

A Checklist of Nycteribiid and Streblid Bat Flies (Diptera: Nycteribiidae and Streblidae) from Thailand with Thirteen New Records for the Country

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ABSTRACT.– The Nycteribiidae and Streblidae are known as two families of obligate blood sucking ectoparasites of bats. Recent data on nycteribiid and streblid bat flies collected from 15 provinces in Thailand during 2018–2020 are hereby presented with data from previous studies. This study recorded 26 species belonging to nine genera of Nycteribiidae and Streblidae known to be associated with 44 host bats species. Thirteen species of which, 11 nycteribiids and two streblids, are herein recorded from Thailand for the first time. Altogether with previously reported records, this paper lists a total of 59 known bat flies, 43 nycteribiids and 16 streblids, with their 63 associated host bat species.

KEY WORDS: bats; bat flies; Chiroptera; checklist; Nycteribiidae; Streblidae

INTRODUCTION

Bat flies (Nycteribiidae and Streblidae) have been known as blood-sucking ectoparasite of bats and some literatures presumably suggested that these flies can be transmitted severe diseases to animals. For example, dengue virus was detected simultaneously in streblid bat flies which were collected from *Desmodus rotundus* (E. Geoffroy) from Mexico, however this dengue virus has never been reported transmission from flies to human (Abundes-Gallegos et al., 2018). Globally, these bat ectoparasitic flies reported to account more than 515 species (276 of Nycteribiidae and 239 of Streblidae) (Graciolli and Dick, 2018; Dick and Graciolli, 2013). These two families, the tiny-sized members of the superfamily Hippoboscoidea, can be distinguished from each other by the possess of a spider-like

appearance in the family Nycteribiidae, absent of eyes in some genera (e.g., *Nycteribia*, *Phthiridium*, and some species of *Basilia*), and wingless; while the family Streblidae (such as *Brachytarsina*, *Megastrebla*, *Raymondia*) is rather hairy than the former family and having a pair of wings.

Despite bats have been extensively surveyed by several biologists in Southeast Asia and clearly considered one of the hotspots of bat diversity of the world (Kingston, 2010; Francis, 2019), in term of their ectoparasitic flies, however, very few studies have been published. Azhar et al. (2015) reported 15 species of bat flies were recorded from 24 species of hosts from Malaysia. In the Philippines, there are reports of bat ectoparasites from Mount Makiling, Luzon Island (Alvarez et al., 2015), Mindoro Island (Alvarez et al., 2016), Marinduque Island (Amarga et al., 2017), and most recently from Romblon Province (Amarga et al., 2020).

In Thailand, the most comprehensive one was published 46 years ago (Hill and McNeely, 1975). It reported a total of 46 species (32 species of Nycteribiidae and 14 species of Streblidae) collected throughout the country (Hill and McNeely, 1975). The most recent study was made in Sakaerat Biosphere Reserve, northeastern Thailand by Aroon et al. (2015) whose reported seven ectoparasites with five species of which are Nycteribiidae and Streblidae that associated with three bat species. However, the authors did not provide specific identification of these bat flies.

This paper seeks to compile an up-to-date checklist of bat flies of the country, as well as provide baseline information on distribution and bat flies and host association.

MATERIALS AND METHODS

This study was carried out between 2018 and 2020. Host bats were trapped by using hand nets in caves, mist nets and harp traps at various habitat types such as by waterfalls, over streams and nature trails in tropical-lowland forest and mixed deciduous forest in 15 provinces focusing in western and peninsular Thailand (Fig. 1). Bats were identified in the field with the aid of identification key of Francis (2019) and the classification followed Simmons and Cirranello (2020). Specimens of nycteribiid and streblid bat flies were gently picked out from bats furs using tweezers and further species identified following a combination of available identification keys (Theodor and Moscona, 1954; Theodor, 1967 for Nycteribiidae; Jobling, 1930, 1931, 1934, 1951; Maa, 1971 for Streblidae).

Specimens of bat flies were preserved with 70% ethanol in microtubes and deposited at the Princess Maha Chakri

Sirindhorn Natural History Museum (PSUNHM), Prince of Songkla University. Individuals of the same bat fly species from a single host are either preserved in a microtube referring to a single museum code, or multiple microtubes with multiple museum codes. External morphological features of bat flies were observed under stereomicroscope (Olympus-SZ40). For the male terminalia preparation, 10% KOH solution was adopted to clear all sclerotized structures of body part, and mounted with glycerin on glass slides.

RESULTS AND DISCUSSION

Twenty-six species belonging to nine genera of nycteribiid and streblid bat flies are found from 44 species of hosts collected during this study (Table 1). This result incorporated with those Streblidae and Nycteribiidae reported in Hill and McNeely (1975) increase the known bat flies in Thailand to 59 species (Table 1). Thirteen species of which have not been recorded before in Thailand are herein listed (Fig. 1; Table 1), together with the list of host bat species associated. Information of the new materials, localities, habitats, and the host species based on this study are given below.

SYSTEMATIC ACCOUNT

Order Diptera

Suborder Brachycera

Division Cyclorhapha

Superfamily Hippoboscoidea

Family Nycteribiidae Samouelle, 1819

Subfamily Cyclopodiinae Maa, 1965

Genus *Leptocyclopodia* Theodor, 1959 (Ferrari group)

Leptocyclopodia ferrarii (Rondani, 1878)

FIGURE 1. Provinces surveyed in this study (shaded in grey) and localities where species of new records were collected (see text for exact location). Dorsal views of new record species are also shown (not to scale).

