

# Weed Management in Winter Wheat

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## Considerations for Weed Control in Winter Wheat

- Crop Rotation
  - Corn / wheat / DC soybean
  - Corn/ FS soybean / wheat / DC soybean
- Problematic weed species
  - Life cycle and emergence patterns
- Herbicide resistance
- Tillage system



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## Window of Weed Control

- Prior to Wheat Planting
  - Residual herbicide usage increase
- Fall Postemergence
  - Can be most effective in heavy infestations
- Spring Postemergence
  - Weed size can become an issue
  - Wild Garlic
- Preharvest
  - Johnsongrass or marestail

## Glyphosate-resistant Marestail

- Was primarily issue in Soybean
- Prior to Planting
  - Tillage
  - gramoxone or glyphosate plus sharpen best option in no-till
- Post-emergence
  - Fair Control – 2,4-D, Dicamba
  - Good Control – Quelex, Pixxaro



## Chickweed, Henbit, Purple Deadnettle, etc.

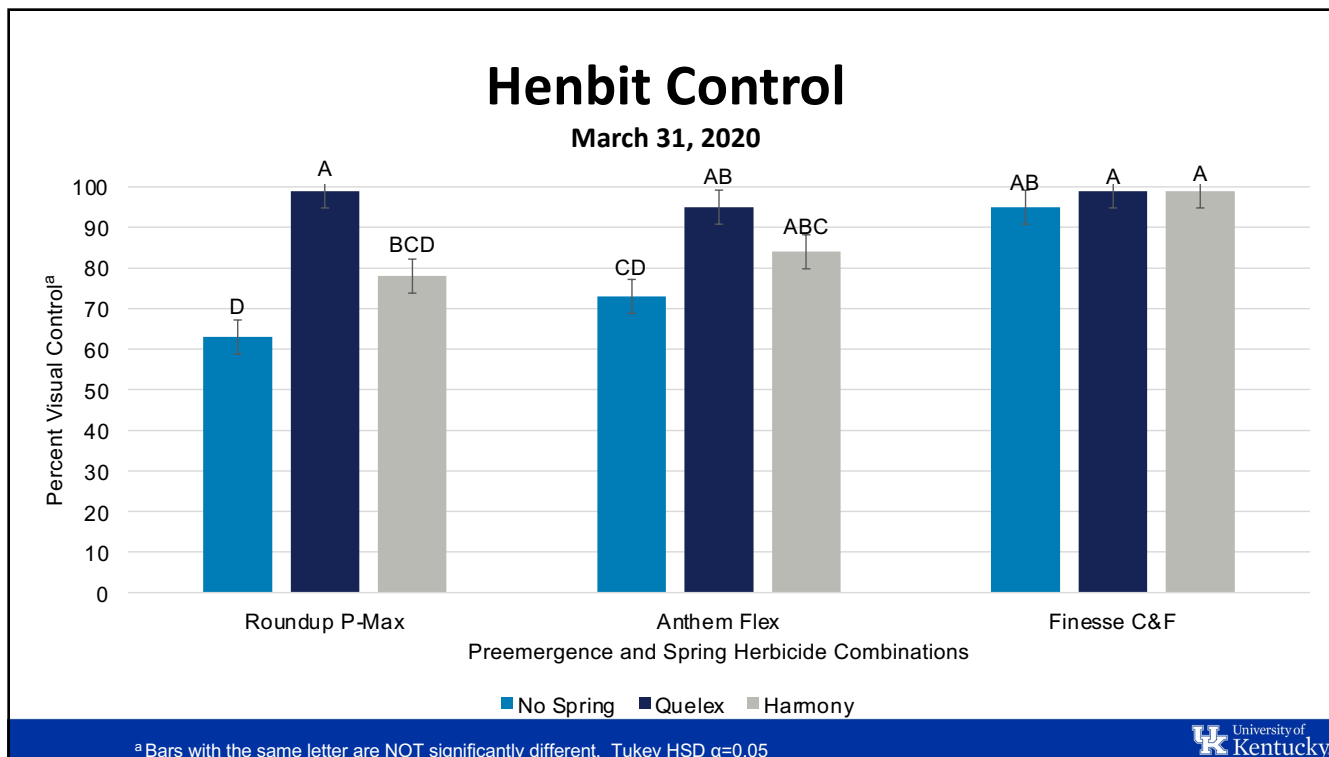


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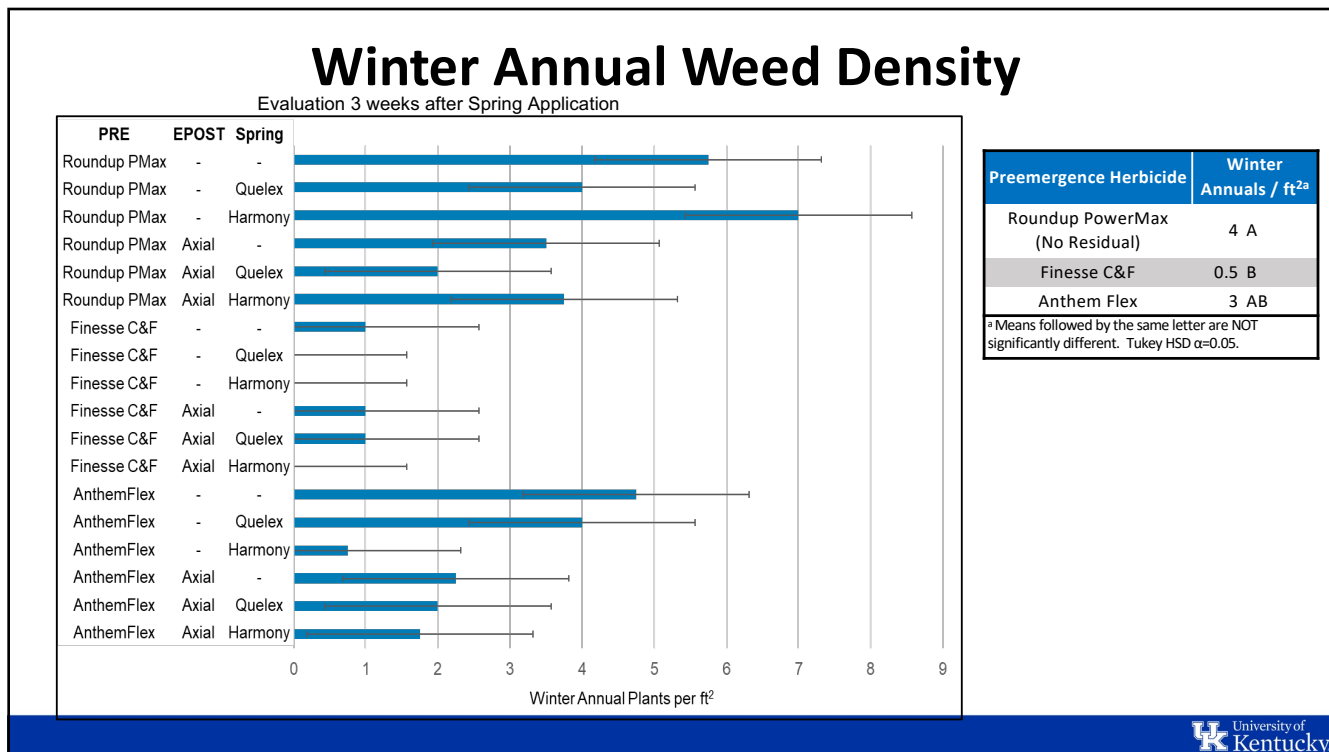
## Influence of Herbicide Inputs on and Winter Annual Weeds in Wheat

