



ENTFACT-639

TERMITE BAITS: A GUIDE FOR HOMEOWNERS

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No structural pest causes more confusion than termites. Most homeowners have little knowledge of these troublesome insects, and what it takes to get rid of them. Our understanding of termites has progressed considerably in recent years. New management tools have begun to emerge, including the use of baits. As more termite control companies begin to offer baiting as an option, homeowners will have many questions. This publication will help them make a more informed purchasing decision.

TERMITES IN PERSPECTIVE

Subterranean termites, the variety common to Kentucky and most other states, typically live below ground in highly organized societies or “colonies.” Termite colonies can be enormous; in fact, a single mature subterranean termite colony may contain several hundred thousand members, occupying many nesting and foraging sites in the soil. The tiny, cream-colored workers, the lifestage doing the damage, can also forage considerable distances -- in some cases as much as the length of a football field! Consequently, the termite colony or colonies responsible for damage may actually be located in a neighbor’s yard, rather than beneath the house that is infested.

Subterranean termites excavate narrow, meandering tunnels through soil, eventually encountering wood, their primary food. Decaying tree roots, logs, stumps, woodpiles, and plant debris afford a ready and abundant supply of food for the colony. In nature, termites are very beneficial since they aid in the decomposition of wood and the recycling of nutrients back to the soil. Occasionally, during their random foraging, termites encounter wood associated with buildings. Once a suitable feeding site is found, the workers establish an invisible odor trail to attract other termites to the structure.

Subterranean termite infestations can go undetected for years, hidden behind walls, floor coverings, and other obstructions. Over time, significant damage can result. The small size, cryptic nature, and tenacious foraging habits of these insects also pose a formidable challenge to control efforts. Unlike other repair-oriented

services, such as plumbing or electrical work, termites are living creatures. The most persistent control efforts may fail at times, reinforcing the need for alternative forms of management.

CONVENTIONAL (BARRIER) TREATMENT

For years, the standard method of controlling subterranean termites was to apply a liquid pesticide, known as a termiticide, to the soil. The goal was to create a continuous chemical barrier around and beneath the structure in order to block all potential routes of termite entry. Termites attempting to penetrate through the treated soil were either killed or repelled. In actual practice, there are many obstacles to achieving such a barrier. Many potential termite entry points are hidden behind walls, floor coverings, and other obstructions. Even where access for treatment is possible, it is hard to uniformly wet soil and achieve thorough coverage. A typical “barrier” treatment may involve hundreds of gallons of termiticide solution injected into the ground alongside the foundation, beneath concrete slabs, and within foundation walls. Considering that termites can tunnel through small untreated gaps as narrow as pencil lead in the soil, it is understandable why conventional liquid treatments sometimes fail to correct a termite problem.

Despite large amounts of pesticide applied, barrier treatments do little to reduce termite colonies or groups of termites foraging in the vicinity of a structure. Over a period of time, termites foraging randomly in the soil may encounter an untreated gap through which to penetrate, or termiticide residues in the soil that are no longer effective. (For more information on this method of treatment, see *ENTFACT-604; Termite Control: Answers for the Homeowner*).

ALTERNATIVE APPROACH: TERMITE BAITS

Termite baits are a whole different concept. With this approach, small amounts of material are deployed like edible “smart missiles” to knock out populations of termites foraging in and around the structure. Some baits may even eradicate entire termite colonies. A comprehensive baiting program then seeks to maintain a termite-free condition on the customer’s property

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through ongoing monitoring and rebaiting as needed.

Termite baits consist of paper, cardboard, or other "termite-friendly" food, combined with a slow-acting substance lethal to termites. The bait must be palatable enough that termites will readily consume it, even in the presence of competing tree roots, stumps, woodpiles and structural wood. If the bait kills too quickly, sick or dead termites may accumulate in the vicinity of the bait stations, increasing the chance of avoidance by other termites in the area. Delayed-action also enhances transmission of the lethal agent to other termites, including those that never fed on the bait. Theoretically, entire colonies could be eliminated in this manner, although total colony elimination may not be necessary to afford structural protection.

PATTERN OF USE

Various methods of termite baiting are now being employed by professional pest control firms. Some bait products are inserted below ground out in the yard, whereas others are installed above ground level on the inside of the structure. On some properties, baits may constitute the only form of treatment; on others, they may be supplemented with either a partial or complete liquid (barrier) application.

