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Bee Health

PP-282

Varroa destructor infestation in pre-pupae and pupae of Apis mellifera in Pantanal, Brazil, 2018-2021

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The *Varroa destructor* mite is an ectoparasite that feeds by sucking the hemolymph from pupae, pre-pupae and adults of Africanized bees (*Apis mellifera*). The process of parasitism exerted by *V. destructor* results in various damages to affected individuals, ranging from malformation, reduced longevity, possible transmission of viruses and, in cases of greater infestation, death. With this study, we sought to determine the infestation rate in capped broods (pre-pupae and pupae) during the seasons of the year in the two castes of adult bees: workers and drones in five colonies in an apiary of Embrapa Pantanal located in the Nhumirim ranch (18°59'15.70"S, 56°37'09.30"W), sub-region of Nhecolândia of Pantanal, in Corumbá-MS, Brazil. The collections were from October 2018 to March 2021. The quantification of the level of parasitism was based on the removal of parts of capped broods from one or two combs of each colony with approximately 100 cells. The formula used to obtain the infestation rate in capped broods (pupae and pre-pupae) was: Infestation rate (%) = (Number of mites/Number of cells) x 100. The months were divided according to the seasons of the year, spring: October, November and December; summer: January, February and March; autumn: April, May and June, and winter: July, August and September, it should be noted that the first day of each month was adopted as the beginning of these seasons. The acquired results were expressed as mean (%) and standard deviation. In the few months in which drone pupae and pre-pupae were collected, the highest infestation was obtained in spring (October) 2019 with an average of 27.83 ± 32.39 and the lowest in autumn (June) 2019 with average of 0.16 ± 1.07 . The results for worker chicks indicated a higher infestation rate in autumn (May) 2020 with an average of 10.71 ± 4.56 and the lowest in winter (August) 2020 with an average of 0.11 ± 0.24 . The results determined that the level of infestation in pre-pupae and pupae throughout the year is greatly influenced by the presence or absence of drone broods.

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Effect of the exposure with sublethal dosis to the insecticides Imidacloprid, Bifenthrin and Chlorpyrifos or its combination on the total amount of body proteins and mRNA expression levels of Vitelogenin on Apis mellifera workers bees

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Agrochemicals, and particularly insecticides in sublethal doses, are widely recognized as being among the group of stressors that drastically reduce the fitness of insects. Particularly, *Apis mellifera* is known for its association with agriculture to sublethal contact with a wide range of this group of stressors that trigger different types of stress, such as nutritional stress. Based on this, the aim of this research is to determine if the level of total body proteins and the expression of the Vitelogenin gene in three days emerged bees varies before the topical exposure to a sublethal dose (LD10) of the pesticides Imidacloprid, Bifenthrin and Chlorpyrifos or a combination of pairs of them. The bioassay was performed on a total of 30 *A. mellifera* workers per treatment, which were contaminated with each pesticide or combination of them and after 24 hours were sacrificed with liquid nitrogen. Total protein content was obtained according to Bradford (1976) while Vitelogenin mRNA levels were determined by RT-qPCR. No significant differences were observed in the total protein content between the control group and the individual treatment groups with bifenthrin and chlorpyrifos, however in the rest of the treatments the total protein content was significantly lower than the control. A significant difference in mRNA levels was also found between individuals in the untreated group and all of the treated groups. Within the treated groups, the mRNA expression in the group in contact with bifenthrin was significantly higher than among all other groups. It was concluded that the individuals that were in contact with the agrochemicals studied presented a lower synthesis of vitelogenin mRNA, which may coincide with studies in other insect species. While it was postulated that this type of agrochemicals to a greater or lesser degree, depending on the family stimulates the corpora allata generating an increase in the juvenile hormone and therefore, in the case of bees, an inhibition of the synthesis of vitelogenin.

