

# New subspecies of *Melitaea sultanensis* Staudinger, 1886, *M. elisabethae* Avinoff, 1910 and *M. robertsi* Butler, 1880 (Lepidoptera, Nymphalidae)

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## Abstract

The paper presents the descriptions of 3 new taxa: *Melitaea robertsi hersilia* Churkin, Bogdanov et Kolesnichenko, ssp. nova is described from Suusamyр Mts., Tian-Shan (Kyrgyzstan), *M. elisabethae tremasovi* Churkin, Kolesnichenko et Bogdanov, ssp. nova from Mazorsky Range (Darvaz, Tadjikistan) and *M. sultanensis sochivkoi* Churkin, Kolesnichenko et Bogdanov, ssp. nova from Gardaniushti Mts. (South Tadjikistan). The holotypes of *M. trivіa bactriana* Shchetkin, 1984 and *M. t. chorasana* Shchetkin, 1984 are figured for the first time.

## Keywords

*Melitaea*, zoogeography, Kyrgyzstan, Tadjikistan, taxonomy, new subspecies, *sultanensis*, *robertsi*, *elisabethae*, Pamirs

## Introduction

Two articles were published in the “Proceedings of the State Darwin Museum. Volume XVI.” (published in 2023): “Review of *Melitaea sultanensis* Staudinger, 1886 and *M. elisabethae* Avinoff, 1910 with the description of new subspecies (Lepidoptera, Nymphalidae)” (Churkin, Kolesnichenko & Bogdanov 2023) and “New subspecies of *Melitaea robertsi* Butler, 1880 from Kyrgyzstan (Lepidoptera, Nymphalidae)” (Churkin, Bogdanov & Kolesnichenko 2023). The author of the articles, the chief keeper of the State Darwin Museum P.V. Bogdanov has died before the publication, and the volume XVI as a whole was dedicated to his memory. Both articles are available on the internet, address is [https://www.darwinmuseum.ru/docs/doc\\_works%202023%20XXVI.pdf](https://www.darwinmuseum.ru/docs/doc_works%202023%20XXVI.pdf).

Unfortunately, this volume was not published in paper, thus the taxonomic acts published in the above mentioned articles are not valid according to the Amendment of Articles 8, 9, 10, 21 and 78 of the International Code of Zoological Nomenclature to expand and refine methods of publication (ICZN 2012).

The present article is prepared in order to make new names and taxonomic acts valid.

## Materials and methods

The adults were photographed using Canon 5DII with Sigma-50 Macro. For wing venation, the Comstock-Needham nomenclature adopted for butterflies (Miller 1970) was used.

The present study is based upon the collections of the following institutions: State Darwin Museum (SDM, Moscow), The Museum of Natural History St. Alexis Hermitage (MSAH, Yaroslavl reg.), collections of the authors, V. Tuzov (Moscow), P. Beda (Ljubertzy, Moscow reg.).

Abbreviations: FW – forewings; HW – hindwings; m – m. a. s.l., metres above sea level.

## Results

### 1. Types of four subspecies of *Melitaea robertsi* Butler, 1880

Thanks to the kindness of V. Tuzov (Moscow) and Yu. Shchetkin (Taganrog) we obtained the type material *Melitaea catapelia shugnana* Shchetkin, 1984 (paratypes), *M. c. chorasana* Shchetkin, 1984 (holotype and paratypes), *M. c. petri* Shchetkin, 1984 (paratypes), *M. c. bactriana* Shchetkin, 1984 (holotype and paratypes). This material was deposited in the author's collection of taxa, which corresponds to the data of the original descriptions.

The research of type material made it possible to restore order within the species, now identified as *Melitaea robertsi* Butler, 1880. Holotypes will be transferred to the collection of the Zoological Institute of Russian Academy of Sciences (St. Petersburg), where, according to descriptions, the holotypes of other two Shchetkin's subspecies are stored, paratypes are deposited in the collection of S. Churkin.

