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Discovery of the types of *Polyommatus* (*Agrodiaetus*) *actis* and its taxonomic consequences (Lycaenidae)

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Summary. The nomenclatural and taxonomic history of the nominal taxon *Lycaena actis* Herrich-Schäffer, 1851 is outlined, and the taxonomic interpretations and quotations of the names *actis* Herrich-Schäffer, 1851, *atys* Gerhard, 1851 and *athis* Freyer, 1851 in the literature are reviewed. It thus appears that the three names apply to a taxon, which is treated as *Polyommatus* (*Agrodiaetus*) *firdussii* (Forster, 1956) pro parte by Hesselbarth *et al.* (1995) and subsequent authors. The discovery of two syntypes (♂, ♀) of *Lycaena actis* confirms this statement. The male specimen is designated as lectotype and the type locality corrected as Turkey, Tokat province, env. Tokat. The name *actis* is considered as the valid name for this taxon, thus promoting stability of nomenclature (cf. ICZN: Preamble, Arts. 23.2 and 23.9). Current taxonomic problems in part of the *actis* group are discussed. Under the name *actis*, probably more than one species is involved, but the picture is not quite clear. The intensity of the blue colour on the male upperside varies from vivid violet blue to a lighter blue, while the variation in colour does not always coincide with the pronounced differences in chromosome numbers and karyotype that are being observed (de Lesse, 1960, 1962; Lukhtanov *et al.*, 1998). A provisional arrangement is proposed for the nominal taxa *Polyommatus* (*Agrodiaetus*) *actis* (Herrich-Schäffer, 1851), *P.* (*A.*) *firdussii* (Forster, 1956), *P.* (*A.*) *pseudactis* (Forster, 1960), species incertae sedis, *P.* (*A.*) *sertavulensis* (Koçak, 1979), species incertae sedis, *P.* (*A.*) *ernesti* Eckweiler, 1989, species incertae sedis, *P.* (*A.*) *artvinensis* (Carbonell, 1997) and *P.* (*A.*) *sigberti* Olivier, van der Poorten, Puplesiene & De Prins, 2000 (= *P.* (*A.*) *actis* sensu Hesselbarth *et al.* (1995) and subsequent authors).

Zusammenfassung. Die nomenklatorische und taxonomische Geschichte des nominellen Taxons *Lycaena actis* Herrich-Schäffer, 1851 wird beschrieben, in Verbindung mit einer Literaturübersicht über taxonomische Interpretationen und Zitate der Namen *actis* Herrich-Schäffer, 1851, *atys* Gerhard, 1851 und *athis* Freyer, 1851. Alle drei Namen scheinen sich auf dasselbe Taxon zu beziehen, das von Hesselbarth *et al.* (1995) und nachfolgenden Autoren pro parte als zu *Polyommatus* (*Agrodiaetus*) *firdussii* (Forster, 1956) gehörig aufgefaßt wurde. Die Entdeckung zweier Syntypen (♂, ♀) von *Lycaena actis* bestätigt diese Einschätzung. Das männliche Exemplar wird hier als Lectotypus designiert und seine Typuslokalität korrigiert (Türkei, Provinz Tokat, Umgebung von Tokat). Der Name *actis* wird im Sinne der Stabilität der Nomenklatur (ICZN: Präambel, Art. 23.2 und

23.9) als valider Name des betreffenden Taxons angesehen. Gegenwärtige taxonomische Probleme in der Gruppe um *actis* werden diskutiert. Unter dem Namen *actis* im Sinne der vorliegenden Arbeit verbergen sich möglicherweise mehrere Arten, aber das gegenwärtige Bild ist noch unklar. Die Intensität der blauen Flügeloberseitenfärbung der Männchen variiert von lebhaftem Violettblau zu hellerem Blau, Unterschiede in der Flügelfärbung fallen nicht immer mit den beachtlichen Unterschieden in Chromosomenzahlen und Karyotypen zusammen (de Lesse, 1960, 1962; Lukhtanov *et al.*, 1998). Für die nominellen Taxa *Polyommatus* (*Agrodiaetus*) *actis* (Herrich-Schäffer, 1851), *P.* (*A.*) *firdussii* (Forster, 1956), *P.* (*A.*) *pseudactis* (Forster, 1960), species incertae sedis, *P.* (*A.*) *sertavulensis* (Kocak, 1979), species incertae sedis, *P.* (*A.*) *ernesti* Eckweiler, 1989, species incertae sedis, *P.* (*A.*) *artvinensis* (Carbonell, 1997) und *P.* (*A.*) *sigberti* Olivier, van der Poorten, Puplesiene & De Prins, 2000 (= *P.* (*A.*) *actis* sensu Hesselbarth *et al.* (1995) und nachfolgender Autoren) wird eine vorläufige systematische Anordnung vorgeschlagen.

Résumé. L'histoire de la nomenclature et de la taxinomie du taxon nominal *Lycaena actis* Herrich-Schäffer, 1851 est esquissée, ainsi que celle des diverses mentions et interprétations des noms *actis* Herrich-Schäffer, 1851, *atys* Gerhard, 1851 et *athis* Freyer, 1851 dans la littérature. Il apparaît ainsi que ces trois noms s'appliquent à un taxon, qui est traité comme étant *Polyommatus* (*Agrodiaetus*) *firdussii* (Forster, 1956) pro parte par Hesselbarth *et al.* (1995) et les auteurs plus récents. La découverte de deux syntypes (♂, ♀) de *Lycaena actis* confirme ce point de vue. Le spécimen mâle est désigné comme lectotype est la localité type est corrigée comme étant Turquie, province de Tokat, env. de Tokat. Le nom *actis* est considéré comme étant le nom valide pour ce taxon, promouvant ainsi la stabilité de la nomenclature (Code International de Nomenclature Zoologique: Préambule, Arts. 23.2 et 23.9). Les problèmes taxinomiques actuels relatifs à une partie du groupe d'*actis* sont discutés. Probablement, plus d'une espèce est comprise sous le nom *actis*, mais la situation est peu claire. L'intensité de la couleur bleue à la face supérieure du mâle varie d'un bleu-violet intense à un bleu plus clair, tandis que la variation du teint ne coincide pas toujours avec les différences importantes du nombre de chromosomes et du karyotype qui peuvent être observées (de Lesse, 1960, 1962; Lukhtanov *et al.*, 1998). Une classification provisoire est proposée pour les taxons nominaux *Polyommatus* (*Agrodiaetus*) *actis* (Herrich-Schäffer, 1851), *P.* (*A.*) *firdussii* (Forster, 1956), *P.* (*A.*) *pseudactis* (Forster, 1960), species incertae sedis, *P.* (*A.*) *sertavulensis* (Koçak, 1979), species incertae sedis, *P.* (*A.*) *ernesti* Eckweiler, 1989, species incertae sedis, *P.* (*A.*) *artvinensis* (Carbonell, 1997) et *P.* (*A.*) *sigberti* Olivier, van der Poorten, Puplesiene & De Prins, 2000 (= *P.* (*A.*) *actis* sensu Hesselbarth *et al.* (1995) et auteurs suivants).

Key words: Lycaenidae, *Polyommatus* (*Agrodiaetus*), *actis*, *atys*, *athis*, *firdussii*, *pseudactis*, *artvinensis*, *sertavulensis*, *ernesti*, taxonomy, nomenclature, lectotype, chromosome number, karyotype, Turkey, Iran, Armenia.

