Study of the attractiveness of their hosts by parasitoids in chicken feces in Goiás, Brazil

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Abstract

The flies included in the infra-order Muscomorpha have medical and veterinary importance, since they may produce myiasis and act in carrying pathogens to man and animals. This study had as objective to verify the attractiveness of parasitoids by their hosts in chicken feces in Itumbiara and Morrinhos, Goiás, from April 2006 to March 2007. The pupae were obtained by the flotation method. They were individually placed in gelatin capsules until the emergency of the adult flies or their parasitoids. The attraction of the parasitoid by their dipterous was tested by Chi-square. The attraction Itumbiara had the value of chi-square of $X^2=39.09; GL=40; P<0.05$ and Morrinhos of $X^2=711.80; GL=36; P<0.05$. It is hoped that this work, expand your knowledge of the fauna of Diptera and their parasitoids and to identify species that may be used in future biological control programs.

Keywords: Hymenoptera, Diptera, natural enemy, biocontrol, flies

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Introduction

The flies included in the infra-order Muscomorpha have medical and veterinary importance, since they may produce myiasis and act in carrying pathogens to man and animals (Marcondes, 2001). They have been found to carry more than 100 species of disease-causing organisms such as bacteria, protozoa and helminthes (Greenberg, 1971).

The use of some chemical substances to control this fly may result in high production costs, causing damages to the environment and to human health as well. So, search for effective natural enemies may be a viable alternative to hold this plague in a long-term
control program.

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

As a possibility to control these flies, the natural regulators can be used, such as parasitoids that are the responsible agents for the reduction of the synanthropic fly populations. (Marchiori et al., 2001; Silveria et al., 1989).

The objective of this study is to report the attractiveness of their hosts by parasitoids in chicken feces in Goiás.

Material and Methods

The study were conducted at the farm “Casa do Sítio” settled in the city of Itumbiara, GO (18°25′ S – 49°13′ W) and Instituto Federal Goiano, Campus Morrinhos, settled in the city of Morrinhos, GO (17°43′S, 49°05′W). The feces collected originated from 40 “Hyline” chickens that were reared in a cage system. The feces that accumulated under the cages varied in terms of moisture content, ranging from pasty to firm. Fresh feces (pasty), which were collected immediately after emission, were placed in five basins of 30 cm in diameter and 12 cm in height, and were left in an appropriate environment, in a dry location, for 15 days. For extraction of the pupae using the floatation method, the routine procedures for this type of experiment were modified. The parasitoids and flies that emerged were identified with the aid of a stereoscopic microscope.

The adult parasitoids were identified using the keys of Legner et al. (1976) and Rueda and Axtell (1985) and the hosts were identified in accordance with Carvalho et al. (2002). The parasitoids' preference for their hosts was tested by means of the chi-square test, with 5.0% probability.

Results and Discussion

In Itumbiara 3116 flies were collected, of which originated 311 parasitoids (Table 1). Were collected in 2815 Morrinhos Diptera, of which originated 785 parasitoids (Table 2). The difference in the amounts of parasitoids and flies collected at the two sites studied may be due to cultural practices used in the two farms as type of feeding, animal handling, use of insecticides to combat the treatment of ectoparasites and endoparasites.
In relation to the attraction of parasitoids towards dipterous insect in Itumbiara, GO, it was found that: *Eurytoma* sp. was attracted to *Fannia pusio* (Diptera: Fanniidae); *Nasonia vitripennis* (Walker, 1836) (Hymenoptera: Pteromalidae) by *Musca domestica* L., 1758 (Diptera: Muscidae) and *Ophyra* sp. (Diptera Muscidae); *Pachycropeoideus vindemmiae* (Rondani, 1875) by *F. pusio*; *Spalangia cameroni* Perkins, 1910 (Hymenoptera: Pteromalidae) by *M. domestica*; *Spalangia endius* Walker, 1839, (Hymenoptera) by *M. domestica* and *Ophyra* sp.; *Spalangia nigra* Latrielle, 1805 (Hymenoptera: Pteromalidae) by *M. domestica*; *Spalangia nigroaenea* Curtis, 1839 (Hymenoptera: Pteromalidae) by *M. domestica*; *Spalangia sp.* (Hymenoptera: Pteromalidae) and *M. domestica*; *Tachinaephagus zealandicus* (Ashmead, 1904) (Encyrtidae) by *Sarcodexia Lambers* (Wiedemann, 1830) (Diptera: Sarcophagidae) (Wiedemann) (X²=329,09; GL=40; P<0,05).

