WHEAT VARIETAL RESPONSE TO FENOXAPROP

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Introduction

Wild oat can be a serious weed problem in wheat fields throughout Texas and Oklahoma. According to the Southern Weed Science Society Proceedings, wild oat is the second most troublesome and the ninth most common weed in Texas (Anonymous 2000). Fenoxaprop, an aryloxyphenoxypropinate, will selectively control wild oat in wheat, but wheat injury from fenoxaprop can occur especially if the herbicide is applied during jointing (Koscelny and Peeper 1997). However, a proprietary safener from Aventis which can be formulated with fenoxaprop could decrease the potential for wheat injury. Tolerance to fenoxaprop may possibly vary between wheat varieties.

Currently, applications of fenoxaprop can only be applied with water and not with liquid fertilizer (Aventis CropScience 2000), but approximately 70% of the acres in the Southern Great Plains receive a topdress application of N later in the growing season (Murphy 2001) . Fenoxaprop applications with urea ammonium nitrate (UAN, 28-0-0) as the carrier would be of great benefit to growers as long as wheat injury was minimal. UAN may substantially effect fenoxaprop activity on wheat by decreasing spray droplet surface tension on the leaf surface. Research by Beckett et al. (1992) reported surface tension did decrease when 10% commercial grade UAN was added to a spray solution containing quizalofop, but the same decrease in surface tension was not reported when 10% reagent grade UAN was added. This research implies that the anticorrosive and compatibility agents added to commercial grade UAN may actually cause fenoxaprop to have better coverage through decreased surface tension of the spray droplets. With increased surface coverage, more fenoxaprop may be absorbed and thus more injury could be observed on wheat.

Objective

The objective of this research was to determine if fenoxaprop with and without a safener applied with UAN or water as a spray carrier may cause injury and yield loss to eleven different wheat varieties adapted to the Southern Great Plains.

Materials and Methods

Eleven regionally adapted hard red winter wheat varieties, Custer, 2137, Hickok, Jagger, Lockett, Ogallala, TAM 202, TAM 301, TAM 302, TAM W-101, and Tomahawk, were planted on November 25, 1997, November 18, 1998, and October 18, 1999 at Chillicothe, TX and November 26, 1997 at Vernon, TX. The studies were planted on a Miles fine sandy loam and a Miles loamy fine sand at Chillicothe and Vernon, respectively. Herbicide POST treatments were applied on March 13, 1998, March 3, 1999, and February 27, 2000 at Chillicothe and March 24, 1998 at Vernon. Herbicide treatments included no fenoxaprop and fenoxaprop at 0.094 kg ai/ha with and without a

safener in combination with UAN and water as a carrier. All treatments were applied at 187 L/ha using a 4-tip backpack sprayer with XR8002 nozzles. Visual injury ratings were taken 3 and 5 WAT. At harvest, wheat height and yield (kg/ha) were determined at all locations except Vernon in 1997-98 which had a poor wheat stand later in the growing season.

The experimental design was a randomized complete block with a factorial arrangement of treatments.

Results

Wheat injury and stunting 3 WAT were uniform among varieties but different at each location, so data was pooled across varieties (Table 1). More moisture in the soil due to previous rains at Vernon and Chillicothe during the 1997-98 growing season may have caused the increased wheat injury and stunting to occur. Rainfall at Vernon and Chillicothe 30 days prior to and after the fenoxaprop application was 19.3 cm at both locations while at Chillicothe in 1998-99 and 1999-2000 during the same time period was 8.4 and 11.6 cm, respectively. The excessive moisture may have water stressed the wheat causing the wheat to be more susceptible to fenoxaprop injury initially. Wheat injury ratings 5 WAT were not significant; however, wheat stunting 5 WAT had a significant three-way interaction of location by herbicide by spray carrier with more injury observed at Vernon in1997 (data not shown). As for wheat height and yield, a two-way interaction of treatment by location is presented in Table 2. Wheat height was affected by fenoxaprop, but no affect was observed on wheat yield. In addition, a wheat variety by location interaction was observed for wheat yield (data not shown).

Table 1. Wheat injury and stunting 3 WAT along with wheat height and wheat yield at harvest as affected by fenoxaprop applications at Chillicothe and Vernon, TX.

Location	Year	Herbicide Treatment	Carrier	Wheat Injury	Wheat Stunting
				----------%----------	
Chillicothe	1997-98	Fenoxaprop	Water	3	11
			UAN	2	9
		Fenoxaprop + safener	Water	2	9
			UAN	1	6
		No fenoxaprop	Water	0	0
			UAN	2	8
Chillicothe	1998-99	Fenoxaprop	Water	2	2
			UAN	2	3
		Fenoxaprop + safener	Water	2	1
			UAN	2	2
		No fenoxaprop	Water	0	0
			UAN	1	2
Chillicothe	1999-2000	Fenoxaprop	Water	0	0
			UAN	0	0
		Fenoxaprop + safener	Water	0	0
			UAN	0	0
		No fenoxaprop	Water	0	0
			UAN	0	0
Vernon	1997-98	Fenoxaprop	Water	6	10
			UAN	2	6
		Fenoxaprop + safener	Water	4	7
			UAN	2	5
		No fenoxaprop	Water	0	0
			UAN	1	3
LSD (0.10)				1.3	2.3

Table 2. Wheat height and wheat yield at harvest as affected by fenoxaprop applications at Chillicothe.

Location	Year	Herbicide Treatment	Height (cm)	Yield (kg/ha)
Chillicothe	1997-98	Fenoxaprop	79	4050
		Fenoxaprop + safener	82	4240
		No fenoxaprop	84	4110
Chillicothe	1998-99	Fenoxaprop	60	3700
		Fenoxaprop + safener	60	3780
		No fenoxaprop	61	3740
Chillicothe	1999-2000	Fenoxaprop	86	3870
		Fenoxaprop + safener	86	3830
		No fenoxaprop	87	3850
LSD (0.10)			3.1	NS .

Conclusions

1.) Wheat injury was minimal and not variety specific. Wheat yield was unaffected by a fenoxaprop application.

2.) The safener formulated with fenoxaprop did not consistently reduce wheat injury.

3.) Applying fenoxaprop with UAN did not increase wheat injury.

4.) The higher wheat injury and wheat stunting at Vernon and Chillicothe in 1997-98 corresponds to excessive soil moisture which may have water stressed the wheat causing the wheat to be more susceptible to fenoxaprop injury.

References

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