Introduction

The nomenclatural and taxonomic history of the nominal taxon *Polyommatus* (*Agrodiaetus*) *actis* (Herrich-Schäffer, 1851) is a

complicated one. In the sixth volume of his "Systematische Bearbeitung der Schmetterlinge von Europa, zugleich als Text, Revision und Supplement zu Jakob Hübner's Sammlung europäischer Schmetterlinge" (Nachtrag zum Ersten Bande, Heft 48, p. 24), Herrich-Schäffer ([1851]) gives the following short description: "*Actis* Kad. – **Sppl.** 496–499. Kleiner wie *Alexis*; dasselbe Blau, Vorderflügel stumpfer, die Unterseite so grau wie bei *Donzelii*, die Augen sehr scharf. – Aus Kleinasien." and, in Heft 49, in his first volume on plate 104, Figs 496–499 (also [1851]), depicts respectively one ♂ on the upperside and in resting position on the underside, and one ♀ in the same positions, again as "*Actis*" (Fig. 1 of the present study). Subsequently, in the "Systema Lepidopterorum Europae. Systematisches Verzeichniss der Europäischen Schmetterlinge", published in the sixth volume of his "Systematische Bearbeitung", he lists on p. 4 (Heft 55, [1852]): "23. *Lycaena*. ... 235. *Actis*.", while in the Index of his first volume (Heft 65, p. [1] – [1854]), he mentions "*actis* (*Lycaena*) Kad. pp 113 [sic! on that page in Vol. 1, *Acis* is quoted as synonym of [*Lycaena*] *Argiolus* L.] HS. 466–499. *Athis* Fr. [the latter name thus being quoted as a synonym]". Finally, in Vol. 6, on p. 172 (Heft 69 – 1856) he writes: "*Actis* dazu *Atys* Gerh. 19.3. a–d.", thus also considering the latter name as a synonym of the former. In all, very little information is contained in all data communicated by Herrich-Schäffer. Carl Gotthelf Kaden (1786–1867) apparently named this butterfly in litteris and communicated it as such to Herrich-Schäffer. The obituary published by Staudinger (1868) gives no evidence that Kaden ever travelled to Asia Minor, or perhaps even abroad, hence he must have obtained his material from that country through exchange or – much more probably – purchase. The figures of *actis* given by Herrich-Schäffer show a rather robust butterfly, of which the male wing upperside is blue with a very narrow black marginal line and black underlining of the veins in their distal fourth, but without any trace of black suffusion in the distal half of the hindwings. The dating of the various instalments ("Hefte") referred to above follows Hemming (1937) and is given on the wrapper to each Heft. Unfortunately, a survey of contemporaneous literature did not allow the present author to date those instalments more precisely, i.e. as to the month of publication, hence they all should be dated 31.XII. of the year concerned (ICZN, Art. 21.3.2).

Gerhard ([1851]) describes on p. 11 (Heft 5 – 31.V.1851, cf. Olivier, 1999) a blue as follows: "[*Lycaena*] ***Atys.*** Kind. Türkei. *Actis*. Herr.-Schaeff. Platte 19. Fig. 3. a, b, ♂, c, d, ♀. Diese von Herrn Kindermann entdeckte seltene Art nannte Herr Dr. Herrich-Schaeffer in Regensburg "*Actis*", da der Name *Atys* schon unter den Exoten sich befindet." The quality of the figures on plate 19 is not very good, but one can again discern a butterfly with a very narrow black marginal line, and absolutely no traces of black dusting in the apical area of the hindwings (Fig. 2 of the present study). His referring to Herrich-Schäffer could be interpreted as indirect evidence for Herrich-Schäffer's name being published before his own *atys*, but this is not necessarily so. The name *actis* may have circulated on sales lists or may have become known to Gerhard via Lederer, before Herrich-Schäffer actually published it, as is established for the names *asabinus* and *ochimus* (Olivier, 1999: 129). The most interesting information contained is perhaps, that both Herrich-Schäffer's *actis* and Gerhard's *atys* were named after material collected by Albert Kindermann Jr.

Finally, Freyer (1851), in his sixth volume (Heft 96), describes on p. 147 "*Lycaena* Pap.[ilio] *Athis*" as follows: "Der Mann von dieser *Lycaena* gleicht auf der Oberseite gewöhnlich dem *P. Alexis*." He further writes (pp. 147–148): "Eine sehr schöne Abart desselben, die dunkler Blau und von der Außenseite gegen die Flügelmitte, in eine schwarze Mischung auf der Oberseite verläuft, zeigt meine Fig. 2. [Fig. 3 of the present study]. Man könnte diese Abart wohl für verschieden vom gewöhnlichen Manne halten, wenn erwiesen wäre, daß solche öfters vorkömmt, worüber mir Herr Kindermann keine Nachrichten ertheilt hat. Das Weibchen ist auf der Oberseite einfach braun wie das von *P. Acis*, Die Unterseite hat ♂ und ♀ ganz übereinstimmend mit *P. Damon*, so daß sich beide Arten von solchem nur durch die geringere Größe unterscheiden. Es zeigen sich wie bei *Damon*, auf den Vorderflügeln das schwarze Mittelauge und die aus großen Augen bestehende weiß eingefaßte Augenbinde, und die Hinterflügel führen die kleine Augenreihe mit den weißen Splitterstrich durch die Flügelmitte vom Wurzelfelde aus. Fühler wie bei den vorhergehenden Arten. Heimath: Amasia.". Beside the interesting information that the type locality of *athis* is Amasia and that Kindermann again is the pro-

Fig. 1. Plate 104 from G. A. W. Herrich-Schäffer's "Systematische Bearbeitung der Schmetterlinge von Europa, zugleich als Text, Revision und Supplement zu Jakob Hübner's Sammlung europäischer Schmetterlinge", Vol. 1, Heft 49 [31.XII.1851].

Fig. 2. Plate 19 from P. B. Gerhard's "Versuch einer Monographie der europäischen Schmetterlingsarten: *Thecla*, *Polyomattus* [sic], *Lycaena*, *Nemeobius*. Als Beitrag zur Schmetterlingskunde", Heft 5 [31.V.1851].

vider of the material, the description consists of two parts: first, the 'nominotypical' taxon looks on the upperside like "*P. alexis*" (a junior primary homonym of *Papilio alexis* Poda, 1761 [currently *Glaucopsyche alexis* (Poda, 1761)] and a senior subjective synonym of *Papilio icarus* Rottemburg, 1775 [currently *Polyommatus icarus* (Rottemburg, 1775)]) and hence again as a blue with a very narrow black marginal line; second, an "Abart" [to be interpreted as form rather than as geographical race or, in present-day terminology, subspecies] is described but not named (!), the ♂ of which has a darker blue wing upperside with extensive black dusting of the apical area, thus suggesting that a distinct taxon is actually involved. It is the latter form that is figured by Freyer. The dating of Heft 96 was established from the printed date on the wrapper (Tremewan, 1988), while a search through contemporaneous literature could not reveal more precise data (Olivier, *in press*).

At this stage, it is worthwile to report on the travelling activities of Albert Kindermann Jr. near Amasia, in order to establish the precise origin of the material that served to describe *actis*, *atys* and *athis*. In March 1848, Kindermann left Ofen [Budapest], along with Stefan Nogell, for a planned journey to Russia (Nogell would collect in 'Grusien', i.e. Georgia), but the Russian authorities refused to let him go there and so they were forced to travel to Anatolia. They arrived in Samsun on 3rd May and stayed there for three weeks. As the vegetation was not well out yet and as very few butterflies were on the wing, Nogell decided to move to Amasia, where Kindermann joined him at the beginning of July. From here, Kindermann explored snowy mountain ranges at six hours walk to the north of town, at altitudes up to 6,000 feet (2,000 m), where he collected very well, but to the end of the year he travelled through Triest back to Ofen. In 1849 he went back to Amasia, this time collecting near Tokat, that is surrounded by even higher mountains, but added only few new species. He returned back again in autumn, sending his material to his colleagues when in Ofen. In May 1850 he collected near Diabekir (now Diarbakir), in June near Sivas and in July near Tokat. His assistant (Nogell) concentrated his activities in the mountains near Tokat in 1848 and 1849 and returned back to Ofen only in September of the latter year (Lederer, 1855; [Lederer], 1860; Staudinger, 1878). In his "Verzeichniss der von Herrn Albert

