

## Notes on the *Plebejus christophi* (Staudinger, 1874) (Lepidoptera: Lycaenidae) species group of China, with a description of a new species from the Eastern Tian Shan

### О группе видов *Plebejus christophi* (Staudinger, 1874) (Lepidoptera: Lycaenidae) Китая с описанием нового вида из Восточного Тянь-Шаня

A.V. Krupitsky<sup>1,2,\*</sup>, Z. Li<sup>1</sup>  
А.В. Крупицкий<sup>1,2,\*</sup>, Ч. Ли<sup>1</sup>

<sup>1</sup> Department of Entomology, Faculty of Biology, Lomonosov Moscow State University, Leninskie Gory 1, corp. 12, Moscow 119991 Russia.

<sup>1</sup> Кафедра энтомологии, биологический факультет, Московский государственный университет им. Ломоносова, Ленинские горы, д.1, корп. 12, Москва 119991 Россия.

<sup>2</sup> A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Leninsky prospekt 33, Moscow 119071 Russia.

<sup>2</sup> Институт проблем экологии и эволюции им. А.Н. Северцова РАН, Ленинский проспект, 33, Москва 119071 Россия.

\* Corresponding author. E-mail: nephurus@yandex.ru

KEY WORDS. Polyommatainae, Polyommataini, Palaearctic, Karlik Shan, Qilian Mountains, biogeography, genitalia, morphology.

КЛЮЧЕВЫЕ СЛОВА. Polyommatainae, Polyommataini, Палеарктика, Карликтаг, Цилиньшань, биогеография, гениталии, морфология.

**ABSTRACT.** A new species of the *Plebejus christophi* (Staudinger, 1874) species group, *P. fantomas* **sp.n.**, is described from China, Xinjiang Uygur Autonomous Region, Karlik Mountains. The new species differs from other members of the *P. christophi* species group in peculiar blueish colouration of the ventral side of the wings and the characters of the male genitalia. The status of the taxon originally described as *Lycaena christophi nanshanica* Forster, 1936 is clarified. It is considered as a distinct species distributed in the Qilianshan and the Altyn-Tagh mountains, *P. nanshanicus* (Forster, 1936), **comb. et stat.n.**, based on the combination of the external characters and the characters of the male genitalia. The redescription of the species is provided along with a key to closely related species of the *P. christophi* species group of Mongolia and northwestern China discussed in this paper.

**РЕЗЮМЕ.** С хребта Карлик в Синьцзянь-Уйгурском автономном районе, Китай, описан новый вид из группы *Plebejus christophi* (Staudinger, 1874), *P. fantomas* **sp.n.** Новый вид отличается от других видов группы *P. christophi* характерной голубоватой окраской испода крыльев и особенностями строения гениталий самцов. Уточнён статус таксона, изначально описанного как *Lycaena christophi nanshanica* Forster, 1936. На основе признаков внеш-

ней морфологии и признаков генитального аппарата самцов он трактуется как отдельный вид, *P. nanshanicus* (Forster, 1936), **comb. et stat.n.**, распространённый на хребтах Цилиньшань и Алтынтаг. Приводится переописание вида и ключ для определения близкородственных видов группы *P. christophi* Монголии и Северо-Западного Китая, рассматривающихся в статье.

### Introduction

The *Plebejus christophi* (Staudinger, 1874) species group comprises about 20 species distributed from Southwest Asia to China through Central Asia and the Himalayas [Krupitsky *et al.*, 2021]. Mountains and deserts of Central Asia are known as the biodiversity hotspots of this group: the majority of the species were described during the last 25 years from Kazakhstan, Kyrgyzstan, Tadjikistan, China and Mongolia [Churkin, Zhdanko, 2004, 2008; Zhdanko, Churkin, 2004; Churkin, Pletnev, 2012; Yakovlev, 2012; Churkin *et al.*, 2019]. Five taxa of the *P. christophi* group were described from the Xinjiang Uygur Autonomous Region of China: *P. rogneda* (Grum-Grshimailo, 1890) (type locality: 60 km W Kashgar, Myin-Ola), *P. choltagi* Zhdanko et Churkin, 2001 (type locality: Kholtag Mts.), *P. maidan-tagi* Zhdanko et Churkin, 2001 (type locality: Uch-Tur-

phan vic., Taushkan-Darya R.), *P. arina* Zhdanko, 2002 (type locality: southern slopes of the Kakshaal Too Mts., Aksu River valley), *P. murza* Churkin et Zhdanko, 2004 (type locality: East Tian Shan, NNW Balguntai v., road Yangi – Narat). Additionally, the taxon *nanshanica* Forster, 1936 was described from the border of Qinghai and Gansu provinces (type locality: Qilianshan Mts., Dingtsiangmiau Pass) as a subspecies of *P. christophi*. Most of these taxa, except *P. rogneda*, are known only from the type localities and are represented in collections only by the type specimens. Analyzing the distribution of the mentioned taxa, it can be concluded that most of them are known from the Central Tian Shan. It is noteworthy that the taxa of the *P. christophi* group are not recorded so far from the easternmost ranges of the Eastern Tian Shan, despite the fact that several taxa were described from the Mongolian Altai and the Dzungarian Gobi in Mongolia, close to the Chinese border [Churkin *et al.*, 2019]. Moreover, the status of the taxon *nanshanica* remains unclear.

In the present paper, we describe a peculiar new species of the *P. christophi* group from the Karlik Mountains in the Eastern Tian Shan and clarify the status of described as *Lycaena christophi nanshanica*, the taxon of this group that has the easternmost distribution originally, along with its redescription.

## Material and methods

The material of this study was collected by the first author during his field studies in Gansu Province and Xinjiang Uygur Autonomous Region in 2016.

