2010
Soybean & Wheat Weed Update

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Current Weed Control Issues

- Crop Price/Herbicide Cost fluctuations
- New Herbicide Technologies
- New Trait Technologies
- Herbicide Resistance

New Herbicides and Technologies for Soybeans

- *Sharpen*
- *OpTill*
- *Liberty Link* Soybeans

Kixor

- New active ingredient (Saflufenacil) from BASF.
- Foliar and residual herbicide activity.
- PPO mode of action.
- Component of several herbicides:
  - Sharpen – Kixor alone
  - Integrity – Kixor plus Outlook
  - Optill – Kixor plus Pursuit

Sharpen

- Contains 2.85 lb saflufenacil (Kixor) per gallon.
- Labeled as a preplant or preemergence treatment in corn, sorghum, soybeans, wheat, and cotton.
- Can be used as a preharvest aid in sunflowers.
- Good burndown activity on various broadleaf weeds including marestail, pigweeds, kochia, ragweeds, velvetleaf and others.
- Residual weed control dependent on application rate.
  - ~ 7-10 days residual control per oz of Sharpen.
- Rates and timings vary by crop.

Sharpen in Soybeans

- Timing: EPP to preemergence
- Rates: 1 oz/A primarily for burndown activity.
- Adjuvants: MSO or COC + AMS or UAN must be used for foliar activity.
- May be especially useful to help control glyphosate resistant marestail as part of burndown treatment with no waiting interval before planting soybeans.
- May want to use OpTill instead of Sharpen for enhanced residual weed control.

OpTill

- Contains 17.8% saflufenacil (Kixor) plus 50% imazethapyr (Pursuit) WDG.
- Timing: EPP through preemergence.
- Application rate: 2 oz per acre
  - = 1 oz Sharpen and 4 oz Pursuit
- Adjuvants: MSO or COC plus AMS or UAN
- Limited residual activity from Kixor component
- May be especially useful to help control glyphosate resistant marestail as part of burndown treatment with some early season residual control, especially from the Pursuit component.

Sharpen & OpTill Restrictions

- Must allow 30 day preplant interval if applied to coarse textured soils with less than 2% organic matter.
- Do not apply after soybean have reached the cracking stage or after emergence or severe injury will occur.
- Do not graze or feed harvested forage, hay, or straw to livestock following 0pTill application, or before 65 days after application of Sharpen.
- Do not apply within 30 days where other PPO inhibiting herbicides such as Valor or Authority are applied to soybeans.
- Do not tank-mix OpTill with clomazone containing herbicides.

Liberty Link Soybeans

- Liberty Link soybeans introduced in 2009 and more widely available for 2010.
- Allows the use of Ignite (new formulation of Liberty) on LL soybeans.
- Timing is critical for good weed control.
- Best approaches include sequential programs with a preemergence program followed by Ignite or a two-pass Ignite program.

Ignite

- New formulations of glufosinate (Liberty) containing 2.34 lb ai/gal.
- Rate: 22 to 36 oz/a.
  - Single application at 29-36 oz/A.
  - Sequential applications at 22 oz/A.
  - Total maximum per season = 44 oz/A.
- Timing: Emergence to bloom stage of soybean growth.
- Adjuvant: AMS at 3 lb/A.
- Application timing, spray coverage, temperature, humidity, light intensity, and time of day all critical to performance.

Weed control and soybean yields in Liberty Link soybeans, Manhattan, KS, 2009 (SB200911).

Herbicide	Application Rate	Application Timing	Lacg	Paam	Vele	Ilmg	Sorg	RR Corn	SB Yield
	(oz/A)		(% control)						(Bu/a)
Ignite	22	P	53	53	78	88	99	100	58
Ignite/Ignite	22/22	EP/Seq	98	99	100	100	100	100	67
Valor/Ignite	2/22	PRE/P	96	98	100	92	100	98	67
Auth Assist/Ignite	8/22	PRE/P	99	100	100	100	100	100	72
Prefix/Ignite/Ignite	3/22/22	PRE/P	100	100	96	97	100	100	70
Untreated									33
LSD (5%)			4	2	3	4	1	2	7

Lacg = large crabgrass; Paam = Palmer amaranth; Vele = velvetleaf; Ilmg = ivyleaf morningglory; Sorg = sorghum; RR corn = volunteer Roundup Ready corn.

