



ABSTRACTS

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## PRESTOP MIX MIGHT RAISE THE WATER LOSS RATE OF FORAGING BUMBLE BEES

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Entomovectoring technology aims to use foraging bees in disseminating microbial pest control agents to flowers of fruit plants. No negative effect has been found to bumble bees and honey bees disseminating *Gliocladium cantenulatum* or its product formulation to strawberry flowers. These studies involve lethal and sub-lethal effect analysed on the basis of behavioural changes, still there is lack of the information about the effect on the physiological state of treated bees.

Metabolic rate (MR) and carbon dioxide release patterns are commonly estimated physiological factors. Water loss rate (WLR), another measurable aspect, is often limiting factor for insects whose body surface is relatively large compared to body mass. The aim of present study was to investigate the effect of Prestop Mix (*G. cantenulatum* J1446) on metabolic rate, water loss rate and longevity of bumble bee *Bombus terrestris* L. foragers.

Bumble bees were purchased from Koppert Biological Systems, The Netherlands. We had three treatments in the experiment: Prestop Mix, botanical insecticide BotanyGard<sup>®</sup> 22WP (*Beauveria bassiana*) as positive control, wheat flour as negative control. Bumble bees from fourth group were left untreated. For the experiments we treated the bees in the way they encounter the preparation by entomovectoring: we covered the bee with powder for a while. For measuring MR and WLR LI-7000 differential CO<sub>2</sub>/H<sub>2</sub>O Analyzer was used. The measurements were made 3h before and 3h after the treatment. Similarly treated bumble bees were monitored daily to study the effect of used powders on the longevity.

Normally bees show the tendency to calm down (decreasing MR) when forced to immobility as was seen also by untreated and wheat flour treated bumble bees. The treatment with Prestop Mix and BotanyGard did not allow the bees to lower the MR. The WLR in bumble bees is normally relatively high because of high permeability to water vapour of the cuticle. The WLR of untreated, wheat flour or BotanyGard treated bumble bees did not change significantly, but Prestop Mix treatment caused significant increase. At the same time the median longevity of bumble bees treated with Prestop Mix did not change compared to untreated and wheat flour treated bees. BotanyGard killed bumble bees rapidly. In conclusions we can say that in spite of increasing WLR, it is safe to use Prestop Mix in field condition where water sources like nectar are available.

**Key words:** entomovectoring, Prestop Mix, metabolic rate, water loss rate