

Mowing Timing Doesn't Affect Common Broadleaf Herbicide Efficacy

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INTRODUCTION

Current recommendations from turfgrass extension publications and herbicide labels for systemic broadleaf herbicides are to withhold mowing two or three days before or after an application for maximum efficacy. However, professional applicators often have little control over mowing, or rarely restrict mowing after an application. The literature pertaining to mowing intervals and herbicide application is conflicted. Mann (1981) evaluated 2,4-D efficacy when dandelion (*Taraxacum officinale* F.H. Wigg.) leaves were cut off at the surface of the ground 14 days after application and suggested withholding mowing for >14 days after application for maximum control of dandelion. Beck et al. (2014) reported that the three mowing timings; mowing 30 min before herbicide application, 30 min after application, or not mowing for at least seven days prior to and at least three days after herbicide application did not impact herbicide efficacy on ground ivy (*Glechoma hederacea* L.). Similar results were also found on Canada thistle [*Cirsium arvense* (L.) Scop.] control in pastures (Beck and Sebastian, 2000). Additional research is required to confirm label recommendations and more precisely define mowing restriction recommendations.

OBJECTIVE

- To determine how mowing timing around an application affects the efficacy of an herbicide mixture (2,4-D + MCP-p + dicamba) commonly used for dandelion control in the Central Plains region.

TREATMENTS AND DATA ANALYSIS

- Experiments were initiated on mature Kentucky bluegrass (*Poa pratensis* L.) with a natural infestation of common dandelion on 11 Oct. 2016 at John Seaton Anderson Turf Research Center in Mead, Nebraska (NE) and 18 Oct. 2016 at Rocky Ford Turfgrass Research Center in Manhattan, Kansas (KS).
- Research plots (1.5 x 1.5 m) at both sites were maintained at 7.6 cm.
- Treatments were arranged in a 2 (herbicide) x 10 (mowing timing) factorial in a randomized, complete-block design with three replications at each site.
- Herbicide treatment levels were untreated or a single application of Trimec Classic (Trimec; PBI/Gordon Corp., Kansas City, MO; 1.1 kg 2,4-D a.e. ha⁻¹ + 0.3 kg MCP-p a.e. ha⁻¹ + 0.12 kg dicamba a.e. ha⁻¹) with a CO₂-pressurized boom sprayer equipped with XR TeeJet 8004VS flat-fan nozzles calibrated to deliver 203.9 L ha⁻¹ at 275.8 kPa.
- To test the effects of mowing timing on the herbicide application, plots were mowed at 7.6 cm 4, 3, 2, or 1 days before herbicide treatment (DBT), immediately before herbicide treatment (IBT), immediately after herbicide was dry following treatment (IAT), or 1, 2, 3, or 4 days after herbicide treatment (DAT).
- All plots were mowed weekly following treatment initiation.
- Percent cover of dandelion was visually estimated from 0 to 24 weeks after treatment (WAT) and then adjusted to percent dandelion control ([% dandelion cover at 0 WAT - % dandelion cover at each rating] / % dandelion cover at 0 WAT x 100).
- Dandelion coverage averaged 19 and 53% at 0 WAT in NE and KS, respectively.
- Site x treatment interactions were not significant; therefore data were pooled over locations, and subjected to analysis of variance using the GLIMMIX procedure of SAS (SAS 9.4, SAS Institute Inc., Cary, NC) with block as a random effect.
- Residual normality was tested with the w statistic of the Shapiro-Wilk test using the UNIVARIATE procedure of SAS 9.4 (Shapiro and Wilk, 1965), and raw data were arcsine square root transformed prior to analysis. Means were separated using Fisher's protected least significant difference test (P < 0.05), and transformed means were back-transformed for presentation.

RESULTS AND DISCUSSION

Neither the herbicide x mowing timing interaction, nor the main effect of mowing were significant at any rating date, but the main effect of herbicide was significant from 2 to 24 WAT (Table 1).

Table 1. Analysis of variance for the fixed effects of herbicide (H) and mowing timing (MT) on dandelion control pooled over sites in Nebraska and Kansas from 2 to 24 weeks after treatment (WAT).

Source	ANOVA [†]			
	2 WAT [‡]	4 WAT	8 WAT	24 WAT
Herbicide [§]	<.0001	<.0001	<.0001	<.0001
Mowing timing [¶]	0.3556	0.7151	0.5165	0.2425
Herbicide x mowing timing	0.8289	0.9976	0.4197	0.2466

[†] Dates for 2, 4, 8, and 24 WAT at Mead NE were 25 Oct., 8 Nov., 6 Dec. 2016, and 24 Apr. 2017, respectively. Dates for 2, 4, 8, and 24 WAT at Manhattan, KS were 2 Nov., 15 Nov., 14 Dec. 2016, and 8 Apr. 2017, respectively.

