

ISSN 0972- 1800

# BIONOTES

VOLUME 21, NO. 4

QUARTERLY OCTOBER-DECEMBER, 2019



Date of Publication: 28<sup>th</sup> December, 2019

# BIONOTES

A Quarterly Newsletter for Research Notes and News  
On Any Aspect Related with Life Forms

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## Rates of Membership (per calendar year):

India: Individuals: Rs. 150/- Institutions: Rs. 700/- . Abroad: US \$ 20/- (by sea mail).  
Back volumes are available @ Rs. 800/- in India.

Published by Dr. R.K. Varshney, A Biologists Confrerie, Raj Bhawan, Manik Chowk, Aligarh (up to volume 20 (2018)) R.N.I. Registration No. 71669/99.

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**Published by the Entomological Society of India (ESI), New Delhi (Nodal Officer: V.V. Ramamurthy, ESI, New Delhi)**

And

**Butterfly Research Centre, Bhimtal**

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Cover Photo by Peter Smetacek of a *Salassa mizorama* Moth

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## TWO NEW SPECIES OF *LOEPA* MOORE (LEPIDOPTERA: SATURNIIDAE) FROM THE INDIAN SUBCONTINENT

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Reviewer: Sankaraman H.

**Keywords:** Himalaya, Nepal, Mizoram, Tripura, Saturniidae, *Loepa*, new species.

### Abstract

Two species of the genus *Loepa* Moore, 1859, are described as new from the Indian subcontinent: *Loepa macrops* n. sp. from Nepal and northwestern India, a member of the *miranda*-group with relatively large ocelli on all four wings; and the small *Loepa nigra* n. sp. from the northeastern Indian states of Mizoram and Tripura, a relative of the sub-Himalayan *L. sikkima* Moore, 1865 in the *katinka*-group which in most specimens show much fuscous suffusion on the forewings. For both taxa males and females are known and figured; the preimaginal instars are unknown at present.

### Introduction

The genus *Loepa* currently comprises around 50 described species in Asia, all of which are yellow, partly suffused with black, pink, or orange scales. A preliminary and tentative phylogenetic grouping of the species of the genus was proposed by Naumann (1995: 82); three species-groups, namely of *L. oberthuri* (Leech, 1890), *L. miranda* Moore, 1865 and *L. katinka* (Westwood, 1847) were later again defined in more detail by Yen *et al.* (2000). Within the *miranda*-group, three well-defined subgroups were recognized further due to the different genitalic morphology and the form and colouration of their wings. The placement of the species into these subgroups is also supported by the results of the COI barcode, from the Canadian Centre for DNA Barcoding (CCDB) in Guelph, Canada. Two of those

groups were intensely revised (Naumann & Loeffler, 2012; Naumann *et al.*, 2012) while the third one, the *miranda*-subgroup, is still under revision.

In this paper, we describe two new species viz., *L. macrops*, n. sp and *L. nigra*, n. sp. from *miranda* and *katinka*-groups, respectively.

Older literature is not very helpful for determination in many cases, since due to similarity, several taxa were often combined under a single species (e.g. Hampson, [1893]; Arora & Gupta, 1979), but also in more recent literature, authors sometimes did not identify species properly. The specimens determined as *L. sikkima* in Allen (1993) are surely *L. katinka*, and the specimen figured as *L. katinka* therein is most probably a specimen of the taxon described below (judging from the poor quality of the photo); surprisingly, the male figured as *L. miranda* does not originate from Nepal, but from northern Thailand, and therefore is certainly not *L. miranda*. The specimen is now in the senior author's collection. Also the handling of the genus by D'Abrera (1998) did not help clear the taxonomic confusion.

### *Loepa macrops*, n. sp.

Holotype (Fig. 1, *recto*; Fig. 2: *verso*): Male, Nepal (E), Mount Everest District, 2900 m, 25.viii. – 20.ix.1999, leg. V. Gurko, Kauf IB Prag x.1999, coll. Stefan Naumann; genitalia no 1879/09 Naumann; barcode SNB 0792. — A red holotype label will be added

accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of ZMHU Berlin.

