

## New taxa of the subgenus *Agrodiaetus* HÜBNER, 1822 from Iran: *Polyommatus (Agrodiaetus) faramarzii* sp. n., *P. (A.) shahrami* sp. n., and *P. (A.) pfeifferi astyages* ssp. n. (Lepidoptera: Lycaenidae)

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**Abstract:** Two new species of the subgenus *Agrodiaetus* HÜBNER, 1822, namely *Polyommatus (Agrodiaetus) faramarzii* sp. n. (holotype ♂ in coll. Zoologische Staatssammlung, München) and *Polyommatus (Agrodiaetus) shahrami* sp. n. (holotype ♂ in coll. Senckenberg-Museum, Frankfurt am Main), are described from the south-central Zagros range. Additionally, one new subspecies, namely *Polyommatus (Agrodiaetus) pfeifferi astyages* ssp. n. (holotype ♂ in coll. Senckenberg-Museum, Frankfurt am Main), is described from the north-central Zagros. The relationships of the newly described taxa to their closest known relatives are discussed.

**Neue Taxa des Subgenus *Agrodiaetus* HÜBNER, 1822 aus Iran:** *Polyommatus (Agrodiaetus) faramarzii* sp. n., *P. (A.) shahrami* sp. n., and *P. (A.) pfeifferi astyages* ssp. n. (Lepidoptera: Lycaenidae)

**Zusammenfassung:** Zwei neue Arten aus der Untergattung *Agrodiaetus* Hübner, 1822, *Polyommatus (Agrodiaetus) faramarzii* sp. n. (Holotypus ♂ in coll. Zoologische Staatssammlung, München, ZSM/Lepidoptera 07/01) und *Polyommatus (Agrodiaetus) shahrami* sp. n. (Holotypus ♂ in coll. Senckenberg-Museum, Frankfurt am Main, SMFL-Nr. 4196), werden aus dem südlichen zentralen Zagros-Massiv beschrieben. Weiterhin wird eine neue Unterart, *Polyommatus (Agrodiaetus) pfeifferi astyages* ssp. n. (Holotypus ♂ in coll. Senckenberg-Museum, Frankfurt am Main, SMFL-Nr. 4197), aus dem nördlichen zentralen Zagrosgebirge beschrieben. Die Beziehungen zwischen den neuen Taxa und den vermutlich nächsten Verwandten werden diskutiert.

### Introduction

As part of the systematic research of the remote areas of the Zagros range during my first expedition to Iran, I made a hiking trip across the Zarde Kuh massive of the south-central part of the Zagros range, together with the Czech mountaineer and photographer Dalibor HÁK. Here I came across two small populations of apparently new taxa of the subgenus *Agrodiaetus* of the genus *Polyommatus* LATREILLE, 1804. The habitual features of both of them are so markedly different from any so far known taxa, that I decided to describe both of them as new species.

### *Polyommatus (Agrodiaetus) faramarzii* sp. n.

**Holotype:** ♂, Iran, Cahar Mahall-o-Bahtiyari, Zarde Kuh massive, 3000 m, 12. VII. 2000., leg. P. SKALA, in coll. Zoologische Staatssammlung, München, ZSM/Lepidoptera 07/01.

**Paratypes** (in total 19 ♂♂, 4 ♀♀): same data as holotype, 16 ♂♂, 3 ♀♀ in coll. P. SKALA, 1 ♂, 1 ♀ in coll. ECKWEILER, 2 ♂♂ in coll. SCHURIAN, 1 ♂♂ in coll. TEN HAGEN.

**Etymology:** This new species is named after a contemporary Iranian writer and nature photographer Mohammad Taghi FARAMARZI, whose beautiful photographs of the Zagros mountains and their nomad inhabitants, apart from their unquestionable artistic merit, became also a source of valuable information for my first Iranian trip.

### Description

♂. Forewing length 13–15 mm (holotype 14 mm).

Upperside: Ground colour deep sky blue, similar to *Polyommatus (Agrodiaetus) hamadanensis* (DE LESSE, 1959) without upperside marking. Fringes basally black and distally white. Tornus of hindwing rounded.

