Taxonomy and morphology of Chinese butterflies 3 -Satyrinae: Satyrini: Ypthimina: *Argestina* RILEY, 1923

(Lepidoptera, Nymphalidae)

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Abstract: The genus *Argestina* RILEY, 1923 is reviewed, based upon a study on androconia, wing venation, wing-pattern and genital structures in both sexes. The following taxonomic changes are made: *A. irma* (EVANS, 1924) stat. rev. is revalidated as bona species; *A. shuana* EVANS, 1915 stat. nov. is raised to full species from subspecies of *A. pomena* EVANS, 1915, with *A. shuana chiuna* BAILEY, 1935 comb. nov. transferred from subspecies of *A. pomena* EVANS, 1915. *A. waltoni pseudonitida* HUANG, 1998 syn. nov. is considered a junior synonym of *A. waltoni waltoni* (ELWES, 1906); *A. inconstans sahasrabhuja* SAKAI, 2015 is considered a junior synonym of *A. inconstans gyala* (EVANS, 1915). Two new subspecies are described: *Argestina. waltoni dellabrunai* subspec. nov. and *A. inconstans jinlingensis* subspec. nov.

Introduction: The genus Argestina RILEY, 1923 (type species: Callerebia waltoni ELWES, 1906) was defined by RILEY (1923) as separable from the genera Paralasa MOORE, 1893 and Callerebia BUTLER, 1867, using characters of venation and antenna. DELLA BRUNA et al. (2000 & 2002) gave a modern version of classification, using more characters especially those in σ genitalia. In summary, Argestina is distinguishable from its relatives by the following diagnostic characters.

1) Forewing vein 10 originated from stalk of veins 7, 8 and 9, well beyond end of cell (figs. 84-93).

[Forewing vein 10 originated from cell or at base of stalk of veins 7,8 and 9 in *Callerebia* BUTLER, *Loxerebia* WATKINS, 1925 (figs. 82-83), *Hemadara* MOORE, 1893, *Eugrunia* DELLA BRUNA et al., 2000 (= *Sinerebia* NAKATANI, 2017, synonymized by ZHANG et al., 2023) and most species of *Paralasa* MOORE except only *Paralasa* nitida (RILEY, 1923) and *P. phantasta* (GOLTZ, 1938)].

This character was first used by RILEY (1923) but was neglected by DELLA BRUNA et al. (2000 & 2002). It is the only useful character in dividing *Argestina* RILEY and *Loxerebia* WATKINS. The following characters employed by DELLA BRUNA et al. (2000 & 2002) for separating *Argestina* RILEY and *Loxerebia* WATKINS are however not reliable in the case of *Loxerebia phyllis* (LEECH, 1891) and *Argestina inconstans* (SOUTH, 1913): the shape of antennal club (gently spatulated versus strongly spatulated), the middle discocellular vein of forewing (more or less curved versus very curved), radial vein (dc 1) of forewing (apparent versus very short), the dorsal process of valva in σ genitalia (poorly pronounced and smoothed versus pronounced and finely indented), and the uncus of σ genitalia (without distinct belly process).

2) Antennal club strongly spatulated in shape.

[Antennal club slightly thickened in Callerebia BUTLER, gently spatulated in Hemadara MOORE].

3) Aedoeagus bent centrally in lateral view (figs. 49-53, 55-63).

[Aedoeagus straight in lateral view in Paralasa MOORE, and Eugrumia DELLA BRUNA et al.].

By this character, DELLA BRUNA et al. (2000 & 2002) removed Argestina nitida RILEY, 1923 and Argestina phantasta (GOLTZ, 1938) to Paralasa MOORE.

4) or brand on forewing upper side well developed with a grater-like texture (fig. 47).

[S brand on forewing upper side never with a grater-like texture in Paralasa MOORE, and Eugrumia DELLA BRUNA et al.].

DELLA BRUNA et al. (2002) used the absence of brachia in ³ genitalia as an additional character to separate *Eugrunia* DELLA BRUNA et al. from other genera including *Argestina* RILEY. However, ZHANG et al. (2023) synonymized the monotypic genus *Sinerebia* NAKATANI, 2017 (type species: *Erebia atramentaria* BANG-HAAS, 1927) with *Eugrunia* DELLA BRUNA et al., 2000 by an analysis on DNA sequences, making the absence of brachia no longer a character for *Eugrunia* DELLA BRUNA et al... It is noteworthy that ZHANG et al. (2023) made a mistake in regarding that *Sinerebia* NAKATANI, 2017 has priority over *Eugrunia* DELLA BRUNA et al., 2000 that was published earlier.

Moreover, DELLA BRUNA et al. (2002) used the L-shaped or V-shaped middle discocellular vein (dc2) as additional character to separate *Paralasa* MOORE and *Eugrumia* DELLA BRUNA et al. from other genera including *Argestina* RILEY; and they used the absence of the forewing radial vein (dc 1) as additional character to separate *Eugrumia* DELLA BRUNA et al. from other genera. However, a detailed survey of species of *Argestina* RILEY and *Eugrumia* DELLA BRUNA et al. in this work proves that these differences are not reliable, being variable within each genus.

The genus identity of *Argestina* RILEY requires a further study on DNA sequences, as the separation of *Argestina* RILEY and *Loxerebia* WATKINS is solely based upon the position of forewing vein 10 which could be variable in a single genus, such as *Paralasa* MOORE. The close similarity between *Loxerebia phyllis* (LEECH) and *Argestina inconstans* (SOUTH) in androconia, wing-pattern and both σ and φ genitalia also promise a possible mergence of the two genera.

