New subspecies of *Erebia anyuica* Kurentsov, 1966 and *Clossiana erda* (Christoph, 1893) from the Vostochnyy Sayan mountains, Russia (Lepidoptera: Nymphalidae)

Alexei G. Belik

Samenvatting. Nieuwe ondersoorten van *Erebia anyuica* Kurentsov, 1966 en *Clossiana erda* (Christoph, 1893) uit het oostelijke Sayangebergte, Rusland (Lepidoptera: Nymphalidae)
Erebia anyuica iltshira **ssp. n.** en *Clossiana erda kitoica* **ssp. n.** worden beschreven uit de Kitoiskiye Gol'tsy bergketen (Vostochnyy Sayan gebergte); beide soorten waren tot nu toe slechts bekend uit Noordoost-Siberië.

Résumé. Nouvelles sous-espèces d'*Erebia anyuica* Kurentsov, 1966 et de *Clossiana erda* (Christoph, 1893) des Monts Sayan orientaux, Russie (Lepidoptera: Nymphalidae)
Erebia anyuica iltshira **ssp. n.** et *Clossiana erda kitoica* **ssp. n.** sont décrites de la chaîne du Kitoiskiye Gol'tsy (Monts Vostochnyy Sayan), jusqu'à présent les deux espèces n'étaient connues que du nord-est de la Sibérie.

Резюме. Новые подвиды *Erebia anyuica* Kurentsov, 1966 и *Clossiana erda* (Christoph, 1893) из гор Восточного Саяна (Lepidoptera: Nymphalidae)
Erebia anyuica iltshira **ssp. n.** и *Clossiana erda kitoica* **ssp. n.** описываются из хребта Китойские Гольцы (Восточный Саян); ранее оба вида были известны только с Северо-Востока Сибири.

Key words: *Erebia anyuica iltshira* ssp. n. - *Clossiana erda kitoica* ssp. n. - Sayan mountains - Siberia.

Belik, A. G.: pr. Entuziastov, 29, apt. 237, RU-410049 Saratov 49, Russian Federation.

Introduction

During a collecting trip to the Vostochnyy [Eastern] Sayan mountains in 1994, the author visited a remote region of the Kitoi river upper stream in the Kitoiskiye Gol'tsy mountain range. This mountain range lies in the south-eastern part of the Vostochnyy Sayan mountain system in south-east Siberia. Further to the Southeast the Tunkinskiye Gol'tsy mountain range is situated, which is the south-eastern limit of the Vostochnyy Sayan mountain system. While the Tunkinskiye Gol'tsy range were often visited by collectors since the end 19th century and its butterfly fauna is studied rather well, other mountain ranges of this region further to the Northwest still remain almost unexplored by lepidopterists.

It seems that the Kitoi upper stream area has never been explored by lepidopterists because of no literature data about this area exist. The author has found that the butterfly fauna of Kitoiskiye Gol'tsy is pretty similar to that of Tunkinskiye Gol'tsy. However, in the Kitoi upper stream area two formerly unknown for the Vostochnyy Sayan mountains and for south-east Siberia in general species were found: *Erebia anyuica* Kurentsov, 1966 and *Clossiana erda* (Christoph, 1893). The specimens from Kitoiskiye Gol'tsy are found to be different from all known subspecies of both species and are described herein as new subspecies. Type material is deposited in the author's collection.

Erebia anyuica iltshira ssp. n.

Erebia kozhantschikovi [sic] ab. *rubescens* Warren, 1930, infrasubspecific name.
Erebia dabanensis [sic] ab. *rubescens* Warren, 1936, infrasubspecific name.

Type material. Holotype ♂: Russia, Vostochnyy Sayan mountains, khrebet (mountain range) Kitoiskiye Gol'tsy, river Kitoi upper stream, vicinity of the lake Il'chir, 2250 m, 26.VI.1994, A. G. Belik leg. Paratypes: 42♂, 9♀, same locality as holotype, 26.VI and 30.VI.1994, A. G. Belik and E. G. Belik leg.

Description

Male (plate 1, figs 1–4), average fore-wing length 22.1 mm (range 21.0 – 24.0 mm). Fore-wing length of holotype 22.5 mm.