Application Timing [Application Date]	Herbicide(s)	Rate
Preemergence (PRE) [Oct 25, 2019]	Roundup Powermax (No Residual)	32 fl oz/A
	Roundup PowerMax + Finesse Cereal and Fallow	32 fl oz/A + 0.5 oz/A
	Roundup PowerMax + Anthem Flex	32 fl oz/A + 3 oz/A
Early Postemergence (EPOST) [Dec 20, 2019]	No EPOST Application	-
	Axial XL	16.4 fl oz/A
Spring Postemergence (SPRING) [Mar 10, 2020]	No SPRING Application	-
	Harmony Extra	0.9 oz/A
	Quelex	0.75 oz/A

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## 2021 Residual Based Wheat Program Evaluation

14DPP (10-8-20)	PRE (10-22-20)	EPOST (11-21-20)	Spring (3-8-21)	April 27, 2021 % Field Pennycress Control
			Axial Bold & Harmony Extra	100 A
			Axial Bold	100 A
			Axial Bold	60 A
	Roundup + Finesse C&F + Anthem Flex		Axial Bold	100 A
	Gramoxone + Finesse C&F + Anthem Flex		Axial Bold	88 A
	Roundup + Finesse C&F	Zidua + metribuzin	Axial Bold	99 A
	Roundup + Finesse C&F	Fierce EZ	Axial Bold	100 A
Untreated				0 B

## Winter Annual Weeds in Wheat

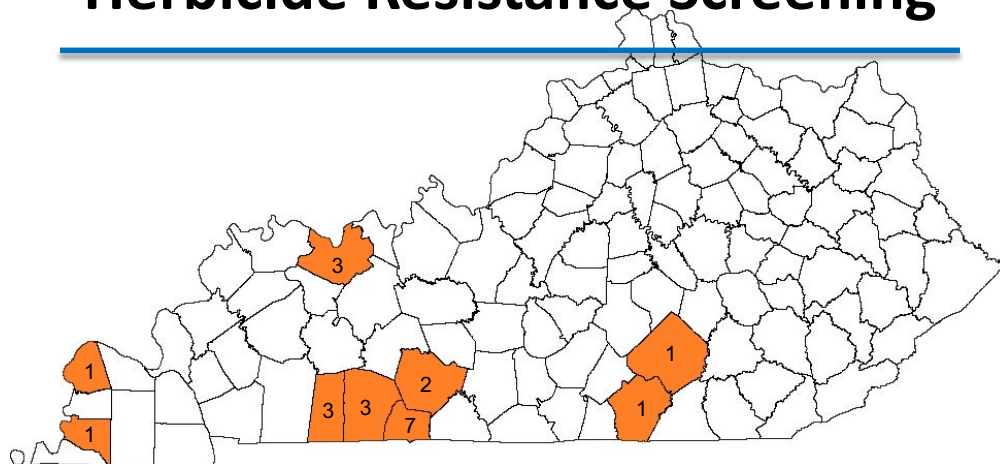
- Single spring applications of products like Quelex or Harmony can be effective, although complete control is not likely
- A PRE application of Finesse C&F or other residual can supply ample weed control, possibly even season long

# Herbicide Resistant Weeds in Kentucky

- **Marestail (horseweed)**
- **Common Chickweed**
- **Italian (annual) ryegrass**

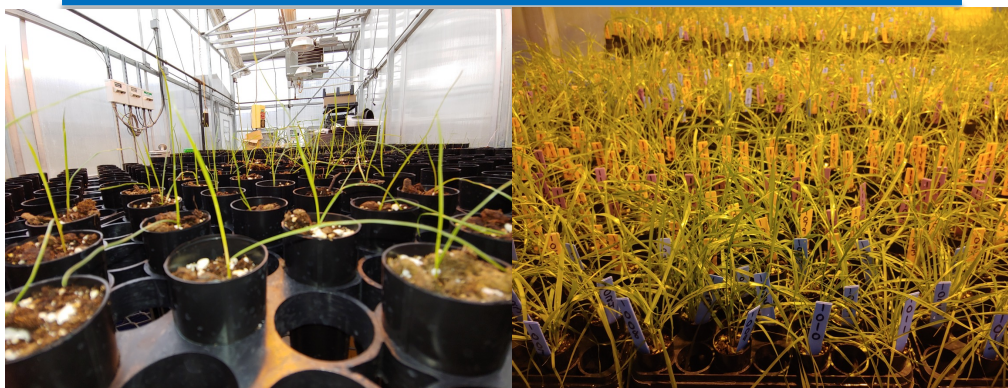


# Herbicide Resistance Screening



• Collected May to June 2020

## Herbicide Resistance Screening

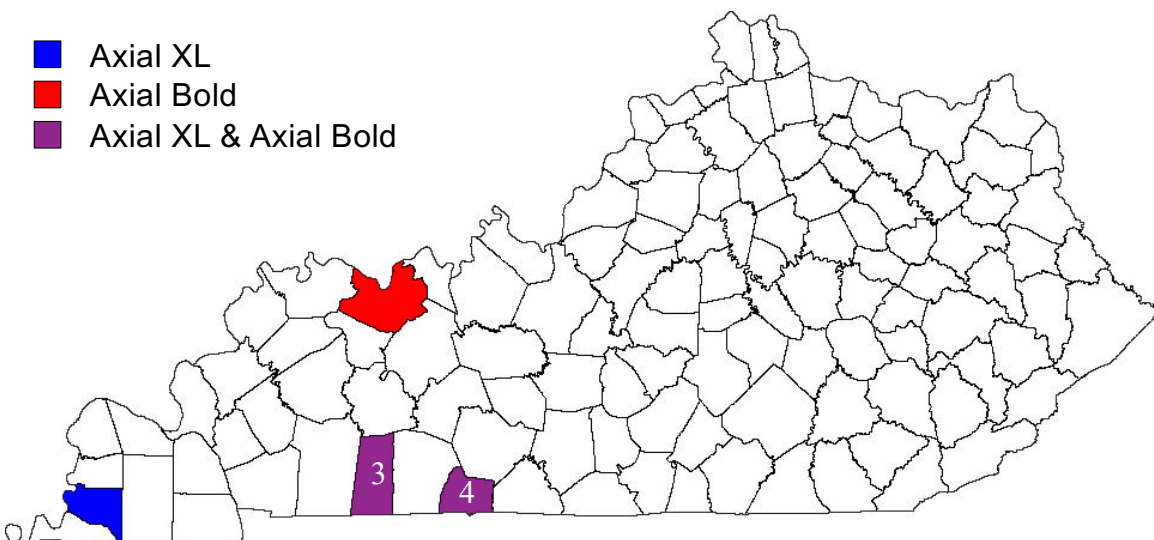


- Grown in Greenhouse (Start in Sept 2020)
- Screened against a known susceptible population
- 1- & 2-fold rates of:
  - Glyphosate [9]
  - Pinoxaden (Axial XL) [1]
  - Pinoxaden + fenoxaprop (Axial Bold) [1]
  - Pyroxsulam (Powerflex HL) [2]

