

[研究文章 Research Article]

<https://doi.org/10.5281/zenodo.7763985>

## Bat Flies (Diptera: Hippoboscoidea) Associated with Fruit Bats (Pteropodidae) on Cebu Island, Philippines

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**Abstract:** The bat fly fauna of Cebu Island is poorly studied as evidenced by relatively few published records. This paper presents records of bat flies (Diptera: Hippoboscoidea) associated with fruit bats on Cebu Island, Philippines with additional island records. These records are as follows: *Cyclopodia horsfieldi* (ex. *Pteropus hypomelanus* & *P. pumilus*), *Leptocyclopodia ferrarii mabuhai* (ex. *Cynopterus luzoniensis*), and *Leptocyclopodia pilosipectus* (ex. *Harpyionycteris whiteheadi*). This account serves as the first checklist of bat flies occurring in Cebu Island.

**Keywords:** Chiroptera, central Visayas, ectoparasites, new bat fly records

### Introduction

Cebu Island is one of the major islands in the Central Philippines and lies within the Visayas Block, a constituent of the seismically active Philippine Mobile Belt (Burton 1986; Mendoza et al. 2022). Cebu Island was dated to have originated during the early Cretaceous period (Deng et al. 2015). This long and narrow island has a land area of approximately 5,088 square kilometers (Supsup et al. 2016) and is characterized by hilly terrain. Cebu is known for its karst landscape (Restificar et al. 2006; Lumongsod et al. 2022). This karst topography serves as the substrate of the remaining karst forests on the island and is home to a variety of vascular plants (Cadiz & Buot, Jr. 2010; Replan & Malaki 2017; Lillo et al. 2019). In terms of biogeographic affinity, Cebu Island is part of the Negros-Panay faunal region based on the Pleistocene Aggregate Island Complexes model (PAIC) (Vallejo, Jr. 2011). This faunal region is comprised of Ticao, Masbate, Negros, Panay, Cebu, and smaller adjacent islands (Heaney 1986; Vallejo, Jr. 2011).

Cebu Island is home to 29 species of bats belonging to 21 genera (Heaney et al. 2010). Of these, 13 species are fruit bats (Pteropodidae) and 6 are Philippine endemics (Paguntalan & Jakosalem 2007; Heaney et al. 2010). Associated ectoparasites of bats such as bat flies are understudied as evidenced by a few published records for the group on Cebu Island. In this paper, new geographic records of bat flies (Diptera: Hippoboscoidea) associated with fruit bats on Cebu Island are presented. Our account serves as the first checklist of bat flies on Cebu Island.

### Material and Methods

Ethanol-preserved (95%) bat flies were examined under a LeicaS9D stereomicroscope. The keys of Theodor (1963) and Cuy (1980) were used to identify bat flies. Focus stacking of representative specimens was done using Helicon Focus (Helicon Soft Ltd., Ukraine). The nomenclature of hosts and bat flies follows Giannini et al. (2019) and Graciolli and Dick (2018), respectively. Examined specimens will be deposited in the National Museum of Natural Science (Taichung, Taiwan).

### Results and Discussion

Order Diptera Linnaeus [true flies]  
Parvorder Calyptratae Robineau-Desvoidy [calyptrate flies]  
Superfamily Hippoboscoidea Samouelle [hippoboscoid flies]  
Family Streblidae Kolenati

#### *Megastrebla parvior* (Maa, 1962) (Fig. 1)

**Material examined:** ex. *Rousettus amplexicaudatus* Geoffroy: 3 ♀♀, Alcoy, Cebu, 2015, local collector.

#### Family Nycteribiidae Samouelle *Cyclopodia horsfieldi* de Meijere 1899 (Fig. 2)

**Material examined:** ex. *Pteropus hypomelanus* Temminck: 1 ♂, 1 ♀, Alcoy, Cebu, 2015, local collector; On *Pteropus pumilus*: 2 ♂♂, Alcoy, Cebu, 2015, local collector.

