ELEVEN NEW SATURNIIDAE SPECIES FROM INDIA AND ADJACENT COUNTRIES

STEFAN NAUMANN & PETER SMETACEK

[1] Research Associate of Museum für Naturkunde Berlin, Hochkirchstrasse 11, 10829 Berlin, Germany.

[2] Butterfly Research Centre, The Retreat, Bhimtal, Uttarakhand, India 263 136.

[3] 27th contribution to the knowledge of the Saturniidae of China (26th contribution: Nässig, W. A., Naumann, S., & Löffler, S. (2017): Revisional notes on the subgenera *Saturnia* (*Perisomena*) and *Saturnia* (*Neoris*) stat. rev. (Lepidoptera: Saturniidae). – Part B: *Neoris*. — *Nachrichten des entomologischen Vereins Apollo, Frankfurt*, N. F. 37 (4): 179–216.

Corresponding author: sn@saturniidae.com

Reviewer: Jatishwor S. Irungbam

ABSTRACT

Nine new species of the family Saturniidae are described as new from northeastern India, Arunachal Pradesh: *Actias smetaceki* **n. sp.**, *Loepa melichari* **n. sp.**, *Loepa himalayana* **n. sp.**, *Cricula mishmica* **n. sp.**, *Sinobirma occidentalis* **n. sp.**, *Salassa dibanga* **n. sp.**, *Salassa occinica* **n. sp.**, *Solus pseudodrepanoides* **n. sp.**, and *Solus tawanga* **n. sp.**. In addition to these, we also name and describe two closely related species from adjacent countries: *Actias loeffleri* **n. sp.**, from Kachin State, Myanmar, and *Salassa linzhica* **n. sp.** from PR China, Tibet. Due to a mixed type series of *Loepa anthera* Jordan, 1911, a male lectotype is designated for that taxon from the collections of NHM London. *Solus loba* Lang, 2017, described as a subspecies of *S. parvifenestatus* Bryk, 1944, is raised to full species rank.

Keywords: Himalaya, Arunachal Pradesh, Tibet, Myanmar, Saturniidae, *Actias*, *Cricula*, *Salassa*, *Sinobirma*, *Solus*, new species, lectotype designation, status change.

INTRODUCTION

A large part of this study is based on material which came into the hands of the senior author by purchasing the Löffler collection some years ago. Among other material, it contains material from Arunachal Pradesh, collected earlier by G. Bretschneider and others. The specimens described from Tibet, China and Kachin State, Myanmar, originate from material either purchased from local collectors or was collected during expeditions by the senior author.

Preimaginal instars of all taxa described here remain unknown for the time being.

This article contains descriptions of nine new species from northeastern India, plus two descriptions of new taxa from Tibet and northeastern Myanmar, which are closely related to the new Indian taxa. All male holotypes and, where available to us, associated females are figured in colour, and the male genitalia structures of all new taxa are shown as well. In one case (*Loepa melichari*, **sp. n**.), it was necessary to fix the identity of another taxon by designating a lectotype.

Holotypes of the taxa described here from the collection of the senior author will be deposited within the Rainer Seegers Foundation in the collections of the Museum für Naturkunde in Berlin, Germany. Depositories of all paratype material are mentioned in the paratype lists. The preparation of specimens and genitalia structures follows standard procedures.

Our results are always based on all data available to our studies; morphological studies and other "non-molecular" characters such as zoogeographical or ecological aspects, while the additional molecular studies are only based on barcode data of the mitochondrial DNA of the cytochrome-*c* oxidase, subunit I gene (COI), received from the laboratory of the *Canadian Centre for DNA Barcoding* (CCDB) in Guelph, Ontario (Canada) (see Ratnasingham & Hebert 2007, 2013).

Collection abbreviations used:

CBRC: Collection Butterfly Research Centre, Peter Smetacek, Bhimtal, India.

CSLL: Collection Swen Löffler, Lichtenstein/Sachsen, Germany, since 2020 part of CSNB.

CSNB: Collection Stefan Naumann, Berlin, Germany. Dedicated to the Rainer-Seegers-Stiftung, to be deposited in MfN Berlin, Germany.

MfN: Museum für Naturkunde, Berlin, Germany.

NHMUK: The Natural History Museum, London, U.K.

Other abbreviations and conventions

BC mtDNA COI Barcode.

BIN Barcode Index Number (as downloaded in 2023); an automatically assigned identifier for genetic clusters within Bold, see Ratnasingham & Hebert (2013).

GP Genitalia dissection.

Descriptions

***Actias smetaceki*, n. sp. Naumann, 2023**

Holotype (Fig. 1a, dorsal view; Fig. 1b: ventral view): ♂ India, Arunachal Pradesh, probably Mishmi Hills, V.1990, leg. local collector. Coll. CSNB. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN, Berlin. The BOLD BIN Code is AEC3353.

Paratypes (in total 4 ♂♂, 1 ♀): 2 ♂♂, Same data as holotype. GP 2599/19; BC SNB 6372 & 6373; coll. CSNB. 1 ♀, Same data as holotype; BC SNB-RR 0265. coll. CSNB. 1 ♂, India, Arunachal Pradesh, road Roing – Hunli, 2277 m, Mayodia, 65 km Roing, N28°16'47'' E95°54'44'', 20.–21.V.2018; 1 ♂ same locality, 18.V.2019 leg. P. Smetacek, Coll. CBRC. – Blue paratype labels will be added.

Etymology: To name an Indian Saturniidae species after Peter Smetacek is an honour for the senior author, to express his admiration and appreciation of Peter's continued intense engagement for, interest in and knowledge of the insect fauna of the Indian subcontinent in so many different ways.

Description

Male (Figs. 1a & b): Length of forewing, measured from base to apex, 45 – 48 mm (holotype 45 mm).

Antennae ochreous brown, quadripectinate, of 13.0 mm length, with 29 segments, longest rami 2.8 mm. Head, thorax, abdomen white, wings with light bluish white ground colour, collum and forewing costa dark carmine inwardly edged with black. Legs with light carmine tibiae and tarsi.

Forewing slender and elongate, apex almost right angled. The only ornamentations are the central ovoid ocellus and an obscure zigzag postmedial line. The ocellus with a maximum diameter of 3.0 – 3.5 mm, has from basad to marginal a black, light blue, pink, clear, broader yellow and grey portion. The light greyish postmedian line has extensions towards the margin between the veins. All veins accentuated, marginal fringe yellow.

Hindwing with long tail, ground colour as for forewing, with a length of 74 – 75 mm, measured from wing base to tip of the tail. Ornamentation similar to forewing, ocellus with 4.0 – 5.1 mm maximum diameter, and with same sequential arrangement of colours as on forewing. The postmedian line is only visible from upper margin to the veins which end in the tail part of the wing. Marginal fringe of the main part of the wing yellow.

On ventral side, thorax and abdomen white, and wings of the same ground colour as dorsal surface. Ornamentation is the same as on dorsal side, but both fore- and hindwing ocelli with only an obscure proximal black line, followed by broader pink and creamy yellow portion. Postmedial zigzag line more heavily marked than on dorsal side. Hindwing anal marginal area clothed with long white hairs.

Male genitalia (Figs. 20a – e; GP 2599/19 SNB): Uncus with one long central process, apically fused to a cupola-like structure. Gnathos with strongly sclerotized and bent ventrolateral processes. The dorsal valve process broad-based, its ending slenderer and more rounded, ventral process round, strongly sclerotized on its margin. Juxta with two short, apically rounded lateral processes, saccus bent backward, relatively long and broad. Aedeagus ending with a dentate left ventrolateral structure where the vesica emerges.

Female (Figs 2a & b): Differences from the male are mainly the typical sexual dimorphic characters, such as slenderer antennae, larger abdomen, more rounded fore- and hindwings with a larger wing surface. The colour and ornamentation are similar to the male. Antennae ochreous brown, quadripectinate, of 9.5 mm length, with 26 segments, longest rami 1.2 mm. Forewing length of the single known female 46 mm, hindwing length, measured again from wing base to tip of the tail 69 mm. The dorsal postmedian line only slightly visible, on ventral side broader than in the males.

Distinctive characters and discussion: Peter Smetacek discovered this species in the Mishmi Hills, Arunachal Pradesh: thanks to his material it is possible to know at least one locality for this species, the original material in Coll. SN lacked locality and flying time data and therefore lay undescribed for many years.

Within the complex of conifer-feeding Asian *Actias* Leach, 1815 species around *A. felicis* (Oberthür, 1896), there is a group of taxa with very similar genitalia structures comprising *A. winbrechlini* Brechlin, 2007 from China, Yunnan, *A. peggyae* Brechlin, 2017 from China, Tibet, and the two new taxa described here, *A. smetaceki* **n. sp**. from India, Arunachal Pradesh, and *A. loeffleri* **n. sp**. from Myanmar, Kachin State, described below. All of them bear a rather angular lower forewing margin, and in male genitalia structures a typical fused uncus with one central projection in combination with large rounded, lobe-like ventral processes of the valves. *A. smetaceki* n. sp., the smallest species in this group, has more similarities in male genitalia structures with *A. peggyae*, such as the relative compact ventral processes of the gnathos and the broad and more rounded lateral processes of the juxta, but differs from that species by the different form of the cupola-like uncus. *A. winbrechlini* and *A. loeffleri* **n. sp**., described below share the more slender processes of the gnathos but differ by the form of their uncus, valves and juxta processes. All four species have different BOLD BIN Codes.

Actias winbrechlini Brechlin, 2007 was figured misidentified as *A. chrisbrechlinae* Brechlin, 2007 by Wu (2017: 88ff.), presenting nicely the preimaginal instars originating from Kunming env., Yunnan, where it was reared on *Cedrus deodara*.

***Actias loeffleri*, n. sp.**

Holotype (Fig. 3a, dorsal view; Fig. 3b: ventral view; Figs. 21, 22): ♂, Myanmar (NE), Kachin State, road Kanphant – Mt. Inwa Bum, near pass, N26°10’31.9’’ E98°30’03.4’’, 3008 m, 26.V.2006, 20.45h., leg. S. Naumann, S. Löffler, & S. Langer; BC SNB-RR 0107; coll. CSNB.

— A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is AAJ6377.

