

A new local population of *Pieris extensa* POUJADE, 1888 from Chudu Razi Hills, Myanmar

(Lepidoptera, Pieridae)

by

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received 4.VI.2024

Abstract: A new local population of *Pieris extensa* POUJADE, 1888 from Chudu Razi Hills in Myanmar is described and a series of the specimens are illustrated, which is polyvoltine with intermediate characteristics between nominotypical Tibetan form (*P. e. extensa* POUJADE, 1888) and Himalayan form (*P. e. bhutya* TALBOT, 1939). It may be lowland form of *P. e. yunnansia* TADOKORO et WANG, 2014, or the transforming form connecting Tibetan and Himalayan forms.

Introduction: *Pieris extensa* POUJADE, 1888 (fig. 1) is known as the largest species in the genus *Pieris* SCHRANK, 1801, initially described as *Pieris erutae* var. *extensa* POUJADE, from “Mou-pin” in Tibet, the former name of Baoxing in Sichuan Province of China. The wing expanse of var. *extensa* POUJADE (♂: 70 mm, ♀: 76 mm) is far larger than that of *Pieris erutae* POUJADE (♂♂: 55-62 mm, ♀♀: 57-65 mm).

LEECH (1891) treated *extensa* POUJADE as a distinct species and newly described var. *eurydice* LEECH, from several localities around the foot of E. Tibetan mountains mostly in Sichuan with adjacent Hubei Province, which was rather larger than *P. extensa* POUJADE as 80-86 mm in ♂♂ with well developed black markings.

TALBOT (1939) classified var. *eurydice* LEECH as a synonym (darker form) of *P. extensa* POUJADE, and newly described Himalayan population *P. e. bhutya* TALBOT with more developed black markings from “Trashiyangsi” in E. Bhutan. It occurred in July and September (TALBOT, 1939), and distributed in south slope of the Himalayas (alt. 2.300-3.000 m) ranging from Bhutan to adjacent W. Kameng state of NE. India (KIRTI et al, 2020). Diagnostic characters in ♂ are (a) ups black marking well developed, and marginal white spot in space 3 present, (b) unf apex and unh ground colour rich yellow, (c) unh venation thickly bordered by black scales, (d) unh cell inner streak present (fig. 2).

EITSCHBERGER (1983) identified “*extensa*” as gen. vern, and “*eurydice*” as gen. aest in *P. e. extensa* POUJADE, while “*antebhutya*” as gen. vern and “*bhutya*” as gen. aest in *P. e. bhutya* TALBOT, with an illustration of “*antebhutya*” occurred in May.

TADOKORO & WANG (2014) described *P. e. yunnansia* TADOKORO & WANG (fig. 3) from high mountain range (alt. 3.100 m) of Zhongdian district in NW. Yunnan, with small wing expanse (59-61 mm in ♂) and intermediate characteristics between *P. e. extensa* POUJADE and *P. e. bhutya* TALBOT. It was likely monovoltine occurs only in May to early June.

DAS et al (2021) found a new local population from Dibang valley at the East end of Arunachal Pradesh in NE. India, which was similar to *P. e. yunnansia* TADOKORO & WANG in wing size, markings and seasonality (fig. 4). However, the new population was concluded as *P. e. bhutya* in gen. vern judging from: (a) presence of postdiscal spot in upf space 3 and (d) faint but traceable cell streak in unh cell (DAS et al, 2021).

Recently, I obtained a series of specimens from Chedu Razi Hills in Myanmar (fig. 5), located between Dibang valley in NE. India and Zhongdian district in NW. Yunnan, which resembled both *P. e. yunnansia* TADOKORO & WANG and *P. e. bhutya* TALBOT from Dibang valley (DAS et al, 2021), but wing size larger and polyvoltine as in nominotypical *P. extensa* POUJADE and *P. e. bhutya* TALBOT. In this paper, a new subspecies of *P. extensa* POUJADE is described, and its taxonomic status is further discussed.

Abbreviations: N. = North., S. = South., W. = West., E. = East., NW. = Northwest., SE. = Southeast., fw = forewing., hw = hindwing., ups = upper side., uns = underside., upf = upper forewing., unf = under forewing., uph = upper hindwing., unh = under hindwing., gen. vern = first generation (Spring form), gen. aest = later generation(s) (Summer form), androconia = androconial scales on upf., TL = Type locality (-ies), RIEB = Research Institute of Evolutionary Biology, Tokyo.

Materials and methods: Specimens from the new local population were collected by native collectors at Chudu Razi Hill, approximately 50 km E. of Khaunglanhpu in Kachin state, Myanmar, in March, May, July and September, as indicated in the description below (fig. 5).

The nominotypical form of *P. extensa* POUJADE ♂ gen. vern (fig. 1) is from Qinling Mts (alt. 1.100 m) in Shaanxi collected on 13 May; ♂ gen. aest (figs 1, 2, 7, 12) is also from Qinling Mts (alt. 1.500-1.900 m) collected on 15-16 July; the other ♂ gen. aest. (fig. 12) is from Julong in Sichuan collected in June; ♀ gen. aest (figs 1, 8) is from Ta-pa Mts in S. Sichuan collected in September; *P. e. bhutya* TALBOT ♂ gen. aest. (figs 2, 7) is from Transhi-Yangtse of E. Bhutan collected on 1-6 July. *P. e. yunnansia* TADOKORO & WANG ♂ gen. vern. (figs 6, 12) is a paratype from Zhongdian district in NW. Yunnan collected on 27.-30.V.2013.

Wing expanse is the maximum wingspan of both forewings, assuming that the inner margins are set straight. Androconia were removed from upf., and observed by optical microscope at 400 magnifications. ♂ genitalia were dissected and observed by stereomicroscope at 20 magnifications after removing membranes and muscles with 20 % KOH solution.

Description

Pieris extensa chudura subsp. nov. (fig. 5)

Holotype ♂ (gen. aest). Chudu Razi Hills, Kachin, Myanmar, 29 VII 2006 (figs 5, 7). The holotype will be deposited in RIEB.

