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TAXONOMIC STATUS OF THE EUROPEAN GENERA OF TRAVUNIIDAE (ARACHNIDA, OPILIONES, LANIATORES)

Adriano B. Kury* and Amanda C. Mendes*

* Departamento de Invertebrados, Museu Nacional/UFRJ. Quinta da Boa Vista, São Cristóvão, 20.940-040, Rio de Janeiro - RJ – BRAZIL. E-mails: adrianok@gmail.com and amanda.mendes@gmail.com

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ABSTRACT: The taxonomic status of the generic names of European Travuniidae is studied. Although the generic name *Abasola* Strand, 1928 is widely used, *Travunia* Absolon, 1920 is a valid replacement name for *Absolonia* Roewer, 1915, junior homonym of *Absolonia* Börner, 1901 (Collembola), while *Abasola* is a superfluous replacement name for the same. Type species of *Travunia* is *Absolonia troglodytes* Roewer, 1915. *Travunia anophthalma* Absolon, 1920 is an objective synonym of *Absolonia troglodytes* Roewer, 1915. The authorship of *Dinaria* is Roewer, 1935 (who first provided a formal proposal of the generic name as such), not Hadži, 1932 (who cited this as a *nomen nudum*). Type species of *Dinaria* is *Travunia vjetrenicae* Hadži, 1932. *Peltonychia* Roewer, 1935 and *Kratochviliola* Roewer, 1935 are unavailable names, being published after 1930 without an explicit designation of a type species among the species originally included. Since it was based on an unavailable name, Peltonychiinae Kratochvíl, 1958 is also unavailable. The authorship of *Peltonychia* must be credited to Martens, 1978 (who first gave a diagnosis and designated a type species), but the available generic name *Hadziana* Roewer, 1935, currently under the synonymy of *Peltonychia*, has priority and must be used instead of it, with *Hadziana postumicola* Roewer, 1935 as type species. The correct name of a superfamily including the Travuniidae and the Triaenonychidae should be Triaenonychoidea, not Travunioidea. The following new combinations are made: *Abasola sarea* Roewer, 1935, is newly combined as *Hadziana sarea*; *Phalangodes navarica* Simon, 1879 (currently *Kratochviliola navarica*) is newly combined as *Hadziana navarica*; *Abasola hofferi* Šilhavý, 1937 is newly combined as *Travunia hofferi*; *Phalangodes claviger* Simon, 1879 (currently *Peltonychia clavigera*) is newly combined as *Hadziana clavigera*; *Peltonychia gabria* Roewer, 1935 is newly combined as *Hadziana gabria*; *Scotolemon leprieurii* Lucas, 1860 (currently *Peltonychia leprieurii*) is newly combined as *Hadziana leprieurii*; *Scotolemon piochardi* Simon, 1872 (currently *Peltonychia piochardi*) is newly combined as *Hadziana piochardi* and *Peltonychia tenuis* Roewer, 1935 is newly combined as *Hadziana tenuis*.

KEY WORDS: Laniatores, Phalangodidae, Karst, hypogean fauna, Europe, Alps, Dinarids, Pyrenees.

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INTRODUCTION

Travuniidae Absolon & Kratochvíl 1932 is a family of Travunioidea, a well defined group but with no consensus in relation to the systematic status of the family group taxa (Maury, 1988; Hunt & Hickman, 1993; Karaman, 2005). Karaman (2005), when describing a new genus of Travunioidea, gave as comparison fine illustrations of genital and body outer morphology of *Abasola hofferi* Šilhavý, 1936 based on material from the type locality. Karaman used the same approach as Maury (1988), who gave up assigning his new genus *Picunchenops* to any family of Travunioidea.

The Travuniidae are represented by 17 species of tiny delicate laniatorids of the northern temperate areas, mainly in southeastern Europe (15 species, see Table 1), with one species from lava tubes in Western USA and another cave-dwelling in Japan (Roewer, 1935; Briggs, 1974; Suzuki, 1975; Martens, 1978). They have been repeatedly regarded as relictual members of disappeared biotas and most of the known species have been found only in caves. Because of the unique special claw structure called the peltonychium, the Travuniidae have been accepted relatively early in the literature (e.g. Roewer, 1935), while the related family Cladonychiidae Hadži, 1935 did not have such acceptance until being rediscovered by Briggs (1969), but it was then called Erebomastridae, while the original name was only much later unearthed by Cokendolpher (1985). Many current travuniid species were originally included in the Phalangodidae Simon, 1879. In the last 30 years no new species of Travuniidae has been described. Novak & Gruber (2000) and Novak (2004; 2005) critically summarized the records of the Travuniidae for Slovenia, Croatia and Bosnia & Herzegovina respectively.

