

Clemson University
Department of Pesticide Regulation

How Pest Management Professionals Protect Your Home Against Wood-Destroying Organisms

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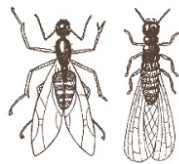
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A Guide for South Carolina Homeowners

Buying a home is the largest single investment for the average American family today. Rising costs of labor and materials make it imperative to protect your investment from structural damage by wood-destroying organisms, especially subterranean termites. Termites are among the most costly of all the insect pests affecting structures. The best way to help ensure protection of your home is to have a subterranean termite control treatment by a licensed pest management professional (PMP). All termite treatments must comply with standards developed by the Clemson University Department of Pesticide Regulation (DPR).

Termites or Winged Ants?



Ant Termite

Because winged termites and winged ants resemble each other, many homeowners may be unable to determine the difference between the two. There are two obvious differences: (1) the front wings on an ant are larger than the hind wings; termites' wings are all the same size; and (2) the winged ant has a definite "waist;" the termite does not.

How Do I Know if my House is Infested?

The most obvious signs of termite activity are swarms during the fall or spring. You can sometimes find discarded termite wings around interior windows in your home. Another visible sign of termite activity is the presence of termite mud shelter tubes. These are usually found on interior foundation walls and piers in your crawlspace. Shelter tubes are a termite's protection from natural enemies. Although subterranean termites usually maintain contact with the soil for moisture, a colony that is already established can become independent of soil contact and get moisture from leaky pipes, gutters, etc. One of the most important elements in guarding your house against termite attack is controlling moisture.

Basic Termite Biology

South Carolina is home to both subterranean and drywood termites.

Eastern subterranean termites are the most common of the native subterranean termite species found in South Carolina. Eastern subterranean termites are small, measuring only 3/8 of an inch long.

The swarmers are dark brown to nearly black in color, and the workers are a whitish color. Like all subterranean termites, Eastern subterranean termites prefer to eat spring wood because it is easier to chew than the summer wood. Spring wood is located between the growth rings; therefore, subterranean termite damage often has a "layered" appearance.



*Eastern subterranean
termite swarmers*

Typical Eastern subterranean colonies consist of about 60,000 to 300,000 or more workers, but much larger colonies are possible. Eastern subterranean termites usually swarm during the spring, from March until May. They normally swarm on warm days after a rain.

Formosan Termites

Another type of subterranean termite that is gaining ground in South Carolina is the Formosan subterranean termite. It is an extremely aggressive species of termite that forms colonies of several million individuals.

Formosan swarmers are yellowish-brown with golden brown heads, a pair of black eyes and 2 pairs of wings of equal length. They are about 1/2 to 3/5 inch long from head to wingtip. The wings are clear with two heavily thickened veins on the leading edge and are covered with small hairs. These hairs are clearly visible under magnification. Formosan termite heads are roundish with somewhat of a pear shape, while their Eastern subterranean termite cousins have long, rectangular heads.



The pear-shaped head of a Formosan termite (left) and the rectangular-shaped head of an Eastern subterranean termite head (right).

Formosan subterranean termites, like other subterranean termites, usually maintain contact with the ground in order to obtain moisture. However, if an adequate source of moisture is available, Formosan subterranean termites are able to form colonies in other protected areas without maintaining ground contact (e.g., wall voids below leaking pipes or air conditioning ducts on which moisture condenses). Formosan subterranean termites build a spongelike material called "carton" in these areas. The carton material may retain moisture for long periods of time, and the colony can survive as long as some source of moisture remains. Even after a treatment, for example, an infestation can persist for some time by surviving on moisture remaining in carton material.

Drywood Termites

Drywood termites are nonsubterranean termites: they live inside wood and do not make contact with the soil. They get the moisture that they need to survive from the humidity in the air. For this reason, drywood termites are most common along the humid coastal areas of South Carolina. Because their colonies are small and difficult to find, they may be in a structure or a piece of furniture for a long time before they are detected. Drywood termites can reinfest after producing swarmers, so older structures are more likely to have multiple infestations than newer ones.



Drywood termite frass

Drywood termite colonies are sometimes noticed when their droppings or fecal pellets are found around the infested site. These termites make small, temporary openings ("kickout" holes) from which they push out fecal material. The holes are later resealed. The fecal pellets are six-sided and about 1/16 of an inch long. They may be black or cream-colored or a combination of both. Fecal pellets are often found in piles and look like tiny stones or salt and pepper

Different Types of Termite Treatments

There are three main types of subterranean termite treatments now available: termite baits, liquid termiticides, and borate products. All three achieve the same result, but they work in different ways.