TABLE 1. Species list of ectoparasitic bat flies and bat hosts from Thailand

Family	Subfamily	Bat flies	Host bats	Remarks
Nycteribiidae	Nycteribiinae	<i>Basilia</i> sp. (nr. <i>majuscula</i> Edw.) ^A	<i>Pipistrellus</i> sp. ^A	
		<i>Basilia</i> sp. (nr. <i>pudibunda</i>) ^A	<i>Pipistrellus</i> sp. ^A	
		<i>Basilia blainvillii amiculata</i> ^A	<i>Taphozous longimanus</i> ^A	
		<i>Basilia burmensis</i> ^A	<i>Scotophilus</i> sp. ^A	
			<i>Scotophilus heathii</i> ^A	
		<i>Basilia chlamydophora</i> ^A	<i>Scotophilus</i> sp. ^A	
		<i>Basilia (Conotibia) compar</i> ^B	<i>Kerivoula hardwickii</i> ^B	New record
		<i>Basilia hispida</i> ^B	<i>Tylonycteris malayana</i> ^B	New record
		<i>Basilia</i> cf. <i>magnocula</i> ^B	<i>Rhinolophus trifoliatus</i> ^B	New record
		<i>Basilia majuscula</i> ^A	<i>Pipistrellus</i> sp. ^A	
		<i>Basilia pudibunda</i> ^A	<i>Myotis</i> sp. ^A	
		<i>Basilia (Paracyclopodia) roylui roylui</i> ^B	<i>Scotophilus kuhlii</i> ^B	New record
		<i>Basilia (Tripselia) coronata coronata</i> ^B	<i>Glischropus tylopus</i> ^B	New record
		<i>Nycteribia</i> sp. ^B	<i>Myotis siligorensis</i> ^B	
		<i>Nycteribia</i> sp. ^A	<i>Pipistrellus javanicus</i> ^A	
		<i>Nycteribia allotopa</i> ^{AB}	<i>Miniopterus medius</i> ^A	
			<i>Miniopterus schreibersii</i> ^{A*}	*= <i>fuliginosus</i>
			<i>Miniopterus fuliginosus</i> ^B	
		<i>Nycteribia allotopoides</i> ^B	<i>Miniopterus magnater</i> ^B	New record
		<i>Nycteribia</i> cf. <i>latiterna</i> ^B	<i>Miniopterus magnater</i> ^B	New record
		<i>Nycteribia parvula</i> ^A	<i>Hipposideros larvatus</i> ^A	
			<i>Miniopterus medius</i> ^A	
			<i>Miniopterus schreibersii</i> ^{A*}	*= <i>fuliginosus</i>
		<i>Nycteribia parvuloides</i> ^{AB}	<i>Miniopterus fuliginosus</i> ^B	
			<i>Miniopterus</i> sp. ^A	
		<i>Phthiridium burmense siamense</i> ^A	<i>Hipposideros armiger</i> ^A	
			<i>Hipposideros larvatus</i> ^A	
		<i>Phthiridium caudatum</i> ^{AB}	<i>Rhinolophus pusillus</i> ^{AB}	
			<i>Rhinolophus refulgens</i> ^B	
			<i>Rhinolophus</i> sp. ^A	
		<i>Phthiridium</i> cf. <i>psiloterum</i> ^B	<i>Rhinolophus acuminatus</i> ^B	New record
		<i>Phthiridium chinense</i> ^A	<i>Rhinolophus pusillus</i> ^A	
		<i>Phthiridium euxestum</i> ^B	<i>Rhinolophus malayanus</i> ^B	New record
			<i>Hipposideros armiger</i> ^B	
			<i>Hipposideros diadema</i> ^B	
		<i>Phthiridium fraternum</i> ^{AB}	<i>Hipposideros bicolor</i> ^B	
			<i>Hipposideros cineraceus</i>	
			<i>Hipposideros diadema</i> ^B	
			<i>Hipposideros galeritus</i> ^A	
			<i>Hipposideros kunzi</i> ^B	
			<i>Hipposideros gentilis</i> ^B	
			<i>Hipposideros</i> cf. <i>gentilis</i> ^B	
			<i>Rhinolophus affinis</i> ^{AB}	
			<i>Rhinolophus coelophyllus</i> ^B	
			<i>Rhinolophus microglobosus</i> ^B	
			<i>Rhinolophus shameli</i> ^B	
			<i>Rhinolophus steno</i> ^B	
			<i>Rhinolophus</i> sp. ^A	
		<i>Phthiridium maximum</i> ^A	<i>Hipposideros armiger</i>	

TABLE 1. (Continue)

Family	Subfamily	Bat flies	Host bats	Remarks
		<i>Phthiridium ornatum</i> ^A	<i>Rhinolophus coelophyllus</i> ^A	New record
		<i>Phthiridium szechuanum</i> ^A	<i>Rhinolophus malayanus</i> ^A	
		<i>Phthiridium aff. szechuanum</i> ^B	<i>Rhinolophus robinsoni</i> ^B	
			<i>Rhinolophus malayanus</i> ^B	
		<i>Phthiridium sp.</i> ^A	<i>Rhinolophus macrotis</i> ^B	*=lylei ?
			<i>Hipposideros lylei</i> ^A	
			<i>Hipposideros pratti</i> ^{A*}	
			<i>Rhinolophus sp.</i> ^A	
			<i>Rhinolophus coelophyllus</i> ^A	*not found in Thailand
			<i>Rhinolophus malayanus</i> ^A	
			<i>Rhinolophus pearsoni</i> ^A	
			<i>Rhinolophus rex</i> ^{A*}	
			<i>Rhinolophus robinsoni</i> ^A	*= <i>Phthiridium sp. n.</i> ^A
		<i>Phthiridium sp.</i> ^{A*}	<i>Rhinolophus yunnanensis</i> ^A	
			<i>Rhinolophus affinis</i> ^A	
			<i>Rhinolophus coelophyllus</i>	
			<i>Rhinolophus rouxi</i> ^{A*}	*= <i>affinis</i> ?
		<i>Eucampsipoda inermis</i> ^A	<i>Cynopterus sphinx</i> ^A	
			<i>Eonycteris spelaea</i> ^A	
			<i>Rousettus leschenaulti</i> ^A	
		<i>Eucampsipoda latisternum</i> ^A	<i>Cynopterus sphinx</i> ^A	
			<i>Eonycteris spelaea</i> ^A	
			<i>Rousettus leschenaulti</i> ^A	
			<i>Taphozous melanopogon</i> ^A	
		<i>Eucampsipoda sundaica</i> ^{AB}	<i>Cynopterus sphinx</i> ^A	
			<i>Eonycteris spelaea</i> ^{AB}	
			<i>Hipposideros lekaguli</i> ^A	
			<i>Megaderma sp.</i> ^A	
			<i>Rousettus leschenaulti</i> ^A	*= <i>Leptocyclopodia sp. n.</i> ^A
			<i>Rhinolophus coelophyllus</i> ^A	
		<i>Leptocyclopodia sp.</i> ^{A*}	<i>Megaerops ecaudatus</i> ^A	
		<i>Leptocyclopodia ferrarii</i> ^B	<i>Cynopterus brachyotis</i> ^{AB}	
			<i>Cynopterus sphinx</i> ^{AB}	
			<i>Cynopterus cf. sphinx</i> ^{AB}	
			<i>Eonycteris spelaea</i> ^B	
			<i>Megaderma sp.</i> ^B	
			<i>Megaerops ecaudatus</i> ^B	
			<i>Megaerops niphanae</i> ^B	
			<i>Rousettus leschenaulti</i> ^B	
			<i>Megaerops ecaudatus</i> ^A	
		<i>Leptocyclopodia kuoi</i> ^A	<i>Cynopterus brachyotis</i> ^A	New record
		<i>Leptocyclopodia simulans</i> ^A	<i>Balionycteris maculata</i> ^B	
		<i>Leptocyclopodia obliqua</i> ^B	<i>Cynopterus sphinx</i> ^A	
		<i>Penicillidia actedona</i> ^{AB}	<i>Miniopterus magnater</i> ^B	
			<i>Miniopterus medius</i> ^A	
			<i>Miniopterus schreibersii</i> ^A	
		<i>Penicillidia acuminata</i> ^A	<i>Cynopterus sphinx</i> ^A	
			<i>Miniopterus medius</i> ^A	
			<i>Miniopterus schreibersii</i> ^{A*}	*= <i>fuliginosus</i>
		<i>Penicillidia sumatrensis</i> ^A	<i>Miniopterus sp.</i> ^A	

TABLE 1. (Continue)

