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Studies on the family Lycaenidae
(Lepidoptera)

by
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It is the purpose of this paper, comprising the results of continuous investigations realized by the author, to present the problems of Lycaenid butterflies from the taxonomic, faunistic and biological points of view, and also to contribute to the stimulation of such interest in this family. Although in the past half century, there have been great advances in knowledge about Turkish *Lycaenidae*, as well as in other groups of Lepidoptera, there is still much to be done within this group. Taxonomically a number of Lycaenids are however not well known or still less recognizable especially in the West Asiatic region. Similarly, only a small number of species or subspecies had been investigated from biological standpoint in that area.

For this purpose, in recent years, some collecting trips had been made by the author in Turkey. The results are presented below.

I. New Taxa and records from east Turkey

Abstract. In the present part, two new subgenera, **Sublysandra** subgen. n., and **Neolysandra** subgen. n. are established in the genus *Agrodiaetus* HÜBNER. One new species, *Agrodiaetus* (s.str.) **turcicus** sp.n., and four new subspecies, *Pseudophilotes bavius* **vanicola** subsp. n., *Polyommatus eroides* **yildizae** subsp.n., *Agrodiaetus (Sublysandra) candalus* **hakkariensis** subsp.n., and *Agrodiaetus* s. str. *transcaspica* **turcicola** subsp.n. are described. A number of new species and subspecies for Turkish fauna are discussed.

The main aim of this paper is to describe the new taxa and give new forms for Turkey, existing in comprehensive study, which has been realized by supporting of „Scientific and Technical Research Council of Turkey (T.B.T.A.K.) as Doctoral thesis (Project number: T.B.A.G.-94). Separately, some little known groups in the family have been discussed below, and various combinations applied to these.

Material were collected by the author during the years of 1972 and 1973. Some complementary records at the same region, were established in July 1974 and May 1976.

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Abbreviations:

av.	average
ca.	circa, approximate height or distance
fw.	forewing, from base to apex
hw.	hindwing
ws.	wing span, from apex to apex
ups.	upperside
uns.	underside
prov.	province
vic.	vicinity
E.	east
W.	west
N.	north
S.	south
SD.	standart deviation
SE.	standart error

Subfamily *Theclinae*

1) *Quercusia quercus longicauda* (RILEY)

Zephyrus quercus longicauda RILEY, 1921, Ann.Mag.Nat.Hist. vol. **8** p. 599

Zephyrus quercus longicauda PEILE, 1921, J.Bomb.Nat.His.Soc. **28**, p. 366, Pl., fig. 5–6

Type locality: Karind Gorge (NW Iran)

This subspecies is new for Turkish fauna. It is characterized by its larger size of wings, longer tails of hw. (2–4 mm) and more bright colouration than European and also N. and W. Anatolian individuals. I have not seen the types of *longicauda*, but the characters in RILEYs description are clear enough for identifying E Turkish populations. There is no doubt that specimens collected from Hakkari Prov. (SE Turkey) and Elaziğ Prov. (E Turkey) are subsp. *longicauda* RILEY, but those from Trabzon Prov. (NE Turkey), Amasya Prov. (N Turkey) and W Taurus mountains are strikingly different from *longicauda*. This species flies in June–August in a single brood and is frequently seen in oak forest from lowland to 1800 m in the mountains.

Specimens examined and measurements:

Hakkari Prov. (SE Turkey): Yüksekova ca. 1800 m, 28.VII.1973 1 ♂ (fw. 17 mm), vic. of Üzümcü ca. 1200 m, 31.VII.1973 2 ♀♀ (fw. 16 mm). Elaziğ Prov. (E Turkey): vic. of Hazar lake ca. 1250 m, 12.VII.1973 6 ♂♂ (fw. 14–17 mm, av. 16 mm), 11 ♀♀ (fw. 16–17 mm, av. 16,45 mm) leg. A. KOÇAK.

Genus *Nordmannia* TUTT, 1907

I doubt very much whether generic name of *Strymon* HÜBNER established on *melinus* HÜBNER can be applied to any western Palaearctic species. I have therefore tentatively used the name *Nordmannia* TUTT for this group. On the other hand, many authors had used the name *Strymonidia* TUTT for European species like *spini* SCHIFF. and *w-album* KNOCH, although it was established on the East Asiatic form *thalia* LEECH. Another generic name, *Klugia* TUTT, 1907 for European *spini* SCHIFF. afterwards was replaced by the name *Tuttiola* STRAND, 1910 as it was preoccupied. Similarly, *Chattendenia* TUTT, 1908, is also a nomen novum instead of *Edwardsia* TUTT, 1907, the latter was preoccupied. *Chattendenia* had been established upon an European species *w-album* KNOCH and is valid name (HEMMING 1967, p. 109). It is therefore used in this paper as a subgeneric name for *spini* SCHIFF. and *w-album* KNOCH. Thus *Tuttiola* STRAND, 1910 falls synonym of *Chattendenia* TUTT, 1908.

2) *Nordmannia* (s.str.) *armena* (REBEL)

Thecla myrtale armena REBEL, 1901 Ann. Hofmus. Wien., p. 165–166

Thecla acaciae armena GAEDE 1930 in SEITZ, suppl. I, p. 241, fig. 15c

Type locality: Kazikoparan (Kars Prov., NE Turkey)

Shortly description: Ups. dark brown, anal tail at hw. well developed (in female 1–2 mm, in male 1 mm); greyish scales scattered at dorsum of hw. in both sexes but in females, occur at submarginal area of anal angle as well; greyish marginal line more defined at anal part and better developed in female; ciliae dirty cream. Uns. of wings dirty blue; postdiscal striae somewhat similar to those of *abdominalis elta* HIGGINS, although ill-defined due to dense bluish cover; darker anal spot of uns. of hw. appears distinctly in one specimen from Kop Dağı pass (Gümüşhane Prov.); anal lobe of hw. orange, with black hairs externally; dark bluish scales restricted to smaller area, more or less developed; orange spot in space 3 smaller in size, with black dot in its outer side and a cap internally; creamy marginal line of wings distinct.

This species occurs generally in upper heights of woodlands or the subalpine zone between 1600–2100 m in E Turkey. It is not uncommon, and flies in July in a single brood.

Although *armena* originally described as a subspecies of *myrtale* (the latter only known from Lebanon), I propose this striking form as a good species due to its very distinct feature-bluish uns. of wings, among the other known species and its relatively restricted distribution; and so far any hybrid or intergradation that occurs in nature is known.

Specimens examined and measurements:

Kars Prov. (NE Turkey): Kazikoparan 2100 m, 25.VII.1973 1 ♂ (topotype) (fw. 14 mm), vic. Akçay ca. 1700 m, 23.VII.1973 1 ♂ (fw. 15 mm). 1 ♀ (fw. 15 mm).