稿件收到 Received: 12 November 2022

稿件接受 Accepted: 25 February 2023

稿件出版 Published: 25 March 2023

***Leptocyclopodia ferrarii mabuhai* Maa, 1975**

**Material examined:** ex. *Cynopterus luzoniensis* (Peters): 1♀, Alcoy, Cebu, 2015, local collector.

***Leptocyclopodia pilosipectus* Maa, 1966**

**Material examined:** ex. *Harpyionycteris whiteheadi* Thomas: 1♂, Alcoy, Cebu, 2015, local collector.

***Leptocyclopodia simulans* Theodor, 1959**

**Material examined:** ex. *Ptenochirus jagori* (Peters): 1♂, Alcoy, Cebu, 2015, local collector.

There were only four species of streblid and nycteribiid bat flies previously reported on Cebu Island. Maa (1971) reported *M. parvior* based on specimens collected on *Rousettus amplexicaudatus* from Minglanilla, central Cebu. Cuy (1980) provided the records of *Eucampsipoda inermis* and *L. simulans* of Cebu Island. Subsequently, Hastriter (2007) reported *Maabella stomalata* in Cebu from Minglanilla collected in 1962 from *R. amplexicaudatus*. The newly recorded streblid and nycteribiids with host records along with previously recorded species are summarized in table 1.

Despite these additional records, the bat fly fauna on Cebu Island is insufficiently studied. With deforestation and disruption of the environment, future surveys and exploration of the karst landscape is urgently needed. Furthermore, it is also worthy to examine the impact of these parasites on their hosts and the associated microbes that inhabit them.

Table 1. Checklist of bat flies recorded on Cebu Island.

Bat fly species	Host records in Cebu	References
<i>Cyclopodia horsfieldi</i> de Meijere	<i>Pteropus hypomelanus</i> ; <i>P. pumilus</i>	<b>*this study</b>
<i>Eucampsipoda inermis</i> Theodor	Unspecified on the list	Cuy 1980
<i>Leptocyclopodia ferrarii mabuhai</i> Maa	<i>Cynopterus luzoniensis</i>	<b>*this study</b>
<i>Leptocyclopodia pilosipectus</i> Maa	<i>Harpyionycteris whiteheadi</i>	<b>*this study</b>
<i>Leptocyclopodia simulans</i> Theodor	Unspecified on the list	Cuy 1980
<i>Maabella stomalata</i> Hastriter & Bush	<i>Rousettus amplexicaudatus</i>	Hastriter 2007
<i>Megastrebla parvior</i> (Maa)	<i>Rousettus amplexicaudatus</i>	Maa 1971; <b>*this study</b>



Figure 1. Habitus of female *Megastrebla parvior* (Maa, 1962) (dorsum).



Figure 2. Habitus of male(A) and female (B) *Cyclopodia horsfieldi* de Meijere, 1899 (ventrum).

#### Acknowledgments

The authors would like to thank Dr. Hui-Yun Tseng (National Taiwan University) for providing laboratory space and to the anonymous reviewers for comments and suggestions.

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## 菲律賓宿霧島上狐蝠的蝠蠅（雙翅目：蠅蠅總科）

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**摘要：**宿霧島上蝠蠅相的研究資料非常少，僅有寥寥數筆紀錄。本研究描述了宿霧及其他島上的蝠蠅和與之相關的狐蝠，如：*Cyclopodia horsfieldi* (ex. *Pteropus hypomelanus* & *P. pumilus*), *Leptocyclopodia ferrarii mabuhai* (ex. *Cynopterus luzoniensis*) 和 *Leptocyclopodia pilosipectus* (ex. *Harpyionycteris whiteheadi*)。本研究提供宿霧島的第一份蝠蠅名錄。

**關鍵詞：**翼手目、外寄生蟲、喀斯特、蛛蠅科、蝠蠅科