



Fall or Late Winter Applications of Preemergence Herbicides Rarely Provide Season-long Control of Crabgrass (*Digitaria* spp) in Nebraska

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FALL AND LATE WINTER applications of preemergence herbicides (PREs) for crabgrass control have been evaluated in Illinois (Fermanian and Haley, 1994), Pennsylvania (Reicher et al., 2011), Indiana (Reicher et al., 2011; Reicher and Throssell, 1993), and Maryland (Dernoeden, 1993). The authors generally concluded that fall and late winter applications provide season-long control with higher application rates in areas with low/moderate crabgrass pressure. Many of these studies used older formulations of current active ingredients. None of these studies were located in the northwest edge of the transition zone where cool-season grasses dominate because of winter survival, but summer temperature extremes can thin even irrigated cool-season stands. Our objective was to determine if fall or late winter applications of PREs can provide season-long control of crabgrass in Nebraska.

SITE DESCRIPTION AND MANAGEMENT

Identical studies were conducted over 3 years on adjacent plots at the University of Nebraska–Lincoln’s John Seaton Anderson research facility near Mead, NE. Soil was a Tomek silty clay loam with pH 7.3 and 3.5% organic matter. Experimental area was a 10+ year old Kentucky bluegrass/perennial ryegrass blend with 58 to 72% large crabgrass cover by August of each year. To encourage crabgrass, areas were mowed at 1.5 inches, unfertilized, and irrigated to prevent drought stress. Herbicides were applied to 5 × 5 ft plots using a CO₂-pressurized sprayer with three XR8002 VS. flat fan nozzles (TeeJet Spraying System, Wheaton, IL) at 2 gal/1000ft² and 30 PSI. Studies were conducted in 2010–2011, 2011–2012, and 2012–2013.

Three replications in a randomized complete block design were used each year. Experimental design was a 6 × 3 × 2 factorial with six application timings, three herbicides, and two rates each, plus an untreated control. Herbicides were applied on 5 October ± 6 days, 5 November ± 7 days, 6 March ± 7 days, 3 April ± 2 days, 2 May ± 2 days, or 2 June ± 4 days, using dithiopyr (Dimension 2EW) at 0.25 or 0.5 lb. a.i./acre,

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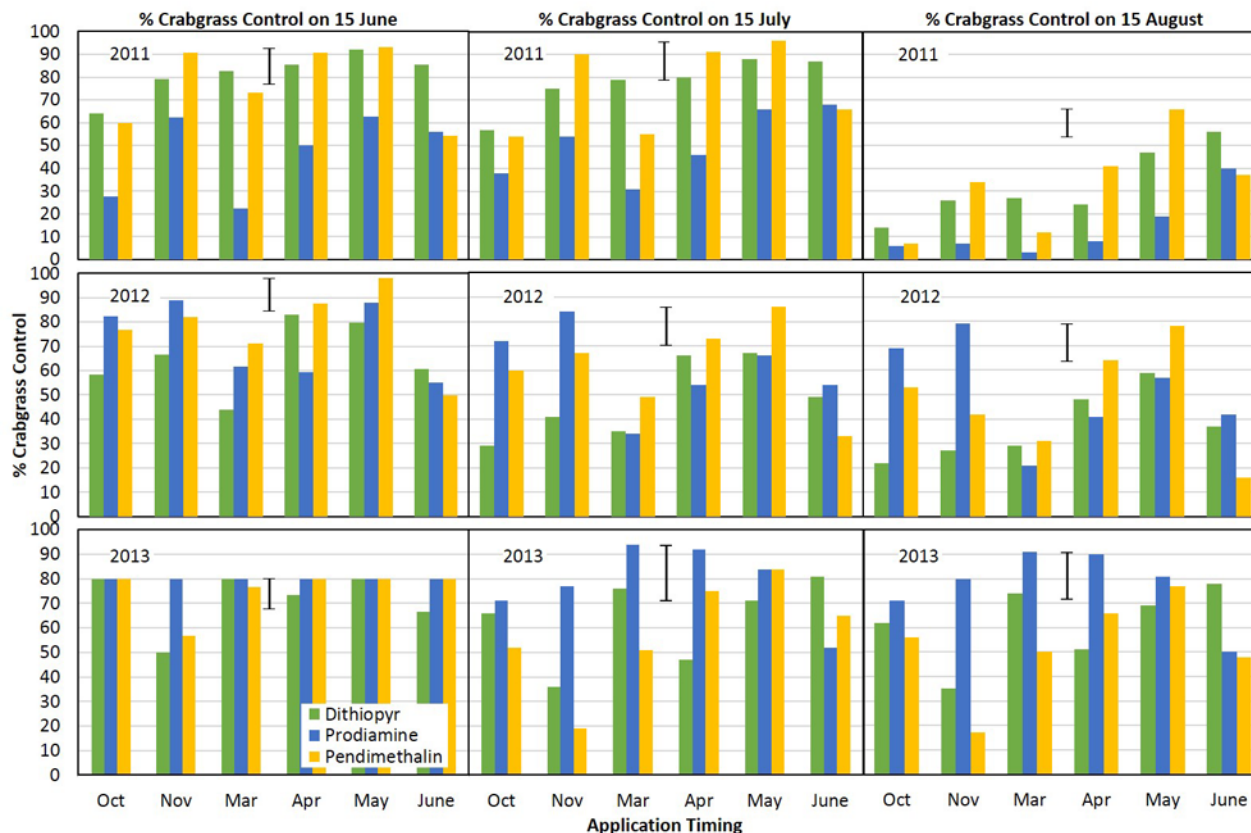


