MANAGING MARESTAIL AND GIANT RAGWEED IN WHEAT

(UKREC 2009-2010)

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INTRODUCTION

Giant ragweed and marestail are examples of weeds that emerge in wheat. While they may sometimes interfere with wheat harvest, the greatest concern is their impact on double-crop soybeans following wheat harvest. Marestail is especially difficult to control since most populations are tolerant to glyphosate.

Limited observations indicate that certain management practices may aid in the control of certain warm-season weeds in wheat. For example, a competitive wheat stand limits the development of warm-season weeds in wheat. Also, preharvest applications of glyphosate are sometimes used to help manage weeds that emerge in wheat and can facilitate wheat harvest.

OBJECTIVE

Evaluate the effect of seeding rate of wheat and preharvest applications of herbicides on managing giant ragweed and marestail in wheat.

RESEARCH METHODS

Trials were conducted on managing giant ragweed and marestail in wheat as separate experiments at the University of Kentucky Research and Education Center during the 2009-2010 growing season. A split-plot design with 4 replications was used with seeding rates as main plots and preharvest herbicide treatments as subplots.

Seeding rates for Pioneer 25R63:

- X Rate = 31 seed/ft^2
- ½ X Rate = 17 seed/ft^2
- 0 Rate = Fallow

Preharvest treatments within each seeding rate:

- Glyphosate 0.75 lb ae/A + AMS 8.5 lb/100gal
- Glyphosate 0.75 lb ae/A + 2.4-D 0.5 lb ae/A + AMS 8.5 lb/100 gal
- Glyphosate 0.75 lb ae/A + 2.4-D 1.0 lb ae/A + AMS 8.5 lb/100gal (marestail study only)
- Non-treated check

Giant ragweed and marestail plant counts were determined in four areas of each plot on June 7, 2010. Data from the wheat plots were taken from the skip row (14" wide) on the left and right side of each plot and from a row (7" wide) from the left and right side of the area to be harvested. A 4 ft^2 quadrat was used to quantify weed density from four random areas within each fallow plot (i.e. 0 seeding rate). In order to compare data between the different sampling areas the densities were based on plants per 100 ft^2.

Heights of marestail and giant ragweed were measured for up to 6 plants from each sampling area.

Preharvest treatments were applied June 10 and plots were harvested June 20. Infestations of giant ragweed and marestail were estimated as a percent ground cover one week after harvest.

Soybeans (Asgrow 4005) were planted July 20. The percent infestations of marestail and giant ragweed were estimated June 23 or approximately 2 Weeks After Treatments (WAT) were applied.

Soybean injury and stand counts were recorded on July 1 (3 WAT).

RESULTS

Giant Ragweed: Wheat plots had substantially fewer giant ragweed plants 100 ft^2 compared with the fallow plots (Table 1). Wheat plots that were seeded at the normal rate of 31 seed/ft^2 tended to have slightly fewer plants than those seeded at 17 seed/ft^2, regardless whether they were sampled from the skip rows or the normal rows in the harvest area.

The width of the skip row areas was 14 inches wide, while the row width of the harvested rows was 7 inches. There was a strong trend in fewer plants in the narrow rows than the wide rows.

Giant ragweed plants were considerably shorter in the wheat plots compared with those in the fallow plots. Plants in the wheat plots ranged from 22.8 inches to 26.6 inches while those in the fallow areas averaged 64.3 inches. Plants tended to be shorter in the plots seeded at the normal rate of 31 seed/ft^2 than those in plots seeded at nearly half the normal rate.

Visual ratings of giant ragweed infestations on June 26, 2010 (nearly 3 WAT) were used as a means of quantifying the impact of the preharvest herbicide treatments on managing this weed (Table 2). The preharvest treatments improved giant ragweed control in wheat as well as in the fallow areas. The infestation level of giant ragweed in the wheat plots treated with herbicides were very low and ranged from 0.5 to 0.6% compared with 1 to 1.5% in the non-treated checks of wheat. The addition of 2,4-D ester at the rate of 0.5 lb ae/A to glyphosate did not improve control of giant ragweed relative to glyphosate alone in wheat, yet it appeared to improve control slightly in the fallow areas.

Marestail: Plots with wheat had substantially fewer marestail plants/100 ft^2 compared with the fallow plots (Table 3). Wheat plots that were seeded at the normal rate of 31 seed/ft^2 tended to have slightly fewer plants than those seeded at 17 seed/ft^2, yet the difference was greater in the skip rows than the harvested rows.

The impact of the row width on weed marestail density was similar to that observed with giant ragweed. There was a strong trend in fewer plants in the narrow rows than the wide rows.

Plant heights of marestail were similar regardless of seeding rate or whether plants occurred in the skip row or the harvest area.

The impact of the preharvest herbicides on marestail was determined from the visual ratings of infestations on June 26, 2010 (i.e. approximately 3 WAT). No marestail survived preharvest treatments in wheat except for glyphosate alone which had only 0.13% infestation (Table 4). The use of 2,4-D ester at either rate as a tankmix partner with glyphosate did not impact the level of marestail that survived in wheat. However, either rate of 2,4-D in combination with glyphosate did appear to have less marestail than glyphosate alone in the fallow plots.

Wheat: The wheat head counts, and yields for both giant ragweed and marestail studies are in Table 5. The number of wheat seedheads in plots with ½ X seed rate was the same or similar to that of the X seeding rate for both studies, indicating plants in the ½ X seed rate were able to compensate for the low seeding rate. Seedhead counts and wheat yields tended to be less in the giant ragweed study compared with those in the marestail study. These differences may be attributed to the fact that the giant ragweed densities and heights appeared to be greater and possibly more competitive than those in the marestail study.

