Are the volatile chemicals from wheat and grain insect (*Tribolium castaneum* (Herbst), *Rhyzopertha dominica* (F.) and *Sitophilus granarius* (L.)) related with inter-communication between insects and host?

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Abstract

We assume that selection pressure can act on both the biochemical and the physiological regulation of the signal and on the morphological and neurophysiologic filter properties of the receiver. Communication is implied when signal and receiver evolves toward more and more specific matching, culminating. In other cases, receivers respond to portions of a body odour bouquet that is released to the environment not as a (intentional) signal but as an unavoidable consequence of metabolic activity or tissue damage. Breath, sweat, urine, faeces, their aquatic equivalents, and their bacterial and other symbiotic embellishments all can serve as identifiers for chemoreceptive insects interested in finding food or hosts. Understanding the biological and chemical bases for these signals could lead to new approaches to the diagnosis and bio-treatment of insect pests. The principal of this research is based on the volatiles released from both commodities and insects after harvest and during storage. The contents of volatiles are related with history of grain (pre and post harvest conditions and treatment). Therefore, the volatiles can be monitored as indicators for diagnostic of grain qualities (insects at this stage). The headspace Solid Phase Mico-extraction Gas Chromatography (HS-SPME-GC) method was used for analysis of volatiles from host wheat, three species of stored grain pests *Tribolium castaneum* (Herbst), *Rhyzopertha dominica* (F.) and *Sitophilus granarius* (L.), and wheat plus each insect species, respectively. The primarily GC results showed that chemical signals or GC spectra maps are different between the different combinations, such as wheat or insect only or wheat plus insects. The primarily models were explored which could partly illustrate stored grain insect evolution from the point of view of inter-communication between insects and host wheat with the volatile chemicals.