

12th International Working Conference on Stored Product Protection (IWCSPP) in Berlin, Germany, October 7-11, 2018

Visible Near Infrared Hyperspectral (VNIH) technique to differentiate *Trogoderma variabile* reared on different commodities

Manjree Agarwal^{1*}, Thamer Al-Shuwaili¹, Anupiya Nugaliyadde¹, Penghao Wang², Kok Wai Wong¹, Yonglin Ren¹

¹School of Veterinary and Life Sciences, Murdoch University

²School of Engineering and Information Technology, Murdoch University

*Corresponding author: m.agarwal@murdoch.edu.au

DOI 10.5073/jka.2018.463.066

Abstract

Under *Trogoderma* sp, some comes major stored grain pest, which are of economic concern and most of the times accurate identification becomes very difficult. Under this study a new diagnostic system using visible near-infrared hyperspectral (VNIH) imaging methods is developed to address identification gaps for *T. variabile*. This technique is useful because different materials have unique reflectance spectra, and this difference in reflectance spectra can be used to identify various constituents in an image. For this study both larvae and adult were studied for *T. variabile* fed on wheat, maize, canola, barley, oats and rice for more than 4 generations. Each individual insects killed by ethanol were scanned using a hyperspectral imaging system from 400 to 1000nm. Matlab 2016b was used to develop predictive model for hyperspectral image classification. Deep neural network approach gave more than 90% accuracy for both larvae and adult stages fed on different commodities. From this result we can say that *T. variabile* on the different host can lead to difference in VNIH reflectance spectra. This is one of most fundamental factors for development of robust VNIH technique as diagnostic tool.

In search of a new attractant for monitoring *Stegobium paniceum* L. (Coleoptera: Anobiidae)

Salvatore Guarino^{1,3*}, Stefano Colazza¹, Ezio Peri¹, Maurizio Sajevo², Giuseppe Braghieri³, Nadia Zini³, Marco Caimi³, Pietro Zito^{2,3}

¹Dipartimento di Scienze Agrarie, Alimentari e Forestali, Università degli Studi di Palermo, Viale delle Scienze, Ed. 5 - 90128, Palermo, Italy

²Dipartimento di Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche, Università degli Studi di Palermo, Via Archirafi 18, 90123, Palermo, Italy

³GEA Srl Via Enrico Fermi 10, 20019, Settimo Milanese (MI), Italy

Part of this work is based on the paper "Laboratory evaluation of volatile semiochemicals for attracting *Stegobium paniceum* (Coleoptera: Anobiidae)", submitted to a peer reviewed journal

*Corresponding author: salvatore.guarino@unipa.it

DOI 10.5073/jka.2018.463.067

Abstract

Stegobium paniceum (L.) is a major pest for several stored products worldwide. Monitoring methods for this species, based on pheromone traps, are affected by the complexity and expensiveness of the chemical synthesis of the pheromone isomer [(2*S*,3*R*,1'*R*)-Stegobinone] and/or by its lost of efficacy after two weeks at room temperature. So other semiochemicals that can be exploited for monitoring this species are highly desirable. In this study was tested the behavioral response in two-choice olfactometer of *S. paniceum* adults to Volatile Organic Compounds (VOCs) collected from colonized substrate. The elution of the headspace collection from *S. paniceum* colony elicited attraction of both sexes. The GC-MS chemical analysis of the extract indicated the presence of several alkanes, alcohols, aldehydes and fatty acids, some of them already reported to attract other stored product coleopteran pests and promising candidates for further studies to test their attractiveness on *S. paniceum*.

keywords: drugstore beetle, monitoring, attractant, volatile organic compounds, headspace

1. Introduction

The drugstore beetle *Stegobium paniceum* (L.) (Coleoptera: Anobiidae), is among the major pests for a wide variety of dry and durable stored agricultural products (Edde et al., 2012). Drugstore beetle females produce a sex pheromone that induces attraction behavior of males, with the highest responses 5–12 days after adult emergence (Kuwahara et al., 1975; Kodama et al., 1987).