

Contributions to the study of butterflies from Xinjiang - 1 the genus *Parnassius* LATREILLE, 1804

(Lepidoptera, Papilionidae)

by

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Abstract: A review is made on the Apollo butterflies from Xinjiang, China, leading to the following taxonomic results: *Parnassius actius caesar* GRUM-GRSHIMAILO, 1885 (nomen nudum) is unavailable in nomenclature; *Parnassius actius dubitabilis* VERITY, [1911] is available in nomenclature for a good subspecies; *Parnassius actius cato* BRYK & EISNER, 1935 is a good subspecies, with a new population from W Xinjiang reported; *Parnassius muzaffir* ELWES, 1886 (nomen nudum) is unavailable in nomenclature; *Parnassius mouzaffar* GRUM-GRSHIMAILO, 1890 (nomen nudum) is unavailable in nomenclature; *Parnassius apollo mongolicus* STAUDINGER, 1900 is restricted to the Karlik Mts., E Xinjiang which was incorrectly treated by KREUZBERG (1992) and WEISS (2005) as the senior synonym of *Parnassius apollo merzbacheri* FRUHSTORFER, 1906; *Parnassius apollo merzbacheri* FRUHSTORFER is a good subspecies occurring in most part of Chinese Tianshan, NE Kyrgyzstan and E Kazakhstan; *Parnassius ariadne dentata* AUSTAUT, 1889 is a good subspecies from Zaisan and Altai; *Parnassius delphijs menander* HEMMING, 1934 is a good subspecies from Yining area and Ketmen Mts.; *Parnassius delphijs juldussica* VERITY, [1911] is a good subspecies from Qiaoerma-Bayanbulak area and the mountain range on north of Kuqa; *Parnassius delphijs constants* BANG-HAAS, 1915 is a good subspecies restricted to the southern valleys of Chantengri; *Parnassius delphijs dolabella* FRUHSTORFER, 1904 is uncertain in taxonomy, pending a further research; *Parnassius patricius exclamatoris* AVINOFF, 1922 is a good subspecies; *Parnassius boedromius toshioi* SHINKAI, 1997 is a good subspecies. Lectotype designation is made for *Parnassius actius minuta* VERITY, [1911]. The following new synonyms (most of which have been incorrectly synonymized with other taxa by various authors) are given: *Parnassius actius minuta* VERITY, [1911] **syn. nov.** (= *Parnassius actius urumtsiensis* VERITY, 1906); *Parnassius actius muzaffir* EISNER & SHELIJZHKO, 1965 **syn. nov.** (= *Parnassius actius brutus* BRYK, 1914); *Parnassius apollo tarbagataicus* VERITY, 1911 **syn. nov.** (= *Parnassius apollo alpherakyi* KRULIKOVSKY, 1906); *Parnassius phoebus halasicus* R.-X. HUANG & MURAYAMA, 1992 **syn. nov.** (= *Parnassius phoebus alpestris* VERITY, [1911]); *Parnassius phoebus vaschenko* HIRSCHFELD & SCHAEFFLER, 2004 **syn. nov.** (= *Parnassius phoebus sedakovii* MÉNÉTRIÉS, [1850]); *Parnassius phoebus bajangolus* YAKOVLEV, 2006 **syn. nov.** (= *Parnassius phoebus chingizid* YAKOVLEV, 2006); *Parnassius clarius clarus* BRYK & EISNER, 1932 **syn. nov.** (= *Parnassius ariadne ariadne* (LEDERER, 1853)); *Parnassius ariadne jiadengyuensis* R.-X. HUANG & MURAYAMA, 1992 **syn. nov.** (= *Parnassius ariadne dentata* AUSTAUT, 1889); *Parnassius delphijs karaschahrica* BANG-HAAS, 1915 **syn. nov.** (= *Parnassius delphijs juldussica* VERITY, [1911]); *Parnassius delphijs mephisto* HERING, 1931 **syn. nov.** (= *Parnassius delphijs constants* BANG-HAAS, 1915); *Parnassius patricius lukhtanovi* ROSE, 1992 **syn. nov.** (= *Parnassius delphijs exclamatoris* AVINOFF, 1922). Two new subspecies are described: *P. delphijs dingliangi* **subspec. nov.** and *P. loxias lipengi* **subspec. nov.**. The following taxa are new records for Xinjiang and China: *P. actius cato* BRYK & EISNER, 1935, *P. tianschanicus grumgrshimailoi* BANG-HAAS, 1927, *P. phoebus sauricus* LUKHTANOV, 1999 and *P. simonius nigrificatus* KREUZBERG, 1986.

Introduction: Finally, the butterfly fauna of Xinjiang became the major interest of the author. His first expedition in the summer of 2019 (from 12th June to 28th July) was proposed by his friend, Mr. P. LI (Xi'an) who had a great interest in searching the Chinese populations of *Parnassius loxias* PÜNGELER, 1901 at the time. The expedition was planned in detail by the author and joined by Mr. P. LI, Dr. S.-Y. LANG and Mr. L. DING (fig. 62). The exploring area covers the entire Ili Prefecture, the Telmed Pass, the Maidantag Mts. and the Irkeshtam area of Pamir. Unfortunately this first expedition was unexpectedly terminated by Mr. P. LI who had to deal with an urgent business at the end of July, thus the author's first attempt to explore the Kunlun Mts. and Karakorum failed. The second expedition to Xinjiang was planned for years but was postponed till the spring of 2022. The author and his friend, Mr. Y.-H. LI (Nanning) explored the southeastern corner of the Taklamakan Desert (Ruoqiang), the Tianshan Mts., the Altai Mts., the Saur Mts., the Balluk Mts., the Karlik Mts. and Pamir (Ulugqat area and Taxkorgan area) from 1st May to 10th August. Again, the expedition was unexpectedly terminated by the sudden outbreak of the COVID-19 in mid August and the road to the Kunlun Mts. was closed by the government. Two years before, the Xinjiang-Tibet Highway was closed in the similar circumstance when the author tried to enter Xinjiang from Ali, W Tibet. It seemed to be a destiny that the author was unable to reach the Kunlun Mts. these years. The expeditions brought back a large collection of butterflies which will be studied and published in a series of papers beginning with this one on the Apollo butterflies.

Abbreviations:

NHML:	The Natural History Museum (London, UK).
BSNU:	Biological laboratory of Shanghai Normal University, Shanghai, P.R. China.
CDL:	Collection of LIANG DING, Beijing.
CHH:	Collection of HAO HUANG.
CLP:	Collection of PENG LI, Xi'an, Shaanxi.
CQZY:	Collection of ZHI-YUAN QI, Shanghai.
CWJQ:	Collection of JIA-QI WANG, Shanghai.
CXR:	Collection of Rui Xing, Urumqi.
DMMR:	DARWIN Museum (Moscow, Russia).

ECSU:	Entomological Collection of Shihezi University (Shihezi, Xinjiang).
EMEM:	Entomologisches Museum Dr. U. EITSCHBERGER (Marktleuthen, Germany).
ICZN:	International Code of Zoological Nomenclature.
MTDG:	Museum für Tierkunde (Dresden, Germany).
MZSF:	Museo Zoologico de la Specola (Florence, Italy).
NMP:	National Museum of Prague.
RMHL:	Rijksmuseum van Natuurlijke Histoire (Leiden, Netherlands).
SPSU:	St. Petersburg State University (Russia).
TL:	Type locality.
ZFMK:	Zoologische Forschungsinstitut und Museum ALEXANDER KOENIG (Bonn, Germany).
ZISP:	Zoological Institute, Russian Academy of Sciences (St.-Peterburg, Russia).
ZMHU:	Zoologisches Museum an der Humboldt-Universität zu Berlin (Germany).
ZMKU:	Zoological Museum, Kyiv National Shevchenko University (Kyiv, Ukraine).
ZMMU:	Zoological Museum of the Moscow State University (Moscow, Russia).
ZSSM:	Zoologische Staatssammlung (Münche, Germany).

A checklist of the *Parnassius* LATREILLE taxa recorded from Xinjiang

- 1a. *P. actius actius* (EVERSMANN, 1843)
- 1b. *P. actius urumtsiensis* VERITY, 1906
- 1c. *P. actius melaniticus* BANG-HAAS, 1915
- 1d. *P. actius caesar* STAUDINGER, 1898
- 1e. *P. actius ambrosius* STICHEL, 1907 - not examined
- 1f. *P. actius cato* BRYK & EISNER, 1935 - **new record**
- 1g. *P. actius brutus* BRYK, 1914
- 1h. *P. actius ornatus* BANG-HAAS, 1915 - not examined
- 2a. *P. tianschanicus tianschanicus* OBERTHÜR, 1879
- 2b. *P. tianschanicus olympius* STAUDINGER, 1898
- 2c. *P. tianschanicus grumgrshimailoi* BANG-HAAS, 1927 - **new record**
- 2d. *P. tianschanicus fujiokai* OHYA, 1986 - not examined
- 3a. *P. apollo mongolicus* STAUDINGER, 1900
- 3b. *P. apollo alpherakyi* KRULIKOVSKY, 1906
- 3c. *P. apollo merzbacheri* FRUHSTORFER, 1906
- 4a. *P. phoebus sauricus* LUKHTANOV, 1999 - **new record**
- 4b. *P. phoebus alpestris* VERITY, [1911]
5. *P. ruckbeili* DECKERT, 1909
6. *P. jacquemontii rubicundus* STICHEL, 1906
- 7a. *P. epaphus subtilis* BANG-HAAS, 1927 - not examined
- 7b. *P. epaphus kahstahsensis* IWAMOTO, 2006 - not examined
- 7c. *P. epaphus altynensis* STICHEL, 1906
- 7d. *P. epaphus hanae* KAWASAKI, 1998 - not examined
8. *P. apollonius apollonius* (EVERSMANN, 1847)
- 9a. *P. ariadne ariadne* (LEDERER, 1853)
- 9b. *P. ariadne dentata* AUSTAUT, 1889
10. *P. tenedius tenedius* EVERSMANN, 1851
- 11a. *P. delphius menander* HEMMING, 1934
- 11b. *P. delphius juldussica* VERITY, [1911]
- 11c. *P. delphius constants* BANG-HAAS, 1915 - not examined
- 11d. *P. delphius hamiensis* BANG-HAAS, 1927 - not examined
- 11e. *P. delphius dingliangi* **subspec. nov.**
- 12a. *P. staudingeri infernalis* STAUDINGER, 1886
- 12b. *P. staudingeri mustagata* ROSE, 1990 - not examined
- 12c. *P. staudingeri abramovi* BANG-HAAS, 1915 - not examined
13. *P. cardinal hunza* GRUM-GRSHIMAILLO, 1888 - not examined
- 14a. *P. patricius priamus* BRYK, 1914 - not examined
- 14b. *P. patricius exclamationis* AVINOFF, 1922
- 14c. *P. patricius koppi* ROSE & KAWASAKI, 1999
- 15a. *P. charltonius aenigma* Dubatolov & Milko, 2003
- 15b. *P. charltonius deckerti* Verity, 1907
- 16a. *P. loxias loxias* PÜNGELER, 1901 - not examined
- 16b. *P. loxias raskemensis* AVINOFF, 1916 - not examined
- 16c. *P. loxias lipengi* **subspec. nov.**
- 17a. *P. simo avinoffi* VERITY, 1911 - not examined
- 17b. *P. simo confusa* BANG-HAAS, 1927 - not examined
- 17c. *P. simo tinonis* IWAMOTO, 2006 - not examined
- 17d. *P. simo simplicatus* STICHEL, 1907
- 18a. *P. boedromius boedromius* PÜNGELER, 1901 - not examined
- 18b. *P. boedromius marcopolo* WEISS, 1996

- 18c. *P. boedromius toshioi* SHINKAI, 1997
 19a. *P. simonius nigrificatus* KREUZBERG, 1986 - **new record**
 19b. *P. simonius* subsp. incert.
 20. *P. acco liae* (R.-X. HUANG & MURAYAMA, 1989) - not examined

Taxonomic accounts

Parnassius actius (EVERSMANN, 1843) (figs. 1-3, 38, 48-50)

It seems that SUGISAWA's (1996, 1997, 1998, 1999) classification is the best at the time, however his usage of the name "*ssp. muzaffir* ELWES, 1886" violates the nomenclature. A detailed survey of the available species group names is presented in this work. The chaos came from the taxa occurring in Kyrgyzstan, mainly caused by the inaccurate interpretations of the TLs for old taxa. The exact TLs of *P. actius dubitabilis* VERITY, [1911] and *P. actius cato* BRYK & EISNER, 1935 remain unknown, pending a further research. The author's expeditions brought the discoveries of some new localities for *P. actius caesar* STAUDINGER, 1898, *P. actius brutus* BRYK, 1914 and *P. actius cato* BRYK & EISNER, 1935. To give a better understanding of the historical materials, some figures of the type specimens in literature are reproduced in this paper (fig. 3). A distributional map showing all the TLs of the available taxa is also included (fig. 38).

Parnassius actius actius (EVERSMANN, 1843)

"*Doritis actius*" EVERSMANN, 1843: 540, Tab. IX, fig. 2a, b.

TL: Erroneously given as Altai in original description. EVERSMANN (1843) described this species and *P. delphius* (EVERSMANN) on the specimens collected from the same locality which was first clarified by GRUM-GRSHIMAILO (1890) as Tarbagatai. However, this species has never been collected from Tarbagatai and its adjacent area and the TL is supposed to be Dzhungarian Alatau (TOROPOV & ZHDANKO 2006 & 2014; KORB, 2020a).

Type material: lectotype ♂ (ZISP) was designated by KORB (2017) and was figured by SUGISAWA (2001: fig. 4, wrongly as ZMKU) and TSHIKOLOVETS et al. (2016: pl. 5, fig. 12); paralectotype ♀ (ZISP) was figured by SUGISAWA (2001: fig. 5, wrongly as ZMKU) and TSHIKOLOVETS et al. (2016: pl. 5, fig. 15).

Synonym. "[*Parnassius actius*] subsp. *marius*" BRYK & EISNER, 1935: 73 (synonymized by KREUZBERG, 1992)

TL: Dsharkend.

Type material: lectotype ♂ (RMHL: EISNER, 1966) was designated by EISNER (1957) and was figured by EISNER (1966) and WEISS (2005; as "holotype").

Material. 17 ♂♂, 1 ♀ (CHH, CLP), Guozigou (44.46 N, 81.16 E), Huocheng County, Yili, Xinjiang, 2200 m, 21.VI.2019, H. HUANG leg.; 1 ♂ (CHH), Guozigou, 1800 m, 17.V.2022, H. HUANG leg.; 7 ♂♂, 2 ♀♀ (CHH, CLP), Angrit-daban Pass of Yining-Zhaosu Road (43.39 N, 81.02 E), Ketmen Mt. Range, 3100 m, 26.VI.2019, H. HUANG & P. Li leg.; 1 ♂ (CXR, photos), Balluk Mts. (45.94 N, 82.89 E), no further data.

Remarks. This subspecies is characterized by the bright appearance in male and the medium size in both sexes. KREUZBERG (1992) simply placed most of the taxa from China into this subspecies, followed by TSHIKOLOVETS (2000, 2003, 2005a, 2005b, 2016) who even included all the taxa from Kazakhstan, Kyrgyzstan, Tajikistan and Ladak into this subspecies. However, it is noted that the ranges of the populations in bright appearance are interrupted by the darker populations from the Kungei Mt. Range and the Narat Mt. Range. *P. actius actius* (EVERSMANN) should be restricted to the Borohoro Mts., the Ketmen Mt. Range and E Kazakhstan. Mr. R. XING (personal communications, 2022) recorded this subspecies from the Balluk Mts., which could be the northernmost record in China.

Parnassius actius urumtsiensis VERITY, 1906

"*Parnassius actius* var. *urumtsiensis* DECKERT (in litt.)" VERITY, 1906: 60, pl. XIII, figs. 7-8.

TL: environs d'Ouroumtsi au N.-E. de la région de Korla.

Type material: syntype ♂ was figured by VERITY (1906); syntype ♀ (ZMKU: TSHIKOLOVETS, 1993a) was figured by VERITY (1906) and TSHIKOLOVETS (2005b); syntype ♂ (as "lectotype", ZMKU) was figured by SUGISAWA (1999).

Synonym. "*Parnassius Actius*, n. var. *urumtsiensis*" DECKERT, 1909: 109 (preoccupied name).

TL: Urumtsi (Monts du Ciel).

Type material: not figured.

Synonym. "*P. actius* Ev. race *minuta*" VERITY, [1911]: 313, partim "pl. LIII, figs. 5-6". **syn. nov.**

"*Parnassius actius minuta* VERITY" ROTHSCILD, 1918: 250.

TL: Jouldousse = Juldus (the current Bayanbulak-Kunnes area).

Type material: ♂ (MZSF; fig. 3), **LECTOTYPE BY PRESENT DESIGNATION**, labeled with "syntype" and "Juldus" (this specimen was figured in VERITY, [1911]: pl. LIII, fig. 5); 1 ♀ (MZSF; fig. 3), **PARALECTOTYPE BY PRESENT DESIGNATION**, labeled with "syntype" and "Juldus" (this specimen was figured in VERITY, [1911]: pl. LIII, fig. 6).

Remarks: VERITY ([1911]) actually mixed two subspecies into one taxon: 1) "*P. actius* Ev. race *minuta*" VERITY, [1911]: pl. LIII, figs. 5-6 (Jouldousse); 2) "*P. actius* EVERSM. var. *minuta*" VERITY, [1911]: pl. LVIII, figs. 12-13 (Issyk Koul). These two populations were considered as the same taxon by VERITY ([1911]) and the subsequent authors (BRYK & EISNER, 1935; BRYK, 1935) with both Juldus and Issyk-kul as its localities. The old geographical name "Juldus = Jouldousse" could be used for a large area from Issykkul to Bayanbulak-Kunnes area (sensu O. BANG-HAAS, 1915b), or for a smaller area around the current Bayanbulak-Kunnes (sensu GRUM-GRSHIMAILO, 1890: 196). The specimens figured by VERITY ([1911]: pl. LIII, figs. 5-6) from "Juldus" agree well with the specimens newly collected from Bayanbulak-Kunnes area. So that the usage of the name "*minuta* VERITY" should be based upon a lectotype designation to avoid the confusion. It seems that only a pair of syntype specimens from "Juldus" are traceable (KUDRNA, 1983) so that have the priority; by this selection, "*P. actius* Ev. race *minuta* VERITY" will be a synonym of *P. actius urumtsiensis* VERITY, as the populations from Bayanbulak-Kunnes connect with those from southwest Urumqi with no remarkable difference.

Material. 11 ♂♂ (CHH, CLP), Aiken-daban Pass (43.22 N, 84.87 E), Kunes, Hejing County, Bayingolin, Xinjiang, 3300 m, 30.VI.2019, H. HUANG & P. Li leg.; 4 ♂♂ (CHH, CLP), Qiaorma (43.46 N, 84.43 E), on Dushanzi-Kuqa Road, Xinjiang, 2980 m, 30.VI.2019, H. HUANG & P. Li leg.

Remarks. The TL is between Urumqi and Korla, restricted to the southwest of Urumqi. The specimens from Ulatai and Sheng-

li-daban figured by SUGISAWA (1999) generally agree with the syntypes in the small size and the black-dusted discal area on forewing upper side of male. However, the specimens from Bogda-shan area have a larger size and brighter appearance; the bright male specimen figured by WEISS (2005: 287-fig. 4) from “Urumtschi” probably belongs to this population. The status of the population from Bogda-shan area needs a further research.

Specimens from Aiken-daban generally agree with the syntypes of *P. actius urumtsiensis* VERITY, but show a transition to *P. actius melaniticus* BANG-HAAS, 1915. The ranges of the bright populations [*P. actius actius* (EVERSMANN) and *P. actius caesar* STAUDINGER] are completely interrupted by the ranges of the dark *P. actius urumtsiensis* VERITY and *P. actius melaniticus* BANG-HAAS along the Dushanzi-Kuqa Road.

WEISS (2005) extended the range of this subspecies to the west of the Kunes-Bayanbulak area without giving any evidence. He might be right as a ♂ specimen collected by Mr. R. XING from Xiata (42.54 N, 80.72 E) in Narat Mt. Range is hardly separable from the population of Aiken-daban. The large area around Narynkol near the China-Kazakhstan-Kyrgyzstan borders seem to be very little known in *P. actius* (EVERSMANN).

***Parnassius actius melaniticus* BANG-HAAS, 1915**

“[*Parnassius*] *actius melaniticus* O. B.-H., nov. var.” BANG-HAAS, 1915c: 173, Taf. V., fig. 21.

TL: Thianschan or. mer., Kourgak Taon, Kutscha Gebirge, nordwestlich Karaschahr.

Type material: syntype ♂ (MTDG: NEKRUTENKO, 2001) was figured by BANG-HAAS (1915c); syntype ♂ (as cotype) was figured by WEISS (2005).

Material. 15 ♂♂, 3 ♀♀ (CHH, CLP), Telmed Pass (42.50 N, 83.42 E), north of Kuqa (Kuche), on Dushanzi-Kuqa Road, Xinjiang, 3500m, 26.VII.2019, H. HUANG & P. LI leg..

Remarks. The blackish specimens are frequently found in this subspecies, but they have never been found in the populations of *P. actius urumtsiensis* VERITY. However, the lightest specimens of this subspecies are indistinguishable from the darkest specimens of *P. actius urumtsiensis* VERITY.

***Parnassius actius caesar* STAUDINGER, 1898**

“*Parnassius Actius* Ev. (var. *Caesar* GRUM GR.)” STAUDINGER, 1898: 347.

TL: Korla, Ost-Tianschan.

Type material: syntypes 2 ♂♂, 2 ♀♀ (all in ZMHU: EISNER & SHELJUZHKO, 1965) were figured by EISNER & SHELJUZHKO (1965) under *P. actius pseudocaesar* EISNER & SHELJUZHKO.

Synonym. “*P. actius pseudocaesar*” EISNER & SHELJUZHKO, 1965: 213 (synonymized by SUGISAWA, 1996).

TL: Korla, Ost-Tianschan.

Type material: holotype ♂, allotype ♀ and paratypes 1♂, 1♀ (all in ZMHU: EISNER & SHELJUZHKO, 1965) were figured by EISNER & SHELJUZHKO (1965); paratypes 2 ♂♂ were figured by SUGISAWA (1999) and WEISS (2005).

Material. 3 ♂♂, 2 ♀♀ (CHH), Daleng-daban Pass (42.46 N, 85.25 E), west Korla, 3300 m, 4.VII.2022, H. HUANG leg.

Nomenclature. EISNER & SHELJUZHKO (1965) considered that “*Parn. Caesar*” GRUM-GRSHIMAILO, 1885 is valid thus “*Parnassius Actius* Ev. (var. *Caesar* GRUM GR.)” STAUDINGER, 1898 is a junior homonym and invalid. However, “*Parn. Caesar*” GRUM-GRSHIMAILO is a nomen nudum, not accompanied by a description, a definition of the taxon or an indication as required by Article 12.1 of the ICZN. GRUM-GRSHIMAILO (1885) only gave “a magnificent, quite unique species among the *Parnassius* of the Palaearctic fauna, which varies very strikingly in coloration and number of red eye-spots (on the forewing 4 to 0)”; this can not be explained as a description or a definition in any sense. Such description on the great variation of the red spots on the wings covers all the possibilities in the wing-pattern of all known *Parnassius* species, thus has no sense in definition. Though EISNER & SHELJUZHKO (1965) located GRUM-GRSHIMAILO’s (1885) original specimens from the Kyzyl-Art-Pass, Transalai in the NHML and debated that GRUM-GRSHIMAILO (1885) provided the precise location information for his taxon, Article 12.3 of the ICZN clearly stated: “The mention of any of the following does not in itself constitute a description, definition, or indication: a vernacular name, locality, geological horizon, host, label, or specimen”. Moreover, GRUM-GRSHIMAILO (1885) reported both *P. actius* EVERSMANN and *P. caesar* GRUM-GRSHIMAILO from the Kyzyl-Art-Pass and gave no indication to separate the two taxa, thus no one could be sure which part of the collection belong to *P. caesar* GRUM-GRSHIMAILO. As a conclusion, “*Parn. Caesar*” GRUM-GRSHIMAILO, 1885 must be invalid in nomenclature. The subsequent authors (ELWES, 1886; GRUM-GRSHIMAILO, 1890; MOORE, 1902) had not given any description or definition for “*Parn. Caesar*” GRUM-GRSHIMAILO, until STAUDINGER (1898) proposed the name, “*Parnassius Actius* Ev. (var. *Caesar* GRUM GR.)” for the larger, more white-colored, less strongly marked specimens from Korla. According to the ICZN, the taxon “*Parnassius Actius* Ev. (var. *Caesar* GRUM GR.)” became valid by STAUDINGER’s (1898) action, with its authorship attributed to STAUDINGER (1898). As EISNER & SHELJUZHKO (1965) used the original series of STAUDINGER’s specimens from Korla as their type series, *P. actius pseudocaesar* EISNER & SHELJUZHKO, 1965 is an objective junior synonym of *P. actius caesar* STAUDINGER, 1898.

EISNER & SHELJUZHKO (1965) did not prove that “*Parn. Caesar*” GRUM-GRSHIMAILO, 1885 is valid in nomenclature, but their action made the name “*caesar*” valid under their authorship, viz. *Parnassius actius caesar* EISNER & SHELJUZHKO, 1965, which is however a junior homonym of *P. actius caesar* STAUDINGER, 1898.

SUGISAWA (1996) correctly held this opinion and gave a brief discussion on this. WEISS (2005) followed this treatment. KREUZBERG (1992), SAKAI et al. (2002) and TSHIKOLOVETS (1997, 2005b) erroneously adopted EISNER & SHELJUZHKO’s (1965) opinion. KORB & BOLSHAKOV (2016) listed “[*Parnassius*] [*actius*] [Subspecies] *caesar* Grum-Grshimailo, 1885” as a valid name with its syntypes deposited in ZMHU; he seemed to overlook EISNER & SHELJUZHKO’s (1965) work. It is noteworthy that most of the authors after STAUDINGER (1898) used the name “*caesar*” in sense of STAUDINGER (1898), regarding Korla as the locality of the taxon.

Remarks. Both *P. actius caesar* STAUDINGER and *P. actius actius* (EVERSMANN) have very bright individuals which are nearly inseparable from each other except for the collecting data. However, the ranges of these two subspecies are completely interrupted by the ranges of the dark *P. actius urumtsiensis* VERITY and *P. actius melaniticus* BANG-HAAS along the Dushanzi-Kuqa Road.

Very few specimens were collected by the author from Daleng-daban on west of Korla, which might represent the westernmost distribution of this subspecies. This new population can be distinguished from *P. actius actius* (EVERSMANN) by having subbasal and anal black dusting on hindwing upper side in both sexes consistently paler and less blackish.

***Parnassius actius ambrosius* STICHEL, 1907**

“*Parnassius ambrosius*” STICHEL, 1907: 33-note 1.

TL: Ak-sou, Turkestan oriental.

Type material: holotype ♂ (ZMKU) was figured by VERITY (1906) and by SUGISAWA (1999) as “lectotype”.

Synonym. “*P. actius*, EVERSM. forme *superbus*, Gr.” VERITY, 1906: pl. XIII, figs. 5-6. (preoccupied name.)

TL: Ak-sou, Turkestan oriental.

Type material: syntypes ♂, ♀ were figured by VERITY (1906).

Nomenclature. RÜHL ([1893]) employed the name “[*Parnassius Actius* Eversm.] var. *superbus* GRUM” for a population of *P. actius* EVERSMANN from Transalai. Subsequently, VERITY (1906) employed the name “*P. actius*, EVERSM. forme *superbus*, Gr.” for a pair of specimens from “Ak-sou, Turkestan oriental”. However, both *Parnassius actius superbus* RÜHL, [1893] and *P. actius superbus* VERITY, 1906 are junior homonyms of “*Parnassius Superbus*, GRUM-GRSHIMAILO” AUSTAUT, 1889 (subspecies of *Parnassius tianschanicus* OBERTHÜR, 1879). Later on, STICHEL (1907) listed “*P. actius* var. *superbus* RÜHL, 1892” and “*P. actius* var. *superbus* VERITY, 1906” as the same thing and gave “Transalai, ? pamiir, Aksu” as distribution; he did not give a replacement name for these junior homonyms in the text. However, in a footnote, STICHEL (1907) considered that the “female” (actually male) specimen figured by VERITY (1906: pl. 13, fig. 6) is peculiar enough (having a complete black marginal band) to constitute a completely new species, *Parnassius ambrosius* STICHEL. Therefore, *Parnassius actius ambrosius* STICHEL, 1907 is absolutely not a replacement name of *Parnassius actius superbus* RÜHL, [1893] as BRYK (1935) stated, but is a taxon based upon the unique specimen from Ak-sou, figured by VERITY. Therefore, this peculiar specimen (VERITY, 1906: pl. 13, fig. 6; ZMKU) is the holotype of *Parnassius actius ambrosius* STICHEL; the holotype was erroneously regarded by TSHIKOLOVETS (1993b, 2005b) as syntype and by SUGISAWA (1999) as lectotype. VERITY’s (1906: pl. 13, fig. 5) “male” (actually female) specimen from the TL, actually representing a topotype, was excluded by STICHEL (1907) in his description; it was erroneously regarded by TSHIKOLOVETS (1993b, 2005) as syntype and by SUGISAWA (1999) as paralectotype.

Remarks. WEISS (2005) simply regarded this subspecies as a synonym of *P. actius urumtsiensis* VERITY, giving no discussion. The few specimens figured and identified by SUGISAWA (1999) as this subspecies are not in common with the holotype. Our knowledge on the *P. actius* (EVERSMANN) from the valleys on north of Aksu is very poor so that a final conclusion on the status of *P. actius ambrosius* STICHEL cannot be made at present.

***Parnassius actius dubitabilis* VERITY, [1911]**

“*P. actius*, Ev. forme *dubitabilis*” VERITY, [1911]: 313, pl. LIII, fig. 3.

“*Parnassius actius dubitabilis* VERITY” ROTHSCCHILD, 1918: 250.

TL: Karagai taou (probably wrong). The TL in reality is probably not Karagai taou, as all the recently collected ♂ specimens from Naryn area do not match the female topotype figured in original description (VERITY, [1911]: pl. LIII, fig. 4).

Type material: syntype ♂ (MZSF: KUDRNA, 1983) was figured by VERITY ([1911]).

Nomenclature: KORB & BOLSHAKOV (2016: 35) noted “The name *dubitabilis* proposed clearly as infrasubspecific (VERITY [1911]: 313: «S’agit-il d’un hybride!»), this unavailable”. However, VERITY ([1911]) wrote that the taxon might represent a hybrid, but he was not conclusive. According to Articles 45.6.4 & 45.6.4.1 of the ICZN, even if VERITY ([1911]) used this name in an infrasubspecific sense, it became available in the authorship of VERITY since ROTHSCCHILD (1918) stated it as a subspecies.

Synonym. “*P. actius*, Ev. forme *separanda*” VERITY, [1911]: 313, pl. LIII, fig. 4. (infrasubspecific).

TL: Karagai taou.

Type material: syntype ♀ (MZSF: KUDRNA, 1983) was figured by VERITY ([1911]).

Remarks. “Karagai taou” cannot be interpreted precisely into the current geographical name, thus the TL remains uncertain in exact location. TSHIKOLOVETS (2005b) located the TL on the map as close to Naryn, but all the known ♀♀ from that area are consistently brighter than the topotype ♀ (VERITY, [1911]: pl. LIII, fig. 4). On the other hand, all the ♀♀ collected by TSHIKOLOVETS (2005b) from “Kyrgyz Alatau Mts, Kegety valley” match the topotype ♀, thus the TL in reality is supposed to be close to Kegety valley in this work. TOROPOV & ZHDANKO (2006) held a similar opinion on the distribution of this subspecies. It is possible that the type material of this subspecies was mislabeled.

The population from northern area of Issyk-kul (Verity, [1911]: 313, partim “pl. LVIII, figs. 12-13”) probably belongs to this subspecies. 1 ♂, 1 ♀ were figured by VERITY ([1911]) from Issyk Koul; they seemed to be lost and was not found in MZSF (KUDRNA, 1983); this pair of specimens are excluded from the type material of *P. actius minuta* VERITY, [1911] by the present lectotype designation (see under *Parnassius actius urumtsiensis* VERITY, 1906).

This subspecies is characterized in ♀ by the very wide dark marginal bands on both wings.

***Parnassius actius cassius* BRYK & EISNER, 1935**

“[*Parnassius actius*] subsp. *cassius*” BRYK & EISNER, 1935: 74.

TL: Naryn.

Type material: lectotype ♂ and paralectotype ♀ (all in RMHL: EISNER, 1966) were figured by EISNER (1966); paralectotypes 2 ♂♂ were figured by SUGISAWA (1997); paralectotype ♂ (as paratype) was figured by WEISS (2005).

Remarks. This subspecies was treated by KREUZBERG (1992) as synonym of *P. actius dubitabilis* VERITY, and this opinion was followed by SUGISAWA (1999) and WEISS (2005). It was however, treated by TSHIKOLOVETS (2005b) as synonym of *P. actius actius* (EVERSMANN). Though this subspecies shows a curious resemblance to *P. actius actius* (EVERSMANN), these two subspecies have their ranges interrupted by the ranges of the dark populations between Issyk-kul and Narat Mt. Range. Moreover, *P. actius cassius* BRYK & EISNER has a larger size and a darker sub-hyaline forewing marginal band (especially in ♀) than *P. actius actius* (EVERSMANN).