Adequate descriptions lack for most species, more acutely regarding genital morphology. In the present paper the systematic status of the European nominal genera of Travuniidae is studied. The species of these genera are distributed in the Pyrenees, Southeastern/central Northern Alps, Sardinia and the Southern Dinarids. Non observance of ICZN rules by past authors caused some nomenclatural problems which will be addressed below. A detailed historic account of the circumstances which defined the creation of the family Travuniidae and its relevant generic and suprageneric names is given below each in a different section.

Systematic and nomenclatural history of the Travuniidae

The family Travuniidae constitutes one of the worst problems of the laniatorid taxonomy in the 20th century. The first travuniid to be described was *Scotolemon leprieuri* Lucas 1860, initially placed in Phalangodidae. It was followed by three species also placed in pre-existing phalangodid genera: *Phalangodes claviger* Simon 1879, *Scotolemon piochardi* Simon 1892 and *Phalangodes caecus* Simon 1911. Roewer (1935) reviewed the European Laniatores and described many new genera and species in Travuniidae, also placing in this family the phalangodid species cited above. Roewer (1935) misunderstood the taxonomic problems in Travuniidae, mainly by his ignorance on Absolon's (1916; 1920) nomenclatural acts, explained in Czech, which he evidently did not understand. He also mistook Hadži's (1932) Serbian language for Czech. This was the starting point of a series of nomenclatural errors which will be treated next.

1. The genera *Travunia* / *Absolonia*

Karel Absolon on 19th August 1913 found a juvenile laniatorid in the cave Đurović pećina, Močići near Cavtat in Southern Dalmatia (Croatia). He passed along this material to Roewer for identification. Based on a letter from Roewer dated 26th September 1913, stating it was an undescribed *Scotolemon* species, Absolon called his find "a blind *Scotolemon*" (Absolon, 1914: 222). Roewer (1915: 14), based on Absolon's original material created the new genus *Absolonia* (which is a junior homonym of *Absolonia* Börner, 1901, Collembola – homonymy first noted by Absolon, 1920) and new species *Absolonia troglodytes*. Absolon (1916) described as new the same specimen from Đurović pećina, calling it *Scotolemon anophthalmum* (which turns the specific name *anophthalmum* into an objective synonym of *troglodytes*). Absolon (1920: 596) created the genus *Travunia* as a valid replacement name for *Absolonia*, but unaware of nomenclatural rules, used again the specific name *anophthalma*, forming *Travunia anophthalma* to replace *Absolonia troglodytes*. "Travunia" is the Latin name of the region around the city Trebinje in Herzegovina. Roewer (1923: 85) continued calling the species from Đurović pećina *Absolonia troglodytes*. Later, Absolon & Kratochvíl (1932a: 154; 1932b: 209) noted the mistake in creating *anophthalma* and correctly treated the species as *Travunia troglodytes*. In the first part of the same paper, the authors (1932a: 155) cited new records for *T. troglodytes* from Herzegovina (Babić pećina near Lastva, Torina jama near Bihovo and Vilina pećina E of Lastva). Oblivious of the creation (or the implications) of *Travunia*, Strand (1928) proposed the superfluous replacement name *Abasola* to take the place of *Absolonia*.

Roewer (1935: 79) stated that both species — *Abasola troglodytes* (material from Croatia) and *Travunia anophthalma* (material from Herzegovina) — were clearly different. The problem is that both names were based on the same Croatian material (making them objective synonyms) and the Herzegovinan material was only added 12 years later of the creation of the name *Travunia anophthalma*. Whether the Croatian and the Herzegovinan species are different or not is irrelevant to the present discussion.

Šilhavý (1936) described the new species *Abasola hofferi* from the cave Pokljuka Gornja, near the village of Knežlaz, Krivošije Mts., Montenegro, then Yugoslavia. Kratochvíl (1937), described a new species of *Travunia*, *T. jandai*, from a cave near the summit of the mountain Grabov in the island of Mljet, Dalmatia in Croatia. He provided a key to identify the five species of Travuniidae of Yugoslavia. The other four were *Abasola hofferi*, *Abasola troglodytes*, *Dinaria vjetrenicae* Hadži, 1932 and *Travunia anophthalma*.

