

# Search for the blind vampire: First record of *Eoctenes* Kirkaldy in Southern Luzon, (Hemiptera: Polyctenidae), with key to the Cimicoidea, ectoparasitic on bats in the Philippines

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## Abstract

Polyctenidae Westwood, also known as bat bugs, is a haematophagous group of hemipterans exclusively ectoparasitic on bats and is closely related to Cimicidae Latreille. These bugs are dorsoventrally flattened with conspicuous ctenidia, apterous, anophthalmus, possess well-developed legs, and reproduce via pseudoplacental viviparity. They are rare compared to other insect taxa ectoparasitic on bats as evinced by a relatively small number of museum collections and described taxa. Worldwide, it is represented by 2 subfamilies, 5 genera, and 32 species. In the Philippines, it is only represented by two species from the genus *Eoctenes* Kirkaldy: *E. spasmae* (Waterhouse) and *E. intermedius* (Speiser). The first Philippine record for the genus was reported in 1961 from Northern Luzon. This paper presents the first record of *Eoctenes* in Southern Luzon, with key to the Cimicoidea ectoparasitic on bats in the Philippines.

**Keywords:** *Cimicoidea*, *Eoctenes*, *new record*, *Polyctenidae*, *Southern Luzon*.

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## Introduction

A fraction of species from Cimicoidea (Hemiptera: Cimicomorpha) are known to be sanguivorous in nature (Ryckman *et al.*, 1981; Maa, 1961, 1964). These parasitic species belong to the families Cimicidae Latreille and Polyctenidae Westwood which are known to occur in both the Old and New World. All species belonging to Cimicidae are known to be obligatory ectoparasites on various avian (Boyd, 1951; Loye and Regan, 1991) and mammalian taxa (Balvin, 2008) ranging from bats (Wilson and Galloway, 2002; Reeves *et al.*, 2005; Balvín *et al.* 2014) to humans (Booth *et al.*, 2012). However, members of the family Polyctenidae tend to display a narrow host specificity. They are known to be only associated with bats (Mammalia: Chiroptera) (Ferris and Usinger, 1939).

Polyctenidae is a small group of bat

bugs comprising of subfamilies Polycteninae Maa which is endemic to the Old World, and Hesperoeteninae Maa which is confined in the New World (Maa, 1964). The former is further subdivided to 4 genera: *Adroctenes* Jordan, *Eoctenes* Kirkaldy, *Hypoctenes* Jordan, and *Polyctenes* Giglioli whereas the latter is only represented by the *Hesperoctenes* Kirkaldy (Ryckman and Casdin, 1977). Polyctenid bugs tend to prefer microchiropterans as host than megachiropterans (Pteropodidae) (Marshall, 1982). Currently, there are 32 species that are known worldwide (Ryckman and Sjogren, 1980).

As compared to other ectoparasitic insects on bats, polyctenid bugs can be considered rare. This claim of rarity can be supported by relatively small number of museum collections and described taxa. The last

described species of Polyttenidae was from the Aldabra group of islands in Seychelles (Maa, 1970). In the Philippines, the first recorded polyttenid bug is a single female specimen of *Eoctenes spasmae* (Waterhouse) from *Megaderma spasma* (Linnaeus) in Bucay, Abra Province, Northern Luzon (Maa, 1961). Herein, we present the first record of the genus *Eoctenes* Kirkaldy in Bicol Peninsula, Southern Luzon along with the key to the Cimicoidea ectoparasitic on bats in the Philippines.

### Materials and Methods

Bats were collected using a mobile mist netting (3 x 2.5 m) inside the cave. Fine-tipped forceps were used to carefully obtain the polyttenid bugs on the pelage of the bat host. Collected polyttenid specimens were temporarily placed in the Eppendorf vial containing 90% ethanol prior to identification. Specimens were cleared using 10% potassium hydroxide (KOH) for 24 hours and mounted on slide using Canada balsam. Specimens were examined using Leica DM 4000M versatile upright microscope and was photographed using Canon D5500. Specimens were identified using available keys from published literature. Voucher material will be deposited in Crop Protection Cluster Insect Taxonomy Laboratory.

