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A new species of the genus *Polyommatus* Latreille, 1804 from Mongolia

(Lepidoptera, Lycaenidae)

by

Alexandre Dantchenko & Sergei Churkin

Abstract: *Polyommatus (Agrodiaetus) mediator* spec. nov. from Mongolia (southernmost Mongolian Altai mountains) is described. The new taxon is close to *P. (A.) juldusus* (Staudinger, 1886) described from East Tian Shan mountains. The taxonomical position of 4 taxa from Mongolia described up to now is discussed, i. e. *P. (A.) damone altaica* (Elwes, 1899), *P. (A.) damone walteri* Dantchenko & Lukhtanov, 1993, *P. (A.) damone bogdoolensis* Dantchenko & Lukhtanov, 1997, *P. (A.) fabiani* (Balint, 1997). The finding of this new taxon made it possible to revise the structure of *damone* species-complex.

The following abbreviations are used in the text:

EMEM	Entomologisches Museum of Dr. Ulf Eitschberger, Marktleuthen, Germany
ZIMP	Zoological Institute and Museum of University of Sankt-Petersburg, Russia
ZFMK	Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany
ZSSM	Zoological Sammlung des Bayerischen Staats, München, Germany
CC	entomological collection of Sergei Churkin, Moscow, Russia
CD	entomological collection of Alexandre Dantchenko, Moscow, Russia

Introduction

According to a recent review (Eckweiler & Häuser, 1997), the genus *Agrodiaetus* contains 190 available species-group names. Extensive field investigation during the last 30 years in Iran, Turkey and Caucasus identified Asia Minor as the centre of origin of this group. Species diversity over that region is exceptionally high. In the restricted area of the same mountainside one can find up to 10 closely related species of the genus, e. g. in the Zuvand plateau of Talish mountains (Dantchenko, unpubl.).
In contrast with this observation, at the eastern edge of the areal (in Mongolia and South Siberia) the genus is represented by few widely distributed species: *P. (A.) damone, P. (A.) damon* and *P. (A.) rippartii*. Disregarding the two latter species, the following taxa from Mongolia were reported up to now (Forster, 1968, 1971; Balint, 1989, 1997; Dantchenko & Lukhtanov, 1997):

P. (A.) damone altaica (Elwes, 1899), TL: Central Altai,
P. (A.) damone walteri Dantchenko & Lukhtanov, 1993, TL: South Tuva,
P. (A.) damone bogdoolensis Dantchenko & Lukhtanov, 1997, TL: West Mongolia (northernmost part of Mongolian Altai),
P. (A.) fabiani (Balint, 1997), TL: Central Mongolia (easternmost part of Khangai mountains).

The first three subspecies represent the eastern part of the areal of widely distributed *P. (A.) damone* (Eversmann, 1841). Taxon *bogdoolensis*, described from three males collected at the beginning of the 20th century by Grum-Grshimailo differs strongly from the other members of the *damone*-complex, and it seems to be a separate species. However, because of lack of the females and any freshly collected specimens from this region, it is currently included within the *damone* species-complex (Dantchenko & Lukhtanov, 1997).
Recently, *Polyommatus fabiani* Balint was described (Balint & Johnson, 1997), based on two males from Mandalgovi (Central Mongolia, easternmost part of Khangai mountains). In the same paper it was reported that two sympatric species occurred in North Mongolia, *P. (A.) damone altaica*, and

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P. (A.) walteri. In order to compare *Polyommatus fabiani* with *P. (A.) walteri* (sensu BALINT), the author presented a picture of the male of the latter species, collected in Central Mongolia (l. c., pl 3, fig. 9 right). Thus, it could be reasonably concluded, that *fabiani* was apprehended by the author himself as the allopatric taxon of *P. (A.) damone*.
Meanwhile, as a matter of fact, *P. (A.) damone walteri* was described as a part of the populations of the *P. (A.) damone* species-complex from Tuva and South Altai. These populations were previously treated as *P. (A.) damone altaica* but described as separate subspecies due to their stable small size and the reduction of the submarginal wing pattern (DANTCHENKO & LUKHTANOV, 1993, 1997).
During last summer a lot of specimens, determined preliminarily as being close to the *P. (A.) damone* species-complex, was collected in the southernmost parts of the Mongolian Altai. According to field observations, both males and females represented the same species. Careful study revealed that all specimens belonged to a new species close to *P. (A.) juldusus* (STAUDINGER, 1886).