Paratypes from same locality 1 ♂ (gen. vern.) 29.III.2008 (figs 5, 6), 1 ♂ (gen. vern.) 5.V.2008, 1 ♀ (gen. vern.) 19.V.2011 (figs 5), 1 ♂ (gen. aest.) 21.VIII.2008, 1 ♂ (gen. aest.) 3.IX.2008, 1 ♂ (gen. aest.) 6.IX.2008, 1 ♀ (gen. aest.) 21.VII.2011 (figs 5, 8). Coll. T. TADOKORO.

- Wing expanse: gen. vern 64 mm in ♂, 66 mm in ♀, gen. aest 64-70 mm in ♂, 65 mm in ♀. Forewing length: gen. vern 33-34 mm in ♂, 36 mm in ♀, gen. aest 35-38 mm in ♂, 35 mm in ♀.
- Wing markings: ♂ gen. vern - resemble *P. e. yunnansia* TADOKORO & WANG, but (c) unh venation slightly more suffused by black scales (fig. 6), ♂ gen. aest - ups black markings more developed than *P. e. extensa* POUJADE, but less developed than *P. e. bhutya* TALBOT (a) upf marginal white spot in space 3 present as in *P. e. bhutya* TALBOT, (b) unf apex and unh ground color intermediate between pale yellow in *P. e. extensa* POUJADE and rich yellow in *P. e. bhutya* TALBOT (c) uns venation with bordering black scales intermediate between *P. e. extensa* POUJADE and *P. e. bhutya* TALBOT (d) unh cell inner streak in *P. e. bhutya* TALBOT absent (fig. 7). ♀: ups dark brown markings and unh venation more developed, but no other significant difference observed with *P. e. extensa* POUJADE (fig. 8).
- Androconia: Scent cell smallest in the genus *Pieris* (11-14 µm). Lamina in gen. vern wider than in gen. aest as in other *Pieris* species, but no significant difference observed with both *P. e. extensa* POUJADE and *P. e. bhutya* TALBOT (fig. 9). Arms in *P. e. yunnansia* TADOKORO & WANG short or undeveloped.
- ♂ genitalia: Distinguishable from sympatric *P. erutae* POUJADE by large genitalia. Uncus and valva long and slender. Tip of valva slightly protruding, but no significant difference observed with both *P. e. extensa* POUJADE and *P. e. bhutya* TALBOT (fig. 10).
- Habitat: “Chedu Razi Hills” in Kachin state in Myanmar, located just between “Dibang valley” of NE. India (= Eastern-most habitat of *P. e. bhutya* TALBOT) and “Zhongdian district” of NW. Yunnan (= TL of *P. e. yunnansia* TADOKORO & WANG), but isolated from both localities by high Tibetan mountains (fig. 11). The southernmost population of *P. extensa* POUJADE - Season of occurrence: Polyvoltine. Gen. vern occurs from end of March to May, and gen. aest occurs from July to September.
- Etymology: The subspecific name “*chudura*” is derived from its locality “Chudu Razi Hills”.

Further Discussions

Distribution of *Pieris extensa* POUJADE, 1888

Pieris extensa POUJADE distributes in three regions as follows (fig. 12):

- 1: *Pieris extensa extensa* POUJADE – Foot of E. Tibetan mountains or Qinling Mts, mostly Sichuan, Shaanxi and adjacent Gansu and Hubei provinces of W. China (alt. 500-2,500m).
 - 2: *Pieris extensa bhutya* TALBOT – S. slope of the Himalayas including Bhutan (Gasa, Mongar, Trashiyangtse) and adjacent Arunachal Pradesh of NE. India (alt. 2,300-3,000m).
 - 3: *Pieris extensa yunnansia* TADOKORO & WANG and *P. e. chudura* **subspec. nov.** – Junction area between South end of E. Tibetan mountains and East end of the Himalayas, including NW. Yunnan in China (alt. 3,100m) and Kachin in N. Myanmar.
- Many of local populations in Tibetan Mts and the Himalayas are isolated each other by high altitude mountains exceeding their habitable height.

Taxonomic relationship with *Pieris extensa yunnansia* TADOKORO & WANG, 2014: A new “subspecies” needs to have (1) isolated habitat with other subspecies, and (2) distinct characteristics. Although horizontal distance to the TL of *P. e. yunnansia* TADOKORO & WANG is less than 150 km, *P. e. chudura* **subspec. nov.** is separated from them by high mountains and deep valleys, so called “headwater area of three major rivers” (fig. 11). And, *P. e. chudura* **subspec. nov.** is polyvoltine with standard wing size, while *P. e. yunnansia* TADOKORO & WANG is monovoltine with significantly small wings (fig. 6).

On the other hand, *P. e. chudura* **subspec. nov.** in gen. vern resemble *P. e. yunnansia* TADOKORO & WANG in wing markings, and no significant difference is observed other than wing size and numbers of annual occurrence. *P. e. chudura* **subspec. nov.** may be considered as a lowland form of *P. e. yunnansia* TADOKORO & WANG.

Taxonomic relationship with nominotypical subspecies and *Pieris extensa bhutya* TALBOT, 1939: Tibetan population (*P. e. extensa* POUJ.) and Himalayan population (*P. e. bhutya* TALBOT) are geographically isolated and easily distinguishable by wing markings, especially in ♂♂ (fig. 2). Although *P. e. yunnansia* TADOKORO & WANG was described from the middle point of the two populations, with intermediate characteristics, it might have been deemed as an aberrational population in monovoltine with small wings. *P. extensa chudura* **subspec. nov.** ascertains that the intermediate population really exists, that can be comparable with both Tibetan and Himalayan populations.

In this paper, one more new local population from Julong, west end of Sichuan near the border to Yunnan, is introduced (fig. 12). The local population from Julong can be included within the range of *P. e. extensa* POUJADE, but shows intermediate characteristics between *P. e. extensa* POUJADE and *P. e. chudura* **subspec. nov.** (or *P. e. yunnansia* TADOKORO & WANG).

Fig. 11 indicates that (a) degrees of development on black markings ups, (b) degrees of yellowish hue uns, (c) degrees of suffusion by black scales on uns venation in ♂♂ gradually increase from the Eastern (Tibetan) population to the Western (Himalayan) populations (figs 12, 7, 6). On the contrary, wing markings in ♀♀ are comparably stable and do not vary as in ♂♂ (fig. 8). It is indicated that *P. extensa* POUJADE used to be seamlessly distributed from Tibet to the Himalayas, and wing markings gradually vary from thin to more developed according to the latitude.