Soybean: Soybean emergence was erratic due to dry weather and poor distribution of wheat straw. The soybean stands that were recorded July 1 (3 WAT) did not appear to be affected by herbicide treatments; however, the data are not reported due to the effects of the dry weather and wheat straw. Soybeans did not show injury in the form of growth regulator symptoms associated with 2,4-D (Data not shown).

SUMMARY

• Wheat played a role in controlling giant ragweed and marestail by limiting the number of plants when compared with the fallow areas. There was a slight trend in fewer weeds in wheat planted at the recommended rate of 31 seeds/ft^2 than wheat seeded at nearly ½ the recommended rate; yet this difference was not statistically significant in the harvest row. A similar trend was observed with giant ragweed.

• Wheat tended to improve weed control by limiting size of weeds; especially giant ragweed, when compared with the fallow areas. The height of giant ragweed was shorter in the X seeding rate compared with the ½ X seeding rate for the skip rows and the harvest rows. A similar trend was observed with marestail.

• It was difficult to assess the impact of preharvest herbicide treatments on giant ragweed and marestail due to dry weather after wheat harvest. A slight improvement in control appeared to occur in some instances with herbicides. The addition of 2,4-D ester with glyphosate did not appear to improve control of either giant ragweed or marestail in wheat but improved control in the fallow areas.

Acknowledgments and Disclaimer: Appreciation is expressed to Kentucky Small Grain Growers Association for helping support this research. These results are based on one growing season at a single location and may not reflect what will occur in other environments.

Table 1. Giant Ragweed Density and Height Prior to Harvest of Wheat Seeded at Different Rates. [1] (UKREC 06-07-2010)

Wheat Seeding Rate [2]	Density (Plants/100 ft^2)		Plant Height (Inches)	
	Skip Row	Harvest Row	Skip Row	Harvest Row
X	67 b	31 b	24.6 c	22.8 c
½ X	74 b	48 b	25.1 b	26.6 b
0 (Fallow)	404 a		63.4 a	

[1] Sampling sites for wheat included 2 skip rows and 2 harvest rows full length of plot. Sampling sites for 0 seed rate (fallow) included 4 random sites 4 ft^2 each. Densities were adjusted to plants/100 ft^2.

[2] X rate = 31 seed/ft^2 , ½ X rate = 17 seed/ft^2, 0 rate = fallow

Table 2. Impact of Preharvest Herbicides on Giant Ragweed Infestation in Wheat Seeded at Different Rates. [1] (UKREC 06-26-2010)

Wheat Seeding Rate [2]	Giant Ragweed Infestation (%)		
	Glyphosate 0.75 lb ae/A	Glyphosate 0.75 lb ae/A + 2,4-D 0.5 lb ae/A	Check
X	0.5 f	0.5 f	1.5 d
½ X	0.6 f	0.6 f	1.0 e
0 (Fallow)	5.5 b	4.25 c	15.0 a

[1] Preharvest treatments were applied 06-26-2010 (approximately 1 week before harvest.

[2] X rate = 31 seed/ft^2 , ½ X rate = 17 seed/ft^2, 0 rate = fallow

Table 3. Marestail Density and Height Prior to Harvest of Wheat Seeded at Different Rates. [1] (UKREC 06-07-2010)

Wheat Seeding Rate [2]	Density (Plants/100 ft^2)		Plant Height (Inches)	
	Skip Row	Harvest Row	Skip Row	Harvest Row
X	15 c	3 b	13.3 a	14.1 a
½ X	25 b	5 b	14.6 a	17.3 a
0 (Fallow)	540 a		18.1 a	

[1] Sampling sites for wheat included 2 skip rows and 2 harvest rows full length of plot. Sampling sites for 0 seed rate (fallow) included 4 random sites 4 ft^2 each. Densities were adjusted to plants/100 ft^2.

[2] X rate = 31 seed/ft^2 , ½ X rate = 17 seed/ft^2, 0 rate = fallow

Table 4. Impact of Preharvest Herbicides on Marestail Infestation in Wheat Seeded at Different Rates. [1] (UKREC 6-26-2010)

Wheat Seeding Rate [2]	Marestail Infestation (%)			
	Glyphosate 0.75 lb ae/A	Glyphosate 0.75 lb ae/A +		Check
		2,4-D 0.5 lb ae/A	2,4-D 1.0 lb ae/A	
X	0.13 c	0 c	0 c	0.13 c
½ X	0 c	0 c	0 c	2.0 c
0 (Fallow)	4.75 b	0.38 c	0.5 c	13.75 a

[1] Preharvest treatments were applied 06-26-2010 (approximately 1 week before harvest).
[2] X rate = 31 seed/ft^2 , ½ X rate = 17 seed/ft^2, 0 rate = fallow

Table 5. Wheat Head Counts and Yield for the X and ½ X Seeding rates in them Giant Ragweed and Marestail Studies. (UKREC 2009-1010)

Seeding Rate [2]	Giant Ragweed Study		Marestail Study	
	Head Counts (Heads/ft^2)	Yield (Bu/A)	Head Counts (Heads/ft^2)	Yield (Bu/A)
X	71 a	92.8 a	101 a	105.7 a
½ X	71 a	87.6 a	94 a	108.6 a

[2] X rate = 31 seed/ft^2 , ½ X rate = 17 seed/ft^2, 0 rate = fallow
There were no statistical differences due to herbicide treatments. The above data were averaged across all herbicide treatments within each study.