The status of the species of *Travunia* in the Balkans is very complex and requires further study, we still do not know how many valid species live in the region (Novak, pers. comm.) but from the nomenclature point of view, *Abasola* is a synonym of *Travunia*. Subsequent authors (e. g. Hadži, 1932; 1973a-b; Roewer, 1935; Šilhavý, 1937; Juberthie, 1972; Martens, 1978; Karaman, 2005; Novak, 2004; 2005) ignored this and continued using *Abasola* instead of/along with *Travunia* creating a situation of *Abasola* being regarded as a different genus, but including the type species of *Travunia*.

Absolon's (1920) proposal of *Travunia* as a new generic name for *Absolonia*, although extremely short, apparently complies with ICZN articles 12.1: "To be available, every new name published before 1931 must satisfy the provisions of Article 11 and must be accompanied by a description or a definition of the taxon that it denotes, or by an indication." and article 12.2.5: the word "indication" denotes only the following: "in the case of a new genus-group name, the use of one or more available specific names in combination with it, or clearly included under it, or clearly referred to it by bibliographic reference, provided that the specific name or names can be unambiguously assigned to a nominal species-group taxon or taxa." Likewise, being published before 1930, *Travunia* does not have to comply with article 13.1 "To be available, every new name published after 1930 must satisfy the provisions of Article 11 and must 13.1.3. be proposed expressly as a new replacement name (nomen novum) for an available name...".

2. The family name Travuniidae

All the six species of Travuniidae known in the 1920's/early 1930's were originally placed in the Phalangodidae (e. g. Roewer, 1923). The

family Travuniidae was recognized (but not published as such) by Hadži — see his claims (Hadži 1932; 1933). Hadži started to share his knowledge with Kratochvíl, who acted quickly and had it published first (Absolon & Kratochvíl 1932a-b). For this family these authors used the name Peltaeonychidae. Upon its creation the family included only the generic name *Travunia*. The family name Peltaeonychidae was not based on the name of an included genus, being unavailable. Advised of that, the authors a few months later (Absolon & Kratochvíl, 1932c) proposed the family name Travuniidae as a replacement for Peltaeonychidae.

3. The genus *Dinaria*

In August 1931, the "Gesellschaft für Höhlenforschung" (Society of Speleology) in Ljubljana (today in Slovenia, then in Yugoslavia) organized an expedition to the famous Vjetrenica cave in the southern margin of the Popovo polje in Herzegovina. Based on the material from this expedition, Hadži (1932) published the description of a new species of *Travunia*, *T. vjetrenicae*, in a paper written in Serbian. The paper was reissued (Hadži, 1933) as a German translation with all the species being cited again as "new". Hadži provided a lengthy description, with many illustrations and a long winded discussion complaining sourly about Absolon and specially Kratochvíl. Hadži (1932; 1933) also stated that initially, when he discovered the new species, he thought *Travunia vjetrenicae* should constitute a new genus he was to name as *Dinaria*. But finally, he reconsidered and included the new species in a pre-existing genus, citing *Dinaria* only as a kind of name *in schedula*. He continued treating *T. vjetrenicae* as a member of *Travunia*, and it is clear that he did not mean to create a new genus *Dinaria*. Besides, he did not gave diagnostic characteres to make this genus available. Hadži therefore created the non-available generic name *Dinaria*.

Roewer (1935: 75) reconciled Hadži's paradox (the invalid creation of *Dinaria*) considering that *Dinaria* had been proposed as a subgenus of *Travunia* and as if he (Roewer) was elevating its rank to full genus. This is evident by Roewer's use of the standard subgeneric formula "*Travunia* (*Dinaria*)" in the specific heading of *T. vjetrenicae*. But on the other hand, in the generic heading "Gattung: *Dinaria* Hadzi" Roewer used the synonymic formula "*Travunia* (= *Dinaria*)". Novak (2005: 311) was already aware of the problem and called the "funny" creation of *Dinaria* an "autosynonymy".