The dissection, photography of specimens and image processing techniques were described in detail earlier [Krupitsky *et al.*, 2015]. Images of the genitalia were taken with a Canon EOS 6D digital camera equipped with a Canon MP-E 65 mm f/2.8 lens, using two Micromed Dual Goose illuminators. For wing venation, the Comstock-Needham nomenclature adapted for butterflies [Miller, 1970] was used. The nomenclature of the male genitalia and terms used for the colouration and wing pattern follow Krupitsky *et al.* [2021]. The distribution map was generated using SimpleMappr [Shorthouse, 2010] and then edited using Adobe Photoshop CS6.

The specimens of the following taxa from the collection of the first author were compared with the species in question: *P. anikini* Yakovlev, 2012 (2 ♂, 1 ♀, MONGOLIA, Govi-Altai Prov., Dzungarian Gobi, Adzh-Bogd Mts., 10 km ESE Altai somon, Hadat-Miangan-Bulak spring, N 44°34'30" E 95°02'17", 1500 m, K.A. Kolesnichenko leg.), *P. germani* Yakovlev, 2012 (1 ♂, MONGOLIA, Khovd Prov., 25 km WSW Uench, N 45°57'44" E 91°45'37", 1150 m, 6.VII.2018, S.V. Churkin leg.), *P. chrisreai* Churkin, Kolesnichenko & Yakovlev, 2019 (1 ♂, 1 ♀, paratypes, MONGOLIA, Khovd Prov., Dzungarian Gobi, Ushig spring, N 45°34'57" E 90°56'25", 1200–1300 m, 27.06.2018, S.V. Churkin leg.).

Abbreviations of the collections are as follows: AKM, private collection of Anatoly Krupitsky, Moscow, Russia; ZMMU, collection of Zoological Museum of Moscow State University, Russia.

## Taxonomic account

### *Plebejus fantomas* Krupitsky et Li, sp.n.

Figs 1–7.

**MATERIAL.** **Holotype** ♂ (Figs 1, 3–7), CHINA, Xinjiang-Uyghur Autonomous Region, Tian Shan Mts., Karlik Shan Range S slope, 53<sup>rd</sup> km Hami–Barkol road, N 43°13'18" E 93°50'37", 1850–2000 m, 6.VII.2016, A.V. Krupitsky leg. (ZMMU).

**Paratypes:** 5 ♂♂, 2 ♀♀, same label as in holotype (AKM).

**DESCRIPTION.** **Male** (holotype) (Fig 1). Antenna black, white-ringed at base of antennomeres, club dark. Eye brown, surrounded with white scales. Frons black, top of head dark with white hairs. Palpus: 2nd palpomere white with black scales, 3rd palpomere dark. Thorax: dark brown with bluish grey hairs dorsally, white ventrally. Legs: femur and tibia white, tarsus brown. Abdomen: dark with bluish-grey hairs dorsally, whitish ventrally. Forewing length 16.0 mm, wingspan 30.0 mm. Dorsal surface of forewing blue with light purple hue, veins black near margin, base with light blue hairs, costal area and veins Sc–R4+5 with suffusion of white scales. Margin black, thin. Fringe white with blackish inner part. Ventral surface of forewing light beige with base and veins strongly suffused with bluish scales. Discal spot large, oblong, surrounded with white scales. Postdiscal pattern well-developed, slightly curved, consisting of four large dark brown spots in spaces M1–Cu1 and two small spots in spaces R4+5 and Cu2. Submarginal markings blurred, rather well-developed in spaces M3–Cu2, represented only by diffused scales in R3–M2. Margin dark, very narrow. Fringe white. Dorsal surface of hindwing blue with light purple tint, veins black near margin, base with light blue hairs, space Sc+R1 brownish black, blue field in space Rs with small indentation, space 2A brownish black with bluish grey scales. Margin brownish black, broad, about 1 mm. Fringe white with brownish inner part. Ventral surface of hindwing light beige with very extensive bluish suffusion covering half of wing and reaching submarginal pattern along veins. Basal, discal and postdiscal spots complete and well-developed. Submarginal pattern surrounded by whitish scales, complete, each element of pattern consisting of V-shaped internal thin black stroke, well-developed orange lunule and large external spot of azure metallic scales. Black margin thin, broadened near veins. Fringe white.

Male genitalia (Figs 3–7). Labis long and thin, with rounded apex; falx rather short, very thin; dorsal edge of valva with straight proximal part gradually turning into shorter straight distal part angled at about 120°, ventral edge wavy, with moderate rounded projection in distal portion turning into straight lower distal projection; upper distal projection of valva well-developed, with large prominent inwardly directed roughly serrated appendage, lower distal projection smaller, with small claw-like pointed tooth; distal part of dorsal edge and ventral edge of valva with inner folds; juxta V-shaped, branch slightly curved, thick, with thin rounded apex; aedeagus rather long, slightly curved, with straight stout basal 2/3 and straight distal third gradually pointed to apex.

Individual variation. Forewing length varies from 13.0 to 15.0 mm. Dorsal surface of hindwing of some specimens with more or less developed black submarginal lunules.

**Female** (Fig. 2). Head, thorax and abdomen as in male. Forewing length 15.0 mm, wingspan 26.0 mm. Dorsal surface of forewing brown with blue suffusion in basal and discal area, most intensive in cell and space Cu2, and suffusion of whitish scales along costal area, veins Sc–R4+5 and stems of veins, and small groups of whitish scales in spaces near margin;

transverse vein marked with blue and whitish scales. Fringe whitish with brownish inner part. Ventral surface of forewing as in male but darker, beige, orange lunules of submarginal line well-developed in all spaces. Dorsal surface of hindwing brown with blue basal suffusion, blue suffusion in space Cu2 and scattered blue scales along veins Cu1–2A, space 2A brownish black with bluish grey scales, spaces Rs–Cu2 with developed dark U-shaped lunules bordered with whitish strokes externally and more or less developed orange suffusion internally, most developed in spaces M3–Cu2. Fringe whitish with brownish inner part. Ventral surface of hindwing as in male but darker, beige, with turquoise basal suffusion; orange lunules of submarginal pattern developed stronger, with larger orange elements; metallic scales of submarginal pattern turquoise.