Termite baits exploit the foraging, feeding, and food sharing behavior of worker termites to spread small amounts of active ingredient throughout the colony. This results in a reduction in the number of foraging termites. As the population of the colony declines, so does the risk of its infesting nearby structures. Consistent and timely inspections of the structure and the termite bait stations are necessary for as long as your pest management professional has the property under contract. Therefore, termite baiting is best described as a "process" and not an "event."



Installed bait station

Liquid termiticides are used to establish a chemical barrier in the soil around the structure's foundation. Termites are almost always present in South Carolina soil, but a properly established chemical barrier can prevent them from gaining access to the structure.

Borate pesticides are used for termite control in a completely different way. These products are applied as a liquid; however, the application is made directly to the wood and not to the soil. This results in a residue of the borate on and in the wood that makes it toxic to the termites. Research has shown that the termites will not tunnel over more than about one to 1.5 feet of borate-treated wood. The most effective time to make a borate application is during the construction of a building because the applicator has access to all framing lumber and can make a more complete treatment.

However, it is possible to make an application of a borate termiticide after the construction is completed. This would, of course, only be appropriate for a structure with a crawlspace which allows access to the wooden floor system.

Control/Prevention Standards

DPR supports pre-treating a structure for termites before it is built. A liquid treatment requires the thorough application of product to cavities in pillars, brick or concrete block walls, voids between brick and block walls or other cavities, and treatment of the soil before concrete slabs are poured.

Pest management professionals must perform the following minimum standards for the prevention or control of subterranean termites:

(1) All cellulose debris (wood such as stumps or construction debris, paper, *etc.*) must be removed from crawlspaces. Applicators must also remove any other debris or rubble that may interfere with a proper treatment.

(2) Any wooden form boards that are in contact with the soil or less than eight (8) inches from it must be removed. Any other contact between wood or other building materials that are susceptible to termites (such as synthetic stucco systems) must be broken by cutting the material off and/or placing it on an impervious base. Treated wood of the proper rating (*i.e.*, ground contact) may be left in place.

(3) All visible and accessible termite shelter tubes on both the masonry foundation and the wooden substructure must be scraped off (not merely broken). Subterranean termite shelter tubes are essentially "termite tracks;" therefore, shelter tubes must also be removed after any re-treatment of the structure.

The above Standards must be completed or waived on every subterranean termite treatment, both pre- and postconstruction, regardless of the method of treatment (liquid, bait, barrier, or a combination). The ventilation Standard, continued below in #6, must be completed or waived on every post-construction treatment.

(4) For conventional liquid treatments, the applicator should cut a narrow trench in the soil around any part of the building that touches the ground: the interior and exterior foundation walls, piers, pillars, and other supports, and pipes. This type of treatment establishes a barrier between the foundation and the soil. If the foundation footings are not covered by soil, the trench should be cut adjacent to, but not below, the footing. If the soil next to the foundation is covered by a concrete slab, the slab must be drilled at intervals of no more than 12 inches and treated at the same rate as the trenches unless the slab is more than 18 inches vertically from the nearest wooden foundation element.

(5) The treatment of hollow voids is also a required part of most conventional barrier treatments, although a few products are beginning to appear in the marketplace that do not require the treatment of voids under all circumstances. Voids must be treated unless they are covered by a solid (*i.e.*, poured concrete) masonry cap; usually only older earth-filled porches are built this way. Voids are normally found in precast-block walls and piers, the bases of chimneys, and between multiple courses of brick. Voids must be treated at intervals of no more than 16 inches. (Voids filled with concrete are no longer required to be treated, provided that test-drilling is conducted to verify that fact.)

(6) Ventilation reduces the overall moisture load in the crawlspace, and so the Standards also require that adequate ventilation be provided. There must be at least one eight (8) by 16 inch foundation ventilator for every 150 square feet of crawl space, with no "dead ends" or corners left unventilated.

(7) There must be enough clearance in the crawlspace to allow a good inspection to be made and for the application of control measures. Eight inches of clearance is the absolute minimum, and applicators must excavate the crawl space to provide at least this much clearance between the soil and the wooden substructure.