Polyommatus (Agrodiaetus) ***mediator* spec. nov.**
(colour plate I, figs. 1–4)

Material
Holotype ♂: Mongolia, Mongolian Altai, 30 km of Biger, 45-25N, 97-08E, 2650–2950 m, 29.VI.02–7.VII.02, CHURKIN S. leg. (will be deposited in ZSSM).
Paratypes: 87 ♂♂, 34 ♀♀, same data as holotype (EMEM, ZFMK, ZSSM, CC, CD).

Description
Holotype ♂: forewing length 14.0 mm.
Upperside: ground colour light blue, close to *P. (A.) iphigenia* (HERRICH-SCHÄFFER, [1847]), discal strokes reduced, forewing costa bordered by white pubescence, marginal obscuration not strong, veins slightly dusted distally, cilia white.
Underside: ground color light gray, with slight brownish tint in hindwings, postdiscal spots relatively small, encircled with white, in hindwings postdiscal spots strongly reduced, discal strokes almost invisible; marginal design strongly reduced, more clearly distinct in hindwings, brackets in the cell 2A–Cu2 with light reddish spot; white stroke sharp, enlarged distally, very close in design to *P. (A.) iphigenia*, basal dusting very strong and wide; cilia white.
Paratype female: forewing length 13.9 mm.
Underside: ground color dark gray, with brownish tint, discal strokes on forewings fine; marginal design strongly reduced, more clearly distinct in hindwings as light reddish brackets; cilia white, inner part with light brownish tint.
Underside: design as in the male, ground colour light brown with gray tint; basal dusting strong and wide.

Variation
Forewing length varies from 12.9 to 15.1 mm (14.1 mm as an average) in males; from 13.5 to 15.1 mm (14.5 mm as an average) in females. Intensity and width of the marginal obscuration in the males' uppersides slightly varies, in several males up to 2.5 mm; discal strokes and postdiscal spots on hindwing undersides often completely reduced. Discal strokes and marginal light reddish brackets on upperside in half of the female specimens strongly reduced.

Definition
P. (A.) mediator spec. nov. is generally close to *P. (A.) juldusus* STAUDINGER, 1886. The males of the new species differ by the less marginal obscuration and light blue colour, the ground colour in females is light brown with a clear grey tint, discal strokes reduced, not so sharp depicted. The *P. (A.) damone* species-complex differs from the new species by its very specific, dark brown ground colour, the very distinct antemarginal wing pattern in females and the specific pattern of the costa area in males; compared to *P. (A.) damone* the valva of the new species is distinctly shorter, with few, short setae.

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Bionomy

The type series was collected at North mountainsides in the southernmost part of the Mongolian Altai. We use here the division of this region according to Gvozdetskyi (Gvozdetskyi & Golubchikov, 1987). Butterflies were collected at several localities of the same valley in a range of altitudes from 2650 to 2900 m. The biotope can be defined as specific highland stone steppe with cretaceous outcrops.

These very specific, relatively humid biotopes were extremely local at middle altitudes and never found either on the South slopes of the same range or on the spurs adjacent to the southern edge of the Mongolian Altai. Extensive study of the adjacent spurs of Goby Altai also did not yield any definite result.

The diurnal activity of the butterflies was typical for the group. The males often patrolled in the biotope, females were mostly observed sitting on the soil or inside small bushes of undetermined plants. Both males and females were feeding on the short whitish flowers of *Rosa* spp. Several copulating pairs were found during the last days of collecting. As egg-laying was not observed, the host plant is unknown. There are several *Astragalus* species in the biotope. It seems logical to suppose that *P. (A.) mediator* spec. nov. must be trophically connected with *Hedysarum* species inhabiting the steppes or cretaceous outcrops (Dantchenko, 1997), i.e. *Hedysarum ferganense*, (*H. gmelinii*-complex). However, it should be note that according to the last review (Yakovlev, 1988) the systematic of this group in Central Asia is still under discussion.

The following Rhopalocera species were also collected in the locality: *Thersamonolycaena* spp., after peak of the flight; *Colias polyographus*, second generation; *Erebia callias*, peak of the flight.

Distribution

P. (A.) mediator spec. nov. is known only from type locality.

Discussion

As discussed in a recent paper (Lukhtanov & Dantchenko, 2002), the main methodological problem in the study of the genus *Agrodiaetus* is the absence of testable parameters to structure this complicated group. The karyotype characters undoubtedly should be considered as distinct and testable, but according to a preliminary date (Lukhtanov & Dantchenko, in prep.) the chromosome number of the *P. (A.) juldusus* species-complex is quite similar to that in the *P. (A.) damone* species-complex. Thus, the chromosome number alone could not be useful for analyses of the taxonomic position of the new species. Since the material fixed for DNA analyses is still under investigation (Kandul, in prep.), several important morphology parameters were examined.