Only four species of *Argestina* RILEY were recognized by DELLA BRUNA et al. (2000 & 2002), this opinion was followed by LANG (2022). The present study reveals that six species are recognizable by the same standard of morphological characters (androconia, σ brand, wing-venation, wing-pattern, σ and φ genitalia). *Erebia phyllis irma* EVANS, 1924 deserves full species rank, which was incorrectly sunk as a synonym of *Argestina waltoni* (ELWES, 1906) by DELLA BRUNA et al. (2000 & 2002). The very little known *A. karta* Riley, 1923 was incorrectly identified and figured by DELLA BRUNA et al. (2000 & 2002), deserving the following notes. This species represents the south-westernmost member of the genus, being restricted to a small area around the valleys of Karta

(Qudang of Dingri County); it was rediscovered by the author from the type locality during his 2017 expedition to Mt. Everest. An examination of σ and φ genitalia supports its species identity in separation from *A. waltoni* (ELWES, 1906). It is noteworthy that the publishing year of *Argestina* (RILEY), *A. karta* RILEY and *A. nitida* RILEY is 1923 as originally stated (RILEY, 1923: 461- footnote), not 1921 or 1922 as stated by DELLA BRUNA et al. (2002: 24, 27 & 50).

Abbreviations

SHNU:	Biological laboratory of Shanghai Normal University, Shanghai, P.R. China.
CHH:	Collection of HAO HUANG, Qingdao.
IZCA:	Institute of Zoology, Chinese Academy of Sciences, Beijing.
NHMUK:	Natural History Museum, London, UK.
OXUM:	HOPE Entomological Collections, Oxford University Museum, UK.
TL:	Type locality.

Genus Argestina RILEY, 1923

Androconia & *d* brand (figs. 47-48). Androconia are highly individually variable in all species of *Argestina* RILEY. Comparisons based upon good number of specimens reveal that the *A. pomena* (EVANS) group is different from the *A. waltoni* (ELWES) group by having a wider and longer lamina in androconia. A few individuals of *A. irma* (EVANS) have some very large abnormal androconia (fig. 48 - left top) which are not found in other species.

 σ brand is formed by parallel lines of androconia, so that has a grater-like texture. The distance between lines of androconia is longer in the *A. pomena* (EVANS) group than in the *A. waltoni* (ELWES) group, with a extent of individual variations. The extent of σ brand is constantly smaller in *A. irma* (EVANS) than in *A. waltoni* (ELWES), but is not markedly different among other species.

Wing-venation (figs. 84-93). A good number of specimens were examined for all known species of *Argestina* RILEY, proving that the base of forewing vein 10 is invariably originated on the stalk of veins 7, 8 and 9, well beyond the end of cell.

A comparison between *A. waltoni* (ELWES) and *A. irma* (EVANS) shows that the two species are different in ratio of dc2-length to dc3-length. The base of vein 5 is closer to that of vein 6 in *A. irma* (EVANS) than in *A. waltoni* (ELWES). All specimens in the author's collection have been examined: in most cases, the difference between the two species is striking; only in one specimen of *A. irma* (EVANS) (fig. 87), the base of vein 5 is not very close to vein 6 as in other specimens of *A. irma* (EVANS), but is still closer to vein 6 than in *A. waltoni* (ELWES).

Wing-pattern. Some characters in wing-pattern are found useful in diagnosing different species, such as those employed in the key below. It is noteworthy that size of eyespot on forewing could be important in subspecific classification of most species except only *A. inconstans* (SOUTH). The presence and absence of reddish coloring on hindwing upper side is important in distinguishing species. ^a genitalia (Figs. 49-64)

d genitalia of *Argestina* RILEY, like in *Loxerebia* WATKINS, are rather uniform with very little variation among species, and are highly individually variable in all known species. No reliable characters are found in tegumen plus uncus in dorsal view, aedoeagus in both dorsal and lateral views, juxta and manica in anterior or posterior view and valva in dorsal view (fig. 64).

However, some useful characters are found in length, thickness and shape of uncus in lateral view, length of dorsal margin of valva in lateral view, and detailed shape of dorsal process of valva in lateral view. By these characters, *A. irma* (EVANS) and *A. karta* RILEY are separable from *A. waltoni* (ELWES), and *A. shuana* (EVANS) is separable from *A. pomena* (EVANS).

The author failed to find any useful σ genital character to distinguish *Argestina* RILEY from *Loxerebia* WATKINS (fig. 54). 9 genitalia (Figs. 65-76)

The φ genitalia of *Argestina* RILEY are rather uniform among species: papilla analis rather uniform in shape, with a vestigial apophysis posterioris; apophysis anterioris absent; sterigma composed of a sclerotized ring around ostium, formed by the conjoined lamella antevaginalis and lamella postvaginalis, a pair of lateral sclerites extending dorsally, and a ventral tray connecting lamella antevaginalis and lodix; lamella antevaginalis protruding as a plate covering ostium ventrally; antrum (sclerotized caudal part of ductus bursae before ostium) absent; ductus seminalis originated near ostium; ductus bursae e-mail, short and thick; corpus bursae large and oval, with a pair of longitudinal signa.

Useful characters are only found in size and shape of lamella antevaginalis.

Key to species and subspecies

Taxonomic accounts

Argestina waltoni (ELWES, 1906): Three subspecies are known. They have no reliable differences in androconia, σ brand, wing venation, σ and φ genitalia.

Argestina waltoni waltoni (ELWES, 1906) (Figs. 3, 14, 25, 30, 47, 48, 52, 64, 68, 77, 94)

Callerebia waltoni ELWES, 1906: 482 (TL not specified; supposed to be Gyantze by BANG-HAAS, 1927; supposed to be between Phari and Gyantze in this work), pl. 36, fig. 14 - ♂, fig. 15 - 9.

Argestina waltoni: RILEY, 1923: 470.

Erebia waltoni: BANG-HAAS, 1927: 47.

Argestina waltoni pseudonitida HUANG, 1998 **syn. nov.**: 265 (TL: near bank of Yarlung Tsangpo River, Lazi, coordinate 29.1150 N, 87.5782 E), partim on specimens from Lazi and Cuola pass (between Shigatse and Lazi), 269- figs. 1-b,d & f, 2- b, d & f for ♂♂ and ♀.