Untreated

Ignite

Valor/Ignite

Weed control and soybean yields in Liberty Link soybeans, Manhattan, KS, 2008 (SB200817).

Herbicide	Application Rate	Application Timing	Lacg	Paam	Vele	Ilmg	RR Corn	SB Yield
	(oz/A)		----------(% control)----------					(Bu/A)
Ignite	22	P	87	30	73	57	95	
Ignite/Ignite	22/22	P/Seq	93	75	100	100	98	40
Valor/Ignite	2/22	PRE/P	100	92	100	100	100	52
Auth First/Ignite	3.2/22	PRE/P	100	90	100	100	100	53
Prefix/Ignite/Ignite	3/22	PRE/P	100	99	100	100	100	55
LSD (5%)			10	4	9	13	4	10

Lacg = large crabgrass; Paam = Palmer amaranth; Vele = velvetleaf; Ilmg = ivyleaf morningglory; Sorg = sorghum; RR corn = volunteer Roundup Ready corn.

P treatments applied 22 days after soybean emergence = **Too Late**.

Future Technologies in Soybeans

- Crops stacked with multiple herbicide resistant traits.
- Optimum GAT soybeans from DuPont – 2011?
  - ALS and Glyphosate resistance
  - Different event than RR soybeans
  - Metabolism based resistance
  - Legal issues with Monsanto
- Dicamba resistant soybeans from Monsanto – 2013?
- DHT resistant soybeans from Dow AgroSciences – 2013?
  - Resistance to 2,4-D
  - Metabolism based resistance

Dicamba Resistant Soybeans
48 oz/A Clarity, 1 WAT

Glyphosate Resistance Evaluations at KSU

- Common waterhemp
- Marestail
- Giant ragweed and common ragweed
- Kochia
- Palmer amaranth

Glyphosate Resistant Kochia?

- Poor control of a wandering row of kochia with glyphosate was observed in a field of Roundup Ready cotton in Stevens county, KS in the summer of 2007.
- Kochia seed was collected from the uncontrolled plants in the cotton field in Stevens county and from an uncropped area in Finney county in the fall of 2007.
- Greenhouse experiments were conducted to compare the efficacy of glyphosate at various rates on the two kochia populations.

Materials and Methods

- S and R biotypes of kochia were grown in the greenhouse and treated when plants were 1 to 2 inches tall.
- Kochia plants were treated with Roundup Weather Max at 0.38, 0.75, 1.5, and 3 lb ae/a (11,22, 44, & 88 oz/A).
- Weed control was visually evaluated 2 and 4 weeks after treatment.

Kochia biotype response to glyphosate , 4 WAT.

Herbicide	Rate		Biotype	
	ae	Product	Finney	Stevens
	(lb/a)	(oz/a)	(% control)	
Roundup WMax + AMS	0.38	11	32	0
"	0.75	22	100	42
"	1.12	33	100	76
"	1.5	44	100	92
"	2.25	66	100	100
"	3	88	100	100
LSD (5%)			9	

Kochia biotype response to glyphosate , 4 WAT.

Herbicide	Rate		Biotype	
	ae	Product	Finney	Stevens
	(lb/a)	(oz/a)	(% Mortality)	
Roundup WMax + AMS	0.38	11	0	0
"	0.75	22	100	0
"	1.12	33	100	45
"	1.5	44	100	75
"	2.25	66	100	100
"	3	88	100	100
LSD (5%)			13	

Glyphosate Resistant Kochia? (2 WAT)

Stevens Co.

Finney Co.

Roundup WMax:	Untreated	0.38 lb (11 oz)	0.75 lb (22 oz)	1.5 lb (44 oz)	2.25 lb (66 oz)	3 lb (88 oz)

Summary

- A biotype of kochia in southwestern Kansas has developed a low level of resistance to glyphosate.
- Exclusive use of glyphosate, especially at reduced rates may result in increased tolerance by weeds.
- Producers should use labeled rates, tank-mix and/or rotate herbicides with different modes of action to manage and minimize the risk of further development of glyphosate resistant weeds.