This subspecies cannot be simply included into *P. actius dubitabilis* VERITY, possessing a much brighter appearance in ♀. Further research is still needed.

On the other hand, this subspecies is only slightly separable from the Transalai subspecies by having the frequently smaller hindwing ocelli especially in ♀.

***Parnassius actius cato* BRYK & EISNER, 1935**

“[*Parnassius actius*] subsp. *cato*” BRYK & EISNER, 1935: 75.

TL: Syrti, Syr Darja. “Syr Darja” could be the name of the Syr Darya River that covers a long distance through Kazakhstan, Uzbekistan and Kyrgyzstan. “Syrti” is probably the same location as “Syrts”, referring to the humid highlands of the eastern part of Inner Tian-Shan (CHURKIN, 2009b).

Type material: lectotype ♂ and paralectotype ♀ (all in RMHL: EISNER, 1966) were figured by EISNER (1966), lectotype ♂ was also figured by SUGISAWA (1999).

Material. 13 ♂♂, 5 ♀♀ (CHH, CLP), a pass of Maidantag Mts. (40.67 N, 77.82 E), SW Akqi County, Xinjiang, 3400 m, 12.VII.2019, H. HUANG & P. LI leg.

Remarks. This subspecies was treated by KREUZBERG (1992) and TSHIKOLOVETS (2000) as a synonym of *P. actius actius* (EVERSMANN, 1843), and by LUKHTANOV & LUKHTANOV (1994) as a synonym of *P. actius dubitabilis* VERITY. The opinion by LUKHTANOV & LUKHTANOV’s (1994), followed by SUGISAWA (1999) and WEISS (2005), is not supported by the fact that all the ♀♀ in type series of *P. actius cato* BRYK & EISNER are very bright in appearance with only small submarginal spots on hindwing.

TSHIKOLOVETS (2000) interpreted the TL as in Uzbekistan, but the 2 ♂♂ figured by him from “Syr-darja” are not in common with the type material, being black-dusted on forewing upper side and marked by prominent black submarginal spots on both wings upper side. Actually, no further ♀♀ have been known in literature matching the type material.

Astonishingly a series of specimens were collected by the author and his friend, PENG LI from a Pass in Maidantag Mts. in the south-west of Akqi area, Xinjiang, matching the type specimens of *P. actius cato* BRYK & EISNER. Thus the possibility arises that the TL could be at the extreme upper water of the Syr Darya River in eastern Kyrgyzstan, which is rather close to China-Kyrgyzstan border. This subspecies can be easily distinguished from all other known subspecies from the adjacent areas by the bright appearance of the female, of which the submarginal black spots on both wings upper side are consistently reduced. Considering individual variations, *P. actius cato* BRYK & EISNER, *P. actius cassius* BRYK & EISNER and *P. actius dubitabilis* VERITY are inseparable in ♂ characters but are easily separable in ♀ characters.

This subspecies is rather similar to *P. actius caesar* STAUDINGER from Korla, but can be distinguished from the latter by the following combination of characters.

- 1) Sub-hyaline marginal band on forewing upper side markedly darker and in high contrast with the whitish ground color in both sexes.
- 2) Sub-basal dusting on hindwing upper side and sub-basal reddish marking on hindwing underside occupying a smaller part of discocellular cell in both sexes.
- 3) Submarginal spots on hindwing upper side usually smaller and frequently absent in ♀.
- 4) Submarginal markings on hindwing underside more linear and closer to termen in both sexes.

***Parnassius actius brutus* BRYK, 1914**

“*Parnassius actius* EVERSM. subsp. *brutus* BANG-HAAS (i. l.)” BRYK, 1914: 40.

TL: Pamir.

Type material: holotype ♀ and paratype ♂ (both in RMHL) were figured by BRYK & EISNER (1931) and repeatedly by BRYK (1935). Nomenclature: BRYK (1914a) described “*Parnassius actius* EVERSM. subsp. *brutus* BANG-HAAS (i. l.) ab. *jambicus* nova” on a pair of specimens from Pamir; his description made the name “*brutus*” available, though his name “*jambicus*” is invalid as an infrasubspecific name. As BRYK (1914a) used both ♂ and ♀ specimens for the description and clearly stated “Type 1 female c.m. ex coll. BANG-HAAS”, the ♀ specimen became the lectotype and the ♂ became a paralectotype. SUGISAWA (1998) incorrectly regarded this taxon as synonym of *P. actius muzaffir* ELWES, 1886 (nomen nudum).

Synonym. “*Parn. Caesar*” GRUM-GRSHIMAILO, 1885: 247. (Synonymized by KREUZBERG, 1992; nomen nudum.)

TL: Kyzyl-Art pass.

Type material: not defined. KORB & BOLSHAKOV (2016) incorrectly listed “[*Parnassius*] [*actius*] [Subspecies] *caesar* GRUM-GRSHIMAILO, 1885” as a valid name with its syntypes deposited in ZMHU; however, the syntypes cannot be defined without a definition provided by GRUM-GRSHIMAILO (1885) who had both “*actius*” and “*caesar*” collected from the TL.

Nomenclature: see under Nomenclature of *P. actius caesar* STAUDINGER, 1898.

Remarks: KREUZBERG (1992) first synonymized *Parnassius actius brutus* BRYK, 1914 with *Parnassius actius caesar* GRUM-GRSHIMAILO, 1885, but he incorrectly regarded *Parnassius actius caesar* GRUM-GRSHIMAILO as an available name in nomenclature.

Synonym. “*Parnassius muzaffir*” ELWES, 1886: 42-note. (Synonymized by EISNER & SHELJUZHKO, 1965; nomen nudum.)

TL: not defined.

Type material: not defined.

Nomenclature: ELWES (1886) only stated “I have to thank the Grand Duke also for a pair of *P. muzaffir*, Gr. GRSH., which also appears to be a form of *P. actius*”, giving no further information, thus the name “*muzaffir*” is a nomen nudum. EISNER & SHELJUZHKO (1965) cited this taxon as “[*Parnassius actius*] *muzaffir* GRUM-GRSHIMAILO sensu ELWES”, and figured a ♂ as syntype (RMHL); their action made the name “*muzaffir*” available under their own authorship: *P. actius muzaffir* EISNER & SHELJUZHKO, 1965. SUGISAWA (1996, 1999) incorrectly employed “ssp. *muzaffir* ELWES, 1886” as a valid name for the Transalai subspecies.

Synonym. “*P. mouzaffir*” GRUM-GRSHIMAILO, 1890: 187-note. (Synonymized by EISNER & SHELJUZHKO, 1965; nomen nudum.)

TL: Kyzyl-Art pass.

Type material: not defined.

Nomenclature: GRUM-GRSHIMAILO (1890) only stated “je ne doutais plus avoir sous les yeux une nouvelle forme originale que je nommais d’abord *P. caesar* et plus tard *P. mouzaffir*”. Therefore the name is a nomen nudum.

Synonym. “[*Parnassius Actius* EVERSM.] var. *superbus* GRUM” RÜHL [1893]: 97 (preoccupied name)

TL: Transalai.

Type material: not defined.

Nomenclature: see under Nomenclature of *P. actius ambrosius* STICHEL, 1907.

Synonym. “[*Parnassius actius*] *brutus* O. B.-H. n. var” BANG-HAAS, 1915a: 94 (synonymized by KREUZBERG, 1992; preoccupied name).

TL: Pamir (Kisiljahn u. Beik sowie vom Mustagata westl. Yarkend).

Type material: not figured.

Synonym. “[*Parnassius actius*] *flora* O. B.-H. n. var” BANG-HAAS, 1915a: 94 (synonymized by KREUZBERG, 1992).

TL: Nord-Alai (Ispajran).

Type material: syntypes 1♂, 1♀ (all in ZMHU) were figured by BRYK (1935) and SUGISAWA (1999); syntype ♀ (as cotype) was figured by WEISS (2005).

Synonym. “[*Parnassius actius*] *cleopatra* (nomen novum)” BRYK & EISNER, 1935: 73 (synonymized by KREUZBERG, 1992).

TL: Kaindy-Pass, Transalai.

Type material: lectotype ♀ (as holotype, RMHL) and paralectotype ♀ (as allotype, RMHL) were designated by EISNER (1957) and figured by EISNER & SHELJUZHKO (1965), and were figured also by EISNER (1966) and WEISS (2005).

Synonym. “[*Parnassius actius*] subspecies *pseudobrutus* (n.)” BRYK & EISNER, 1931: 2 (synonymized by KREUZBERG, 1992).

TL: Mustag-Ata.

Type material: syntype ♀ (RMHL) was figured by BRYK & EISNER (1931) and BRYK (1935), and was interpreted as “Holotype” by EISNER (1966). The figured syntype should be lectotype as the number of type specimens was not mentioned in the original description.

Synonym. “[*Parnassius actius*] *muzaffir* GRUM-GRSHIMAILO sensu ELWES” EISNER & SHELJUZHKO, 1965: 212, Taf. 2, fig. 4. **syn. nov.**

TL: Kyzyl-Art-Pass (Transalai).

Type material: syntype ♂ (RMHL) was figured by EISNER & SHELJUZHKO (1965).

Synonym. “[*Parnassius actius*] ssp. *caesar*” EISNER & SHELJUZHKO, 1965: 213, Taf. 1, figs. 5-8 (preoccupied name).

TL: Kyzyl-Art-Pass (Transalai).

Type material: holotype ♂ (as lectotype), paratype ♀ (as “lectoallotype”) and paratypes 2 ♂♂ (all in NHML) were figured by EISNER & SHELJUZHKO (1965).

Material. 2 ♀♀ (CHH), Torugart Pass (40.52 N, 75.36 E), Ulugqat county, 3200 m, 28.VII.2022, H. HUANG leg..

Remarks. The author did not encounter this subspecies at Irkeshtam that was supposed to be a locality. However, 2 ♀♀ were collected from Torugart Pass together with a few specimens of *Parnassius simonius* STAUDINGER, 1883.

A few specimens (CXR) were collected by Mr. R. XING (personal communications, 2022) from the base camp of the Muztagata Peak (TL of *P. actius pseudobrutus* BRYK & EISNER, 1931) and the mountains on southeast of Taxkorgan; some ♀♀ in this collection appear much darker than the lectotype ♀ of *P. actius pseudobrutus* BRYK & EISNER, supporting that *P. actius pseudobrutus* BRYK & EISNER is a synonym of *P. actius brutus* BRYK.

***Parnassius actius ornatus* BANG-HAAS, 1915**

“*Parnassius actius ornatus* O. B.-H. n. var.” BANG-HAAS, 1915a: 93

TL: SW Hotan, around Kurat Pass of Kunlun Mts. (GRIESHUBER et al, 2012: 218).

Type material: syntype ♂ was figured by BANG-HAAS (1915c). “cotype” ♀ (probably syntype) was figured by WEISS (2005). A couple of syntypes (NHML) are figured by SUGISAWA (1999).

Synonym. “*Parnassius actius inomatai*” OHYA, 1986: 4 (synonymized by SUGISAWA, 1998)

TL: Southern Hotan, Kunlun Mts.

Type material: holotype ♂ and paratype ♀ (all in private collection of A. OHYA) were figured in original description (OHYA, 1986: figs. 1-4).

Remarks: OHYA (1986) described this as new because he believed that *P. actius ornatus* BANG-HAAS was described from “Karakoram Mts.” as labeled by BANG-HAAS from Shahidulla. However, the two taxa were actually from the same area on south- southwest of Hotan.

***Parnassius actius sula* BRYK & EISNER, 1934**

“*P. actius*, subspecies *sula* (subsp. nova)” BRYK & EISNER, 1934: 42.

TL: Karambar-Pass, Hindukusch. BRYK & EISNER (1934) gave “Baroghil-Pass, Chitral” as for syntype ♂ and “Faisabad, Afghanistan” for syntype ♀. However, EISNER (1966) selected syntype ♂ as holotype (actually lectotype) and corrected its locality as “Karambar-Pass, Hindukusch”.

Type material: lectotype ♂ and paralectotype ♀ (all in RMHL) were designated and figured by EISNER (1966); lectotype ♂ was also figured by SUGISAWA (1999) and by WEISS (2005).

Synonym. “*Parnassius actius* ssp. *hussi* ssp. nova” EISNER & NAUMANN, 1980: 17, Taf. 8, Abb.15 (synonymized by SAKAI, 1981).

TL: Afghanistan, Prov. Badakhshan, Grosser Pamir, Issik-Tal.

Type material: in addition to the original description, a paratype ♂ was figured by WEISS (2005).

Remarks: KREUZBERG (1992) first synonymized both, *P. actius sula* BRYK & EISNER, 1934 and *P. actius hussi* EISNER & NAUMANN, 1980, with *P. actius caesar* GRUM-GRSHIMAILO, 1885 (nomen nudum).

***Parnassius actius yelyangi* BANG-HAAS, 1934**

“*Parnassius actius yelyangi* O. B.-HAAS, subsp. nova” BANG-HAAS, 1934: 135.

TL: Kashmir mer., Zaskar Yelyang Pass.

Type material: not figured in literature.

Synonym. “*P. actius* Ev., subspecies *catilina* (subsp. nova)” EISNER & PESCHKE, 1934: 41 (synonymized by KREUZBERG, 1992).

TL: Doubounni-Berge. EISNER (1966) gave “Doubounni-montes, Gilgit, Indien”.

Type material: lectotype ♂ (as holotype, RMHL) and paralectotype ♀ (as allotype, RMHL) were designated and figured by EISNER (1966); paralectotypes ♂, ♀ were figured by SUGISAWA (1999).

Synonym. “*Parnassius actius* ssp. *lahulensis* ssp. nova” WEISS, 1990: 12-13, cpl.[1], fig. 9 (synonymized by SUGISAWA, 1998).

TL: Barala-cha, Lahoul Central (Ouest Himalaya).

Type material: in addition to the original description, m holotype (RMHL) was also figured by SUGISAWA (1999) and one paratype ♂ was figured by WEISS & RIGOUT (2016).

***Parnassius actius solomon* SORIMACHI, 2010**

“*Parnassius solomon*” SORIMACHI, 2010: 82, 89-90

TL: S. Jinshuikou 15km, Qinghai. The exact location of the real TL is actually unknown, so this taxon is not included on the map in this work.

Type material: holotype ♂, paratypes 7 ♂♂, 8 ♀♀ (all in coll. SORIMACHI, Saitama, Japan) were figured in original description.

Remarks. The exact TL remains unknown; a friend of the author searched the area around the TL but failed to rediscover this butterfly. WEISS & RIGOUT (2016) downgraded this taxon as good subspecies of *P. actius* (EVERSMANN).

***Parnassius tianschanicus* OBERTHÜR, 1879** (figs. 4, 24-25, 60)

Four or even five subspecies (if *P. tianschanicus tancrei* DECKERT, 1909 is a good subspecies) are known from Xinjiang. It is noted that *P. tianschanicus olympius* STAUDINGER, 1898 (= *P. tianschanicus verityi* ROTHSCILD, 1918) which was treated by WEISS (2005) as a synonym should be a good subspecies as stated by SAKAI et al. (2002).

The dispute was centered on the populations from Kyrgyz Tianshan: TOROPOV & ZHDANKO (2014: 66) recognized four subspecies whilst SAKAI et al. (2002) and WEISS (2005) retained only one subspecies; SAKAI et al. (2002) considered the subspecies from Kyrgyz Tianshan as different from *P. tianschanicus tianschanicus* OBERTHÜR, 1879 from Chinese Tianshan whilst WEISS (2005) regarded the subspecies from Kyrgyz Tianshan as *P. tianschanicus tianschanicus* OBERTHÜR.

***Parnassius tianschanicus tianschanicus* OBERTHÜR, 1879** (TL: Forêt de Kouldja et du Tianshan)

Material. 4 ♂♂, 2 ♀♀ (CHH), east of Bayanbulak area (43.11 N, 84.61 E), 2800 m, 3. & 23. VII.2022, H. HUANG leg.; 1 ♂ (CHH), Qiaoerma (43.46 N, 84.43 E), on Dushanzi-Kuche Road, VII.2001, ex. coll. J. LUO; 1 ♀ (CHH), Houxia (43.26 N, 87.30 E), south of Urumqi, 6.VIII.2004, X. ZHANG leg., ex. coll. H.-L. SHI.

Remarks. The following taxa were listed by SAKAI et al. (2002) as synonyms, agreed by the author: *P. discobolus* STAUDINGER, 1881 (TL: Tian Schan), *P. tianschanicus minor* STAUDINGER, 1881 (TL: Dschungarischer Alatau), and *P. t. erebus* VERITY, 1906 (TL: monts Thian-chan orientaux).

The very dark-coloured *P. tianschanicus tancrei* DECKERT, 1909 from Lob-Noor area needs a further research. It has been treated by SAKAI et al. (2002) and WEISS (2005) as a synonym of *P. t. tianschanicus* OBERTHÜR, however its locality (if it is true) is remote from all the known localities in Tianshan.

***Parnassius tianschanicus olympius* STAUDINGER, 1898** (TL: Kuruk-Tau, Korla; the current Krugtag Mts.)

Material. 2 ♂♂ (CWJQ), Kuqa area, no farther data (the locality might be wrong, but the specimens belong to *Parnassius tianschanicus olympius* STAUDINGER with no doubt).

Remarks. The lectotype ♂ (ZMHU) was designated and figured by KORB (2012: 5, fig. 112). This taxon was treated as a synonym of *P. t. tianschanicus* OBERTHÜR by KREUZBERG (1992) and WEISS (2005), but was raised to full species by KORB (2012). KORB (2012) dissected 1 ♂ and stated “the valva of *P. olympius* is much wider than in *P. tianschanicus* OBERTHÜR, 1879, triangular in lateral view (in *P. tianschanicus* it is narrow, linear-oval), the harpe of *P. olympius* is much longer than a half of the valva length (in *P. tianschanicus*, harpe is shorter than a half of the valva length), the harpe of *P. olympius* with apex straight (in *P. tianschanicus*, the apex of valva is convexed).” However, the photos published by KORB are apparently taken from the flattened ♂ genitalia in slides with all structures changed in various degrees, making an accurate comparison impossible. The valva of *P. tianschanicus olympius* STAUDINGER figured by KORB (2012: figs. 33 & 35) is broken with the basal part missing; the uncus is broken too, with only apical part recognizable, somewhat misleading; the apical part of the valva is generally in the same form as that of *P. t. tianschanicus* OBERTHÜR.

A series of specimens of this taxon were collected by a Chinese collector from eastern Kuqa area (J.-Q. Wang, personal communications), showing a constantly larger size and a very whitish appearance of the wings. With the help of Mr. J.-Q. Wang, the author dissected 1 ♂ of *P. tianschanicus olympius* STAUDINGER in comparison with 5 ♂♂ of other subspecies (figs. 24-25) and found that there is no remarkable difference between these subspecies. The valva is variable in shape even in the same population (Specimens t2 and t3 from Bayanbulak): the apex of valva could be pointed or broadly rounded. The harpe of valva could be large (Specimen t1) or small (Specimen t3). There is no remarkable difference in 8th segment and uncus between these subspecies.

***Parnassius tianschanicus grumgrshimailoi* BANG-HAAS, 1927** (TL: Transalai)

Material. 7 ♂♂, 2 ♀♀ (CHH, CLP), Irkeshtam (39.72 N, 73.98 E), west of Ulugqat, 3400 m, 18.-23.VII.2019, H. HUANG & P. Li leg.; 3 m, 1 f (CHH), Irkeshtam, 1.VIII.2022, H. HUANG leg.

Remarks. The synonymic relationship between *P. t. grumgrshimailoi* BANG-HAAS (with large red ocelli of hindwing) and *P. t. insignis* STAUDINGER, 1886 (TL: South Alai; with small red ocelli) remains unsolved. WEISS (2005) regarded both as distinct subspecies, whilst TOROPOV & ZHDANKO (2006) put all populations from Alai and Transalai into *P. t. insignis* STAUDINGER, 1886. TSHIKOLOVETS (2005b) located the TLs of all the taxa described from Alai and Transalai on the map, showing that the TL *P. t. eisnericus* D. WEISS, 1983 (with large ocelli; synonym of *P. t. grumgrshimailoi* BANG-HAAS) is remoter from that of *P. t. grumgrshimailoi* BANG-HAAS than that of *P. t. insignis* STAUDINGER. The range of the large-ocelli-form surrounds that of the small-ocelli-form. Clarification is needed on whether the small-ocelli-form is very local (confined to a very small range) or consistently presented in a few localities. Similar case is found in Kaindy Mts. of Tianshan where a small-ocelli-form (namely *P. t. strictio* OHYA, 1988) is found, surrounded by *P. t. tianschanicus* OBERTHÜR. If the small-ocelli-form is proved to be very local or variable, *P. t. grumgrshimailoi* BANG-HAAS should be treated as a synonym of *P. t. insignis* STAUDINGER.

P. t. grumgrshimailoi BANG-HAAS can be distinguished from *P. t. tianschanicus* OBERTHÜR by the more clearly defined sagittate submarginal markings on forewing upper side, and by the frequently (not consistently) larger red ocelli on hindwing.

***Parnassius tianschanicus fujiokai* OHYA, 1986** (TL: Hotan, Kunlun Mts.)

Remarks. This subspecies is characterized in ♂ by the obsolete submarginal markings on hindwing upper side.

***Parnassius apollo* (LINNAEUS, 1758)** (figs. 5, 52, 55)

Three subspecies are recognized from Xinjiang as listed below. *Parnassius apollo sibiricus* (NORDMANN, 1851) (TL: Irkutsk) is not found from Xinjiang; this subspecies should be confined to the populations in Irkutsk area and the northern half of Mongolia, being similar to *P. apollo merzbacheri* FRUHSTORFER, 1906 but markedly paler in female. It is noted that the ranges of *P. apollo sibiricus*

(NORDMANN) and *P. apollo merzbacheri* FRUHST. are divided by the range of *P. apollo alpherakyi* KRULIKOVSKY, 1906. *P. apollo mongolicus* STAUDINGER, 1900 should be confined to the populations from the Hami-Barkul-Yiwu area (Karlik Mountains) in China, and *P. apollo churkini* MOHN, 2003 from Khangai Mts., Mongolia could be a synonym. This subspecies is very limited in distribution and rarely seen in the collections, being pure white in ground color of wings; it was incorrectly used by KREUZBERG (1992) and WEISS (2005) as the senior synonym of *P. apollo merzbacheri* FRUHST. (and its various synonyms), and by KORB (2013) as the senior synonym of a series of taxa.

Parnassius apollo merzbacheri FRUHST. is the most widely distributed subspecies in China, occupying the most part of Chinese Tianshan, northeastern Kyrgyzstan and eastern Kazakhstan.

P. apollo alpherakyi KRULIKOVSKY, 1906 is confined to Altai area and Tarbagatai-Saur area in Xinjiang, with *P. apollo tarbagataicus* VERITY, [1911] (TL: Tarbagatai) **syn. nov.** as its synonym. Both WEISS (2005) and KORB (2013) incorrectly treated *P. apollo tarbagataicus* VERITY as a synonym of *P. apollo mongolicus* STAUDINGER. *P. apollo alpherakyi* KRULIKOVSKY differs from both *P. apollo merzbacheri* FRUHST. and *P. apollo sibiricus* (NORDMANN) in ♂ by having a frequently wider submarginal band on forewing and a series of markedly larger submarginal spots on hindwing underside.

***Parnassius apollo mongolicus* STAUDINGER, 1900** (TL: Hami area, East Tianshan)

Material. 1 ♂ (CHH), foothills (43.19 N, 94.46 E) on north slope of Karlik Mountains, Southwest of Yiwu county, 2200 m, 7.VII.2022, H. HUANG leg.

Remarks. This could be one of the rarest subspecies of *P. apollo* (LINNAEUS). The type specimens or even the topotypes have never been figured in literature. The ♂ specimen figured by VERITY ([1911]: pl. LVIII, fig. 6), labeled as a cotype from “Saisan, Mongolie occ.” (not the TL) actually belongs to *P. apollo alpherakyi* KRULIKOVSKY.

This subspecies is similar to *Parnassius apollo sibiricus* (NORDMANN) from Irkutsk and northern Mongolia and *P. apollo merzbacheri* FRUHST. from the main part of Chinese Tian-shan (to the west of Karlik Mts.), but can be distinguished from the latter two by the male having a pure white (somewhat chalky white in the male specimen collected) ground color of wings and a reduced forewing marginal band. WEISS (2005) incorrectly used this name for the widely distributed *P. apollo merzbacheri* FRUHST.

This butterfly is very rarely seen at the dry rocky hills at the foot of Karlik Mts. The author observed three other individuals but failed to catch them. It is noteworthy that *P. apollo churkini* MOHN, 2003 from Mongolia could be a synonym of *P. apollo mongolicus* STGR.

***Parnassius apollo alpherakyi* KRULIKOVSKY, 1906** (TL: Russia, Altai)

Material. 1 ♂ (CHH), On road (48.46 N, 87.29 E) to Hemu village, Kanas, Altai, 1500 m, 17.VII.2022, H. HUANG leg.; 1 ♂ (CHH), On road (48.19 N, 86.89 E) to Burqin Kanasi Airport, 1080 m, 20.VI.2022, H. HUANG leg.; 2 ♂♂, 1 ♀ (CHH), near Awusiqi (46.94 N, 85.13 E), Saur Mts., NW of Hoboksar, 1500-1800 m, 20.VII.2022, H. HUANG leg.; 2 ♂♂ (CHH), on National Highway 219, Saur Mts., North of Hoboksar, 1700-2200m, 19.VII.2022, H. HUANG leg.

Remarks. Only very few specimens have been collected for study as this species is inexplicably under the protect of Chinese law though it is the commonest *Parnassius* in Xinjiang. The populations from the Saur Mts. are in common with those from Altai area, not with those from Tianshan. Therefore, *P. apollo tarbagataicus* VERITY, [1911] (TL: Tarbagatai) **syn. nov.** is recognized as a synonym of *P. apollo alpherakyi* KRULIKOVSKY.

P. apollo regius LUKHTANOV, 1997 (TL: Kasachstan, Altai, Ust-Kamenogorsk-Gebiet, Syrjanovsk) based on larger hindwing ocelli in ♀, was treated by WEISS (2005) as a synonym of *P. apollo alpherakyi* KRULIKOVSKY.

***Parnassius apollo merzbacheri* FRUHSTORFER, 1906** (TL: Kuldja = Yining area)

Material. 1 ♂ (CHH), Horgos (44.50 N, 80.37 E), W of Huocheng, Yili Prefecture, 1500 m, 18.VI.2019, H. Huang leg.; 1 ♂ (CHH), Zeketai (43.62 N, 83.09 E), N of Xinyuan, Yili Prefecture, 1100 m, 28.VI.2019, H. Huang leg.; 1 ♀ (CHH), Xiata, SW Zhaosu county, VII.1991, Z.-W. Zhang leg.

Remarks. Though the ♂ is separable from that of *P. apollo alpherakyi* KRULIKOVSKY, the ♀ is not.

The following taxa were listed by WEISS (2005) as synonyms, agreed by the author: *P. apollo chryseis* OBERTHÜR, 1913 (TL: Naryn), *P. apollo transiliensis* EISNER, 1966 (TL: Alma Ata), *P. apollo talgarica* EISNER & SEDYCH, 1966 (TL: Bolschoi Talgar) and *P. lepsinskensis* MOHN, 2003 (TL: Lepsinsk, Dsungarischer Alatau).

***Parnassius phoebus* (FABRICIUS, 1793)** (figs. 6, 26-27, 39, 46, 55)

This work only deals with the taxa available in nomenclature, described from Altai and its adjacent areas; a survey of all other subspecies is out of the scope of this paper. Six valid subspecies are recognized, two of which are discovered in Xinjiang. A map showing the TLs of all the available names in this region is included (fig. 39).

WEISS (2005) retained only three valid subspecies as from Altai and its adjacent areas. TSHIKOLOVETS et al. (2002, 2009a, 2009b, 2016) placed all the known taxa from this area into *P. phoebus phoebus* (F.). However, after checking more than one thousand specimens, CHURKIN (2003) stated “It is absolutely certain, that *P. phoebus* does not provide expressed ecological forms in Siberia or Russian Far East, as it was clearly stated in the detailed study of the *phoebus*-populations distributed in Dahuria and Russian Far East published by GLUSCHENKO & MARTYSENKO (2000)”.

A brief discussion on the six subspecies recognized in this work is as follows. 1) *P. p. phoebus* (F.) and *P. p. sauricus* LUKHTANOV, 1999 are hardly separable from each other, the latter differs from the former only by the ♂ usually having no black discal spot (or smudge) in space 6 of forewing; however these two subspecies are well separated biogeographically by the range of *P. p. alpestris* VERITY, [1911]. 2) *P. p. alpestris* VERITY is characterized by the ♂ having a pure white ground color on both wings upper side, and by the female having the less reddish costal (upper discal) markings (frequently replaced by entirely black spots) on forewing upper side, the frequently wider marginal band on both wings and the more contiguous non-triangular submarginal markings on hindwing upper side. 3) *P. p. sedakovii* MÉNÉTRIÉS, [1850] is generally inseparable from *P. p. phoebus* (F.) in ♂, but is characterized in ♀ by having constantly larger reddish ocelli on hindwing. 4) *P. p. chingizid* YAKOVLEV, 2006 differs a little from *P. p. phoebus* (F.) only by having a more whitish ground color in male, it however stands by a viewpoint from biogeography that these two subspecies are divided by the range of *P. p. alpestris* VERITY. 5) *P. p. tsenguun* CHURKIN, 2003 is characterized in ♀ by having more discrete, smaller triangular submarginal markings on hindwing upper side.

***Parnassius phoebus phoebus* (FABRICIUS, 1793)**

“*Papilio phoebus*” FABRICIUS, 1793: 181

“*Papilio phoebus* FABRICIUS, 1793” LUKHTANOV et al., 2019: 19, fig. 2

TL: Altai, Ongudai (LUKHTANOV et al., 2019).

Type material: neotype ♂ (ZISP) from “Altai, Ongudai” was proposed by LUKHTANOV et al. (2019) to serve nomenclatural stability. Nomenclature: HANUS & THEYE (2010, 2011) discovered that *Papilio phoebus* F. in reality is a senior synonym of *Parnassius ariadne* (LEDERER, 1853). To conserve the prevailing usages of these specific names, LUKHTANOV et al. (2019) proposed a neotype of *Parnassius phoebus* FABRICIUS from Ongudai, Altai. This action (Case 3767) has been supported by most of the researchers (BALINT, 2021; KOSTERIN, 2021; VANE-WRIGHT, 2021; WIEMERS, 2021) involved into this problem except KORB (2020b). Though this case is still open as no voting has been done on it yet, the treatment of LUKHTANOV et al. (2019) is supported by the author and adopted in this work, as the prevailing usages of *Parnassius phoebus* (F.) have appeared in numerous Chinese publications.

Remarks. The following individual variations are noticed in literature: ♂ forewing costal spots in spaces 5 and 7 varying from red-dish to entirely blackish; ♀ forewing costal spots varying in size, frequently reddish but occasionally blackish.

***Parnassius phoebus sauricus* LUKHTANOV, 1999**

“*Parnassius phoebus sauricus* subsp. nov.” LUKHTANOV, 1999: 136

TL: Kasachstan, Ust-Kamenogorsk-Gebiet, Saur-Gebirge, Kysylkiya.

Type material: holotype ♀ (EMEM), 23 ♂♂, 10 ♀♀ (EMEM, SPSU, ZISP) were listed but not figured.

Material. 17 ♂♂, 4 ♀♀ (CHH), on National Highway 219 (47.04 N, 85.99 E), Saur Mts., North of Hoboksar, 2100-2300 m, 2.-10. VI.2022, H. HUANG & Y.-H. LI leg.

Remarks. It is noted that WEISS (2005) incorrectly stated the TL of *P. phoebus intermedius* MÉNÉTRIÉS, [1851] as “Saur Mts, Tarbagatai” and regarded *P. p. sauricus* LUKHTANOV as a synonym of the former. *Parnassius p. intermedius* MÉNÉTRIÉS should be a synonym of *P. p. corybas* FISCHER DE WALDHEIM, 1824, with lectotype ♂ designated by NEKRUTENKO (in NEKRUTENKO & KERZHNER, 1986), labeled from “Kamtsch[atkai]”.

This subspecies was treated by TSHIKOLOVETS et al. (2016) as a synonym of *P. p. phoebus* (F.). However, the ranges of these two subspecies are widely separated by the range of *P. phoebus alpestris* VERITY, [1911].

A larva of this butterfly was found on the leaf of *Corydalis capnoides* PERSOON (fig. 46) in the biotope.

***Parnassius phoebus alpestris* VERITY, [1911]**

“*Parnassius delius*, *Esp. var. alpestris*” VERITY, [1911]: 314, pl. lxiii 19-20.

TL: Tschuja Mts., Altai.

Type material: syntypes ♂, ♀ (NHML) were figured by VERITY ([1911]); 5 ♂♂ syntypes were located in ZMKU by TSHIKOLOVETS (1993a).

Nomenclature: TSHIKOLOVETS et al. (2009a) incorrectly attributed the authorship to ELWES (1899) who did not publish this taxon.