### Key to the Cimicoidea ectoparasitic on bats in the Philippines

1. Eyes present; antennae longer than pronotum; thoracic ctenidia absent.....2
  - Eyes absent; antennae shorter than pronotum; thoracic ctenidia present..... 3
2. Tibiae I-III with apical tufts; hemelytral pad rounded at all aspect; parameres bent at apex .....*Cacodmus sumatrensis*  
**Ferris & Usinger**
  - Tibia III without apical tufts; hemelytral pad rounded except for straight inner margin; parameres evenly bent and tapering.....  
.....*Loxaspis seminitens* **Horvath**
3. Apical membranous lobe of tibia I subcylindrical; abdominal tergite VII-VIII bearing no complete bristle rows .....  
.....*Eoctenes intermedius* (**Speiser**)
  - Apical membranous lobe of tibia I conical; abdominal tergite VII-VIII bearing complete

row of curved bristles .... *Eoctenes spasmae* (**Waterhouse**)

### Genus *Eoctenes* Kirkaldy, 1906

*Eoctenes* Kirkaldy, 1906: 375.

**Type species:** *Polyctenes spasmae* Waterhouse, 1879: 312.

### *Eoctenes spasmae* (Waterhouse, 1879)

#### Figure 1-2

*Polyctenes spasmae* Waterhouse, 1879: 312.

*Eoctenes spasmae* Kirkaldy, 1906: 375.

**Diagnosis:** *Eoctenes spasmae* is closely similar to *E. sinae* Maa by virtue of the following sets of taxonomic characters: denticles on anterior ctenidium on antennal segment I rather regularly arranged; genal comb reaching the posterolateral angle of head; rostrum 4 segmented; posterior margin of hypostoma bearing long and strong setae; mesonotum shorter than wide but subequal in length with reference to pronotum; intercoxal process of prosternum triangular, subacute; posterior margins of abdominal tergite VII- VIII bearing complete row of long setae. However, *E. spasmae* differs from the latter by having a longer labrum, antennal segment III and IV subequal in length, submedian line of hypostomal region bearing fine setae, antero-interior margin of coxa I bearing 4 stout abd 2-3 fine setae, legs II and III long and narrow, and abdominal sternites bearing numerous setae (Maa, 1961, 1964).

**Description:** Head capsule anteriorly rounded; posterolateral angle of the head capsule acute slightly reaching the anterolateral angle of pronotum; antennae short; anterior ctenidium of antennal segment I evenly arranged in an arcuate line; dorsal comb on antennal segment II absent; genal comb extending to the posterior angle of the head capsule; lateroventral margin of labrum bearing 4 setigerous tubercles; rostrum 4 segmented; submedian line of hypostoma bearing few fine setae; posterior of hypostomal region bearing 15 setae arranged in 2-3 rows; pronotum subquadrate, as long as wide; denticles on pronotum shorter than denticles on mesonotum; mesonotum shorter than wide; comb on mesonotal lobe pronounced; mesonotal denticles shorter than occipital denticles;



Figure 1. Habitus in dorsal profile of female (A) and male (B) *Eoctenes spasmae* (Waterhouse). Scale= 200x.