Paratypes (in total 12 males, 1 female): 7 males, same data as holotype, one with barcode SNB 0793, 6 in coll. Stefan Naumann, 1 in coll. Butterfly Research Centre, Bhimtal, India. 1 male, same data, barcode SNB 2637, coll. Swen Loeffler > coll. Stefan Naumann. 1 female, Nepal (C), Kakani, 2070 m, 17.viii.1991, leg. T. W. Harman; material bought from Tony Harman in Turville Heath, Henley on Thames, Oxfordshire, 11.vii.2009, coll. Stefan Naumann. 1 male, Nepal (C), Magwanpur, Daman, vii.2009, leg. Alok Kumar, coll. Swen Loeffler > coll. Stefan Naumann; barcode SNB 263. 2 males, India, Uttarakhand, Dogalbitta, N 30.29303° E 79.10768°, 2400 m, 28. – 30.vii.2008, leg. Bretschneider; barcode SNB 2639; coll. Swen Loeffler > coll. Stefan Naumann. 1 male, India, Himachal Pradesh, Village Upper Gutdi N 32.556889 E 76.010313, 2000 m, 23. vii. 2011, leg. Alok Mahendroo, genitalia no. 2619/19 SNB, barcode SNB-RR 0264, collection of Butterfly Research Centre. Blue paratype labels will be added.

**Etymology:** *L. macrops* n. sp. is named after the relatively large ocelli on all four wings, compared to related species.

### Description

Male (Figs. 1 – 4): Length of forewing, measured from base to apex, 54 – 62 mm (holotype 59 mm).

Head, thorax, abdomen and wings with bright, light yellow ground colour and typical pattern for the genus *Loepa*. Collar violet grey, tegulae yellow. The antennae ochreous brown, quadripectinate, only last 5 segments bipectinate, 13 mm in length, 35 segments in total, longest rami 1.5 mm long.

Forewing elongate, apex somewhat produced with rounded tornus, the outer margin concave. Antemedial line of intense carmine colour. The rounded forewing ocellus of 8.0 – 10.5 mm maximum diameter (holotype 9.0

mm), orange brown, separated from the costa by a narrow, sharply defined black semicircle, followed distally by a narrow pinkish white line and a vertical pale line representing the pupil of the ocellus. Costa violet grey until the proximal postmedial line, beyond which it is yellowish grey as far as the distal double black postmedial lines beyond which there is a pinkish grey subapical patch crossed by the outer of the two distal postmedial black lines, which is white as it crosses this patch. A black subapical spot with some pink suffusion around it. The erect submarginal line white, interrupted along the wing venation, embedded in yellowish olive patches. Cilia yellow.

Hindwing antemedial line black, turning to carmine near the dorsum. Hindwing ocellus almost circular, of 7.0 – 9.0 mm diameter (holotype 7.5 mm), defined proximally by an obscure black ring, with violet and white semicircle within the ocellus and an obscure white vertical mark representing the pupil of the ocellus. Triple postmedial lines, proximal one grey, marginal one bluish, submarginal area as in forewing.

On ventral side frons darker yellow, thorax and abdomen with yellow ground colour, all legs pink. On the forewing the carmine antemedial line and the orange brown colour and black half ring of the ocellus is missing, giving that a more pinkish and generally smaller impression. Hindwing with black antemedial line. The postdiscal and marginal markings as on upperside.

Male genitalia (Figs. 15, 16): Uncus long, acute and fused up to its tip. Dorsal process of the valves round and elongate, the ventral process acute and small-based. Both processi are connected with an internal longitudinal vertical protuberance. Sacculus distinctive, saccus long with rounded end, juxta rounded, strongly sclerotized on lateral and ventral side, there elongated with an internal process. The phallus of around 4 mm length, with two left and right lateral sclerotized processes at its

end; the vesica emerging to dorsal side, with left and right dorsolateral field of sclerites.