Gümüşhane Prov. (NE Turkey): Kop dağı pass ca. 1800 m, 28.VII.1972 2 ♂♂ (fw. 14–15 mm). Tunceli Prov. (E Turkey): vic. Pülümür ca. 1700 m. 16.VII. 1973 1 ♂ (fw. 14 mm). Hakkari Prov. (SE Turkey): vic. Şemdinli ca. 1600 m. 30.VII.1973 1 ♀ (fw. 14 mm), 16.VII.1974 1 ♀ (fw. 15 mm) leg. A. KOÇAK.

Genus: *Callophrys* BILLBERG, 1820

Taxonomic problems of *Callophrys*-species in Turkey are not well clarified till now, so some forms need much material and confirmations both on their taxonomical and zoogeographical standpoints. According to some authors, the following species occur in Turkish territory: *rubi* LINNÉ, *chalybeitincta* SOV. (new record, see text), *mystaphia* MILL., *paulae* PFF., and *kolak* HIGG. With the exception of *rubi* and *chalybeitincta*, the rest of the forms mentioned above are originated from Asia. Another Asiatic form, *Callophrys suaveola* STGR., widespread in Central Asia, westwards Sultanabad (Central Iran) (STICHEL, 1910) and N-Iraq (HIGGINS, 1958), was recently taken from Hakkari Prov. (SE-Turkey). This new capture, to some extent, has clarified the status of some Asiatic forms in Turkey, viz., *paulae* PFF. and *kolag* HIGG. As a matter of fact, there was any diagnostic character at specific level between last mentioned forms. After taking some minor differences and striking similarities to E-Turkish *suaveola* into account, I was able to propose these forms as two distinct subspecies of *suaveola* STGR.

On the other hand *chalybeitincta* had been originally described by SOVINSKY as a subspecies of *Callophrys rubi* LINN., but in recent years, it was given as a distinct species by some authors. Recently, NEKRUTENKO (1973) suggested this form as a good geographic subspecies of *rubi*. In this paper *chalybeitincta*, which is firstly captured from NE-Turkey, has been accepted as a subspecies of *rubi*.

Another problem belongs to *herculeana* PFF., which is originally described as a subspecies of *rubi*. It is easily distinguishable from *rubi* by its larger size. But yet some confirmations are still needed for the specific or subspecific distinctness of *herculeana* PFF.

It might be well to conclude the complexity in the genus *Callophrys* by summarizing the forms occuring in Turkey as follows.

1. *rubi* LINNÉ:	a) subsp. near to nominate form occuring in N-Turkey b) subsp. *herculeana* PFF. Taurus mountains c) subsp. *chalybeitincta* SOV., NE-Turkey
2. *suaveola* STGR.:	a) subsp. *suaveola* STGR. SE-Turkey b) subsp. *paulae* PFF. (n.comb.) S-Turkey c) subsp. *kolak* HIGG. (n.comb.) NE-Turkey
3. *mystaphia* MILL.:	only nominate subspecies known in E-Turkey.

After taking this new arrangement into consideration, the following key for Turkish *Callophrys*-species may be suggested:

1 (2). Anal lobe of hw. well developed *rubi*
2 (1). Anal lobe of hw. highly reduced or absent.
3 (4). Ups. of wings dark smoky brown; uns. of wings, white postdiscal spots developed; small-sized butterflies (fw. less than 11 mm) *mystaphia*
4 (3). Ups. of wings greyish-brown (lighter in tone than *mystaphia*); uns. of wings, white postdiscal spots rudimentar or absent; larger in size (fw. more than 12 mm) *suaveola*

3) *Callophrys rubi chalybeitincta* SOVINSKY

1905. Rev. Russ. d'Ent. **5**, p. 109

Type localities: „Daghestan: pr. Berikei, Dervent; Transcaucasus: Elisabethpol".

Shortly description: Ups. of wings dark bluish-brown; ♂ with dark brown sex-brand at cell end of fw.; hw. undulate at termen and with well developed anal lobe as nominate *rubi*; ciliae brownish at inner- and whitish or greyish at outer part. Uns. of wings dark green as in *rubi*, white postdiscal spots absent at fw., reduced at hw. but present; labial palpi covered with white-black scales, frons with black hair tuft, rarely dark green scales.

It flies in the openings of woodlands of middle heights in May–July, possibly in double brood.

Specimens examined and measurements:

Kars Prov. (NE-Turkey): vic. of Posof 1450 m, 20.V.1973 2 ♂♂ (fw. 13–14 mm, av. 13,50 mm), 25.VII.1973 1 ♀ (fw. 14 mm).

4) *Callophrys suaveola suaveloa* STAUDINGER

1881. Stett.Ent.Z. **42**, p. 279

Type locality: Saisan (Central Asia)

This species is new for Turkish fauna. Specimens collected from Hakkari Prov., have been regarded as nominate form due to their characters agree almost entirely with STAUDINGERs description.

Specimens examined and measurements:

Hakkari Prov. (SE-Turkey): on the highway 44 km away NE of Hakkari ca. 1650 m, 14.–17.V.1976 5 ♂♂ (fw. 17–17,5 mm, av. 17,10 mm), 1 ♀ (fw. 14 mm).

Other geographic subspecies of *suaveola*, existing in Turkey, are as follows:

a) subsp. *paulae* (PFEIFFER) (n.comb.)

Callophrys paulae PFEIFFER, 1932 Mitt.Münch.Ent.Ges. **22**. p. 30–31, Taf. III, fig. 13

Type locality: „Achyr Dagh in 1800–2000 m" (= Ahir Dağı, N. Maraş, S-Turkey)

Butterflies fly in May–June, and frequently visit the purple blooms of massive-type *Astragalus* sp., which are very common at alpine zone.

Specimens examined and measurements:

5 ♂♂, 1 ♀ (topotypes) collected from type locality.
♂♂ (fw. 14–16 mm, av. 14,80 mm), ♀ (fw. 15 mm)

b) subsp. *kolak* (HIGGINS) (n.comb.)

Callophrys kolak HIGGINS, 1965 Entomologist **98**, p. 10

Type locality: Maden (Gümüşhane Prov., NE-Turkey)

This form slightly smaller in size than *paulae*. Habitat and phenology as in *paulae*.

Specimens examined and measurements:

3 ♂♂ (topotypes) (fw. 13,5–14 mm, av. 13,83 mm)

Subfamily: *Lycaeninae*

Genus: *Tomares* HÜBNER, 1840

5) *Tomares romanovi romanovi* (CHRISTOPH)

Thestor romanovi CHRISTOPH, 1888 Hor.Soc.Ent.Ross. **17**, p. 106–109

Type locality: Ordubad (Transcaucasus)

This nominate subspecies is new for Turkey.

