



## Abundance and ecological succession of necrophagous insects in two distinct resources: rat and fish carcasses

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### Abstract

The present study evaluated the abundance and ecological succession of necrophagous insects in two types of carcasses: rat and fish. These results, in the forensic context, may reflect the preference and order of arrival of species in ephemeral resources, important information to estimate the postmortem interval in cases of violent death.

### Key words:

forensic entomology, postmortem interval, flies.

### Introduction

Forensic Entomology, through information provided by insects, can help investigate crimes against people, particularly victims of violent death<sup>1,2</sup>. Among others, it can be used to determine when, where, and under what circumstances death occurred, whether the victim consumed drugs within hours of his or her death, inferred whether the body was transported from the place where the crime occurred, as well as providing information if victim would have been sexually molested<sup>3</sup>.

In order to respond to the several of the issues discussed above, the present study evaluated the abundance and ecological succession of necrophagous insects in two types of carcasses: rat and fish

### Results and Discussion

The carcasses, with approximately 200g each, were exposed in an urban area of the campus of UNICAMP (S: 22°49'16.6"; W: 47°04'10.9") from April 24 to May 2, 2019. Cages were disposed on the carcasses to avoid predation by large scavengers. Adult collections were done daily with the help of insect net. The immatures were collected on the last day of exposure of the carcasses, individualized according to the type of resource in plastic containers containing sterile sawdust until the emergence of adults. Taxonomic keys<sup>4,6</sup> and other instruments were used to identify adults. Temperature, relative humidity and precipitation were measured daily at the site.

As expected, dipterans were the most abundant insects (92.5%). The following species of Diptera were recorded by rearing in the substrates: *Hemilucilia segmentaria* (N= 258), *Lucilia eximia* (N= 8) (Calliphoridae), *Peckia (Peckia) chrysostoma* (N= 41), *Peckia (Pattonella) intermutans* (N= 6), *Oxysarcodexia* sp. (N= 8), *Ravinia* sp. (N= 3) (Sarcophagidae), *Megaselia scalaris* (N= 46) (Phoridae). In Coleoptera, only immatures of *Dermestes maculatus* (N= 30) were recorded. Although Calliphoridae was the most abundant, Sarcophagidae were the most diverse (S= 4).

With regard to preference, insect abundance was significantly higher in rat carcasses than in fish carcasses ( $\chi^2= 304.6$ ;  $p < 0.0005$ ). A clear successional process was observed with blowflies colonizing the carcass first, followed by Sarcophagidae, Coleoptera and Phoridae (Fig. 1).

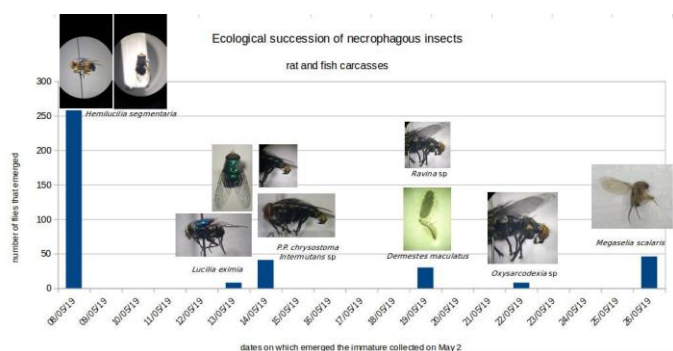


Figure 1. Succession of species throughout the decay process of carcasses.

### Conclusions

Flies show preference in the selection of resources and a clear successional process: in general, Calliphoridae are the most abundant dipterans while Sarcophagidae are the most diverse. These results, in the forensic context, may reflect the preference and order of arrival of species in ephemeral resources, important information to estimate the postmortem interval in cases of violent death.

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