THE SPECIES OF NECROPHAGOUS INSECTS FOUND ON BURNED HUMAN REMAINS: A CASE STUDY FROM LOWER SILESIA, POLAND

Paweł FIGURSKI [1], Patrycja ZBIERALSKA [1], Katarzyna PALACZ-ZIÓŁEK [1],
Agata THANNHÄUSER [2], Łukasz SZLESZKOWSKI [2] , Marcin KADEJ [1]
1 Department of Biology, Evolution and Insect Conservation, Centre for Forensic Biology and Entomology, University of Wrocław, ul. Przybyszewskiego 65, PL-51-148 Wrocław, Poland
2 Department of Forensic Medicine, Wroclaw Medical University, ul. Mikulicza-Radeckiego 4, PL-50-345 Wrocław, Poland

Introduction

Necrophagous insects play a crucial role in the decomposition of corpses found in various environments and subjected to various physical changes, including charring. While it was initially believed that burned bodies provided an unfavorable environment for insect colonization, research has shown that necrophagous species can still be present on such remains [1].

This poster presents data on the species and abundance of necrophagous insects collected from discovered human remains

Fig. 1. Photograph of the location where the body was discovered.

Fig. 2. Photograph depicting the remains, with a clearly visible degree of thermal damage and charring.

The body of a middle-aged male was discovered in a burned field near Wrocław, Poland. The remains were almost completely charred. Necrophagous insects were collected from the corpse in various developmental stages: larval, pupal, and adult (imago). In the case of two species, puparia were also recovered. The specimens were subsequently identified to the species level.

Results of the taxonomic identification of collected necrophagous insects

Order	Family	Genus/Species	Quantity collected
Diptera	Fanniidae	*Fannia scalaris*	6 pupae, 1 puparium
	Sarcophagidae	*Sarcophaga* sp.	9 larvae
	Calliphoridae	*Calliphora vomitoria*	2 larvae
	Muscidae	*Hydrotea capensis*	5 pupae
		Hydrotea dentipes	1 puparium, 8 pupae, 2 adults
		Muscina prolapsa	21 larvae

Fig. 3. Diagram presenting data on the species composition and abundance of necrophagous insects belonging to the order Diptera.

Fig. 4. A comparison of the abundance of individuals belonging to various diptera species or genera. The total count includes adult, larval, and pupal stages. Puparia were also included in the total number.

Order	Family	Species	Quantity collected
Coleoptera	Dermestidae	*Dermestes undulatus*	1 adult
	Cleridae	*Necrobia violacea*	2 larvae, 3 adults
	Histeridae	*Margarinotus brunneus*	2 adults
	Staphylinidae	*Philonthus succicola*	2 adults
		Philonthus jurgans	2 adults
		Philonthus politus	1 adult

Fig. 5. Diagram presenting data on the species composition and abundance of necrophagous insects belonging to the order Coleoptera.

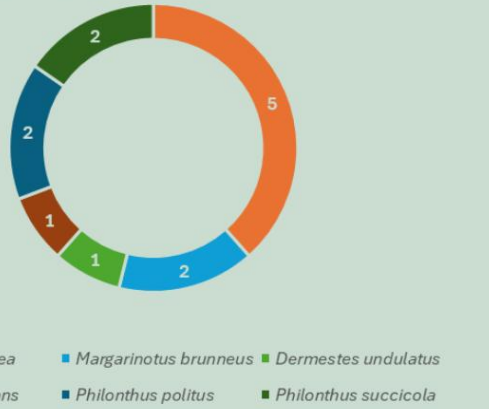

Fig. 6. A comparison of the abundance of individuals representing various beetle species. The total count comprises both adult and larval stages.

CONCLUSIONS

The presence of insects on burned remains has long been overlooked. However, data from previous experiments suggest that necrophagous insects can play a valuable role in forensic investigations, particularly in estimating the post-mortem interval (PMI). Some studies indicate that the process of insect colonization and species succession may differ from that observed on unburned remains. The differences may concern the timing of colonization, where its estimation in the case of burned remains may be more challenging [2]. Additionally, the degree of charring of the remains may influence the progression of decomposition and insect activity [3]. Therefore, further research - including within the territory of Poland - is needed to gain a deeper understanding of this issue.

References:

[1] Vanin, S., Zanotti, E., Gibelli, D., Taborelli, A., Andreola, S., & Cattaneo, C. (2013). *Decomposition and entomological colonization of charred bodies–a pilot study.* Croatian medical journal, 54(4), 387-393.
[2] Owings, C. G., McKee-Zech, H. S., Orebaugh, J. A., Devlin, J. L., & Vidoli, G. M. (2024). *The utility of blow fly (Diptera: Calliphoridae) evidence from burned human remains.* Forensic Science International, 356, 111962.
[3] Whitaker, A. P. (2017). *Effect of burning on minimum post-mortem interval (minPMI) estimation from an entomological perspective.* Archaeological and environmental forensic science, 1(1), 17-31.