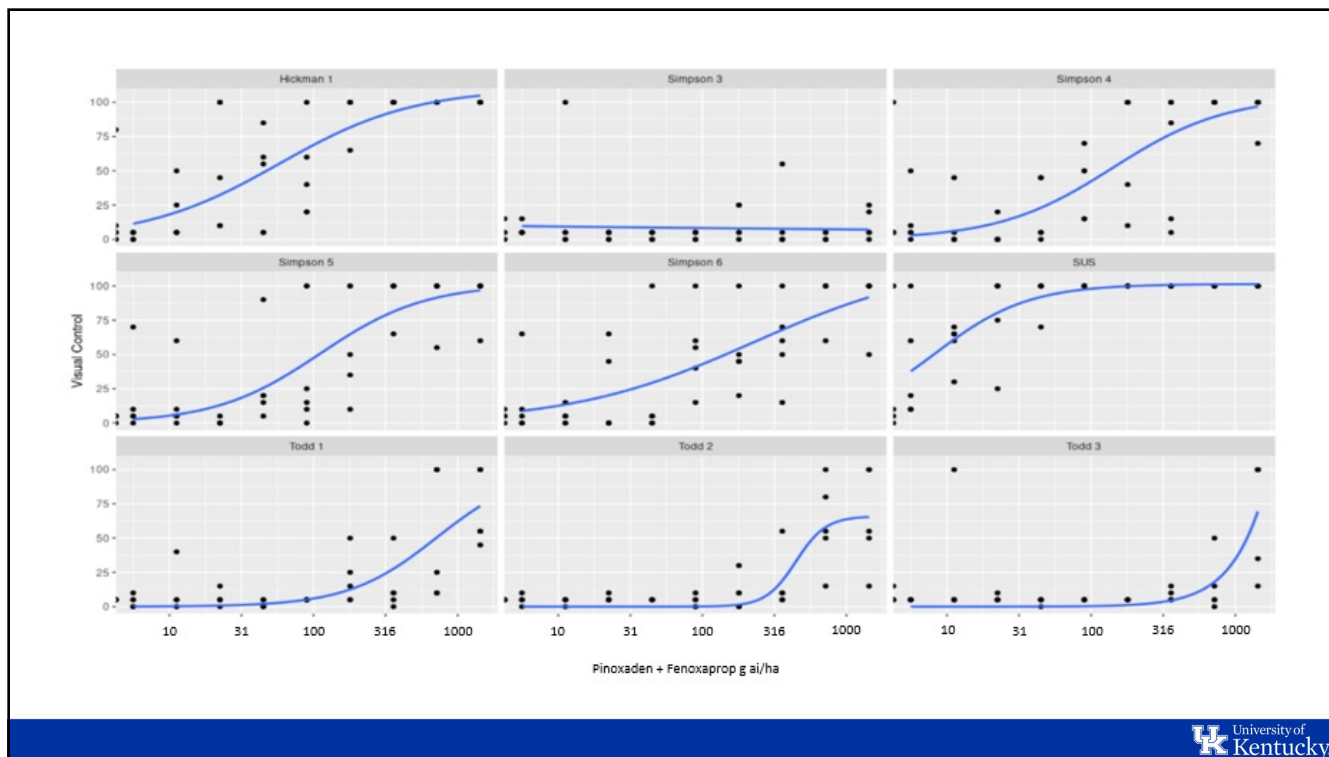
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## Potential Axial XL and Axial Bold Resistance

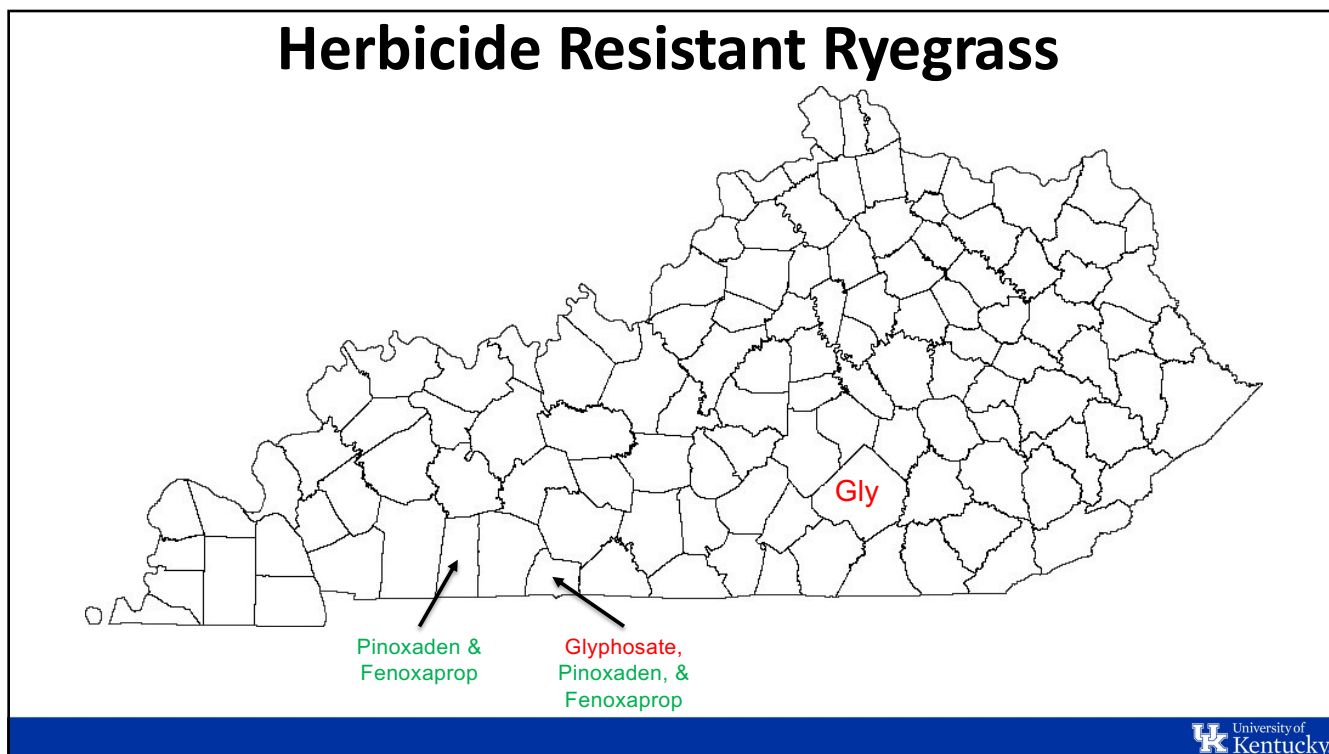
- Axial XL
- Axial Bold
- Axial XL & Axial Bold



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# Pyroxasulfone Products and Application Timing