Paratypes (in total 17 ♂♂): 5 ♂♂, same locality and collectors as holotype, but with dates: 26.V.2006, 21.25h, 21.40h, 21.45h, 23.25h and 28.V.2006, 0.20h; BC SNB 1505, all coll. CSNB. 5 ♂♂, same locality and collectors, 26.–27.V.2006; BC SNB 3895 & 3896; coll. CSLL, bought 2020, coll. CSNB. 1 ♂, Myanmar, Kachin State, Imaw Bum Mts. [sic], 2660 m, 31.V.–3.VI.2002, leg. Y. Watanabe; received VII.2002 from Yasuyuki Watanabe; GP 944/03 SNB; BC SNB 4933; coll. CSNB. 3 ♂♂, Myanmar, Kachin State, Chudu Razi Hills, 30 miles E Kawnglangphu, 7., 14., & 15.VI.2007, leg. Local collector, received in exchange from Adam M. Cotton; coll. CSNB. 2 ♂♂, same locality, 18.VI.2007; coll. CSLL, bought 2020, coll. CSNB. 1 ♂, Myanmar, Kachin State, Chudu Raji, 2800 m, VIII.2004, leg. Local collector, received XI.2005 from Kiyotami Fukinuki; GP 1388/04 SNB; coll. CSNB. – Blue paratype labels will be added.

Etymology: This beautiful species is named after Swen Loeffler, longtime companion of the senior author during several, sometimes strenuous expeditions to remote areas in Myanmar in recognition of his friendship. His moth collection was purchased by the senior author.

Description

Male (Figs. 3a & b): Length of forewing, measured from base to apex, 47 – 52 mm (holotype 52 mm).

Antennae ochreous brown, quadripectinate, of 13.5 mm length, with 29 segments, longest rami 3.1 mm. Head, thorax, and abdomen white, with a yellowish shade on the thorax beside the collar, collar and forewing costa dark reddish carmine with a narrow inner black margin. Legs with light carmine tibiae and tarsi.

Wings with light bluish green ground colour. Forewing slender and elongate, outer margin erect. The only ornamentations are the central, completely round ocellus and an obscure zigzag postmedial line. The ocellus with 4.1 – 5.0 mm maximum diameter has from basad to marginal a broad black, small white, intense pink, clear, broader whitish pink and tiny grey portion. The light greyish postmedial line has extensions towards the margin between the veins. All veins accentuated, marginal fringe yellow.

Hindwing with long tail in ground colour, with a length of 74 – 88 mm, measured from wing base to tip of the tail. Ornamentation similar as on forewing, the little ovoid ocellus with 5.0 – 5.5 mm maximum diameter, and with same sequential arrangement of colours as on forewing. The postmedial line is only visible from upper margin to the veins which end in the tail part of the wing. Marginal fringe of the main part of the wing yellow.

On ventral side thorax and abdomen white, and wings as well in ground colour. Ornamentation is the same as on dorsal side, both fore- and hindwing ocellus with same colour sequence as on

dorsal side, but black portion narrower whereas the white portion is broader. Postmedian zigzag line more intense than on dorsal side, and on the forewing followed by a portion of grey scales in the apical third of the postmedian area. Hindwing anal marginal area clothed with long white hairs.

Male genitalia (Figs. 21, 22; GP 944/03 & 1388/04 SNB): Uncus with one long central process, apically ending with acute tip. Gnathos with long, slender and almost straight ventrolateral processes. The dorsal valve process with slender base, ending even more slender and rounded, ventral process round. Juxta with two apically rounded lateral processes, the right one a little longer than the left one, saccus relatively long and slender. Aedeagus ending with a small triangular dentate left ventrolateral structure before the vesica emerges.

Female: Unknown.

Distinctive characters and discussion: Some distinctive characters were already mentioned in the description of *A. smetaceki* **n. sp**. above. *A. loeffleri* **n. sp**. is the largest species in the complex, and differs from *A. winbrechlini* aside of the little larger size in some details of the ocellus colouration and male genitalia with its acute tip of the uncus, very slender and long lateral processes of the gnathos, even more slender dorsal processes of the valves, a longer saccus, and longer, apically little rounded lateral processes of the juxta.

It is immediately distinguishable from *A. smetaceki* **n. sp**. by the round forewing ocellus, which is oval in *A. smetaceki*.

Brechlin mentioned in his 2007 paper that *A. winbrechlini* would occur in Eastern Myanmar as well but gave no information from where he had this knowledge nor did he mention any locality data for Myanmar; this was a misinterpretation as he apparently had no material from there, and based his assertion on the information that in Kachin State, an *Actias* species of the *felicis*-group would likely occur. He clearly referred to *A. loeffleri* **n. sp**., which we have described here. Racheli (2008) repeated this note but gave some exact data for material from Myanmar from his collection.

***Loepa melichari*, n. sp.**

Holotype (Fig. 4a, dorsal view; Fig. 4b: ventral view; Fig. 23): ♂, India, Arunachal Pradesh, "Namdafa" "V.2007"; BC SNB 7302; ex coll. CSLL, coll. CSNB. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is AEG3182.

Paratypes (in total 3 ♂♂, 1 ♀): 3 ♂♂, same data as holotype, with GP 2847/22 SNB, BC SNB 7303; coll. CSNB. 1 ♀, paralectotype of *Loepa anthera* Jordan, 1911; Digboi, Assam, L. Brunt;

NHMUK 014203927; Syntype [blue margin]; coll. NHMUK London. – Blue paratype labels will be added.

Etymology: *L. melichari*, n. sp. is named after our friend Tomas Melichar, in recognition of our friendship and of his extensive contribution to the knowledge of Indian Sphingidae.

Description

Male (Figs. 4a & b): Length of forewing, measured from base to apex, 55 – 60 mm (holotype 60 mm).

Tegulae, main part of the thorax and abdomen intense dark yellow. Collar and medial part of the thorax dark grey. Wings with the intense dark yellow ground colour and bright orange and pink ornamentation as is typical for the closely related *L. anthera*. The antennae light ochreous brown, quadripectinate, only last 12 segments bipectinate or with completely reduced pectination, 11.0 mm in length, 34 segments in total, longest rami 1.5 mm long.

Forewing elongate, apex almost right angled with rounded tornus, the outer margin almost straight. On dorsal side the antemedial field and lower half of the medial area pink, merging into more orange colour towards the marginal zone, antemedial line dark grey. The almost crescent shaped ocellus separated from the dark grey costa by a narrow black arc. It has a vertical maximum diameter of 10 – 12 mm (holotype 12.0 mm), and is of orange-brown colour, with internal white semicircle and vertical curved black line with light marginal shade representing the pupil of the ocellus. To marginal side there are two triangular extensions, touching the grey very undulate medial line, at its end the costal margin turning from grey to yellow. The two undulate bluish grey postmedial lines are interspersed and marginally followed by a violet portion, in the apical area light pink with marginal white zigzag line and subapical black dot in the form of a halfmoon, with some proximal blue scales. The prominent submarginal line white, with small extensions along the wing venation, embedded in a dark orange yellow zone. Cilia olive yellow.

Hindwing antemedial line black, becoming broad and pink near the dorsum. Hindwing ocellus of same form and colours as on forewing, the light marginal shade wider than on forewing. It has a vertical maximum diameter of 8.0 – 9.5 mm. Pink and orange portion of the forewing missing, the ornamentation and colours similar.

On ventral side frons darker yellow, thorax and abdomen with yellow ground colour, all legs pink; abdomen with two lateral rows of grey dots. On the forewing the pink and orange portion of the dorsal side is missing, and the ocellus is reduced to a halfmoon-like structure with a vertical maximum diameter of 5.0 – 5.5 mm, coloured violet brown with central slender black line. Pattern otherwise as on dorsal side. Hindwing antemedial line completely black, ocellus with bluish wide proximal line, and submarginal zone dark olive, otherwise as on dorsal side.

Male genitalia (Fig. 23: GP 2847/22 SNB): Uncus bifid on its tip, and with small indention on its ventral margin. Dorsal process of the valves not as rounded as in the structures of *L. anthera*, with a more rectangular form; internal process round, ventral process broad-based and shorter than in *L. anthera*. Juxta with two short lateral lobes. Saccus long and broad. The aedeagus very similar to that of *L. anthera*, little more compact, vesica with three lobes, two of them, the left dorso- and ventrolateral ones, with small dentate sclerite. The genitalia structures were compared with those of topotypical *L. anthera* from northern Vietnam, Nghe An Province (GP 2848/22 SNB) in coll. Naumann.

Female (Figs 5a & b): The single known female, the paralectotype of *L. anthera* itself, is very similar to the males in all characters, and differs from those only by some sexual dimorphic characters such as different structure of antennae and more rounded wings. It has a forewing length of 66 mm, the forewing discal spot has a diameter of 11.0 mm, that of the hindwing of 10 mm. The antennae are 12.0 mm long, completely bipectinate, there are 37 segments, the longest rami are 1.0 mm long.

Distinctive characters and discussion: *Loepa melichari*, **n. sp**. is easily distinguished from most other members of the genus by its colourful wings with pink portions, which is a rare feature in the genus, so far known only in the two closely related species *L. anthera* Jordan, 1911 and *L. oberthuri* (Leech, 1890). It can be separated from the superficially very similar *L. anthera* by its smaller size in general, details of pattern such as the more proximal medial line, slenderness of the wing ocelli, a darker postmedial band on the hindwing, more intense dark pattern on the ventral side, and some details in the male genitalia structures (longer processes of the uncus, more extruded dorsal valve process, rounded internal process, broader and shorter ventral process, and more compact saccus).

Loepa anthera itself was described after two syntypes with different localities, both stored in NHMUK London, a male with data: *Loepa anthera* Type, 1911, Jord., Nov. Zool. [handwritten, Jordan]; Tonkin; Syntype [blue margin]; NHMUK 014203926; and a female with data: Digboi, Assam, L. Brunt; Syntype [blue margin]; NHMUK 014203927 (Fig. 5a & b). Thereby it is obvious, that *L. anthera* has a mixed type series. To stabilize nomenclature, we hereby designate the male syntype as lectotype of *L. anthera* which fixes the identity of the species to the Vietnamese population which is widespread in that country, but also in southern China, with a few records from Laos and northern Thailand. No representative of either *L. anthera* or *L. melichari*, n. sp. are known from Myanmar. The female paralectotype of *L. anthera* is designated here as single known female also as a paratype of *L. melichari*, n. sp. which is so far known only from northeastern Assam and the southeastern part of Arunachal Pradesh in India.

