

# **Termites**

**Prevention • Detection • Control**

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**Termites** cause more than \$1 billion in damage annually in the United States. Subterranean termites travel underground in soil and can eat wood, roots, or processed cellulose materials, such as paper and cardboard. They may tunnel through foam insulation or chew through some thin plastics. We often build portions of our homes out of “termite food”; however, when wood used in home construction is maintained properly, it can last for generations.

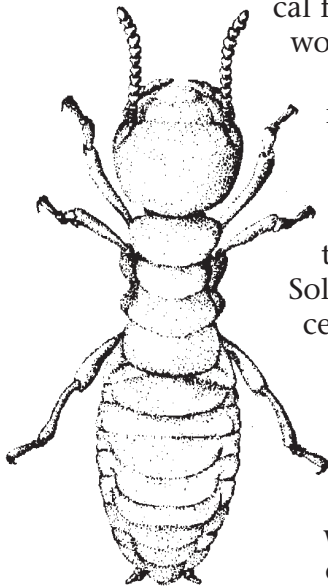
Although termites are obnoxious pests when they infest structures, they are crucial to the dynamics of ecosystems. As decomposers of wood and other vegetative materials, termites play an essential role in recycling elemental nutrients and increasing organic matter in soils. Their underground tunneling helps to aerate, drain, and mix soil. Seasonal swarms of winged termites are an important food source for predators, including birds, bats, lizards, frogs, and ants. Although termites must remain and thrive in natural ecosystems, we want them out of human structures. By understanding the biology and habits of these insects, we can more effectively prevent, detect, and control termite infestations in buildings.

## **Termite Colonies**

Termites native to Maryland are subterranean (genus *Reticulitermes*): they normally travel underground through tunnels in the soil that connect their food sources. They are social insects, living in colonies of up to

several million individuals. The structure of a mature colony is complex, with one or more central headquarters, which are normally found with a food source, such as a buried stump or log on the forest floor. These colony centers are connected to a variety of other food sources by a network of underground tunnels. A single colony may use food sources that are more than 200 feet apart.

Members of termite colonies develop into castes, groups associated with the division of labor within the society. Workers are the most numerous caste in the colony. They are typically up to  $\frac{1}{4}$  inch (2 to 6 mm) long, cream-colored, and eyeless (Figure 1). Termite workers navigate and perform all of their duties using only tactile (touch) and chemical forms of communication. Termite



workers eat wood, and they can move into a piece of timber in large numbers. Some workers carry food back to immatures and reproductives, maintaining a network of food transfer and communication among members of the colony. Soldier termites make up 2 to 5 percent of the population. They accompany workers to food sources and defend the colony against ants and competitor termites. Termite colonies have a limited number of reproductives, which cluster in chambers in wood or underground. Reproductives concentrate their efforts on egg

**Figure 1.** Worker termite.

production, and they are fed and tended by an entourage of workers.

Periodically, mature termite colonies produce a brood of winged reproductive offspring called swarmers or alates. These winged termites fly in large numbers to disperse and initiate new colonies. Flights of termite alates (or piles of shed wings) are often the first sign to the homeowner of an infestation. Most alates die of dehydration if they fly indoors. However, a flight of alates indicates a healthy termite colony nearby, and the source should be investigated.

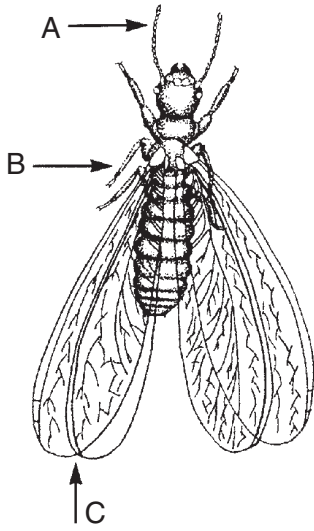
## Identifying Termites

Ants are another common insect found in and around homes. At first glance, ants can be mistaken for reproductive termites. Ants look like termites in the winged or alate forms because, like termites, they have dark bodies and move quickly. Termites and ants are distinguished by the following characteristics (Figure 2a and 2b):

