
Overwintering strategy of different populations of *Aphidius colemani* from Chile

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Abstract

Overwintering strategies are essentially an ecological adaptation to face environmental variability. To survive winter, ectotherms can stay active or enter diapause; the selected strategy depends on winter harshness at a given location, and the capacity to enter diapause must thus be assessed for each insect population. Short photoperiods and low temperatures are the main factors inducing winter diapause in insects. Response to photoperiod and temperature in two different Chilean geographic populations originating from cereal fields (Talca 35° 26'S; 71°40'W and Temuco 38° 45'S; 72° 40'W) of the aphid parasitoid *Aphidius colemani* (Hymenoptera: Braconidae) was studied. The aim of this study was to determine the effect of different combinations of day lengths and temperatures on diapause incidence in *A. colemani*, and to evaluate if cold storage in complete darkness (extreme conditions) may induce diapause at the highest level. We examined the potential effects across four constant conditions; 8:16 LD (Light: Dark, h) at 10°C, 10:14 LD at 14°C, 16:8 LD at 20°C (control), and cold storage at 4°C in complete darkness after one day of mummification for seven days. Besides, immature developmental time, survival and longevity were measured. Neither of two populations of *A. colemani* expressed diapause at any tested condition. Our results showed that the shortest photoperiods and the lowest temperatures prolonged the development time of immatures. However, there were no significant differences among emerging individual performance in terms of survival and adult longevity. These results suggest that *A. colemani* remain active during the winter and may therefore act as biological control agent against aphids (also active during the winter) in winter cereal fields from Chile.

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