FOREST SERVICE RESEARCH ON ALTERNATIVE METHODS FOR TERMITE CONTROL

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The Wood Products Insect Research unit of the USDA Forest Service, Southern Research Station, in Starkville, Mississippi, United States, has nationwide responsibility for research on protecting new and existing structures from wood-destroying insect pests, primarily subterranean termites. The unit conducts laboratory and field research to evaluate new chemistry insecticides as treatments to soil, new treatment methods, new formulations, and non-chemical, low-toxicity, or repellent physical barrier techniques for control of subterranean termites. All currently registered termiticides have been thoroughly tested by the Wood Products Insect Research unit.

Drywood termites, which occur throughout the southern and western United States and Hawaii, are the primary target of structural fumigation (Scheffrahn and Su 1992). The recommended methyl bromide dose for termite control often is much higher than that required for complete control, according to Scheffrahn and Su (1992). Lower doses could be used if methyl bromide concentrations were monitored to detect losses during exposure of structures; this would result in lower costs, less contamination, and decreased risk of worker exposure. Further assessment is not warranted since widespread use of methyl bromide as a fumigant is scheduled for discontinuation. Other materials such as sulfuryl fluoride (Vikane®, DowElanco) can be used against termite infestations (Truman et al. 1982).

Alternative methods involve: 1) *physical barriers*, such as high-grade stainless-steel mesh, and sand; 2) *baiting systems*, which are an important area for the pest control industry; 3) *new and improved chemicals and formulations* for treatments to soil; 4) *biological organisms* such as fungi and nematodes; and 5) *borate treatments*. Borates are slow-acting toxicants, and dip-diffusion treatments to unseasoned wood are in use by several log home manufacturers and lumber companies. Borates can be used to treat damaged wood.

Physical barriers and *baiting systems* are emphasized here. Stainless-steel mesh tests were installed in Arizona, Florida, Mississippi, and South Carolina in 1993, and on

Midway Island in 1994. So far, stainless-steel mesh has remained 100% effective in excluding native subterranean termites in mainland tests, and Formosan subterranean termites in Midway Island tests (Kard 1996).

Sand-barriers consist of sand particles too large for termites to carry, but that pack too tightly together for termites to crawl through. Tests were installed in Arizona, Florida, Mississippi and South Carolina in 1991, and on Midway Island from 1988 - 1991. Sand-barriers varied in effectiveness (Kard 1996). On Midway Island, sand-barriers placed under concrete slabs remained 100% effective for five years, but declined to 80% within seven years. Concrete blocks partially filled with sand-barriers (5, 10, or 15 cm-thick) remained 100% effective after 4 - 6 years on Midway. Concrete block tests on the mainland ranged from 0 - 80% effectiveness at 5-cm thickness, and from 30 - 90% at 10-cm thickness. Effectiveness of 15-cm-thick barriers was 95 - 100% in Arizona, Florida, and South Carolina, but only 50% in Mississippi.

Termite *baiting systems* depend on a slow-acting toxicant that is not repellent. Foraging termites must eat and pass on the toxicant to other termites in the colony. DowElanco developed the Sentricon Colony Elimination System containing hexaflumuron, an insect growth regulator. Also, FMC has developed an above-ground baiting system called FirstLine with the active ingredient sulfluramid. Baits are expected to play a greater role as we learn more about their application for control of termites.

Kard, B. M. 1996. Stainless-steel mesh and sand-barrier tests for termite control. Proc. The 1996 Whitmire Micro-Gen Scientific Symposium and Management Conference. Whitmire Micro-Gen Research Laboratories, Inc., St. Louis, Missouri. September 8-12, 1996.

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