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Short Communication

New records of Sarcophagidae species (Diptera) with forensic potential in Rio de Janeiro

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ABSTRACT

Sarcophagidae species are frequent and abundant in the decomposition process of corpses and, consequently, play an important role as a tool for the application of Forensic Entomology. *Helicobia pilifera* Lopes, 1939, *Microcerella erythropyga* (Lopes, 1936), *Oxysarcodexia fringidea* Curran & Walley, 1934 and *Peckia* (*Peckia*) *pexata* (Wulp, 1895) were recorded for the first time in a Forensic Entomology experiment in Rio de Janeiro, using domestic pig carcasses as substrate.

Entomology has acquired great importance in elucidating various issues in forensic analysis, since the famous book "La faune des corpses", published by Mégnin (1894), who announced the application of entomology to estimate postmortem interval (PMI) based on observation of the entomological succession pattern associated to corpses in France. After Mégnin (1894), several researchers have adapted the technique for different sites, confirming the importance of conducting regional surveys, since the pattern of succession is geographically specific (Oliveira-Costa, 2011). As insects are ectothermic organisms, the climatic variation has direct influence on the succession pattern (Smith, 1986).

The large Brazilian territory shows a great diversity of biomes, ecosystems and climates, and consequently a peculiar insect fauna in each different region (Carvalho and Linhares, 2001; Mise et al., 2013). Furthermore, the correlation of the fauna with each season and their climatic features are also important to record the differences along the regional succession patterns.

Diptera is considered as the largest insect group of forensic importance, especially the calyptratae muscoids, and Sarcophagidae is one of the most distinctive to the forensic application (Oliveira-Costa, 2011; de Carvalho and Mello-Patiu, 2008). Despite the forensic importance of Sarcophagidae, it is clear the small number of studies including data on this family. This group has been neglected in most Forensic Entomology papers, possibly because of the difficult identification, and especially for non-taxonomists (Carvalho et al., 2004; de Carvalho and Mello-Patiu, 2008). Identification of flesh flies species has been done mainly by morphological differences of the male genitalia, having no striking external features; their ovoviviparous females deposit first instar larvae and have more difficult segregation because the morphological uniformity (Mello-Patiu et al., 2009). Consequently, the knowledge of the flesh-fly bionomics is very poor as well as on the niche they occupy on carcasses and corpses. Thus, it is essential to survey the attracted species and how they succeed along the process of corpse decomposition in different climatic regions. Thus, we aim to furnish four new records of flesh-flies species attracted by decomposing carcasses in Rio de Janeiro, revealing their potential forensic importance for the southeast region of Brazil.

The experiment was conducted in the city of Rio de Janeiro, state of Rio de Janeiro, from June 21, 2006 to May 07, 2007, in an urban area in the neighborhood of Deodoro (S22°52′00″ W43°23′00″), near a remaining riparian vegetation into a large area of a military airport. Carcasses of domestic pigs (*Sus scrofa* Linnaeus, 1758) were used as a model, following the usual method of the forensic entomology experiments (Catts and Goff, 1992). Four pigs were exposed, one in each season, to the insect collection, following Oliveira-Costa et al. (2011) methodology. The collections were performed daily along throughout decomposition process and all the collected specimens were taken to the Laboratory of Forensic Entomology, Universidade Castelo Branco, for identification.

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Sarcophagidae males were sorted out and their terminalia were exposed to allowing the species identification, confirmed by comparison with the material of the Entomological Collection of Museu Nacional (MNRJ), Universidade Federal do Rio de Janeiro.

A total of 1894 specimens of 26 sarcophagid species of nine genera were collected (Dias et al., personal communication). Among them, were recorded *Microcerella erythropyga* (Lopes, 1936), *Helicobia pilifera* Lopes, 1939, *Oxysarcodexia fringidea* Curran & Walley, 1934, and *Peckia* (*Peckia*) *pexata* (Wulp, 1895). Although these four species had previous distribution records to Rio de Janeiro (see records in Mello-Patiu et al., 2009), they were not collected in preceding studies using animal carcasses in the metropolitan region of the city (Salviano, 1996; Oliveira-Costa et al., 2001; Oliveira-Costa, 2011; Barbosa et al., 2009).

The relative and absolute frequencies obtained for each species were: *M. erythropyga* 1.37% (26 specimens), *H. pilifera* 1.21% (23 specimens), *O. fringidea* 0.15% (3 specimens), and *P. pexata* 0.10% (2 specimens). Despite their relatively low frequency compared to the dominant species in the decomposition process, *M. erythropyga* and *H. pilifera* were collected in the early stages of decomposition enabling a future application of these species for the postmortem interval estimate.

In earlier records of scavenger flesh flies in carcass from other Brazilian regions, *M. erythropyga* was collected in Cerrado (Rosa et al., 2009), *H. pilifera* in Cerrado and Atlantic Forest (Moretti et al., 2008; Rosa et al., 2009), *P. pexata* in Cerrado, Atlantic Forest, and Caatinga (Moretti et al., 2008; Rosa et al., 2009; Alves et al., 2014), but *O. fringidea* is herein recorded for the first time in this substrate.

The decomposition stage was divided into fresh, bloated, decay, post-decay and skeletonization, according to Goff (2000). Winter, as highlighted by Oliveira-Costa et al. (2001) and Souza and Linhares (1997), was the station with higher richness and abundance of Sarcophagidae. In this season, *M. erythropyga* occurred from the 1st to 7th day, returning on the 10th day of decomposition (fresh, bloated and skeletonization stages). *Helicobia pilifera* was present from the first day to deterioration stage, while *P. pexata* was only collected on the 5th day of decomposition (bloated stage) and *O. fringidea* was not present.

During the spring, only *M. erythropyga* was present during the 2nd and 5th days (fresh and bloated stages). In autumn, *H. pilifera* attended the 2nd and 7th day of decomposition (fresh, bloated, decay, and post-decay stages), *M. erythropyga* was present at day 12 and *O. fringidea* was present only in the 22th (both post-decay stage). In summer, *H. pilifera* appeared only on 14th day (skeletonization stage) and *O. fringidea* was present only in the initial stage.

Conflicts of interest

The authors declare no conflicts of interest.

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