Trade Name	Active Ingredients	Labeled Application Timings <sup>1</sup>	Use Rates <sup>2</sup>	Maximum Cumulative Rate per year
Zidua SC	Pyroxasulfone	Delayed PRE & Early POST	1.25 to 4 fl oz/A	4 fl oz/A
Anthem Flex <sup>3</sup>	Pyroxasulfone + carfentrazone	PRE, Delayed PRE, & Early POST	2.0 to 4.5 fl oz/A	4.5 fl oz/A
Fierce (Fierce EZ) <sup>4</sup>	Pyroxasulfone + flumioxazin	14 DPP & Early POST <sup>4</sup>	3 oz/A (6 fl oz/A) 1.5 oz/A (3 fl oz/A)	3 oz/A (6 fl oz/A)

<sup>1</sup> **14 DPP:** Fourteen days prior to wheat planting. **PRE:** From planting up to spiking. **Delayed PRE:** 80% germinated wheat with ½" shoots up to spiking. **Early POST:** Spiking to 4 tiller wheat

<sup>2</sup> Refer to herbicide labels for use rates by soil texture and application timing

<sup>3</sup> Labeling of Anthem Flex wheat is through 24c supplemental labeling valid in Kentucky till August 14, 2023.

<sup>4</sup> Labeling of Fierce and Fierce EZ in wheat is through 24c supplemental label.



## Delayed PRE

80% germinated seeds have ½" shoot until spiking

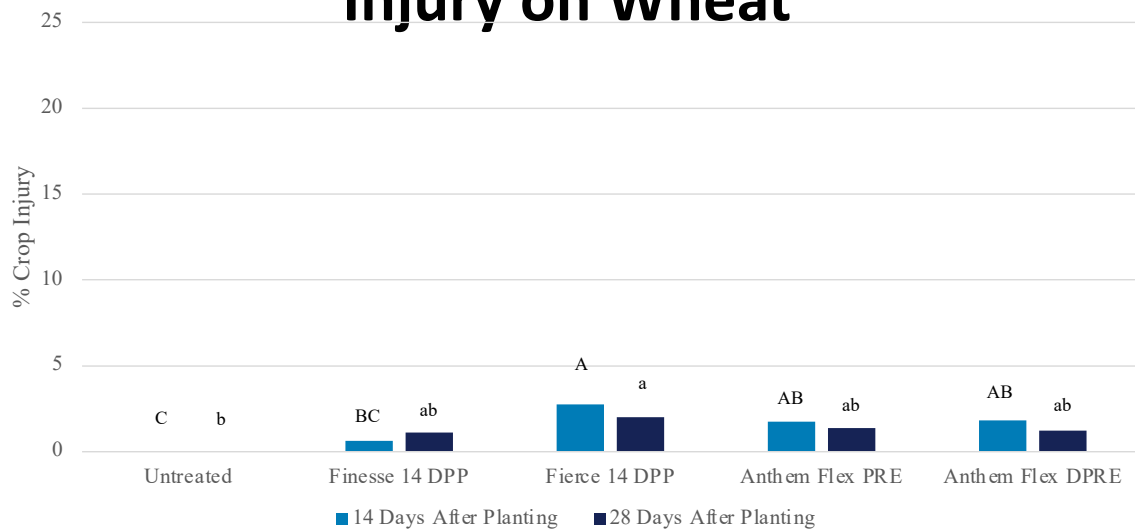
## Early POST

Spiking to 4 tiller wheat

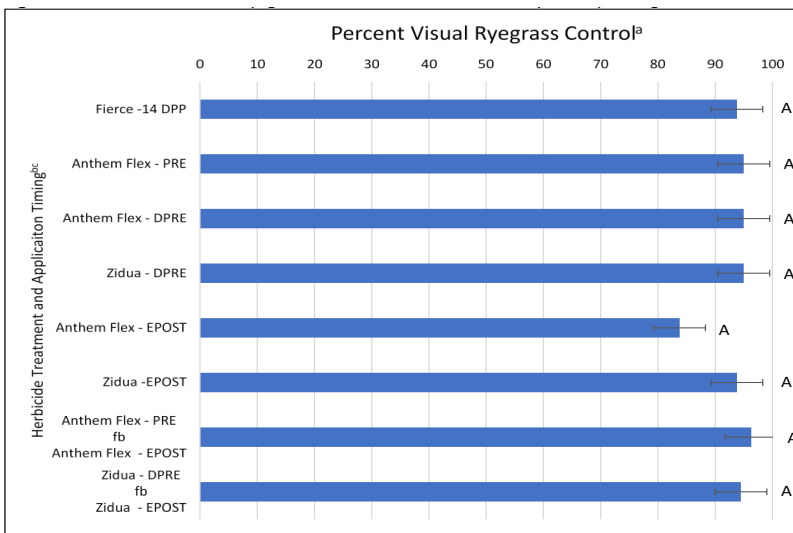
## Reducing pyroxasulfone Injury to Wheat

- Coarse soils with low OM have increased injury risk
- Plant at least 1" deep
- Quality seed bed and planting equipment
- Prolonged saturated soils after application increase injury risk

## Pyroxasulfone Preemergence Herbicide Injury on Wheat



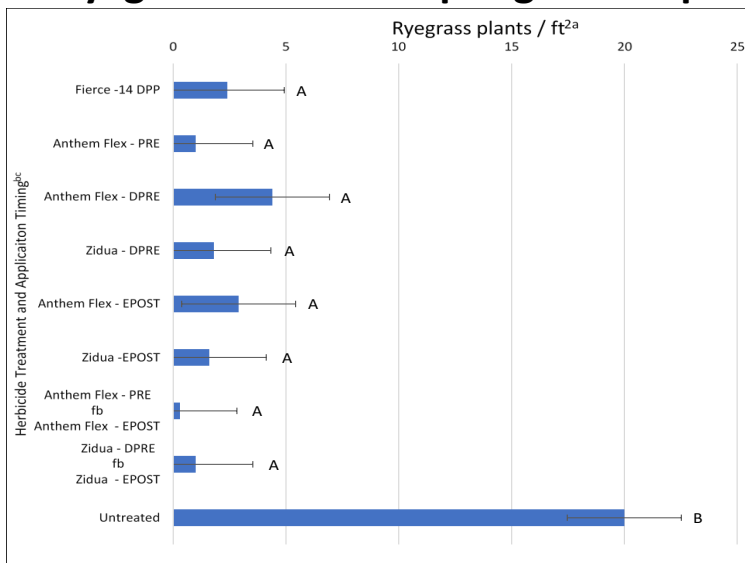
### Ryegrass Control 90 Days After Planting



<sup>a</sup> Treatments with the same letter are not statistically different. Tukey HSD.  $\alpha=0.05$   
<sup>b</sup> **14DPP**: 14 days pre plant; **PRE**: preemergence; **DPRE**: delayed preemergence; **EPOST**: early postemergence.  
<sup>c</sup> All 14DPP, PRE, and DPRE treatments included 32 fl oz/A Roundup PowerMax. EPOST treatments included 2 oz/A metribuzin 75DF.



