Bulletin of Insectology ***71*** *(1): 121-130, 2018*
ISSN 1721-8861

Sublethal exposure to fipronil affects the morphology and development of honey bees, *Apis mellifera*

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Abstract

Honey bees play a major role in agriculture because they pollinate most crops. Despite its importance, the non-rational use of agrochemicals could endanger the bee populations. In this study, the objective was to investigate if the sublethal exposure to the fipronil insecticide affects the morphology and causes any abnormal development of bee colonies during the winter of the southern hemisphere. Six hives were fed with sugar water (Sugar and tap water ratio, 2:1) during the experiment; three of them were also fed with known amounts of fipronil (dose 0.025 $\mu g\ g^{-1}$). The six colonies were allowed to feed freely in the surroundings. Bees that were exposed to a sublethal dose of fipronil for six consecutive months (May to October 2015) had abnormal development of body size, wings and antennae. During the autumn and winter period, number of sealed offspring and brood frames in hives exposed to fipronil showed a significant decrease with respect to the initial value. We conclude to exposure to the subletal dose of fipronil during the winter season, this insecticide caused abnormal growth in the exposed bees and hives, in comparison with the untreated ones, developed an abnormal growth of the left antenna, the area of the right wing and the size of the honey bee.

Key words: neurosystem pesticide, phenylpyrazole, fipronil, honey bees, morphology.

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Received August 23, 2017. Accepted March 20, 2018.