Some types (including both holotypes) are figured on the Fig. 1: 9–21.

## 2. *Melitaea robertsi hersilia* Churkin, Bogdanov et Kolesnichenko, ssp. nova

<http://zoobank.org/42C8934E-ADCF-45E3-A3DE-0D8AB60BD69C>

Fig. 1: 1–8

**Holotype:** male, Tian-Shan, Suusamyр Mts., 5 km N Kyzyl-Oi v., 1800–2200 m, 19–20.06.2001, S. Churkin leg.

**Paratypes:** 2 males, 2 females, same data, S. Churkin; 1 male, 3 females, same loc., 1800–2000 m, 24–29.06.2000, V. Pletnev leg.; 3 males, 2 female, same data, S. Churkin leg.; 2 males, same loc., 2400–2800 m, 20-21.07.2006, S. Churkin leg.; 1 female, Tian-Shan, Kekemeren r., 5 km SW Aral v., 1450 m, 25.06.2006, S. Churkin leg.; 3 males, Tian-Shan, Uzun-Akhmat r., 5 km NW Chon-Aryk v., 1050 m, 26.06.2006, S. Churkin, 1 female, Tian-Shan, Bosbu-Too Mts., Bos-Byik v., 1700–2100 m, 1.07.2008, S. Churkin.

Holotype is deposited in the collection of the State Darwin Museum (Moscow), paratypes are in the collections of the authors and the Museum of Natural History St. Alexis Hermitage.

**Description.** Holotype FW length 18 mm, male paratypes 15–19 mm (17–18 mm, as a rule), female paratypes 17–21 mm (as a rule, 18–20 mm).

Antennae, palpi and body colouration and hairs seem to have no taxonomically valuable characters.

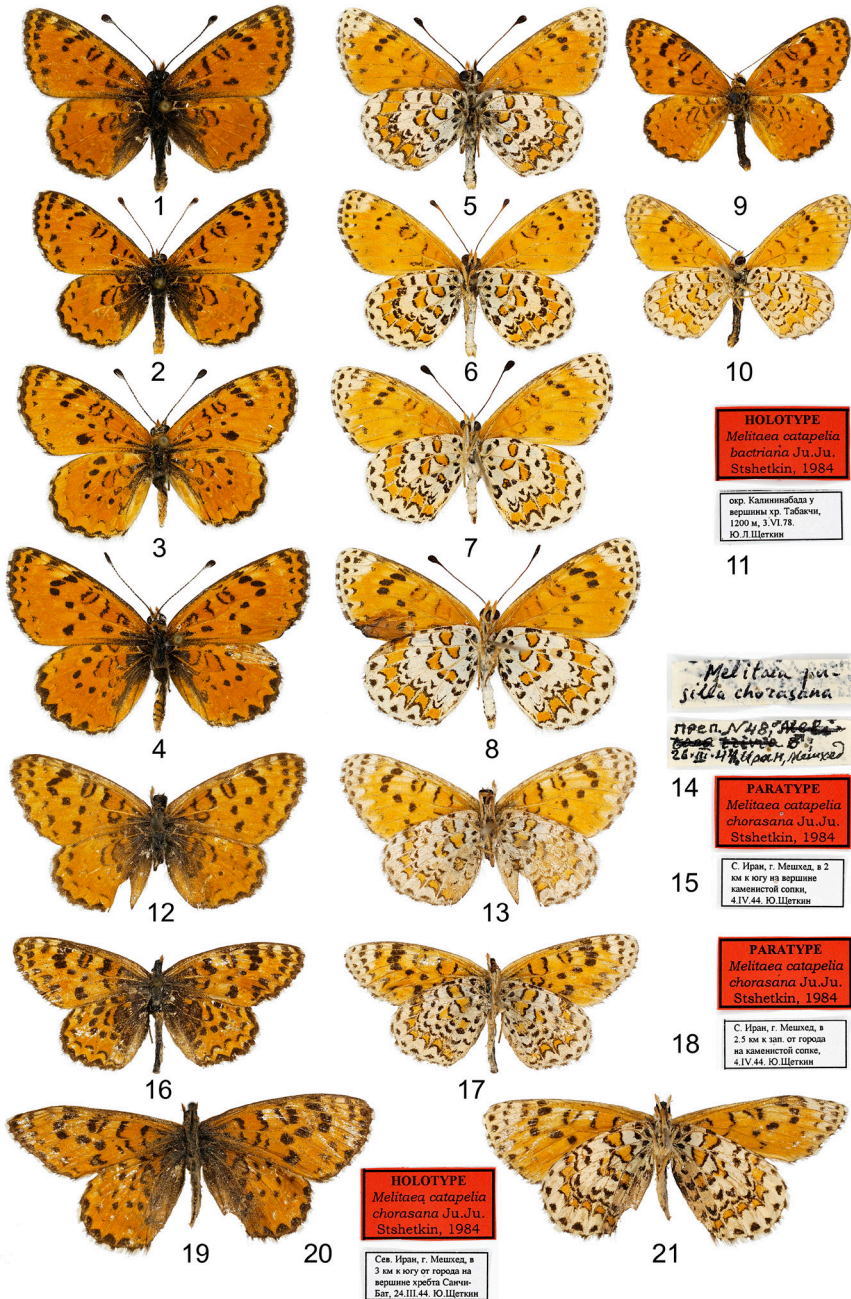
**Male.** Upperside ground colour yellow with slight hue of orange, not bright, whitish spot near apex not contrasting and small, often not well obvious. General pattern typical for the species, discal row of black spots partly reduced at the medium part, as a rule. Submarginal row complete. Fringes light with small not dense dark parts. HW discal row often reduced, submarginal row represented by thin blackish lines.