Conclusion: Based on the intermediate characteristics between *Pieris extensa extensa* POUJADE and *Pieris extensa bhutya* TALBOT, as well as isolated habitat from other populations, *P. extensa chudura* **subspec. nov.** is described. This population may be included in *P. extensa yunnansia* TAD. & WA. as its low-land polyvoltine form. Or, *Pieris extensa* POUJADE may also be treated as the taxon that continuously varies its wing markings from Eastern thinner markings to the Western thicker markings. Taxonomic statuses of *Pieris extensa* POUJADE and its subspecific taxa are depend on the definition of the “subspecies”.

Acknowledgements: Special thanks to Mr. GIAN CRISTOFORO BOZANO in Milan and the late YUICHI KOIDE for providing me with specimens, Dr. ULF EITSCHBERGER in Marktleuthen and Dr. GAURAB NANDI DAS for their valuable information and advices.

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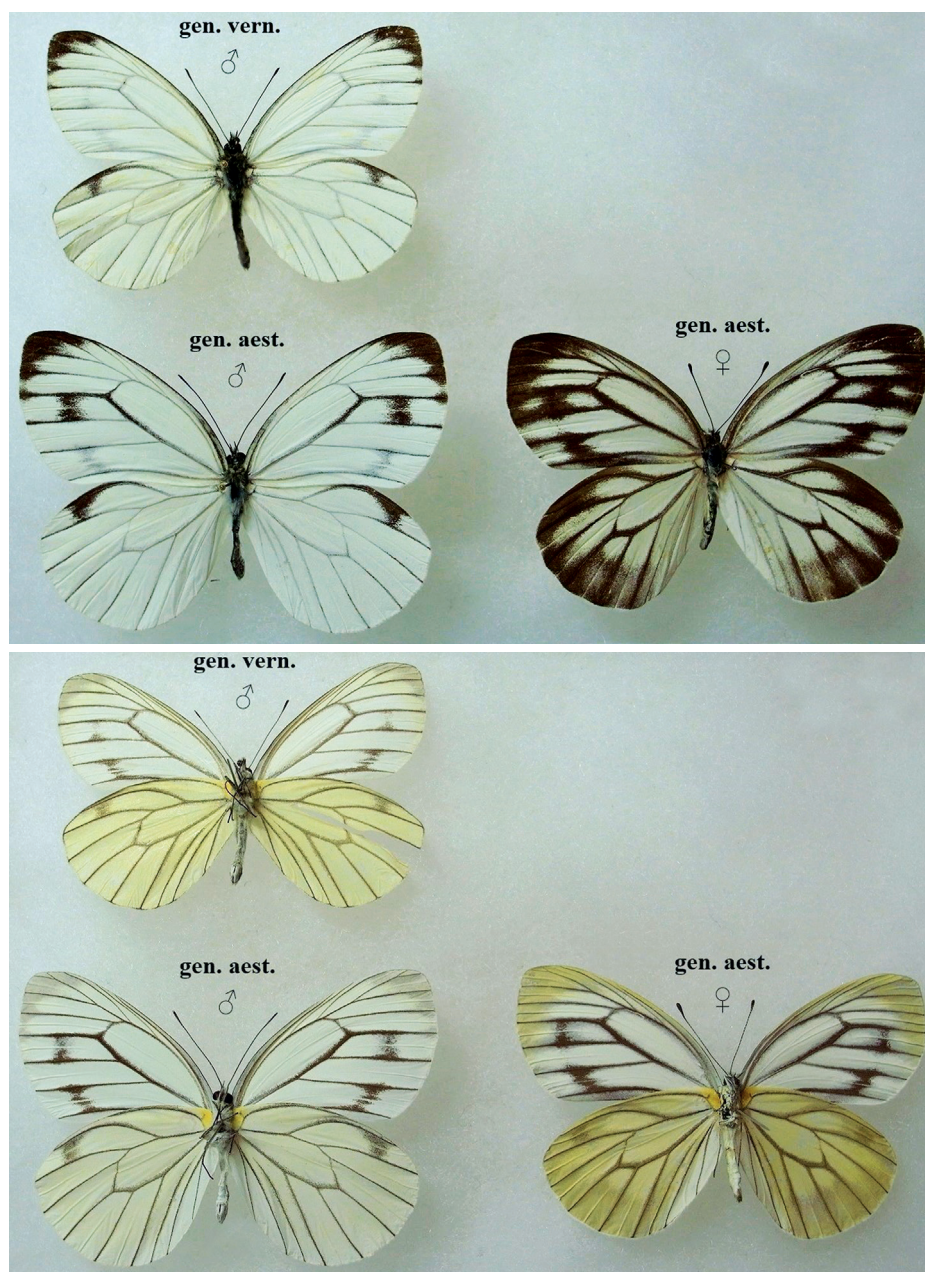


Fig. 1. *Pieris extensa extensa* POUJADE, 1888.

