Termiticide Efficacy Results 2010

By Terry Wagner, Chris Peterson and Thomas Shelton Contributors

Candidate termiticides typically undergo five years of evaluation at four field sites before the U.S. Environmental Protection Agency (EPA) considers them for registration. These tests are conducted by the United States Department of Agriculture Forest Service (USDA-FS), which has a long history of evaluating termiticides for federal and state registration. In 2010, the USDA-FS managed and administered 20 agreements with product manufacturers as part of its ongoing termiticide testing program.

Although the number varies from year to year, on average three new products are tested annually. Product installations have declined recently, and in 2010 only one product was installed at one test site in Florida and two sites in Mississippi.

Field tests generate the efficacy data needed for termiticide registration, but most candidate termiticides are never registered. For example, only about 13 percent of the products installed between 1985 and 2005 were registered.

The first new termiticide in nearly a decade, DuPont's Altriset, was registered last year.

The USDA-FS also screened four termiticides in the laboratory during 2010. These two-year laboratory tests often precede the five-year field trials. The Forest Service tracked 15 termiticides and two impregnated barriers in ongoing field tests. Six ongoing studies ended during the year, two of which were canceled prematurely (before the full five years of registration data were acquired). These early cancellations often result from a loss of interest by the registrant because of early test failures or marketing considerations. The recent high rate of early cancelations was discussed in detail in the report published in the February 2008 issue of *pmp* magazine.

New termiticide on the market

Altriset is the first termiticide introduced by DuPont Professional Products. The EPA awarded Altriset reduced-risk status in March 2010, becoming the first liquid termiticide to earn this status. It was registered for pre- and post-construction uses two months later. Altriset represents the first new termiticide registered in nearly a decade (the last to do so was BASF Professional Pest Control's Phantom, in December 2001).

The active ingredient in Altriset, chlorantraniliprole, is the first molecule from the diamide class of insecticides. Specifically, it is an anthranilic diamide that acts on insect muscles by interfering with ryanodine receptors and calcium regulation in muscle cells. The initial inspiration for the molecule came from the extracts of plants in the genus *Ryania*. Because of its extreme selectivity and near absence of toxicity to non-targets, the Altriset label does not contain a signal word and therefore has fewer requirements for personal protective equipment than other termiticides.

Test methods

The test methods used to evaluate soil-applied termiticides are specified in the U.S. EPA's 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 17x17-in. plot of exposed treated soil, replicated 10 times at all

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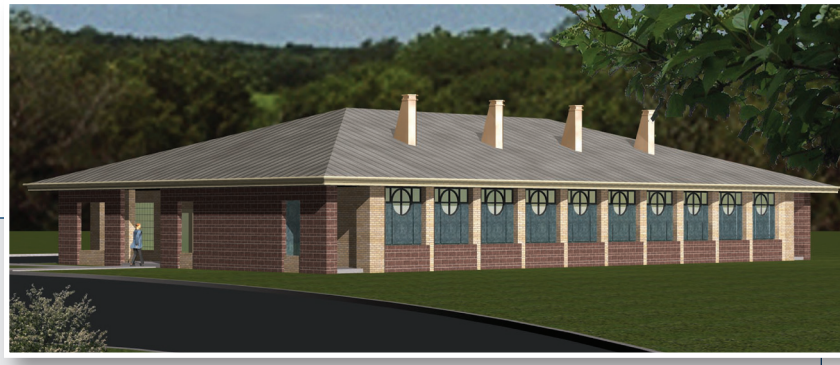

Forest Service to break ground on green laboratory

STARKVILLE, Miss. — The United States Department of Agriculture (USDA) Forest Service Southern Research Station (SRS) recently broke ground on a new $1.3 million environmentally friendly laboratory.

The green laboratory will provide scientists in the SRS Wood Products Insect Research Unit with a state-of-the-art facility to conduct research that helps protect homes, forests and other resources from insect pests.

"The new facility will give Forest Service researchers a modern laboratory where they can better serve the public, regulatory community and industry by meeting the increasing demand for testing termite and other control products," said SRS Director Jim Reaves. "This laboratory is an investment in the Starkville area and the nation that will pay dividends today and in the future."

The new 6,635-sq.-ft. Wood Products Insect Laboratory will house the SRS research unit that includes the Termiticide Testing Program. The program provides data to the Environmental Protection Agency (EPA) and state regulators for registration of termiticides in the United States.

The unit also conducts research on termites and other wood-destroying insects. Currently, research unit employees are scattered across three locations including two temporary laboratories at Mississippi State University, a key research partner.

The new laboratory will serve as a permanent location for about 10 employees and allow SRS to expand its research and increase opportunities with existing and new partners. SRS will construct the new facility on federal property, open space across from the Forestry Sciences Laboratory at Mississippi State University.

The Station designed the facility to meet standards required by the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver certification. SRS is paying for the project with general Station funds.

Research at the laboratory will complement programs at Mississippi State University, and it better satisfies cooperative ties with federal and state regulatory agencies, private industries and associations, and the public.

SRS conducts insect and termiticide research with a variety of partners including major corporations and is recognized internationally for its research and testing activities.

SRS comprises about 120 Forest Service scientists and several hundred support staff who conduct natural resource research in 20 locations across 13 Southern states (Virginia to Texas). The Station's mission is "…to create the science and technology needed to sustain and enhance southern forest ecosystems and the benefits they provide."

