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Revision of the family Metarbelidae (Lepidoptera) of the Oriental Region. II. Two monotypic genera – *Ghatarbela* gen. nov. and *Micrarbela* gen. nov. – from the Western Ghats and Sri Lanka biodiversity hotspot

ROMAN V. YAKOVLEV^{1, 2, 3} & VADIM V. ZOLOTUHIN⁴

¹Altai State University, pr. Lenina 61, Barnaul, 656049, Russia. E-mail: yakovlev_asu@mail.ru

²Tomsk State University, Laboratory of Biodiversity and Ecology, Lenina pr. 36, 634050 Tomsk, Russia

³Paleo Data Lab., Institute of Archaeology and Ethnography SB RAS, Novosibirsk, Russia.

⁴Ulyanovsk State Pedagogical University, pl. 100-letia Lenina 4, RUS-432700, Ulyanovsk, Russia.
E-mail: v.zolot@mail.ru

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Abstract

Two new genera: *Ghatarbela* gen. nov. (type species: *Ghatarbela bifidunca* sp. nov.) and *Micrarbela* gen. nov. (type species: *Arbela minima* Hampson, 1910) are established in the second part of the revision of the Metarbelidae (Lepidoptera) of the Oriental Region. A new species *Ghatarbela bifidunca* sp. nov. (type locality: S. India, Kerala, 7 km N Munnar, Eravikulam Nat. Park) is described, and a new combination *Micrarbela minima* (Hampson, 1910), comb. nov. is established.

Key words: biodiversity, Cossoidea, Asia, Palearctica, Metarbelidae, taxonomy, new genera, new species.

Introduction

We gave a brief review of the genera distributed in the Oriental Region in the first part of our revision of the poorly known family Metarbelidae (Yakovlev & Zolotuhin 2020). The present work is devoted to taxa known from the Western Ghats and Sri Lanka. Two peculiar species have been found there. Taxonomic notes with necessary descriptions are given below.

Material and methods

The materials for the study were the adult Metarbelidae specimens deposited in various collections:
MWM – Museum of Thomas Witt (Munich, Germany) – a part of ZSM since 2020;

NHMUK – National Museum of Natural History (formerly: The Natural History Museum, London, U.K.);

ZSM – Zoologische Staatssammlung der Bayerischen Staaten (Munich, Germany).

Male and female genitalia were mounted in Euparal on slides following Lafontaine and Mikkola (1987) and examined with an Olympus SZX16 microscope. The images were taken with the digital camera CMOS 20.7 megapixels and processed using Corel Photo-Paint 2017 software.

Morphological terminology used in the description follows Kristensen (2003). The map was made using open source (<https://www.simplemappr.net/>).

Taxonomical part

Genus *Ghatarbela* gen. nov.

<https://zoobank.org/urn:lsid:zoobank.org:act:44044A3E-1B17-4A85-8414-9F0619E35443>

Type species (here designated): *Ghatarbela bifidunca* sp. nov.

Description. Male. Moths of medium size, with fore wing length in male ca. 15 mm and wing expanse ca. 30 mm. Antenna short (1/3 of fore wing length), bipectinate, pilifers twice longer than flagellum diameter. Fore wing with pale creamish ground color with yellowish tint, expressed dark brown discal spot as rather rectangular tuft of raised scales, poorly expressed spotted dark cream pattern which is condensed in postmedial spot in Cu zone and characteristic blackish row along dorsal margin. This row consists of broadened raised scales. Hind wing patternless pale yellow. Cilia as three rows of scales with alternate cream and brownish plots. Abdomen slender, pale cream, basally with protruding brown apically widened scales and with very long caudal bundle of cream hair-like, shorter widened blackish and longer widened brown scales. Thorax the same cover widened raised brown scales.

Male genitalia. Uncus completely split into two thin, long halves, apically slightly clavate; gnathos arms long with wide lamellar bases, narrowing distally, thin; gnathos small; valve short, apically semicircular, saccular edge sclerotized with small conical harpe; juxta semicircular, large; saccus not expressed; phallus short (twice shorter than valve), apically thick, curved in medium third, apically slightly narrowing, vesica without cornuti.

Female unknown so far.

Diagnosis. The new genus has the following apomorphic characters – wing pattern strongly modified from initially reticulate; presence of protruded scales through forewing and body and uncus is completely (up to the base) split into two halves. It can be closed with more primitive *Squamura* Heylaerts, 1890 as a sister genus but its exact position shall to be defined using genetic method and will be considered later.

Composition. Monotypic genus.

Distribution. Southern India (Western Ghats).

Etymology. The new genus is named after its typical habitat – Western Ghats.