Underside similar to upperside. HW submarginal fascia wide, moderately bright, consists of orange-yellow spots bordered by thin sometimes reduced blackish lines.

Genitalia. Similar to that of ssp. *catapelia* Staudinger, 1886, detailed study of geographical variability outside of the paper limits.

**Female** similar to male, but larger, black pattern more reduced, FW submarginal pattern usually only slightly obvious, HW submarginal row absent, as a rule, while discal series developed in opposite to males.

HW underside orange submarginal fascia not narrower than in males, spots brighter, big and widely disjoined by whitish veins.



**Figure 1.** *Melitaea* spp., upperside (1–4, 9, 12, 16, 19), underside (5–8, 10, 13, 17, 21), labels (11, 14, 15, 18, 20):

1, 5 – *Melitaea robertsi hersilia* ssp. nova, male, Holotype, Tian-Shan, Suusamyр Mts., 5 km N Kyzyl-Oi v., 1800–2200 m, 19–20.06.2001, S. Churkin leg.

2, 6 – *M. r. hersilia* ssp. nova, paratype, male, Tian-Shan, Uzun-Akhmat r., 5 km NW Chon-Aryk v., 1050 m, 26.06.2006, S. Churkin leg.

3, 7 – *M. r. hersilia* ssp. nova, paratype, female, data as 1. Continued on the next page.

**Figure 1.** Continued from previous page.

4, 8 – *M. r. hersilia* ssp. nova, paratype, female, data as 1.

9, 10, 11 – *Melitaea catapelia bactriana* Shchetkin, 1984, holotype, male, Таджикистан, окр. Калининабада у вершины хр. Табакчи, 1200 м, 3.06.1978, Ю.Л. Щеткин [Tajikistan, Kalininabad vic., tops of Tabakchi Mts., 1200 m, 3.06.1978, Yu. L. Shchetkin leg.].

12, 13, 14, 15 – *M. c. chorasana* Shchetkin, 1984, paratype, female, Сев. Иран, г. Мешхед, в 2 км к югу на вершине каменистой сопки / *Melitaea pusilla chorasana* / ПРЕП. 48, 26.IV.1944, Ю.Л. Щеткин [North Iran, Mashhad vic., 2 km S, on the top of the stony hill / *Melitaea pusilla chorasana* / Prep. 48, 26.IV.1944, Yu. L. Shchetkin leg.].

