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A new species of *Euthalia* Hübner, 1819 (*Limbusa* Moore, 1896) from S. Sichuan, S.W. China

(Lepidoptera, Nymphalidae)

by

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Abstract: In this paper, a new species of the subgenus *Limbusa* Moore, 1896, viz. *Euthalia* ***ruoyuae*** **spec. nov.**, is described from Miyi, S. Sichuan, S.W. China. The new species belongs to "*patala* group - Type A - Subtype A3" sensu Yokochi (2012), and it is closely related to *Euthalia monbeigi* Oberthür, 1907 and *E. yunnanica* Koiwaya, 1996 from N.W. Yunnan, S.W. China.

The oriental subgenus *Limbusa* Moore, 1896, belonging to the genus *Euthalia* Hübner, 1819 (Limenitidinae: Adoliadini), was revised by Yokochi (2010, 2011, 2012). In his series of revisional works, Yokochi (2012) considered *Euthalia duda* Staudinger, 1886 and its relatives as a species group called "*patala* group - Type A - Subtype A3", which was also approximately treated as the *E. duda* Stdg.-group by Huang (2002) and the *E. thibetana* (Poujade, 1885)-complex by Lang (2012a). For convenient, it is called the *thibetana* Pouj.-group or more simply the group in this paper (the taxon *thibetana* Pouj. is one year older than the taxon *duda* Stdg.). According to Yokochi (2012), in the *thibetana* Pouj.-group, 8 species have a blue fascia distad of the discal band on the hindwing upperside (abbreviation DBHU), they are *Euthalia durga* (Moore, 1858), *E. amplifascia* Tytler, 1940, *E. duda* Stdg., *E. tsangpoi* Huang, 1999, *E. takeru* Yokochi, 2012, *E. chayuensis* Huang, 2001, *E. monbeigi* Oberthür, 1907 and *E. sakota* Fruhstorfer, 1913. Lang (2012b) described an additional species with a blue fascia distad of DBHU, viz. *E. pseudoduda* Lang, 2012. The range of the *thibetana* Pouj.-group is a typical Sino-Himalayan pattern, extending from Darjeeling (N. India) eastwards to S.E. China (including Taiwan Island), and weakly overflowing southwards to C. Vietnam along the Annamite Range. In the west part of its range, including E. Himalayan region, N. Indochina, and especially Yunnan and Kachin (N. Myanmar), most species (viz. the 9 species mentioned above) of the group have a distinct blue fascia distad of DBHU. Besides, the rest species often have green or greyish white fascia distad of DBHU, e.g. *E. bellula* Yokochi, 2005, *E. heweni* Huang, 2002, *E. hesui* Yokochi, 2012, *E. yunnanica* Koiwaya, 1996 and *E. yunnana* Obth., 1907. Whereas, in the east part of its range, from W. Sichuan to S.E. China (Zhejiang, Fujian, Taiwan), species of the group always have no obvious blue fascia distad of DBHU. However, in the fauna of Yunnan and Kachin as well as their nearby regions, the interspecific similarity, that most of species in the group always have a blue fascia distad of DBHU, does not mean that they have more close relationships within themselves than with those species from the east part. Possibly, the similarity only might be a result of convergent evolution caused by some unknown reasons. For example, though *E. durga* (Moore) has a developed blue fascia distad of DBHU, it is quite different from all other members in the group including those sympatric species also with blue fascia. For another instance which is highly involved in this work, in N.W. Yunnan, the closest relative of *E. monbeigi* Obth. with a blue fascia distad of DBHU from Lancang (Upper Mekong) valley is not any other species also with a blue fascia, but is *E. yunnanica* Koiwaya with a greyish white fascia from Jinsha (Upper Yangtse) valley nearby. Recently, a ♂ specimen was collected from S. Sichuan, and it is the first specimen which has a distinct blue fascia distad of DBHU known from Sichuan. But the faunistic feature of S. Sichuan is often more close to that of N. Yunnan than to W. Sichuan. In appearance, the ♂ is very similar to *E. monbeigi* Obth. and *E. yunnanica* Koiwaya, but considering their differences and the rapid speciation of the *thibetana* Pouj.-group, it is described as a new species herein.