Synonym. “*Parnassius phoebus halasicus* ssp. nov.” R.-X. HUANG & MURAYAMA, 1992: 3, fig. 4 **syn. nov.**

TL: Halasi, Altai.

Type material: holotype ♂ was figured by R.-X. HUANG & MURAYAMA (1992), deposited in the entomological collection of Xinjiang University.

Material. 6 ♂♂, 4 ♀♀ (CHH, CQZY), Xiaoheihu (48.64 N, 87.22 E), Kanas, Altai, 1870 m, 19.VI.2020, Z.-Y. QI leg.

Remarks. This subspecies has a pure white ground color of the wings in ♂ and a more contiguous submarginal band on both wings in ♀. KREUZBERG (1992) simply treated *P. p. alpestris* VERITY as a synonym of *P. p. phoebus* (F.); WEISS (2005) followed KREUZBERG (1992) and added *P. p. halasicus* R.-X. HUANG & MURAYAMA (the authorship is incorrectly attributed to MURAYAMA by WEISS (2005)) as another synonym of *P. p. phoebus* (F.). CHURKIN (2003) considered *P. p. alpestris* VERITY as a true subspecies inhabiting a large area of Altai; this opinion is followed by the author.

Parnassius p. halasicus R.-X. HUANG & MURAYAMA seems to have a wider marginal band on both wings of ♀ than *P. p. alpestris* VERITY, however it does not deserve being retained as its range connects with the range of *P. p. alpestris* VERITY.

***Parnassius phoebus sedakovii* MÉNÉTRIÉS, [1850]**

“*Parnassius sedakovii*” MÉNÉTRIÉS, [1850]: 17, pl. 4, fig. 2.

TL: envoyée d'Irkutsk.

Type material: lectotype ♂ (ZISP) was designated by NEKRUTENKO & KERZHNER (1986) and figured by TSHIKOLOVETS et al. (2002).

Synonym. “*Parnassius intermedius* forma *fortuna* B-H.” BANG-HAAS, 1912: 103 (synonymized by WEISS, 2005).

TL: Arasaggungol, Sayan-Gebirge.

Type material: syntypes 1 ♂, 1 ♀ (ZMHU) were figured by TSHIKOLOVETS et al. (2009b).

Synonym. “[*Parnassius phoebus*] subsp. *amalthaea* (subsp. nova)” BRYK & EISNER, 1935: 49 (synonymized by WEISS, 2005).

TL: Mondy, Gouv. Irkutsk.

Type material: lectotype ♂ and paralectotype ♀ (all in RMHL) were figured by EISNER (1966).

Synonym. “*Parnassius phoebus badmaevi* ssp. n.” MARTYNENKO & GLUSCHENKO, 2001: 38, cpl. VI, figs. 1-2, 5-6 (Synonymized by KORB & BOLSHAKOV, 2011).

TL: Buryatia, south-western Khamar-Daban Mts., Khangarul'sky Ridge, source of Tsakirka River, “Belchir”. The TL is very close to that of *P. p. sedakovii* MÉNÉTRIÉS, [1850].

Type material: holotype ♂, and paratype ♂ and ♀ were figured by MARTYNENKO & GLUSCHENKO (2001).

Remarks. This taxon was treated by TSHIKOLOVETS et al. (2009a) as a synonym of *P. p. phoebus* (FABRICIUS).

Synonym. “*Parnassius phoebus vaschenko* subsp. nov.” HIRSCHFELD & SCHAEFFLER, 2004: 1, Taf. 12, fig. 1-15 **syn. nov.**

TL: Tuva, Tannuola Mts., Southern slopes, Samagaltai v.

Type material: f holotype (ZSM), m & f paratypes were figured by HIRSCHFELD & SCHAEFFLER (2004).

Remarks. This taxon was treated by TSHIKOLOVETS et al. (2009a) as a synonym of *P. p. phoebus* (F.). Only ♀ is separable from that of the western subspecies by having larger hindwing ocelli.

***Parnassius phoebus chingizid* YAKOVLEV, 2006**

“*Parnassius phoebus chingizid* YAKOVLEV, ssp. n.” YAKOVLEV & DOROSHKIN, 2006: 15, pl. 1, figs. 15-20.

TL: W. Mongolia, Bayan-Ulegei aimak, middle stream of Elt-Gol River (Kara-Irtys basin).

Type material: holotype ♂ (ZISP) and paratype of ♂ and ♀ were figured by YAKOVLEV & DOROSHKIN, (2006) and also by TSHIKOLOVETS et al. (2009b).

Remarks. This taxon was treated by TSHIKOLOVETS et al. (2009b) as a synonym of *P. phoebus phoebus* (FABRICIUS).

Synonym. “*Parnassius phoebus bajangolus* YAKOVLEV, ssp. n.” YAKOVLEV & DOROSHKIN, 2006: 16, pl. 1, figs. 7-14 **syn. nov.**

TL: W. Mongolia, Hovd aimak, Bulan-gol basin, middle stream of Ulyastain-Sala river.

Type material: holotype ♂ (ZISP) and paratype of ♂ and ♀ were figured by YAKOVLEV & DOROSHKIN, (2006) and also by TSHIKOLOVETS et al. (2009b).

Remarks. This taxon was treated by TSHIKOLOVETS et al. (2009b) as a synonym of *P. phoebus phoebus* (FABRICIUS). This subspecies is hardly separable from *P. p. phoebus* (FABRICIUS) in external features as indicated by TSHIKOLOVETS et al. (2009b), but is widely separated from the latter by the range of *P. p. alpestris* VERITY.

***Parnassius phoebus tsenguun* CHURKIN, 2003**

“*Parnassius phoebus tsenguun* subsp. nov.” CHURKIN, 2003: 51, cpl. 1, figs. 1, 4, 6, 7, 10.

TL: South Mongolia, Gobi-Altai Aimak, 30 km south Biger Somon.

Type material: holotype ♂ (DMMR) and paratype of ♂ and ♀ were figured by CHURKIN (2003) and repeatedly by TSHIKOLOVETS et al. (2009b).

Remarks. This is the southeastern-most subspecies in Altai area, with a markedly weaker sexual dimorphism.

***Parnassius ruckbeili* DECKERT, 1909 (figs. 7, 26-27, 44-45, 54)**

“*Parnassius delius*, n. var. *Ruckbeili*” DECKERT, 1909: 108.

TL: montagnes des environs de la ville de Barkul.

Type material: lectotype ♂ (ZMKU) was designated by KORB (2017).

Material. 11 ♂♂, 2 ♀♀ (CLP, CHH), above Machang (43.53 N, 93.03 E), South of Barkul county, 3000-3200 m, 20.VII.2017, P. LI leg.; 1 ♂ (CHH), SW of Yiwu county (43.13 N, 94.41 E), 3600 m, 7.VII.2022, H. HUANG leg.

Remarks. This species is widely accepted as an independent species from *P. phoebus* (F.), supported by the researches in mtDNA sequences (OMOTO et al., 2004; MICHEL et al., 2008; TODISCO et al., 2012). A careful comparison of the ♂ genitalia between the two species shows the following constant differences: the low apex of the 8th tergite is rounded in *P. phoebus* (F.) but is produced in *P. ruckbeili* DECKERT; the distal (central) process of tegumen has its widest point near the base in *P. phoebus* (F.) but near the apex in *P. ruckbeili* DECKERT; the apex of the harpe in dorsal view is close to the valva in *P. phoebus* (F.) but is remote from the valva in *P. ruckbeili* DECKERT. The last instar larva (fig. 44) collected by P. LI from Barkul can not be separated from that of *Parnassius phoebus* (FABRICIUS). The pupa (fig. 45) is coloured with yellowish brown and reddish brown.

***Parnassius jacquemontii* BOISDUVAL, 1836 (fig. 7)**

***Parnassius jacquemontii rubicundus* STICHEL, 1906 (TL: Pamir and Fergana)**

Material. 3 ♂♂, 1 ♀ (CHH), Khunjerab Pass (36.85 N, 75.43 E), South of Taxkorgan county, Pamir, 4740 m, VII.1990, Z.-W. ZHANG leg.

Remarks. The specimens examined were collected by the late Professor ZI-WEN ZHANG (Shihezi, Xinjiang). The collecting locality (unreachable for travelers since 2019) is very close to the TL of *P. jacquemontii hunzaica* TYTLER, 1926 (TL: Hunza) which has been widely accepted as a synonym of *P. jacquemontii rubicundus* STICHEL. WEISS' (2005) classification is followed in this work. But the opinion of ROSE & WEISS' (2011) that *P. jacquemontii rubicundus* STICHEL is an independent species is not well supported. The record of *Parnassius mercurius cyrnus* FRUHST., 1906 (TL: Aksu) is most likely a mistake.

***Parnassius epaphus* OBERTHÜR, 1879**

Four subspecies are known from Xinjiang. A further subspecies, *P. e. hazaraensis* BRYK & EISNER, 1937 has been recorded by SUGISAWA (as *P. e. takahashii* SUGISAWA, 1998) from Kunjerab Pass on the Pakistan side; it is supposed to be also distributed in Chinese side but no formal record has been published yet. The record of *P. epaphus huwei* FRUHST., 1903 (TL: Aksu, Chinese Turkestan) is most likely a mistake.

***Parnassius epaphus subtilis* BANG-HAAS, 1927 (TL: SW Hotan, around Kurat Pass of Kunlun Mts.)**

Remarks. The TL was originally stated as “Nordabhang des Karakorum, Chinesische Tatarei, Schahidulah”. However, this statement is incorrect. The type series of this taxon were collected by the 1914 expedition under the leadership of Abramov sent out by O. Bang-Haas to search for Lepidoptera. The party travelled from Chotan in a south-westerly direction towards Shahidulla. GRIESHUBER et al. (2012) stated “there is no actual indication that the ABRAMOV party ever reached Xaidulla, though O. BANG-HAAS had the material (at least partly) so labeled”. The TL is supposed to be near the Kurat Pass area, presumably a long distance removed from Shahidulla. BANG-HAAS (1915a: 95) described “*P. epaphus epaphactius* O. B.-H. n. var.” on a large ♂, which was figured as “[*Parnassius*] *actius epaphactius*” BANG-HAAS (1915: Taf. V, Nr. 28). He was not sure if this ♂ represents a hybrid between *P. epaphus* OBTH. and *P. actius* (EVERSMANN). This taxon is available as a species group name in nomenclature; it has priority over *Parnassius epaphus subtilis* BANG-HAAS, 1927 if its syntype is proved to be only an abnormal large-sized specimen.

***Parnassius epaphus kahstahsensis* IWAMOTO, 2006 (TL: Mt. Kaxtax, Kunlun Mts.)**

Remarks. ROSE & WEISS (2011) suggested this to be a synonym of *P. epaphus subtilis* BANG-HAAS. However, the TL (ca. 36.22 N, 82.04 E) is remote from that of *P. epaphus subtilis* BANG-HAAS (ca. 36.74 N, 78.96 E) and the pair of type specimens figured by IWAMOTO (2006) have the markedly larger submarginal spots on hindwing upper side than in *P. epaphus subtilis* BANG-HAAS. This could be a good subspecies with a small size and strongly developed black markings.

***Parnassius epaphus altynensis* STICHEL, 1906 (TL: Altyntag, SE Xinjiang)**

Remarks. This subspecies is also well known from Dangjin-shankou Pass, W Qinghai; a pair of specimens (CHH) collected by K.

SONG have been examined. This subspecies is quite large and pale in appearance with very small submarginal markings on hindwing.

***Parnassius epaphus hanae* KAWASAKI, 1998** (TL: 125 km S. of Miran, Altun Shan, SE Xinjiang)

Remarks. This subspecies is distributed to the southwest of the preceding one. The author has not seen any specimens from the Chinese collections. This subspecies is similar to *P. epaphus altynensis* STICHEL, but is constantly smaller.

***Parnassius apollonius* (EVERSMANN, 1847)** (figs. 8, 51)

WEISS (2005) recognized five valid subspecies, whilst TSHIKOLOVETS (2000, 2005b) and TSHIKOLOVETS et al (2016) retained only the nominotypical subspecies, regarding all others as synonyms. There is no doubt that all the known Chinese populations belong to *P. apollonius apollonius* (EVERSMANN).

***Parnassius apollonius apollonius* (EVERSMANN, 1847)**

“*Doritis Apollonius*” EVERSMANN, 1847: 71, Tab. III, figs. 1-2.

TL: Volat in Songariae montibus. The TL in reality was supposed by KORB (2020a) as “foothills of Dzhungarian Alatau near Lepsinsk in South-Eastern Kazakhstan”.

Type material: lectotype ♀ (ZISP) was designated by KORB (2017) and figured by TSHIKOLOVETS (2000, 2005b) and SUGISAWA (2001).

Synonyms. As stated by WEISS (2005). A discussion on the subspecific classification from outside China is out of the scope of this paper.

Material. 1 ♂, 1 ♀ (CHH), south mountain range of Shihezi (44.31 N, 86.08 E), 600-700 m, 19.V.2021, S.-S. WANG leg.; 3 ♂♂, 4 ♀♀ (CHH), Shihezi, 700 m, 14.V.2022, H. HUANG leg.; 6 ♂♂, 1 ♀ (CHH), SW of Yumin (45.79 N, 82.40 E), Balluk Mts., 800 m, 12.V.2022, H. HUANG leg.; 1 ♂, 2 ♀♀ (CHH), south mountain range of Shawan (44.33 N, 85.62 E), 700 m, 27.V.2021, Z.-Y. QI leg.

Remarks. This species is reported from the Balluk Mts. for the first time.

***Parnassius ariadne* (LEDERER, 1853)** (figs. 9, 52)

Three valid subspecies are recognized, two of which are distributed in Xinjiang.

***Parnassius ariadne ariadne* (LEDERER, 1853)**

“*[Doritis] Ariadne* n. sp.” LEDERER, 1853: 354.

TL: Tarbagatei.

Type material: lectotype ♂ of *Doritis clarius* EVERSMANN, 1843 designated by LUKHTANOV et al. (2019) became lectotype of *Doritis ariadne* LEDERER, 1853 (ICZN, Art. 72.7).

Nomenclature: “the name *Doritis clarius* EVERSMANN, 1843, is invalid as it is a junior secondary homonym of *Papilio clarius* HÜBNER, 1805 (currently both taxa belong to the genus *Parnassius*) and was replaced by the name *Doritis ariadne* LEDERER (1853: 354) by HEMMING (1934b: 198). The name *Doritis ariadne* was first published by LEDERER in synonymy with *Doritis clarius* EVERSMANN, 1843, and is available according to Art. 11.6.1 as it was used as valid before 1961; first by HEMMING (1934b: 198)” (LUKHTANOV et al., 2019). WEISS (1999) did not know that *Parnassius ariadne* (LEDERER) is a replacement name of *Doritis Clarius* EVERSMANN.

Synonym. “*Doritis Clarius*” EVERSMANN, 1843: 539 (preoccupied name; synonymized by HEMMING, 1934b).

TL: originally as “promontoriis Altaicis australibus”; labeled as “Tarbagatei” for lectotype ♂ designated by LUKHTANOV et al. (2019).

Type material: lectotype ♂ (ZISP) was designated and figured by LUKHTANOV et al. (2019).

Synonym. “*Parnassius clarius* subsp. *clarus* (subsp. nova)” BRYK & EISNER, 1932: 91 **syn. nov.**

TL: Saur-Gebirge.

Type material: lectotype ♂ (RMHL) was designated by EISNER (1966) and figured by WEISS (1999); the paralectotype ♀ (RMHL) was figured by BRYK & EISNER (1932) and repeatedly by BRYK (1935); paralectotype ♂ (RMHL) was figured by EISNER (1966).

Remarks. “In old literature the Tarbagatai Mountains were often considered a part of the Altai (e.g. ELWES, 1989), but currently they are treated as a part of the Saur-Tarbagatai mountain system, which is located between Altai and Tian Shan” (LUKHTANOV et al., 2019). BRYK & EISNER (1932) incorrectly interpreted “promontoriis Altaicis australibus” (sensu EVERSMANN, 1843; actually Tarbagatei) as the current Altai area.

Material. 8 ♂♂, 2 ♀♀ (CHH), Awusiqi (46.94 N, 85.13 E), Saur Mts., NW Hoboksar, 1900 m, 11.VI.2022, H. HUANG leg.; 1 ♂ (CHH), Awusiqi, 15.VI.2017, S.-S. WANG leg., ex coll. S.-Y. LANG.

Remarks. This subspecies can be easily distinguished from *P. ariadne dentata* AUSTAUT, 1889 by the following combination of characters: 1) forewing termen more convex near tornus in both sexes; 2) angle between forewing pale submarginal band and forewing dorsum somewhat smaller in both sexes; 3) all blackish markings on both wings more clearly defined in ♀; 4) hindwing submarginal sagittate markings markedly narrower in ♀.

***Parnassius ariadne dentata* AUSTAUT, 1889**

“*[Parnassius Clarius, EVERSMANN.] Variété Dentata*, STAUDINGER. [In litteris]” AUSTAUT, 1889: 149, pl. 21, figs. 1-2.

TL: les montagnes de Saisan. AUSTAUT (1889) incorrectly interpreted the TL as farther south than Tarbagatai, however, the Saisan (= Zaisan) area is situated to the north of Tarbagatai and Saur and to the west of Altai.

Type material: syntype ♂ and ♀ were figured by AUSTAUT (1889). Syntype ♀ (MNHN) was figured by TSHIKOLOVETS et al. (2016).

Remarks. This taxon was described to have continuous forewing discal band in ♂ and reddish hindwing anal markings in both sexes; however, TSHIKOLOVETS et al. (2016) figured three further specimens from the TL and revealed that these characters are not constant. The forewing-shape of this taxon is as that of the populations from the current Altai area.

Synonym. “*Parnassius ariadne jiadengyuensis* ssp. nov.” R.-X. HUANG & MURAYAMA, 1992: 3, fig. 3 **syn. nov.**

TL: Jiadengyu, Altai.

Type material: holotype ♂ was figured by R.-X. HUANG & MURAYAMA (1992), deposited in the entomological collection of Xinjiang University.

Material. 7 ♂♂, 6 ♀♀ (CHH), Baihaba (48.63 N, 86.72 E) and Naren (48.75 N, 86.90 E), Altai Mts., 1300-1600 m, 7-8.VI.2022, H. HUANG leg.; 1 ♂ (CHH), Baihaba, VI.2021, Z.-Y. QI leg., ex coll. Z.-Y. QI.

Remarks. As the TL of *P. ariadne ariadne* (LEDERER) is at the Saur-Tarbagatai mountain system, not the current Altai area, the populations from the current Altai which have long been identified as *P. ariadne ariadne* (LEDERER) actually belong to *P. ariadne*

jiadengyuensis R.-X. HUANG & MURAYAMA. However, *P. ariadne dentata* AUSTAUT from Zaisan has no constant difference from *P. ariadne jiadengyuensis* R.-X. HUANG & MURAYAMA and has the priority in nomenclature.

***Parnassius ariadne erlik* YAKOVLEV, 2009**

“*Parnassius ariadne erlik* subsp. nov.” YAKOVLEV, 2009: 201, pl. 23, figs. 1-6.

TL: Altai Rep., Chikhacheva Mts., Tabduair [Talduair] Mt.

Type material: holotype ♂ (ZISP) and a pair of paratypes (coll. R. YAKOVLEV) were figured by YAKOVLEV (2009).

Remarks. This subspecies flies one month later than the other two subspecies, with traditional reddish ocelli of hindwing replaced by black ones.

***Parnassius tenedius* EVERSMAAN, 1851** (figs. 7, 55)

***Parnassius tenedius tenedius* EVERSMAAN, 1851** (TL: Irkuzk)

Material. 5 ♂♂, 3 ♀♀ (CHH), on National Highway 219 (47.04 N, 85.99 E), Saur Mts., North of Hoboksar, 2100-2300 m, 2.-10. VI.2022, H. HUANG & Y.-H. LI leg.

Remarks. KORB & BOLSHAKOV (2016) made a lectotype designation and figured the lectotype ♂. RUBIN & YAKOVLEV (2013) first recorded this species from Saur Mts. in Kazakhstan on only two specimens. The first reliable record of this species from Chinese Saur Mts. was made by a Chinese collector who shared his information with his friends. Subsequently, the locality was visited by several Chinese collectors including the author.

Corydalis capnoides PERSOON appears sparsely among the stones at the biotope. This could be the possible foodplant of *Parnassius tenedius* EVERSMAAN.

***Parnassius delphius* (EVERSMANN, 1843)** (figs. 10-14, 29-30, 41, 49-50, 53, 58-59)

WEISS (1992) recognized nine valid subspecies, but in a later work, ROSE & WEISS (2011) followed KREUZBERG's (1985) classification in retaining three subspecies alongside *P. maximinus* STAUDINGER, 1891. However, KREUZBERG's (1985) classification was not agreed by S. CHURKIN (2009b) who stated “I do not know any serious Russian collectors (who have much more material and knowledge about Tian-Shan) who agrees with KREUZBERG's position”.

According to CHURKIN (2009b), the great variability of some *P. delphius* (EVERSMANN) populations in Kyrgyzstan is mainly caused by some recent reciprocal invasions and hybridization of the whitish historical subspecies and the blackish historical subspecies; these historical subspecies were adapted to different ecological conditions, with differences not only in adult morphology, but also in larva morphology and foodplant. This hypothesis makes sense in explaining the different percentages of the various forms found in the similar biotopes in different locations of Kyrgyzstan. It explains why some subspecies or populations are consistent in adult wing-pattern without great individual variations; in such case the populations were not invaded largely by very different historical subspecies in recent period. CHURKIN (2009b) revealed that *P. maximinus* STAUDINGER and *P. delphius* (EVERSMANN) hybridize quite easily at Chanach Pass, Chatkal, feeding on the same foodplant. Thus *P. delphius maximinus* STAUDINGER represented another pale subspecies of *P. delphius* (EVERSMANN) in recent history and it still stands as good subspecies as it has not invaded largely into other subspecies or been invaded largely by other subspecies.

The subspecies concept is certainly subjective and not suitable for all the cases found in nature. The author prefers a strict subspecies concept in this work: a subspecies is accepted only if its majority or all major forms are not found in other subspecies, more or less with recognizable difference from the corresponding forms in other subspecies. The populations will not be regarded as different subspecies if they have exactly the same corresponding forms no matter how many percent. So that KREUZBERG's (1985) classification is partly followed in this work in the limit of Kyrgyzstan, Uzbekistan and Kazakhstan: the populations are united under *P. delphius albulus* HONRATH, 1889 if they have both the black form and the very whitish form (represented by the original figure of *P. d. albulus* HONRATH). Of course such treatment is only tentative, pending a further deep research on Kyrgyz populations. *P. d. delphius* (EVERSMANN, 1843) is characterized by its frequently smaller size and the lacking of the very whitish form. *P. d. namanganus* STAUDINGER, 1886 stands on that its major form is consistently (though slightly) separable from the corresponding form in *P. d. albulus* HONRATH and that the very whitish form and the black form are absent. In Chinese limit, five further subspecies are recognized: 1) *P. d. menander* HEMMING, 1934 is very close to *P. d. delphius* (EVERSMANN) but can be separated more or less by some minor differences; 2) *P. d. juldussica* VERITY, [1911] stands on that its unique form is separable from other subspecies by having the black pattern and the whitish ground in higher contrast; 3) *P. d. constants* BANG-HAAS, 1915 stands on that its major form is consistently (though slightly) separable from the corresponding pale form in other subspecies; 4) *P. d. hamiensis* BANG-HAAS, 1927 stands on the small ocelli of hindwing and the remote isolation; 5) *P. d. dingliangi* subsp. nov. stands on that its unique form is consistently separable from the corresponding pale form in other subspecies. Such classification is generally like SAKAI et al.'s (2002) arrangement. To give the convincing description of a new subspecies from Akqi area, Xinjiang, a survey of all the historical names (including nomina nuda which were incorrectly used by previous authors) under this species is presented in this work except for the infrasubspecific names. BANG-HAAS (1915b) and BRYK (1935) gave the detailed lists of the old infrasubspecific names (originally published as the fourth name or aberrations) which are not available as species group names in nomenclature. A survey of the original descriptions of all these names confirmed BRYK's (1935) treatment except for the following names.

“*Parnassius Delphius* EVERS. Vn. *Tancrei*” AUSTAUT, 1910

“*Parnassius delphius* Evers. V^{te} *Barteli*” AUSTAUT, 1911

These two names are available as species group names in nomenclature, placed and discussed in the synonymic list below.

“[*P. delphius*] Forma nova *puritana*” STICHEL, 1911: 277

“[*P. delphius*] Forma nova *amelia*” STICHEL, 1911: 277

“[*P. delphius*] Forma nova *scotina*” STICHEL, 1911: 277

Though STICHEL (1911) used “Forma” instead of aberration for these names, he clearly regarded them as individual variations instead of geographical variations, giving no localities for his new names. No publications put these names as species or subspecies before 1985. Thus all these names are unavailable in nomenclature.

A detailed distributional map of *P. delphius* (EVERSMANN) and the Chinese subspecies of *P. staudingeri* BANG-HAAS, 1882 is provided (fig. 41), including the recent localities reported by CHURKIN (2009b), CHURKIN et al. (2012), TSHIKOLOVETS (2000, 2005b) and TSHIKOLOVETS et al. (2016). The various names (subspecific and infrasubspecific) under *P. staudingeri* BANG-HAAS are neglected in this chapter. It is noted that TSHIKOLOVETS (2005b) incorrectly placed *P. staudingeri infernalis* STAUDINGER, 1886 under *P. delphius* (EVERSMANN), regarding “*Parnassius delphius dolabella*” FRUHSTORFER, 1904 (a taxon close to *P. staudingeri illustris* GRUM-GRSHIMAILO, 1888) as a synonym of *P. delphius albulus* HONRATH. To give a better understanding of historical materials, some figures of type specimens in literature are reproduced in this paper (fig. 14).

***Parnassius delphius delphius* (EVERSMANN, 1843)**

“*Doritis Delphius*” EVERSMANN, 1843: 541, Tab. VII, fig. 1, a, b

TL: erroneously given by EVERSMANN as Altai. The type material was found labeled from Tarbagatai (GRUM-GRSHIMAILO, 1890; KREUZBERG, 1985; TSHIKOLOVETS, 2005b). However, as in case of *P. actius* (EVERSMANN), the TL in reality is supposed to be Dzhungarian Alatau (TOROPOV & ZHDANKO 2006 & 2014; TSHIKOLOVETS et al., 2016; KORB, 2020a).

Type material: lectotype ♂ (ZISP) was designated by KREUZBERG (1985) and figured by SUGISAWA (2001) and TSHIKOLOVETS (2005b).

Remarks. TSHIKOLOVETS et al. (2016) figured a few topotypes (reproduced in fig. 14) from Dzhungarian Alatau and revealed that this subspecies has great variability in having both pale form and black form.

This subspecies is characterized by its constantly smaller size. The intermediate forms have a more extensive black dusting in discal area of forewing upper side than those of *P. delphius menander* HEMMING, 1934. The brightest form has discal area of forewing upper side extensively dusted by sparse black scales, appearing darker than that of *P. delphius menander* HEMMING. All the known specimens have the basal black area on hindwing upper side covering the entire discocellular cell.

***Parnassius delphius menander* HEMMING, 1934**

“*Parnassius delphius menander*, nom. n.” HEMMING, 1934a: 99

Nomenclature: This name is a replacement name for *P. delphius intermedia* VERITY, 1911.

Synonym. “[*P. delphius*] [Rasse] *intermedia*” VERITY, [1911]: 316 (preoccupied name; synonymized by HEMMING, 1934a)

“*P. delphius*, Evers. var. *infernalis*, STDGR” VERITY, [1911]: pl. 18, figs. 8-9

TL: Kouldja, Thian-chan occ.

Type material: 2 ♂♂, 1 ♀ of syntypes were figured by VERITY ([1911]; reproduced in fig. 14). Syntype ♂ (ZMKU) was repeatedly figured by TSHIKOLOVETS (2005b).

Nomenclature: VERITY ([1911]) actually made the name “*intermedia*” available under his own authorship. He stated “Im östlichen Thianschan fliegt eine andere Rasse als *intermedia*, welche ich als *namanganus* Uebergang zu *infernalis* abgebildet habe, ohne die Localität dieses Paares zu kennen. Ich empfang nun eine identische Serie aus dem Juldusgebiet, welche mir erlaubt, diese Rasse definitiv als *juldussica* zu beschreiben”. BANG-HAAS (1915b: 154, Taf. 4, fig. 7) cited VERITY’s name as valid and figured a further ♂ from “Kuldscha”. However, this name is preoccupied by *Parnassius intermedius* MENÉTRIÉS, [1851].

Material. 31 ♂♂, 11 ♀♀ (CHH), Angrit-daban Pass of Yining-Zhaosu Road (43.39 N, 81.02 E), Ketmen Mt. Range, 3100 m, 2.VII.2022, H. HUANG leg.

Remarks. This subspecies can not be included into *P. delphius albulus* HONRATH, as it is usually smaller in all the corresponding forms, with the brightest form possessing a larger hindwing basal dusting that covers the entire discocellular cell. However, a few individuals in black form and intermediate form cannot be separated from the small specimens of *P. delphius albulus* HONRATH without a dissection. It is noteworthy that in male genitalia this subspecies is different from *P. delphius albulus* HONRATH by having a pair of thinner uncus processes.

This subspecies is close to *P. delphius delphius* (EVERSMANN) both morphologically and biogeographically. However, the former differs from the latter by having a more restricted dark discal area on forewing upper side in the corresponding forms except the black form. These two subspecies are inseparable in the black form.

Of the total 42 specimens collected from Angrit-daban, seven are in pale form, 13 are in black form and the remainder 22 are in intermediate forms (with darker ones more than paler ones).

***Parnassius delphius namanganus* STAUDINGER, 1886**

“[*Parnassius Delphius* EVERSM.] var. *Namanganus* STGR” STAUDINGER, 1886 (April): 195.

TL: Alpen bei Namangan. The exact location is unknown.

Type material: syntypes 1 ♂, 1 ♀ were figured by BANG-HAAS (1915b); this syntype ♂ was designated by KORB (2018a) as the lectotype of *Parnassius delphius namanganus* ELWES, which also became the lectotype of *P. delphius namanganus* STAUDINGER.

Synonym. “[*P. delphius*] Var. *namagana*, STGR. MSS” ELWES, 1886 (June): 39 (preoccupied name: TSHIKOLOVETS et al., 2016)

TL: ELWES (1886) gave “Ferghana” but did not mean to describe this taxon. The subsequent authors adopted ELWES as the authorship of the name, making this name an objective synonym of *Parnassius delphius namanganus* STAUDINGER; thus the TL should be “Alpen bei Namangan”. KREUZBERG (1985) erroneously gave “Chatkal Mts, Chanach Pass” by a neotype designation which was denied by KORB (2018a).

Type material: not defined in original description. KREUZBERG (1985) designated a neotype (ZISP), not from the type material of *P. delphius namanganus* STAUDINGER. KORB (2018a) designated the syntype ♂, figured by BANG-HAAS (1915b) as the lectotype.

Nomenclature: ELWES (1886) stated “some of these (? var. *namagana*) have blue ocelli on the hind wing, as in *stoliczkanus*” and “some of the females of *P. staudingeri* (var. *infernalis*, STGR.) are very dark, almost black in their ground colour”. This might be considered as a simple description to make the names, “*namagana*” ELWES, 1886 and “*infernalis*” ELWES, 1886, available in nomenclature; however, ELWES (1886) actually tried to explain that even *P. staudingeri* BANG-HAAS and *P. delphius* (EVERSMANN) are the same thing, not agreeing to naming further taxa. KREUZBERG (1985) attributed the authorship of both “*namanganus*” and “*infernalis*” to ELWES (1886) instead of STAUDINGER (1886); this treatment was followed by WEISS (1992), CHURKIN (2009b) and KORB & BOLSHAKOV (2016); however ROSE & WEISS (2011) and KORB (2015 & 2018a) made a contradictory that they adopted *Parnassius delphius namanganus* STAUDINGER, 1886 and *Parnassius infernalis* ELWES, 1886. Recently, TSHIKOLOVETS et al. (2016: 82) clarified that STAUDINGER’s publication was in April, 1886 whilst ELWES’ paper was in June, 1886. Therefore, the names in authorship of

STAUDINGER (1886) are earlier and available in nomenclature.

Synonym. “*Parnassius delphi* *kasakhstan* O. B.-HAAS, subsp. nov.” BANG-HAAS, 1933: 262 (synonymized by TSHIKOLOVETS et al., 2016). TL: Kasakstan: Ala-Tau-Gebirge, Fluss Djebagly-su.

Type material: 1 ♂, 1 ♀ of the paratypes were deposited in RMHL (EISNER, 1966). One syntype ♀ was figured by TSHIKOLOVETS et al. (2016; reproduced in fig. 14).

Remarks. The type specimens could be hybrids between *P. d. namanganus* STAUDINGER and *P. d. maximinus* STAUDINGER. CHURKIN (2009b) revealed that the hybrids between these two subspecies could represent more than 15% of the butterflies at a sympatric biotope. This westernmost subspecies has no great variability in wing-pattern, with its localities not largely invaded by different historical subspecies in recent period. The major form looks like a rather pale form (not the very whitish form corresponding to the original figure of *P. d. albulus* HONRATH) of *P. d. albulus* HONRATH, but can be distinguished more or less from the latter by the combination of the smaller reddish ocelli, the larger and more blue-dusted sub-anal spots on hindwing and the broader pale band between dark marginal and submarginal bands on forewing. The populations from Alexander Mt. Range and Moldo-Too Mt. Range were identified by TSHIKOLOVETS (2005b) as *P. d. namanganus* STAUDINGER; however, they are more in common with *P. d. albulus* HONRATH.