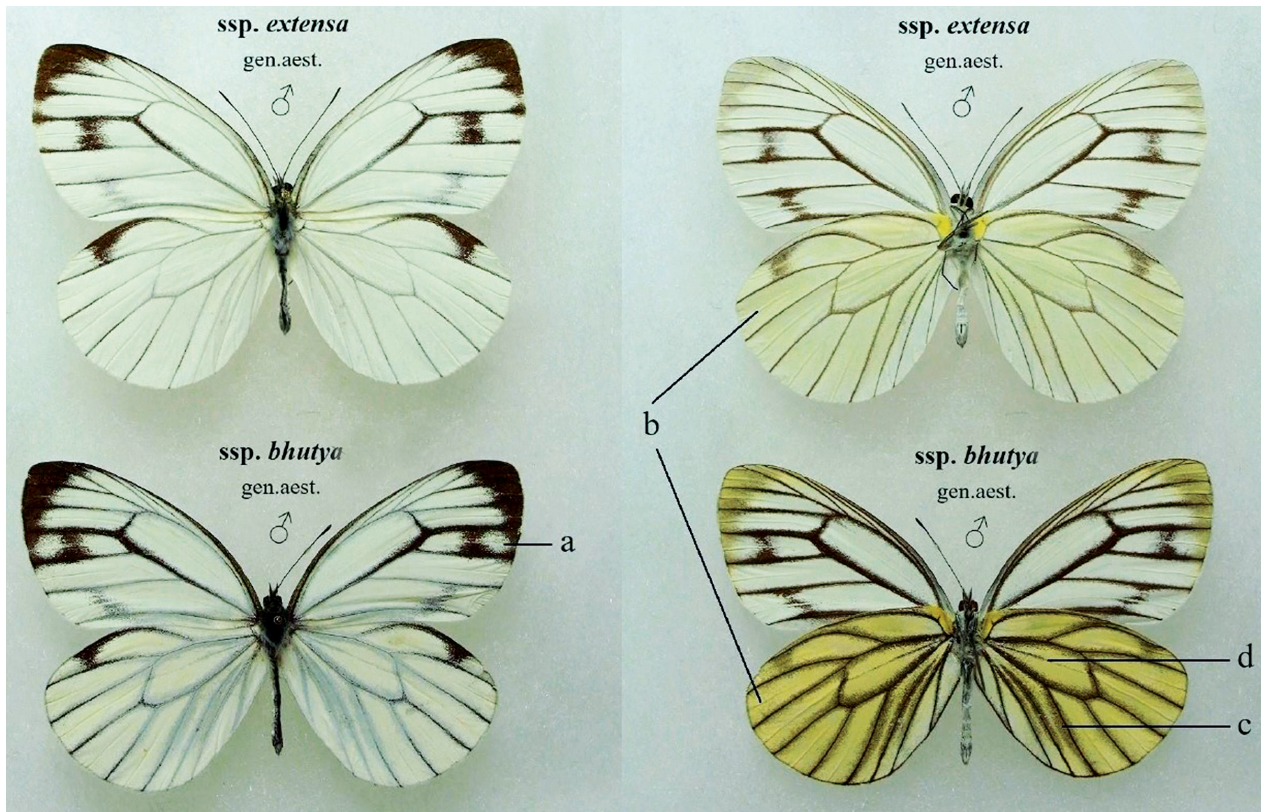


Fig. 2: *Pieris extensa extensa* POUJADE, 1888 & *Pieris extensa bhutya* TALBOT, 1939 (gen. aest. ♂).



Fig. 3: *Pieris extensa yunnansia* TADOKORO & WANG, 2014, gen. vern. ♂. [© TADOKORO & WANG, 2014.]



Fig. 4: *Pieris extensa bhutya* TALBOT, 1939 from Dibang valley, gen. vern. ♂. [© DAS et al, 2021.]

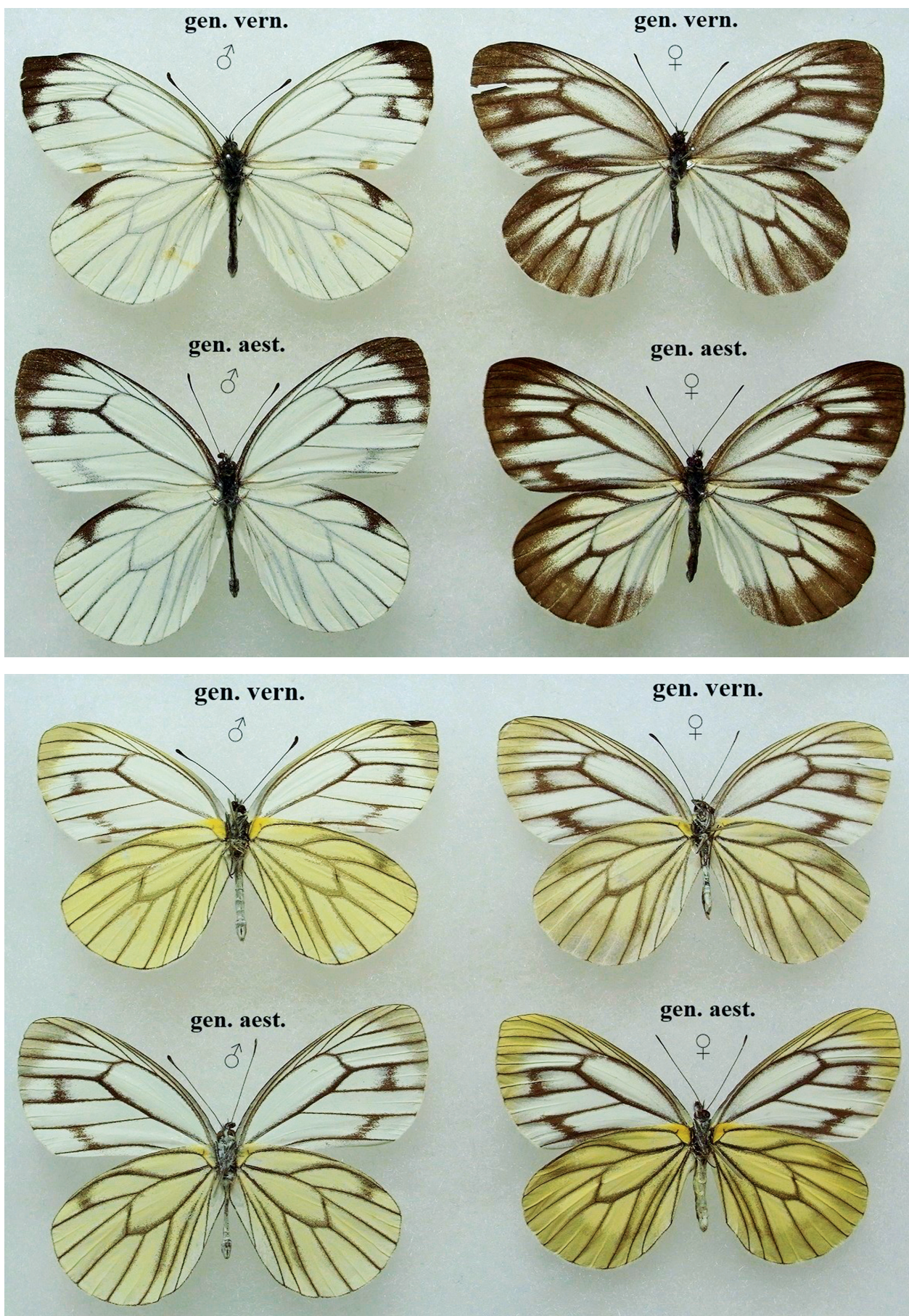


Fig. 5. *Pieris extensa chudura* subsp. nov. Chudu Razi Hills, Kachin, Myanmar.

