Abstract

Prostephanus truncatus (Horn) (Coleoptera: Bostrichidae) is an important pest of stored maize which produces large quantities of dust/frass through boring. Two bioassays were used to assess the role of such dust/frass in close-range prey location by its predator *Teretrius nigrescens* (Lewis) (Coleoptera: Histeridae).

Adult *T. nigrescens* were strongly attracted/arrested by *P. truncatus* dust/frass whereas responses to maize flour were comparatively weak. This attractive/arrestive property was shown not to degrade over nearly one year and was unaffected by heating to 150°C. However, it was significantly reduced by Soxhlet extraction using methanol. A similar preference was detected for applications of dust/frass extract, and these were prepared by shaking with solvent. Fractionation and bioassaying showed a fraction containing a mixture of fatty acids to be the most bioactive.

T. nigrescens responded more strongly to *P. truncatus* dust/frass than to dust/frass originating from other storage pest beetles, all of which were reared on maize. A similar preference for *P. truncatus* dust/frass was found when extracts were prepared and presented together with dust/frass extracts from other species. Chemical analysis revealed all extracts to contain similar mixtures of fatty acids and it was concluded that these originated from the maize. It was hypothesised that strong responses to *P. truncatus* dust/frass were caused by the presence of an additional chemical factor(s) specific to *P. truncatus*. Equally strong responses were recorded when dust/frass originated from *P. truncatus* infesting cassava or other artificial substrates. These experiments confirmed a generic *P. truncatus* effect that was independent of substrate.

T. nigrescens responded more strongly to female *P. truncatus* infestations than to male infestations, even after insects were killed by freezing. It was shown that females produced more dust/frass than males, however, this difference could not explain the difference in *T. nigrescens* response. Responses to virgin and mated *P. truncatus* showed that, in addition to eggs, other differences between male and female *P. truncatus* infestations did exist. Bioassays using extracts of male and female *P. truncatus* dust/frass, and chemical analysis demonstrated that very small quantities of male

aggregation pheromone were repellent to the predator at close-range. This was unexpected since *T. nigrescens* is known to use the same pheromone as a kairomone when flying. This is the first time a predator, which is attracted to a cue at a distance, has been shown to be repelled by the same cue at close-range.

Bioassays of *T. nigrescens* volatiles indicated that they were attractive to other *T. nigrescens*. Three components were detected and two were identified as hexenoic acid and a decenoic acid.

All results are discussed in relation to *T. nigrescens* prey location behaviour and general biology.