MICROBIAL TERMITE CONTROL: EFFECTS OF ENTOMOGENOUS FUNGI ON THE FORMOSAN SUBTERRANEAN TERMITE (ISOPTERA: RHINOTERMITIDAE)

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Studies reviewed in this conference report were performed with a number of different collaborators: M. Tamashiro, W.E. Jones, B.S. Davidson, M. Wahlman, K.M. Delate, R.T. Yamamoto, K.L. Strong and C.H.M. Tome.

Subterranean termites (Isoptera: Rhinotermitidae) live in a confined and relatively humid environment that is favourable to fungus growth. Isolates of the entomogenous fungi *Beauveria bassiana* (Balsamo) Vuillemin and *Metarhizium anisopliae* (Metsch.) and compounds extracted and purified from these fungi are under investigation as potential bait toxicants for control of the Formosan subterranean termite, *Coptotermes formosanus* Shiraki. One of the *B. bassiana* cultures was originally isolated from another subterranean termite, *Reticulitermes flavipes* (Kollar).

Lethal doses (conidia per termite) and exposure periods required for termite mortality were determined by topical application of conidial suspensions. Subsequent laboratory tests demonstrated that termite workers "dusted" with conidia were capable of transmitting the pathogens to other colony members. Spore loads on termite workers exposed in this fashion ranged from 600,000 to 8,000,000 conidia per termite, and greatly exceeded the LC_{95} values of 490 to 20,000 conidia per termite established in the topical application tests.

Feeding and topical application studies were performed with purified extracts of *B. bassiana* and *M. anisopliae*. Destruxin A_1 from *M. anisopliae* had little toxicity to *C. formosanus* workers when topically applied. However, both Destruxin A_1 and Destruxin E elicited gradual mortality over 18 days (62% and 92%) when delivered to termites as oral toxicants at 1600 or 1500 ppm (by weight) on filter paper. Choice tests indicate that both toxins are feeding deterrents, probably limiting the potential for use of these isolated toxins in termite control. Current studies are concerned with effective delivery of the pathogens to foraging termites.

Proceedings of the First International Conference on Urban Pests.
K.B. Wildey and Wm H.Robinson (editors). 1993