

Tolerance of Kentucky Bluegrass to Mesotrione

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Introduction

Creeping bentgrass (*Agrostis stolonifera* L.) is a stoloniferous, cool-season perennial grass used predominately on golf course putting greens in temperate regions of the United States. Its use on golf course fairways is increasing steadily as new cultivars possess improved shoot density and disease tolerance. However, due to the aggressive growth habit of bentgrass, it often spreads into surrounding areas of Kentucky bluegrass (*Poa pratensis* L.) forming unsightly, scattered patches.

Mesotrione controls several grassy and broadleaf weeds including large crabgrass, goosegrass, nimblewill, ground ivy, common purslane, black medic, and dandelion. The herbicide acts by suppressing 4-hydroxyphenylpyruvate dioxygenase (HPPD). This leads to a reduction of carotenoids, resulting in the bleaching of plant tissues and subsequent death. Previous research indicates that mesotrione exhibits herbicidal activity on creeping bentgrass, but the tolerance of Kentucky bluegrass is not known.

The objectives of this research were to determine: 1) what rates of mesotrione are safe to Kentucky bluegrass, 2) if sequential applications of mesotrione are safe, and 3) if both spring and fall applications of mesotrione are safe.

Materials and Methods

The experiment was conducted at the Iowa State University Horticulture Research Station in 2005 on the Kentucky bluegrass Vantage. The research area was maintained at a 3 in. mowing height and received regular irrigation. Soil type

was a Nicollet, fine, loamy mixed Mesic-Aquic Hapludolls, with 3 ppm phosphorus (P), 98 ppm potassium (K), 4.4% organic matter, and a pH of 6.8. The trial was arranged as a randomized complete block with three replications. Plots measured 5 ft × 5 ft. Spring applications of mesotrione were applied on June 6, 2005, at 0.187, 0.25, 0.5, and 0.75 lb ai/acre. Three weeks later on June 27, 2005, three plots in each block received a second application of mesotrione at 0.187, 0.25, and 0.5 lb ai/acre. The procedure was repeated in the fall with initial applications made on September 1, 2005, and repeat applications on September 22, 2005. A backpack sprayer pressurized with carbon dioxide to 38 psi and equipped with TeeJet #8002 flat fan nozzles was used to make all applications. Total spray volume was 3 gallon/1000 ft². Turfgrass phytotoxicity was evaluated 7, 14, 21, and 28 days after each application on a scale of 1–9, with 1 the worst, 6 acceptable, and 9 the best rating.

Results and Discussion

Phytotoxicity was not observed on Kentucky bluegrass receiving single and sequential spring applications of mesotrione (data not shown). In addition, Kentucky bluegrass proved tolerant to fall applications of mesotrione except 7 days after the initial application. Phytotoxicity was observed on plots receiving applications of mesotrione at 0.5 and 0.75 lb ai/acre (Table 1). Phytotoxicity symptoms were located toward the leaf tips and were temporary, recovering to levels equal to untreated controls by 14 days after treatment.

Kentucky bluegrass appears tolerant of single and sequential applications of mesotrione in the spring and appears tolerant of fall applications of mesotrione at rates ≤ 0.25 lb ai/acre.

Table 1. Phytotoxicity of Vantage Kentucky bluegrass receiving one or two applications of mesotrione in the fall.

Rate (lb ai/acre)	Application date	Days after initial treatment							
		7	14	21 ¹	28	35	42	49	56
		Phytotoxicity							
0.25	Sept. 1	9a ²	9a	9a	9a	9a	9a	9a	9a
0.5	Sept. 1	6b	9a	9a	9a	9a	9a	9a	9a
0.75	Sept. 1	6b	9a	9a	9a	9a	9a	9a	9a
0.187	Sept. 1, Sept. 22	9a	9a	9a	9a	9a	9a	9a	9a
0.25	Sept. 1, Sept. 22	9a	9a	9a	9a	9a	9a	9a	9a
0.5	Sept. 1, Sept. 22	6b	9a	9a	9a	9a	9a	9a	9a

¹The second application was applied on Sept. 22, 21 days after the initial application.

²Means within columns followed by the same letter are not different according to Fisher's LSD_{0.05}.