Installation Below ground- Baits are deployed below ground by enticing termites to feed on wooden stakes, cardboard, or some other cellulose-based material. The toxicant-laced bait can either be installed initially, or substituted after termites have been detected in an untreated monitoring device. Termites cannot see or smell the baits underground; they encounter them by chance during their random foraging activities. To increase the odds of discovery, the stations are installed at fixed intervals around the perimeter of the structure, and/or in suspected areas of termite activity (e.g., around woodpiles, stumps, moist areas, and adjacent to previous termite damage). With persistence and a little luck, the termites eventually find and feed upon one or more of the bait installations.

Perhaps the greatest difficulty in below-ground baiting is getting termites to find the baits in the first place. Bait discovery will vary from property to property, depending on such factors as termite foraging intensity, time of year, moisture, and food availability. On one infested property in Kentucky, more than a dozen monitoring devices were "hit" (attacked by termites) within two weeks of installation; on another home in the same neighborhood, no below-ground stations were attacked during a full year of intensive monitoring despite two concurrent termite swarms

inside the home. Similar variances in bait detection have been reported elsewhere in the country. In temperate climates such as in Kentucky, bait discovery usually will be greatest during peak foraging periods in the spring and summer. Baiting during late-fall and winter is generally less fruitful, although termites are occasionally found in below ground stations when air temperatures are in the 30°F range.

The more below ground baits installed, the better the chances of locating termites. Installing more stations increases the odds of encountering multiple colonies, or weakly associated "satellite nests" of the same colony -- any of which could be of potential risk to the structure. Planning, patience and persistence are requisites for successfully using below-ground termite baits. *Regardless of which product is used, the homeowner must be prepared and willing to accept the possibility of a lengthy baiting process.*

Above-ground installation- Termite baits may also be installed above ground, in known areas of termite activity. Typically, the stations are installed directly in the path of active termite tunnels after the mud tubes have been broken. Effects tend to be more rapid with above-ground baiting, since the procedure does not depend upon "chance" termite encounters with the stations.

It is too soon to know whether structural infestations can routinely be "eliminated" with above ground baits alone. Manufacturers currently recommend that they be used in conjunction with other forms of treatment, such as in-ground baiting or conventional barrier treatments. Nonetheless, above-ground baits provide an excellent opportunity for introducing slow-acting toxicants directly into structural termite infestations.

COMMERCIAL BAIT PRODUCTS

Following is a description of the commercial bait products and programs being offered by a growing number of professional pest control companies. All of the products mentioned are still quite new, while others not listed are in various stages of development. Interested homeowners may need to call around to locate which companies are using which products.

SENTRICON(TM) SYSTEM. This method of termite baiting has been the most extensively tested of those currently on the market. Consequently, it will be discussed in some detail. The *Sentricon Colony Elimination System* was developed by DowElanco (Indianapolis, IN; 800/678-2388), and is sold only through authorized pest control firms. The bait contains a slow-acting ingredient which disrupts the

normal growth process in termites (i.e., termites die while attempting to molt).

Termite control with the Sentricon System(TM) entails a 3-step process: (1) initial monitoring to “pinpoint” termite activity, (2) delivery of the bait, and (3) subsequent monitoring to provide on-going protection (Figure 1.)

Step 1. Monitoring- Termites are detected by installing plastic monitoring stations around the perimeter of the building. The station housing is a hollow green plastic cylinder, about 10 inches long by 2 inches wide, with slits along the sides for termites to enter. Initially, each station is provisioned with two untreated pieces of wood, intended as monitoring devices for the presence of termites in the area.

The station is inserted into an augured hole in the ground, with the cover flush with the soil surface. Monitoring stations are installed around the outside perimeter of the building, at about 10 to 20 foot intervals alongside the foundation. Narrower intervals, while more effort to install and inspect, increase the odds that termites will encounter them during random foraging. Patios, driveways, and other paved areas are not a serious problem unless soil access is prevented around the majority of the structure. Oftentimes, stations can be installed farther out from the foundation, or in adjoining planter boxes.

As a supplement to installations along the foundation, additional stations are installed in suspected termite foraging areas, such as adjacent to pre-existing termite damage, stumps, woodpiles, or moist areas on the property. Periodically thereafter (monthly, bimonthly, etc.) the wood monitoring devices within each below-ground installation are inspected for termite presence.