Underside: Ground colour brownish gray with intense blue-green basal suffusion of hindwings. Basal black spots absent on forewings, but present on hindwings. Discoidal and postdiscal black marking well developed on both fore- and hindwings. Submarginal polyommata pattern well developed: on forewings the whitish submarginal band broken by veins and surrounded by two parallel bands of dark gray lines. In corresponding submarginal pattern of hindwings complete dark outer submarginal band paralleled by inner submarginal band of contrast dark gray v-shaped spots. Characteristic white streak on hindwing clear and contrast. Fringes light gray to white.

♀. Forewing length 12 mm.

Upperside: Ground colour medium to dark brown with darker veins. Traces of basal blue suffusion of ♂ ground colour visible mainly on hindwings. Discoidal spots on both fore- and hindwings black, but barely visible, without lighter rim. Submarginal pattern inconspicuous on forewings, but strong and contrast on hindwings, consisting of whitish spots distally bordered by dark squares, and containing dark outer submarginal dots. Fringes light gray to white.

Underside: Ground colour of forewing light grayish brown with darkened base, hindwing darker and more brown. Basal suffusion green, marking pattern similar to ♂. Fringes light gray to white.

**Variation:** In ♂♂ the upperside shows virtually no variation. On the underside the colour of the submarginal markings varies from dark gray to nearly black.

In ♀♀ the dorsal submarginal markings on forewings may be scattered with blue scales and the corresponding marking on hindwings varies in colour from nearly white to bluish.

## Differential diagnosis

The ♂ of *P. (A.) faramarzii* is so distinct that it can hardly be mistaken for any other known taxon: The ventral submarginal marking, particularly on hindwings, clearly differentiates ♂♂ of *P. (A.) faramarzii* from other similarly coloured, but not closely related taxa, e.g., *P. (A.) wagneri* (FORSTER, 1956), and *P. (A.) actis* (HERRICH-SCHÄFFER, 1851).

This type of submarginal marking is typical for the *erschoffii*-group. Male *P. (A.) faramarzii* can be easily separated from all so far described taxa of this group by its unique dorsal ground color.

Similarly coloured ♂♂ of *P. (A.) actinides* (STAUDINGER, 1886) differ from *P. (A.) faramarzii* by a more rounded forewing apex, and by the clearly marked orange submarginal lunules on hindwing underside.

The closely related *P. (A.) eckweileri* (TEN HAGEN, 1998) differs considerably in dorsal ground colour: *P. (A.) eckweileri* is lighter and greener, much closer in ground colour to *P. (A.) pfeifferi* (BRANDT, 1938), than to *P. (A.) faramarzii*. Also, the characteristic white streak on hindwing underside, always present in *P. (A.) faramarzii*, is absent in *P. (A.) eckweileri*.

The ♀ of *P. (A.) faramarzii* can be distinguished from similar ♀♀ of *P. (A.) pfeifferi* and *P. (A.) eckweileri*, as well as from the ♀♀ of all other *erschoffii*-group taxa, by the colour of the blue suffusion on upperside, which corresponds with the ground colour of the ♂. Also, ♀ *P. (A.) faramarzii* differs from ♀ *P. (A.) pfeifferi* by the shape of the dorsal submarginal pattern on hindwings: in *P. (A.) faramarzii* the light spots are distally bordered by darker square shapes, while in *P. (A.) pfeifferi* these squares are replaced by indistinct darker crescents.

This submarginal pattern also differentiates ♀♀ *P. (A.) faramarzii* from the ♀♀ of *P. (A.) bogra* (EVANS, 1932), and *taftanus* (ECKWEILER, 1997). The whitish submarginal spots, typical for ♀ *P. (A.) faramarzii*, are absent in *P. (A.) bogra*, and orange coloured in *P. (A.) taftanus*.

Female *P. (A.) eckweileri*, very similar by upperside habitus, differs from ♀ *P. (A.) faramarzii* by the absence of the ventral white streak on hindwings.

## Ecology and distribution

The two populations observed of *P. (A.) faramarzii* inhabit small patches of montane *Astragalus* steppe surrounded by areas of steep rocky slopes, supporting little or no viable vegetation. The remaining vegetation of the area is extensively grazed by sheep, feeding also on the unidentified thorny *Astragalus* plants which I presume to be the hostplants. The ♂♂ of *P. (A.) faramarzii* have an extremely vigorous flight reminiscent of *P. (A.) pfeifferi*.

The only accompanying species in this low-diversity environment are *Pontia callidice chrysidice* (HERRICH-

SCHÄFFER, 1844), *Hyponophele cadusia brandti* (GROSS & EBERT, 1975), and another apparently still unknown *Agro-diaetus* species described below in this paper.