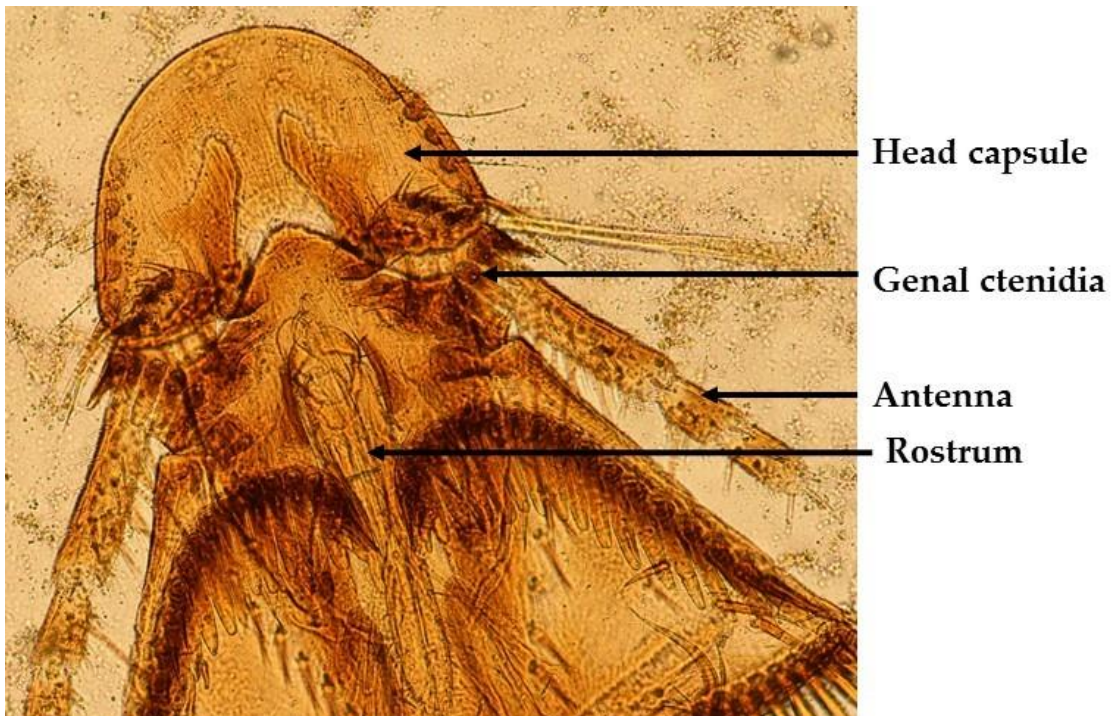


Figure 2. Head of *E. spasmae* (Waterhouse). Scale= 200x.

metanotum pronounced; legs subequal, leg I shorter than legs II and III; intercoxal process of sternum subacute; apical membranous lobe of tibia I conical; peg-like setae on tarsi II and III absent; abdominal tergite VII and VIII bearing complete row of long, curved bristles; lateral bristles on abdomen conspicuous; abdominal sternite bearing numerous setae.

**Material examined:** PHILIPPINES: LUZON: 5♂, 7♀, Albay, Batan Island, Brgy. Lagundi, 21-vi-2014, ex. *Megaderma spasma* (Linnaeus), A. K. S. Amarga leg.

**Distribution:** India, Indonesia (Borneo, Java, Karimata Islands, Sumatra), Malaysia, Philippines (Luzon: Abra; Bicol Peninsula, **new record**), Sri Lanka, Thailand.

**Remarks:** Maa (1961) noted a variability on the length of occipital, pronotal, and mesonotal denticles. Moreover, *E. spasmae* is known to be distributed in the Indo-Malayan ecoregion particularly in Southeast Asia. Such geographic distribution coincides with the distribution of its true host *Megaderma spasma*.

### Discussion

Currently, there are four species under Cimicoidea known to be associated with Chiroptera in the Philippines: *Cacodmus sumatrensis* Ferris & Usinger, *Eoctenes intermedius* (Speiser), *Eoctenes spasmae* (Waterhouse), and *Loxaspis seminitens* Horvath.

The bat bugs, *C. sumatrensis* and *L. seminitens*, belongs to the subfamily Cacodminae, a group known to occur in the Old World particularly in Indo- Malayan and Afrotropical ecozone (Coetzee and Segerman, 1992; Kock *et al.*, 1998). *C. sumatrensis* was first described in 1957 from a *Galeopithecus* (now *Galeopterus* Thomas), a genus of flying lemur in the island of Sumatra. Kock and Aellen (1987) stated that bats are the true host for this species and its occurrence on flying lemur is erroneous. In the Philippines, this species was recorded on *Miniopterus* sp. (Zipagan, 1990). Furthermore, *C. sumatrensis* is recorded from Indonesia (Java, Sumatra), Malaysia, and Philippines (Laguna) (Ford, 1979; Ryckman *et al.*, 1981; Zipagan, 1990). Of the three *Loxaspis*

Rothschild (the other two are *L. malayensis* Usinger from Malaysia, and *L. spinosa* Usinger from Borneo) occurring in the Indo-Malayan ecoregion (Ford, 1979; Ryckman *et al.*, 1981), only *L. seminitens* was documented in the Philippines. The first specimen of *L. seminitens* in the Philippines was collected in *Chaerephon plicatus* (Buchanan) from Rizal, Luzon Island (Zipagan, 1990).

The expanse of the distribution of genus *Eoctenes* encompasses five ecozone: Palearctic, Indo-Malaya, Afrotropics, Australasia, and Oceania. Among its seven species, only two are found in the Philippines: *E. spasmae* and *E. intermedius*. The former is widespread in Southeast Asia and can be considered as Indo-Malayan endemic whereas the latter has a wider distribution range (found in Indo-Malaya, Afrotropics, and Australasia). Furthermore, the first record of *E. intermedius* in Philippines was from a single specimen collected from Montalban, Rizal in 1961 (Maa, 1964).

The true breeding host of *E. spasmae* is *M. spasma* (Chiroptera: Megadermatidae), however, certain cases of accidental occurrences can be observed as in the case of its presence on *Megaderma lyra* Geoffroy, *Nycteris javanica* Geoffroy, and *Cynopterus sphinx* (Vahl) (Speiser, 1909; Maa, 1961, 1964). On the other hand, the true host of *E. intermedius* are *Taphozous* species (Maa, 1964). Its documentation on *Rhinolophus* and *Rousettus* needs further confirmation if it is accidental occurrence or cross contamination (Maa, 1961).

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