



# **PMP**

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# 2008

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# **Termite Report**

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# A Historic Pest

## Ninety years of USDA publications reveal changes in termite management

By Chris Peterson, Terence L. Wagner,  
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Last year, the U.S. Department of Agriculture's Forest Service (USDA-FS) released a revision of its popular booklet "Subterranean Termites — Their Prevention and Control in Buildings" (Home and Garden Bulletin #64) in print and electronic format ([www.srs.fs.usda.gov/pubs/misc/misc\\_bg064.pdf](http://www.srs.fs.usda.gov/pubs/misc/misc_bg064.pdf)). The long history of this booklet, going back to 1916, reflects the continuing importance of termite management over the years.

During the revision of this booklet, we had the pleasure of digging in our USDA-FS archives for its previous versions and predecessors. This has been interesting, entertaining, and sometimes horrifying (dilute DDT in fuel oil and pour on the ground!). The progression of techniques and recommendations reveal how attitudes and practices have changed over the years, and how this booklet has adapted to meet those changes.

### SCOPE OF THE TERMITE PROBLEM

According to the 2000 U.S. Census, there are 105.5 million occupied housing units in the United States, with a median value of \$120,000 each. This represents a nationwide investment of more than \$12.5 trillion tied up in residential real-estate. This does not include business, public or institutional buildings, such as retail stores, schools, office buildings, churches, hospitals, warehouses, etc.

For most people, their homes represent their largest single monetary investments. Naturally, people want to protect those investments from termites, just as they would from fire, storms or criminal activity. The amount of damage caused by termites, about \$5 billion per year, equaled that caused by fire in 2004 (based on figures provided by the National Association of Insurance Commissioners).

That \$5 billion damage tag comes to an average of \$50 per household per year. Roughly half of the 105.5 million homes are in areas of low termite pressure — the Northeast, colder parts of the Midwest and colder and drier parts of the West (an estimate based on a U.S. Census Bureau report), so that raises the average to \$100 per household per year for homes in the most-vulnerable areas (the South, California and warmer parts of the Midwest). Because most structures go many years without termite damage, count on the bill being \$100 for every year you go without damage.



### THE BOOKLET'S BEGINNINGS

USDA booklets concerning termites have existed since 1916. That year saw the publication of two USDA booklets by termite pioneer Thomas E. Snyder. Bulletin #333, "Termites, or 'White Ants' in the United States: Their Damage, and Methods of Prevention," was aimed at entomologists, while Farmer's Bulletin #759, "'White Ants' as Pests in the United States and Methods of Preventing Their Damage," was intended for a general audience and is the early but direct precursor to the booklet published last year. The latter publication was reissued in 1919 as Farmer's Bulletin #1037 with little change.

Being Farmer's Bulletins, these booklets went into depth on termite damage to forest trees, nursery stock and field crops. Although important in the tropics, these problems are of little consequence in the United States today. Protection of wood in structures in 1916 relied on good building practices, such as minimizing soil-wood contact, using stone or cement foundations instead of wood, etc.

Chemical prevention focused exclusively on chemically treated lumber, usually brush or dip treated with coal-tar creosote. Soil treatments for termite prevention were unheard of at the time.

The increasing importance of termites in structures is reflected in the number of pages devoted to structural protection in the booklets. In 1926, Farmer's Bulletin #1472 replaced #1037 under the title "Preventing Damage by Termites or White Ants," with revisions in 1934 and 1939. The older Farmer's Bulletin #1037 devoted about half again as many pages to structural protection as it did to protection of living vegetation (nine pages to structures versus six pages to vegetation) while Farmer's Bulletin #1472 devoted more than three times the number of pages to structural protection as it did to vegetation (11.5 pages to 3.5 pages).