Marestail Escapes from Glyphosate

Glyphosate Resistant Marestail Assay

Sumner Co. →

Miami Co. →

Check →

Glyphosate Rate: 1 pt 1 qt 1.5 qt 0

Glyphosate Resistant Marestail Assay

Sumner Co. →

Miami Co. →

Check →

Glyphosate Rate: 1 pt 1 qt 1.5 qt 0

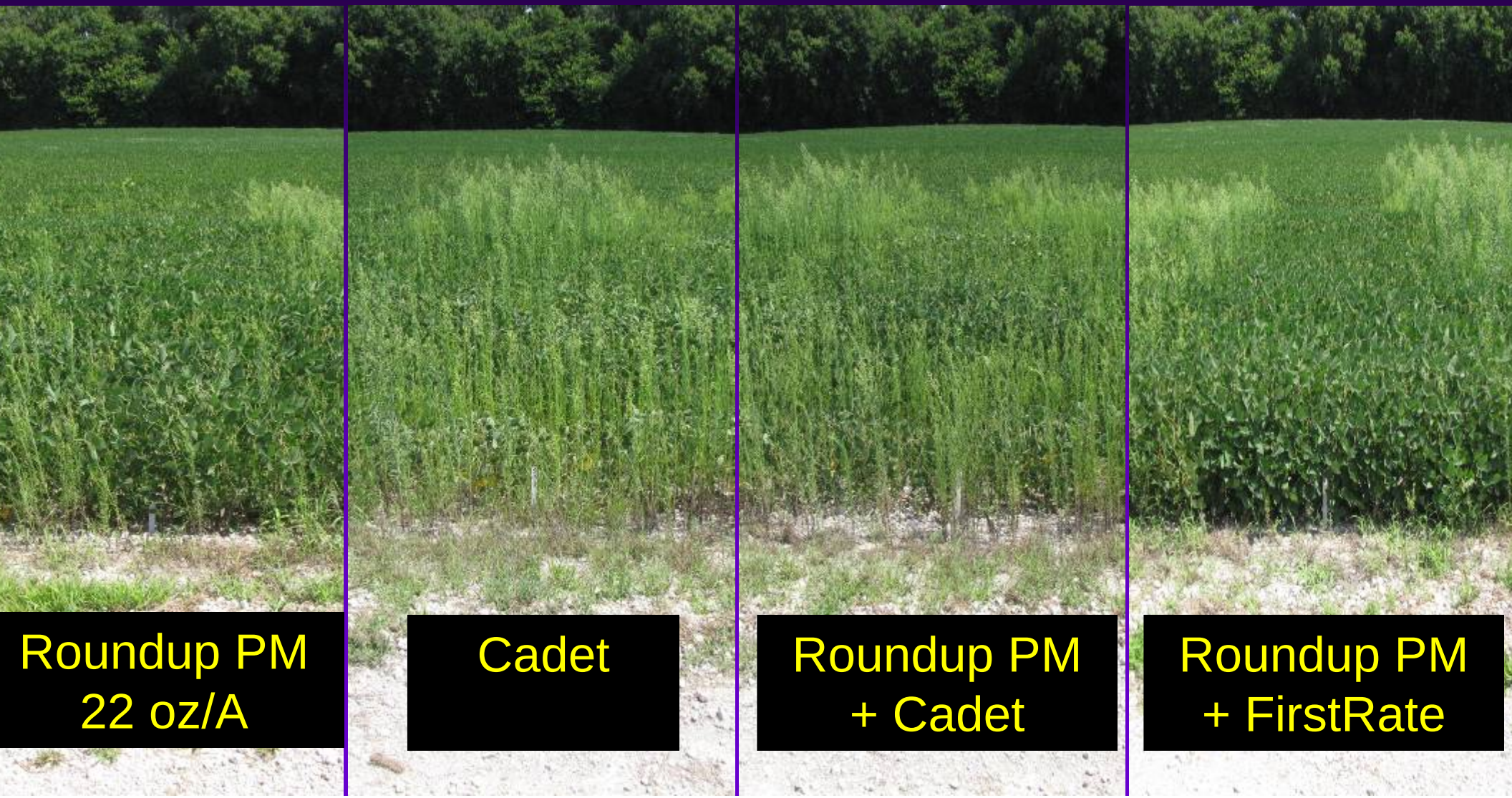
Managing Marestail

- Timing, Timing, Timing!
- Atrazine + 2,4-D in corn or sorghum
- Utilize 2,4-D, dicamba, Sharpen and/or residual herbicides in fall and early spring burndown in no-till.
- Control marestail in the wheat crop.
- Don’t skimp on rate or appropriate spray additives.
- Use appropriate treatments.