***Parnassius delphi* *albulus* HONRATH, 1889**

“*Parnassius Delphi* EVERS. var. n. *Albulus*” HONRATH, 1889: 161.

TL: erroneously given as “östlich von Osch gelegenen Theile des Alai-Gebirges”. CHURKIN (2009b) stated “All other authors treated this record as being wrong; *P. delphi* Ev. is not known from Alai and even from the western slopes of Fergansky Mts.” and “The type locality is always placed somewhere close to Naryn, but nobody has conducted a detailed study of the types and geographical variability to limit the possible type locality”. CHURKIN (2009b) revealed that a syntype ♂ of subspec. *albulus* HONRATH is in the form which is only occasionally found in the population from Naryn but is commonly found in the populations from At-Bashi Range and more commonly in Baibiche-Too Mts.

Type material: syntype ♂ was figured by HONRATH (1890; reproduced in fig. 14). Some syntypes were deposited in NHML (BRYK, 1935; ACKERY, 1973).

Synonym. “[*Parnassius Delphi* EVERS. var. ? *Intermedia*” GRUM-GRSHIMAILO, 1890: 196- distributional map (nomen nudum) TL: area around Issyk-koul as indicated on map.

Type material: not defined.

Synonym. “*Parnassius Delphi* EVERS. Vn. *Tancrei* AUSTAUT” AUSTAUT, 1910: 55 (synonymized by KREUZBERG, 1985; preoccupied name). TL: alpes du Syr-tag et de celles qui bordent le fleuve ili.

Type material: a few syntypes were mentioned in the original description but not figured.

Nomenclature: BANG-HAAS (1915b) incorrectly list this taxon as “[*P. delphi*] ab. *tancrei* AUST.” in his list for abbreviations. The word “Vn.” in original description probably means var. n. as AUSTAUT clearly used the words “aberratio”, “ab” and “aber.” for aberrations in the same paper. Later, AUSTAUT (1912) raised this taxon as “*Parnassius tancrei* AUST.”. However, this taxon is a junior homonym of “*Parnassius discobolus*, n. var. *Tancrei*” DECKERT, 1909.

Remarks: AUSTAUT (1912) described “*Parnassius tancrei* AUST. ab. *cocles* AUST.” from the TL of this taxon, which agrees with the extreme pale form of *P. delphi* *albulus* HONRATH, 1889.

Synonym. “*Parnassius delphi* EVERS. V^{te} *Barteli*” AUSTAUT, 1911: 224 (synonymized by KREUZBERG, 1985)

“*Parnassius delphi* *barteli* AUST” ROTHSCCHILD, 1918: 255

TL: Semirjetschensk (Turkestan). Its exact current location is unknown. However, according to Brockhaus’ Kleines Konversations-Lexikon (zeno.org), the name Semirjetschensk (“Seven Stromland”) refers to a territory in the current Kazakhstan, between Thian-shan and Balkhash Lake, with Wjernyj as its capital; and Wjernyj is at the foot of the Transilian Alatau and the Almatinka. Type material: 2 ♂♂, 1 ♀ of the syntypes were mentioned in the original description, not figured. ROTHSCCHILD (1918) located 3 ♂♂, 1 ♀ in the Tring Museum, exchanged from the BARTEL collection, which could be the topotypes.

Remarks. This taxon was treated by ROTHSCCHILD (1918) as a subspecies and by BRYK (1935) as an infrasubspecific taxon. Here is a translation of the original description. “Size being of a large copy of *P. delphi* (EVERSMANN). General appearance of the male being a clear yellowish white without dark dusting in discal area of forewing except for a slight trace of marking connecting the costal spots internally. [Upper side.] [Forewing.] Ordinary spots (2 discoidal, costal and internal) large and well marked in black. Fine submarginal band, cutting the wing from side to side, formed of semi-lunar spots which merge one into the other. Marginal band like that of *P. delphi* (EVERSMANN). [Hindwing.] Ocellus on the hindwing large, carmine, broadly circled with black. Submarginal band at first formed of two large rounded black spots towards the anal angle, which are strongly suffused with blue, then going up towards the anterior margin as 2 or 3 widely isolated small black markings. Very black basal dusting, covering all the space of the discoidal cell and reaching a large black anal spot below. The underside of the present new taxon, as with most *Parnassius* taxa, is analogous to the upper side in a more yellowish tone except that there are three carmine spots at the base of the hindwing, largely surrounded by black, and a black anal spot on hindwing, marked with red in the middle. Head, antennae and body analogous to those of *P. delphi* (EVERSMANN). The female differs little from the male just described except that the marginal band of the forewing seems to be a little wider and the inner patch and the above-mentioned slight discal black-dusting on the forewing are absent.” “It also seems to be close to *P. delphi* *albulus* HONRATH but differs from the latter chiefly by the continuous submarginal band of forewing, which is obsolete in *P. delphi* *albulus* HONRATH.” This description falls into the individual variations of *P. delphi* *albulus* HONRATH, pending a further research.

Synonym. “[*Parnassius delphi*] v. *candidatus* O. B.-H. nov. var.” BANG-HAAS, 1915: 158, Taf. 4, figs. 3-4. (synonymized by KREUZBERG, 1985) TL: Oestlich des Issykkul. BANG-HAAS (1915b) gave “Juldus (Kuldscha, Ili, Issykkul)” as distribution; apparently, the name “Juldus” (sensu BANG-HAAS, 1915b) represents a large area occupied actually by two different subspecies. The TL is supposed to be the area between Issyk-kul and Ili as the populations of *P. delphi* (EVERSMANN) from Kuldscha (current Yining area) have no large pale patch in discocellular cell of hindwing.

Type material: 1 ♂, 1 ♀ of the syntypes were figured by BANG-HAAS (1915b; reproduced in fig. 14).

Remarks. The locality name “Juldus” (sensu BANG-HAAS, 1915b) is not the current Bayanbulak-Kunes area. The syntypes figured

by BANG-HAAS (1915b) possess a restricted basal black dusting on hindwing upper side, falling into individual variations of *P. delphius albulus* HONRATH. TSHIKOLOVETS (2005b; reproduced in fig. 14) figured a very whitish form from Issyk-kul, leaving it no doubt that *P. delphius candidatus* BANG-HAAS is a synonym of *P. delphius albulus* HONRATH.

Synonym. “[*Koramius delphius*] *pulchra* (subsp. n.)” EISNER, 1939: 58 (synonymized by KREUZBERG, 1985).

TL: Kungei Ala Tau, Kok-Bulak.

Type material: lectotype ♀ (as holotype), paralectotype ♂ (all in RMHL) were designed and figured by EISNER (1966; reproduced in fig. 14).

Remarks. TSHIKOLOVETS (2005b; reproduced in fig. 14) figured a pale intermediate form from the TL. CHURKIN (2009b) revealed that the white form with strongly reduced pattern is known for the populations from Kungei Alatau. Thus in a strict concept *P. delphius pulchra* EISNER is a synonym of *P. delphius albulus* HONRATH.

Synonym. “*P. delphius* Ev. *valentini*” PALIY, 1963 (synonymized by KREUZBERG, 1985).

TL: Sary-Dzhaz.

Type material: not defined. TSHIKOLOVETS (2005b) did not find the type material in Zoological Museum of Academy of Sciences, Kyrgyzstan (Bishkek) and Zoological Institute, Russian Academy of Sciences (St.-Peterburg).

Remarks. KREUZBERG (1985) treated this name as synonym of *P. delphius albulus* HONRATH, followed by WEISS (1992) and TSHIKOLOVETS (2005b). Further on, TSHIKOLOVETS (2005b) figured a few specimens from Sary-Dzhaz (reproduced in fig. 14) which are in common with specimens of *P. delphius albulus* HONRATH from other areas.

Synonym. “*Koramius delphius almatinus*” FILIPJEV, 1971: 136 (nomen nudum; synonymized by KREUZBERG, 1985).

TL: Zailiisky Alatau Mts..

Type material: not defined.

Remarks. TSHIKOLOVETS (2005b) treated this name as either a nomen nudum or a synonym of *P. delphius albulus* HONRATH. KREUZBERG (1985) stated that white forms sometimes could be observed in neighbouring populations and even far from Naryn and all populations from Inner, Central and Chinese Tian-Shan were united under the taxon *albulus* HONRATH. WEISS (1992) stated “in the populations of ssp. *albulus*, light coloured forms can be found in the following percentages in different, successive mountain ranges running parallel to each other from north to south, every 50 km: at Dolon Pass 10-20%, at Naryn Tau 80%, in the Atbashi Mts. 98%. The remainder is made up of dark forms but black specimens (*satanas* and *styx*), normally present as 2-3% of the population, are strangely missing from the middle range” and “*Ssp. albulus* from the vicinity of Naryn has the majority of specimens large, light coloured, with very reduced bands and large ocelli”. CHURKIN (2009b) revealed that the population from Narynsky Mts. includes 95% (even more) of whitish specimens and the different populations from neighbouring areas could have the pale form and the dark form in quite different percentage.

***Parnassius delphius juldussica* VERITY, [1911]**

“[*P. delphius*] [Rasse] *juldussica*” VERITY, [1911]: 316

“*P. delphius*, Evers. var. *namanganus*, STDGR. trans. ad var. *infernalis*, STDGR.” Verity, [1911]: pl. 18, figs. 20-21

“[*Parnassius delphius*] v. (ab.?) *juldussica* VER.” BANG-HAAS, 1915b: 158

“*Parnassius delphius juldussica* VERITY” ROTHSCILD, 1918: 255

TL: Juldusgebiet.

Type material: syntypes 1 ♂, 1 ♀ (fig. 14) were figured by VERITY ([1911]).

Nomenclature: VERITY ([1911]) actually made the name “*juldussica*” available by providing the figures. BANG-HAAS (1915: 158, Taf. 4, figs. 9-10) cited VERITY’s name in sense of subspecies and figured a further pair of specimens from “Juldus”. ROTHSCILD (1918) stated VERITY’s name as subspecies. SAKAI et al. (2002) incorrectly attributed the authorship to BANG-HAAS (1915).

Synonym. “[*Parnassius delphius*] v. *karaschahrica* O. B.-H. nov. var.” BANG-HAAS, 1915b: 159, Taf. 4., fig. 11 **syn. nov.**

TL: nordwestl. Karaschahr (Kutscha mont.). The TL is near the current Telmed Pass on north of Kuqa (= Kutscha).

Type material: syntype ♂ (fig. 14) was figured by BANG-HAAS (1915b).

Remarks. Based on the newly collected material, the size of the specimens from the area around the TL is not constantly larger than that of the neighbouring populations in Narat, Kunes and Qiaoerma.

Material. 25 ♂♂ 18 ♀♀ (CHH, CLP), Telmed Pass (42.50 N, 83.42 E), north of Kuqa (= Kuche or Kutscha), on Dushanzi-Kuqa Road, Xinjiang, 3300-3500m, 6. & 26.VII.2019, H. HUANG, P. LI & S.-Y. LANG leg.; 22 ♂♂ (CHH, CLP), Xueliangu (Saussurea valley; N 43.16, E 83.93), Narat, Xinyuan County, Ili, Xinjiang, 3400 m, 1.VII.2019, H. HUANG, P. LI & S.-Y. LANG leg.; 4 ♂♂ (CHH), Qiaoerma (43.46 N, 84.43 E), on Dushanzi-Kuche Road, Xinjiang, 3300 m, VII.2003, J. LUO leg.; 2 ♀♀ (CHH, CLP), Qiaoerma, on Dushanzi-Kuche Road, Xinjiang, 3300m, 30.VI.2019, H. HUANG & P. LI leg.; 3 ♂♂ (CHH, CLP), Aiken-daban Pass (43.22 N, 84.87 E), Kunes, Hejing County, Bayingolin, Xinjiang, 3400 m, 29.VI.2019, H. HUANG & P. LI leg.

Remarks. This subspecies has a high stability in wing-pattern, with only one form found corresponding to the intermediate form of the neighbouring *P. delphius menander* HEMMING. It differs from *P. delphius menander* HEMMING by having the well marked pale discal band outside of the reddish ocelli on hindwing in higher contrast with the dark markings, and by the lacking of the pale form and the black form. The intermediate form of *P. delphius menander* HEMMING generally has the pale discal bands on both wings not in high contrast with the dark markings.

Some historical specimens with ambiguous collecting data must be neglected for a serious study, such as some old specimens labeled from “Juldus”. O. BANG-HAAS (1915b) explained “Juldus” as a large area from Issykkul to the current Yining, however, this name was more frequently used for the current Bayanbulak-Kunes area. The black form represented by a syntype ♀ of *P. delphius ab. satanas* BANG-HAAS, 1910, figured by TSHIKOLOVETS (2005b: pl. 14, fig. 12) and labeled from “Juldus”, has never been found in the populations from Bayanbulak and its adjacent areas.

***Parnassius delphius constants* BANG-HAAS, 1915**

“[*Parnassius delphius*] v. *constants* O. B.-H. nov. var.” BANG-HAAS, 1915b: 157, Taf. 4, figs. 5-6.

TL: Aksutal (Chantengri.).

Type material: syntypes 1 ♂, 1 ♀ were figured by BANG-HAAS (1915b). Syntypes 2 ♂♂, 1 ♀ (fig. 14) were figured by TSHIKOLOVETS (2005b).

Synonym. “*Parnassius delphius mephisto* subsp. nov.” HERING, 1931: 4 **syn. nov.**

TL: Aksu.

Type material: 2 syntypes ♂♂ (ZMHU) (fig. 14) were figured by HERING (1931).

Remarks. This taxon was treated by KREUZBERG (1985) as a synonym of *P. delphius albulus* HONRATH. This subspecies has only small variability in wing-pattern, mainly represented by three forms. The major form, represented by the syntypes of *P. delphius constants* BANG-HAAS, is similar to some pale forms of *P. delphius albulus* HONRATH, but can be distinguished from the latter by the combination of the more clearly defined forewing discal markings in spaces 2-3, the more frequently larger reddish ocelli and the usually smaller sub-anal spots on hindwing. The brightest form, represented by the syntype of *P. delphius mephisto* f. *alba* HERING, 1931, looks like the very whitish form of *P. delphius albulus* HONRATH, but can be distinguished from the latter by the more extensive black basal dusting on hindwing upper side that covers the entire discocellular cell. The darkest form, represented by the syntype of *P. delphius mephisto* f. *obscura* HERING, 1931, differs from the corresponding form in *P. delphius albulus* HONRATH by having discal black dusting or marking on forewing upper side more clearly defined.

***Parnassius delphius hamiensis* BANG-HAAS, 1927**

“*Parnassius delphius hamiensis* O. B.-HAAS, subsp. nov.” BANG-HAAS, 1927: 29, pl. 2, figs. 11, 12.

TL: Hami.

Type material: syntypes 1 ♂, 1 ♀ (fig. 14) were figured by BANG-HAAS (1927).

Remarks. This subspecies is characterized by the small ocelli of hindwing and a remote distribution from all other subspecies. Unfortunately it was not rediscovered by the author during his expedition to Hami.

***Parnassius delphius maximinus* STAUDINGER, 1891**

“*Parnassius Delphius* Ev. var. *Maximinus*” STAUDINGER, 1891: 158.

TL: Südwestufer des Issyk-kul.

Type material: BRYK (1935) stated “Typen: male female in coll. O. STAUDINGER, Dresden-Blasewitz”. 1 syntype ♂ was located in NHML by ACKERY (1973). BERGMANN (1995) figured 1 ♂ (ZMHU) labeled as “Lectotypus ♂, KREUZBERG design. 21.IX.1989”, he actually made the lectotype designation. 1 paralectotype ♂ (ZSSM) was figured by TSHIKOLOVETS et al. (2016). KORB (2018) argued that BERGMANN’s (1995) lectotype designation is invalid and he designated the same specimen as the lectotype.

Synonym. “*Parnassius maximinus legezina* subsp. nov.” BERGMANN, 1995: 140, cpl. 1, figs. 1-2 & 4 (synonymized by TSHIKOLOVETS, 2000) TL: Usbekistan, westl. Tian-Shan, Kuraminski-Kette, Kamtschik-Pass.

Type material: holotype ♂ and a pair of paratypes were figured by BERGMANN (1995), deposited in BERGMANN’s private collection.

Remarks. This subspecies is easily distinguishable from all other subspecies by the entire absence of a wide dark marginal band on hindwing. It has been widely accepted as an independent species from *P. delphius* (EVERSMANN). However, CHURKIN (2009b) reported that at Chanach Pass, Chatkal Range, “*P. maximinus* STGR. and *P. delphius* Ev. obviously use the same foodplant:” “*Corydalis gortschakovi*” and “Intensive hybridization was also registered”. The two taxa prefer different biotopes and flight periods but the hybrids represent more than 15% of the butterflies. Considering that the two taxa have no difference in male genitalia and mtDNA sequences, CHURKIN (2009b) regarded *P. maximinus* STAUDINGER as a subspecies of *P. delphius* (EVERSMANN).

***Parnassius delphius dingliangi* subsp. nov.**

Holotype ♂ (figs. 10-11): China, Xinjiang, SW Akqi, Pass of Maidantag Mts. (40.67 N, 77.80 E), ca. 3580-3610 m, 12.VII.2019, H. HUANG leg., deposited in BSNU.

Paratypes: Tibet: 18 ♂♂, 6 ♀♀ (CHH, CLP, CDL), same data as holotype, L. DING & H. HUANG leg. (5 ♂♂, 3 ♀♀ in CHH; 1 ♂, 1 ♀ in CLP; 12 ♂♂, 2 ♀♀ in CDL).

Etymology. This new subspecies is named in honor of Mr. LIANG DING who accompanied the author during his 2019 expedition to Xinjiang.

Diagnosis. This new subspecies can be distinguished from all other subspecies by the following combination of characters.

- 1) Size is constantly larger than in other subspecies except *P. d. maximinus* STAUDINGER and some individuals of *P. d. albulus* HONRATH, with a wingspan of 62.7-65.2 mm or a forewing-length of 34.9-35.7 mm.
- 2) Marginal band of forewing is markedly wider than in *P. d. maximinus* STAUDINGER, that of hindwing is broadly developed in spaces 4-6, not obsolete as in *P. d. maximinus* STAUDINGER.
- 3) Submarginal marking in space 7 of hindwing is clearly defined, not obsolete as in the very whitish form of *P. d. albulus* HONRATH.
- 4) Sub-anal spots in spaces 2-3 of hindwing are markedly closer to termen than in all other subspecies except very few individuals of *P. d. albulus* HONRATH.
- 5) Basal black dusting on hindwing upper side does not cover the entire discocellular cell, being different from that of *P. d. delphius* (EVERSMANN), *P. d. menander* HEMMING, *P. d. namanganus* STAUDINGER, *P. d. juldussica* VERITY, *P. d. constants* BANG-HAAS and *P. d. hamiensis* BANG-HAAS.
- 6) Broad submarginal band of forewing, large submarginal spots of hindwing and elongate reddish ocellus in space 7 of hindwing are simultaneously found in all specimens, however these characters are only partly found in the whitish specimens of *P. d. albulus* HONRATH.

This new subspecies might be similar to some individuals in the whitish form of *P. d. albulus* HONRATH, but can be easily identified without a label. No specimen matching *P. d. dingliangi* subsp. nov. has been found in all of the known populations of *P. d. albulus* HONRATH.

♂ **genitalia** (figs. 29-30). The ♂ genitalia of *P. d. dingliangi* subsp. nov., *P. d. menander* HEMMING and *P. d. juldussica* VERITY are examined in this work, in comparison with those of *P. d. albulus* HONRATH, *P. d. namanganus* STAUDINGER, and *P. d. maximinus* STAUDINGER figured by CHURKIN (2009b). Both *P. d. menander* HEMMING and *P. d. juldussica* VERITY have the uncus branches much thinner than all other subspecies, supporting that the Chinese subspecies are not synonyms of *P. d. albulus* HONRATH. The uncus branches of *P. d. dingliangi* subsp. nov. are similar to those of Kyrgyz subspecies in width, but differ from the latter by having the bases largely fused (not clearly divided at base).

Remarks. This new subspecies has a high stability in wing-pattern, with only one pale form found, adapting to the cold biotopes above 3570 m. The TL was apparently not invaded by the different historical subspecies in recent period. The biotopes (figs. 58-59)

are restricted to scree slopes near hill-tops above 3570m where *P. actius cato* BRYK & EISNER and *Melitaea fergana* STAUDINGER, 1882 also fly. In the lower areas at the same locality, *Colias cocandica* ERSCHOFF, 1874, *Erebia radians* LANG, 1884 and *Polycaena temir* GRUM-GRSHIMAILO, 1890 can be found.

This new subspecies looks like *P. delphius kasakhstana* BANG-HAAS, but can be easily distinguished from the latter by the much darker and less transparent marginal bands on both wings, the larger blue-dusted sub-anal spots in space 3 of hindwing, and the elongate reddish costal ocellus in space 7 of hindwing; these two taxa are widely separated in distribution. The syntypes of *P. delphius kasakhstana* BANG-HAAS could be the nature hybrids between *P. delphius namanganus* STAUDINGER and *P. d. maximinus* STAUDINGER.

Distribution. Maidantag Mt. Range (Akqi, Xinjiang).

***Parnassius staudingeri* BANG-HAAS, 1882 - complex (figs. 15, 29-30, 41, 60-61)**

The independence of *P. staudingeri* BANG-HAAS from *P. delphius* (EVERSMANN) has been confirmed by CHURKIN's (2009b) field observation that the two species (*P. delphius albulus* HONRATH and *P. staudingeri vladimir* CHURKIN, 2009) fly together at the same locality in Bavachal Range, Baetovo District, Kyrgyzstan. CHURKIN (2009b) revealed that the two species have difference not only in flight period and foodplant but also in ♂ genitalia (directions of uncus branches in dorsal view) (fig. 29) and that no hybridization has been found among the ♂ specimens by an examination of ♂ genitalia.

Parnassius cardinal GRUM-GRSHIMAILO, 1887 is widely accepted as an independent species from *P. staudingeri* BANG-HAAS (KREUZBERG, 1992; WEISS, 1992 etc.). But the classification of the *P. staudingeri* BANG-HAAS-complex (or super-species) is very controversial. WEISS (1992) recognized 28 subspecies in six subspecies groups; these subspecies groups were considered as semi-species by ROSE & WEISS (2011) who presented a different classification retaining 23 subspecies in eight semi-species including *Parnassius cardinal* GRUM-GRSHIMAILO. KREUZBERG (1992) divided this complex into three species: *P. staudingeri* BANG-HAAS, *P. infernalis* STAUDINGER, 1886 and *P. hunza* GRUM-GRSHIMAILO, 1888. SAKAI et al. (2002) recognized five species with very different compositions. KORB (2010 & 2012) divided this complex into nine species, and later KORB (2020) retained only six species with *P. hunza* GRUM-GRSHIMAILO transferred to *P. cardinal* GRUM-GRSHIMAILO, 1887.

MICHEL et al. (2008) made a molecular phylogenetic analysis on the sequences of four mitochondrial DNA segments and revealed that *P. jacobsoni* AVINOFF, 1913 is well separated and two other clades are strongly supported: "*staudingeri* clade" and "*cardinal* clade". Thus three good species are recognized:

- 1) *P. jacobsoni* AVINOFF;
- 2) *P. staudingeri* BANG-HAAS, composed of *P. s. staudingeri* BANG-HAAS, *P. s. illustris* GR.-GR., 1888, *P. s. kiritshenkoi* AVINOFF, 1910 and *P. s. darvasicus* AVINOFF, 1916;
- 3) *P. cardinal* GR.-GR., composed of *P. c. cardinal* GR.-GR., *P. c. kohibaba* CLENCH & SHOUMATOFF, 1956, *P. c. affinis* PESCHKE & EISNER, 1934, *P. c. hunza* GR.-GR., 1888, *P. c. chitralica* VERITY, 1911 and *P. c. ruth* KOTZSCH, 1936.

The other taxa have not been studied in mtDNA sequences. But some conclusions can be made on the similarities in morphological characters. *P. staudingeri infernalis* STAUDINGER, 1886 is at best treated as a subspecies of *P. staudingeri* BANG-HAAS, as it is very close to *P. s. illustris* GR.-GR. Both *P. s. mustagata* ROSE, 1990 and *P. s. abramovi* BANG-HAAS, 1915 could be treated as subspecies of *P. staudingeri* BANG-HAAS, as some individuals of *P. staudingeri infernalis* STAUDINGER. are transitional to the former two in wing characters (fig. 15).

Only four taxa of this complex have been described or recorded from China as indicated on the distributional map of *P. delphius* (EVERSMANN) (fig. 41). A detailed survey of all other taxa of *P. staudingeri* BANG-HAAS-complex is out of the scope of this paper.

***Parnassius staudingeri infernalis* STAUDINGER, 1886**

"*Parnassius Delphius* Eversm. var. *Infernalis* STGR" STAUDINGER, 1886 (April): 195.

TL: Alpen bei Oesch. Kreuzberg (1985) restricted the TL as the area near Taldyk Pass.

Type material: lectotype ♂ (ZMHU) was designated and figured by KORB (2015: 16, pl. 1, fig. 26).

Synonym. "[*P. delphius*] Var. *infernalis*, STGR. MSS" ELWES, 1886 (June): 39 (preoccupied name: TSHIKOLOVETS et al., 2016).

TL: not defined.

Type material: not defined.

Nomenclature: see under Nomenclature of *Parnassius delphius namanganus* STAUDINGER, 1886.

Synonym? "*Parnassius delphius dolabella* nov. subsp." FRUHSTORFER, 1904: 29 (synonymized by BANG-HAAS, 1915b)

TL: Kashgar. The TL is supposed to be the mountain ranges to the west or northwest of Kashgar, as all the known subspecies to the south or southwest of Kashgar do not fit the description. A suspicion is the area around Torugart Pass (one of the entrances to Kashgar) where a few *P. staudingeri* BANG-HAAS were observed (unfortunately not captured) by the author.

Type material: 3 syntype ♂♂ were mentioned in original description but only 1 ♂ was traceable (NHML: ACKERY, 1973).

Remarks. The original description falls into individual variations of *P. staudingeri illustris* GRUM-GRSHIMAILO, 1888 and *P. staudingeri vladimir* CHURKIN, 2009: ground color pure white; white spots between marginal and submarginal bands on forewing well isolated and clearly defined; discal marking on forewing forming a band almost even in width throughout; hindwing ocelli very broadly ringed with black and connected by a black line; hindwing sub-anal spots without trace of blue scaling; hindwing submarginal band isolated from marginal band by white spots; hindwing basal black dusting not beyond discocellular cell, leaving ocelli on a white ground. As its exact locality is unknown, this taxon can not be clearly defined. Nevertheless, it belongs to *P. staudingeri illustris* GRUM-GRSHIMAILO or its relatives, doing nothing with *P. delphius* (EVERSMANN). VERITY (1911: pl. LVIII, figs. 19-20) figured a pair of specimens from Kashgar, identified as *P. delphius dolabella* FRUHST., but the specimens are apparently not syntypes, with exact locality unknown as well; this pair of specimens belong to *P. staudingeri infernalis* STAUDINGER. BANG-HAAS (1915b: pl. IV, fig. 12) stated this taxon as aberration and figured a further male in STAUDINGER collection, which belongs to *P. staudingeri infernalis* STAUDINGER. KREUZBERG (1985) and WEISS (1992) followed BANG-HAAS (1915b) in placing this taxon as a synonym of *P. staudingeri infernalis* STAUDINGER with no discussion.

Material. 22 ♂♂, 21 ♀♀ (CHH, CLP), Irkeshtam (39.70 N, 73.97 E), west of Ulugqat, Xinjiang, 3300-3500 m, 17.-18.VII.2019, H. HUANG & P. Li leg..

Remarks. KREUZBERG (1985) treated this taxon as a subspecies of *P. staudingeri* BANG-HAAS, later on KREUZBERG (1992) changed his opinion in treating this taxon as full species. KORB (2012) followed KREUZBERG (1992) and declared that *P. staudingeri infernalis*

STAUDINGER and *P. staudingeri staudingeri* BANG-HAAS have more than 2% difference in mitochondrial COI and ND1 sequences from each other. However, KORB's (2012: figs. 74-76 & 80-81) research on ♂ genitalia and MICHEL et al.'s (2008) molecular phylogenetic analysis do not support such a separation.

CHURKIN (2009b) conducted an investigation into the relationships between *P. staudingeri infernalis* STAUDINGER, *P. s. illustris* GRUM-GRSHIMAILO, 1888, *P. s. interjecta* VERITY, 1911, *P. s. pontifex* BRYK & EISNER, 1932 and *P. s. hoareaui* HANUS, 1996. The specimens from Irkeshtam were identified as *P. staudingeri infernalis* STAUDINGER, according to CHURKIN's (2009b) distributional data. However, all these taxa might be united into a single subspecies using a more strict subspecies concept, as they are separable only on large series of specimens. The identification of a single specimen without collecting data will be impossible for any of these subspecies.

It is noteworthy that 1 ♂ (fig. 15) in the collection from Irkeshtam can not be separated from *P. staudingeri mustagata* ROSE, 1990, with a very large size. On the other hand, 1 ♂ in the same collection (fig. 15) shows a curious resemblance to *P. staudingeri abramovi* BANG-HAAS, 1915, with a very small size. These aberrations may suggest a close relationship between the three subspecies.

***Parnassius staudingeri mustagata* ROSE, 1990** (TL: Karakul)

Remarks. *P. staudingeri dunkeldykyus* SOTSHIVKO & KAABAK, 1996 (TL: Dunkeldyk Lake) is a synonym of this subspecies (ROSE & WEISS, 2011). This subspecies has not been collected by Chinese collectors (R. XING, personal communications).

***Parnassius staudingeri abramovi* BANG-HAAS, 1915** (TL: SW Hotan, N slope of Kunlun Mts.)

Remarks. The lectotype ♂ (ZMHU) was designated and figured by KORB (2012: 32, fig. 109). According to GRIESHUBER et al. (2012: 218), the TL is around Kurat Pass of Kunlun Mts., not at Shahidulla.

This taxon was treated by KREUZBERG (1992) as a subspecies of *P. infernalis* STAUDINGER, by WEISS (1992) as subspecies of *P. staudingeri* BANG-HAAS, by ROSE & WEISS (2011) as subspecies of *P. kiritshenkoi* AVINOFF, 1910 and by KORB (2012) as full species. KORB (2012) declared that *P. staudingeri abramovi* BANG-HAAS has more than 2% difference from the other taxa in mitochondrial COI and ND1 sequences and has a wider sacculus of valva and a harpe-base closer to distal margin of valva. However, the width of the sacculus is rather variable individually and geographically and the position of the harpe-base seems to be only a little different between the various taxa of *P. staudingeri* BANG-HAAS. Moreover, there is no standard in mitochondrial difference for species delimitation of allopatric taxa.

Parnassius delphiussobolevskiyi AVINOFF, 1916 (TL: Kiliang Pass; 36.72 N, 78.30 E: Sakai et al., 2002) is a synonym of this taxon (KREUZBERG, 1992; WEISS, 1992; SAKAI et al., 2002). The TLs of these two taxa are very close.

***Parnassius cardinal hunza* GRUM-GRSHIMAILO, 1888** (TL: Hunza)

Remarks. Mr. S.-S. WANG (Shihezi University) collected a female specimen from Wakhan Corridor on Chinese side on 1.VIII.2019. The photos of the specimen have been examined by the author.

***Parnassius patricius* NIEPALT, 1911** (figs. 16-17, 42, 53)

Six good subspecies are recognized, three of which are known from Xinjiang. The controversial classification of the taxa from the China-Kyrgyzstan border is discussed in details.

***Parnassius patricius patricius* NIEPALT, 1911**

"*Parnassius patricius* m. n. sp." NIEPALT, 1911: 274.

TL: Thian-shan Gebirge, Turkestan. Though the exact TL can not be deduced from the historical material, the specimens collected from Naryn Mt. Range agree well with the type material.

Type material: lectotype ♂

(RMHL) was designated by EISNER (1966) and was figured by EISNER (1966) and KAWASAKI (1996).

Synonym. "*Parnassius delphiussobolevskiyi* Ev. *cretatus* (subsp. nov.)" SHELJUZHKO, 1914: 18, fig. 1 (synonymized by BRYK, 1935)

TL: erroneously given as "Pamir centr."

Type material: f holotype (ZMKU) was figured by SHELJUZHKO (1914) and TSHIKOLOVETS (2005b).

Remarks. WEISS (1992) and WEISS & RIGOUT (2016) figured two male specimens from Naryn (south of Issyk-kul) matching the type material. This subspecies is characterized by the entire absences of the forewing discal smudges in spaces 2-3 and the hindwing submarginal markings. A further ♂ from Alysh, Naryn-Too Mts. figured by TSHIKOLOVETS (2005b: pl. 19, fig. 6) already shows a transition to *P. patricius priamus* BRYK, 1914.

***Parnassius patricius uzyngyrus* D. WEISS, 1979**

"*Parnassius patricius uzyngyrus* n. subsp." D. WEISS, 1979 (April): 79, fig. 1.

