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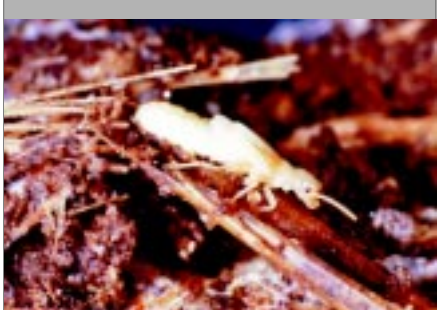


Subterranean Termites: Detection and Control

The prevention and control of subterranean termites accounts for approximately 26 percent of all pest control industry revenues in the United States. In 2004, it is estimated that these termite revenues will be in excess of $2 billion. The cost to repair the damage caused by subterranean termites easily exceeds $2 billion a year. However, along with the potential business from this market segment comes the potential for liability in the form of termite damage claims and litigation. This pest management bulletin will focus on two of the most important aspects of termite management – detection and control, and their potential for causing liability to PMPs.

BIOLOGY

As social insects, termites live in groups or populations usually referred to as colonies. Depending on species, location and age of the colony, a single colony can contain from a few thousand to several million termites. Currently, colony structure is thought to be in the form of a diffuse network of satellites or nodes connected by tunnels or galleries. There is no central colony headquarters. Immature and reproductive forms can be found dispersed throughout the colony.

Linear foraging distance for subterranean termites can range from less than 10 meters to more than 100 meters. Estimated foraging area for subterranean termite colonies ranges from less than 10 square meters to several thousand square meters. Given the diffuse nature of termite colonies, their potential linear foraging distance and foraging areas, it is likely that a termite colony will feed at several different sites at any given time.

Of all the environmental factors necessary for sustaining subterranean termites, moisture is probably the most important. Subterranean termites lose moisture through their exoskeleton and, unless there is a readily available supply of moisture, they will either abandon the location or they will die. Moisture can be obtained from wet wood, soil or moisture-laden air. Wood with moisture content above 15 percent by weight may be sufficient to support subterranean termite activity and survival. Optimum temperatures necessary for subterranean termite activity range from 75° F to 95° F and will vary somewhat among species. Feeding diminishes above or below this range.

There are currently six species of subterranean termites in the genus Reticulitermes known to occur in North America. They are:

1. *Reticulitermes flavipes* (eastern subterranean termite)
2. *Reticulitermes virginicus* (dark southern subterranean termite)
3. *Reticulitermes hesperus* (western subterranean termite)
4. *Reticulitermes tibialis* (arid land subterranean termite)
5. *Reticulitermes hageni* (light southern subterranean termite)
6. *Reticulitermes arenicola* (sand-dwelling subterranean termite)

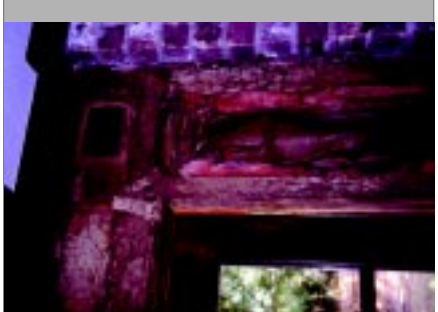
Four additional subterranean species are also found in the U.S. including:

1. *Coptotermes formosanus* (formosan subterranean termite)
2. *Coptotermes havilandi* (* no common name)
3. *Heterotermes aureus* (desert subterranean termite)
4. *Prorhinotermes simplex* (Florida damp wood termite)

All 10 species listed above are capable of damaging structures – some more than others. The eastern and western subterranean termites and the Formosan subterranean termite account for the largest share of structural damage in the United States.

Mud Tube

Discarded Wings



INSPECT

Generally, there are relatively few visible signs of incipient subterranean termite infestation in most structures. Since they are primarily soil-dwelling insects, they often enter structures completely undetected through elements of construction. It is not until they swarm or produce visible damage on or in the structure that their presence may be noticed. When subterranean termites attempt to enter a structure over an exposed structural element, such as a perimeter foundation wall or pier, they risk the drying effects of air and the possibility of attack by predators. To avoid these conditions, they construct earthen or mud shelter tubes over the surface of exposed areas. These mud tubes are common signs of subterranean termite infestation.