Postemergence marestail control in soybeans at Manhattan in 2009 (Peterson & Thompson).

Treatment	Rate	1WAT	5 WAT	10 WAT
		(% Marestail control)		
Roundup PMax	22 oz	30	57	57
Roundup PMax	44 oz	37	60	57
Cadet	0.9 oz	20	0	0
RU PMax + Cadet	22+0.9 oz	50	47	47
FirstRate	0.3 oz	47	73	63
RU PMax + FirstRate	22+0.3 oz	47	87	95
Classic	0.5 oz	53	53	40
RU PMax + Classic	22+0.5 oz	53	73	77
Raptor	4 oz	30	27	17
RU PMax + Raptor	22+4 oz	40	70	65
LSD (5%)		6	10	8

Marestail Control in Soybeans



New Herbicides for Wheat

- PowerFlex
- Huskie
- Pulsar

PowerFlex

- New herbicide (pyroxsulam) from Dow AgroSciences for postemergence control of cheatgrass, Italian ryegrass, and broadleaf weeds in wheat.
- Rate: 3.5 oz/a
- Adds: NIS
- Timing: Spring or fall postemergence from 3 leaf to jointing stage of wheat.
- Weeds: Cheat, Japanese brome, downy brome (F), Italian ryegrass, and many broadleaf weeds.
- Minimal Crop Rotation Restrictions
  - 9 Months for most crops. May be shortened for some crops.
- ALS inhibiting herbicide similar to Olympus.

Weed control and wheat response to herbicide application timing at Manhattan, KS in 2009 (WH200901).

Herbicide	Timing	Wheat		Hebi	Blmu	Dobr	Cheat
		Vig Red (%)	Yield (Bu/a)	----------(% control)---------			
PowerFlex	Fall	0	76	95	95	91	100
Olympus	"	0	83	78	100	82	100
Beyond	"	0	81	92	93	100	100
PowerFlex	Winter	10	66	60	73	75	98
Olympus	"	3	74	43	96	80	100
Beyond	"	8	68	67	72	83	83
PowerFlex	Spring	20	66	57	77	78	99
Olympus	"	22	66	50	83	73	100
Beyond	"	20	67	57	77	78	92
Untreated			48				
LSD (5%)		8	11	10	7	10	6

Fall = 11/26/08; Winter = 1/21/09; Spring = 3/17/09; Hebi = henbit; Blmu = blue mustard; Dobr = downy brome.

ALS Resistant Cheatgrass?

- Several cases of poor cheatgrass control with Olympus and Maverick herbicides were reported in 2007.
- Japanese brome seed was collected in Cowley county and cheat seed was collected in Dickinson county from fields that had control problems and extensive histories of ALS herbicide use.
- Greenhouse experiments were conducted to confirm the occurrence of ALS resistance and to evaluate cross resistance among ALS herbicides.

Bromus biotype responses to ALS herbicides at WAT 4

		Cheat Population		Japanese Brome Population	
Herbicide	Rate	Susc.	Res.	Susc.	Res.
	(oz/A)	----------(% control)----------			
Olympus	0.9	93	3	96	0
Olympus	9	98	3	98	0
Maverick	0.67	89	0	92	0
Beyond	4	94	50	94	35
PowerFlex	3.56	85	0	87	0
LSD (5%)			6		

