



Checklist of bat flies (Diptera: Nycteribiidae and Streblidae) and their associated bat hosts in Malaysia

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Abstract: The number of publications on bat flies of Malaysia suggests that this group of parasitic dipterans is understudied. From April 2011 to September 2013, we surveyed 10 localities from seven states in Malaysia with the main objective to compile a checklist of bat flies. As a result, a total of 15 species of bat flies were recorded from 24 species of hosts. Our surveys indicated that there is a correlation between the number of bat species and the number of bat flies species recorded due to the host specific nature of bat flies.

Key words: bats, bat flies, host, Nycteribiidae, Streblidae

INTRODUCTION

Bat flies are parasitic dipterans that are only found on bats. Bat flies from the families Streblidae and Nycteribiidae are part of the superfamily Hippoboscoidea, which includes other obligate sanguivorous families such as Glossonidae and Hippoboscidae (Dittmar et al. 2006). Generally, nycteribiids and streblids can be distinguished easily by the presence (streblids) or absence (nycteribiids) of wings.

Based on a compilation from various sources, there are approximately 30 species of bat flies recorded from Malaysia (Theodor 1967; Maa 1968, 1971). Despite these studies, knowledge of the taxonomy and ecology of bat flies in Malaysia is scarce and there are no recently published literatures on this group from Malaysia since the late 19th century. To remedy this, surveys were conducted to explore the diversity and to compile a checklist of the bat flies and their incidental hosts. Various surveys were carried out between April 2011 and September 2013 to record the host and parasite association of bats and bat flies at several sites in Malaysia. Herein, the results from our surveys are reported.

MATERIALS AND METHODS

Study sites

Fieldwork was carried out at 10 different localities in Malaysia. The study sites in Sarawak, Malaysian Borneo include Batang Ai National Park, Gunung Gading National Park, Mulu World Heritage Area and Wind Cave Nature Reserve. The sites in mainland Malaysia include Air Terjun Batu Hampar (Kedah), Gua Musang district (Kelantan), Wang Kelian State Park (Perlis), Pulau Tioman Wildlife Reserve (Pahang), Sekayu Recreational Forest (Terengganu) and Tambun (Perak) (Figure 1).

These study sites have varied habitats, including mixed dipterocarp forest, hill dipterocarp forest, alluvial forest, secondary forest, heath forest, forest near limestone cave areas, and agricultural plots. The details of each trapping site are shown in Table 1.

Data collection

Fieldwork was conducted from April 2011 to September 2013. Different types of sampling methods were used to maximize the representativeness of the bat host species. Two four-bank-harp traps (Francis 1989) and 10 polyester nets were positioned in forest understories, across small streams, and at forest edges. Additionally, hand nets were used to collect roosting bats.

During each sampling day, mist nets and harp traps were set up before the emergent time of bats and were closed at 7:00 h the following day. Mist nets were checked every 15–30 minutes for the first three hours and then every two to three hours before they were closed the next morning. Meanwhile, harp traps were checked three to five times during each sampling night.

Captured bats were placed inside cloth bags. Each bat specimen was identified following Payne et al. (1985), Kingston et al. (2006) and Francis (2008). Each host was scanned with an intensive light source for bat flies