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Insecticidal efficacy of abamectin against red flour beetle *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae): influence of dose, exposure interval, relative humidity and temperature

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In this communication, the insecticidal efficacy of Abamectin against *Tribolium castaneum* adults were evaluated in two sets of bioassays: In the 1st series of experiment, the effect of temperature was assessed on wheat treated at 0.01, 0.10, 0.25, 0.50, 0.75, 1.00 and 1.50 mg kg-1 at 20°C and 30°C, and 65%rh. The moisture content of the wheat ranged between 11.8 and 12.1%. Spraying was performed using a Badger 100 artists' airbrush (Franklin Park, IL, USA) on a stainless-steel tray in which 1 kg of wheat containing 5% (weight:weight) broken kernel was treated with 5 mL of an aqueous solution containing the appropriate volume of the EC formulation corresponding to each dose. Treated and untreated grains were kept into incubators at 30°C for 6 h to remove the excess moisture. After that, the grains were kept at 20 and 30°C and 65% rh in temperature-controlled incubators (Binder Model: KB 720) for 24 h for acclimatization to experimental conditions. For the experiment, eight samples of 60 g were obtained from each treated or untreated lots for each temperature and put into a cylindrical plastic vial (7 cm long × 5 cm diameter). Sixty (1-2 wk old) adults were placed in each vial containing treated wheat. There were 8 replicates for each exposure period and control. Adult mortality were recorded on 7th, 14th, and 21st d after treatment by reintroducing alive adults in the same vial while discarding the dead ones. At the end of the 21th d of exposure, all dead and alive adults were discarded, and the vials containing wheat only was returned to corresponding temperature-control.

The effectiveness of Spinetoram against red flour beetle, *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae)

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The data were analyzed, after arcsine transformation, with GLM-repeated measures (ANOVA) at a significance level of P less than 0.05 using Statistica version 7, and the means were compared with Tukey's HSD test. Arcsine transformed means were back transformed for presentation. Mortality was proportional to dose rate and exposure period. At 1 ppm dose rate, mortality at the end of 7th day was recorded as 34,44% and increased to 52.59% after 15 day of exposure. Mortality response was more pronounced at/above 1 ppm. Thus at 15th day of exposure, mortality rates were calculated as

3.33%, 52.59%, and 99,26 for 0,01, 1, and 10 ppm dose rate, respectively. F1 development was also proportional to dose rate and the population growth was suppressed by 99% and 100% at 5, and 10 ppm, respectively. Results show that the spinetoram can be effectively used for the control of stored grain insects.

The effectiveness of Spinetoram against maize weevil, *Sitophilus zeamais* Motschulsky (Coleoptera: Curculionidae): influence of dose, exposure interval, and temperature

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In this research, the effectiveness of Spinetoram was investigated against *Sitophilus zeamais* at three temperatures of 20, 25, and 30°C and 65%RH. Radiant 120 SC was selected to test the efficacy of Spinetoram. The formulation was applied to maize at the rates of 0.00, 0.01, 0.10, 0.25, 0.50, 0.75, 1.00, 2.00, 5.00, and 10.00 mg/kg using 9 replicates each. 50 g samples of treated maize were separately put into small PVC vials along with 30 adults. Mortality of insects were observed at 1st, 2nd, 3rd, 7th, 14th, 21st and 28th days after setting up the experiment. At the end of final count at 28th day, all individuals were removed and the test vials containing maize only were additionally kept for 50 days to determine the F1 development. Mortality rates increased along with temperature and exposure time. At the dose of 1 mg/kg, 66.68% and 97,08% adult mortality were obtained at 20 and 30°C, respectively. Similarly, at 25°C at the dose of 5 mg/kg, adult mortality were 71,89%, 98,89%, and 100% for 7, 14, and 21 days of exposure, respectively.