Material. 1 ♂, 8 ♀ (CHH), Aiwang Temple, Kangma, on road between Phari and Gyantze, 28.45 N, 89.60 E, 4350 m, 1.VII.2017, H. HUANG leg.; 1 ♂ (holotype of *pseudonitida*; IZCA), 1 ♀ (paratype of *pseudonitida*; CHH), near bank of Yarlung Tsangpo, Lazi, 29.1150 N, 87.5782 E, 10.VI.1993, H. HUANG leg.; 1 ♂ (paratype of *pseudonitida*; CHH), Cuola pass, between Shigatse (= Shigaze) and Lazi, 29.07 N, 87.98 E, 4530 m, 9.VI.1993, H. HUANG leg. All dissected.

TL & identification. The TL was not specified in the original description. However, ELWES (1906) stated that the expedition was "on the march from Phari to Gyantze in June and July 1904", after then at Gyantze and "at and near Lhasa, where a few specimens were afterwards taken in August". Considering that this species was observed to fly in June and early July, the most probable TL should be between Phari and Gyantze (= Gyantse or Jiangzi).

All specimens collected by the author from the area between Phari and Gyantze fit in with the original figures of the syntypes (fig. 77) in both sexes. However, the specimens from Karola, E Gyantze have a larger subapical ocellus on the forewing in both sexes, not matching with the type specimens. Therefore, the correct TL should be the area between Phari and Gyantze, not between Gyantze and Lhasa. The immediate area around Gyantze has not been thoroughly explored, but it can be sure that the mountain range on north and east of Gyantze is occupied by a different subspecies with large forewing ocellus.

Remarks. The author (HUANG, 1998) made a mistake in regarding the populations from the area between Gyantze and Lhasa as nominotypical subspecies, overlooking that these populations do not fit in with the syntypes figured in original description. Such mistakes were also found in all the subsequent works after ELWES (1906). Apparently due to the extreme rarity of the nominotypical subspecies in the collections, all these authors believed that the nominotypical subspecies occurs in Lhasa area and they might regard the difference in size of forewing ocellus as individual variation. However, a new material collected by the author from the area between Phari and Gyantze and the mountain range on east of Gyantze reveals that two distinct geographical races are clearly defined: one is distributed to the west of Gyantze, with vestigial forewing ocellus on upper side and smaller forewing ocellus on underside; another is distributed to the east of Gyantze, with prominent forewing ocellus on both upper and undersides. *A. waltoni pseudonitida* HUANG is proved to be a synonym of the nominotypical subspecies. So far, there is only slight individual variations in size of forewing ocellus for all the known populations.

Distribution. Southern Tibetan area between Gyantze and Lazi (fig. 94).

Argestina waltoni sangsangensis HUANG, 1999 (figs. 4, 15, 27, 32, 48, 51, 70, 94)

Argestina waltoni sangsangensis HUANG, 1999: 646 (TL: Sangsang, coordinate 29.4835 N, 86.4871 E).

Material. & holotype (IZCA), 3 & paratypes (CHH), 1 & paratype (CHH), Sangsang, Ngamring County, Shigatse, 29.4835 N, 86.4871 E, 12.VI.1993, H. HUANG leg.

Remarks. Argestina. w. sangsangensis HUANG is the westernmost subspecies, being intermediate in wing-pattern between the other two subspecies. The range of this subspecies is still unclear as only the TL is known.

Distribution. Sangsang.

Argestina waltoni d e 11 a b r u n a i subspec. nov. (figs. 2, 13, 26, 31, 47, 48, 50, 64, 65, 69, 94)

Argestina waltoni: D'ABRERA, 1992: 192, figs. for *s* and *Q* from Lhagyari, SE Tibet.

Argestina waltoni: DELLA BRUNA et al., 2002: 25, figs. for ♂♂ and ♀ from Mila, SE Tibet and Gyantse, C Tibet; LANG, 2022: pl. XXII, fig. 1 for ♂ from W of Mila Pass, pl. 19, fig. 235 for ♂ genitalia.

Holotype \circ (SHNU; figs. 26- wd6, 31- wd6): Tibet, Lhasa, near Tsurphu, coordinate 29.6942 N, 90.6363 E, 4500 m, 22.VI.2017, H. HUANG leg.; **Paratypes**: 3 $\circ \sigma$, 1 \circ (CHH), same data as holotype; 3 $\circ \sigma$ (CHH), north of Nimu County, 29.56 N, 90.01 E, 4200 m, 2.VII.2020, H. HUANG leg.; $\sigma \sigma$, 2 \approx (CHH), near Karola Pass, E Gyantze, 28.89 N, 90.32 E, 4900-5000 m, 23.VI.2017, H. HUANG leg.; 3 $\circ \sigma$ (CHH), Linzhou, N Lhasa, 30.11 N, 91.26 E, 4700 m, 22.V.1999, J. Luo leg.; 4 \approx (CHH), S Damxung, 30.30 N, 91.10 E, 5.VI.1999, J. Luo leg. 8 $\circ \sigma$ and 8 \approx dissected.

Etymology. This new subspecies is named after C. DELLA BRUNA, one of the recent reviewers of this genus. **Diagnosis**. As indicated in the key above.

Remarks. Unlike *A. inconstans inconstans* (SOUTH), all subspecies of *A. waltoni* (ELWES) have very little individual variation in size of forewing ocellus in all of the known populations. This needs to be confirmed by more investigations in future.

Distribution. As indicated in fig. 94. It is noteworthy that this taxon is replaced by A. inconstans gyala (EVANS) in the east.

