

Selectivity of mycoinsecticides and a pyrethroid to the egg parasitoid *Cleruchoidea noackae* (Hymenoptera: Mymaridae)

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Introduction and Aims

Thaumastocoris peregrinus (Hemiptera: Thaumastocoridae), is an exotic pest of great importance for *Eucalyptus* plantations. The use of the egg parasitoid *Cleruchoidea noackae* (Hymenoptera: Mymaridae), is the most used control method. However, other techniques are studied, such as use of entomopathogenic fungi and chemical insecticides. The compatibility of chemical and biological control methods favors integrated pest management. The objective was to evaluate the action of mycoinsecticides and insecticides on the parasitoid *C. noackae* and its parasitism on *T. peregrinus* eggs.

Material & Methods

Two bioassays were performed: 1) cage surfaces (IOBC standard) were submitted to the application of *Beauveria bassiana* (Boveril) and *Metarhizium anisopliae* (Metarril), both with concentrations of 1×10^8 conidia/g, Bifenthrin (Capture), with a concentration of 400 g/L, and control (water); after drying, 20 adults of the parasitoid were released per replicate (cage). 2) in this bioassay eggs of *T. peregrinus* were submitted to the same treatments; after drying 10 eggs of *T. peregrinus* treated by cage, and released a couple of *C. noackae* by replicate. Parasitism was allowed for 24 hours ($T = 25 \pm 2^\circ \text{C}$; $UR = 70 \pm 10\%$ and photophase = 12h). The statistical design was completely randomized with four treatments and five replicates. Mortality, parasitism and viability were evaluated.

Results

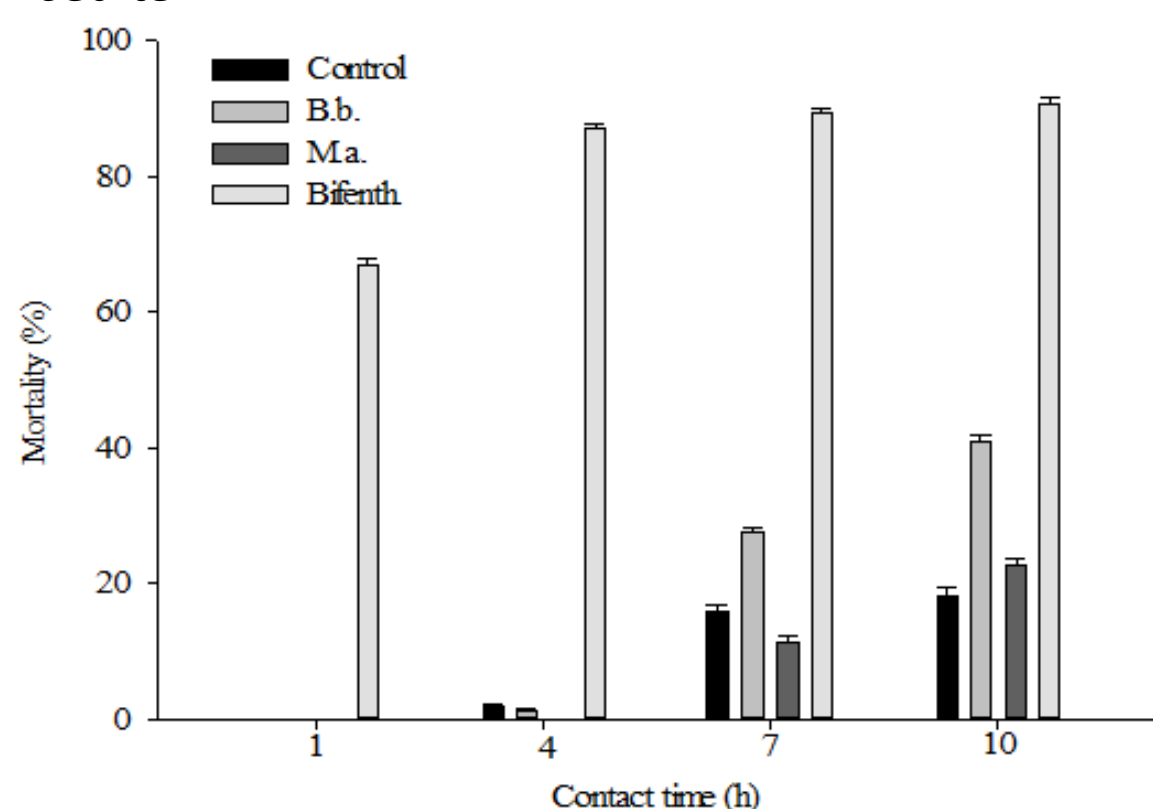


Figure 1. Mortality (%) of *Cleruchoidea noackae* (Hymenoptera: Mymaridae) adults, over the time of contact in hours (h) with the biological insecticides *Beauveria bassiana* (B.b.) and *Metarhizium anisopliae* (M.a.) and to the chemical bifenthrin (Bifenthrin.) (Temp.: $25 \pm 1^\circ \text{C}$, RH: $70 \pm 10\%$ and photophase: 12 h).

Table 1. Mortality (%) of *Cleruchoidea noackae* (Hymenoptera: Mymaridae) adults, by contact with the biological insecticides *Beauveria bassiana* (B.b.) and *Metarhizium anisopliae* (M.a.) and to the chemical bifenthrin (Bifenthrin.) (Temp.: $25 \pm 1^\circ \text{C}$, RH: $70 \pm 10\%$ and photophase: 12 h) and classes of these products (Cl.)

Treatments	Contact time (h)				%E ¹	Cl. ²
	1	4	7	10		
Control	0.0±0.00Aa	2.0±0.25Aa	15.9±0.86Aa	18.0±1.52Aa	0.00	1
B.b.	0.0±0.00Aa	1.3±0.20Aa	27.6±0.40Ba	40.8±1.16Bb	40.80	2
M.a.	0.0±0.00Aa	0.0±0.00Aa	11.3±1.11Aa	22.6±1.08Aa	22.60	1
Bifenthrin.	67.0±0.93Ab	87.0±0.66Ab	89.4±0.58Ab	90.6±0.80Ac	90.60	3

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

Table 2. Parasitism (Paras.) and viability (Viab.) (Mean ± SD) (%) and reduction in the beneficial capacity of the parasitoid *Cleruchoidea noackae* (Hymenoptera: Mymaridae) (% E) on *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) eggs treated with different insecticides (Temp.: $25 \pm 1^\circ \text{C}$, RH: $70 \pm 10\%$ and photophase: 12 h) and class of these products (Cl.)

Treatments	Paras. (%)	%E	Cl.	Viab. (%)	%E	Cl.
Control	72±15.94a	0.00	1	100±0.00a	0.00	1
<i>Beauveria bassiana</i>	70±8.94a	2.80	1	96±4.47a	5.00	1
<i>Metarhizium anisopliae</i>	46±15.68ab	36.12	2	100±0.00a	0.00	1
Bifenthrin	8±4.90b	88.89	3	100±0.00a	0.00	1

Means followed by the same uppercase letter per line or lower case per column do not differ by the Tukey test ($p \leq 0.05$).

Conclusions

B. bassiana was selective to parasitism and viability, and slightly harmful to adults of *C. noackae*; *M. anisopliae* was innocuous to adults and the viability of offspring, but it reduced parasitism; and bifenthrin was non-selective to *C. noackae* in all bioassays.



Figure 2: Standard Cages IOBC