

# Diptera of economic and sanitary importance collected on different substrates in southern Goiás, Brazil

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## Abstract

Some species of dipterous are of fundamental medical and veterinary importance, since it can produce myiasis and act in the transmission of pathogens to humans and animals. The dipterous are potential mechanical vectors of etiological agents such as viruses, bacteria, protozoan cysts and helminthes eggs. The objective of this study was to determine the species of Diptera of economic and sanitary importance collected from cattle dung, buffalo dung, human faeces, bovine liver, chicken, fruit and fish in southern Goiás. Four thousand eighty Diptera species were found in savanna in southern Goiás the most frequent species of Diptera and were *Palaeosepsis* sp. (Diptera: Sepsidae) with 36.6% and *Sarcophagula occidua* (Fabricius) (Diptera: Sarcophagidae) with 22.8%.

Keywords: Insecta, trap, dipterous, synanthropic, baits

## 1. Introduction

Many species of dipterous are associated with humans and their environment changed, becoming in several important pests and disease vectors [1, 2, 3, 4]

These dipterous are of medical and veterinary importance, since it can act in spreading pathogens to humans and animals [5, 6, 7].

The association occurs because of dipterous be exploitative of organic substances and wastes, which are produced by human and animal activity, especially faeces and vegetable waste [7].

The dipterous, which act as vectors of disease, have caused several epidemics in underdeveloped nations [8]. Dipterous larvae such also occasionally cause myiasis man and domestic animals [9, 10].

Due to inadequate management and hygiene of organic waste creates a diversity of species of dipterous as *Musca domestica* Linnaeus, *Muscina stabulans* (Fallén), *Chrysomya megacephala* (Fabricius), *Chrysomya putoria* (Wiedemann), *Chrysomya albiceps* (Wiedemann), *Stomoxys calcitrans* Linnaeus, *Haematobia irritans* Linnaeus, *Phaenicia eximia* (Wiedemann), *Phaenicia cuprina* (Wiedemann) and others.

The objective of this study was to determine the species of dipterous medical and veterinary importance in southern Goiás, Brazil.

## 2. Materials and Methods

### 2.3. Experiment with Human Feces, Cattle Kidneys, Cattle Liver, Fish and Fruit

The dipterous 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 could be collected. The following items were used as baits: human feces, cattle kidneys, cattle liver, fish and fruit, 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 (number 00) in order to obtain the dipterous. The experiment was conducted from May 1998 to June 1999

### 2.2- Experiment with cattle dung and buffalo

In southern of Goiás, the experiment was conducted from May 1998 to June 1999 in the farm of Faculdade de Agronomia. Every fortnight, 10 plates of fecal cake (of approximately 3 kg each) were produced from fresh bovine feces and that were collected immediately after defecation in pastures of *Brachiaria brizantha* (Hochst ex. A. Rich) and in corrals. The material was collected in plastic buckets and was homogenized. It was then placed in 10 round plastic supports, with a hole to allow rainwater to drain away.

This methodology was used for precise determination of the time between the emission of the fecal cake and its collection. The feces remained exposed (five in the pastures and five in the corrals) for 15 days. After this period, the feces were taken to the laboratory for extraction of pupae by means of the flotation method. The pupae were removed with the aid of a sieve; they were counted and individually stored in gelatin capsules (number 00) until the dipterous emerged. The dipterous that emerged were identified with the aid of a stereoscopic microscope and were conserved in 70% alcohol. The same methodology was used for feces of buffalos.

### 3. Results and Discussion

In the present study were obtained 4080 dipterous belonging to six families (Table 1). The most frequent was the family Sarcophagidae with 41.6%, followed by Sepsidae family with 40.2%. In contrast, in this study, the family Calliphoridae was the most abundant in the work done in Rio de Janeiro, RJ [11].