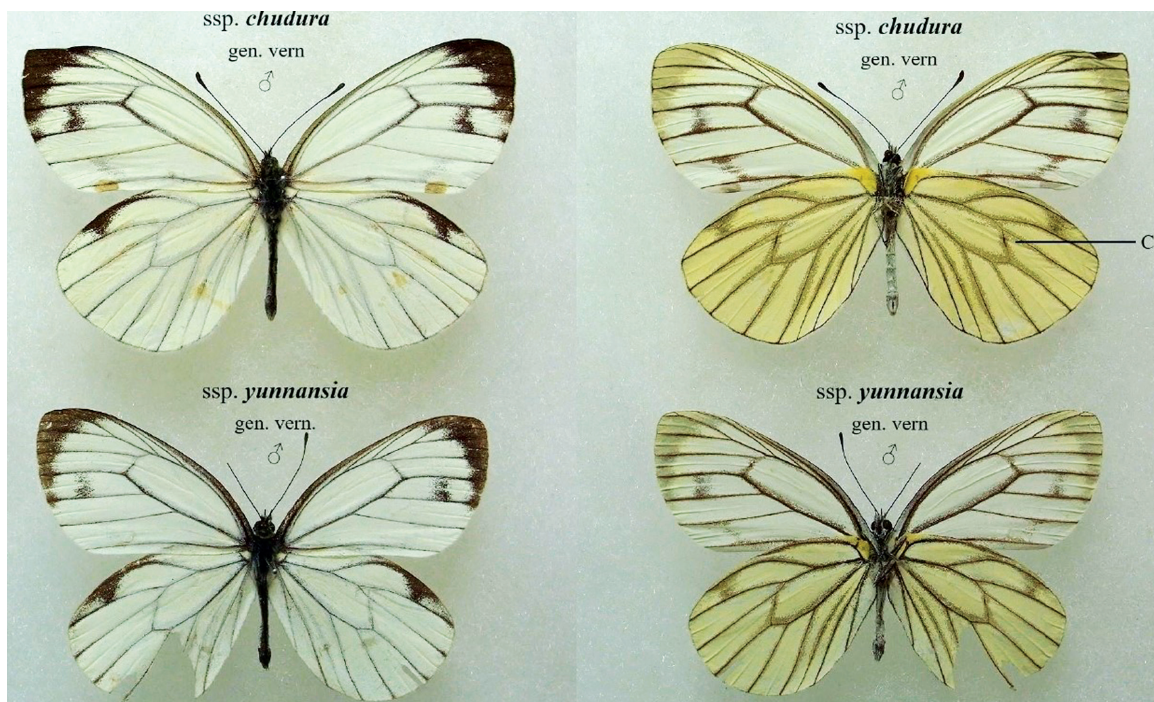


Fig. 6: *Pieris extensa chudura* subsp. nov. & *Pieris extensa yunnansia* TADOKORO & WANG, 2014 (gen. vern. ♂).

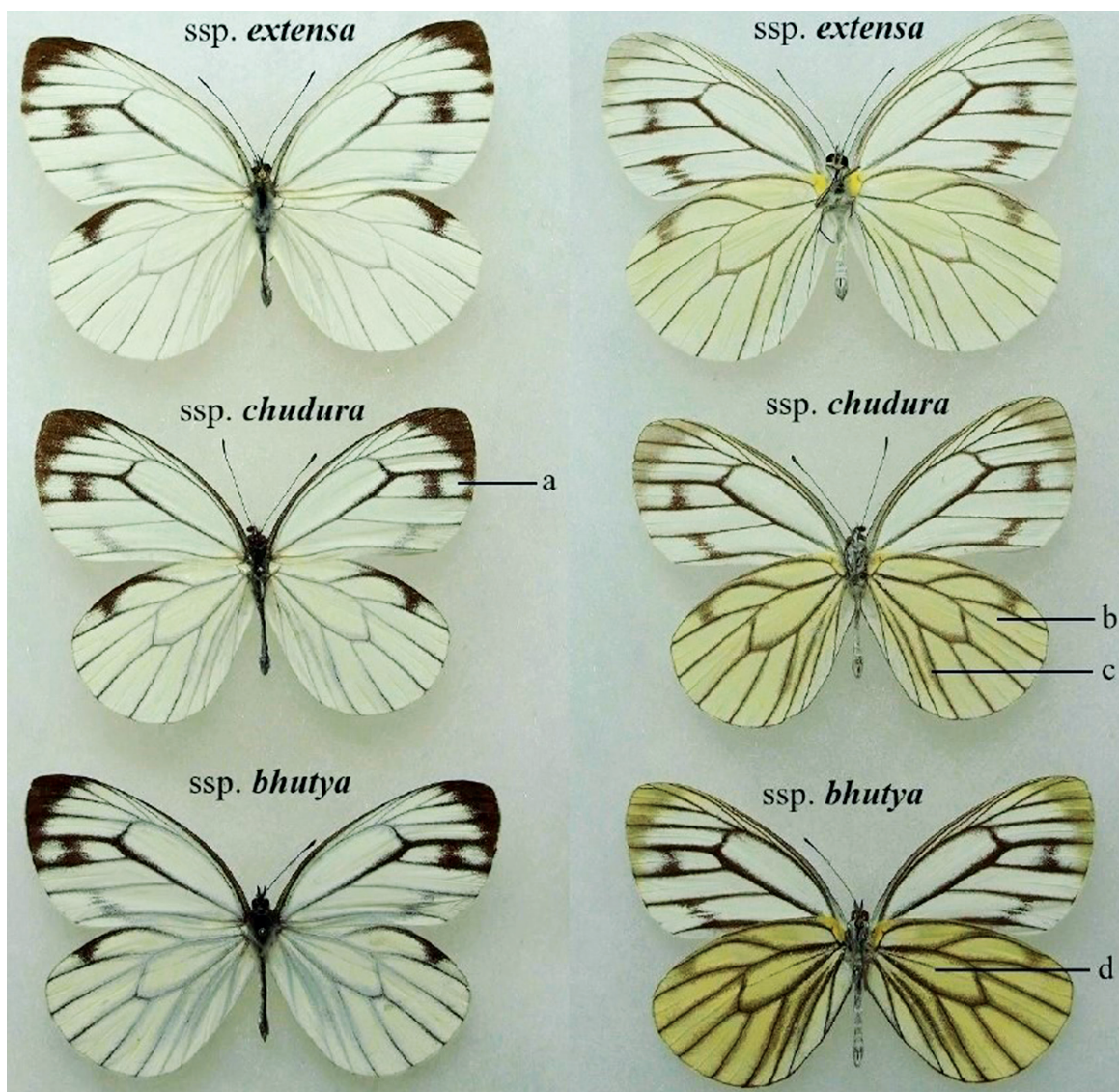


Fig. 7: *Pieris extensa extensa* POUJADE, 1888, *Pieris extensa chudura* subsp. nov. & *Pieris extensa bhutya* TALBOT, 1939 (gen. aest. ♂).