### Winged or “Swarmer” Termites

- A. Straight antennae (look like a string of beads under strong magnification)
- B. No constriction between thorax and abdomen (no “waist”)
- C. Front and hind wings are similar in shape and length (wings of Maryland species are about  $\frac{1}{4}$  inch long)

Some termites have yellow or brownish bodies and amber-colored wings. These may be drywood termites, not native to Maryland



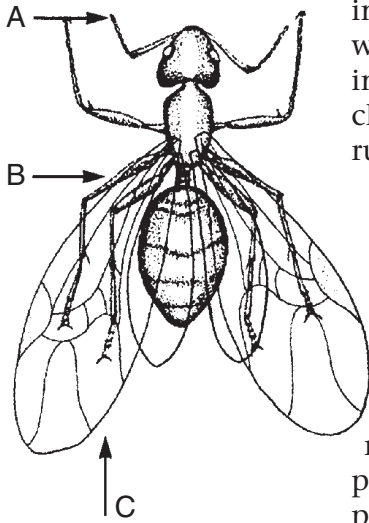
**Figure 2a.** Winged reproductive termite.

but occasionally imported in wood or wood products.

### Winged Ants

- A. Elbowed antennae
- B. Obvious constriction between thorax and abdomen (a distinct "waist")
- C. Front wings are longer than hind wings

Both winged termites and ants drop their wings in preparation for pairing and mating. The body shapes of the two types of insects are distinctive, but if you have any doubts, collect a few as a sample to show to a specialist. Dead, dry samples can be kept in any container where they won't be crushed. Fresh, live insects can be preserved in a closed container with enough rubbing alcohol to cover them.



**Figure 2b.** Winged ant.

### Termite Prevention

Make a practice of routinely inspecting your home, foundation, and landscaping to identify and correct situations that may be attractive to termites before they become problems. The most important preventive measures you can take to make your home inhospitable to termites are

eliminating any direct contact between wood and soil and reducing moisture in and around the house.

Basic aspects of home maintenance and landscaping can have a substantial impact on termite prevention, as the following paragraphs describe.

## What You Can Do to Help Protect Your House

### **Moisture Reduction**

Termites need a moisture supply. They usually enter homes through the surrounding soil, often bringing moisture from the soil into the wood inside a house. For this reason, minimize soil moisture under and next to structures. Buildings at the base of a sloping grade or in poor drainage areas are most vulnerable. Follow these guidelines for reducing soil moisture in and around homes:

- Slope soil grade, exterior paving, and slab patios to drain water away from the building.
- Keep the roof gutter system in good condition, avoiding blocked drains, leaky elbow joints, and drain catches that cause water to accumulate near the house.
- Make sure doors, windows, roof joists, and chimneys have proper flashing.
- Adequately ventilate crawl spaces and attics.
- Keep the roof and plumbing free of leaks.
- Make sure condensation from air conditioners or humidifiers drips into a receptacle that does not moisten wood, wall board, plaster, or insulation.

### **Vegetation Around the House**

Plants near homes contribute to moisture and other problems associated with termites. Vegetation may impede the evaporation of moisture from walls and soil next to the structure; shrubbery may obstruct the airflow around basement or crawl space vents. Regular watering of plants may increase moisture levels around and under the home. Finally, roots may create cracks in a foundation wall, allowing moisture or termites to enter.

Plant all shrubs with trunks at least 3 feet from the house and keep them clipped to allow 18 inches of clear space between vegetation and the side of the house. This clearance will allow adequate light and airflow around the building and will facilitate inspection access around the exterior.

The expected mature size of a tree should determine its planting distance from the foundation. If the maximum height will only be 15 to 20 feet, planting a minimum of 20 feet away should be sufficient. Planting too close to a structure increases problems with branches damaging the roof and siding and with roots compromising the foundation. Tree roots can easily extend beyond the crown at a length several times the height of the tree.

