

SUBTERFUGE® TERMITE BAIT for CONTROL of SUBTERRANEAN TERMITES (ISOPTERA: RHINOTERMITIDAE) in the UNITED STATES

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Abstract Subterfuge® termite bait contains 0.3% hydramethylnon in a wood-flour matrix. Hydramethylnon provides a delayed-action mortality that allows for transfer of lethal doses within the termite population, followed by a relatively rapid elimination of the termites. Subterfuge® is effective in controlling all key subterranean termites found in the United States, including *Coptotermes*, *Reticulitermes*, and *Heterotermes* spp. University cooperators, private contractors, and BASF personnel initiated field trials in four states in 2000. The data from these trials to-date show termite recruitment to Subterfuge® is excellent; approximately 40-50% of the baits were fed upon within the initial three months after installation. Bait consumption by termites ranged from approximately 15-30% during the same time period. Over 30% of the baits fed upon at one month after installation had termites present. The number of termites present in the bait decreased over subsequent months as the overall population was eliminated. Within four months after installation, 100% of the termite activity in the structures had been eliminated. These field trials demonstrate very rapid recruitment of key subterranean termite species to Subterfuge®, continuous feeding activity, and elimination of termites from structures. BASF will launch Subterfuge® in the United States in 2002.

Key Words hydramethylnon *Coptotermes* *Reticulitermes* *Heterotermes*

INTRODUCTION

Baiting has evolved into one of the most widely used techniques of the pest control industry for termite control. Several manufacturers market termite baits for use by Pest Management Professionals (PMPs). Subterfuge® termite bait was developed by American Cyanamid Company, now BASF, and will be marketed in 2002 to the PMP. The active ingredient is hydramethylnon, which is found in several ant and cockroach bait products. Hydramethylnon is a stomach toxicant that inhibits electron transport and must be ingested by the termite for death to occur. The amount of active ingredient within the matrix is small, which allows for a termite to acquire a lethal dose, return to the colony, and transfer a lethal dose to other members through grooming, trophallaxis, and other physical contact. The bait matrix is wood-flour, which is presented to termites in a plastic cartridge placed in a Termatrol station. Subterfuge® bait has been shown to be more attractive to termites than other commonly used cellulose sources in laboratory studies. Active bait is applied at installation and no wood-monitoring stakes are used as in other baiting systems; thus termites begin acquiring lethal doses when feeding first occurs. Rapid recruitment and elimination of the termite infestation are important to the PMP and the consumer, especially with baiting systems. The next step is the continued protection of the structure, which occurs when termites locate the baits, feed, and recruit other members to the baits prior to re-infesting the structure. Subterfuge® termite bait achieves rapid recruitment, elimination, and continued protection of the structure from termites and should be considered another tool for the PMP.

MATERIALS and METHODS

A study was initiated in 2000 to test efficacy of Subterfuge® termite bait against subterranean termite species in the United States. A total of five subterranean termite-infested structures

located in Alabama, Arizona, Florida, and North Carolina were identified by Pest Management Professionals (PMPs) as test sites. Subterfuge® bait installations were initiated from June to November 2000. The subterranean termite species tested included the eastern, *Reticulitermes flavipes* (Kollar); desert, *Heterotermes aureus* (Snyder); formosan, *Coptotermes formosanus* Shiraki; and southeastern, *Reticulitermes virginicus* (Banks). All active termite infestation sites and shelter tubes were identified and mapped prior to bait station installation. A total of 55 active infestation sites and shelter tubes were identified at that time. Subterfuge termite bait stations were installed in the soil near the active infestation sites and shelter tubes. Additional stations were placed at 10-15 foot intervals from those stations, installed near infestation sites and shelter tubes, followed by placement at 10-15 feet intervals to completely encircle the foundation with bait stations. A total of 105 Subterfuge® bait stations were installed. All active shelter tubes were destroyed. Bait station placements were diagrammed on graph paper. Bait stations, infestation sites, and shelter tubes were inspected on a monthly basis. Any rebuilt or new shelter tubes were recorded and destroyed. The amount of bait consumed and the number of termites infesting the bait were estimated and recorded. Any bait cartridge in which bait consumption was greater than 50% was replaced.

RESULTS and DISCUSSION

Approximately 40-50% of the Subterfuge® bait stations were fed upon by subterranean termites within the first three months after installation (Figure 1). The percent of stations fed upon during the next 16 months ranged from 0% to 45%. This intense amount of feeding during the first three months demonstrates the attractiveness of the bait matrix. Termites quickly found the bait and began feeding on it. As the population was reduced, the amount of feeding decreased. The percent bait consumed per station ranged from 18% to 32% during the first three months and 0% to 60% during the next sixteen months (Figure 2). The amount of bait consumed during the first three months demonstrates that once termites located the station, feeding was heaviest during that time; as the population was reduced, the feeding decreased. The percentage of infested baits was greater than 30% at the one-month rating and 18 and 19% at the two- and three-month ratings, respectively (Figure 3). The percent of infested baits was 17% or less through 13 months and, from 14–19 months, no live termites were found in any of the stations. The high percentage of infested baits during the first three months shows foraging termites that located the stations actively recruited other colony members to them. The percentage of infested baits decreased as the population was reduced and fewer termites were foraging and recruiting to the baits. The number of active infestation sites and shelter tubes was reduced from 55 at time of installation to 28 at one month, 15 at two months, 4 at three months, and 0 from four months and beyond (Figure 4). The elimination of termites from the structure shows that, even though termites continue to feed on the baits, the structure is protected over a substantial period of time.

