

USDA-FS Termiticide Report Termiticide Efficacy Results for 2008

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The United States Department of Agriculture Forest Service (USDA-FS) evaluates candidate termiticides for federal and state registration. In 2008, the USDA-FS administered 33 agreements with product manufacturers as part of its ongoing Termiticide Testing Program.

Two termiticides were installed at the four national test sites in Florida (February), Arizona (April), Mississippi (June), and South Carolina (September). A third termiticide was installed in Mississippi and South Carolina. The number of

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Table 1. Number of years that termiticides remained effective in concrete slab (CS) and ground board (GB) tests at four field sites applying the EPA guideline and Florida efficacy rule.[†] Fractions of years occurred when products were installed out of cycle. Control = percentage of all untreated plots attacked over the life of the study.

% A.I.	Test	Arizona		Florida		Mississippi		South Carolina		FL SE States
		EPA	FL	EPA	FL	EPA	FL	EPA	FL	
Bifenthrin – Biflex TC (est. 1986)										
0.031	CS	0	9	4	11	2	5	2	4	4
0.062††	CS	16	16	22	22	7	7	10	16	10
0.125††	CS	10	15	9	22	2	7	22	22	9
0.25	CS	22	22	22	22	16	17	22	22	22
0.5	CS	6	22	22	22	18	22	22	22	22
0.031	GB	6	7	4	5	2	2	3	4	4
0.5	GB	10	11	14	21	12	15	8	11	14
Control	CS	52%		67%		52%		62%		-
Control	GB	67%		85%		77%		86%		-
Cypermethrin (est. 1982)										
0.125	CS	1	4	0.5	1.5	1	3	2	2	2
0.25††	CS	4	4	10.5	12.5	3	5	4	4	4
0.5††	CS	4	5	4.5	9.5	7	14	12	12	11.5
1.0	CS	8	10	7.5	21.5	6	15	12	16	15
1.0	GB	3	6	4.5	4.5	5	5	5	6	5
Control	CS	62%		65%		56%		65%		-
Control	GB	74%		76%		87%		90%		-
Permethrin – Dragnet (est. 1978)										
0.25	CS	8	10	2	2	1	2	0.5	0.5	1
0.5††	CS	13	19	4	4	5	6	4.5	4.5	4.5
1.0††	CS	15	15	15	25	5	8	10.5	11.5	10.5
1.0††	GB	9	11	6	6	2	3	0.5	3.5	3
Control	CS	50%		55%		60%		53%		-
Control	GB	43%		78%		86%		84%		-
Permethrin – Torpedo (est. 1980. Controls same as cypermethrin)										
0.25	CS	9	9	3	7	2	2	0.5	0.5	1.5
0.5††	CS	11	13	6	9	3	5	1.5	4.5	5
1.0††	CS	19	28	25	27	3	7	6.5	7.5	7
0.5††	GB	4	4	4	4	1	1	1.5	1.5	1.5
1.0††	GB	8	9	5	5	2	2	1.5	1.5	1.5

† EPA: Years with no penetration through treated soil in any plot.

FL: Years with no damage worse than ASTM 9 to test blocks in 90% or more of the plots per site.

FL SE States: Years with no damage worse than ASTM 9 to test blocks in 90% or more of the plots for all southeastern sites.

†† Registered rates.

Table 2. Number of years that termiticides remained effective in concrete slab (CS) and ground board (GB) tests at four field sites applying the EPA guideline and Florida efficacy rule.[†] Fractions of years occurred when products were installed out of cycle. Control = percentage of all untreated plots attacked over the life of the study.