Kindermann 1848–1850 um Samsun, Amasia, Tokat, Siwas und Diarbekir gesammelten Schmetterlinge" (pp. 235–254), Lederer (1855: 237) lists "[*Lycaena*] *Actis* H.-Sch. ... Auf den Tokateralpen". It is quite possible, however, that Kindermann also collected material elsewhere, as Staudinger (1878: 181) quotes: "Auch konnte Lederer nicht alle von Kindermann gefundene Arten aufführen, da derselbe, wenigstens an Gruner bestimmt, direkte Sendungen machte die Arten enthielten, welche er an Lederer nicht sandte". In the systematic part of his publication however, Staudinger (*loc. cit.*: 254–255) reports that it was found by Kindermann "in den Tokat-Alpen". He further mentions: "Drei alte ♂♂ (aus Lederer's, Weissenborn's und Sommer's Sammlung), welche ziemlich sicher von Kindermann bei Tokat gefangen wurden, sind auf den Hinterflügeln mehr schwarz als blau". Interestingly, Staudinger (1899: 147) explicitely states: "Freyer giebt zwar Amasia als Fundort seiner *Athis* an, aber fast zweifellos stammt sein ♂ von Tokat, da weder ich, noch irgend ein anderer Sammler (soweit mir bekannt) *L. Athis* bei Amasia fand". It thus appears that both "forms", i.e. "typical *actis*" and the "Aberration ... Abart" with blackish suffusion in the distal part of the hindwings, originate from the surroundings of Tokat, rather than from Amasia.

Taxonomic interpretations and quotations of the names *actis*, *athis* and *atys* in literature

Heydenreich (1851: 13) was not yet in the possession of the critical instalments of Gerhard, Herrich-Schäffer and Freyer when writing his catalogue (cf. Olivier, 1999, *in press* and *in prep.*) and published under nr. 337 the name "[*Lycaena*] *Atys* Kind. i. l.", which is a nomen nudum, as it is not accompanied by any description or reference to another work. Keferstein (1851: 305) only had Gerhard up to Heft 5 and hence quoted under nr. 183 "[*Lycaena*] *Damon* Var. d *Atys* Gerhard tab. 19. f. 3. Amasia" and apparently the same applies to Meyer-Dür (1852: 94) who also listed the name "[*Lycaena*] *Atys* Kinderm." among the "Varietäten" of "*Lycaena Damon* O.".

Fig. 3. Plate 573 from C. F. Freyer's "Neuere Beiträge zur Schmetterlingskunde mit Abbildungen nach der Natur", Vol. 6, Heft 96 [31.XII.1851].

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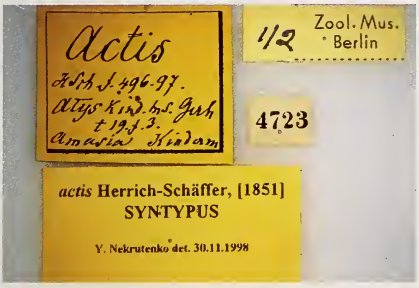

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Fig. 4. *Polyommatus* (*Agrodiaetus*) *actis* (Herrich-Schäffer, 1851), lectotype ♂ (upperside), [Turkey, Tokat province], "Amasia" [recte Tokat], [VII.1849], leg. Albert Kindermann, in coll. Museum für Naturkunde der Humboldt-Universität zu Berlin.
Fig. 5. Same as Fig. 4 (underside).
Fig. 6. Same as Fig. 4 (labels, the one containing the lectotype designation not included).
Fig. 7. *Polyommatus* (*Agrodiaetus*) *actis* (Herrich-Schäffer, 1851), paralectotype ♀ (upperside), [Turkey, Tokat province], ["Amasia", recte Tokat], [VII.1849], [leg. Albert Kindermann], in coll. Museum für Naturkunde der Humboldt-Universität zu Berlin.
Fig. 8. Same as Fig. 7 (underside).
Fig. 9. Same as Fig. 7 (label, the one containing the lectotype designation not included).

Lederer (1852: 21) quotes "*Actis* H.-Sch. 496–499", with "*Athis* Freyer 575" as synonym, while later (Lederer, 1869: 81–82) he considers *actis* as only a variety of *damon*. It is clear that, for him, typical *actis* is violet blue and "der schwarze Rand fehlt (*Actis* H. Sch.)", while he further also mentions "unter *Actis* eine Varietät mit fast ganz schwarzen Hinterflügeln". He further reports *actis* from Astrabad (now Iran, province of Māzandarān, Gorgān), the Taurus Mts. (own observations), as well as from Achalzich (now Georgia, Akhaltsikhe), Hankynda (now Nagorno-Karabach (disputed: Armenia vs. Azerbaijan), Xankändi; known also as Stepanakert) and several mountainous areas of Transcaucasia (leg. Haberhauer; see also Lederer, 1870: 23).

In the first edition of his catalogue, Staudinger (1861: 6), under nr. 149, writes: "[*Lycaena*] ***Actis*** HS. 496–9. (1851); *Athis* Frr. 537, 2. 3. (Febr. 1852); *Atys* Gerh. T. 19, 3 a–d.", thus also considering *actis* as the valid name for this taxon. In the second edition of his "Catalog", Staudinger (1871: 13) considers *actis* again as a "varietas" *of L. damon*, stating under entry 172g: "v. *Actis* HS. 496–9 (1851), VI p. 24; Ld. Hor. l. c. *Athis* Frr. 573, 2. 3 (Febr. 1858); *Athys* Gerh. Pl. 19, 3a–d; ? *Iphigenia* Gerh. 20. 2 (minor, violaceo-caerul., ♂ interdum nigricans)" and reporting it from "*As.min; Arm. et Hyrc.; Mont. et Alp.*". Staudinger (1878: 251) lists "[*Lycaena*] *Actis* HS.; Ld.; *Athis* Frr.; *Athys* Gerh. *Carmon* Ld. pro parte. — Pont. alp. (Tokat); Lyd. m. alp.; *var.*: Hyrc. et Arm.". It is clear that, for Staudinger (*loc.cit.*: 254–255) as well, typical *actis* "hat … einen weit schmäleren schwarzen Aussenrand der Flügel". He further notices that "Die *Actis* aus Armenien und Nord-Persien sind nicht so tiefblau wie die kleinasiatischen, indessen sind sie doch stets rein blau, etwa wie bei *Icarus*, nie so grünblau wie *Iphigenia*, haben auch einen schmalen schwarzen Randsaum, wie die typischen *Actis*" and, finally, apparently considers *actis* as being a distinct species again. Staudinger (1886: 214–215) describes the nominal taxon "*Lyc.*[*aena*] *Actis* var. *Actinides* Stgr. … aus dem südlichen Alai [now Tajikistan: Transalai Mts.]". Staudinger (1899: 146–147) repeats by and large what he said in 1878, adding "aus verschiedenen Orten des Taurus, aus Malatia (westliches Kurdistan) und von Gümüschane (nordöstliches Pontus-Gebiet)" to the known localities, but now applies the name

Athis to the "form" with extensive black suffusion: "Dahingegen scheinen die von Kindermann bei Tokat gefangenen *Actis* ♂♂ durch *stärkeres Auftreten* von *Schwarz* besonders auf den Hinterflügeln (wo es bei 2 meiner 3 ♂♂ das Blau fast ganz verdrängt hat), vielleicht vorwiegend verschieden gewesen zu sein, so dass sie in diesem Falle als Lokalform, jedenfalls aber als auffallende Aberration, den Namen ***Athis*** Freyer (unter welchem Freyer, Taf. 573 Fig. 2, ein solches ♂ abbildet) führen können". He further elevates *actinides* to species rank, which is currently still the taxonomic status of this butterfly. Staudinger & Rebel (1901: 88, nr. 626) list "[*Lycaena*] ***Actis*** HS. 496–9 (1851) VI p. 24; Ld. Hor. VI p. 81; Stgr. Hor. XIV p. 254; Iris XII p. 146; *Athys* Gerh. t. 19, f. 3 a–d." from "*Pont; Arm; Hyrc; Kurd. oc; Taur.*" and, as a separate entry, "a) v. (an ab?) *Athis* Frr. 573, 2 ♂ (3 ♀) (♂ plus minusve praesertim in al. post. nigro-mixtus)" from "*Pont. (Tokat); As. min. c. (Konia)*".

