

Notes on the status of the Caucasian taxa of the group *Polyommatus (Meleageria) coridon* (sensu de Lesse) with description of a new species from the high-mountain area of West Caucasia (Lepidoptera: Lycaenidae)

B. V. Stradomsky and V. I. Shchurov

Summary. *Polyommatus (Meleageria) arzanovi* **spec. nov.** is described from the high-mountain area of West Caucasia. The new species is distinct from the related species *P. (M.) melamarina* and *P. (M.) corydonius* in habitus, genitalia, and karyological characteristics. The haploid number of *P. (M.) arzanovi* is $n=19-20$ chromosomes, of *P. (M.) melamarina* $n=24-27$, and of *P. (M.) corydonius* $n=84$.

Samenvatting. Bemerkingen over de Kaukasische taxa van de groep *Polyommatus (Meleageria) coridon* (sensu de Lesse) met beschrijving van een nieuwe soort uit het hooggebergte van de West-Kaukasus (Lepidoptera: Lycaenidae)

Polyommatus (Meleageria) arzanovi **spec. nov.** wordt beschreven uit het hooggebergte van de West-Kaukasus. Deze nieuwe soort verschilt van de verwante soorten *P. (M.) melamarina* en *P. (M.) corydonius* in uiterlijk, genitalia, en karyologische kenmerken. Het haploïede nummer van *P. (M.) arzanovi* is $n=19-20$ chromosomes, van *P. (M.) melamarina* $n=24-27$, en van *P. (M.) corydonius* $n=84$.

Résumé. Remarques sur les taxa caucasiens du groupe de *Polyommatus (Meleageria) coridon* (sensu de Lesse) avec description d'une nouvelle espèce des hautes montagnes du Caucase occidental (Lepidoptera: Lycaenidae)

Polyommatus (Meleageria) arzanovi **spec. nov.** est décrite de la région alpine du Caucase occidental. Cette espèce nouvelle se distingue des espèces apparentées *P. (M.) melamarina* et *P. (M.) corydonius* par sa morphologie externe, ses genitalia, et des caractères caryologiques. Le nombre haploïde de *P. (M.) arzanovi* est $n=19-20$ chromosomes, de *P. (M.) melamarina* $n=24-27$, et de *P. (M.) corydonius* $n=84$.

Key words: *Polyommatus arzanovi* **spec. nov.** – North Caucasia – Karyological characteristics.

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In the last few years new taxa of the subgenus *Meleageria* De Sagarra, 1925 (= *Lysandra* Hemming, 1933) were described in the region of North Caucasia; however, there is some controversy as to their validity and status, the latter often diminished (Gorbunov 2001). Until recently only one taxon of all described in the region was considered as clearly identified by appearance, namely *Polyommatus (M.) corydonius* (Herrich-Schäffer, [1852]). In North Caucasia, including the low-mountain areas, this xerophilous species develops in one generation.

Clear morphological distinctions allowed A. Dantchenko to describe another species met in the area of the Russian Black Sea coast – *P. (M.) melamarina* Dantchenko, 2000. Our observations, including those on a type locality, suggest that *P. (M.) melamarina* is a mesophytic, obligate bivoltine taxon with two distinctly separated flights of generations. Calendar periods of the type

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material's collecting (Dantchenko 2000 in Tuzov *et al.* 2000) demonstrate that the species produces two generations per season; yet it didn't prevent O. Gorbunov (Gorbunov 2001) from attributing monovoltinity to the species and reducing its status to subspecies of *P. (M.) corydonius*. The same author believes that the area of *P. (M.) melamarina* includes Transcaucasia, Turkey, and Northern Iran; seemingly he inferred so from conclusions about conspecificity of Caucasian and Turkish butterflies, assumedly made by H. de Lesse (1969).

According to our finding (Fig. 1), *P. (M.) melamarina* in Russia inhabits the Black Sea coast from the valley of the river Mezyb in the west to the Abkhazia border. Along the valley of the river Pshada *P. (M.) melamarina* gets into the northern mountainside of Caucasia, where it occurs at relic alpine steppes on woodless peaks located along the upper beds of the rivers Ubin, Shebsh, and Afips bordering with the Pshada's river headwater. Similarly, via the valley of Mzymta the taxon reaches the depression of Krasnaya Poliana, where it was collected by A. Kirichenko (1909) in the beginning of the 20th century. Within all known populations, *P. (M.) melamarina* produces two generations per season, the first flight falling on June, the second lasting from the end of July to the end of September. The second generation imagos outnumber significantly the first ones. Also, we had the occasion to collect butterflies bearing a strong resemblance to typical *P. (M.) melamarina* in the middle part of the river Inguri (Western Georgia), 500 m above sea level. It seems that E. Milyanovskiy in his work on the Lepidoptera of Abkhazia (1964) meant just the same taxon.