### **Landscape Mulches**

Bark, gravel, and other landscape mulches create a warm and moist zone hospitable to termites. We recommend bare earth within several feet of the perimeter of a home to minimize termite activity and therefore the



risk of infestation. If you desire mulch right up to the house for aesthetic reasons, apply as thin a layer as possible.

### **Building with Pressure-Treated Wood**

The use of copper-chromium-arsenic (CCA) pressure-treated pine poses a dilemma that must be resolved by individual homeowners. The CCA pressure treatment is designed to protect wood against insect attack and fungal decay. High quality CCA wood is effective at deterring attack by wood-destroying organisms for many years, or even decades, but homeowners should be aware of the following:

(1) if pressure-treated wood is burned, some of the toxic arsenic is released in the smoke and some remains in the ashes; (2) sawing or drilling CCA-treated wood during construction creates sawdust that is dangerous to inhale; and (3) some reports cite health risks associated with prolonged human skin contact with pressure-treated woods (for example, walking with bare feet on a deck).

A reasonable compromise may be prudent use of pressure-treated wood only in portions of a home that are most vulnerable to termite attack.

Do not allow footings constructed from pressure-treated wood to be in direct contact with soil. Set deck pilings, stair framing, and other structural elements on concrete supports above soil grade even when using pressure-treated wood.

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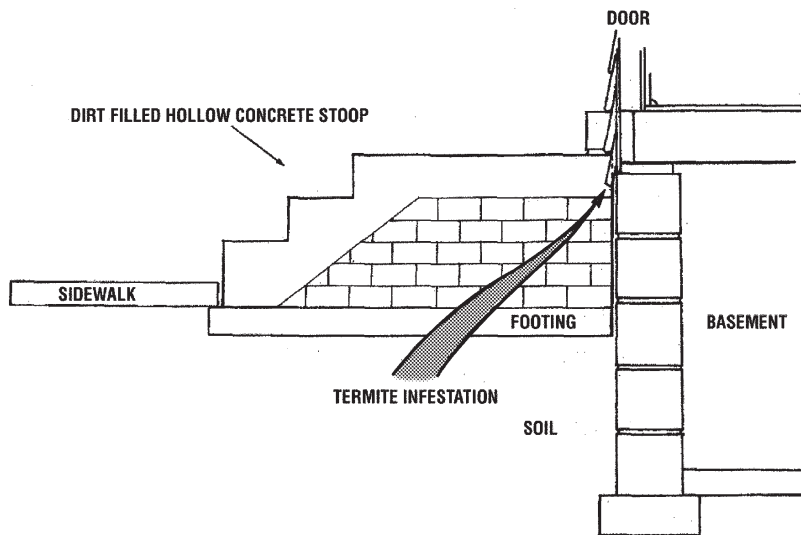
## High-Risk Zones for Termite Infestations

### Wood in Contact with Soil

Any wood in direct contact with soil can allow termites easy access into a home.

Common examples include the following:

- deck posts or other structural elements set in concrete, but with the base of the post penetrating through the concrete into the soil
- wooden stair framing positioned directly on the soil
- earth fill under a stoop or porch in contact with the wooden sill or framing of the house (Figure 3)
- form boards left in place around poured concrete



**Figure 3.** Earth under a concrete stoop allows termites to find a path to wood.

- a high soil grade or planters built up against a foundation, allowing termite access under siding, veneer, or into cracked mortar
- wood scraps or firewood stored adjacent to or under a house. (Stack firewood at least 25 feet from the structure and at least 12 inches off the ground to keep the wood dry and to avoid creating rat habitat.)
- a wooden trellis attached to the house
- foam insulation or stucco extending into the soil (i.e., below grade)

### **Areas with Leaks and Drainage Problems**

High-risk areas for residential moisture problems include roof seams and flashing, particularly around chimneys, gables, or skylights. In an underground basement, keep the ports for entry of plumbing lines and electric cables properly caulked. Grade the landscape at an angle away from the house to direct water drainage from around the foundation. Periodic cleaning of gutters and downspouts and maintenance of household plumbing are important for minimizing moisture problems around a house.

Occasional infestations on upper stories may occur when debris is allowed to accumulate on roofs or in gutters, keeping the surrounding wood moist.