Table 1. Number of years 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.

		Arizona		Florida		Mississippi		South Carolina		FL SE
% A.I.	Test	EPA	FL	EPA	FL	EPA	FL	EPA	FL	States
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	24	2	7	24	24	9
0.25	CS	24	24	24	24	16	17	24	24	24
0.5	CS	6	23	24	24	18	24	24	24	24
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	51%		68%		51%		60%		-
Control	GB	67%		85%		75%		85%		-
Cypermethrin (est. 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 (est. 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 (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	30	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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test concentrations and at each of four test sites in Arizona, Florida, Mississippi and South Carolina. The concrete slab test consists of a 17x17-in. plot of treated soil covered by a 21x21-in. concrete slab. A 4-in. 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 1 gal. per 10 sq. ft. 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 damage, 4 = heavy damage, and 5 = block failure.

Performance standards

Termiticides are evaluated by applying the EPA's Test Guideline (OPPTS 810.3600) and the Florida Termiticide Efficacy Rule (5E-2.0311, FAC). The federal guideline is used by the 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 (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. 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 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 69 percent of the cases — and identical durations in 31 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 71 percent of non-repellent termiticides had longer performance periods under

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The EPA places the greatest weight on the data generated from the concrete slab test, such as these plots in Arizona.

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.

		Arizona		Florida		Mississippi		South Carolina		FL SE
% A.I.	Test	EPA	FL	EPA	FL	EPA	FL	EPA	FL	States
Imidacloprid – Premise 75 WSP (est. 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 (est. 1994 and closed 2010)										
Only five treated GB plots were attacked at 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 (est. 1999)										
0.06††	CS	11	11	10.5	10.5	8	11	8	8	10.5+
0.125††	CS	11	11	10.5	10.5	8	11	11	11	10.5+
0.25	CS	11	11	10.5	10.5	11	11	11	11	10.5+
0.06††	GB	10	11	9.5	10.5	9	10	5	11	10.5+
0.125††	GB	11	11	10.5	10.5	8	11	10	10	10.5+
0.25	GB	0	9	2.5	10.5	2	2	11	11	10.5+
Control	CS	2%		66%		83%		55%		-
Control	GB	49%		96%		85%		86%		-
Chlorfenapyr – Phantom (est. 1996)										
0.125††	CS	14	14	1	7	1	1	6	7	1
0.25††	CS	14	14	11	11	2	5	5	14	6
0.5	CS	14	14	14	14	4	4	14	14	14
0.75	CS	14	14	1	1	5	5	14	14	14
1.0	CS	14	14	14	14	5	7	8	8	7
2.0	CS	14	14	14	14	1	9	14	14	14
0.25††	GB	9	11	0	0	2	6	5	8	6
0.5	GB	5	10	1	8	4	4	12	14	5
0.75	GB	14	14	4	7	5	12	11	14	8
1.0	GB	8	14	9	11	5	11	11	11	11
2.0	GB	6	11	14	14	12	12	8	14	12
Control	CS	19%		64%		80%		45%		-
Control	GB	53%		87%		99%		95%		-
Chlorantraniliprole – Altriset (est. 2004)										
0.025	CS	3	5	1	6	2	5	6	6	6
0.05††	CS	5	6	3	6	6	6	4	4	6
0.1	CS	2	6	6	6	6	6	6	6	6
0.25	CS	4	6	6	6	6	6	6	6	6
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	6	1	6	4	6	4	4	4
0.25	GB	2	4	2	6	2	6	4	6	6
Control	CS	1%		71%		86%		55%		-
Control	GB	15%		92%		83%		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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the Florida rule compared to the federal guideline, while 71 percent of all termiticides in concrete slabs and 67 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 91 percent of the cases and equal durations in 9 percent of the cases. On average, the product performance duration is about twice as long under the Florida rule (7.4 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 is the Florida rule. Stated differently, some products registered under the Florida rule would not be registered under the federal guideline if the guideline were always taken literally. However, because 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.

Request to revise the guideline

The EPA's Product Performance Test Guidelines (OPPTS 810.3600) regulates the way in which termiticides are tested and evaluated for registration. In 2005, the Termiticide Standards Committee (TSC) 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 this annual report in this magazine ever since (see the February 2006 and 2007 issues of *Pest Control* magazine, and

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the February issues of *pmp* magazine, 2008-10).

Among these developments were a series of four stakeholder meetings held by the TSC between 2007 and 2010 to discuss a new guideline. A draft guideline was forged from these meetings that, if adopted by ASPCRO, would serve as a guide for individual states to use in developing their own termiticide efficacy legislation.

Perhaps more importantly, it would serve as a guide for the Termiticide Label Review Committee (TLRC) of ASPCRO to follow when they deliberate on candidate products not covered by the current federal guideline. At the EPA's invitation, the TLRC provides independent evaluation to the EPA on products being considered for registration. At press time, the TSC draft standard is available at ASPCRO.org/htbin/aspapers.com.

Coincidental to these developments, the EPA chose to go through a rule-making process in 2009 to develop new federal product performance standards that control termiticide registrations. This work encompasses other pests of public significance in addition to termites, and involves personnel from multiple EPA divisions. At the same time, the Registration Division is working on revising the Test Guidelines. The EPA has set a 2011 date for publishing a draft standard for public comment.

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, Starkville, Miss. Peterson and Shelton are research entomologists with the project.