### "SOIL POISONING" FOR TERMITE CONTROL

In 1929, Snyder authored USDA Leaflet #31, "Termites in Buildings," which dealt with termites exclusively as structural pests. It was a distillation of the information found in Farmer's Bulletin #1472. When revised in 1933 as Leaflet #101, "Injury to Buildings by Termites," the text included a

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discussion of *soil poisons*, the then-used term for soil-applied termiticides, for the first time.

Previous versions had recommended good construction practices and impregnated timber to prevent termites. The recommendations given for soil treating in 1933 (and in a 1936 revision) are for what we now refer to as trench or perimeter treatments around walls and piers. At that time, coal-tar creosote, orthodichlorobenzene and paradichlorobenzene were mentioned as soil treatments.

It's interesting that soil applications of termiticides, now a multi-billion-dollar industry, were viewed so dismissively from their first use in 1928 and throughout the 1930s by these booklets and by other literature from that time. Both the 1933 and 1936 versions of Leaflet #101 described soil poisons as being useful "for a temporary period." They were "experimental" and at that time "[could] not be recommended as a permanent remedy" because they "lack adequate proof of effectiveness and permanency."

In 1942, the immediate precursor of the current booklet was introduced: Farmer's Bulletin #1911, "Preventing Damage to Buildings by Subterranean Termites," which replaced both Leaflet #101 and Farmer's Bulletin #1472. This booklet was largely a rewriting of Farmer's Bulletin #1472, with the focus solely on structural control. Any mention of termites as pests in living vegetation had been dropped, reflecting the fact that in the United States, termites are not serious pests of living vegetation.

By 1942, soil poisoning had gained acceptance, and highly specific recommendations were given for four products: sodium arsenite, coal-tar creosote, orthodichlo-

## Where Did They Come Up With "1 Gallon Per 10 Square Feet"?

At the USDA Forest Service, we sometimes are asked where the "1 gallon per 10 square feet" application recommendation came from. In the 1944 and 1946 ground board tests, various application rates were tested: 1/2 pint, 1 pint and 2 pints per square foot.

Based on the results of these tests, in 1954, Kowal, then the project leader of the Forest Service termite project, recommended an application rate of 1 pint per square foot, the equivalent of 1.25 gallons per 10 square feet, for application beneath slabs.

Two years later, Smith suggested a rate of one gallon per 10 square feet. At this rate, only simple math was necessary to determine how much compound should be applied, and how long the job would take, if the square footage were known. For example, if an applicator needed to treat 750 square feet, he would know that it would take 75 gallons and 15 minutes at a flow rate of 5 gallons per minute.

Although it is not clear whether Smith was the first to propose the new rate or if it was already a common practice, in 1958 the Federal Housing Administration adopted this rate in its recommendations for new construction. It is now regarded as the industry standard practice.

### References

Kowal, *Pest Control*, February 1954.

Smith, *Pest Control*, November 1956.

Federal Housing Administration, #300, Nov. 1, 1958.

robenzene and pentachlorophenol. The 1949 revision added trichlorobenzene to the list.

### **DAWN OF CONCRETE SLAB FOUNDATIONS**

A major development in construction practices was discussed in 1942 for the first time: the concrete platform or ground slab foundation. This is the slab foundation common today. Although not used for homes on a large scale until after World War II, it was a common practice for garages, warehouses, storage areas and similar structures for some time before, and concrete floors were common in basement construction (see Farmer's Bulletin #1472).

Amusing to our eyes today is the observation that slab foundations were common for "low-cost housing." As late as 1961, buildings with slab foundations were referred to as "low-cost" and "temporary" structures.

Despite the slow start, slab foundations have continued to grow in popularity. According to figures provided by the U.S.

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Census Bureau, in 1971, the first year for which such records are available, 26 percent of new homes completed nationwide had a conventional foundation, while 38 percent had slab foundations and 36 percent had full or partial basements. By 2006, the percentage of conventional foundation homes had declined to only 15 percent of the total, and slab foundations comprised 56 percent.