### **Slab, Foundation, Mortar, or Settlement Cracks**

Brick pillars or fieldstone supports in contact with soil in a crawl space or basement (such as under a chimney) are also areas of high risk. Over time, mortar cracks in these supports can provide access for termites.

## **Heated Slabs**

Homes constructed on slabs with internal heating elements are particularly vulnerable to termite infestation; the warmth of the foundation during the winter can facilitate year-round termite activity, in addition to raising the possibility of access cracks appearing in the slab. Treatment programs for these homes must be particularly well planned to avoid damaging the embedded heating system.

## **Termite Detection**

Even very active termite infestations can be difficult to detect because of the cryptic (hidden) habits of these insects. Subterranean termites tunnel inside wood, leaving an outer shell that may appear entirely normal from the exterior.

If you notice any of the following in your house, call a pest control operator for a professional inspection:

- dirt tunnels, or shelter tubes, typically about  $\frac{1}{4}$  inch wide but sometimes wider, on the foundation, along exposed wood, or dangling down from the ceiling; these are transit tubes built by termites (Figure 4)
- soil packed in cracks and crevices
- piles of silvery, membranous insect wings, all about  $\frac{1}{4}$  inch long, on floors, window sills, or in spider webs
- evidence of structural weakness, such as settling cracks or sagging floors
- dark or blistered areas on wood paneling; blistered or peeling paint on wood (because of moisture under the paint)

If you do have an active termite infestation, do not panic: to cause structural damage, termites must work in a home for quite a while. You can take weeks or even a few months to evaluate the problem and decide on a treatment program. A key element for the inspector is to determine where the termites are gaining access into the house. This knowledge can help in planning a treatment program and in making structural or landscape modifications that will prevent a reinfestation.

## Termite Control

Treating for termites is definitely a job for a licensed professional. It involves specialized training and equipment. However, homeowners should be informed of all aspects of the treatment program for their residences,



**Figure 4.** Termite tubes on the foundation of a structure.

including monitoring and follow-up inspections in subsequent years. A summary of the most common treatment approaches follows.

### Soil Drench Termiticide Applications

In a conventional treatment for control of subterranean termites, liquid termiticide (a liquid pesticide that kills termites) is injected around the entire perimeter of a structure, as well as underneath the building if it has a concrete slab or a basement. The injection rods used in these applications are inserted every 6 to 8 inches around the house, releasing a stream of insecticide to diffuse into the surrounding soil. Holes are also drilled through stoops, slab patios, and driveways abutting the house. Typically, applicators will also dig a small trench around the perimeter of the house, and fill this with termiticide to soak into the upper layers of the soil.

Soil termiticide applications are designed to create a chemical barrier in the soil around the exterior foundation walls and under the cement slab (or basement floor) of homes without crawl spaces. For a termiticide barrier to be effective, it must be complete. Most failures result from termites breaching gaps or untreated areas. Think of the termite treatment as a fence: if you dig or disturb the soil within 2 feet of your home in the years following a soil termiticide treatment, you risk disrupting the chemical barrier along your foundation—in other words, breaking the fence. Disturbed areas should be spot treated with termiticide to reestablish the barrier (repair the fence).

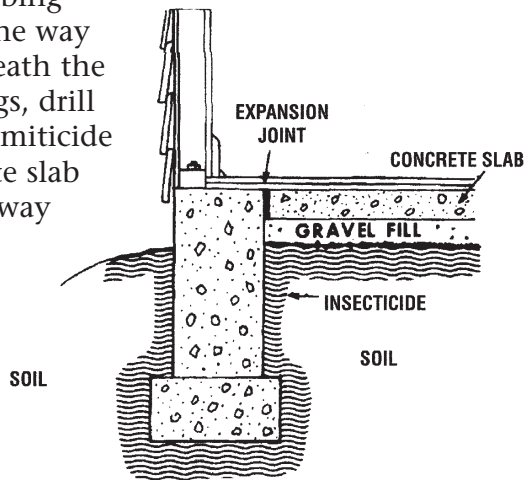
## Treating Homes with Different Types of Foundations

Residential construction in the United States is typically of three types: homes built on concrete slabs with no crawl space or basement, homes with basement walls serving as the foundation, and homes built on foundations with crawl spaces. With all three types, the goal of a liquid termiticide application is to form a chemical barrier in the soil surrounding all structural elements of the house that could allow access to termites.