Argestina irma (Evans, 1924) (figs. 1, 12, 23, 28, 47, 48, 49, 64-66, 78, 94)

Erebia phyllis irma Evans, 1924: 972 (TL: between Bhutan and Gyantse, S. E. Tibet); DELLA BRUNA, 2002: 25, synonymy for *Argestina waltoni* (ELWES).

Argestina irma: D'ABRERA, 1992: 191, figs. for of and Q (NHMUK; most probably syntypes) from Sekargutok, SE Tibet.

Material. 2 ♂♂ (CHH), 4 km west of Zhari, Lhozhag County, 28.36 N, 90.61 E, 4350 m, 24.VI.2017, H. HUANG & X.-D. YANG leg.; 1 ♂ (CHH), dry valley on east of Lhozhag, 28.39 N, 91.04 E, 4500 m, 24.VI.2017, H. HUANG leg.; 3 ♂♂, 2 ♀ (CHH), on road from Lhozhag to Se, 28.24 N, 90.99 E, 3400 m, 3.VIII.2020, H. HUANG leg.; 3 ♂♂, 1 ♀ (CHH), west of Lhozhag, 3300 m, 3.VIII.2020, H. HUANG leg.; 2 ♂♂ (CHH), Se, 28.18 N, 90.80 E, 4039 m, 3.VIII.2020, H. HUANG leg. 8 ♂♂ and 3 ♀ dissected.

Remarks. DELLA BRUNA et al. (2000 & 2002) apparently did not examine any specimens in detail, as the specimens of this species were very rare in the collections. They synonymized this species with *A. waltoni* (ELWES) on account of the similarity in wingpattern. An examination of venation, σ brand, σ and φ genitalia reveals that the two taxa are separate species. *A. irma* (EVANS) is different from *A. waltoni* (ELWES) in the following structural characters: 1) σ brand smaller in extent (fig. 47); 2) ratio of dc2-length to dc3-length in forewing venation smaller (figs. 85-90); 3) uncus in lateral view thicker in same-sized individuals, with apex less hooked (figs. 49-52); 4) lamella antevaginalis in full-face view larger (figs. 66, 68-70).

Distribution. West part of Lhokha Prefecture, as shown in fig. 94.

Argestina karta RILEY, 1923 (figs. 5, 16, 24, 29, 47, 48, 53, 64, 65, 67, 80, 81, 94)

Argestina karta RILEY, 1923: 461 (TL: Kharta, now at Qudang of Dingri), pl. 36, fig. 11- °, 12- ° (color hand-drawings, not photos); NOMAD, 2017: figs. for ° paratype and its labels (reproduced in fig. 81).

Argestina nitida: D'ABRERA, 1992: 192, partim - fig. for ♀ (recto surface) from Kharta Tashi Dz. Misidentification. *Argestina waltoni pseudonitida*: LANG, 2022: pl. XXII, fig. 2 for ♂ from Meynpu. Misidentification.

Material. 1 ° (CHH), Cha village, north of Qudang, Dingri County, 28.32 N, 87.33 E, 3800 m, 30.VII.2017, H. HUANG leg.; 1 ° (CHH), 3 km north of Qudang, 28.13 N, 87.35 E, 3640 m, 30.VII.2017, H. HUANG leg.; 1 ° (CHH), Zhuanzhulin, west of Qudang, 28.06 N, 87.27 E, 3930 m, 31.VII.2017, H. HUANG ♀ (CHH), Kadapu (= Kharta), west of Qudang, 28.06 N, 87.25 E, 4120 m, 31.VII.2017, H. HUANG leg. All dissected.

Remarks. This very little known species had not been rediscovered until the author explored the TL in 2017. The type series, consisting of two pairs collected by BULLOCK, are deposited in OXUM, not NHMUK. However, there is a single \Im in NHMUK (fig. 80), apparently from an early collection, misidentified and figured by D'ABRERA (1992). Probably due to the lack of the type material in NHMUK, all the subsequent authors (D'ABRERA, 1992; DELLA BRUNA et al., 2002) who based their works on NHMUK collection made mistakes in identifying this species. RILEY's (1923) original figures are hand drawings without scale, thus are somewhat misleading. The only known photo of the type material was published by NOMAD (2017) on a website (reproduced in fig. 81).

This species is very similar to *A. waltoni* (ELWES), but differs from the latter by having a more pointed apex of forewing. The single clear pupil of the subapical ocellus of forewing could be a useful character for recognizing *A. karta* RILEY, but this character can be occasionally found in some $\sigma\sigma$ of *A. waltoni sangsangensis* HUANG (fig. 15). A dissection of both σ and φ genitalia reveals that *A. karta* RILEY is separable from *A. waltoni* (ELWES) by having a less hooked uncus, a longer dorsal margin of valva and a wider lamella antevaginalis in φ genitalia.

Unlike other species of Argestina RILEY, A. karta RILEY is very rare in nature, with very few individuals seen at each habitat observed by the author in 2017.

Distribution. Qudang area (= Kharta area), as shown in fig. 94.

Argestina inconstans (SOUTH, 1913)

This species replaces *A. waltoni* (ELWES) in eastern Tibet, being allopatric with the latter. These two species are clearly separable in size (length of forewing), wing-pattern (with or without reddish coloring on hindwing upper side) and width of lamella antevaginalis in \Im genitalia. These two species also have difference in length of androconia and size of \Im genitalia, but such difference might be blunt in very few individuals (figs. 48, 50 & 57).

Three subspecies of *A. inconstans* (SOUTH) are known, including a new subspecies described herein. There is no constant difference in σ and \circ genitalia between the subspecies. However, ssp. *gyala* (EVANS) tends to have a shorter uncus and a shorter distal process of valva than other two subspecies, though such difference is not constant.

Argestina inconstans inconstans (SOUTH, 1913) (figs. 11, 22, 40, 43, 46-48, 55, 62, 64, 65, 74, 94)

Callerebia inconstans SOUTH, 1913: 350 (TL: Polu, a village on north of Chayu, coordinate 28.9960N, 97.3992 E),

Argestina inconstans: RILEY, 1923: 470; D'ABRERA, 1992: 191, figs. for or & 9 from SE Tibet.

