HYG-2092A-03

THE OHIO STATE UNIVERSITY EXTENSION

Extension FactSheet

Entomology, 1991 Kenny Road, Columbus, OH 43210-1000

Termite Baits

Susan C. Jones, Ph.D.
Assistant Professor of Entomology
Extension Specialist, Household & Structural Pests

Subterranean termites are the most economically important wood-destroying organisms in the United States, with approximately $2 billion per year spent for their prevention and treatment. Termite control is of particular interest to homeowners considering that a home typically represents their largest monetary investment.

Baits have become an important tool for controlling subterranean termites, which are the most common type of termites found in the United States. Native termites in the genus *Reticulitermes* are the most widespread. Subterranean termites are closely associated with the soil habitat where they excavate a network of tunnels to reach water and food. Termite baiting is a very complex subject that is discussed in detail herein. An overview of additional termite control measures is available in OSU Extension Fact Sheet HYG-2092-03.

Baits rely on the biological fact that termites are social insects that feed and groom each other, hence providing a mechanism for transfer of chemical throughout their colonies. Because of social exchange of food (trophallaxis), termites can be affected by a slow-acting toxicant without directly contacting or feeding upon it. Furthermore, baits can have colony-wide effects because individual termites are not site-specific, but instead move freely between numerous, interconnected sites during relatively short periods of time. They also intermix with other colony members so that the same group of termites does not simultaneously visit a bait site.

Wood or some other type of cellulose is used in termite baits, because cellulose (wood) is the food of subterranean termites. The cellulose is impregnated with a slow-acting toxicant that cannot be detected by the termites. The toxicant necessarily is slow acting because termites tend to avoid sites where sick and dead termites accumulate. Termite workers feed on the treated material and carry it back to other colony members, where it slowly poisons the termites and eventually reduces or eliminates the entire colony.

Typically, in-ground stations are inserted in the soil next to the structure and in the vicinity of known or suspected sites of termite activity. In-ground stations often initially contain untreated wood that serves as a monitoring device. The monitoring wood is replaced with the toxicant once termites have been detected feeding on it. In addition, aboveground stations may be installed inside or on the structure in the vicinity of damaged wood and shelter tubes. Above ground stations initially contain bait.

Baits work much more slowly than soil termiticides, and the homeowner should be aware of the possibility of a lengthy baiting process. Several months or more may elapse before the termites locate stations, then termites must feed on sufficient amounts of the toxicant.

An often-cited advantage of termite baits is that they are "environmentally-friendly" because they use very small quantities of chemical and decrease the potential for environmental contamination. In addition, bait application causes little disruptive noise and disturbance compared to soil treatments. Furthermore, baits can be used in structures with wells or cisterns, sub-slab heating ducts, and other features that may preclude a soil treatment. Baits are often used in sensitive environments.

Commercial Baits

A number of baits are marketed for termite control. Most are only available to licensed pest management professionals (PMPs). It is very important that bait systems are properly installed and diligently serviced. Monthly inspections of a baiting system usually are warranted, except during inclement winter weather.

Professional (PMP) Bait Products

- The **Sentricon® Colony Elimination System** is manufactured by Dow AgroSciences LLC (Indianapolis, IN; 1-800-678-2388; www.sentricon.com/). The Sentricon® System is sold only through pest management firms that have been authorized and trained by Dow AgroSciences. This termite bait was the first to be commercially introduced into the United States and has been marketed since 1995. It is labeled to be used as the sole measure to achieve termite control, without a supplementary soil treatment.

  The active ingredient (toxicant) in the Sentricon® System is a slow-acting chemical, 0.5% hexaflumuron (Recruit® II). During 2003, hexaflumuron is slated to be replaced with noviflumuron (Recruit® III). Both of these chemicals are

chitin synthesis inhibitors (CSIs) that disrupt the termites' normal molting process, causing them to die in the process of shedding their skin. CSIs can achieve their effects because worker termites continue to molt periodically throughout their life and they comprise the majority of the colony. Futhermore, workers feed other colony members, which starve as the worker population is depleted.