The third taxon in this group of colourful large *Loepa* Moore, 1859 species, *L. oberthuri*, described from Ichang (today: Yichang, Hubei Province, PR China) has an even wider wingspan than the two species mentioned above, and is easily separable by its large salmon-pink portion on both fore- and hindwings and the huge apical bluish black dots at the forewing apex. It occurs in central and southern China. A specimen mentioned in its original description

originating from “Cochin China” [today Vietnam] from the collection of Ch. Oberthür is probably a misidentified *L. anthera*; no specimens of *L. oberthuri* are known from Vietnam. Similar with the situation of the type series of *L. anthera*, there was also in this taxon the possibility of a mixed type series, and to avoid misinterpretations of the identity, a lectotype was already designated by Brosch *et al*. (1999).

***Loepa himalayana*, n. sp.**

Holotype (Fig. 6a, dorsal view; Fig. 6b: ventral view): ♂, India, Arunachal Pradesh, Dist. Along, near Rapum, N28.53176° E94.24941°, 2000 m, 17.–21.IX.2006, leg. Gil Bretschneider, coll. CSLL; BC SNB 4873; collection purchased in 2020; coll. CSNB. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is ACC1700.

Paratypes (in total 30 ♂♂, 2 ♀♀): 6 ♂♂, same data as holotype, with BC SNB 4874 & 4876; coll. CSNB; 5 ♂♂, India (NE), Arunachal Pradesh, Mishmi Hills, Lower Dibang Valley District, Mayudia, 1900 m, 24.–25.IX.2006 leg. Gil Bretschneider, coll. CSLL; GP 2733/21 SNB; coll. CSNB. 1 ♀, PR China, Tibet, Yigong, ca. 30°30’N 94°80’E, 2300–2400 m, V.–IX.1996 ?, leg. Wang, bought X.1996 from Huang Hao, Quingdao; BC SNB 0798 [no result]; coll. CSNB. 13 ♂♂, 1 ♀, PR China, Tibet (Xizang Zizhiqu), Nyingchi Pref., Bomi – Pailung, ca. 30°02’N 95°01’E, 2000 m, VI.–VIII.2012, leg. Yang Yang, bought VI.2014 from Yang Yang, Beijing; GP 2732/21 SNB (♂); BC SNB 5498 (♀); coll. CSNB. 1 ♂, PR China, Tibet (Xizang Zizhiqu), Linzhi area, Motuo, Hanmi, 2200 m, VII.–VIII.2013, bought III.2019 from Yang; coll. CSNB; 1 ♂, PR China, Tibet (Xizang Zizhiqu), Motuo (Metok) County, Duoxiongla valley, Hanmi, 29°21’N 95°07’E, 2120 m, VIII.2013, leg. Yunkang Hu, bought X.2013; coll. CSNB. 1 ♂, PR China, Tibet (Xizang Zizhiqu), Motuo County, Duoxiongla valley, 2000 m, VII.–IX.2016, leg. Yang, material bought 2020 from Yang; coll. CSNB. 3 ♂♂, PR China, Tibet (S) (Xizang Zizhiqu), Motuo County, Hanmi, Duoxiongla valley, 2000 – 2200 m, VIII.2017, leg. Yang, bought 2018 & 2020 from Yang; GP 2737/21 SNB; BC SNB 6400 & 6401; coll. CSNB. – Blue paratype labels will be added.

Etymology: *Loepa himalayana*, **n. sp**. is named for its solely Himalayan distribution in northeastern India and southern Tibet.

Description

Male (Figs. 6a & b, 8a & b): Length of forewing, measured from base to apex, 49 – 66 mm (holotype 62 mm), the Tibetan specimens being smaller on average.

Head, thorax, abdomen and wings with bright, light yellow ground colour and typical pattern for the genus *Loepa*. Collar grey with greyish violet border to the thorax, tegulae yellow. The antennae ochreous brown, quadripectinate, only last 6 segments bipectinate or with completely

reduced pectination, 13.0 mm in length, 32 segments in total, longest rami 1.8 mm long. Legs light pink, with black claws.

Forewing elongate, apex somewhat produced with rounded tornus, the outer margin concave. Antemedial line of intense carmine. The ovoid forewing ocellus of 5.5 – 7.5 mm maximum diameter (holotype 7.0 mm), orange-brown, separated from the costa by a narrow, sharply defined black semicircle, followed distally by a narrow yellow and then pinkish white line and a vertical pale line representing the pupil of the ocellus. Costa grey until the medial line, beyond which it is yellowish grey as far as the distal double black postmedial lines. Beyond that there is a pinkish grey subapical patch crossed by the outer of the two postmedial black lines, which is white as it crosses this patch, marginal portion of the patch more orange. Below that a black subapical speck with some intense carmine suffusion around it. The erect submarginal line white, interrupted along the wing venation, embedded in yellowish olive patches. Marginal fringe yellow.

Hindwing antemedial line greyish black, turning to carmine near the dorsum. Hindwing ocellus almost round, of 5.5 – 7.2 mm diameter (holotype 6.2 mm), without the black proximal semicircle of the forewing ocellus, but otherwise with same sequential arrangement of the colours. Undulate dark grey medial line and double postmedial lines, proximal one dark grey, marginal one bluish, submarginal area as in forewing.

On ventral side frons darker yellow with carmine tip, thorax and abdomen with yellow ground colour. On the forewing the grey antemedian line is obscure. In both the fore- and hindwing ocelli the black semicircle is followed by some bluish scales, and the orange brown colour is missing, giving them a faded and more pinkish impression. Hindwing with black antemedial line. The postdiscal and marginal markings as on dorsal side.

Male genitalia (Fig. 25, GP 2733/21 SNB from India; Fig. 26, GP 2732/21 SNB from Tibet): Uncus long, acute and fused up to its tip. Dorsal process of the valves longitudinal and rounded, the ventral process acute, long and small-based. Both processes are connected with an internal longitudinal vertical protuberance with a rectangular dorsal end. Sacculus distinctive, saccus long, bulb-like, with rounded end, juxta rounded, on ventral side elongated with an internal process. The aedeagus of around 5 mm length, with two left and right lateral sclerotized processes at its end; the vesica emerging to dorsal side, with four left and right large dentate sclerites.

Female (Figs 7a & b): The single known female is very similar to the males in all characters and differs from those mainly by some sexual dimorphic characters such as different structure of antennae, broader abdomen, and more rounded wings. The medial line is somewhat more undulate, the inner of the two postmedial lines is suffused with some blue and carmine scales, and the outer one is broader bluish. The female has a forewing length of 57 – 61 mm, the ovoid forewing discal spot has a diameter of 8.5 mm, that of the hindwing of 7.0 mm. The antennae

are 14 mm long, completely bipectinate, there are 34 segments, the longest rami are 1.1 mm long.

Distinctive characters and discussion: The here described *L. himalayana,* **n. sp**., *L. miranda* Atkinson *in* Moore, 1865 and *L. macrops* Naumann & Smetacek, 2019 form a group of closely related species, occurring in the Himalayan and sub-Himalayan areas of Tibet and Arunachal Pradesh (*L. himalayana,* **n. sp**. with BOLD BIN Code ACC1700), Sikkim, Darjeeling, eastern Nepal and western Bhutan (*L. miranda* with BOLD BIN Code AAB0772), and central to western Nepal, Uttarakhand and Himachal Pradesh (and perhaps further westward) (*L. macrops* with BOLD BIN Code AAB0779). *L. macrops* easily can be separated already by external morphology from the here described taxon by its much larger wing ocelli (for which it is named) plus by details of the male genitalia structures such as form of the processes of the valves and number of sclerites on the vesica (see figures in Naumann & Smetacek, 2019). *L. miranda* resembles much more the here described taxon, but differs by an intense black basal semicircle of the forewing ocellus, less elongate forewings, and in the male genitalia structures by a more triangular dorsal process of the valves and less sclerites on the vesica.

We follow with the authorship of *L. miranda* the interpretation of Naumann & Nässig (2010) or Naumann *et al*. (2012), and cite Atkinson as author of the taxon, similar to some other Saturniidae taxa, and with same reasons as mentioned in the 2010 work, and do not follow Brechlin & Kitching (2010) who gave only Moore as author.

***Cricula mishmica*, n. sp.**

Holotype (Fig. 9a, dorsal view; Fig. 9b: ventral view): ♂, India, Arunachal Pradesh, road Roing – Hunli, 1440 m, 17.–18.V.2009, leg. Bretschneider; GP 2718/21 SNB; BC SNB 6377; coll. CSNB. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is ADR1603.

Paratypes (in total 31 ♂♂): 18 ♂♂, same data as holotype, with BC SNB 6318, 6376, 6378, 6384, 6385; coll. CSNB; 13 ♂♂, India, Arunachal Pradesh, Mishmi Hills, above Roing, 1450 m, V.1990, leg. Wankhar; GP 2717/21; coll. CSNB. – Blue paratype labels will be added.

Etymology: This new species is named after its type locality.

Description

Male (Figs. 9a & b, 10a & b): Length of forewing, measured from base to apex, 28.5 – 35 mm (holotype 33 mm).

Head, thorax, abdomen and wings with intense orange-brown ground colour and dark greyish black markings, with typical pattern for the genus *Cricula* Walker, 1855. Collum in ground colour. The antennae light ochreous brown, quadripectinate, only last 3 segments bipectinate, 8.5 mm in length, with 20 segments in total, longest rami 1.8 mm long.

Forewing almost rectangular with apical tip bent outward, the outer margin strongly concave. Antemedial and medial area in ground colour, the antemedial zigzag line slender, medial area with a variable number of ocelli and/or dark grey patches of variable size. All specimens bear a drop-like fenestrum with narrow grey margin at the marginal end of the cell between basal vein M_1 and CuA_1 (nomenclature following Scoble, 1995); most specimens bear a second fenestrum or grey dot near the costa, and some have a third fenestrum or dot in between, and very few even a fourth dot or tiny window proximal to the first one. The variability with one (paratype) and four fenestra (holotype) is shown in our figures. The grey postmedial line is almost straight, turning little bent into the apical costal area. The postmedial area darker violet grey than ground colour, with lighter area around the tornus. Marginal fringe white.

Hindwing completely in ground colour, the grey antemedial line without indentions, the postmedial line dentate, approaching each other or in some specimens even connected near the upper wing margin. One central round fenestrum with grey margin in the medial area.

On ventral side thorax with legs and abdomen in ground colour. Both on the fore- and hindwing the antemedial and medial zone lighter, suffused with violet-whitish scales, the postmedial zone in the more intense ground colour of dorsal side. The area below cell yellowish, without dark suffusion. Both ante- and postmedial lines reduced, the apical two thirds on fore- and hindwing more violet than grey. Marginal fringe white.