Specimen examined and measurement:

Ağri Prov. (NE-Turkey): 5 km S of Hamur, ca. 1600 m, 18.V.1973 1 ♂ (fw. 12 mm)

Genus: *Heodes* DALMAN, 1816

6) *Heodes virgaureae caucasica* (JACHONTOV)

Chrysophanus virgaureae caucasica JACHONTOV, 1908 Rev.Russ.d'Ent. vol. **8** (3/4), p. 291

Type locality: Beschtai (N-Caucasus).

This subspecies is new for Turkish fauna. It is distinguishable from *armeniaca* B.H. by the following characters:

♂ Ups. of fw. blackish marginal band well developed, broader at apical area (2,5–3 mm, in width); uns. of wings ground colouration tinged with greenish except basal and central area of fw., but in some specimens purplish tone in postdiscal area of hw. more or less developed.

♀ Ups. of wings, ground colour more darker tone than *armeniaca*; uns. of hw. white postdiscal spots much better developed than those of *armeniaca*; reddish antemarginal line distinct only at anal angle of hw.

This subspecies of *virgaureae* inhabits in damp forest in NE-Turkey.

Specimens examined and measurements:

Rize Prov. (NE-Turkey): vic. Sivrikaya (northern slopes of Tatos mountains) ca. 1700 m, 1.VIII.1972 3 ♂♂ (fw. 15–17 mm, av. 16 mm), 1 ♀ (fw. 15 mm). Kars Prov. (NE-Turkey): vic. of Sarikamiş ca. 2000 m, 20.VII.1973 1 ♂ (fw. 17 mm), 6.VIII.1972 1 ♂ (fw. 16 mm).

Subfamily: *Plebejinae*

7) *Pseudophilotes bavius* **vanicola** subsp.n. (figs. 1–4)

Holotype (♂): fw. 16 mm, ws. 31 mm

Ups. of wings: Ground colour blackish brown, sparsely covered with bluish scales except marginal area (ca. 3 mm in width); discoidal line distinct on both wings; blackish submarginal dots obscured, orange lunules reduced, they exist only in anal angle of hw; ciliae at inner part chequered with black and white, at outer part white.

Uns. of wings: Ground colour of fw. creamy rather suffused with grey, of hw. dark cream, tinged basally greenish; usual black spots well developed; dull orange submarginal lunules separately developed.

Allotype (♀): fw. 15,5 mm, ws. 30 mm

Ups. of wings: Ground colour dark brown, few bluish scales confined at base of wings; discoidal line of wings indistinct; orange submarginal lunules of hw. much better developed than those of male (in spaces 1a–5); ciliae blackish at inner part, slightly chequered, white at outer part.

Uns. of wings: Fw. less suffused with grey, and orange submarginal lunules more bright than in male, other characters similar to holotype.

Paratypes:

10 ♂♂ (fw. 11–18 mm, av. 14,4 mm (SD) $\pm$ 2,01 (SE) $\pm$ 0,63) (ws. 20–33 mm, av. 27 mm (SD) $\pm$ 3,59 (SE) $\pm$ 1,13).

Ups. of wings: Bluish scales generally infrequent; dull orange submarginal lunules more or less developed, in some specimens completely absent. Uns. of wings: Colouration generally pale, orange submarginal lunules in some specimens brighter than others, otherwise similar to holotype.

1 ♀ (fw. 13 mm, ws. 26 mm), wing characters similar to allotype. 2 ♂♂ (excluded from type series due to their right wings destroyed) (fw. 15 mm, each). Wing characters similar to holotype.

This new subspecies is probably the eastern tip of a long clinal variation existing in Taurus mountain range (S-Turkey). It is easily distinguishable from other

described subspecies of *bavius*, by the bluish scales of ups. of wings instead of purplish as in *onalpae* KOÇAK and its thinned structure, contrary to those of *onalpae* and *eitschbergeri* KOÇAK; presence of discal line of fw.; reduced or absence of orange submarginal lunules of ups. of hw. (especially in male); the ground colouration of uns. of wings, pale orange submarginal lunules of hw. instead of bright reddish-orange ones as in *eitschbergeri* and *onalpae*; finally its interruptedly developed submarginal lunules of uns. of hw. on the contrary to *onalpae* and *eitschbergeri.*

Type-series:

♂ (Holotype): Van Prov. (E-Turkey), vic. of Çatak ca. 2000 m, 28.VI.1972; ♀ (Allotype) from same locality and date; 10 ♂♂, 1 ♀ (Paratypes) from same locality and date. leg. A. KOÇAK

2 ♂♂ (worn, excluded from type-series) from same locality and date. 1 ♂ from Hakkari Prov. (SE-Turkey), vic. of Yüksekova 1900 m, 3.VII.1972, and 1 ♂ from same prov., vic. of Bağişli ca. 1750 m. 30.VI.1972 are similar to *vanicola* subsp.n. (all the Type specimens are preserved in Department of Systematic Zoology, University of Ankara).

8) *Aricia* (s.str.) *artaxerxes* (FABRICIUS)

This species is new for Turkish fauna. In the present paper, any subspecific name has been applied to this species, due to a single specimen was taken from NE-Turkey. As a matter of fact, there are in my collection some different series of *artaxerxes* recently collected from vic. of Abant lake, Ilgaz mountains and Murat mountains (all these localities situated in N and W-Turkey), approaching to *macedonica* VRTY. In order to clarify the subspecific categories of Turkish *artaxerxes*, much more material is needed.

Specimen examined and measurement:

Kars Prov. (NE-Turkey): vic. of Posof ca. 1450 m, 22.VII.1973 1 ♂ (fw. 15 mm).

9) *Aricia (Eumedonia) eumedon modestus* (NEKRUTENKO)

Eumedonia eumedon modestus NEKRUTENKO, 1972, J.Lep.Soc. **26** (4), p. 215–218, figs.

Type locality: SW-Caucasus Abkhasian SSR, Awadhara, 1800–2000 m.

Specimens, which collected from the vic. of Posof and highland of Kutul (NE-Turkey), have been included to this subspecies, due to the reduced or absence of submarginal lunules of uns. fw., although their wing size slightly larger than *modestus.*

This species inhabits in the opening of damp woodlands of subalpine and also in the alpine meadows up to 2500 m height from sealevel.

Specimens examined and measurements:

Kars Prov. (NE-Turkey): vic. Posof ca. 1450 m, 22.VII.1973 3 ♂♂ (fw. 15–16

mm, av. 15,66 mm). Artvin Prov. (NE-Turkey): Kutul (on the highway of Ardanuç-Ardahan), ca. 2450 m, 2.VIII.1972 3 ♂♂ (fw. 14–15 mm, av. 14,66 mm), 1 ♀ (fw. 15 mm).