Ghatarbela bifidunca sp. nov.

<https://zoobank.org/urn:lsid:zoobank.org:act:C10D7B33-64B1-41B6-A93D-8DA8833653CF>

Figs 1, 5, 7

Material. Holotype male, S. India, Kerala, 7 km N Munnar, Eravikulam Nat. Park, 1740 m, 10°09' N / 77°04' E, 12–13.iv.1997, leg. Sinjaev & Schintlmeister (Genitalpräparat Heterocera MWM: 28.004). Paratypes: 1 male, same locality (Genitalpräparat Heterocera MWM: 28.031); 1 male, S. India, Kerala, 6 km N Munnar, 1700 m, Kodalar Tea Estate, 10°06' N / 77°04' E, Mountain rain forest, 14–15.iv.1997, leg. Schintlmeister & Siniaev (MWM).



Figures 1–2. *Ghatarbela bifidunca* sp. nov.: 1. male holotype (MWM); 2. male genitalia (holotype: slide Genitalpräparat Heterocera MWM: 28.031).

Description. Length of fore wing 13–15 mm; antenna yellowish; thorax, abdomen basally and apically covered with long brown scales strongly widened apically, medium third of abdomen covered with light-yellow scales. Fore wing yellowish with bright dark-brown discal spot, not numerous small dark-brown to blackish dots along costal edge, narrow dark-brown stroke along anal edge, poorly expressed blurred light-brown portions discally and postdiscally, cilia chess mottled (yellowish between veins, brown at veins).

Male genitalia. See description of the genus.

Female unknown.

Habitat and fly period. Mountain rain forest, moths were collected on light in mid-April at the altitudes 1700–1740 m u.s.l.

Distribution. Southern India, Kerala State, Western Ghats Region.

Etymology. The new species is named after its morphological feature – uncus with very long bifurcation.

Genus *Micrarbela* gen. nov.

<https://zoobank.org/urn:lsid:zoobank.org:act:8546F939-6346-42C7-8588-F05299D1D11E>

Type species (here designated): *Arbela minima* Hampson, 1910.

Description. Strongly sexually dimorph.

Male. Very small in size (not more than 12 mm in wingspan) dark-colored moths, antenna equal to 1/3 of fore wing in length, pilifers 3 times longer than flagellum diameter. Bundle of long dark hair-like scales on top of abdomen. Fore wing short, apically rounded, dark; hind wing dark with indistinct paler reticulate pattern.

Male genitalia. Uncus long, basally thin, distally gradually thickening, apically very thick, poorly expressed bifurcation apically as small crescent notch; gnathos arms basally thick, distally narrowing, long,

gnathos small; valve very short, semicircular (length not exceeding its width), saccular edge sclerotized, with thin finger-like harpe; juxta wide, lamellar; phallus very short (three times shorter than valve), thick, poorly narrowing to apex, with robust uncinat cornutus twice shorter than phallus.

Female. Slightly larger than male; antennae simple; fore wing narrow and slender with protruded reticulate pattern of wide wavy whitish lines, hind wing narrow and slender (more than in males) chocolate brown without pattern.

Female genitalia were not studied.

Diagnosis. The new genus joins the smallest members of the family. They have poorly developed pattern on the male fore wing and very short semicircular valve (with equal linear length and width). Contrary externally similar genus (*Orgyarbela* Yakovlev & Zolotuhin, 2020), anal tuft in male consists from very slender hair scales not widened at apex.

Composition. Monotypic genus.

Distribution. Sri Lanka.



Figures 3–7. *Micrarbela minima* (Hampson, 1910): 3. reproduction from the original drawing; 4. male holotype (NHMUK); 5. male, Ceylon, Mankulam (NHMUK); 6. female, Ceylon, Mankulam (NHMUK); 7. male genitalia (slide NHMUK: 010315535).

***Micrarbela minima* (Hampson, 1910) comb.nov.**

Figs 2–4, 6–7

Arbela minima Hampson, 1910, Journ. Bombay Soc. 20: 97, pl. F, fig. 24.

Type locality: Ceylon, Galle [Sri Lanka, Southern Province, 6°03'N / 80°12'E].

Type material. Holotype (male) in NHMUK, examined.

Material examined. Holotype, male, Ceylon, Galle, 22.iii.1907, Bainbridge Fletcher (NHMUK). 1 male, 1 female, Ceylon, Mankulam, N. Prov., February, 1913 – 213, J. Pole (NHMUK, individuals numbers NHMUK: 012832504 and 012832514).