16, 17, 18 – *M. c. chorasana* Shchetkin, 1984, paratype, male, Сев. Иран, г. Мешхед, в 2.5 км к западу от города на каменистой сопке. 4.04.1944, Ю.Л. Щеткин [North Iran, Mashhad vic., 2.5 km W, on the stony hill, 4.04.1944, Yu. L. Shchetkin leg.].

19, 20, 21 – *Melitaea catapelia chorasana* Shchetkin, 1984, голотип, самка, Сев. Иран, г. Мешхед, в 3 км к югу от города на вершине хр. Санчи-Бат, 21.03.1944, Ю.Л. Щеткин [North Iran, Mashhad vic., 3 km S, on the top of Sanchi-Bat Mts., 21.03.1944, Yu. L. Shchetkin leg.].

Female genitalia were not studied.

**Diagnosis.** New subspecies represents the combination of two subspecies – *nativa* Tuzov, 2000 from West Pamirs (yellowish, pale, upperside with reduced black pattern) and *petri* from Darvaz – being distinctively different from geographically nearest *catapelia*. The latter has narrowed underside HW submarginal fascia with developed blackish borders of the spots, while in the females this band consists of the series of widely disjoined small pale spots.

**Etymology.** *Hersilia* (Lat.) – Romulus wife.

**Bionomics and distribution.** Inhabits the mountains around the Suusamyр river. Biotope is mountain meadows, sometimes rising up to altitudes of 2500–2600 m. Biological features unknown. We assume one generation the flight of which is extended depending on the altitude.

### 3. *Melitaea sultanensis sochivkoi* Churkin, Kolesnichenko et Bogdanov, ssp. nova

<http://zoobank.org/67FB41A4-9F6E-43B5-BD5E-A545B1695786>

Figs 2–3: 1–4

**Holotype:** male, South Tajikistan, Gardaniushti Mts., Gardaniushti pass, 1900 m, 15.06.2013, A. Sochivko leg.

**Paratypes:** 3 males, 1 female, same data, A. Sochivko leg.; 4 males, 5 females, South Tajikistan, Karategin Mts., Sorbo v., 2200 m, 12–25.06.2011, V. Tremasov leg.; 3 males, 2 females, South Tajikistan, Sarsarjak Mts., 5.06.1984, V. Makhat leg.

Holotype is deposited in the collection of the State Darwin Museum (Moscow), paratypes are in the collections of the authors and the Museum of Natural History St. Alexis Hermitage.

**Description.** Holotype FW length 18.5 mm, male paratypes 18–20.5 mm, female paratypes 20–22.5 mm.

Antennae, palpi and body colouration and hairs seem to have no taxonomically valuable characters.

**Male.** Butterflies from Karategin have rounded and widened wings similar to ssp. *danieli* Achteлик, 1999, other specimens have wings shape typical to the species with more or less pointed apex.

Upperside colour pale-yellow with slight hue of orange. Black pattern almost fully reduced, only thin basal/discal spots usually obvious while marginal pattern expressed. Fringes light with narrow dark parts.

FW underside: blackish spots developed only in apical part.

HW underside: pattern mainly developed but looks erased and thin. Median band widened with slightly obvious yellow tingle as a rule. Marginal lines thin and slightly widened in their central parts.

Genitalia typical for species.

**Female** similar to male, but larger, the black pattern obvious, but look erased, pale and thin. Only one female has fully reduced upperside pattern (except marginal series). Colourful females absent. Ground colour yellowish, pale.

Underside as in males, median band wider, similar to than in *danieli* but partly erased.

Female genitalia not studied.

