Acaricidal activity of an annonin-based commercial biopesticide against citrus red mite

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INTRODUCTION

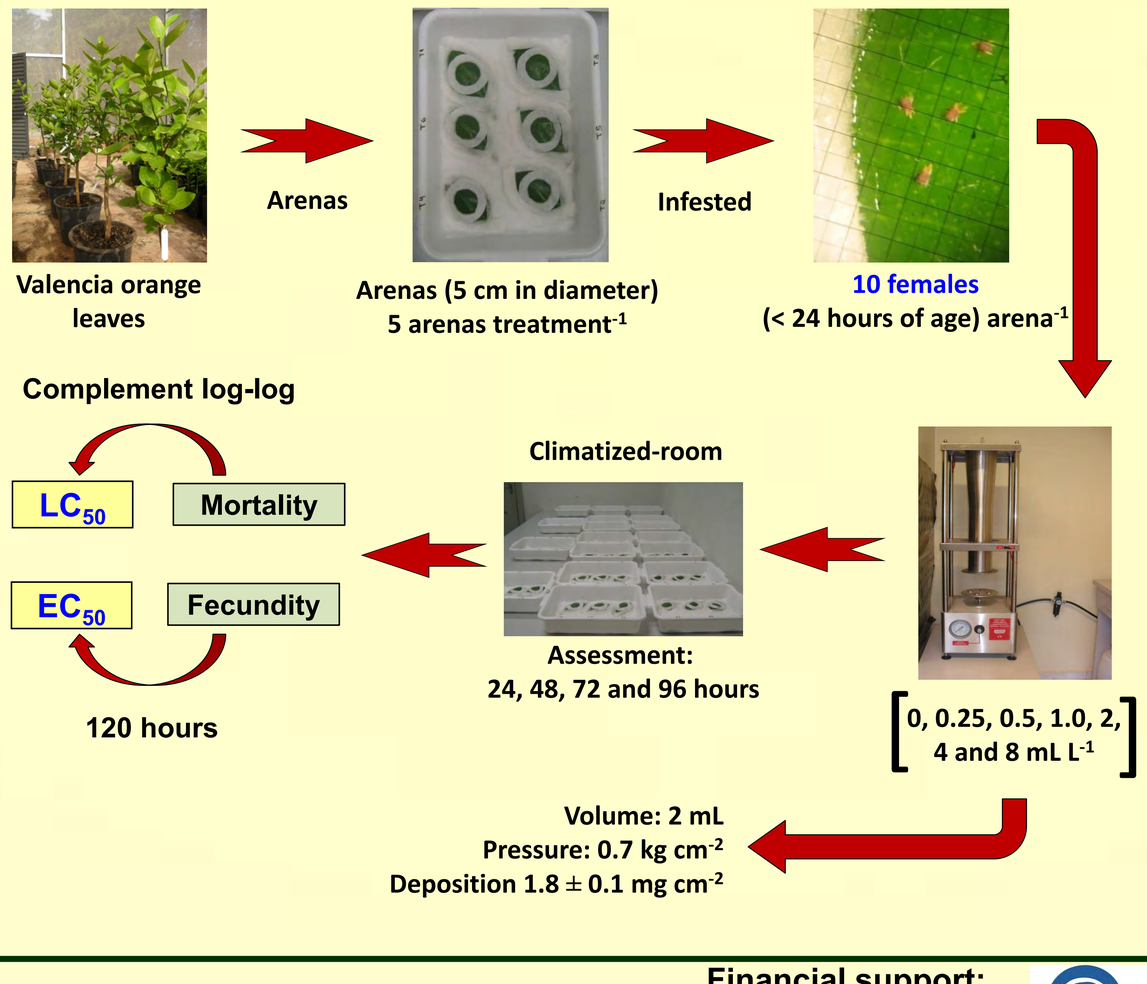
Acetogenins are a class of natural compounds found in some Annonaceae species with promising insecticidal/acaricidal properties. These compounds are potent inhibitors of electron transport systems in the mitochondria, reducing the ATP levels in the cells conducting the death of the target arthropods. However, few studies had been performed in order to assess the bioactivity of acetogenin-based biopesticides on mites that occur in fruit crops.

OBJECTIVE

To evaluate, by topic + residual contact bioassays, the bioactivity of an annonin-based commercial formulation (Anoson® 1.0 EC) against the citrus red mite, *Panonychus citri* (McGregor) (Acari: Tetranychidae), an important pest of citrus in Brazil.