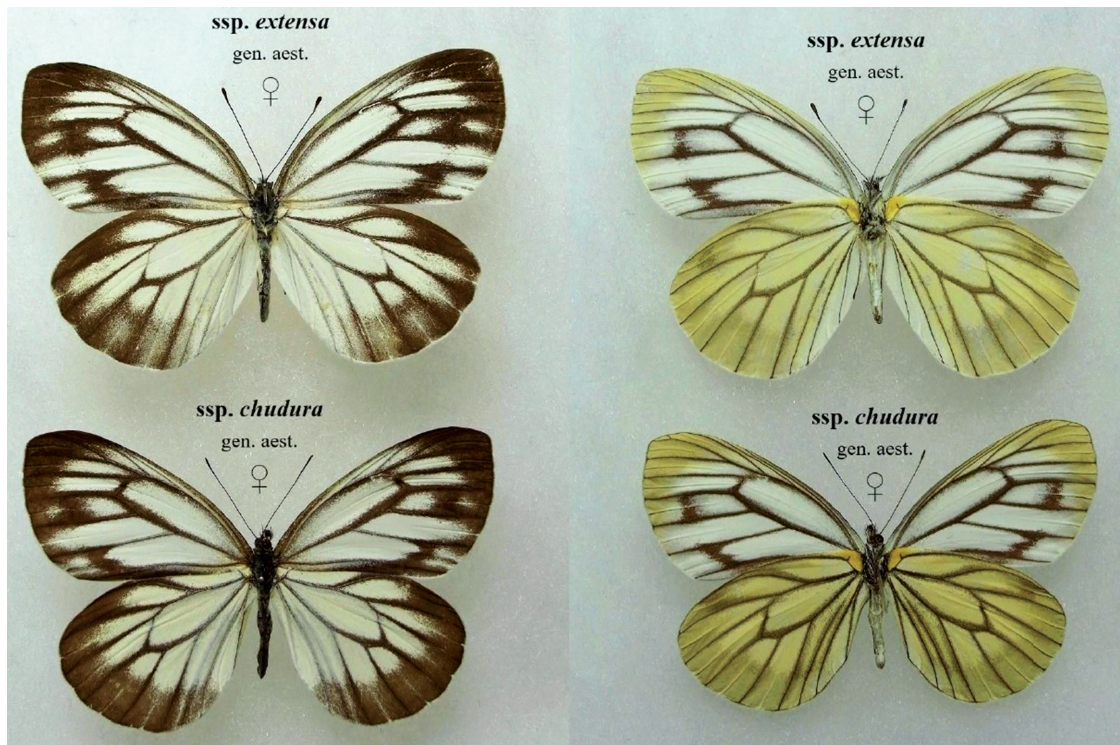
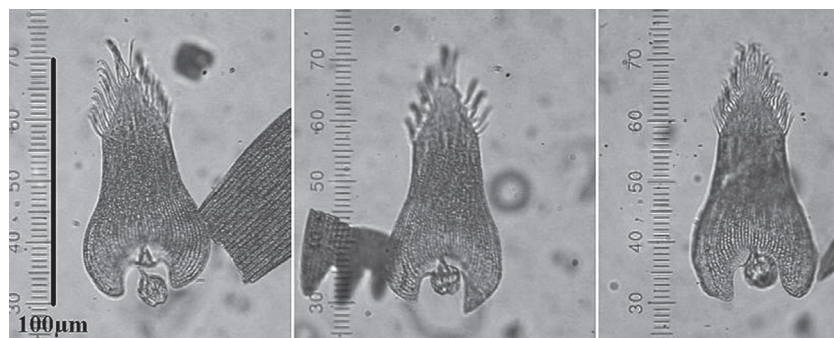


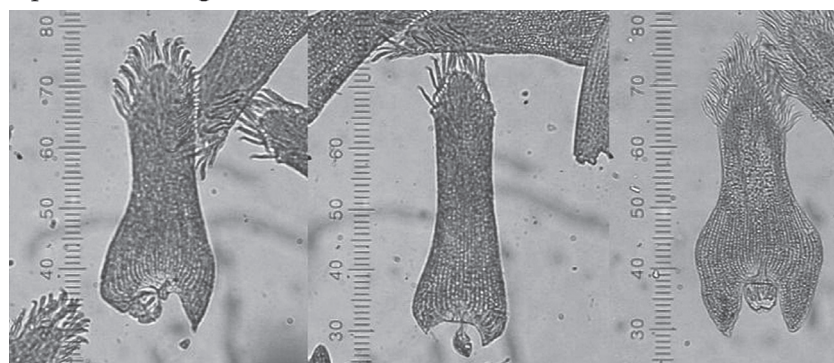
Fig. 8. *Pieris extensa extensa* POUIADE, 1888 & *Pieris extensa chudura* subsp. nov. (gen. aest. ♀).



ssp. *chudura* gen. vern.



ssp. *chudura* gen. aest.



ssp. *yunnansia* gen. vern.

