

4.5 Effect of the microbial biopesticides Prestop-Mix and BotaniGard on respiratory physiology and longevity of bumblebees

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Abstract

Entomovector technology has been demonstrated to be an effective new biopesticide application technology where bees are used to vector microbial control agents for pest control. The effects of biopesticides to bees may sometimes occur in very low levels having still the potential to decrease the fitness of individuals or colonies. The present study was designed to investigate the safety of the biofungicide Prestop-Mix, containing *Gliocladium catenulatum*, and the bioinsecticide BotaniGard, containing *Beauveria bassiana*, and to compare them to powders such as kaolin and wheat flour. We tested for lethal and sublethal effects on workers of the bumble bee *Bombus terrestris* L.

The laboratory tests show that these powdery formulations have minimal effect on metabolic rate, still Prestop Mix and kaolin treatments increased significantly cuticular water loss in bumblebees. BotaniGard 22WP decreased the longevity of bumble bees compared to control bees. Our results indicate that formulations of microbial pest control agents used in entomovector technology may pose a risk to vectoring bumble bees, although the risk is much lower than with synthetic pesticides. This demonstrates well that mortality data alone are not sufficient for estimating pesticide risk adequately.