Step 2. Bait Delivery- When termites are found in a monitoring device, the untreated wood pieces are replaced with a perforated plastic tube containing the bait -- white “paper toweling” treated with the slow-acting termite growth inhibitor. To hasten the overall process, termites feeding on the wood pieces are carefully dislodged and placed within the Baitube. Eventually, these termites tunnel through and out of the perforated tube, reuniting with their nestmates in the soil. In doing so, they leave behind a colony-specific “scent” that promotes recruitment of other nestmates to the bait. In order to promote additional “hits,” a pair of auxiliary monitoring stations, provisioned with wood pieces, are installed adjacent to stations receiving Baitubes.

Inspection of all Sentricon stations, with and without substituted bait tubes, continues until no more live termites are discovered. Empty, moldy or degraded baits are replaced, and additional auxiliary stations added as deemed necessary.

Step 3. Continued Monitoring- After termites are no longer found in installed Baitubes, the tubes are once again replaced with untreated wood pieces and monitoring continues. Even if the termite colony threatening the structure has been eliminated, termites from neighboring colonies can reinfest the area. Reinfestation can also occur if only part of the original colony or colonies was eliminated. Consequently, structures protected with the Sentricon System(TM) will need to be continually monitored to guard against reinvansion from new colonies or previously suppressed ones. Depending upon conditions, the pest control firm will continue to monitor at three- to four-month intervals *for an indefinite period*, after the termite population is deemed to have been eliminated.

Independent research studies, including some performed in Kentucky, indicate that the Sentricon(TM) *Colony Elimination System* can be an effective termite control option. A number of these studies involved structures with chronic termite infestations. Despite Sentricon’s clearcut potential, thoroughness and persistence are requisites for success -- as is true for any termite management program.

FIRSTLINE(TM)- Another recently introduced product is the *FirstLine (TM) Termite Bait Station*, manufactured by FMC Corporation (Princeton, NJ). The product is intended for above-ground baiting of active termite tubes. The station consists of a semi-transparent plastic housing (4x4x1-inches) with open slots at the base. Contained within is corrugated cardboard treated with a slow-acting ingredient lethal to termites.

Installation is accomplished by securing the station at the leading edge of a previously broken, active termite tube. Termites construct such tubes as they travel over foundations, floor joists, and other exposed surfaces. FirstLine (TM) stations must be installed on flat surfaces, so that the base of the station meets the tube. Installation is completed by attaching the plastic housing to the surface (wood, masonry, etc.) using tamper-resistant screws. When the station is installed correctly, the termites rebuild the tube into the station and feed on the insecticide-treated cardboard. New stations may need to be substituted as baits are depleted.

It is too soon to know whether structural infestations can routinely be “eliminated” with this product alone. The manufacturer currently recommends that FirstLine(TM) Bait Stations be used in conjunction with other forms of treatment, such as in-ground baiting or conventional barrier treatments. Additional research and field experience with the product are needed to delineate effects against structural infestations.

Another formulation of *Firstline(TM)* was recently introduced for below ground use, *FirstLine GT(TM)* (“GT” stands for ground treatment). Label directions emphasize placement of baits in areas where termite activity is known or suspected, i.e., installation may not involve insertion of baits at fixed intervals around the entire perimeter of the building as is required with the Sentricon system. *Firstline (GT)* may be installed in the soil initially, in effect, by-passing the unbaited monitoring step utilized with Sentricon.

As with the *FirstLine(TM)* bait station for above ground use, it is too soon to predict how effective this product will be in protecting structures from termites.

SUBTERFUGE(TM) SYSTEM- One other below-ground termite bait that will be marketed in 1997 is *Subterfuge(TM)*, manufactured by American Cyanamid (Princeton, NJ). As of this writing, effectiveness of the product has not yet been demonstrated under Kentucky termite conditions.

BAITS OR BARRIERS...WHICH IS BETTER?