Female genitalia: not studied.

Individual variation. The other known female specimen is somewhat smaller (13.5 mm, wingspan 23.0 mm). Dorsal surface of wings with less developed blue suffusion.

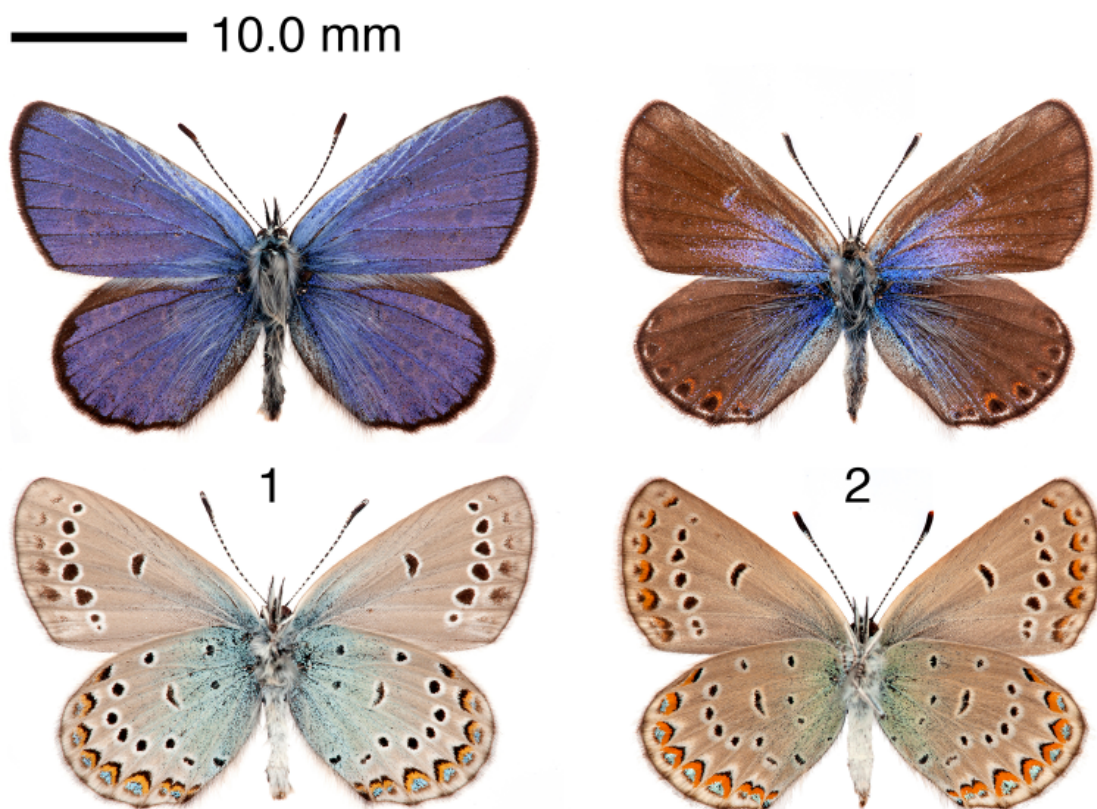
**DIFFERENTIAL DIAGNOSIS.** Males of *Plebejus fantomas* **sp.n.** can be readily distinguished from all the known *Plebejus* species in the very extensive bluish suffusion covering the half of the ventral side of the hindwing and reaching the submarginal pattern along veins; this peculiar colouration resembles that of some species of the genus *Patricius* Balint, 1991. The only somewhat similar species is *P. germani* Yakovlev, 2012 described from Khovd Province in Mongolia, close to the Chinese border. Externally, *P. fantomas* **sp.n.** differs from *P. germani* in the mentioned developed blueish suffusion (less developed blueish suffusion

limited by the basal area in *P. germani*, cf. figs 1–3 in plate 2 in Churkin *et al.* [2019]). Females of the new species differ from those of *P. germani* in the developed blue colouration of the dorsal side of the wings and well-developed whitish scales on the dorsal side of the hindwing (less developed blue suffusion limited by the base of the wings dorsally in hindwing with nearly lacking white scales in *P. germani*, cf. figs 4–6 in plate 1 in Churkin *et al.* [2019]). Moreover, both males and females of *P. fantomas* **sp.n.** differ in smaller rounded submarginal lunules of the ventral side of the hindwing separated from the postdiscal line of spots (elongated submarginal lunules connected with postdiscal line of spots by white strokes in *P. germani*, cf. figs 1–3 in plate 2 in Churkin *et al.* [2019]).

In the male genitalia, the new species differs from *P. germani* in the thin labis, gradually curving dorsal edge of the valva, smaller upper and lower distal projections of the valva and straighter less arcuated aedeagus (curved dorsal edge of the valva, larger distal projections of the valva, curved aedeagus in *P. germani*, cf. fig. 2 in plate 3, fig. 2 in plate 4, figs 3, 4, 6 in plate 5 in Churkin *et al.* [2019]).

Two other species of the *P. christophi* group known from Mongolia, *P. anikini* Yakovlev, 2012 and *P. chrisreai* Churkin, Kolesnichenko et Yakovlev, 2019, are characterised by different combinations of the external and genitalic characters.

