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## Review of the subfamily Aganainae (Lepidoptera, Erebidae) from Cambodia

Ulziijargal Bayarsaikhan<sup>a</sup>, Sol-Moon Na<sup>b</sup>, Yang-Seop Bae<sup>a,b,\*</sup><sup>a</sup> *Bioresource and Environmental Center, Division of Life Sciences, College of Life Sciences and Bioengineering, Incheon National University, Songdo-dong, Incheon, South Korea*<sup>b</sup> *Division of Life Sciences, College of Life Sciences and Bioengineering, Incheon National University, Songdo-dong, Incheon, South Korea*

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## ABSTRACT

The subfamily Aganainae is reviewed for the first time from Cambodia. Fifteen species of five genera are recognized from Cambodia. Key and diagnoses for the genera and all species are provided. The adults and genitalia are illustrated for all examined species.

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## Introduction

The subfamily Aganainae Boisduval, 1833, belonging to family Erebidae (Fibiger and Lafontaine 2005; Zahiri et al 2012), includes around 109 described species of 11 genera worldwide (Zahiri et al 2012). Aganainae has often been treated as the family Hypsidae (e.g. Holloway 1976; Inoue et al 1982) and Aganidae (e.g. Inoue and Sugi 1958–1961) or as a subfamily Hypsinae of Arctiidae (e.g. Seitz et al 1914–1915; Daniel 1943), and also Aganainae (Watson et al 1980); subfamily Aganainae of Noctuidae (e.g. Holloway 1988; Scoble 1992; Kitching and Rawlins 1998). Recently, it has been treated as subfamily Aganainae belonging to the family Erebidae by Fibiger and Lafontaine (2005) and Zahiri et al (2012).

Aganainae are mostly large, robust, colorful moths, both as larvae and adults, and like many taxa that have poisonous larval hosts, they are often aposematic day flyers (Kitching and Rawlins 1998). Aganainae was best defined by the combination of the following unique characters (Holloway 1988; Zahiri et al 2012): (1)

labial palpus long, upward, with the third segment long, slender; (2) forewing vein M2 arises closer to the origin of M3 than M1, in the lower part of the discal cell, so that the cubital vein appears to be four-branched; and (3) M2 in the hindwing is present giving vein Cu a four-branched appearance. Aganainae have been recorded feeding on Moraceae, Apocynaceae, and Asclepiadaceae (Holloway 1988; Common 1990), and lactiferous plant families that contain cardenolides. The larvae of Aganainae have fully developed or only slightly reduced abdominal prolegs (Zahiri et al 2012).

The subfamily Aganainae is a poorly studied group in the fauna of Cambodia. Up to now, there have been only two recorded species in Cambodia (Barlow 1982; Kononenko and Pinratana 2005).

## Materials and methods

During our expeditions of Cambodia in 2009–2015, we were able to make a rich collection of aganaine moths, which consisted of 202 Cambodian specimens. In the present study, we recognized 15 species of 5 genera in Cambodia. Illustrations of adults and genitalia are provided and the specimens used in this study are deposited in the collection of Incheon National University, Incheon, Korea, and the National Institute of Biological Resources (NIBR), Incheon, Korea. Abbreviations used in this study are as follows: TS = type species; TL = type locality.

\* Corresponding author.

E-mail address: [baeys@inu.ac.kr](mailto:baeys@inu.ac.kr) (Y.-S. Bae).

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## Systematic accounts

### Family Erebidae

#### Subfamily Aganainae

#### Key to the genera of subfamily Aganainae from Cambodia by external morphology

1. Forewing and hindwing with bright yellow ground color and some light spots in the forewing..... *Agape* Felder, 1874
  - Forewing and hindwing with different ground color or pattern.....2
2. Forewing with white streak from base to termen; adults do not show sexual dimorphism.....3
  - Forewing with white streak from medial part to termen; adults show sexual dimorphism.....4
3. Forewing yellow, brown, and dark brown, with spot, wedge, and elongated patch; hindwing yellow, orange, and white, with spot, and bands.....*Asota* Hübner, 1819
  - Forewing bluish gray-brown, bluish brown, and gray-brown, with a few dark spots and small orange yellow basal area; hindwing with one patch on the middle of the costa or band.....*Neochera* Hübner, 1819
4. Forewing with irregular orange band on the base in the female; forewing of the male without orange yellow band or patch; hindwing without spot or band.....*Euplocia* Hübner, 1819
  - Forewing and hindwing with orange yellow basal area in the both sexes.....*Peridrome* Walker, 1854

#### Genus *Agape* (Felder, 1874)

*Agape* Felder, 1874: pl. 106, f. 4. TS: *Agape cyanopyga* Felder, 1874. *Spilobotys* Butler, 1887: 123. TS: *Spilobotys arctioides* Butler, 1887.

Species of this genus are light yellow, with orange spots or fascia on the forewing. Abdomen bright yellow, with dark blue dorsal bands. Male genitalia: valva simple, narrow; uncus slender, pointed; tegumen shouldered, but not all species; saccus large, bifurcated. Female genitalia: ductus bursae long, sclerotized; corpus bursae elongate, wrinkled (Holloway 1988). Only one species has been collected from Cambodia.

#### *Agape chloropyga* (Walker, 1854)

*Hypsa chloropyga* Walker, 1854: 455. TL: Australia.

*Hypsa analis* Walker, 1856: 1677. TL: Brazil (Parà).