Fore-wing upper side: ground colour dark brown with golden tinge. Four submarginal spots between M_1 and Cu_2, coloured from reddish-brown to ochre-orange, with diffuse outline especially towards wing base, often forming a band. When separated, these spots look like diffuse oval ocelli with minute black pupils. Sometimes an additional submarginal spot in R_5–M_1. Fringe concolourous as in fore-wing.

Hind-wing upperside: ground colour as in fore-wing. Between M_2–Cu_2 three reddish-brown to ochre-orange submarginal spots with slightly diffuse outlines. Now and then there are additional spots in M_1–M_2 and Cu_2–2A. Submarginal spots sometimes centred with minute black dots. Fringe concolourous with the wing.

Fore-wing underside: ground colour dark brown. Wide submarginal band usually reddish-brown to ochre-brown, generally darker than the corresponding spots on the upperside. Space between submarginal band and wing base usually with reddish tinge because of diffuse reddish scales, which are more numerous near the inner margin of the submarginal band and cause a more prominent reddish colour to this area. So the border between submarginal band and darker postdiscal area is often not sharp. Black dots inside submarginal band corresponding to those on the upperside that centre the submarginal spots, somewhat larger than on the upperside.

Hind-wing underside: ground colour blackish-brown, very dark. Sometimes a submarginal band of a slightly paler colour is visible, especially in oblique light. Usually three reddish-brown submarginal ocelli between M_2–Cu_2, containing black pupils of larger size than in upperside submarginal spots. Fringe concolourous with the wing.

Genitalia (fig. 1): of similar structure to other species of the *Erebia dabanensis* complex. The shape of valve in *Erebia anyuica* varies within broad limits (figs 1, 2, 5), being somewhat similar to that of *E. kozhantschikovi* Sheljuzhko, 1925 (as in fig. 5, though Kurentsov's figure seems somewhat schematic) or of *E. dabanensis* Erschoff, 1871 (as in fig. 2). The main characteristic feature of *E. anyuica* male genitalia, which distinguishes it from the related species, is the presence of an additional row of spines on the outer surface of the dorsal side of the valve in its distal half. So the valve of *E. anyuica* has 3 rows of spines, while the valve of both *E. dabanensis* (fig. 3) and *E. kozhantschikovi* has 1–2 rows of spines only along the costal edge in the distal half and has no spines on the outer surface of the valve.

It is surprising that Warren (1930, 1936) has overlooked this fact and never recognised his specimen as belonging to a new species. He considered it only as an aberration, first of *E. kozhantschikovi* and then of *E. dabanensis*. Though on the valve of his specimen the additional rows of spines are much reduced, they are visible as two short additional rows in the extreme distal part of its outer surface (Warren, 1936: pl. 42, fig. 384).

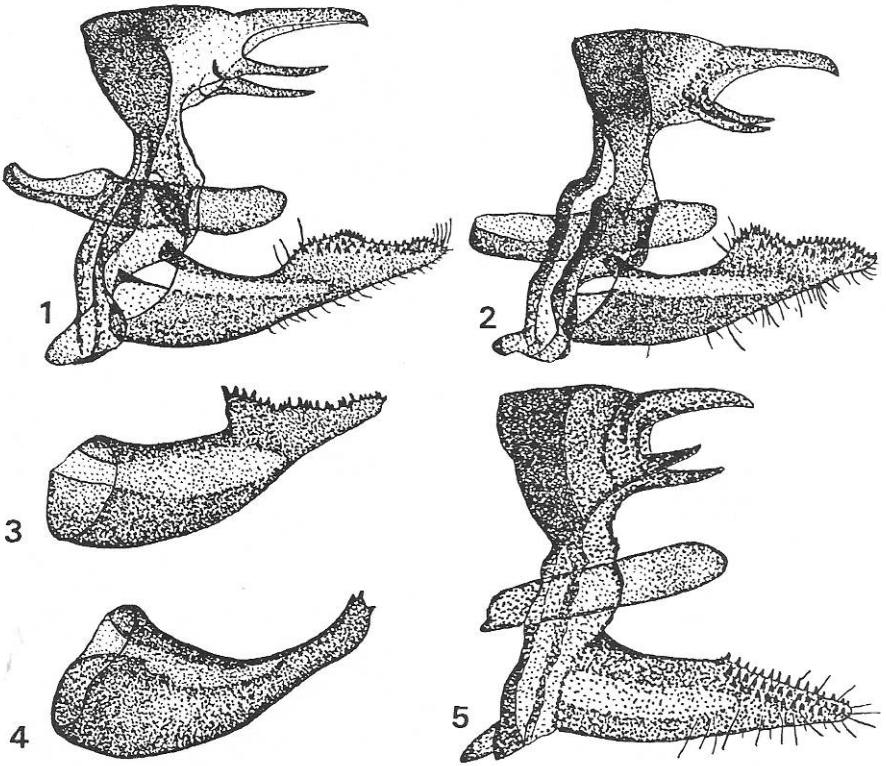
Female (plate 1, figs 5–8), average fore-wing length 22.5 mm (range 22.0–23.0 mm).