10) *Aricia (Eumedonia) eumedon osiris* (BANG–HAAS) (n.comb.)

Lycaena osiris BANG–HAAS, 1927 Horae Macrolep. **1**, p. 52, T. 7, f. 26-27

Polyommatus (Eumedonia) eumedon osiris FORSTER, 1938 Mitt.Münch.Ent. Ges. 28, p. 113

Polyommatus (Eumedonia) osiris KORSHUNOV, 1972 Rev.Russ. d'Ent. **51**, p. 364

Type locality: „Dorf Tshangla, Kagymann (=Kağizman) mont." (in Kars Prov., NE-Turkey).

From alpine zone of Kağizman mountains (NE-Turkey), a small series of *osiris* which may be referable as topotypes, have been collected.

This form is suggested as a good geographic subspecies due to its constant external characters and similarity of male genitalia with other *eumedon* populations in Turkey. A short description has been given below.

♂. Ups. of wings: Dark brown, as dark as in *modestus* and other N- Turkish *eumedon* populations; discoidal spot of fw. hardly recognizable; in one specimen, submarginal orange lunules restricted at anal angle of hw., otherwise unmarked; ciliae at basal part dark brown, at outer part pure white.

Uns. of wings: Ground colour greyish but generally tinged with reddish-brown tone; usual black postdiscal and discal spots regularly developed, slightly larger in size than those of *modestus*, all of them white ringed; white streak of hw. well developed, generally broader than that of *modestus*; orange submarginal lunules on hw. well developed, complete, each triangular in shape on fw. reduced but better developed than in *modestus*, their traces distinct, almost complete; bluish scales well developed but more restricted at basal area than in *modestus.*

♀. Ups. of wings: Orange lunules generally well developed at anal angles of hw. and fw.; discoidal spots of fw. more conspicuous than in male; otherwise similar to male.

Uns. of wings: Ground colour more reddish-brown in tone; orange submarginal lunules well developed, and almost complete or reduced on fw.; other characters similar to male.

Specimens examined and measurements:

Kars Prov. (NE-Turkey): Kağizman mountains, on the road of Cumaçay-Akçay, ca. 2400–2500 m, 24.VII.1973 7 ♂♂ (fw. 13,5–15 mm, av. 14,5 mm) 3 ♀♀ (fw. 14–15 mm, av. 14,33 mm).

11) *Plebejus (Kretania) eurypilus iranica* (FORSTER)

Lycaena (Plebejus) eurypilus iranica FORSTER, 1938 Ent.Rundsch. **55**, p. 216, Taf. I, figs. 5a, 6a

Type locality: „Elburs m.sept., Tacht i Suleiman, Vandarban Tal 1900–2200 m".

This subspecies which is new for Turkish fauna is easily recognizable from others by valva-character of male genitalia, larger size of wings and reduced orange lunules of hw. It inhabits in the mountainous areas, on stony slopes where its foodplant, *Astragalus* sp. grow; it flies in June–July, in a single brood.

Specimens examined and measurements:

Hakkari Prov. (SE-Turkey): vic. of Şemdinli ca. 1600 m, 3.VII.1972 7 ♂♂ (fw. 14–17 mm, av. 15,7 mm): Yüksekova ca. 1800 m, 2.VII.1972 5 ♂♂ (fw. 15–17 mm, av. 15,60 mm); Hakkari ca. 1700 m, 2.VII.1972 1 ♀ (fw. 15 mm); Uludere ca. 1800 m, 14.VII.1974, 1 ♂ (fw. 17 mm).

12) *Polyommatus eroides* **yildizae** subsp.n. (figs. 5–8)

Holotype (♂): fw. 17 mm, ws. 31 mm.

Ups. of wings: Ground colour bright greenish-blue as in *myrrhina* STGR., but more bluish in tone, approaching to alpine *eros* OCHS., blackish marginal band broad on both wings as in *eroides* FRIV., blackish dots of hw. conspicuous; discoidal line of fw. absent; ciliae blackish at base, white at outer part.

Uns. of wings: General appearance similar to nominate subspecies, ground colour light greyish-brown, slightly more brownish in tone than *eroides*; black spots normally developed, white ringed; whitish discoidal mark of hw. better defined; orange submarginal lunules well developed on both wings; bluish scales reduced at basal area.

Allotype (♀): fw. 15 mm, ws. 28 mm

Ups. of wings: Ground colour dark brown, few bluish scales restricted at base; discoidal line of fw. distinct, orange submarginal lunules well developed on both wings.

Uns. of wings: Similar to holotype, ground colour more brownish in tone than holotype; colouration much vivid and spots more conspicuous than holotype.

Paratypes: 29 ♂♂ (fw. 14–16 mm, av. 15,24 mm. (SD) $\pm$ 0,68, (SE) $\pm$ 0,12; ws. 26–31 mm, av. 28,68 (SD) $\pm$ 1,41 (SE) $\pm$ 0,26).

Ups. of wings: In some specimens discoidal line hardly recognizable (37%), blackish marginal band no less than 1 mm in width.

Uns. of wings: Similar to holotype

4 ♀♀ (fw. 13–15 mm, av. 14 (SD) $\pm$ 0,81, (SE) $\pm$ 0,40; ws. 26–29 mm, av. 27,25 (SD) $\pm$ 1,25, (SE) $\pm$ 0,62).

Ups. of wings: Submarginal lunules more or less developed.

Uns. of wings: Similar to allotype.

This new subspecies is easily distinguishable by its greenishblue ground colouration, broad marginal band, generally reduced or absence of discoidal line of ups. fw. of male, and brighter colouration of uns. of female.

I dedicate this beautiful subspecies of *eroides* to my wife to whom I am very much indebted for her support and encouragement.

Type-series: Holotype (♂). Gümüşhane Prov. (NE-Turkey): Kop dağı pass ca. 2500 m, 19.VII.1973; Allotype (♀) from same locality and date; Paratypes: 23 ♂♂, 4 ♀♀ 28.VII.1972 same locality, ca. 2400–2600 m, 6 ♂♂ 19.VII.1973 same locality, ca. 2400–2600 m, leg. A. KOÇAK.

(All the types are preserved in the Department of Systematic Zoology, University of Ankara).

