

Side-effect of acetamiprid in adult Africanized honeybee

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DOI: 10.5073/jka.2012.437.045

Abstract

The insecticide acetamiprid is widely used in many crops in Brazil like cotton, beans, citrus and rice to control many kind of pests and ensure high yields. Honeybees (*Apis mellifera*) may frequently become exposed to such chemicals as a consequence of their foraging activities (collecting water, natural resins, pollen and nectar) or even by spray drift, since in some of these cultures this neonicotinoid is applied by aircraft. Intoxication resulting from exposure to xenobiotics products can be lethal, which is easily identifiable, or cause effects on the physiology and insect behavior. These effects, caused by sublethal doses are difficult to measure (such as paralysis, disorientation or behavioral changes), and can compromise the entire social structure of the colony.

To improve the knowledge about the action of low doses of insecticides in honey bees, the effects of acetamiprid was studied in adult Africanized honey bees. To achieve this goal was used two behavioral protocols: proboscis extension reflex (PER) and locomotor activity. Bees were obtained from adequately fed, healthy and queen-right colonies. Adult worker bees were collected from frames without brood. After insecticide application, the bees were kept in plastic containers (250 mL) and held in a incubator at a temperature of 32°C and relative humidity around 70% and were fed with cãndi solution. Initially, LD₅₀ and LT₅₀ were estimated. The PER and locomotor activity were analyzed 1, 4 and 24 hours after topical application of 1 µl in doses corresponding to LD₅₀, LD₅₀/10 and LD₅₀/100.

The PER was impaired 1 and 4 hours after application of LD₅₀ and LD₅₀/10. The locomotor activity behaviour was impaired 1 hour after application of LD₅₀ and 4 hours after application of LD₅₀ and LD₅₀/10. It was not observed impairment 24 hours after topical application. The greater impairment was found when the behavioral analyses were made close to the period determined by LT₅₀. These results can be justified, probably, due to the presence of a detoxification mechanism. Some studies show that metabolites of acetamiprid were not toxic to honeybee which is compatible with the time of action of the insecticide observed in this study.