### Ryegrass Control at Spring Greenup

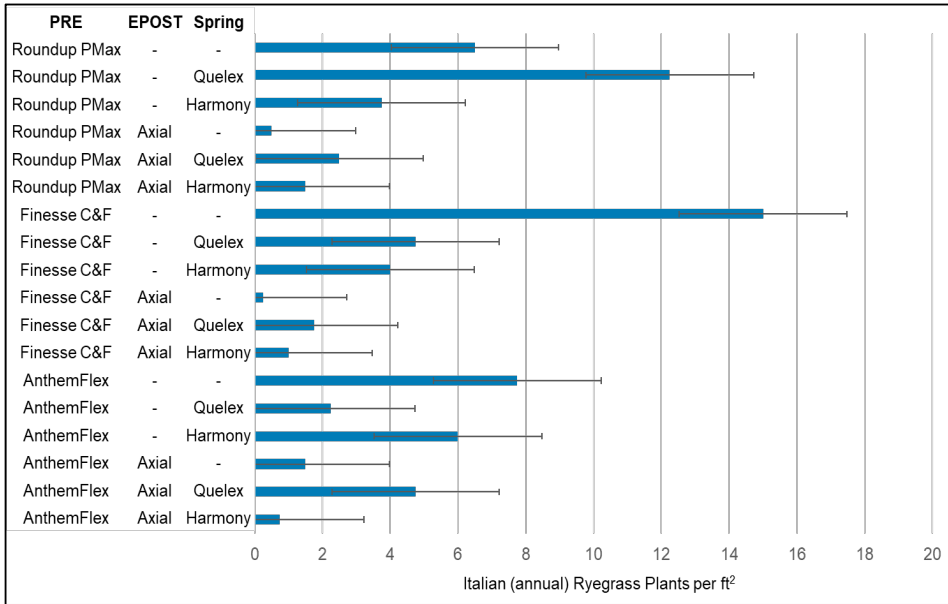


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### Annual Ryegrass Density

Evaluation 3 weeks after Spring Application



Early Postemergence Herbicide	Ryegrass Plants/ ft <sup>2a</sup>
No EPOST	7 A
Axial XL	2 B

\* Means followed by the same letter are NOT significantly different. Tukey HSD  $\alpha=0.05$ .



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### 2021 Residual Based Wheat Program Evaluation

14DPP (10-8-20)	PRE (10-22-20)	EPOST (11-21-20)	Dec 3, 2020 % Ryegrass Control
FIERCE EZ (6 fl oz/a)			60 B
	Anthem Flex (3.2 fl oz/a)		92 A
		Fierce EZ (3 fl oz/a)	78 AB
		Zidua (3 fl oz) + metribuzin (2 oz/a)	83 AB
Untreated			0 C



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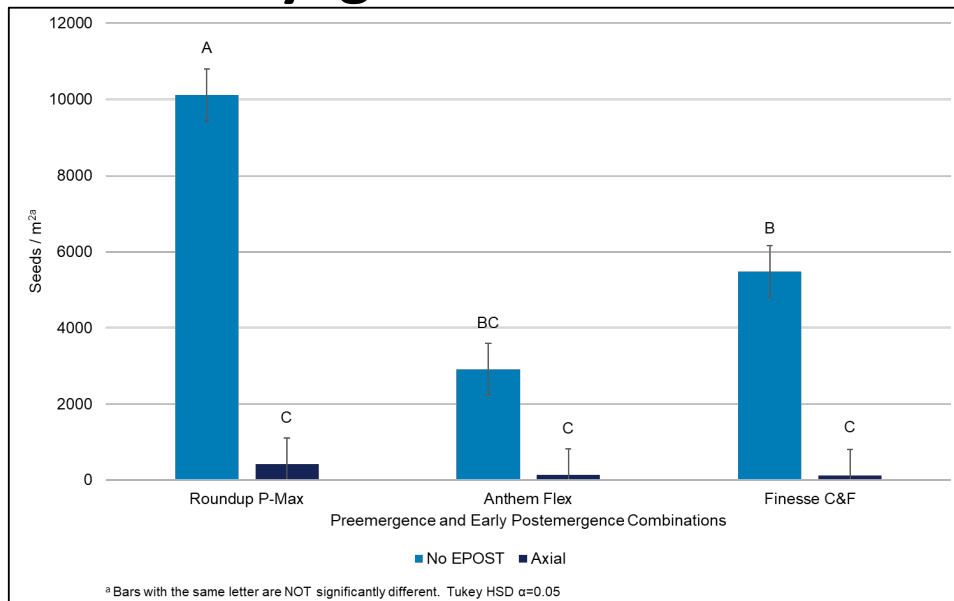
## 2021 Residual Based Wheat Program Evaluation

14DPP (10-8-20)	PRE (10-22-20)	EPOST (11-21-20)	Spring (3-8-21)	Dec 3, 2020	April 27, 2021	@ Harvest	
				% Ryegrass Control		Panicle Density / m <sup>2</sup>	Wheat Yield
Roundup + Fierce EZ			Axial Bold & Harmony Extra	74 AB	90 A	9 B	99 A
Roundup + Fierce EZ			Axial Bold	53 B	94 A	7 B	91 A
Gramoxone + Fierce EZ			Axial Bold	53 B	73 A	5 B	82 A
	Roundup + Finesse C&F + Anthem Flex		Axial Bold	86 AB	98 A	2 B	103 A
	Gramoxone + Finesse C&F + Anthem Flex		Axial Bold	98 A	98 A	0 B	102 A
	Roundup + Finesse C&F	Zidua + metribuzin	Axial Bold	83 AB	100 A	1 B	102 A
	Roundup + Finesse C&F	Fierce EZ	Axial Bold	78 AB	99 A	1 B	97 A
Untreated				0 C	0 B	259 A	23 B



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## Annual Ryegrass Seed Production



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## Influence of Herbicide Inputs on Annual Ryegrass in Wheat

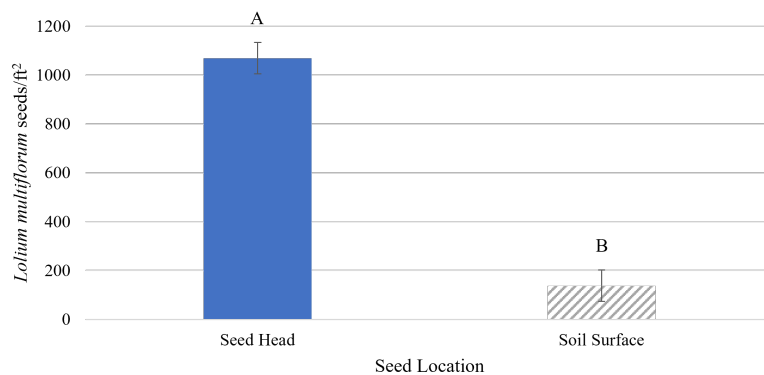
- EPOST applications of Axial currently have greatest influence on ryegrass control
- Widespread Pinoxaden resistance is already occurring
- Pyroxasulfone suppresses ryegrass emergence and provides an alternate SOA for ryegrass control
- Pyroxasulfone injury can be mitigated
- Ryegrass escapes can occur even with a robust herbicide program