## *Polyommatus (Agrodiaetus) shahrami* sp. n.

**Holotype:** ♂, Iran, Cahar Mahall-o-Bahtiyari, Zarde Kuh massive, 3000 m, 12. VII. 2000, leg. P. SKALA, in coll. Lepidopterenammlung des Senckenberg-Museums, Frankfurt am Main, SMFL-no. 4196.

**Paratypes:** 15 ♂♂, 6 ♀♀, same data as holotype. 12 ♂♂, 5 ♀♀ in coll. P. SKALA, 1 ♂, 1 ♀ in coll. ECKWEILER, 2 ♂♂ in coll. SCHURIAN.

**Etymology:** I name this new species after the contemporary Iranian musician Shahram GOLPARIAN, whose music became one of the cultural highlights of our Iran 2000 expedition.

## Description

♂. Forewing length 14–16 mm (holotype 15 mm).

Upperside: Ground colour and overall habitus similar to *Polyommatus (Subblyssandra) aedon* (CHRISTOPH, 1877) and *P. (A.) posthumus* (CHRISTOPH, 1877) with nearly same light greenish-blue ground colour and distinct submarginal dark gray to black suffusion, particularly on forewings, and black marginal line on both fore- and hindwings. Discoidal marking completely absent on both fore- and hindwings. A row of semi-developed antemarginal spots similar to those of *P. (S.) aedon* usually present on hindwings. Fringes basally gray and distally white on forewings, and overall white on hindwings.

Underside: Ground colour and overall habitus again resembling *P. (S.) aedon*, and also close to *P. (A.) faramarzii*, but ground colour somewhat lighter gray without brownish shade. Basal suffusion greenish blue, intense, and widespread, covering sometimes up to one third of entire hindwing surface. Basal black spots present on hindwings, but absent on forewings.

Discoidal and postdiscal black marking well developed on both fore- and hindwings. Submarginal row of v-shaped spots on hindwings paralleled by another outer submarginal row of well developed dark gray dots. White streak on hindwings clearly visible. Fringes white.

♀. Forewing length 14–15 mm.

Upperside: Ground colour medium brown with darker veins. Slight traces of light blue-green suffusion usually present on both wings. Discoidal spots clearly visible on both fore- and hindwings, and nearly always lighter rimmed. Submarginal pattern weak on forewings and well developed on hindwings, but always without orange colouring, typical for *iphigenides*-group. Light brown lunules of submarginal hindwing pattern distally bordered by darker crescents and always containing dark brown outer submarginal spots. Fringes very light brownish gray on forewings, white on hindwings.

Underside: Ground colour light brown, darker on hindwings. Forewings darkened near base. Basal suffusion

green and not as widespread as in ♂. Marking similar to ♂, including characteristic submarginal pattern. Fringes very light gray-brown.

**Variation:** The dorsal aspect of ♂ *P. (A.) shahrami* shows variable extent and intensity of submarginal dark suffusion. The width of the marginal black line is also slightly variable. Additionally, the characteristic dorsal antemarginal spots on hindwings are completely absent in approximately 10% of the ♂ population.

On the ventral aspect the white streak on hindwing is sometimes not fully developed, especially in the basal area. In some individuals it broadens near its submarginal end up to triple its basal width. The inner submarginal row of v-shaped spots is sometimes joined together into one solid unbroken line.

In ♀♀ the dorsal discoidal spots are nearly obliterated in one of the 6 ♀♀ of the paratype series. This is also accompanied by a substantial darkening of the light submarginal lunules.

#### Differential diagnosis

The ♂♂ of *P. (A.) shahrami* differ from ♂♂ of *P. (S.) aedon* and *P. (A.) posthumus* (CHRISTOPH, 1877) by the absence of the dorsal discoidal marking on the forewings. Further, they differ from the ♂♂ of *P. (S.) aedon* by more greenish-blue ground colour and by more pointed forewing apex.