Family	Subfamily	Bat flies	Host bats	Remarks
Streblidae	Brachytarsinae	<i>Penicillidia</i> sp. ^A	<i>Miniopterus</i> sp. ^A	
			<i>Miniopterus medius</i> ^A	
			<i>Miniopterus schreibersii</i> ^{A*}	*= <i>fuliginosus</i>
		<i>Ascodipteron</i> sp. n. ^{A*}	<i>Hipposideros larvatus</i> ^A	*= <i>Ascodipteron</i> sp. n. ^A
			<i>Miniopterus schreibersii</i> ^{A*}	*= <i>fuliginosus</i>
		<i>Brachytarsina</i> sp. ^A	<i>Aselliscus stoliczkanus</i> ^A	
			<i>Cynopterus brachyotis</i> ^A	
			<i>Hipposideros armiger</i> ^A	
			<i>Hipposideros bicolor</i> ^A	
			<i>Hipposideros diadema</i> ^A	
			<i>Hipposideros galeritus</i> ^A	
			<i>Hipposideros larvatus</i> ^A	
			<i>Hipposideros lylei</i> ^A	
			<i>Pipistrellus</i> sp. ^A	
			<i>Rhinolophus acuminatus</i> ^A	
			<i>Rhinolophus affinis</i> ^A	
			<i>Rhinolophus coelophyllus</i>	
			<i>Rhinolophus luctus</i> ^A	
			<i>Rhinolophus pearsoni</i>	
			<i>Rhinolophus pusillus</i> ^A	
			<i>Rousettus leschenaulti</i> ^A	
			<i>Taphozous melanopogon</i> ^A	
		<i>Brachytarsina</i> sp. ^{A*}	<i>Taphozous theobaldi</i> ^A	*= <i>Brachytarsina</i> sp. n. ^A
		<i>Brachytarsina amboinensis</i> ^A	<i>Cynopterus sphinx</i> ^A	
			<i>Miniopterus schreibersii</i> ^{A*}	*= <i>fuliginosus</i>
			<i>Pipistrellus javanicus</i> ^A	
		<i>Brachytarsina caudata</i> ^{AB}	<i>Aselliscus stoliczkanus</i> ^B	
			<i>Hipposideros bicolor</i> ^B	
			<i>Rhinolophus refulgens</i> ^B	
			<i>Taphozous melanopogon</i> ^A	
		<i>Brachytarsina cucullata</i> ^A	<i>Taphozous melanopogon</i> ^A	
			<i>Taphozous theobaldi</i> ^A	
		<i>Brachytarsina falcozi</i> ^A	<i>Rhinolophus malayanus</i> ^A	
		<i>Brachytarsina macrops</i> ^A	<i>Taphozous melanopogon</i> ^A	
			<i>Pipistrellus javanicus</i> ^A	
		<i>Brachytarsina modesta</i> ^{AB}	<i>Aselliscus stoliczkanus</i> ^B	
			<i>Rhinolophus accuminatus</i> ^B	
			<i>Rhinolophus afiinis</i> ^B	
			<i>Rhinolophus coelophyllus</i> ^B	
			<i>Rhinolophus malayanus</i> ^B	
			<i>Rhinolophus pusillus</i> ^B	
			<i>Rhinolophus refulgens</i> ^B	
			<i>Rhinolophus rouxi</i> ^{A*}	*= <i>affinis</i> ?
			<i>Rhinolophus shameli</i> ^B	
			<i>Rhinolophus</i> sp. ^A	
		<i>Brachytarsina</i> cf. <i>wernerii</i> ^B	<i>Hipposideros armiger</i> ^B	New record
			<i>Hipposideros</i> cf. <i>ceneraceus</i> ^B	
			<i>Hipposideros</i> cf. <i>gentilis</i> ^B	
			<i>Myotis siligorensis</i> ^B	
			<i>Rhinolophus robinsoni</i> ^B	

TABLE 1. (Continue)

Family	Subfamily	Bat flies	Host bats	Remarks
			<i>Rhinolophus pearsoni</i> ^B	
			<i>Rhinolophus steno</i> ^B	
			<i>Rhinolophus thomasi</i> ^B	
		<i>Brachyotheca lobulata</i> ^A	<i>Rousettus leschenaulti</i> ^A	
		<i>Megastrebla limbooliati</i> ^A	<i>Eonycteris spelaea</i> ^A	
			<i>Rousettus leschenaulti</i> ^A	
		<i>Megastrebla parvior</i> ^{AB}	<i>Cynopterus sphinx</i> ^A	
			<i>Cynopterus brachyotis</i> ^A	
			<i>Eonycteris spelaea</i> ^{AB}	
			<i>Rousettus leschenaulti</i> ^A	
		<i>Raymondia lobulata</i> ^B	<i>Lyroderma lyra</i> ^B	New record
		<i>Raymondia pagodarum</i> ^{AB}	<i>Hipposideros armiger</i> ^{AB}	
			<i>Hipposideros bicolor</i> ^{AB}	
			<i>Hipposideros cineraceus</i> ^B	
			<i>Hipposideros diadema</i> ^B	
			<i>Hipposideros galeritus</i> ^{AB}	
			<i>Hipposideros gentilis</i> ^B	
			<i>Hipposideros larvatus</i> ^{AB}	
			<i>Hipposideros lekaguli</i> ^{AB}	
			<i>Hipposideros lylei</i> ^A	
			<i>Hipposideros pendleburyi</i> ^B	
			<i>Hipposideros cf. pomona</i> ^{A*}	*= <i>gentilis</i> ?
			<i>Pipistrellus javanicus</i> ^A	
			<i>Rhinolophus accuminatus</i> ^{AB}	
			<i>Rhinolophus coelophyllus</i> ^A	
			<i>Aselliscus stoliczkanus</i> ^A	
			<i>Hipposideros lekaguli</i> ^B	
			<i>Hipposideros pendleburyi</i> ^B	
			<i>Kerivoula hardwickii</i> ^B	
			<i>Rhinolophus acuminatus</i> ^B	
			<i>Rhinolophus affinis</i> ^{AB}	
			<i>Rhinolophus coelophyllus</i> ^{AB}	
			<i>Rhinolophus malayanus</i> ^B	
			<i>Rhinolophus pusillus</i> ^{AB}	
			<i>Rhinolophus rex</i> ^{A*}	*= <i>paradoxolophus</i> ?
			<i>Rhinolophus steno</i> ^B	

^A = after Hill and McNeely (1975)^B = this study^{AB} = records from both Hill and McNeely (1975) and this study

Material examined: THAILAND: on *Cynopterus brachyotis* (Müller): 5♂♂, 2♀♀: Phang Nga Province, nature trail, Khuraburi District, Phra Thong island, 16.I.2019, PSUNHM DipNyc0106, 0109–0110, harp

trapped by A. Samoh and P. Soisook; 1♂: Phang Nga Province, Khuraburi, Phra Thong island, 17.I.2019, PSUNHM DipNyc0111, harp trapped by A. Samoh and P. Soisook; 1♂: Tak Province, Thung Yai Naresuan WS,

Umphang District, 28.XI.2018, PSUNHM DipNyc0113, harp trapped by P. Soisook; 1♂, 1♀: Songkhla Province, nature reserved area surrounded with rubber plantation and fruit orchards, Khao Long hill, Tha Kham, Hat Yai District, 27.VIII.2019, PSUNHM DipNyc0104–0105, harp trapped by A. Samoh and P. Soisook; 1♀: Phatthalung Province, Uthokkaram Cave, Si Nakharin District, 9.XI.2019, PSUNHM DipNyc0103, mist netted by A. Samoh and P. Soisook; 3♀♀: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew Waterfall, 4.I.2020, PSUNHM DipNyc0102, harp trapped by A. Samoh and P. Soisook. On *Cynopterus sphinx* (Vahl): 2♂♂, 1♀: Phang Nga Province, along nature trail, Khuraburi District, Phra Thong Island, 16.I.2019, PSUNHM DipNyc0107–0108, harp trapped by A. Samoh and P. Soisook; 4♂♂, 2♀♀: Tak Province, Thung Yai Naresuan WS, Umphang District, 28.XI.2018, PSUNHMDipNyc0115–0116, harp trapped by P. Soisook; 2♂♂, 1♀: Chiang Mai, Chiangdao, Khun Huay Mae Kok, 2.XII.2020, PSUNHM DipNyc0152, mist netted by A. Samoh and P. Soisook. On *Megaerops niphanae* Yenbutra and Felten: 1♂: Tak Province, Thung Yai Naresuan WS, Umphang District, 28.XI.2018, PSUNHM DipNyc0114, mist netted by P. Soisook.

