Kansas Agricultural Experiment Station Research Reports

Volume 1
Issue 6 *Turfgrass Research*

Article 12

January 2015

Dose Responses of Silvery-thread Moss to Carfentrazone-ethyl

Z. Raudenbush
Kansas State University, zane12@k-state.edu

S. Keeley
Kansas State University, skeeley@ksu.edu

M. Jugulam
Kansas State University, mithila@ksu.edu

Recommended Citation

Raudenbush, Z.; Keeley, S.; and Jugulam, M. (2015) "Dose Responses of Silvery-thread Moss to Carfentrazone-ethyl," *Kansas Agricultural Experiment Station Research Reports*: Vol. 1: Iss. 6. https://doi.org/10.4148/2378-5977.1100

Turfgrass Research 2015

K-STATE TURFGRASS RESEARCH

JULY 2015

Dose Responses of Silvery-thread Moss to Carfentrazone-ethyl

Zane Raudenbush, Steve Keeley, and Mithila Jugulam

Summary. As compared with label recommendations, this research suggests that lower carfentrazone-ethyl rates and longer intervals may be effective for silvery-thread moss (STM; *Bryum argenteum* Hedw.) control in putting greens.

Rationale. Quicksilver® (ai carfentrazone-ethyl) has a supplemental label for STM control in bentgrass greens and tees. As of 2015, the label stipulates two STM control strategies: 1) for burndown and control of STM in bentgrass greens and tees, apply 112 g ai ha^{-1}, followed by a second application 2 weeks later at the same rate; and 2) for control over longer periods, applications may be repeated every 2 weeks at a rate no less than 33 g ai ha^{-1}. These rates are higher than those typically used for broadleaf weed control. It seems plausible that superintendents could potentially obtain sufficient STM control using lower rates of carfentrazone-ethyl.

Objectives. Determine the efficacy of POST applications of carfentrazone-ethyl at rates ranging from 1/8X to 2X (in which X = the approximate label rate of 112 g ai ha^{-1}) for control of STM.

Study Description. Growth chamber studies were conducted using an STM population collected from Rocky Ford Turfgrass Research Center in Manhattan, Kansas. Pots were filled with sand conforming to United States Golf Association (USGA) specifications. Dried STM shoot material was evenly spread over pots and allowed to establish for approximately 3 months. Once established, plugs of creeping bentgrass cv. 007 plugs were inserted through the STM gametophyte and into the sand substrate. Carfentrazone-ethyl was applied to pots using a track sprayer at rates of 0, 14, 28, 56, 112, and 224 g ai ha^{-1}. Percent gametophyte injury was visually estimated weekly for 11 weeks. Plants with necrotic gametophore tips were considered dead,

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

while green tips were considered healthy. A three-parameter log-logistic model estimated ED_{50} and ED_{90} values using the *drc* package in R (R Foundation for Statistical Computing, Vienna, Austria, 2014).

Results. At 28 days after treatment (DAT), 14 g ai ha^{-1} of carfentrazone caused 83% injury to STM gametophytes, which was significantly less than the > 97% injury caused by the 56, 112, and 224 g ai ha^{-1} doses (Figure 1). The estimated ED_{90} value for gametophyte injury at 28 DAT was 26.8 g ai ha^{-1}. At 49 DAT some recovery had occurred, and the 14 g ai ha^{-1} had only 50% gametophyte injury. The 112 and 224 g ai ha^{-1} doses had > 90% injury, which was significantly more than 14 and 28 g ai ha^{-1}, but not different than 56 g ai ha^{-1}. The ED_{90} value at 49 DAT was 54.3 g ai ha^{-1}, which was a twofold increase compared to the ED_{90} value at 28 DAT. Course superintendents spraying multiple applications at intervals up to 4 weeks should expect to see adequate control with the 28 DAT ED_{90} rate of 26.8 g ai ha^{-1}; while superintendents who make less frequent applications would benefit from the higher 49 DAT ED_{90} rate of 54.3 g ai ha^{-1}.

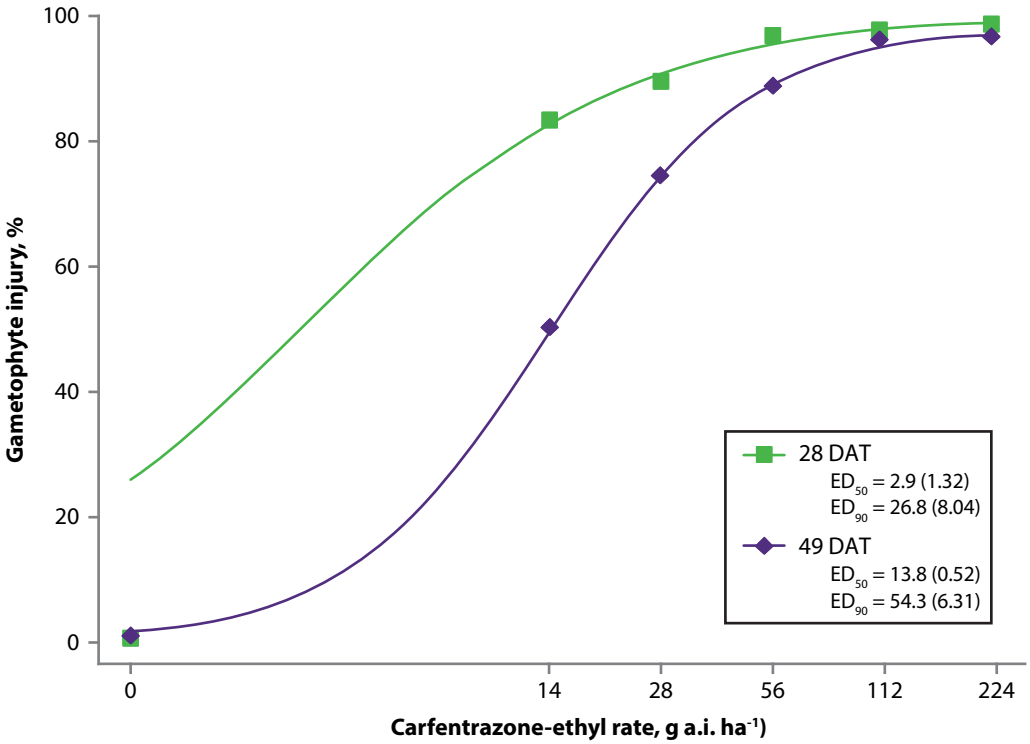

Figure 1. Percent silvery-thread moss (*Bryum argenteum* Hedw.) gametophyte injury, and ED_{50} and ED_{90} values, as influenced by carfentrazone application rate at 28 and 49 days after treatment (DAT). Values within parentheses are the standard error (±) for each ED value as predicted by the log-logistic model. The label rate for STM control in creeping bentgrass putting greens is 112 g ai ha^{-1}.

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service