Redescription

Male. Length of fore wing 5–6 mm (holotype – 5 mm). Fore wing brown with poorly expressed dark-brown discal spot, with indistinct reticulate pattern. Hind wing brown without pattern.

Male genitalia. See description of the genus.

Female. See description of the genus.

Female genitalia not known.

Distribution. Sri Lanka.

Habitat and fly period. Mountain rain forest, moths were collected in February and late March, and no fresh material known. They are seemingly extremely rare and local and probably are day-fliers.

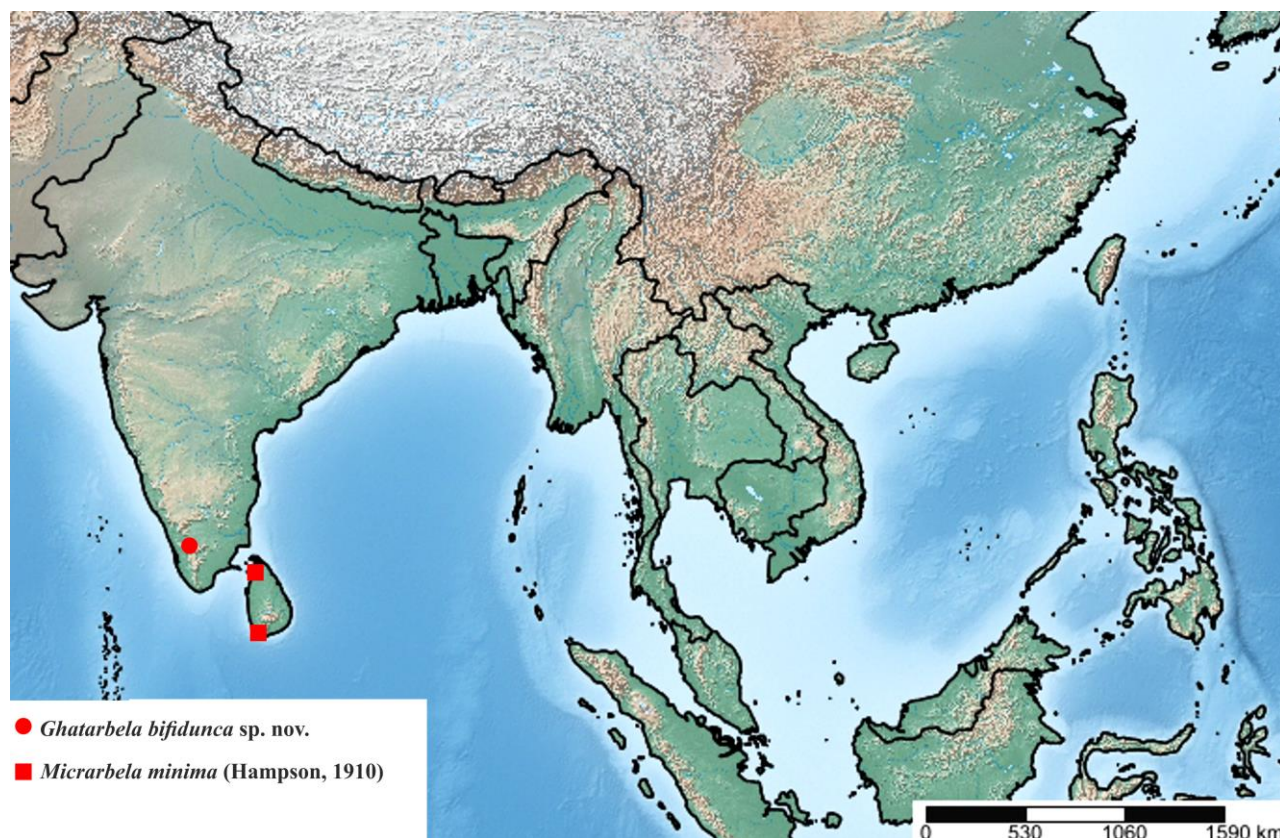


Figure 8. Distributional map of *Ghatarbela* and *Micrarbela* species.

Discussion

Both new genera are endemics for the Western Ghats and Sri Lanka, united into one of “biodiversity hotspots” (Myers 1988; Myers *et al.* 2000). The region’s biota is characterized here by a high level of endemism in flora as well as in the studied animal groups (Gadgil 1996; Mathew *et al.* 1998; Kunte *et al.* 1999; Wijesekara & Wijesinghe 2003; Bossuyt *et al.* 2004; Daniels 2004; Bambaradeniya 2006; Gunawardene *et al.* 2007; Sergeev & Zolotuhin, 2010).

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Images of type-specimens from the NHMUK are figured here with the kind permission of The Trustees of the Museum..

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