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● **A new subspecies of *Lethe argentata* (Leech, 1891) from Yunnan, China (Lepidoptera: Nymphalidae)**

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Abstract: The population of *Lethe argentata* (Leech, 1891) from Yunnan, China is described as a new subspecies, namely *L. argentata ruoliae* Li & Wu **ssp. nov.** The adults, male genitalia, diagnosis, phylogenetic position of the new subspecies, along with taxonomic discussion and a distributional map of *L. argentata* are provided.

Keywords: genitalia, new subspecies, phylogeny, Satyrinae

● **中国云南银线黛眼蝶一新亚种（鳞翅目：蛱蝶科）**

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摘要: 中国云南的银线黛眼蝶 *Lethe argentata* (Leech, 1891), 被记述为一新亚种, 即 *L. argentata ruoliae* Li & Wu **ssp. nov.**。本文提供了新亚种的成虫形态、雄性外生殖器、鉴别特征、系统发育位置, 以及针对银线黛眼蝶的分类学讨论和地理分布图。

关键词: 外生殖器, 新亚种, 系统发育, 眼蝶亚科

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● Introduction

The genus *Lethe* Hübner, [1819] represents the most speciose butterfly group in China, with over one hundred species and ongoing discoveries of new taxa (Wu 2017). Among these, the *baladeva*-group is readily distinguished by the conspicuous white stripes on the hindwing underside (Lang 2017). Although historically classified under genus *Zophoessa* Doubleday, [1849], current morphological and molecular evidence consistently supports the placement of this group in *Lethe* (Seitz 1907; Lang 2020; Chen *et al.* 2020; Dewan *et al.* 2025). Meanwhile, the subgenus *Charma* Doherty, 1886 (syn. = *Putlia* Moore, [1892]) was proposed to accommodate this group but infrageneric classification of *Lethe* remains unresolved due to the absence of a comprehensive molecular phylogenetic analysis (Hemming 1967; Huang 2025). Consequently, the taxonomic validity of designating the *baladeva*-group as *Lethe* (*Charma*) requires further substantiation.

Of the nine recognized species within this group, *Lethe argentata* (Leech, 1891) is a Chinese endemic, originally described from Sichuan under *Zophoessa* and subsequently transferred to *Lethe* (de Lesse 1956; Lang 2017). Currently, this species is diagnosed by its broken and dislocated white discal band on the hindwing underside, a particular variation of wing pattern termed as pierellisation (Schwanwitsch & Sokolov 1934; Lang 2017). Although this species has no subspecific divisions, population of *L. argentata* from Yunnan, as specimens illustrated in historic literature or examined in present study, bears a nearly continuous white discal band, resulting in morphological overlap with other related species.

Given these morphological discrepancies, the present study aims to reexamine the population of *L. argentata* from Yunnan and to describe it as a new taxon.

● Material and methods

A series of *L. argentata* from Yunnan and Sichuan were examined (Collection of Z-J Wu, CZJW; Collection of P Yu, CPY; Collection of Wei Guo, CWG; Collections of Yi-Xuan Wang, CYXW). Specimens of *Lethe argentata* were also analyzed by examining illustrations given in previous works, including (i) Sichuan populations figured in Leech (1892–1894), D' Abrera (1990), Seitz (1907), Schwanwitsch & Sokolov (1934), Lee & Zhu (1992), Lang (2017) and Wu (2017), and (ii) Yunnan population figured in Chou (1994; 1999), Bozano (1999), Zhai (2010) and iNaturalist (<https://www.inaturalist.org/taxa/1074074-Lethe-argentata>). All the above literature serves as sources of distributional data, with some additional records from Xie *et al.* (2004), Liu *et al.* (2009), Mao *et al.* (2009), and Fan *et al.* (2020). Terminology for genitalia follows Klots (1970). The nomenclature of wing marking and venation refers to Schwanwitsch & Sokolov (1934). The dates on publications of Hübner (1816–1826), Doubleday *et al.* (1849–1852), Moore (1890–1892), Seitz (1907) are demonstrated by Hemming (1943, 1941), Sherborn (1893), Griffin (1936) respectively, and thus, the dates of some taxa are enclosed in square brackets (Recommendation 22A of ICZN 3rd Edition).

