GENDER-BASED EFFECTS OF SPINETORAM ON PROGENY DEVELOPMENT OF *Tribolium castaneum* (Herbst) (COLEOPTERA: TENEBRIONIDAE) FOLLOWING HIGH-TEMPERATURE EXPOSURE

S.P.G.D.D. Wijesinghe and L.K.W. Wijayaratne

Department of Plant Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura, Sri Lanka.

The red flour beetle (*Tribolium castaneum*) infestation in stored food has a direct impact on quantitative losses and product deterioration. The bacterial formulation of spinetoram reduces progeny of *T. castaneum* but its sex-based effects and effect on progeny production following exposure to elevated temperature are not yet understood. The objectives were to determine progeny development by *T. castaneum* adults, initially received spinetoram (either as unisex or both sexes) and later exposed to high temperature. Virgin male and female adults introduced separately into rice flour treated with a given concentration of spinetoram (0-62.5 ppm) were subsequently exposed to heat (42℃) for different durations (0-20 h). Following 6 h from the termination of heat, pairing of one male and one female exposed to the same spinetoram concentration and heat duration was done in separate vials as 'untreated × untreated', 'untreated × treated', 'treated × untreated' or 'treated × treated' to study sex-based effects. These parent adults were removed after two weeks and the flour samples were held another four weeks for progeny development. Data were analysed using ANOVA procedures of SAS run as a mixed model. Increase in spinetoram concentration and heat individually declined progeny emergence of *T. castaneum* compared to the progeny produced in nature (no spinetoram, no heat); effects varied with the concentration and exposed sex. Combination of spinetoram and heat further reduced the progeny. The progeny produced varied in the order of exposed sex to the treatments as female>male>both sexes. In general, progeny declined following exposure to 42°C for 0-16 h. By contrast, beyond 16 h the progeny developed by female parent adults exposed to spinetoram started an increasing trend. This study concludes that pre-treatment with spinetoram and subsequent exposure to elevated temperature is a promising method of stored product protection from *T. castaneum* infestation.

Keywords: Combined effect, Female, Heat, Male, Progeny