

Two new *Loepa* species from Tibet and Shaanxi, China (Lepidoptera: Saturniidae)

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Abstract: Two new species of the genus *Loepa* MOORE, 1859 (Lepidoptera: Saturniidae), both members of the *miranda*-group, are described, figured and compared with other species of the genus. They are: *L. meyi* sp. n. from the People's Republic of China, Shaanxi province, a very small species, and *L. tibeta* sp. n. from Tibet, Yigong area, a bigger one with much reduced markings; the male holotypes of both species from the author's collection will be deposited in the collections of Zoologisches Museum der Humboldt-Universität, Berlin. The male lectotype of *L. yunnana* MELL, 1939, deposited in Museum Alexander Koenig, Bonn, is designated.

Key words: Saturniidae, *Loepa meyi*, *Loepa tibeta*, new species, *Loepa yunnana*, lectotype, China, Shaanxi, Tibet.

Zwei neue Arten der Gattung *Loepa* aus Tibet und Shaanxi, Volksrepublik China (Lepidoptera: Saturniidae)

Zusammenfassung: Zwei neue Arten der Gattung *Loepa* MOORE, 1859 (Lepidoptera: Saturniidae) werden beschrieben, abgebildet und mit anderen Arten der Gattung verglichen: *L. meyi* sp. n. aus der Provinz Shaanxi, Volksrepublik China, sowie *L. tibeta* sp. n. aus dem südöstlichen Tibet. Die männlichen Holotypen beider Arten sowie der weibliche Allotypus von *L. meyi* werden nach Abschluß weiterer Arbeiten an der Gattung *Loepa* aus der Sammlung des Autors an das Museum für Naturkunde der Humboldt-Universität zu Berlin gelangen. Aufgrund der großen habituellen Ähnlichkeit von *L. yunnana* MELL, 1939 mit der hier neu beschriebenen *L. tibeta* sowie der nicht mehr vollständig vorliegenden Typenserie und damit entstandener taxonomischer Unsicherheit dieses Taxons wird ein männlicher Lectotypus aus der Sammlung des Museums Alexander Koenig in Bonn designiert. Alle drei Arten werden in Farbe, dazu die männlichen Genitalstrukturen der Holotypen beziehungsweise des Lectotypus abgebildet. Schließlich wird noch eine kurze Aufstellung zur bisherigen Erwähnung von Vertretern der *miranda*-Gruppe des Genus für Tibet in der rezenten Literatur gegeben; neben einigen unklaren Zitaten gibt es auch zwei eindeutig durch Farbbildungen belegte Nachweise der neuen Art *L. tibeta* in der chinesischen Literatur.

Introduction

The genus *Loepa* MOORE, 1859 currently comprises more than 30 yellowish species in Asia; a preliminary attempt to group closely related taxa was given by NAUMANN (1995: 82), these groups later were defined again by YEN et al. (2000: 153).

The present work is dealing with two new species of the so-called *miranda*-group which mainly is defined by its fused tip of the uncus in ♂ genitalia; a further peculiarity is the pale ground colour in many, but not all species.

The larval morphology of only one species of the group *L. miranda* ATKINSON in MOORE, 1865, was described completely so far (NÄSSIG & RAGUS 2001).

The members of the *miranda*-group are distributed mainly in continental Asia, but including Taiwan (YEN et al. 2000), with a clear maximum of species-richness in China, and some of the more showy species were discovered just during the last years (BRECHLIN 1997, NAUMANN 1998, NAUMANN & KISHIDA 2001). The observation mentioned by YEN et al. (2000: 160) that a gap between the Himalayan *L. miranda* and the closely related Taiwanese *L. mirandula* YEN, NÄSSIG, NAUMANN & BRECHLIN, 2000 exists in the southeastern provinces of China is still confirmed, but meanwhile three other species of the group were found to occur in that zone: *L. obscurmarginata* NAUMANN, 1998 (known from Guangxi, Guangdong, Jiangxi, Hunan, Hubei, and Henan provinces), *L. microocellata* NAUMANN & KISHIDA, 2001 (known so far from Guangxi, Guizhou, Guangdong, Hunan, Fujian, and Jiangxi provinces), plus a third species described here from Shaanxi province.

