

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

damage, such as weight loss, frass production, and presence of insect-damaged kernels, should also be done as well. **8.**

## 7. Acknowledgements

Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture. The US Department of Agriculture is an equal opportunity provider and employer.

## References Cited

- AFFUL, E., ELLIOTT, B., NAYAK, M. K., PHILLIPS, T. W., 2018: Phosphine Resistance in North American Field Populations of the Lesser Grain Borer, *Rhyzopertha dominica* (Coleoptera: Bostrichidae). *Journal of Economic Entomology* **111**, 463-469.
- ARTHUR, F. H. 2012: Aerosols and contact insecticides as alternatives to methyl bromide in flour mills, food production facilities, and food warehouses. *Journal of Pest Science* **85**, 323-329.
- ARTHUR, F. H. 2016: Efficacy of methoprene for multi-year protection of stored wheat, brown rice, rough rice and corn. *Journal of Stored Products Research* **68**, 85-92
- ARTHUR, F. H., 2018: Residual efficacy of deltamethrin as assessed by rapidity of knockdown of *Tribolium castaneum* on a treated surface: Temperature and seasonal effects in field and laboratory settings. *Journal of Stored Products Research* (In Press).
- ARTHUR, F. H., AND CASADA, M. E., 2005: Feasibility of summer aeration to control insects in stored wheat. *Applied Engineering in Agriculture* **21**, 1027-1038.
- ARTHUR, F. H., CASADA, M. E., 2010: Directional flow of summer aeration to manage insect pests in stored wheat. *Applied Engineering in Agriculture* **26**, 115-122.
- ARTHUR, F. H., CASADA, M. E., 2016: Temperature stratification and insect pest populations in stored wheat with suction versus pressure aeration. *Applied Engineering in Agriculture* **32**, 849-860.
- DAGLISH, G. D., 2008: Impact of resistance on the efficacy of binary combinations of spinosad, chlorpyrifos-methyl and s-methoprene against five stored-grain beetles. *Journal of Stored Products Research* **44**, 71-76.
- FIELDS, P. G., 1992: The control of stored-product insects and mites with extreme temperatures. *Journal of Stored Products Research* **28**, 89-118.
- HERTLEIN, M. B., SUBRAMANYAM, B., THOMPSON, G. D., ATHANASSIOU, C. 2011: Spinosad: a new natural product for stored grain protection. *Journal of Stored Products Research* **47**, 131-146
- HOWE, R. W., 1965: A summary of estimates of optimal and minimal conditions for population increase of some stored products insects. *Journal of Stored Products Research* **1**, 177-184.
- KAVALLIERATOS, N. G., ATHANASSIOU, C. G., ARTHUR, F. H., 2015: Efficacy of deltamethrin against stored-product beetles at short exposure intervals or on a partially-treated rice mass. *Journal of Economic Entomology* **108**, 1416-1421.
- LORINI, I., COLLINS P. J., DAGLISH G. J., NAYAK M. K., PAVIC H., 2007: Detection and characterization of strong resistance to phosphine in Brazilian *Rhyzopertha dominica* (F.) (Coleoptera: Bostrichidae). *Pest Management Science* **63**, 358-364.
- LUI, S., F. H. ARTHUR, D. VANGUNDY, AND T. W. PHILLIPS. 2016: Combination of methoprene and controlled aeration to manage insects in stored wheat. *Insects: Alternatives to chemical control for stored-product insects*. **7**, 25.
- NAVARRO S., NOYES, R. T., CASADA, M. E., ARTHUR, F. H., 2012: Aeration of grain. pp. 121-134 In *Circular E-912, Stored Product Management*, Cuperus, G. C., Hagstrum D., Phillips, T. W., Eds. Kansas State University Extension Circular **5156**, Manhattan, Kansas, USA.
- NAYAK, M. K., DAGLISH, G. D., 2017: Base-line susceptibility of field populations of *Rhyzopertha dominica* (F.) to spinosad in Australia. *Journal of Stored Products Research* **70**, 1-6.
- NAYAK, M. K., DAGLISH, G. D., PHILLIPS, T. W., 2015: Managing resistance to chemical treatments in stored products pests. *Steward Posharvst Review* **1**, 3.
- NAYAK, M. K., FALK, M. G., COLLINS, P. J., HOLLOWAY, J. C., 2017: An analysis of trends, frequencies and factors influencing the development of resistance to phosphine in the red flour beetle *Tribolium castaneum* (Herbst) in Australia. *Journal of Stored Products Research* **72**, 35-48.