Female (Figs. 6, 7): The single known female is very similar to the males in all characters, and differs from those only by some sexual dimorphic characters such as different anatomy of antennae and more rounded wings. It has a forewing length of 61 mm, the forewing discal spot has a diameter of 9.5 mm, that of the hindwing of 8.5 mm. The antennae are 13 mm long, completely bipectinate, there are 35 segments, the longest rami are 1.2 mm long.

The preimaginal instars are unknown.

**Distinctive characters and discussion:** *L. macrops* is the nearest relative of *L. miranda* (Fig. 5) and replaces this species in Nepal and north-western India. There exists one male specimen labelled to originate from Lahore (Pakistan) ex collection R. Gschwandner, stored in Naturhistorisches Museum Vienna, Austria which should be conspecific with our type series. However, the labelled locality lies in the lowlands of north-eastern Pakistan and is almost certainly not the correct origin of the specimen, therefore we hesitate to include this specimen in the type series. It most probably originates from the mountain areas north of Lahore, now in Jammu and Kashmir which would expand the known distribution of *L. macrops* westwards. This distribution is yet to be confirmed.

We figure here the male lectotype of *L. miranda* from the collections of The Natural History Museum, London for comparison (NHM collection no. BMNH(E) 1626468). The labels announced in the lectotype designation (BOLD-label, designation and violet lectotype label) by Brechlin & Kitching (2010) will in due course be attached to the specimen. The forewings of this (and other conspecific specimens) are more falcate and prolonged, and the more ovoid wing ocelli are smaller in size, of only 5.5 – 8.0 maximum diameter. Within the BOLD barcoding campaign *L. miranda* gets a BIN no. AAB0772 and is clearly separated from the

new species *L. macrops* with BIN no. AAB0779.

***Loepa nigra*, n. sp.**

Holotype (Fig. 8, dorsal view; Fig. 9: ventral view): Male, India, Mizoram, Khawmawi, 22.50° N 92.77 E, 130 m, iv.1997, via Yamamura; coll. Stefan Naumann. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of ZMHU Berlin.

Paratypes (in total 8 males, 1 female): 4 males, same data as holotype, one with barcode SNB 6131, one with genitalia no. 2622/19 Naumann, coll. Stefan Naumann; 2 males, same data as holotype, coll. Butterfly Research Centre, Bhimtal, India. 1 female, India, Mizoram, Lawngtlai, 29.ix.2013, in Entomological Collections, Systematics and Toxicology Laboratory, Department of Zoology, Mizoram University, Aizawl, Mizoram. 2 males, India Tripura, Vanghmun, 23°59'N, 92°16'E, 19.iv.1995, leg. Bishal Chakma, coll. Swen Loeffler > coll. Stefan Naumann; barcode SNB 3424 & 3425; genitalia no. 1468/06 Naumann. — Blue paratype labels will be added.

**Etymology:** *L. nigra* n. sp. is named for the fuscous subapical area of the forewing and the darkened wing margins.

**Description**

Male (Figs. 8 – 10): Length of forewing, measured from base to apex, 36 – 41 mm (holotype 37 mm).

Head, thorax, abdomen and wings with intense dark yellow ground colour and typical pattern for the genus *Loepa*. Collar dark grey, tegulae yellow. The antennae ochreous brown, quadripectinate, only last two segments bipectinate, 8 mm in length, 24 segments in total, longest rami 0.8 mm long. The rami are very compact and densely fringed with short hairs.

