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Legal Medicine 5 (2003) S372–S374

LEGAL
MEDICINE

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Insects' colonization of human corpses in warm and cold season

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Abstract

The succession of insects is commonly used for estimation of the postmortem interval (PMI). In the warm season there are many insect species, which enable us to estimate the time of death, but in the cold season there are less species. For the estimation of a seasonal pattern, we examined 117 human corpses found in domestic environment during the year 2001. We found three typical 'summer species', active from May until October, three further species active from April until November. One blowfly species (*Calliphora vicina*) and the family of scuttle flies were active all over the year. These insects may be useful for PMI estimation in winter; however, further research concerning the developmental rate of scuttle flies is required. The distinct seasonal pattern of the early colonizing blowfly species allows to allocate the time of death to a particular time interval even in cases of long PMIs if empty puparia of these insects are found.

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Keywords: Postmortem interval; Insects' colonization; Seasonal differences

1. Introduction

In forensic entomology, necrophagous insects are useful to answer questions concerning estimation of the postmortem interval (PMI) [1–6], postmortal transfer [7], toxicological investigation [8–11] and neglect of living people [12,13]. The use of insects in death scene investigations dates back to the 13th century in China [14] and came into use in Europe in the 19th century. Since the early 1980s, forensic entomology became more and more popular.

There are many species usable to calculate the time of death especially in the warm season, but it is commonly known that less insect species are active during the cold season. The following study presents seasonal differences concerning the occurrence of necrophagous species in domestic environment.

2. Materials and methods

During the period of one calendar year (2001) all species of necrophagous insects colonizing 117 human corpses found in domestic environment were classified. Fly larvae were collected, reared in the laboratory and identified as adult flies [15–17].

In total 24 species were found, most of them determined to the species level, some to the genus and two to the family. For the present study, only species frequently occurring (at least in 15 cases) were evaluated. Thus, the seasonal pattern of six fly species, one fly family (scuttle flies = Phoridae), and beetles, genus *Dermestes* (combination of the two species *Dermestes maculatus* and *Dermestes lardarius*) was investigated.

3. Results

As expected, more different species were found in summer than in winter (Fig. 1). During the warm season,

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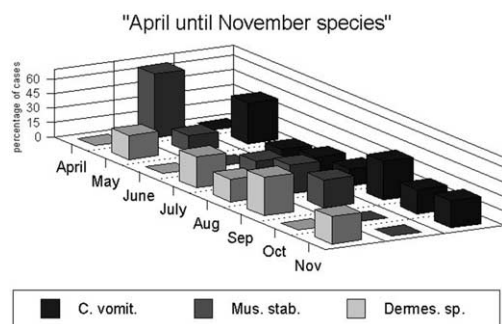


Fig. 3. Percentage of cases of species active from April until November in 2001.

in winter. In the cold months only one blowfly species, *C. vicina*, and the family of scuttle flies were found, the latter ones apparently preferring the cold season. These insects may be useful for PMI estimation in winter; however, the developmental rate of scuttle flies is not well known yet [21] and further research

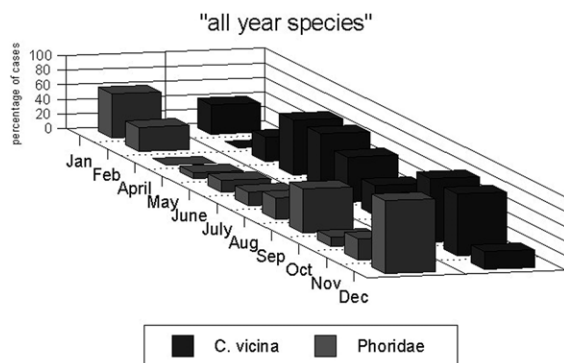


Fig. 4. Percentage of cases of species active all over the year 2001.

in this field is required. Due to the distinct seasonal pattern of the early colonizing blowfly species it becomes possible to determine the time of death even in cases of long PMIs (i.e. several months or years) if empty puparia of these insects are found.

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