Bienert ([1869]: 46) lists "*Lycaena Actis*" from Amasia and Tokat, while Kirby (1871: 370) writes: "237. c. **C. Actis, Herr. Schäff**. (*Lyc. A.*) Schmett. Enr. (sic!) I. f. 496–499. (1851); Led. Hor. Soc. Ent. Ross. VI. p. 81 (1869); *Lyc. Athis, Frey*. Neuere Beitz [sic!]. VI. t. 537. f. 2, 3. (1852); *Lyc. Damon, var. Atys, Gerh.* Mon. Lyc. t. 19. f. 3 a–d. (1853). ib. Asia Minor." Christoph (1873: 26) mentions "*Lycaena Damon* ... var. *Actis* HS." as "Nicht eben selten bei Hadschyabad [now Iran, province of Māzandarān, Hajibad] und Schahkuh [now Iran, province of Māzandarān, Shāhkūh]". Romanoff (1879: 487) reports *Lycaena Damon* Schiff. v. *Actis* HS. from the "Haut-Plateau Arménien": "Très abondante sur le mont Ben-gel et Zchniss-Kala" (now in southwestern Armenia and northeastern Turkey), while Bramson (1890: 42), in his key to the genus *Lycaena*, lists among the characters of "***Actis*** H. S.": "Der dunkle Saum der Obs. sehr schmal, Rippen am Saume nicht schwarz. ♂ oben tief hochblau, bisweilen schwärzlich bestäubt, besonders auf den Htfl.", thus suggesting that he also considers typical *actis* to lack any extension of black suffusion. He further lists as synonyms: "Syn. *Athis* Frr. *Athys* Gerh. *Carmon* Ld. pro parte. *Damon var.* (Stgr. Cat. 1871 No. 172 g)" and gives as range: "Oestlicher Caucasus, Transcaucasien". Groum-Grshimaïlo (1890: 409–412), dealing with "*Lycaena Actis* HS. var. *Actinides*

Stgr.", states a. o. (p. 411): "les ♂♂ sont d'une coloration plus lilas que p. ex. les *Actis* de Kasikoparan, moins brillants et à bordure noire plus large", thus also treating the latter taxon as one lacking any black suffusion on the male wing upperside. Rühl (1893: 290) writes: "***L. Actis* H. S.,** *Athis Frr.*, *Athys Gerh.* Wenig kleiner (Exemplare eben so gross wie *Kindermanni* kommen jedoch vor). Vorderflügel und Hinterflügel mit verändertem, in's Violette ziehenden Blau, Schatten am Aussenrand schmäler und schwächer, Rippen nicht schwarz einmündend. ♂ sehr selten schwärzlich, besonders an den Hinterflügeln bestäubt, ... Fluggebiet: in Transkaukasien, bei Hadschyabad und Schahkuh (Persien). Heyne (1895: 765) adds: "S. 290. ***L. Actis* H. S.** Weitere Fundorte: Oestlicher Kaukasus, Kleinasien, Armenien". It is thus clear that, for Rühl also, typical *actis* is the blue with a very narrow black marginal line. Holtz (1897: 47) writes about "*L. actis* H.-S.": "Von Lederer und Haberhauer an denselben Örtlichkeiten gefangen wie die vorige Art ["In höheren Teilen des Taurus von Lederer und Haberhauer gefunden"]". Radde (1899: 420), in his list of the Lepidoptera collection housed in the Museum Caucasicum (which is virtually a part of Romanoff's collection), states "[*Lycaena*] *actis* H. S. Kasik[o]p.[oran]".

In a faunistical paper on the butterflies of Crimea, Melioransky (1897: 220) lists "*Lycaena actis* H. S. — a single specimen collected in July 1893" — but without doubt he misidentified a different species (cf. Forster, 1960: 107; Nekrutenko, 1985: 139). The report of "*Lycaena damon* var. *actis* H.-S." from the Rilo Dagh in Bulgaria by Bachmetjew (1902: 404) is also based on a misinterpretation (Forster, *loc.cit.*: 107, footnote).

Seitz (1909: 318) lists "***L. actis* *H.-Schäff.*** (= *athys Gerh.*) (82a).", also considering the totally blue butterfly as typical, while "Bei der Form ***athis* *Frr.*** (82a) ist der Rand der Vflgl und die ganze Aussenhälfte der Hflgl von der blauen Bestäubung freigelassen und erscheinen tiefschwarz". Courvoisier (1910: 192) mentions "*Actis* H. S. mit Var. *Athis* Frr." as a distinct species, while Courvoisier (1914: 152) lists *actis* H Sch., with "*atys* (Kindermann) Ghd. 1853" as a synonym and "*athis* Freyer" as a "Nebenform". Le Cerf (1913: 69) merely lists "*L. actis* H.-Sch." in his account on the butterflies of Persia.

Wagner (1929: 62) reports "*Lycaena actis* H. S. und var. *athis* Frr." from the Sultan Dagh (now Sultan Dağları, in the provinces of Afyon, Isparta and Konya) north of Akşehir, in the western Taurus. Osthelder & Pfeiffer (1932: 48) list "[*Lycaena*] *actis* H. Sch. ssp." in their account of the butterflies from Marash, also quoting in their brief description of the butterfly: "Das wunderbare Blau besonders leuchtend und ohne jede Saumlinie". Schwingenschuss (1935: 132) publishes a report of butterflies collected in the neighbourhood of Bolu (June) and in Akşehir and on the nearby Sultan Dağları (July). From the latter area, he reports "*Lycaena athis* Frr." and "*athis* nov. ab. *lunulata* Schw.". As the name refers to an infrasubspecific form, it is unavailable, the more it is not accompanied by any description. Subsequently, Schwingenschuss (1938: 146) quotes "*Lycaena actis* H. S. ssp. *athis* Frr.", thus for the first time unambiguously using this name at subspecies level, and applying it to the taxon with blackish apical suffusion, as he further writes: "Kommt nur in der ssp. *athis* mit der ganzen Variationsbreite vor (Pf). Ich habe auch nur *athis* gefunden, darunter Stücke mit prächtig blauen Monden auf den Hinterflügeln, für die ich den Namen *lunulata* in Vorschlag brachte (Verh. d. z. b. G. 1935, S. 132) (Sch)". His name *lunulata* does not become available by this action, as it stays infrasubspecific. Schwingenschuss (1939: 88) lists "*L. actis* H. S." from the central Elburs Mts. in northern Iran, reporting it "Im Tarseegebiet (Pf., Sch., W.) und bei Pelur (Sch.) in ganz wenigen, meist schlechten ♂♂ erbeutet", thus also considering the name *actis* to apply to a blue without any black suffusion on the upperside.