In West Caucasia there are known, in addition to the low-mountain taxon *P. (M.) melamarina*, several high-mountain populations of this group of *Meleageria*. So, a local population occurs at the subalpine zone of the mountain range of Aibga (the upper reach of the river Mzymta) with external morphological characteristics close to those of *P. (M.) melamarina*, but with a number of distinguishing features. Besides, the population in question is characterized by monovoltinity.

Studying the Lepidoptera of the Teberda Nature Reserve, the authors, independently of one another, have found two populations of the *Polyommatus (Meleageria) coridon* group (sensu de Lesse) inhabiting the bordering valleys located in similar altitudinal belts (Fig. 1). A comprehensive study of the material collected, its subsequent comparison with the known Caucasian taxa of the given group have allowed the authors to set aside a new taxon on the level of species of *Polyommatus (Meleageria)*.

Polyommatus (Meleageria) arzanovi spec. nov.

Material. Holotype ♂, Russia, Karachai-Cherkessia, the mountain range of Mussa-Achitara, 2300 m, 07.08.2003, B. Stradomsky leg., deposited in the Zoological Museum of the Moscow University.

Paratypes: 5♂, same locality, 2250–2350 m, 07.08.2003, B. Stradomsky leg.; 5♂, same locality, 2250–2500 m, 06–08.08.2004, B. Stradomsky leg.; 1 specimen deposited in the Zoological Museum of the Moscow University, 4 specimens deposited in the Zoological Museum of the Rostov-on-Don University, 5 specimens deposited in the private collections of the authors.

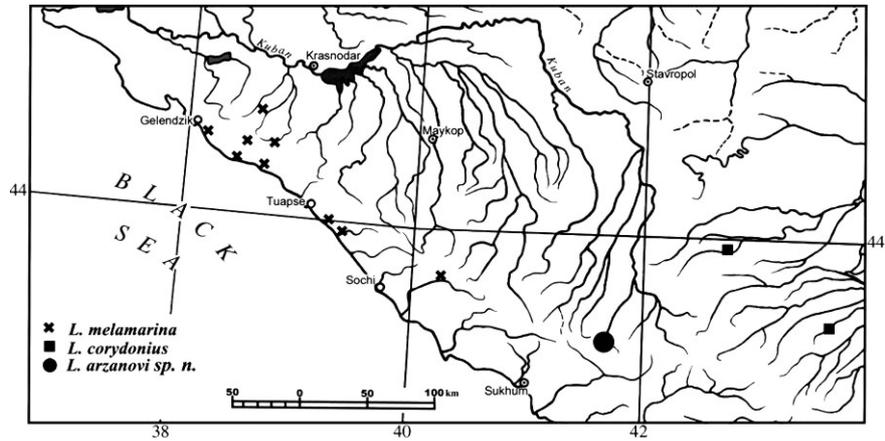


Figure 1: Localities in North Caucasia where specimens of the subgenus *Meleageria* were collected.

Description. Male (holotype) (Fig. 2). Forewing length 16.3 mm (16.0–16.8 mm in the series).

Upperside dark-blue-violet, lustrous. Basal area of forewing covered with whitish androconial hairs. Discal stroke absent, marginal darkening weak, black marginal line narrow, bordered with black spots located between veins, ends of veins blackened. Hindwings with black spots between veins, separated from black marginal line by whitish touches. Wing edge in 2A-Cu₂ slightly angular. Fringe completely white with black-grey spots located along veins' extensions, weakly pronounced on hind wings.

Underside: background colour of forewings light-grey with basal-oriented darkening, background colour of hind wings with beige shade. Forewings with postdiscal row of large black spots, spot in M₃-Cu₁ slightly offset and prolonged along basal line. Submarginal pattern of forewings weak and unclear. Discal and basal spots distinct, with weak white edging. Spots of postdiscal row visibly smaller than spots on forewings, with strong weak edging. Large clear-white edge-shaped spot along M₃ vein. In place of discal spot on hind wings white heart-shaped spot. Marginal pattern consists of submarginal bright-orange lunules and small black spots. Basal part with distinct green-blue metallic dusting.

Male genitalia. Blades of uncus elongated. Branches of gnathos half as long as blades of uncus, on external edge of caudal third equipped with prominent triangular teeth. Valva elongated, structure typical for *Meleageria*. Aedeagus short, cylindrical, widened to apex.