Male genitalia (Fig. 27; GP 2718/21 SNB): Uncus strongly sclerotised at its tips, with two short lateral triangular processes and deep furcation. Gnathos almost rectangular, with rounded edges. There are two short, little rounded dorsal tips of the valves, the sacculus is quite broad. Juxta with two lateral lobe-like, triangular processes with short dentation on their tips, and a ventral rounded sella with central furcation. The saccus short, broad and triangular. The aedeagus has a sclerotised portion on dorsal side, the vesica is short and has four bulbs with one large sclerotised spine each on their tips, all in almost same size.

Female: Unknown.

Distinctive characters and discussion: *C. mishmica*, **n. sp.** forms with *C. flavoglena* Zhu & Wang, 1993 from Yunnan Province, China, *C. aungsansukyiae* Naumann & Löffler, 2010, from Kachin and Sagaing States, Myanmar, and *C. gandhii* Naumann & Löffler, 2013, from India, Arunachal Pradesh a small group of species within the genus with most similarities in male genitalia structures (form of uncus, gnathos, valves and four sclerites on the vesica; figures in Naumann & Löffler 2010, 2013), and those four taxa are also near to each other in the neighbour joining tree downloaded from the BOLD website. *C. gandhii* which occurs partly

sympatrically with *C. mishmica*, has a greater forewing length, different, darker ground colour and in male genitalia a different form of the juxta processes and the vesica.

***Sinobirma occidentalis*, n. sp.**

Holotype (Fig. 11a, dorsal view; Fig. 11b: ventral view): ♂, India (NE), Arunachal Pradesh, Ziro, Pange valley,1850 m, 17.VI.2007, 3.30h, leg. Bretschneider; GP 2624/19 SNB; BC SNB 6323; coll. CSNB. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is ADQ8860.

Paratypes (in total 3 ♂♂, 4 ♀♀): 3 ♂♂, 4 ♀♀, same locality as holotype, collected 12.–17.VI.2007 1 ♀ with BC SNB 6324; coll. CSNB – Blue paratype labels will be added.

Etymology: The new *Sinobirma* species is named after its westernmost distribution within the genus. The three already known taxa originate from Kachin and Sagaing State in northern Myanmar, Yunnan province in China, southeastern Tibet, and northeastern Arunachal Pradesh, India (overview in Rougerie, 2003 and Rougerie *et al*., 2012).

Description

Male (Figs. 11a & b): Length of forewing, measured from base to apex, 41 – 44 mm (holotype 42 mm mm).

Head, thorax, abdomen and wings with light yellow ground colour and typical pattern for the genus *Sinobirma*, the wings with scattered grey scales. Collum and tegulae yellow. The antennae olive-ochreous, bipectinate, the pectination much reduced on the 2 apical units, 10.0 mm in length, 35 segments in total, longest rami are around 2.0 mm long. The rami are situated in longitudinal direction on the antenna, turning to the tip, and are little bent to ventral side. Legs greyish carmine, with yellow hairs.

The forewing rounded, with almost right-angled lower angle and similarly angled apex, the latter with a small apical tip. The forewing with the following pattern elements on the otherwise homogenous wings on dorsal side, which consistently differ in detail from those of other *Sinobirma* species: Costa with grey shade in the basal half, the crenulate antemedial line chestnut brown and almost invisible, and the median band grey, undulate in the basal half, but straight in the costal half, touching the basal side of the forewing fenestrum which is drop-like, almost rounded, with 2.8 mm maximum diameter, and has a chestnut brown and grey margin. Postmedial line almost straight, broad, and of chestnut- brown colour. Postmedial area entirely in ground colour. Marginal fringe yellow.

Hindwing grey antemedial line slightly indicated, the grey medial line broad and intense dark grey, touching the ocellus at its basal margin. Ocellus round, with broad black outer circle, with a maximum diameter of 4.0 mm. Postmedial line slight, crenulate, and of chestnut brown colour. Postmedial area with a row of tiny grey dots between the veins. Marginal fringe yellow.

On ventral side somewhat lighter ground colour, and the pattern differs in the following characters: The forewing medial line is more curved, little crenulate, and is situated marginally to the ocellus. Both fore- and hindwing ocellus have the black margin circled with a chestnut brown external circle, and both fore- and hindwing bear a row of grey dots in the postmedial zone. Otherwise, similar to dorsal side.

Male genitalia (Figs. 28 & 29; GP 2624/19 & 2912/23 SNB): Uncus as in *S. malaisei* Bryk, 1944 and *S. bouyeri* Naumann *et al*., 2012, with two rounded dorsal processes with a slight dorsal indention, and a disto-ventral hook-like tip. The median processes of the gnathos are not fused in the centre and club-like, strongly sclerotized. The two knob-like protuberances at the dorsal basis of the valves are not connected with this structure, but are lateral ends of the gnathos. Valves with a well-developed harpe and two relatively acute apical processes. Juxta with lateral small rounded processes. Aedeagus with vesica emerging left lateral, the vesica has a very small apical sclerite. The 8th sternite with two quite acute processes, originating widely separated with round indention in between, and basally not sharing a mutual prolongation of the sternite. The sclerotisation of the 8th tergite slightly narrow in shape, median indention broad and not very deep.

Female (Figs 12a & b): Again, the female is very similar to the males, with few differences: The ground colour on dorsal side is a little more intense yellow, the colouration of antemedial and medial line is somewhat darker, the medial line even a little crenulate, the forewing postmedian area has a chestnut brown hue aside of the apical part and contains a row of darker chestnut brown dots. As in the male, the straight postmedian line ends at the costa before the apex. The wing ocelli are round and larger than in males, with a maximum diameter of 5.0 mm. Ventral side as in males, the postmedial area in ground colour. The forewing median line again is not a reflection of that of the dorsal side, it is situated posterior to the forewing ocellus and very wavy. The female has some more differences due to sexual dimorphism: The wings are somewhat more compact, still with almost right-angled apex, the forewing length, measured from base to apex, is 46 – 48 mm. The antennae have much shorter rami (still bipectinate) of around 0.6 mm length, are 9.0 mm long and have 37 segments, and the body mass is typically more compact.

Distinctive characters and discussion: *Sinobirma occidentalis*, **n. sp.** is smaller than *S. 62alaise* and *S. myanmarensis* Naumann *et al*., 2012, but larger than *S. bouyeri* which occurs also in Arunachal Pradesh. It has almost the same ornamentation as *S. myanmarensis* (situation of the medial line in comparison to the ocellus, form and colour of the postmedial line) but differs from that species, aside from much smaller size, by the dark grey portion of the ocellus ring (carmine in *S. myanmarensis*). The smaller males of *S. bouyeri* have less intense pattern

structures and are more homogenously coloured. The markings of this species (e.g. medial line) are situated in different positions. The apical processes of the valves in male genitalia of *S. occidentalis* are unique in their form.

***Salassa dibanga*, n. sp.**

Holotype (Fig. 13a, dorsal view; Fig. 13b: ventral view): ♂, India, Arunachal Pradesh, Mishmi Hills, 2600 m, IV.1990, leg. Wankhar. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is AEF2584.

Paratypes (in total 8 males, 9 females): 5 ♂♂ 5 ♀♀: India, Arunachal Pradesh, Mishmi Hills, 2300 m, IV.,V., VII. 1990, leg. Wankhar; BC SNB 6624 & 6625; GP 2725/21 SNB; BC SNB 7287; GP 2731/21 SNB; BC SNB 6457; GP 2798/22 & 2799/22 SNB; BC SNB 7299 & 7300; Coll. CSNB. 3 ♂♂ India, Arunachal Pradesh, road Roing – Hunli, km 65, 28°16'47''N 95°54'45''E, 2306 m, 20.IV.2021, 29.IV.-10.V.2019, IV.2022, 4 ♀♀: same locality, 19.IV.2021; 23.IV.2021 x2 specimens, 24.IV.2021, leg. P. Smetacek; BC SNB 7298; coll. CBRC – Blue paratype labels will be added.

Etymology: The new taxon is named after distribution in the Dibang area in northeastern Arunachal Pradesh.

Description

Male (Figs. 13a & b): Length of forewing, measured from base to apex, 50 – 55 mm (holotype 55 mm).

Head, thorax, abdomen and wings with dark greyish brown ground colour, wings suffused with fuscous orange-brown scales, the complete thorax and basal part of the wings covered with hair-like scales. Antennae chestnut brown, completely quadripectinate, 15.0 mm in length, with 38 segments, longest rami 2.0 mm.

Forewing almost rectangular, apex with somewhat acute tip, tornus rounded. Antemedial and medial area in ground colour, separated by an indistinct black antemedial line with white proximal shade. Forewing fenestrum with green transparent centre, little rounded to proximal side, with upper and lower acute tip and acute extension to marginal side. Postmedial fuscous line almost straight, with costal part being orange, and with 6 to 7 small hyaline patches between the veins. Postmedial area in the proximal half dark brown, ending violet in the apical area, marginal half in ground colour. Marginal fringe brown.

Hindwing with black antemedial and postmedial line, connected with a semicircle to each other near the upper wing margin and circling the eyespot with black pupilla and transparent

halfmoon-like vertical thin structure, with white and outer orange-red ring, this with a maximum diameter of 8.0 – 9.5 mm (one specimen with barcode SNB 2799 known with much reduced eyespot of only 6.0 mm diameter). The eyespot surrounded by light greyish-brown zone. The black postmedial line is followed marginally with a greyish violet portion, suffused with olive scales, a dark grey submarginal line, and the outer submarginal zone in uniform ground colour. Marginal fringe brown.

On ventral side thorax, abdomen and legs covered with long, dark brown hair. Both fore-and hindwings up to the postmedial line dark brown without any ornamentation, suffused with white hairs in the basal part, the only pattern are the transparent parts of the ocelli and fenestra. Postmedial line consisting of a row of hyaline vertical patches, followed by an inner violet part of the postmedial area in the proximal two thirds, separated with a broad dentate line from the marginal olive area. The area below the cell paler brown.

Male genitalia (Figs. 30 & 31; GP 2798/22 & 2799/22 SNB): Uncus with an acute hook bent to ventrad side, and a second, bulb-like structure on dorsal side. Transtilla central with slender, rounded lobe, and two lateral round projections with lots of bristles. The dorsal process of the valves with acute ventrad projection, the ventral one with one tip and dentate margin on ventrad side. Sacculus round, the juxta without major details, a ventrad semi-circle. Saccus short and round, vesica one round bulb with small dorsal and long distal hose-like projection.

