

The entomopathogenic fungus *Metarhizium brunneum* Petch for the control of whiteflies in protected cultivation

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Background

Whiteflies are notable insect pests that affect vegetable crops and many ornamental plants, causing both direct and indirect damages. Among the Integrated Pest Management (IPM) approaches for whitefly control, the use of entomopathogenic fungi (EF) as a potential substitute for inorganic insecticides is gaining increasing interest worldwide. About 20 EF species are currently being extensively studied for their detrimental effects on whiteflies, with *Beauveria bassiana* (Balsamo-Crivelli) Vuillemin, *Cordyceps fumosorosea* (Wize) Kepler and *Lecanicillium muscarium* being the most promising ones.

Objective

In this study we evaluated the efficacy of a *Metarhizium brunneum*-based mycoinsecticide formulation in controlling a whitefly population infesting eggplant cultivated under greenhouse conditions.

Materials and Methods

The field trial was carried out in Sicily (Ragusa province) in a randomized block design (RBD) with four replications per treatment. Three doses of a "WP" (wetable powder) formulation of a *M. brunneum*-based mycoinsecticide were compared with a negative control (untreated plants) and with a positive control (*B. bassiana*-based mycoinsecticide in OD – oil dispersion – formulation) (tab. 1). The number of live adults was counted directly in the greenhouse (fig. 1) whereas, the number of alive young instars was calculated in laboratory with the use of a stereomicroscope (fig. 2,3).



Fig. 1



Fig. 2



Fig. 3 - Whitefly nymphs infected by the tested entomopathogenic fungus *Metarhizium brunneum*.

Table 1 – Treatments and doses applied to conduct the experiment.

TREATMENTS	Dose
A - Untreated	-----
B - <i>M. brunneum</i>	1 kg/ha
C - <i>M. brunneum</i>	1.5 kg/ha
D - <i>M. brunneum</i>	2 kg/ha
E - <i>B. bassiana</i>	0.75 Kg/ha

