

Entomofauna of mummified corpses from indoor environments in the Wrocław area

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Introduction

Mummified bodies present a distinct ecological niche, characterized by the desiccation of soft tissues, which alters both the spectrum and behavior of colonizing insect species. Initial colonizers, predominantly Diptera such as Calliphoridae and Sarcophagidae, often leave characteristic feeding traces in natural orifices and wounds during the early post-mortem interval¹. As the environment becomes inhospitable to these taxa due to tissue drying, later-arriving necrophagous insects, particularly beetles from the families Dermestidae, become dominant, feeding on dried skin, hair, and residual organic matter². These successional patterns are not only critical for reconstructing the post-mortem interval (PMI) but also for understanding the environmental and microclimatic factors that influence the preservation and transformation of human remains^{1,3}. In this study, we analyzed the entomofauna associated with three human corpses discovered indoors in the Wrocław area in 2019, 2020 and 2021, where mummification was observed. Insect specimens were collected from each body during forensic examinations and identified to assess the species composition and successional patterns.

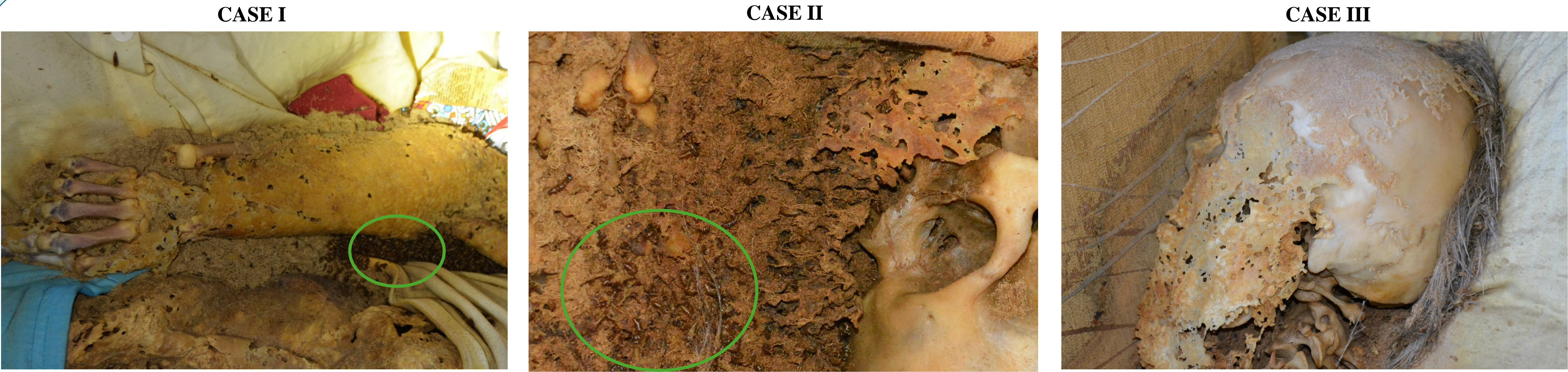


Fig. 1. Photographs of corpses found in apartments in Wrocław with visible mummification and marked insect activity.

Table 1
List of insect species and the number of individuals found and preserved from cadavers.

	FAMILY	SPIECES	CYCLE STAGE	QUANTITY
CASE I	COLEOPTERA	<i>Dermestes haemorrhoidalis</i>	Larva	603
			Moult	23
			Imago	57
	DIPTERA	<i>Dermestes frischii</i>	Pupa	3
		Piophilidae	Larva	35
		<i>Liopiophila varipes</i>	Imago	1
		<i>Calliphora vicina</i>	Larva	1
		<i>Megaselia scalaris</i>	Larva	3
			Pupa	1
CASE II	COLEOPTERA	<i>Dermestes haemorrhoidalis</i>	Imago	298
			Moult	374
			Larva	2
	DIPTERA	<i>Sarcophaga</i> sp.	Pupa	4
			Puparium	7
		<i>Cynomya mortuorum</i>	Imago	1
CASE III	COLEOPTERA	<i>Dermestes haemorrhoidalis</i>	Moult	uncountable
			Imago	4
		<i>Dermestes frischii</i>	Larva	1
		<i>Anthrenus</i> sp.	Moult	10
	DIPTERA	<i>Megaselia scalaris</i>	Pupa	3