Another sign of subterranean termite infestation occurs when large numbers of winged termites or alates swarm from the wood in an infested structure. The presence of a large number of discarded wings on the floor beneath windows or on windowsills suggests that winged termites have emerged from within the building. While it is typically thought that a subterranean termite colony producing winged reproductives is considered to be well established and usually containing at least several thousand colony members, this is not always the case. Small numbers of termites isolated above ground in structures as a result of treatment with repellent termiticides can, if sufficient moisture is available, produce swarming termites within the first year of their isolation from the original colony. The total number of termites in these isolated colonies may not exceed 200 or 300, yet are capable of producing winged reproductives.

The cryptic nature of termites and the complexity of building design and construction can make it virtually impossible to find visible evidence of infestation in some infested buildings. As a result, termite inspectors must be thoroughly trained in termite biology, building construction methods and inspection techniques before they are allowed to inspect buildings unsupervised.

Most termite inspections done today are limited in scope to the visible accessible areas of a structure and rarely, if ever, involve destructive testing such as removing wall, ceiling or floor coverings. Inspectors search for visible signs of subterranean termite activity including mud tubes, the discarded wings of alates and visible damage done by termites.

At a minimum, the tools a termite inspector should use include:

- Flashlight
- Graph paper for preparing a diagram
- Pick/probe for probing and sounding suspect areas
- Ladder for reaching overhead areas
- Moisture meter for detecting moisture from leaks and other sources
- Camera to document conditions
- Safety equipment for inspection of crawl spaces, and/or attics

Finally, a professional subterranean termite inspector must have enough time to perform a thorough inspection. It is unlikely that a thorough professional termite inspection on even a small slab foundation home can be completed in less than 45 minutes. Larger homes with crawl space foundations may take as long as 90 minutes or longer to inspect thoroughly.

As mentioned above, it is entirely possible for a building to be infested with subterranean termites and not have any visible signs in accessible areas. As a result, the use of termite detection stations around the exterior perimeter of the building can be an important tool for early detection of termite activity around the building. The use of Whitmire Micro-Gen's termite monitoring stations such as PT® 702 or PT 707 are ideal components of a truly integrated termite monitoring system.

PT 702

PT 707

A newer and more innovative method of subterranean termite control was initiated in the mid 1990s called termite baiting.

Advance® Termite Bait System

1. Quick-Lock™ cap
2. Termite Inspection Cartridge (TIC)
3. Termite Monitoring Base (TMB)
4. Termite Bait Station (TBS)
5. Termite Bait Cartridge (TBC)

PRESCRIBE

If termites are found during an inspection, the PMP will typically prescribe a treatment for the structure. There are a number of variables that must be considered before a treatment plan can be prescribed:

- Species of termite and the locations and extent of the infestation
- Type of foundation and building construction and environmental factors such as proximity to lakes, rivers, streams, water wells
- Soil type and landscaping practices
- Customer concerns and previous infestation and treatment history
- Potential legal and regulatory issues
- Time, tools and materials required to complete the job
- Pricing and warranty considerations

TREAT

Currently in the United States, there are two primary methods used to treat subterranean termite infestations in buildings: 1) conventional soil treatment with liquid termiticides and 2) termite baits.

Application of liquid termiticides to create a barrier between the termites in the soil and the wood (cellulose) in the building has been the primary method of treating subterranean termites for more than 60 years. Current liquid termiticides fall into one of two categories based on termite response: repellent or non-repellent. All of the pyrethroid termiticides currently used are repellent to termites and, while fully capable of killing termites, function primarily as repellents in keeping termites from entering structures.

The newer non-repellent termiticides are relatively slow acting and while they do not immediately stop termite activity in or around the structure, they ultimately cause the demise of a greater number of termites in the colony than repellents, although no definitive colonly elimination studies have been published to date.

A newer and more innovative method of subterranean termite control was initiated in the mid 1990s called termite baiting. This method uses a highly palatable food source to entice subterranean termites to feed in bait stations installed in the soil. Once termite feeding becomes established, a bait matrix containing a slow-acting termiticide is introduced into the bait station. Because termites use a form of social food sharing known as trophallaxis, termites feeding on the bait toxicant ultimately share the toxicant with other colony members during food exchange. This mode of action can lead to elimination of the colony. The active ingredients used in termite baits today include neurotoxicants, metabolic inhibitors and chitin synthesis inhibitors such as diflubenzuron and hexaflumuron.

