

Tomorrow's choices

Candidate termiticides typically undergo a five-year evaluation at four field sites before the U.S. Environmental Protection Agency (EPA) considers them for registration. The tests are conducted by the U.S. Department

of Agriculture Forest Service (USDA-FS), which has a long history of evaluating termiticides for federal and state registration. In 2011, the USDA-FS managed and administered 14 agreements with product manufacturers as part of its ongoing termiticide testing program.

Field tests generate the efficacy data needed for termiticide registration. **Figure 1** illustrates the number of products installed at the Forest Service test sites since 1985. Product installations have declined markedly recently, and no products were installed in 2011. This is the first time since 1984 the Forest Service hasn't installed a new termiticide.

The USDA-FS screened two termiticides in the laboratory during 2011, and tracked 11 liquid termiticides and one impregnated barrier in ongoing field tests. Eight of the field studies were canceled during the year, two of which were canceled prematurely (before the initial

five years of registration data were acquired). Only four field agreements will be carried into 2012, three of which represent candidate products.

As the number of products being tested decreases, so too, do future product registrations. At the time of this writing, one new product is scheduled for field installation in 2012.

Few candidate termiticides are left in the pipeline, according to the 2011 USDA-FS termiticide report.

Drs. Terry Wagner, Thomas Shelton and Chris Peterson Contributors

Test methods

The test methods used to evaluate soil-applied termiticides are specified in the EPA's Product Performance Test Guideline, OPPTS 810.3600. Two standard field methods — ground boards and concrete slabs — are used.

The ground board test consists of a pine board centered in a 17-inch-by-17-inch plot of exposed treated soil, replicated 10 times at all test concentrations and at each of four test sites in Arizona, Florida, Mississippi and South Carolina. The concrete slab test consists of a 17-inch-by-17-inch plot of treated soil covered by a 21-inch-by-21-inch concrete slab.

The USDA-FS Wood Products Insect Research Lab in Starkville, Miss.



A 4-inch pipe extends through the center of the slab and 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 preconstruction volume of 1 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 equals no damage, 1 equals nibbles to surface etching, 2 equals light damage with penetration, 3 equals moderate damage, 4 equals heavy damage and 5 equals block failure.

Performance standards

Termiticides are evaluated by applying EPA's test guideline and the Florida Termiticide Efficacy Rule (5E-2.0311, FAC). The EPA uses the federal guideline to determine the acceptability of preconstruction and postconstruction use directions for a product. The Florida Efficacy Rule specifically applies to preventative treatments for new construction.

According to the federal guideline, termiticides remain effective during the period they prevent termites from penetrating the treated soil in all test plots (that is, 100 percent control). To be completely 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. The EPA places the greatest weight on data generated from the concrete slab test.

Under the Florida rule, termiticides remain effective during the period 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 succeed, 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 68 percent of the cases and identical durations in 32 percent of the cases (excluding paired rate vs. site comparisons of products that never failed either standard).

Sixty-seven percent of the repellent termiticides and 69 percent of non-repellent termiticides had longer performance periods under the Florida rule compared to the federal guideline. Seventy percent of all termiticides in concrete slabs and 66 percent of those in ground boards had extended performance under the Florida rule.

Florida doesn't 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 the federal guideline in 91 percent of the cases and equal durations in 9 percent of the cases. On average, the product

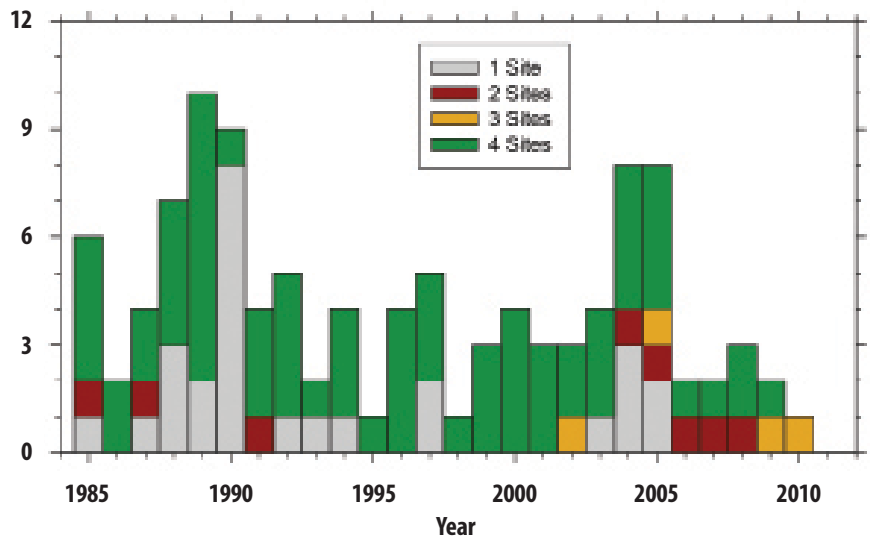


Figure 1. Number of candidate termiticides installed at USDA-FS test sites.

performance duration is about twice as long under the Florida rule (7.6 years) as the federal guideline (3.5 years), when all active ingredients and rates are considered.

