

Evaluating combinations of Pyriproxyfen and imidacloprid for control of Japanese beetle larvae in Kentucky Bluegrass turf

Douglas S. Richmond, Timothy J. Gibb, Walter Baldauf, Andy Seiter and Autumn Nance
Department of Entomology, Purdue University

SUMMARY: This study was designed to compare the efficacy of imidacloprid and pyriproxyfen, alone and in combination, for control of Japanese beetle grubs in cool season turfgrass. It was determined that all treatments containing imidacloprid provided excellent levels of control (> 95% mortality). Pyriproxyfen alone provided acceptable levels of control (>70%) but only at the highest rate tested (0.22 oz product/1000 ft²). Further, Pyriproxyfen did not appear to significantly influence the activity of imidacloprid at either rate tested.

The primary objective of this study was to evaluate combinations of Pyriproxyfen and Imidacloprid for control of Japanese beetle larvae in Kentucky bluegrass turf.

MATERIALS AND METHODS

The experiment was located at the Nursery Complex at Purdue University (West Lafayette, IN) on a stand of turfgrass consisting primarily of Kentucky bluegrass maintained at 7.6 cm. Plots measuring 1.5 x 1.5 meters were arranged in a randomized complete-block design with 0.3 meter alleys between plots. Each treatment was replicated 4 times. All materials were applied using a hand-held CO₂ boom sprayer configured with four 8010 nozzles operating at 30 psi and calibrated to deliver a spray volume of 2 gal/1000ft².

Field conditions on the July 11 treatment date were:

- (1) Soil Temp: 27°C
- (2) Air Temp: 34°C

ADDITIONAL INDEX WORDS:

Efficacy tests, Pyriproxyfen, Imidacloprid, Interaction, Japanese beetles, grubs, Purdue University, Entomology, Turfgrass Insects

- (3) Weather: Partly Cloudy, wind 0-5 mph
- (4) Thatch: 1.0 cm

Japanese beetle larval infestations were created by driving three, 8" diameter pvc cylinders into each plot along its mid-line and caging two separate groups of 40 Japanese beetle adults (50:50 sex ratio) within each cylinder at two week intervals during July. At the time of caging, beetles were provided an apple wedge as a source of moisture and nutrition. Larval populations were assessed October 7, 2010 using a sod cutter to remove a strip of sod lying directly beneath the caging area of each plot and examining the soil to a depth of 3 inches. The number of Japanese beetle larvae were counted and recorded. Variation in Japanese beetle larval populations was examined using main effects ANOVA and treatment means were compared using Fisher's LSD test ($\alpha=0.05$).

RESULTS:

All treatments significantly reduced Japanese beetle larval densities compared to the untreated control and all treatments containing imidacloprid provided average levels of control in excess of 95%. Pyriproxyfen alone provided acceptable levels of control (>70%) only at the highest rate tested (0.22 oz product/1000 ft²) and pyriproxyfen did not significantly influence the activity of imidacloprid at either rate tested. However, 100% control of Japanese beetle larvae was only achieved by the treatment containing imidacloprid in combination with pyriproxyfen at the highest rate.

Purdue Turfgrass Science Program 2011 Annual Report

Table 1. Japanese beetle (JB) larval densities and percent control in plots of Kentucky bluegrass turf treated with various combinations of imidacloprid and pyriproxyfen. Applications made 11 July and evaluated 7 October. West Lafayette, Indiana 2011.

Treatment/Product	Rate (oz product/1000 ft ²)	JB larvae/ft² (±SE)	% Control
Untreated	---	26.8±4.3 c	---
QP Imidacloprid 2F	0.59	0.8±0.3 a	97.2
Pyriproxyfen EC	0.11	14.0±3.0 b	47.7
Pyriproxyfen EC	0.22	6.3±3.6 ab	76.6
QP Imidacloprid 2F Pyriproxyfen EC	0.59 0.11	1.3±0.9 a	95.3
QP Imidacloprid 2F Pyriproxyfen EC	0.59 0.22	0.0±0.0 a	100.0

*Values in same column followed by different letters are significantly different ($\alpha=0.05$)