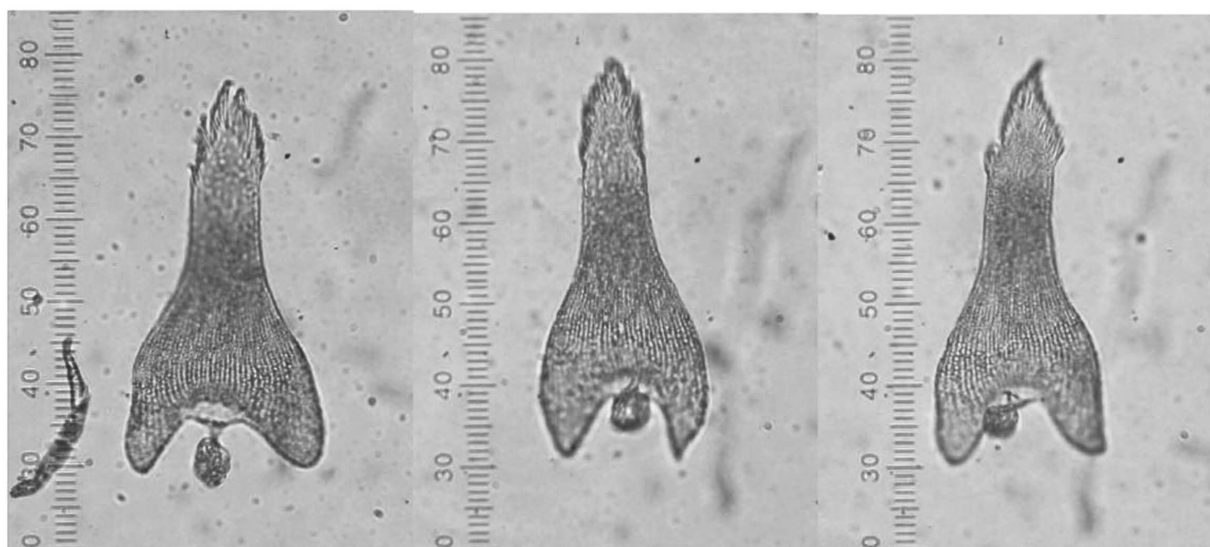
Fig. 9a.: *Pieris extensa* subspecies, Androconia ♂.



ssp. *extensa* gen. vern.



ssp. *extensa* gen. aest.



ssp. *bhutya* gen. aest.

Fig. 9b.: *Pieris extensa* subspecies, Androconia ♂.

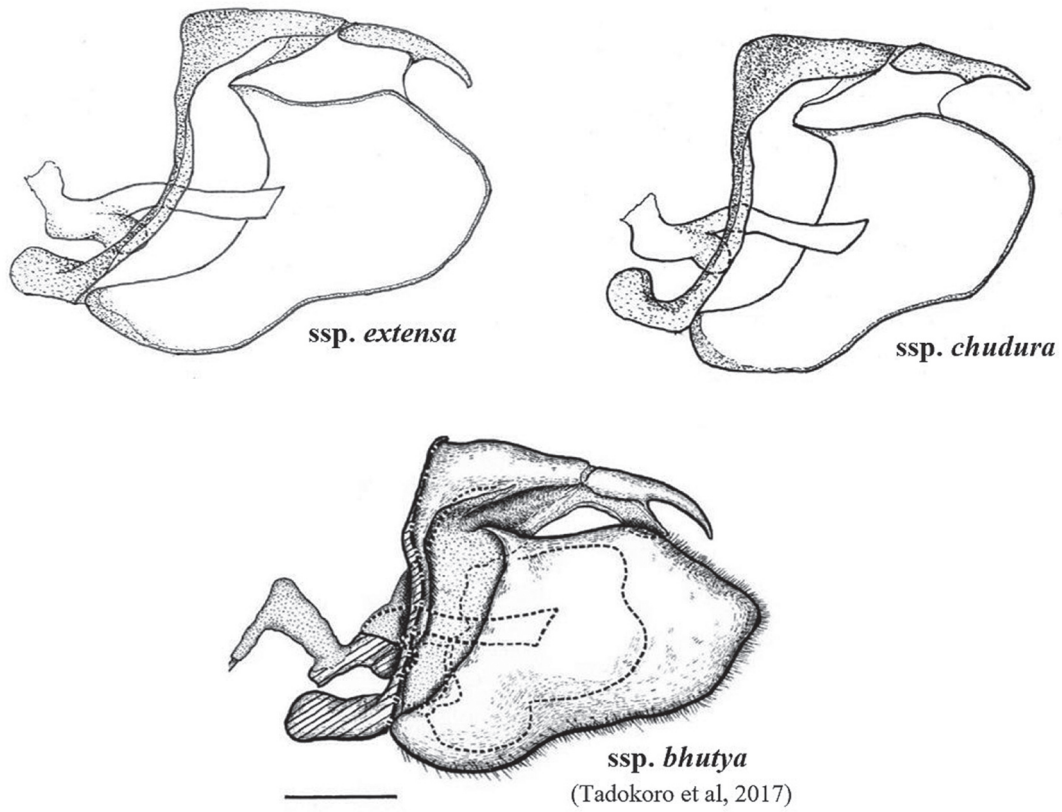


Fig. 10: *Pieris extensa* subspecies, ♂ Genitalia.