TL: Kirgizia, Kirizskii Ridge (Alexander Mt.), Uzyn-Gyr.

Type material: holotype ♂ (NMP) was figured by D. WEISS (1979); paratype ♂ was figured by J.-C. WEISS (1992) and KAWASAKI (1996).

Synonym. "*Koramius patricius haugumensis* subsp. nov." EISNER, 1979 (November): 280, pl. 1, figs. 1-3 (synonymized by KREUZBERG, 1985).

TL: Uzun-Gir, Kirgistan-Ala-Tau.

Type material: holotype ♀ (RMHL) was figured by EISNER (1979) and KAWASAKI (1996).

Synonym. "*Parnassius patricius ludwigi* KREUZBERG ssp. n." KREUZBERG, 1989: 37, fig. 6 (synonymized by J.-C. WEISS, 1992).

TL: Kyrgyzstan, Tshatkal Mts., upwards of Tshanatsh river, Mamek Pass.

Type material: holotype ♀ (ZISP) was figured by KREUZBERG (1989) and TSHIKOLOVETS (2005b).

Remarks. This subspecies is distributed to the west of Issyk-kul and is characterized by the small but usually clearly defined submarginal spots in spaces 2-3 of hindwing.

***Parnassius patricius kardakoffi* BRYK & EISNER, 1930**

"*Parnassius acdestis* subsp. *kardakoffi* n." BRYK & EISNER, 1930: 7, figs. 1-2.

TL: Kungeischen Ala-Tau.

Type material: lectotype ♂ (RMHL) was designated by EISNER (1966) and figured by KAWASAKI (1996); paralectotypes 2 ♂♂ (ZMHU) were figured by TSHIKOLOVETS et al. (2016).

Remarks. This subspecies is distributed to the north of Issyk-kul. It is similar to *P. patricius uzyngyrus* D. WEISS, but has the discal markings or smudges in spaces 2-3 of forewing more developed. It was incorrectly stated by ROSE & J.-C. WEISS (2011) as a synonym of *P. patricius priamus* BRYK, 1914.

***Parnassius patricius priamus* BRYK, 1914**

“*Tadumia acdestis* GR. GR. subsp. *priamus* B.-Hs. i. l.” BRYK, 1914b: 24, figs. 1 & 3.

“[*Parnassius*] *acdestis priamus* BRYK” BANG-HAAS, 1915b: pl. V, fig. 20.

TL: Chantengrin (Aksu). The range of this subspecies was incorrectly located to the west of the TL on a map by KASAWAKI (1996: 12-map) and ROSE & KAWASAKI (1999: 31-map). The TL is most likely in the southeastern valleys of Chantengrin on north of Aksu. Type material: holotype ♀ (unique in original description; ZMHU) was figured as a hand-drawing by BRYK (1914b) and as a photo by BANG-HAAS (1915) (reproduced in fig. 17); it was designated as the lectotype by KORB (2012: 5, fig. 110). The original hand-drawing published by BRYK (1914b) is inaccurate and somewhat misleading in having an entirely blackish discocellular cell of hindwing.

Remarks. KREUZBERG (1985) designated a neotype, giving no purpose to solve a taxonomic problem; the neotype was collected from Sary-Dzhaz, a locality rather distant from the TL of *P. patricius priamus* BRYK. KREUZBERG’s (1985) designation of neotype is invalid as the holotype was located by Korb (2012) in ZMHU. Beside the holotype ♀ figured by BANG-HAAS (1915b), a topotype ♂ was figured by BRYK (1935: 570, fig. 514) and also by KAWASAKI (1996: pl. 12, fig. 8). These two specimens (reproduced in fig. 17) form the basis of further research. WEISS (1992: 87, fig. 4) figured 1 ♂ from Aksu, of which the exact locality is unknown. However, the pair of specimens from Borkoldai and Kaindy Mts. and 1 ♀ from Kaindy Mts. figured by ROSE (1992) and ROSE & WEISS (2011) as *P. patricius priamus* BRYK are not topotypes; these populations inhabit an intermediate location between *P. patricius lukhtanovi* ROSE, 1992 and *P. p. patricius* NIEPELT.

P. patricius priamus BRYK is characterized by the combination of a pale patch in hindwing discocellular cell (Character 1) and a larger pale discal area of hindwing (Character 2). Such Characters 1 and 2 can not be found simultaneously in any specimens of *P. patricius lukhtanovi* ROSE, 1992 and *P. patricius xinjiangensis* KAWASAKI, 1996. The specimens from northeastern Kyrgyzstan, misidentified by ROSE (1992) and ROSE & WEISS (2011) as *P. patricius priamus* BRYK, usually do not possess Character 1.

The TL of *P. patricius priamus* BRYK is probably the same as that of *P. actius ambrosius* STICHEL and that of *P. delphius constants* BANG-HAAS. The southeastern valleys of Chantengrin (on north of Aksu) seem to be well isolated from other areas of Tianshan, with the populations of all the known *Parnassius* species appearing much paler than their neighbouring populations. From a viewpoint of biogeography, *P. patricius priamus* BRYK is probably restricted to a very small range around the TL.

***Parnassius patricius exclamationis* AVINOFF, 1922**

“*Parnassius Acdestis* Subsp. (ou ab?) *Exclamations* Av., nov.” AVINOFF, 1922: 56.

TL: Tien-Chan central (Musart-Pass). Musart-Pass is a famous pass on the silk-road between the current Xiata and the source of Musart River, near the coordinates 42.38 N, 80.69 E.

Type material: syntypes 2 ♂♂ were figured by AVINOFF (1922) as hand-drawings (fig. 17). In ZISP 1 ♂ was designated by KREUZBERG (1985) as lectotype and was figured by TSHIKOLOVETS (2005b); however this ♂ (fig. 17) is quite different from the original figure in having a much wider forewing blackish discal band and a markedly thinner forewing whitish submarginal band. Though the label “10-20 VII 1910, RÜCKBELL, coll. AVINOFF” seems to support the identity, the locality “Sary-Dzhaz, Oldzhbay gorge” does not fit the original description (“Musart-Pass”, northeast of Chantengri). In conclusion, KREUZBERG’s (1985) lectotype designation is invalid, as the lectotype is not selected from the type material.

Remarks. This name is available as species group name in nomenclature, originally described as a subspecies. It was incorrectly treated as a synonym of *P. patricius priamus* BRYK by KREUZBERG (1985), based upon an invalid neotype designation of *P. patricius priamus* BRYK and an incorrect lectotype designation of *P. patricius exclamationis* AVINOFF.

Synonym. “*Parnassius patricius lukhtanovi* subsp. nov.” ROSE, 1992: 120 **syn. nov.**

TL: Kazakhstan, ostlicher Terskey Alatau, Narynkol distr., Kokpak, 30km nordlich Chantengri peak.

Type material: m holotype (ZFMK), 2 m & 1 f paratypes were figured by ROSE (1992: Farbtaf. V, abb. 1-4).

Remarks: In the original description, the pair of specimens identified as *P. patricius priamus* BRYK for comparison actually belong to an intermediate population between *P. p. lukhtanovi* ROSE and *P. p. patricius* NIEPELT.

Synonym. “*Parnassius patricius xinjiangensis*” KAWASAKI, 1996: 9, Pl. XII, figs. 5-6 (synonymized by ROSE & WEISS, 2011)

TL: Telmed Davan (North of Kuqa).

Type material: holotype ♂ (coll. Kawasaki, Oita, Japan) and 1 f paratype were figured by KAWASAKI (1996).

Remarks: The type specimens of this taxon are not separable from those of *P. patricius lukhtanovi* ROSE in large percentage; they were considered by KAWASAKI (1996) as different subspecies because the ranges of these two subspecies were thought to be interrupted by *P. patricius exclamationis* AVINOFF.

Material. 9 ♂♂, 8 ♀♀ (CHH), Telmed Pass (42.50 N, 83.42 E), north of Kuqa (= Kuche or Kutscha), on Dushanzi-Kuqa Road, Xinjiang, 3530 m, 25.VI.2022, H. HUANG leg..

Remarks. Here we meet with three taxa described from the area around Chantengri (fig. 42): *P. p. priamus* BRYK, 1914 from the southeastern valleys surrounded by massive glaciers, *P. p. exclamationis* AVINOFF from the northeastern area, and *P. p. lukhtanovi* ROSE from the northern area.

It is controversial that WEISS (1992) placed *P. p. exclamationis* AVINOFF in synonymy with *P. p. priamus* BRYK and that ROSE & WEISS (2011) synonymized *P. p. xinjiangensis* KAWASAKI with *P. p. lukhtanovi* ROSE: by such treatments, the range of *P. p. lukhtanovi* ROSE (sensu ROSE & WEISS, 2011) will be completely divided by the range of *P. p. priamus* BRYK (sensu WEISS, 1992).

The ♂ syntypes of *P. p. exclamationis* AVINOFF have an extensive blackish basal dusting on hindwing upper side and a broad whitish submarginal band on forewing, more in common with the male holotype of *P. p. lukhtanovi* ROSE than with the male topotype of *P. p. priamus* BRYK. Though most of the paratypes of *P. p. lukhtanovi* ROSE appear as dark as *P. p. xinjiangensis* KAWASAKI, the holotype of *P. p. lukhtanovi* ROSE (ROSE, 1992: cpl.5, fig. 1) does possess a whitish discal area in spaces 2-3 of forewing, a broad pale submarginal band of forewing and a large pale discal area on hindwing upper side, showing great similarity to the syntypes of *P. p. exclamationis* AVINOFF. So that the male syntypes of *P. p. exclamationis* AVINOFF could represent either a extreme form of *P. p. lukhtanovi* ROSE or a distinct subspecies

from *P. p. lukhtanovi* ROSE. However, to treat *P. p. lukhtanovi* ROSE as a synonym of *P. p. exclamatoris* AVINOFF is more supported also by the following facts: 1) the black streak between hindwing ocelli is also frequently found in *P. p. lukhtanovi* ROSE and *P. p. xinjiangensis* KAWASAKI; 2) the black costal ocellus of hindwing is occasionally found in *P. p. lukhtanovi* ROSE and *P. p. xinjiangensis* KAWASAKI; 3) *P. p. lukhtanovi* ROSE and *P. p. xinjiangensis* KAWASAKI which are inseparable in large percentage of individuals are connected by *P. p. exclamatoris* AVINOFF in distribution; 4) the TLs of *P. p. lukhtanovi* ROSE and *P. p. exclamatoris* AVINOFF are not well isolated in biogeography. The population from Sary-Dzhaz should belong to *P. p. exclamatoris* AVINOFF (in sense of this paper), and not to *P. p. priamus* BRYK.

***Parnassius patricius koppi* ROSE & KAWASAKI, 1999**

“*Parnassius patricius koppi*” ROSE & KAWASAKI, 1999: 30, pl. 3, No. 7-9.

TL: Borohoro Shan, 90 km NE. Balguntay City.

Type material: m holotype and m & f paratypes were figured by ROSE & KAWASAKI (1999).

Material. 1 ♀ (CHH), Houxia (43.26 N, 87.30 E), south of Urumqi, 3450 m, 14.VI.2020, Z.-Y. Qi leg., ex coll. Z.-Y. Qi.

Remarks. This subspecies is characterized by the smaller reddish ocelli and the more rounded submarginal spots in spaces 2-3 of hindwing.

***Parnassius charltonius* GRAY, [1853] (figs. 18-19, 31-32)**

Two subspecies are known from Xinjiang.

***Parnassius charltonius aenigma* DUBATOLOV & MILKO, 2003** (TL: Kyrgyzian Kashgaria, upper stream of Chinese Kyzyl-Su River).

Material. 1 ♂ (ECSU), about 60 km northeast of Ulugqat, 25.VII.2014, SUYUNBIEKE leg.

Remarks. This taxon was treated as a subspecies of *P. romanovi* GRUM-GRSHIMAILO, 1885 by CHURKIN & MICHEL (2014), without evidence in crossbreeding or sympatric distribution. Such treatment was denied by KORB et al. (2016). As the status of *P. charltonius deckerti* VERITY, 1907 and *P. charltonius voigt* BANG-HAAS, 1927 remain unsolved and the split between *P. charltonius* GRAY and *P. romanovi* GRUM-GRSHIMAILO is apparently smaller than the normal distance between *Parnassius* species, with no evidence in biology (such as sympatric distribution), *P. romanovi* GR.-GR. is still treated as a subspecies of *P. charltonius* GRAY in this paper.

The only known specimen from China, figured by WU & HSU (2017), was captured by a student of Mr. SHAO-SHAN WANG (Shihezi University) from NE Ulugqat. This specimen is figured herein with the permission of Mr. S.-S. WANG (fig. 18). The author and his friends tried to find this beautiful butterfly at Irkeshtam (near the TL) in 2019 and at Tuoyun in 2022 but all failed.

The specimen was collected from a mountain range on north of Ulugqat, which is closer to the TL of *P. charltonius varvara* CHURKIN, 2009 (Karasu R., Dzhaman-Too Mts.: CHURKIN, 2009c) than to the TL of *P. c. aenigma* DUBATOLOV & MILKO. This suggests that *P. c. aenigma* DUBATOLOV & MILKO occupies a much larger area than we knew before and its range may continue to the TL of *P. c. varvara* CHURKIN. And *P. c. varvara* CHURKIN might be a synonym of *P. c. aenigma* DUBATOLOV & MILKO. It is noteworthy that *P. c. aenigma* DUBATOLOV & MILKO, *P. c. sochivkoi* CHURKIN, 2009 and *P. c. alrashid* CHURKIN & PLETNEV, 2012 are all treated as synonyms of *P. charltonius romanovi* GR.-GR., 1885 by KORB et al. (2016).

***Parnassius charltonius deckerti* VERITY, 1907** (TL: Kachmir)

Material. 1 m (holotype of *P. charltonius mazhaensis* HUANG, 1994), Mazha-daban (36.44 N, 77.01 E), on National Highway 219, 3500 m, 21.VIII.1993, H. HUANG leg.

Remarks. *P. charltonius mazhaensis* HUANG, 1994, based on a single worn-out male specimen (fig. 19), was treated as a synonym of *Parnassius charltonius deckerti* VERITY by WEISS & RIGOUT (2016).

The ♂ genitalia (fig. 31) shows no difference from those of *P. charltonius bryki* HAUDE, 1912 (fig. 32) from SW Tibet except for the shape of the pigmented portion of the 8th segment.

***Parnassius loxias* PÜNGELER, 1901 (figs. 20-21, 28, 40, 47)**

Four valid subspecies are recognized, three of which are known from Xinjiang including a new subspecies from Maidantag Mts. The remaining *P. loxias uvarovi* CHURKIN & PLETNEV, 2015 could be possibly discovered on Chinese side in future.

***Parnassius loxias loxias* PÜNGELER, 1901**

“*Parnassius loxias*, n. sp.” PÜNGELER, 1901: 178, Taf. 1, figs. 5-6.

TL: Aksu.

Type material: lectotype ♀ (ZMHU; wrongly labeled as m) was designated by KORB (2017); paralectotype ♀ was figured by VERITY (1906: pl. 19, fig. 13) and also by WEISS & RIGOUT (2016: 561, fig. 13).

Remarks: Topotypes were figured by WEISS (1991), TSHIKOLOVETS (2005b) and TSHIKOLOVETS & PAGES (2016).

Synonym. “*Parnassius loxias tashkorensis* KREUZBERG, ssp. n.” KREUZBERG (1984): 72 (synonymized by SAKAI et al., 2002)

TL: Kyrgyzstan, Kaindy (Kaindy-Katta) Mts., Utsh-Tshat “massif”.

Type material: holotype ♂ (ZISP) was figured by KREUZBERG (1984) and repeatedly by TSHIKOLOVETS (2005b); paratype ♂ (ZMAU) was figured by TSHIKOLOVETS (2005b).

Remarks. This subspecies was treated as synonym of *P. loxias loxias* PÜNGELER by SAKAI et al. (2002), TSHIKOLOVETS (2005b) and ROSE & WEISS (2011).

***Parnassius loxias raskemensis* AVINOFF, 1916**

“*Parnassius loxias*, PÜNG. subsp. *raskemensis*, nov.” AVINOFF, 1916: 359, pl. LII, fig. 10.

TL: ramifications of the Raskem Mountains, namely, from the Kiliang Pass. It was located by WEISS (1991) as between Hotan and Shahidulla, and by TSHIKOLOVETS & PAGES (2016) as very close to Kunjrab Pass of Pamir. SAKAI et al. (2002) gave the coordinates as 36.72 N, 78.30 E, based upon KITAWAKI’s exploration in 1996.

Type material: holotype ♀ (lost?) was figured by AVINOFF (1916).

***Parnassius loxias uvarovi* CHURKIN & PLETNEV, 2015**

“*Parnassius loxias uvarovi* ssp. nov.” CHURKIN & PLETNEV, 2015: 14.

TL: Upper stream of Chinese Kyzyl-Sur, Transalai Mts. (eastern edges), Kyrgyzstan.

Type material: type specimens were figured by CHURKIN & PLETNEV (2015) and also by WEISS & RIGOUT (2016).

***Parnassius loxias lipengi* subsp. nov.**

Holotype ♂ (fig. 21): China, Xinjiang, SW Akqi, on southeast of Maidantag Pass (40.67 N, 77.80 E), ca. 3000-3100 m, 23.-28. VII.2019, H. HUANG leg., deposited in BSNU.

Paratypes: 7 ♂♂, 3 ♀ (1 ♂ in CHH, 2 ♂♂, 1 ♀ in CLP, 4 ♂♂, 2 ♀♀ in CDL), same data as holotype, L. DING, P. LI & H. HUANG leg.; 1 ♀ (CHH), same locality as holotype, 27. VII.2022, H. HUANG leg.

Etymology. This new subspecies is named in honor of Mr. PENG LI who accompanied the author during his 2019 expedition to Xinjiang.

Diagnosis. This new subspecies can be distinguished from all other subspecies by the following combination of characters (fig. 20).

Both sexes:

1) Inner cell spot of forewing is consistently thinner than in *P. l. loxias* PÜNGELER.

♀♀:

2) Outer edge of forewing postdiscal band is zigzag, not smooth as in *P. l. raskemensis* AVINOFF.

3) Forewing postdiscal band is somewhat thinner than in *P. l. uvarovi* CHURKIN & PLETNEV, but is consistently wider than in *P. l. loxias* PÜNGELER and *P. l. raskemensis* AVINOFF.

4) Inner edge of forewing postdiscal band in space 4 is closer to discocellular spot than in *P. l. loxias* PÜNGELER.

5) Hindwing reddish ocelli are markedly smaller than in *P. l. uvarovi* CHURKIN & PLETNEV.

6) Submarginal spot in space 7 of hindwing is remote from costal ocellus, whereas in *P. l. uvarovi* CHURKIN & PLETNEV it is very close to costal ocellus.

7) Black dusting around submarginal spots on hindwing upper side is less developed than in *P. l. uvarovi* CHURKIN & PLETNEV.

8) Basal dusting of hindwing upper side is markedly paler and less extensive than in *P. l. uvarovi* CHURKIN & PLETNEV.

9) Upper discal stripe of forewing is reduced or obsolete, not so prominent as in *P. l. uvarovi* CHURKIN & PLETNEV.

This new subspecies seems to form a transition from *P. l. loxias* PÜNGELER to *P. l. uvarovi* CHURKIN & PLETNEV in morphology and distribution; however it has the much paler basal dusting on hindwing upper side than all other known subspecies.

Remarks. This new subspecies is acceptable from a view point of biogeography, as all the other *Parnassius* species found in the Maidantag Mts. are different from those in Aksu or Transalai at subspecific level.

The ♂ genitalia examined (fig. 28) show no difference from those of *P. l. loxias* PÜNGELER.

This butterfly is very rarely seen at its biotope where its food plant (*Corydalis* sp.) appears sparsely on rocky cliff above 3000 m. It prefers to fly and settle on vertical rock faces which can not be reached by the collector.

Distribution. Maidantag Mt. Range (Akqi, Xinjiang).

***Parnassius simo* GRAY, [1853] (figs. 22-23, 33-37)**

Four subspecies are known in Xinjiang.

Both *P. simo simulator* STAUDINGER, 1899 (TL erroneously given as Kisil-art-Pass, Transalai) and *P. simo glylpos* FRUHSTORFER, 1903 (TL erroneously given as Aksu) were described on incorrect data of type localities. The lectotype ♂ of *P. simo simulator* STAUDINGER was designated and figured by KORB (2018b: fig. 4), showing no remarkable difference from *P. simo confusa* BANG-HAAS. KORB (2018b) located *P. simo simulator* STGR. as from Korum-Kechu, northern slope of Moldo-Too mountain range; but no recent collections support this.

The lectotype ♂ and 2 paralectotype ♂♂ of *P. simo glylpos* FRUHST. were designated and figured by KORB (2018b: fig. 1), possessing a more whitish ground color and the more developed discal markings on both wings than *P. simo confusa* BANG-HAAS. Their real locality remains unknown.

Both *P. simo simulator* STGR. and *P. simo glylpos* FRUHST. were incorrectly placed into *P. simonius* STAUDINGER, 1883 (together with *Parnassius simo confusus* BANG-HAAS, 1927 and some other taxa) by KORB (2018b) who was apparently confused by the classification of the *P. simo* GRAY - group. KORB (2018b) considered *P. andreji* EISNER, 1930 from Qinghai as a subspecies of *P. simonius* STGR. and stated "The male genitalia of both taxa showed no differences at all"; however the male genitalia figured by him as *P. andreji* EISNER (KORB, 2018b: fig. 7; reproduced from KORB, 2012: fig. 64) actually belong to a Qinghai subspecies of *P. simo* GRAY and do differ from those of *P. simonius* STGR. in having no acute process at lower corner of apex of uncus in lateral view. *P. andreji* EISNER and *P. simo* GRAY are widely sympatric in Qinghai, with consistent difference in ♂ genitalia (KOWAYA, 1995); and *P. andreji* EISNER is not only widely separated from *P. simonius* STGR. in distribution, but is also different from the latter by having a markedly wider and shorter uncus in dorsal view (fig. 35).

To give a better understanding of the genital differences between the species of the *P. simo* GRAY - group, the following specimens are dissected in this work (fig. 37): *P. andreji norikoe* OHYA, 1988 (2 ♂♂, Lajishan, Qinghai); *P. simo simo* GRAY (3 ♂♂, Zhada, SW Tibet); *P. simo wenquanensis* SORIMACHI, 1994 (6 ♂♂, Ela Pass, north of Wenquan, Qinghai); *P. simo fickleri* GEITH, 1996 (3 ♂♂, Zhujiaola, west of Qamdo, NE Tibet); *P. simo demolensis* KAWASAKI, 1998 (3 ♂♂, Demula Pass, SE Tibet); *P. simo biamanensis* LI, 1994 (5 ♂♂, Baimaxueshan Pass, NW Yunnan). It is noteworthy that *P. simo kozlovi* Avinoff, 1913, first stated by KOCMAN (2009) in its correct authorship, is a subspecies of *P. simo* GRAY.

***Parnassius simo avinoffi* VERITY, 1911 (TL: Hindou-Kouch, Beik)**

Remarks. This subspecies was recorded from "30 km E. of Muztagata" as *P. simo tsuchiyaorm* MORITA, 1997, a synonym of *P. simo avinoffi* VERITY (ROSE & WEISS, 2011).

***Parnassius simo confusus* BANG-HAAS, 1927 (TL: SW Hotan, around Kurat Pass of Kunlun Mts.)**

Remarks. The lectotype ♂ (ZMMU) was designated and figured by KORB (2018b: fig. 6), labeled from "Schahidulla". However, the TL in reality is near Kurat Pass of W Kunlun Mts., SW Hotan, according to GRIESHUBER et al. (2012).

***Parnassius simo tinonis* IWAMOTO, 2006 (TL: Mt. Kaxtax, C Kunlun Mts.; ca. 36.22 N, 82.04 E)**

Remarks. This taxon was simply treated by ROSE & WEISS (2011) as a synonym of *P. simo confusa* BANG-HAAS. However, it is actually more similar to *P. simo simplicatus* STICHEL, 1907 by having a wider black submarginal band on hindwing upper side. On the other hand, this subspecies has the pale submarginal spots on the forewing upper side more or less smaller than *P. simo simplicatus* STICHEL.

Parnassius simo simplicatus STICHEL, 1907 (TL: Altıntag)

Material. 2 ♂♂ (CHH), Ka-er-dun (36.7741N, 90.3461E), E. Kunlun Mts., 4400 m, 28.VI.1984, R.-X. HUANG leg., ex coll. R.-X. HUANG (1993).

Parnassius boedromius PÜNGELER, 1901 (figs. 22-23, 33-36, 43, 50, 53)

Three subspecies are known from Xinjiang.

Parnassius boedromius boedromius PÜNGELER, 1901 (TL: Gebirge N. von Aksu, Chantangri).

Remarks. TSHIKOLOVETS et al (2016) figured 2 paralectotype ♂♂ (as syntypes) and further 3 pair of topotypes from Ak-su, making the current discussion possible. KORB & BOLSHAKOV (2016) made a lectotype designation and figured the lectotype ♀.

KREUZBERG (1985) treated both *P. b. pygmaeus* A. BANG-HAAS, 1910 (TL: Juldus-Gebiete; supposed to be Issyk-kul area in this paper) and *P. b. candidus* AVINOFF, 1913 (TL: Sarydzhaz) as forms and synonyms of *P. b. boedromius* PÜNGELER. TSHIKOLOVETS (2005b) neglected *P. b. pygmaeus* BANG-HAAS and added further four synonyms for *P. b. boedromius* PÜNGELER: *P. b. hohlbecki* AVINOFF, 1913 (TL: montibus Alexandri orientalibus), *P. b. martiniheringi* BRYK & EISNER, 1930 (TL: Kungei-Ala-Tau), *P. b. prasolovi* KREUZBERG, 1986 (TL: Terskey Alatau Mts., Barskaun gorge), and *P. b. sokolovi* KREUZBERG, 1989 (TL: Susamyrtau Mts., Alabel pass). ROSE & WEISS (2011) followed KREUZBERG's (1985) treatment and added only *P. b. martiniheringi* BRYK & EISNER and *P. b. prasolovi* KREUZBERG as synonyms of *P. b. boedromius* PÜNGELER. KORB (2018b) retained most of these synonyms as good subspecies but treated both, *P. b. marcopolo* WEISS, 1994 and *P. b. toshioi* SHINKAI, 1997 from China as synonyms of *P. b. pygmaeus* A. BANG-HAAS, giving no discussion on this.

It is out of the scope of this paper to discuss the validity of these taxa from Kyrgyzstan, but a brief discussion on “*Parnassius boedromius* PÜNG. v. *pygmaeus*” BANG-HAAS, 1910 is necessary as this taxon is possibly described from China, with “Juldus” as the TL. According to the original description (A. BANG-HAAS, 1910), *P. b. pygmaeus* BANG-HAAS differs from *P. b. boedromius* PÜNGELER only in having a smaller size, a more developed dark discal band on forewing and the smaller pale submarginal spots on both wings. This description falls into the individual variations of *P. b. martiniheringi* BRYK & EISNER but does not fit the characters of *P. b. marcopolo* WEISS and *P. b. toshioi* SHINKAI. It is noteworthy that the range of *P. b. martiniheringi* BRYK & EISNER is around the northern area of Issyk-kul which was included into “Juldus” by O. BANG-HAAS (1915b). In conclusion, *P. b. pygmaeus* A. BANG-HAAS is most likely described from Issyk-kul area and is a senior synonym of *P. b. martiniheringi* BRYK & EISNER, doing nothing with *P. b. marcopolo* WEISS and *P. b. toshioi* SHINKAI.

Parnassius boedromius marcopolo WEISS, 1994 (TL: Sources de l'Urumqi)

Material. 7 ♂♂, 18 ♀♀ (CHH, CLP), Aiken-daban Pass (43.22 N, 84.87 E), Kunes, Hejing County, Bayingolin, Xinjiang, 3300 m, 29.-30.VI.2019, H. HUANG & P. LI leg.

Remarks. The specimens from Aiken-daban do not differ from those from the TL.

Parnassius boedromius toshioi SHINKAI, 1997 (TL: Telmed-Davan, North of Kuqa)

Material. 8 ♂♂, 23 ♀♀ (CHH, CLP), Telmed Pass (42.50 N, 83.42 E), north of Kuqa (Kuche), on Dushanzi-Kuqa Road, Xinjiang, 3500 m, 6. & 26.VII.2019, H. HUANG & P. LI leg.

Remarks. This subspecies was incorrectly treated by ROSE & WEISS (2011) as a synonym of *P. b. marcopolo* WEISS, 1994. Actually it is much more similar to *P. b. boedromius* PÜNGELER than to *P. b. marcopolo* WEISS.

Parnassius b. marcopolo WEISS can be easily distinguished from both, *P. b. boedromius* PÜNGELER and *P. b. toshioi* SHINKAI, by having a frequently reddish costal ocellus of hindwing, a blacker submarginal band on both wings upper side, and the blacker submarginal markings on hindwing underside in much higher contrast with the pale ground.

Parnassius b. toshioi SHINKAI can be distinguished from *P. b. boedromius* PÜNGELER and all the subspecies from Kyrgyzstan by having a wider pale submarginal band of forewing and a larger costal ocellus of hindwing.

Parnassius simonius STAUDINGER, 1883 (figs. 22-23, 33-36, 43, 61, 63)

The lectotype ♂ (ZMHU) of this species was designated and figured by KORB (2018b: fig. 5), labeled from “Transalai/ Pamir”. The ♂ genitalia of the lectotype was dissected and figured in lateral view by KORB (2018b: fig. 8). The TL was clarified by AVINOFF (1913) and was located on the map by CHURKIN (2009a). It seems that two subspecies are known from China, one of which is uncertain in subspecific name.

Parnassius simonius nigrificatus KREUZBERG, 1986 (TL: Kyzyl-Art Pass, East Transalai)

Material. 1 ♂, 2 ♀♀ (CHH), Irkeshtam (39.72 N, 73.98 E), west of Ulugqat, 3400-3500 m, 16.-17.VII.2019, H. HUANG leg..

Remarks. CHURKIN (2009a) published a distributional map of this species in Alai, Transalai and the adjacent areas. The population from Chinese Irkeshtam is proved to be *P. simonius nigrificatus* KREUZBERG, 1986 and it is very close to the known population located by CHURKIN (2009a: 476, map) at China-Kyrgyzstan border.

Parnassius simonius subsp. incert.

Material. 2 ♀♀ (CHH), Torugart Pass (40.52 N, 75.36 E), Ulugqat, 3400 m, 28.VII.2022, H. HUANG leg.

Remarks. The ♀♀ collected from Torugart Pass might represent a different subspecies by having the reddish hindwing ocelli; they have a more developed forewing discal band in spaces 2-3 than in *P. simonius saluki* CHURKIN, 2009 from the nearby area in the northwest, and have no subbasal black smudge at base of space 7 of hindwing which is usually well marked in *P. simonius taldicus* GUNDOROV, 1991 (TL: Taldyk Pass, East Alai). This population from Torugart needs a further research on more specimens in future.

Parnassius acco GRAY, 1853

Only one subspecies is known from SE Xinjiang.

Parnassius acco liae (R.-X. HUANG & MURAYAMA, 1989) (TL: Ka-er-dong, E Kunlun)

Synonym. *Tadumia przewalskii kunlunica* R.-X. HUANG & MURAYAMA, 1989 (objective synonym due to repeated publication).

Remarks. According to the information given by ZHANG et al. (1986), the TL, Ka-er-dong (= Ka-er-dun) is near the co-ordinates

36.7741N, 90.3461E, and the locality of the paratype ♀, Kalachuka is near the co-ordinates 36.9365N, 88.6674E.

Postscript

The following species are expected to be found in Xinjiang, but no reliable record has been published yet: *Parnassius nomion* FISCHER DE WALDHEIM, 1824; *P. mnemosyne* (LINNAEUS, 1758); *P. stubbendorffii* MÉNÉTRIÉS, 1849; *P. eversmanni* MÉNÉTRIÉS, [1850]. Most of these species could be possibly found at the extreme north of Chinese Altai Range which remains inaccessible. R.-X. HUANG et al. (2000) recorded all these species in their book, but most of the figures in the book came from foreign publications, foreign specimens or specimens from outside Xinjiang; they recorded many taxa which are definitely not known from Xinjiang, not giving any collecting data. R.-X. HUANG & MURAYAMA (1992) listed *Parnassius nomion* FISCHER DE WALDHEIM in their report, but gave no locality and figures; the specimens of *Parnassius nomion* FISCHER DE WALDHEIM were not found in the collection of Xinjiang University during a visit by the author in 1993.

It is noteworthy that the Kunlun Mts. and the Chantengri area are particularly important for the future research, as the historical materials from these areas are very scanty, leaving a lot of taxonomic problems unsolved.