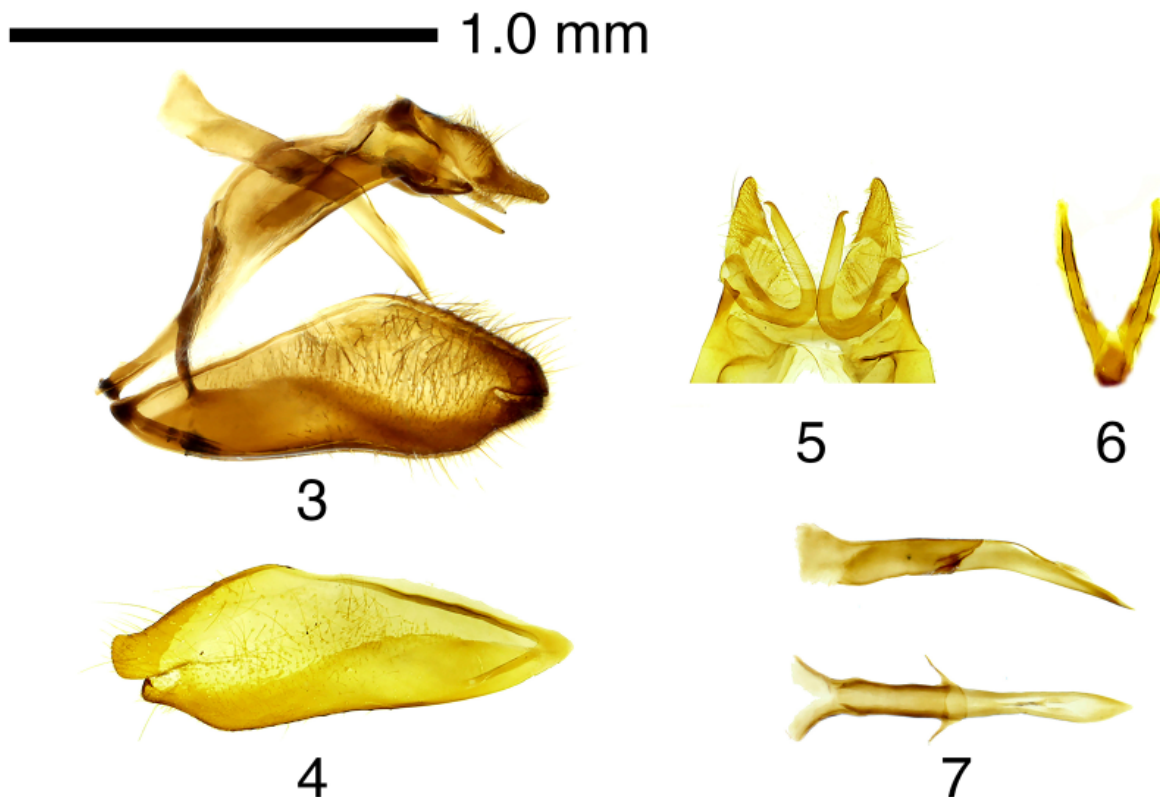
**DISTRIBUTION AND BIONOMICS.** According to the known material, the new species seems to be endemic to the Karlik Mountains in the Eastern Tian Shan, Xinjiang Uyghur Autonomous Region, China. The Karlik Mountains (also known as the Karlik Shan) is the remote easternmost part of



**Figs 1–2.** *Plebejus fantomas* **sp.n.**, imago (dorsal side above, ventral side below): 1 — holotype, male; 2 — paratype, female.

**Рис. 1–2.** *P. fantomas* **sp.n.**, имаго (вид сверху и вид снизу): 1 — голотип, самец; 2 — паратип, самка.





**Figs 3–7.** *P. fantomas* sp.n., male genitalia (holotype): 3 — lateral view; 4 — valva, lateral view; 5 — labides and falces, ventral view; 6 — juxta; 7 — aedeagus, lateral view (above), dorsal view (below).

**Рис. 3–7.** *P. fantomas* sp.n., гениталии самца (голотип): 3 — вид сбоку; 4 — вальва, вид сбоку; 5 — лопасти ункуса и ветви гнатоса, вид снизу; 6 — юкста; 7 — эдеагус, вид сбоку и вид сверху.

the Tian Shan Mountains separated by deserts from the neighbouring Bogda Shan of the Eastern Tian Shan as well as from the Mongolian Altai and the Gobi Altai Mountains. The Karlik Mountains are U-shaped. They comprise three ranges running in the east-west direction, namely the Karlik Range, the Barkol Range and the Metshin-Ula Range situated to the north of them. The Barkol Plateau is situated between these ranges. The northern slopes of the Karlik-Barkol ranges are covered with larch forests at mid altitudes, and the southern slopes are covered with dry rocky grasslands with *Caragana* shrubs.

*Plebejus fantomas* sp.n. was found at mid-altitudes (1850–2000 m a.s.l.) on the southern slope of the easternmost Barkol Range, being strongly isolated from all the known populations of the somewhat similar *P. germani* from Mongolia by the southeastern Dzungarian Gobi (Fig. 15). The same distribution pattern is known for the species of the *Neolycaena davidi* species group [Krupitsky, 2021]. The new species inhabits dry rocky grassland (Fig. 16) covered with *Caragana leucophloea* Pojark. According to our field observations, shrubs of the latter are used by adults for hiding during rainy weather (Fig. 17). Our search for the host plant was unsuccessful, but we suggest that the new species also utilizes *Caragana halodendron* (Pall.) Dum. Cours., as do the species of the *P. christophi* species group described from Mongolia [Churkin *et al.*, 2019].

Most of the collected specimens were rather worn, so it can be suggested that the flight period is from the mid-June to mid-July. Individuals of the new species were found flying

together with *Hyponephele przewalskyi* Dubatolov, Sergeev et Zhdanko, 1994, *H. kirghisa chamyla* (Staudinger, 1901), *Hipparchia autonoe sibirica* (Staudinger, 1861), *Pseudochazara hippolyte mercurius* (Staudinger, 1887), *Melitaea didyma ambra* Higgins, 1941, *Tongeia burte* Churkin, 2003, *Plebejus maracandicus* ssp., *Polyommatus eros aloisi* Bálint, 1988, *Plebica amanda* ssp. and *Neolycaena markhasi* Krupitsky, 2021 recently described from this locality.

