

# Mesotrione Kills Creeping Bentgrass in Kentucky Bluegrass

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## **Introduction**

Creeping bentgrass creates a dense, high-quality playing surface on golf courses, but often encroaches adjacent Kentucky bluegrass areas. Callisto, an herbicide produced and marketed by Syngenta containing the active ingredient mesotrione, provides preemergence and postemergence control of broadleaf and annual grassy weeds. Preliminary field trials show that mesotrione kills creeping bentgrass, but more information is needed regarding application protocol. Our research objective was to determine the affect of 1.) mesotrione rate and 2.) the number of applications on percent removal of creeping bentgrass from Kentucky bluegrass/bentgrass mixtures while monitoring overall turfgrass quality.

## **Materials and Methods**

Research was conducted at the Iowa State University Horticulture Research Station. Turfgrass was a mixture of 'Pencross' creeping bentgrass and an unknown cultivar of Kentucky bluegrass. Experimental design was a randomized complete block with three replications. Each plot measured 5 x 5 feet. Plots were irrigated daily and mowed at a height of 1.5 inches three times per week. On May 5 mesotrione was applied at 0, 0.0625, 0.125, 0.25, 0.5, 0.75, and 1.0 lb ai/A. An untreated plot served as a control. On June 17 six plots in each block received a second application at the same rates. During each application, Mesotrione was mixed with a non-ionic surfactant at 0.25% volume to volume ratio.

