

UW – Madison Weed Science Renz Lab

Evaluation of DuraCor impregnated to fertilizer can provide equivalent control of buttercup to standards

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Objective:

Evaluate if herbicide impregnation of DuraCor, Milestone or GrazonNext HL to fertilizer can provide equivalent control of buttercup compared to standard broadcast applications.

Summary:

While buttercup species are problematic weeds in pastures in spring, several herbicide options are available for control. We tested if we could attain similar control of buttercup with products impregnated onto fertilizers as standard foliar applications of Escort, Milestone or Enlist One (2,4-D). We found that foliar application of the standards all provided > 95% control of buttercup 33 days after treatment (DAT). Impregnating Milestone (6.7 fl oz/A) or DuraCor (20 fl oz/A) or GrazonNext HL (32 fl oz/A) provided similar control as standards (86-95%) 33 DAT. While other treatments were less effective, they still provided good suppression of buttercup. Control did not persist into the following year as cover was similar with all treatments 389 DAT. Lack of differences may be a result of low cover (2-14%) of buttercups. Even the non-treated control had low cover (7%) compared to the previous year (50%).

Results confirm that foliar applications of Escort, Milestone or Enlist One are effective at controlling buttercup but use of DuraCor, Milestone, and GrazonNext HL impregnated to fertilizer applications is a viable alternative that can provide similar levels of control.

Notes

- Two 42" passes were made with the Gandy spreader (7' treated in each plot)
- Untreated strip down the center of plots
- Wheel tracks located on the inside of plots
- Plots 201-204, 304-307, and 407-410 were burned from an escaped prescribed fire and which may have affected results in these plots at 389 DAT

Herbicide Treatments

Treatment Number	Treatment	Rate
1	Nontreated Control (NTC)	-
*2	DuraCor Fertilizer NPK	16 fluid ounces per acre (fl oz/A) 250 lb/A
*3	DuraCor Fertilizer NPK	20 fl oz/A 250 lb/A
*4	Milestone Fertilizer NPK	5.3 fl oz/A 250 lb/A
*5	Milestone Fertilizer	6.7 fl oz/A 250 lb/A
*6	GrazonNext HL Fertilizer NPK	25.6 fl oz/A 250 lb/A
*7	GrazonNext HL Fertilizer NPK	32 fl oz/A 250 lb/A
8	Escort NIS	0.5 oz weight/A 0.25% volume/volume
9	Milestone NIS	7 fl oz/A 0.25% v/v
10	Enlist One NIS	33.7 fl oz/A 0.25% v/v

*Numbers with asterisk indicate impregnated herbicide

Herbicide Application

Application Type	Broadcast foliar	Drop spreader pellet
Date	April 23 rd , 2021, 10:50am –11:00am	April 23 rd , 2021, 1:35pm – 2:15pm
Equipment	CO ₂ pressurized 10-foot boom sprayer (20 GPA)	Gandy Variable Rate Drop Spreader
Nozzles & spacing	Eight TeeJet 11002VS Nozzles	42" wide drop spreader, aperture calibrator dial set to 30
Regulator PSI	38	-



Weather Data

Weather Station	KWILANCA6
Temperature	50.2°F – 56.4°F
Wind Speed and Direction	7.5 mph S – 14.3 mph SSW
Relative Humidity	53% - 47%
Cloud Cover	100%
Previous Rain Event Within 48 Hours	None
When ≥ 0.25 inches of precipitation occurred after treatment	May 23 rd , 2021, 10:24pm – 0.4 inches

Research Plot Information

Plot Dimensions	10 feet by 25 feet
Design	Randomized Complete Block, 4 blocks
Soil Type	Fayette silt loam
Soil Characteristics	25.4% clay, 0.5% organic matter, 6.3 pH, 9% slope

Plants Present at Application – Developmental Stage

Species	Average Height (in)	Phenological Stage
Buttercup sp. (<i>Ranunculus</i>)	2.5	Vegetative (70%), flower bud (29%), flowering (1%)



Buttercup site
at application –
April 23rd, 2021.



Closeup of
buttercup
plants at
application –
April 23rd, 2021.
Flower buds
and flowers
present.