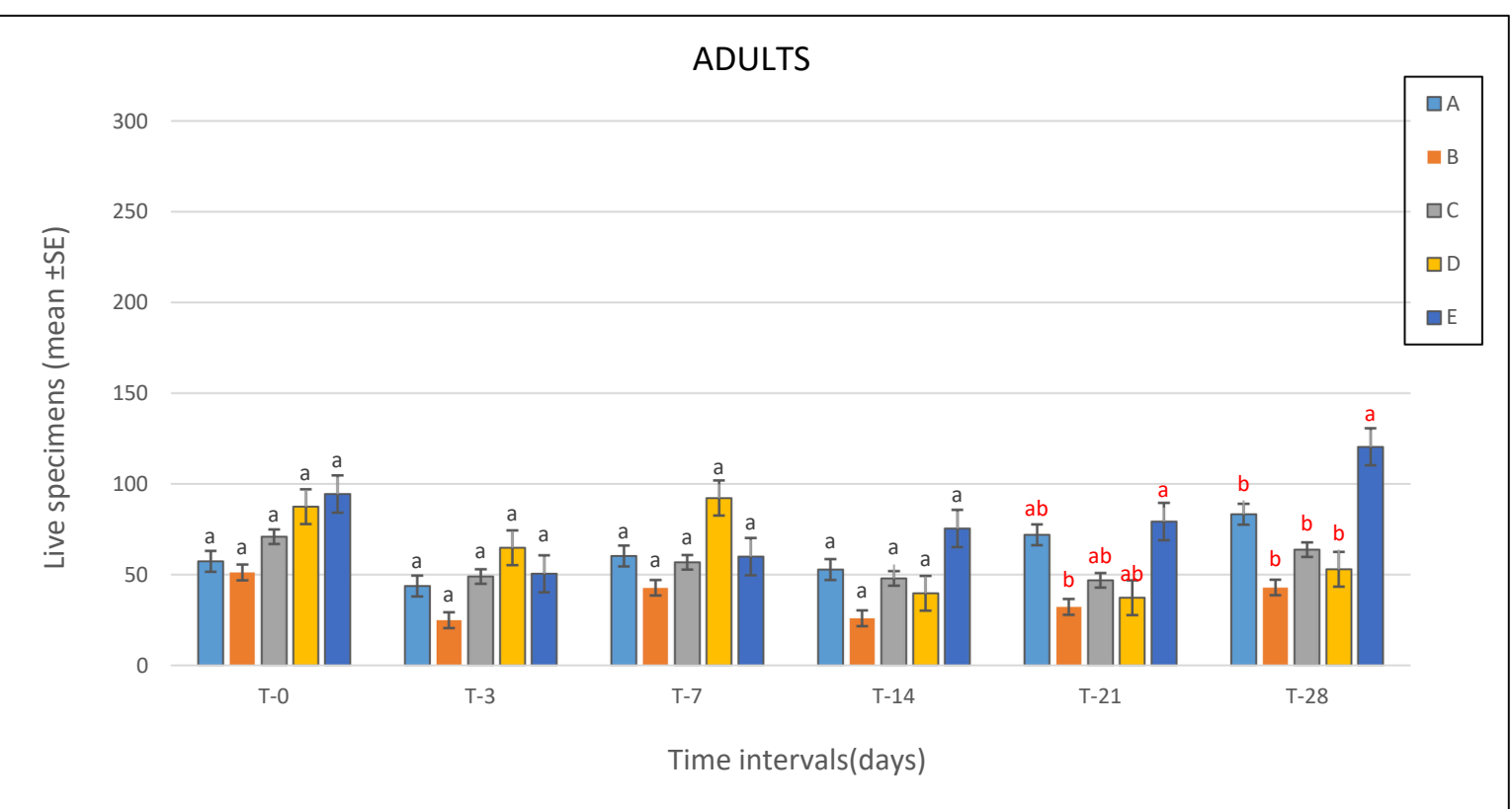
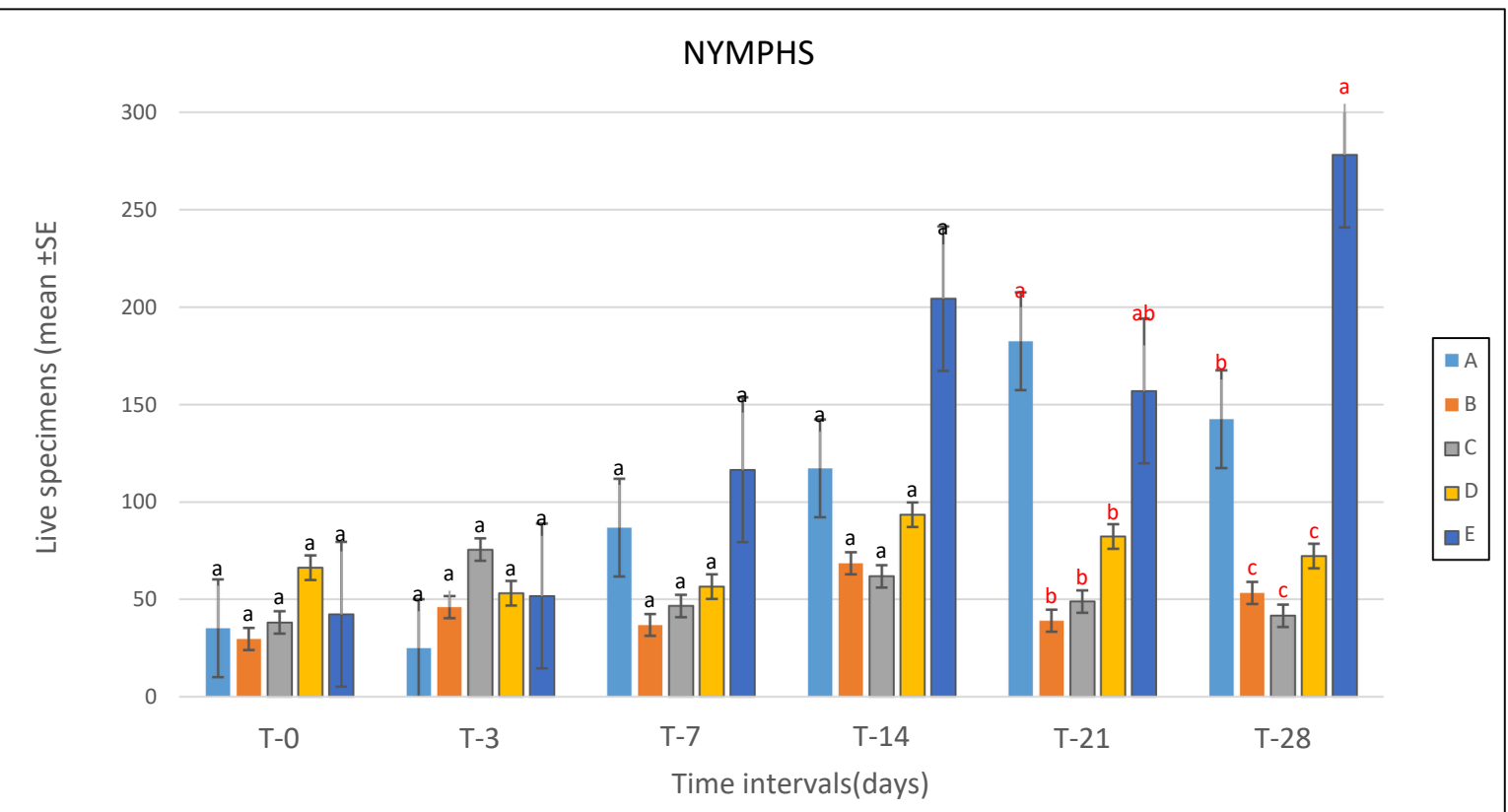


Fig. 4 – Mean number of live whitefly's nymphs and adults, infesting eggplant in greenhouse conditions, recorded at the different time intervals considered after the treatments applied as in table 1.

Results

The *M. brunneum*-based mycoinsecticide tested showed promising performance in controlling whiteflies on eggplant in protected cultivation (fig. 4). Indeed, both field and laboratory data indicated better efficacy of this formulation in the surveys conducted after 21 and 28 days, against both adults and nymphs of the whitefly, regardless of the dose applied. Furthermore, they demonstrated greater and more persistent efficacy than the *B. bassiana*-based formulation, used as positive control.

Conclusions

Although the promising results, the *M. brunneum*-based formulation deserves further investigations before its inclusion in IPM strategies to be adopted for the control of whitefly infestations.