## Comparative efficacy of spinetoram, chlorfenapyr, cypermethrin, beta-cyfluthrin against *Tribolium castaneum* (Herbst) and *Trogoderma granarium* (Everts)

Mansoor ul Hasan\*<sup>1</sup>; Qurban Ali<sup>2</sup>; Muhammad Faisal<sup>1</sup>; Faizan Amjad<sup>1</sup>; Habib ur Rehman<sup>1</sup>

<sup>1</sup>Department of Entomology, University of Agriculture, Faisalabad, Pakistan

<sup>2</sup>Entomological Research Institute, Ayub Agricultural Research Institute, Faisalabad, Pakistan

\*Presenting author

DOI 10.5073/jka.2018.463.173

Post-harvesting losses is a critical component for filling the demands of ever increasing population. Because a large number of food security issues can be facing in the future. Current study was planned to probe the comparative insecticidal, growth inhibitory and feeding deterrent activities of spinetoram, chlorfenapyr, cypermethrin and beta-cyfluthrin against *Trogoderma granarium* (Everts) and *Tribolium castaneum* (Herbst) under laboratory conditions. The insecticides were used at three different concentrations i.e., 5, 7 and 9ppm. Results revealed that maximum adult mean percent mortality of *T. castaneum* was recorded at highest concentration (9ppm) was 78.08% followed by 69.41% at 7ppm and 61.41% at 5ppm. In case of *T. granarium* at highest concentration (9ppm) the mortality was 72.58% followed by 64.08% at 7ppm and 55.33% at 5ppm. Results regarding growth inhibition showed that cypermethrin and chlorfenapyr gave highest values 28.77 and 23.78% for larval emergence inhibition. While beta-cyfluthrin gave lowest larval emergence inhibition against the *T. castaneum*, beta cyfluthrin gave 53.02% pupae inhibition. 50.26%, 48.66% and 46.48% pupae inhibition values were given by spinetoram, chlorfenapyr and cypermethrin, respectively. Adult emergence inhibition was highest 40.17% in case of cypermethrin followed by chlorfenapyr (30.60%). Similarly, the efficacy of all tested insecticides in term of feeding deterrence for both insects was cypermethrin > chlorfenapyr > spinetoram > beta-cyfluthrin.

### **Toxicity of four Cuban botanical derivatives against two stored-products coleopteran pests**

**Oriela Pino Pérez<sup>1</sup>, Sayonara González<sup>2</sup>, Juan Carlos Pérez<sup>3</sup>, Rafael S. Herrera<sup>2</sup>, Nurys Valenciaga<sup>2</sup>, Dayleni Fortes<sup>2</sup>, Yaima Sánchez<sup>1</sup>, Susana Ramírez<sup>1</sup>, Moraima Suris<sup>1</sup>**

<sup>1</sup>Centro Nacional de Sanidad Agropecuaria (CENSA), Grupo Plagas Agrícolas. Dirección de Sanidad Vegetal. Carretera de Jamaica y Autopista Nacional. Apdo 32700. San José de las Lajas. Mayabeque, Cuba. Email: orielapino@censa.edu.cu

<sup>2</sup>Instituto de Ciencia Animal, Apartado Postal 24, San José de Las Lajas, Mayabeque, Cuba

<sup>3</sup>Universidad de Las Tunas. Filial Universitaria Municipal Jesús Menéndez. Calle 21 No. 3, El Batey, Chaparra Jesús Menéndez. Las Tunas. Cuba. CP.77300

DOI 10.5073/jka.2018.463.174

#### **Abstract**

Plants are a source of substances for protection of stored products. The Cuban flora has not yet been fully studied as a source of pesticides for postharvest protection, partly due to its great diversity. The toxicity of four Cuban plant derivatives against *Lasioderma serricorne* (F.) and *Sitophilus zeamais* Motschulsky was investigated. The anti-insect activity of the powders and the essential oil from plants belonging to Asteraceae, Fabaceae and Piperaceae was tested. Mortality and emergence of adult insects and the repellent effect of products were evaluated. Two products derived from *Piper aduncum* subsp. *ossanum*, caused high mortality (81,6 and 100%), reduced emergence (27,9 and 0,4%) and exhibited strong repellent activity on *L. serricorne*. Against *S. zeamais*, treatments with the highest mortality values were stems of *Lonchocarpus punctatus* (72,4%), seeds and stems of *Canavalia ensiformis* (64,9 and 69,9%), and leaves of *Tithonia diversifolia* (67,2%). The progeny production of *S. zeamais* was inhibited by powders of *L. punctatus* stems (31,8%), *C. ensiformis* seeds (40,5%), leaves (43,7%) and stems (30,6%), and *T. diversifolia* leaves (38,7%). The stems of *C. ensiformis*, leaves of *T. diversifolia* and *L. punctatus* had the highest repellent effect. These products have potential for small-scale treatments of grains for protection against both insects, and *P. aduncum* subsp. *ossanum*-based products to control *L. serricorne* infestation in tobacco. Identification of local candidates to develop effective and safe pesticides offers new alternatives to the Cuban agriculture in the control of storage pests.

**Keywords:** *Lasioderma serricorne*, *Sitophilus zeamais*, Fabaceae, Asteraceae, Piperaceae.

#### **Introduction**

Stored products of agricultural and animal origin are attacked by many species of insect pests causing quantitative and qualitative losses and insect contamination in food commodities is an important quality control problem of concern for food industries (Rajendran and Sriranjini, 2008). Storage insects cause significant losses for grain and legume producers, due to the reduction of the quantity and quality of food for domestic consumption and the value of the grain for sale in the