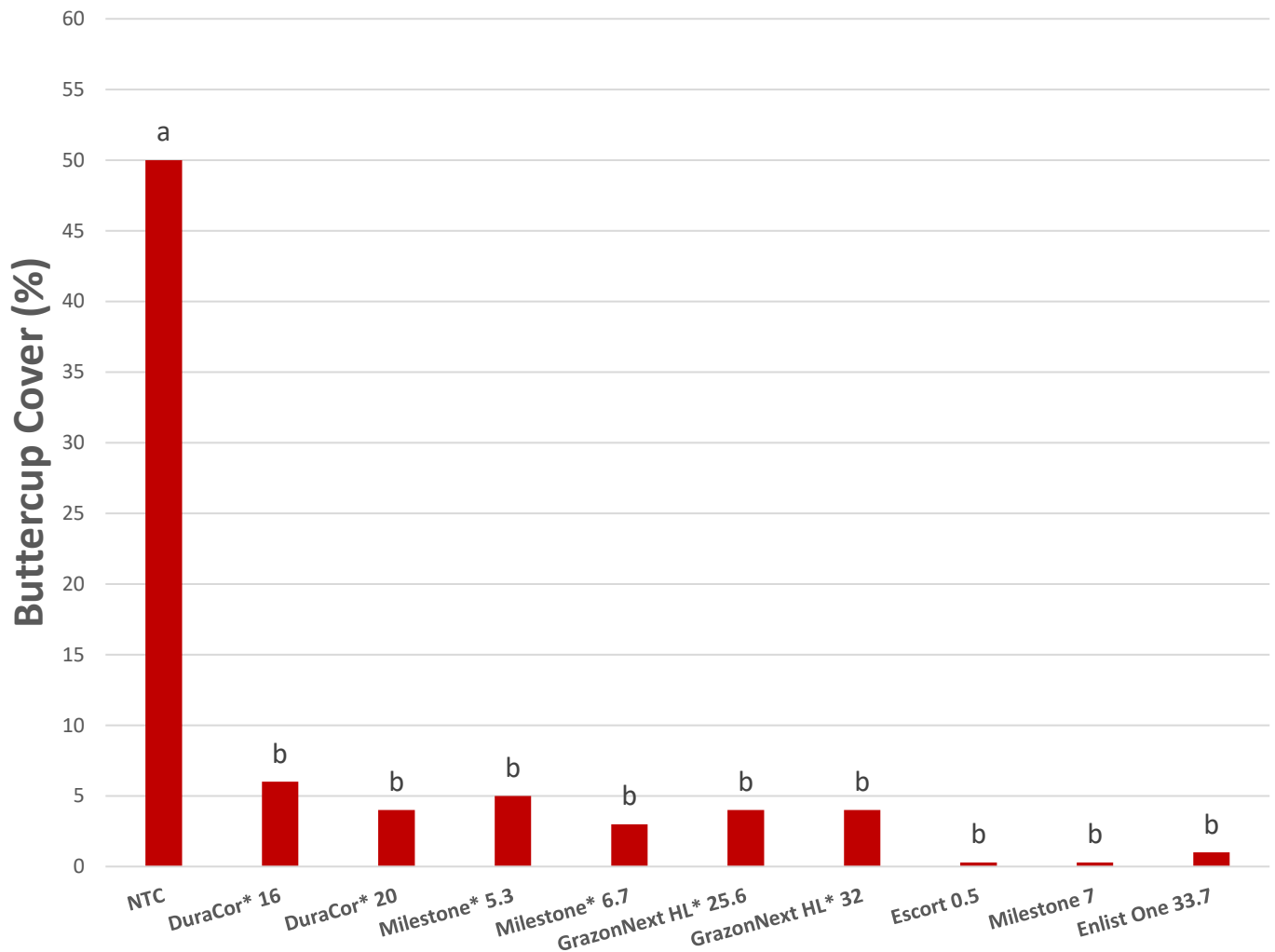


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Buttercup Cover 33 DAT May 26, 2021



Bars labeled with the same letter are not significantly different ($P=0.05$, LSD).

Results:

0 Days After Treatment (DAT) – April 23 rd , 2021						
Trt. No.	Treatment	Rate	Buttercup Cover (%)	Other Broadleaf Weeds Cover (%)	Grass Cover (%)	Bareground/ Litter Cover (%)
1	NTC	-	43 -	1 -	3 -	54 -
2	DuraCor*	16 fl oz/A	30 -	2 -	3 -	66 -
3	DuraCor*	20 fl oz/A	33 -	2 -	4 -	61 -
4	Milestone*	5.3 fl oz/A	31 -	2 -	6 -	61 -
5	Milestone*	6.7 fl oz/A	39 -	6 -	3 -	53 -
6	GrazonNext HL*	25.6 fl oz/A	21 -	3 -	11 -	65 -
7	GrazonNext HL*	32 fl oz/A	26 -	2 -	5 -	67 -
8	Escort	0.5 oz wt/A	25 -	2 -	10 -	64 -
9	Milestone	7 fl oz/A	35 -	1 -	2 -	63 -
10	Enlist One	33.7 fl oz/A	33 -	1 -	3 -	64 -
Statistics ¹						
Least Significant Difference (LSD) P=.05			17.29	4.96	9.35	17.94
Standard Deviation			11.92	3.42	6.45	12.36
Coefficient of Variation (CV)			37.83	173.16	130.89	20.07
Treatment Prob(F)			0.369	0.7188	0.4674	0.7926