Mitochondrial *COI*, nuclear *EF-1 α* and *RPS5* were chosen for phylogenetic analysis. DNA extraction and primers used are identical to those of Huang (2025). The processes of phylogenetic analyses are based on the work of Li *et al.* (2025), employing the GTR+F+G4 model for *COI* dataset and the TNe model for *EF-1 α* and *RPS5* datasets. The accession numbers of specimens used in the molecular analysis were listed in Fig. 5.

● Results

Externally, *Lethe argentata* from Yunnan is almost identical to the typical population of Sichuan except for differences in circuli and white discal band on the hindwing underside. Specifically, in the nominal subspecies from Sichuan, the intracircular area on the hindwing underside, region between the circulus (C) and eye-spot (OC), tends to darken and eventually be concolorous with circulus. As a result, these structures merge to form an integrated unit, termed as ocello circulus (OCC) by Schwanwitsch & Sokolov (1934). Then, the OCC begin to lose their round form, acquiring quadrangular shape and fusing together, such as OCC₂₋₅ in LAA1 (Schwanwitsch & Sokolov 1934) (Fig.

3). In contrast, the population from Yunnan usually displays lighter intracircular areas and darker circuli that still maintain their rounded structural independence (Fig. 3). More notably, in Yunnan population, the broken white discal band—composed of upper and lower sections—is narrower and extends further into space 2, bringing the two sections closer to each other, rather than ending abruptly against space 2 (Fig. 3). Given that the shape of white discal band serves as a species-level diagnostic characteristic within *baladeva*-group, this variation in Yunnan population of *L. argentata* exhibits a superficial resemblance to *L. andersoni* (Atkinson, 1871) and *L. yunnana* D' Abrera, 1990 (Vis & Coene 2012). However, by the examination of male genitalia, the uncus and gnathos undoubtedly confirm that the focal population is not conspecific with either *L. andersoni* or *L. yunnana* but is instead closely allies *L. argentata* from Sichuan (de Lesse 1956; Zhai 2010; Huang 2014; Lang 2017) (Fig. 2). Furthermore, the apical spine on the valva appears longer in the Yunnan specimen examined, but comparison with genital illustrations from other studies suggests that this difference likely represents individual rather than geographical variation (Lang 2017) (Fig. 2).

Regarding the phylogenetic tree constructed using *COI*, *EF-1 α* , and *RPS5*, the Yunnan population is proved to be conspecific with *L. argentata* from Sichuan, differing by a few base pairs (Fig. 5). Furthermore, the Yunnan and Sichuan populations form a clade sister to *L. andersoni*, indicating that LAR2, the individual bearing the most developed discal band, does not belong to the latter species. It is noteworthy that although three gene segments were used in this phylogenetic tree, the resulting topology unfortunately fails to resolve *L. argentata* into a dichotomous clade, which does not reflect the monophyly of the Yunnan population (Fig. 5).

Therefore, given no fundamental distinction on male genitalia and DNA sequences, treating the Yunnan representative of *L. argentata* as a new subspecies is preferable to a full species. Hence, a new subspecies-level taxon is described herein.

***Lethe argentata argentata* (Leech, 1891) 银线黛眼蝶指名亚种**

(Figs 1–5)

Zophoessa argentata Leech, 1891: 1, TL: Wa-Shan (瓦山), Chia-Ting-Fu (嘉定府), Huang-Mu-Chang (皇木厂) [Dawa Mountain (大瓦山), Leshan city (乐山市), Huangmu Town (皇木镇)]; Leech (1892–1894): 46 + pl. VII, fig. 8 for ♂; Seitz (1907): 87 + 32a for ♂; Dresden (1925): 52; South (1902): 8.