From similarly coloured taxa of the *damon*-group, e.g., *P. (A.) posthumus*, *birunii* (ECKWEILER & TEN HAGEN, 1998), *darius* (ECKWEILER & TEN HAGEN, 1998), *phyllis* (CHRISTOPH, 1877), *nekruutenkoi* (DANTSCHENKO & LUKHTANOV, 1994), *dagestanicus* (FORSTER, 1960), and *vanensis* (DE LESSE, 1957), and also from apparently closely related *P. (A.) muelleriae* (ECKWEILER, 1997) it can be easily separated by its distinct ventral submarginal pattern, specifically by the well developed outer line of submarginal dots. This line is absent in all above mentioned *Agrodiaetus* taxa.

Also, the antemarginal spots on the dorsal hindwing, normally present in *P. (A.) shahrami*, are completely absent in all other so far known Iranian *Agrodiaetus*. This characteristic antemarginal pattern occurs in some Russian, Siberian and Mongolian members of the *damone*-complex, e.g., *P. (A.) damone tanais* (DANTSCHENKO & LUKHTANOV, 1993), *irinae* (DANTSCHENKO, 1997), *walteri* (DANTSCHENKO & LUKHTANOV, 1993) and especially the little known *P. (A.) fabiani* (BÁLINT & JOHNSON, 1997). Again, *P. (A.) shahrami* can be separated from all these by its unique ventral hindwing submarginal pattern, as well as by dorsal ground colour.

The same antemarginal pattern of dorsal hindwing, also accompanied by similar dorsal and ventral habitus, even including the same ventral hindwing submarginal pattern, is also found in some members of the *iphigenides*-

group, e.g., *P. (A.) iphigenides* (STAUDINGER, 1886) and especially its ssp. *karatavicus* (LUKHTANOV, 1990), where also the ♂ dorsal ground colour is quite similar. However, *P. (A.) shahrami* can be separated from all members of the *iphigenides*-group including *P. (A.) iphigenides karatavicus* by the total absence of the orange submarginal lunules on ventral hindwing, which are typical for that group.

The ♀ of *P. (A.) shahrami* can be separated from otherwise similar ♀♀ of the above mentioned *damon*-group taxa by the ventral hindwing submarginal pattern in the same way as the ♂. Additionally, ♀ *P. (A.) muelleriae*, otherwise the closest in overall habitus, is also missing the outer line of submarginal marking on ventral hindwing, typical for *P. (A.) shahrami*.

Similar ♀ *P. (A.) ardschira* (BRANDT, 1938) is best distinguished from ♀ *P. (A.) shahrami* by the absence of dorsal bluish suffusion and by the colour of the fringes, especially on hindwings, which are light brown in *P. (A.) ardschira*, and pure white in *P. (A.) shahrami*.

The ♀♀ of the above mentioned *damone*-complex and *iphigenides*-group can be separated from ♀ *P. (A.) shahrami* by the same characters as the ♂♂.

#### Ecology and distribution

The only population observed so far of *P. (A.) shahrami* occurs syntopically with *P. (A.) faramarzii* on one of the two above described biotopes, but not quite synchronously. Its emergence seems to be approximately one or two weeks earlier than that of *P. (A.) faramarzii*, since most ♂ specimens of *P. (A.) shahrami* were already worn by the collecting time, while ♂♂ of *P. (A.) faramarzii* were mostly fresh in both populations. The flight of *P. (A.) shahrami* is much less vigorous than that of *P. (A.) faramarzii*. Both sexes often visit various flowering plants. For lack of time and unfavourable weather conditions no observations with respect to copula, oviposition, and host plant determination were possible. These studies will be the subject of further expeditions.

Later during the same expedition, on one of the isolated mountain ridges near Khounsar, north-west of Esfahan, I also found an interesting population of *P. (A.) pfeifferi*. The specimen of this population showed constant habitual and morphological differences against the nominotypical population from Kuh-e-Barm Firuz (Fars) and also against a similar population observed in the Kuh-e-Dinar approximately 100 km further west from the type locality, which I also regard as representative of the nominotypical *P. (A.) pfeifferi*. Having ruled out purely environmental explanation of the differences between both populations as unlikely, I decided to describe the Khounsar population as a separate new subspecies of *P. (A.) pfeifferi*.

***Polyommatus (A.) pfeifferi astyages* ssp. n.**

**Holotype:** ♂, Iran, Esfahan, Khounsar 2950–3100 m, 16. VII. 2000, leg. P. SKALA, in coll. Lepidopterensammlung des Senckenberg-Museums, Frankfurt am Main, SMFL-no. 4197.