Cheat Response to ALS Herbicides, 2WAT

R - Cheat

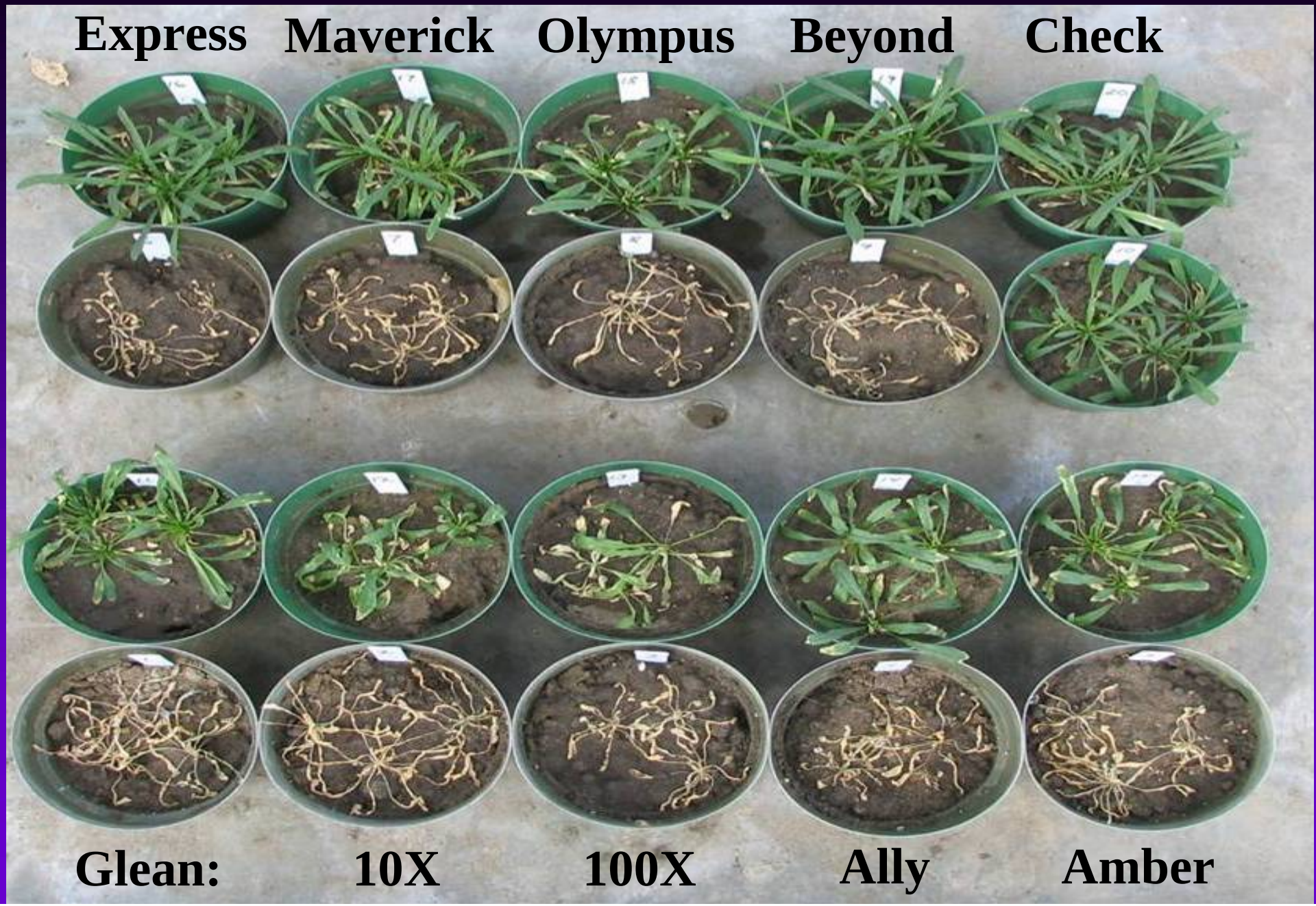
S - Cheat

Olympus 0.9 oz	Olympus 9 oz	Maverick 0.67 oz	Beyond 4 oz	PowerFlex 3.5 oz	Check

ALS Resistant Cheatgrass

- ALS resistant cheat and Japanese brome populations are present in Kansas.
- Cross resistance occurs among all ALS herbicides evaluated, but to a lesser degree with Beyond than to Olympus or Maverick.
- Producers will have to rely on cultural practices to manage cheatgrass problems in fields where ALS resistance has developed.

Bushy Wallflower Biotype Response to ALS Herbicides



ALS Susceptible and Resistant Flixweed Response to ALS Herbicides, 5 WAT.

Resistant

Susceptible

Glean Express Power Flex Olympus Untreated

Summary

- Populations of ALS resistant bushy wallflower and flixweed have developed in central Kansas.
- Alternative control measures such as 2,4-D, MCPA, or Huskie will need to be utilized to achieve acceptable control of ALS resistant mustard weeds.

