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BOOK OF ABSTRACTS



THE EFFECT OF BIOFUNGICIDE PRESTOP MIX ON RESPIRATION, WATER LOSS AND LONGEVITY OF BUMBLEBEE *BOMBUS TERRESTRIS* L.

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Prestop Mix is based on a natural soil fungus *Gliocladium catenulatum* J1446, which is applied to control fungal plant diseases. Bees can be used as vectors in carrying the biofungicide powder onto crop flowers; this has two benefits: pollination and protection from fungal pathogens. An important precondition is for the biopreparation to be safe for bees, therefore lethal and sublethal effects have to be tested. The safety of a pesticide cannot be tested solely through the direct impact on longevity, it is essential to assess also the sublethal effects, which in many cases can be even more detrimental, causing the whole bee colony to weaken or even die. One way to assess sublethal effects of pesticides is to measure the metabolic rate (MR), respiratory patterns and water loss of an insect (Kestler, 1991; Zaferidou, Theophilidis, 2006). So far no detrimental effects of Prestop Mix on bumblebee reproduction, foraging behaviour or survival have been found (Mommaerts et al 2009, 2011, 2012). However, the effects on respiration have not been tested. Aim of the study was to determine the effect of Prestop Mix to MR, respiratory patterns, water loss and longevity of bumblebee *Bombus terrestris* L.. Experiments were conducted with bumblebee foragers from commercially reared hives. The MR, respiratory patterns and water loss were measured 3h before and 3h after treatments. Longevity of treated and untreated bees was followed daily after treatments. Treatments (pouring the powder on a bee) used were Prestop Mix, wheat flour and untreated blank as negative and the entomopathogenic fungus *Beauveria bassiana* GHA as positive control. For respiratory measurements LI-7000 differential CO₂/H₂O Analyzer was used. Prestop Mix had no significant effect on the mean MR of bumblebees, nor did it change the respiratory patterns. However, after treatment there was a significant increase in total water loss. Nor Prestop Mix neither wheat flour did change the median lifespan of foragers significantly, still the number of long-living foragers decreased in both cases, whereas wheat flour decreased maximum life span more than Prestop Mix. *B. bassiana* decreased the longevity of bumblebees significantly. In conclusion Prestop Mix cannot be considered completely safe for bumblebees; dermal contact with the biofungicide may significantly increase water loss and shorten the lifespan of foragers. The detrimental effect of Prestop Mix may not result from the fungus itself; it could rather be the effect of carrier substances in the biopreparation powder, which could absorb the lipid layer of the insect cuticle, leading to increased water loss. Excessive water loss can be very hazardous on hot summer days, if foragers are not able to regulate water loss and may die because of desiccation.