Remarks: This bat fly species found mainly on fruit-eating bats (frugivorous bats). This agreed with a previous documented by Hill and McNeely (1975), they tell us that this parasitic fly species from Thailand known only to infest the host bats in the family Pteropodidae, namely, *Cynopterus brachyotis*, *C. sphinx angulatus* Miller, *Eonycteris spelaea* (Dobson), *Megaerops ecaudatus* (Temminck), and *Rousettus leschenaulti leschenaulti* (Desmarest), and were also found on *Megaderma* sp.

Host: *Cynopterus brachyotis*, *Cynopterus* cf. *sphinx*, *Cynopterus sphinx*, and *Megaerops niphanae*.

Geographical distribution: Phang Nga, Phatthalung, Songkhla, Tak, and Trang provinces.

(Obliqua group)

Leptocyclopodia obliqua Theodor, 1959

Material examined: THAILAND: on *Balionycteris maculata* (Thomas): 1♂, 2♀♀: Songkhla Province, waterfall, Na Thawi District, Khao Namkhang NP, Ton Lat Waterfall, 7.I.2020, PSUNHM DipNyc0153, mist netted by A. Samoh and P. Soisook.

Remarks: This is the first record for the country.

Host: *Balionycteris maculata*

Geographical distribution: Only found at Ton Lat Waterfall, Khao Namkhang National Park, Songkhla Province.

Genus *Eucampsipoda* Kolenati, 1857

***Eucampsipoda Kolenati* (1857):** 62. Type species: *Nycteribia hyrtlii* Kolenati (1856), by subsequent designation of Theodor (1955): 196; Theodor (1955): 196; Maa (1962): 426; Maa (1965): 380; Delfinado and Hardy (1977): 420.

Eucampsipoda sundaica Theodor, 1955

Material examined: THAILAND: on *Eonycteris spelaea*: 7♂♂, 4♀♀: Phang Nga Province, nature trail, Khuraburi District, Phra Thong Island, 16.I.2019, PSUNHM DipNyc0117–0121, mist netted by A. Samoh and P. Soisook.

Remarks: This bat ectoparasites used to sampled from several host bat species namely *Rousettus amplexicaudatus*, *R. leschenaultii*, and *Eonycteris spelaea* (Azhar et al., 2015). The present study we solely collected from the cave nectar bat (*E.*

spelaea) which is commonly found in peninsular Thailand.

Host: *Eonycteris spelaea*

Geographical distribution: Phang Nga Province.

Subfamily Nycteribiinae Westwood, 1835

Genus *Basilis* Miranda Ribeiro 1903

Basilis hispida Theodor, 1967

Material examined: THAILAND: on *Tylonycteris malayana* Chasen, 2♂♂, 15♀♀: Songkhla Province, Na Thawi District, Khao Namkhang NP, Ton Lat Waterfall, 7.I.2020, PSUNHM DipNyc0154, harp trapped by A. Samoh and P. Soisook.

Remarks: This is a new record for the country.

Host: *Tylonycteris malayana*.

Geographical distribution: Songkhla Province.

Basilis cf. *magnocula* (Schuermans Stekhoven, 1942)

Material examined: THAILAND: on *Rhinolophus trifolius* Temminck, 1♀: Songkhla Province, nature trail, Na Thawi District, Khao Namkhang NP, Ton Lat waterfall, 5.I.2020, PSUNHM DipNyc0155, harp trapped by A. Samoh and P. Soisook.

Remarks: New record for the country

Host: *Rhinolophus trifolius*.

Geographical distribution: Songkhla Province.

Basilis (Conotibia) compar Theodor, 1967

Material examined: THAILAND: on *Kerivoula hardwickii* (Horsfield), 1♂, 1♀: Prachuap Khiri Khan Province, Kaeng Krachan, Pa La-U Waterfall, 22.I.2020, PSUNHM DipNyc0146, mist netted by A. Samoh and P. Soisook.

Remarks: New record for the country

Host: *Kerivoula hardwickii*.

Geographical distribution: Prachuap Khiri Khan Province.

Basilis (Paracyclopodia) roylii roylii (Westwood, 1835)

Material examined: THAILAND: on *Scotophilus kuhlii* Leach, 9♂♂, 9♀♀: Phang Nga Province, Khuraburi, Phra Thong Island, 14.I.2019, PSUNHM DipNyc0122–0125, harp trapped by A. Samoh and P. Soisook.

Remarks: New record for the country.

Host: *Scotophilus kuhlii*.

Geographical distribution: Phang Nga Province.

Basilis (Tripselia) coronata coronata Theodor, 1967

Material examined: THAILAND: on *Glischropus tylopus* (Dobson), 2♂♂, 15♀♀: Songkhla Province, Na Thawi District, Khao Namkhang NP, Ton Lat Waterfall, 7.I.2020, PSUNHM DipNyc0156, harp trapped by A. Samoh and P. Soisook.

Remarks: This species can be barely found in Ton Lat Waterfall, Na Thawee, Songkhla Province, and this is a new record for Thailand.

Host: *Glischropus tylopus*.

Geographical distribution: Songkhla Province.

Genus *Nycteribia* Latreille, 1796

Nycteribia Latreille (1796): 76. Type species: *Nycteribia pedicularia* Latreille 1805, by designation under the Plenary powers of ICZN, Opinion 128: 493; Speiser (1901): 11; Maa (1962): 417; Maa (1965): 381; Delfinado and Hardy (1977): 427.

Listripoda Kolenati (1857): 62. Type species: *Listripoda blassi* Kolenati 1856, by subsequent designation of Coquillett (1910): 562.

Acrocholidia Kolenati (1857): 62. Type species: *Acrocholidia bechsteini* Kolenati 1857, by subsequent designation of Coquillett (1910): 502.

Nycteriphila Grulich and Povolny (1955): 116-128. Type species: *Nycteribia schimidlii* Schiner 1853, by original designation.

***Nycteribia allotopoides* Theodor, 1963**

Nycteribia allotopoides Theodor (1963): 157. Type: male, ex *Miniopterus* sp., Luangbay Cave, Sitio Tegato, Davao City, Mindanao, Philippines, in Field Museum of Natural History (Chicago); Maa (1965): 382; Delfinado and Hardy (1977): 427.

Material examined: THAILAND: on *Miniopterus magnater* Sanborn: 1♂, 1♀: Prachuap Khiri Khan Province, waterfall, Kaeng Krachan, Pa La-U Waterfall, 22.I.2020, PSUNHM DipNyc0132, mist netted by A. Samoh and P. Soisook.

Remarks: New record for the country

Host: *Miniopterus magnater*.

Geographical distribution: Prachuap Khiri Khan Province.

***Nycteribia cf. latiterna* Theodor, 1957**

Material examined: THAILAND: on *Miniopterus magnater*: 1♂, 1♀: Prachuap Khiri Khan Province, waterfall, Kaeng Krachan, Pa La-U Waterfall, 22.I.2020, PSUNHM DipNyc0150, mist netted by A. Samoh and P. Soisook.

Remarks: New record for the country

Host: *Miniopterus magnater*.

Geographical distribution: Prachuap Khiri Khan Province.