This is the most common question from homeowners trying to decide which form of treatment to purchase. The question is a difficult one, considering the industry’s limited amount of experience with the new bait products. Liquid barrier treatments have been the standard method for controlling subterranean termites for decades. Not to say that there haven’t been performance failures and other problems; but for the most part, barrier treatments have afforded adequate termite protection. Although baiting clearly has potential advantages (see below), the approach does not yet have a long-term track record on which to base its performance. Other factors to consider in the purchasing decision include:

1. *Has the structure already been treated (unsuccessfully) using conventional methods?* Some structures have construction features that interfere with conventional soil treatment methods, e.g., wells, cisterns, plenums, subslab heating ducts, drainage systems, inaccessible crawl spaces, stone foundations, etc. Buildings with hard-to-treat construction or

chronic retreatment histories are logical candidates for termite baits. With baits, gaining access for treatment is seldom a problem since foraging termites are as likely to encounter below-ground bait stations around the foundation exterior as beneath the structure. In respect to contamination of wells, heat ducts, drainage systems, etc., baits are of negligible risk and can be used in the most sensitive treatment situations.

2. *Are you opposed to having your floors drilled, and furniture/stored items/carpeting moved?* Baiting requires fewer disruptions than does conventional barrier treatment. Installation and subsequent monitoring of bait stations generally does not even require the technician to come indoors. Noise, drill dust, and similar disruptions associated with conventional treatment are avoided.

3. *Are you strongly opposed to the use of pesticides around your home?* Based on the current body of scientific research, conventional liquid termiticides pose no significant hazard to humans, pets or the environment when applied according to label directions. In spite of the negligible health risk from such treatments, some individuals are still apprehensive. Chemically-concerned homeowners may find the concept of baiting more attractive. With baits, the total amount of pesticide applied is minute in comparison to the high gallonages needed to achieve a thorough and effective soil barrier treatment.

4. *How much are you willing to spend for termite protection?* Termite treatments are rather expensive, ranging in price from about \$500-\$2000. Along with the initial treatment fee, homeowners are advised to purchase a renewable service agreement (warranty) in case the termites return. Depending upon the circumstances, a baiting program may end up costing more than a conventional treatment -- the reason being that baiting programs require multiple visits to the property for ongoing monitoring of bait stations. This is especially true in respect to purchase of the renewable service agreement. Whereas conventional treatments typically entail a single annual followup inspection, baiting contracts may require three or more visits per year, for as long as the agreement is in effect. (Thus the annual renewal fee for baiting typically will be as much as two to three times higher than for conventional treatment). Homeowners should consider both the initial treatment price and renewal fee in making their purchasing decision.

5. *Assuming my home will be baited, should I also request a supplemental barrier treatment?* The need for supplemental soil treatment depends on the

circumstances. Property owners with a serious termite problem, or those involved in a real estate transaction, may not want to wait 2 to 6 months (sometimes longer) for baits to suppress or eliminate the infestation. With comprehensive baiting programs such as Sentricon, liquid applications (when deemed necessary) are usually made as partial treatments to infested areas, rather than to the entire structure. Other bait products (e.g., FirstLine) are more suited for spot-treatment of active tunnels, feeding galleries, and localized areas in the soil. Such products are typically used in conjunction with more extensive barrier treatments.

CLOSING REMARKS

As indicated throughout this publication, the “art” and “science” of termite baiting is in an evolutionary state. Many questions are still without answers. One thing we do know is that the products will not perform by simply hammering a few baits into the ground and walking away. Success will require thoughtful installation and diligent monitoring by an experienced service technician, backed by a responsible pest control firm.

Where trade names are used, no endorsement is intended, nor criticism implied of similar products not named.

FIGURE 1. The Sentricon System (TM) of Termite Baiting



(1) Inspecting home for signs of termites



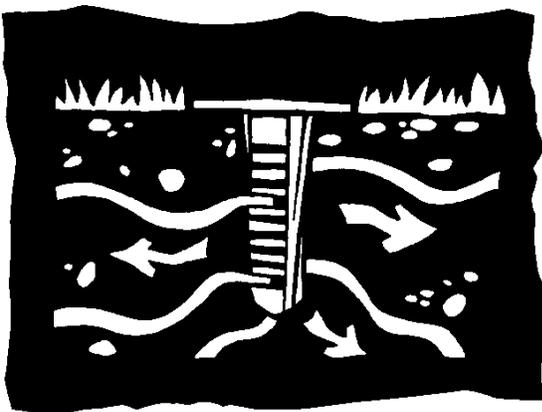
(2) Installing monitoring stations in the soil



(3) Inspecting wood monitoring pieces for presence of termites



(4) Transferring termites from wood monitors into bait tubes



(5) Termites tunnel out of bait tube and recruit other colony members to the bait



(6) After termite population is eliminated, monitoring resumes using unbaited wood pieces