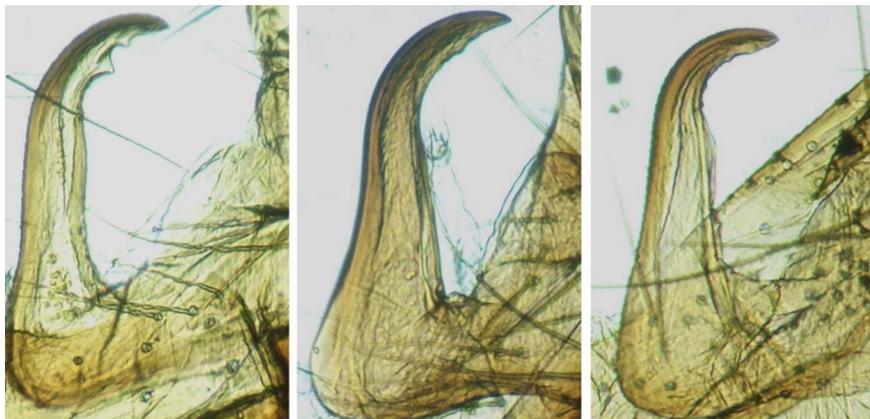


P. (M.) arzanovi **sp. nov.**

P. (M.) melamarina

P. (M.) corydonius

Figure 2: Habitus of the imago of the studied species in the subgenus *Lysandra*.

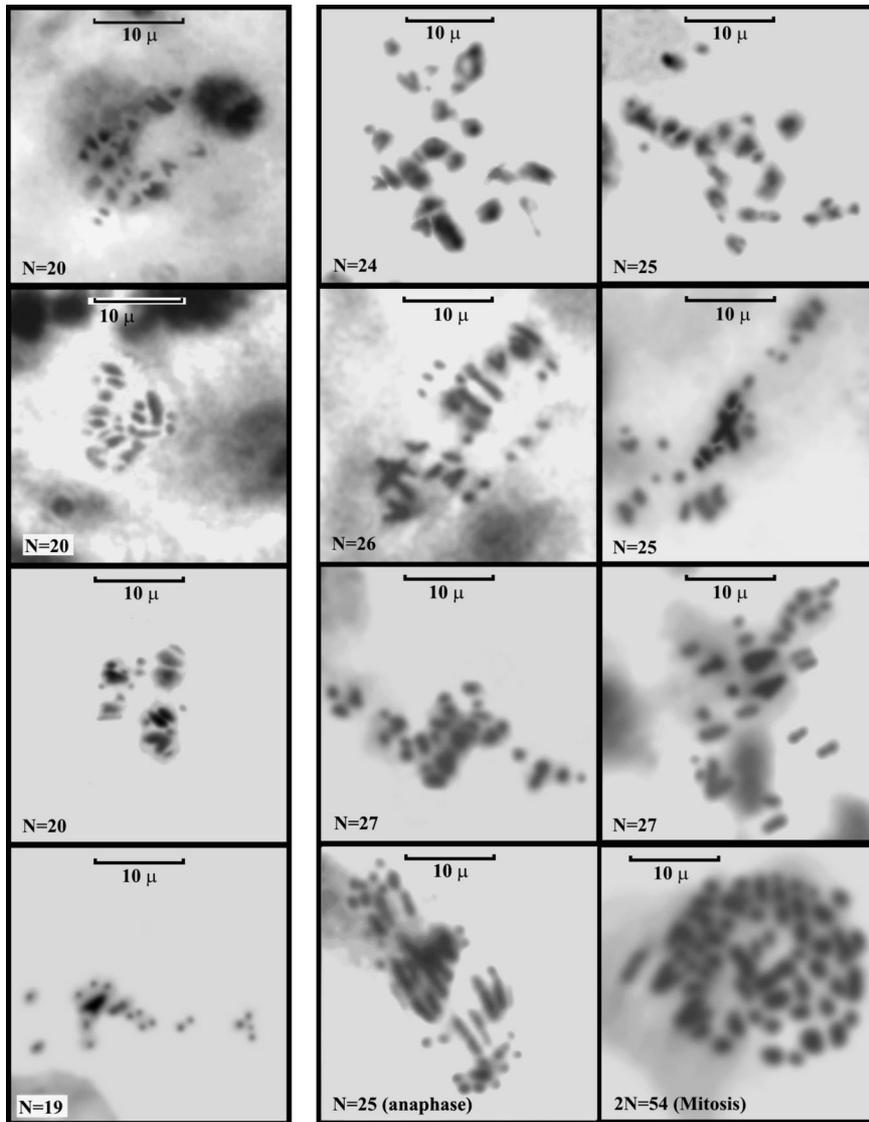


P. (M.) arzanovi **sp. nov.**

P. (M.) melamarina

P. (M.) corydonius

Figure 3: Male genitalia (gnathos) of the studied *Meleageria* species.



