

## Species of Diptera of Medical, Sanitary and Veterinary Importance Collected from Buffalo and Cattle Dung in South Goiás, Brazil

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### Abstract

This study had the objective of determining the dipterous species present in buffalo and bovine dung, collected in south Goiás between May 2003 and June 2004. The dipterous pupae were obtained by means of the flotation method. They were individually placed in gelatin capsules until the dipterans emerged. The dipterous species collected from cattle dung were: *Archiseopsis scabra* (Loew) (Diptera: Sepsidae) with 310 specimens (9.0%); *Brontaea debilis* (Williston) (Diptera: Muscidae) with 127 (3.7%); *Brontaea quadristigma* (Thomson) (Diptera: Muscidae) with 138 (4.0%); *Cyrtoneurina paraescita* Couri (Diptera: Muscidae) with 19 (0.5%); *Palaeosepsis* sp. (Diptera: Sepsidae) with 1948 (56.0%) and *Sarcophagula occidua* (Fabricius) (Diptera: Sarcophagidae) with 931 (26.8%). The dipterous species collected from buffalo dung were: *A. scabra* with 40 specimens (6.5%); *B. debilis* with 56 (8.9%); *B. quadristigma* with 49 (7.8%); *C. paraescita* with 151 (24.0%); *Chrysomya megacephala* (Fabricius) (Diptera: Calliphoridae) with 51 (8.1%); *Musca domestica* L. (Diptera: Muscidae) with 10 (1.6%); *Oxysarcodexia thornax* (Walker) (Diptera: Sarcophagidae) with 70 (11.2%); *Palaeosepsis* sp. with 107 (17.0%); *Ravinia belforti* Prado & Fonseca (Diptera: Sarcophagidae) with 63 (10.0%) and *Sarcophagula occidua* with 31 (4.9%).

**Key words:** Arthropoda, Insecta, Diptera, dipterous, feces

### 1. Introduction

Urban population growth requires increased production of food such as meat, milk, eggs and other derivatives. For the supply of these food products to be able to meet the need, improved agricultural production practices are required (Seolin et al. 2012; Marchiori, 2013).

Through feedlot and semi-confined animal production systems, these foods can be obtained on a larger scale. However, in this management system, the manure accumulated in containers, in quantities proportional to the numbers of amount of animals, forms an excellent medium for several species of dipterous insects to breed and develop in rural environments (Cunningham, 1985; Armitage, 1986).

The arthropod fauna occurring in manure consists of many species, and dipterous species that are harmful to humans and animals account for approximately 5.0%.

Some species of dipterous included in the infraorder Muscomorpha are of fundamental medical and veterinary importance, since they can produce myiasis (Oliveira et al., 2004) and act towards transmission of pathogens to humans and animals (Chow, 1940; Greenberg, 1971; Ekanem et al., 2013; Marchiori, 2013). These dipterous are potential mechanical vectors for etiological agents such as viruses, bacteria, protozoan cysts and helminth eggs (Greenberg, 1971). The occurrence, distribution and prevalence of these dipterous in metropolitan areas are factors of great public health importance. In rural areas, these insects can cause decreased egg production and animal diseases and constitute a nuisance for human populations close to the breeding sites (Berti Filho et al., 1996; Couri and Barros, 2010).

The aim of this study was to determine the dipterous species collected from buffalo and cattle dung in south Goiás, Brazil.

## 2. Material and Methods

In south Goiás, the experiment was conducted on the farm of the Agronomy School between May 2003 and June 2004. Every fortnight, 10 plates of fecal cake (of approximately 3 kg each) were produced from fresh bovine feces 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 insects 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 buffalo feces. Hypotheses regarding dipterous insect preferences for buffalo dung and cattle dung were tested by means of the Chi-square test.

## 3. Results and Discussion

A total of 3473 pupae of dipterous were collected from buffalo dung and were found to belong to three families and six different species (Table 1). From cattle feces, a total of 628 pupae of dipterous were collected and were found to belong to four families and 10 species (Table 2).

