Broadleaf Weed Control in Kentucky Bluegrass Turf with NEU 1173H-2006

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Introduction:
The purpose of this study was to evaluate an experimental natural broadleaf weed control formulation for the selective control of broadleaf weeds in Kentucky bluegrass when applied at different rates with a CO_2 backpack sprayer and with a hose-end sprayer. The product was NEU 1173H, an iron containing product from Eco-Care Technlologies Inc. of Saanichton, BC, Canada. This trial was located at the Iowa State University research station near Gilbert, Iowa.

Materials and Methods:
This trial was conducted as a randomized complete block design with 3 replications. It had 5 treatments including the control (Table 1). The first application of the products took place on June 21, 2006 and the second application was made on July 26, 2006. Treatments 2, 3, and 4 were made with a CO_2 backpack sprayer to 25 ft^2 plots in 420, 840, and 1260 ml water, respectively. Treatment number 5 was made to 2 x 2 m (43 ft^2) plots with a hose end sprayer. The rates for treatments 2, 3, and 4 were a half rate (8.6 ml/m^2), the recommended rate (17.2 ml/m^2), and a rate 1.5 times the recommended (rate 25.8 ml/m^2), respectively. Treatment 5, made with a hose end sprayer, was applied at the recommended rate for the product (table 1). All weed control data are expressed on the basis of weeds/25 ft^2 of area.

Data were taken 1 day, 1 week, 2 weeks, and 4 weeks after each treatment. The data taken at one day included damage to dandelion and clover based on a percentage scale where 0 was no damage and 100 was dead weed tissue, and the phytotoxicity rating to grass based on a percentage scale where 0 is no damage and 100 is dead grass. Dandelion numbers and percentage clover cover were evaluated at 1, 2 and 4 weeks.

Results:
The 8.6 ml/m^2 treatment (#2) produced some reduction in quality of the Kentucky bluegrass turf for the first week following treatment (Table 2). This damage recovered by the second week after treatment (WAT). The damage to the bluegrass lasted for 2 WAT following the second application. This damage recovered by the fourth WAT (Table 3). The 8.6 ml/m^2 treatment reduced total weed cover for two WAT following the first application, but the weeds recovered by the fourth WAT (Table 2). The percentage of clover cover and dandelion numbers were reduced by this treatment for the first two WAT, but the weeds had recovered by the fourth WAT. Following the second treatment (Table 3) dandelions in plots treated with the 8.6 ml/m^2 treatment recovered by the second WAT, whereas clover was reduced for all four WAT.

The recommended rate of 17.2 ml/m^2 treatment (#3) resulted in some phytotoxicity to the Kentucky bluegrass in the first WAT, but this damage recovered by the second WAT (Table 2). Following the second application, the phytotoxicity lasted for two WAT (Table 3). Dandelion numbers were reduced for two weeks following the first treatment and for 1 week following the second treatment. Percentage clover was reduced for two weeks following the first treatment and for four weeks following the second treatment.

The 25.8 ml/m^2 treatment (#4) resulted in phytotoxicity to the Kentucky bluegrass for two WAT following the first and second applications (Tables 1 and 2). Dandelion numbers were reduced for two WAT following both the first and second treatments. Clover percentage was reduced for 2 WAT following the first application and for 4 WAT following the second application.

The hose end sprayer treatment (#5) produced some reduction in quality for the first WAT only, following both applications. This damage was less than that observed in the treatments applied with the CO_2 backpack sprayer. Dandelion numbers and clover percentage were reduced for two WAT following the first application and for one WAT following the second application.

While we report reductions in quality following application with this product, the reductions were not severe. The bluegrass generally took on a darker color with slight browning of the leaf, which generally recovered following the second WAT. While the weed reductions are generally limited to about two weeks following treatment with NEU 1173H, the standards expected by the consumer from a natural product are less than those expected from an herbicide like 2, 4-D and we feel that this product may find acceptance in the market place from those who choose not to use standard herbicide products.

Table 1. Product, Rate/m^2, mL/25 ft^2 plot, water/ 25 ft^2 plot

Number	Product	Rate/m	Rate/ 25 sq ft Plot	Water
1	Control	XXXX	XXXX	XXXX
2	1/2X rate	8.6 mL/m^2	20 mL	420 mL
3	1X rate	17.2 mL/m^2	40 mL	840 mL
4	1.5X rate	25.8 mL/m^2	60 mL	1260 mL
5	Hose End	17.2 mls/m^2	68.8 ml/plot	22 to one

* #5 were 4 m^2 plots and 1-4 will be in 25 ft^2 plots

Table 2. Data collected following the first treatment of NEU 1173H on June 21, 2006.

		6-22-2006 (1 Day)				6/30/2006 (1 Week)					
Rep	**Treatment**	Damage to Dandelion	Damage to Clover	% Weed Tissue Death	Phyto to Grass	Damage to Dandelion	Damage to Clover	% Weed Coverage	Phyto Grass	# Dandelion	% clover
	1	0	0	0	0	0	0	95	0	52	83
	2	100	100	100	10	97	57	43	22	2	37
	3	100	100	100	10	100	65	30	37	2	30
	4	100	100	100	33	100	73	13	70	3	33
	5	100	50	80	5	80	50	40	20	5	53
	LSD	0	0	0	5	5	7	14	9	30	21

Table 2. continued

		7/5/2006 (2 Weeks)						7/24/2006 (4 Weeks)			
Rep	**Treatment**	% damage dandelion	% damage clover	% weed coverage	# Dandelion	% clover	% phyto	# Dandelion	% Clover	Phyto grass	% Weed Cover
	1	0	0	93	49	87	0	34	82	0	90
	2	0	0	47	2	42	13	32	80	0	85
	3	3	0	38	2	37	13	22	78	0	82
	4	0	0	27	3	37	10	21	67	0	70
	5	0	0	52	7	60	0	37	80	0	85
	LSD	ns	ns	24	28	22	ns	ns	ns	ns	ns

Table 3. Data collected after the second treatment of NEU 1173H on July 26, 2006.

		7/27/2006 (1 Day)				8/2/2006 (1 Week)					
Rep	**Treatment**	Damage to Dandelion	Damage to Clover	% Weed Tissue Death	Phyto to Grass	damage dandelion	Damage Clover	Weed Coverage	# dandelion	% clover	Phyto grass
	1	0	0	0	0	0	0	95	47	65	0
	2	98	82	85	12	100	88	8	1	12	10
	3	100	97	97	20	100	97	2	0	2	22
	4	100	100	100	30	100	100	0	0	0	33
	5	68	73	70	7	70	75	42	1	13	7
	LSD	4	5	6	6	4	7	10	31	15	7

Table 3. continued.

		8-9-2006 (2 Week)						8/18/2008 (4 weeks)			
Rep	**Treatment**	% damage dandelion	% damage clover	% weed cover	# Dandelion	% clover	% phytotoxicity	% weed cover	Phyto grass	# dandelion	% Clover
	1	0	0	92	73	77	0	90	0	92	82
	2	0	0	60	73	25	7	73	0	89	30
	3	0	0	22	42	13	8	28	0	44	15
	4	0	0	5	18	2	15	6	0	14	3
	5	0	0	70	55	63	0	78	0	70	65
	LSD	ns	ns	18	46	25	4	23	ns	ns	31