Brachymeria podagrica (Hymenoptera: Chalcididae) (Fabricius) collected in Brazil

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Abstract

The study determined the species of hosts of the parasitoid Brachymeria podagrica (Hymenoptera: Chalcididae) (Fabricius), in Brazil. The pupae were obtained by the flotation method. They were individually placed in gelatin capsules until the emergence of adult flies or their parasitoids. The overall percentage of parasitism was 2.3%.

Keywords: Insecta, Diptera, biocontrol agents, insects pests, parasitoids

1-Introduction

Diptera is an optimal model to study synanthropy, not only for its ecological importance, but also by medical-veterinary aspects, as vectors of etiological agents, such as amoeba cysts, helminthes eggs, pathogenic enterobacteria, viruses and fungi (Greenberg, 1971; Seolin, et al., 2012).

Besides the chemical technique by means of insecticides for insect control, natural regulators called various pests as an alternative control these insects in agriculture and animal husbandry areas (Silveira et al., 1989) can be used. Mendes and Linhares (1993) research of new methodologies for the control of flies believe necessary.

All the representatives of Chalcididae behave as parasitoid and most attack Lepidoptera, Diptera, Hymenoptera and Coleoptera (Grissel and Schauff, 1990). The Chalcididae are cosmopolitan insects with a high diversity in the tropics (Gauld and Bolton, 1988) including approximately 1500 species. They are predominantly solitary endoparasitoids (Gauld and Bolton, 1988).

Species of the genus *Brachymeria* Westwood are important primary parasitoid of dipterous, such as species of the Sarcophagidae (Grissel and Schauff, 1990) and

Calliphoridae families. Some species are of economical importance, for they attack insect pests (Gauld and Bolton, 1988; Habu, 1960).

The objective of this study was to verify the hosts of parasitoid ipterous (flies) *Brachymeria podagrica* (Hymenoptera: Chalcididae) (Fabricius) in the south Goiás and west Minas Gerais, Brazil

2-Material and Methods

The flies were collected by using traps, made of dark cans measuring 19 cm in height and 9 cm in diameter, with two openings resembling blinders, located in the lowest third of the can, to allow flies to enter. The top of the can was connected to a nylon funnel that was open at both ends, with the base pointing down. This was wrapped in plastic bags, so that when they were removed, the flies and parasitoids could be collected. The following items were used as baits: human feces, cattle kidneys, cattle liver, chicken and fish which were placed inside the cans, over a layer of earth. Five traps were used and they were hung on trees at a height of one meter above the ground, two meters apart from each other.

The insects collected were taken to the laboratory, sacrificed with ethyl ether and kept in 70% alcohol for further identification. To obtain the parasitoids, the contents of the traps were placed in plastic containers with a layer of sand for use as a substrate for transformation of the larvae into pupae. This sand was sifted after being in the fields for 15 days and the pupae were extracted from it and were individually placed in gelatin capsules in order to obtain the flies and/or parasitoids.

The total percentage parasitism was calculated by means of the number of pupae parasitized, divided by the total number of pupae collected, and multiplied by 100. The percentage parasitism of each parasitoid species was calculated by means of the number of pupae parasitized per species of parasitoid, divided by the total number of pupae from that host, and multiplied by 100.

3-Results and Discussion

From March 2001 December 2014 were collected 2430 pupae of Diptera and 395 specimens of *B. podagrica* (Table 1).

The total parasitism rate observed was 16.2%. Probably due to the availability of resources, to the density of hosts and to the searching capacity of the parasitoids.

The species *B. podagrica* occurs almost everywhere in the world and lives associated with synanthropic and other Diptera flies emerging from their pupae (Delvare and Boucek, 1992).

This species occurred as dipterous parasitoid, developed in rats carcasses in areas of tropical wood in the State of Goiás, Brazil. Its preferred host was *Patonella intermutans* (Walker) (Sarcophagidae) from where parasitoid pupae emerged, predominating female. Tomberlin and Adler (1998) studying the decomposition and colonies of insects in the carcasses of rats during the summer and winter in the South Caroline (E.U.A), collected B. podagrica in pupae of *Sarcophaga* sp. (Sarcophagidae).

Chrysomya albiceps (Wiedemann) (Diptera: Calliphoridae) was the fly that had a higher percentage of parasitism, 50.4%. Probably, the prevalence of parasitism may be influenced by variations in the quality, availability of food resources and the type of methodology used.

In relation to the hosts collected, the species *C. albiceps* and *Chrysomya megacephala* (Fabricius) (Diptera: Calliphoridae) medical-veterinary. *Chrysomya albiceps* is of major medical and sanitary interest, because it is responsible for secondary myiasis and is a vector for pathogenic microorganisms (Marchiori, et al., 2013).

Chrysomya megacephala is often found associated with the modified human environment with creating their larvae into an animal decomposing organic matter. This is of great interest Diptera medical sanitary and their occurrence, distribution and prevalence in metropolitan areas are very important factors. Have been observed in human bodies and pets. Adults can be attracted by substances in the fermentation process, decomposing, blood and wounds (Bishop, 1996).

Through this study, knowledge of the bioecology and geographical distribution of parasitoids of dipterous insects that develop in bovine feces in Brazil has been increased. It is known that dipterous control using insecticides usually selects resistant populations. New methods for dipterous control are therefore needed, and one possible method for controlling these insects is to use natural enemies such as parasitoids. Such agents may be responsible for reducing the sizes of synanthropic dipterous f populations in nature. The emergence of resistance to insecticides justifies the growing need to implement alternative control programs, with the aim of controlling dipterous (flies) (Marchiori, 2014; Marchiori et al., 2014).

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Table 1. Hosts of the parasitoid *Brachymeria podagrica* (Hymenoptera: Chalcididae) collected from March 2001 to June 2014 in the south Goiás and west Minas Gerais, Brazil.

Taxonomic Group	Number of pupae	Number of pupae parasitized	Percentage
Calliphoridae:			
Cheysomya albiceps	20	9	45.0
Cheysomya megacephala	19	1	5.3
Hemilucilia flavifacies	43	3	7.0
Muscidae:			
Ophyra sp.	26	1	3.8
Sarcophagidae:			
Oxysarcodexia thornax	390	24	6.2
Peckia chrysostoma	1324	245	18.5
Sarcodexia lambens	608	112	18.4
Total	2430	395	-