Subterfuge® is an effective control measure for subterranean termites. Termites quickly locate the bait and actively recruit additional colony members to it. Once feeding occurs, the infestation in the structure is eliminated within a short time. The ultimate goals of the PMP are to provide control of subterranean termites and protect the structure. Subterfuge® provides the PMP with an additional tool to achieve these goals.

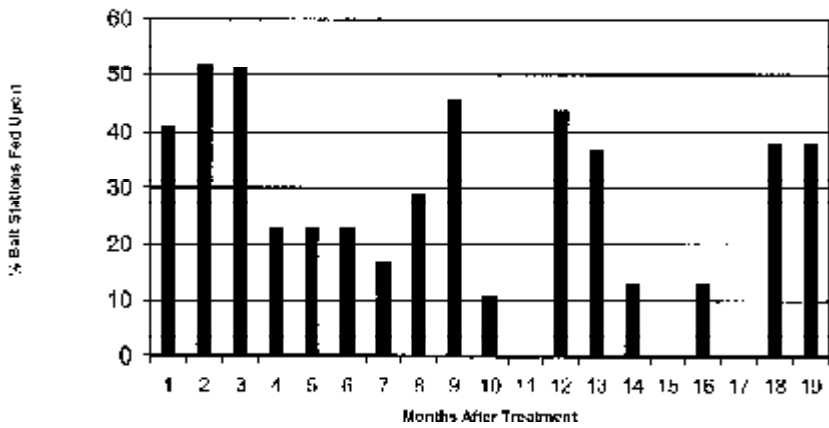


Figure 1. Percent of Subterfuge® bait stations fed upon by subterranean termites in five structures baited in 2000.

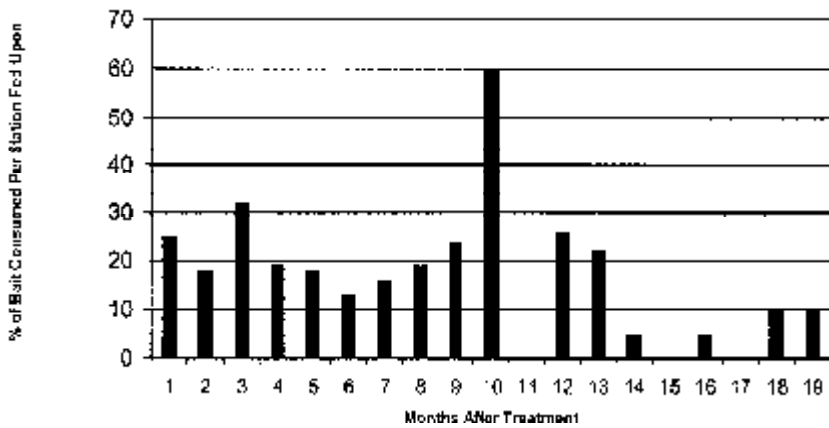


Figure 2. Percent of Subterfuge® bait consumed per station fed upon by subterranean termites in five structures baited in 2000.

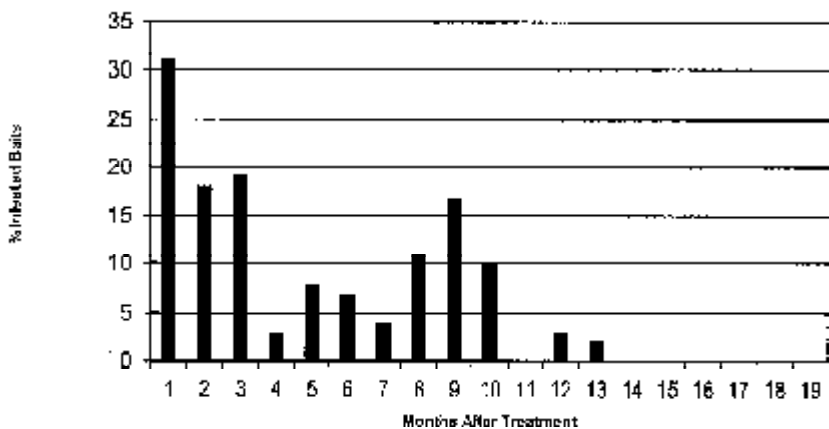


Figure 3. Percent of fed-upon Subterfuge® bait stations infested by subterranean termites in five structures baited in 2000.

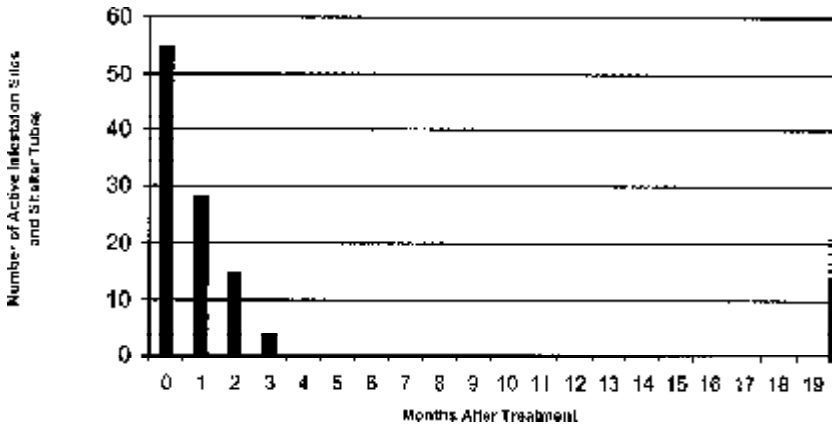


Figure 4. Number of active termites infestation sites and shelter tubes in five structures baited with Subterfuge® in 2000.