Fore-wing upperside: ground colour paler than in male, submarginal ochre-brown spots often united into a band of 3–5 mm wide. 3–4 black dots inside this band are larger than in male, up to 0.5 mm in diameter.

Hind-wing upperside: as in male, but paler in colour. 3 to 5 submarginal reddish-brown or ochre-brown ocelli larger than in male.

Fore-wing underside: as in male but paler. Submarginal band usually ochre-brown. Area between inner margin of band and base of wing usually flushed with colour, slightly darker than that of band. Submarginal black dots often centred with white nuclei.

Hind-wing underside: general pattern as in male, but much more visible. Usually wing heavily dusted with pearly grey scales that produce a silvery-greyish tinge. This dusting shades wing pattern that is often well visible as a dark heavy jagged marginal band and a dark basal-discal area with jagged outer margin. Submarginal ochre ocelli prominent but not very conspicuous on the silvery-greyish band.

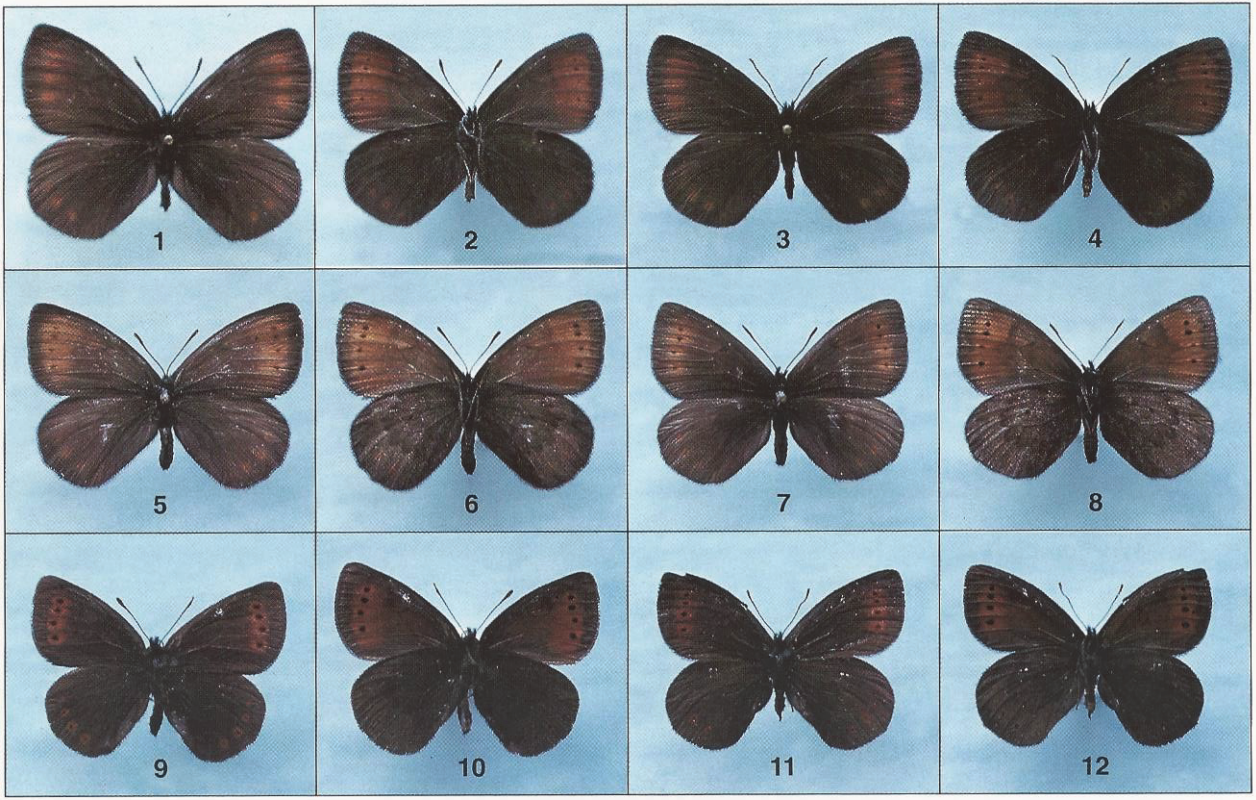


Figs 1–5: 1 – *Erebia anyuica iltshira* **ssp. n.**, holotype male genitalia, lateral view with right valva removed; 2 – *E. anyuica jakuta*, topotype male genitalia, lateral view with right valva removed. E. Yakutia, Suntar-Khayata mountain range, upper stream of E. Khandyga river, near Kiurbiliah stream, 16.VI.1990, D. G. Zamolodchikov *leg.*; 3 – *E. dabanensis dabanensis*, left valva, lateral view. E. Sayan Mts, Kitoiskiye Gol'tsy range, upper stream of Kitoi river, vicinity of Il'chir lake, 30.VI.1994, A. G. Belik *leg.*; 4 – *E. fletcheri fletcheri*, left valva, lateral view. E. Sayan mts, Kitoiskiye Gol'tsy range, upper stream of Kitoi river, vicinity of Il'chir lake, 26.VI.1994, A. G. Belik *leg.*; 5 – *A. anyuica anyuica*, holotype male genitalia (after Kurentsov 1966: 34, fig. 2).

Differential diagnosis. Two subspecies of *Erebia anyuica* have been described until now, both from north-east Siberia.

