Abstract

The lesser grain borer, *Rhyzopertha dominica* (F.) (Coleoptera: Bostrichidae) is a destructive pest of stored-grain. Males produce a pheromone, with two components Dominicalure-1 (D1) and Dominicalure-2 (D2), which is attractive to both sexes. However, little is known about the pheromone biology of *R. dominica*. This thesis presents new studies that used behavioural bioassay and pheromone entrainment separately, and in tandem, to elucidate the host finding behaviour, the pheromone communication system and the interactions between these two.

The role of host volatiles in primary host selection was tested for several different commodities. For the first time it was shown that *R. dominica* adults are unable to determine the suitability of a host from its volatiles alone. Further studies on the responses of beetles reared on two different hosts demonstrated that rearing medium does not affect beetle response to a host. The attractiveness of host grains, to both males and females, was increased when infested by male *R. dominica*. This affect was stronger for females. The mixture of host volatiles and aggregation pheromone was more attractive to both sexes than either of these alone.

Studies on individual pheromone outputs of males varied considerably in the absolute quantities of pheromone components D1 and D2 but the ratio of the two in the blend varied little. Pheromone production was found to rise in the period 16.00h to 20.00h. The actual output of pheromone was positively correlated with body size and extent of feeding/boring.

When present with other males, *R. dominica* released smaller amounts of pheromone. However, when present in an unsuitable host or with females the pheromone signal was modified by a reduction in both the amount of pheromone released and proportion of D2 in the blend. Responding beetles found modified signals less attractive than 'normal' signals. Attempts were made to determine which characteristics of the signal were correlated with the observed responses.

The significance of these findings in relation to biology of *R. dominica*, practical implications and avenues for future research are discussed.