

Influence of application timing on efficacy of granular formulations of grubicides against Japanese beetle larvae in Kentucky bluegrass turf

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SUMMARY: This study was designed to compare the efficacy of several currently available insecticides and times of application for the control of Japanese beetle grubs in cool season turfgrasses. All treatments studied significantly reduced white grub populations compared to untreated plots. Application timing (months) demonstrated no consistent influence on the efficacy of any of the materials used in this study.

The primary objective of this study was to describe the efficacy of various granular grub control formulations applied at different timings against Japanese beetle larvae.

MATERIALS AND METHODS

This 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. Two separate sets of untreated control plots were created. All test materials were applied using shaker jars and plots were irrigated (1-2 cm) immediately after each application.

Field conditions on the April 15 treatment date were:

- (1) Soil Temp.: 10°C
- (2) Air Temp: 6°C
- (3) Weather: Overcast, wind 5-20 mph
- (4) Thatch: 1.0 cm

ADDITIONAL INDEX WORDS:

Efficacy tests, GrubEx, Imidacloprid, Thiamethoxam, Japanese beetles, grubs, Purdue University, Entomology, Turfgrass Insects

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Field conditions on the May 10 treatment date were:

- (1) Soil Temp.: 15 °C
- (2) Air Temp: 20 °C
- (3) Weather: Cloudy, wind 5-7 mph
- (4) Thatch: 1.0 cm

Field conditions on the June 13 treatment date were:

- (1) Soil Temp.: 23 °C
- (2) Air Temp: 22 °C
- (3) Weather: Clear, wind 0-5 mph
- (4) Thatch: 1.0 cm

Field conditions on the July 1 treatment date were:

- (1) Soil Temp.: 23°C
- (2) Air Temp: 26°C
- (3) Weather: Overcast, wind 0-5 mph
- (4) Thatch: 1.0 cm

Field conditions on the July 11 treatment date were:

- (1) Soil Temp.: 33°C
- (2) Air Temp: 27°C
- (3) Weather: Partly Cloudy, wind 0-5 mph
- (4) Thatch: 1.0 cm

Field conditions on the September 1 treatment date were:

- (1) Soil Temp.: 11°C
- (2) Air Temp: 27°C
- (3) Weather: Cloudy, wind 5-7 mph
- (4) Thatch: 1.0 cm

Field conditions on the August 1 treatment date were:

- (1) Soil Temp.: 29°C
- (2) Air Temp: 36°C
- (3) Weather: Clear, wind 3-6 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. Larval populations were assessed October 6-7, 2011 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 white grub populations compared to untreated controls and all treatments provided excellent levels of control. Application timing appeared to have no consistent influence on the efficacy of any of the materials used in this study. There were no indications of phytotoxicity observed during any point in the experiment.

Table 1. White grub densities and percent control in plots of Kentucky bluegrass turf treated on different dates with granular white grub insecticides. White grub populations assessed October 7, 2011. West Lafayette, Indiana 2011

Product	Active Ingredient	Formulation	Rate (lb AI/A)	Application Date	Japanese Beetle/ft ² Mean(±SE)	% Control
Untreated #1	-	-	-	-	33.8±7.2 a	0
GrubEx	w/clorotraniliprole	10.08 GR	0.07	July 1	6.3±4.0 b	83.0
Meridian	thiamethoxam	.33 GR	0.04	Aug 1	6.8±5.5 b	80.0
Meridian	thiamethoxam	.33 GR	0.04	Sept 1	2.5±1.0 bc	93.3
Acelepryn GF	chlorantraniliprole	0.067GF	0.1	Apr 15	0.00±0.00 c	100.0
Acelepryn GF	chlorantraniliprole	0.067GF	0.1	May 10	2.00±2.00 c	92.2
Acelepryn GF	chlorantraniliprole	0.067GF	0.1	Jun 13	0.25±0.25 c	99.0
Merit GranFert	imidacloprid	0.2GF	0.3	Jun 13	0.00±0.00 c	100.0
Acelepryn GF	chlorantraniliprole	0.067GF	0.1	Jul 11	0.75±0.48 c	97.1
Merit GranFert	imidacloprid	0.2GF	0.3	Jul 11	0.25±0.25 c	99.0
Untreated #2	-	-	-	-	25.50±7.64 a	0

*Japanese beetle larval densities followed by the same letter are not significantly different ($\alpha=0.05$)