***Nycteribia parvuloides* Theodor, 1963**

Nycteribia parvuloides Theodor (1963): 162. Type: male, ex *Miniopterus* sp., Luangbay Cave, Sitio Tegato, Davao City, Mindanao, Philippines, in Field Museum of Natural History (Chicago); Maa (1965): 382; Delfinado and Hardy (1977): 427.

Material examined: THAILAND: on *Miniopterus fuliginosus* Hodgson: 4♂♂, 9♀♀: Satun Province, near entrance zone of Uraithong Cave, La-Ngu District, Kamphaeng, Uraithong Cave, 27.I.2020, PSUNHM DipNyc0126–0130, mist netted by A. Samoh and P. Soisook.

Remarks: It seems to be restricted to *Miniopterus*.

Host: *Miniopterus fuliginosus*.

Geographical distribution: Satun Province.

***Nycteribia allotopa* Speiser, 1901**

Material examined: THAILAND: on *Miniopterus fuliginosus*: 3♂♂, 4♀♀: Chiang Mai, Chiangdao, Pha Tang Na Lao, 4.XII.2020, PSUNHM DipNyc0157, mist netted by A. Samoh and P. Soisook.

Host: Only found on *Miniopterus fuliginosus*.

Geographical distribution: Chiang Mai Province.

***Nycteribia* sp.**

Material examined: THAILAND: on *Myotis siligorensis* (Horsfield): 1♂, 2♀♀: Phatthalung Province, Khao Chaison District, Chang Cave, 4.XI.2019, PSUNHM DipNyc0148–0149, mist netted by A. Samoh and P. Soisook.

Remarks: Potentially new species.

Host: The present study we found only on *M. siligorensis*.

Geographical distribution: Phatthalung Province.

Genus *Penicillidia* Kolenati, 1863

Megistropoda Kolenati (1857): 62

Penicillidia Kolenati (1863): 69. Type species: *Nycteribia dufourii* Westwood 1834, by subsequent designation of Speiser (1901): 32; Maa (1962): 422; Maa (1965): 379; Delfinado and Hardy (1977): 428.

***Penicillidia actedona* Theodor, 1967**

Material examined: THAILAND: on *Miniopterus fuliginosus* Bonaparte, 1♀: Satun Province, near entrance zone of Uraithong Cave, La-Ngu District, Kamphaeng, Uraithong Cave, 27.I.2020, PSUNHM DipNyc0100, mist netted by A.

Samoh and P. Soisook; 1♂: Chiang Mai, Chiangdao, Pha Tang Na Lao, 4.XII.2020. PSUNHM DipNyc0158, harp trapped by A. Samoh and P. Soisook; on *Miniopterus magnater* Sanborn: 3♂♂, 2♀♀: Prachuap Khiri Khan Province, waterfall, Kaeng Krachan, Pa La-U Waterfall, 22.I.2020, PSUNHM DipNyc0101, mist netted by A. Samoh and P. Soisook; 1♀: Chiang Mai, Chiangdao, Khun Huay Mae Kok, 2.XII.2020. PSUNHM DipNyc0159, harp trapped by A. Samoh and P. Soisook; 1♀: Pha Tang Na Lao, 2.XII.2020. PSUNHM DipNyc0160, harp trapped by A. Samoh and P. Soisook.

Remarks: This species seems to be restricted to *Miniopterus*.

Host: *Miniopterus fuliginosus* and *Miniopterus magnater*.

Geographical distribution: Chiang Mai, Satun, Prachuap Khiri Khan Province.

Genus *Phthiridium* Hermann, 1804

Phthiridium Hermann (1904): 12. Type species: *Phthiridium biarticulatum* Hermann 1804, by subsequent designation of Coquillett (1910): 590; Maa (1965): 381; Delfinado and Hardy (1977): 429.

***Phthiridium caudatum* (Theodor, 1967)**

Material examined: THAILAND: on *Rhinolophus pusillus* Temminck: 2♀♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipNyc0072 – 0073, harp trapped by A. Samoh and P. Soisook; 1♀: Ubon Ratchathani Province, Khong Chiam District, Pha Taem NP, 4.V.2019, PSUNHM DipNyc0161, harp trapped by A. Samoh and P. Soisook; 3♂♂, 3♀♀: Ubon Ratchathani Province, Khong Chiam District, Pha Taem NP, 5.V.2019, PSUNHM DipNyc0162, harp trapped by A. Samoh and P. Soisook; 1♀: Chiang Mai Province, Pha

Tang Na Lao, 4.XII.2020, PSUNHM DipNyc0163, harp trapped by A. Samoh and P. Soisook. On *R. refulgens* Andersen: 2♂♂, 1♀: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew Waterfall, 2.I.2020, PSUNHM DipNyc0076, 0080, harp trapped by A. Samoh and P. Soisook; 3♂♂, 1♀: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew Waterfall, 3.I.2020, PSUNHM DipNyc0077–0079, harp trapped by A. Samoh and P. Soisook; 2♂♂: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew Waterfall, 4.I.2020, PSUNHM DipNyc0081, harp trapped by A. Samoh and P. Soisook; 2♂♂, 9♀♀: Songkhla Province, Hat Yai District, Khuan Khao Wang Forest Park, 4.II.2019, PSUNHM DipNyc0069–0071, harp trapped by A. Samoh and P. Soisook; 1♂, 1♀: Sadao District, Khao Le, 26.VIII.2019, PSUNHM DipNyc0068, harp trapped by A. Samoh and P. Soisook; 2♂♂, 1♀: Sabayoi District, Than Khiri nature reserved area, 9.IV.2018, PSUNHM DipNyc0067, harp trapped by A. Samoh and P. Soisook; 1♀: Surat Thani Province, nature trail, Ban Ta Khun District, Rajjaprabha dam, 25.VI.2019, PSUNHM DipNyc0164, harp trapped by A. Samoh and P. Soisook.

Remarks: This is one of the most common bat flies occurred in Thailand.

Host: *Rhinolophus pusillus*, *R. refulgens*.

Geographical distribution: Phetchaburi, Ubon Ratchathani, Trang, Songkhla, and Surat Thani provinces.

***Phthiridium euxestum* (Speiser, 1901)**

Material examined: THAILAND: on *Hipposideros armiger* (Hodgson): 1♂, 1♀: Phatthalung Province, limestone cave in monastery, Si Nakharin District, Sumano Cave, 25.XI.2018, PSUNHM DipNyc0083, mist netted by A. Samoh and P. Soisook. On

H. diadema (E. Geoffroy): 1♂: Phatthalung Province, Si Nakharin District, Sumano Cave, 27.X.2018, PSUNHM DipNyc0082, mist netted by A. Samoh and P. Soisook. On *H. larvatus* (Horsfield): 1♂, 1♀: Trang Province, limestone cave, Huai Yod District, Khuan Miang-Tham Rad, 21.XII.2019. PSUNHM DipNyc0086, harp trapped by A. Samoh and P. Soisook; on *R. malayanus* Bonhote, 1♂: Ubon Ratchathani Province, Khong Chiam District, Pha Taem NP, 5.V.2019, PSUNHM DipNyc0084, harp trapped by A. Samoh and P. Soisook.

Remark: New record for the country.

Host: *Hipposideros armiger*, *H. diadema*, *H. larvatus*, and *Rhinolophus malayanus*.

Geographical distribution: Phatthalung, Trang (Banthad Mountain Range, peninsular Thailand), and Ubon Ratchathani (northeastern part of Thailand).