[‡] Raw data were subjected to the arcsine square root transformation to normalize.

[§] Herbicide treatments were Trimec Classic (PBI/Gordon Corp., Kansas City, MO; 1.1 kg 2,4-D a.e. ha⁻¹ + 0.3 kg MCP-p a.e. ha⁻¹ + 0.12 kg dicamba a.e. ha⁻¹) or untreated, applied with a CO₂-pressurized boom sprayer equipped with XR TeeJet 8004VS flat-fan nozzles calibrated to 203.9 L ha⁻¹ at 275.8 kPa 0 WAT on 11 Oct. 2016 at Mead, NE and 18 Oct. 2016 at Manhattan, NE.

[¶] Mowing timing treatments were mowing at 4, 3, 2, or 1 days before herbicide treatment (DBT), immediately before herbicide treatment (IBT), immediately after herbicide was dry following treatment (IAT), or 1, 2, 3, or 4 days after herbicide treatment (DAT).

RESULTS AND DISCUSSION

Averaged over mowing timings at 24 WAT, dandelion control was 81.6% in Trimec-treated plots, significantly more than in untreated plots (16.5%) (Fig. 1).

The lack of differences a significant mowing x herbicide treatment interaction, in addition to expected control from Trimec, regardless of mowing timing, indicates that herbicide applications were not affected by mowing timing treatments. Our results are similar to previous research where researchers concluded that sufficient leaf tissue remained after mowing to allow for herbicide absorption, translocation, and subsequent control of ground ivy (Beck et al., 2014). Therefore, we recommend following label instructions for maximum efficacy, but suggest that mowing from 4 DBT to 4 DAT with Trimec or similar systemic herbicides should not reduce the overall efficacy of an herbicide application as long as the turf's typical height of cut is consistently maintained.