During the recent years I received some material of Tibetan Saturniidae directly from China; among those specimens there was already the holotype of *Rhodinia tenzinyatsoi* NAUMANN, 2001, and now a second species from the same locality proved to be undescribed. Among that Tibetan material there were some widespread Himalayan species, but some others were only found so far in nearby Yunnan province or seem to be endemics. As it is always hard to get reliably labelled material from that remote area, and after unsuccessfully checking several institutional collections (e.g., The Natural History Museum, London; Muséum d'Histoire Naturelle, Lyon; Muséum National d'Histoire Naturelle, Paris; Naturhistorisches Museum Wien) for potential further type specimens I finally decided to describe the species as new to science to make the taxon available.

Abbreviations used in the text

BMNH	The Natural History Museum, London (formerly British Museum (Natural History)).
CSNB	collection Stefan NAUMANN, Berlin.
MAKB	Museum Alexander Koenig, Bonn.
MWM	Museum Witt, München, assigned to Zoologische Staatssammlungen München.
ZMHU	Zoologisches Museum der Humboldt-Universität, Berlin.

¹ 10th contribution to the Saturniidae fauna of China (9th contribution: R. S. PEIGLER & S. NAUMANN [2003]: A revision of the silkmoth genus *Samia*. – San Antonio, Texas [University of the Incarnate Word], 283 pp. incl. 10 maps, 148 col. figs., 80 b.&w. figs.).

***Loepa meyi* sp. n.**

Holotype: ♂ (Figs. 5, 6), People's Republic of China, Shaanxi province (West), Taibaishan, Yuhangshan, 1800 m, VIII. 2000, leg. WANG, genitalia no. 498/01 NAUMANN, CSNB.

Paratypes (1 ♂, 1 ♀): Allotype ♀ (Fig. 7), same data as ♂ holotype. Holo- and allotype will be deposited in the ZMHU when some further work on Chinese *Loepa* is finished. – 1 ♂, People's Republic of China, Shaanxi province (South), Dabing Shan, Xunyang, 1300 m, IX. 2000, leg. WANG, CSNB. This specimen will remain in the author's collection.

Derivatio nominis: The species is dedicated to Dr. Wolfram MEY of Zoologisches Museum der Humboldt-Universität, Berlin, to thank for his continuing help during my work in the museum's collection and library.

Description

♂ (Figs. 5 dorsal, 6 ventral): Ground colour light yellow, similar to ♂♂ of *L. miranda*. Antennae ochreous, 11 mm (both holotype and ♂ paratype) long, with 30 segments, quadrupectinate, the last 6–8 segments reduced bipectinate, length of rami 1.2 mm at maximum. Labial palpi in ground colour, collar and prothorax covered with grey hair, tibiae and tarsi with pinkish grey hair, rest of thorax and abdomen with hair in ground colour. Generally a very small *Loepa* species, the length of right forewing from basis to apex ca. 47 (holotype) and 48 mm (paratype) only, that of the hindwing at anal angle around 30 mm. The wings completely coloured in the ground colour dorsally, but with some markings: Costa in the proximal two thirds grey, similar to the collar, the antemedian line fading dark greyish black from the costa, then a completely dark pink zigzag band which is only slightly visible in the two available specimens. Forewing ocellus almost round, with black shadow in the proximal part and with 6 mm maximum diameter. The dark grey zigzag postmedian band slightly visible in the holotype, but missing in the paratype, in the submarginal area followed by a more or less developed double zigzag band and a broken white marginal band. Forewing apex with a pink area and a black subapical dot. Hindwing of similar colour, antemedian band grey, postmedian and submarginal band similar to forewing, but outer submarginal band with bluish violet scales. Hindwing ocellus without black outer ring, 4.5 mm in maximum diameter. From ventral side in absolute similar ground colour and with similar pattern, but antemedian band of the forewing missing and ocelli of both fore- and hindwings lighter, suffused with white scales in the inner part.

♂ genitalia (Fig. 9): ♂ genitalia in typical style of the *miranda*-group with fused uncus. The size does not correspond with the small size of the specimens, it is a relatively large genitalia apparatus compared to the small size of the moth. Uncus short and broadly based, saccus quite large, bulbous, similar to that of *L. obscuro-marginata*. Valves a little elongate, with small sacculus, ventral process bent outward, dorsal apex narrow, the internal process with a nearly rectangular dorsal end at the most sclerotized part. The aedeagus relatively broad, at its end laterally on the right with heavy sclerotization,

continued with a sclerotized band on the right part of the vesica and ending there with some thorns on a cornutus. Laterally on the right the vesica is heavily covered with a field of small sclerites; as far as known this is the most intensive scobination for the whole genus. Dorsolateral on the left there is a second cornutus on the vesica.