(8) The same general principles apply to slab construction, although they are applied using different techniques. For structures built on a concrete slab the soil beneath all points of potential termite entry must be treated, usually by drilling holes and pumping termiticide under pressure into the soil beneath interior and perimeter expansion joints, plumbing pipes, and voids. Expansion joints must be treated at intervals of no more than 12 inches, and voids must be treated at intervals of no more than 16 inches, just as in the Standards above. Drill holes in slabs must be no more than 12 inches away from the construction feature being targeted.

(9) Open bath traps (bath traps where soil is visible) must be accessed and treated so that subterranean termites will not enter the structure from these areas.

(10) Finally, the Regulations require that inspections be conducted in accordance with the terms of the warranty or the product label, whichever results in more frequent inspection of the structure.

Annual Inspections for Subterranean Termites

When a contract is maintained, PMPs will inspect your home annually to ensure that no termites are active. Annual re-treatments are not necessary, and are in fact prohibited by many product labels. Most termiticide labels direct the PMP to retreat only when there is evidence of reinfestation.

The annual renewal fee that you pay is similar to an insurance premium, and it covers the cost of the annual inspection and continuation of the guarantee coverage. The scope of coverage may differ from company to company. The Department of Pesticide Regulation neither regulates this function of a pest control company, nor do we regulate the costs of contracts and/or termite treatments. Ask your PMP what types of contracts are available and the coverage they provide.

If It's Not One Thing, It's Another

Termites aren't the only pests that can invade and infest your dream home. There are other wood-destroying organisms that can cause a mess, such as wood boring beetles, wood-decay fungi,

Wood Boring Beetles

Most of the major beetle pests of wood start their destruction by laying eggs in holes, pores, or in cracks on or at the end of lumber. After hatching, the tiny grubs will bore into the wood. Thus, the beetle larvae are nearly always found inside the wood. The larvae eat the wood and fill the tunnels with frass. As you might expect, the consistency and appearance of frass varies depending on the species.

There are several species of wood boring beetles that can potentially cause problems in structures, but for the purposes of this publication, the two most common will be discussed: powder-post beetles and the old house borer.



Powder-post beetle damage

Powder-post beetles are very common in South Carolina. Their exit holes are about the size of a pencil lead and are made as the adults come out of the wood. The presence of powder-post beetle emergence holes alone does not indicate an active infestation. If their frass (usually very fine and sawdust-colored) is seen streaming out of the exit holes and accumulates into noticeable piles, then you probably have an active infestation. Your pest control company should re-inspect your home to determine whether there is any recent activity. Damage from powder-post beetles progresses slowly, so you will have ample time to treat if your house is infested.

Old house borers belong to a group called cerambycid beetles. They are sometimes called longhorned beetles. The old house borer is the only cerambycid beetle that infests seasoned lumber, and it has never been found anywhere other than seasoned lumber. Old house borers infest seasoned softwoods, especially pine. They can occasionally be found in old houses, but they are actually more common in new homes. In South Carolina, it's most common for active old house borer infestations to be found in structures 10 to 15 years old. The newly-hatched larvae penetrate into the wood to feed, but they often stay near the surface. Larvae usually require two to three years to develop in moist new wood, but they can take as long as 15 years to develop in very dry or older wood. The frass of old house borers consists of a very fine talc-like powder with small elliptical pellets mixed in.

Streaming frass is not enough evidence to call an old house borer infestation "active." Fortunately, the larvae are relatively easy to collect from the wood. Capturing one is enough evidence to establish an active infestation. Alternatively, larvae make a distinctive gnawing noise (like bacon frying), so hearing the noise would also be enough evidence to determine an active infestation.

There are also a few tricks that you can use to determine if you have an active infestation when things aren't so clearcut. If you see any new emergence holes, mark the old emergence holes with a pen or spray paint, or cover them with tape. If new holes appear, you have an active infestation. If there's new frass, sweep or vacuum it up. If it reappears, then you likely have an active infestation.

When you have determined that a structure has an active infestation of wood boring beetles, then this four-step control process should be followed:

- Have the species of beetle correctly identified. If you're unsure, contact your local county extension office for advice.
- If there is a small infestation, the best way to rectify it is to have the infested wood removed and replaced with new wood. Obviously, the infested wood pieces must be destroyed.

- If there is a widespread and accessible infestation (or if removal and replacement is not desirable or practical), chemical treatment is warranted. Thoroughly apply a surface treatment with an appropriately labeled pesticide. Be aware that surface treatments work by interrupting the cycle of re-infestation, rather than immediately killing the insects that are already in the wood. Therefore, it can take several weeks (even up to the complete lifecycle of the pest) to be effective.
- Fumigation is appropriate when the infestation has spread to inaccessible areas, when the infestation is so large that the potential for further damage is unacceptable, or when immediate control is the only acceptable option.

