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First Report of the Bat Ectoparasite Fauna on Siargao Island, Philippines

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Abstract: We provide a preliminary account of the bat ectoparasite fauna of Siargao Island, Philippines. Three bat fly species are recorded in this study, representing the genera *Brachytarsina* Macquart, *Eucampsipoda* Kolenati, and *Megastrebla* Maa. There was no published work on Siargao Island bat flies before this study. Thus, this report represents the first published documentation of bat flies in Siargao Island, Philippines.

Keywords: bat flies, Chiroptera, Greater Mindanao faunal region, Hippoboscoidea

Introduction

Siargao is a small island situated in the southern Philippines and politically part of the Surigao del Norte province. This island is known for its large, intact mangrove forest and considered as one of the key conservation sites in the Philippines (Mallari et al. 2001). Geologically, Siargao Island is part of the Greater Mindanao faunal region, one of the Pleistocene island complexes in the Philippines, which also encompasses Basilan, Biliran, Bohol, Dinagat, Leyte, Maripipi, Mindanao, Samar, as well as smaller adjacent islands (Heaney 1986). Furthermore, Siargao Island is home to a variety of flora (Besitulo-Donoso 2016a, b) and fauna (duPont & Rabor 1973; Heaney & Rabor 1982; Villanueva 2011; Nuñeza & Galorio 2014, 2015; Tan et al. 2019; Calagui et al. 2022) including several Philippine endemic species such as Dinagat tarsier (Brown et al. 2014), Large Mindanao roundleaf bat (Amarga & Fernandez 2020), Mindanao flying dragon (Sanguila et al. 2016), Mindanao hawk owl (Rasmussen et al. 2012), and *Tylophora parviflora* (Apocynaceae) (Meve et al. 2002).

The bat fauna of Siargao Island is comprised of 15 species belonging to the 10 genera (Heaney et al. 2010; Nuñeza & Galorio 2014). The latest addition to this fauna is the documentation of *Hipposideros coronatus* (Peters) from Del Carmen Watershed (Amarga & Fernandez 2020). To date, no checklist concerning the bat ectoparasite fauna of Siargao Island has been published. This paper serves as the first published documentation of bat ectoparasites, especially bat flies, in Siargao Island, Philippines.

Materials and Methods

Specimens were examined using a stereomicroscope (Leica S9D) and identified by diagnostic characters provided by Jobling (1951) and Theodor (1963). Species names of bat flies follow Cuy (1980a, b), and host names follow Heaney et al. (2010). Taxa names higher than the species level follow the recommendation of Pape et al. (2011). Specimens will be deposited at the Entomological Collection of 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 [tsetse flies, louse flies, bat flies]

Family Hippoboscidae [louse flies and bat flies]

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***Brachytarsina amboinensis* (Rondani, 1878)**

Material examined: PHILIPPINES: 1♀, Siargao Island, ex. *Rhinolophus arcuatus*, 2019, *leg*. J Cantil.
This is a widespread species across the Oriental zoogeographic realm extending to Australasia (Maa 1971a). It has been reported in several countries, including India, Sri Lanka, Japan (in Ryukyus archipelago), Taiwan, Myanmar, Thailand, Malaysia, Indonesia, Philippines, extending to Australia and New Caledonia (Jobling 1951; Hiregaudar & Bal 1956; Maa 1967; Papp et al. 2006; Seneviratne et al. 2009; Kwak et al. 2022). This species is primarily associated with the genus *Miniopterus* (bent-winged bats) (Maa 1967), and it has been reported to occasionally parasitize some members of *Eonycteris*, *Hipposideros*, *Rhinolophus*, and *Rousettus* (Theodor 1973; Bhat et al. 1977; Cuy 1980a; Amarga et al. 2017).
Distribution in the Philippines: Luzon, Polillo, Marinduque, Tablas, Bohol, Mindanao (Jobling 1951; Cuy 1980a; Alvarez et al. 2016; Amarga et al. 2017; Amarga & Fornesa 2020; Amarga & Phelps 2021), Siargao (***new island record***).

***Eucampsipoda sundaica* (Theodor, 1955)**

Material examined: PHILIPPINES: 1♂, 1♀, Siargao Island, ex. *Eonycteris spelaea*, 2019, *leg*. J Cantil.
This species is widespread across the Oriental zoogeographic realm and has been reported to occur in India, Myanmar, Laos, Cambodia, Thailand, Malaysia, Indonesia, Borneo, and the Philippines (Theodor 1955, 1963, 1967). Recently, this species has been reported in China (in the China-Myanmar border of Yunnan province) (Feng et al. 2017). *Eucampsipoda sundaica* is primarily associated with Pteropodidae and is associated with *Eonycteris spelaea* and *Rousettus amplexicaudatus* in the Philippines.
Distribution in the Philippines: Luzon, Mindoro, Palawan, Leyte, Negros, Bohol, Mindanao (Cuy 1980b; Amarga & Phelps 2021), Siargao (***new island record***).