E. anyuica anyuica Kurentsov, 1966 (= *anuyka* Kurentsov, 1970: 44, 57; = *anjuika* Tuzov, 1993: 32, **syn. n.** — unjustified emendations) (Type-locality: "[Severnyy? Yuzhnyy?] Anyuyskiy khrebet (mountain range) East of Kolyma river lower stream" — requires restriction) is described after a single male. Later, Kurentsov reported another male, collected in the Omsukchanskiy mountain range (Kurentsov 1970: 57). No further records of this subspecies are known until now.

Plate 1



E. anyuica jakuta Dubatolov, 1992 (Type-locality: "Yakutia, 180 km ENE from settlement Khandyga, 232nd km of the road Khandyga–Magadan") is described from eastern Yakutia, in the Suntar-Khayata mountain range on the upper stream of Eastern Khandyga river (plate 1, figs 9–12).

E. anyuica iltshira **ssp. n.** differs from the nominotypical subspecies by the presence of wing pattern, wings in *E. anyuica anyuica* being uniformly coloured. The new subspecies is more similar to *E. anyuica jakuta*, but there are two main distinctions:

1. Strong reduction of black spots of the submarginal row in fore-wing (in *E. anyuica iltshira* **ssp. n.** these spots are 0.3 mm in diameter, whereas in *E. anyuica jakuta* they are ca. 1.0 mm); the black spot in cell M_3–Cu_1 is often reduced to a minute black dot or even totally absent, while in *E. anyuica jakuta* this spot is usually present and of equal size as the other three spots.
2. Submarginal reddish-brown band on fore-wing underside is much broader in the new subspecies than in *E. anyuica jakuta* (6–7 and 3–5 mm respectively). Besides that, in *E. anyuica iltshira* **ssp. n.** the outer margin of this band is heavily jagged and the inner margin is projected towards the outer margin of the wing between M_2 and Cu_1. In *E. anyuica jakuta* the dentition of the outer margin of the submarginal band on fore-wing underside is not so sharp, the inner margin of this band is almost straight. On fore-wing upperside in *E. anyuica iltshira* **ssp. n.** the submarginal brown spots, having diffuse outlines, very rarely look like ocelli. In *E. anyuica jakuta* these spots usually are more clear-cut and look like brown ocelli centred with black pupils.

