

**FIELD EFFICACY of NOVIFLUMURON and SPINOSAD
APPLIED to MOUNDS for CONTROL of the
RED IMPORTED FIRE ANT, *SOLENOPSIS INVICTA* BUREN
(HYMENOPTERA: FORMICIDAE)**

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INTRODUCTION

The benzoylphenyl urea insect growth regulator (IGR) noviflumuron and the fast-acting insect neurotoxicant spinosad were field tested separately and in combination to determine efficacy against the Red Imported Fire Ant (RIFA), *Solenopsis invicta* Buren. Two separate trials were conducted in three separate years (1997, 1998, and 2001) using corncob grit granulated baits. The 1997 trials were conducted in Florida and Georgia while the 1998 and 2001 trials were conducted in Georgia only. The 1997 trials were designed to determine the efficacy of noviflumuron as measured by a dose response. The 1998 trials compared three rates of noviflumuron to commercial standards. Trials conducted in 2001 compared combination treatments of noviflumuron and spinosad to commercial standards.

MATERIALS and METHODS

Each trial location was subdivided into areas containing 10 mounds each (one mound = one rep). The same treatment was applied to 10 mounds within an area to minimize possible confusion among treatment assignments due to the establishment of new mounds when colonies move. Bait was applied when the ants were actively foraging, when the ground and grass were dry, and when no rain was expected for at least 24 h. Efficacy of each treatment was based on the percentage of mounds that remained active. Ant activity was determined by probing each mound with a metal pin flag and mounds were evaluated as either 100% control or 0% control. Binary Logistic Regression was used for analysis of mound activity/inactivity utilizing MINITAB Release 12.2 statistical software. Specific bait treatments and application methods for each trial year were as follows. All trials included an untreated control.

1997

The treatments were noviflumuron at 0.03%, and 0.003%, and the commercial IGR product Award™* (1% fenoxycarb). Bait formulations were applied at a rate of 3 level tablespoons (T) per mound, and were uniformly distributed 3–4 feet around the base of the mound. The bait was not applied directly to the top of the mound. Each mound was evaluated 4, 8, and 12 weeks after treatment (WAT).

1998

The treatments were noviflumuron at rates of 0.022%, 0.11%, and 0.22%, spinosad at 0.015%, fenoxycarb at 1%, and the product Amdro™** (0.73% hydramethylnon). The formulations were

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applied at a rate of 4 level T per mound uniformly distributed on top of, and 3-4 feet around the base of, each mound. Mounds were evaluated 1, 2, 4, 8, 12, and 16 WAT.

2001

The treatments were 5 level T combinations of spinosad (0.015%) and noviflumuron (0.22%) at different ratios (80:20, 50:50, and 20:80) in comparison to spinosad (0.015%) alone at 5 T, hydramethylnon (0.73%) at 4 T, and the product Ascend™*** (0.11% Abamectin B1) at 6 T. The formulations were uniformly distributed on top of, and 3-4 feet around the base of, each mound. Mounds were evaluated 1, 3, 5, 8, 12, and 16 WAT.

RESULTS

The 1997 trial findings were that at 12 WAT, noviflumuron at 0.03% controlled 70% of mounds treated and was significantly better than noviflumuron at 0.003% (33.3% control), fenoxycarb at 1% (21.7% control), and the untreated control (6.7%). In the 1998 trial, results at 2 and 4 WAT showed spinosad to have the best control percentage with hydramethylnon the second best. By 8 WAT, the two high rates of noviflumuron, spinosad and hydramethylnon had similar rates of control at 70 – 85%. At 16 WAT, the two high rates of noviflumuron displayed a higher likelihood of controlling mounds as compared to hydramethylnon and spinosad, but overall there were no significant differences among the treatments with all significantly better than the untreated control.

Findings from the 2001 trial showed the 50:50 ratio of spinosad and noviflumuron to be the best treatment with 80% control noted at 5 and 8 WAT and 100% control at 12 and 16 WAT. At the conclusion of the trials (16 WAT), Abamectin B1 (0.11%) showed 75% control and hydramethylnon and spinosad alone exhibited 55% control. The other spinosad/noviflumuron combination treatments gave 70% control (80:20 ratio) and 85% control (20:80 ratio) respectively (Figure 1).