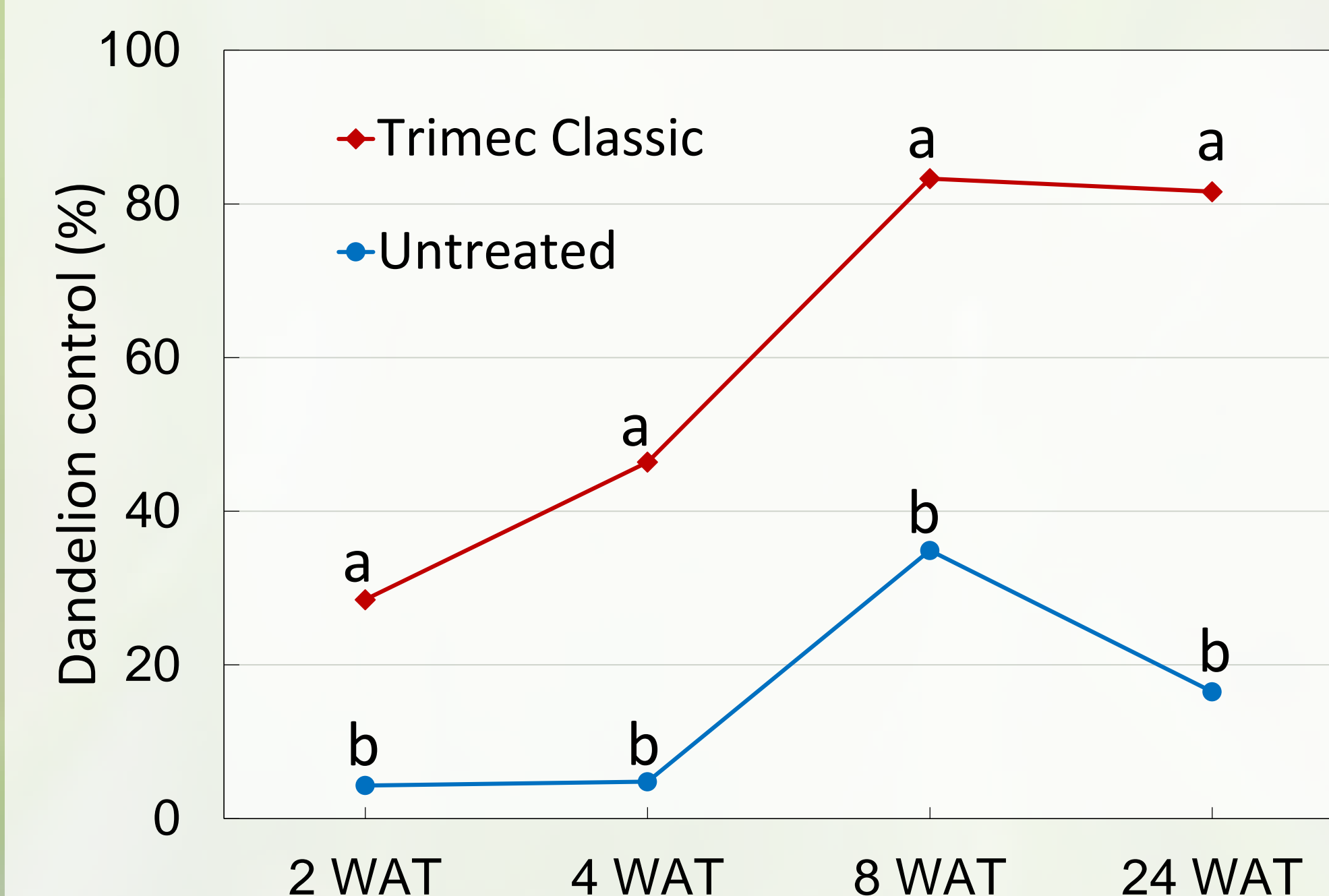


Figure 1. Effect of the main effect of herbicide (Trimec Classic (1.1 kg 2,4-D a.e. ha⁻¹ + 0.3 kg MCP-p a.e. ha⁻¹ + 0.12 kg dicamba a.e. ha⁻¹) on percent dandelion control from 2 to 24 weeks after treatment (WAT). Means are averaged over two sites, three replications, and 10 mowing timing treatments. Raw data were arcsine square root transformed prior to analysis. Means were separated using Fisher's protected least significant difference test (P ≤ 0.05), and transformed means were back-transformed for presentation. Within rating dates, means with different letters are significantly different according to Fisher's Protected LSD (P ≤ 0.05).

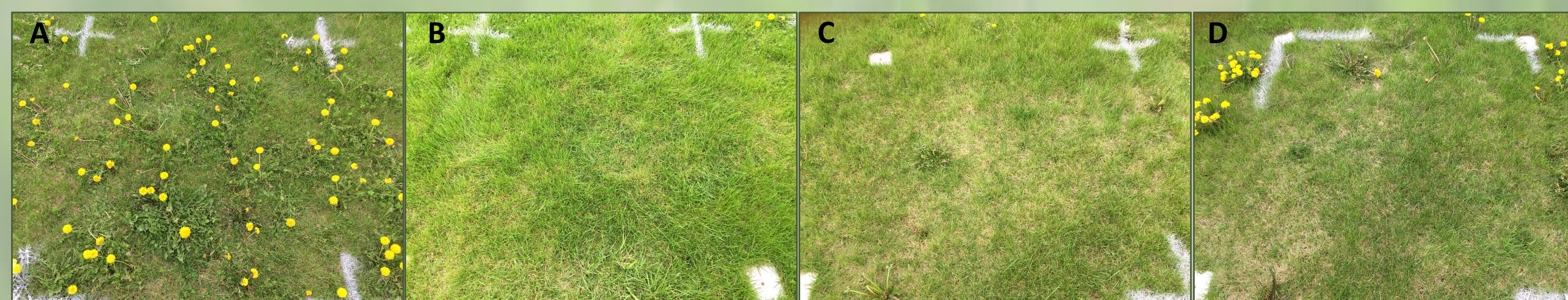


Figure 2. Effects of herbicide and mowing treatments on the efficacy of a fall application of *Trimec Classic* in Mead, NE at 24 weeks after treatment. A) representative of all untreated plots across all mowing timings; B) Trimec + mowed 4 days before herbicide treatment; C) Trimec + mowed immediately after herbicide was dry following treatment, and D) Trimec + mowed 4 days after herbicide treatment. There were no differences among mowing timings of 4 days before to 4 days after treatment with herbicide.

CONCLUSIONS

- Sufficient leaf tissue remained after mowing to allow for herbicide absorption, translocation, and subsequent control of dandelion.
- Mowing 4 days before to 4 days after herbicide treatment did not impact herbicide efficacy.
- Future research should be conducted to determine the amount of leaf defoliation required to reduce herbicide efficacy.

LITERATURE CITED

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