Female (Figs 14a & b): The female differs from the male by a more olive ground colour, larger size, broader abdomen, more rounded wings, and different anatomy of the antennae. It has a forewing length of 57 – 60 mm, and the antennae are 15.0 mm long, completely bipectinate, there are 32 segments, the longest rami are 0.8 mm long. Pattern differences are the much larger forewing fenestrum with more drop-like form, with a maximum diameter of 4.0 – 5.9 mm. The 7 to 8 hyaline patches of the forewing postmedial are much wider, and the postmedial area is more greyish. The outer margin of the forewing is a little concave, the apex has a small apical tip bent outward. Also, the hindwing ocellus has a much bigger greenish hyaline, almost rhombic centre, the complete ocellus is little larger than in the male, with a maximum diameter of 10 – 11 mm. The black postmedial line is followed by a row of vertical hyaline patches, the marginal part again more greyish. On ventral side with same ornamentation and colours as the male.

Distinctive characters and discussion: See also the discussion below under *S. linzhica*, **n. sp.** which is a member of the same group. *S. dibanga*, **n. sp.** was known to the senior author from the type series, but exact locality data was missing until it was re-discovered by Peter Smetacek; perhaps most of the type series originated in the same locality. *S. dibanga*, **n. sp.** is the most greyish brown species in this group, compared to more orange colours of the other members. The forewing fenestrum is as small as in *S. belinda* Witt & Pugaev, 2007, but more drop-like and of different form. The very small hyaline portion of the hindwing ocellus is unique. Male genitalia structures differ from those of *S. belinda* in the form of the ventral process of the

uncus, the more triangular dorsal valve apex, and the more dentate ventral valve process; structures of this species were figured in the original description by Witt & Pugaev (2007).

***Salassa occinica*, n. sp.**

Holotype (Fig. 15a, dorsal view; Fig. 15b: ventral view): ♂, India (NE), Arunachal Pradesh, Mishmi Hills, VI.1990, leg. Wankhar. GP 2952/23 SNB; coll. CSNB. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is AEC2605.

Paratypes (in total 2 ♀♀): 1 ♀, India, Arunachal Pradesh, Mishmi Hills, V. 2007, coll. Loeffler; BC SNB 6369; coll. CSNB. 1 ♀, India, Arunachal Pradesh, road Roing – Hunli, 2400 m, 10.VII.2019, leg. P. Smetacek; female BC SNB 7297; coll. CBRC. – Blue paratype labels will be added.

Etymology: The name is a combination mentioning the westernmost distribution of a species group in the genus *Salassa* Moore, 1859, with the oldest available name being *S. katschinica* Bryk, 1944.

Description

Male (Figs. 15a & b): Length of forewing, measured from base to apex, 50 mm (holotype).

Head, thorax, abdomen and wings with orange-brown ground colour, wings with dark chestnut brown markings, the complete thorax and very basal part of the wings covered with hair-like scales. Antennae greyish brown, quadripectinate, 14.0 mm in length, with 35 segments, longest rami 1.8 mm.

Forewing a little rounded, apex almost right angled, slightly excised below apex, tornus rounded. Antemedial and medial area in ground colour, separated by an indistinct dark greyish antemedial line with white proximal shade. Forewing fenestrum with green transparent centre, drop-like, little rounded to proximal side, with upper and lower tip and short extension to marginal side, with a maximum diameter of 3.2 mm. Postmedial fuscous line curved, with faint white shade only near the lower wing margin, and without any hyaline patches between the veins. Postmedial area in the proximal half dark brown, ending violet in the apical area, marginal half in ground colour. Marginal fringe brown.

Hindwing with broad black antemedial and postmedial line, connected with a semicircle to each other near the upper wing margin and circling the eyespot with black pupilla and large transparent halfmoon-like vertical transparent zone, with broad white and outer vivid red ring, this with a maximum diameter of 12 mm. The eyespot surrounded by light greyish zone. The black postmedial line with three hyaline patches near the inner margin is followed marginally

with a white line and a greyish brown portion, suffused with orange scales, a dark bluish grey submarginal line, and the outer submarginal zone in ground colour. Marginal fringe brown.

On ventral side thorax, abdomen and legs covered with chestnut hair, legs dark violet brown. Both fore-and hindwings up to the postmedial line dark violet brown without any ornamentation, suffused with white hairs in the basal parts, only pattern are the transparent parts of the ocelli and fenestra with some black suffusion around. Postmedial line white, followed by an inner whitish violet part of the postmedial area in the proximal two thirds, separated with a dentate line from the marginal dark brown third.

Male genitalia (Fig. 32; GP 2952/23 SNB): Uncus with a hook bent to ventrad side, ending with a small bulb with apical tip, and a second, bulb-like structure on dorsal side. Transtilla central with slender, rounded lobe, and two small lateral broad-based, rounded projections covered with lots of bristles. The dorsal process of the valves of almost rectangular form with outer concave margin, the ventral one acute with very few dentate marginal projections. Sacculus round, the juxta without major details, a ventrad semi-circle. Saccus round and short, vesica one large round bulb with broad dorsal and long, slender distal hose-like projection.

Female (Figs 16a & b): The female differs from the male by its somewhat darker ground colour, the presence of hyaline patches in the postmedial line, the acute and prolongated forewing apical tip, larger size, broader abdomen, and different anatomy of the antennae. It has a forewing length of 58 mm, and the antennae are 15.0 mm long, completely bipectinate, there are 34 segments, the longest rami are 0.8 mm long. Pattern differences are the much larger, rhomboid forewing fenestrum, with a maximum diameter of 6.0 mm. There are 6 relatively large hyaline patches of the forewing postmedial line, and the postmedial area is more greyish. The outer margin of the forewing is more concave, the apex has an apical tip bent outward. Also, the hindwing ocellus has a much bigger greenish hyaline, almost halfmoon-like centre, the complete ocellus is larger than in the male, with a maximum diameter of 13 mm, but with same colouration. The black postmedial line is followed by a row of 5 vertical hyaline patches, the marginal part again more greyish. On ventral side with same ornamentation and colours as the male.

Distinctive characters and discussion: See also the discussion below under *S. linzhica,* **n. sp.** which is a member of the same group. *S. occinica,* **n. sp.** is a very colourful species which shares most characters with the smaller *S. linzhica,* **n. sp.** and the larger *S. katschinica* but differs from those species by its size, form of forewing fenestrum, hindwing ocellus, number of hyaline patches in the postmedial line, and details in male genitalia structures (form of the uncus tip and transtilla, outer margin of the dorsal valve apex, less dentate margin of the ventral valve process, and large size of the vesica).

***Salassa linzhica* n. sp.**

Holotype (Fig. 17a, dorsal view; Fig. 17b: ventral view): ♂, PR China, Tibet (Xizang Zizhiqu), Bomi County, Linzhi area, 2000 m, V.–VI.2021, leg. Local collector, material bought 2021 from Yang, Beijing; GP 2953/23 SNB; BC SNB 7257; coll. CSNB. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is AFA0475.

No paratypes.

Etymology: The name of this species is a combination of its type locality with a reminder to its probably nearest relative, *Salassa katschinica*.

Description

Male (Figs. 17a & b): Length of forewing, measured from base to apex, 46.5 mm (only holotype known).

Head, thorax, abdomen and wings with light orange-brown ground colour, wings with dark greyish brown markings, the complete thorax and very basal part of the wings covered with hair-like scales. Antennae greyish brown, quadripectinate, 13.0 mm in length, with 35 segments, longest rami 1.6 mm.

Forewing margin rounded, apex only slightly produced, tornus round. Antemedial and medial area in ground colour, separated by a faint dark greyish antemedial line with white proximal shade. Forewing fenestrum with green transparent centre, drop-like, rounded to proximal side, with costal tip and broad extension to marginal side, with a maximum diameter of 3.1 mm. Postmedial fuscous line curved, with slight white suffusion only near the lower wing margin and six very tiny hyaline patches between the upper veins. Postmedial area in the proximal half dark brown, ending violet in the apical area, marginal half in ground colour. Marginal fringe orange.

Hindwing with broad black antemedial and postmedial line, connected with a semicircle to each other near the upper wing margin and circling the eyespot with black pupilla and transparent halfmoon-like vertical transparent zone, with white and broad outer vivid orange-red ring, this with a maximum diameter of 8.0 mm. The eyespot surrounded by a small light greyish zone. The black postmedial line with six hyaline patches near the inner margin is followed marginally with a bluish violet portion, suffused with orange scales, a dark violet grey submarginal line widening towards the apex, and the outer submarginal zone in ground colour. Marginal fringe brown.

On ventral side, thorax, abdomen and legs covered with orange-brown hair, legs dark violet brown. Both fore-and hindwings up to the postmedial line orange brown without any ornamentation, suffused with white hairs in the basal parts, the only pattern are the transparent parts of the ocelli and fenestra surrounded with faint black shade. Postmedial line white,

followed by an inner orange and then whitish violet part of the postmedial area in the proximal two thirds, separated with a dentate line from the marginal olive brown third.

Male genitalia (Fig. 33; GP 2953/23 SNB): Uncus with a hook bent to ventrad side, ending with a rounded tip, and a second, bulb-like structure on dorsal side. Transtilla central with broad, rounded lobe, and two lateral slender, ear-like projections. The dorsal process of the valves of almost rectangular form, the ventral one with two dentate dorsal projections. Sacculus round, the juxta without major details, a ventrad semi-circle. Saccus a little triangular, vesica one round bulb with long distal hose-like projection.

Female: Unknown.

Distinctive characters and discussion: *S. linzhica*, **n. sp.** is the smallest of all species within the species-group around *S. katschinica* which all have quite rounded hindwing ocelli and a compact, rounded wing form separating them from most other taxa of the genus. Members of this group are *S. katschinica* itself, *S. belinda*, *S. dibanga*, **n. sp.**, *S. occinica*, **n. sp.**, and the here described *S. linzhica*, **n. sp.**. It differs from the members of that group by the smaller size. (Bryk (1944) in his description mentioned around 58 mm forewing length for his type series of *S. katschinica*, and two almost sympatrically collected specimens from Kachin State in the senior author's collection have a forewing length of 57 and 58 mm and thereby are much larger than all other members of the group), details of the pattern such as number of the hyaline patches near the postmedial line, form of the forewing fenestrum, intense orange colour, combination of colours on ventral side and details in male genitalia structures (the rounded tip of the uncus, form of transtilla, margins of valve processes, triangular form of saccus, and small size of vesica). Genitalia structures of the holotype of *S. katschinica* were figured already by Witt & Pugaev (2017) for comparison.