While many structures are currently protected with conventional liquid treatments or termite baits, a large number of homes and other buildings are receiving hybrid treatments where termite baits are used along with spot applications of liquid termiticides. Other methods of termite control currently in use include treatment of above ground wood with borates, termite shields, stainless steel mesh to create physical barriers between the structure and the soil, termiticide-impregnated plastic films and particulate barriers such as sand and basaltic rock. Also in wide use, the localized treatment of termite-infested wood has become a common practice. One of the most widely used products for localized wood injection is Cy-Kick® crack & crevice® pressurized residual.

If, after a thorough inspection of a property and homeowner interview, you decide that baiting or the combination of baiting and liquids is the primary treatment technique necessary for the control of a subterranean termite infestation, you will want to select the best designed termite bait system on the market. The Advance Termite Bait System is, without a doubt, the most innovative termite baiting system available.

Installing and maintaining the Advance Termite Bait System is easy and straightforward:

1. Place station around the home at 10-foot intervals. Be sure to locate stations adjacent to any known sites of termite infestation or activity.
2. Drill holes in the soil with a gasoline-powered soil auger and 2 1/2 inch bit. Place the stations in the hole and press firmly into the ground.
3. If termites are active and/or in the structure at the time of installation, inspect the stations at 45 and 90 days from the install date and approximately every 90 days thereafter. If no termite activity is detected at the time of installation, then the first inspection is approximately 90 days after installation and approximately every 90 days thereafter. Following the initial installation, if termites are detected in the stations, the inspection interval remains approximately every 90 days.

The Spider attached to the Advance Termite Bait Station.

Extension handle (sold separately) attached to The Spider.

For additional information, literature and photos, visit www.advancetbs.com

4. To inspect the station, remove the station cap with The Spider™ station access tool, than remove the Termite Inspection Cartridge (TIC) with the cotter pin or needle nose pliers. Termite feeding activity within the TIC can be readily detected by finding termites in the cartridge, by evidence of their feeding on the compressed cellulose tablets, and/or by the presence of mud in or around the cartridge or the Termite Monitoring Base (TMB). If no termite activity is present, replace the TIC in the bait station until the next monitoring period. The TMB does not have to be removed during routine inspection.
5. If termites are detected in the TMB or in the TIC, the TIC is replaced with an Advance Termite Bait Cartridge (TBC) containing 93 grams of 0.25% diflubenzuron. Remove the plastic wrapper around the TBC before installing the cartridge in the bait station.
6. The termite bait station is now inspected every 90 days. The TBC is replaced as necessary per label instructions. Then the TBC is replaced with a TIC and monitored every 90 days.

COMMUNICATE

In professional termite control, communication with the customer is essential and should begin prior to performing an inspection and continue throughout the termite management process. It's especially important to interview the customer to learn as much as you can about the history of the house, construction techniques used, any repairs or additions to the structure, and termite infestation and treatment history.

After your inspection, inform the customer of your findings and recommendations for treatment. Be forthcoming with the customer regarding the correction of any conditions which may be conducive to termite infestation or which may interfere with inspection or treatment of the structure. Explain these items clearly, document them on the initial inspection diagram and provide this information to the customer in writing.

Another benefit of using a quarterly baiting system such as the Advance Termite Bait System is the opportunity to communicate with the customer on a quarterly basis instead of annually, as you would with liquids. This is the time to discuss the status of the baiting process and to remind the customer of the importance of eliminating conditions that promote termite activity or interfere with the control program. It has been said that most lawsuits filed against PMPs regarding termite work are primarily due to a lack of effective communication. Don't let this happen to you. Be completely forthcoming with your customer and stay in touch. Also, don't miss the opportunity to combine termite control with Advance along with general insect control.

FOLLOW-UP

Continual follow-up is essential in any termite management program. Whether baiting or using conventional liquid treatments, the primary follow-up procedure is the post-treatment annual inspection. While termite bait systems are often inspected monthly or quarterly, this is not the same as an annual inspection of the structure for evidence of termite infestation. Annual inspections may very well be the most important inspections done on any structure being managed for termites. Thoroughness is absolutely essential.

If a re-occurrence of termite infestation of the structure is not detected during the annual inspection, it may be 12 months before another opportunity to find any re-infestation presents itself. Of course, during that time period, the level of damage may become worse and the infestation more extensive use. Use annual inspections to remind customers of their responsibility in correcting conditions conducive to infestation by subterranean termites or conditions that may reduce the effectiveness of treatment or make inspection difficult. Communication with customers about these issues is important and should always be in writing.

For additional information about the Advance Termite Bait Station, please consult our website at www.advancetbs.com.

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