Forster (1936: 59; 1938: 116) merely lists "*actis* H.-Sch." but, in his famous "Bausteine", for the first time since Staudinger (1899), deals with the subgenus *Agrodiaetus* in detail, undertaking a series of taxonomic actions which are of great importance for a further understanding of this story. Under "*Agrodiaetus damone* Ev.", Forster (1956: 58–59, Tafs 8–9, Figs 16–17) describes the nominal taxon "*A. damone firdussii* ssp. nov." from Shāhkūh in the eastern Elburs (northern Iran), listing in its synonymy "*actis* pro parte Staudinger, Horae Soc. Ent. Ross. 14, 1878, p. 255" and "*actis* Schwingenschuss, Entom. Zeitschr. 53, 1939, p. 87". Later, Forster (1960: 106–107, Tafs. 10–11, Figs 1–3) deals with "*A. actis actis*

H. Sch.", listing "*athys* Gerhard", "*damon* var." sensu Staudinger (1871: 13) and both "f. *athis* Freyer" and "f. *lunulata* Schw." among its synonyms. He considers his ♂ material to consist of 20 *actis* and 70 *athis*, the latter being a mutation that is a little smaller, a deeper violet blue and, especially on the hindwing, has an extensive black suffusion, and believes that "Ende des 19. Jahrhunderts war die f. *athis* Frr. offensichtlich noch wesentlich seltener, wie aus der Literatur und dem untersuchten alten Material zu entnehmen ist". As type locality ("Loc. class.") he mentions "Kleinasien". He further describes "*A. actis pseudactis* ssp. nov." (Forster, *loc.cit.*: 107–109, Tafs 10–11, Figs 4–5) from Armenia, that is a more bright blue, including among its paratypes material originating from localities now in the northeast of Turkey, i.e. in the Aras Valley (Kagysman, Kulp, Kazikoparan, Agri Dagh, Geliagadzha (now resp. Kağızman, Iğdır, Kazıkoparan, mountains south of Kazıkoparan, untraceable locality near Kağızman, in the provinces of Kars and Iğdır)), as well as material collected by de Lesse in 1956 ("Col du Kop Dagh entre Bayburt et Erzerum" (Kopdağı Geçidi, at the border of the provinces of Bayburt and Erzurum), "Mirgemir Dagh entre Erzurum et Agri" (Tahir Geçidi, province of Ağrı), "Col routier entre Erzerum et Agri"), and further 1♂, 1♀ from Ordubad (now in Naxçivan). Interestingly, Forster (*loc.cit.*: 109) further lists material from the Elburs, "Mesopotamia", "Kurdistan" (incl. vic. Malatya), "Zeitun" (now Süleymanlı in the province of Maraş) and the Taurus (both Lydia and the Cilician Taurus!) as belonging only conditionally to *pseudactis*, and possibly representing an undescribed subspecies. It is worth mentioning, that Wiltshire (1957: 30) reports "*Polyommatus actis* H.-S. ssp. *pseudactis* Forst." from Iraq "At great heights in the mountains", three years before Forster's description! As no definition of the taxon is given, Wiltshire's name is a nomen nudum.

In the late 1950's and early 1960's, de Lesse carried out extensive karyological studies on *Agrodiaetus* taxa from Turkey and Iran, his results still forming the basis of much of our current views on taxonomy in this difficult group. In his thesis, de Lesse (1960: 186–187), on karyological evidence, transfers the nominal taxon *firdussii* to the rank of subspecies of "*Agrodiaetus actis*": from his

discussion, it further appears that, for him, *actis* is also a blue without any black suffusion in the apical part of the wings. On his table on p. 207, and on fig. 219 on the next page, he lists "*A. actis pseudactis* Forst. *in litt.*" from "Mirgemir D." and "Kop Dagh" and "*A. actis firdussi* Forst." from the Demavend (Elburs Mts.). In a separate paper, de Lesse (1962) presents new data on the chromosomal variation in "*Agrodiaetus actis*", including results for one population from Bürücek in the Taurus Mts. (province of İçel, Tekir) that, according to him (p. 67), may belong to a new subspecies, "ainsi que l'a récemment indiqué Forster". This population is likely to belong to the newly described *P.* (*A.*) *sigberti* Olivier, van der Poorten, Puplesiene & De Prins, 2000 (cf. Oliver *et al.*, 2000).

Higgins (1966: 213), in his checklist of Turkish butterflies, lists under nr. 118: "*Agrodiaetus actis* Staudinger. "Taurus"; 28 as *lunulata* Schwingenschuss; 43 as *athis* Freyer (42)". His publication being based on a survey of the literature, one cannot tell which butterfly Higgins considers to be *actis*. Goossens & Cromphout (1978) and Goossens (1979), in two accounts on successive collecting trips in Turkey, include "*Agrodiaetus actis* Staudinger" from the province of İçel in a list of butterfly taxa, following the concept of Higins's (1966) paper. Again, one cannot tell what they understand under *actis*.

Koçak (1979: 323–324) describes "*Agrodiaetus* (s. str.) *pseudactis sertavulensis* n. subsp." from the Sertavul Geçidi in the province of Konya in Turkey, placing it in the "*actis-pseudactis* group" but rather closer to *pseudactis*, according to wing shape and coloration. He further considers that the ranges of both *actis* and *pseudactis* overlap partly in the Taurus Mts. and consequently proposes *pseudactis* to be a distinct species from *actis*. Subsequently, Koçak (1980: 19), as a result of a study on the publication dates of Gerhard's "Versuch einer Monographie der europäischen Schmetterlingsarten ... (1850–1853)", concludes that [*Lycaena*] *actis* Herrich-Schäffer, [1851] (December) is a synonym of *Lycaena atys* Gerhard, [1851] (May). In his "Critical check-list of European Papilionoidea", Koçak (1983: 33) lists "[*Agrodiaetus*] *atys* Gerhard, 1851" (with *actis* Herrich-Schäffer, 1852 as synonym) and "[*Agrodiaetus*] *pseuactis* Forster, 1960" [sic!], quite in agreement with the conclusions arrived at in his two previous papers.

Eckweiler & Hofmann (1980: 20) list two subspecies of "*Agrodiaetus actis* Herrich-Schäffer, 1851" in their "Checklist of Iranian butterflies", i. e. ssp. *pseudactis* Forster, 1960 (provinces of [West- and East-] Azerbeijan) and ssp. *firdussii* Forster, 1960 (Elburs), while Eckweiler & Görgner (1981: 105) report "*Agrodiaetus actis* Herrich-Schäffer, 1851 ssp. *pseudactis* Forster, 1960" from the Palandöken Mts. in the province of Erzurum, in northeastern Turkey. In an important taxonomic paper, Eckweiler (1989: 97) considers, in full agreement with Koçak (1979), that *pseudactis* and *actis* are distinct species as, according to him, both appear to be syntopic and synchronous in the Taurus range. Eckweiler (pers. comm. 29.IV.2000) applied the name *actis* to the taxon we now know as *P.* (*A.*) *sigberti*. He further underlines the conspecificity of *firdussii* Forster, 1956 and *pseudactis* Forster, 1960 and establishes the following new combinations: *Polyommatus* (*Agrodiaetus*) *firdussii firdussii* (Forster, 1956) (Elburs), *P.* (*A.*) *firdussii pseudactis* (Forster, 1960) (East Anatolia) and *P.* (*A.*) *firdussii sertavulensis* (Koçak, 1979) (Taurus). He describes a new taxon, "*Polyommatus* (*Agrodiaetus*) *firdussii ernesti* subspec. nov.", from near Elmalı in the Kohu Dağları in the Turkish province of Antalya, in the western Taurus, while admitting that specimens transitional to *sertavulensis* (according to underside markings) occur on the Palaz Dağı, in the eastern part of the province of Antalya. He finally figures (Abb. 43–46) "*Polyommatus firdussii* trans. ad *sertavulensis* Koçak" from the Turkish province of Niğde (Çamardı, Çukurbağ).

De Prins *et al.* (1991: 146 and plates 1 & 2, figs 11 & 14) list material from the province of Van, in southeastern Turkey, as "*Polyommatus* (*Agrodiaetus*) *firdussii* (Forster, 1956)" and so do Koçak & Seven (1994: 6, as "*Agrodiaetus firdusii* Forst." [sic!]), while Avcı & Özbek (1996: 84) also name "*Polyommatus firdussii* Forster, 1956" material from the province of Erzurum. Seven (1996: 28–29) reports this taxon among material collected "in Central and North Turkey". Lukhtanov *et al.* (1998) ascribe material from different localities in the southeastern Turkish provinces of Bitlis and Van to "*P.* (*A.*) *firdussii pseudactis* (Forster, 1960)".