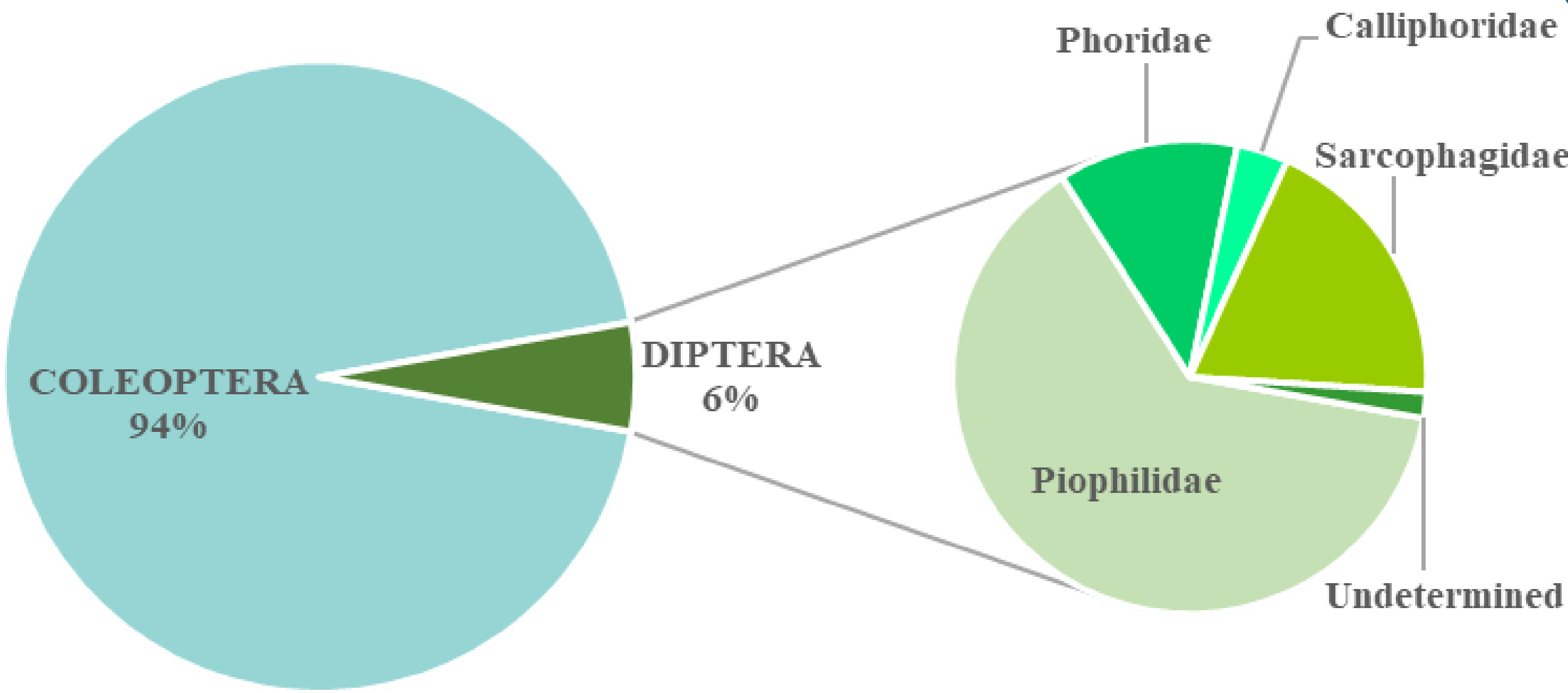


Fig. 2. Diagram showing the proportion of each insect group in all three cases. Dermestidae moults were excluded from the analysis.

Conclusions

All three cases were classified as in an advanced decomposition/mummification state. The corpses showed traces of Dermestidae living and feeding, in which all developmental stages were observed. *Dermestes heamorrhoidalis* was particularly abundant, although it is the presence of *Dermestes frischii* that is the more interesting observation, as it is considered to be an outdoor-specific species⁴. In addition, interesting beetle behavior was observed. The material secured moults that were found inside the bones, as well as larvae using the puparia of the flies to pupate. In the case of flies, the abundance was much lower than that of beetles, but the species composition differed significantly. Among the collected material were all growth stages. Despite advanced decomposition, species characteristic of early stages of decomposition were still found. In addition to these flies, species characteristic of later stages have also been found. Such cases highlight the need for forensic entomologists to be present at the scene where the corpse was found, so that a skilled eye can assess the amount of material and where and how to collect and secure it. This is especially important when it is necessary to estimate PMI from entomological evidence.

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