Huskie

- New herbicide from Bayer which is a premix of pyrasulfotole and bromoxynil for postemerence control of broadleaf weeds.
- Rates: 11 to 15 oz/a
- Adds: NIS + N source
- Timing: Spring or fall postemergence from 1 leaf to flag leaf emergence when weeds and crop are actively growing.
- Weeds: Mustards, pennycress, henbit, kochia, Russian thistle, wild buckwheat*, prickly lettuce.
- Minimal Crop Rotation Restrictions
  - 4 Months for sorghum and soybeans
  - 9 months for most other crops
- Cost: 11 oz of Huskie ~ $8.50

Huskie

- Safe treatment for fall and spring application for general broadleaf weed control.
- Control of ALS resistant weeds, including:
  - Kochia
  - Russian thistle
  - Bushy wallflower
  - Flixweed/Tansy mustard

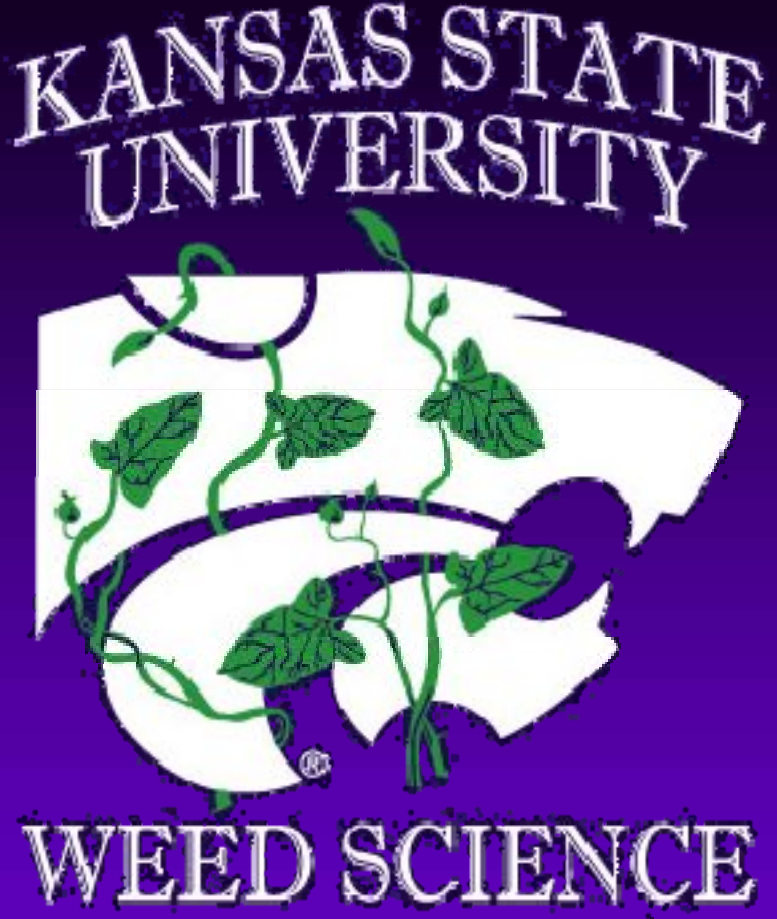
Pulsar

- New premix from Syngenta which contains 0.73 lb dicamba (Banvel) and 0.95 lb fluroxypr (Starane) per gal. for broadleaf weed control in wheat.
- Rates: 8.3 to 12.5 oz/a
- Adds: NIS optional with dry conditions
- Timing: Spring or fall postemergence from 1 leaf to flag leaf emergence when weeds and crop are actively growing.
- Weeds: kochia, Russian thistle, and wild buckwheat
  - Weak on mustards
- Tank-mix with MCPA for broader spectrum control

Sharpen
Preharvest Aid in Sunflowers

- Timing: After sunflower are physiologically mature
  - Seed moisture < 36%
  - At least 7 days prior to harvest
- Rate: 1 to 2 oz/A
- Adjuvant: MSO at 1% v/v
- Do not treat sunflower grown for seed production

Sharpen at 2 oz/A 4DAT



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