13) *Meleageria daphnis brandti* (PFEIFFER)

Lycaena meleager brandti PFEIFFER, 1938 Mitt.Münch.Ent.Ges. **28**, p. 191–192, Taf. IV, Nr. 9, 10

Type locality: „Elburs mts.c., Keredj Tal, Nissa 2000–2700 m"

This subspecies is new for Turkish fauna. It is characterized by milky-blue with slightly tinged light greenish colouration of ups., and light brown ground colour of uns. hw. of males, lighter brown colour and smaller ocelli of uns. of females.

Western and Northern parts of Hakkari (SE-Turkey) are most probably interbreeding zone of *brandti* PFF., and *ignorata* STGR. the latter flies in S-Turkey, especially in vic. of Van lake (E-Turkey). The population of Yüksekova is easily referable to *brandti* PFF., although a single male in the series shows intermediate character of *brandti* x *ignorata*. One male from Üzümcü and one male from Uludere (both in W. Hakkari) seem nearer to *ignorata* than *brandti*.

Specimens examined and measurements:

Kars Prov. (NE-Turkey): Ağri dağı ca. 1700 m, 7.VIII.1972 1 ♂ (fw. 17 mm), 2400 m, 26.VII.1973 1 ♂ (fw. 16 mm). Hakkari Prov. (SE-Turkey): vic. Yüksekova ca. 1800 m, 29.VII.1973 7 ♂♂ (fw. 15–17 mm, av. 16 mm), 2 ♀♀ (fw. 15 mm), 20 km W of Yüksekova 1800 m, 16.VII.1974 1 ♀ (fw. 14 mm).

New generic combination in the genus *Agrodiaetus* HÜBNER

After an examination of male genitalia, it has been revealed that all species in this genus, have more or less marked by bulbous swelling at the upper end of their aedoeagus. This feature had been previously pointed out by HEMMING (1929) as diagnostic character of the genus *Lysandra* HEMM. I am impressed that this character has no longer useful for distinguishing *Lysandra* from its allies, and this allows me to propose a new generic adjustment in this group.

After taking that character of aedoeagus into account, apart from *Lysandra* HEMM. and *Plebicula* HIGG., I was able to establish two new subgenera which

closely related to *Lysandra* HEMM. and propose all these taxa as subgenera of the oldest one, that is to say *Agrodiaetus* HÜBNER

Key to the subgenera of *Agrodiaetus*

1 (2). Underside of hw. with well developed or rudimentar whitish or yellowish longitudinal streak; uns. of fw. without black spot in cell and base of (1b); ciliae without chequered. *Agrodiaetus* (s.str.)

2 (1). Uns. of hw. without such a longitudinal streak

3 (8). Ciliae without chequered

4 (7). Uns. of fw. without black spot in cell and base of (1b)

5 (6). Uns. of wings submarginal markings generally well developed; basal black spots present at hw. *Plebicula* HIGG.

6 (5). Uns. of wings submarginal markings absent, rudimentar, or few traces of lunules appear in a different shape at anal angle of hw. (especially in female); uns. of hw. without basal spots **Neolysandra** subgen.n.

7 (4) Uns. of fw. with a black spots in cell and base of (1b) **Sublysandra** subgen.n.

8 (3). Ciliae chequered with darker hairs *Lysandra* HEMM.

Neolysandra subgen. n.

Type-species: *Lycaena diana* MILLER, 1912 (fig. 9)

Ups. of wings purplish-blue in male, brown in female. Uns. of wings, basal and partly submarginal spots absent, fw. cell and base of space (1b) without black spots, ciliae without chequered.

Male genitalia (Fig. 21) is characterized by larger and broader unci and slender subunci.

This new subgenus also includes *coelestina* EVERSMANN, *ellisoni* PFEIFFER and *corona* VERITY; (*pontica* COURVOISIER had been accepted as a subspecies of *coelestina* EV. (BERNARDI, 1962)).

Sublysandra subgen. n.

Type-species: *Polyommatus candalus* H.-Sch., 1851 (fig. 10)

Ups. of wings purplish blue in male, brown in female. Uns. of wings, basal, post-discal and submarginal spots well developed; in fw. cell and base of space (1b) with well marked black spots; ciliae without chequered.

Male genitalia (fig. 22): Lobes of unci and subunci stouter, the former almost triangular in shape.

Apart from *candalus* H.Sch., the following species are included to this new subgenus; *anatolica* KOÇAK, *isauricoides* GRAVES and *myrrha* H.Sch.; (*myrrhina* STAUDINGER and *aedon* CHRISTOPH are attributed here as subspecies of *myrrha* H. SCH.).

14) *Agrodiaetus (Sublysandra) candalus* **hakkariensis** subsp.n. (figs. 11–12)

Holotype (♂). fw. 15 mm, ws. 27 mm

Ups. of wings: Ground colour light purplish-blue, somewhat similar to that of second brood of *A. anteros anteros*, only less shiny and slightly more purplish in tone. Marginal band and outer parts of veins greyish-brown, the former broader in fw. than in hw.; ante-marginal spots of hw. hardly visible; discoidal spot of fw. indistinct.

Uns. of wings: Ground colour light sandy brown, blue scales restricted between base and basal spots of hw.; postdiscal spots small, dark brown and poorly ringed with whitish, better developed on fw. than hw.; discoidal spots dark brown, well marked on fw., light brown on hw.; submarginal markings fainted, there is no trace of yellowish-orange scales at inner end of submarginal lunules of fw., although on hw. very slightly conspicuous; whitish dash between 4th and 5th postdiscal spots of hw. indistinct; ciliae creamy in colour.

Allotype is unknown.

This new subspecies is easily recognizable from nominate form and subsp. *zuleikae* PFF. by the characters of ups. colouration (in *zuleikae* and nominate form darker purplish blue as in *P. amanda*), reduced markings of uns. (in others well developed), and creamy ciliae (in others white in colour).

Holotype (♂) from vic. Üzümcü ca. 1300 m (Hakkari Prov., SE-Turkey), 31.VII. 1973 leg. A. KOÇAK.

(Type is preserved in the collection of Systematic Zoology Department, University of Ankara).

15) *Agrodiaetus (Plebicula) amanda gina* (HIGGINS)

Polyommatus amandus gina HIGGINS, 1958 Entomologist **91**, p. 43

Type locality: Sersang (N.Iraq)

This subspecies is new for Turkish fauna. Specimens collected from Hakkari Prov. (SE-Turkey), vic. Şemdinli, Esendere, Yüksekova and Bağişli carry typical characters of *gina*, but northwards, in the region of Van lake, these change into a different population which characterized by its smaller wing size, darker ground colouration and better developed orange submarginal lunules of uns., approaching to the subspecies *orientalis* STAUDINGER. I am of the opinion that the area

between Van and Hakkari Provinces is intergradation zone of these two subspecies.