**Buildings with slab-on-ground foundations.** Homes built on slabs are vulnerable to termite infestation. In this type of construction, termites can enter through cracks in the slab, expansion joints, or spaces around plumbing and utility pipes. One way to treat soil underneath the slab is to pull up rugs, drill holes, and inject termiticide through the concrete slab (Figure 5). Another way is to drill through the exterior foundation walls to a point just below the slab and inject termiticide to form a continuous barrier around the entire interior foundation.

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Think of the termite treatment as a fence.



**Figure 5.** Pesticide treatment for slab-on-ground construction.

Care must be taken to avoid drilling into plumbing or electrical or duct work within the slab.

**Buildings with basement foundations.**

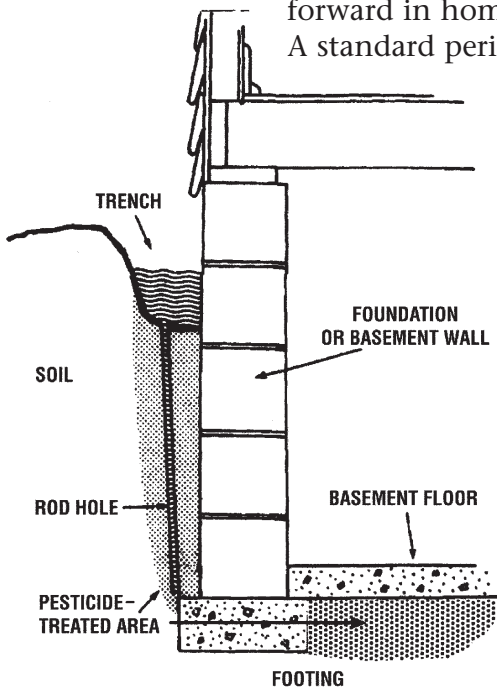
For homes with basements, treatment involves applying termiticides with deep rods to create a chemical barrier all along the foundation wall down to the footing (Figure 6). In addition, holes may be drilled in the basement floor for pesticide injection into the soil below, as with slab-on-ground foundations.

**Buildings with crawl spaces.**

Termiticide treatment is most straightforward in homes with crawl spaces. A standard perimeter treatment is

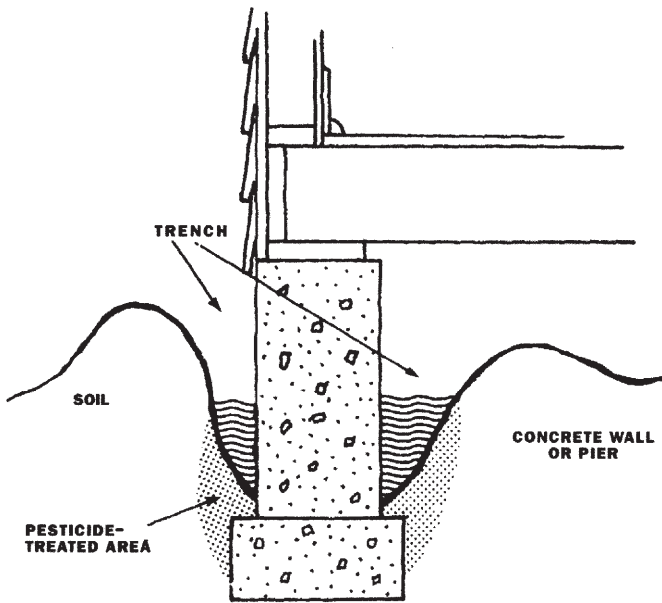
done around the exterior by applying termiticide down to the footings (Figure 7). Within the crawl space, the interior wall of the foundation is treated. It is also critical to treat the soil around and under all piers and supports that could offer bridges for termite access from the soil to the house.