**Diagnosis.** New subspecies presents moderately large butterflies with sharply reduced black pattern, only the marginal series are developed. In other taxa forms with reduced pattern are rare but always present. The populations of ssp. *fumarata* Achteлик, 1999 from southern slopes of Ghissar look as intermediate and may include 40–45% of the specimens with more or less reduced spots, but even here the forms with fully reduced pattern are rare (while the size of the specimens obviously smaller and the median band on the underside is not widened, the erasing of the pattern if developed includes marginal series).

From neighbouring ssp. *danieli* Achteлик, 1999 differs by the erased pattern and pale coloration of the females.

**Etymology.** Andrei Vladimirovich Sochivko – well-known Russian entomologist and painter, who collected valuable material belonging to this species.

**Bionomics and distribution.** On Karategin Mts. – the meadows with *Ferula* sp. (Apiaceae). On Gardaniushti Mts. – the passes at the top, rocky meadows with *Agro-diaetus iphigenides* (Staudinger, 1886) and *A. dagmara* (Grum-Grshimailo, 1888). The food plant is unknown.

#### 4. *Melitaea elisabethae tremasovi* Churkin, Kolesnichenko et Bogdanov, ssp. nova

<http://zoobank.org/E4A8DCD1-72A7-4AD9-94C8-8ADC14225E15>

Figs 2–3: 10–14

**Holotype:** female, Tajikistan, Darvaz, Mazorsky Range, Obimazor r., 3200–3300 m, 4–13.07.2011, V. Tremasov leg.

**Paratypes:** 5 males, 10 females, same data, V. Tremasov leg.; 7 males, 5 females, same loc., 2–15.07.2013, V. Tremasov leg.

Holotype is deposited in the collection of the State Darwin Museum (Moscow), paratypes are in the collections of the authors and the Museum of Natural History St. Alexis Hermitage.

**Description.** Holotype FW length 16 mm, male paratypes 13.5–16 mm (14–15 mm, as a rule), female paratypes 15–18 mm (16–17 mm, as a rule).

Antennae, palpi and body colouration and hairs seem to have no taxonomically valuable characters.

**Female.** FW upperside yellowish, sometimes with orange hue and well developed dark pattern. Cell basal spot variable sometimes finely defined sometimes darkened and divided in two separated parts. Discal spot similar to that in nominative subspecies, oval or rounded and only rarely stretched or even angular. Discal row complete, all spots joined in one line, costal series sharply widened (sometimes the median part of discal row moderately reduced). Postdiscal row includes light rounded background spots in thickened dark aureoles, the spots' size practically equal. Submarginal series developed, blackened margin wide. Fringes white with sharp blackish parts.

HW mainly orange as usually and brighter than FW, with light row of marginal lunules. Sometimes several blackish spots expressed in postdiscal row. FW underside with reduced pattern which is obvious only near the apex, submarginal row of delicate blackish lines developed.

HW underside with typical for the species pattern. Median band bright whitish with outlined inner yellowish part. Submarginal band narrow and consists of yellowish or orange lunules with small orange dots inside, each lunula surrounded by thin black line. Marginal lunules whitish with thin blackish lines externally (each line thickened at the centre), marginal bordure yellow.