The most abundant species in the buffalo and cattle dung were *Palaeosepsis* sp. (Diptera: Sepsidae) (56.0%) and *Cyrtoneurina paraescita* Couri (Diptera: Muscidae) (24.0%) (Tables 1 and 2), respectively. The biology of the Sepsidae family is virtually unknown in the Neotropics.

Sepsidae are usually found on or near animal feces or various other materials such as garbage, animal housing and low shrub foliage (Silva, 1991). In a preliminary survey of the Sepsidae family in Roraima, Brazil (the Maraca Project), the species *Archiseopsis scabra* Loew and *Palaeosepsis pusio* Schiner were collected (Silva, 1991).

Among the species collected, *Chrysomya megacephala* (Fabricius) (Diptera: Calliphoridae) and *Musca domestica* L. (Diptera: Muscidae) were the most important ones from the medical and veterinary point of view. *Chrysomya megacephala* is of major medical and sanitary interest, because it is responsible for secondary myiasis and is a vector for pathogenic microorganisms. *Musca domestica* is a species of great sanitary interest because of its synanthropic characteristics, abundance in urban areas, capacity to develop in several sorts of substrates and high reproductive capacity.

The species that showed a preference for buffalo feces were: *Brontaea debilis* (Williston) (Diptera: Muscidae); *Brontaea quadristigma* (Thomson) (Diptera: Muscidae); *C. paraescita*; *C. megacephala*; *M. domestica*; *Oxysarcodexia thornax* (Walker) (Diptera: Sarcophagidae) and *Ravinia belforti* (Prado & Fonseca) (Diptera: Sarcophagidae). The species that showed a preference for cattle feces were: *A. scabra*, *Palaeosepsis* sp. and *Sarcophagula occidua* (Fabricius) (Diptera: Sarcophagidae) ( $X^2 = 2105.69$ ; GL: 10;  $P < 0.05$ ).

Knowledge of the biology and population activities of these various types of dipterous insects is important from an epidemiological point of view. Through epidemiological studies, the places where they occur, the periods when and mechanisms through which their activities are induced and the importance of certain members of the population regarding transmission of diseases and dispossession of the host process can be ascertained. This information can contribute significantly towards studies aimed at prevention of disease transmission by these insects and towards formulation of more effective control methods (Marchiori et al, 2013; Marchiori, 2014; Marchiori et al., 2014).

This study was the first survey of Diptera collected from buffalo feces in the state of Goiás. It provides increased knowledge of the bioecology and geographical distribution of Diptera in Brazil.

## 4. Conclusion

1. The most abundant species in the buffalo and cattle dung were *Palaeosepsis* sp. and *C. paraescita*, respectively.
2. Among the species collected, *M. domestica* and *C. megacephala* were the most important ones from the medical and veterinary point of view.
3. This study was the first survey of Diptera collected from buffalo feces in the state of Goiás, Brazil.

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**Table 1. Species of dipterous collected from buffalo dung in south Goiás, in the period from May 2003 to June 2004.**

Species of dipterous	Number of specimens collected	Percentage
Muscidae:		
<i>Brontaea debilis</i>	127	3.7
<i>Brontaea quadristigma</i>	138	4.0
<i>Cyrtoneurina paraescita</i>	19	0.5
Sarcophagidae:		
<i>Sarcophagula occidua</i>	931	26.8
Sepsidae:		
<i>Archiseopsis scabra</i>	310	9.0
<i>Palaeosepsis</i> sp.	1948	56.0

**Table 2. Species of dipterous collected in cattle dung in south Goiás, in the period from May 2003 to June 2004.**

Species of dipterous	Number of specimens collected	Percentage
Calliphoridae:		
<i>Chrysomya megacephala</i>	51	8.1
Muscidae:		
<i>Brontaea debilis</i>	56	8.9
<i>Brontaea quadristigma</i>	49	7.8
<i>Cyrtoneurina paraescita</i>	151	24.0
<i>Musca domestica</i>	10	1.6
Sarcophagidae:		
<i>Oxysarcodexia thornax</i>	70	11.2
<i>Ravinia belforti</i>	63	10.0
<i>Sarcophagula occidua</i>	31	4.9
Sepsidae:		
<i>Archiseopsis scabra</i>	40	6.5
<i>Palaeosepsis</i> sp.	107	17.0
Total		