Pulvia argentata: Moore (1880–1881): 291.

Lethe argentata: de Lesse (1956): 85, fig. 23 for ♂ genitalia; D' Abrera (1990): 130, 131 for ♂ and ♀; Lang (2017): 94 + pl. X, figs. 11, 12 for ♂ and ♀ + pl. 10, fig. 118 for ♂ genitalia; Wu (2017): 0446 for 2 ♂♂; Lang (2020): 334.

Material: 3 ♂♂: 25.V.2006, Jiulong, Ganzi, Sichuan, Z-J Wu leg. (CZJW, LAA1); 29.VI.2024, Menghuocheng, Shimian, Ya'an, Sichuan, W Guo leg. (CWG, LAA2); 25.VII.2022, Yala Snow Mountain, Ganzi, Sichuan (CYXW, LAA3). 1 ♀: 6.VI.2016, Menghuocheng, Shimian, Ya'an, Sichuan, W Guo leg. (CWG).

Remarks. Although the specimens illustrated in Lee & Zhu (1992) and Schwanwitsch & Sokolov (1934) lack locality data, their hindwing underside markings suggest an origin in Sichuan and belong to the nominal subspecies.

***Lethe argentata ruoliae* Li & Wu ssp. nov. 银线黛眼蝶云南亚种**

<https://zoobank.org/A992B617-2CEE-4818-AAE6-31BE3CF1224D>

(Figs 1–5)

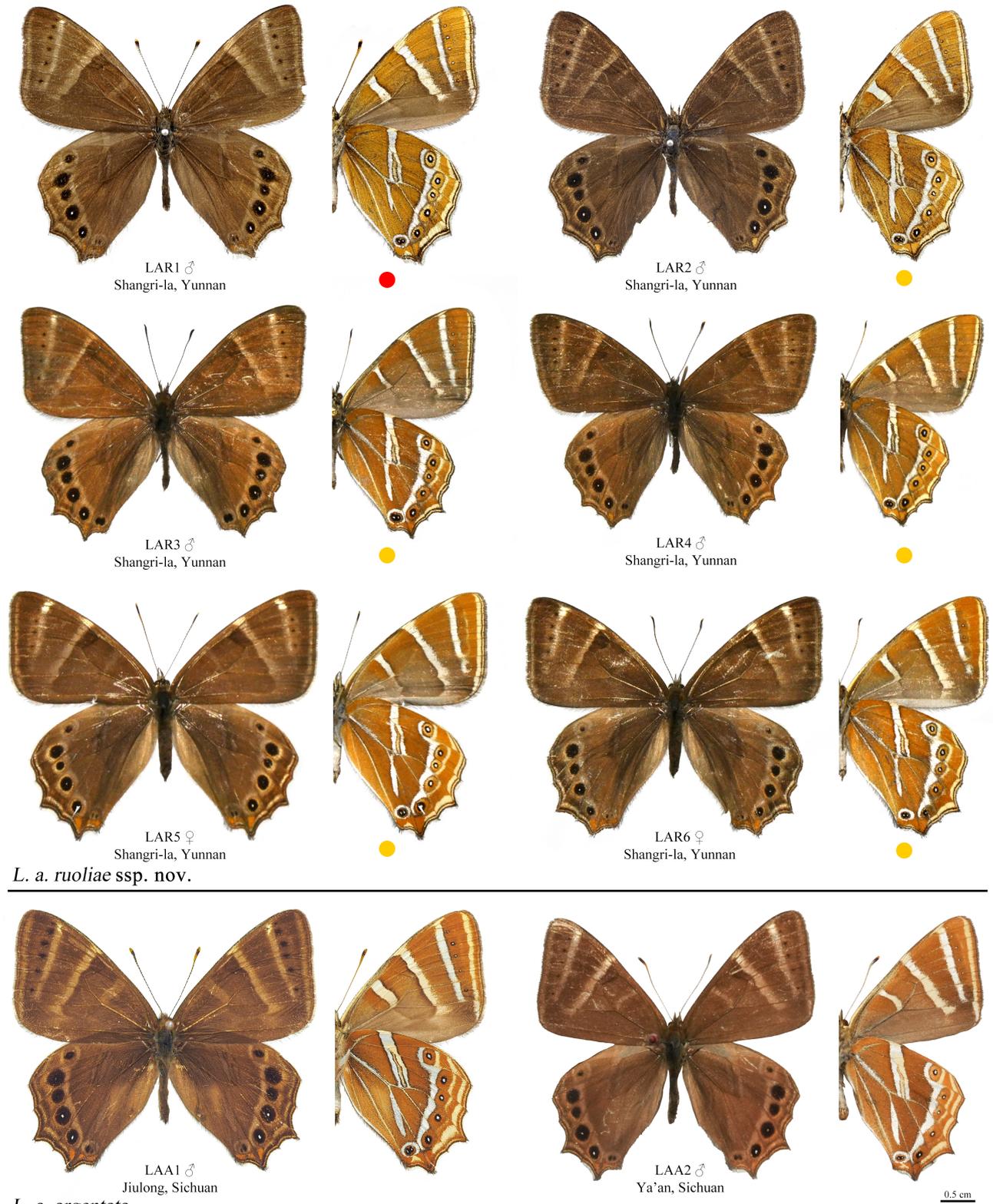
Lethe argentata: Chou (1994): 336 for ♂ [reproduced by Chou (1999)]; Bozano (1999): 45 for ♂; Zhai (2010): 93, fig. 4-41 for ♂ genitalia + 310, fig. I for ♂; Lang (2017): 94.