*Agape cyanopyga* Felder, 1874: pl. 106, f. 4. TL: Luzon and Amboina.

*Agape chloropyga* var. *snelleni* Gaede, 1914: 74. TL: Indonesia (Seram).

*Agape chloropyga*: Holloway, 1988: 79.

**Diagnosis** (Figures 2A, 2B, 5A, 7A). Wingspan 62–67 mm. *A. chloropyga* differs from any other aganaine by having golden yellowish wings with five brown spots at median area and two black spots at basal area of forewing; the forewing have no retinaculum in the male. The male genitalia can be distinguished by having a broad shouldered tegumen; ductus bursae long and sclerotized, and large, oval corpus bursae with two signa in the female genitalia.

**Distribution.** Cambodia (Bokor, Cardamom, Mondulkiri, Pramaoy, Samkos, Seima), Thailand, Philippines, South China, Indonesia, India, Moluccas, North Australia.

**Host plant.** Unknown.

**Material examined.** 1♂, Cambodia, Mondulkiri, 3–8.VII.2009 (Bae et al), Gen. slide No. UIK-1427; 1♂, Cambodia, Mondulkiri, 17–19.X.2009 (Bae et al); 1♂, Cambodia, Mondulkiri (N12°28'41", E107°11'30.7"), 8.X.2010 (Bae et al); 1♀, Cambodia, Cardamom (N11°56'83", E103°23'38"), 29.VI.2011 (Bae et al), Gen. slide No.

UIK-1426; 1♂, Cambodia, Seima (N12°11'45", E107°00'16"), 3.VII.2011 (Bae et al); 1♀, Cambodia, Seima (N12°14'12", E107°02'35"), 12.XI.2011 (Bae et al); 1♂, 1♀, Cambodia, Seima (N12°14'56.80", E107°03'17.10"), 15.VIII.2013 (Bae et al), Gen. slide No. UIK-1415; 1♂, Cambodia, Samkos (N12°12'45.6", E102°53'19.2"), 16.II.2012 (Bae et al); 1♂, Cambodia, Samkos (N12°12'39", E104°53'55"), 18.II.2012 (Bae et al); 1♂, 2♀, Cambodia, Samkos (N12°12'39", E102°53'55"), 19.II.2012 (Bae et al); 1♂, Cambodia, Samkos (N12°12'40.43", E102°53'42.38"), 20.VII.2012 (Bae et al); 1♂, Cambodia, Samkos (N12°12'38", E102°53'55"), 19.VII.2012 (Bae et al); 1♂, Cambodia, Bokor (N10°37'42.1", E104°03'53.9"), 15.I.2013 (Bae et al); 1♂, Cambodia, Pramaoy (N12°12'38.72", E102°53'54.76"), 8.II.2014 (Bae et al).

**Remarks.** This species did not show sexual dimorphism. Wing coupling of the male of this species is same as the female, and both sexes have only one retinaculum. Therefore, it is difficult to distinguish the sex (Figure 1). This species is reported for the first time from Cambodia.

#### Genus *Peridrome* (Walker, 1854)

*Peridrome* Walker, 1854: 444. TS: *Hypsa orbicularis* Walker, 1854.

*Aganopsis* Herrich-Schäffer, [1856]: 12. TS: *Aganopsis subquadrata* Herrich-Schäffer, (1856).

*Anagnia* Walker, 1854: 446. TS: *Hypsa subfascia* Walker, 1854.

Species of this genus show sexual dimorphism. The wings of the male are short, broad, the shortening occurring over the basal half of the wing such the distal cells are shortened relative to the rest in comparison with the female. Male genitalia: apical part of sacculus bifurcated; valva upcurved over the apical half. Female genitalia: ductus bursae narrow at connected part to corpus bursae; corpus bursae long, wrinkled, with two band-shaped signa (Holloway 1988). Two species have been collected from Cambodia.

#### Key to the genus *Peridrome* species from Cambodia by external morphology

1. Ground color of forewing gray-brown or dark brown with white streaking on the veins..... 2
  - Ground color of forewing gray-brown without white streaking on the veins.....*Peridrome orbicularis* (male)
2. Forewing with basal 2/3 orange-brown color; base of the costa with two dark spots on white ground color.....
  - .....*Peridrome subfascia* (male)
  - Forewing with basal 1/2 orange-yellow color; base of the costa with more than two dark spots on white ground color..... 3
3. Forewing with rectangular orange-yellow basal area.....
  - .....*P. orbicularis* (female)
  - Forewing with irregular orange-yellow basal area.....
    - .....*P. subfascia* (female)

#### *Peridrome orbicularis* (Walker, 1854)

*Hypsa orbicularis* Walker, 1854: 445. TL: North India, Bangladesh. *Aganopsis subquadrata* Herrich-Schäffer, [1856] 1850–1858: 12. TL: Bangladesh.

*Eriocrypta longipennis* Herrich-Schäffer, [1856]: 12. Unavailable name (Holloway, 1988).

*Peridrome orbicularis*: Holloway, 1988: 80.

**Diagnosis** (Figures 2C, 2D, 5B, and 7B). Wingspan 72–77 mm. *P. orbicularis* can be distinguished by having a broad, subquadrate, grayish brown forewing, with five dark spots on the orange ground color basal area in the male. Female is similar to that of *P. subfascia*, but this species can be distinguished from the latter by having a wide orange basal area to the forewing and hindwing, and terminal area with white streaking on the veins and the space between the

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