Review of the distribution of the Balkan endemic *Polyommatus (Agrodiaetus) aroaniensis* (Lepidoptera: Lycaenidae), with notes on its sympatry with related species

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Summary. All available data on the distribution and biology of the Balkan endemic *Polyommatus aroaniensis* (Brown, 1976) is reviewed. With the addition of previously unpublished records from ex-Yugoslav Macedonia and Southwest and central-East Bulgaria, it is shown that the range of this species may extend much farther north- and eastward than previously believed.

Samenvatting. De verspreiding van de Balkan endeem *Polyommatus (Agrodiaetus) aroaniensis* (Lepidoptera: Lycaenidae) met gegevens over het sympatrisch voorkomen met verwante soorten.
Alle bekende gegevens over de verspreiding en de biologie van de voor de Balkan endemische *Polyommatus aroaniensis* (Brown, 1976) worden opgesomd. De soort wordt nieuw vermeld uit ex-Joegoslavisch Macedonië. Samen met aanvullende gegevens uit Zuidwest- en Oost-Bulgarije blijkt het verspreidingsgebied zich hierdoor verder naar het noorden en oosten uit te strekken dan tot nu toe werd aangenomen.

Résumé. La répartition de l'endémique balkanique *Polyommatus (Agrodiaetus) aroaniensis* (Lepidoptera: Lycaenidae) et données sur la sympatrie avec des espèces voisines.
Toutes les données publiées sur la répartition et la biologie de l'espèce endémique balkanique *Polyommatus aroaniensis* (Brown, 1976) sont énumérées. L'espèce est mentionnée pour la première fois de la Macédoine ex-yougoslave. Avec de nouvelles données du sud-ouest et de l'est de la Bulgarie l'aire de répartition de cette espèce semble s'étendre plus vers le nord et l'est que l'on ne l'a supposé jusqu'à présent.

Key words: Lycaenidae – *Polyommatus* – *Agrodiaetus* – *aroaniensis* – distribution – Balkans – ecology.

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Introduction

The so-called anomalous blues, or the monomorphic *Agrodiaetus*, are a taxonomically problematic group in which both males and females are brown on the upperside. The taxa often resemble each other very much, but are usually separable on features of their morphology, anatomy, karyology or ecology. Most species of this complex are endemic to relatively small areas in South Europe and the Near East, and a large fraction of them have been described only in the last few decades.

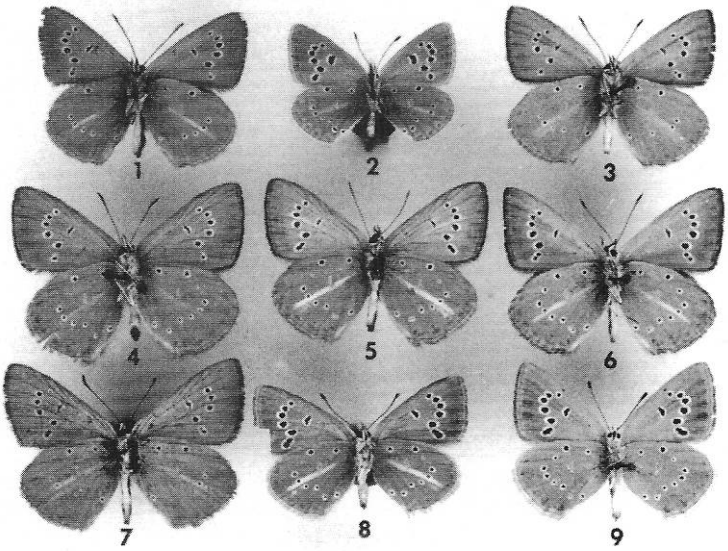
In Europe, these lycaenids are best represented on the Balkan Peninsula, where five species are currently known to occur. Often two or three of them may be found flying in sympatry retaining their individual characteristics, a circumstance which confirms their separation at species level.

Taxonomic history of *Polyommatus aroaniensis*

Until about 20 years ago, only two species of this group were known from the Balkans: *P. (A.) admetus* (Esper, [1783]) and *P. (A.) ripartii* (Freyer, 1830). Coutsis (1972) for the first time attracted attention to a population of "*ripartii*" on Mt. Chelmos in southern Greece, noting that in about half of all specimens the white streak on the hindwing underside, always present in *ripartii*, was completely absent. Brown (1976a) wrote about these same butterflies from Chelmos as "an unrecognized *Agrodiaetus* sp. similar to and often sympatric with *ripartii* [*pelopi*] in Greece". It was described as *Agrodiaetus alcestis aroaniensis*, type-locality Mt. Chelmos (Brown 1976b). However, Coutsis (1978) found this taxon to be considerably different morphologically from *P. (A.) alcestis* (Zerny, 1932) from Lebanon and Central Turkey. Because of this and of the

lower chromosome number (n = 15–16 as opposed to n = 19–21 in *alcestis*), *aroaniensis* was elevated to species rank (Brown & Coutsis 1978).

