

Parasitoids Collected in Poultry Farms in Brazil

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ABSTRACT

The objective of this work is to report the presence of dipteran parasitoids in poultry farms in Brazil. The experiment was carried out in two poultry farms in the Midwest Region in Brazilian territory. The pupae were removed and individualized in glass capsules for the emergence of adult dipterans or parasitoids. The specie *Pachycrepoideus vindemmiae* (Rondani) (Hymenoptera: Pteromalidae) presented a frequency of 46.4% and showed parasitism of 93.9%. The species *Musca domestica* (Diptera: Muscidae) presented a frequency of 93.3%. Of the dipterans collected, the most important species was *M. domestica* for causing public health problems, disturbing people and being a vector of disease-causing agents.

Keywords: Arthropods; Insects; Dipterans; Himenopterans; Feces.

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I. INTRODUCTION

Muscoïd dipteran are widely distributed throughout the Neotropical region, and the ecological study, which is of great importance in controlling the spread of pathogens of various diseases to humans and animals [1].

In poultry farms, careful control of dipterans should be constant. It is important to remember that excessive fly production can cause, in addition to damage to poultry, disease transmission, low worker production due to continuous insect discomfort and decreased egg quality due to the presence of feces and bird regurgitation dipterans. Parasitoids, which include mainly taxa belonging to Hymenoptera Parasitic, play an important role in maintaining other populations of arthropods and mites, acting as regulators of host densities.

The purpose of this paper is to report the parasitoids of dipterans in poultry farms in Brazil.

II. MATERIAL AND METHODS

The experiment was carried out in two poultry farms in the Midwest Region in Brazilian territory (Fig. 1). Feces were removed from the farm sheds placed in 10 basins to be transported to the laboratory for removal of pupae. In the laboratory, pupae were obtained according to Marchiori [2]. The pupae were removed and placed on absorbent paper for drying and later individualized in glass capsules for the emergence of adult flies or parasitoids. The collections were carried out monthly from January to December 2007. Total percentage of parasitism was obtained by the number of parasitized pupae / total number of pupae collected x 100.



Fig. 1. Map of Brazil – Goiás (GO) region West Central Brazil (yellow color).
Source: <https://globalfranchise.com.br/auto-booking/glob-ft-mapa-brasil>.

III. RESULTS AND DISCUSSION

From 10.608 pupae of dipteran collected 816 parasitoids emerged from 540 pupae (Table I).

The most collected species was *Pachycrepoideus vindemmiae* (Rondani) (Hymenoptera: Pteromalidae) (Fig. 2) with (379/816) 46.4%. Parasitoid searching capacity, seasonality, and greater presence of its hosts in the collection area.



Fig. 2. *Pachycrepoideus vindemmiae* (Rondani) (Hymenoptera: Pteromalidae).
Source: <http://bestfreshglobal.blogspot.com/2016/08/pachycrepoideus-vindemmiae-podria-ser.html>.

TABLE I: PARASITOIDES AND THEIR DIPTERANS HOSTS COLLECTED FROM POULTRY FARMS IN THE STATE OF GOIÁS, MIDWEST REGION OF BRAZIL

Diptera	Number of pupae	Number of specimens	Pupae parasitized	%	Specie of parasitoid
Calliphoridae:					
<i>Chrysomya megacephala</i>	500	50	3	0.6	<i>Nasonia vitripennis</i>
		3	3	0.6	<i>Pachycrepoideus vindemmiae</i>
		3	3	0.6	<i>Spalangia endius</i>
Fanniidae:					
<i>Fannia pusio</i>	42	40	2	4.8	<i>Muscidifurax raptorellus</i>
		2	2	4.8	<i>Pachycrepoideus vindemmiae</i>
Muscidae:					
<i>Musca domestica</i>	9892	63	3	0.3	<i>Muscidifurax raptorellus</i>
		100	5	0.5	<i>Nasonia vitripennis</i>
		364	364	3.7	<i>Pachycrepoideus vindemmiae</i>
		12	12	0.1	<i>Spalangia cameroni</i>
		75	75	0.8	<i>Spalangia endius</i>
		17	17	0.2	<i>Spalangia nigra</i>
		8	8	0.1	<i>Spalangia nigroaenea</i>
		5	5	0.2	<i>Spalangia sp.</i>
10	2	0.2	<i>Tachinaephagus zealandicus</i>		
Sepsidae:					
<i>Palaeosepsis</i> spp.	81	41	2	2.5	<i>Nasonia vitripennis</i>
		8	8	10.0	<i>Pachycrepoideus vindemmiae</i>
		2	2	2.5	<i>Spalangia drosophilae</i>
		10	10	1.2	<i>Spalangia sp.</i>
Syrphidae:					
<i>Ornidia obesa</i>	93	2	2	2.2	<i>Pachycrepoideus vindemmiae</i>
		2	2	2.2	<i>Spalangia cameroni</i>
Total	10.608	816	540	-	-

Pachycrepoideus vindemmiae generalist wasp that attacks pupae of several species cyclorrhaphous dipteran as a primary parasitoid. *P. vindemmiae* pupae remain concealed under the soil or manure until they are ready to emerge as adults [3].

Percentage of parasitism for each species of parasitoid was calculated according to the formula: number of parasitized puparium / by the number of host puparium x hundred.

The total percentage of parasitism found in this study was 5.1% (540/10.608) and species *Muscidifurax raptorellus* Kogan & Legner (Hymenoptera: Pteromalidae) with (5/504) 1.0%, *Nasonia vitripennis* (Walker) (Hymenoptera: Pteromalidae) (10/504) 2.0%, *P. vindemmiae* (367/504) 93.9%, *Spalangia cameroni* Perkins (Hymenoptera: Pteromalidae) (12/504) 2.4%, *Spalangia drosophilae* Ashmead (Hymenoptera: Pteromalidae) (2/504) 0.4%, *Spalangia endius* Walker (Hymenoptera: Pteromalidae) (77/504) 15.2%, *Spalangia nigra* Latrielle (Hymenoptera: Pteromalidae) (17/504) 3.3%, *Spalangia nigroaenea* Curtis (Hymenoptera: Pteromalidae) (8/504) 1.6%, *Spalangia sp.* (Hymenoptera: Pteromalidae) (15/504) 3.0% and *Tachinaephagus zealandicus* (Ashmead) (10/504) 2.0% (Encyrtidae).

The highest percentage of parasitism occurred with *P. vindemmiae*, probably due to its polyphagous habit. The *P. vindemmiae* species presented higher parasitism percentage in *Palaeosepsis* spp. (Diptera: Sepsidae), with 10.0% (Table I), probably due to the competitive ability of the young forms. This species also parasitized a greater diversity of dipterans species.

The species *Musca domestica* (Diptera: Muscidae) presented the highest frequency with 93.3%. Of the dipterans collected, the most important species was *M. domestica* as it causes problems in public health, annoys people and is a vector of disease-causing agents and in poultry farming it causes economic damage in electrical installations [4].

Survey of these species of natural enemies, to assist in the adequate control of dipteran by means of integrated methods. The parasitoids are bioindicators of the degree of preservation of biomes [5].

IV. CONCLUSION

The most collected species was *P. vindemmiae* 46.4% and the highest percentage of parasitism occurred with 10.0%. Of the dipterans collected, the most important species was *M. domestica*.

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