Wood-decaying fungi can potentially cost homeowners thousands of dollars in repairs. Believe it or not, fungi cause more damage than subterranean termites. Decay fungi require a minimum moisture content of 28% and above for growth, but they can remain “dormant” in wood for long periods of time until the right moisture conditions come along.

On a Wood Infestation Report, “excessive” moisture conditions begin at 20%. Active decay begins at 28%.

The optimum temperature range for fungal growth is between 70 and 80 degrees Fahrenheit. Fungi are inactive at cooler temperatures, and die if the temperature rises above 105° F. But fungal spores, which are fungal “seeds,” can survive great extremes of temperature and other environmental conditions. Spores get into houses through the air, or may be in the wood that is used for building the house itself. Fungal spores are virtually everywhere, waiting patiently for conditions that allow them to grow.



Wood-decaying fungi. damage

It is easier to prevent fungi than to get rid of it. Use vapor barriers to prevent condensation from forming on the wood in the substructure. Wood-to-ground contact should be eliminated. Also, make sure that there are no problems such as leaking plumbing pipes or condensation from heating and cooling system ductwork.

Wood Infestation Reports

The Wood Infestation Report (WIR) is used in real estate transactions to inform the lending institution and buyer of the results of an inspection that is performed by a pest management professional. As a protective measure, banks and lending institutions require that homes be inspected for damage from termites and other wood-destroying organisms before they will loan money on the home.

A Wood Infestation Report is a report of visible infestation and damage caused by insects (e.g., termites and beetles) and decay in accessible areas of the structure at the time of the inspection. Hidden or inaccessible areas are not inspected. The inspection for fungi, decay damage, and excessive moisture conditions is limited to those parts of the structure that are below the level of the first main floor. This primarily means those parts of the wooden substructure that are visible and accessible from the crawlspace or basement, but it also includes areas such as the bottoms of door jambs, the lower edges of siding, and similar locations. It does not include the window sills, soffits, or any portion of the structure higher than the level of the first main floor.

The Wood Infestation Report is sometimes inappropriately referred to as a “clearance letter” or a “termite letter.” It is not a “clearance letter” in that it does not necessarily “clear” a structure. It is not a “termite letter” because it addresses more than just termites. As noted before, the Wood Infestation Report is used to report the presence or apparent absence of any wood-destroying organisms, or their damage at the time of the inspection. Pest management professionals are required **BY LAW** to report any damage or wood-destroying organism activity on the Wood Infestation Report. If they do not, the Department of Pesticide Regulation will take appropriate enforcement action. A PMP may submit a bid to treat and stop such activity; however, it is up to the seller/buyer to obtain a contract to have the activity stopped.

Please note that pest management professionals are NOT responsible to report to you any type of health-related fungi, mold, or mildew that they may find under or around your structure or home. They are only responsible for reporting the presence of any wood-decaying fungi.

Please understand that the WIR is not a structural damage report. It is simply a description of any visible activity or damage made by wood-destroying organisms. A qualified building expert should be consulted to determine the extent of the damage and whether repairs are necessary. If you suspect that an improper WIR has been issued, contact DPR at 864.646.2150 or select the Request Our Assistance option on our website at clemsont.edu/dpr.

Checklist for Selecting a Pest Control Company

- ▶ Get several bids, which usually are free, from different Pest management professionals. While looking at bids, compare not only the “up-front” costs, but also compare the annual fees to maintain the coverage. In comparing companies, inquire about what type of coverage is offered, along with the provisions for transferring the coverage to a new owner if you sell the house.
 - ▶ Ask the company for references and check them out. Ask friends and neighbors to recommend a firm.
 - ▶ Get a termite contract. Contracts are usually written for five to 10 years. The most useful contracts cover damage, namely treatment and repair.
 - ▶ Have your house inspected regularly for termites.
 - ▶ A licensed company must place its yellow pesticide sticker, business license number, company name, and location on their company trucks.
 - ▶ To learn whether a company is licensed, call the Clemson University Department of Pesticide Regulation at 864.646.2150. To learn about a company’s history, please visit our Enforcement Database at regfocus.clemson.edu/dpr/greenbook.htm.
 - ▶ Trust your instincts—if the pest control service you’re working with doesn’t treat you or your concerns with courtesy and professionalism, it may be time to find another company!
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