In their monumental work on the butterflies of Turkey, Hesselbarth *et al.* (1995) apply the species group name *actis*

Herrich-Schäffer to the smaller species, the ♂ of which is more violet blue, often with a more or less extensive blackish suffusion in the distal half of the hindwing (cf. Tafel 123, Figs 1–21), that had been ascribed to *athis* Freyer by several earlier authors, from the second half of the 19th century up to Forster (1960). In their interpretation, they consider both *atys* Gerhard and *athis* Freyer as subjective synonyms of *actis* Herrich-Schäffer and further give as chromosome number "*n* = 27, Bürücek (Içel) (de Lesse, 1962a: 68)". Their interpretation (and that of Eckweiler, vide supra) is quite understandable, when one knows of the arrangement of Forster's material in coll. Zoologische Staatssammlung München: under "*actis actis* H.S.", 46♂, 7♀ of *P.* (*A.*) *sigberti* (now labelled as paratypes) are included at present, while among "*actis pseudactis* Forst.", 1♂ of *P.* (*A.*) *actis* from "Kleinasien Amasia Korb" and 9♂ from various localities in the Taurus Mts. (all violet blue, quite different from *sertavulensis*) are included along with *P.* (*A.*) "*wagneri*" (Forster, 1956) from "Konia" (2♂) and "Lydia Cilicië Taurus". The larger species without any blackish suffusion is named *P.* (*A.*) *firdussii* (Forster, 1956) and *pseudactis* (Forster, 1960) is sunk in synonymy (cf. Tafel 122, figs 37–72). Nevertheless, the authors leave open the possibility that "*firdussii*" consists of more than one taxon on karyological evidence. *P.* (*A.*) *sertavulensis* (Koçak, 1979) is raised to species rank on morphological-chorological data, as on Sertavul Geçidi they found both species (*sertavulensis* and *wagneri* — not *firdussii*! — cf. locality lists on pp. 728–733) syntopic and synchronous; they further synonymize *ernesti* under *sertavulensis*.

Häuser & Eckweiler (1997) list alphabetically all the species group taxa dealt with so far in the present overview, with their original combination, type locality and data to their primary sources (literature reference as well as current depository of extant types (when existing), while Eckweiler & Häuser (1997), in a systematic checklist, arrange the species group taxa into different unnamed species groups. All taxa relevant to the present study are placed in a very inclusive, large "*A. damon* group", and the nominal taxa *actis* (sensu Hesselbarth *et al.*, 1995!), *firdussii* and *ernesti* are figured in colour. The names *ernesti*, *sertavulensis*, *pseudactis* — but also *maraschi* Forster, 1956 — are associated as subspecies to *firdussii*. The latter taxon was described by Forster (1956:

57–58) as a subspecies of "*A. damone*", but is currently considered to represent either a junior synonym or a subspecies of *P.* (*A.*) *wagneri* (Forster, 1956) (Hesselbarth *et al.*, 1995; Carbonell, 1998). In the Zoologische Staatssammlung München, I found 4♂ of *actis* from "Syr. sept. Taurus Marasch", that clearly differ from the holotype and 2♂ paratypes of *maraschi*, that were also collected in the same locality, in being darker violet blue, with the spots and the submarginal lunules on underside hindwing much more apparent. The holotypes of *wagneri* and *maraschi* are also very different and it thus appears to the present author that *maraschi* is a taxon quite distinct from both *actis* and topotypical *wagneri*.

Bálint & Johnson (1997: 19) list *actis* and *firdussii* without any further subdivision, while Bálint (1999: 31) lists 10 ♂, 2 ♀ paratypes of *firdussi* [sic], deposited in The Natural History Museum, London.

Carbonell (1997) presents an historical overview of the "complexe *actis-firdussii-pseudactis*", also applying the names *actis* and *firdussii* in the sense of Hesselbarth *et al.* (1995) and describes "*A. actis artvinensis* n. ssp." from the extreme northeast of Turkey (provinces of Erzurum and Artvin), that is characterized by the even darker violet blue colour with traces of a discoidal spot, as well as the extreme development of the black suffusion on both fore- and hindwings on the upperside, and by the dark grey-brown ground-colour with sharply contrasting white streak on the underside. He further states about the specimens of "*actis* ssp?" from Bürücek, of which de Lesse (1962) studied the karyotype: "la majeure partie des ♂♂ concernés ont effectivement les nervures noircies sur plusieurs mm, mais sans aucune trace de suffusion submarginale noire". Carbonell (1998) reports the sympatry of "*pseudactis*" and *sertavulensis* on the Sertavul Geçidi. He lists *pseudactis* as a subspecies of *firdussii* and, in accordance with Hesselbarth *et al.* (1995), considers *sertavulensis* as a distinct species, but *ernesti* as a valid subspecies of the latter. Carbonell & Naderi (2000: 219) again quote "*A. actis artvinensis* Carbonell, 1997" in the heading on the differential diagnosis of their new taxon *Agrodiaetus arasbani*. Reinhard & Eitschberger (1999: 350), following Häuser & Eckweiler (*loc.cit.*) and Eckweiler & Häuser (*loc.cit.*), present the same arrangement and further add *artvinensis* as a subspecies of *actis* (sensu Hesselbarth *et al.*, 1995).

Lately, Koçak (1996: 22–23) has listed "*Polyommatus* (*Agrodiaetus*) *atys*" and *P.* (*A.*) *firdussii* as two different species, the latter with four subspecies (*firdussii*, *pseudactis*, *sertavulensis* and *ernesti*). It is not stated however if Koçak (*loc.cit.*) and Koçak & Seven (1996) interpret "*atys*" as "*actis* sensu Hesselbarth *et al.* (1995)" or in a different way, but Koçak & Seven (1998) probably do, as they link *artvinensis* (Carbonell, 1997) as a subspecies to "*atys* (Gerhard, [1851])". They also list *maraschi* as a subspecies of *firdussii* (presumably following Eckweiler & Häuser, 1997).

Lectotype designation

After Herrich-Schäffer died in 1874, his private Lepidoptera collection was split up via Staudinger & Bang-Haas and part of it went via the private collection of Otto Staudinger to the Zoological Museum of Berlin [now Museum für Naturkunde der Humboldt-Universität zu Berlin]; many Lepidoptera described from the Kaden collection by Herrich-Schäffer became isolated in various collections (Horn *et al.*, 1990).

While visting the Museum für Naturkunde der Humboldt-Universität zu Berlin in late November 1998, I was shown a box by Dr. Yuri P. Nekrutenko, that included two apparent syntypes (♂, ♀) of [*Lycaena*] *Actis*. In their primary position in the collection, both specimens were placed behind a bottom label attached to the first specimen (♂); this specimen also bears a printed numerical label "4723" to refer it to the handwritten inventory book entitled *Catalogus Generalis Musei Zoologici Berolinesis*. Vol. 1 (Nos. 1–3753) Vol. 2 (Nos. 3754–10098), that is deposited in the Lepidoptera section library; each entry (row) of the Catalogus consists of five columns: number (shown on the printed label) | name and author | number of specimens | locality | collector or provider. In the "Catalogus", under "4723" is written: "Lycaena Actis HSch. | 2 | Amasia | Kindermann".

I herewith designate the ♂ as lectotype (Figs 4–6) and the ♀ as paralectotype (Figs 7–9):

Lectotype ♂ with labels: handwritten "Actis | HSch. f. 496-97| Atys Kind.[ermann] ms. Gerh.[ard] | t. 19. f. 3. | Amasia <recte

Tokat — vide supra> Kind[ermann]" (recto yellow, in printed box, verso white); printed "4723" (on white paper), "actis Herrich-Schäffer, [1851] | SYNTYPUS | Y. Nekrutenko det. 30.11.1998" (on yellow paper); designated now with printed label "[Lycaena] Actis | Herrich-Schäffer, 1851 | LECTOTYPUS ♂ | design. Olivier, 2000" (on red paper).