***Solus pseudodrepanoides*, n. sp.**

Holotype (Fig. 18a, dorsal view; Fig. 18b: ventral view): ♂, India, Arunachal Pradesh, Mishmi Hills, 2300 m, V.1990, leg. Wankhar; BC SNB 6472; coll. CSNB. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is AEC5132.

Paratypes (in total 4 ♂♂): 4 ♂♂, India (NE), Arunachal Pradesh, same data has holotype; GP 2954/23 SNB; BC SNB 6374 & 6375; coll. CSNB. – Blue paratype labels will be added.

Etymology: The species is named for its close relationship to the type species of the genus *Solus* Watson, 1914, *S. drepanoides* (Moore, 1865).

Description

Male (Figs. 18a & b): Length of forewing, measured from base to apex, 31 – 34 mm (holotype 31 mm).

Head, thorax, and forewings with intense light grey ground colour and typical pattern for the genus *Solus*. Collar and tegulae grey, central dorsal part of the thorax with orange patch. The antennae ochreous with a white base, quadripectinate, 7.0 mm in length, 22 segments in total, longest rami 1.0 mm long.

Forewing slender and elongate, apex strongly produced with almost right angled tornus, the outer margin a little concave. The area with hyaline patches large, with a large central patch. Postmedial line dark greyish carmine, almost straight in the lower part of the wing, bent backward towards the costa in the apical third. Postmedial area including apical zone grey, sometimes with orange hue, and a dark grey, dentate submarginal line, ending straight towards the apex.

Hindwing of greyish orange ground colour, with broad ante- and postmedial lines which never touch each other on the upper wing margin. Medial area with four to six hyaline patches. Postmedial area in the proximal half in ground colour, marginal half of which is separated by a thin grey and dentate line, more greyish, especially in the upper and lower parts. Tornal area suffused with grey.

On ventral side thorax and abdomen greyish. Antemedian lines on both fore- and hindwings absent, and postmedial lines dentate. Otherwise, similar to dorsal side.

Male genitalia (Fig. 34; GP 2954/23 SNB): Uncus bifurcate and V-shaped, with small dorsolateral angled projections. Transtilla serrate and a little triangular to ventral side. Dorsal process of the valves broad-based, with arched outer margin, ventral process strongly sclerotized, acute and almost straight. Juxta like a rounded sclerotized lobe, with small indention on ventral side. Saccus broad, straight, and long, aedeagus broad, with left ventrolateral sclerotization at its end, vesica with a bent row of cornuti.

Female: Unknown.

Distinctive characters and discussion: *Solus pseudodrepanoides*, **n. sp.** forms with *S. drepanoides* and *S. medogiana* Brechlin, 2015 a small group in the genus with very colourful species with huge hyaline patches on the forewing. *S. drepanoides* which is known to us from Darjeeling (type locality), Nepal, Sikkim, and western Bhutan is slightly smaller, has a small bulge on the outer hindwing margin, and an ochreous postmedial and apical area of the forewing. *S. medogiana* (with its younger synonym *S. wui* Lang, 2017; already synonymized by Brechlin, 2022), known from Tibet and northern Arunachal Pradesh, has almost the same size as *S. pseudodrepanoides*, **n. sp.**, but is much more colourful, with carmine forewing postmedial line and ochreous yellow postmedial area; the marginal half of the hindwing postmedial area is almost entirely greyish violet, and in almost all specimens the hindwing ante- and postmedial

lines are connected to each other in the upper wing area. Male genitalia structures are quite similar to those of *S. drepanoides*, but differ in details of the lateral uncus and the triangular transtilla; the valves of *S. drepanoides* have a more right-angled dorsal margin of the dorsal process, and the ventral process is less sclerotized and more acute. The juxta of *S. drepanoides* lacks the ventral indention, and the saccus is smaller. *S. medogiana* bears a U-shaped uncus with different transtilla, the dorsal process of the valves is rounded, the ventral process is longer. Details of all genitalia structures of *S. drepanoides* and *S. medogiana* (there under the name *S. wui*) were nicely figured by Lang (2017) for comparison. *S. drepanoides* has the BOLD BIN Code AAD7316, and *S. medogiana* ABZ0707.

In the original description of the genus more than hundred years ago, Watson (1914) already mentioned the unique wing venation of the single known specimen he examined (a male specimen of *S. drepanoides* from Bhutan) and the unique appearance with the irregular hyaline patches which reminded him of the African genus *Eudaemonia* Maassen, 1877 (probably *E. argiphontes* (Westwood, 1849)). He found some concordance of the venation with Attacini which are not really closely related to *Solus*. The standing of the genus is somewhat ambiguous and might even demand classification in an own, separated subfamily of Saturniidae. Preimaginal instars of the whole genus are still unknown to science, and knowledge of those would help a lot to classify *Solus* properly within Saturniidae.

***Solus tawanga*, n. sp.**

Holotype (Fig. 19a, dorsal view; Fig. 19b: ventral view): ♂, India (NE), Arunachal Pradesh, Ziro, Pange valley, 1850 m, 15.VI.2007, 4.00h, leg. G.-Bretschneider, coll. CSLL; BC SNB 6319; coll. CSNB. — A red holotype label will be added accordingly. The holotype will be deposited within the Rainer Seegers Foundation in the collections of MfN Berlin. The BOLD BIN Code is ABZ2058.

Paratypes (in total 10 ♂♂): 8 ♂♂, same locality as holotype, but 15.VI.2007, 0.15h, 0.45h, & 4.00h, 16.VI.2007, 3.30h, 17.VI.2007, 3.45h, 18.VI.2007, 2.00h & 2x 3.00h; GP 2956/23 SNB; BC SNB 6320; coll. CSLL. 2 ♂♂, India (NE), Arunachal Pradesh, Dist. Bomdila, near hill station, N27.28355' E92.41671', 2800 m, 21.–23.VII.2007, leg. Gil Bretschneider, coll. CSLL; GP 2075/09; BC SNB 1360 & 3800; material exchanged with S. Löffler IX.2007; coll. CSNB. – Blue paratype labels will be added.

Etymology: The name of the new species refers to Tawang, the westernmost known locality for the moth.

Description

Male (Figs. 19a & b): Length of forewing, measured from base to apex, 33 – 34 mm (holotype 34 mm).

Head, thorax, and forewings with faded greyish ground colour and typical pattern for the genus *Solus*. Collar and tegulae light grey, central dorsal part of the thorax with some ochreous hairs. The antennae ochreous with a white base, quadripectinate, 7.5 mm in length, 21 segments in total, longest rami 1.2 mm long.

Forewing slender and elongate, apex strongly produced with very acute tip, with rectangular tornus, the outer margin almost straight. The area with hyaline patches relatively small compared to other species, with a large costal patch and several very small ones in the upper half of the wing. Postmedial line greyish carmine, almost straight in the lower part of the wing, bent backward as a very thin line towards the costa in the apical area. Postmedial area including apical zone light ochreous, sometimes with greyish hue, and a grey, dentate submarginal line, ending straight towards the costal area in front of the apex.

Hindwing of ochreous ground colour, with broad ante- and postmedial lines which touch each other on the upper wing margin. Medial area with four to five hyaline patches, some of them partly only indicated as dark grey patches. Postmedial area in ground colour, with a tiny grey and dentate line, more greyish lower parts. Greyish brown suffusion around the apex and tornus.

On ventral side thorax, abdomen and most parts of the legs in ground colour, first pair of legs with white tarsi and black claw. Antemedian lines on both fore- and hindwings absent, and postmedial lines dentate. Otherwise, similar to dorsal side.

Male genitalia (Fig. 35 & 36; GP 2075/09 & 2956/23): Uncus bifurcate, with two projections directed to ventrad side on each process. Central part of the transtilla very long and almost rectangular. Dorsal process of the valves relatively slender, with strongly serrate dorsal margin; ventral process long and straight. Juxta with two dorsolateral tips, saccus short. Vesica with two separated fields of sclerite rows.

Female: Unknown.

Distinctive characters and discussion: *Solus tawanga*, **n. sp.** is a member of the complex around *S. parvifenestratus* Bryk, 1944, with probably its nearest relative *S. loba* Lang, 2017, **stat. nov.** as species, described from Tibet, but known to us also from higher altitudes in northeastern Arunachal Pradesh (specimens in coll. Smetacek), near to the Tibetan type locality. *S. loba* is of more homogenous ochreous ground colour, and specimens available to us from Arunachal Pradesh with similar barcode result as the holotype of *S. loba* are larger, and have the forewing apex much more produced and more acute than *S. tawanga*, **n. sp**. Male genitalia structures resemble those of *S. parvifenestratus* (from eastern Myanmar) but differ a little in the shape of the uncus processes, the even more serrate dorsal valve process, and details of the vesica sclerites. Genitalia of the almost sympatric *S. loba* differ even more, with shorter transtilla, not serrate, rounded and more slender dorsal valve processes and the broad-based ventral valve processes. Details of the genitalia of *S. loba* were figured nicely by Lang (2017). *S. loba* has a

flight time later in the year, starting in August in Tibet, as late as November in Arunachal Pradesh. *S. loba* has the BOLD BIN Code ACK9522.

Acknowledgements

We would like to thank the following persons who helped over the years with information, material, discussion, field support and notes on the manuscript (in alphabetical order): Gil Bretschneider (Lichtenstein/Sachsen), Adam Cotton (Chiang Mai), Kiyotami Fukinuki (Hiroshima), Alessandro Giusti (NHMUK London), Htay Aung (Yangon), Nikolai Ignatev (České Budějovice), Stanley Jákl (Prague), Ian J. Kitching (NHM London), Steve Kohll (Luxemburg), Michael Langer (Niederwiesa), Théo Léger (MfN Berlin), Swen Löffler (Lichtenstein/Sachsen), Iprah Mekola (Roing), Tomas Melichar (Příbram), Wolfram Mey (MfN Berlin), Wolfgang A. Nässig (SMFL Frankfurt am Main), Jibi Pulu (Roing),Viola Richter (MfNB Berlin), Rodolphe Rougerie (MNHN Paris), Alexander Schintlmeister (Dresden), and Yasuyuki Watanabe (Amagasaki-shi).

REFERENCES

Barcode of Life [or BOLD or Boldsystems] 2012/21: Advancing species identification and discovery by providing an integrated environment for the assembly and application of DNA barcodes. Barcode of life data systems. — URL: www. barcodinglife.org or www.boldsystems.org (last accessed: 04. VIII. 2023).