The Sentricon® System is based on a multi-step process that entails monitoring to identify stations that contain active termites, delivery of the toxic bait, and on-going monitoring to detect new termite infestations. Termites are detected by inserting plastic in-ground monitoring stations into the soil at intervals around the building perimeter and at conducive sites. Each in-ground Sentricon® station consists of a cylindrical green tube (10 inches deep by 2 inches wide) with slits for termite access; it is covered by a flat, round disc (locking cap assembly) that lies flush with the soil surface. Initially, two pieces of untreated wood are placed inside each station to serve as the monitoring device. Once termites have been found in the wood monitors, a treated bait tube is substituted. Termites are carefully dislodged from the monitoring wood and placed into the bait tube where they begin feeding on the bait as they tunnel through it and then eventually reunite with their colony members in the soil. In the process, they deposit trail pheromones (chemical scents) that promote recruitment of other nestmates to the bait. All stations around the structure are inspected on a continuing basis and bait delivery continues until no more live termites are found. Termite elimination is considered to be achieved if no termites are evident for three consecutive months, excluding inclement winter weather that may cause termites to be absent. Bait tubes subsequently are removed and untreated wood is once again inserted and monitored. On-going monitoring at less frequent intervals is useful to detect termites that have reinfested the area.

Aboveground bait stations complement the Sentricon® System. These are tan, rectangular boxes containing two treated paper rolls (Recruit® AG) that are positioned aboveground over active termite shelter tubes. The use of aboveground stations in combination with in-ground stations can enhance delivery of the bait toxicant to the colony.

The Sentricon® System has undergone extensive evaluation throughout the United States. A large number of field trials with Sentricon® have demonstrated elimination of subterranean termites.

- The **FirstLine® Termite Defense System** is manufactured by FMC Corporation (Princeton, NJ; 1-800-321-1FMC; www.fmc-apgspec.com/) and has been marketed since 1996. It is labeled for use by PMPs for termite colony suppression. The active ingredient in the bait component, 0.01 % sulfluramid, is a slow-acting stomach toxicant that interferes with termite metabolic processes. The bait toxicant is one component of the FirstLine® System, which uses a comprehensive approach that includes inspection, moisture and food reduction, and selective use of a liquid termiticide. A localized treatment using bifenthrin (Talstar®) is applied to live termite infestations in or on the structure prior to the introduction of the monitoring/baiting components.

  The FirstLine® System includes a monitoring component that is intended for in-ground placement at about 10 ft intervals around the structure and in areas conducive to termite attack. These FirstLine® in-ground stations are capped, grey-green, cylindrical plastic tubes that initially contain a piece of slotted, untreated monitoring wood. The circular cap assembly is termed a SMARTDISC® Locator as it is ridged to help channel termites into the station. Once termites have been detected feeding on the monitoring wood, the plastic housing is removed and replaced with a perforated plastic cartridge that contains the bait (FirstLine® GT Plus). All stations around the structure are inspected on a continuing basis and bait delivery continues until no live termites are found.

  FMC also recently introduced a larger in-ground station, the Defender® Termite Defense Unit, which contains four slotted pine stakes that serve as monitors. In-ground stations are supplemented with aboveground stations to target active termite shelter tubes. Aboveground stations consist of a slotted semi-transparent plastic housing (4x4x1-inches) that contains sulfluramid-treated corrugated cardboard (FirstLine® Termite Bait).

  FirstLine® is not a stand-alone bait treatment, although field trials are underway to investigate whether the bait is effective without being used in conjunction with a localized treatment with a liquid termiticide. There are few published field studies to indicate the effectiveness of the FirstLine® System against *Reticulitermes* spp., and variable results have been obtained in several field trials against the Formosan subterranean termite (not present in Ohio). Studies conducted by FMC Corp. demonstrate control, i.e., disappearance of termites from bait stations and structures.

- Ensystex, Inc. (Fayetteville, NC; 1-888-398-3772; www.ensystex.com/) developed the **Exterra® Termite Interception and Baiting System** for application by PMPs. The active ingredient is 0.25% diflubenzuron, which is a chitin synthesis inhibitor that kills termites by disrupting their molting process; it is labeled as Labyrinth® termite bait. Diflubenzuron is highly toxic to aquatic invertebrates and should not be placed where it could be washed into ponds, streams, rivers, etc. During the initial treatment phase, the Exterra® System allows for localized application of a liquid termiticide to the soil or treatment of termite-infested structural timbers with an injected termiticide.