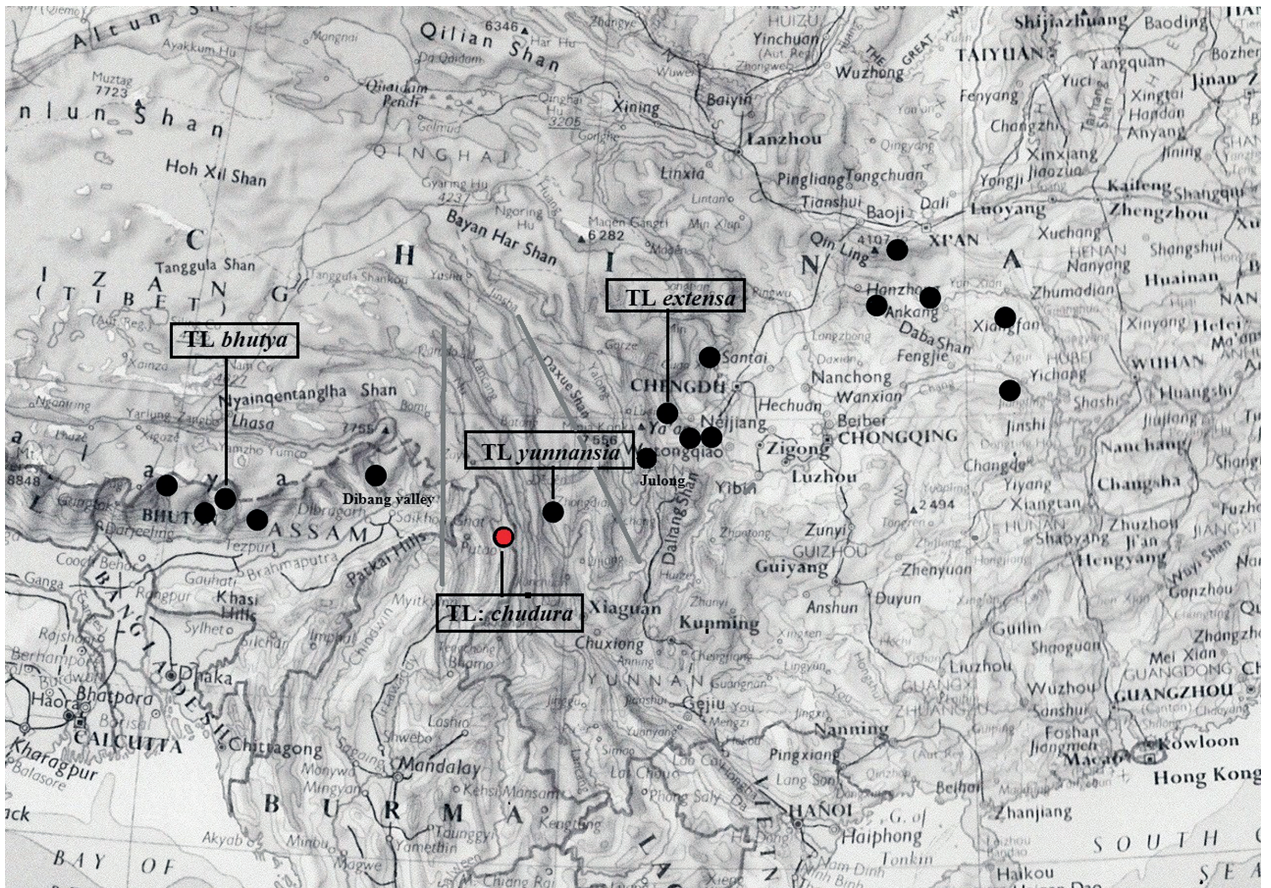


Fig. 11: Distribution of *Pieris extensa* subspecies.

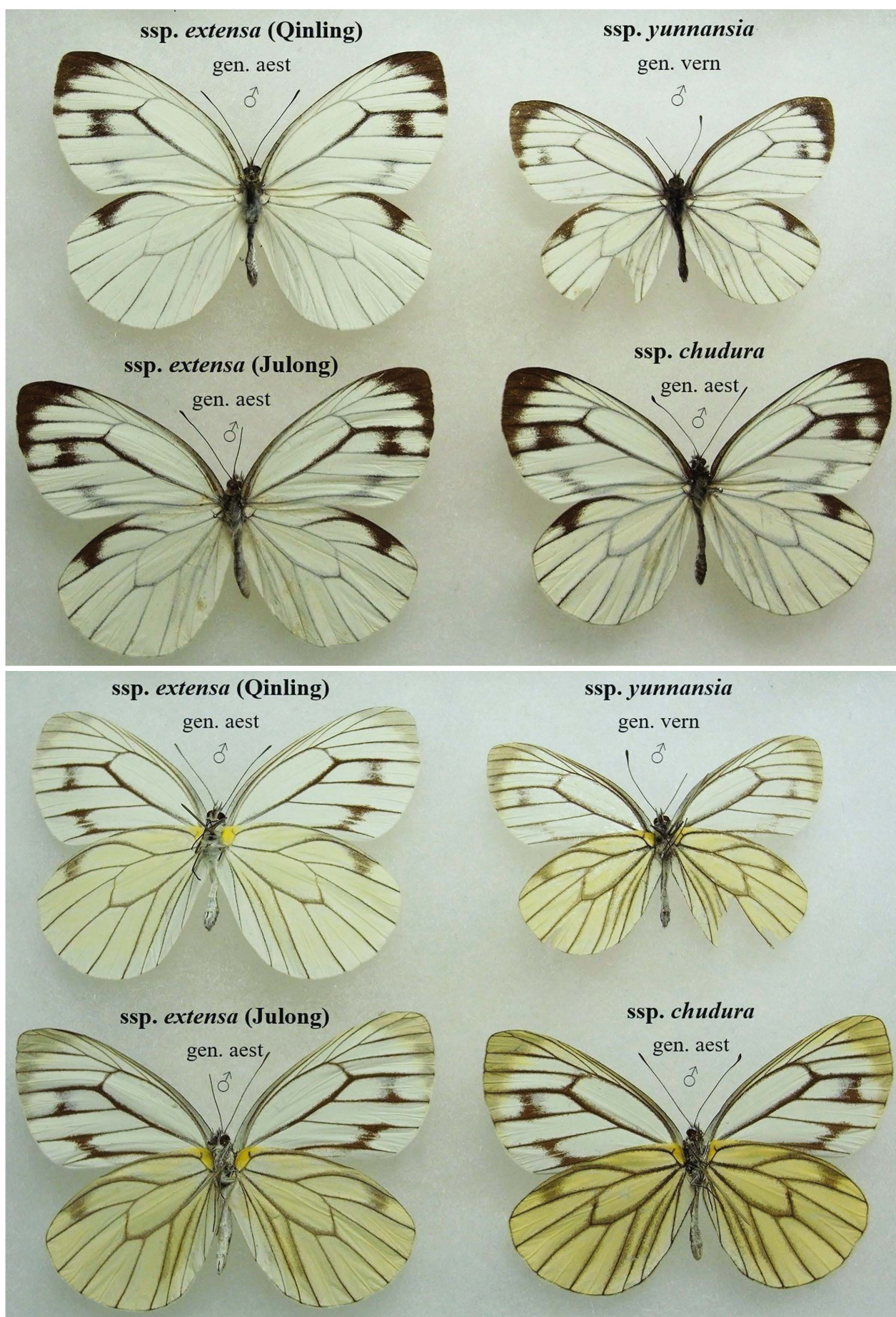


Fig. 12. *Pieris extensa extensa* from Qinling and Julong, *Pieris extensa yunnansia* and *Pieris extensa chudura* subsp. nov.

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Autor(en)/Author(s): Tadokoro Teruo

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