Specimens examined and measurements:

Hakkari Prov. (SE-Turkey): Bağişli ca. 1750 m, 30.VI.1972 1 ♂ (fw. 15 mm) 1 ♀ (fw. 17 mm); vic. of Yüksekova 1900 m, 3.VII.1972 3 ♂♂ (fw. 17 mm), 1 ♀ (fw. 17 mm); Esendere ca. 1600 m, 3.VII.1972 5 ♂♂ (fw. 17–20 mm, av. 18,2 mm), 1 ♀ (fw. 18 mm); Şemdinli ca. 1600 m, 3.VII.1972 7 ♂♂ (fw. 17–19 mm, av. 18 mm).

16) *Agrodiaetus* (s.str.) **turcicus** sp.n. (figs. 13–16, 23)

Holotype (♂): fw. 14 mm, ws. 28 mm

Ups. of wings: Ground colour dark violet-blue as in *Plebejus argus*, veins black in colour, especially in outer parts well marked; black discoidal spot of fw. conspicuous; marginal blackish band broad (on fw. ca. 2 mm in width), more or less developed; ciliae blackish at base, white at outer part.

Uns. of wings: Ground colour light brownish grey; black discoidal spot of fw. well developed, postdiscal spots black, small in size, white ringed, and that of in space (2) replaced in a line with discoidal and twin spot in space (1b); submarginal area paler, markings highly reduced; discoidal spot of hw. brown in colour, poorly developed; postdiscal spots black, whitish ringed, much smaller in size than those of fw., but complete; whitish streak well developed; submarginal markings conspicuous, light brownish grey in colour; basal area of hw. covered with bluish scales; ciliae white.

Allotype (♀): fw. 13 mm, ws. 24 mm

Ups. of wings: Ground colour brown; on fw. discoidal spot distinct, dark brown in colour; bluish scales infrequently developed only at base of wings; ciliae blackish at base, white at outer part.

Uns. of wings: Ground colour light brownish grey, but more brownish in tone than in male; post discal and discoidal spots as in male; submarginal markings better developed than those of male; basal area of hw. covered with bluish-green scales; ciliae white.

Paratypes: 3 ♂♂: fw. 14–15 mm, av. 14,66 mm, ws. 26–28 mm, av. 27,33 mm in one specimen, submarginal markings of uns. more conspicuous; otherwise similar to holotype.
2 ♀♀: fw. 13–14 mm, av. 13,5 mm, ws. 24 mm

Yellowish traces of submarginal lunules of ups. hw. conspicuous; uns. of wings, postdiscal spots larger than allotype; ground colour varies from light brownish grey to light brown.

Type-series: Holotype (♂), Allotype (♀) and Paratypes (3 ♂♂, 2 ♀♀) were collected by the author from grassy and stony places at the top of hills which situated

on the roadside of Kağizman-Cumaçay (Kars Prov., in NE-Turkey), ca. 2500 m, 23.VII.1973.

Other co-habitants at that locality are *Colias chlorocoma* CHR., *Colias aurorina* H. SCH., and *Eumedonia eumedon osiris* B.H.

Male genitalia (fig. 23) of this new species is nearer to *Agrodiaetus* (s.str.) *carmon carmon* H. SCH., but external characters show great differences from it. It is easily distinguishable from *carmon* by its smaller size, more purplish and darker tone of ups. of males, size and arrangements of postdiscal spots and fainted submarginal area of uns. of both sexes.

17) *Agrodiaetus* (s.str.) *transcaspica* **turcicola** subsp. n. (figs. 17–20)

Holotype (♂): fw. 16 mm, ws. 29 mm

Ups. of wings: Ground colour light blue as in *ninae* FORSTER; costal area of hw. blackish, costal edge of fw. white; blackish marginal line very fine, blackish suffusion hardly visible on both wings; discoidal line of fw. almost indistinct; ciliae white at outer, brownish at inner part.

Uns. of wings: Ground colour light greyish-brown, but brownish tone slightly better developed than in *ninae*; discoidal and postdiscal spots of fw. medium-sized, black in colour, white ringed; submarginal lunules of fw. more brownish in tone than ground colour, but weakly developed; marginal line fine, light brown on both wings; brownish discoidal line of hw. almost invisible; postdiscal spots generally highly reduced in size, and wanting; submarginal lunules light brownish in tone and complete; creamy streak well developed; greenish scales restricted at base of wings.

Allotype (♀): fw. 14 mm, ws. 28 mm

Ups. of wings: Ground colour dark brown; on fw. dark brownish discoidal line distinct; veins slightly darker in tone than ground colour; yellowish orange submarginal lunules confined at anal area of hw.; base of wings and partly thorax with a few scattered greenish scales; ciliae whitish at outer, brown at inner part.

Uns. of wings: Ground colour almost uniformly pale brown; on fw. discoidal and postdiscal spots black, medium-sized and white ringed; submarginal lunules brown, more or less developed with the exception of apical area; on hw. discoidal and postdiscal spots highly reduced in size as in holotype, but complete; submarginal lunules almost complete, but weakly developed; creamy streak well developed; greenish scales confined at base.

Paratypes: 14 ♂♂: fw. 14–16 mm, av. 15,35 mm (SD) $\pm$ 0,74, (SE) $\pm$ 0,19; ws. 28–32 mm, av. 28,92 mm (SD) $\pm$ 1,12, (SE) $\pm$ 0,29,

Ups. of wings: Blackish marginal suffusion poorly developed, variable in width (up to 3 mm); veins at outer part more or less covered with black scales.

Uns. of wings: In some specimens, discoidal and postdiscal spots of fw. slightly smaller in size, and in the latter, twin spot wanting; postdiscal spots of hw. al-

ways very small in size, generally complete in number, only in one specimen almost invisible. Other characters of paratypes similar to those of holotype.

2 ♀♀: fw. 15–16 mm, av. 15,5 mm, ws. 28–29 mm, av. 28,5 mm

Ups. of wings: Similar to allotype.

Uns. of wings: In one specimen on fw. orange submarginal markings better developed; on hw. at inner parts of submarginal lunules, creamy arrow-head shaped markings slightly better developed than others; postdiscal spots of hw. small, but well marked. Other characters are not remarkably different from those of allotype.

Type-series: 16 ♂♂, 3 ♀♀ (including Holo-, Allo- and Paratypes) collected by the author from vic. of Van (Van Prov. E-Turkey) ca. 1800 m, 18.VII.1974 (all the types are preserved in the Department of Systematic Zoology, University of Ankara).