Holotype: ♂: Lianhe village, Xiaozhongdian, Shangri-La, Diqing, Yunnan, 18.VI.2025, 3200–3300 m, local collectors leg. (LAR1, CZJW).

Paratypes: 3 ♂♂ + 2 ♀♀: same data as in HT (LAR2, CZJW; LAR3–LAR6, CPY).

Diagnosis. This subspecies can be distinguished from the nominal subspecies by (Fig. 3):

- (1) On hindwing underside, broken white discal band extends into space 2, whereas ends abruptly against space 2 in *ssp. argentata*.
- (2) On hindwing underside, broken white discal band usually narrower.
- (3) On hindwing underside, submarginal circuli usually darker and more rounded.



L. a. ruoliae ssp. nov.

L. a. argentata

FIGURE 1. Habitus of *Lethe argentata* from China.

Variation. Size of the lower section of the white discal band on the hindwing underside is variable, from relatively reduced (LAR1) to well present (LAR2). However, the band size is relatively stable in the nominal subspecies.

Etymology. The subspecific name is dedicated to Miss Ruo-Li Yu (于若离), daughter of the third author, while also being homophonic with Chinese phrase “ruo li” (若离, seemingly apart), alluding to the characteristic of the upper and lower white discal bands being semi-separated.

Distribution. N.W. Yunnan, China (Fig. 4).

Phenology. Univoltine with single generation from May to June (Zhai 2010; Lang 2017).

Remarks. In *L. argentata*, the coalescence of the third externae (E^3) with OCC on the forewing underside is very pronounced, so that a complex component $E^3 + OCC$ arises, leaving minimal white interspaces (Schwanwitsch & Sokolov 1934) (Fig. 3). This important characteristic of *L. argentata* makes it different from its allied *L. yunnana*, whose OCC were not fully established and the interspace between E^3 and circuli is conspicuous on wings underside (Chou 1994, 1998; Zhai 2010; Huang 2014; Yang 2015).