Materials: Specimens in this study are kept in Chongqing Museum of Natural History, Beibei, CHINA (CMNH), Institute of Zoology, Chinese Academy of Sciences, Beijing, CHINA (IZC), Song-Yun Lang's private collection, Beibei, CHINA (LSY) and Si-Yao Huang's private collection, Zhuhai, CHINA (HSY).

Euthalia r u o y u a e **spec. nov.** (figs. 1-3, 5a)

Holotype ♂, CHINA: Sichuan, Miyi, Puwei, 2300-2550 m, leg. Song-Yun Lang, NYM-0072 (CMNH).

Description: ♂ Forewing length (FWL): 40 mm. Antenna: upperside black, underside ochreous. Wing shape: Forewing: the costa evenly and slightly convex; the apex weakly protruding; the termen slightly waved and weakly concave; the dorsum nearly straight. Hindwing: the termen dentate at the end of each vein; the tornus slightly protruding. Wing pattern: Upperside: the ground colour deep olive-drab; the basal half blackish circular markings the same as the general pattern of the subgenus; the cilia white and chequered with black beyond the veins. Forewing: the discal spots creamy white, present from the dorsum to the space 6, normally wide; the discal spot in the space 3 shifted inwards; the band composed of the discal spots in the spaces 4, 5 and 6 oblique inwards, and as wide as the spot in the space 3; the subapical spots creamy white, present in the spaces 6 and 8, very tiny in the space 8; an obscure black postdiscal fascia present, tapering from the dorsum to the costa. Hindwing: the discal band pure white, extending upwards from the spaces 1b to 8, normally wide, its outer edge weakly wavy in the spaces 5, 6 and 7; a deep blue fascia distad of the discal band well present, not widened, tapering towards the both ends respectively; a very broad blackish postdiscal fascia present distad of the blue fascia, its outer edge very close to the termen. Underside: the ground colour deep yellowish green, strongly tinged with blue on the forewing basal area and on the hindwing dorsum area from the base to the tornus; the basal half blackish circular markings the same as the general pattern of the subgenus; the pattern of the whitish markings the same as those on the upperside. Forewing: the discal spots creamy white; the inner edges of the discal spots thickly outlined with black; the outer edges of the discal spots only outlined with black in the spaces 3 and 4; the subapical spot in the space 6 pure white, the tiny spot in the space 8 creamy

white; the blackish patch outside the discal spots very conspicuous and broad in the spaces 1a, 1b and 2, and slender, faint and blur from the space 3 upwards to the costa; the submarginal whitish series very obscure, but present as a visible ">"-shaped marking in the space 1b. Hindwing: the discal band pure white; the postdiscal blackish fascia vestigial throughout; the submarginal whitish lines ill-defined.

♂ genitalia (figs. 3, 5a): Tegumen: normal helmet-shape, narrow in dorsal view. Uncus: longer than the tegumen, thick, tapering forwards, strongly bent downwards. Gnathos: narrow, extending downwards. Saccus: short and slender. Valva: only slightly bent upwards; its apical two thirds somewhat expanded ventrally, tapering forwards but not very elongated; the apex round and spinose, twisted or not. Aedeagus: short, straight, its apical third weakly bent and sharply pointed as a thick spine.

♀: Unknown.

Diagnosis: Considering biogeographical, morphological and phylogenetical factors, the new species should be compared with the following 4 species (A-D). The new species is more close to *Euthalia monbeigi* Obth. and *E. yunnanica* Koiwaya from N.W. Yunnan, all of them have more yellowish ground colour with bluish tinges on the underside. Meanwhile, the three species are allopatric, though ranges of *E. monbeigi* Obth. and *E. yunnanica* Koiwaya are next to each other. The shape of the ♂ valva of the new species is somewhat similar to that of *E. sakota* Fruhst. from N.W. Yunnan, which is sympatric with *E. monbeigi* Obth. and *E. yunnanica* Koiwaya respectively. Furthermore, the new species should be compared with another species with a blue fascia from C. Yunnan, and the latter was identified as *E. chayuensis* Huang (Type locality: Zayv, S.E. Tibet) by Yokochi (2012).