* Treatments with impregnated fertilizer are indicated by an asterisk

¹ All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

18 DAT – May 11th, 2021

Trt. No.	Treatment	Rate	Butter-cup Injury (%)	Butter-cup Control (%)	Butter-cup Cover (%)	Other Broadleaf Weeds Cover (%)	Grass Cover (%)	Bareground /Litter Cover (%)
1	NTC	-	0 d	0 c	63 a	2 -	6 -	30 e
2	DuraCor*	16 fl oz/A	42 bc	0 c	44 ab	2 -	9 -	45 de
3	DuraCor*	20 fl oz/A	54 b	0 c	35 bc	4 -	13 -	49 cd
4	Milestone*	5.3 fl oz/A	32 c	10 bc	51 ab	3 -	14 -	32 de
5	Milestone*	6.7 fl oz/A	44 bc	13 bc	44 ab	11 -	10 -	36 de
6	GrazonNext HL*	25.6 fl oz/A	48 bc	0 c	36 bc	5 -	9 -	49 cd
7	GrazonNext HL*	32 fl oz/A	52 b	6 c	38 bc	3 -	10 -	49 cd
8	Escort	0.5 oz wt/A	83 a	29 b	21 cd	1 -	15 -	63 bc
9	Milestone	7 fl oz/A	96 a	89 a	5 d	2 -	7 -	87 a
10	Enlist One	33.7 fl oz/A	88 a	32 b	19 cd	1 -	9 -	72 ab
Statistics								
LSD P=.05			19.08	21.92	21.85	8.05	11.57	17.26
Standard Deviation			13.15	15.11	15.06	5.55	7.98	11.9
CV			24.52	84.87	42.48	169.31	78.98	23.25
Treatment Prob(F)			0.0001	0.0001	0.0005	0.3675	0.8403	0.0001

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

* Treatments with impregnated fertilizer are indicated by an asterisk



33 DAT – May 26th, 2021

Trt. No.	Treatment	Rate	Butter-cup Control (%)	Butter-cup Cover (%)	Other Broadleaf Weeds Cover (%)	Grass Cover (%)	Bareground /Litter Cover (%)	Buttercup Cover Reduction (%)
1	NTC	-	0 e	50 a	23 a-d	8 -	20 e	16.8 b
2	DuraCor*	16 fl oz/A	71 d	6 b	18 bcd	18 -	58 abc	71.0 a
3	DuraCor*	20 fl oz/A	88 a-d	4 b	34 ab	30 -	32 cde	88.0 a
4	Milestone*	5.3 fl oz/A	80 bcd	5 b	40 a	39 -	16 e	79.8 a
5	Milestone*	6.7 fl oz/A	95 abc	3 b	25 abc	22 -	51 bcd	94.8 a
6	GrazonNext HL*	25.6 fl oz/A	79 cd	4 b	38 ab	31 -	28 de	78.8 a
7	GrazonNext HL*	32 fl oz/A	86 a-d	4 b	35 ab	29 -	33 cde	86.0 a
8	Escort	0.5 oz wt/A	99 a	0.3 b	2 d	20 -	78 a	98.8 a
9	Milestone	7 fl oz/A	99 a	0.3 b	4 cd	20 -	76 ab	99.0 a
10	Enlist One	33.7 fl oz/A	96 ab	1 b	11 cd	10 -	78 ab	96.3 a
Statistics								
LSD P=.05			17.11	10.11	21.86	28.07	27.68	21.48
Standard Deviation			11.79	6.97	15.07	19.35	19.08	14.81
CV			14.89	92.02	66.09	85.43	40.61	18.3
Treatment Prob(F)			0.0001	0.0001	0.0059	0.459	0.0001	0.0001

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

* Treatments with impregnated fertilizer are indicated by an asterisk

389 DAT – May 17th, 2022

Trt. No.	Treatment	Rate	Buttercup Cover (%)	Other Broadleaf Weed Cover (%)	Grass Cover (%)	Bareground/ Litter Cover (%)	Buttercup Cover Reduction (%)
1	NTC	-	7 -	15 -	71 -	7 -	80.9 -
2	DuraCor*	16 fl oz/A	4 -	7 -	76 -	14 -	80.1 -
3	DuraCor*	20 fl oz/A	2 -	21 -	63 -	15 -	91.8 -
4	Milestone*	5.3 fl oz/A	2 -	16 -	75 -	8 -	93.5 -
5	Milestone*	6.7 fl oz/A	14 -	7 -	59 -	21 -	65.6 -
6	GrazonNext HL*	25.6 fl oz/A	4 -	11 -	68 -	18 -	78.5 -
7	GrazonNext HL*	32 fl oz/A	2 -	17 -	66 -	15 -	92.0 -
8	Escort	0.5 oz wt/A	17 -	0 -	73 -	10 -	66.7 -
9	Milestone	7 fl oz/A	13 -	1 -	70 -	17 -	63.6 -
10	Enlist One	33.7 fl oz/A	5 -	9 -	77 -	9 -	81.2 -
Statistics							
LSD P=.05			14.31	13.91	26.51	16.98	33.459
Standard Deviation			9.87	9.59	18.27	11.7	23.0199
CV			141.45	94.21	26.24	88.64	29.0
Treatment Prob(F)			0.2889	0.0747	0.9097	0.7781	0.5083

* Treatments with impregnated fertilizer are indicated by an asterisk