Figure 1. Percent crabgrass control rated in June through August following applications of preemergence herbicides applied in late fall and spring. Percent control in each replication as $\{[1 - (\text{percent crabgrass cover in treated plot} / \text{percent crabgrass cover in untreated plot})] \times 100\}$. Vertical bar indicates Fisher's least significant difference at $P \leq 0.05$. Values are means over two rates of each herbicide and three replications. Crabgrass germination began on the area the first week of May of 2011, last week of April 2012, and second week of May 2013.

proflaminate (Barricade 4FL) at 0.38 or 0.75 lb. a.i./acre, or pendimethalin (Pendulum AquaCap 3.8CS) at 1.5 or 3 lb a.i./acre. Within 24 h of application, herbicides were watered-in by rain or irrigation with at least 0.1 inch of water. Crabgrass percent cover was visually estimated in mid-June, mid-July, and mid-August. Data were converted to percent control in each replication as $\{[1 - (\text{percent crabgrass cover in treated plot} / \text{percent crabgrass cover in untreated plot})] \times 100\}$. Variance for each year was modeled separately using PROC GLIMMIX in SAS [need reference entry for SAS] to account for heterogeneous variance between years and data were combined over years for analysis. Mean separation used Fisher's least significant difference at $P \leq 0.05$.

PRE APPLICATION TIMING AFFECTS SEASON-LONG CRABGRASS CONTROL

The high rate of herbicides increased crabgrass control regardless of product or timing. Averaged over all 3 years, herbicides, and timings, the high rate provided 80% control of crabgrass in June while the low rate provided 64% (data not shown). Overall control decreased when evaluated in late summer where the high and low

rates produced 75 and 52% control in July, and 58 and 33% in August, respectively (data not shown).

Since there were no higher order interactions with herbicide rate, control means are averaged over rate. Additionally, significant year \times treatment interactions occurred and thus data are presented by year. No herbicide by timing combination was consistently in the top performing statistical group (TPSG) regardless of rating date or year. Rated 15 June, 29 of the 54 applications (3 herbicides \times 6 timings \times 3 years) were in the TPSG for crabgrass control (72–98% depending on year; Fig. 1). Averaged over rates, seven of the nine April or May applications were in the TPSG in the June rating, whereas four or less of each of the other application timings were in the TPSG. By the 15 July rating date, 21 of the 54 applications were in the TPSG (72–94%; Fig. 1). Five of the nine applications made either in April or May were in the TPSG, whereas a maximum of three applications from any of the other timings were in the TPSG. Only 14 of 54 applications were in the TPSG rated 15 August (55–91%; Fig. 1). Five of the nine May applications were in the TPSG, but only two of the nine applications made in any of the other months were in the TPSG. Interestingly, June applications of pendimethalin or proflaminate provided control similar to dithiopyr applied

on the same date, though dithiopyr is known to be more effective as a postemergence herbicide than the other two herbicides. Crabgrass germination on our site often continues well into June and July and thus PRE herbicides applied in June may limit later-germinating crabgrass.

RECOMMENDATIONS FOR CRABGRASS CONTROL WITH PREEMERGENCE HERBICIDES ON NORTHWEST EDGE OF THE TRANSITION ZONE OF THE U.S.

When using single applications of PREs, applying at the high rate will improve control regardless of application timing. Fall or late winter applications only occasionally provided adequate season-long control, but applying a single PRE application in April or early May maximized crabgrass control through August. This is different from

previous research in milder climates where fall or late winter applications often provided season-long control. Since crabgrass control rated in June was effective in over half of the herbicide × timing combinations, a sequential PRE application in early June should be considered if the initial application is applied in fall or late winter.

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