Forewing slender and elongate, apex somewhat produced with rounded tornus, the outer margin strongly concave. Antemedial line broad, pink, with carmine margins. The

ovoid forewing ocellus large, complex, of 11.5 – 14.0 mm maximum diameter (holotype 11.5 mm), in general of chestnut brown colour, edged with black, proximal white and then black semicircular marks with white and dark grey centre. The ocellus touches the dark grey costa, the postdiscal area dusky, suffused with fuscous scales, the submarginal and marginal area, distal to the double postmedial zigzag line, of yellowish olive colour, the submarginal lunulate line white, connected throughout its length. Subapical area with inner violet and outer crimson red suffusion on either side of the white submarginal line and black subapical patch.

Hindwing without black suffusion, antemedian line black on its upper half, sharply angled until it touches the ocellus, thence to the dorsum it is pink and not sharply defined. Hindwing ocellus almost round, of 7.0 – 8.5 mm diameter (holotype 7.0 mm), with proximal whitish semicircular mark, ochreous and black crescents, followed by an inner light brown pupil, all this surrounded by a chestnut brown ring. Postmedian line doubled, proximal one grey, marginal one bluish, followed by a dusky, yellowish olive marginal area with complete white submarginal lunulate line.

On ventral side thorax and abdomen yellow, all legs pink. On the forewing the pink antemedian line and the chestnut brown portion of the ocellus is missing, giving that a more pinkish and generally smaller impression. The black subapical suffusion and subapical pink and violet portions plus subapical black spot, the dusky marginal area and the white submarginal line similar to upperside. Hindwing with violet lower half of the antemedial line, hindwing ocellus also with reduced chestnut brown portion and a pink subapical spot. Otherwise similar to upperside.

Male genitalia (Fig. 17): Uncus long, slender and divided into two rounded lobes for the apical 0.5 mm. Valves with larger dorsal, rounded process with small lateral indentation,

and a smaller, acute ventral process, ending in the inner part of the valves with a widening. Saccus long and slender, juxta rounded, anellus thickened in its lateral and ventral part. Phallus slender, ca. 4 mm in length, with two lateral ends, vesica emerging to left lateral side with a left lateral sclerite, from there a thorn emerging backward. The genitalia are very similar to those of the sub-Himalayan *L. sikkima* (Figs. 18, 19) which have a deeper indentation between the two apical processes of the uncus, the valves have a more compact, rounded dorsal process with longer lower prolongation and a more rounded ventral process, ending internally with a small lobe. The saccus and phallus of the latter are broader.

Female (Figs 11, 12): The single known female is a very worn specimen, where not all characters can be easily determined. It is missing the antennae, legs, its abdomen and portions of the scales and ornamentation. It has a forewing length of 43 mm, the forewing ocellus has a maximum diameter of 10 mm, that of the hindwing of 7.0 mm. The forewing antemedian line pink as well, the darkened portion is found only in the upper subapical area, there suffused with a pink field. The dusky postmedian area similar to the male, also with complete white submarginal line. Hindwing with missing pink portion of the antemedian anal part, otherwise this and the complete underside similar to the male.

The preimaginal instars of *L. nigra* n. sp. remain unknown.

**Distinctive characters and discussion:** *L. nigra* n. sp. can easily be distinguished from its nearest relative, the sub-Himalayan *L. sikkima* (Figs. 13, 14), by the combination of its smaller size with larger wing ocelli, the more slender forewing with concave outer margin (that of *L. sikkima* more compact and with straight margin), more often complete yellow specimens without dark or black suffusion of the forewing and marginal area, plus details in the male genitalia (see above). For *L. sikkima* we measured a forewing length

of 39 – 45 mm, and forewing ocellus maximum diameter of 11.0 – 12.5 mm, that of the hindwing with 6.0 – 7.0 mm. The male antennae are a little longer with 8.5 mm on average, with 26 segments and longest rami of 1.0 mm. The white submarginal line often is broken along the veins.