**Foam termiticide applications.** Some pest control companies offer foam termiticide



**Figure 6.** Pesticide treatment for houses with a basement.





**Figure 7.** Pesticide treatment for crawl-space construction.

applications under slabs. Foam formulations contain the same termiticides used as liquids in perimeter treatments, but when injected under a slab the foam distributes broadly and dissolves relatively slowly. This method results in more even distribution of termiticide in the soil and allows a residual layer of chemical on the underside of the slab to come into contact with any termite tubing.

### **Precautions**

- Termiticide treatments near wells, streams, or ponds require special precautions. Discuss these with a pest control professional.
- Prohibit children from playing in soil near a foundation to avoid chemical contact.

(This is a prudent rule for any home because it may have been treated at some point in the past and there may be residual pesticide in the soil.)

## Termite Baits

Your pest management professional may suggest the use of termite baits, either alone or in combination with a complete or localized liquid termiticide treatment. Termite baiting is based on a totally different concept than a traditional soil drench treatment. Instead of applying a chemical barrier designed to exclude the voracious pests from a structure, the technician actually offers termites food sources, called baits. Treatment baits have two components: a matrix containing cellulose (the main constituent of wood and the staple of a termite's diet) and a slow-acting termiticide. Termites feeding on the bait are not killed immediately; they remain alive long enough to recruit nest-mates to the bait and to pass the pesticide to other colony members through food transfer behaviors that are characteristic of social insect colonies. Like a long-term intravenous port delivering drugs to a patient, baits act as an artery for delivery of pesticides into the heart of a termite colony, ultimately leading to the decline or perhaps elimination of the colony. Thus, the goal of termite baiting is suppression of the pest population, not just exclusion, which is the primary objective of barrier treatments. If successful, a termite baiting program may therefore reduce the risk of a reinfestation by the same colony of

termites in subsequent years, although monitoring is recommended, to stay alert to activity of a new or recovered colony of termites entering the area.

Discovery of bait by termites is obviously critical to baiting success, so baits are placed where termites are likely to intercept them. Most commercially available bait systems involve in-ground and aboveground station options. In-ground stations are designed to interest termites as they explore the soil for new resources; when they encounter the bait, they establish the site as a food source for the colony. In the jargon of the bait trade, a "hit" at a station is evidence that termites have attacked the bait matrix. Aboveground bait stations are easier to place directly in the path of active termites because they are installed in areas of known termite activity.

Termite baits are designed to precisely target subterranean termites; the baits are of little interest to other organisms. Baits are considered environmentally friendly because they do not affect other animals, and they use small amounts of pesticide contained within a small station.

For further information about termite baits, see Maryland Cooperative Extension Fact Sheet 772, "Homeowners' Guide to Termite Baits."

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Most commercially available bait systems involve in-ground and aboveground station options.

## Other Treatment Techniques

### **Borates as Wood Preservatives**

Borates have been used as wood preservatives for decades. They pose no significant risks to humans. Over the past decade, borate formulations with residual insecticidal qualities have been developed that can control or inhibit local infestations of

Preferred locations for borate treatments are protected areas.

all wood-destroying organisms (including termites, carpenter ants, beetles, and fungi). Borate applications are not designed to control a widespread subterranean termite infestation, but they are effective in some situations for protecting wood.

The standard borate formulations can be brushed or sprayed onto wood by a licensed pest control operator. Borates are persistent, nonvolatile compounds. They leach out of wood only when water flows over treated areas for extended periods of time. Sealers are recommended after applying borates on exterior wood. Multiple applications of borates on the same wood surfaces (with drying in between) are recommended to build adequate concentrations on the outside of the wood. Preferred locations for borate treatments are protected areas allowing access to large expanses of bare wood, such as attics, crawl spaces, or unfinished basements and garages.

Wood that has been pretreated with borates is available at some lumber yards. This is an option that can be considered for new construction.