Paralectotype ♀ with printed labels "*actis* Herrich-Schäffer, [1851] | SYNTYPUS | Y. Nekrutenko det. 30.11.1998" (on yellow paper); designated now with printed label "[Lycaena] Actis | Herrich-Schäffer, 1851 | PARALECTOTYPUS ♀ | design. Olivier, 2000" (on red paper).

Type locality. Since label and stated type locality ("Amasia") are found to be erroneous (see *Introduction* above), it is corrected here according to the available data as *Turkey, Tokat province, env. Tokat* (ICZN, Art. 76.2, Recommendations 74E, 76A.2).

Taxonomic consequences

Nomenclature. Koçak (1980: 19) proposed "*Agrodiaetus atys* (Gerhard, [1851)" as the valid name for this species, as it was published in May 1851, thus taking precedence over [*Lycaena*] *actis* Herrich-Schäffer, [1851] (December), the latter name furthermore having been published uninominally. Except for Heydenreich (1851), Keferstein (1851) and Meyer-Dür (1852), who did not possess Hefte 48 and 49 of Herrich-Schäffer's work, all authors except Koçak, from the second half of the 19th century up to 1995, used the name *actis* for this taxon. Indeed, the name *actis* just looks like published without combination with a generic name, but it is obvious that Herrich-Schäffer consistently applied the Principle of Binominal Nomenclature and ascribed it to the genus *Lycaena*, likewise all the "blues" in volume 1 of his work are placed in this genus (ICZN Art. 11.4). It is therefore agreed here with Hesselbarth *et al.* (1995: 732) that the name *actis* should be considered as the valid name for this taxon, thus promoting stability of nomenclature (see also ICZN, Preamble and Arts. 23.2 and 23.9). The more, there is now also a lectotype available for *actis*, while Gerhard's collection (including the type specimens of *atys*) was probably entirely destroyed (Olivier, 1999: 129–130).

Correct attribution of the name. The type specimens of *P.* (*A.*) *actis* are rather robust and they leave no doubt as to their specific distinctness from the taxon referred to under this name by Hesselbarth *et al.* (1995), thus confirming what was already apparent from an attentive study of the original description and illustration by Herrich-Schäffer, as well as from that of *L. atys* Gerhard, [1851] and of *L. athis* Freyer, [1851]. It appears that the taxon denoted as "*Polyommatus* (*Agrodiaetus*) *actis* (Herrich-Schäffer, [1851])" by Hesselbarth *et al.* (1995) and subsequent authors, or at least its Taurus populations, was unnamed yet. Freyer's *athis* indeed applies to a blue butterfly "usually looking like *alexis* [*P. icarus*] on the upperside", while the butterfly with black suffusion in the distal part of the hindwings is considered as "a very nice form" but not named. The application of the name *athis* by several subsequent authors to denote this form is thus probably unjustified, although it must be said that specimens of the smaller and darker taxon without any black suffusion exist as well. As no extant types of *athis* are known however, and in the interest of nomenclatural stability, it is best to follow current use in considering it as a subjective synonym of *actis*. The name *lunulata*, attributed to material from the Sultan Dağları, applies to an aberration and is thus unavailable. Carbonell's (1997) name *artvinensis* applies to populations from the provinces of Erzurum and Artvin in northeastern Turkey, that look quite different from populations of "*actis* sensu Hesselbarth *et al.* (1995) et sqq." and that have a different haploid chromosome number.

Current problems and provisional arrangement. True *actis*, the taxon *firdussii* [pro parte!] of Hesselbarth *et al.* (1995), most probably consists of more than one species, but the picture is not quite clear. The intensity of the blue colour (even leaving *sertavulensis* and *ernesti* aside) varies from vivid violet blue to a lighter blue (especially in *firdussii* from the Elburs), and the variation in colour does not always coincide with that in chromosome numbers (de Lesse, 1960: 186–197, 1962: 66–70). The following haploid chromosome numbers (CN), determined in metaphase I (I) and in metaphase II (II), have been found in populations ascribed to *actis*, *firdussii* or *pseudactis* (after de Lesse, 1960, 1962; Hesselbarth *et al.*, 1995; Lukhtanov *et al.*, 1998; Lukhtanov, unpublished):

CN (*n*)	Locality	Number and stage of cells examined	Name used in original publication	Literary source
27	E Bürücek (İçel, Tekir, TR)	5 (I), 1 (II)	*A. actis* ssp.	de Lesse (1962)
27–28	İvrız, Pozantı (Konya & Adana, TR)	?	*firdussii*	Hesselbarth *et al.* (1995)
23–24	Aladağları, 15 km SE Çamardı (Niğde, TR)	?	—	Lukhtanov (unpubl.)
24 25	25 km N Erzincan (TR)	1 (I) 2 (I), 1 (I, II)	*A. actis pseudactis* Forst.	de Lesse (1962)
30 31 32	Kopdağı Geçidi (Erzurum/ Bayburt, TR)	1 (I) 3 (I, II) 3 (I, II), 1 (II)	*A. actis pseudactis* Forst.	de Lesse (1962)
27 28 29	Mirgemir Dagh [Tahir Geçidi, Ağrı, TR) 1 (II) 1 (I), 1 (II)	1 (I, II) 8 (I), 2 (I, II),	*A. actis pseudactis* Forst.	de Lesse (1962)
28 (27–29)	Kuzgunkıran Geçidi (Bitlis, TR)	?	*firdussii*	Hesselbarth *et al.* (1995: 705, Tab. 20)
25–26 25 25 + m		? (Forster, 1956) 8 (I) 3 (I)	*P.* (*A.*) *firdussii* (1995: 733) *P.* (*A.*) *firdussii pseudactis* (Forster, 1960)	Hesselbarth *et al.* Lukhtanov *et al.* (1998)
25 (25–26) 25	N Çatak (Van, TR) 32 km NNE Çatak (Van, TR)	? 8 (I)	*firdussii* *P.* (*A.*) *firdussii pseudactis* (Forster, 1960)	Hesselbarth *et al.* (1995) Lukhtanov *et al.* (1998)
ca. 21–23 22 23 ca. 21–22	Güzeldere Geçidi (Van, TR)	? 3 (I) 3 (I) 3 (I)	*P.* (*A.*) *firdussii* (Forster, 1956) *P.* (*A.*) *firdussii pseudactis* (Forster, 1960)	Hesselbarth *et al.* (1995: 733) Lukhtanov *et al.* (1998)
28	Pass E. Tabrīz (Āzarbāyjān-é Sharghī, Iran)	2 (I), 1 (II)	*A. actis* ssp.	de Lesse (1962)
31 32 33–34	Damāvand (Tehrān, Iran)	1 (I), 2 (I, II) 1 (I), 1 (I, II) 1 (33:I), (33–34: II)	*A. actis Firdussi* Forst.	de Lesse (1962)
32	"Ab e Ali (Elbourz)" (Iran)	1 (I), 1 (II)	*A. actis Firdussi* Forst.	de Lesse (1962)

It thus appears that not only variability in the number of bivalents is encountered, but also the presence or absence of a small extra element (m), while variability in specimens from different

localities (often at close range, compare e.g. material from Van and Çatak, both in the province of Van in SE Turkey) is significant (Lukhtanov *et al.*, 1998: 3, 6). Matters are further complicated by notable differences in karyotype, even between allopatric populations with a similar chromosome number (e.g. Bürücek, Mirgemir Dagh [Tahir Geçidi] and Tabrīz), suggesting a possibly different organisation of the hereditary material with a resulting degree of intersterility (de Lesse, 1962: 70).

In order to ever be able to ascribe any population unambiguously to any given taxon, it is necessary to study the karyotype and chromosome number of topotypical *actis*, *firdussii*, *pseudactis*, *sertavulensis* and *ernesti* (there are no data at hand for the two last-named nominal taxa), and to combine these data to those obtained after a study of the phenotype and karyotype of any given population. Cross-breeding studies between several populations would further deepen our insight into this interesting case.