A) The new species can be distinguished from *E. monbeigi* Obth. from N.W. Yunnan (Lancang valley) by the combination of the following characters: 1) on the forewing upperside, the discal spot in the space 6 is as large as the spot in the space 4, whereas it is obviously smaller than the spot in the space 4 in *E. monbeigi* Obth.; 2) on the hindwing upperside, the blue fascia distad of DBHU is tapering towards the tornus, whereas it is gradually widened towards the tornus in *E. monbeigi* Obth.; 3) on the hindwing upperside, the outer edge of the blue fascia is nearly smooth, whereas it is sharply protruding towards the termen in each space, and deeply inserting and cutting the outside blackish fascia in *E. monbeigi* Obth.; 4) on the hindwing upperside, the black postdiscal fascia is wide and with its inner edge nearly smooth, whereas it is obviously narrower and with its inner edge deeply cut in each space in *E. monbeigi* Obth.; 5) the ♂ valva (fig. 5a) is not elongated forwards, whereas its apical portion is obviously protruding in *E. monbeigi* Obth. (fig. 5b).

B) The new species can be distinguished from *E. yunnanica* Koiwaya from N.W. Yunnan (Jinsha valley) by the combination of the following characters: 1) on the forewing upperside, the discal spot in the space 6 is as large as the spot in the space 4, whereas it is obviously smaller than the spot in the space 4 in *E. yunnanica* Koiwaya; 2) on the hindwing upperside, the fascia distad of DBHU is vivid blue, whereas it is greyish white in *E. yunnanica* Koiwaya; 3) on the hindwing upperside, the blue fascia is tapering towards the dorsum, whereas the corresponding pale fascia is not narrowing with its lower portion in *E. yunnanica* Koiwaya; 4) on the hindwing upperside, the black postdiscal fascia is obviously wider than that of *E. yunnanica* Koiwaya; 5) the ♂ valva (fig. 5a) is not elongated forwards, whereas its apical portion is more elongated in *E. yunnanica* Koiwaya (fig. 5d).

C) The new species can be distinguished from *E. sakota* Fruhst. from N.W. Yunnan (Lancang valley and Jinsha valley) by the combination of the following characters: 1) The ♂ FWL with 40 mm is longer than FWL of *E. sakota* Fruhst. with 36-38 mm (Yokochi, 2012); 2) on the forewing upperside, the discal spot in the space 6 is as wide as the spot in the space 4, whereas it is obviously smaller than the spot in the space 4 in *E. sakota* Fruhst.; 3) on the hindwing upperside, the blue fascia distad of DBHU is narrower than that of *E. sakota* Fruhst.; 4) on the underside, the ground colour is deep yellowish green and tinged with blue, whereas it is green and without blue tinges in *E. sakota* Fruhst.; 5) the ♂ valva (fig. 5a) is more expanded ventrally with its apical third, whereas it is less expanded in *E. sakota* Fruhst. (fig. 5e).

D) The new species can be distinguished from *E. chayuensis* Huang from C. Yunnan (not comparing with the genuine *E. chayuensis* Huang from S.E. Tibet here) by the combination of the following characters: 1) on the forewing upperside, the discal spots are creamy white, whereas they are pure white in *E. chayuensis* Huang; 2) on the forewing upperside, the discal spots in the spaces 3, 4 and 5 are somewhat short, whereas they are obviously elongated in *E. chayuensis* Huang; 3) on the hindwing, the discal band is less widened than that of *E. chayuensis* Huang; 4) the ♂ valva (fig. 5a) is more expanded ventrally with its apical portion and less protruding forwards, whereas it is less expanded and more protruding in *E. chayuensis* Huang (figs. 5g2, 5g3).

Etymology: The specific name *ruoyuae* is named after Ms. Jiang Ruo-Yu from Chengdu, my grandmother, who had to pasture cattle at a farm in Miyi for several years during the culture revolution.

Distribution: S.W. China (S. Sichuan).