Argestina inconstans: DELLA BRUNA et al., 2002: 25, partim - figs. for specimens from Pahsho (Basu) and genitalia from Zogong (Zuogong); LANG, 2022: pl. XXII, figs. 3-4 for d'd from Bome (= Bomi), pl. 19, fig. 236 for d' genitalia.

Argestina karta: D'ABRERA, 1992: figs. for o' and 9 from Molo, SE Tibet; DELLA BRUNA et al., 2002: 27, partim - figs. for o' and 9 from Rawu (Ranwu) and genitalia from Wzogong (Zuogong). Misidentification

Material. 2 ởở (CHH), Guyu, Chayu, 29.17 N, 97.20 E, 3400 m, 11.VIII.2000, H. HUANG leg.; 7 ởở (CHH), on road from Demula Pass to Guyu, Chayu County, between (29.33 N, 97.06 E) and (29.17 N, 97.20 E), 3400-4300 m, 16.VI.2017, H. HUANG leg.; 2 ¢¢ (CHH), Guyu, Chayu, 3400 m, 12.VIII.2017, H. HUANG leg.; 1 ở (CHH), 10 km north of Ranwu, south of Anjiula Pass, 29.59 N, 96.74 E, 4300 m, 15.VI.2017, H. HUANG leg.; 3 ởở (CHH), 45 km west of Ranwu, 29.62 N, 96.32 E, 3335 m, 19.VI.2017, H. HUANG leg.; 6 ởở , 4 ♀♀ (CHH), southwest of Bomi County, 29.84 N, 95.72 E, 3000 m, 18.VI.1996, H. HUANG leg.; 3 ởở (CHH), 25 km east of Basu, 30.07 N, 97.16 E, 2972 m, 15.VI.2017, H. HUANG leg.; 4 ởở , 3 ♀♀ (CHH), southwest of Yela Pass, 30.13 N, 97.28 E, 4300 m, 15.VI.2017, H. HUANG leg.; 5 ởở , 4 ♀♀ (CHH), Duoda village, southeast of Zuogong, 29.49 N, 97.94 E, 3900 m, 16.VI.2023, H. HUANG leg.; 5 ởở (CHH), east of Zuogong, 29.64 N, 97.89 E, 3860 m, 16.VI.2023, H. HUANG leg.; 3 ởở (CHH), northeast of Kangsha, E Lhorong County, 30.82 N, 96.18 E, 3500 m, 21.VI.2023, H. HUANG leg.; 1 ở (CHH), west of Lhorong, 30.87 N, 95.54 E, 3600 m, 22.VI.2023, H. HUANG leg. 14 ởở and 6 ♀ dissected.

TL. The type series was collected from a series of localities around Chayu: Polu, Loma, Sanga Chu Dzong and Shiuden Gompa. One σ from Polu (coordinate 28.9960 N, 97.3992 E) was selected by SOUTH (1915: 351) as "Type" in sense of holotype. Thus the TL is Polu, on north of Chayu.

Remarks. This subspecies is a combination of a series of variable populations. The populations from Parlung Tsangpo valley (between Bomi and Ranwu) usually have a small unipupilled forewing ocellus, but sometimes have a larger forewing ocellus marked by a second small pupil (figs. 40- ii14, 43- ii14). These populations were misidentified by both D'ABRERA (1992) and DELLA BRUNA et al. (2002) as A. karta RILEY. The populations from Chayu area (on south of Demula, including TL) have a bipupilled forewing ocellus that is variable in size; some individuals from Chayu area with small ocellus are inseparable from the bipupilled specimens from Bomi. All these above-mentioned populations are rather uniform in androconia that are markedly wider than in the populations from Basu, Zuogong, Chawalong and Lhorong. The populations from Basu, Zuogong, Chawalong and Lhorong always have a large bipupilled forewing ocellus and the thinner and roconia than the foregoing populations. It is apparent that the populations from Parlung Tsangpo valley are not at 95% level distinguishable from those from Chayu [typical populations of ssp. inconstans (SOUTH)], thus there is no need to separate the populations from Parlung Tsangpo as a further subspecies. The case in the populations from Basu, Zuogong, Chawalong and Lhorong is somewhat confusing: they cannot be distinguished from the typical populations from Chayu at high percent level by wing-pattern, but they seem to be constantly distinguishable by the markedly narrower lamina of androconium. The author decided to include these northeastern populations as ssp. inconstans (SOUTH) because of the following reasons: 1) and roconia are so individually variable in all species of Argestina RILEY that they do not provide good character to support subspecies solely; 2) such variations in androconia have been observed in a single subspecies described below. Very few & specimens of this subspecies (Specimen ii3 in figs. 11 & 22 and Specimen ii20 in figs. 40 & 43) have a clearly defined eyespot on hindwing upper side, being indistinguishable from those of ssp. gyala (EVANS).

Distribution. Vast area in eastern Tibet, mainly between Parlung Tsangpo valleys and Nujiang (upper Salween) valleys, as shown in fig. 94.

Argestina inconstans gyala (Evans, 1915) (figs. 9, 20, 41, 44, 45, 47, 48, 57, 61, 64, 65, 75, 94)

Erebia phyllis gyala Evans, 1915: 536 (TL not originally specified; as Gyala, Pe, SE Tibet by lectotype designation in this paper), partim on specimens from Pe and Tsa, figs. for σ and φ .

Argestina inconstans gyala: RILEY, 1923: 470; DELLA BRUNA et al., 2002: 25, figs. for ♂ (lectotype designated in this paper) and ♀ from Gyala, SE Tibet.

Argestina inconstans inconstans: DELLA BRUNA et al., 2002: 25, partim on or from Bayi.