This new subspecies had been previously noticed by Dr. W. FORSTER (1956, Z.Wien.Ent.Ges. 41, p. 74, Taf. 10 u. 11, f. 1,2) from vic. of Van. It is easily distinguishable from *ninae* FORSTER which is locally found in Kars Prov., within Turkish territory, by its smaller size of wings (in 5 ♂♂ of *ninae*, det. W. FORSTER, from vic. of Akçay ca. 1700 m in Kars Prov.: fw. 15,5–17 mm, av. 16,6 mm (SD) ± 0,65, (SE) ± 0,29, ws. 29–32 mm, av. 30,4 mm (SD) ± 1,14, (SE) ± 0,51, more brownish tone of uns. of males, more reduced postdiscal spots of hw. of both sexes, and reduced submarginal lunules of uns. of females.

Apart from the type-series, one male from Güzelsu (=Hoşap) and three males from Çuh pass ca. 2300–2500 m (both localities are situated in SE Van, on the highway of Van-Hakkari) seem to be somewhat conspecific with *turcicola* subsp.n., but uns. of wings of one specimen from Çuh pass is more darker brownish, spots of fw. smaller, moreover, greenish basal scales of hw. better developed.

It doubtless indicates that further exploration in these regions should produce good results.

18) *Agrodiaetus* (s.str.) *demavendi eriwanensis* (FORSTER)

Agrodiaetus ripartii eriwanensis FORSTER, 1960 Ent.Zeitschr. **70**, p. 19–20

Agrodiaetus demavendi eriwanensis, de LESSE 1961 Rev.Franç.d'Ent. **28** (2), p. 95–96, 100

Type locality: Eriwan (Transcaucasus)

This subspecies is new for Turkish fauna. It is characterized by its larger wing-size, well-marked of postdiscal spots and more conspicuously developed submarginal lunules (especially on hw.) of uns. of wings.

Specimens examined and measurements:

Kars Prov. (NE-Turkey): Ağri dağı (=Ararat) 7.VIII.1972 1 ♂ (fw. 16 mm), Karakurt ca. 1600 m, 23.VI.1972 1 ♂ (fw. 16 mm), 20.VII.1973 2 ♂♂ (fw. 15–16 mm), vic. of Akçay ca. 1700 m, 23.VII.1973 1 ♂ (fw. 15 mm), Sarikamiş ca.

Explanations of the figures:

Fig. 1–4: *Pseudophilotes bavius vanicola* subsp. n. Fig. 1 Holotype (male) Ups., fig. 2 ibid. Uns., fig. 3 Allotype (female) Ups., fig. 4 ibid. Uns.

Fig. 5–8: *Polyommatus eroides* yildizae subsp. n. Fig. 5 Holotype (male) Ups., fig. 6 ibid. Uns., fig. 7 Allotype (female) Ups., fig. 8 ibid. Uns.

Fig. 9: *Agrodiaetus (Neolysandra) diana* MILLER. Male Uns. from vic. Kağizman (Kars Prov., in NE-Turkey).

Fig. 10: *Agrodiaetus (Sublysandra) candalus* H.Sch. Male Uns. from Amasya (N-Turkey).

Fig. 11–12: *Agrodiaetus (Sublysandra) candalus hakkariensis* (subsp. n.) Fig. 11 Holotype (male) Ups., fig. 12 ibid. Uns.

Fig. 13–16: *Agrodiaetus (s.str.) turcicus* sp.n. fig. 13 Holotype (male) Ups., fig. 14 ibid Uns., fig. 15 Allotype (female) Ups., fig. 16 ibid. Uns.

Fig. 17–20: *Agrodiaetus* (s.str.) *transcaspica turcicola* subsp. n. fig. 17 Holotype (male) Ups., fig. 18 ibid. Uns., fig. 19 Allotype (female) Ups., fig. 20 ibid. Uns.

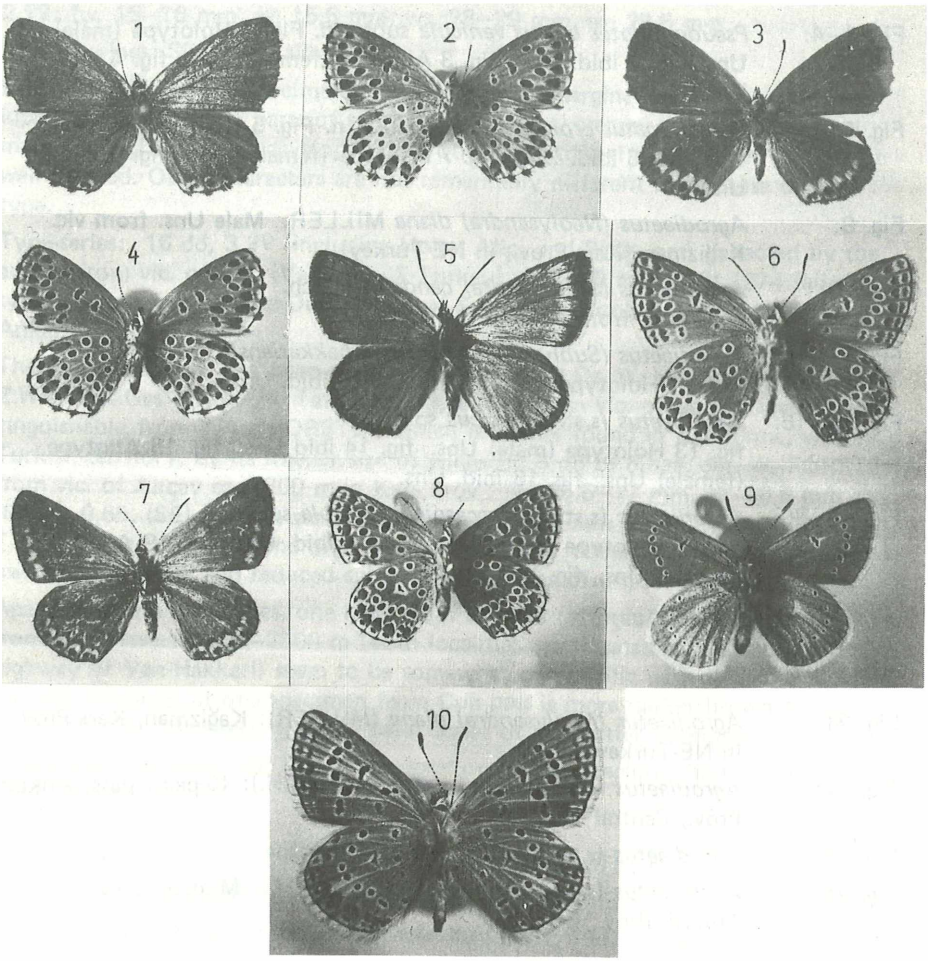
Male genitalia:

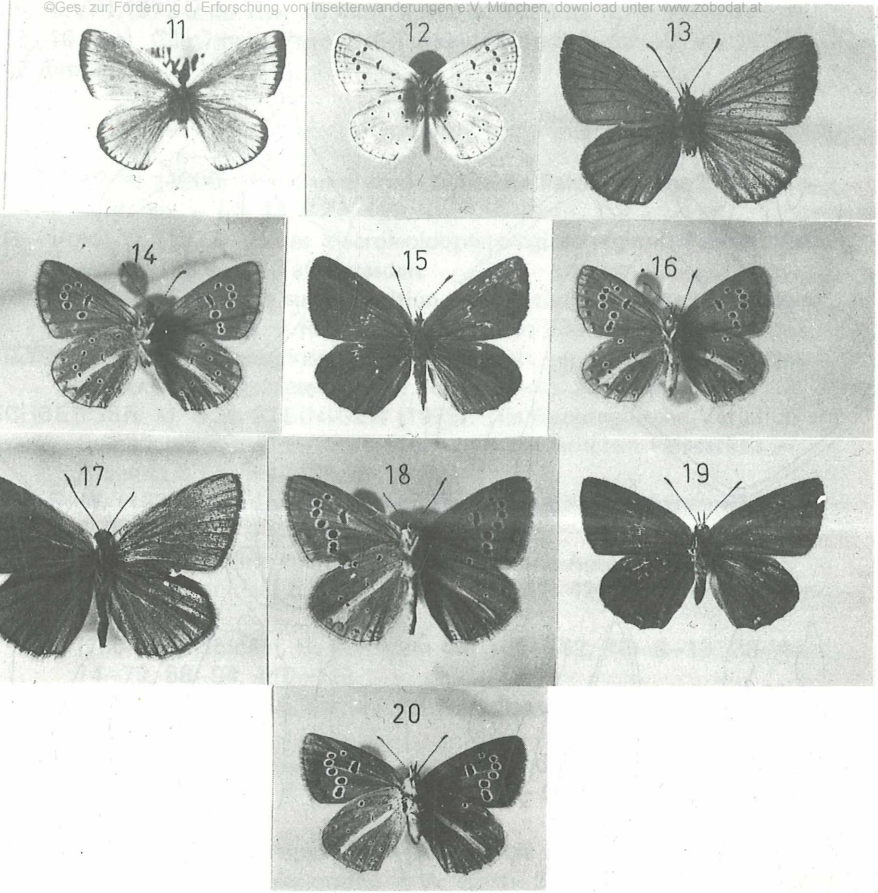
Fig. 21: *Agrodiaetus (Neolysandra) diana* (MILLER): Kağizman, Kars Prov., in NE-Turkey.

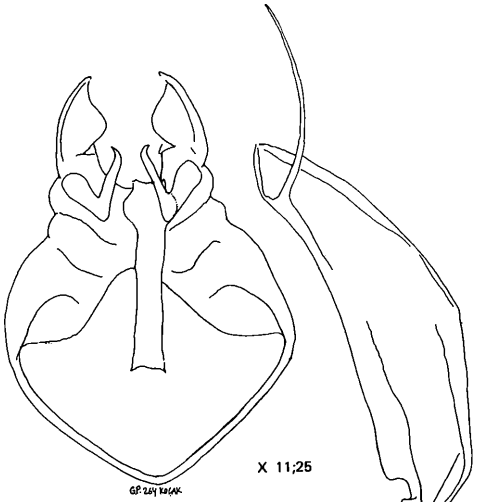
Fig. 22: *Agrodiaetus (Sublysandra) candalus* (H.SCH.): Kepekli pass, Ankara Prov., Central Turkey.

Fig. 23: *Agrodiaetus* (s.str.) *turcicus* sp.n.: Holotype.

Fig. 24: *Agrodiaetus* (s.str.) *carmon carmon* H.SCH.): Munzur valley, Tunceli Prov., E-Turkey.







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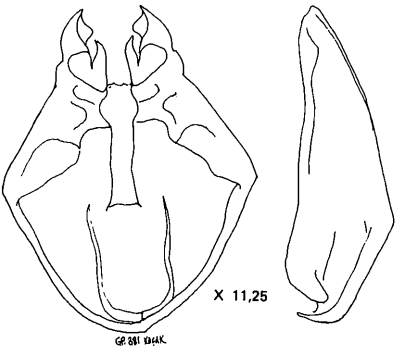

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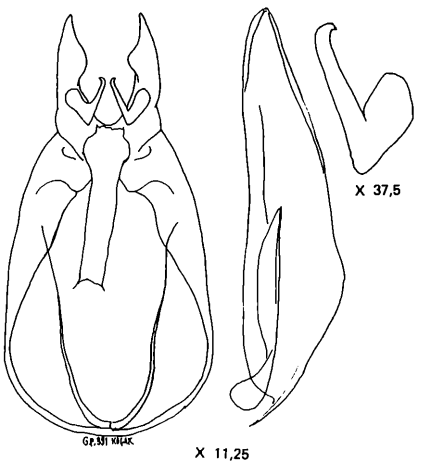

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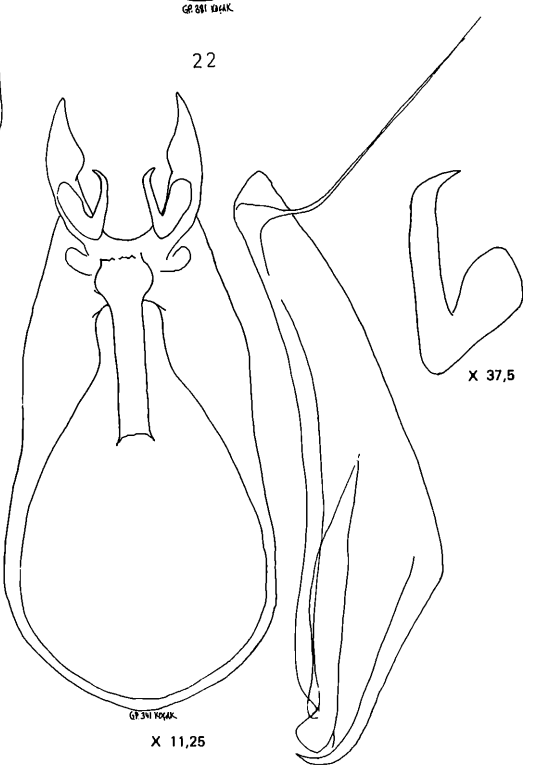

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2000 m, 6.VIII.1972 2 ♂♂ (fw. 15 mm), Ardahan 2000 m, 3.–4.VIII.1972 2 ♂♂ (fw. 15–16 mm), Gümüşhane Prov. (NE-Turkey): Kop dağı pass 27.VII.1972 1 ♂ (fw. 15 mm).

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