In its type-locality *E. anyuica iltshira* **ssp. n.** sometimes flies together with *E. dabanensis dabanensis* and *E. fletcheri fletcheri* Elwes, 1899 and could at a first glance be mistaken for these species. From *E. dabanensis dabanensis* it immediately differs by the very dark underside of the hind-wings with an almost invisible median band, by the very broad brown submarginal band on the fore-wing underside, by the absence of the clear-cut heel-like projection on the costal margin of the valve and by the presence of three rows of spines there. From *E. fletcheri fletcheri* it can easily be distinguished by the absence of the broad brown submarginal band on the fore-wing upperside and by different colour of the band (if present): ochre-orange-brown in *E. anyuica iltshira* **ssp. n.** and brick-red in *E. fletcheri fletcheri*. When in some specimens of *E. anyuica iltshira* **ssp. n.** the submarginal ochre-brown spots are fusing and form a band, this band is crossed with black scales along the veins, in *E. fletcheri fletcheri* submarginal band is not interrupted. The male genitalia of both species are very different. *E. fletcheri* belongs to another species group of the genus with distinct shape of the valvae (fig. 4).

Legend of plate 1:

1. *Erebia anyuica iltshira* **ssp. n.**, holotype male, upperside. 2. Idem, underside.
3. *Erebia anyuica iltshira* **ssp. n.**, paratype male, upperside. 4. Idem, underrside.
5. *Erebia anyuica iltshira* **ssp. n.**, paratype female, upperside. 6. Idem, underside.
7. *Erebia anyuica iltshira* **ssp. n.**, paratype female, upperside. 8. Idem, underside.
9. *Erebia anyuica jakuta*, male, upperside, E. Yakutia, road Khandyga-Magadan, km 170, vic. Settlement Razvilka, 15.VI.1990, D. G. Zamolodchikov leg. 10. Idem, underside.
11. *Erebia anyuica jakuta*, topotype male, upperside, E. Yakutia, Suntar-Khayata mountain range, upper stream of E. Khandyga river, near Kiurbiliah stream, 16.VI.1990, D. G. Zamolodchikov leg. 12. Idem, underside.

Notes on taxonomy

The use of the name *Erebia anyuica* Kurentsov, 1966 constitutes a big problem. In fact it is still unclear which insect Kurentsov described under this name. Judging from the original description it superficially looks like a butterfly belonging to the *E. magdalena* species complex (large butterflies with a wingspan of 50 mm, completely blackish-brown without any trace of wing pattern on both upper- and underside — cf. Kurentsov 1970: 57), while the structure of the male genitalia, figured in the original description, clearly shows that the species belongs to the *E. dabanensis* species group (cf. Kurentsov 1970: 57, fig. 53, *2*, *3*). The Nearctic species *E. occulta* Roos & Kimmich, 1983 (= *E. phellea* Philip & Troubridge, 1983) has the same structure of male genitalia. This fact led Dubatolov (1992: 44) to accept *E. occulta* conspecific with *E. anyuica*.

The author supposes that such taxonomic arrangement would be premature. Firstly, it is necessary to compare series of specimens of both taxa before concluding whether these are conspecific or not. Dubatolov was unable to do this as *E. anyuica* was described after a single male. The holotype specimen was not found in Kurentsov's collection, which is deposited in the Institute of Biology and Pedology in Vladivostok (Azarova 1986), and it is presumed to be lost.

To resolve this taxonomic puzzle it is necessary to explore thoroughly the type locality of *E. anyuica* to find a population and get specimens for study and eventual neotype designation. It is one of the nearest aims of the author in the course of preparation of a taxonomic revision of the entire *E. dabanensis* species group.

Notes on ecology and distribution

The only known population of *E. anyuica iltshira* **ssp. n.** was found on a hill slope near the Il'chir lake. Bad weather did not allow to explore many other mountains in the neighbourhood. Two other mountain slopes were explored but did not reveal the presence of the new subspecies although the other species flying in the type locality were present: *E. dabanensis dabanensis*, *E. erinnyn* Warren, 1932, *Oeneis melissa tunga* Staudinger, 1894.