♀ (Fig. 7): The ♀ shows most pattern elements similar to the ♂♂ and is of the same ground colour, but differs from them by the typical sexual dimorphism and some markings: Antennae almost missing in the allotype, the remaining rests ochreous and bipectinate. The right forewing length is 43 mm, that of the hindwing about 29 mm. The costa is more purplish grey, this only in the proximal half, and the wings are generally much more rounded. The antemedian band, as far as remaining, is completely dark grey both on fore- and hindwings, the submarginal band consisting of broken blue dots between the veins. The ocelli of both fore- and hindwing are more lenticular in shape, and show also on the hindwing a proximal shadow. Ventral side as in the ♂♂, a little more creamy yellow.

***Loepa tibeta* sp. n.**

Holotype: ♂, People's Republic of China, Tibet, Yigong, ca. 30°30'N, 94°80'E, 2000 m, V. 1996, leg. WANG, genitalia no. 522/01 NAUMANN, CSNB. The holotype will be deposited in the ZMHU when some further work on Chinese *Loepa* is finished.

Paratypes (4 ♂♂): 1 ♂, same data as holotype, genitalia no. 521/01 NAUMANN, CSNB; 2 ♂♂, Tibet, Yigong, ca. 30°30'N 94°80'E, 2300–2400 m, V.–IX. 1996, leg. WANG, CSNB. These paratypes will remain in the author's collection. – 1 ♂, Tibet, Yigong, 2250 m, specimen figured in ZHANG (1986: pl. 7, fig. 59), probably in collection of Academia Sinica, Beijing.

Derivatio nominis: The species is, self-explanatory, named after its geographical origin.

Description

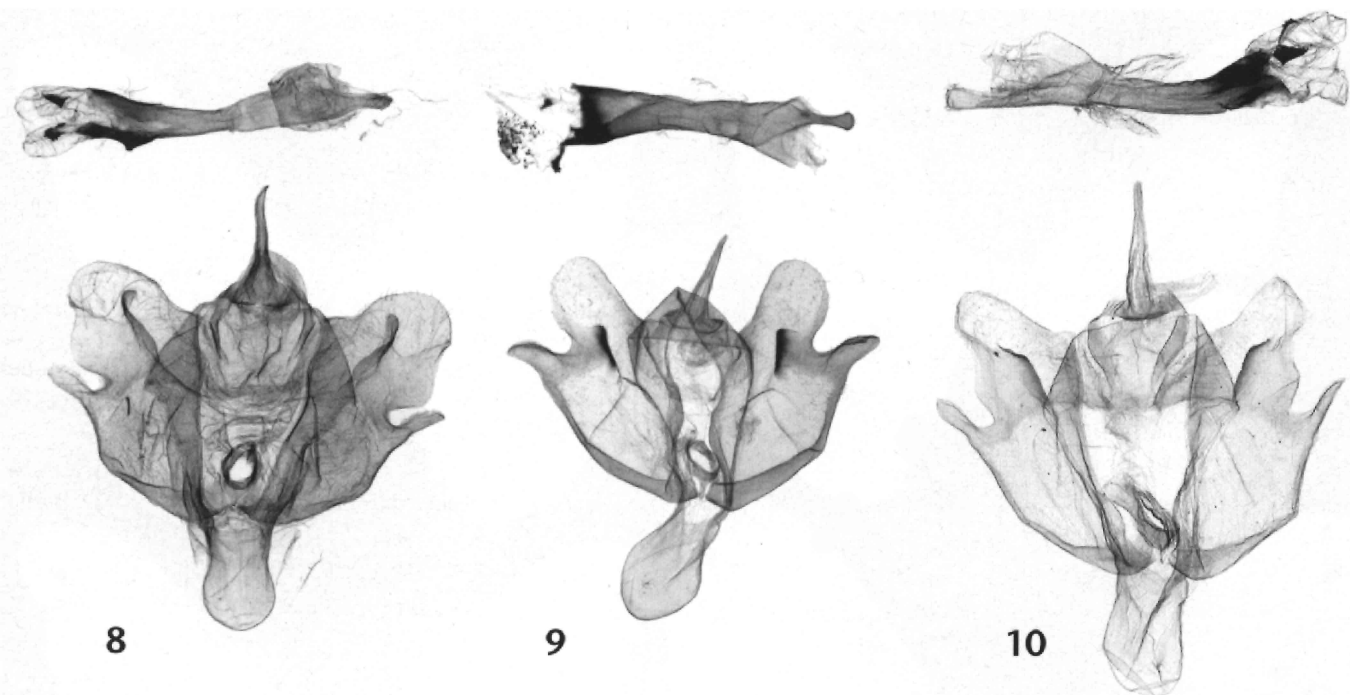
♂ (Figs. 1 dorsal, 2 ventral): Ground colour of relatively intensive yellow for representative of the *miranda*-group. Antennae ochreous yellow, 13–13.5 mm (both holotype and one paratype, others missing) long, with only 25 segments, completely quadrupectinate, length of rami 2.0 mm in maximum. Labial palpi in ground colour, collar and prothorax covered with purplish grey hair, tibiae and tarsi with purplish grey hair, rest of thorax and abdomen with hair in ground colour. The length of right forewing from basis to apex 53–57 mm (holotype 55 mm, average 54.5 mm, n = 4), that of the hindwing at anal angle around 37–39 mm. The wings completely coloured in the ground colour dorsally, but with following markings: Costa in the proximal two thirds purplish grey, similar to the collar, the antemedian line fading with a purple patch from the costa, then a zigzag band consisting of two colours, purple medially and the outer part dark grey. The dark grey zigzag postmedian band clearly visible, in the submarginal area followed by a more or less developed double zigzag band consisting of grey scales and a broken white marginal band. Forewing apex with a violet and pink area and a black subapical dot. Hindwing



