

Parasitoids of Diptera collected in the urban area of Goiânia, Goiás, Brazil

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Abstract: This study had the objective of determining the species of parasitoids of Diptera collected in the urban area of Goiânia, region central of Goiás, Brazil, from November 2013 to October 2014. The dipterous pupae were obtained by the flotation method. They were individually placed in gelatin capsules until the emergence of the dipterous insects and/or their parasitoids. The overall percentage of parasitism was 16.8%. *Brachymeria podagrica* (Fabricius) (Hymenoptera: Chalcididae) was the species with the highest percentage of parasitism with 39%.

Zusammenfassung: Das Ziel dieser Studie war es, die Parasitoidenarten der Dipteren zu bestimmen, die in der urbanen Gegend Goiânia, der zentralen Region Goiás in Brasilien, zwischen November 2013 und Oktober 2014 gesammelt wurden. Die Dipterenpuppen wurden durch das Flotationsverfahren erhalten. Sie wurden einzeln bis zum Erscheinen der Diptera und/oder deren Parasitoiden in Gelatinekapseln gehalten. Der Gesamtprozentsatz des Parasitismus war 16,8%. *Brachymeria podagrica* (Fabricius) (Hymenoptera: Chalcididae) war mit 39% die häufigste Parasitoidenart.

Key words: Diptera, Hymenoptera, natural enemy, flies, Brazil.

Introduction

Some species of Diptera included in the infraorder Muscomorpha are of fundamental medical and veterinary importance, since they can produce myiasis and act towards transmission of pathogens to humans and animals (GREENBERG, 1971; EKANEM et al., 2013; MARCHIORI, 2013).

These Diptera are potential mechanical vectors for etiological agents such as viruses, bacteria, protozoan cysts and helminth eggs (GREENBERG, 1971).

Parasitoids are important regulators of insect populations and stand out as the main group of natural enemies in agricultural systems. The parasitoid life style can be found in several families of insects and their adaptation to a parasitoid mode of life is seen most diversely and abundantly in the order Hymenoptera (PANIZZI & PARRA, 2009).

Parasitoids are responsible for reducing the populations of Diptera that proliferate on various substrates. Evaluation of these species for natural control of these insect pests is important for enabling studies that aim towards subsequent selection of species for use in biological control programs (MARCHIORI et al., 2000).

This study had the objective of determining the species of parasitoids of Diptera collected in the urban area in Goiânia central region of the state of Goiás, Brazil.

Material and Methods

Diptera 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 Diptera 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 Diptera and parasitoids could be collected. Cattle kidneys were used as bait 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 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 gelatine capsules (size number 00) in order to obtain the Diptera 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.

Results and Discussion

The total percentage of parasitism was 16.8%, probably due to the presence of gregarious parasitoids. *Brachymeria podagrica* (Fabricius, 1787) (Hymenoptera: Chalcididae) was the species that showed highest percentage of parasitism, possibly due to variations in the quality and availability of food resources or the density of hosts (Table 1).

Table 1. Parasitoids collected in urban area states of Goiás, from November 2013 to October 2013.

Diptera taxon	Number of pupae	Parasitoid species	Number of individuals	Number of pupae parasitised	% parasitised
Calliphoridae:					
<i>Chrysomya albiceps</i>	08	-----	-----	-----	-----
-					
Fanniidae:					
<i>Fannia pusio</i>	155	-----	-----	-----	-----
-					
Muscidae:					
<i>Synthesiomya nudiseta</i>	33	<i>P. vindemmiae</i>	4	4	12.0
Sarcophagidae:					
<i>Peckia chrysostoma</i>	25	-----	-----	-----	-----
-					
<i>Sarcodexia lambens</i>	137	<i>B. podagrica</i>	53	53	39.0
		<i>H. herbertii</i>	13	1	0.7
		<i>P. vindemmiae</i>	01	1	0.7
		<i>Tachinobia</i> sp.	11	1	0.7
Total	358		82	60	

There were 53, 1, 5 and 1 specimens of *B. podagrica*, *Hemencyrtus herbertii* Ashmead, 1900 (Hymenoptera: Encyrtidae), *Pachycrepoideus vindemmiae* (Rondani, 1875) (Hymenoptera: Pteromalidae), and *Tachinobia* sp. (Hymenoptera: Eulophidae), respectively (Table 1).

The low diversity in the central region was probably related to the low synanthropy of the species of Diptera and parasitoids collected in the urban area studied. The locality studied is now surrounded by human populations on all sides.

The most frequent species was *B. podagrica*, accounting for 88.3% of the individuals collected. Species of the genus *Brachymeria* Westwood are important primary parasitoids of muscoid Diptera, such as species in the Sarcophagidae and Calliphoridae families. Some species are of economic importance, as they attack insect pests (GAULD & BOLTON, 1988).

The species *B. podagrica* occurs almost everywhere in the world and lives associated with synanthropic Diptera and other flies, emerging from their pupae (DELVARE & BOUCEK 1992, MARCHIORI 2001).

In relation to the hosts collected, the species *Chrysomya albiceps* (Wiedemann) (Diptera: Calliphoridae) 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).

Besides the chemical technique by means of insecticides for insect control, natural enemies of various pests can be used as an alternative control in agriculture and animal husbandry areas (SILVEIRA et al., 1989). MENDES & LINHARES (1993) stated research on new methodologies for the control of flies are necessary.

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