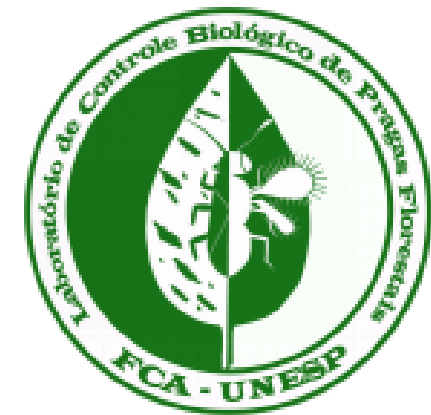


Effect of mycoinsecticides and insecticides on emergence of the pupae parasitoid *Tetrastichus howardi* (Hymenoptera: Eulophidae)



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Introduction and Aims

Tetrastichus howardi (Hymenoptera: Eulophidae) is a gregarious endoparasitoid and a facultative hyperparasitoid. This parasitoid has potential to use to control lepidopterous pests in *Eucalyptus* plantations in Brazil. The use of mycoinsecticides and insecticides in pest management may have deleterious effects on non-target organisms. The recommendation of selective insecticides has great appeal to the conservation of natural enemies and parasitoids. Therefore, the objective of the work was to evaluate the action of mycoinsecticides and insecticides used to *Eucalyptus* pests on the emergence of *T. howardi*.

Material & Methods

Pupae of *Diatraea saccharalis* were offered to *T. howardi* parasitoids, with parasitism allowed for 48 hours, after which they were individualized in glass tubes and maintained under controlled conditions (25±2° C; UR= 70±10% and 12h photophase). The statistical design was completely randomized with seven treatments and 10 replicates. When the pupae were close to emerging the treatments were prepared: *Beauveria bassiana* and *Metarhizium anisopliae* (both with concentrations of 1 x 10⁸ conidia/g), tiamethoxam, bifenthrin, imidacloprid and clorfenapyr (under higher recommended doses) and control (water). The pupae were immersed in the treatments for 10 seconds. After drying, they were transferred to polystyrene tubes until the parasitoids emerged. It was evaluated the number of parasitoids emerged and were retained in pupa. The insecticides were classified according to the International Organization for Biological Control (IOBC).



Figure 1: Materials used for pupae immersion.



Figure 2: Pupae of *D. saccharalis* parasitized by *T. howardi* immersed in *Metarhizium anisopliae* suspension.

Results

The treatments showed no significant differences regarding emergence (F=2,115, P=0,064) and sex ratio (F= 0,4664, P= 0,8306). All presented the reduction in the capacity of the parasitoid less than 30%, being classified as harmless (Table 1).

Table 1. Emergence (%) and sex ratio (Mean ± SD) of *Tetrastichus howardi* (Hymenoptera: Eulophidae) in pupae of *Diatraea saccharalis* (Lepidoptera: Crambidae) treated with different insecticides 20 days post parasitism (Temp.: 25 ± 1°C, UR: 70 ± 10 % and photophase: 12 h)

Treatments	Emergence (%)	%E ¹	Class ²	Sex ratio
Control	99,74 ± 0,16a	0,00	1	0,83 ± 0,03a
<i>B. bassiana</i>	90,60 ± 3,57a	9,16	1	0,79 ± 0,05a
<i>M. anisopliae</i>	99,41 ± 0,19a	0,33	1	0,78 ± 0,04a
Tiamethoxam	95,08 ± 3,36a	4,67	1	0,87 ± 0,03a
Bifenthrin	80,57 ± 8,58a	19,22	1	0,80 ± 0,03a
Imidacloprid	84,53 ± 8,35a	15,25	1	0,82 ± 0,05a
Clorfenapyr	94,30 ± 3,88a	5,45	1	0,82 ± 0,06a

Means followed by the same lowercase letter per column do not differ by the Tukey test (p≤0.05). ¹%E: Reduction in the beneficial capacity of the parasitoid. ²Cl- class 1- harmless (E<30%), class 2- slightly deleterious (30%≤E<79%), class 3- moderately harmful (80%≤E≤99%), class 4- harmful (E>99%).

Conclusions

None of the treated pupae affected the emergence of parasitoid adults, therefore, all products classified as innocuous. However, studies to verify the direct effect on the parasitoid still need to be done.