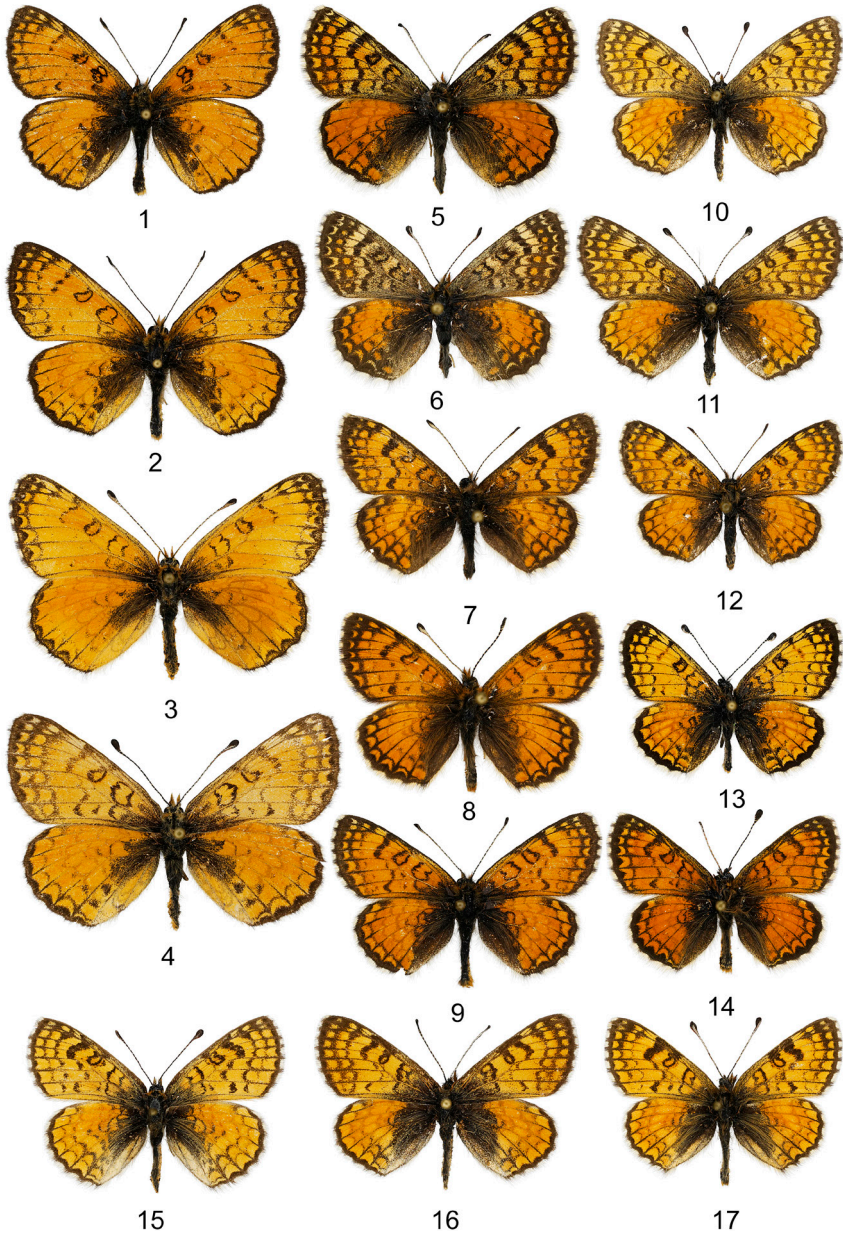
Genitalia not studied.

**Males** have sharply outlined variability. Common form similar to females in colour and pattern (the latter sometimes more reduced at the disc).

Approximately one third of males have similarity with *sebastiani* Achtelik, 1999 / *gabrielae* Achtelik, 1999 (Figs 2–3: 7–9), it would be difficult to separate two of them without underside features. These males present small orange-reddish butterflies with *gabrielae*-pattern, even the fringes are blackish with whitish segments, discal and postdiscal row often seriously reduced, discal spots angular, nearly rectangular (Figs 2–3: 14). Male series includes some intermediate specimens, worth to note (Figs 2–3: 13).

Underside as in females, even in reddish males – with all characters of *elisabethae*, but spots of narrowed band becomes bright-orange, even reddish.

Genitalia (4 specimens studied with all colouration variants) similar to nominate subspecies and have short distal part of valva. Distal tooth on beginning of distal part small. Ssp. *gabrielae* have obviously larger genitalia, proximal part of valva is 20% longer, the discal part – 30% longer than in all studied males of *tremasovi*.



**Figure 2.** *Melitaea* spp., upperside:

1 – *Melitaea sultanensis sochivkoi* ssp. nova, holotype, male, South Tajikistan, Gardaniushti Mts., Gardaniushti pass, 1900 m, 15.06.2013, A. Sochivko leg.

2 – *M. s. sochivkoi* ssp. nova, paratype, male, same data as 1.

