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## Original Article

A review of *Barsine* Walker, 1854 (Lepidoptera: Erebiidae, Arctiinae) in Cambodia, with a new recordUlziijargal Bayarsaikhan<sup>a</sup>, Dong-June Lee<sup>b</sup>, Yang-Seop Bae<sup>a,b,\*</sup><sup>a</sup> Bio-Resource and Environmental Center, Division of Life Sciences, College of Life Sciences and Bioengineering, Incheon National University, Songdo-dong, Incheon 22012, South Korea<sup>b</sup> Division of Life Sciences, College of Life Sciences and Bioengineering, Incheon National University, Songdo-dong, Incheon, 22012, South Korea

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## ABSTRACT

The genus *Barsine* Walker, 1854 of Cambodia is reviewed. Of the 12 species recorded, *Barsine sieglindae* Černý, 2016 is newly recorded from Cambodia. A key to the Cambodian species of the genus *Barsine* with illustration of adults and genitalia are presented.

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## Introduction

*Barsine* is one of the largest quadridid Erebiidae genus (formerly in Arctiidae) within the Lithosiini tribe, including about a hundred of described species (Volynkin & Černý 2016b). It was established for its type species *Barsine defecta* Walker, 1854 from Nepal. Species of the genus *Barsine* Walker have in the past been treated as a synonym or subgenus of *Miltochrista* Hübner, [1819] (Hampson 1900; Strand 1917; Reich 1937; Daniel 1951; 1952; 1955; Inoue 1980; Holloway 1982; Fang 1991; 2000; Černý 1995). In 2001, Holloway revived *Barsine* as a distinct genus.

The genus *Barsine* is widely distributed in the Oriental tropics, with more than 94 described species, and worked on by Holloway (2001), Kaleka (2003), Černý & Pinratana (2009), Bucsek (2012, 2014), Dubatolov et al (2012), Dubatolov & Bucsek (2013), Kirti & Singh (2015, 2016), Černý (2016), Volynkin & Černý (2016a, 2016b), and Volynkin & Černý (2017a, 2017b).

In Cambodia, 11 species of *Barsine* are recorded by Bucsek (2012) and Bae et al (2012, 2016). Accordingly, we report an additional one

species from Cambodia in the present article. *Barsine sieglindae* Černý, 2016 is reported for the first time from Cambodia.

## Material and methods

Specimens used in this study were collected during expeditions in Cambodia by the MOU between Korea and Cambodia, the National Institute of Biological Resources (NIBR), Ministry of Environment, Korea, and the Forestry Administration, Ministry of Agriculture, and Forestry and Fisheries, Cambodia, on cooperation concerning biological resources and information. Collecting sites are as follows: Seima biodiversity conservation area and Mondulkiri protected forest (Mondulkiri province); Pursat high mountain area (Pursat province); Central Cardamom protected forest, Koh Kong mountain area, and Kirirom National Park (Koh Kong province); Kep and Bokor national parks (Kampot province), during the years 2009–2015. The depository is fixed in the Incheon National University (INU), Korea and NIBR to include the type specimens. The materials are shared between Cambodia and Korea, but the present materials are deposited in Korea. The terminology of genitalia follows that of Kristensen (2003). Abbreviations for the type depositories are as follows:

INU: Incheon National University, Incheon, Korea.

NIBR: National Institute of Biological Resources, Ministry of Environment, Korea.

TS: type species.

TL: type locality.

\* Corresponding author. Bio-Resource and Environmental Center, Division of Life Sciences, College of Life Sciences and Bioengineering, Incheon National University, Songdo-dong, Incheon 22012, South Korea.

E-mail addresses: [uug228@yahoo.com](mailto:uug228@yahoo.com) (U. Bayarsaikhan), [baeys@inu.ac.kr](mailto:baeys@inu.ac.kr) (Y.-S. Bae).

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**Taxonomic accounts****Genus *Barsine* Walker, 1854**

*Barsine* Walker, 1854: 546. TS: *Barsine defecta* Walker, 1854.

*Ammatho* Walker, 1855: 759. TS: *Ammatho cuneonotatus* Walker, 1855.

*Castabala* Walker, [1865]: 270. TS: *Castabala roseata* Walker, [1865].  
*Korawa* Moore, 1878: 11. TS: *Korawa pallida* Moore, 1878.

*Mahavira* Moore, 1878: 11. TS: *Mahavira flavicollis* Moore, 1878.

Adults are small to medium size, with slender or robust body. Wing coloration varies from milky white to yellow or red. Pattern varies and consists of spots or lines. In male genitalia, the most diagnostic features are the presence of medial costal extension of valva directed ventrally and the presence of one or several fields of small, short, and robust cornuti in the phallus vesica; in female genitalia, the corpus bursae with fine scobination or signum (Holloway 2001).

