

ORIGINAL ARTICLE

Biocontrol of almond bark beetle (*Scolytus amygdali* Geurin-Meneville, Coleoptera: Scolytidae) using *Beauveria bassiana* (Bals.) Vuill. (Deuteromycotina: Hyphomycetes)

Y.A. Batta

Laboratory of Plant Protection, Department of Plant Production and Protection, Faculty of Agriculture, An-Najah National University, Palestine, Israel

Keywords

bark beetles, *Beauveria bassiana*, biocontrol, entomopathogenic fungi, *Scolytus amygdali*.

Correspondence

Y. A. Batta, Laboratory of Plant Protection, Department of Plant Production and Protection, Faculty of Agriculture, An-Najah National University, P. O. Box 425 (Tulkarm), West Bank, Palestine, via Israel.
E-mail: yabatta@najah.edu

2007/0040: received 11 January 2007,
revised and accepted 15 February 2007

doi:10.1111/j.1365-2672.2007.03369.x

Abstract

Aims: To formulate the entomopathogenic fungus *Beauveria bassiana* in invert emulsion, then apply it against adults of almond bark beetle (*Scolytus amygdali*) under laboratory and field conditions.

Methods and Results: The effect of formulated *B. bassiana* in invert emulsion against *S. amygdali* adults was shown by comparing the mortality percentage of adults exposed to the formulated fungus using a Petri dish treatment method and by field applications to infested peach trees with mortality of adults exposed to the unformulated fungus or the untreated control. Results obtained from both exposure methods have indicated that treatment of *S. amygdali* adults with the formulated fungus resulted in a significantly higher mean mortality percentage ($P < 0.05$) when compared with the treatment with the unformulated fungus or the untreated control. This mortality ranged from 81.2 to 100%, 10 days after treatment with the formulated fungus when compared with 6.7 to 49.6% mortality, 10 days after treatment with the control or the unformulated fungus, respectively. Viability of the fungus conidia in invert emulsion was assessed by calculating the germination percentage of the conidia over time. Results indicated a high storage stability shown by a small loss of germination percentage for the formulated conidia of both strains (5.8 to 8.4% over a 12-week period) vs a low storage stability shown by a high loss of germination percentage for the unformulated conidia of the same strains (58.9 to 61.0% over the same period). The presence of *B. bassiana* in the galleries of beetles following the treatment of infested trees was shown in the present research.

Conclusions: The results obtained have demonstrated a significantly higher level of efficacy of formulated *B. bassiana* in invert emulsion against *S. amygdali* adults under laboratory and field conditions. The ingredients of invert emulsion used in the formulation of the fungus had a negligible effect on the viability of formulated conidia when compared with the unformulated.

Significance and Impact of the Study: Results obtained in the present research are promising and may be exploited commercially to control *S. amygdali* adults on various species of stone fruit trees, especially peach trees. This type of biocontrol of this insect may be used as an alternative means to chemical control for management of the insect. No adverse environmental impacts of the fungus or its formulation have been observed during application.