**Paratypes:** 6 ♂♂, 2 ♀♀, same data as holotype. 5 ♂♂, 2 ♀♀ in coll. P. SKALA, 1 ♂ in coll. ECKWEILER.

**Etymology:** The name *astyages* draws from ancient Persian history: ASTYAGES was the last king of the Medes, the mysterious ruling dynasty of ancient Medea. The name of the new taxon is a noun in apposition.

**Description**

♂. forewing length 14–15 mm (holotype 15 mm).

**Upperside:** Ground colour sky blue, very close to ssp. *pfeifferi*, but slightly deeper blue with less greenish shade. No dorsal marking present, except very thin black marginal line. Fringes basally gray, distally white.

**Underside:** Ground colour gray-brown with darker veins. Basal hindwing suffusion blue-green. Forewings slightly darkened near base. Basal spots present on hindwings, absent on forewings. Discoidal and postdiscal black spots very strongly developed, particularly on hind wings, their rows complete including full sized C6 spot. Submarginal marking same as in *P. (A.) faramarzii*. White streak on hindwing present, but not as contrast as in ssp. *pfeifferi*.

♀. forewing length 13 mm

**Upperside:** Ground colour medium brown with darker veins. Traces of blue suffusion of ♂ ground colour present in basal area. Well developed light blue rimmed discoidal spots present on both fore- and hindwings. Submarginal pattern well noticeable on forewings, and very pronounced on hindwings. Fringes very light brown to white.

**Underside:** Ground colour same light brown gray as in ssp. *pfeifferi*, hindwings more brown, forewings basally darkened. Marking pattern as in ♂. Fringes whitish gray.

**Variation:** There seems to be a slight variation in the ♂ dorsal ground colour. Despite some variation in the intensity of the ventral black marking in both sexes, all spots, especially the postdiscal rows, always remain very pronounced. The same applies to the ventral submarginal marking.

**Differential diagnosis**

Given the fact that the systematic placement of many *Agrodiaetus* taxa remains unclear and contentious, and also with respect to the apparent close relationship of this new taxon to *P. (A.) eckweileri*, it seems relevant not only to mention the differentiating characters between *P. (A.) pfeifferi pfeifferi* and *pfeifferi astyages* ssp. n., but also to include a brief summary of those differential characters of *P. (A.) pfeifferi* which also apply to ssp. *astyages* and can be used to separate *astyages* from other taxa, particularly from *P. (A.) eckweileri*.

The ♂ dorsal ground colour of *P. (A.) pfeifferi* is less violet than the similarly coloured *P. (A.) firdussii* (FORSTER, 1956), *wagneri* (FORSTER, 1956), and *maraschi* (FORSTER, 1956), and slightly more blue than *P. (A.) eckweileri*. However, the differences in dorsal ground colour between *P. (A.) pfeifferi* and *eckweileri* are very fine, and the two subspecies of *P. (A.) pfeifferi* are not exactly identical in dorsal ground colour either, making the deeper blue ssp. *astyages* easier to distinguish from *P. (A.) eckweileri* than the nominotypical ssp., whose ground colour is more greenish and very close to *P. (A.) eckweileri*. Therefore the best differentiating character of both subspecies of *P. (A.) pfeifferi* against *P. (A.) eckweileri* is the white streak on ventral hindwing. Its total absence in *P. (A.) eckweileri* sharply contrasts with *P. (A.) pfeifferi*, where the streak is always well noticeable in both subspecies. The ventral marking, especially the two well developed parallel bands of submarginal lines on hindwings, clearly separates *P. (A.) pfeifferi* from the above mentioned Anatolian taxa, as well as from *P. (A.) ernesti* (ECKWEILER, 1989), *sertavulensis* (KOÇAK, 1979), and *altivagans* (FORSTER, 1956), and from Iranian taxa *ectabanensis* (DE LESSE, 1963) and *gorbunovi* (DANTCHENKO & LUKHTANOV, 1994).

Also in ♀♀, the above mentioned ventral submarginal pattern sets *P. (A.) pfeifferi* apart from all the above taxa, except *P. (A.) eckweileri*. ♀♀ of *P. (A.) pfeifferi* and *eckweileri* can be separated by the white streak on ventral hindwing in the same way as the ♂♂. Additionally, traces of ♂ ground colour on the upperside differentiate ♀ *P. (A.) pfeifferi* from ♀♀ of *P. (A.) posthumus* and *darius* with otherwise similar dorsal and ventral habitus.

