

The Contribution of the Insect Succession in the Medico-Criminal Entomology Context

Bonacci T*

DIBEST Department, University of Calabria, via P. Bucci, s.n., 87036 Rende, CS, Italy

Forensic entomology is a field that uses the arthropods to estimate the time elapsed since death (Post-Mortem Interval - PMI), but also to solve other issues in the civil law context. Insects are the first organisms to discover and colonize a corpse after death [1,2]. For this reason, the entomologists often use insects and other arthropods in solving crimes of violence. Estimation of PMI by entomological methods is based on the age of the oldest fly larvae (Calliphoridae) or on the ecological succession of arthropods discovered on the cadaver [2-4]. The estimated age of immature flies that have fed on a corpse provides a minimum PMI. This approach does not estimate the maximum PMI, because an unknown period of time may pass between death and the colonization of a corpse [5], by the first fly. In contrast to the larval age method, the succession model needs information about the time passed between death and the presence of a particular taxon and stage [6]. Carrion succession is characterized by predictable changes in a successional sequence of an arthropod community through time and the decomposition stages [2,3].

The data resulting from the appearance and disappearance of arthropods during experimental studies along the different stages of decomposition, is a matter of crucial importance for estimation of the PMI in advanced stages of corpse decomposition [5,7]. In this context, the information obtained from non-human carcasses are used to estimate the date of death and to apply the results to investigations involving human remains [2,7]. The recognition of the species involved, the pattern and time of arrival of arthropods on the corpse and the knowledge of their developmental rates can give an indication of the time of death [4]. Very important when this method is applied, is to compare the collected data with other death investigations, or consulting existing experimental data from animal models (*Sus scrofa*) [4]. The faunal successional model is useful in cases where a corpse has been moved and the fauna collected from the body does not match to local species [2,8], but also to understanding the artifacts caused by some arthropods [4]. For example, ants are among the insects that colonize exposed human and animal corpses during the early stage of decomposition. This taxon, causes post-mortem injuries to different parts of the human body which in some circumstances could be misinterpreted as antemortem injuries [9]. Moreover, the presence of ants near a corpse can cause Diptera egg laying disruption or delay

the colonization by Calliphoridae. In conclusion, insect succession on a carrion can provide useful information to determine the time of death and other circumstances related to the crime scene, but the season, temperature, geographic area can have effects on arthropod assemblage. For these reasons, many investigations are needed in order to implement a geographical database of the sarcosaprophagous invaders in a variety of habitats and in all geographical areas in which forensic entomology is used [10].

References

1. Catts EP, Goff ML (1992) Forensic entomology in criminal investigations. *Annu Rev Entomol* 37: 253-272.
2. Byrd JH, Castner JL (2009) *Forensic Entomology. The Utility of Arthropods in Legal Investigations*. CRC Press, Boca Raton, FL, London, New York, Washington, USA p: 681.
3. Payne JA (1965) A summer carrion study of the baby pig *Sus scrofa* Linnaeus. *Ecology* 46: 592-602.
4. Bonacci T, Zetto Brandmayr T, Brandmayr P, Vercillo V, Porcelli F (2011) Successional patterns of the insect fauna on a pig carcass in southern Italy and the role of *Crematogaster scutellaris* (Hymenoptera, Formicidae) as a carrion invader. *Entomological Science* 14: 125-132.
5. Smith KGV (1986) *A Manual of Forensic Entomology*. Cornell University Press, Ithaca p: 205.
6. Schoenly K, Goff ML, Wells JD, Lord WD (1996) Quantifying statistical uncertainty in succession-based entomological estimates of the postmortem interval in death scene investigations: a simulation study. *American Entomologist* 42: 106-112.
7. Nuorteva P (1977) Sarcosaprophagous insects as forensic indicators. In: Tedeschi CG, Eckert WG, Tedeschi LG (eds) *Forensic Medicine: A Study in Trauma and Environmental Hazards*, Vol. II, pp: 1072-1095. WB Saunders, New York.
8. Tabor KL, Brewster CC, Fell RD (2004) Analysis of the successional patterns of insects on carrion in southwest Virginia. *J Med Entomol* 41: 785-795.
9. Bonacci T, Vercillo V (2015) Outdoor post-mortem bite injuries by *Tapinoma nigerrimum* (Hymenoptera, Formicidae) on a human corpse: Case report. *J Forensic Leg Med* 33: 5-8.
10. Anderson GS (2000) Insect succession on carrion and its relationship to determining time of death. In: Byrd JH, Castner JL (eds) *Forensic Entomology. The Utility of Arthropods in Legal Investigations* pp: 143-175. CRC Press, Boca Raton, FL.

*Corresponding author: Bonacci T, DIBEST Department, University of Calabria, Italy, Tel: +390984493831; E-mail: teresa.bonacci@unical.it

Received April 27, 2016; Accepted April 29, 2016; Published May 03, 2016

Citation: Bonacci T (2016) The Contribution of the Insect Succession in the Medico-Criminal Entomology Context. *Entomol Ornithol Herpetol* 5: e119. doi:[10.4172/2161-0983.1000e119](https://doi.org/10.4172/2161-0983.1000e119)

Copyright: © 2016 Bonacci T. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.