Product Performance Data Evaluation Review
by Kevin J. Sweeney, Entomologist
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Reviewer: Ann Sibold

PM: Joseph Tavano. Acting PM 10

EPA Reg. or File Symbol: 264-EUP-121, 432-EUP-4 and 432-900 and 901.

Products: Termidor 80WG and SC, respectively.

Action code: 305

Submissions: S614192, S614195

DP: D282432, D282436

Chemical: fipronil applied at various end-use dilutions.

Use pattern and site: Indoor and outdoor residential. Termidor was applied as a soil termiticide to the exterior perimeter of a structure and as an indoor spot treatment. Aventis defined a Termidor exterior perimeter only applications as: "a structure receiving a complete, whole-building exterior perimeter (soil) application, with no interior (space) drilling with the possible exception of bath traps, spot treatments to live termite areas, and the drilling and rodding of attached slabs abutting foundation walls." For clarification, living space areas are defined as "interior" areas. Crawl spaces, plenums, and garages are not interior spaces.

Application rate: 4 gallons of end-use dilution per 10 linear feet per foot of depth. Rodding and trenching were used. Trenches were 6 inches deep by 6 inches wide.

The registrant submitted an interim report for this new application pattern. "New" is used to describe this use pattern because this use pattern does not appear on any of the EPA registered soil termiticide product labels.

Reviews of Submitted studies:

MRID 45635101 Overview of Termidor Exterior Perimeter Efficacy Data 1997-2001 by A. Krygsman.

MRID 45635102 Exterior Targeted Liquid Termiticides: An Alternative Approach to Managing Subterranean Termites (Isoptera: Rhinotermitidae) in Buildings. A.E. Hillary and M. Potter.

This study is in the form of a published article from the Journal Sociobiology and summarizes research done on 12 infested structures. Termidor was applied as an exterior perimeter treatment to each structure. Data were collected from 1999-2001. Comparisons were made to Premise termiticide. Results indicated that the applications were effective and eliminated termites in the infested structures as well as most of the monitoring stations. Some, if not all treated structures, were done as part of the Aventis EUP program.

MRID 45635103 Performance of Termidor Brand Fipronil Applied as an Exterior Perimeter Treatment for Termite Control: Results of Research Conducted during 1997-2000 by K. Kukorowski.

This volume provided an overview of the EUP program results from treated structures in 19 states. Approximately 150 structures were exterior only treatments. A variety of construction types were treated. The registrant does not know if all structures received an interior bath trap treatment. The length of the data collection period for the treated structures was four years (1), three years (39), two years (25), and one year (85). About two-thirds of the treatments were made at the 0.06% dilution, while the remaining third received the 0.0125% dilution. However, some structures were treated with Termidor SC at the 0.09% rate according to submitted data tables. The number of retreatments was only one, equal to 0.67% of the exterior perimeter treatments.

Treatments were made with the 80WG formulation and with a formulation identified as 0.8SC and not the 9.1% SC formulation currently registered.

MRID 45635104 Performance of Termidor brand Fipronil Applied as an Exterior Perimeter Treatment for Termite Control. Results of Research EUPs (EPA Reg. No. 432-EUP-4 for Termidor SC and 264-EUP-121 for Termidor 80WG), 2001-2002 by K. Kukorowski.

This volume presents results from the current EUP with Termidor SC and the results from the EUP extension for Termidor WG. Treatments were made to 88 infested structures with a variety of construction types in 16 states. Summaries can be found in the study on pages five to six.

Seventy-five structures were treated with Termidor SC in 2001, while 10 were treated with Termidor WG, for a total of 85 structures with an exterior perimeter only treatments. Most of the structures were treated with the 0.06% dilution, however, 0.09% and 0.125% dilution treatments were also made with Termidor SC. Three other structures in Texas were also treated but the formulation used is not known. As of March 2002, all treated structures were free of termites. In 2002, Aventis (Bayer) plans to add about 100 more structures to the EUP program.

MRID 45635105 The Performance of Termidor Applied as an Exterior Perimeter Treatment for Termite Control in Commercial Use. Volumes 1-4 by N. Hamon.

These four volumes summarize 1,824 Termidor exterior treatment applications made by Pest Management Professionals in the United States. Eighty-six percent of the applications were made to structures infested with termites. All treatments are considered post construction applications. These data were provided by PMPs from 21 states. Aventis estimates that of the 300,000 structures treated with Termidor termiticide, about 15,000 have received only an exterior perimeter application. The reinfestation and retreatment rates have been less than 1%.

I spoke to Adrian Krygsman on December 3, 2002. Adrian indicated that the product identified by Dr. Nick Hamon as Termidor 0.8 SC was incorrect. Instead, the entry should simply read Termidor SC. The U.S. Termidor SC formulation is 9.1% fipronil while the European SC formulation is 0.8% fipronil. The dilutions stated in these reports are correct.

I have some comments about these results: 1) the number of gallons applied varies greatly, indicating that some of the reported treatments are merely spot treatments. Some structures have received as little as 25 gallons of end-use dilution. This is too little end-use solution if the exterior perimeter treatment was made as directed by the label, where 4 gallons of end-use dilution per foot of depth per 10 linear feet are applied; 2) it is not clear if the attached garages were treated when present; 3) the currently registered Termidor SC and Termidor 80WG labels require a complete treatment, not a partial or exterior only perimeter treatment. Apparently, many states have allowed this use pattern provided consumers are informed. This application type is less than is required by the Federal label; 4) despite the above facts, PMP testimony supports the exterior perimeter use pattern.

