INTEGRATED PEST MANAGEMENT
NON-TOXIC TERMITE AND WOOD BORING BEETLE CONTROL
INDUSTRY UPDATE

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The Consumer: Lewis and Haverty (1996) report that 67% of studied populations are very conscious of the inherent problems with the use of toxic chemicals; 70% to 80% have used non-toxic alternatives to chemical pesticides. Consumer concerns have lead to a demand which has spurred the development of new "alternative" technology for the eradication of pests. In the area of control of drywood termites and wood-boring beetles, research and development has lead to at least three new and non-toxic methods for dealing with these pests. Both localized (electrocution, microwave and nitrogen freezing) and whole-house (heat induction) treatment methods have been developed and are available in the marketplace today.

University Testing: These alternative methods underwent comparative testing recently at the University of California, Berkeley. That testing demonstrated that each of the methods tested are completely effective when properly used in accordance with each manufacturer's recommendations. Each of the methods tested, however, has its own unique limitations. If inappropriately used, efficacy can drop below acceptable levels. Localized methods are dependent upon thorough and complete inspection and delimitation of infestation.

Electrocution clearly causes mortality in termites (Lewis & Haverty, 1996; Ebeling 1983), but where the electrical current can not be effectively delivered to the termite gallery or tunnels, efficacy is likely to drop unless augmented by applying another method which is not subject to limitations in that particular area. Such areas include use directly adjacent to metal window and door frames, concrete stemwalls, and any other similar configuration where electrical current will be grounded away from the area to be treated.

While microwave is not subject to the same limitations as the electrocution method, and augments electrocution well in its weak spots, microwave systems are cumbersome and difficult to use, especially in tightly configured areas, and care must be taken to protect other living organisms from the microwave radiation emitted in the treatment process.

The nitrogen freeze method is, likewise, cumbersome and difficult to apply in tight quarters or where containment of the liquid nitrogen for the time period necessary for effective treatment is difficult to obtain. Care must also be taken to protect the application technician from direct contact with the liquid nitrogen and the possibility of anoxia in the treatment area.

Heat induction, where the temperature of the entire structure or the localized area being treated is raised to above 60°C for an appropriate time period proved just as effective as comparative treatment with synergized methyl bromide and sulfuryl fluoride, but has the disadvantage of causing warping of some structural items; all plants, plastics, food items, and any other materials which may be adversely affected by prolonged exposure to temperatures in excess of 60°C must be removed from the structure throughout the treatment process.

Past Laboratory Testing of Fumigants: The pest control industry has long been confused as to why chemical fumigants such as methyl bromide and sulfuryl fluoride consistently obtain 100% mortality of termites in laboratory testing configuration, yet result in 5%-15% failure rates in the field. Review of the laboratory testing procedures reveals that there is a high incidence of the use of "artificially" infested boards in the testing process. These boards are almost universally constructed by routing an artificial gallery into one board, and thereafter butting another board directly against it and securing the two together with tape or another wrapping material as opposed to glue lamination. (i.e., two 1x4 boards are butted together to create an artificial 2x4 board) The result is to create an artificial airway throughout the length of the "artificially" infested board which allows penetration of the gas fumigants to the termite gallery. In field applications, however, the 2x4 infested boards are solid and, except for entry holes or "kick-outs", there is no passage way for gas fumigants to reach many of the infested areas. A truer test in the laboratory would be to drill into the end of a 2x4 at least several inches, implant the population of termites, and plug the entry hole from the end. A small (approximately 1/8 inch) artificial "kick-out" drilled through the side of the board into the artificial gallery would simulate what is actually found in the field, and a truer testing of the efficacy of the gas fumigants could be obtained.

The Lesson To Be Learned: Both University and field testing of the non-toxic "alternatives" to chemical fumigation show results as good or better than the field experience for gas fumigants. In each instance, the "alternatives" were tested as stand-alone methods, yet each achieved mortality above the minimally acceptable efficacy levels established for the testing (90% mortality). In practical field application, the non-toxic alternatives are almost never used on a stand-alone basis. At the very least, the non-toxic alternatives are combined with the use of a mild borate to serve as a retardant or inhibitor to future infestation.

Almost every state now advocates an Urban Integrated Pest Management Program. We suggest that the lesson to be learned from the testing at the University of California, Berkeley, is that the appropriate use of the non-toxic alternative treatment methods for the control of drywood termites and wood-boring beetles can provide effective IPM control when the alternatives are combined so that their relative advantages and limitations counterbalance each other. Over 70% of all drywood termite infestations diagnosed are localized infestations. Complete and effective control of localized infestations can be obtained through the use of non-toxic alternatives, rendering whole-structure fumigation with toxic gases unnecessary in those instances.

As with all other technology in today's day and age, however, advancements and improvements of alternative IPM technology are progressing geometrically, and, because of consumer insistance, all of the efforts are directed at broadening the scope of effective non-toxic application, and further minimizing of the use of toxic chemicals.