## **Results and Discussion**

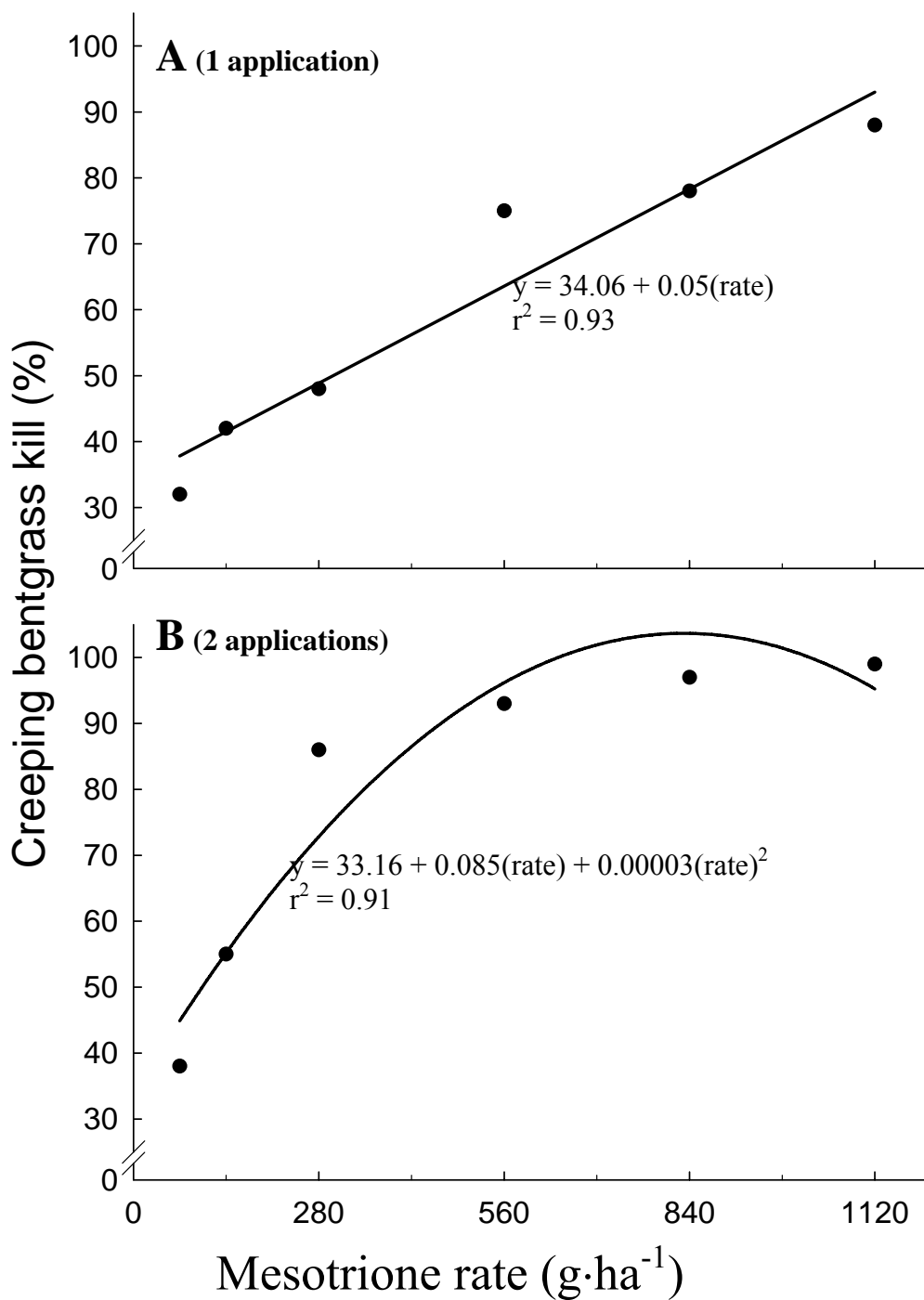
### *One Application*

One application of mesotrione killed 32% to 88% of the creeping bentgrass in Kentucky bluegrass (Fig. 1A). Applying mesotrione at 0.0625, 0.125 and 0.25 lb ai/A killed less than 50% of the creeping bentgrass. Conversely, applying mesotrione at 0.5, 0.75, and 1.0 lb ai/A resulted in 75% to 88% creeping bentgrass kill. Further analysis show that single applications of mesotrione at 0.5 lb ai/A were equally effective compared with rates of 0.75 and 1.0 lb ai/A. Currently, the label rate for maximum single applications of mesotrione is 0.3 lb ai/A. But, our research demonstrates that a single application of 0.3 lb ai/A would only kill 51% creeping bentgrass (Fig. 1A).

### *Two Applications*

Two applications of mesotrione at increasing rates of 0.0625 to 1.0 lb ai/A each, killed 38% to 99% of the creeping bentgrass in Kentucky bluegrass (Fig. 1B). Two applications of mesotrione at 0.0625 and 0.125 lb ai/A each, provided 38% and 55% creeping bentgrass kill, respectively. Two applications at rates of 0.25 lb ai/A and higher, provided greater than 86% creeping bentgrass kill with the highest rate resulting in 99% kill. Further analysis show that two applications of mesotrione at 0.25 lb ai/A each, were equally effective compared with rates of 0.5, 0.75, and 1.0 lb ai/A. Two applications of mesotrione at a rate of 0.25 lb ai/A each, killed 86% of the creeping bentgrass in Kentucky bluegrass (Fig. 1B). This rate of two split applications of 0.25lb ai/A each meets label use requirements while still providing effective control of creeping bentgrass in Kentucky bluegrass.

**Fig. 1.** Percentage creeping bentgrass kill in Kentucky bluegrass in plots receiving one (A) or two (B) applications of mesotrione at 0.0625, 0.125, 0.25, 0.5, 0.75, and 1.0 lb ai/A. The first application was applied 5 May 2004 and plots receiving a second application were treated again on 17 June 2004. Percentage creeping bentgrass kill was determined 5 Aug. 2004 using a modified grid.



**Overall Turfgrass Quality**

One and two applications of mesotrione at a rate of 0.25 lb ai/A and greater, reduced overall turfgrass quality 44% to 56% two weeks after final application but fully recovered six weeks later. However, plots receiving two applications of mesotrione at 0.25 lb ai/A each, recovered to acceptable levels one week after final application (data not shown). Reductions in overall turfgrass quality resulted from the lack of plant density once creeping bentgrass died. In areas where creeping bentgrass comprises a large percentage of mixtures, removal would create gaps in the canopy inviting weeds to colonize. Seeding Kentucky bluegrass, fescue species or perennial ryegrass rather than

simply allowing the established Kentucky bluegrass to fill this void may improve overall turfgrass quality faster. Further work is required to determine if mesotrione possesses preemergence activity on various cool-season turfgrass seeds.

