

INSECT SUCCESSION AND DECOMPOSITION PATTERNS OF CARCASSES IN SARAWAK, MALAYSIAN BORNEO

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Abstract: Insect succession and decomposition process on three types of carcasses were conducted in peat swamp forest in Kota Samarahan, Sarawak, Malaysia, from August 2007 until January 2008. Nine fresh animal carcasses were used as carcass model in forensic entomological research. Three experiments were conducted and using three species of animals, namely plantain squirrels, *Callosciurus notatus*, chickens, *Gallus gallus*, and toads, *Duttaphrynus melanostictus*. The objectives of this study are to determine the decomposition stages and the insect succession with decomposition of different types of carcass in a peat swamp forest. Five decomposition stages were observed during this study which were fresh, bloated, active decay, advanced decay and dry remains stages. A total of 38 species of insects (seven Orders and 14 families) were collected from the nine carcasses. The common species that visit all three types of carcasses were *Chrysomya megacephala* and *C. ruffifacies* (*Calliphoridae*). Ambient temperatures and relative humidity showed a reciprocal relationship in all the locations where the readings were recorded from the carcasses. These data may be used as a reference for further studies in ecology and forensic entomology in Malaysia.

Keywords: carcasses, decomposition stages, peat swamp forest, forensic entomology

Introduction

Every living organism will eventually die and the body will undergo decomposition process. Decomposition process is a process of chemical breakdown of organic matter into its constituents by the action of decomposer (Oxford Dictionary of Biology, 2004). Some arthropods play important roles as decomposer beside bacteria and fungi. They help in maintaining and balancing the ecosystem by decomposing organic matters including carcasses; they can be used as tools in determining elapsed time since death (Anderson, 1999; Lee *et al.*, 2004). However, the ecological data of insects that are involved in the decomposition process in a particular area, such as in Sarawak, are still lacking in information and need to be established.

The type and composition of taxa that are attracted to a carcass usually change in a predictable pattern as decomposition progresses through different stages (Smith, 1986). The pattern of succession of insects is specific to the

location and environmental conditions in which the carcass occurs (Payne, 1965). Taxonomic of fauna can varies greatly with locality, thus it is important for estimation of the post-mortem interval (PMI) to identify the forensically important insects that are specific to an area (Tabor *et al.*, 2005).

Sarawak is the largest state in Malaysia and it covers about 11.6% (1.6 million ha) of peat swamp forest (Phillips, 1998; Abang & Hill; 2006). Peat swamp forest in Malaysia (Sabah and Sarawak) is known to harbour varies species of flora and fauna, and also serves as a key habitat for the unique endemic species such as proboscis monkey, *Nasalis larvatus* and treeshrew, *Tupaia picta* and some invertebrates (Abang & Hill; 2006; Phillipps & Phillipps, 2016). Studies of carrion arthropods to determine the species composition and the successional pattern have been done in several regions of the world (Tabor *et al.*, 2005), a few similar studies have been done in Malaysia, mostly in Peninsular Malaysia (Lee *et al.*, 2004; Heo *et al.*, 2008; Azwandi & Abu Hasan, 2009; Rumiza *et al.*, 2010; Azwandi