For comparison we figure a syntype of *L. sikkima* from the collections of The Natural History Museum with black suffusion on the forewing (collected in Sikkim by Captain J. L. Sherwill who is mentioned in Moore's introduction (1865a)), and a specimen from Darjeeling, West Bengal, without any black suffusion. Moore cites W. S. Atkinson in his original description as follows: "*L. katinka* [Westwood, 1847; publication year cf. Naessig (2007)] also occurs in Darjeeling (but sparingly), and is always larger than the dark form, which appears earlier in the year (beginning of August). *L. sikkima* inhabits the hot valleys, whereas *L. katinka* is found at from 5000 to 7000 feet elevation." This is confirmed by material in our hands from Nepal and India, the species was found only at elevations of 330 – 850 m. *L. nigra* n. sp. is also a lowland species, reported from altitudes of 150 – 370 m.

#### Acknowledgement

We would like to thank the following persons who helped over the years with information, material, and notes on the manuscript: Gil Bretschneider (Lichtenstein, Germany), Yasuyuki Fukinuki (Tokyo, Japan), Alessandro Giusti (The Natural History Museum, London, Great Britain), Vladimir Gurko (Kiev, Ukraine), Tony W. Harman (Turville Heath, Great Britain), Ian J. Kitching (The Natural History Museum, London, Great Britain), Steve Kohll (Kayl, Luxembourg), Esther Lahlmingliani (Mizoram University, Aizawl, India), Théo Léger (Museum fuer Naturkunde, Berlin, Germany), Swen Loeffler (Lichtenstein, Germany), Alok Mahendroo (Auroville, Tamil Nadu, India), Tomas Melichar (Příbram, Czech Republic), Wolfram Mey (Museum fur Naturkunde,

Berlin, Germany), Wolfgang A. Naessig (Senckenberg-Museum, Frankfurt am Main, Germany), Dave Rolfe (Northfleet, Great Britain), and Harald Sulak (Museum Witt, Munchen, Germany). SN is grateful to the Natural History Museum, London, for permission to figure type specimens of *Loepa miranda* and *Loepa sikkima* in their collection.

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*miranda*, 2: The subgroup of *Loepa damartis* (Lepidoptera: Saturniidae). *Nachrichten des Entomologischen Vereins Apollo* N.F. 33 (2/3): 87 – 106.

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Fig.1: *Loepa macrops* n. sp., male holotype, Nepal, dorsal view, coll. Naumann.

Fig.2: *Loepa macrops* n. sp., male holotype, Nepal, ventral view, coll. Naumann.



Fig.3: *Loepa macrops* n. sp., male paratype, Nepal, dorsal view, coll. Loeffler > coll. Naumann.



Fig.4: *Loepa macrops* n. sp., male paratype, Himachal Pradesh, dorsal view, Butterfly Research Centre.



Fig.5: *Loepa miranda*, male lectotype, dorsal view, NHM London.



Fig.6: *Loepa macrops* n. sp., female paratype, Nepal, dorsal view, coll. Naumann.



Fig.7: *Loepa macrops* n. sp., female paratype, Nepal, ventral view, coll. Naumann.



Fig.8: *Loepa nigra* n.sp., male holotype, India, Mizoram, dorsal view, coll. Naumann.



Fig.9: *Loepa nigra* n.sp, male holotype, India, Mizoram, ventral view. coll. Naumann.



Fig.10: *Loepa nigra* n. sp., male paratype, India, Tripura, dorsal view.



Fig.11: *Loepa nigra* n. sp., female paratype, India, Mizoram, Entomological Collections, Systematics and Toxicology Laboratory, Department of Zoology, Mizoram University, Aizwal, Mizoram, dorsal view.



Fig.12: *Loepa nigra* n. sp., female paratype, India, Mizoram, Entomological Collections, Systematics and Toxicology Laboratory, Department of Zoology, Mizoram University, Aizwal, Mizoram ventral view.



Fig.13: *Loepa sikkima*, male syntype, India, Sikkim, dorsal view, NHM London.



Fig.14: *Loepa sikkima*, male. India, West Bengal, dorsal view, coll. Naumann.