**Key to the species of the genus *Barsine* from Cambodia based on external morphology**

1. Ground color of forewing pale yellow, orange yellow or red, with clear antemedial, medial, and postmedial lines.....2
  - Ground color of forewing yellow or golden yellow, without clear antemedial, medial, and postmedial lines.....12
2. Forewing covered with longitudinal.....3
  - Forewing not covered with longitudinal.....8
3. Antemedial line of forewing strongly angled, almost confluent with medial line.....4
  - Antemedial line of forewing slightly rounded, separated with medial line.....*Barsine orientalis bigamica*
4. Forewing with crossed antemedial and medial lines; hindwing white yellow.....*Barsine pallinflexa*
  - Forewing without crossed antemedial and medial lines; hindwing pink or black.....5
5. Terminal area of forewing streaked in black; hindwing black, except red basal area.....*Barsine sieglindae*
  - Terminal area of forewing not streaked in black; hindwing pink wholly.....6
6. Medial line of forewing inwardly oblique, meets to postmedial line in costa.....*Barsine cornicornutata*
  - Medial line of forewing almost straight, not meets to postmedial line in costa.....7
7. Antemedial and postmedial lines of forewing strong dark gray and medial line bent in costa; hindwing pink.....*Barsine striata*
  - Antemedial and postmedial series of forewing not strong dark gray and medial line not bent in costa; hindwing pale pink.....*Barsine ustrina*
8. Forewing with black terminal area; hindwing black wholly.....*Barsine punicea melanandra*
  - Forewing without black terminal area; hindwing not black wholly.....9
9. Ground color of wings white, with veins of terminal area picked out in black; short dark bands in basal area; a large dark discoidal dot.....*Barsine syntypica*
  - Ground color of wings golden yellow, with irregular dark brown or red brown markings.....10
10. Wingspan 10–15 mm; forewing with a small red brown discal spot; terminal area of forewing with short, red brown streaks.....*Barsine porphyrea*
  - Wingspan 30–38 mm; forewing with an orange yellow discal patch; terminal area of forewing with long, brown streaks.....*Barsine cuneonotata*
11. Forewing with dark gray reticulation.....*Barsine euprepioides*

- Forewing with large brown patch and narrow golden yellow terminal band.....*Barsine phaeoxanthia*

***Barsine cornicornutata* (Holloway, 1982)**

(Figures 1A, 1B, 3A, 4D)

*Miltochrista cornicornutata* Holloway, 1982: 71, pl. 23: 31. TL: Sumatra.

*Miltochrista cornicornutata*: Fang, 1991: 384.

*Miltochrista cornicornutata*: Fang, 2000: 95, pl. 2: 15.

*Barsine cornicornutata*: Černý & Pinratana, 2009: 62, pl. 13: 12.

*Barsine cornicornutata*: Bucsek, 2012: 40, pl. 7: 92.

**Diagnosis.** Wingspan 25–28 mm in male, 24–34 mm in female. *B. cornicornutata* differs from congeners by having the orange yellow forewing covered with crimson streaks; medial dark line inwardly oblique from costa and connected with postmedial line in costal margin; in male genitalia, apex of valva broad, rectangular, longer than distal sacculus process; distal sacculus process slightly bifurcated, basal sacculus process long, almost same length with valva; phallus vesica with scobination and two groups of irregular short spines; in female genitalia, corpus bursae globular, wrinkled near cervix of bursae, with a large, rounded signum and sclerotized bands.

**Material examined.** Cambodia: 1♀, Pursat (N1205'34.2", E10311'10.01"), 4 v 2010 (Y.S. Bae et al); 4♂ and 4♀, Seima (N1211'45", E10700'16"), 2 vii 2011 (Y.S. Bae et al), Gen. Slide No. INU→1222; 2♂, Osam (N121'31", E10311'4"), 21 ii 2012 (Y.S. Bae et al); 2♂, Kulen (N1336'43", E10406'55"), 15 ii 2013 (Y.S. Bae et al); 1♂ and 12♀, Samkos (N1212'48.2", E10253'29.2"), 18 ii 2013 (Y.S. Bae et al), Gen. Slide No. INU→1098; 1♂, Mondulkiri (N1221'13.6", E10719'9.06"), 14 viii 2013 (Y.S. Bae et al); 1♀, Bokor (N1039'30.73", E10403'3.74"), 4 ii 2014 (Y.S. Bae et al); 3♀, Pramaoy (N1212'25.89", E10252'26.16"), 10 ii 2014 (Y.S. Bae et al); 3♀, Koh Kong (N1141'44.9", E10306'51.8"), 278 m, 25 xii 2014 (Y.S. Bae et al).

**Distribution.** Cambodia, China, Vietnam, Thailand, Peninsular Malaysia, Sumatra.

**Remarks.** This species was reported from Cambodia by Bae et al (2012, 2016).

***Barsine striata* (Bremer & Grey, 1853)**

(Figures 1C, 1D, 3B, 4E)

*Lithosia striata* Bremer & Grey, 1853: 63. TL: N. China.

*Miltochrista gratiosa kurilensis* Bryk, 1942: 29. TL: Kuril.

*Miltochrista striata hachijoensis* Inoue & Maenami, 1963: 43, 58. TL: Japan.

*Miltochrista striata*: Inoue, 1982: 1, 649; 2, 157, fig. 26→35.

*Miltochrista striata*: Fang, 1982: 209, fig. 1547.

*Miltochrista striata*: Dubatolov et al, 1993: 167.

*Miltochrista striata*: Fang, 2000: 101, pl. 2: 28.

*Miltochrista striata*: Park, 2000, 8: 37, pl. 1: 22.

*Barsine striata*: Jinbo, 2004→2008: List→MJ.

*Barsine striata*: Bae et al, 2013: 22, pl. 2, figs. 5a→b.

**Diagnosis.** Wingspan 34–35 mm in male, 45–48 mm in female. *B. striata* differs from congeners by having the golden yellow forewing covered with crimson streaks; postmedian series of forewing forked at costa; in male genitalia, valva rounded at apex; distal sacculus process sharpened, longer than valva, basal sacculus process same length with valva; phallus vesica with two groups of irregular large, short spines and scobination; in female genitalia, corpus bursae wrinkled, sclerotized near cervix of bursae; signum absent.

**Material examined.** Cambodia: 3♀, Pursat (N1205'34.2", E10311'10.01"), 4 v 2010 (Y.S. Bae et al), Gen. Slide No. INU→1106; 1♂ and 1♀, Samkos (N1212'40.43", E10253'42.38"), 20→21 vii 2012

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