RESPONSE OF NO-TILL WHEAT TO BURNDOWN AND POSTEMERGENCE APPLICATIONS OF 2,4-D AND DICAMBA (UKREC 2004-2005 AND 2005-2006)

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Introduction:

2,4-D and dicamba are examples of growth regulator herbicides that can cause significant wheat injury when applied at the wrong time. The traditional application timing of these herbicides has been when wheat is in Feekes growth stage 5 or when plants are fully tillered and just prior to jointing and are about 4 to 8 inches in height. This usually occurs around March to early April in Kentucky, and will vary depending on the environment and location.

Some wheat growers have expressed an interest in using growth regulator herbicides in the fall when certain problem weeds are more easily managed, but they are concerned with the risk of crop injury.

This objective of this research was to evaluate wheat response to fall burndown and fall postemerence applications of 2,4-D and dicamba. Studies were conducted in 2004-2005 and 2005-2006.

Methods:

'Pioneer 25R35' was planted with a no-till planter into corn stalks October 23, 2004 and October 12, 2005 at a seeding rate of 35 viable seeds per ft^2. The herbicides used in this study included 2,4-D ester (Weedone LV4 Solventless) at 1 and 2 pt/A and dicamba (Clarity) at 4 oz/A. A tank mix of Harmony Extra at 0.5 oz/A plus 2,4-D at 6 oz/A was included as a fall post application in the second study. Treatments were applied at approximately 2 weeks ahead of planting (2 WK EPP), preemergence at planting (PRE), and fall postemergence (FALL POST) to 1 to 2 tiller wheat.

In order to limit interference from other pests, Warrior insecticide was applied in the fall and spring and Tilt fungicide was applied in the spring. Nitrogen was applied as a split treatment at approximately 30 units/A mid February and 80 units/A on mid to late March.

The methods used for collecting data are summarized in footnotes of Table 1.

Results:

The use of 2,4-D Ester or Clarity as burndown treatments at 2 WK EPP or PRE did not affect wheat stands (data not shown). These treatments did not affect other plant growth or yield factors such as plant height, percent of abnormal seedheads, test weight, or yield relative to the non-treated checks in either study with the exception of one treatment involving 2,4-D (see table 1). Wheat yield in the 2004-2005 study was reduced nearly 20 bu/A where 2,4-D at 2 pt/A was applied PRE at the time of planting.

Injury symptoms were not visible during the fall or early winter; however, by early spring, some plants in the 2,4-D FALL

POST plots began to show twisting of stems. Plants that were treated with FALL POST applications of 2,4-D Ester at 1 or 2 pt/A were significantly shorter than those of the non-treated checks (see table 1). The stunting that resulted from that FALL POST of 2,4-D ester was greater with the 2 pt/A rate than the 1 pt/A rate in the first year. The 6 oz/A rate of 2,4-D Ester that was mixed with Harmony Extra and applied as a FALL POST treatment, tended to cause stunting but was not statistically different relative to the non-treated check.

The seedheads that were collected from mature plants before harvest indicated abnormalities in nearly every sample including the non-treated checks in both studies. The symptoms were in the form of twisted or curled heads, short length, and/or green in color. FALL POST treatments of 2,4-D ester at 1 or 2 pt/A had 43% to 48% abnormal seedheads; whereas, the non-treated checks had 19% abnormal heads in 2005 and 14% in 2006 (see table 1). Plants treated with Harmony Extra plus 2,4-D ester as a FALL POST spray had 31% abnormal seedheads in the 2006 study.

Another indicator of injury was the low test weight of harvested samples from the FALL POST treatments of both 2,4-D ester rates in the 2005 study and with the low rate in the 2006 study.

The effect of 2,4-D ester on yield was greatest when it was applied in the fall to wheat with 1 to 2 tillers. The use of 2,4-D ester as a FALL POST treatment reduced yield by approximately 15% for both rates in the first study and 28% and 33% for 1 and 2 pt/A, respectively, in the second study. It is interesting to note that the 6 oz/A rate of 2,4-D that was used with Harmony Extra at the FALL POST timing caused significant percent of abnormal seedheads, yet it did not limit wheat yield.