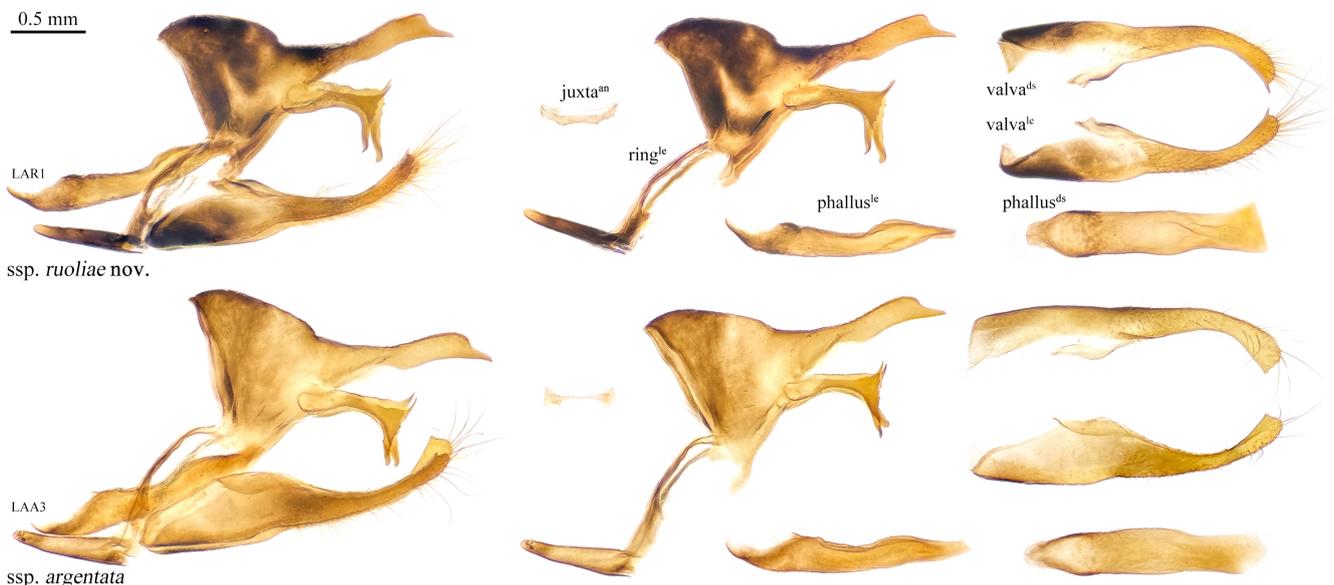


FIGURE 2. Genitalia of *Lethe argentata*. le = lateral left view, ds = dorsal view, an = anterior view.