Butterflies of *E. anyuica iltshira* **ssp. n.** were found mainly on a steep slope covered with scree, within an area of about 300 × 50 m. Density of the population is not high, only 1 or 2 specimens were seen on the wing simultaneously. Some single specimens were seen in the stony grass mountain tundra together with *E. dabanensis dabanensis* and sometimes on block scree with *E. erinnyn* and *O. melissa tunga*.

Similar environmental conditions are present in the Tunkinskiye Gol'tsy range, e. g. in a well-known collecting locality, Khulugaisha Mountain, but *E. anyuica* has never been found there. Since the end of the 19th century many butterflies from Vostochnyy Sayan were delivered to lepidopterists, but no new *Erebia* species were discovered. The only specimen belonging to *E. anyuica* and described by Warren (1930) as an aberration, lacks a detailed label. As type locality Warren only mentioned: "... from the Sayan mountains".

It seems that the locality of *E. anyuica iltshira* **ssp. n.** is completely isolated from the one of *E. anyuica jakuta*. There is a distance of about 2500 km in direct line between the source of the Kitoi river and the upper stream of Vostochnaya Khandyga river. The distance between the localities of both subspecies is ca. 1400 km. There are no literature records about other populations of *E. anyuica* indicating links between the three discussed subspecies.

Considering aforementioned data, it could be supposed that *E. anyuica* is an extremely local species with a very broad, but disjunct range. Further investigations into

the mountains around Baikal lake and to the Northeast of Baikal, also of the mountains in north-easternmost Siberia, are needed to clear the situation.

Etymology

iltshira is a toponymic name derived from Il'chir lake, a most remarkable feature in its type-locality (phonetic transliteration (romanization) of the Cyrillic spelling into Latin is different from that of into English and/or other European language; in this case the "Erasmus tradition" should rather be applied. — *Editor*).

Clossiana erda kitoica ssp. n.

Type material. Holotype ♂: Russia, Vostochnyy Sayan mountains, khrebet (mountain range) Kitoiskiye Gol'tsy, river Kitoi upper stream, vicinity of the lake Il'chir, 2350 m, 26.VI.1994, A. G. Belik leg. Paratypes: 3♀, same locality as holotype, 26.VI and 30.VI.1994, A. G. Belik *leg.*

Description

Male (plate 2, figs 1–2), holotype fore-wing length 23.0 mm.

Fore-wing upperside: ground colour dull ochre-orange, all elements of black wing pattern very prominent, elements of discal row united into a band. Basal area well suffused with dark scales. Holotype is worn so fringes are torn.

Hind-wing upperside: ground colour as on fore-wing, all black markings very prominent. Spots of discal row form a continuous black band. Space from wing base to this band very dark, covered with black scales that almost conceal the ground colour. Characteristic solid black strip in discal cell remains well visible.

Fore-wing underside: looks paler than upperside because of less prominent black pattern. Area near apex yellowish.

Hind-wing underside: basal area dark brown, with silvery-white spots dusted with black scales. Median band silvery-white, intersected by veins dusted with dark brown scales. In cells from 2A to anal margin this band is heavily dusted with dark brown and black scales. Distally the median band is bordered with a fine black line and a dark brown discal band. Postdiscal area immediately distad to the discal band silvery-white, but distad to the postdiscal row of black spots it is dull ochre-orange. Black triangular spots of submarginal row linked with outer margin of wing by silvery-white spots. Outer margin bordered with marginal band consisting of two fine black lines.

Genitalia (fig. 6): attribution of this subspecies to *Clossiana erda* is confirmed by the structure of the male genitalia. They are almost the same as in the nominal subspecies (fig. 7). The long superior process of the valve is bulged in its distal end. But the bulge is not directed so clearly ventrally as in *C. erda erda*.

Female (plate 2, figs 3–6), average fore-wing length 24.3 mm (range 24.0–25.0 mm).

Fore-wing upperside: as in male, but ground colour paler, elements of black pattern even more enlarged and whole wing covered with black diffuse scales. General appearance of wing much darker than in male. Fringes chequered with black as in other *Clossiana* species.