MRID 45635106 Interim Technical Report Soil Residue Behavior of Fipronil following Perimeter Application of Termidor Termiticide by K. Essig.

This volume is a collection of soil residue data from: 1) Aventis field plots in AZ, CA, FL, and NC; 2) USDA-FS concrete slab (five years) and ground board tests (three years); 3) Aventis experimental station plots in Clayton, NC; 4) three of the EUP exterior perimeter only houses from South Carolina (four years). The data collected from the USDA-FS was from the Termidor WG and Termidor EC plots only. No data were collected from the Termidor SC plots. The

registrant needs to collect and submit these data.

Soil residue analyses included detection of all termiticidal fipronil metabolites (fiproles). Models were presented for soil dissipation from trench applications. However, the author did not reference methods previously accepted by the EPA to determine the environmental fate of fipronil and its metabolites in soil. Therefore, we do not know if an EPA accepted residue detection method was used or if the method and model discussed in this study are novel and applicable only to soil applied termiticides. The registrant needs to comment on the acceptability of this method. The analytical method is described in the study's appendix.

In summary, the data showed that fipronil could be detected in soils for up to five years after treatment. The pH of the soil appears to affect the level of fipronil over time. Generally, when compared to acidic soils, fipronil and its active metabolites degrade faster in alkaline soils (Arizona). Results showed that fipronil concentrations varied in the standardized USDA-FS and AES plots, but that the mean residue level is about 1.83 ppm five years after treatment in the concrete slab test.

The study below describes the soil concentration of fipronil necessary to kill termites.

MRID 45635107 LC50 and LC90 Determination of Fipronil Using Eastern Subterranean Termites by K. Morris.

This study is a compilation of laboratory bioassays done with fipronil treated soils against the Eastern subterranean termite, *Reticulitermes flavipes*. All termite exposures were continuous. One report in this volume summarizes results from AES bioassays where soil (80% sand: 20% peat moss) was treated with known quantities of fipronil. Treatments ranged from 0.006 ppm to 60 ppm in petri dish assays. In the second report, bioassays were conducted with soils collected 4.25 years after application of Termidor to EUP homes in South Carolina, and with soils collected 4.5 years after application to the ground board and concrete slab test plots in Clayton, NC. Termidor treatments consisted of 0.0625% end-use dilution applications made to homes and 0.3% end-use dilution applications made to the GB and CS test plots.

None of the assays were designed to determine the LC100 or LT100. Instead, assays were conducted for up to 7DAT and % mortality was measured for each soil applied concentration at 24 hour intervals. Termite mortality in the control replicates was very low. The LT values were as follows:

Target Rate (fipronil ppm)	LT value
60 ppm	LT100 = 96 hours (4DAT)
6.0 ppm	LT100 = 96 hours (4DAT)
0.6 ppm	LT100 = 168 hours (7DAT)
0.06 ppm	LT94.5 at 7DAT.
0.006 ppm	LT92.5 at 7DAT

The LC values were as follows:

LC value	3DAT	5DAT	7DAT
LC50	0.65 ppm	0.18 ppm	0.11ppm
LC90	3.9 ppm	0.67 ppm	0.61 ppm

The 95% confidence intervals for the mean values above were large. Graphs of the probit analyses were not provided. Future reports should include the graphs. Chi-square values should be provided from the computerized analyses.

Data were not included on the effect of fipronil on termites following their tunneling through treated soils. Some of these data were submitted in earlier studies and should be cited in support of this new use pattern.

Entomologist's Recommendations:

1. The data from the Termidor EUPs indicate that, to date, the exterior perimeter application has been successful in eliminating termites from infested structures. Data from the upcoming 2003 submission should be reviewed before any decision regarding registration of this use pattern can be made.

2. Treatments to attached garages, crawl spaces, and plenums should be required as part of this use pattern. Spot treatments to a termite infested area inside the structure should also be required and these treatments should include below slab applications and wall void applications with dry

foam solutions.

3. More soil residue data need to be collected from Termidor treated EUP homes.

4. Bioassay data should be cited or submitted to determine the LC100 and LT100 from fipronil treated soils against both *Reticulitermes flavipes* and *Coptotermes formosanus*. Testing should be conducted that includes the effect of termite tunneling on LT and LC values.

5. If Bayer Environmental Science proposes to label Termidor for the exterior perimeter use in Hawaii, where termites consist of *Coptotermes formosanus*, Hawaiian data should be collected, submitted and reviewed.

6. The most recent USDA-FS results from Termidor treated plots must be submitted.

7. Graphs of probit and/or regression analyses, where applicable, should be submitted.

8. Bayer Environmental Science must explain the results of the many spot treatment homes. Are these results demonstrating the effect of a spot treatment on a localized termite population or the effect of an exterior perimeter treatment on a termite population established in an infested structure? The goal of the EUP was to test the latter. We already know that a spot treatment can kill a small localized population of termites infesting a structure from a location adjacent to the foundation.

9. The use of unlabeled treatments in non-EUP, although allowed by many states, does not appear to conform to the EPA approved labeling where a complete treatment is required for a post construction treatment of an infested structure.

10. Explain what effect treating nearly every home in a community located in Arizona has the experimental use permit results for the exterior perimeter application. If fipronil treatments do have an area-wide effect, how might this impact desert termite populations? The termite distribution was not determined before the test was conducted.