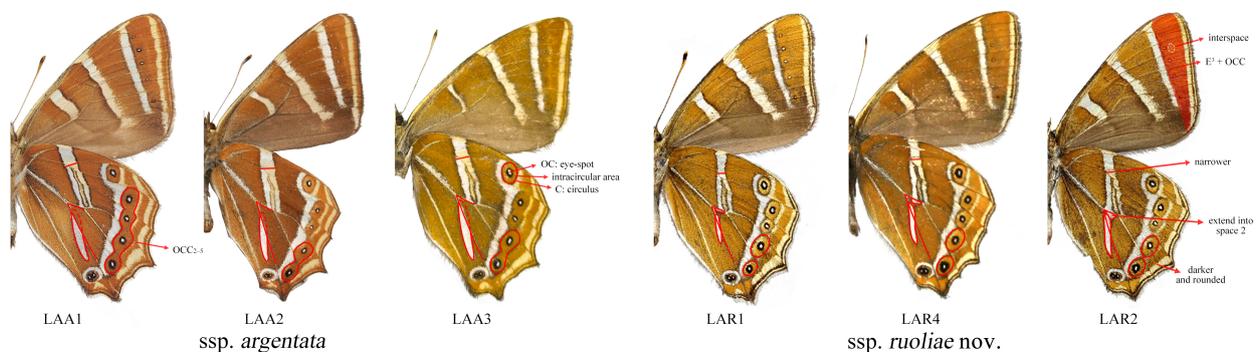


FIGURE 3. Diagnosis of *Lethe argentata ruoliae ssp. nov.*

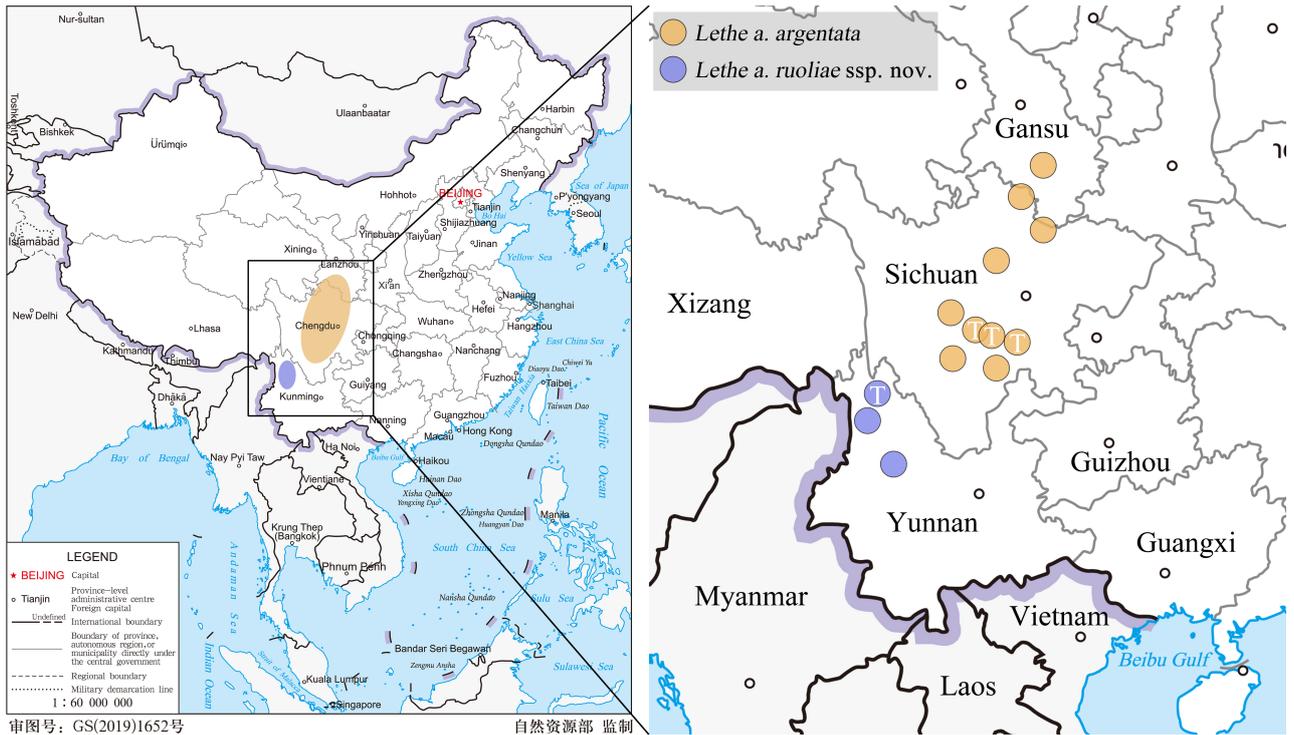


FIGURE 4. Distributional map of *Lethe argentata*. T = type locality. Source from references in Material and methods.

