REMOVAL OF RR ALFALFA IN NO-TILL SYSTEMS

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Alfalfa is a key crop in Wisconsin, but if not successfully removed it can be troublesome in subsequent crops. This is especially true in no-till systems. Currently most no-till systems rely on glyphosate to remove the alfalfa prior to planting rotational crops the following spring. Glyphosate however will not be effective at removing Roundup Ready alfalfa, as it is engineered to tolerate this herbicide. In these situations other active ingredients will need to be used to remove the alfalfa crop. Detailed results from a Wisconsin study that evaluated the effectiveness of growth regulator herbicides in removing alfalfa are summarized below. This information as well as other data from across the United States will be presented along with specific recommendations for the upper-midwest.

Wisconsin Study

Research was conducted in Wisconsin in 2006-2007 to evaluate the effectiveness of growth regulator herbicides at removing RR alfalfa stands. Applications were applied at two timings in October that represent typical timings and environmental conditions for alfalfa removal in Wisconsin. The October 5 timing had good environmental conditions conducive for herbicide absorption/translocation and mortality. In contrast the October 19 timing was applied when conditions were sub-optimal with maximum air temperatures below 50 F the day of and the day after application. A range of growth regulator herbicides and rates were evaluated (See Table 2 for details). All treatments were applied to plots that were 10 ft wide by 30 ft long using a hand held CO2 powered backpack sprayer that delivered 15 gallons/a of spray solution. Other site and environmental conditions are summarized in Table 1.

Table 1.Environmental conditions for fall herbicide applications at Arlington, WI.

Timing of treatment	10/5/06	10/19/2006
Height of alfalfa	4-6 inches tall	5 – 7 inches tall
Air/soil temp at time of application	Air = 59 F; Soil =57 F	Air = 39 F; Soil =40 F
Max/min air temp day before application	Max= 62F; Min= 43F	Max = 53F; Min= 35F
Max/min air temp day of application	Max= 57F; Min= 34F	Max = 39F; Min= 31F
Max/min air temp day after application	Max= 62F; Min= 29F	Max = 47F; Min= 25F

In May, the effectiveness of treatments was evaluated. Percent cover of alfalfa was visually estimated, and number of crowns that had green foliage present was counted in each plot. Table 2 summarizes the average (each treatment was replicated four times) values along with significant differences ($p<0.05$). Only Weedmaster applied at 2 pt/a did not have any resprouting plants, however all herbicides were effective at limiting resprouting of alfalfa at the appropriate rate and timing. The early October timing had significantly better results than the later timing. 2,4-D and Banvel performance was reduced at the later timing at the lowest rate. Weedmaster applied in late October did not have any significant reduction in the number of crowns, but control was much more variable between plots. Only Weedmaster applied at 1.5 pt/a in late October had 5 crowns or less resprout the following spring.

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Table 2. Alfalfa cover and # crowns May following fall herbicide applications at Arlington, WI.

Treatment	Rate		Applic. date	% cover*		# crowns / 300 ft^{2*}	
2,4-D Amine + NIS	1.0	pt/a	10/5	5.0	cd	45.8	c
2,4-D Amine + NIS	2.0	pt/a	10/5	1.3	fg	8.5	de
2,4-D Amine + NIS	3.0	pt/a	10/5	0.8	g	2.0	e
Banvel + NIS	1.0	pt/a	10/5	1.0	g	5.0	de
Banvel + NIS	1.5	pt/a	10/5	1.0	g	2.3	de
Banvel + NIS	2.0	pt/a	10/5	0.5	g	0.5	e
Weedmaster + NIS	1.0	pt/a	10/5	1.0	g	5.8	de
Weedmaster + NIS	1.5	pt/a	10/5	0.3	g	0.3	e
Weedmaster + NIS	2.0	pt/a	10/5	0.0	g	0.0	e
2,4-D Amine + NIS	1.0	pt/a	10/19	26.3	b	103.5	b
2,4-D Amine + NIS	2.0	pt/a	10/19	4.3	cd	42.5	cd
2,4-D Amine + NIS	3.0	pt/a	10/19	1.0	fg	8.3	de
Banvel + NIS	1.0	pt/a	10/19	5.0	c	58.8	c
Banvel + NIS	1.5	pt/a	10/19	2.0	de	30.5	cde
Banvel + NIS	2.0	pt/a	10/19	0.8	fg	8.8	e
Weedmaster + NIS	1.0	pt/a	10/19	2.5	fg	23.0	cde
Weedmaster + NIS	1.5	pt/a	10/19	1.0	ef	4.3	de
Weedmaster + NIS	2.0	pt/a	10/19	-		-	
UTC	-	-	-	95.0	a	1000	a

* Treatments within this column that contain different letters were found statistically different with a Fisher's LSD test ($P<0.05$)
NIS = nonionic surfactant (applied at 0.25 % v/v)

Significance

This experiment clearly shows that environmental conditions can alter the level of control with growth regulator herbicides in alfalfa. Applications when conditions promote herbicide absorption and translocation (temperatures at least in the 50s) are the most desirable. Unfortunately time constraints often make for applications during non-ideal conditions. Realize that this IS NOT RECOMMENDED, but if this does occur a reduction in control will likely result. The level of reduction will vary from field to field due to a range of environmental conditions. Spring applications, although not studied, will likely give even poorer results and will be discussed in more detail in the presentation.

Conclusions

This study found that while growth regulator herbicides can remove alfalfa, rates needed to be increased when applied later in the fall. While we all want fields clean at planting, I think it is important to ask ourselves do we need 100% control? How many alfalfa plants surviving are acceptable in your production system? While a few volunteer alfalfa plants are unsightly in a field, yield loss is estimated to be very low indicating 100% control is not needed.