Male fore legs

The male fore leg structure is widely used for higher classification of the Lycaenidae (Eliot, 1973). It was first used by Carbonel for taxonomic analysis at the species level for a group close to *Agrodiaetus* (Carbonell, 1993). According to this parameter *P. (A.). mediator* differs from specimens from populations of *P. (A.) damone walteri* (figs. 1, 2).

However, it should be noted that, in the case of extreme local and widely distributed species, the correlation of this parameter with other morphological patterns is rather complex and unequivocal (Dantchenko, unpubl.) and its significance is questionable.

Male genitalia structure

It was noted that male genitalia structures were of minor value for taxonomic analysis of the genus. It is worthwhile noting that the results reported in very important papers (Coutsis, 1985, 1986) are still unused.

One of the main problem of previous attempts of using genitalia structure for taxonomic analysis (i. e. Carbonel, 1993) is concerned with the lack of data, which could define the structural level of applicability of this character, i. e., a population, a metapopulation, or a species level. In the cited works the biostatistics was also missing.

Recent investigations showed clearly the stability of the shape and relative size of valva for some widely distributed species (Dantchenko, in prep.). According to this parameter, *P. (A.) mediator* falls into the short valva species-group, i. e.to *P. (A.) juldusus* but not to *P. (A.) damone* (figs. 3, 4).

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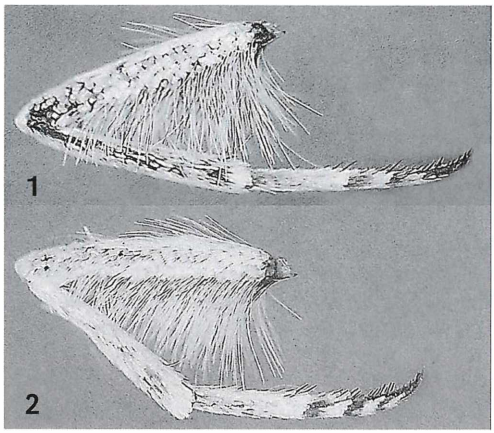

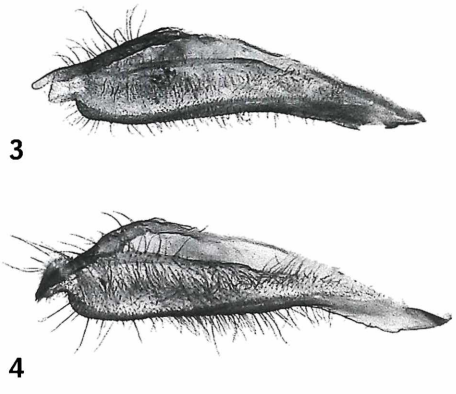

Fig. 1: Fore leg of *P. (A.) mediator* DANTCHENKO & CHURKIN spec. nov. Fig. 2: Fore leg of *P. (A.) damone walteri* DANTCHENKO & LUKHTANOV, 1993, ♂, South Altai, Ukok plateau, July 2001. Fig. 3: Left valva of *P. (A.) mediator* DANTCHENKO & CHURKIN spec. nov. Fig. 4: Left valva of *P. (A.) damone walteri* DANTCHENKO & LUKHTANOV, 1993, ♂, South Altai, Ukok plateau, July 2001.

Costal area structure

The scale pattern on the forewing costa was first proposed for intro-specific rearrangement in an earlier paper (DANTCHENKO, 1994). According to this parameter, at least two groups in the genus could be designated. The first group is characterized by the costa covered with scales of the same colour as the discal part of the wing and the presence of white dense hairs near the border. In the case of the second group, the costal area is mostly covered by white scales of the same structure as the discal part of the wing. Only a small portion of white hairs is present near the border. The *P. (A.) damone* species-complex differs clearly by this character from the *P. (A.) juldusus* species-complex. *P. (A.) mediator* falls to the latter complex (colour plate II, figs. 3, 4).

The finding of *P. (A.) mediator* spec. nov., clearly different from the *damone* species-complex, makes us revise the earlier described *Agrodiaetus* taxa from Mongolia.