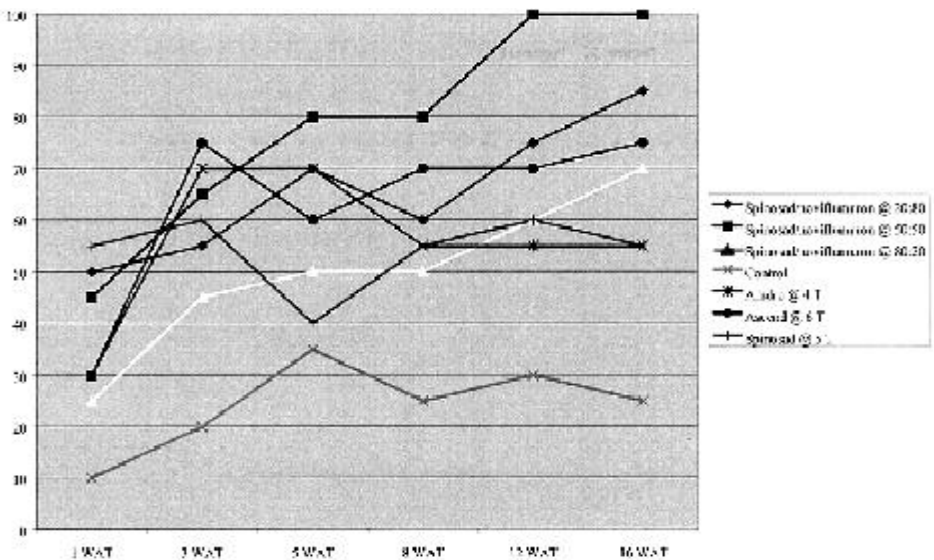


Figure 1. Percent RIFA mound control comparing the treatments from the 2001 trial.

*** Ascend™ is a trademark of Whitmire Micro-Gen

Findings from these trials show the IGR noviflumuron to be a slow-acting but very good RIFA bait active ingredient giving long-term control. A comparison of control from the 1998 and 2001 trial (Figure 2) shows that the 50:50 ratio combination treatment of spinosad and noviflumuron gave similar fast-acting control to spinosad alone and also had the added benefit of long-term activity.

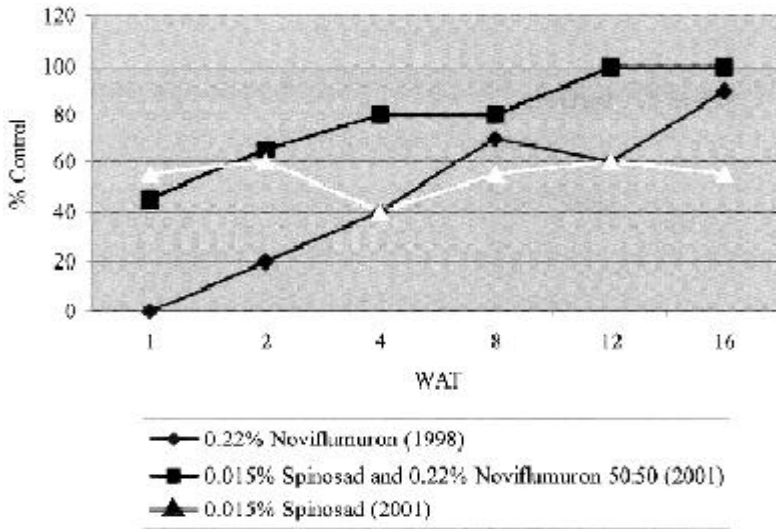


Figure 2. Comparison of percent RIFA mound control for noviflumuron (0.22%) alone from 1998 trial to combination treatment spinosad (0.015%)/noviflumuron (0.22%), 50:50 ratio and spinosad (0.15%) alone from 2001 trial. Noviflumuron in combination with the fast-acting spinosad had the advantage of quick control with overall long-term activity.