MATERIAL AND METHODS

For this purpose, arenas made from Valencia orange leaves were infested with 10 newly emerged mite females and sprayed with solutions (2 mL) at different concentrations (0, 0.25, 0.5, 1, 2, 4 and 8 mL of formulation L^{-1}) in a Potter tower. For each treatment, five arenas with two replicates over time were used, and the mite mortality assessment was performed daily until the fourth day.



RESULTS

The tested biopesticide caused high mortality of *P. citri* (LC_{50} = 13.47, 0.84, 0.70 and 0.63 mL L^{-1}, after 24, 48, 72, and 96 h of exposure, respectively) in a concentration-dependent way (Table 1). Moreover, the biopesticide also reduced significantly the number of eggs laid per female (EC_{50} = 0.87 mL L^{-1}), but did not affect *P. citri* female fertility (Figure 1).

Table 1. Estimate of LC_{50} (in mL L^{-1}) of an annonin-based biopesticide against *P. citri* females.

Mite pest	Exposure time (hours)	N[1]	*Slope* ± SE (*p* value)	LC_{50} (CI)[2]	χ^2 (*d.f.* = 4)[3]	h[4]
	24	735	1.0 ± 0.17 (*p*<0.0001)	13.5 (7.4-38.6)	5.4	1.4
	48	733	1.4 ± 0.18 (*p*<0.0001)	0.8 (0.7-1.0)	8.5	2.1
	72	733	1.7 ± 0.14 (*p*<0.0001)	0.7 (0.6-0.8)	4.8	1.2
	96	730	2.2 ± 0.18 (*p*<0.0001)	0.6 (0.5-0.7)	1.5	0.8

[1]N: number of insects tested. [2]Letal concentration (LC) and confidence interval (CI) at 95% of probability of error. [3]Pearson' chi-squared value (χ^2) and degrees of freedom (*d.f.*). [4]Heterogeneity factor.

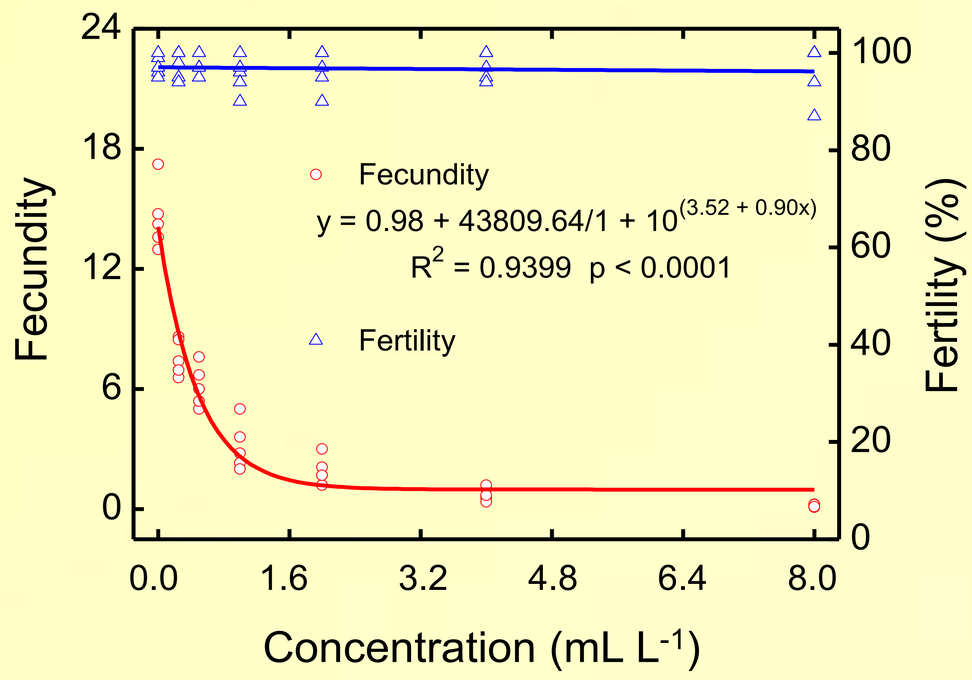


Figure 1. Estimate of EC_{50} (in mL L^{-1}) of an annonin-based biopesticide against *P. citri* females.

CONCLUSION

Therefore, our results indicate that Anoson® 1.0 EC is a useful component in the framework of citrus red mite IPM in citrus and elsewhere.

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