Thus, taxon *bogdoolensis* from North Mongolian Altai described as a subspecies of *P. (A.) damone*, is actually closer to *P. (A.) mediator*, and it may represent its allopatric population. Following this assumption, the male presented in the figure given by BALINT (1997: 65, pl. 3, fig. 9, right) also can be described as an allopatric population of *P. (A.) mediator*.

In this connection, the assumption of a sympatric occurrence of two closely related species in North Mongolia, stated in that paper (BALINT, 1997: 50), may be reasonable. In this case, the discovery of two sympatric species in South Altai and Tuva regions could be also very probable.

Moreever, if the DNA data prove the identification of *P. (A.) mediator* as a part of the *P. (A.) juldusus* species-complex, treated up to now as endemic of Tian Shan mountains, its intra-specific structure and areal pattern can be noticeably changed.

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Colour plate I

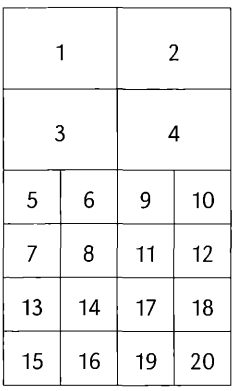

Fig. 1: *Polyommatus (Agrodiaetus) mediator* DANTCHENKO & CHURKIN spec. nov., holotype ♂: Mongolia, Mongolian Altai, 30 km of Biger, 45-25N, 97-08E, 2650–2950 m, 29.VI.02–7.VII.02, CHURKIN S. leg., ZSSM, upperside.
Fig. 2: *Polyommatus (Agrodiaetus) mediator* DANTCHENKO & CHURKIN spec. nov., holotype ♂: ibid, underside.
Fig. 3: *Polyommatus (Agrodiaetus) mediator* DANTCHENKO & CHURKIN spec. nov., paratype ♀: same date as holotype, CD, upperside.
Fig. 4: *Polyommatus (Agrodiaetus) mediator* DANTCHENKO & CHURKIN spec. nov., paratype ♀: same date as holotype, underside.
Fig. 5: *P. (A.) damone walteri* DANTCHENKO & LUKHTANOV, 1993, ♂, South Altai, Ukok plateau, July 2001, CD, upperside.
Fig. 6: ibid, underside.
Fig. 7: *P. (A.) damone walteri* DANTCHENKO & LUKHTANOV, 1993, ♀, South Altai, Ukok plateau, July 2001, CD, upperside.
Fig. 8: ibid, underside.
Fig. 9: *P. (A.) damone walteri* DANTCHENKO & LUKHTANOV, 1993, ♂, South Tuva, Uyukskyi mts., 1600 m, July 2002, CD, upperside.
Fig. 10: ibid, underside.
Fig. 11: *P. (A.) damone walteri* DANTCHENKO & LUKHTANOV, 1993, ♀, South Tuva, Uyukskyi mts., 1600 m, July 2002, CD, upperside.
Fig. 12: ibid, underside.
Fig. 13: *P. (A.) juldusus* (STAUDINGER, 1886), ♂, Кульджа [Kuldja, East Tian Shan mts., Juldus plateau, 2400–2600 m alt.], 15.07[1879], [ALPHERAKI S. leg.], paralectotype, designated here, ZIMP, upperside.
Fig. 14: ibid, underside.
Fig. 15: *P. (A.) juldusus* (STAUDINGER, 1886), ♀, Кульджа [Kuldja, East Tian Shan mts., Juldus plateau, 2400–2600 m alt.], 15.07[1879], [ALPHERAKI S. leg.], paralectotype, designated here, ZIMP, upperside.
Fig. 16: ibid, underside.
Fig. 17: *P. (A.) damone bogdoolensis* DANTCHENKO & LUKHTANOV, 1997, holotype ♂: [West Mongolia], [Mongolian] Altai, [Khovd region], [the mountain North of Kobdo river], [5.–18.VII.1903], leg. GR[UM]-GR[SHIMAILO], ZIMP, upperside.
Fig. 18: ibid, underside.
Fig. 19: *Polyommatus (Agrodiaetus) mediator* DANTCHENKO & CHURKIN spec. nov., paratype ♀: same date as holotype, CD, upperside.
Fig. 20: *Polyommatus (Agrodiaetus) mediator* DANTCHENKO & CHURKIN spec. nov., paratype ♀: same date as holotype, CD, underside.