The federal guideline is clearly more restrictive in approving termiticides for registration than the Florida rule. As such, some products registered under the Florida

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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 (study established 1986 and closed 2011)										
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	25	2	7	24	25	9
0.25	CS	25	25	25	25	16	17	25	25	25
0.5	CS	6	23	25	25	18	24	25	25	25
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%		68%		51%		59%		-
Control	GB	68%		86%		74%		84%		-
Cypermethrin (study established 1982 and closed 2004)										
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%		66%		50%		60%		-
Control	GB	73%		75%		85%		88%		-
Permethrin – Dragnet (study established 1978 and closed 2004)										
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 (study established 1980 and closed 2011). 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	31	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.

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rule wouldn't be registered under the federal guideline if the guideline was always taken literally. However, because 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 don't strictly adhere to the guideline. Therein lies the difference between a guideline and a rule: The former may be subject to interpretation; the latter isn't.

New lab for the termite project

The official opening of a new Wood Products Insect Research Laboratory is scheduled for this month. This 6,635-square-foot facility provides modern laboratories for the termite team. It sits on Forest Service property that adjoins the Mississippi State University campus.

Federal guideline revision

The EPA's test guideline regulates the way in which termiticides are tested and evaluated for registration. In 2005, the Termiticide Standards Committee of the Association of Structural Pest Control Regulatory Officials (ASPCRO) requested the EPA consider revising the guideline. Developments related to this request have been reported in *PMP*'s annual report since February 2006.

Numerous stakeholder meetings have been held throughout the years to discuss termiticide testing and evaluation. These discussions have led ASPCRO to develop a set of efficacy recommendations in 2011 (see ASPCRO.org/htbin/aspapers.com). The document is intended to provide guidance to state regulatory agencies and the Termiticide Label Review Committee of ASPCRO when

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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 (study established 1992 and closed 2007)										
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 (study established 1994 and closed 2010)										
Only five treated GB plots were attacked during the life of the study, 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%		18%		2%		3%		-
Control	GB	9%		8%		16%		11%		-
Fipronil – Termidor SC (study established 1999 and closed 2011)										
0.06††	CS	12	12	11.5	11.5	8	12	8	8	11.5+
0.125††	CS	12	12	11.5	11.5	8	12	12	12	11.5+
0.25	CS	12	12	11.5	11.5	12	12	12	12	11.5+
0.06††	GB	10	12	9.5	11.5	9	10	5	11	10.5+
0.125††	GB	12	12	11.5	11.5	8	11	10	10	11.5+
0.25	GB	0	9	2.5	11.5	2	2	12	12	11.5+
Control	CS	1%		67%		85%		50%		-
Control	GB	50%		97%		86%		88%		-
Chlorfenapyr – Phantom (study established 1996 and closed 2011)										
0.125††	CS	15	15	1	7	1	1	6	7	1
0.25††	CS	15	15	11	11	2	5	5	15	6
0.5	CS	15	15	15	15	4	4	15	15	15
0.75	CS	15	15	1	1	5	5	15	15	15
1.0	CS	15	15	15	15	5	7	8	8	7
2.0	CS	15	15	15	15	1	9	15	15	15
0.25††	GB	9	11	0	0	2	6	5	8	6
0.5	GB	5	10	1	8	4	4	12	15	5
0.75	GB	15	15	4	7	5	12	11	15	8
1.0	GB	8	15	9	11	5	11	11	11	11
2.0	GB	6	11	15	15	12	12	8	14	12
Control	CS	19%		66%		79%		44%		-
Control	GB	54%		87%		99%		95%		-
Chlorantraniliprole – Altriset (study established 2004)										
0.025	CS	3	5	1	7	2	5	7	7	7
0.05††	CS	5	6	3	7	7	7	4	4	7
0.1	CS	2	7	7	7	7	7	7	7	7
0.25	CS	4	7	7	7	7	7	7	7	7
0.025	GB	2	5	0	1	1	2	1	2	1
0.05††	GB	2	2	0	2	2	4	1	2	2
0.1	GB	4	7	1	6	4	6	4	4	4
0.25	GB	2	4	2	7	2	7	4	6	7
Control	CS	2%		70%		87%		52%		-
Control	GB	14%		89%		85%		90%		-

† 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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it deliberates on candidate products under registration review.

In 2009, the EPA chose to go through a rule-making process to develop the new federal product performance standards that control termiticide registrations. This work isn't limited to termites; it involves insecticides labeled for use against other pests of public significance such as mosquitoes, bed bugs, cockroaches, ants and ticks. Because of this, multiple EPA divisions have been involved in the process. The Office of Pesticide Programs is working to finalize a proposed product performance rule that will define the new performance standards for termites and public health pests. When completed, the draft will be made available for public comment.



Inside one of the USDA-FS Wood Products Insect Research labs.

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.

Presently, there are few candidate termiticides being tested — leaving one to wonder about the choices available for tomorrow. **PMP**

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