Brechlin, R. 2007. Fünf neue Taxa der Gattung *Actias* Leach, 1815 aus China (Lepidoptera: Saturniidae). *Entomofauna*. *Zeitschrift für Entomologie*, Monographie 1: 12–27.

Brechlin, R. 2015. Drei neue Arten der Gattung *Solus* Watson, 1913 (Lepidoptera: Saturniidae). *Entomo-Satsphingia* 8 (2): 8–13.

Brechlin, R. 2017. Eine neue Art der Gattung *Actias* Leach, 1815 aus Tibet (Lepidoptera: Saturniidae). *Entomo-Satsphingia* 10 (1): 5–7.

Brechlin, R. 2022. Einige Anmerkungen zur Gattung *Solus* Watson, 1913 mit Beschreibung eines neuen Taxons aus Laos (Lepidoptera: Saturniidae. *Entomo-Satsphingia* 15 (1): 69–71.

Brechlin, R. & Kitching, I. J. 2010. Drei neue Taxa der *miranda*-Gruppe der Gattung *Loepa* Moore, 1859 (Lepidoptera: Saturniidae). *Entomo-Satsphingia* 3 (1): 12–18.

Brosch, U., S. Naumann, L.H. Paukstadt, U. Paukstadt,I. Tcherniak & M. Beeke. 1999. Anmerkungen zur Brahmaeiden- und Saturniidenfauna von Laos und Kambodscha (Lepidoptera: Bombycoidea). *galathea. Berichte des Kreises Nürnberger Entomologen e.V.*, Suppl. 6: 33–58.

Bryk, F. 1944. Entomological results from the Swedish expedition 1934 to Burma and British India. Lepidoptera: Saturniidae, Bombycidae, Eupterotidae, Uraniidae, Epiplemidae und Sphingidae, gesammelt von René Malaise. *Arkiv för Zoologi*, 35A (8): 1–55, 6 pls.

Jordan, K. 1911. Descriptions of new Saturniidae. *Novitates Zoologicae. A journal of zoology in connection with the Tring Museum* 18 (1): 129–134.

Kitching, I. J., R. Rougerie, A. Zwick, C.A. Hamilton, R.A. St. Laurent, S. Naumann, L. Ballestros Mejia & A.Y. Kawahara. 2018. A global checklist of the Bombycoidea (Insecta: Lepidoptera). *Biodiversity Data Journal* 6: e22236 [DOI: doi.org/10.3897/BDJ.6.e22236].

Lang, S.-Y. 2017. Notes on the genus *Solus* Watson, 1913 from Yunnan and Tibet, China with description of new taxa (Lepidoptera, Saturniidae). *Atalanta* 48 (1–4): 240–244.

Naumann, S. & S. Löffler. 2010. Notes on the Asian genus *Cricula* Walker, 1855, with descriptions of new species (Lepidoptera, Saturniidae). *Neue Entomologische Nachrichten*. Supplement 2: 1–24.

Naumann, S. & S. Löffler. 2013. Two new species of the genus *Cricula* Walker, 1855 from Myanmar and India, with synonymic notes (Lepidoptera: Saturniidae). *Nachrichten des entomologischen Vereins Apollo* N.F. 33 (4): 177–184.

Naumann, S., S. Löffler & S. Kohll. 2010. Bemerkungen zur Gattung *Salassa* Moore, 1859, mit Beschreibung einiger neuer Arten (Lepidoptera, Saturniidae). *The European Entomologist* 2 (3-4): 93–123.

Naumann, S., S. Löffler & W.A. Nässig. 2012. Taxonomic notes on the group of *Loepa miranda*, 2: The subgroup of *Loepa damartis* (Lepidoptera: Saturniidae). *Nachrichten des entomologischen Vereins Apollo* N.F. 33 (2/3): 87–106.

Naumann, S. & W.A. Nässig. 2010. Revisional notes on the species-group of *Saturnia grotei* Moore, 1859 of the genus *Saturnia* Schrank, 1802 (Lepidoptera: Saturniidae). *Nachrichten des entomologischen Vereins Apollo*. N.F. 31 (1/2): 31–62.

Naumann, S. & P. Smetacek. 2019. Two new species of *Loepa* Moore (Lepidoptera: Saturniidae) from the Indian subcontinent. *Bionotes* 21 (4): 161–170.

Naumann, S. & P. Smetacek. 2021. A new species of *Lemaireia* Nässig & Holloway (Lepidoptera: Saturniidae, Saturniinae) from North-Eastern India. *Bionotes* 23 (2/3): 120–124.

Racheli, L. 2008. Noteworthy records of Saturniids from northern Myanmar with notes on the true identity of *Loepa diversiocellata* (Lepidoptera, Saturniidae). *Fragmenta entomologica* 40 (1): 157–166.

Ratnasingham, S., & P.D.N. Hebert. 2007. Barcoding. BOLD: The barcode of life data system (www.barcodinglife.org). *Molecular Ecology Notes* **7** (3): 355–364.

Ratnasingham, S. & P.D.N. Hebert. 2013. A DNA-based registry for all animal species: The Barcode Index Number (BIN) system. *PLoS ONE* **8** (8): e66213; doi: 10.1371/journal.pone.0066213.

Rougerie, R. 2003. Re-capture of *Sinobirma malaisei* in China: description of the female genitalia and comments on the systematic position of the genus in the tribe Urotini (Saturniidae). *Nota Lepidopterologica* 25 (4): 227–233.

Rougerie, R., S. Naumann & W.A. Nässig. 2012. Morphology and molecules reveal unexpected cryptic diversity in the enigmatic genus *Sinobirma* Bryk, 1944 (Lepidoptera: Saturniidae). *PLos ONE* 7 (9): e43920: 1–12 [online journal].

Scoble, M. J. 1995. *The Lepidoptera. Form, function and diversity*. [Reprint 1995]. Oxford University Press, Oxford. xi + 404 pp., 4 col. pls.

Watson, J. H. 1914. Note XVIII. A new genus, a new species of *Antheraea*, and some geographical races of the genus *Cricula* (Saturnidae [sic]) from the Indo-Malayan region. *Notes from the Leyden Museum* XXXV: 181–185, pl. 8.

Witt, T. J., & S.N. Pugaev. 2007. *Salassa belinda* sp. n. – A new Nepalese Saturniidae species from the *lola* Westwood, 1847-group (Lepidoptera, Saturniidae). *Entomofauna. Zeitschrift für Entomologie*. Monographie 1: 1–11.

Wu, V. Y. 2017. *The marvellous moths of China*. Luoyang (Henan Science and Technology Press), [IV] + 403 pp. [in Chinese and English].

Figure 1a (left): *Actias smetaceki* **sp. n.** Holotype male dorsal; 1b (right): *ditto* ventral

Figure 2a (left): *Actias smetaceki* **sp. n.** Paratype female dorsal; 2b (right): *ditto* ventral

Figure 3a (above): *Actias loeffleri* **sp. n.** Holotype male dorsal; 3b (below): *ditto* ventral

Figure 4a (left): *Loepa melichari* **sp. n.** Holotype male dorsal; 4b (right) *ditto* ventral

Figure 5a (left): *Loepa melichari* **sp. n.** Paratype female dorsal; 5b (right) *ditto* ventral

Figure 6a (above): *Loepa himalayana* **sp. n.** Holotype male dorsal; 6b (below) *ditto* ventral

Figure7a (left): *Loepa himalayana* **sp. n.** Paratype female dorsal; 7b (right): *ditto* (ventral)

Figure 8a (left): *Loepa himalayana* **sp. n.** Paratype male dorsal (Tibet); 8b (right): *ditto* ventral

Figure 9a (left): *Cricula mishmica* **sp. n.** Holotype male dorsal; 9b (right): *ditto* ventral

Figure 10a (left): *Cricula mishmica* **sp. n.** Paratype male dorsal; 10b (right): *ditto* ventral

Figure 11a (left): *Sinobirma occidentalis* **sp. n.** Holotype male dorsal; 11b (right): *ditto* ventral

Figure 12a (left): *Sinobirma occidentalis* **sp. n.** Paratype female dorsal; 12b (right): ditto ventral

Fig. 13a (left): *Salassa dibanga* **sp. n.** Holotype male dorsal; 13b (right): *ditto* ventral

Figure 14a (left): *Salassa dibanga* **sp. n.** Paratype female dorsal; 14b (right) *ditto* ventral

Figure 15a (left): *Salassa occinica* **sp. n.** Holotype male dorsal; 15b (right): *ditto* ventral

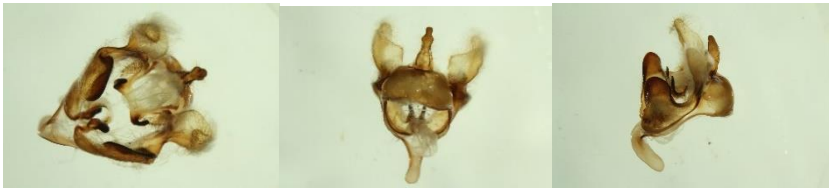
Figure 16a (left): *Salassa occinica* **sp. n.** Paratype female dorsal; 16b (right): ditto ventral

Figure 17a (above): *Salassa linzhica* **sp. n.** Holotype male dorsal; 17b (below): *ditto* ventral

Figure 18a (left): *Solus pseudodrepanoides* **sp. n.** Holotype male dorsal; 18b (right): *ditto* ventral

Figure 19a (left): *Solus tawanga* **sp. n.** Holotype male dorsal; 19b (right): *ditto* ventral