% A.I.	Test	Arizona		Florida		Mississippi		South Carolina		FL SE States
		EPA	FL	EPA	FL	EPA	FL	EPA	FL	
Imidacloprid – Premise 75 WSP (est. 1992)										
0.025	CS	15	15	15	15	1	1	3	4	2
0.05††	CS	15	15	6	12	2	2	10	10	6
0.1††	CS	15	15	15	15	2	4	5	15	8
0.15	CS	15	15	15	15	3	4	5	15	5
0.2	CS	15	15	15	15	2	5	5	5	5
0.25	CS	15	15	12	15	2	2	8	9	8
0.3	CS	15	15	15	15	5	5	5	11	14
0.4	CS	15	15	12	15	5	9	5	14	15
0.1††	GB	3	7	2	2	1	1	2	2	2
0.2	GB	8	14	2	2	2	2	2	2	2
0.3	GB	5	6	2	2	2	2	1	2	2
0.4	GB	5	7	2	3	2	2	4	5	2
Control	CS	33%		77%		75%		36%		-
Control	GB	40%		95%		96%		70%		-
Fipronil – Termidor 80 WG (est. 1994)										
Only one treated GB plot has been attacked in 14 years, but due to the low attacks at untreated control plots and multiple products in the test site, it is impossible to evaluate treatment effects. For additional information, refer to the 2006 Termiticide Report (PC, February 2007, page 66).										
Control	CS	14%		19%		2%		3%		-
Control	GB	10%		6%		14%		11%		-
Fipronil – Termidor SC (est. 1999)										
0.06††	CS	9	9	8.5	8.5	8	9	8	8	8.5
0.125††	CS	9	9	8.5	8.5	8	9	9	9	8.5
0.25	CS	9	9	8.5	8.5	9	9	9	9	8.5
0.06††	GB	9	9	8.5	8.5	9	9	5	9	8.5
0.125††	GB	9	9	8.5	8.5	8	9	9	9	8.5
0.25	GB	0	9	2.5	8.5	2	2	9	9	8.
Control	CS	2%		60%		81%		62%		-
Control	GB	48%		97%		82%		87%		-
Chlorfenapyr – Phantom (est. 1996)										
0.125††	CS	12	12	1	7	1	1	6	7	1
0.25††	CS	12	12	11	11	2	5	5	12	6
0.5	CS	12	12	12	12	4	4	12	12	12
0.75	CS	12	12	1	1	5	5	12	12	12
1.0	CS	12	12	12	12	5	7	8	8	7
2.0	CS	12	12	12	12	1	9	12	12	12
0.25††	GB	9	11	0	0	2	6	5	8	6
0.5	GB	5	10	1	8	4	4	12	12	5
0.75	GB	12	12	4	7	5	12	11	12	8
1.0	GB	8	12	9	11	5	11	11	11	11
2.0	GB	6	11	12	12	12	12	8	12	12
Control	CS	19%		58%		79%		49%		-
Control	GB	48%		85%		98%		96%		-

† EPA: Years with no penetration through treated soil in any plot.

FL: Years with no damage worse than ASTM 9 to test blocks in 90% or more of the plots per site.

FL SE States: Years with no damage worse than ASTM 9 to test blocks in 90% or more of the plots for all southeastern sites.

†† Registered rates.

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products installed each year during the last 25 years is illustrated in Figure 1. Although the number varies from year to year, on average about three products were installed per year at the four test sites.

These field tests hopefully result in product registrations, but the registration rate has been low during the last 25 years; e.g., only about 11 percent of candidate termiticides (8 out of 71) have been registered during this time.

This low registration rate is due primarily to poor product performance, but other factors are also involved. For example, marketing decisions by companies keep some successful products from being registered, as occurred with Termidor® (fipronil, BASF), which was successfully tested as four formulations, but only two were registered.

In 2008, the USDA-FS evaluated three new termiticides in the laboratory. These two-year tests often precede the five-year field trials. The Forest Service tracked 24 termiticides and 4 impregnated barriers in ongoing field tests, losing 10 termiticides and two impregnated barriers to cancellations as the year progressed.

Six of these cancellations occurred before the full five-year field test was completed and before the registration data set was acquired. These early cancellations often reflect a loss of interest in the registration process. The recent high rate of early cancellations in Forest Service tests was discussed in last year's Termiticide Report (*PMP*, February 2008).

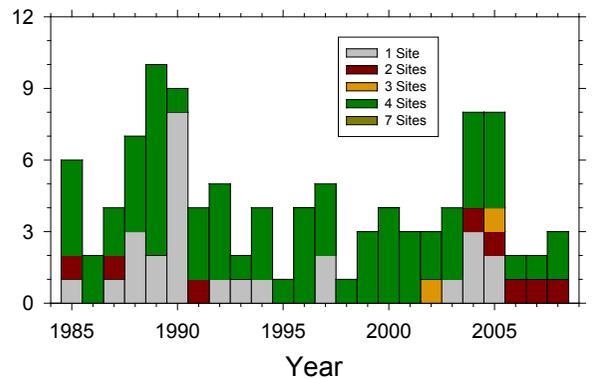


Figure 1. Number of candidate termiticides installed at USDA-FS test sites.

Test Methods

The test methods used to evaluate soil-applied termiticides are specified in the U.S. Environmental Protection Agency's (EPA) Product Performance Test Guideline, OPPTS 810.3600. Two standard field methods are used: ground boards and concrete slabs.

The ground board test consists of a pine board centered in a 17 by 17-inch plot of exposed treated soil, replicated 10 times at all concentrations tested and at each of the four field sites mentioned above. The concrete slab test consists of a 17 by 17-inch plot of treated soil covered by a 21 by 21-inch concrete slab. A 4-inch pipe extends through the center of the slab and through an underlying polyethylene vapor barrier. The covered pipe contains a pine test block placed on the treated soil.