P. (M.) arzanovi sp. nov.

P. (M.) melamarina

Figure 4: Chromosomes of *Polyommatus (Meleageria) arzanovi sp. nov.* and *P. (M.) melamarina*.

Biotope. The butterflies are concentrated at stony slide-rocks among subalpine meadows at a height of 2250–2500 m, periodically visiting for a while sites of tall grasses. The following species of legumes, possibly host plants for larvae of the taxon described, are discovered at the slide-rocks: *Lotus caucasicus* Kupr., *Coronilla balansae* (Boiss.) Grossh., *Hedysarum caucasicum* Bieb. A freshly-burst imago with partially hardened wings was found near anthills of *Proformica caucasae* (Santschi) and *Tetramorium taurocaucasicum* K. Arnoldi.

Differential diagnosis. *P. (M.) arzanovi* spec. nov. was compared with two congenial taxa: *P. (M.) melamarina* Dantchenko, 2000 and *P. (M.) corydonius ciscaucasica* (Jachontov, 1914). In contrast to weakly indented gnathos of the latter two species, gnathos of *P. (M.) arzanovi* bear prominent teeth, often very large (Fig. 3). Besides, difference of habitats of taxa compared attracts attention (Fig. 2). *P. (M.) corydonius* and *P. (M.) melamarina* are noted for light-blue colour of upper wings with marginal darkening, that visibly differs from dark-blue-violet colour of *P. (M.) arzanovi*. Underside *P. (M.) melamarina* is almost white, *P. (M.) corydonius* brown, and *P. (M.) arzanovi* grey with beige shade. In addition to abovementioned distinctions, *P. (M.) arzanovi* has such characteristic feature as clearly visible basal green-blue dusting of the upper hind wings, virtually not found in *P. (M.) melamarina* and *P. (M.) corydonius*.

Karyological characteristics. Karyological analysis was made on males. Abdomens of imagos were fixed in a mix of ethanol and acetic acid solution (3:1) and kept for 3–5 months. After that the gonads were extracted and stained with 2% acetic orcein. Pressed specimens were prepared in a drop of 40% lactic acid and shot with the use of microscope objective (Fig. 4). The authors analyzed karyotypes of 4 specimens of *P. (M.) melamarina* (meiosis metaphases, early anaphase, mitosis metaphase) and 4 examples of *P. (M.) arzanovi* (meiosis metaphases).

Results of karyologic analysis (Fig. 4) suggest that the haploid number of chromosomes of *P. (M.) melamarina* males is 24–27 (diploid number $2n=54$ chromosomes in metaphase of mitosis), while haploid number of *P. (M.) arzanovi* makes up $n=19–20$ chromosomes. Furthermore, the chromosomes of *P. (M.) arzanovi* are smaller than chromosomes of *P. (M.) melamarina*.

Thus, the authors established the differences, both quantitative and qualitative, between *P. (M.) melamarina* and *P. (M.) arzanovi*, as well as the difference between these and one related Turkey taxon identified by H. de Lesse as *P. (M.) corydonius caucasicus* (Lederer, 1870), the haploid number of the latter making is $n=84$ chromosomes (de Lesse, 1969). Besides, results of karyological analysis confirm the specificity of *P. (M.) melamarina* Dantchenko described from the Black Sea coast. The chromosome numbers of two Caucasian taxa (*P. (M.) melamarina* and *P. (M.) arzanovi*) differ markedly from those which H. de Lesse (1969) established for related taxa inhabiting the Pontic Alps in Turkey (*P. (M.) olympica* and *P. (M.) caucasica* sensu de Lesse). His

assumption (p. 510) that there is "a high probability of finding karyotype $n=84$ in Caucasia" (the karyotype established by him for the so-called "*L. caucasica*" in Turkey: Erzincan, Gümüşhane) lacks support.

The findings presented make it possible to suggest the occurrence in the Caucasus of at least three species of *Polyommatus* (*Meleageria*) characterized by significant morphological and karyological distinctive features. The karyotype of *P. (M.) corydonius* remains unknown; the taxonomic status of populations found in the mountain range of Aibga and the valley of the river Gonachkhir is yet to be defined.

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