In accordance with Novak (2005), we conclude that:

(1) Hadži's (1932; 1933) use of *Dinaria* failed to meet ICZN articles 11.5: "To be available, a name must be used as valid for a taxon when proposed", 11.6: "A name which when first published in an available work was treated as a junior synonym of a name then used as valid is

not thereby made available" and 13.1. "To be available every new name published after 1930 must satisfy the provisions of Article 11 and must" 13.1.1 "be accompanied by a description or definition that states in words characters that are purported to differentiate the taxon or" 13.1.2 "be accompanied by a bibliographic reference to such a published statement...or" 13.1.3 "be proposed expressly as a new replacement name (nomen novum) for an available name, whether required by any provision of the Code or not."

(2) The description of *Dinaria* by Roewer (1935) who provided a type species (*Travunia vjetrenicae* Hadži, 1932 by monotypy) and a diagnosis formally satisfied ICZN rules. So, the authorship of *Dinaria* is Roewer, 1935, not Hadži, 1932.

4. The genera *Hadziana*/*Peltonychia*/ *Kratochviliola*

Roewer (1935: 55) created the genus *Peltonychia*, giving a diagnosis and a key to the six included species. He did not, however, explicitly choose a type species, which by the ICZN renders this generic name unavailable (see below). Roewer (1935: 64) described *Kratochviliola*, with three included species without designating a type species, which falls in the same case as *Peltonychia* being an unavailable name. Roewer (1935: 69) described the monotypic genus *Hadziana*, which has no nomenclatural problems.

Martens (1978) cast doubt on the validity of many genera of Travuniidae, but formally proposed only one generic and few specific synonymies. The only relevant point for us here is the synonymy of *Hadziana* with *Peltonychia* and the synonymy of two of the species of *Kratochviliola* under species of *Peltonychia*. Martens (1978: 70) wrote on *Peltonychia*: "Type species (designation by Rower, 1935): *Scotolemon leprieuri* Lucas, 1860". That mentions an original designation by Roewer. We were unable to find any such designation of a type species for this or another genus in Roewer's text. However, as Martens (1978) gave a diagnosis and mentioned explicitly the type species *S. leprieuri*, the authorship of *Peltonychia* must be attributed to Martens, 1978.

Novak et al. (1985) criticized the records of two species of *Peltonychia* — *P. postumicola* and *P. tenuis* — from Slovenia. According to their intensive search of the species, and following Thaler`s (1996) findings, Novak & Gruber (2000) concluded that Roewer original indications of type localities for three species of *Peltonychia* in Slovenia and in the adjacent regions of Italy are in error and that Travuniidae are to be removed from the faunal lists of Slovenia and northeastern Italy. Likewise, Novak & Gruber (2000) cast serious doubt on the existence of real species of *Peltonychia* in the Triestine Karst, concluding that *P. tenuis* and *P. gabria* are very similar to the Pyrenean *P. clavigera* and

P. postumicola belong to the general type of P. clavigera and is very similar to "*P. sarea*", although these authors did not propose formal synonymies or combinations.

The diagnosis of *Kratochviliola* (Roewer 1935), is different from that of *Hadziana* only in the number of tarsomeres in leg II (6 versus 7-8). This is unconvincing, but Martens (1978), not having studied the type species of *Kratochviliola*, recognized both genera as valid. We do not think there is any justification for keeping these genera distinct, so the only species remaining in *Kratochviliola* should be combined under *Hadziana*.

Roewer's creation of *Kratochviliola* and *Peltonychia* collides with ICZN article 13.3: "To be available, every new genus-group name published after 1930... must... be accompanied by the fixation of a type species in the original publication." So, both names are unavailable. In the case of *Peltonychia*, the description given by Martens (1978) satisfied ICZN rules, but *Hadziana*, treated in the same paper as a junior synonym of *Peltonychia*, in fact has priority over it and must be used.

5. The genera *Arbasus* and *Buemarinoa*

Arbasus Roewer, 1935 and *Buemarinoa* Roewer, 1956 are monotypic genera. *Arbasus caecus* (Simon, 1911) is known only from a cave in the Pyrenees and *Buemarinoa patrizii* Roewer, 1956 from a cave in Sardinia. Both look superficially like members of *Hadziana*, but with clearly troglomorph traits such as depigmentation, absence of eyes or eye mound, effacing of scutal grooves, elongate legs, slender pedipalps and very long basichelicerite. Both genera are defined exclusively by tarsal segmentation — *Arbasus* has tetramere distitarsus II and *Buemarinoa* has trimere tarsus III — so their status is very doubtful.

