Potential for utilization of entomopathogenic fungus, *Beauveria bassiana*, for control of banana weevil, *Cosmopolites sordidus* (Germar)

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ABSTRACT

Banana production in Kenya has been on the decline due to among other factors, pests and disease of which banana weevil is major. Although, entomopathogenic fungi such as *Beauveria bassiana* and *Metarhizium anisopliae* have been used successfully to control various agricultural and pasture pests, lack of effective application system limits their wider application.

This study therefore seeks to evaluate the potential of utilizing the fungus to control the banana weevil using infected weevils to disseminate the entomopathogen, *Beauveria bassiana* for control of the banana weevil (*Cosmopolites sordidus).* Tests were carried out in the laboratory with ten isolates of *B. bassiana* ; ICIPE 273, M 313, M 207, KE 300, M 221, ICIPE 50, M 573, M 618, M 470 and ICIPE 279. Pathogenicity studies were carried out and all the ten isolates of *B. bassiana* tested were found to be pathogenic to adult *Cosmopolites sordidus* causing mortalities of between 20 - 50% when a standard concentration of 1×10^8 was used 40 days post exposure. Isolate ICIPE 273 was the most pathogenic killing 50% of adults, followed by M 313 36%, M 207 30%. The other isolates KE 300, M 221, ICIPE 50, M 573, M 618, M 470 and ICIPE 279 killed less than 20% with ICIPE 279 being the least pathogenic to the adult *C. sordidus*.

A virulence test of the best three isolates of *Beauveria bassiana* (ICIPE 273, M 313 and M207) at three concentrations (1×10^8, 3×10^8 and 1×10^9) was carried out in the laboratory. At higher fungal concentrations of 3×10^8 and 1×10^9 adult mortality for all the three isolates was between 35% - 70%. The LC_{50} values were 5.34×10^6, 4.22×10^8 and 8.89×10^8 conidia/ml for ICIPE 273, M 313 and M 207 strains respectively. Lethal time LT_{50} was 31, 34 and 51 days for ICIPE

273, M 313 and M 207 strains respectively. Incubation of dead weevils in a moist environment led to development of mycelia on the surface starting from intersegmental junctions, confirming that the mortality was caused by fungus.

In laboratory, the rate of transmission from two infected banana weevils to non infected was between 24% - 26 % for the three isolates (ICIPE 273, M 313 and M 207) for 40days. The current studies show that *Beauveria bassiana* has potential to be used as a biological control agent for the management of *Cosmopolites sordidus*.