**ETYMOLOGY.** The name is named after Fantômas, the fictional villain wearing a blue mask played by Jean Marais in a popular film trilogy in 1964–1967. The name refers to the blue underside of the wings of the new species.

*Plebejus nanshanicus* (Forster, 1936), **comb. et stat.n.**  
Figs 8–14.

*Lycaena christophi nanshanica* Forster, 1936: 84. Type locality: “Paß Dingsiangmiao, Richthofengebirge, Kansu [sic] 2800 m” [China, Qinghai Prov., Qilianshan (= Nanshan) Mts., Huzhu Tu Autonomous County, Datong River valley, ca. 36°55'00.0"N 102°31'00.0"E, 2800 m].

**MATERIAL.** 29 ♂♂, 26 ♀♀, CHINA, Gansu Prov., Qilianshan Mts., Sunan Yugur Autonomous County, Jingtieshan work area env., N 39°18'46"E 97°56'29", 2700–2750 m, 08–11.VII.2016, A.V. Krupitsky leg.; 1 ♂, CHINA, Gansu Prov., Altyn-Tagh Mts., Aksay Kazakh Autonomous County, 30 km S

Aleteng Town, 39°24'32"N 94°17'50"E, 2800 m, 13.VII.2016, A.V. Krupitsky leg.

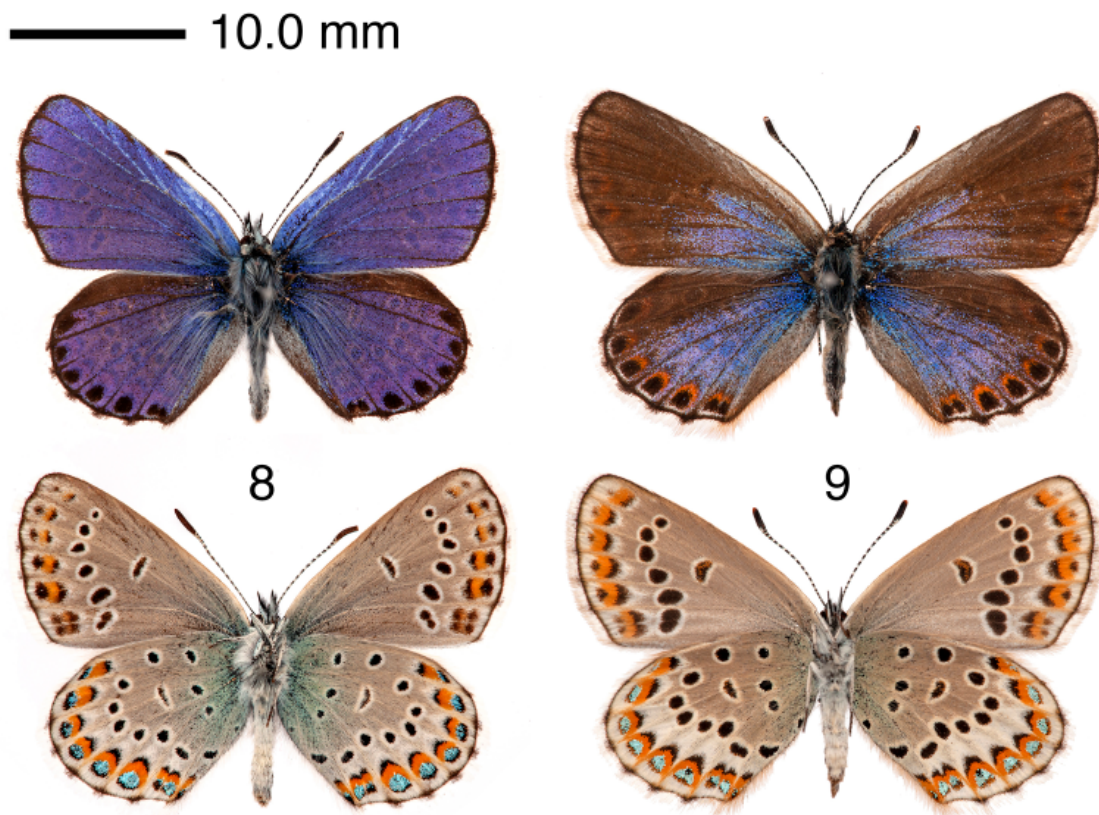
**TAXONOMY.** The taxon was originally described as a subspecies of *P. christophi* based on two males from the Qilianshan Mts. near the border of Qinghai and Gansu provinces, China. In the original description Forster compared it with other taxa of the *P. christophi* species group known at that time. The main differences mentioned in the description are the developed basal suffusion of the ventral side of the wings and the large very contrasted submarginal pattern of the ventral side of the hindwing. Since its description the taxon *nanshanica* has been forgotten in the taxonomic literature for nearly 90 years and, consequently, has never been considered in the genus *Plebejus*: before the 1940s the species currently treated in this genus were usually attributed to the genus *Lycaena*.