6. The subfamily Peltonychiinae

Travuniidae was divided into two subfamilies – Peltonychinae [sic] (should be properly Peltonychiinae) and Travuniinae (with single genus *Travunia*) – by Kratochvíl (1958). This division, based only on the number of distitarsomeres of leg I, mirrored the misleading Roewerian dichotomy Phalangodinae versus Tricommatinae and subsequent authors did not adopt them. The three genera described later, *Buemarinoa* Roewer, 1956, *Yuria* Suzuki, 1964 and *Speleonychia* Briggs, 1974 have not been assigned to any of Kratochvíl's subfamilies and they are not mentioned by any other author.

Original spelling of the subfamily name created by Kratochvíl (1958) is incorrect, it should be Peltonychiinae instead of Peltonychinae. In any case this is an unavailable name because it is based on the (then) non-available generic name *Peltonychia*. Should the family Travuniidae be subdivided into subfamilies, new names will have to be created, because there is no available name besides the nominotypic Travuniinae.

7. The superfamily Travunioidea

Hadži considered both Travuniidae (1932) and Cladonychiinae (1935) as subfamilies of Triaenonychidae. By doing this, Hadži created the concept of the Travunioidea (*sensu* Kratochvíl, 1958; Martens, 1980) as equivalent to Insidiatores (*sensu* Kury, 2002). Hadži deserves credit for the Insidiatores (Travunioidea + Triaenonychoidea) hypothesis, which lasted half a century and still has to be convincingly tested to be ruled out.

Kratochvíl (1958) resurrected Hadži's idea (1932; 1935) that Cladonychiidae and Travuniidae were closely related to the Triaenonychidae and proposed the superfamily Travunoidea [sic] to include the three cited families. The spelling was later corrected to Travunioidea by Shear (1977). Martens (1980) supported this hypothesis, which went largely unchallenged until Kury (2002) suggested that the Triaenonychidae as currently understood was a paraphyletic group, forming two clades, the Travunioidea and the Triaenonychoidea, the latter being sister group to the Grassatores Kury, 2002. A detail no one has noticed is that by ICZN rules, if the Insidiatores Loman 1900 is to be retained as the Hadži/Kratochvíl/Martens concept, then Triaenonychoidea Sørensen, 1886 has priority over Travunioidea Absolon & Kratochvíl, 1932 as the superfamily name. This oversight, starting with Kratochvíl (1958) was propagated through many authors (Shear, 1977; Martens, 1980; Kury, 2003; Hallan, 2006). The precedence of Triaenonychoidea was first noted in a letter from Miguel Angel Alonso-Zarazaga (2003, in litt.) to A. Kury, and then later independently in another message from Wojciech Staręga (2004, in litt.) to the same.

DISCUSSION

An examination on the penial morphology as published (Juberthie, 1972; Martens, 1976; 1978; 1986; Chemini, 1985; Thaler, 1996; Karaman, 2005 and Novak, 2005) lets us recognize two sharply distinct groups of genera of Travuniidae (Pyrenean/Alpine versus Dinarid): 1) *Hadziana* endemic of the Pyrenees and the Southeastern/central Northern Alps with (a) muscle restricted to bulbous basal part of truncus, (b) glans capsule clearly articulated with truncus and (c) aletae

absent or much reduced; 2) *Dinaria* and *Travunia*, endemic of the Southern Dinarids (penis of type species of *Travunia* unknown, holotype of *Travunia troglodytes* is a juvenile) with (a) muscle stretched along truncus, thicker in the middle, (b) glans capsule undefined and (c) aletae well developed as large "ears".

Abasola is a synonym of *Travunia*, so judging only by the nomenclature, all species of *Abasola* should be allocated in *Travunia*. This is indeed the case of *Abasola hofferi* Šilhavý, 1937 which should be under *Travunia*. But on the other hand, *Abasola sarea* geographically and morphologically belongs to the Pyrenean travuniids and should be accordingly newly combined under *Hadziana*.

The genital structure of species of *Hadziana* as described above is clearly more similar to the Cladonychiidae than to traditional Travuniidae. If it proves to be synapomorphic, it would render the Travuniidae paraphyletic relative to the Cladonychiidae. It is clear that much basic taxonomic work is still needed to clarify the complex relationships among the Travuniidae and related families. The current simplistic view of Dinarid Travuniidae is likely to be greatly expanded and refined by just recognizing a diversity greater than earlier acknowledged.