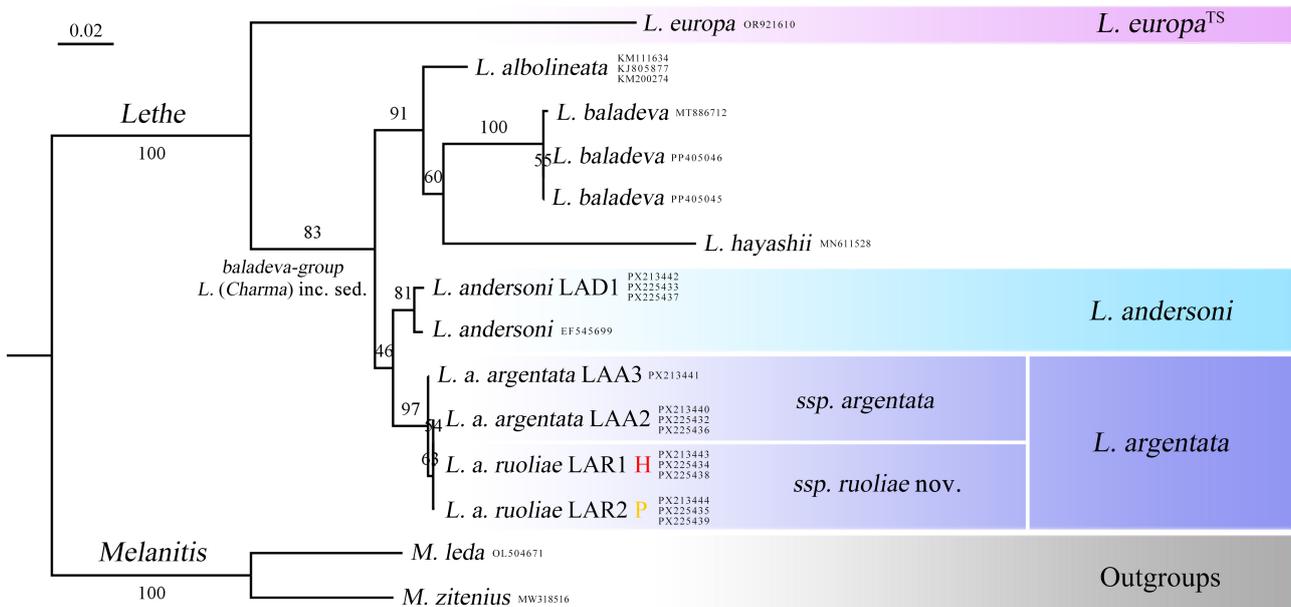


FIGURE 5. Phylogenetic tree of *Lethe argentata* inferred from ML analysis of *COI* and partial *EF-1 α* and *RPS5*.

● Discussion

Among the three localities listed by Leech (1891) in the original description of *L. argentata*, a pair of specimens from Wa-Shan and Huang-Mu-Chang were mentioned as types in the work of South (1902), omitting those from Chia-Ting-Fu. However, the lectotype designation in South (1902) is invalid as more than one specimen listed as name-bearing types (Article 74.1.1 of ICZN 4th Edition). Consequently, all specimens from these localities retain their status as syntypes, with three type localities (Article 73.2.3, 76.1 of ICZN 4th Edition) (Fig. 4). Notably, D’Abrera (1990) illustrated a pair of *L. argentata* from two of these type localities, which are likely the syntypes and show no differences compared with other Sichuan specimens examined in this study.

As mentioned above, the newly described subspecies of *L. argentata*, especially those with upper and lower sections of the discal band developed, shares certain similarities to both *L. andersoni* and *L. yunnana*. Beside the genital distinctions, the new subspecies can be additionally separated from the two congeners by several features, including the elongated discocellular bar on the hindwing underside (Huang 2014; Lang 2017) (Fig. 1). It is worth noting that this new subspecies was once misidentified as sympatric *L. yunnana* by Jiang (2025), a species can be further diagnosed by the longer tail and the conspicuous white interspaces between E³ and circuli (Zhai 2010) (see Remarks).

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● Additional information

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