Reproduction of the parasitoid *Anisopteromalus calandrae* in the different developmental stages of *Rhyzopertha dominica*

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Abstract

Rhyzopertha dominica (Fabricius) is one of the most common damaging pests of stored grains causing significant losses worldwide. Eggs are deposited on top of the grain while newly hatched larvae are voracious feeders inside the kernels where they develop until the emergence of adults. In the stored grain ecosystems, the naturally occurring parasitoid *Anisopteromalus calandrae* (Howard) parasitizes immature stages of several coleopteran pests, including *R. dominica*. The parasitoid exerts a host-size-dependent behavior when the host is *Sitophilus oryzae* (L.) and *S. zeamais* (Motschulsky), however it has not been studied yet with *R. dominica*. Furthermore, susceptibility of the beetle to attack by the parasitoid could vary according to the type of infested grain. Thus, laboratory studies were conducted to assess the suitability of different developmental stages of the beetle for the parasitoid reproduction in wheat or brown rice at 28ºC. Vials containing 90 grains were infested with 30 eggs of beetle, and when they reached first, second, third, fourth instar larvae and the pupal stage, a mated female parasitoid was introduced into each vial for 3 days. Vials were incubated for 8 weeks until emergence of adult hosts and/or parasitoids. Stages from which most of the parasitoid emerged were fourth instar larvae and pupae. Although a few adults also emerged from third and second instar, none emerged from the first. However, mortality of first and second instar of the beetle ranged between 33 and 70% in both grains. This mortality could either be due to host feeding by the adult parasitoid and/or to mortality of immature stages of the parasitoid. Total mortality of *R. dominica* and reproduction of the parasitoid was higher in brown rice than in wheat.

Keywords: biological control, lesser grain borer, Bostrichidae, Pteromalidae, grain, *Anisopteromalus calandrae* (Howard)