Colour plate. Specimens of *Loepa* of the *miranda*-group from China. **Fig. 1:** *Loepa tibeta*, ♂ holotype, dorsal view. **Fig. 2:** *L. tibeta*, ♂ paratype, ventral view. **Fig. 3:** *L. miranda*, ♀, dorsal view, from the type locality of *L. tibeta*. **Fig. 4:** *L. yunnana*, ♂ lectotype, dorsal view. **Fig. 5:** *L. meyi*, ♂ holotype, dorsal view. **Fig. 6:** *L. meyi*, ♂ paratype, ventral view. **Fig. 7:** *L. meyi*, ♀ allotype, dorsal view. — All specimens to the same scale. — Photograph U. BROSCHE.

of similar colour, antemedian band grey, postmedian and double submarginal band similar to forewing, but outer portion of the submarginal band with dark bluish scales. Hindwing ocellus without or less developed outer black portion, 4–5 mm in maximum diameter. From ventral side in absolute similar ground colour and with similar pattern, but antemedian band of the forewing missing and ocelli of both fore- and hindwings lighter, suffused with white scales in the inner part.

♂ genitalia (Fig. 9): Although genitalia of all taxa of the *miranda*-group look somewhat similar and show a fused uncus, there are some different and constant characters in the genitalia of *L. tibeta*: The valves are broad, have a well developed ventral process, and the dorsal process is bent outward ventrally in very typical form which is found in no other species. The internal process is elongated far dorsally, nearly up to the dorsal margin of the valva. The aedeagus is relatively tall and has a typical



Figs. 8–10: ♂ genitalia of *Loepa* of the *miranda*-group from China. **Fig. 8:** *Loepa tibeta*, holotype, ♂ genitalia no. 522/01 NAUMANN. **Fig. 9:** *L. meyi*, holotype, ♂ genitalia no. 498/01 NAUMANN. **Fig. 10:** *L. yunnana*, lectotype, ♂ genitalia no. 903/03 NAUMANN. — Figs. 8 & 9 to the same scale, Fig. 10 slightly different. — Direct scans U. BROSCHE.

right ventrolateral spine which is not known in other representatives of the *miranda*-group; it ends with two dorsolateral processes, which are continued on the bulbous vesica by two large acute and thorned cornuti.

♀: Unknown.