The species *Palaeosepsis* spp. (Diptera: Sepsidae) was the most abundant with 36.6% of the individuals collected, then the species *Sarcophagula occidua* (Fabricius) (Diptera: Sarcophagidae) with 22.8%. Both species were collected from cattle feces, probably due to the greater number of substrates listed for performing the work. These results are different to those found by [11, 12] whose research *Palaeosepsis pusio* (Schiner) (Diptera: Sepsidae) was the most frequent species, with 29.9% and 29.5%, respectively.

Was collected from a greater diversity of species of the family Sarcophagidae (06 species), among the four families studied. Probably due to the ability of adults to search to find the food sources. In the work of [13, 14], this family was also presented that a greater number of species.

Noted the absence of species of the genus *Phaenicia* (native) this work. Probably, this fact can be interpreted as an escape mechanism to competition with *Chrysomya*. The species of *Chrysomya* (exotic) have great adaptability to different environments remarkable competitive ability capable of displacing native species.

Species *Chrysomya* were collected in bovine liver in Uberlândia, Minas Gerais, and Rio de Janeiro-RJ, respectively, represent 100% of Calliphoridae collected. They are of great medical and sanitary importance, because they are producing secondary myiasis and transmission of pathogenic microorganisms [13, 14].

Despite the *M. domestica* was not the most abundant Diptera, but is the species of greatest health concern because of its synanthropic character, its abundance in the urban districts ability to develop into various types of substrates, their high reproductive power and be identified as veiculadora of pathogens to humans and animals.

In this study *Zaprionus indianus* (Gupta) (Diptera: Drosophilidae) was the species of greatest economic importance. The first record published on the occurrence of this dipterous in the American continent was in khaki fruit in Santa Isabel, São Paulo, Brazil. Its poliphagy and relatively fast lifetime in high hot weather have contributed for its settling and dispersion through this country. A loss of 50% was recorded in the fig production in the state of São Paulo, Brazil due to this fly [15].

This information contributes significantly in studies aimed at the prevention of which can be transmitted by these insects diseases as well as for the formulation of more effective methods of control [16, 17].

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Table 1. Relative frequency of Diptera collected in traps containing cattle dung, buffalo dung, human feces, cattle kidney, cattle liver, fruit and fish from May 1998 to April 1999.

Taxonomic Group	Cattle dung	Buffalo Dung	Human Feces	Cattle Kidney	Cattle Liver	Fruit	Fish	Total
<b>Calliphoridae:</b>								
<i>Chrysomya albiceps</i>	00	00	60	05	00	00	06	71
<i>Chrysomya megacephala</i>	00	00	13	00	00	00	20	33
<b>Drosophilidae:</b>								
<i>Zaprionus indianus</i>	00	00	00	00	00	31	00	31
<b>Fanniidae:</b>								
<i>Fannia pusio</i>	00	00	118	27	51	01	00	197
<b>Muscidae:</b>								
<i>Brontaea debilis</i>	52	00	00	00	00	00	00	52
<i>Brontaea quadristigma</i>	31	117	21	00	00	00	00	169
<i>Cyrtoneurina paraescita</i>	50	00	00	00	00	00	00	50
<i>Musca domestica</i>	10	00	00	07	01	00	00	18
<i>Synthesiomyia nudiseta</i>	00	00	00	00	03	00	00	03
<b>Sarcophagidae:</b>								
<i>Euboettcheria collusor</i>	00	00	29	00	00	00	00	29
<i>Oxysarcodexia thornax</i>	00	00	217	22	00	00	244	483
<i>Peckia chrysostoma</i>	00	00	135	04	27	00	30	196
<i>Ravinia belforti</i>	63	00	00	00	00	00	00	63
<i>Sarcodexia lambens</i>	00	00	114	00	00	00	00	114
<i>Sarcophagula occidua</i>	00	929	00	00	00	00	00	929
<b>Sepsidae:</b>								
<i>Archiseptis scabra</i>	27	120	00	00	00	00	00	147
<i>Palaeosepsis spp.</i>	60	1435	00	00	00	00	00	1495
Total	293	2601	707	65	82	32	300	4080