***Megastrebla parvior* (Maa, 1962)**

Material examined: PHILIPPINES: 1♀, Siargao Island, ex. *Eonycteris spelaea*, 2019, *leg*. J Cantil.
This species has been known to occur in India, Myanmar, Thailand, Malaysia, Borneo, Indonesia, and Philippines (Maa 1971b; Cuy 1980a; Moseley et al. 2012; Amarga et al. 2017). *Megastrebla parvior* is the sole representative of the genus *Megastrebla* in the Philippines and has been primarily associated with fruit bats (Pteropodidae). Maa (1971b) stated that the genus *Rousettus* is the primary host of *M. parvior* and *Eonycteris* is a secondary host. Thus, the presence of this species on insectivorous bat taxa can be noted as occasional or accidental records. Furthermore, in cavernicolous fruit bats such *E. spelaea* and *R. amplexicaudatus*, *M. parvior* has been reported to co-exist with the nycteribiid bat flies *Eucampsipoda* species.
Distribution in the Philippines: Luzon, Marinduque, Mindoro, Leyte, Negros, Cebu, Palawan, Balabac, Bohol, Mindanao, Samal (Maa 1971b; Cuy 1980a; Alvarez et al. 2016; Amarga et al. 2017; Amarga & Phelps 2021), Siargao (***new island record***).

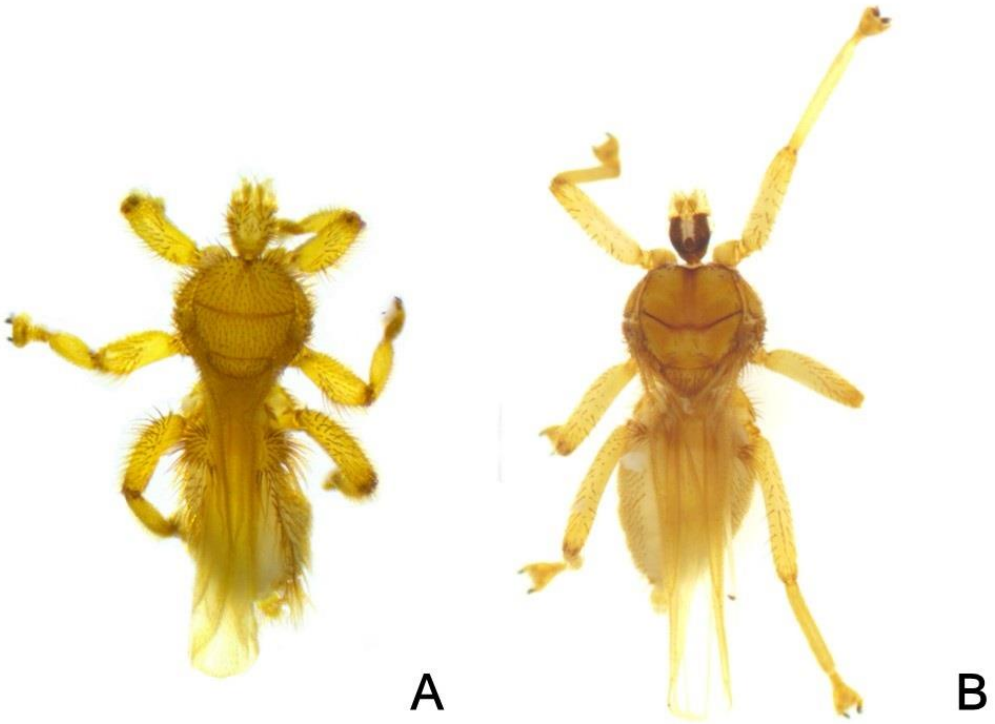

Figure 1. Representative bat fly fauna recorded from Siargao Island, Philippines: (A) *Brachytarsina amboinensis* (dorsal, ♀) and (B) *Megastrebla parvior* (dorsal, ♀).

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菲律賓錫亞高島蝙蝠體外寄生動物相的首次報導

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摘要：本研究提供菲律賓錫亞高島蝙蝠體外寄生蟲動物群的初步報告。研究共記錄三種蝠蠅，分別為蝙蝠蠅屬 (*Brachytarsina*) 、真蝙蝠蠅屬 (*Eucampsipoda*) 和巨蝙蝠蠅屬 (*Megastrebla*)。 目前尚無錫亞高島蝠蠅的正式紀錄，故本研究為錫亞高島蝠蠅的首次報導。

關鍵字：蝠蠅、翼手目、泛民答那峨動物區、蠅蠅總科