**Table 1.** Mesotrione rate and number of applications affect overall turfgrass quality. The first application was applied May 5 and plots receiving two applications were treated again on June 17 2004. Plots were irrigated daily and fertilized with urea (46-0-0) at 1.0 lb N/1000 ft<sup>2</sup> on May 24 2004. Values represent means of three replications.

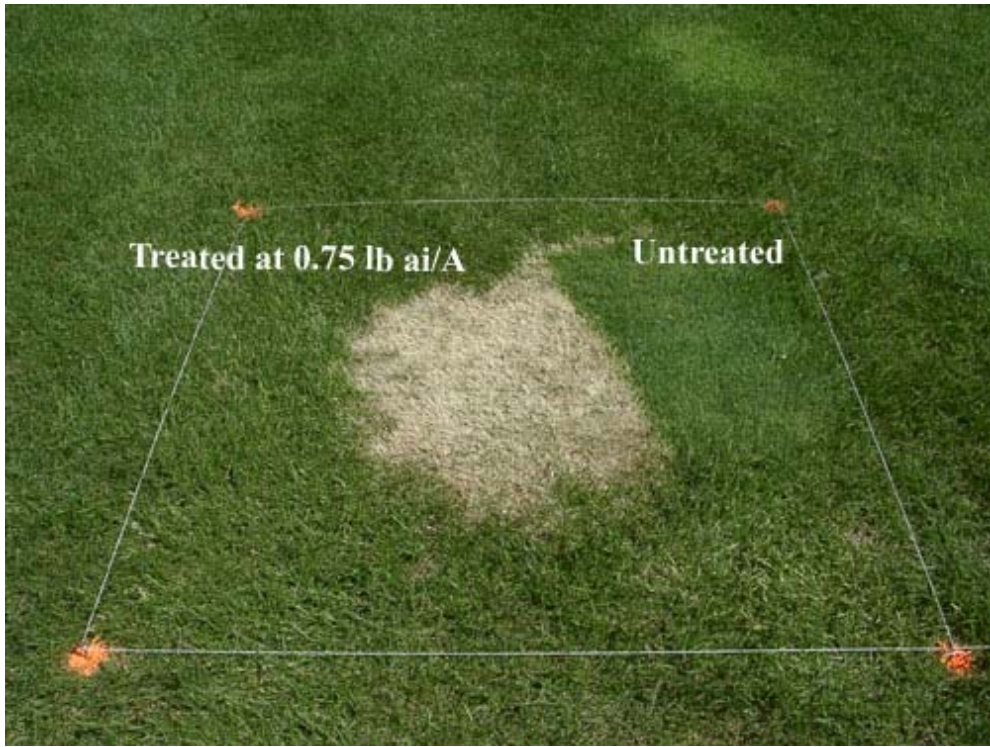
Rate (lbs ai/A)	One application						Two applications				
	Time after application (weeks)						Time after final application (weeks)				
	2	3	4	5	6	7	2	4	6	8	10
	Overall quality <sup>z</sup>						Overall quality				
Control	9a <sup>y</sup>	9a	9a	9a	9a	9a	9a	9a	9a	9a	9a
0.0625	8ab	8a	9a	9a	9a	9a	9a	9a	9a	9a	9a
0.125	7b	8a	9a	9a	9a	9a	7ab	9a	9a	9a	9a
0.25	5c	6b	8ab	8b	9a	9a	5bc	8a	9a	9a	9a
0.5	5c	6b	6bc	8b	9a	9a	5bc	7b	8b	9a	9a
0.75	4d	5bc	5cd	7c	8b	9a	4bc	7b	8b	9a	9a
1.0	4d	4c	4d	5d	6c	8a	4c	5c	5c	7b	9a

<sup>z</sup>Overall quality based on color, uniformity, and plant density was assessed visually on a 1 to 9 scale with 1 = poorest, 6 = least acceptable, and 9 = best.

<sup>y</sup>Means within column followed by the same letter are not different according to Fishers LSD<sub>0.05</sub>.



Close-up of creeping bentgrass damage receiving a single application of mesotrione at 0.75 lb ai/A. Kentucky bluegrass (center) was unaffected by the application.



Field plot demonstrating characteristic bleaching of plant tissue. Left half of creeping bentgrass patch received mesotrione at 0.75 lb ai/A. Right half was untreated. Adjacent Kentucky bluegrass was unaffected by the application.