In 2016, a large series of an unusually looking *Plebejus* species was collected by the first author near Jingtieshan village in the western Qilianshan Mountains, Gansu Province. Examination of these specimens revealed that they correspond to the description of the obscure taxon *nanshanica*, which should be treated as a distinct species, *P. nanshanicus*, **comb. et stat.n.**

**REDESCRIPTION.** **Male** (Fig 8). Antenna black, white-ringed at base of antennomeres, club dark. Eye brown, surrounded with white scales. Frons black, top of head dark with white hairs. Palpus: 2nd palpomere white with black scales, 3rd palpomere dark. Thorax: dark brown with bluish grey hairs dorsally, white ventrally. Legs: femur and tibia white, tarsus brown. Abdomen: dark with bluish-grey hairs dorsally,

whitish ventrally. Forewing length 12.0 – 16.0 mm, wingspan 24.0–27.0 mm. Dorsal surface of forewing blue with purple tint, veins black near margin, base with light blue hairs, costal area and veins Sc–R4+5 with suffusion of whitish scales. Margin black, thin. Fringe checkered, with blackish inner part. Ventral surface of forewing light beige with base slightly suffused with bluish scales. Discal spot large, reniform, surrounded with white scales. Postdiscal pattern well-developed, slightly curved, consisting of four large dark brown spots in spaces M1–Cu1 and two small spots in spaces R4+5 and Cu2. Submarginal markings well-developed, consisted of black and orange elements surrounded with whitish scales. Margin dark, narrow, wavy. Fringe white, with groups of small hairs near veins. Dorsal surface of hindwing blue with purple tint, veins black near margin, base with blue hairs, space Sc+R1 brownish black, blue fields in spaces Rs–CuA2 with large black spots, space 2A bluish grey. Margin brownish black, narrow. Fringe checkered, white with brownish inner part. Ventral surface of hindwing light beige with bluish basal suffusion reaching basal group of spots. Basal, discal and postdiscal spots complete and well-developed. Submarginal pattern surrounded with whitish strokes reaching postdiscal row of spots, complete, each element of pattern consisting of V-shaped internal black stroke, well-developed orange lunule, and large external spot of blue metallic scales. Black margin thin, broadened near veins. Fringe checkered.

Male genitalia (Figs 10–14). Labis long and thin, with pointed apex; falx rather short, stout; dorsal edge of valva with straight proximal part gradually turning into shorter straight distal part



**Figs 8–9.** *P. nanshanicus* **comb. et stat.n.**, imago (dorsal side above, ventral side below): 8 — male; 9 — female.

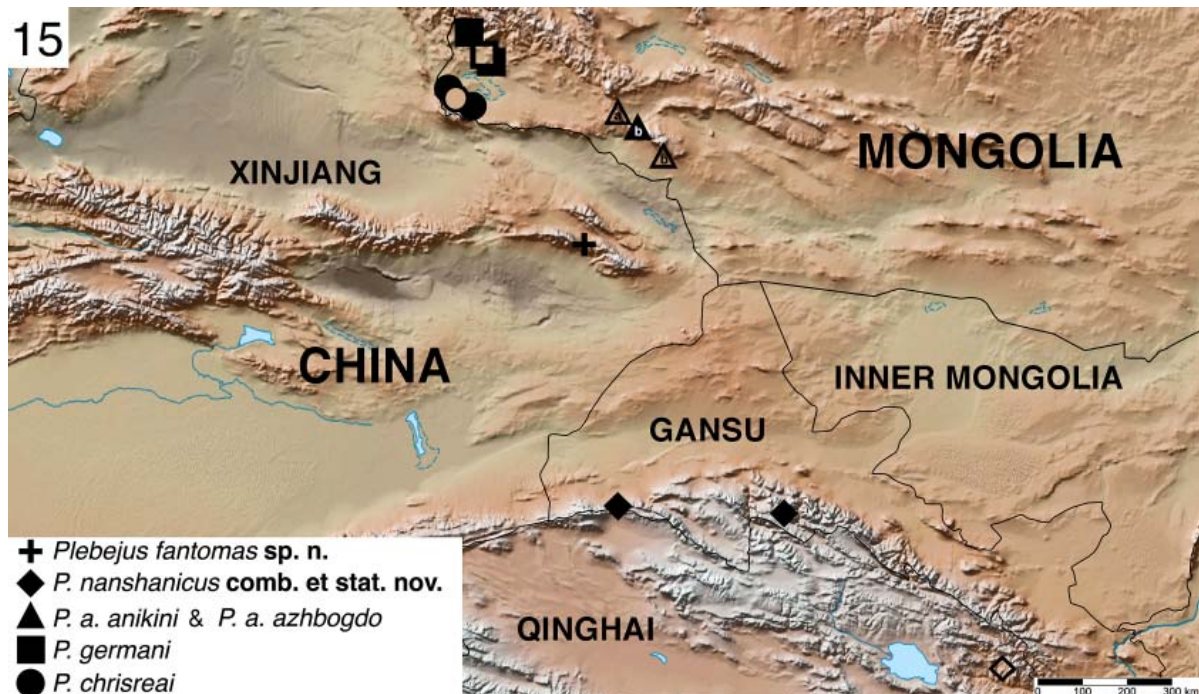
**Рис. 8–9.** *P. nanshanicus* **comb. et stat.n.**, имаго (вид сверху и вид снизу): 8 — самец; 9 — самка.





**Figs 10–14.** *P. nanshanicus* **comb. et stat.n.**, male genitalia: 10 — lateral view; 11 — valva, lateral view; 12 — labides and falces, ventral view; 13 — juxta; 14 — aedeagus, lateral view (above), dorsal view (below).

**Рис. 10–14.** *P. nanshanicus* **comb. et stat.n.**, гениталии самца: 10 — вид сбоку; 11 — вальва, вид сбоку; 12 — лопасти ункуса и ветви гнатоса, вид снизу; 13 — юкта; 14 — эдеагус, вид сбоку и вид сверху.



**Fig. 15.** Distribution of some taxa of *P. christophi* species group in China and Mongolia based on examined specimens and published data [Forster, 1936; Churkin *et al.*, 2019]; blank characters refer to type localities; a — *P. anikini anikini*, b — *P. a. azhbogdo*.