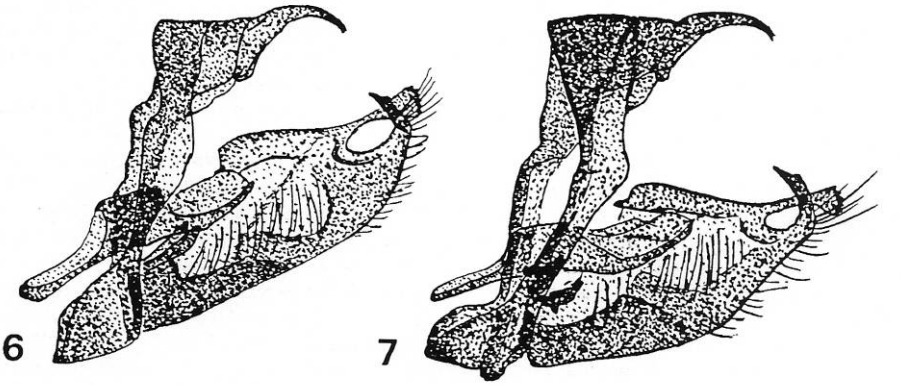
Hind-wing upperside: as in male, with the same modification as on fore-wing upperside. Area from wing base to discal black band almost completely black because of solid covering with diffuse black scales. Fringes as on fore-wing.

Fore- and hind-wing underside: as in male.

Differential diagnosis: until now only the nominal subspecies, *Clossiana erda erda* (Christoph, 1893) was known. It was described from Western Yakutia (type locality: "Vilui") and is distributed in Eastern Yakutia, Magadanskaya oblast' and north of

Amurskaya oblast' without noticeable variation between specimens from different populations over this area. For comparison, specimens from the author's collection were used (E. Yakutia: Suntar-Khayata mountain range; plate 2, figs 7–10) and specimens from A. V. Tsvetaiev's collection, deposited in the Zoological Museum of Moscow University (Magadanskaya oblast', settlement Galimyi; north of Amurskaya oblast', settlement Ekimchan).

Clossiana erda kitoica **ssp. n.** is very distinct from the nominotypical subspecies, ground colour of wing upperside being much paler, and all black pattern and suffusion with black scales much enlarged in comparison with *C. erda erda*, which is much brighter: ground colour bright orange in male and orange-brown in female, black pattern and suffusion not so prominent. On the underside the main distinction lies in the hind-wing colouration: in *C. erda kitoica* **ssp. n.** basal area and discal band are very dark brown, whereas in *C. erda erda* they are light brown. The median band in the new subspecies is silvery-white with dark brown and black suffusion in both sexes, in the nominal subspecies this band is yellow with light brown suffusion in the male and yellowish-white with silvery-white spots and with brown and black suffusion in the female.