3 – *M. s. sochivkoi* ssp. nova, paratype, female, South Tajikistan, Karategin Mts., Sorbo v., 2200 m, 12–25.06.2011, V. Tremasov leg.

4 – *M. s. sochivkoi* ssp. nova, paratype, female, same data as 3. Continued on the next page.



**Figure 2.** Continued from previous page.

- 5 – *M. s. gabriela*e, female, Tajikistan, Darvaz Mts., Khabu-Rabot pass, 3100 m, 19.06.2016, D. Goshko leg.
- 6 – *M. s. gabriela*e, female, same data as 5 (normal form).
- 7 – *M. s. gabriela*e, male, same data as 5.
- 8 – *M. s. gabriela*e, male, same data as 5 (form with reduced pattern).
- 9 – *Melitaea s. sebastiani*, male, Tajikistan, Peter the Great Mts., Gardan-i-Kaftar pass, 3200 m, 25.06.2012, V. Tremasov leg.
- 10 – *M. s. tremasovi* ssp. nova, holotype, female, Tadjikistan, Darvaz, Mazorsky Range, Obimazor r., 3200–3300 m, 4–13.07.2011, V. Tremasov leg.
- 11 – *M. s. tremasovi* ssp. nova, paratype, female, same data as 10.
- 12 – *M. s. tremasovi* ssp. nova, paratype, male, same data as 10.
- 13 – *M. s. tremasovi* ssp. nova, paratype, male, same data as 10 (transitional form).
- 14 – *M. s. tremasovi* ssp. nova, paratype, male, same loc, 2-15.07.2013, V. Tremasov leg. (*gabriela*e-like form).
- 15 – *M. s. elisabethae*, female, Tajikistan, West Pamirs, Vanch Mts., Gyshkhun vall., 6.07.1992, S. Churkin leg.
- 16 – *M. s. elisabethae*, female, Tajikistan, West Pamirs, Ishkashim vic., 3200 m, 4.07.1992, S. Churkin leg.
- 17 – *M. s. elisabethae*, male, same data as 16.