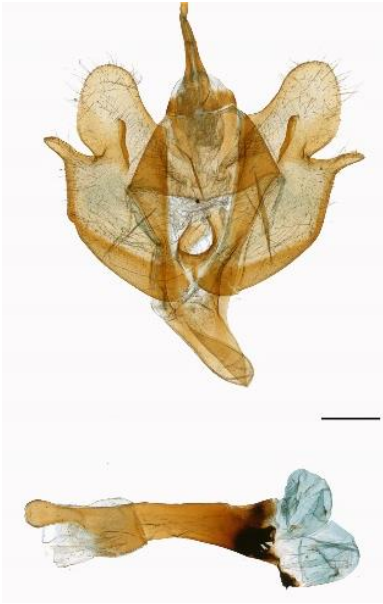


Fig.15: *Loepa macrops* holotype, Nepal, male genitalia no. 1879/09 Naumann.

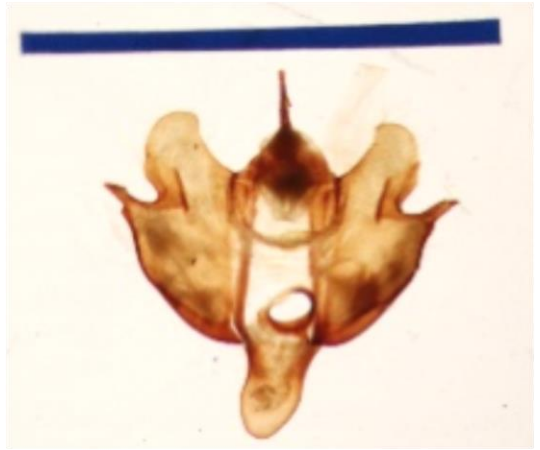


Fig.16a: *Loepa macrops* paratype, India, Himachal Pradesh, male genitalia no. 2619/19 Naumann.

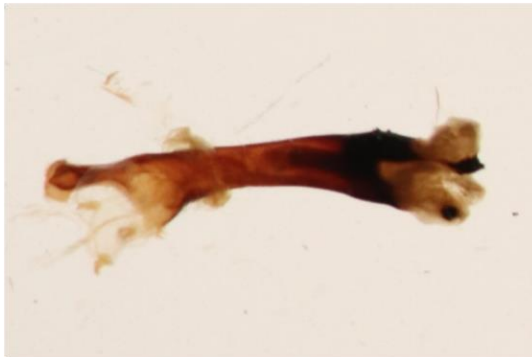


Fig.16b: *Loepa macrops* paratype, India, Himachal Pradesh, aedeagus, phallus separate.



Fig.17a: *Loepa nigra* paratype, India, Mizoram, male genitalia no. 2622/19 Naumann.



Fig.17b: *Loepa nigra* paratype, India, Mizoram, male aedeagus, phallus separate



Fig.18: *Loepa sikkima*, India, West Bengal, genitalia no. 1899/09 Naumann.

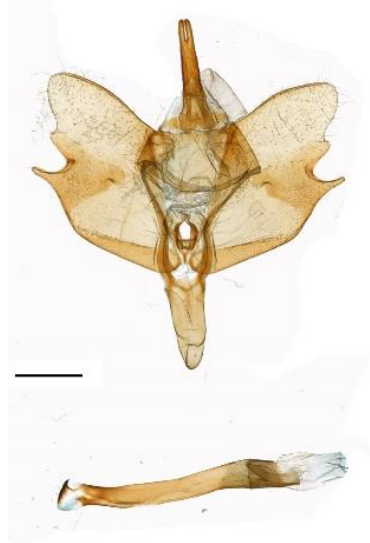


Fig.19: *Loepa sikkima*, Nepal (E), male genitalia no. 1952/09 Naumann.

Scale bars for figs. 15, 18, & 19 = 1 mm; for figs. 16 & 17 = 10 mm.