***Phthiridium fraternum* (Theodor, 1967)**

Material examined: THAILAND: On *Hipposideros bicolor* Temminck, 2♂♂: Narathiwat Province, Tropical lowland forest, Waeng District, Hala-Bala WS, 24.VI.2019, PSUNHM DipNyc0026, 0043, harp trapped by A. Samoh and P. Soisook; 1♂, 1♀: Songkhla Province, Tropical lowland forest with fast running waterfall, Na Thawee District, Khao Namkhang NP, Ton Lat Waterfall, 8.I.2020, PSUNHM DipNyc0027, mist netted by A. Samoh and P. Soisook. on *H. cineraceus* Blyth, 1♂: Trang province, nature trails, Na Yong District, Ton Pliew Waterfall, 2.I.2020, PSUNHM DipNyc0061, harp trapped by A. Samoh and P. Soisook; 1♂: Songkhla Province, Sabayoi District, Than Khiri nature reserved area, 9.IV.2018, PSUNHM DipNyc0015, harp trapped by A. Samoh and P. Soisook; 2♂♂: Songkhla Province, Hat Yai District, Khuan Khao Wang Forest Park, 4.II.2019, PSUNHM DipNyc0029,

harp trapped by A. Samoh and P. Soisook. On *H. kunzi* Murray, Khan, Kingston, Zubaid & Campbell, 8♂♂, 2♀♀: Trang Province, nature trails, Na Yong District, Ton Pliew Waterfall, 2.I.2020, PSUNHM DipNyc0011, 0024, 0028, 0035, 0037–0039, harp trapped by A. Samoh and P. Soisook. On *H. gentilis* Andersen, 1♂: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang camp, 20.I.2020, PSUNHM DipNyc0165, harp trapped by A. Samoh and P. Soisook. On *H. cf. gentilis*, 1♂: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang camp, 20.I.2020, PSUNHM DipNyc0166, harp trapped by A. Samoh and P. Soisook. On *Rhinolophus shameli* Tate, 1♀: Ubon Ratchathani Province, Pha Taem NP., 4.V.2019, PSUNHM DipNyc0056, harp trapped by P. Soisook. On *Rhinolophus coelophyllus* Peters, 2♂♂, 1♀: Satun Province, near entrance zone of Uraithong Cave, La-Ngu District, Kamphaeng, Uraithong Cave, 27.I.2020, PSUNHM DipNyc0042, mist netted by A. Samoh and P. Soisook; 1♂: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew Waterfall, 4.I.2020, PSUNHM DipNyc0048, harp trapped by A. Samoh and P. Soisook. On *R. microglobosus* Csorba & Jenkins, 1♂, 1♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipNyc0051, harp trapped by A. Samoh and P. Soisook.

Remarks: This is one of the most common bat flies occurred in Thailand. It can be found on several species of host bats especially in the genus *Rhinolophus* and *Hipposideros* (at least 13 species of hosts observed – Table 1).

Host: *Hipposideros bicolor*, *H. cineraceus*, *H. diadema*, *H. kunzi*, *H. gentilis*, *H. cf. gentilis*, *Rhinolophus affinis*, *R.*

coelophyllus, *R. microglobosus*, *R. shameli*, *R. sthenos*.

Geographical distribution: Narathiwat, Satun, Songkhla, Trang and Phetchaburi provinces.

***Phthiridium* cf. *psiloterum* Theodor, 1967**

Material examined: THAILAND: on *Rhinolophus acuminatus* Peters, 3♂♂, 3♀♀: Narathiwat Province, Tropical lowland forest, Waeng District, Hala-Bala WS, 24.VI.2019, PSUNHM DipNyc0094–0099, harp trapped by A. Samoh and P. Soisook; 3♀♀: Songkhla Province, nature trails, Hat Yai, Prince of Songkla University, Kho Hong hill, 10.III.2018, PSUNHM DipNyc0088–0089, harp trapped by A. Samoh and P. Soisook; 3♂♂, 4♀♀: Phang Nga Province, Khuraburi, Phra Thong island, 15.I.2019, PSUNHM DipNyc0090–0092, harp trapped by A. Samoh and P. Soisook; 1♂, 1♀: Prachuap Khiri Khan Province, waterfall, Kaeng Krachan, Pa La-U Waterfall, 22.I.2020, PSUNHM DipNyc0093, harp trapped by A. Samoh and P. Soisook.

Remarks: New record for the country and it is exclusively found on *Rhinolophus acuminatus*.

Host: *Rhinolophus acuminatus*.

Geographical distribution: Narathiwat, Phang Nga, and Prachuap Khiri Khan provinces.

***Phthiridium* aff. *szechuanum* (Theodor, 1954)**

Material examined: THAILAND: on *Rhinolophus robinsoni* Andersen: 1♀: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew Waterfall, 4.I.2020, PSUNHM DipNyc0002, harp trapped by A. Samoh and P. Soisook. On *R. malayanus*: 1♂: Tak Province, Thung Yai Naresuan WS, Umphang District, 28.XI.2018, PSUNHM DipNyc0003, harp trapped by P. Soisook.

On *R. macrotis* Blyth: 1♂: Kanchanaburi, Thung Yai Naresuan WS, 19.I.2020, PSUNHM DipNyc0167, harp trapped by wildlife sanctuary staff.

Remarks: this may prove to be distinct species.

Host: *Rhinolophus robinsoni*, *R. malayanus* and *R. macrotis*.

Geographical distribution: Trang and Tak provinces.

Order Diptera

Suborder Brachycera

Division Cyclorrhapha

Superfamily Hippoboscoidea

Family Streblidae Kolenati 1863

Subfamily Brachytarsinae Speiser 1900

Genus *Brachytarsina* Macquart 1851

Brachytarsina Macquart (1851): 280.

Nycteribosca Speiser (1900): 48.

Type species: *Brachytarsina flavipennis* Macquart 1851.

***Brachytarsina caudata* (Jobling, 1934)**

Material examined: THAILAND: on *Rhinolophus refulgens*, 1♂: Songkhla Province, nature trail, Na Thawi District, Khao Namkhang NP, Ton Lat Waterfall, 5.I.2020, PSUNHM DipStreb0116, harp trapped by A. Samoh and P. Soisook; on *Aselliscus stoliczkanus* (Dobson), 1♀: Tak Province, Thung Yai Naresuan WS, Umphang District, 28.XI.2018, PSUNHM DipStreb0117, harp trapped by P. Soisook; on *Hipposideros bicolor*, 1♀: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew Waterfall, 4.I.2020, PSUNHM DipStreb-0118, harp trapped by A. Samoh and P. Soisook.

Remarks: New host records.

Host: *Aselliscus stoliczkanus*, *Hipposideros bicolor* and *Rhinolophus refulgens*.

Geographic distribution: Songkhla and Trang provinces (peninsular Thailand), and Tak Province.