In 1959, the booklet was reintroduced under its current title, "Subterranean Termites — Their Prevention and Control in Buildings," and the series number of Home and Garden Bulletin #64. The move to the Home and Garden series was because the booklet no longer had a discussion of termite damage to living vegetation, and it didn't really fit as a Farmer's Bulletin.

It replaced not only Farmer's Bulletin #1911, but also the 1948 booklet Farmer's Bulletin #1993, "Decay and Termite Damage in Houses," which dealt with fungal decay and termites.

## 50 YEARS OF STABILITY

In 1959, the now-standard rates for perimeter (4 gallons per 10 linear feet) and sub-slab application (1 gallon per 10 square feet — see sidebar, page 28) are mentioned. Prior to the mid-1950s, chemical treatment of slabs relied on a trench treatment along the perimeter. It was thought that several inches of concrete would be impervious to termites, and that attack could only come from the perimeter.

Although first mentioned in the booklets in 1942, as early as 1944 the Forest Service initiated tests to determine the length of time an overall soil treatment would remain effective. These were the first ground board tests, used to this day in determining termiticide efficacy.

The fact that ground board tests were necessary at a time when slab construction was relatively new and somewhat rare

suggests that perimeter treatments to slabs were ineffective by themselves. Indeed, Kowal reported that termite infestations through plumbing penetrations, expansion joints and cracks were common in slab foundations.

Five active ingredients were listed in 1959: aldrin, benzene hexachloride, chlordane, dieldrin and DDT. None of the active ingredients listed in 1949 were listed in 1959, and presumably were no longer being used.

As the years went by, different compounds were added to the list\* [heptachlor (1969), chlorpyrifos (1983), isofenphos (1983), cypermethrin (1989), fenvalerate (1989), permethrin (1989) and bifenthrin (1994)], while others were dropped [DDT (1972), benzene hexachloride (1972), chlordane (1989) and heptachlor (1989)]. Other than the changing chemistry, the approach and techniques changed little until the 1990s with the emergence of baits.

## CHANGES IN THE CURRENT BOOKLET

The current booklet includes a discussion of termite baits, which were just becoming available when the 1994 version was printed. We discussed the general characteristics of baits compared to soil-applied termiticides in table form. This information will help homeowners and pest management professionals (PMPs) to make more informed decisions regarding control.

We made a deliberate decision not to include the names of currently registered insecticide formulations or active ingredients in the 2006 revision. By 2006, imidacloprid, fipronil, chlorfenapyr and acetamiprid (in combination with bifenthrin) have been introduced and chlorpyrifos discontinued. Available formulations change frequently, and a revision of the booklet would be necessary whenever a new product was launched or an old product was no longer used. Also, several states have

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restricted or altered the allowed use of certain products.

Lastly, product labels have become more complex over the years, and it would be laborious, if not impossible, to adequately cover the use patterns, rates and precautions of every currently registered termiticide. We did retain, however, general information common to all products, with instructions to consult the product label before using any product.

We also made cosmetic changes, such as an increase in size to 8.5-by-11 inches to allow a larger font size. The illustrations were redrawn or created new by Beth Dishongh, a professional illustrator formerly of the Mississippi State University Agricultural Communications Office. Professional nature photographer Tom Murray supplied photographs of termites. The “Good Building Practices” section was rearranged for better flow and a more logical ordering of elements.

The enduring lesson of our jaunt through history is that “everything old is new again.” For the last several years, many have been talking about “exterior perimeter and limited interior” treatments for slab foundations — a modern variation on the exterior-only

treatments used in the 1930s and 1940s. Increased environmental and health awareness has prompted many to seek alternatives to soil treatments, such as resistant woods, metal framing, site sanitation or good building practices, exactly what was recommended in 1916. Finally, the Formosan termite is capable of attacking living trees, resurrecting the importance of termite control in forestry, especially if this termite becomes established in forested areas. **PMP**

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*\* Dates refer to the booklet version in which the active ingredient was first listed and is not the date it was introduced.*