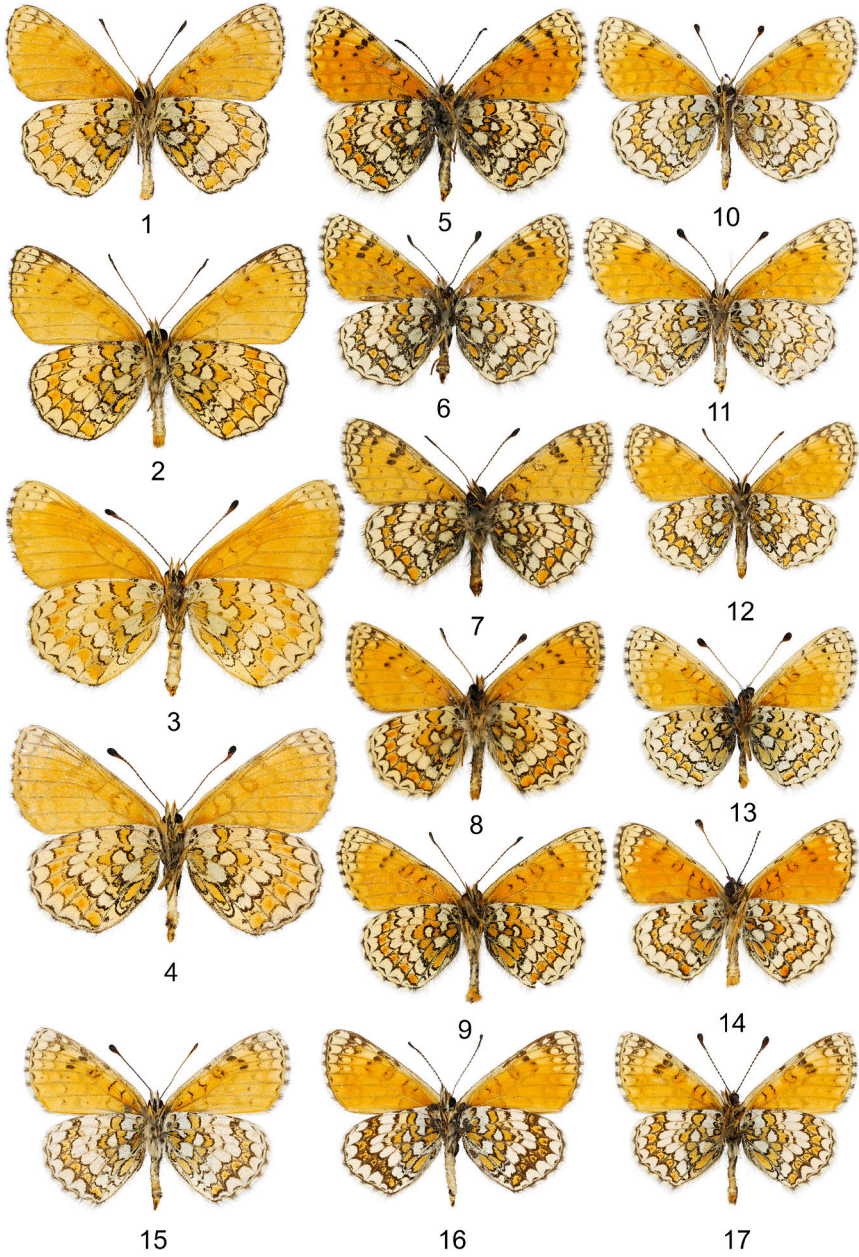
**Diagnosis.** New subspecies is similar to nominate ssp. *elisabethae* Avinoff, 1910 (Figs 2–3: 15–17) according to the shape of FW discal spot, general colouration, developed submarginal row of light equal rounded spots and male genitalia. HW underside has sharply expressed whitish colour of the marginal spots and main part of the median band, the submarginal band is obviously narrowed.

The distinctions are as follows: the spots of HW underside submarginal band have no expressed thick blackish aureoles/lines but have orange centers (in nominate butterflies – black lines are thick, often forming blackish aureoles, the centers are blackish). Statistically, the nominate females often have much more reduced postdiscal row on the FW upperside, while in new subspecies the general pattern is more developed (i. e. the nominate females of *elisabethae* much more often recalls common pattern of *M. sultanensis* Staudinger, 1886).

The male underside corresponds the females. Moreover, if the postdiscal band are bright and reddish, new males differs from the nominate subspecies more distinctively than the females.

In general, the smallest taxon in the species complex: it is statistically smaller than nominate *elisabethae*, and obviously smaller than *gabriela*e.

New taxon differs from geographically nearest *gabriela*e by the same characters as ssp. *elisabethae* (see above), in addition the females are yellowish and pale in contrast to the dark and contrasting *gabriela*e females (Figs 2–3: 5–6). However, males demonstrate the line of intermediate upperside patterns (worth to remember that the undersides doesn't provide with such line!).



**Figure 3.** *Melitaea* spp., underside. See description to the Fig. 2.

The females of *gabrielae* Achtelik, 1999 rarely shown some similarity when the FW discal spot is small and rounded while the submarginal spots are rounded also – however, even such forms are contrasting and sharply darker. We have only one (the darkest) female of *tremasovi* which has actual upperside similarity with *gabrielae* (if we would be ignore underside distinctions).

**Etymology.** Vyacheslav Nikolaevich Tremasov (Penza) – Russian collector, who worked mainly in Kyrgyzstan and Tadjikistan, with good ability and success in scientific research.

**Bionomics and distribution.** Discovered in Darvaz mountain system in the inaccessible and little-studied Mazor range. Food plant is unknown. Biotope – meadows among rocky slopes, flew together with *Colias eogene* C. & R. Felder, 1865 and *Colias alpherakyi* Staudinger, 1882.

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