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Thermal conditions in selected urban and semi-natural habitats, important for the forensic entomology.

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Highlights

- Temperatures in open places are often different from those prevailing at weather station
- Daily amplitudes of temperatures in open microhabitats may be very high
- Thermal conditions in buildings are relatively stable, even in unheated rooms
- Conditions in cellars are very stable and mild, when compared to external ones

Abstract:

A long-term study on thermal conditions in selected urban and semi-natural habitats, where human corpses are likely to be found, was conducted in the city of Lodz (Central Poland). Thermal data were collected during two years at nine sites and compared with corresponding data from the nearest permanent meteorological station at Lodz Airport (ICAO code: EPLL).

The conditions closest to those at the meteorological station prevailed in the deciduous forest, coefficient of determination R^2 for those sets of data was above 0.96. The open field was characterized by high daily amplitudes, especially during spring, while the site in the allotment gardens was characterized by relatively high winter temperatures. The conditions prevailing in all closed space sites were very diverse and only slightly similar to the external ones. The most distinct site was an unheated basement in a tenement house, where temperature was almost always above 0°C and daily amplitudes were negligible.

Keywords:

Forensic entomology; Thermal conditions, Urban habitats; Postmortem Interval

1. Introduction

The local temperature has a fundamental and manifold importance for the course of corpse decomposition. It affects the likelihood of finding the body by insects and the length of pre-colonization phase [1], [2]. Because each insect species has its own preferences, the thermal conditions modify the course of interspecific competition and the subsequent fauna of the body [3]. Finally, the rate of development of larvae is closely dependent on the temperature (e.g. [4-6]).

Determining temperature at the site where a corpse was found is crucial for defining the post-mortem interval (PMI) with the help of entomological methods [7]. Due to the nature of these analyses, usually it is necessary to reconstruct the past local thermal conditions on the basis of data obtained from the nearest permanent meteorological station and corresponding data collected after discovery of the body ([7- 9]). The methods, that

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