The differentiating characters between ssp. *astyages* and ssp. *pfeifferi* are the following:

**Ventral postdiscal and basal marking in both sexes:** in ssp. *astyages* the row of very pronounced black spots is complete, including full sized c6 spot on hindwing, where also the basal spot is fully developed. In ssp. *pfeifferi*, the postdiscal marking is less developed especially on hindwing, where the basal spot, and the c6 spot are vestigial or absent.

**Ventral veins in both sexes:** the ventral veins in ssp. *astyages* are darkened, while in ssp. *pfeifferi* the ground colour is uniform without darker veins. This character also differentiates ssp. *astyages* from *P. (A.) eckweileri*, which has also more uniform ventral ground colour, especially on the hindwings.

**Dorsal discoidal spots in ♀♀:** the well developed and light blue rimmed dorsal discoidal spots on both fore- and hindwings of ssp. *astyages* contrast with only weak and usually unrimmed forewing spots and vestigial or completely absent hindwing spots in ssp. *pfeifferi*.

**Dorsal veins in ♀♀:** In ssp. *astyages* the dorsal veins, especially on hindwings, are considerably darkened, while in ssp. *pfeifferi* the ground colour is more uniform brown with less darkened veins.

Larger size in both sexes: ssp. *astyages* with its average forewing length of 14,5 mm in ♂♂ and 13 mm in ♀♀ is somewhat larger than ssp. *pfeifferi* (♂ forewing length 13–14,5 mm, average 13,5 mm, ♀ forewing length 12–13 mm, average 12,3 mm), although individual variation is considerable.

Dorsal ground colour in ♂♂: ssp. *astyages* has slightly deeper, more violet dorsal ground colour than ssp. *pfeifferi*, although in some specimen the difference is barely noticeable.

### Ecology and distribution

The type locality of *P. (A.) pfeifferi astyages* ssp. n. is a very steep stony slope covered by fine scree, containing occasional small pockets of *Astragalus*, and the similarly shaped steep stony banks of a nearby creek, ground approximately 10 meters under the surface of a plateau covered by relatively green meadow above the slope. The observed specimens of *P. (A.) pfeifferi astyages* nearly completely avoided this lush, green meadow with a multitude of flowering plants, and stayed mainly on the rocky places, where they were accompanied by *Hyponephele shirazica* (CARBONELL, 1997), and *H. cadusia brandti* (GROSS & EBERT, 1975), both well past their peak of flight, and *Lycaena lampon* (LEDERER, 1870), and *Gonepteryx farinosa meridiorana* (DE FREINA, 1983) which inhabit also the green plateau. This ecological requirement is fully consistent with that of the nominotypical *P. (A.) pfeifferi*. Earlier I observed two populations of ssp. *pfeifferi*, both at its type locality near Kuh-e-Barm Firuz and at Kuh-e-Dinar. Also here *P. (A.) pfeifferi* preferred very steep rocky slopes, and in both cases worn specimen of *H. shirazica* were observed somewhat further down the slope. However, the observed flight habits of both subspecies differ considerably: while ssp. *pfeifferi* is characterised by an exceptionally vigorous flight, ssp. *astyages* does not fly nearly as vigorously.

Unfortunately, the limited time and deteriorating weather conditions at this locality did not permit any host plant observations, which will be the subject of further expeditions.

### Discussion

The subgenus *Agrodiaetus* is undoubtedly one of the most contended groups of Lycaenidae. Attempts at systematic classification of this subgenus have traditionally been prone to subjective interpretations, especially in the poorly known south Asian part of its range, which seems to be the key to successful classification of the whole *Agrodiaetus* subgenus. The frequent changes in the classification of *Agrodiaetus* into species-groups of “related” species, which inevitably follow each wave of new descriptions, may seem frustrating, especially since classification has so far been based on external characters, which may often express secondary environmental

adaptations, irrelevant from the ontological point of view.

Therefore any effort to reclassify the subgenus in accordance with the latest findings at this point would be short-lived. Nevertheless the finding of the three taxa described above casts some interesting new light onto possible mutual interrelation of some previously known taxa.

In the case of *P. (A.) shahrami* and *faramarzii*, some habitual traits, e.g., the submarginal ventral marking, suggest a possible closer relation to the central Asian *iphigenides*-group, as defined by ECKWEILER & HÄUSER (1997).