For the time being, the following arrangement seems to offer a fair provisional solution (only the holotype or lectotype of each nominal taxon is listed):

Polyommatus (*Agrodiaetus*) *actis* (Herrich-Schäffer, 1851)

"[*Lycaena*] *Actis* Kad." Herrich-Schäffer, G. A. W., [31.XII.1851]. Systematische Bearbeitung der Schmetterlinge von Europa, zugleich als Text, Revision und Supplement zu Jakob Hübner's Sammlung europäischer Schmetterlinge, Vol. 6(48), 24; "[*Lycaena*] *Actis*", Vol. 1(49), Tab. 104, [Figs] 496–499 [31.XII.1851]; "*Lycaena Actis*", Vol. 6(55), Systema Lepidopterorum Europae. Systematisches Verzeichniss der Europäischen Schmetterlinge 4 [31.XII.1852]; "*actis* (*Lycaena*) Kad. HS. 466–469. *athis* Fr.", Vol. 1(65), Index 1 [31.XII.1854]; "*Actis* dazu *Atys* Gerh." Vol. 6(69), 167 [31.XII.1856]; "*actis* Lycaena" Vol. 6(69), Index Universalis Macrolepidoptera 1 [31.XII.1856]. Type locality: Turkey, Tokat province, env. Tokat (**corrected here**). Type material: lectotype ♂, Turkey, "Amasia" (recte Tokat), VII.1849, leg. Albert Kindermann, in coll. Museum für Naturkunde der Humboldt-Universität zu Berlin (see above).

"[*Lycaena*] *Atys*. Kind. *Actis*. Herr.-Schaeff." Gerhard, [P.] B., [31.V.1851]. Versuch einer Monographie der europäischen Schmetterlingsarten: *Thecla*, *Polyomattus* [sic], *Lycaena*, *Nemeobius*. Als Beitrag zur Schmetterlingskunde, (5), 11, Platte 19, 3 a, b ♂, c, d ♀. Type locality: Turkey, Tokat province, env. Tokat (**corrected here**). Type material: presumably lost. Subjective synonym of [*Lycaena*] *actis* Herrich-Schäffer, 1851 (Herrich-Schäffer, [1856], 6(69): 6).

"[*Lycaena*] *Atys* Kind. i. l." Heydenreich, [G. H.], [31.VIII.]1851. Lepidopterorum Europæorum Catalogus methodicus. Systematisches Verzeichniss der europaeischen Schmetterlinge, 3. Aufl., 13. — ***nomen nudum***.

"*Lycaena* Pap.[ilio] *Athis*." Freyer, C. F., [31.XII.1851]. Neuere Beiträge zur Schmetterlingskunde mit Abbildungen nach der Natur, Vol. 6(96), 147. Type locality: Turkey, Tokat province, env. Tokat (**corrected here**). Type material: not found. Subjective synonym of [*Lycaena*] *actis* Herrich-Schäffer, 1851 (Herrich-Schäffer, [1854], 1(65): Index 1).

Polyommatus (*Agrodiaetus*) *firdussii* (Forster, 1956)

"*A.*[*grodiaetus*] *damone firdussii* ssp. nov." Forster, W., 1956. Bausteine zur Kenntnis der Gattung *Agrodiaetus* Scudd. (Lep. Lycaen.) I. — *Z.wien.ent.Ges.* 41: 58–59, Taf. 8–9, Figs 16, 17. Type locality: "Nordiran, Schahkuh, Westabhang, Geröllzone, 1800–2000 m". Type material: holotype ♂, Iran, Māzandarān province, Shāhkūh, leg. Exp. Wernicke, in coll. Zoologische Staatssammlung München.

Polyommatus (*Agrodiaetus*) *pseudactis* (Forster, 1960), species incertae sedis

"*A.*[*grodiaetus*] *actis pseudactis* ssp. nov." Forster, W., 1960. Bausteine zur Kenntnis der Gattung *Agrodiaetus* Scudd. (Lep. Lycaen.) II. — *Z.wien.ent.Ges.* 45: 107–109, Taf. 10–11, Figs 4, 5. Type locality: "Armenia, mts. Daralagez, pag. Martiros, ca. 2000 m alt.". Type material: holotype ♂, Armenia, Daralagez Mts., Martiros, leg. Leo Sheljuzhko & Nina Pavlitzkaja, in coll. Zoologische Staatssammlung München.

"*Polyommatus actis* H.-S. ssp. *pseudactis* Forst." Wiltshire, E. P., 1957. The Lepidoptera of Iraq, p. 30. — ***nomen nudum***.

Polyommatus (*Agrodiaetus*) *sertavulensis* (Koçak, 1979), species incertae sedis

"*Agrodiaetus* (s. str.) *pseudactis sertavulensis* n. subsp." Koçak, A. Ö., 1979. Studies on the family Lycaenidae II. New taxa and records from Turkey. Lycaeniden-Studie II. Neue Taxa und Meldungen aus der Türkei (Lep. Lycaenidae). — *Atalanta* (*Würzburg*) 10(4a): 323–324, Fig. 31. Type locality: "South Turkey, Konya Prov. Sertavul Paß 1600 m". Type material: holotype ♂, Turkey, Karaman province, Sertavul Geçidi, leg. Ahmet Ömer Koçak, in Department of Zoology, University of Ankara.

Polyommatus (*Agrodiaetus*) *ernesti* Eckweiler, 1989, species incertae sedis

"*Polyommatus* (*Agrodiaetus*) *firdussii ernesti* subspec. nov." Eckweiler, W., 1989. Drei neue Lycaeniden aus der Türkei (Lepidoptera, Lycaenidae). — *Nachr.ent.Ver.Apollo*, N. F. 10(2): 97–101, Abb. 35–40. Type locality: "Türkei, Prov. Antalya, Elmalı, Kohu Dağları, Dokuz Gölü, 1700–2000 m". Type material: holotype ♂, Turkey, Antalya province, Elmalı, Kohu Dağları, Dokuz Gölü, leg. et coll. Wolfgang Eckweiler.

Polyommatus (*Agrodiaetus*) *artvinensis* (Carbonell, 1997)

"*Agrodiaetus actis artvinensis* n. ssp." Carbonell, F., 1997. Contribution à la connaissance du genre *Agrodiaetus* Hübner (1822), *Agrodiaetus actis artvinensis* n. ssp. en Turquie orientale, (*Lepidoptera: Lycaenidae*). — *Linn.belg.* 16(4): 140–141, pl. coul., figs 1–3. Type locality: "gorge après Tortum, 1400 m, prov. Erzurum". Type material: holotype ♂, Turkey, Erzurum province, gorge near Tortum, leg. J. Salmon, in coll. Muséum National d'Histoire Naturelle, Paris.

Polyommatus (*Agrodiaetus*) *sigberti* Olivier, van der Poorten, Puplesiene & De Prins, 2000

"*Polyommatus* (*Agrodiaetus*) *sigberti* sp. nov." Olivier, A., van der Poorten, D., Puplesiene, J. & De Prins, W., 2000. *Polyommatus* (*Agrodiaetus*) *artvinensis* stat. nov. and *P.* (*A.*) *sigberti* sp. nov., two vicariant species known so far only from Turkey (Lepidoptera: Lycaenidae). — *Phegea* 28(2): 61–63, 67–73, col. pls 1 & 2, figs 17–32. Type locality: "Turkey, Kayseri province, Aladağları E. side, 34 km S. Yahyali, 2800–2900 m, St. 2384". Type material: holotype ♂, Turkey, Kayseri province, Aladağları E. side, 34 km S. Yahyalı, 2800–2900 m, St. 2384, leg. W. De Prins, A. Olivier & D. van der Poorten, in coll. Instituut voor Systematiek en Populatiebiologie, Zoölogisch Museum Amsterdam.

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249–250, 253–255, 257–259, 261–263, 265–266, 269–270, (1911); 25 (1–14): 2–7, 9–11, 13–17, 22–23, 25–27, 33–34, 37–39, 45–46, 49–50, 61–63, 69–70, 82–84 (Nachtrag), (1911).

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