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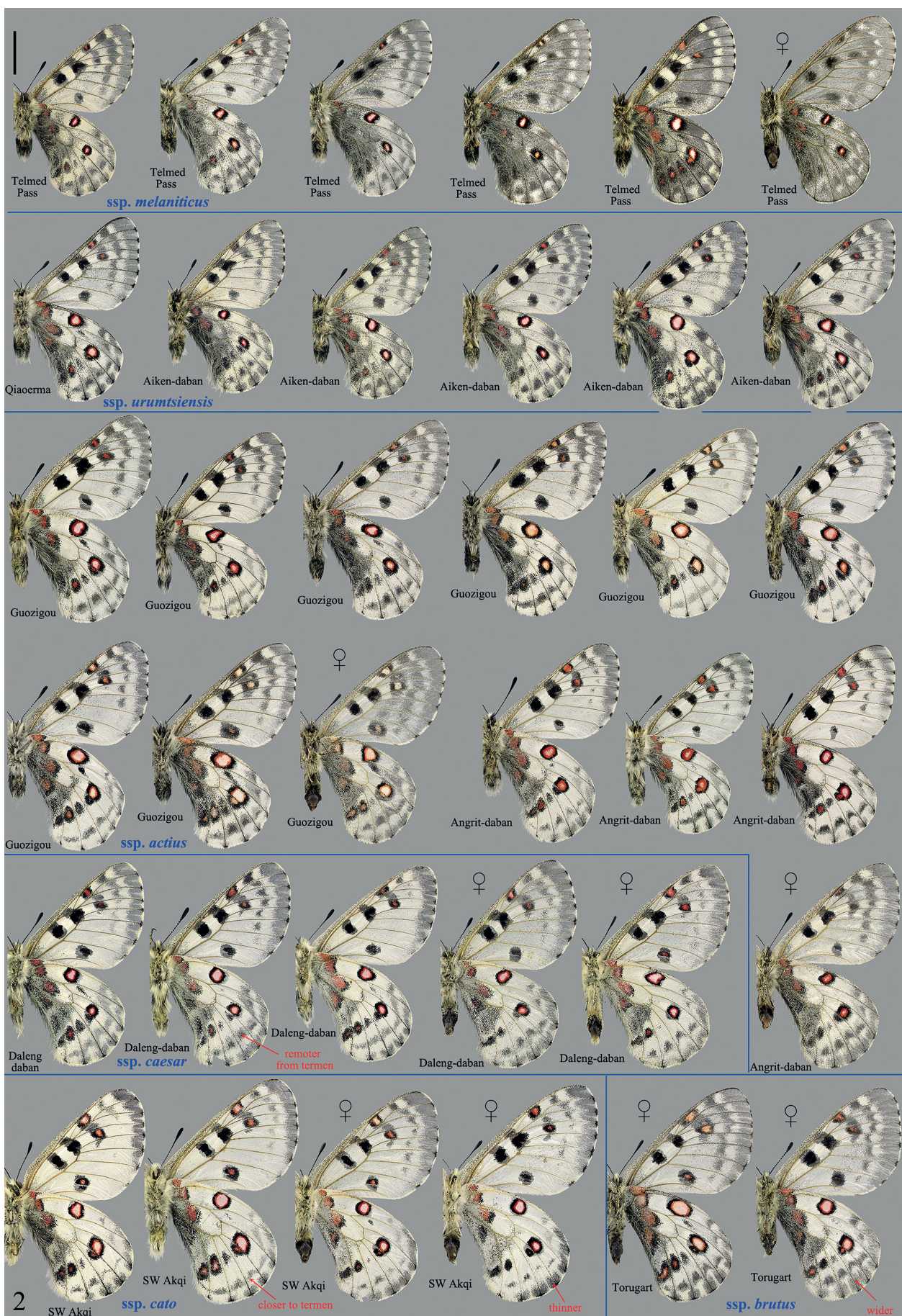


Fig. 2: Habitus of *Parnassius actius* (EVERSMANN, 1843) under same scale: underside.

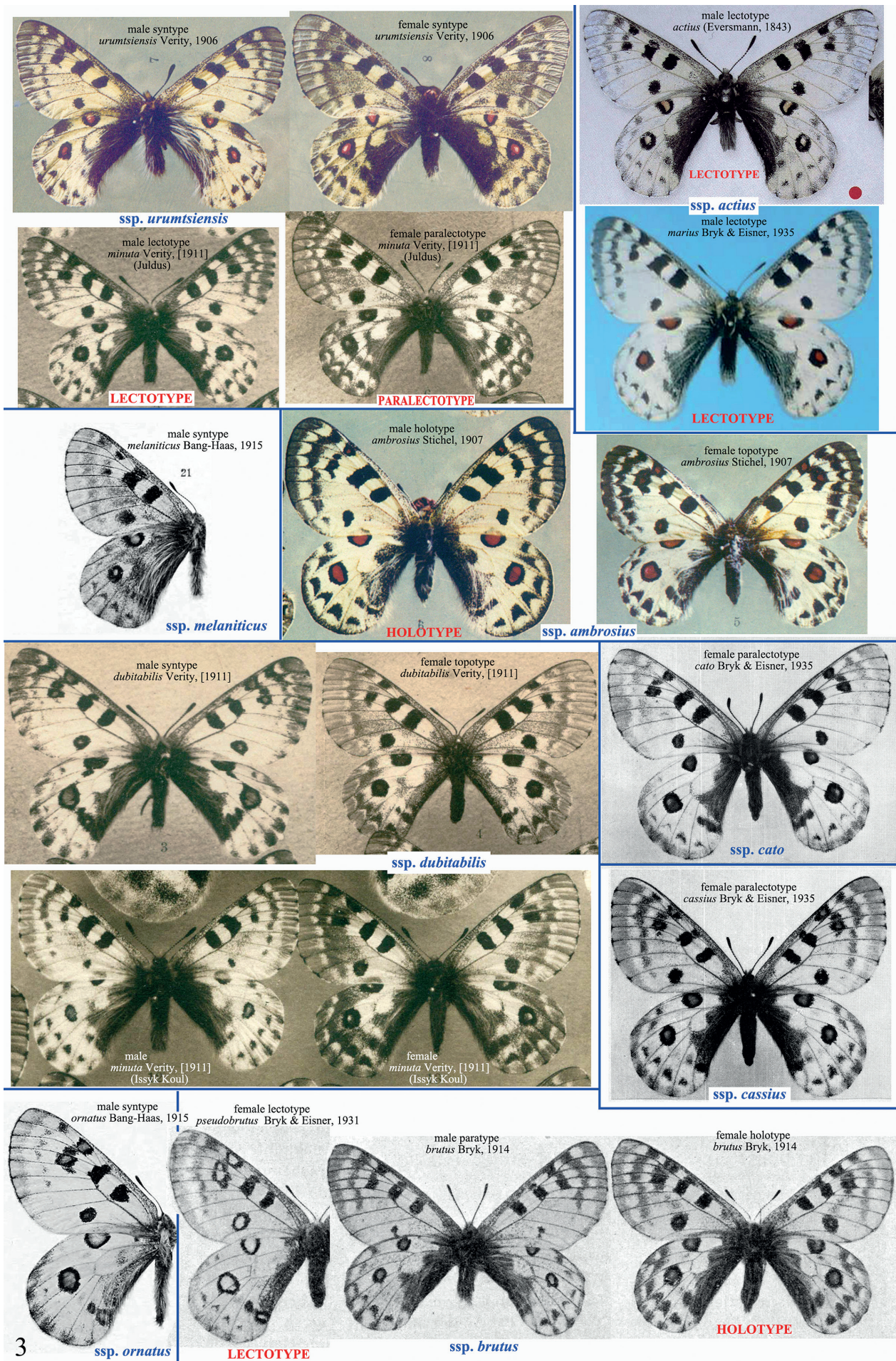


Fig. 3: Historical figures of type specimens in literature: various subspecies of *Parnassius actius* (EVERSMANN, 1843).

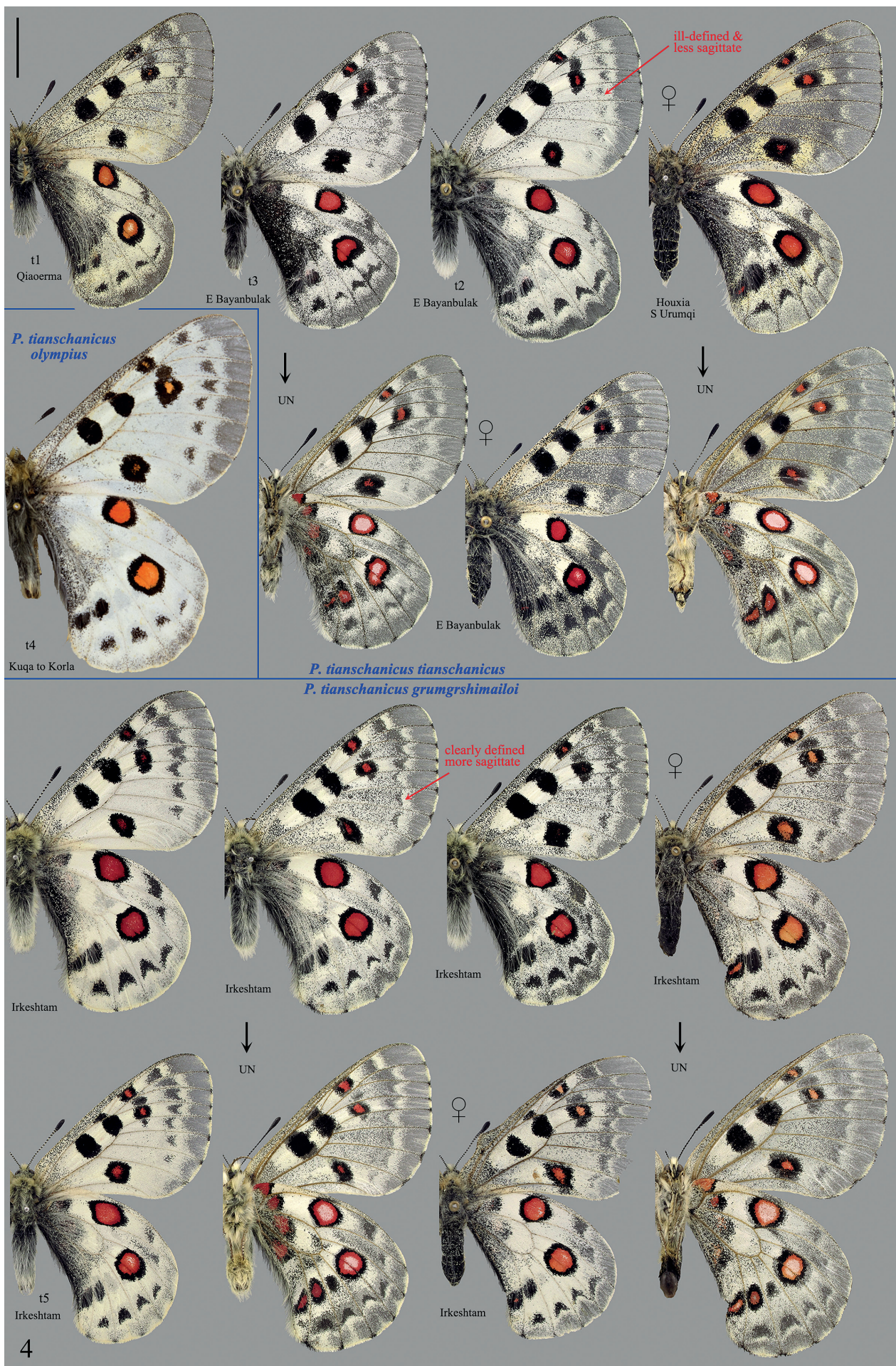


Fig. 4: Habitus of *Parnassius tianschanicus* OBERTHÜR, 1879 under same scale: upperside and underside (UN).

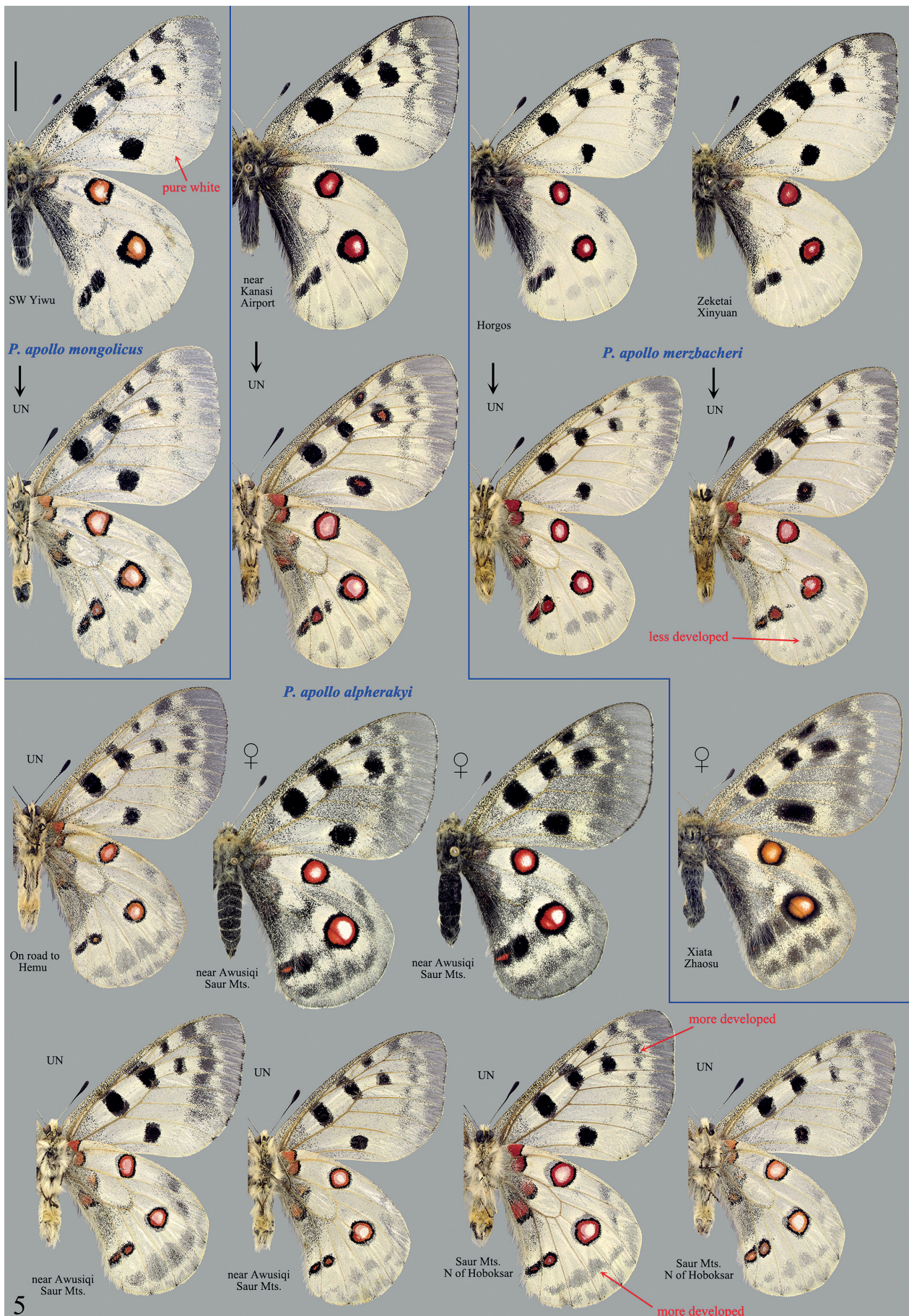


Fig. 5: Habitus of *Parnassius apollo* (LINNAEUS, 1758) under same scale: upperside and underside (UN).



Fig. 7: Habitus of *Parnassius jacquemontii* BOISDUVAL, 1836, *P. ruckbeili* DECKERT, 1909 and *P. tenedius* EVERSMAHN, 1851 under same scale: upperside and underside (UN).



Fig. 8: Habitus of *Parnassius apollonius* (EVERSMANN, 1847) under same scale: upperside and underside (UN).

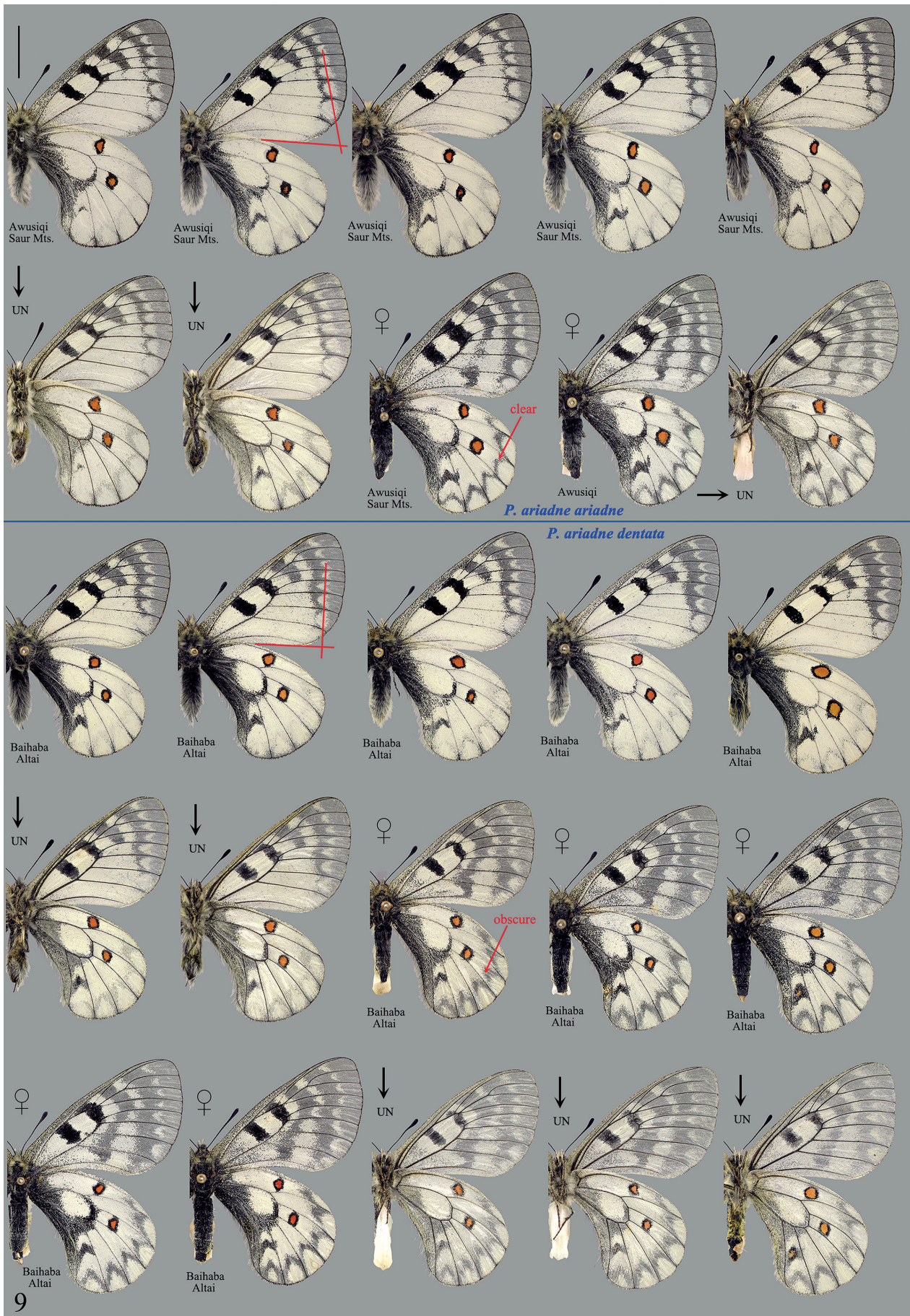


Fig. 9: Habitus of *Parnassius ariadne* (LEDERER, 1853) under same scale: upperside and underside (UN).



Fig. 13: Habitus of *Parnassius delphius menander* HEMMING, 1934 and *P. delphius juldussica* VERITY, [1911] under same scale: underside.



Fig. 14: Historical figures of type specimens in literature: various subspecies of *Parnassius delphiuss* (EVERSMANN, 1843).

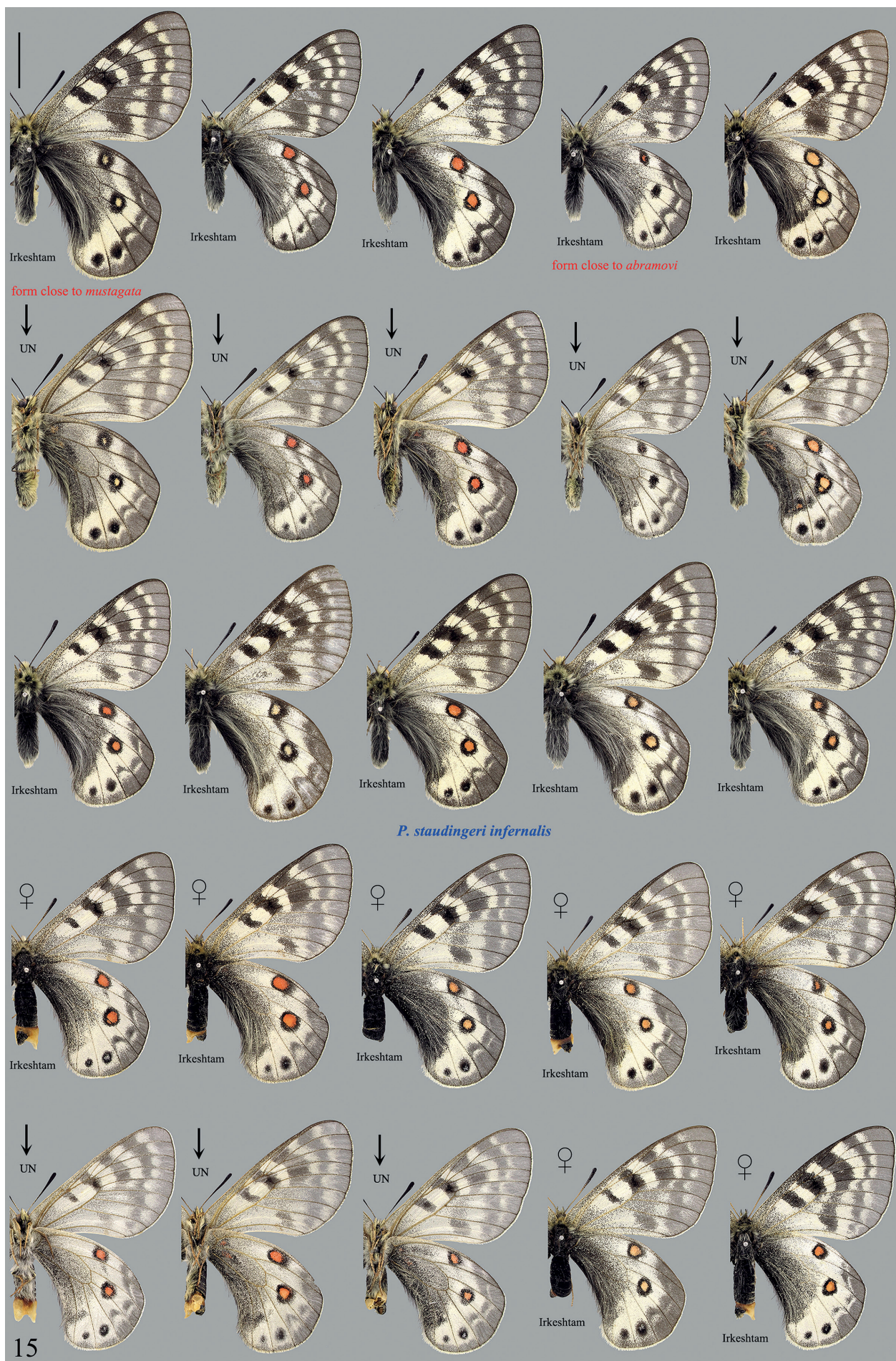


Fig. 15: Habitus of *Parnassius staudingeri infernalis* STAUDINGER, 1886 under same scale: upperside and underside (UN).

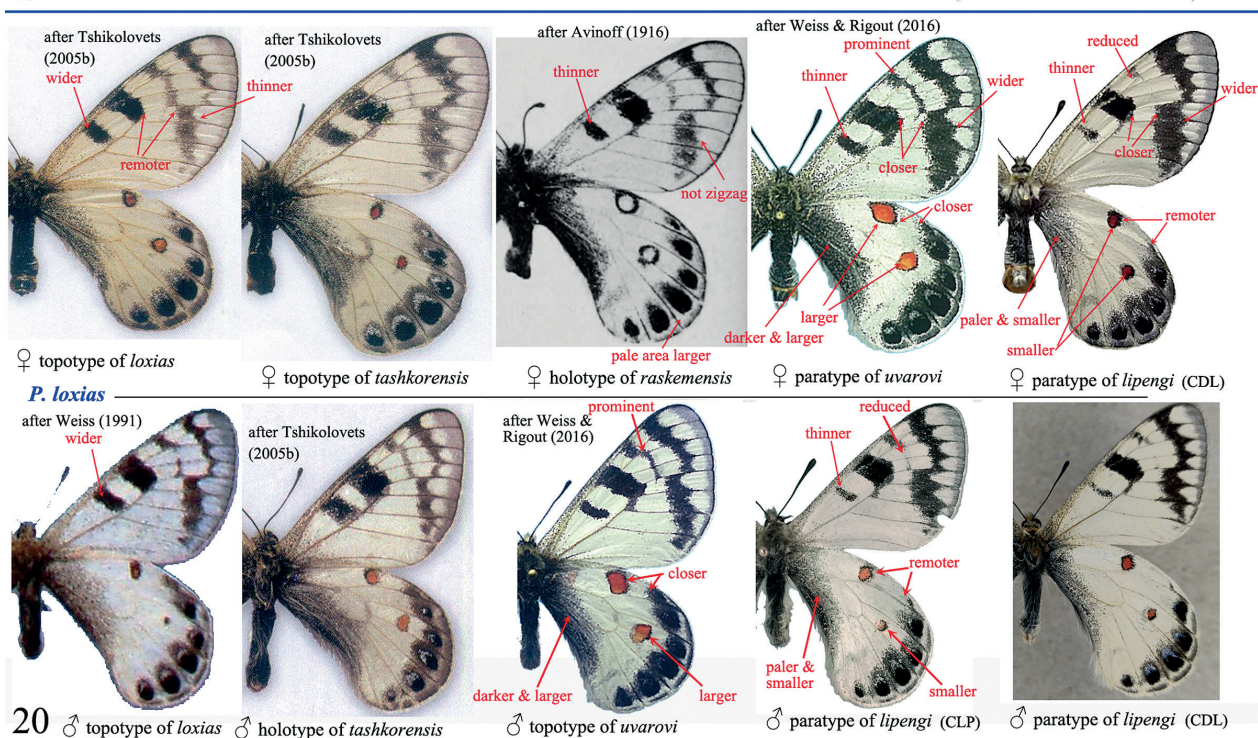
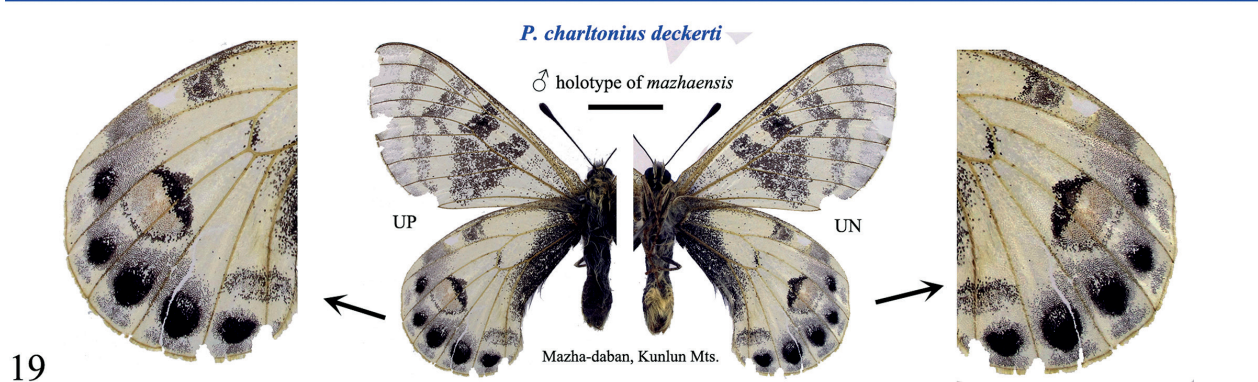
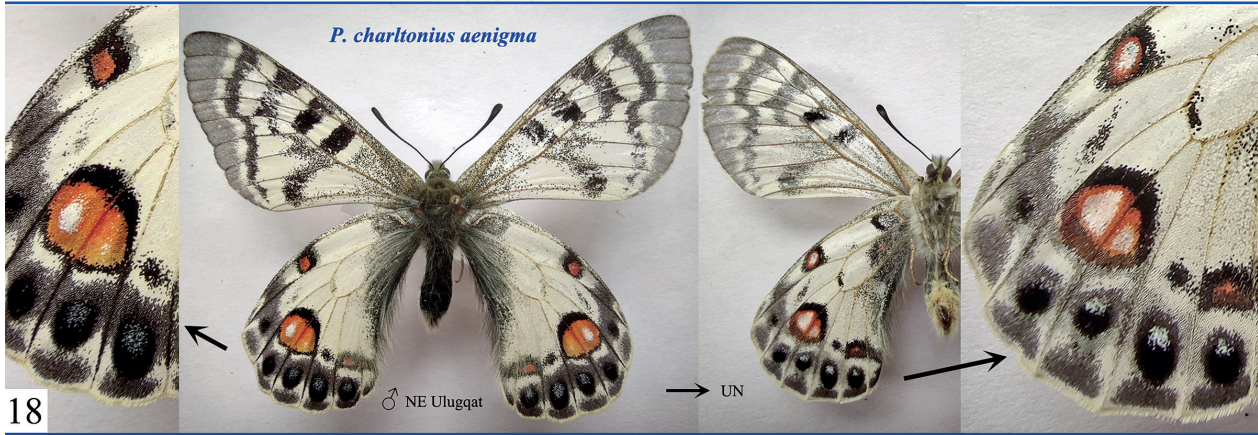
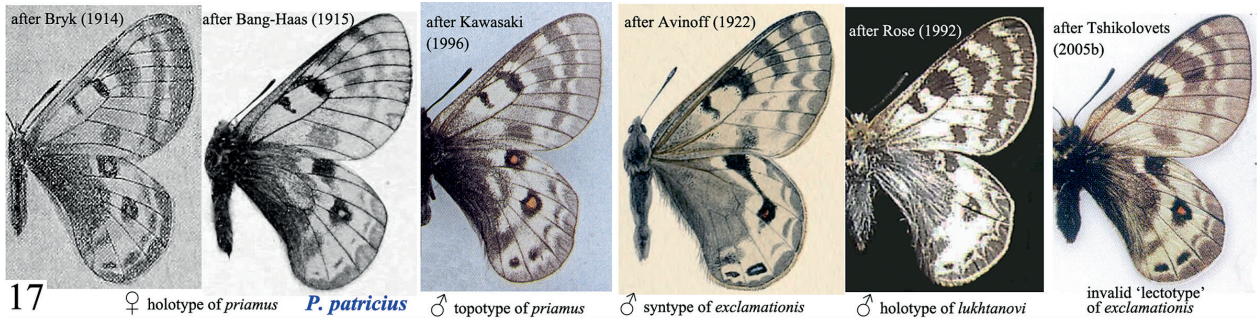


Fig. 17: Historical figures of type specimens in literature: various subspecies of *Parnassius patricius* NIEPOLT, 1911.

Fig. 18: Habitus of *Parnassius charltonius aenigma* DUBATOLOV & MILKO, 2003.

Fig. 19: Habitus of *Parnassius charltonius deckerti* VERITY, 1907.

Fig. 20: Subspecific characters of *Parnassius loxias* PÜNGELER, 1901.

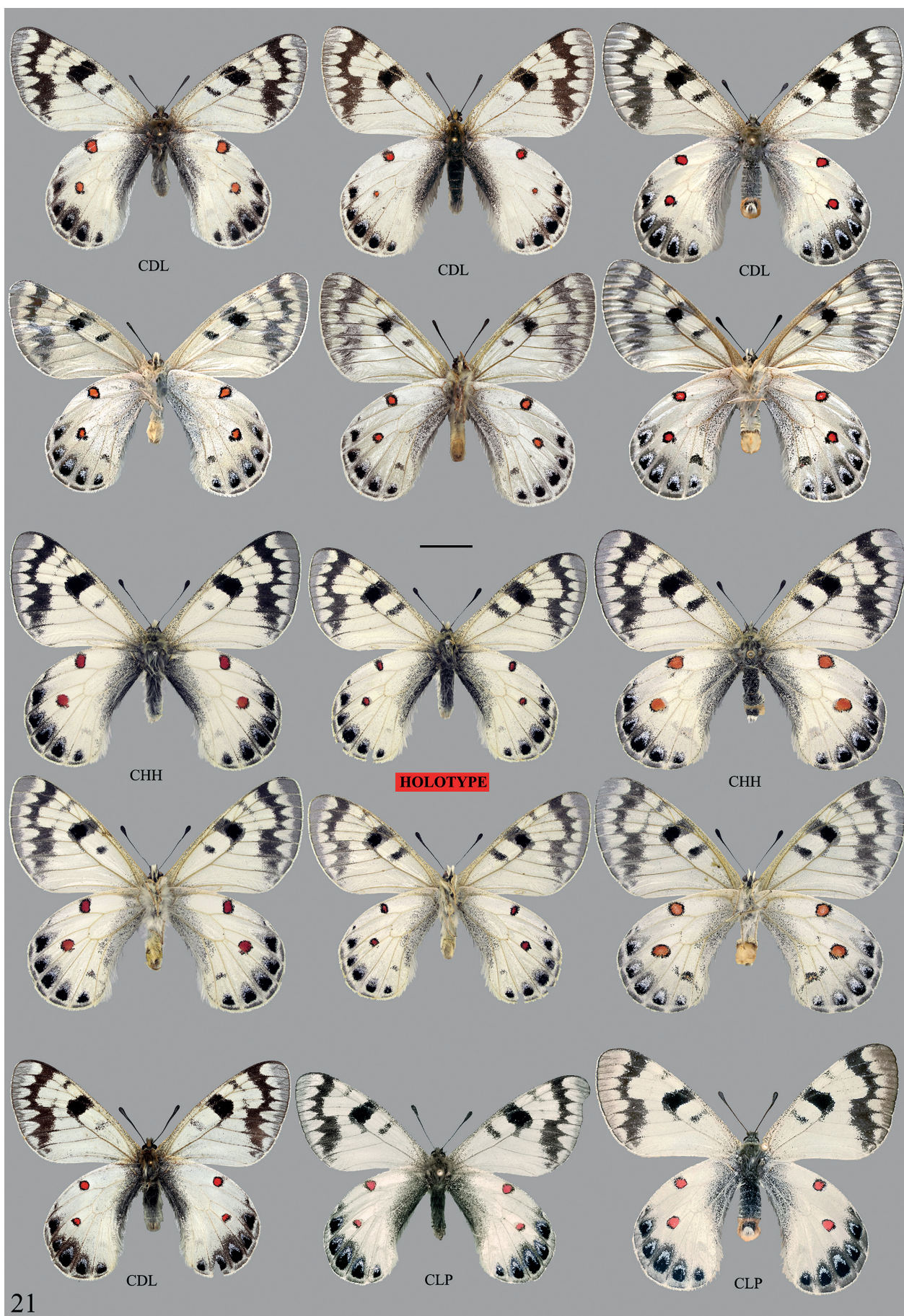


Fig. 21: Habitus of *Parnassius loxias lipengi* subspec. nov. under same scale: upperside and underside.



