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Plega hagenella (Neuroptera), efficient parasitoid of stingless bees (Meliponini) colonies: biology, infestation and control in stingless bees breeding sites

Gilberto Barbosa Souza[1], Cristiano Menezes[2], Vera Lucia Imperatriz-Fonseca[3]
[1]Senar, Amapá, Brazil
[2]Embrapa, Sào Paulo, Brazil
[3]Biosciences Institute, Sao Paulo University, Brazil

Plega hagenella (Neuroptera) is a parasitoid of bees that has recently been studied in the nests of the stingless bee Melipona subnitida (Maia-Silva et al., 2012, 2015) and Scaptotrigona spp. It has been extensively investigated as a parasitoid of Melipona compressipes colonies in Amapá State, Brazil. The infestation was monitored in several smallholder meliponaries, with the first author conducting an in-depth study on its control.

The impact of Plega infestation gradually increases in meliponaries, and the parasitoid's behavior was examined through a control program that tested various strategies, primarily focusing on cleaning the breeding sites to eliminate adults that are typically not found during the day. Data regarding behavior, infestation, and control had been largely unknown until now. Infestation begins with small larvae invading the nest and searching for brood cells in the pre-pupal or pupal phase. The mantisfly larva consumes the pupa and develops within the brood cell, and its silken cocoon can be detected by the host stingless bee workers, who are unable to open them. After completing its development, the Plega larva opens its cocoon and exits the brood cell in a pharate form. It shows behavioral plasticity: pharate adults were not attacked by their hosts in M. subnitida, that remove them unharmed from the nest, as refuse; but can leave the colony undisturbed by workers in M. compressipes. Outside the nest, often on the external walls of the hives, it completes its development, emerging with its wings while leaving its exuviae attached to the hives.

It was found that brushing the external walls of the hives once a week is an effective management technique that controls the infestation or even prevents its development. Numerous exuviae can be found outside hives in infested areas, allowing for the identification of both female and male. The adult insects exhibit nocturnal activity and can be captured using light traps, which accounts for the small number of individuals in zoological collections. The exuviae likely attract females to oviposit on the hive walls, facilitating infestation. Recently, new infestations have been discovered in Scaptotrigona colonies across several Brazilian states, expanding their range distribution