## Harvest Weed Seed Control

- Popular in Australian wheat production (rigid ryegrass)
- Mills attached to harvesting equipment
- Weed seed retention and shatter at and before harvest vital to Harvest Weed Seed Control success



## Ryegrass Seed Distribution Prior to Harvest



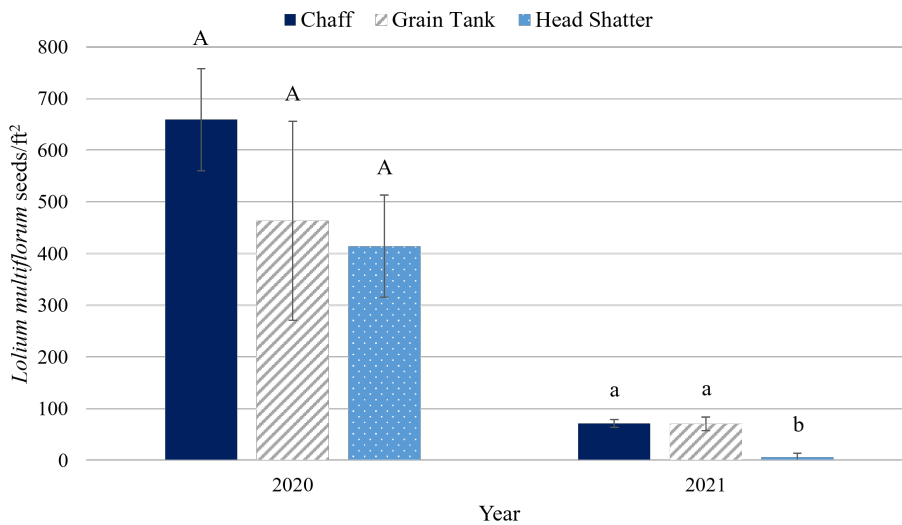
\* Means followed a different letter are significantly different. Tukey HSD  $\alpha=0.05$

\*Means with a different letter are significantly different. Tukey HSD  $\alpha=0.05$



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## Ryegrass Seed Distribution at Harvest



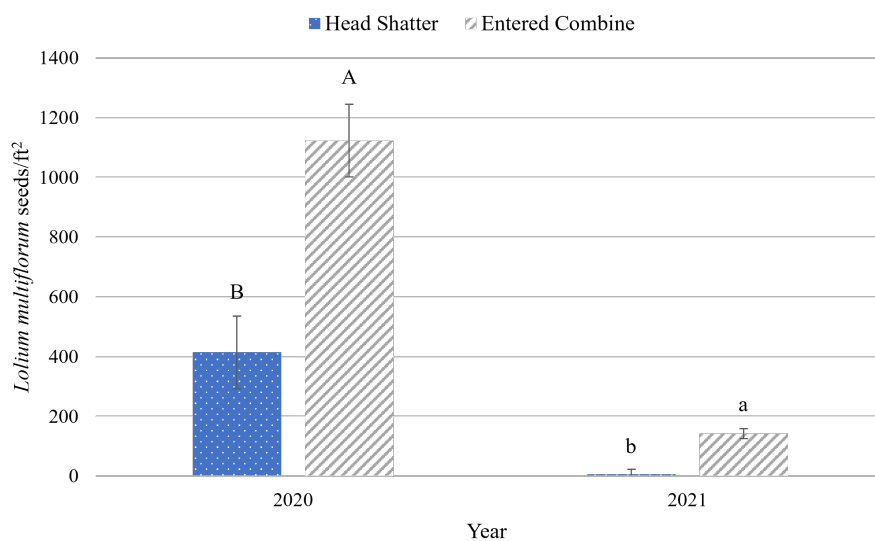
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## Ryegrass Seed Distribution at Harvest



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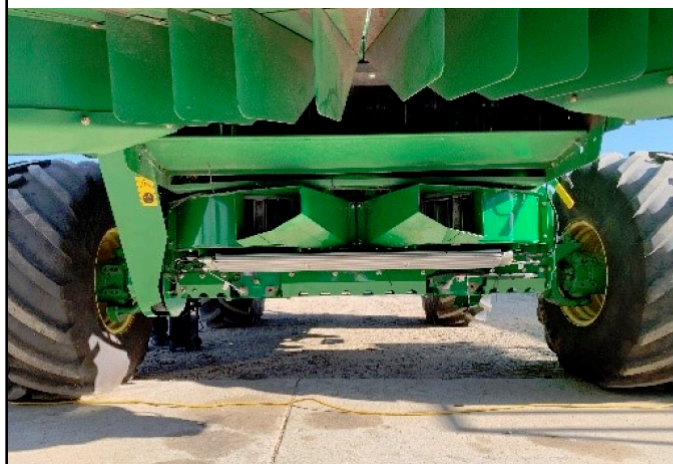


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## Harvest Weed Seed Control