Apart from the chromosome number, typical *aroaniensis* are characterized by the following characters. The hindwing underside is medium coffee-brown with well perceptible reddish hue and without darker marks along the margin. The postdiscal spots on hindwing tend to be small (a few are often absent) and are displaced more basad than in most other species of the group. A white stripe on the hindwing underside is present in about 50–60% of all specimens in a population, while in the rest it is either completely absent or sometimes indicated by a weak suffusion of whitish scales. The male genitalia are relatively large compared to the size of the butterfly: valva around 3.0–3.1 mm long (fig. 10).



Figs. 1–9: *Polyommatus (Agrodiaetus) aroaniensis* (Brown, 1976); 1. ♂ ex-Yugoslav Macedonia, near Prilep, 1000 m, 29.VI.1989, leg. J. Dils; 2. ♀ ex-Yugoslav Macedonia, Petrina Planina, 1850 m, 21.VII.1981, leg. D. van der Poorten; 3. ♂ Greece, Achaia, Kalavrita, 750 m, 7.VII.1985, leg. D. van der Poorten; 4. ♂ Greece, Drama, N. Phalakron, 1600 m, 3.VII.1984, leg. D. van der Poorten; 5. ♂, same data as fig. 4; 6. ♂ Greece, Achaia, Chelmos, 1700 m, 16.VII.1984, leg. D. van der Poorten; 7. ♂ Bulgaria, Balkan Mts., Karandila reserve above Sliven, 1000 m, 4.VIII.1996, leg. Z. Kolev; 8. ♀ SW. Bulgaria, S. Pirin Mts., 2 km E of Paril village, 850-950 m, 30.VI.1994, leg. Z. Kolev; 9. ♀ Greece, Achaia, Chelmos, 600 m, 6.VII.1979, leg. D. van der Poorten.

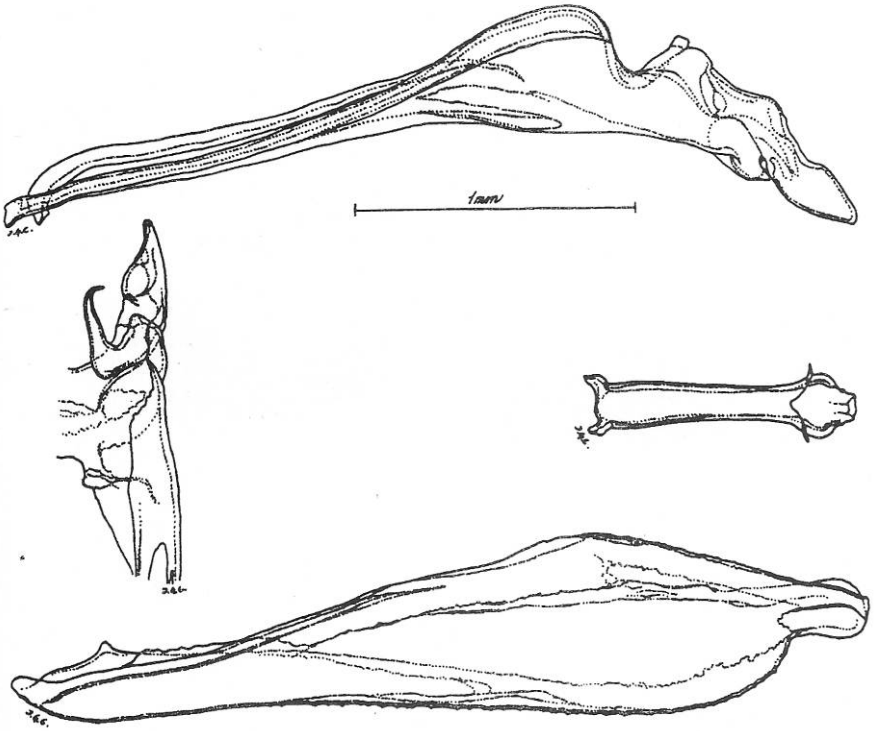


Fig. 10: *Polyommatus (Agrodiaetus) aroaniensis* (Brown, 1976), male genitalia, Bulgaria, Balkan Mts., Karandila Res. Sliven town, 1000 m, 4.VIII.1996 (Prep. 2851 JGC).

Reported distribution and larval host-plant

Polyommatus aroaniensis is a mountain species found in dry flowery glades and meadows at altitudes between 500 and 1600 m, and occasionally higher. Until a few years ago it was only known from Greece, mainly the southern and central regions: Mt. Chelmos, Mt. Smolikas, Mt. Parnassos, Mt. Tymphristos (Brown 1976b, Wakeham-Dawson & Spurdens 1994), but also in the north: Mt. Triklario (Coutsis, pers. comm.), and the mountains of the Drama district (Brown 1976b, van der Poorten 1982). Tolman (1995) reported that the larval host-plant of *aroaniensis* on Mt. Chelmos is *Onobrychis arenaria* (Kit) DC., and noted an interesting ecological fact concerning the three brown *Agrodiaetus* sympatric there (*admetus*, *pelopi*, and *aroaniensis*). He found that they all used the same plant species, but "the larvae of these three species were never found within the same colony of their common host-plant" (Tolman, *l.c.*: 115).

