Assessing the competitive interactions between two egg parasitoids of the *Eucalyptus* snout beetle, *Gonipterus platensis*, and their implications for biological control

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Abstract

The *Eucalyptus* snout beetle, *Gonipterus* platensis (Marelli), is an important pest of *Eucalyptus globulus* Labill. This insect is partially controlled by the egg parasitoid *Anaphes nitens* (Girault) in many regions, but the introduction of additional natural enemies can potentially increase pest control. In this study, we evaluate intra- and interspecific competitive interactions between the incumbent *A. nitens* and the new egg parasitoid *Anaphes inexpectatus* Huber and Prinsloo. The effects of temperature, order of parasitism, number of parasitoid ovipositions, time interval between ovipositions, and host egg age were analysed. Distinct outcomes of competition were found at different temperatures, with benefit to *A. inexpectatus* at 20 °C. The first species to parasitise generally prevailed over the second, indicating exploitation competition. However, interference competition was also apparent, namely when *A. inexpectatus* laid multiple eggs, outcompeting *A. nitens*, and when the first parasitism occurred six days before. In this case, the second species was able to eliminate the first. Anaphes nitens tended to reject eggs parasitised by *A. inexpectatus*, whereas *A. inexpectatus* showed no interspecific host discrimination behaviour towards eggs parasitised by *A. nitens*. Overall, *A. nitens* parasitised more hosts and is expected to contribute more to pest control, but it was found to be more susceptible to intraspecific competition. Results suggest that *A. inexpectatus* and *A. nitens* should be able to coexist, as asymmetric competition was found to depend on temperature. However, *A. inexpectatus* establishment in the field in areas where *A. nitens* is already present may be delayed or even prevented due to interspecific competition. As such, the introduction of *A.*

inexpectatus in a classical biological control programme against *G. platensis* is advised to be carried out by releasing large numbers of parasitoids in consecutive occasions.