**Рис. 15.** Распространение некоторых таксонов группы *P. christophi* в Китае и Монголии на основе исследованных экземпляров и данных литературы [Forster, 1936; Churkin *et al.*, 2019]; контурные фигуры обозначают типовые местонахождения; а — *P. anikini anikini*, б — *P. a. azhbogdo*.

angled at about 135°, ventral edge wavy, with small rounded projection in distal portion turning into straight lower distal projection; upper distal projection of valva well-developed, with large prominent inwardly directed finely serrated appendage, lower distal projection smaller, with small claw-like pointed tooth; distal part of dorsal edge and ventral edge of valva with inner folds; juxta U-shaped, branch of juxta straight, thick, with rounded apex; aedeagus rather long, curved, with straight very stout basal part abruptly turning into distal part gradually narrowing to apex.

Individual variation. Ventral surface of hindwing of some specimens with more or less developed black submarginal lunules.

**Female** (Fig. 9). Head, thorax and abdomen as in male. Forewing length 13.0 – 16.0 mm, wingspan 25.0 – 27.0 mm. Dorsal surface of forewing brown with violet-blue suffusion covering 2/3 of wing from base to postdiscal area, most intensive in cell and spaces Cu1–2A. Fringe checkered. Ventral surface of forewing as in male but darker, beige, orange lunules of submarginal line well-developed in all spaces. Dorsal surface of hindwing brown with strong violet-blue suffusion reaching submarginal pattern and developed in all spaces but Sc+R1, Rs and 2A; spaces separated by dark brown veins; submarginal lunules consisting of internal V-shaped orange stroke, large dark brown spot and whitish marginal stroke developed in spaces M1–2A. Fringe checkered. Ventral surface of hindwing as in male but darker, with less developed basal suffusion, more contrasted; orange lunules of submarginal

pattern developed more strongly, with larger orange elements; metallic scales of submarginal pattern turquoise.

Female genitalia: not studied.

Individual variation. Intensity of dorsal blue suffusion slightly varies between females.

**DIFFERENTIAL DIAGNOSIS.** Some external characters of *P. nanshanicus* **comb. et stat.n.** resemble those of the species of the recently described Mongolian complex of the *P. christophi* group [Churkin *et al.*, 2019], *P. germani*, *P. anikini* and *P. chrisreai*, but generally the species in question clearly differs from the latter in the peculiar colouration and pattern of the males and females as well as in the male genitalia. The males of *P. nanshanicus* **comb. et stat.n.** differ from the males of *P. germani*, *P. anikini* and *P. chrisreai* in the combination of the checkered fringe and margin of the wings, well-developed dark submarginal lunules of the dorsal side of the hindwing and large metallic submarginal lunules connected by the white strokes with the postdiscal row of spots (the fringe and the margin of the wings are only slightly checkered in some specimens of all species from the Mongolian complex of the *P. christophi* group, dark submarginal lunules of the dorsal side of the hindwing are slightly developed in some specimens of *P. germani* and *P. chrisreai*, submarginal lunules are smaller in *P. anikini* and slightly connected with the postdiscal row of spots in males of *P. germani*). The females of *P. nanshanicus*



**Figs. 16–19.** *Plebejus* spp., habitats of studied species and adults in nature: 16 — type locality of *P. fantomas* **sp.n.**; 17 — *P. fantomas* **sp.n.**, male in nature (photo by A. Marusov); 18 — habitat of *P. nanshanicus* **comb. et stat.n.** near Jingtieshan work area; 19 — *P. nanshanicus* **comb. et stat.n.**, female in nature (photo by A. Marusov).

**Рис. 16–19.** *Plebejus* spp., биотопы изучаемых видов и имаго в природе: 16 — типовое местонахождение *P. fantomas* **sp.n.**; 17 — *P. fantomas* **sp.n.**, самец в природе (фото А. Марусова); 18 — биотоп *P. nanshanicus* **comb. et stat.n.** в окрестностях пос. Цзяньгешань; 19 — *P. nanshanicus* **comb. et stat.n.**, самка в природе (фото А. Марусова).



**comb. et stat.n.** differ from those of *P. germani*, *P. anikini* and *P. chrisreai* in the strong violet-blue suffusion of the dorsal side of the wings combined with well-developed orange lunules of the dorsal side of the hindwing (only basal violet-blue suffusion is developed in the females of *P. germani*, very light blue fields in *P. chrisreai* and dark lunules lacking orange scales in *P. anikini*). In the pattern and colouration of the ventral side of the wing, only some females of *P. chrisreai* are somewhat similar to the species in question (cf. figs 11, 22, Plate 2 in Churkin *et al.* [2019]). In the male genitalia, *P. nanshanicus comb. et stat.n.* differs in the narrower valva with the rather narrow upper distal projection (broader valva with broader upper distal projection in the species from the Mongolian complex of the *P. christophi* group) and peculiar aedeagus with very stout base abruptly turning into distal part gradually pointed to apex (basal part of aedeagus smaller in *P. germani*, *P. anikini* and *P. chrisreai*).

Additionally, *P. nanshanicus comb. et stat.n.* differs from *P. fantomas sp.n.* described above in the checkered fridge and margin of the wings, absence of extensive bluish suffusion of the ventral side of the wings in males and very well-developed white contrasted pattern of the ventral side of the hindwing.

**DISTRIBUTION AND BIONOMICS.** According to the known material, *P. nanshanicus comb. et stat.n.* inhabits the Qilianshan Mountains. Additionally, one male was collected in the Altyn-Tagh Mountains, a series of mountain ranges connecting the Kunlun Mountains and the Qilianshan Mountains. We therefore believe that it inhabits the mid-altitudes of the entire Qilianshan Mountains, Altyn-Tagh Mountains and, probably, part of the Kunlun Mountains, being isolated both from *P. fantomas sp.n.* and the Mongolian complex of the *P. christophi* group by the northwestern and northern Gobi Desert, respectively (Fig 15).

