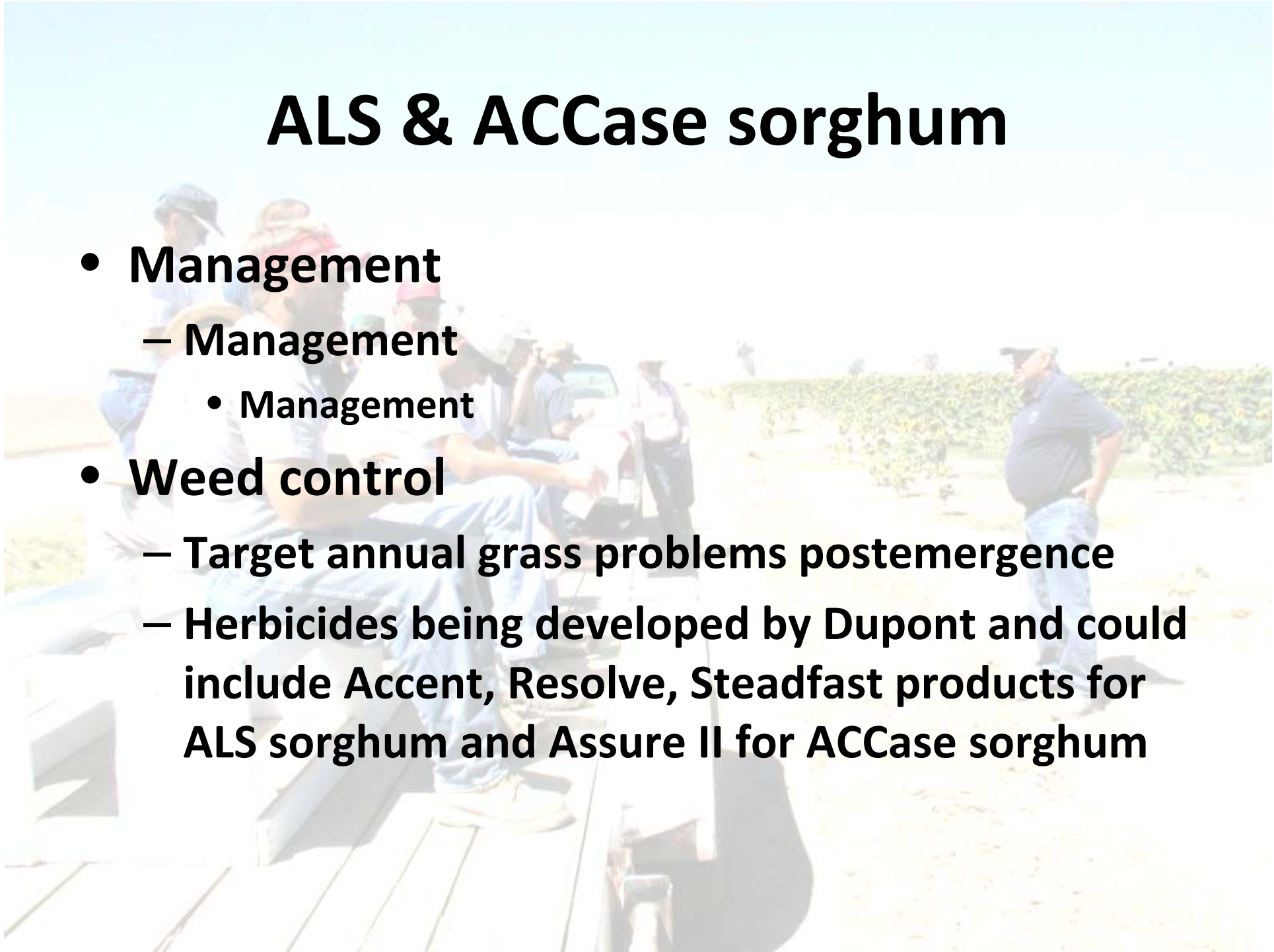
**Introducing a New Weed Control  
Technology for Grain Sorghum to  
Kansas Growers**

# Development

- **ALS and ACCase resistant sorghum lines were developed at KSU**
- **ALS resistant shattercane was crossed with grain sorghum lines (Tuinstra and Al-Khatib)**
- **ACCase resistance sudangrass genes were moved into grain sorghum (Tuinstra and Al-Khatib)**
- **ACCase and ALS resistant lines were distributed by K-State to sorghum breeding programs**
- **This is a cooperative project with Dupont and all programs breeding these sorghum have signed agreements with Dupont**

# ALS & ACCase sorghum

- **Management**
  - **Management**
    - **Management**
- **Weed control**
  - **Target annual grass problems postemergence**
  - **Herbicides being developed by Dupont and could include Accent, Resolve, Steadfast products for ALS sorghum and Assure II for ACCase sorghum**





# Summary

- **ALS and ACCase sorghum are tools in the weed control strategy tool chest for grain sorghum in coming years**
- **ALS and ACCase sorghum will provide growers means to control some grass weeds post-emergence**
- **All tools have there limitations**
  - **ALS resistant weeds**
  - **ACCase expense, performance in tough conditions, and inability to mix with growth regulator herbicides**



***Questions?***

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