A. inconstans sahasrabhuja SAKAI, 2015: 5 (TL: wrongly as "Kangding"), figs. 35-36 for ♂ holotype; LANG, 2022: 197, synonymy for *A. inconstans* (SOUTH). syn. nov.

Material. 14 ♂♂, 3 ♀♀ (CHH), Gangga, on road from Milin to Pai, 29.43 N, 94.46 E, 2940 m, 22.VIII.1995, H. HUANG leg.; 6 ♂♂ (CHH), on road from Milin to Langxian, 28.99 N, 93.28 E, 3050 m, 8.VII.2018, X.-D. YANG leg.; 8 ♂♂ (CHH), 30 km west of Gongbugymda, 30.02 N, 92.96 E, 3700 m, 21.VI.2017 & 10.VI.2020, H. HUANG leg. 7 ♂♂ and 3 ♀♀ dissected.

TL & Lectotype Designation. EVANS (1915) gave the following three localities for the original specimens, not specifying the type: Pe (Pai, coordinate 29.5045 N, 94.8505 E), Tsa near Rongchakar (Kadang near Rongxiang, coordinate 29.2737 N, 92.0987 E), and Po Chu Valley (between Bomi and Guxiang in the Parlung Zangbo valley). This study reveals that the specimens from Po Chu (around Bomi) actually belong to ssp. *inconstans* (SOUTH), with no sub-tornal spot on hindwing upper side. Thus a lectotype designation is required to fix this taxon.

Lectotype: of (NHMUK; figured in DELLA BRUNA et al., 2002: 25- left bottom), lectotype by present designation, labeled from Gyala

(a small village belonging to Pe = Pai), SE Tibet, 10000 feet.

Synonym. A. inconstans sahasrabhuja SAKAI, 2015 was described on $2 \, \sigma \sigma$ and $1 \, \varphi$ collected by native collectors from "Kangding", with two specimens measured 23 mm for forewing-length and one measured 20 mm. The σ holotype of A. inconstans sahasrabhuja SAKAI figured shows no difference from A. inconstans gyala (EVANS), but SAKAI (2015) based his subspecies on smaller size, regarding it as the smallest subspecies. However, the specimens with a length of forewing around 22 mm are commonly seen in the populations of A. inconstans gyala (EVANS) from Gongbugymda and Lhokha areas. The vast area between Kangding and Mekong valleys has been explored by many collectors in the recent thirty years but no specimen of Argestina species has ever been collected by any reliable collectors. It can be sure that SAKAI's specimens were wrongly labeled for an unknown reason. In conclusion, A. inconstans sahasrabhuja SAKAI syn. nov. is a synonym of A. inconstans gyala (EVANS).

Distribution. SE Tibetan area between Mila Pass and Namjagbarwa, and along Yarlung Tsangpo as far as Sangri County.

Argestina inconstans jinling ensis subspec. nov. (figs. 10, 21, 39, 42, 47, 48, 56, 63-65, 76, 94)

Holotype & (figs. 39- ij3, 42- ij3): northeast of Jinling, west of Xiagongla pass, Bianba County, coordinate 30.74 N, 94.37 E, 4050 m, 24.VI.2023, H. HUANG leg., deposited in SHNU. Dissected.

Paratypes: 6 ♂♂, 1♀ (CHH), northeast of Jinling, coordinate 30.74 N, 94.39 E, 4260 m, 24.VI.2023, H. HUANG leg.; 1 ♂ (CHH), 8 km east of Lhari, 30.63 N, 93.29 E, 4530 m, 25.VI.2023, H. HUANG leg.; 1 ♂ (CHH), 40 km east of Lhari, 30.58 N, 93.52 E, 4100 m, 25.VI.2023, H. HUANG leg. 5 ♂♂ and 1 ♀ dissected.

Etymology. This new subspecies is named after the TL.

Diagnosis. As indicated in the key above.

Remarks. Very few σ specimens of ssp. *inconstans* (SOUTH) from the Parlung Tsangpo valley (such as Specimen ii1 in figs. 11 & 22) have extensive reddish patches on both wings upper side, but such reddish patch on forewing is always ill-defined and at most well marked in upper half of space 2, never crossing space 2 in full width. So far, all the known specimens of ssp. *jinlingensis* subspec. nov. are at 100% level distinguishable from those of ssp. *inconstans* (SOUTH). More specimens of this rare subspecies need to be examined in future.

Distribution. Restricted to upper valleys of Yigong Tsangpo and its tributaries, being the north-westernmost subspecies.

Argestina pomena (Evans, 1915)

(Figs. 6, 17, 33, 36, 47, 48, 58, 64, 65, 71, 94)

Erebia pomena Evans, 1915: 535 (TL: Po Chu Valley, Lagong and Pemako Chung), figs. for *syntypes*.

Argestina pomena: D'ABRERA, 1992: 191, partim on new combination of name, excluding figs.;

Argestina pomena pomena: DELLA BRUNA et al., 2002: 26, figs. for a & 9 from Tangmai (= Tangme) and a genitalia from Tangmai; LANG, 2022: pl. XXII, figs. 7-8 for a & 9 from Guxiang and Tongmai (= Tangmai), pl. 19, fig. 237 for a genitalia.

Material. 3 ♂♂ (CHH), Laohuzui, on path from Hanmi to Beibeng, Motuo, 29.32 N, 95.17 E, 1350m, 26.VIII.1995 & 10.VII.1996, H. HUANG leg.; 4 ♂ ♂, 3 ♀ (CHH), Yigong, 2300-2500 m, 3-11.VIII.1996, H. HUANG leg.; 1 ♂ (CHH), north of Motuo, 1700 m, 24.VII.2016, X.-D. YANG leg.; 1 ♂ (CHH), Niwu, 30.48 N, 94.05 N, 3100 m, 24.VI.2023, H. HUANG leg.; 1 ♀ (CHH), Guxiang, Bomi, 29.90 N, 95.50 E, 2650 m, 14.VII.2010, J.-Q. ZHU leg.; 1 ♀ (CHH), Tongmai, 30.10 N, 95.12 E, 2300 m, 24.VIII.2016, X.-D. YANG leg.; 1 ♂ (CHH), west of Guxiang, Bomi, 30.03 N, 95.26 E, 2400 m, 9.VI.2020, H. HUANG leg. 7 ♂♂ and 5 ♀ dissected.

