

Title Interaction of starvation and insecticide toxicity in granary weevil *Sitophilus granarius* L. (Coleoptera: Curculionidae) populations of different susceptibility.

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### Abstract

The effects of starvation and contact insecticides (dichlorvos, malathion, chlorpyrifos-methyl, pirimiphos-methyl and deltamethrin) on granary weevils were studied in Yugoslavia. The evaluated weevil populations of varying levels of susceptibility to insecticides consisted of laboratory population (normally susceptible to insecticides), and populations from Cacak, Belgrade Port, Bijeljina and Kikinda. Laboratory weevils and those obtained from Belgrade Port and Kikinda were used to determine the interaction between starvation and insecticide toxicity. Insecticide toxicity was determined by exposing surviving individuals to treated filter paper (after previous starvation periods LT20 and LT50 in the 10x10 experiment variant). The mortality percentage for granary weevil adults was modified to include the mortality rate in untreated vessels. A mortality rate of 95% was recorded for the laboratory and Kikinda populations after 11 days; similar mortality rate was recorded after 8 days for the population from Belgrade Port and approximately after 8 days and 10 days for the Bijeljina population. The level of insecticide resistance had no significant effect on granary weevil susceptibility to starvation. After LT20 starvation interval and 24-h exposure of weevils to treated filter paper, chlorpyrifos-methyl was the most toxic among the insecticides, while the least toxic was dichlorvos (LD95 level was 14.5-fold lower than that of chlorpyrifos-methyl). Following LT50 starvation and 24-h exposure to treated filter paper, the most toxic insecticide was dichlorvos and the least toxic was deltamethrin (LD95 level was 9.6-fold lower than that of dichlorvos). Malathion and deltamethrin demonstrated higher toxicity to unstarved individuals. After LT50 starvation of the selected weevil adults from Belgrade Port and their 24-h exposure to treated filter paper, deltamethrin showed higher toxicity than malathion (LD95 level was 10.2-fold higher). The variation in insecticide toxicity was not significant considering the individuals from Kikinda. However, compared with the toxicity of the two insecticides to unstarved adults (both populations), malathion and deltamethrin showed equal toxicity. This shows that the resistance levels found in granary weevil populations from Belgrade Port and Kikinda had no effect on malathion and deltamethrin toxicity.