Remarks: A) Lang (2012b) stated that in all species with a blue fascia distad of DBHU, only *Euthalia pseudoduda* Lang has a twisted apex of the ♂ valva. This is a mistake largely because of that his studying genitalia materials are kept on permanent slides then. Actually, almost all related species have a more or less twisted apex of the ♂ valva, and in most cases, the twisted apexes can be totally flattened under a pressure from the lateral side. So, the observation and description of the ♂ valva should base on a unified standard in the future.

B) Yokochi (2012) treated *Euthalia bellula uedai* Yokochi, 2009 from Kachin (N. Myanmar) as a junior synonym of *E. monbeigi* Obth., however, it seems that the two taxa are quite different from each other. On the other hand, Monastyrskii (2019) recorded *E. monbeigi* Obth. from N. Vietnam, but in fact, this Vietnamese population is more close to *E. bellula* Yokochi from Laos than to others. Therefore, the concept of *E. monbeigi* Obth. in this paper is that it is a short range endemic species only known from the section of Lancang valley around Tseku (its type locality) in N.W. Yunnan, S.W. China.

C) Yokochi (2012) largely resolved the classification of the *thibetana* Pouj.-group, which is a huge complexity, based upon studies of typical materials kept in various collections, but it still have not been completely resolved. The biggest problem of Yokochi (2012) is that the author used many purchased Chinese specimens with suspicious labels in his research. Therefore, many new confusions had been introduced since his revision, for instances as following. The type locality (TL) of *Euthalia koharai* Yokochi, 2005 is Binchuan, N. Yunnan and it was also recorded from C. China (Hunan) and S. China (Guangxi) by Yokochi (2012), but in fact, it is largely impossible a species from N. Yunnan. The present author caught several ♂ specimens recently from E. Guizhou (Shibing, Weng'an). So, *E. koharai* Yokochi might be a local species only known from a restricted area in S. C. China (including

W. Hunan, E. Guizhou and N. Guangxi) which is far away from N. Yunnan (so called TL). *Euthalia rickettsi* Hall, 1930 (TL: N.W. Fokien [Fujian]) is a species known from S.E. China, but Yokochi (2012) also provided records of this species from S. China (Guangxi) and W. China (W. Sichuan, S. Shaanxi). These dubious localities might mislead a proper understanding of the true status of this taxon. A more clear example is for *Euthalia yunnana* Obth. (TL: Tseku, [N.W. Yunnan]) and *E. staudingeri* Leech, 1891 (TL: Chia-kou-ho, [W. Sichuan]). A sound classification is treating the taxon *yunnana* Obth. as a Yunnanese subspecies of *E. staudingeri* Leech as suggested by Lang (2012a) and Yoshino (2023). However, Yokochi (2012) recorded the taxon *yunnana* Obth. not only from N. Yunnan but also from S.E. China (Fujian) and C. China (Hunan), meanwhile, he recorded the nominate *staudingeri* Leech not only from W. Sichuan but also from N. Yunnan. Therefore, if the labels are right, the ranges of the two taxa are largely overlapped, and it might be the reason why Yokochi (2012) treated the taxon *yunnana* Obth. as a distinct species against *E. staudingeri* Leech. But in fact, the taxon *yunnana* Obth. is only a local race which is confined its range only in N. Yunnan. So, to clarify the problems left in the species group, future researches should base on reliable materials.