***Brachytarsina cf. modesta* (Jobling, 1934)**

Material examined: THAILAND: on *Aselliscus stoliczkanus*, 1♂, 1♀: Tak Province, Thung Yai Naresuan WS, Umphang District, 28.XI.2018, PSUNHM DipStreb0119, harp trapped by P. Soisook. On *Rhinolophus accuminatus* Peters, 2♂♂, 4♀♀: Narathiwat Province, tropical lowland forest, Waeng District, Hala-Bala WS, 24.VI.2019, PSUNHM DipStreb0120, harp trapped by A. Samoh and P. Soisook; 2♂♂, 3♀♀: Songkhla Province, nature trails, Hat Yai, Prince of Songkla University, Kho Hong hill, 28.VIII.2019, PSUNHM DipStreb0121, harp trapped by A. Samoh and P. Soisook; 1♀: Phang Nga Province, nature trail, Khuraburi District, Phra Thong island, 17.I.2019, PSUNHM DipStreb0122, mist netted by A. Samoh. On *R. refulgens*, 1♂, 1♀: Songkhla Province, nature trail, Na Thawi District, Khao Namkhang NP, Ton Lat waterfall, 7.I.2020, PSUNHM DipStreb0123, harp trapped by A. Samoh and P. Soisook; On *R. coelophyllus*, 2♂♂, 2♀♀: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew waterfall, 2.I.2020, PSUNHM DipStreb0124, harp trapped by A. Samoh and P. Soisook; 2♂♂, 2♀♀: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew waterfall, 4.I.2020, PSUNHM DipStreb0125, harp trapped by A. Samoh and P. Soisook. On *R. malayanus*, 1♂: Surat Thani Province, nature trail, Ban Ta Khun District, Rajjaprabha dam, 25.VI.2019, PSUNHM DipStreb0126, harp trapped by A. Samoh and P. Soisook; 1♀: Surat Thani Province, nature trail, Ban Ta Khun District, Rajjaprabha dam, 26.VI.2019, PSUNHM DipStreb0127, harp

trapped by A. Samoh and P. Soisook; 1♂, 1♀: Tak Province, Thung Yai Naresuan WS, Umphang District, 28.XI.2018, PSUNHM DipStreb0128, harp trapped by P. Soisook. On *R. pusillus*, 1♂: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0129, harp trapped by A. Samoh and P. Soisook.

Remarks: This parasitic bat-flies species seemed to be restricted to rhinolophid bats

Host: *Aselliscus stoliczkanus*, *Rhinolophus accuminatus*, *R. affinis* Horsfield, *R. coelophyllus*, *R. malayanus*, *R. pusillus*, *R. refulgens*, and *R. shameli* Tate.

Geographic distribution: Tak and Phetchaburi provinces (western Thailand), Narathiwat, Phang Nga, Songkhla, Surat Thani, and Trang provinces (peninsular Thailand).

***Brachytarsina cf. wernerii* Jobling, 1951**

Nycteribosca wernerii Jobling (1951): 238. Type: on *Hipposideros diadema griseus* (Meyen), Central Cave, Cotabato City, Mindanao, Philippines, in Field Museum of Natural History (Chicago); Maa (1962): 434.

Brachytarsina wernerii Maa (1965): 383; Delfinado and Hardy (1977): 434.

Material examined: THAILAND: On *R. stheno* Andersen, 21♂♂, 17♀♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0130–0133, harp trapped by A. Samoh and P. Soisook; 2♂♂, 1♀: Prachuap Khiri Khan Province, waterfall, Kaeng Krachan, Pa La-U waterfall, 22.I.2020, PSUNHM DipStreb0134, mist netted by A. Samoh and P. Soisook. On *R. thomasi* Andersen, 1♂, 1♀: Tak Province, Thung Yai Naresuan WS, Umphang District, 28.XI.2018, PSUNHM DipStreb0135, harp trapped by P.

Soisook. On *R. robinsoni*, 4♂♂, 1♀: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew waterfall, 4.I.2020, PSUNHM DipStreb0136, harp trapped by A. Samoh and P. Soisook; 1♀: Narathiwat Province, Tropical lowland forest, Waeng District, Hala-Bala WS, 24.VI.2019, PSUNHM DipStreb0137, harp trapped by A. Samoh and P. Soisook. On *R. pearsoni* Horsfield, 1♂: Tak Province, Thung Yai Naresuan WS, Umphang District, 28.XI.2018, PSUNHM DipStreb0138, harp trapped by P. Soisook. On *M. siligorensis*, 1♂, 11♀♀: Ratchaburi Province, limestone cave and very humid, Chom Bueng District, Chomphon Cave, 22.I.2019, PSUNHM DipStreb0139, mist netted by A. Samoh and P. Soisook; 1♂, 1♀: Ratchaburi Province, limestone cave and very humid, Chom Bueng District, Chomphon Cave, 3.VIII.2019, PSUNHM DipStreb0140, mist netted by A. Samoh and P. Soisook. On *H. armiger*, 1♂: Phatthalung Province, Khao Chaison District, Chang Cave, 4.XI.2019, PSUNHM DipStreb0142, mist netted by A. Samoh and P. Soisook. On *H. cf. gentilis*, 2♀♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0143, harp trapped by A. Samoh and P. Soisook. On *H. cf. cineraceus*, 1♂: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0144, harp trapped by A. Samoh and P. Soisook.

Remarks: Similar to *Brachytarsina cf. modesta* but larger, with femora thinner and less setose. Nevertheless, future taxonomic investigation with aid of genetic data is recommended. This is a new record from Thailand.

Host: *Hipposideros armiger*, *H. cf. cineraceus*, *H. cf. gentilis*, *Rhinolophus*

robinsoni, *R. pearsoni*, *R. stheno*, *R. thomasi*, *Myotis siligorensis*.

Geographic distribution: Phatthalung, Phetchaburi, Prachuap Khiri Khan, Ratchaburi and Tak provinces.

Genus *Megastrebla* Maa, 1971

Megastrebla Maa (1971): 230. Type species: *Nycteribosca nigriceps* Jobling (1934), by original designation. Delfinado and Hardy (1977): 434.

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

Nycteribosca gigantea Speiser (1900): 31–70. Type: on *Dobsonia peroni* (Geoffroy), Bismarck Archipelago, in Natural History Museum Giacomo Doria (Genoa); Ferris (1924): 73, pro parte; Jobling (1951): 230.

Nycteribosca parvior Maa (1962): 433. Type: on *Eonycteris spelaea* Dobson, Batu Caves, Selangor, Malaysia, in Bernice Pauahi Bishop Museum (Honolulu).

Brachytarsina parvior Maa (1965): 383.

Megastrebla parvior Maa (1971): 222; Delfinado and Hardy (1977): 434.

Material examined: THAILAND: on *Eonycteris spelaea*, 1♂, 1♀: Phang Nga Province, nature trail, Khuraburi District, Phra Thong Island, 16.I.2019, PSUNHM DipStreb0145, mist netted by A. Samoh and P. Soisook.

Remarks: This species is considered as one of the large in body size and the present study we sampled entirely from two females of fruit eating bat from Phra Thong Island located in Phang Nga Province.

Host: *Eonycteris spelaea*.

Geographic distribution: Phang Nga Province.

Genus *Raymondia* Frauenfeld, 1856

Raymondia Frauenfeld (1856): 323–328. Type: *Raymondia huberi* 1855, by subsequent designation of Speiser (1900): 49; Jobling (1930): 283; Jobling (1951): 228;

Maa (1962): 435; Maa (1965): 384; delfinado and Hardy (1977): 434.

***Raymondia lobulata* Speiser, 1900**

Material examined: THAILAND: on *Lyroderma lyra* (E. Geoffroy), 5♂♂, 5♀♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0010–0011, harp trapped by A. Samoh and P. Soisook.

Remarks: This species is solely collected from Phetchaburi Province, western part of Thailand (above isthmus of Kra), and it seems to be specific to a single species of host bat is *Lyroderma lyra*.

Host: *Lyroderma lyra*.

Geographical distribution: Phetchaburi Province.