Fig. 22: Habitus of *Parnassius simo* GRAY, [1853], *P. boedromius* PÜNGELER, 1901 and *P. simonius* STAUDINGER, 1883 under same scale: upperside..

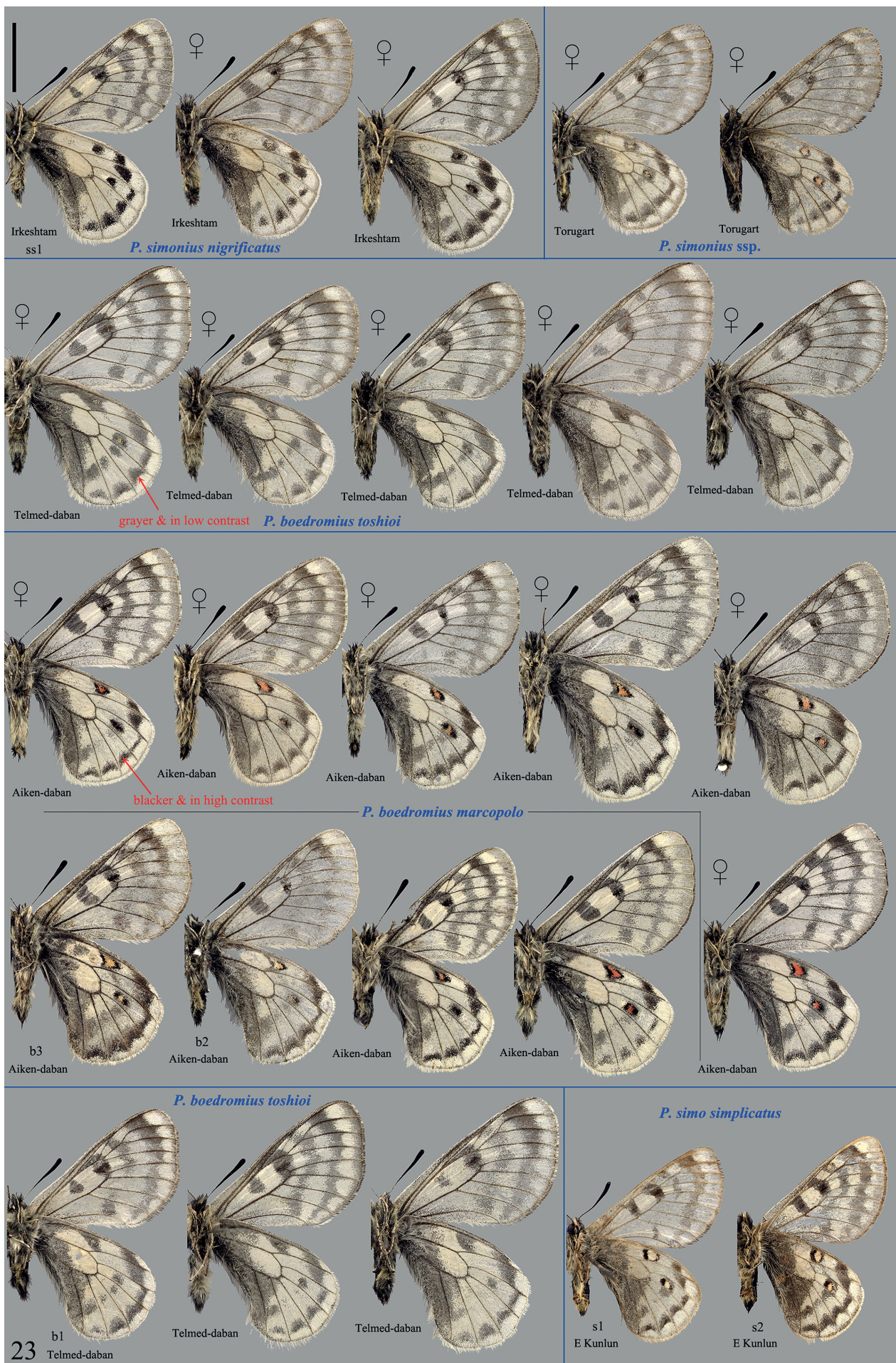


Fig. 23: Habitus of *Parnassius simo* GRAY, [1853], *P. boedromius* PÜNGELER, 1901 and *P. simonius* STAUDINGER, 1883 under same scale: underside.

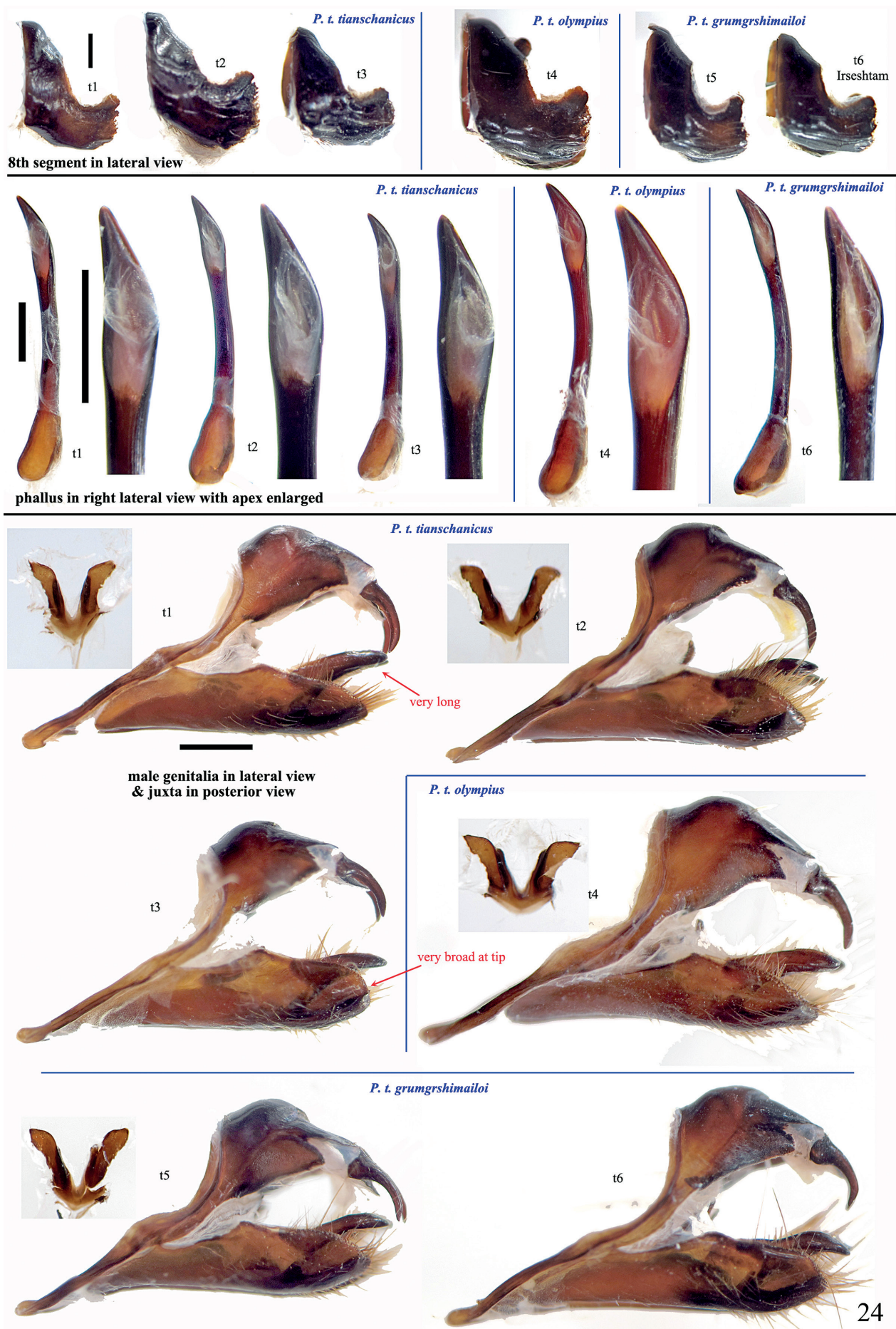


Fig. 24: ♂ genitalia of *Parnassius tianschanicus* OBERTHÜR, 1879: 8th segment, aedoeagus, whole genitalia and juxta (scale bar = 1 mm).

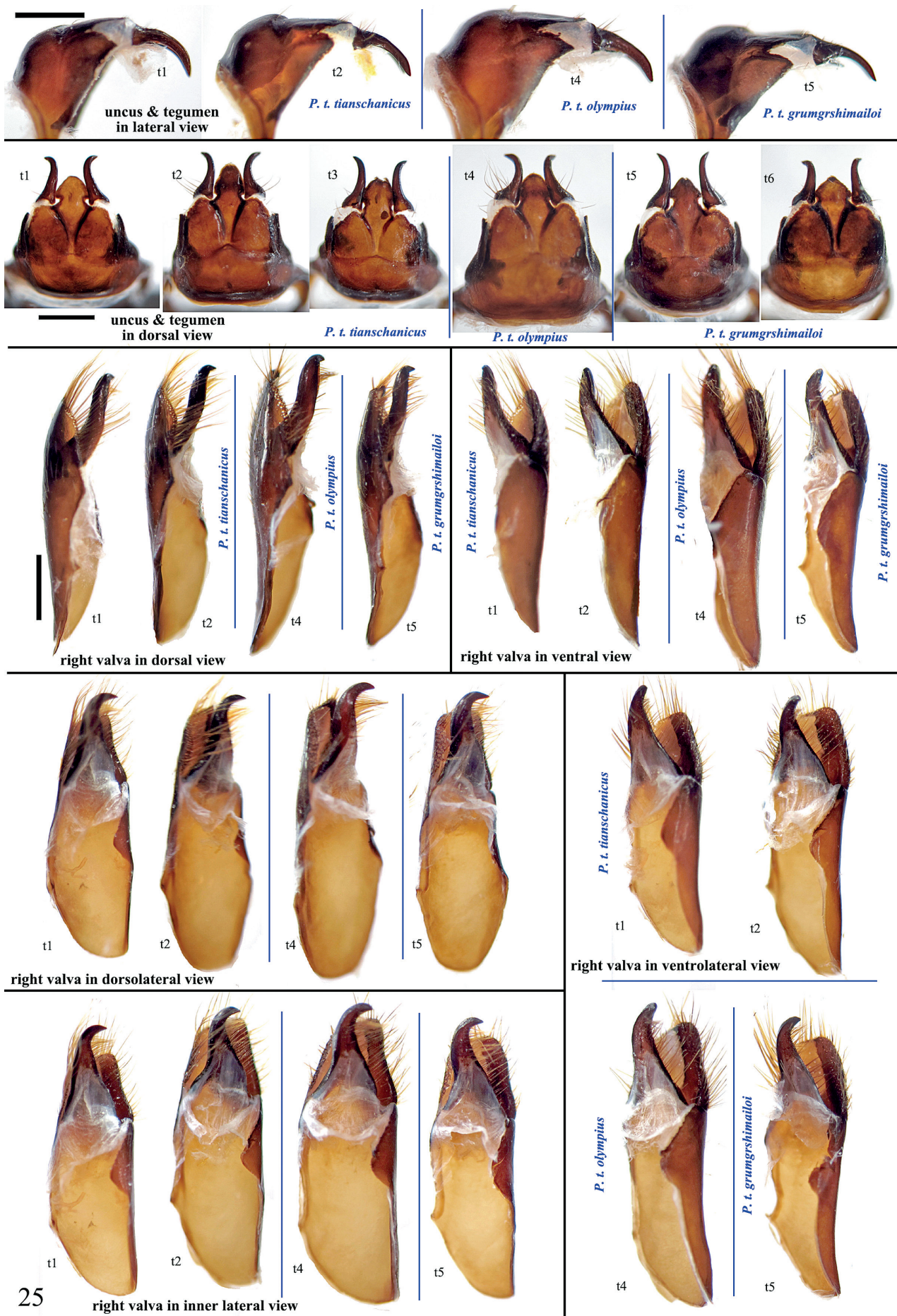


Fig. 25: ♂ genitalia of *Parnassius tianschanicus* OBERTHÜR, 1879: uncus and valva (scale bar = 1 mm).

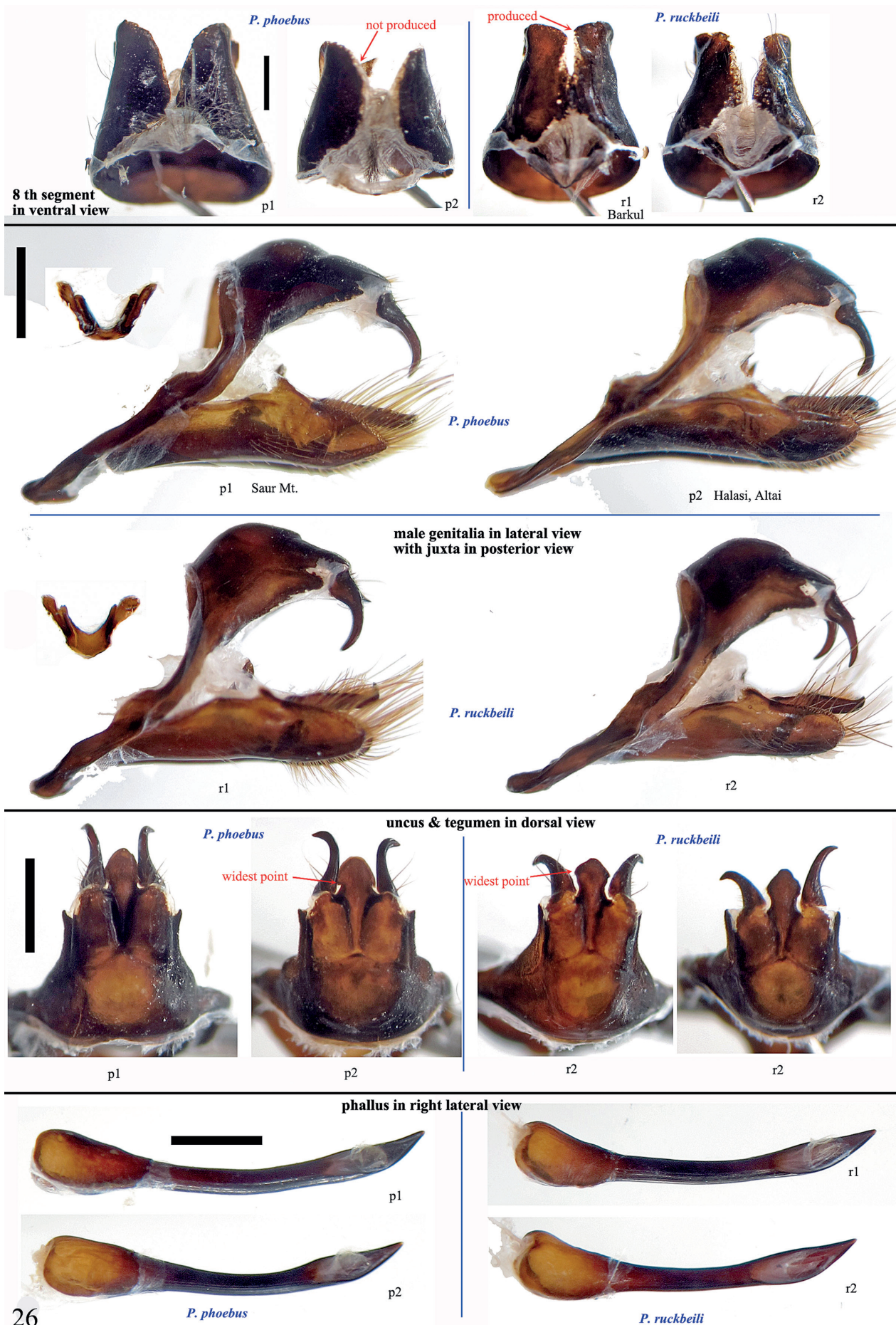


Fig. 26: ♂ genitalia of *Parnassius phoebus* (FABRICIUS, 1793) and *Parnassius ruckbeili* DECKERT, 1909: 8th segment, whole genitalia, juxta, uncus and aedoeagus (scale bar = 1 mm).

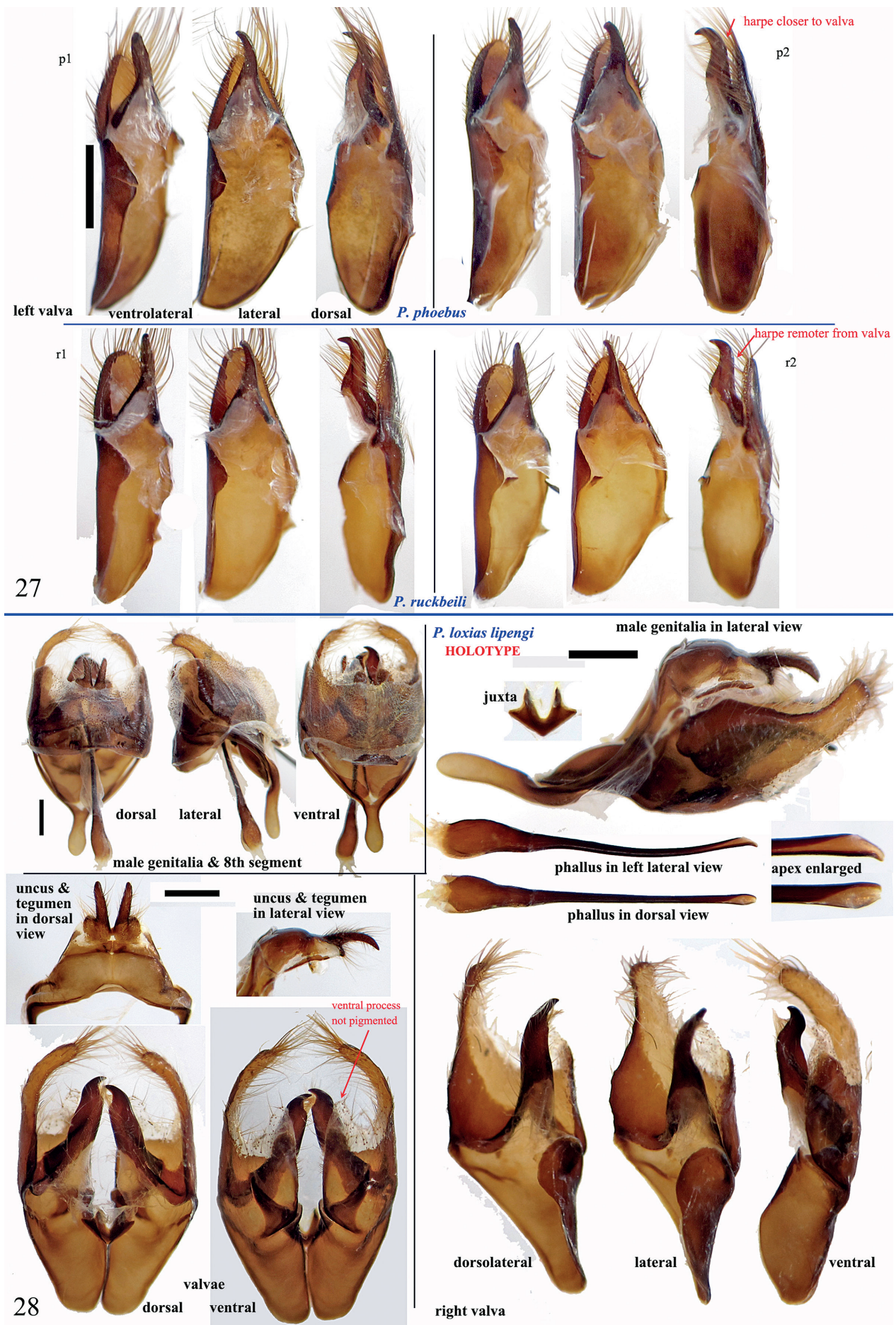


Fig. 27: ♂ genitalia of *Parnassius phoebus* (FABRICIUS, 1793) and *Parnassius ruckbeili* DECKERT, 1909: valva (scale bar = 1 mm).
 Fig. 28: ♂ genitalia of *Parnassius loxias lipengi* **subspec. nov.** (scale bar = 1 mm).

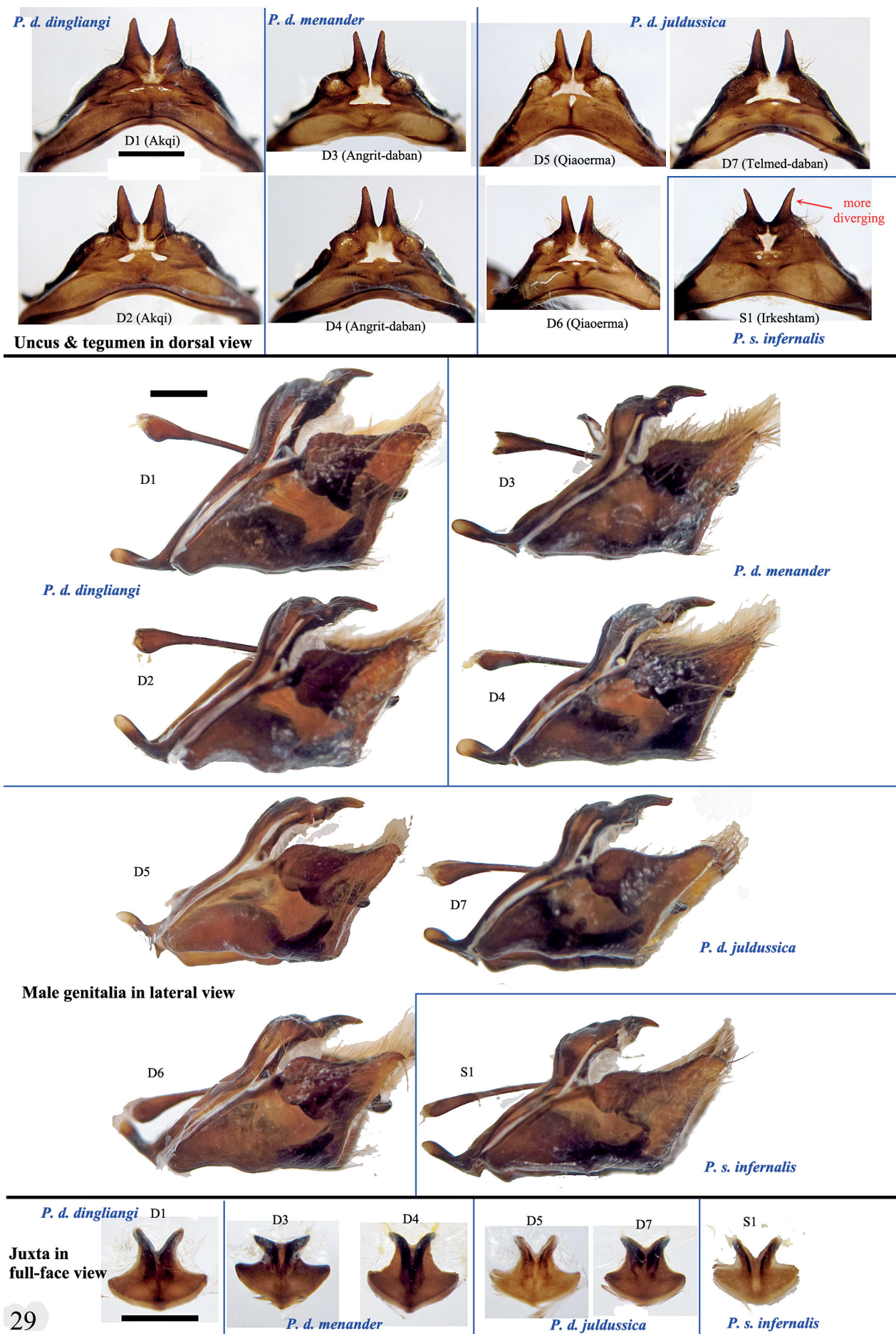


Fig. 29: ♂ genitalia of *Parnassius delphius* (EVERSMANN, 1843) and *P. staudingeri infernalis* STAUDINGER, 1886: uncus, whole genitalia and juxta (scale bar = 1 mm).

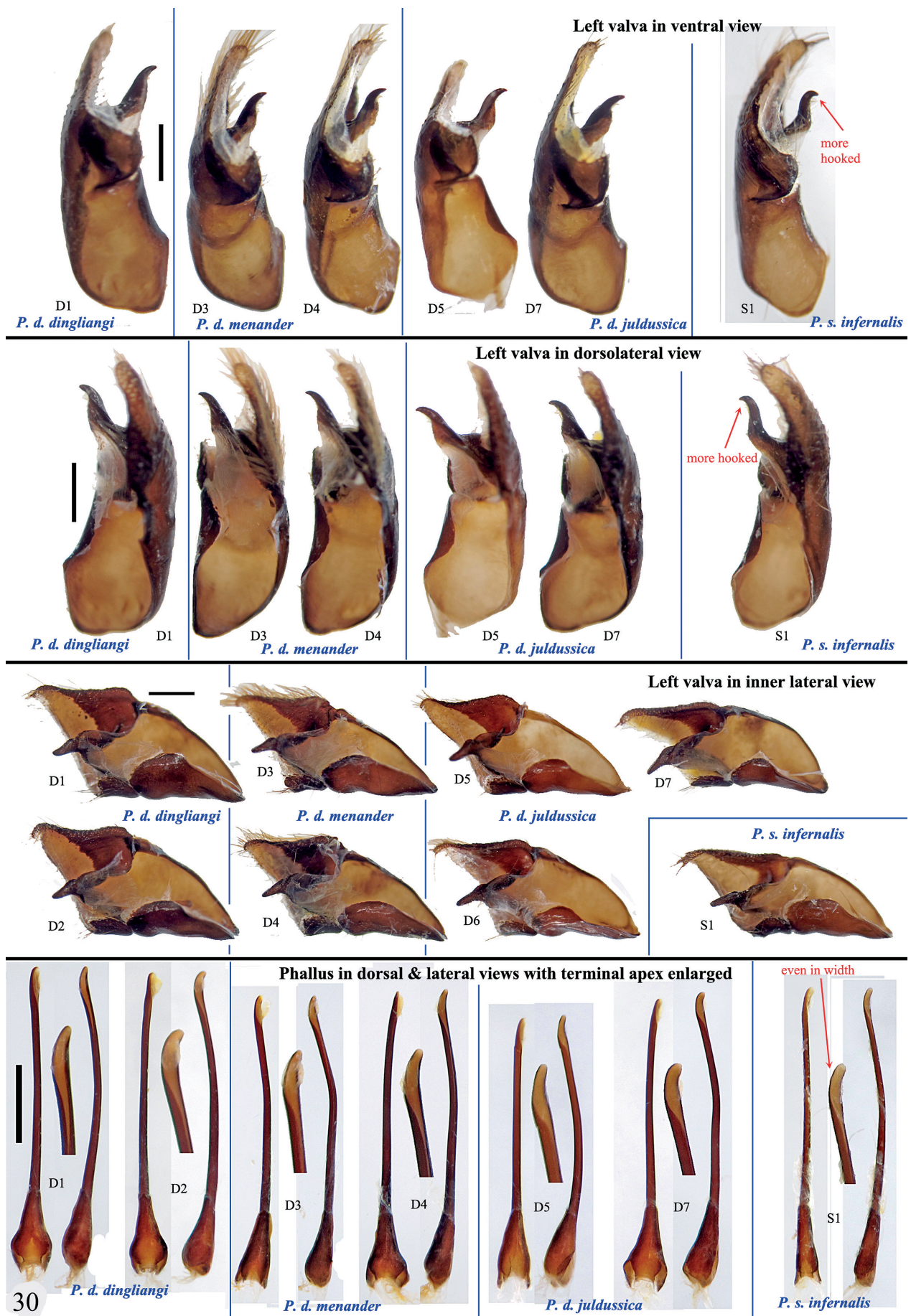


Fig. 30: ♂ genitalia of *Parnassius delphi* (EVERSMANN, 1843) and *P. staudingeri infernalis* STAUDINGER, 1886: left valva and aedoeagus (scale bar = 1 mm).

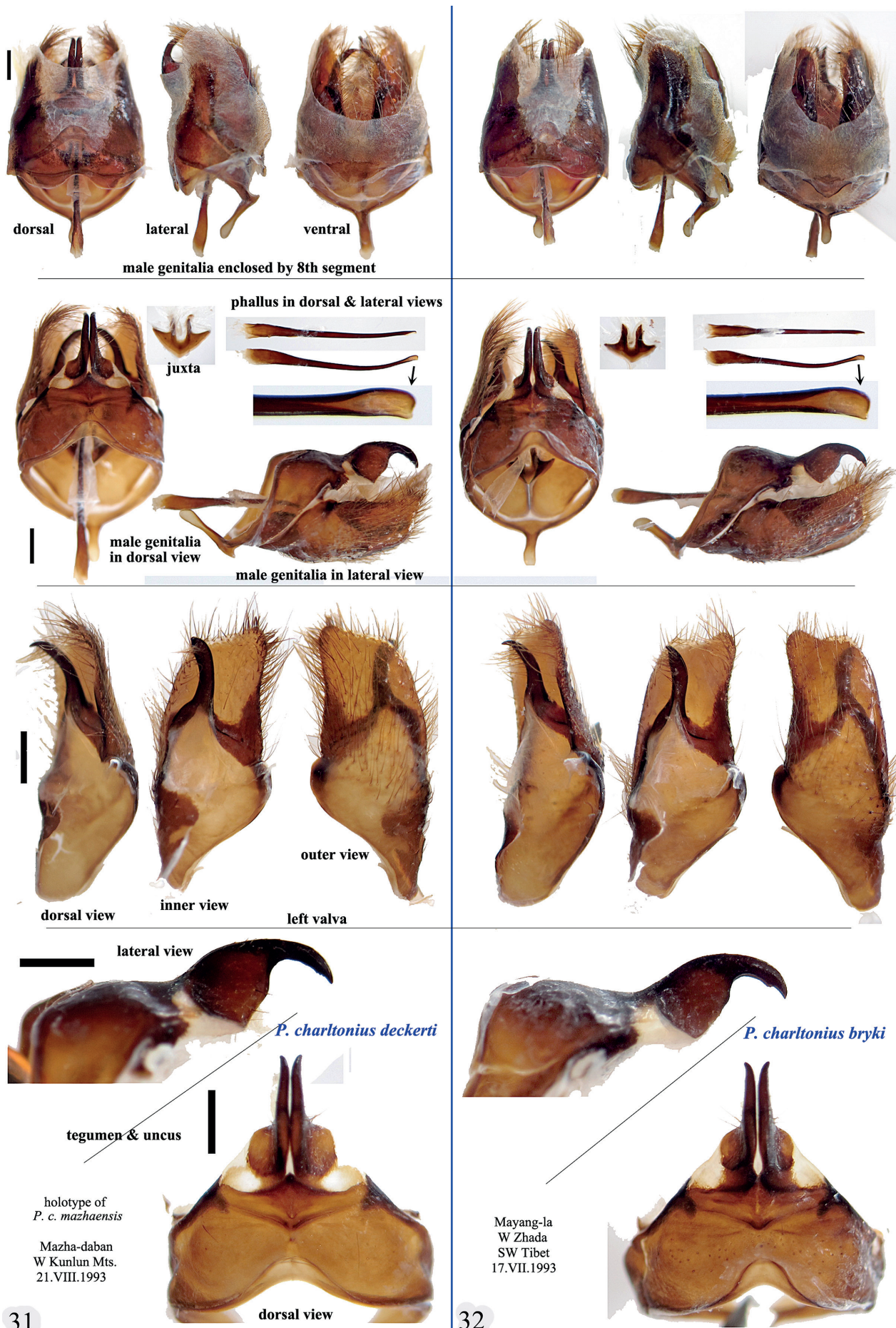


Fig. 31: ♂ genitalia of *Parnassius charltonius deckerti* VERITY, 1907.
Fig. 32: ♂ genitalia of *P. charltonius bryki* HAUDE, 1912.

