

**THE EFFICACY AND HISTOPATHOLOGY OF ENTOMOGENOUS FUNGI**  
*Beauveria bassiana* (BALS.) VUILLEMIN AND *Metarrhizium anisopliae*  
(METCH.) SOROKIN AGAINST WOOD TERMITES  
*Kalotermes cynocephalus* LIGHT

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In Partial Fulfillment  
of the Requirements for the Degree  
**MASTER OF SCIENCE IN BIOLOGY**

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by


**Febe M. Lavador**  
June 2005

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This Thesis entitled “**THE EFFICACY AND HISTOPATHOLOGY OF ENTOMOGENOUS FUNGI *Beauveria bassiana* (BALS.) VUILLEMIN AND *Metarrhizium anisopliae* (METCH.) SOROKIN AGAINST WOOD TERMITES *Kalotermes cynocephalus* LIGHT**” prepared and submitted by **FEBE M. LAVADOR** in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE IN BIOLOGY**, has been examined and is recommended for acceptance and approval for **ORAL EXAMINATION**.

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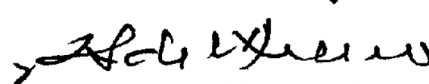
  
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## ABSTRACT

This study was conducted to evaluate the *in vitro* efficacy of *Beauveria bassiana* (Bals.) Vuillemin and *Metarrhizium anisopliae* (Metch.) Sorokin against *Kalotermes cynocephalus* Light. The insecticide under the brand name Lentrek<sup>®</sup> was used as an insecticidal test. Bioassay was done to find out the LC<sub>50</sub> of the two fungi. Mortality rate was recorded every 24 hours post treatment. Histopathology was conducted on the treated and untreated termites. This study was done at the USC biology laboratory from May 1998 to May 1999.

Linear regression indicated that LC<sub>50</sub> of *Beauveria bassiana* was achieved at 14.79 or  $4.56 \times 10^6$  spores/mL while that of the *Metarrhizium anisopliae* was at 199.53 or  $7.24 \times 10^6$  spores/mL. Termites treated with the chemical all died after 30 minutes. Pure fungal spore suspension of *Metarrhizium anisopliae* manifested 100 percent mortality within 24 hours while *Beauveria bassiana* pure fungal spore suspension achieved 100 percent within 120 hours.

Histopathological studies revealed that mycelial growths were found in the different parts of the insects namely: cuticle, hypodermis, malpighian tubules, nervous system, trachea, and alimentary canal.

Spore concentration and the length of exposure were the two factors to which the mortality of the wood termites *Kalotermes cynocephalus* was attributed.



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## Chapter I

### INTRODUCTION

#### Rationale

Drywood termites are social insects since they live in colonies. Moreover, they are crypto-biotic, which means, they live entirely in the dark within the wood they are feeding on (Nolen, 1996). As such, they serve an important function in nature as they convert trees, wood, or wood products containing cellulose into organic matter (Kamble, 1995). Termites have, in their intestines a protozoa which provides enzymes to digest cellulose (Bland, 1978). Although termites are soft bodied insects, their hard, saw-toothed jaws work like shears and are able to bite off extremely small fragments of wood, a piece at a time (Kamble, 1995). Drywood nests are usually small when gauged in terms of the number of individual termites. It takes a few years for the first nuptial pair to form new colonies. Although a single small group of drywood termites does not eat very much, colony after colony within a confined area can create a significant damage from feeding (Nolen, 1996).

Damage from termites is often a most horrifying event as it presents itself a surprise for the process occurs unnoticed. Termites are considered one of the most destructive pests because they infest buildings, lumbers, wood panels, floorings, sheet rocks, wall papers, plastics, paper products and fabric made of plant fibers (Kamble, 1995). Kocher (1996) added that the most serious damage is the loss of structural strength of residential and commercial buildings and the destruction of carpet, artwork,