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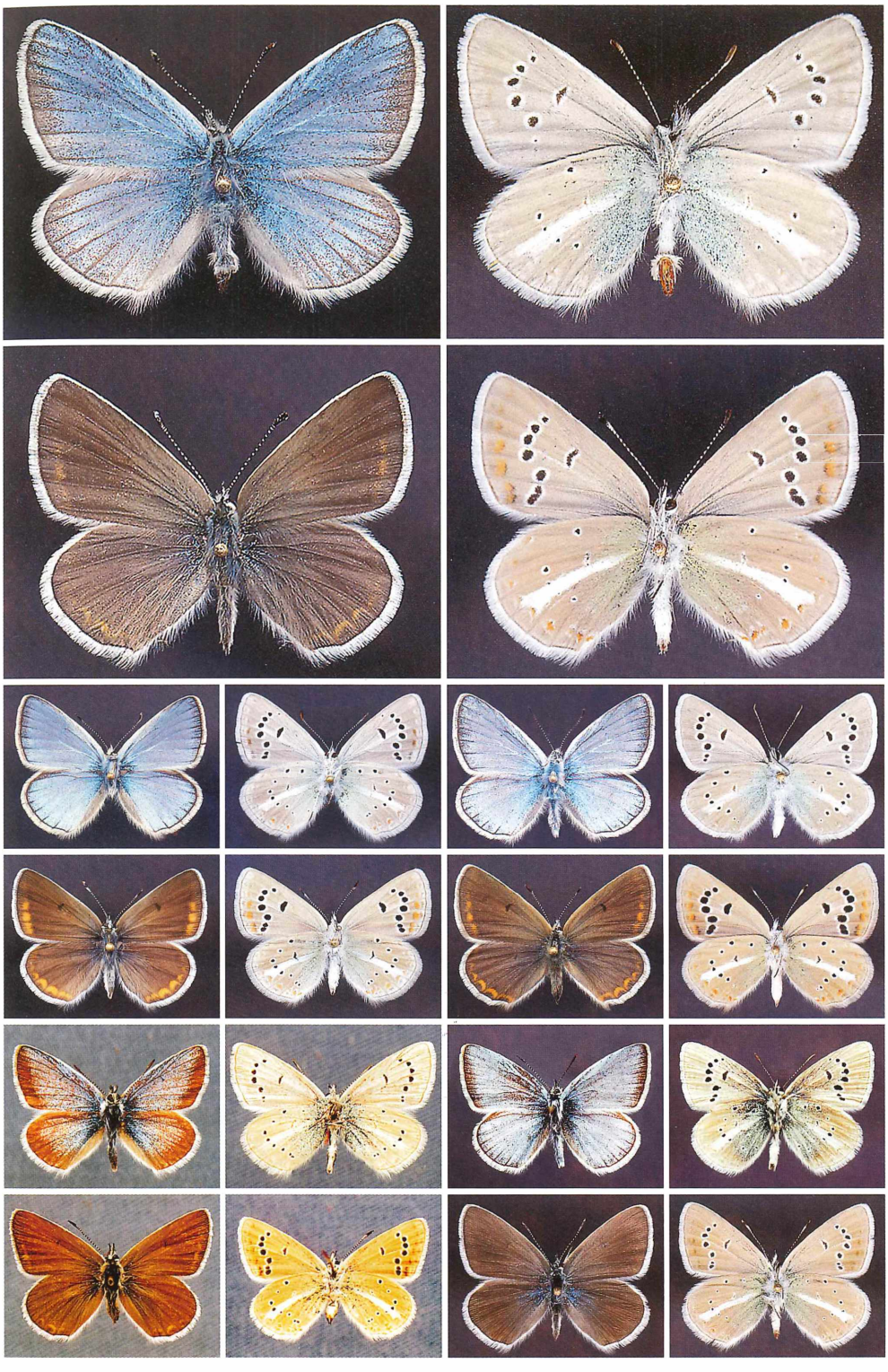

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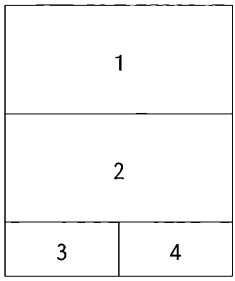
Colour plate II

Fig. 1: Biotope of *P. (A.) mediator* DANTCHENKO & CHURKIN spec. nov.
Fig. 2: General view to the valley.
Fig. 3: Costa of *P. (A.) mediator* DANTCHENKO & CHURKIN spec. nov.
Fig. 4: Costa of *P. (A.) damone walteri* DANTCHENKO & LUKHTANOV, 1993, ♂, South Altai, Ukok plateau, July 2001.



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