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The Impact of thiamethoxam Exposure on Feeding and Locomotor Activity of *Abax parallelus* (Coleoptera: Carabidae) †

Lara Ivanković Tatalović *and Lucija Šerić Jelaska

Department of Biology, Faculty of Science, University of Zagreb.; lucija.seric.jelaska@biol.pmf.hr
* Correspondence: lara.ivankovic@biol.pmf.hr
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Abstract: Carabids (Coleoptera: Carabidae) act as agents in biocontrol against pest species in agroecosystems and forestry. Studies have shown that exposure to pesticides can cause lethal and sublethal effects on behavior and physiology, which can impact predation efficiency. Neonicotinoids are widely used insecticides that in lower concentrations cause nervous stimulation, while higher concentrations cause paralysis and death in targeted groups of arthropods. Here we test the impact of thiamethoxam on the feeding rate and locomotion of a predatory carabid, *Abax parallelus*. Beetles were caught in Zagreb County, Croatia. Every individual was weighted and exposed to thiameth oxam (0, 3.9, 9.1, 20, 40 mg A.I./L, based on preliminary studies) by dipping method for 15 s. Two hours after treatment each beetle was offered fresh blowfly larvae and left to feed for twelve hours. Larvae were weighed before and after the feeding and the mass of the consumed food per body weight was calculated for each beetle. The locomotor ability was tested by turning a beetle on its back and observing the reaction 4, 12, 24, and 48 hours after the treatment. They were classified as normal, slightly intoxicated, intoxicated, and dead/moribund. The results show that groups treated with higher concentrations had significantly lower feeding rates and a higher share of intoxicated and moribund individuals. Feeding rate and locomotion did not differ significantly between control and groups treated with lower concentrations of thiamethoxam. To conclude, short-term exposure to thiamethoxam can result in negative sub-lethal effects, while the effects of long-term exposure to lower doses require further research

Keywords: Biocontrol; carabid beetles; feeding; locomotion; thiamethoxam

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