Adults of this species were found in abundance on very dry rocky slopes and in bottoms of gorges covered with various xerophytic plants (Fig. 18) actively flying during sunny weather and resting on stones and grasses on cloudy days (Fig. 19). Imagines were associated with shrubs of *Corethroedendron multijugum* (Maxim.) B.H. Choi & H. Ohashi (Fabaceae), which may be a host plant of this species. The only observed accompanying butterfly taxa were *Lasiommata deidamia kasumi* Yoshino, 1995, *Patricius themis* (Grum-Grshimailo, 1891) and *Polyommatus sininus* (Grum-Grshimailo, 1891). Most of the collected specimens were rather fresh, so we believe that the flight period is in the first half of July.

KEY TO THE SPECIES OF *P. CHRISTOPHI* GROUP OF MONGOLIA AND NORTHWESTERN CHINA

1. Submarginal lunules of ventral side of hindwing widely separated from postdisclal line of spots ..... 2
- Submarginal lunules connected with postdisclal line of spots by white strokes ..... 3
2. Metallic scales of submarginal lunules reduced. Bluish suffusion of dorsal side of hindwing limited by postbasal area in male and basal area in female. Mongolia: Dzungarian and Transaltaian Gobi ..... *P. anikini*
- Metallic scales of submarginal lunules well-developed. Bluish suffusion of dorsal side of hindwing extended to postdisclal line in male and postbasal area in female. China: Karlik Mountains ..... *P. fantomas sp.n.*
3. Distance between submarginal lunules of dorsal side of hindwing and spots of postdisclal line larger than size of lunule. Female light blue dorsally. Mongolia: Baitag Mountains ..... *P. chrisreai*
- Distance between submarginal lunules of ventral side of hindwing and spots of postdisclal line smaller than size of

lunule or equal to latter. Female dark brown with more or less developed blue colouration dorsally ..... 4

4. Fringe checkered only on hindwing. Female dark brown dorsally, with slight basal suffusion of blue scales. Ventrally, wings of both sexes slightly contrasted, ground colour light grey in male and beige in female. Mongolia: southern Mongolian Altai ..... *P. germani*
- Fringe checkered on both wings. Female with well-developed blue suffusion dorsally. Ventrally, wings of both sexes strongly contrasted, ground colour grey. China: Qilianshan and Altyn-Tagh Mountains ..... *P. nanshanicus comb. et stat.v.*

**Acknowledgements.** We sincerely thank Sergei Churkin (Reutov, Russia) for his advices and discussion as well as for the specimens granted for comparison, Kirill Kolesnichenko (Moscow, Russia) for the specimens granted for comparison, Maxim Markhasiov (Khimki, Russia) and Anatoly Marusov (Moscow, Russia) for participation in the expeditions to China and help during fieldwork, Pyotr Petrov (Moscow, Russia) for improvements of English. The study was supported by the Russian Science Foundation, grant No. 23-74-10011 to A.K.

**Competing interests.** The authors declare no competing interests.

## References

- Churkin S.V., Zhdanko A.B. 2004. A new species of blues, *Plebejus murza* sp. n. from East Tian-Shan (Lepidoptera, Lycaenidae) // *Helios*. Vol.5. P.60–63.
- Churkin S.V., Zhdanko A.B. 2008. New taxa of blues (Lepidoptera, Lycaenidae) from Tian-Shan // *Atalanta*. Vol.39. P.297–310.
- Churkin S.V., Pletnev V.A. 2012. Taxonomic notes on the *Plebejus christophi* complex (Lepidoptera, Lycaenidae) with descriptions of new taxa // *Atalanta*. Vol.43. P.108–113.
- Churkin S.V., Kolesnichenko K.A., Yakovlev R.V. 2019. Two new taxa of *Plebejus* Kluk, 1780 (Lepidoptera, Lycaenidae) from the Gobi Desert, Mongolia // *Zootaxa*. Vol.4695. P.45–58.
- Forster W. 1936. Beiträge zur Systematik der Tribus Lycaenini unter besonderer Berücksichtigung der *argyrognomon* under der *argus* Gruppe // *Mitteilungen der Münchner Entomologischen Gesellschaft*. Bd.26. H.2. S.41–150.
- Krupitsky A.V. 2021. Taxonomy of the *Neolycaena* (*Rhymnaria*) *da-vidi* (Oberthür, 1881) species group, with the description of two new taxa from Russia and China (Lepidoptera, Lycaenidae) // *Zootaxa*. Vol.3985. P.421–431.
- Krupitsky A.V., Pljushtch I.G., Pak O.V. 2015. Taxonomic notes on the genus *Satyrium* Scudder, 1876 (Lepidoptera, Lycaenidae) of Afghanistan with description of two new taxa // *Zootaxa*. Vol.3985. P.421–431.
- Krupitsky A., Pljushtch I., Skrylnik Yu. 2021. A new species of the *Plebejus samudra* (Moore, 1874) (Lycaenidae: Polyommatainae) group from Afghanistan // *Zoology in the Middle East*. Vol.67. No.2. P.152–158.
- Miller L.D. 1970. Nomenclature of wing veins and cells // *Journal of Research on the Lepidoptera*. Vol.8. P.37–48.
- Shorthouse D.P. 2010. SimpleMappr, an online tool to produce publication-quality point maps [online]. <https://www.simplemappr.net/> (accessed 15 November 2023).
- Yakovlev R.V. 2012. Checklist of Butterflies (Papilionoidea) of the Mongolian Altai Mountains, including descriptions of new taxa // *Nota Lepidopterologica*. Vol.35. P.51–96.
- Zhdanko A.B., Churkin S.V. 2004. A new species of blues, *Plebejus kapanovi* sp. n. from East Kazakhstan (Lepidoptera, Lycaenidae) // *Helios*. Vol.5. P.64–67.