Therefore, it is possible that *P. (A.) shahrami*, and possibly also *P. (A.) faramarzii*, may represent the first recognized element of this group found in the main Zagros range. After all, cases of closely related Lycaenids occurring in the Zagros and in Central Asia are well documented. Further, *P. (A.) faramarzii* also seems closely related to *P. (A.) pfeifferi*, which suggests that also other taxa from the Zagros region, e.g., *P. (A.) pfeifferi* and the discoloured, but otherwise very similar *P. (A.) ardschira*, as well as some taxa from the Kuhha-ye Qohrud range, e.g., *P. (A.) eckweileri* and *baltazardi* (DE LESSE, 1962), may also turn out to be close relatives of the central Asian *Agrodiaetus*.

The close relationship of *P. (A.) faramarzii* to *P. (A.) pfeifferi* becomes more obvious, when the new ssp. *astyages* is compared to both nominotypical *P. (A.) pfeifferi* and *P. (A.) faramarzii*. The possibility that *P. (A.) faramarzii* may be an extreme subspecies of *P. (A.) pfeifferi* does not seem likely in the light of the distribution ranges of the above three taxa known so far. However, it is not possible to make a final statement in this matter, at least until more data, especially concerning the biology and geographical distribution of these taxa, become available.

The relevance of the above described taxa is not only in finding a possible link between the *Agrodiaetus* taxa of the Zagros region and the Central Asian *iphigenides*-group. The newly discovered population described as *P. (A.) pfeifferi astyages* also represents an apparent link between the nominotypical *P. (A.) pfeifferi* and the so far odd and unique *P. (A.) eckweileri* from the northern part of the Kuhha-ye Qohrud range, which by the relevant submarginal ventral marking suggests a close relationship with *P. (A.) baltazardi* from the southern end of Kuhha-ye Qohrud. The new ssp. *astyages* does seem to be transitional between nominotypical *P. (A.) pfeifferi*, and *P. (A.) eckweileri*, and also its type locality is situated more or less between the known ranges of the two taxa. However, in the light of the nearly complete lack of relevant biological, biogeographical, and last but not least, karyological data, it would be at least premature at this point to suggest a possible revision of the specific rank of *P. (A.) eckweileri*, or to regard *astyages* as subspecies of *P. (A.) eckweileri*, or even to propose *astyages*



as its own species. After all, in a relatively young and complex group, such as the subgenus *Agrodiaetus*, with its multilevel relationships far more complex than the traditional two-level species-subspecies taxonomic structure, the question of specific or subspecific rank may often be completely irrelevant.

Therefore, I consider fully appropriate at this point to regard *astyages* as a subspecies of *P. (A.) pfeifferi*, while retaining *P. (A.) eckweileri* as a separate species, at least until further data are obtained.

Another interesting aspect of *P. (A.) pfeifferi* and its new ssp. *astyages* is the fact that their mutual habitual relationship is very similar to the relationship found between the nominotypical *P. (A.) musa* (KOÇAK & HOSSEINPOUR, 1996), also found in Fars near Kuh-e-Barm Firuz, and *P. (A.) musa esfahensis* (CARBONELL, 2000), described from the northern Qohrud range in Esfahan province, north of the main Zagros range, just like *P. (A.) pfeifferi astyages*.

In both cases the subspecies from Esfahan province is somewhat larger, and darker in dorsal ♂ ground colour, the ventral ground colour is less uniform, and the ventral postdiscal marking is stronger, compared to the nominotypical subspecies from near Kuh-e-Barm Firuz.

For this reason, I regarded the Khounsar population at first as a possible ecological form of *P. (A.) pfeifferi*. After all, ecological factors are known to play a role in some *Agrodiaetus*, resulting for example in substantial habitual differences between the first and second generations of some biennial taxa, e.g., *P. (A.) damone tanais*

(DANTCHENKO & PLJUSHCH, 1993). However, it is equally relevant to note that other closely related biennial taxa, in this case *P. (A.) damone irinae* (DANTCHENKO, 1997), may be totally resistant to any such influence.