In relation to the attraction of parasitoids towards dipterous insect in Morrinhos, GO, it was found that: *Muscidifurax raptorellus* (Kogan & Legner, 1970) (Hymenoptera: Pteromalidae) was attracted to *F. pusio*; *N. vitripennis* by *Chrysomya megacephala* (Fabricius) (Diptera: Calliphoridae); *P. vindemmiae* by *F. pusio* and *Ornidia obesa* Fabricius (Diptera: Syrphidae); *S. cameroni* by *O. obesa*; *S. drosophilae* by *Palaeosepsis* sp. (Diptera: Sepsidae); *S. endius* by *C. megacephala* and *M. domestica*; *S. nigra* by *M. domestica*; *S. nigroaenea* by *M. domestica*; *Spalangia sp.* by *M. domestica* and *T. zealandicus* by *M. domestica* (X²=711,80; GL=36; P<0,05).

In Itumbiara and Morrinhos, *M. domestica* was the species that showed a greater attraction for a greater diversity of parasitoids likely to be the most frequent in this type of environment. This is important, since *M. domestica* is the species of greatest health concern due to its character synanthropic, his endophily studies, its abundance in the urban area, the ability to develop into various types of substrates, their high reproductive power and being appointed as veiculadora pathogens to humans and animals (Nakano and Leite, 2000; Mariconi et al. 1999).

It is hoped that this paper, expand your knowledge of the fauna of Diptera and their parasitoids and to identify species that may be used in future biological control programs.

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### Table 1. Diptera and their parasitoids collected in feces in chickens Itumbiara, Goiás.

| Taxonomic group | No. of Specimens | Species | Pupae parasitizing |
|-----------------|------------------|---------|-------------------|
| Fanniidae:      |                  |         |                   |
| Brama puto      | 153              | Burytoma sp. | 2 |
|                 |                  | Pachycrepoidea viceverna | 9 |
| Muscidae:       |                  |         |                   |
| Musca domestica | 1982             | Aphaereta sp. | 1 |
|                 |                  | Nasonia viripennis | 11 |
|                 |                  | Pachycrepoidea viceverna | 52 |
|                 |                  | Spalangia cameroni | 38 |
|                 |                  | Spalangia drosophilae | 1 |
|                 |                  | Spalangia eosilus | 14 |
|                 |                  | Spalangia nigra | 3 |
|                 |                  | Spalangia nigrossea | 10 |
|                 |                  | Spalangia sp. | 21 |
|                 |                  | Tachinaephalus zealandicicus | 1 |
| Ophiura sp.     | 529              | Nasonia viripennis | 1 |
|                 |                  | Spalangia eosilus | 4 |
| Sarcophagidae:  |                  |         |                   |
| Sarcoderina lumbene | 222 | Pachycrepoidea viceverna | 2 |
|                 |                  | Tachinaephalus zealandicicus | 9 |
| Syrphidae:      |                  |         |                   |
| Ornithus obesa  | 226              | Pachycrepoidea viceverna | 2 |
| Other species not parasitized | 04 | - | - |
| Total           | 3116             | -       | 310               |
Table 2. Diptera and their parasitoids collected in feces in chickens Morroinhos, Goiás.

| Taxonomic group | No. of specimens | Species                  | Pupae parasitizing |
|-----------------|------------------|--------------------------|--------------------|
| Chrysopidae     | 500              | *M swoptya vitripennis*  | 3                  |
|                 |                  | *Pachycrepoides vindemini* | 3                  |
|                 |                  | *Spalangia endius*       | 3                  |
| Fanniidae       | 42               | *Muscidiflae reptorea*   | 2                  |
|                 |                  | *Pachycrepoides vindemini* | 2                  |
| Muscidae        | 2083             | *Muscidiflae reptorea*   | 101                |
|                 |                  | *M swoptya vitripennis*  | 168                |
|                 |                  | *Pachycrepoides vindemini* | 247                |
|                 |                  | *Spalangia endius*       | 67                 |
|                 |                  | *Spalangia nigra*        | 16                 |
|                 |                  | *Spalangia nigrocasta*   | 2                  |
| Sepidae         | 81               | *M swoptya vitripennis*  | 2                  |
|                 |                  | *Pachycrepoides vindemini* | 8                  |
|                 |                  | *Spalangia drosophilae*  | 2                  |
|                 |                  | *Spalangia sp.*          | 10                 |
| Syrphidae       | 93               | *Pachycrepoides vindemini* | 2                  |
|                 |                  | *Spalangia cameroni*     | 2                  |
| Other species not parasitized | 16 | - | - |
| Total           | 2815             | -                        | 785                |