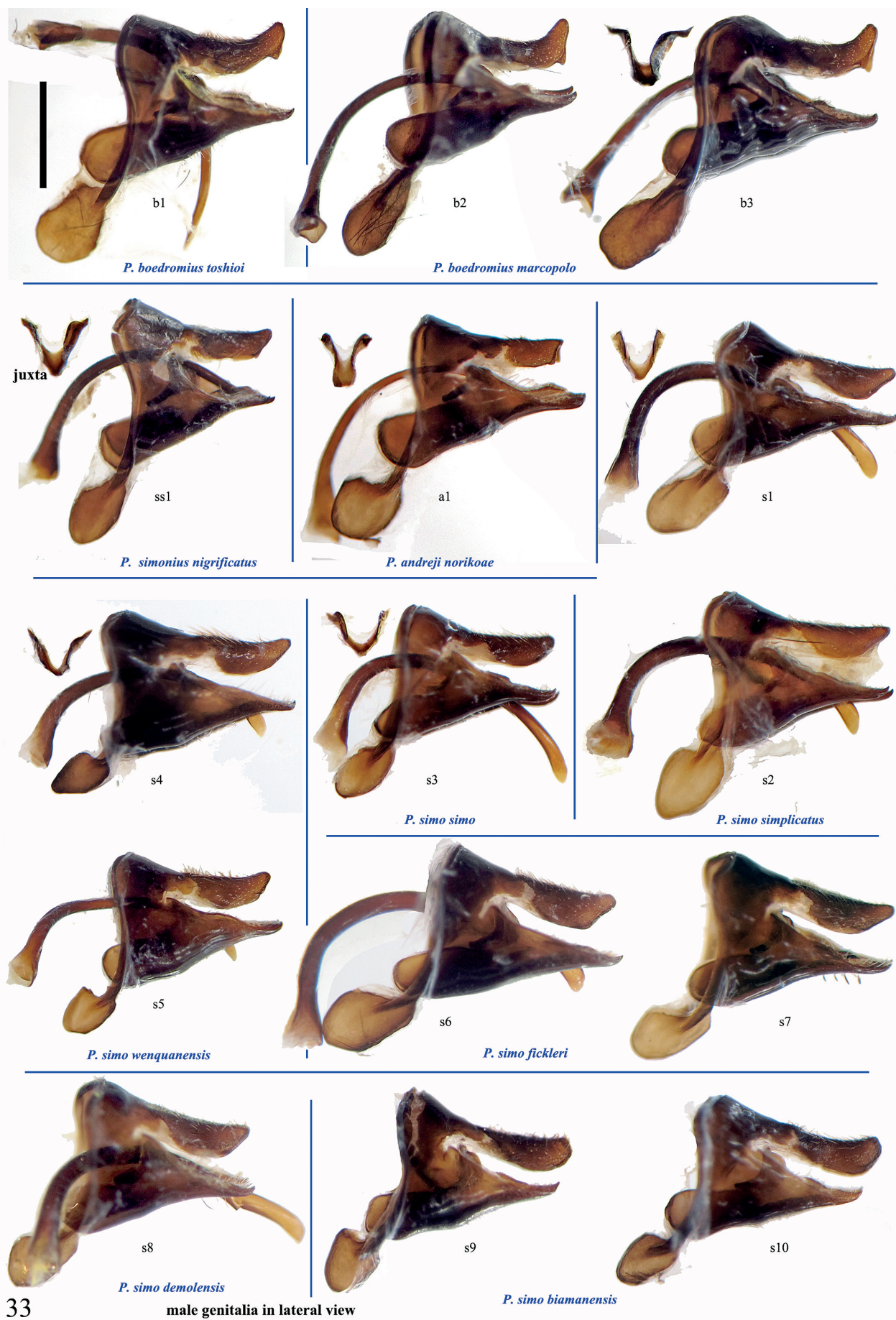


Fig. 33: ♂ genitalia of the *Parnassius simo* GRAY, [1853] - group under same scale: whole genitalia and juxta (scale bar = 1 mm).



Fig. 34: ♂ genitalia of the *Parnassius simo* GRAY, [1853] - group under same scale: aedeagus and valva (scale bar = 1 mm).

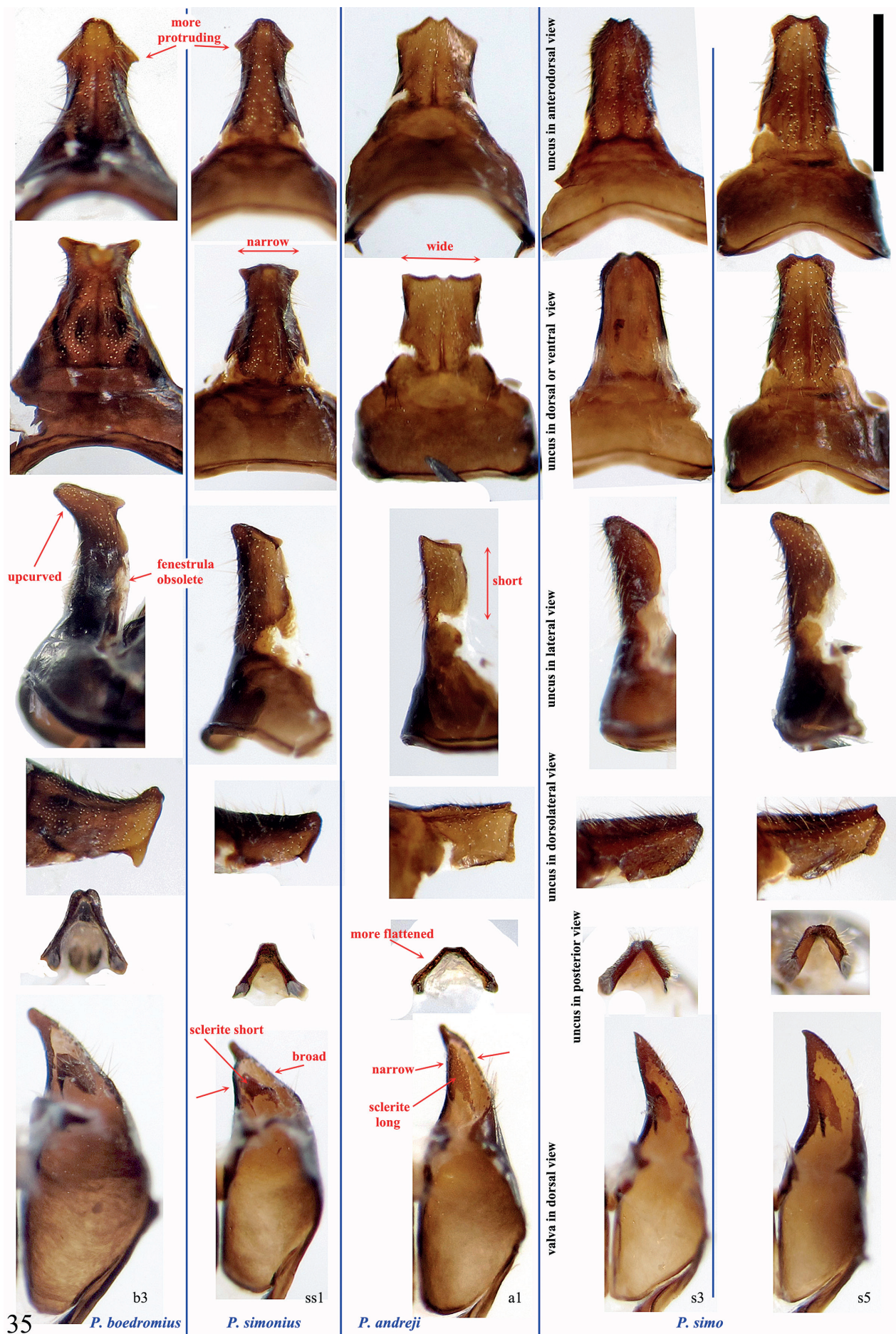


Fig. 35: ♂ genitalia of the *Parnassius simo* GRAY, [1853] - group under same scale: diagnostic characters (scale bar = 1 mm).

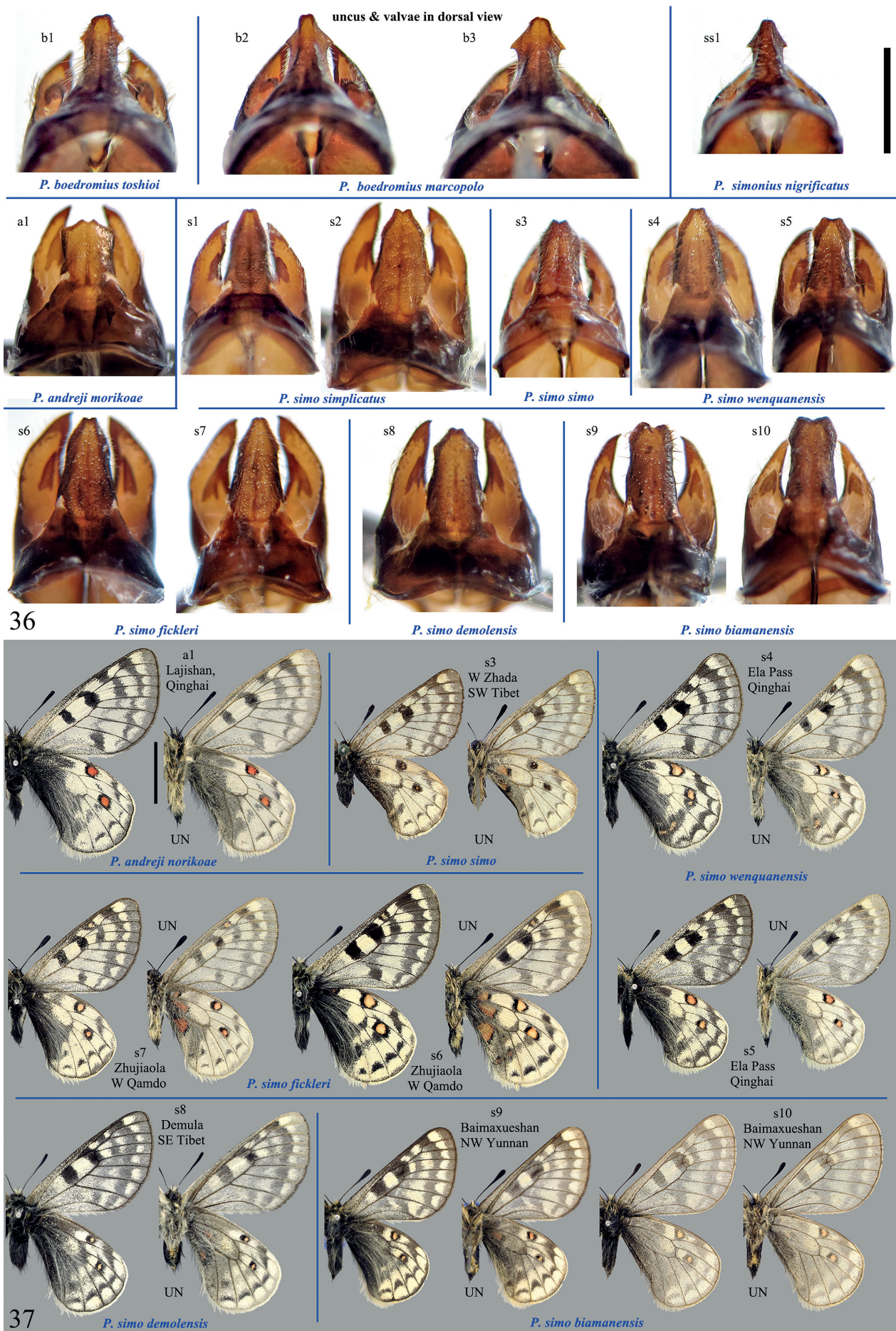


Fig. 36: ♂ genitalia of the *Parnassius simo* GRAY, [1853] - group under same scale: uncus and valvae in dorsal view (scale bar = 1 mm).
 Fig. 37: Habitus of *Parnassius andreji* EISNER, 1930 and *Parnassius simo* GRAY, [1853] under same scale (scale bar = 1 cm): upper side and underside (UN).

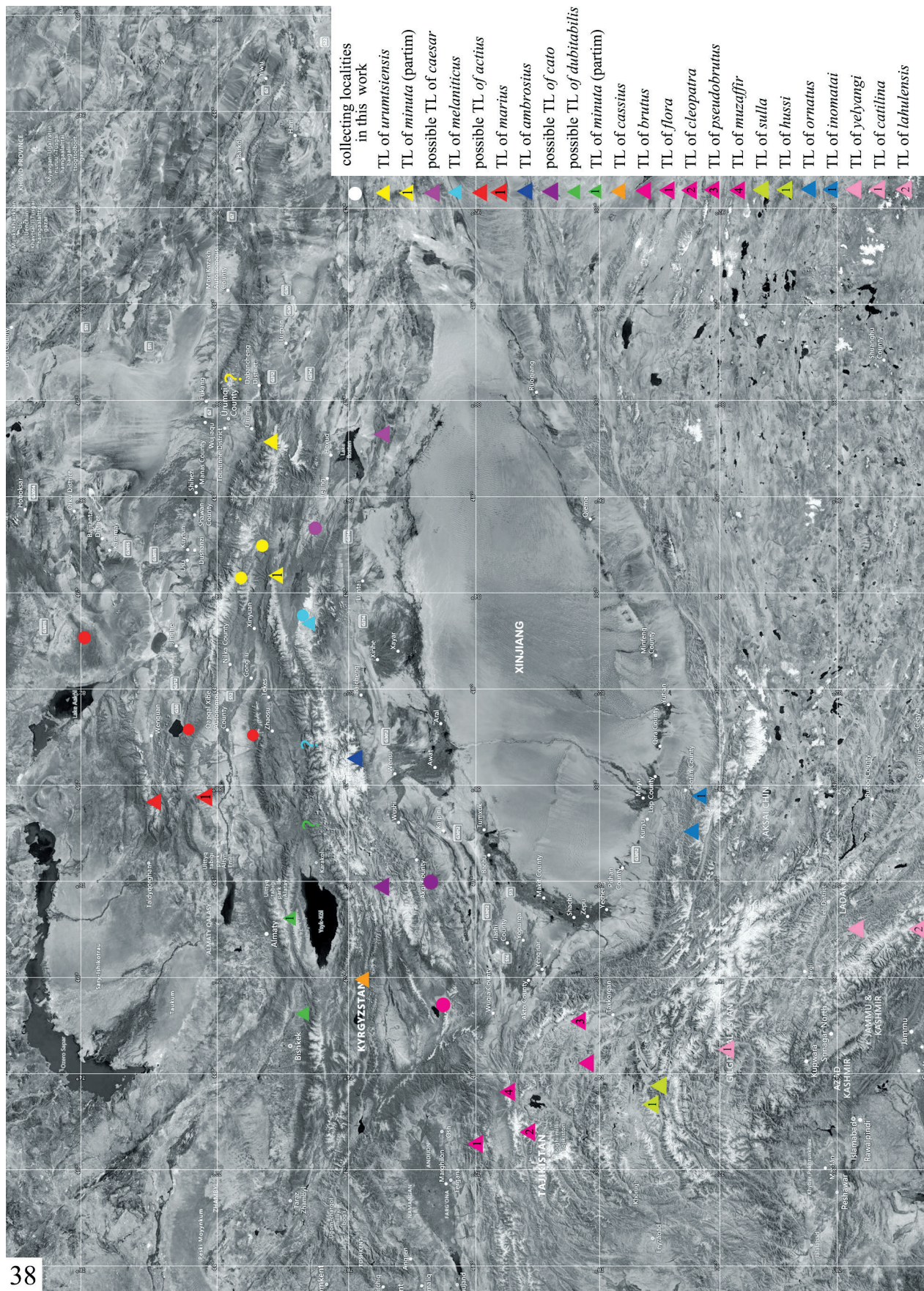


Fig. Fig. 38: Distribution of *Parnassius actius* (EVERSMANN, 1843).

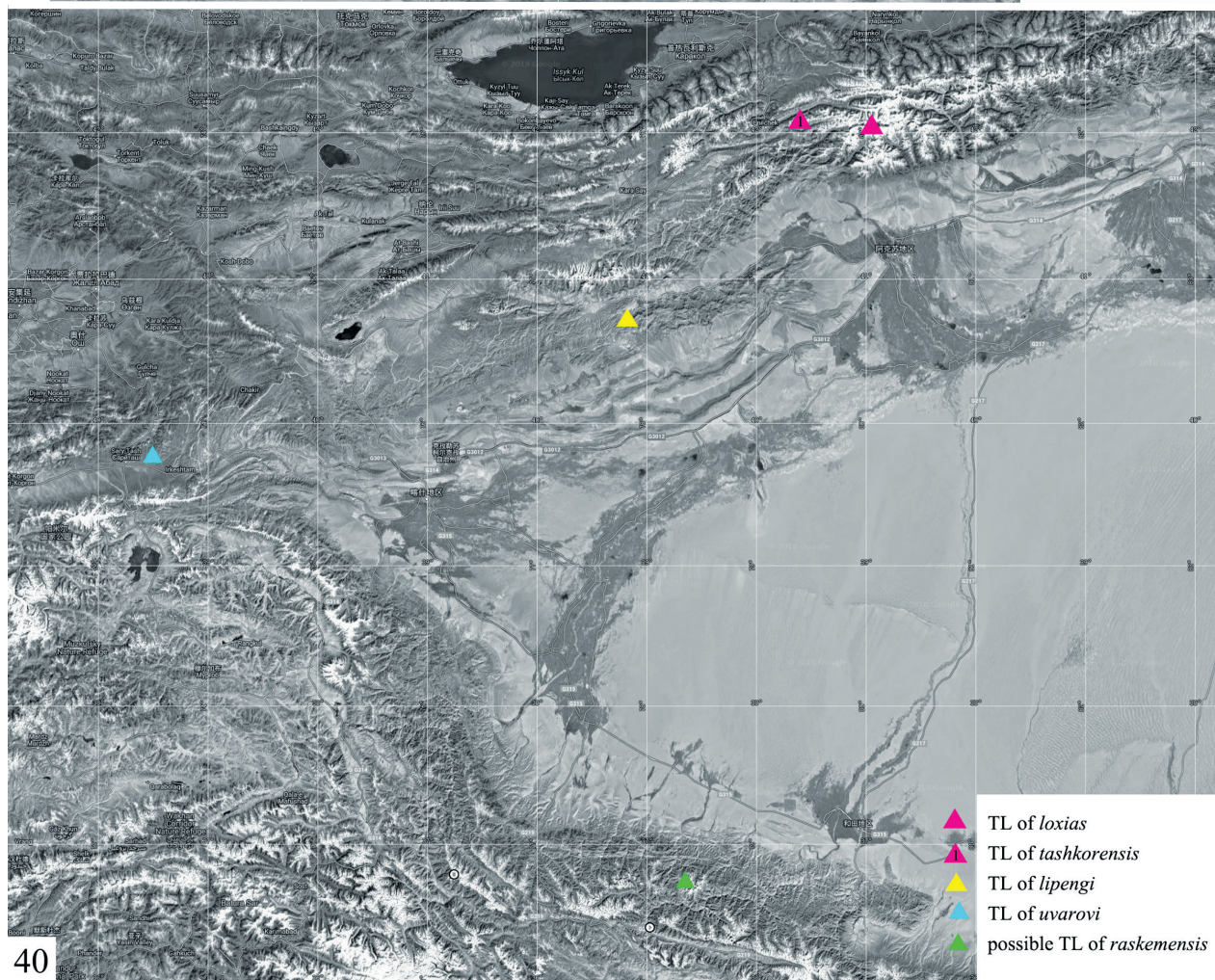
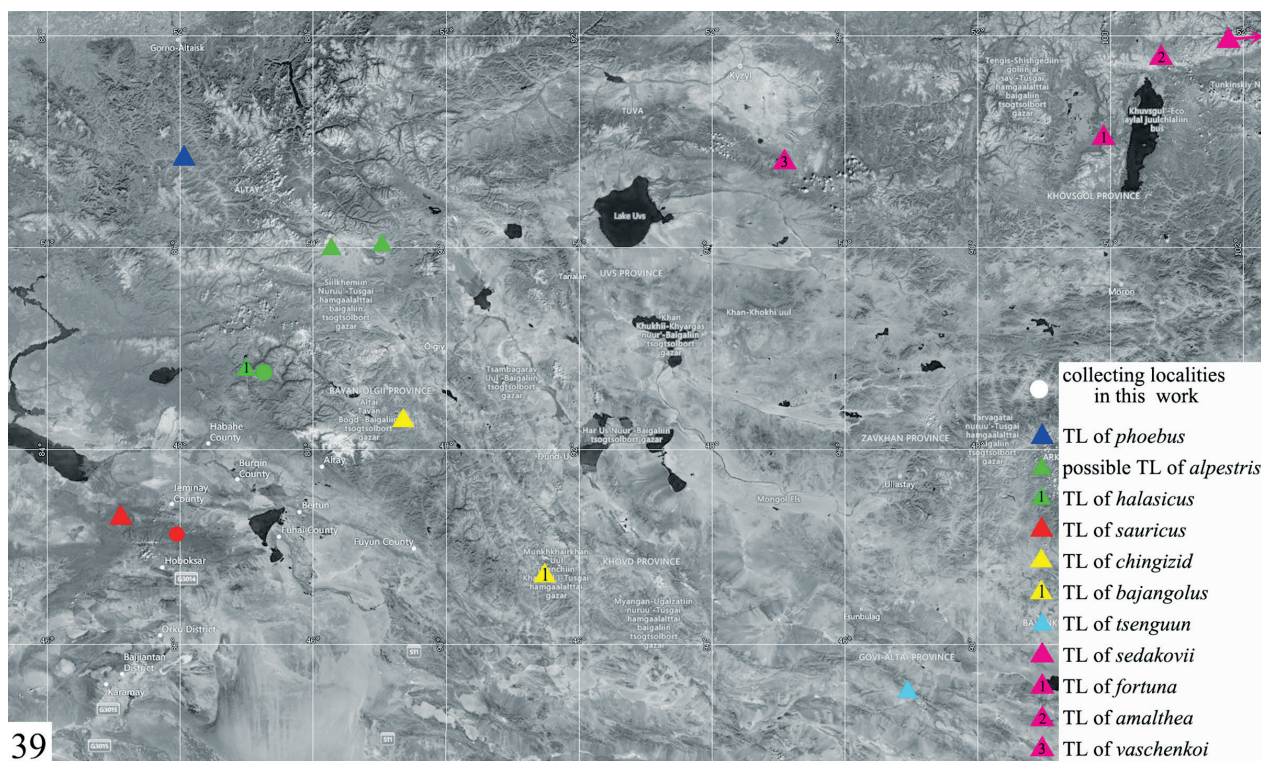


Fig. 39: Distribution of *Parnassius phoebus* (FABRICIUS, 1793) in Altai and its adjacent areas.
 Fig. 40: Distribution of *Parnassius loxias* PÜNGELER, 1901.

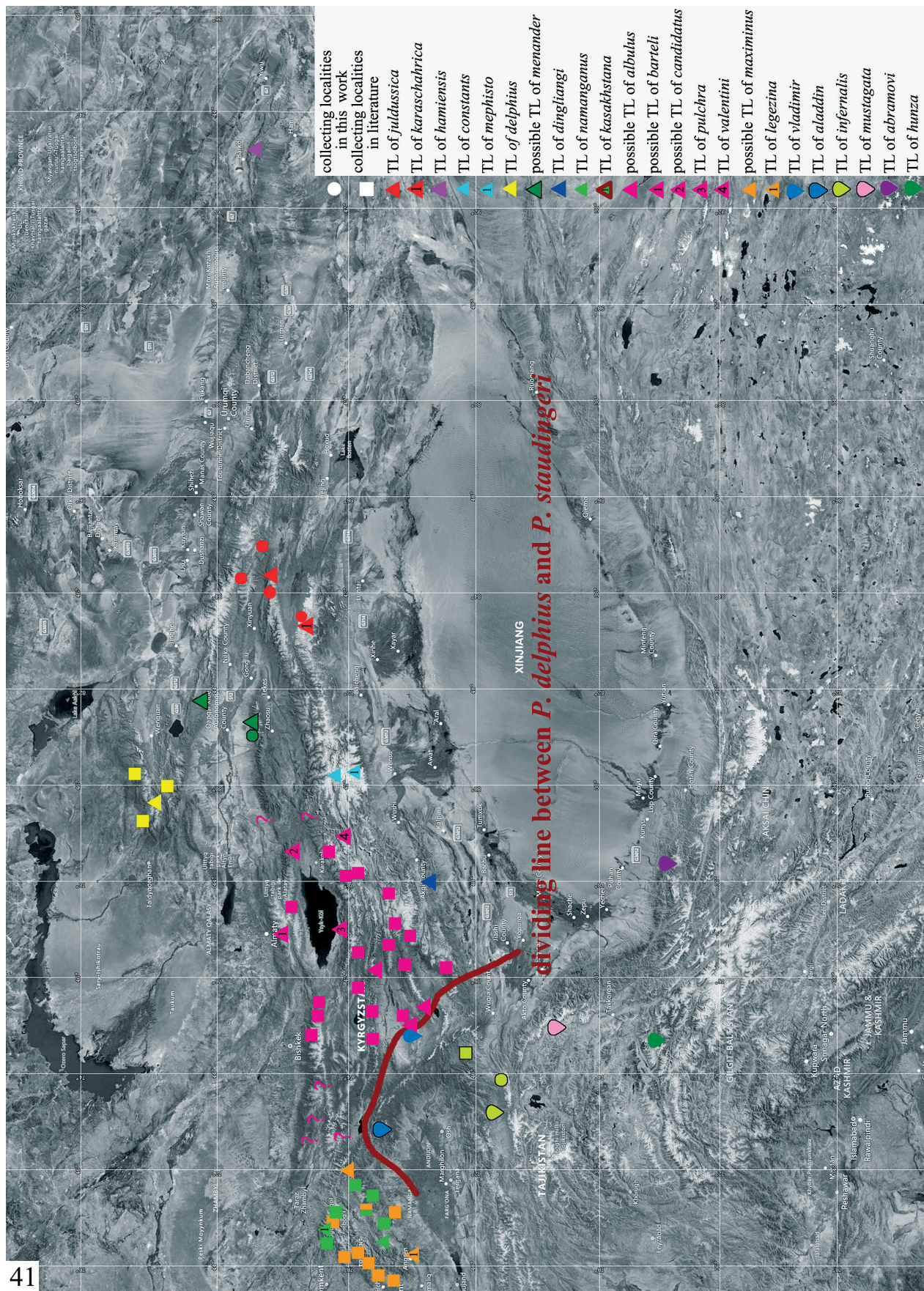


Fig. 41: Distribution of *Parnassius delphioides* (EVERSMANN, 1843) and Chinese subspecies of *P. staudingeri* BANG-HAAS, 1882 and *P. cardinal* GRUM-GRSHIMAILO, 1887.

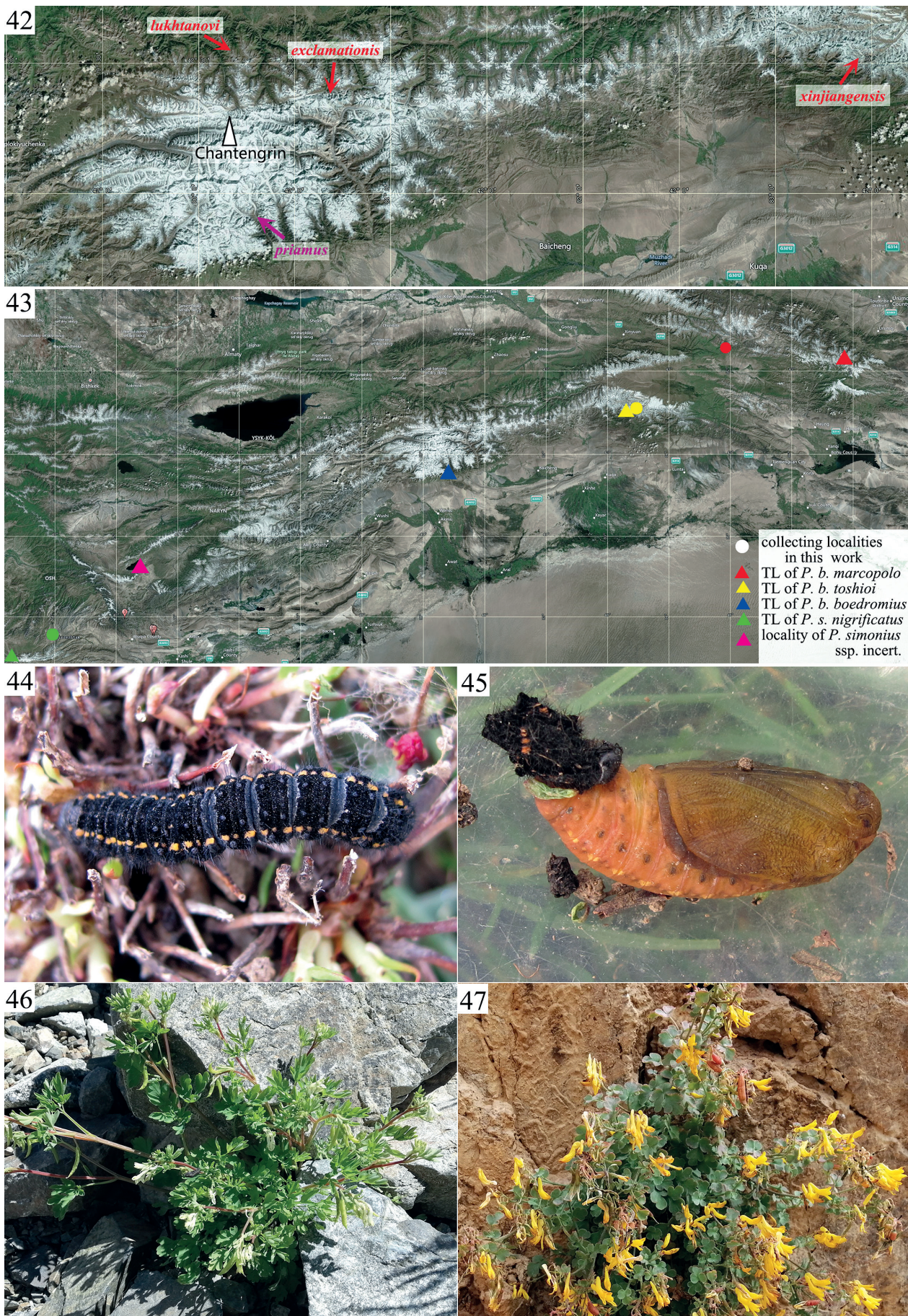


Fig. 42: Distribution of *P. patricius* NIEPALT, 1911 around Chantengri. Fig. 43: Distribution of *P. boedromius* PÜNGELER, 1901 and *P. simonius* STAUDINGER, 1883 in Chinese limit. Fig. 44: Last instar larva of *P. ruckbeili* DECKERT, 1909. Fig. 45: Pupa of *P. ruckbeili* DECKERT, 1909. Fig. 46: Foodplant of *P. phoebus sauricus* LUKHTANOV, 1999. Fig. 47: Foodplant of *P. loxias lipengi* subsp. nov.



Figs. 48-55: Biotopes: 48- *P. actius* (EVERSMANN, 1843) at Guozigou; (49) *P. actius* (EVERSMANN, 1843) and *P. delphius* (EVERSMANN, 1843) at Angrit-daban; (50) *P. actius* (EVERSMANN, 1843), *P. boedromius* PÜNGELER, 1901 and *P. delphius* (EVERSMANN, 1843) at Aiken-daban; (51) *P. apollonius* (EVERSMANN, 1847) at Balluk Mts.; (52) *P. ariadne* (LEDERER, 1853) and *P. apollo* (LINNAEUS, 1758) at Saur Mts.; (53) *P. actius* (EVERSMANN, 1843), *P. boedromius* PÜNGELER, 1901, *P. patricius* NIEPELT, 1911 and *P. delphius* (EVERSMANN, 1843) at Telmed-daban; (54) *P. ruckbeili* DECKERT, 1909 at Karlik Mts.; (55) *P. phoebus* (FABRICIUS, 1793) and *P. teneidius* EVERSMANN, 1851 at Saur Mts.



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Figs. 56-63: Travel records and biotopes: (56) sculptures at Ulugqat; (57) Kyrgyz wedding at Akqi; (58 & 59) biotopes of *P. actius* (EVERSMANN, 1843) and *P. delphius* (EVERSMANN, 1843) at Akqi; (60) biotope of *P. staudingeri* BANG-HAAS, 1882 and *P. tianschanicus* OBERTHÜR, 1879 at Irkeshtam; (61) biotope of *P. staudingeri* BANG-HAAS, 1882 and *P. simonius* STAUDINGER, 1883 at Irkeshtam; (62) members of the 2019 expedition: from left to right: L. DING, H. HUANG, S.-Y. LANG and P. LI (magnification see page 264; (63) biotope of *P. actius* (EVERSMANN, 1843) and *P. simonius* STAUDINGER, 1883 at Torugart Pass.