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URBAN, INDUSTRIAL, AND STRUCTURAL PESTS

FIELD EVAULATION OF INSECTICES FOR WESTERN DRYWOOD TERMITE CONTROL, 2009

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Western drywood termite: *Incisitermes minor* (Hagen)

Six insecticides were tested for their effectiveness against natural field infestations of *I. minor* found in homes and commercial structures from fourteen cities from Jun 2008 to Jun 2009. Boards were determined active for drywood termites using a portable acoustic emission (AE) device (Termite Tracker, Dunegan Engineering, Midland, TX) that detects termite feeding. The Bora-Care was diluted 1:1 with water to a 23% DOT final solution. The Optigard ZT was prepared according to the label directions at a 15:1 expansion ratio for a final thiamethoxam concentration of 0.1%, and applied with the Optigard ZT Foamer Kit. The Premise foam (0.05% imidacloprid) came as ready-to-use foam in a pressurized aerosol can equipped with an applicator tip. The Termidor® SC was injected as an aqueous preparation at 0.125% final solution. The Tim-bor was mixed with water to a final 15% DOT solution. The XT-2000 was injected directly from the container into treated boards. All chemical treatments were randomized. In addition, two untreated checks were included in the study: treatments with water and no treatment. In total there were eight treatments, each replicated at least four times, and all were randomly assigned. Label instructions were followed and a State licensed structural pest control company conducted all applications. All boards receiving chemical treatments were drilled and treated. Author should either use metric This process included drilling two diagonal holes (3.2 mm dia) spaced approximately 10-mm apart, down the entire length of the board. Pre- and post-treatment AE counts per minute were compared for all treatments. Post-treatment evaluations included visual searches of boards for signs of re-infestations (pellets, termites, and wings) and use of AE equipment to take three one-minute recordings from the same boards that underwent pre-treatment investigations. Differences between pre- and post-treatment mean AE counts, mean holes drilled, and mean amount of pesticides injected among treatments were conducted using ANOVA and pair-wise comparisons among treatment means using Tukey's test.

The results for the field study are presented in Table 1. The average number of drilled holes varied from 34 to 91 among treatments, and was significantly different ($F = 3.4$; $df = 6, 16$; $P < 0.01$). The number of drilled holes for Tim-bor was about three-fold less than for other products. The amount of pesticide applied also varied among products used (Table 1). Under field conditions, the average amount of product applied for treatments ranged from 177 to 680 ml, roughly a four-fold difference. However, the only significant difference in the amount of material applied was for the untreated checks, which did not receive any treatment. The efficacy of products among treatments when compared to untreated checks was unremarkable after the 3-month post-treatment inspection (Table 1). With the exception of Tim-bor and the untreated checks, products demonstrated at least a 90% reduction in AE counts post-treatment. However, the reduction in AE counts, as measured by the change between pre- and post-treatment AE counts, was not significantly different when compared to the water injected boards and untreated checks ($F = 1.07$, $df = 7, 35$; $P > 0.40$). Our field results suggest local treatments are limited in what can be expected of their field performance; better results when treating exposed, accessible boards and worse results when infestations are concealed or inaccessible. With current AIs and limited drywood termite field detection technologies and capabilities, local treatments are better served to consumers when packaged as a control service agreement.

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TABLE 1.

Treatment (AI - %)	Number of Replicates[a]	Number of drilled holes (Mean ± SD)	mL injected (Mean ± SD)	Pre-treat AE counts/min (Mean ± SD)	Post-treat AE counts/min (Mean ± SD)	Mean % reduction in AE counts/min
Bora-Care® (DOT - 23%)	6	85 ± 42ab	296 ± 177a (10 ± 6 fl oz)	53 ± 48a	5 ± 8	-92a
Optigard ZT (Thiamethoxam - 0.1%)	6	91 ± 17a	325 ± 237a (11 ± 8 fl oz)	71 ± 111a	2 ± 2	-97a
Premise Foam® (Imidacloprid - 0.05%)	4	58 ± 40ab	177 ± 177a (6 ± 6 fl oz)	43 ± 17a	2 ± 1	-96a
Termidor® SC (Fipronil - 0.125%)	7	90 ± 44ab	355 ± 207a (12 ± 7 fl oz)	43 ± 40a	2 ± 2	-96a
Tim-bor® (DOT - 15%)	4	34 ± 17b	355 ± 325a (12 ± 11 fl oz)	131 ± 71a	30 ± 32	-78a
XT-2000 (*d*-limonene - 92%)	5	91 ± 54ab	325 ± 148a (11 ± 5 fl oz)	104 ± 119a	7 ± 8	-94a
Water only[b]	4	44 ± 19ab	680 ± 591a (23 ± 591 floz)	77 ± 29a	6 ± 7	-93a
Untreated[b]	7	n/a	n/a	47 ± 35a	34 ± 50	-29a

Means in columns with the same letter are not significantly different level (P > 0.05) using Tukey's test (SAS Institute 2008).
[a]A total of 43 field replicates from 14 cities, including Northern and Southern California, and the Central valley were used in this study.
[b]Untreated checks included water injection and untreated.