- Roller mills or high impact mills attached to harvesting equipment

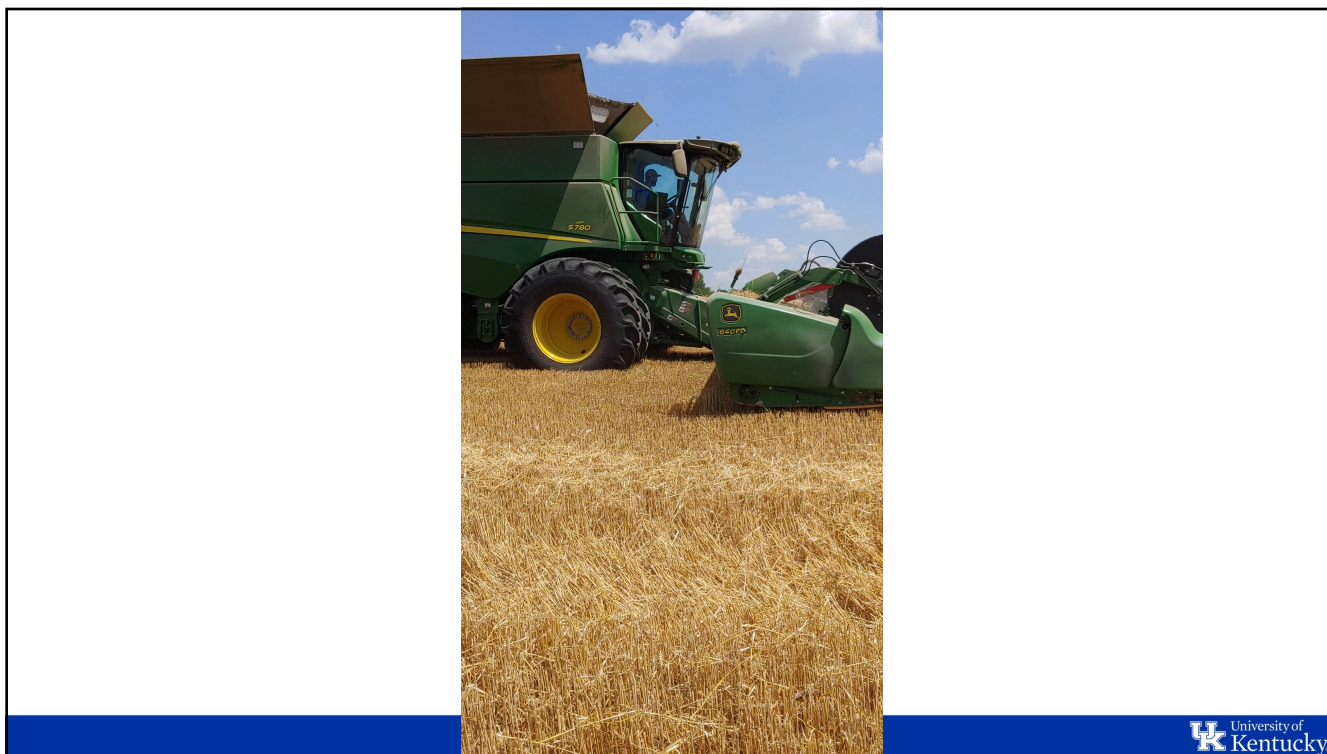


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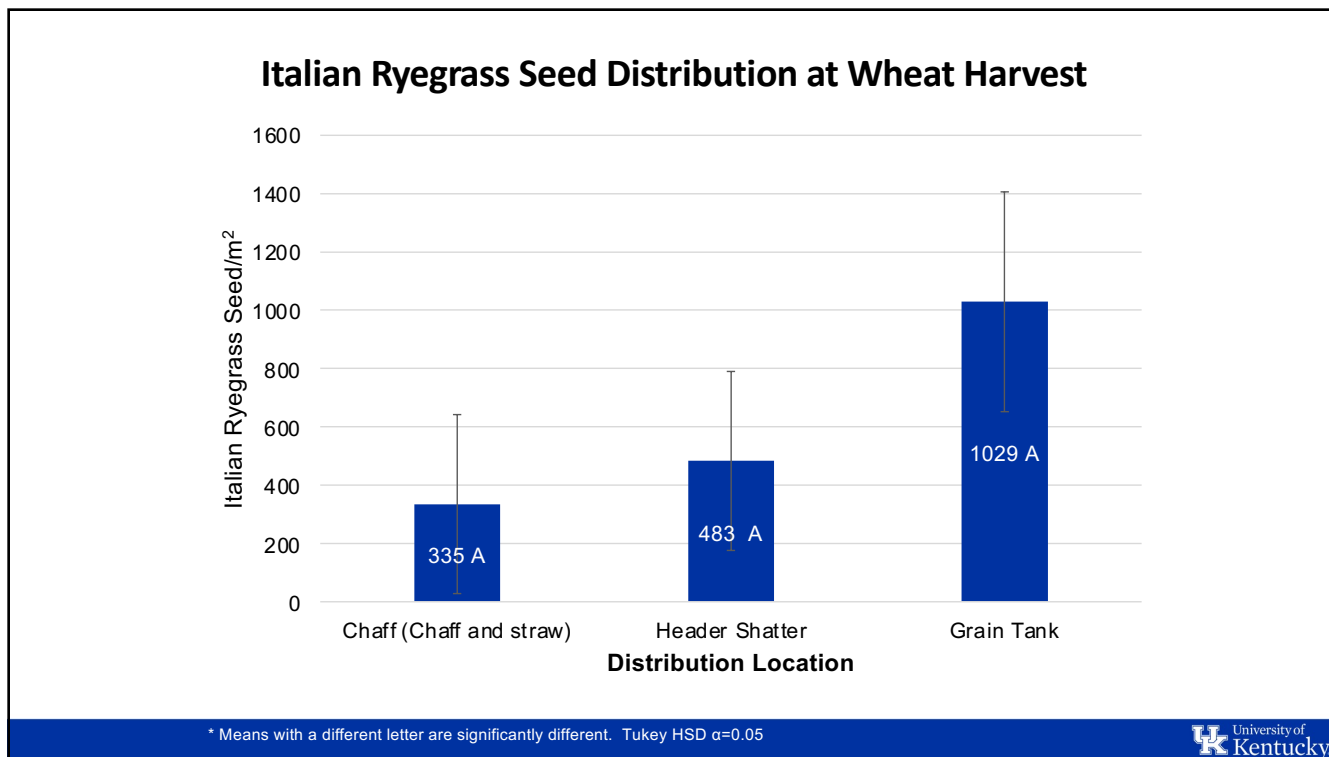