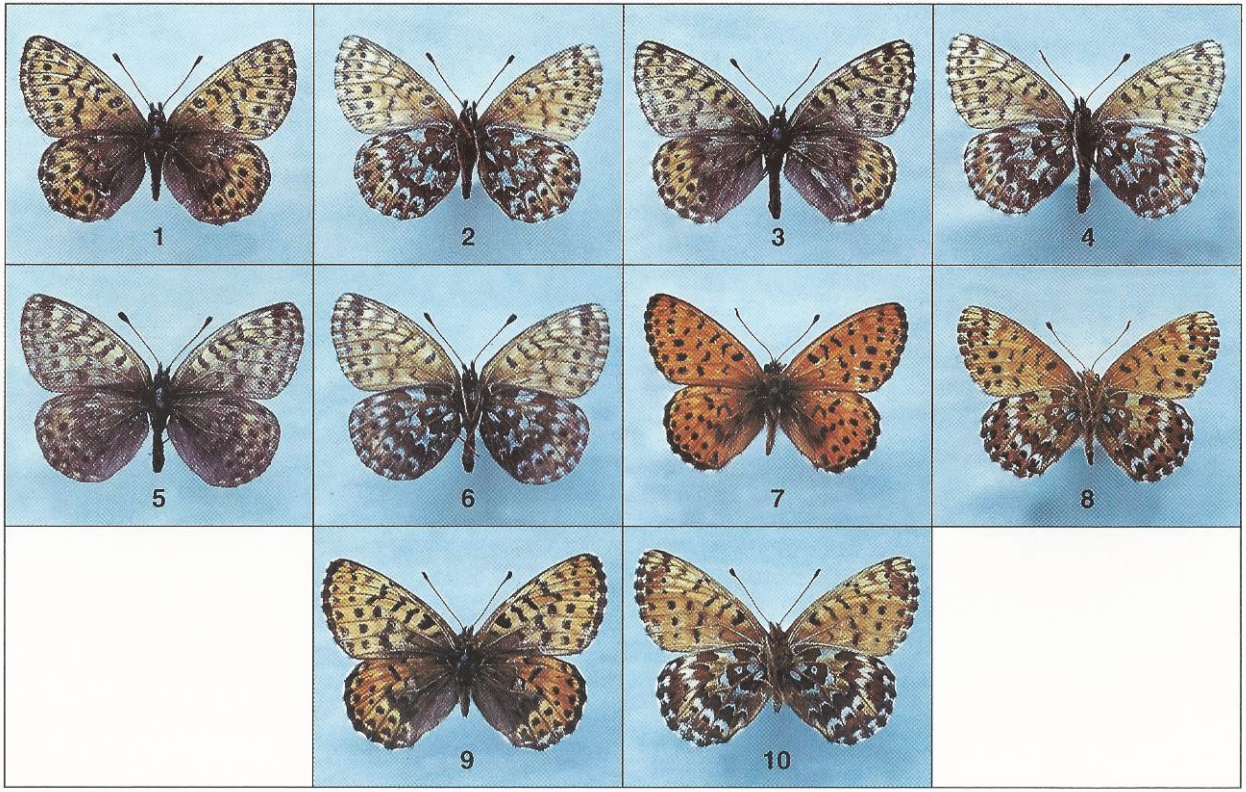


Figs 6–7: 6 – *Clossiana erda kitoica* **ssp. n.**, holotype male genitalia, lateral view with left valva removed; 7 – *Clossiana erda erda*, male genitalia, lateral view with left valva removed, E. Yakutia, Suntar-Khayata mountain range, upper stream of E. Khandyga river, 17.VI.1991, A. G. Belik *leg.*

Legend of plate 2:
1. *Clossiana erda kitoica* **ssp. n.**, holotype male, upperside; 2. Idem, underside.
3. *Clossiana erda kitoica* **ssp. n.**, paratype female, upperside; 4. Idem, underside.
5. *Clossiana erda kitoica* **ssp. n.**, paratype female, upperside; 6. Idem, underside.
7. *Clossiana erda erda*, male, upperside, E. Yakutia, Suntar-Khayata mountain range, upper stream of E. Khandyga river, 17.VI.1991, A. G. Belik *leg.*; 8. Idem, underside.
9. *Clossiana erda erda*, female, upperside, E. Yakutia, Suntar-Khayata mountain range, upper stream of E. Khandyga river, 16.VI.1991, A. G. Belik *leg.*; 10. Idem, underside.

(all photographs A. G. Belik).

Plate 2



Notes on ecology and distribution

All four specimens of *C. erda kitoica* **ssp. n.** were collected at the stony summit of a hill, among boulders. No specimens were seen in other localities around Il'chir lake, like different types of mountain tundra, larch bogged taiga or wet meadows. The new subspecies seems to be strictly petrophilous high mountain dweller unlike the nominotypical subspecies. *C. erda erda* occurs in humid habitats preferring localities covered with the forest. In 1991 in East Yakutia, the author observed *C. erda erda* in the Suntar-Khayata mountain range, where these butterflies were abundant within sparse bogged larch taiga at an altitude of ca. 900 m. The butterflies did not fly at higher elevations between 1000 and 1600 m, among rocks, boulders and different types of screes, which are inhabited by other species of the *Clossiana tritonia* group.

The type-locality of *C. erda kitoica* **ssp. n.** is situated far away from the main range of *C. erda erda* in north-eastern Siberia. It is about 1500 km in direct line from the source of the river Kitoi to the Vilui river, where the type locality of *C. erda erda* is situated. There are no previous records of *C. erda* from Vostochnyy Sayan or from the mountains of south-eastern Siberia as a whole.

Etymology

kitoica is a toponymic name derived from Kitoi river in its type-locality.

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