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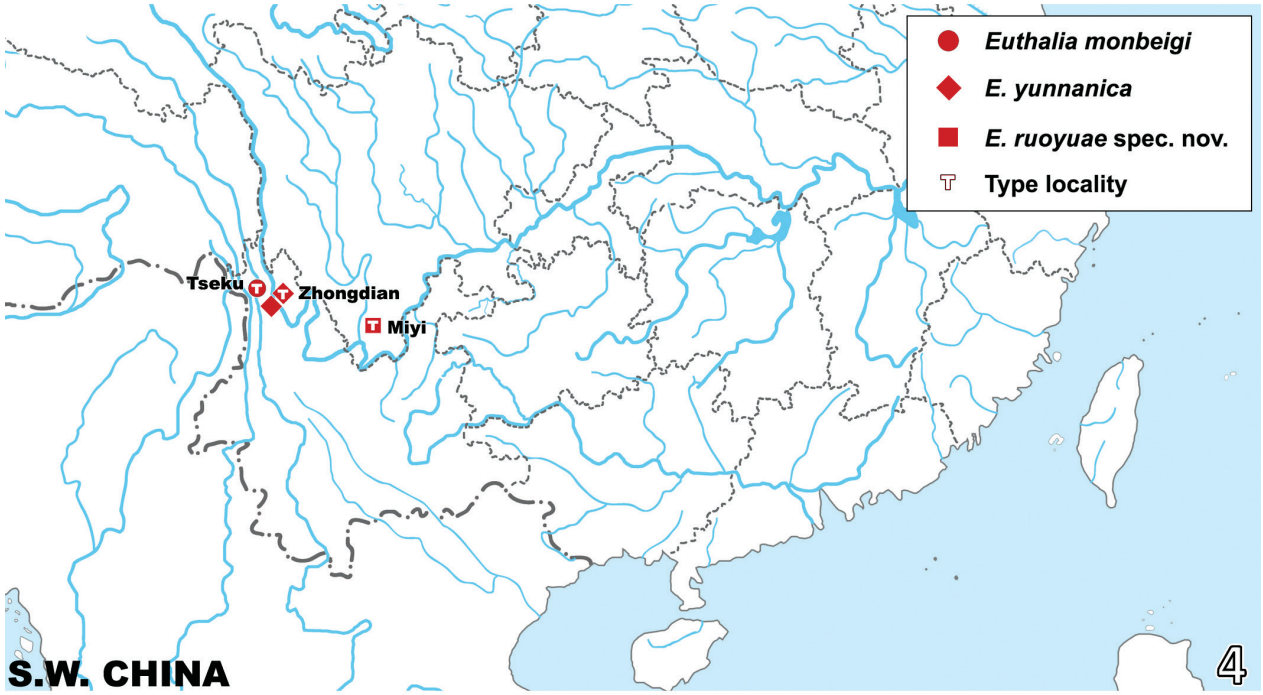

Fig. 1-3: *Euthalia (Limbusa)* ***ruoyuae*** **spec. nov.**, Holotype(HT), ♂, Sichuan, Miyi, NYM-0072, CMNH, (1) upperside, (2) underside, (3) ♂ genitalia.

Fig. 4: Distributional map of *Euthalia monbeigi* Oberthür, 1907, *E. yunnanica* Koiwaya, 1996 and *E.* ***ruoyuae*** **spec. nov.**