TL. EVANS (1915) gave three localities and selected a pair of specimens (in copula) collected from Tongto in Po Chu Valley as "types". However, as EVANS (1915) did not specify a single specimen, none of this pair can be regarded as holotype. All the original 56 specimens should belong to syntypes, and all the three known localities are type localities for syntypes: Po Chu (valley of Parlung Zangbo between Guxiang [29.8989 N, 95.4956] and Bomi [29.8726 N, 95.7381 E]), Lagong (a village in Motuo on the Tsangpo, coordinate 29.6892 N, 95.3780 E), Pemako Chung (Baima-gouxiong, coordinate 29.7402 N, 95.0651 E). As the present study proves that all the populations from the area around Bomi, Yigong, Motuo and Niwu belong to the same taxon, there is no necessity in taxonomic purpose for a lectotype designation.

Remarks. The range of this species may overlaps that of *A. inconstans* (SOUTH) in valleys of Yarlung Tsangpo, Parlung Tsangpo and Yigong Tsangpo, but this species inhabits much lower areas than *A. inconstans* (SOUTH). These two species have never been collected together from the same biotopes.

Distribution. Lower valleys of Yarlung Tsangpo, Parlung Tsangpo and Yigong Tsangpo.

Argestina shuana (Evans, 1915) stat. nov.

An examination of σ and φ genitalia reals that both *Erebia pomena shuana* Evans, 1915 and *Paralasa pomena chiuna* BAILEY, 1935 can be combined into a single species that is separable from *A. pomena* (Evans) as indicated in the above key. These two species are different also in biotope: *A. shuana* (Evans) prefers much higher elevations than *A. pomena* (Evans).

Argestina shuana shuana (Evans, 1915) (figs. 7, 18, 34, 37, 47, 48, 59, 64, 65, 73, 79, 94)

Erebia pomena shuana Evans, 1915: 535 (TL: along the Tsang Po between Timbo and Kongbo Nga La, mostly at Shu), figs. for & 9 syntypes.

Argestina pomena: D'ABRERA, 1992: 191, partim on figs. for ${}^{\circ} \& \circ (NHMUK, most probably syntypes of$ *shuana*) from Shu. $Argestina pomena shuana: Della Bruna et al., 2002: 26, figs. for <math> {}^{\circ} \& \circ from$ Zetang and road between Gyatsa and Namsham. Argestina karta: Della Bruna et al., 2002: 27, partim - figs. for ${}^{\circ} from 36$ km E of Lhasa. Misidentification.

Material. 2 $\[mu]$ (CHH), Qiangna, between Milin and Pai, 29.42 N, 94.50 E, 2955 m, 22.VIII.1995, H. HUANG leg.; 1 $\[mu]$ (CHH), Pai, 29.50 N, 94.85 E, 2950 m, 3.IX.1995, H. HUANG leg.; 4 $\[mu]$ (CHH), Dagu village, Baidui, Sangri, Lhokha Pref., 29.2286 E, 92.3315 N, 3545 m, 27.VII.2019, S.-X. GE. leg.; 1 $\[mu]$, 4 $\[mu]$ (CHH), Baidui, Sangri, 6.VIII.2020, H. HUANG leg.; 1 $\[mu]$ (CHH), south of Nimu, on road between Shigatse (= Shigaze) and Lhasa, 29.35 N, 90.17 E, 4020 m, 4.VIII.2017, H. HUANG leg. All dissected. **Remarks**. This taxon is sympatric with *A. inconstans gyala* (Evans) at Pai and Qiangna: both species were collected together from the

same biotopes by the author. Unlike *A. pomena* (EVANS), *A. shuana* (EVANS) inhabits higher elevations as well as in *A. inconstans* (SOUTH). 1 ° specimen of this taxon from E Lhasa was misidentified by DELLA BRUNA et al. (2002) as *A. karta* RILEY. **Distribution**. Along Yarlung Tsangpo valley as far as Nimu County.

Argestina shuana chiuna (BAILEY, 1935) comb. nov. (figs. 8, 19, 35, 38, 47, 48, 60, 64, 65, 72, 94) Paralasa pomena chiuna BAILEY, 1935: 15 (TL: Chiu Valley near Gyantse; not defined on modern map). Argestina pomena chiuna: DELLA BRUNA et al., 2002: 26, figs. for 37 & 99 from Gyantse.

Material. 5 ♂♂, 2 ♀ (CHH), north of Shigatse, 3800 m, 4.VIII.2017, H. HUANG leg.; 1 ♂ (CHH), Xietongmen, 29.34 N, 88.33 E, 3900 m, 7.VII.2020, H. HUANG leg.; 1 ♂ (photo only, provided by Z.-H. ZHENG), west Gyantse, no collecting data. 5 ♂♂ and 2 ♀ dissected. **Remarks**. The forewing ocellus can be absent in a few individuals. **Distribution**. Between Xietongmen and Gyantse.

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References

BAILEY, F. M. (1935): A new Paralasa (Lep., Satyridae) from Thibet. - Entomologist 68: 15, London.

BANG-HAAS, O. (1927): Horae Macrolepidopterologicae regionis Palaearcticae. - Verlag O. STAUDINGER & BANG-HAAS, Dresden.

D'ABRERA, B. (1992): Butterflies of Holarctic Region 2. - Hill House, Victoria.

