## G73 Parasitic Wasps: Succession, Development, and Forensic Importance as PMI Indicators

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After attending this presentation, attendees will understand the potential forensic value of parasitic wasps associated with decomposing remains in determining time since death. Aspects of parasitoid biology and behavior in regard to carcass attendance and insect development will also be discussed for use in the estimation of a postmortem interval (PMI).

This presentation will impact the forensic science community by. These results provide biological and developmental data for forensically relevant species of parasitic wasp for use in determining time since death in forensic investigations. Data gathered will improve the accuracy of PMI estimations in cases where decomposition has advanced beyond the life cycle of flies, the traditional indicators of time since death. Discussion of the relevance of the results presented here to forensic cases will establish the importance of parasitic wasps as forensic indicators of time since death and our findings provide reference data required for accurate PMI estimation.

Knowledge of the predictable pattern of insect succession onto a carcass and the relationship between temperature and larval development has proved invaluable in estimating PMI. To date forensic entomologists have focused on the use of synanthropic flies, particularly Calliphorids as forensic indica- tors of time since death. However, where time since death extends beyond the larval development time of these commonly used species, only a mini- mum PMI can be estimated. For instance, where only empty fly pupae cases are recovered from a crime scene the time lapse between the emergence of adult flies from the pupae cases and the discovery of the body is unknown. In such cases, the presence of parasitic wasp larvae within insect hosts such as fly pupae can be used to estimate an extended PMI.

The order Hymenoptera contains an extremely diverse range of insects, including numerous parasitic wasps or more accurately “parasitoids.” The term “parasitoid” encompasses those arthropod species whose larvae feed exclusively on the body of an arthropod host, eventually killing it. Parasitoids use a broad spectrum of hosts including necrophagous insects found in association with decomposing remains (Archer & Elgar, 2003).

Use of parasitoids as tools in criminal investigations requires; baseline data on the temperature-dependant development of both the host and para- sitoid species; knowledge of the development stage at which the female wasp parasitizes the host; and an understanding of the factors involved in host lo- cation within a decomposition habitat. Currently, there is a paucity of rele- vant reference data and the research that is available is either geographically specific or is focused on parasitoid species used as biological control agents of filth flies rather than in a forensic context.

In this study, the species and biology of parasitic wasps associated with decomposing remains in Western Australia and their relevant host species were investigated. A monthly survey of relevant insect fauna frequenting decomposing remains was conducted. Domestic guinea pig carcasses (*Cavea porcellus*) were used as an attractant. The stage of decomposition at which the observed parasitoid species attended carcasses, species seasonality and rates of parasitization in the field were identified. Predominant species identified included *Tachinaephagus zealandicus* Ashmead (Hymenoptera, Encyrtidae) and *Nasonia vitripennis* Walker (Hymenoptera, Pteromalidae). Base-line reference data on the temperature-dependant development of both of these parasitoid species were also established under laboratory conditions.

These results provide biological and developmental data for forensically relevant species of parasitic wasp for use in determining time since death in forensic investigations. Data gathered will improve the accuracy of PMI estimations in cases where decomposition has advanced beyond the life cycle of flies, the traditional indicators of time since death. Discussion of the rel- evance of the results presented here to forensic cases will establish the im- portance of parasitic wasps as forensic indicators of time since death and our findings provide reference data required for accurate PMI estimation.

**Entomology, Parastic Wasp, Postmortem Interval**

 ** Presenting Author*