## Fumigation

Tarping an entire structure for fumigation is not done on the type of termites native to Maryland. Because subterranean termites in a structure nearly always maintain a linkage to colony mates in the ground, fumigation treatment of a building would not offer lasting protection as termites in the soil could reinvade.

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## Common Questions About Termites and Termite Control

### **Q** *How long have the termites been in my home?*

There is no way to determine precisely how long a home has been infested with termites. Many variables (such as termite colony size and species, type and condition of wood, availability of alternate food sources, and seasonal temperatures) influence the extent of an infestation and the rate of wood consumption by the termites. Frequently, inspectors find no evidence of termites in a structure, only to have the homeowner discover insects and damage during a remodeling project 6 months later. The inspector may have looked very carefully, but most of the structural elements of a home are inaccessible and not visible. Subterranean termites have cryptic habits and may elude

detection for a number of years. One can presume that substantial amounts of termite damage has occurred over years rather than months, but reconstructing the exact time course of an infestation is impossible.

**Q** ***I found evidence of termite damage, but there were no live insects. Is the infestation active? Do I need to treat?***

It is common to see termite damage but no live termites. The termites may have abandoned the site, the damage may indicate an infestation that was treated years ago by a previous owner, or there may still be live termites associated with the galleries, but they are presently working somewhere else in the structure. If you discover wood that you did not previously know was damaged, a professional inspection is warranted.

If you find no evidence of live termites, a few clues will definitely suggest an active infestation. Any sign of moisture associated with the damaged wood, either directly visible or in the form of newly bubbled paint or stained wallpaper over that area, probably indicates a live infestation. If there are mud tunnels or tubes, scrape them away and vacuum up the debris. Check back in several weeks; rebuilt galleries will obviously indicate an active infestation.

**Q** *Should I leave my house during the termite treatment? What about the chemical smell? Should I remove or seal all of the food in the house?*

With the current generation of soil-drench termiticides there is no reason to leave your house during treatment. The chemical smell is not from the active ingredient of the pesticide but rather the emulsifying or mixing agent. Many people prefer to leave the premises because of the smell, but it is not necessary. As long as the termiticide is applied according to label instructions, the applications are not considered dangerous to occupants. There is no need to remove or seal food during treatment.

People should, however, avoid direct skin contact with these pesticides, which is another reason to avoid digging within 2 feet of your foundation in the years following a perimeter termiticide treatment.

**Q** *What questions should I ask a pest management professional before committing to a treatment?*

You need to fully understand the plan and its renewal costs before authorizing or paying for a treatment. For all treatment approaches, inquire about

the warranty: what will the company do if termites reappear in a year, or 2 years, or 5 years? Also ask about specifics of the application. In the case of liquid termiticides, verify that the pesticide will be applied at the maximum label rate and that rodding of the pesticide will be every 6 to 8 inches into the soil.



***How should I select a pest control company to treat for termites?***

As in any decision to purchase goods or services, references from friends and neighbors are a good place to start. Most companies provide free estimates, at which time they discuss a treatment plan, cost, follow-up monitoring or inspection programs, and warranties associated with the treatment. No company will guarantee to eliminate the termite problem forever, but most liquid applications carry a guarantee to re-treat at no additional charge if the insects reappear within a year.

Compare recommended treatment programs and estimates among several companies. A number of termiticides are registered for termite control; use of different compounds and formulations varies among companies. Companies should fully disclose to you the type of chemical they will be using in the treatment.



Companies that are members of the Maryland Pest Control Association and the National Pest Management Association have access to all current treatment practices. You can check a company's reputation by calling the Better Business Bureau. Make certain that the company has an active certification license from the Maryland Department of Agriculture Pesticide Regulation Section.

If you have had a termite problem, it is advisable to purchase an annual contract that includes a yearly inspection and re-treatment if necessary. For bait programs, it is essential to maintain the program. Termite control is difficult. The best company can do a careful and responsible job and still not completely solve the problem. For that reason or in case the termites return, signing up for an annual inspection is recommended.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, University of Maryland, College Park, and local governments. Thomas A. Fretz, Director of Maryland Cooperative Extension, University of Maryland.

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