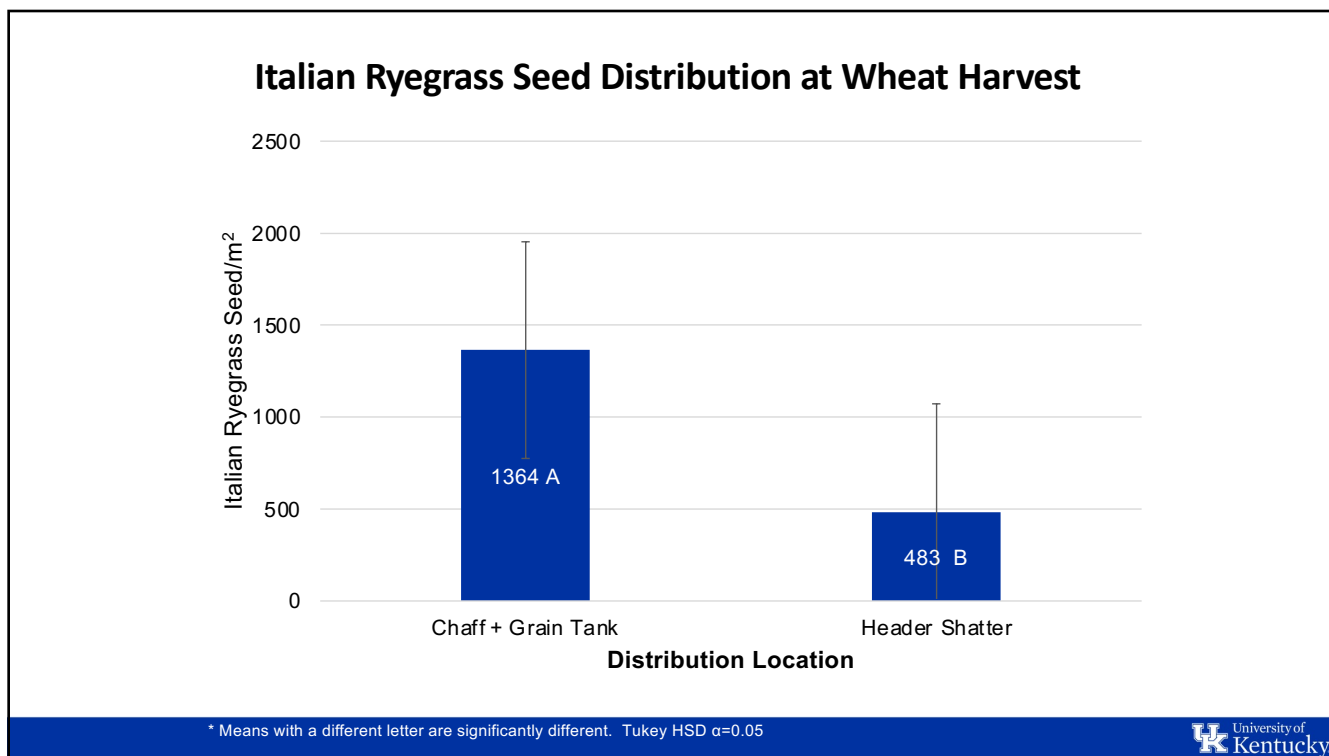
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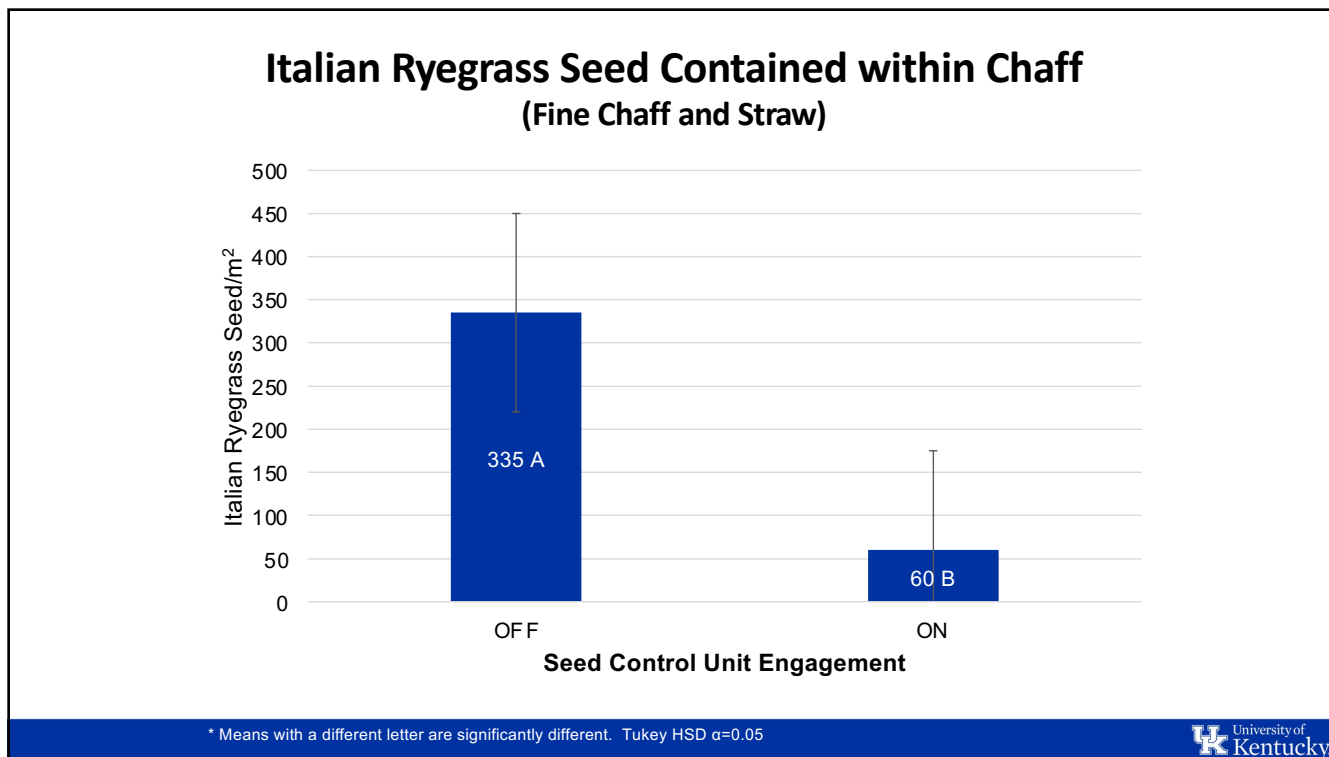
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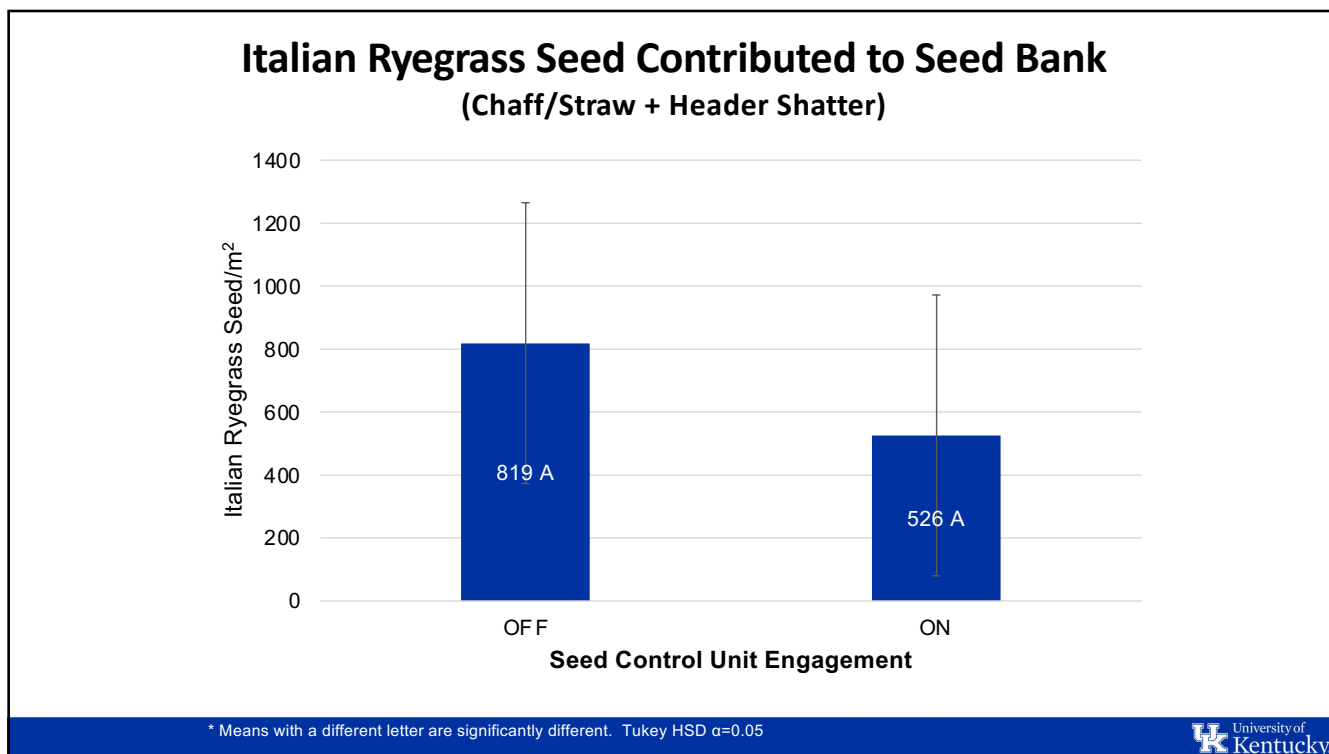
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## Harvest Weed Seed Control

- Roller or high impact mills are not cheap (70 to 80K)
- Header Shatter is a concern
- Justification needed by farmer
  - Multiple crops/weeds
- Cheaper options
  - Chaff lining?



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