In the case of both nominotypical *P. (A.) musa* and *P. (A.) pfeifferi*, and their populations from the Esfahan province, the following evidence points strongly towards separate taxa:

- the mutual distance of the two respective populations of each species, exceeding 500 km, and also the considerable mutual distance of the type localities of ssp. *astyages* and *esfahensis*;
- the fact that no intermediates between *pfeifferi* and *astyages*, or *musa* and *esfahensis* have been found anywhere so far, while at least one population practically identical with *P. (A.) musa esfahensis* has been found by Dr. Z. WEIDENHOFFER (personal communication) near Zefre in central Qouhrud range, approximately 200 km south of the type locality of ssp. *esfahensis*, and typical *P. (A.) pfeifferi* occurs also in the Kuh-e-Dinar, approximately 100 km from its type locality.

These observations seem to confirm that the differences between the Fars and Esfahan province populations of both *P. (A.) musa* and *P. (A.) pfeifferi* are genetically imbedded, rather than caused by local environmental factors affecting otherwise genetically identical populations.

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## References

- Figs. 1–4:** *Polyommatus (Agrodiaetus) faramarzii* sp. nov. **Fig. 1:** holotype ♂, upperside, Iran, Cahar Mahall-o-Bahtiari, Zarde Kuh Massive, 3000 m, 12. VII. 2000, leg. P. SKALA. **Fig. 2:** ditto, underside. **Fig. 3:** paratype ♀, upperside, same data as holotype. **Fig. 4:** ditto, underside. — **Figs. 5–8:** *Polyommatus (Agrodiaetus) actinides*. **Fig. 5:** ♂ upperside, Kirgistan, Transalai, Aram Kungei, 2900 m, 21. VII. 1995, leg. LUKHTANOV, coll. ECKWEILER. **Fig. 6:** ditto, underside. **Fig. 7:** ♀ upperside, same data as ♂. **Fig. 8:** ditto, underside. — **Figs. 9–12:** *Polyommatus (Agrodiaetus) shahrami* sp. nov. **Fig. 9:** holotype ♂, upperside, Iran, Cahar Mahall-o-Bahtiari, Zarde Kuh Massive, 3000 m, 12. VII. 2000, leg. P. SKALA. **Fig. 10:** ditto, underside. **Fig. 11:** paratype ♀, upperside, same data as holotype. **Fig. 12:** ditto, underside. — **Figs. 13–16:** *Polyommatus (Agrodiaetus) iphigenides karatavicus*. **Fig. 13:** ♂, upperside; Kazakhstan, Chimkent, Kentau, Karatau mts., Mindshilki, 1400 m, 6.–7. VII. 1990, leg. LUKHTANOV, coll. ECKWEILER. **Fig. 14:** ditto, underside. **Fig. 15:** ♀, upperside, same data as ♂. **Fig. 16:** ditto, underside. — **Figs. 17–20:** *Polyommatus (Agrodiaetus) muelleriae*. **Fig. 17:** paratype ♂, upperside, Pakistan, Chitral, Birmoglasht 2700–2900 m, 6. VII. 1983, leg. & coll. ECKWEILER. **Fig. 18:** ditto, underside. **Fig. 19:** paratype ♀, upperside, same data as ♂. **Fig. 20:** ditto, underside. — **Figs. 21–24:** *Polyommatus (Agrodiaetus) pfeifferi astyages* ssp. nov. **Fig. 21:** holotype ♂, upperside, Iran, Esfahan, Khounsar, 2950–3100 m, 16. VII. 2000, leg. P. SKALA. **Fig. 22:** ditto, underside. **Fig. 23:** paratype ♀, upperside, same data as holotype. **Fig. 24:** ditto, underside. — **Figs. 25–28:** *Polyommatus (Agrodiaetus) pfeifferi pfeifferi*. **Fig. 25:** ♂, upperside, Iran, Boyer Ahmad-o-Kuhgilye, Sisakht, 3300–3500 m, 9. VII. 2000, leg. P. SKALA. **Fig. 26:** ditto, underside. **Fig. 27:** ♀, upperside, same data as ♂. **Fig. 28:** ditto, underside. — **Figs. 29–32:** *Polyommatus (Agrodiaetus) eckweileri*. **Fig. 29:** paratype ♂, upperside, Iran, Kashan, Qamsar, Janin (pass), 2500–2600 m, 10. VII. 1997, leg. & coll. ECKWEILER. **Fig. 30:** ditto, underside. **Fig. 31:** paratype ♀, upperside, same data as ♂. **Fig. 32:** ditto, underside. — Photographs Dr. W. ECKWEILER.
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