Recently the species was found on Mt. Alibotush in SW Bulgaria, where it is sympatric with *P. (A.) nephohiptamenos* (Brown & Coutsis, 1978), another Balkan endemic of the same complex (Kolev 1994). The record was based on a single male with a white stripe on the underside. The first author revisited the locality in early July 1994 and managed to find some more males, of which half lacked the white stripe. The population was restricted to flowery places on the steep south-facing calcareous slope "Koynara" in the Hambar-Dere valley, at 1500–1600 m.

Fig. 11: Map of the Balkan Peninsula showing the currently known localities of *Polyommatus (Agrodiaetus) aroaniensis* (Brown, 1976).

New localities of *aroaniensis*

During the same 1994 trip a second population of *aroaniensis* was found adjacent to the Alibotush on the southernmost flanks of Mt. Pirin, east of Paril village. The biotope was very different from the flowery glades in which the species was found on Mt. Alibotush, and apparently also in Greece (Brown 1976b). It comprised eroded stony slopes with extremely sparse low vegetation, at 900–950 m. There, only one male and one female were collected. *P. admetus* was abundant there, but concentrated without exception in the sheltered gulleys on the slopes with more vegetation. Some of the other species flying there were *Pieris ergane* (Geyer, [1827]), *Euchloe penia* (Freyer, [1851]) gen. aest., *Pseudochazara orestes* De Prins & van der Poorten, 1981, *Satyrus ferula* (Fabricius, 1793), and *Hipparchia senthes* (Fruhstorfer, 1908).

A few years ago, *aroaniensis* was also found in ex-Yugoslav Macedonia (close to the Greek border): 1♀ on Petrina Planina, 1850 m, 21.VII.1981, leg. D. van der Poorten and 1♂ near Prilep, 1100 m, 29.VI.1989, leg. J. Dils. In the first locality the species was accompanied by *Polyommatus (Agrodiaetus) pelopi* (Brown, 1976), and in the second

one by *Euchloe penia*, *P. (A.) pelopi* and *Pseudochazara cingovskii* Gross, 1973. This is the first record of *aroaniensis* for this country.

Conclusion

Apparently, *P. aroaniensis* is confined in its distribution to the Balkan peninsula. However, the new data presented here show that, while its range in Greece is rather well understood, very little is known about the northern limit of distribution, in Macedonia and Bulgaria, and possibly also in eastern Albania.

It appears that there is hardly any locality where *P. aroaniensis* is not sympatric with at least one other species of its complex. Contrary to popular belief (see e. g. Wakeham-Dawson & Spurdens 1994), *P. aroaniensis* is usually easy to distinguish in the field from the other relatives it may be flying with: *P. admetus*, *P. pelopi*, and *P. nephohiptamenos*.

The constancy of the morphological features of these taxa relative to each other, combined with differences in their chromosome numbers and such distributions which result in partial sympatry, is a good, albeit arguably indirect, indication of their reproductive isolation at specific level. This seems to be corroborated by the so far unique evidence (Tolman 1995, see above) which suggests that in a state of sympatry *P. aroaniensis*, *P. pelopi*, and *P. admetus* on Mt. Chelmos differ in their microhabitat preferences for oviposition on the same plant species, thus obviously reducing competition for their common larval food source. Apparently, this interesting system of related taxa in the Balkans has much to offer for population, genetical, and evolutionary studies.

In early August 1996, the first author and Mr. Bart Vanholder (Haaltert, Belgium) found *aroaniensis* in Stara Planina (Balkan Mts.) above Sliven town, in the highest part of the national park "Karandila". This is by far the northeasternmost known locality of the species, suggesting that *aroaniensis* may have an even wider distribution to the north in the central part of the Balkans. Remarkably, none of the ten males or the single female found had a white stripe, and only in three males was there a very vague whitish suffusion in the discal area of the hindwing.

The very localized population was found in the highest part of the area (at 1000 m), in a glade bordering a forest dominated by *Fagus sylvatica moesiaca* (K. Maly) Hyelmq. and *Quercus dalechampii* Ten. The vegetation in the glade was low and sun-dried, with hardly any flowers left. All individuals were collected sitting on, or flying around, the inconspicuous flowers of an unidentified odourless, silvery-grey plant of the Labiatae. On the same site a single specimen of *P. (A.) admetus* was found. Other characteristic butterfly species were *Pieris krueperi* Staudinger, 1860, *Melanargia larissa* (Geyer, [1827]), *Satyrus ferula* (Fabricius, 1793), *Hipparchia syriaca* (Staudinger, 1871), *Plebeius sephirus sephirus* (Frivaldsky, 1835), *Polyommatus dorylas* ([Denis & Schiffermüller], 1775), *Pyrgus cinarae* (Rambur, [1839]), and *Hesperia comma* (Linnaeus, 1758).

Acknowledgments

Thanks to Messrs. John G. Coutsis (Athens, Greece), Bart Vanholder (Haaltert, Belgium), and Willy De Prins (Antwerpen, Belgium), for communicating important information and views.

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