***Raymondia pagodarum* Speiser, 1900**

Material examined: THAILAND: on *Hipposideros armiger*, 1♀: Phatthalung Province, limestone cave in monastery, Si Nakharin District, Sumano Cave, 10.XI.2019, PSUNHM DipStreb0032, mist netted by A. Samoh and P. Soisook; 10♂♂, 8♀♀: Trang Province, limestone cave, Huai Yod District, Janglon Cave, Khuan Miang-Tham Rad, 21.XII.2019, PSUNHM DipStreb0033–0034, harp trapped by A. Samoh and P. Soisook; 2♂♂, 3♀♀: Ratchaburi Province, limestone cave and very humid, Chom Bueng District, Chomphon Cave, 22.I.2019, PSUNHM DipStreb0035, mist netted by A. Samoh and P. Soisook. On *H. bicolor*, 1♂, 6♀♀: Chumphon Province, Sawee District, Khao Khram, 23.XII.2017, PSUNHM DipStreb0036–0037, mist netted by A. Samoh and P. Soisook. On *H. cineraceus*, 3♂♂, 1♀: Songkhla Province, Sabayoi District, Than Khiri nature reserved area, 9.IV.2018, PSUNHM DipStreb0063, 0069, harp trapped by A. Samoh and P. Soisook;

13♂♂, 4♀♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0061–0062, harp trapped by A. Samoh and P. Soisook. On *H. diadema*, 3♂♂, 1♀: Songkhla Province, Sadao District, Khao Le, 26.VIII.2019, PSUNHM DipStreb0025, harp trapped by A. Samoh and P. Soisook. On *H. galeritus* Cantor, 1♀: Narathiwat Province, tropical lowland forest, Waeng District, Hala-Bala WS, 24.VI.2019, PSUNHM DipStreb0026, harp trapped by A. Samoh and P. Soisook. On *H. gentilis*, 1♂: Ratchaburi Province, Mueang District, Khao Bin Cave, 3.VIII.2019, PSUNHM DipStreb0014, mist netted by A. Samoh and P. Soisook. On *H. larvatus*, 1♂: Songkhla Province, nature trail, Na Thawi District, Khao Namkhang NP, Ton Lat Waterfall, 5.I.2020, PSUNHM DipStreb0016, harp trapped by A. Samoh and P. Soisook; 2♂♂: Hat Yai District, Tha Kham, Khao Long hill, 14.XII.2018, PSUNHM DipStreb0015, harp trapped by A. Samoh and P. Soisook; 1♂, 2♀♀: Chumphon Province, Sawee District, Khao Khram, 23.XII.2017, PSUNHM DipStreb0017, mist netted by A. Samoh and P. Soisook. On *H. lekaguli* Thonglongya & Hill, 29♂♂, 23♀♀: Ratchaburi Province, limestone cave and very humid, Chom Bueng District, Chomphon Cave, 22.I.2019, PSUNHMDipStreb0019–0024, mist netted by A. Samoh and P. Soisook. On *H. pendleburyi* Chasen, 1♀: Trang Province, limestone cave, Huai Yod District, Khuan Miang-Tham Rad, 21.XII.2019, PSUNHM DipStreb0018, harp trapped by A. Samoh and P. Soisook. On *H. gentilis*, 3♂♂, 3♀♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0059, harp trapped by A. Samoh and P. Soisook. On *H. cf. gentilis*, 31♂♂, 28♀♀: Phetchaburi

Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0039, 0041–0058, harp trapped by A. Samoh and P. Soisook. On *Rhinolophus acuminatus*, 3♂♂, 2♀♀: Narathiwat Province, tropical lowland forest, Waeng District, Hala-Bala WS, 24.VI.2019, PSUNHM DipStreb0079–0083, harp trapped by A. Samoh and P. Soisook; 1♂, 3♀♀: Hat Yai District, Tha Kham, Khao Long hill, 27.VIII.2019, PSUNHM DipStreb0073–0074, harp trapped by A. Samoh and P. Soisook; 1♀: Songkhla Province, nature trails, Hat Yai, Prince of Songkla University, Kho Hong hill, 10.III.2018, PSUNHM DipStreb0075, harp trapped by A. Samoh and P. Soisook.

Host: *Hipposideros armiger*, *H. bicolor*, *H. cineraceus*, *H. diadema*, *H. galeritus*, *H. gentilis*, *H. larvatus*, *H. lekaguli*, *H. pendleburyi*, *H. gentilis*, *H. cf. gentilis*, and *Rhinolophus acuminatus*.

Geographical distribution: Phatthalung, Trang, Ratchaburi, Chumphon, Songkhla, Phetchaburi, and Narathiwat.

***Raymondia pseudopagodarum* Jobling, 1951**

Raymondia pseudopagodarum Jobling (1951): 241. Type: on *Rhinolophus* sp., Cantor, Sitio Tegato, Davao City, Mindanao, Philippines; Maa (1962): 435; Maa (1965): 384; Delfinado and Hardy (1977): 434.

Material examined: THAILAND: on *Hipposideros pendleburyi*, 1♀: Phatthalung Province, limestone cave in monastery, Si Nakharin District, Sumano Cave, 25.XI.2018, PSUNHM DipStreb0006, mist netted by A. Samoh and P. Soisook. On *Kerivoula hardwickii*, 1♀: Prachuap Khiri Khan Province, waterfall, Kaeng Krachan, Pa La-U Waterfall, 22.I.2020, PSUNHM DipStreb0012, mist netted by A. Samoh and

P. Soisook. On *Rhinolophus affinis*, 1♂: Narathiwat Province, Tropical lowland forest, Waeng District, Hala-Bala WS, 21.VI.2019, PSUNHM DipStreb0002, harp trapped by A. Samoh and P. Soisook; 1♂: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0008, harp trapped by A. Samoh and P. Soisook. On *R. cf. affinis*, 1♂, 2♀♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0001, harp trapped by A. Samoh and P. Soisook. On *R. coelophyllus*, 4♂♂, 2♀♀: Trang Province, nature trails and running waterfall, Na Yong District, Ton Pliew Waterfall, 4.I.2020, PSUNHM DipStreb0098–0100, harp trapped by A. Samoh and P. Soisook; 1♂: Chiang Mai Province, Chiangdao, Pha Tang Na Lao, 4.XII.2020, PSUNHM DipStreb0146, harp trapped by A. Samoh and P. Soisook. On *R. malayanus*, 1♂, 2♀♀: Surat Thani Province, nature trail, Ban Ta Khun District, Rajjaprabha dam, 25.VI.2019, PSUNHM DipStreb0101, 0106, harp trapped by A. Samoh and P. Soisook; 1♂, 2♀♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHMDipStreb0102, 0108–0109, harp trapped by A. Samoh and P. Soisook. On *R. pusillus*, 4♂♂, 1♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0086–0089, 0115, harp trapped by A. Samoh and P. Soisook; 2♂♂, 2♀♀: Tak Province, Thung Yai Naresuan WS, Umphang District, 28.XI.2018, PSUNHM DipStreb0113–0114, harp trapped by P. Soisook. On *R. stheno*, 1♂, 2♀♀: Phetchaburi Province, nature trails, Kaeng Krachan District, Ban Krang Camp, 20.I.2020, PSUNHM DipStreb0003, harp trapped by A. Samoh and P. Soisook.

Host: *Hipposideros pendleburyi*, *Kerivoula hardwickii*, *Rhinolophus affinis*, *R. cf. affinis*, *R. coelophyllus*, *R. malayanus*, *R. pusillus*, *R. stheno*.

Geographical distribution: Phatthalung, Prachuap Khiri Khan, Narathiwat, Phetchaburi, Trang, Surat Thani, and Tak.

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