Summary:

Fall sprays of 2,4D ester at 1 or 2 pt/A to emerged wheat with 1 to 2 tillers will likely cause crop injury and limit yield. The only burndown treatment that limited wheat yield was the PRE treatment of 2,4-D ester applied at the high rate of 2 pt/A in the first study. Clarity (dicamba) at 4 oz/A did not cause crop injury or limit wheat yield regardless of timing of application.

These results show wheat has a greater tolerance to fall sprays of dicamba than 2,4-D, particularly when treatments are applied to seedling plants**.**

The perception of risk of injuring wheat with fall sprays of dicamba is largely based on earlier versions of product labels that limited the application to wheat immediately after winter dormancy but before jointing. Changes in the dicamba labels in recent years have allowed more flexibility to making fall sprays. The current labels allow applications to be made before, during, or after planting but before jointing. This research help support the potential use of dicamba in fall sprays as early preplant, preemergence, or postemergence to seedling wheat.

The fact that injury occurred with 2,4-D applied at planting and to seedling plants in the fall demonstrates the risk of injury. This is one reason why labels of 2,4-D products do not address making burndown or fall post applications in wheat.

Table 1. **Effect of 2,4-D and Clarity on Growth and Yield Parameters of Wheat. (UKREC 2004-2005 and 2005-2006)** [1]

Treatment			Plant Height (Inches)[3]		Abnormal Head (%)[4]		Test Wt (lb/Bu)[5]		Yield (Bu/A)[6]	
Herbicide	Rate	Timing[2]								
					2005	2006	2005	2006	2005	2006
2,4-D Ester	1 pt/A	2 WK EPP	35	29	19	12	60.0	53.4	124.8	72.6
2,4-D Ester	2 pt/A	2 WK EPP	35	30	25	10	59.6	54.7	127.5	76.7
Clarity	4 oz/A	2 WK EPP	33	29	21	11	60.4	51.1	123.7	72.0
2,4-D Ester	1 pt/A	PRE	34	31	21	16	61.0	53.1	129.0	78.9
2,4-D Ester	2 pt/A	PRE	35	30	21	8	61.0	55.0	116.1 *	82.5
Clarity	4 oz/A	PRE	36	31	16	11	60.2	55.0	126.7	87.8
2,4-D Ester	1 pt/A	FALL POST	31 *	26 *	44 *	45 *	53.6 *	46.6 *	116.1 *	57.3 *
2,4-D Ester	2 pt/A	FALL POST	28 *	25 *	48 *	43 *	50.9 *	52.7	115.1 *	53.3 *
Clarity	4 oz/A	FALL POST	35	30	20	15	61.5	52.7	126.1	80.4
H Extra + 2,4-D Ester NIS	0.5 oz/A 6 oz/A 0.125%	FALL POST	—	28	—	31 *	—	52.4	—	81.4
Non-treated Check			35	30	19	14	60.7	54.3	136.0	79.4
LSD (0.05)			3	2	13	10	2.8	4	14.5	12.7

[1] An asterisk indicates a significant difference relative to non-treated check.

[2] Application dates: (2 WK EPP = 10/3/04 and 9/29/05) (PRE = 10/23/04 and 10/12/05) (Fall Post = 12/4/04 and 11/30/05)

[3] Plant height was based on an average of 2 plants from random sites in each plot on 6/01/05 and 6/1/06.

[4] Collected 20 consecutive heads within a single area per plot on 6/17/05 and 6/14/06 to estimate the percent of heads that appeared to be small, twisted or had other anomalies.

[5] Test weight measured from harvested sample.

[6] Yield collected with a small plot combine on 6/20/05 and 6/14/06 and was adjusted to 15% moisture.