Both tests apply termiticides to the soil at an equivalent pre-construction volume of one gallon per 10 square feet. Data are collected annually on the amount of damage to the wooden blocks and the presence of termites in attacked plots.

Damage is read using the Gulfport scale, where 0=no damage, 1=nibbles to surface etching, 2=light damage with penetration, 3=moderate

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damage, 4=heavy damage, and 5=block failure.

Performance Standards

Termiticides are evaluated by applying EPA's Test Guideline (OPPTS 810.3600) and the Florida Termiticide Efficacy Rule (5E-2.0311, FAC). The federal guideline is used by EPA to determine the acceptability of both pre- and post-construction use directions for a product, while the Florida Efficacy Rule specifically applies to preventative treatments for new construction.

According to the federal guideline, termiticides remain effective during the period that they prevent termites from penetrating the treated

soil in all test plots (e.g., 100 percent control). To be fully successful for registration, termiticides must satisfy this condition for at least five years at the four national test sites using the concrete slab, ground board, or stake tests. EPA places the greatest weight on data generated from the concrete slab test.

Under the Florida rule, termiticides remain effective during the period that they prevent damage worse than ASTM 9 (equivalent to Gulfport 1) to wooden test blocks in at least 90 percent of all plots. All test plots are evaluated each year regardless of their previous attack history. To be successful, termiticides must satisfy this condition for at least five years at one or more of the southeastern sites containing a minimum of 10 concrete slab plots.

Latest Test Results

Results for repellent and non-repellent termiticides are presented in Tables 1 and 2, respectively. The Florida rule applied to individual test sites yielded longer product performance durations than the EPA guideline in 66 percent of the cases and identical durations in 34 percent of the cases (excluding paired rate versus site comparisons of products that never failed either standard).

Sixty-eight percent of the repellent termiticides and 63 percent of non-repellent termiticides had longer performance periods under the Florida rule compared to the federal guideline, while 69 percent of all termiticides in concrete slabs and 61 percent of those in ground boards had extended performance under the Florida rule.

The state of Florida does not apply its rule on a site-by-site basis if data exist from multiple

southeastern sites; rather, it combines the data from all sites.

Combining the data for the three southeastern sites (see Tables), the Florida rule yielded longer performance periods than did the federal guideline in 90 percent of the cases and equal durations in 10 percent of the cases.

On average, the product performance duration is about twice as long under the Florida rule (7.3 years) as the federal guideline (3.5 years) when all active ingredients and rates are considered (excluding Termidor®, see Tables).

The federal guideline is clearly more restrictive in approving termiticides for registration than is the Florida rule. Stated differently, some products registered under the Florida rule would not be registered under the federal guideline if the guideline was always taken literally.

Since the EPA's primary mission is to protect human health and the environment, it places greater weight on toxicology and environmental data than it does on efficacy.

As a result, it sometimes registers compounds that do not strictly adhere to the guideline. Therein lies the difference between a guideline and a rule — the former may be subject to interpretation while the latter is not.

Premise® Study Closes

Premise® (imidacloprid, Bayer) was the first modern non-repellent termiticide, registered in the United States in 1995. The USDA-FS began testing the compound in 1992, and testing continued until the study was closed at the end of 2007, after 15 years.

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Request to Revise the Federal Guideline

EPA's Product Performance Test Guidelines (OPPTS 810.3600) is an important document that regulates the way termiticides are tested and evaluated. In 2005, the Termiticide Standards Committee (TSC) of the Association of Structural Pest Control Regulatory Officials (ASPCRO) requested that EPA consider revising the guideline. Developments related to this request have been reported in this article ever since (*PC*, February 2006 and 2007; *PMP*, February 2008).

In 2008, the EPA sponsored a public workshop to gather information on: (1) the relevance of the existing guideline, (2) the application of the existing guideline to new chemistries, and (3) ways to resolve differences in testing liquid termiticides and other relevant products. From this and other input, the EPA has developed a working framework around which a new guideline will emerge. This framework distinguishes between pre-construction treatments, post-construction preventative treatments and

remedial treatments. During the coming months, the EPA will gather additional input and make further refinements to the draft document. The revision process is expected to take several years, but in the end, it will influence the way termiticides are registered and labeled.

Conclusions

All registered termiticides in the U.S. have been evaluated by the USDA-FS. Its testing program has provided product performance data to registrants, regulators, the pest management industry, and the American public for decades. Numerous candidate termiticides are presently being tested, and some will certainly be registered in the coming years. These products will add to the choices pest management professionals and homeowners have, challenging them to consider their options carefully. **PMP**

Wagner is team leader of the USDA-FS' Wood Products Insect Research Team in Starkville, Miss. Mulrooney, Peterson, and Shelton are research entomologists with the project.