Discussion

The two new species easily can be separated from all other members of the *miranda*-group within the genus *Loepa*, either by their size, their genitalia structures, their pattern and the combination of different elements within. Each of the two taxa has another representative to which it is quite similar but from which it on the other side can easily be separated. *L. meyi* and *L. mirandula* look quite similar, but differ in the ♂ genitalia, here mainly in the less rounded valves and the heavily scobinated vesica, further in the differently coloured antemedian band, the less intensive markings, and the smaller size in *L. meyi*. *L. tibeta* and *L. yunnana* superficially resemble each other, but clearly differ in the ♂ genitalia with the hardly lobed valves and the lateral thorn of the aedeagus, the deeper yellow colour, the less intensive markings, especially on the hindwings, and the larger antennae in *L. tibeta*. *L. yunnana*, which was described as a subspecies of *L. miranda* and sometimes synonymized with that, was raised to full species rank by YEN et al. (2000: 161) due to its different characters. As the location of the type series of *L. yunnana* is not known completely at present, and because, consequently, there is no certainty about the conspecificity of all 20 syntypes, I herewith designate a lectotype out of this series to guarantee stability in nomenclature (ICZN 1999). The species sometimes look so similar that the identity of the

taxon *yunnana* has to be fixed. The ♂ lectotype and its genitalia structures are figured in Figs. 4 and 10.

Loepa yunnana MELL, 1939

Lectotype ♂ (Fig. 4) with typical HÖNE data label: “Li-kiang. (China). Provinz Nord-Yuennan. 6. x. 1935. H. HÖNE”, genitalia no. 903/03 NAUMANN, MAKB. Designated herewith.

Paralectotypes so far located (6 [of 20 syntypes, according to the original description, i.e. of 19 paralectotypes] ♂♂): 3 ♂♂ from same locality in MAKB with following data: 8. ix. 1935 (1 specimen) and 9. ix. 1935, genitalia 676/93 & 1265/00 NÄSSIG (2 specimens). — 3 ♂♂ from same locality in MWM with following data: 1 ♂, 12. ix. 1935, H. HÖNE, coll. F. DANIEL; genitalia no. 930/03 NAUMANN. 1 ♂, 6. ix. 1935, H. HÖNE, coll. F. DANIEL. 1 ♂, *L. damartis* ♂ [sic], same locality, 6. ix. [19]35, AUSSEM coll.; genitalia no. 929/03 NAUMANN. — Lectotype and paralectotype labels will be fixed to the specimens accordingly.

Obviously parts of the type series of *L. yunnana* from the MELL and/or HÖNE collections were later distributed to several private collections, and not all of the specimens could be relocated so far. No syntypes were found in BMNH (pers. comm. Ian KITCHING) nor in ZMHU, where several specimens from the MELL collection are held. If ever any further of the former 20 syntypes, which MELL cited in the original description, would appear, they automatically are paralectotypes.

Other records

Few records for *Loepa* of the *miranda*-group exist so far for Tibet; none were cited in ZHU & WANG (1982, 1983, 1993), but in 1996 they mention *L. damartitis* [sic, misspelling] JORDAN, 1911 from that province, although this may be a misidentification, perhaps based on the record of WANG (1988). More substantial records are given by ZHANG (1986) and XUE & WANG (1989): ZHANG

mentiones *Leopa* [sic, misspelling] *katinka* from Tibet, Yigong, 2250 m, and figures under that name a readily identifiable ♂ of *L. tibeta* on the title page of the book and again on plate 7, figure 59, which is included in the type series. Unfortunately it is not clear where the specimen remained but most probably it should be found in the collections of the Academia Sinica in Beijing, China. XUE & WANG mention *L. anthera* JORDAN, 1911 (again a misidentification) and refer to figure 5 on plate 9 in their book where a ♀ is shown which either may be the unknown ♀ of *L. yunnana* or of *L. tibeta*. The locality for this ♀ is Tibet, Lebu, 2840 m, but the further records provided for “Fujian, India and Indo-China” refer probably to the real *L. anthera*.

Finally another representative of the *miranda*-group is recorded for Tibet and figured in the present work: One ♀ of *L. miranda* in the author's collection, collected at the type locality of *L. tibeta* at the same flight period (Fig. 3).

During recent years some additional material was imported from Yunnan by Ronald BRECHLIN (specimens in coll. R. BRECHLIN and CSNB); due to overall similarity of those specimens they were tentatively interpreted as *L. yunnana*.

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