

# ***Beauveria bassiana* as an Artificial Endophyte in Tissue-cultured Banana Plants: a Novel Way to Combat the Banana Weevil *Cosmopolites sordidus***

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## **Abstract**

*Beauveria bassiana*, which is effective against a variety of insect pests, is the most researched and commercialised fungal biopesticide. Laboratory and greenhouse studies have revealed great potential of this entomopathogenic fungus for use against the banana weevil, *Cosmopolites sordidus*, in banana. However, impractical field delivery methods and high costs associated with the application of *B. bassiana* against *C. sordidus* prevent its use and commercialisation in banana fields. Our research has revealed that *B. bassiana* can colonise internal banana tissues for at least four months after tissue-cultured plantlets are dipped in a spore suspension. The type of banana cultivar did not affect colonisation by *Beauveria bassiana* and, even when elevated *B. bassiana* doses were used, plant growth was not reduced. In a set of three greenhouse experiments, larval mycosis rates in *B. bassiana*-treated plants were 23.5-88.9% and the presence of the fungus inside treated plants led to a reduction in larval damage of up to >50%. Application of *B. bassiana* as an artificial endophyte inside banana plants could circumvent bottlenecks associated with its application as a conventional biopesticide, because i) it kills the damaging larval stages inside the plant, ii) it is protected from adverse biotic and abiotic factors, iii) little inoculum is required, drastically reducing its cost, and iv) farmers do not need to apply the biological control organism themselves, as the technology is easily transferable to a commercial tissue culture producer.