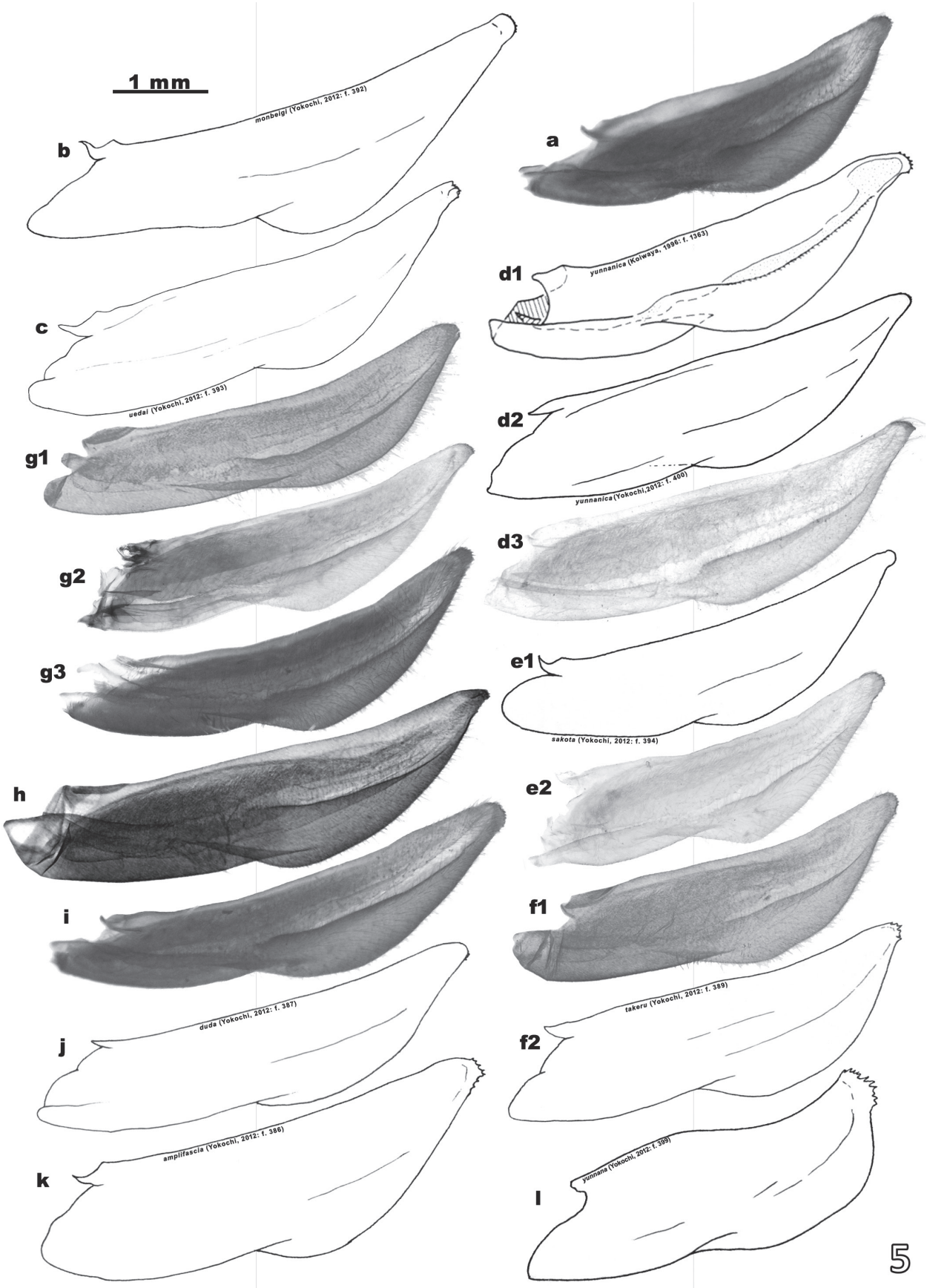

Fig. 5: ♂ valva of *Euthalia* spp. in lateral view. **(a)** *E.* ***ruoyuae*** **spec. nov.**, HT, Sichuan, Miyi, CMNH; **(b)** *E. monbeigi* Obth., 1907, syntype(ST), Yunnan(YN), after Yokochi(Ykc.) (2012: f. 392); **(c)** *E. bellula uedai* Ykc. (2009), paratype(PT), Kachin, after Ykc. (2012: f. 393); **(d)** *E. yunnanica* Koiwaya, 1996: (d1) YN, Zhongdian, after Koiw. (1996: f. 1363); (d2) PT, YN, after Ykc. (2012: f. 400); (d3) YN, Lijiang, IZC; **(e)** *E. sakota* Fruhst., 1913: (e1) ST, YN, after Ykc. (2012: f. 394); (e2) YN, Weixi, HSY; **(f)** *E. takeru* Ykc., 2012: (f1) YN, Gongshan, IZC; (f2) PT, Kachin, after Ykc. (2012: f. 389); **(g)** *E. chayuensis* Huang, 2001: (g1) Tibet, Zayv, IZC; (g2) YN, Kunming, HSY; (g3) YN, Jingdong, LSY; **(h)** *E. pseudoduda* Lang, 2012, HT, YN, Banna, IZC; **(i)** *E. tsangpoi* Huang, 1999, Tibet, Metog, LSY; **(j)** *E. duda* Stdg., 1886, Khasi Hills, after Ykc. (2012: f. 387); **(k)** *E. amplifascia* Tyt., 1940, HT, Kachin, after Ykc. (2012: f. 386); **(l)** *E. yunnana* Obth., 1907, ST, YN, after Ykc. (2012: f. 399).