- DELLA BRUNA, C., GALLO, E., LUCARELLI, M & V. SBORDONI (2000): Guide to the butterflies of the Palearctic Region. Satyridae part II. First Edition. - Omnes Artes, Milano.
- DELLA BRUNA, C., GALLO, E., LUCARELLI, M & V. SBORDONI (2002): Guide to the butterflies of the Palearctic Region. Satyridae part II. Second Edition. Omnes Artes, Milano.

ELWES, H. J. (1906): On the Lepidoptera collected by the Officers on the recent Tibet Frontier Commission. Butterflies. - Proceedings of the Zoological Society of London 1906: 479-485, pl. XXXVI, London.

EVANS, W. H. (1915): A list of butterflies caught by capt. F. M. BAILEY in S. E. Tibet during 1913. - Journal of the Bombay Natural History Society 23 (3): 532-546, Bombay.

Evans, W. H. (1924): Notes on Indian butterflies, 40-42. - Journal of the Bombay Natural History Society 29: 971-973, Bombay.

HUANG, H. (1998): Two new Rhopalocera from Central Tibet. - Neue Ent. Nachr. 41: 265-269, Marktleuthen.

HUANG, H. (1999): Some new butterflies from China 1. - Lambillionea 99 (4) Tome III: 642-676, Bruxelles.

LANG, S. Y. (2022): The Nymphalidae of China. Part III. - Tshikolovets Publications, Pardubice.

NOMAD (2017): The Everest Butterfly Hunters. - https://collector-secret.proboards.com/thread/1610/everest-butterfly-hunters (accessed on 3 Jan. 2024).

RILEY, N. D. (1923): The Rhopalocera of the Mt. Everest 1921 Expedition. - Transactions of the Entomological Society of London 70 (3-4): 461-482, pls. XXXVI, XXXVII, London.

SAKAI, S. (2015): New butterflies from the Hindu Kush, Kashmir, Ladak and Tibet. - Pallarge 9: 1-27, Gifu.

SOUTH, R. (1913): A list of butterflies collected by Captain F.M. BAILEY in Western China, Southeastern Tibet, and the Mishimi Hills, 1911. - Journal of the Bombay Natural History Society **22**: 345-365, 598-615, Bombay.

ZHANG, J., CONG, Q., SHEN, J.-H., SONG, L.-N. & N. V. GRISHIN (2023): Genomic analysis reveals new species and subspecies of butterflies. - The Taxonomic Report of the International Lepidoptera Survey 11 (6): 1-62, Lincoln.

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Figs. 1-11: Habitus of Argestina taxa ♂♂ and ♀ under same scale - upper side.



Figs. 12-22: Habitus of Argestina taxa and and and under same scale - underside.



Figs. 23-27: Habitus of Argestina taxa $rac{a}$ and $rac{c}$ under same scale - upper side.



Figs. 28-32: Habitus of Argestina taxa and and and and see underside.



Figs. 33-35: Habitus of Argestina taxa and and same scale - upper side.



Figs. 36-38: Habitus of Argestina taxa $rac{a}$ and $cap{under same scale}$ - underside.



Figs. 39-41: Habitus of Argestina inconstans (SOUTH, 1913) d'd' under same scale - upper side.



Figs. 42-44: Habitus of Argestina inconstans (SOUTH, 1913) d'd' under same scale - underside.



Figs. 45-46: Habitus of Argestina inconstans (SOUTH, 1913) do and 99 under same scale - upper and undersides.



Fig. 47: ° brand on forewing upper side (artificially outlined in white).

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Fig. 48: Androconia under same scale.



Figs. 49-57: σ genitalia of *Argestina* taxa under same scale, consisting of whole genitalia in lateral view with aedoeagus and left valva removed, and of aedoeagus in lateral view. Scale bar = 1 mm.



Figs. 58-63: \circ genitalia of *Argestina* taxa under same scale, consisting of whole genitalia in lateral view with aedoeagus and left valva removed, and of aedoeagus in lateral view. Scale bar = 1 mm.



Figs. 64: ♂ genitalia of *Argestina* taxa under same scale, consisting of tegumen plus uncus in dorsal view, of aedoeagus in dorsal view, of juxta and manica in anterior or posterior view, and of left valva in dorsal view. Scale bar = 1 mm.



Fig. 65: 9 genitalia of *Argestina* taxa under same scale, consisting of whole genitalia in lateral view, of sterigma in lateral view, and of sterigma in various view (only for ij2). Scale bar = 1 mm.



Figs. 66-76: φ genitalia of *Argestina* taxa under same scale, consisting of sterigma in ventral view and of sterigma in ventroposterior view. Scale bar = 1 mm.



Figs. 77-81: Important figures of *Argestina* specimens in literature. Figs. 82-93: Forewing venation around end of cell. Explanations of arrows as shown in fig. 83.



Fig. 94: Distribution of *Argestina* species: triangles or TL - type localities; circles - localities in this work; squares - localities in literature.



Figs. 95-98: Biotopes of *Argestina irma* (EVANS) at Lhozhag. 95-96 (W Lhozhag), 97 (on road from Lhozhag to Se), 98 (Se). Figs. 99-102: Biotopes of *Argestina karta* RILEY at Kharta, Qudang.



Fig. 103: Biotope of Argestina waltoni waltoni (ELWES) at Kangma, on road from Phari to Gyantze. Fig. 104: Biotope of Argestina waltoni dellabrunai subspec. nov. at Karola, E Gyantze. Fig. 105: Biotope of Argestina inconstans (SOUTH) at Yela Pass. Fig. 106: Biotope of Argestina inconstans jinlingensis subspec. nov. at Jinling. Fig. 107: Biotope of Argestina pomena (EVANS) at Guxiang, Bomi. Fig. 108: Biotope of Argestina shuana chiuna (BAILEY) at Xietongmen. Figs. 109-110: Biotope of Argestina shuana shuana (EVANS) at Baidui, Sangri.

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