  The Exterra® in-ground plastic station is brown and box-shaped, with flat, untreated wooden monitors (interceptors)

affixed inside its slotted walls. Quarterra® is a larger station that allows for extended inspection intervals (<90 days). Stations are placed no more than 20 ft apart and about 2 ft from the foundation, as well as in areas suspected to have termite activity. After termites start feeding on the wood monitors, the bait (cellulose matrix treated with diflubenzuron) is placed inside the central chamber within the station. The wooden interceptors inside the walls are not removed so as to reduce disturbance to termites, which then transition from the wood to the bait matrix. Full effects generally occur after the termites have fed for 6 to12 months on the bait.

Little independent research is available on field performance of the Exterra® System.

- **Subterfuge® Termite Bait**, which contains 0.3% hydramethylnon, was recently marketed by BASF Corporation (Research Triangle Park, NC; 1-800-545-9525; www.spd.basf-corp.com/default.asp?page=pestpro/products/subterfuge). This is a slow-acting stomach poison that interferes with the termites' energy production. Subterfuge® is licensed only for use by PMPs.

  With Subterfuge®, a monitoring period is precluded, and the active ingredient in a highly palatable cellulose matrix is deployed from the first day. These baited in-ground stations are placed in areas of known termite activity. Subterfuge® can be used as a supplemental treatment, i.e., in conjunction with a soil termiticide. It also is labeled for use as a remedial treatment or a preventive treatment.

  There are no published data on the efficacy of Subterfuge®.

- Another recent bait is **Outpost® Termite Bait Response** (0.25% diflubenzuron) that is used in conjunction with the Outpost® Termite Detection System (Bayer Corporation, Kansas City, MO; 1-800-331-2867; www.bayerprocentral.com/pest/products/view:outpost/). As in the Exterra® System, diflubenzuron stops the termites' ability to molt; it is highly toxic to aquatic invertebrates. The Outpost® System is for use only by licensed PMPs. It can be used in conjunction with a localized soil treatment or wood treatments to critical areas and sites with active termites.

  The Outpost® station consists of a black cylindrical tube with a green cap assembly. It is pre-baited with non-toxic cellulose so as to establish termite activity in the station. The pre-baiting food material is installed as a thin lining against the interior station wall in order to create a vacant center cavity for bait installation.

  Data on the efficacy of Outpost® have not been published.

Consumer (Do-It-Yourself) Bait Products

- **Spectracide Terminate®** (0.01% sulfluramid [Transflur®]) is marketed by Spectrum Brands (St. Louis, MO; 1-888-545-5837; www.spectracideterminate.com) for homeowner use. It contains the same active ingredient, sulfluramid, as the FirstLine® System.

  Terminate® "stakes" consist of sulfluramid-treated cardboard inside small, transparent plastic tubes with red caps. Bait stakes are 4 inches long and 1 inch wide and have holes in their sides. Instructions call for the stakes to be inserted into the soil so that the cap is slightly below ground level, a procedure that can make these stakes very difficult to find for inspection purposes. Each stake is to be monitored every 3 months for termite activity. However, once termites have been found, 1-month inspection intervals are called for.

  According to the label, Terminate® is not recommended as sole protection against termites, and an active infestation should be treated by a professional. Terminate® stakes do not replace mechanical alteration and soil treatments. **This product is intended to be used before termites find your home.** The limited warranty excludes damages resulting from termite activity. Little or no research has been conducted to verify the effectiveness of Terminate®, particularly when used by homeowners.

- Very limited information is available pertaining to **Termirid® 613** (borate), which can be purchased by homeowners. This product consists of red wooden stakes that can be inserted into stations. Termirid® can be used to reduce subterranean termite populations. However, simply reducing the termite population may be insufficient to provide structural protection. Little or no research has been conducted to verify the effectiveness of this product, particularly when used by homeowners.

Visit Ohio State University Extension's web site "Ohioline" at:
http://ohioline.osu.edu

Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension
TDD No. 800-589-8292 (Ohio only) or 614-292-1868 7/03-des