GENITALIA



20a. ventral 20b. dorsal 20c. lateral

20d. aedeagus 20e. detail of aedeagus

Figs. 20 a,b,c,d,e: *Actias smetaceki* **sp. n.** Paratype 2599-19 SNB

Fig. 21. Paratype 0944-03 SNB

Fig. 22. Paratype 1388-06 SNB

Figs. 21 & 22: *Actias loeffleri* **sp. n.** aedeagus & male genitalia capsule

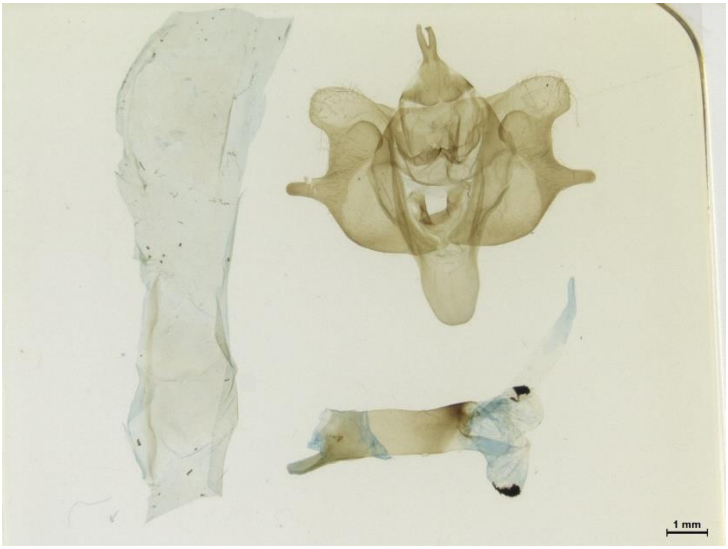


Fig. 23. *Loepa melichari* **sp. n**. Paratype 2847-22 SNB

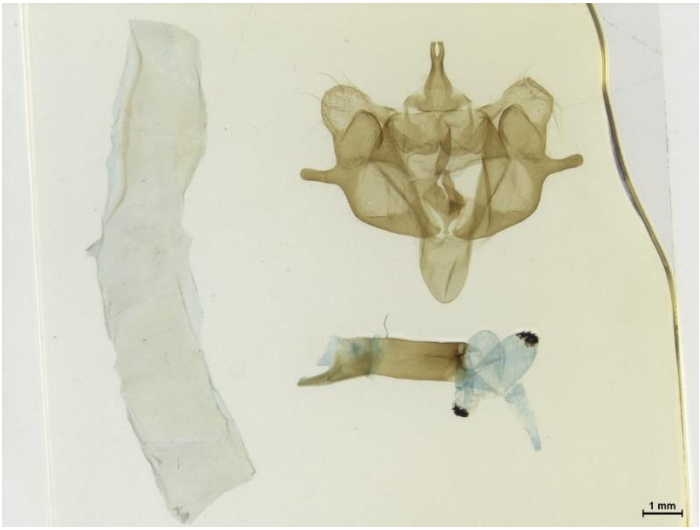


Fig. 24. *Loepa anthera* Vietnam 2848-22 SNB

Fig. 25. *Loepa himalayana* **sp. n.** Paratype Arunachal Pradesh 2733-21 SNB

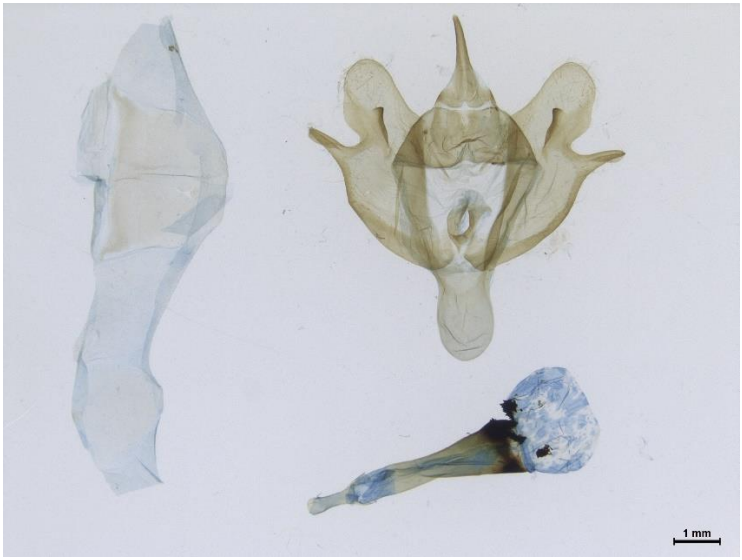


Fig. 26. *Loepa himalayana* **sp. n.** Paratype Tibet 2732-21 SNB

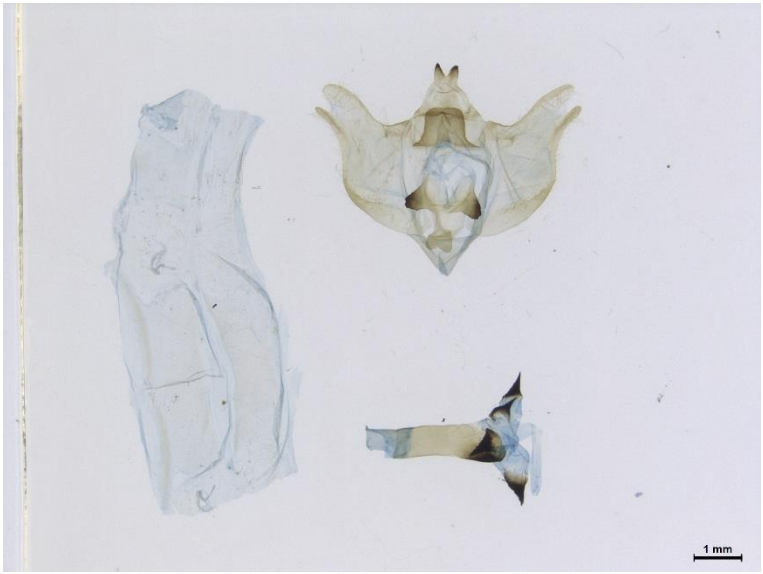


Fig. 27. *Cricula mishmica* **sp. n.** Holotype 2718-21 SNB

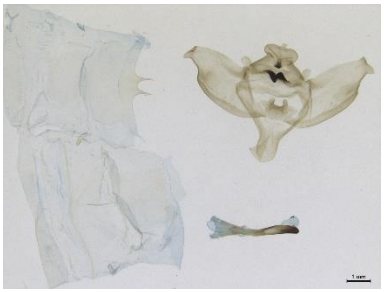


Fig. 28. Holotype 2624-19 SNB

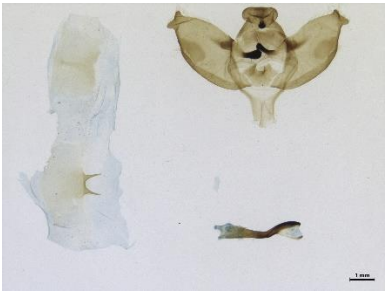


Fig. 29. Paratype 2912-23 SNB

Figs. 28 & 29. *Sinobirma occidentalis* **sp. n.**

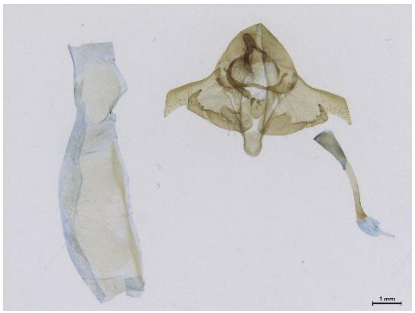


Fig. 30. Holotype 2798-22 SNB

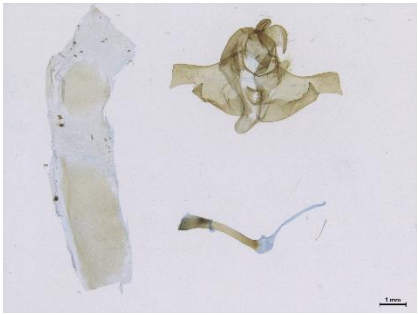


Fig. 31. Paratype 2799-22 SNB

Figs. 30 & 31. *Salassa dibanga* **sp. n.** male genitalia

Fig. 32a. genitalia capsule

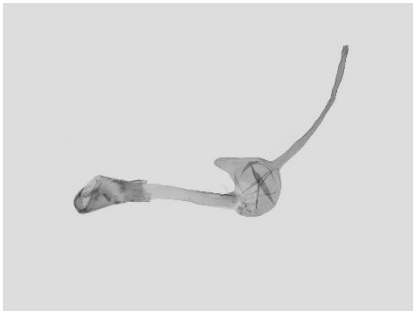


Fig. 32b. aedeagus

Fig. 32a & b: *Salassa occinica* **sp. n.** Paratype 2952-23 SNB

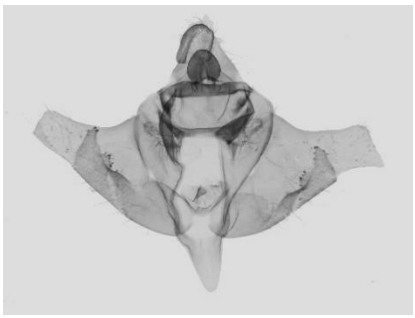


Fig. 33a. genitalia capsule

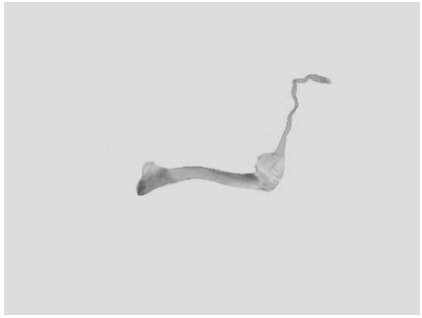


Fig. 32b. aedeagus

Fig. 33a. *Salassa linzhica* **sp. n.** Holotype 2953-23 SNB

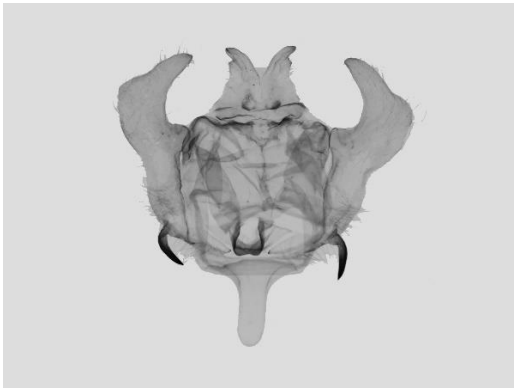


Fig. 34a. genitalia capsule

Fig. 34b. aedeagus

Fig. 34a & b. *Solus pseudodrepanoides* **sp. n.** Paratype 2954-23 SNB

Fig. 35**.** Paratype 2075-09 SNB

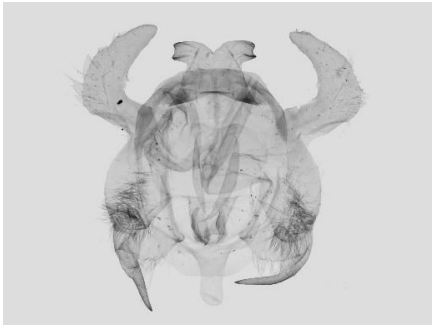


Fig. 36a. Paratype 2956-23 SNB

Fig. 36b. aedeagus

Figs. 35, 36a & 36b. *Solus tawanga* **sp. n.**