CONCLUSIONS

A series of changes are introduced in the classification of the family Travuniidae. A synoptic classification of the relevant names of Travuniidae reflecting these changes is shown in the Table 2. Our conclusions follow:

(1) Triaenonychoidea Sørensen, 1886 has priority over Travunioidea Absolon & Kratochvíl, 1932 as the superfamily name including the Travuniidae + Triaenonychidae.

(2) Peltonychiinae Kratochvíl, 1958 is an unavailable name because it is based on the (then) non-available generic name *Peltonychia*.

(3) *Travunia* Absolon, 1920 is a valid replacement name for *Absolonia* Roewer, 1915 and *Abasola* Strand, 1928 is a superfluous replacement name for *Absolonia*. Type species of *Travunia* is *Absolonia troglodytes* Roewer, 1915, by monotypy.

(4) *Scotolemon anophthalmum* Absolon, 1916 is a *nomen nudum*, this species was only formally described as *Travunia anophthalma* Absolon, 1920. *T. anophthalma* is an objective synonym of *Absolonia troglodytes* Roewer, 1915. The combination for this species should be *Travunia troglodytes* (Roewer, 1915).

(5) *Dinaria* as described by Hadži (1932) is not a valid name and it was first given a formal description by Roewer (1935). The authorship of the genus is thus *Dinaria* Roewer, 1935, type species *Travunia vjetrenicae* Hadži, 1932, by monotypy.

(6) *Arbasus* Roewer, 1935 and *Buemarinoa* Roewer, 1956 are both available and valid generic names, but their taxonomic status is uncertain pending further study of their type species.

(7) *Peltonychia* as described by Roewer (1935) is not a valid name and was first given a formal description by Martens (1978). The authorship of the genus is thus *Peltonychia* Martens, 1978, type species *Scotolemon leprieurii* Lucas, 1860, by original designation.

(8) *Peltonychia* Martens, 1978 is newly proposed as a junior subjective synonym of *Hadziana* Roewer, 1935. All the species currently included in *Peltonychia* should be combined under *Hadziana*.

(9) *Kratochviliola* Roewer, 1935 is not an available name and its only currently included species, *Phalangodes navarica* Simon, 1879 (currently *Kratochviliola navarica*) is newly combined as *Hadziana navarica* (Simon, 1879).

(10) *Abasola sarea* Roewer, 1935 is newly combined as *Hadziana sarea* (Roewer, 1935).

(11) *Abasola hofferi* Šilhavý, 1937 is newly combined as *Travunia hofferi* (Šilhavý, 1937).

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Table 1. Summary of the current taxonomy of the European Travuniidae. Use of *Abasola* vs *Travunia* is inconsistent in the literature (see text for details).

Abasola Strand, 1928
- *Abasola sarea* Roewer, 1935
- *Abasola hofferi* Šilhavý, 1937
- *Abasola troglodytes* (Roewer, 1915)

Arbasus Roewer, 1935
- *Arbasus caecus* (Simon, 1911)

Buemarinoa Roewer, 1956
- *Buemarinoa patrizii* Roewer, 1956

Dinaria Roewer, 1935
- *Dinaria vjetrenicae* (Hadži, 1932)

Kratochviliola Roewer, 1935
- *Kratochviliola navarica* (Simon, 1879)

Peltonychia Roewer, 1935 (= *Hadziana* Roewer, 1935)
- *Peltonychia clavigera* (Simon, 1879)
- *Peltonychia gabria* Roewer, 1935
- *Peltonychia leprieuri* (Lucas, 1860)
- *Peltonychia piochardi* (Simon, 1872)
- *Peltonychia postumicola* (Roewer, 1935)
- *Peltonychia tenuis* Roewer, 1935

Travunia Absolon, 1920
- *Travunia borisi* (Hadži, 1973)
- *Travunia jandai* Kratochvíl, 1937
- *Travunia anophthalma* Absolon, 1920

Table 2. Proposed classification of the European Travuniidae (*indicates type species; ? indicate doubtful species):

Arbasus Roewer, 1935
**Arbasus caecus* (Simon, 1911) – France
Buemarinoa Roewer, 1956
**Buemarinoa patrizii* Roewer, 1956 – Sardinia
Dinaria Roewer, 1935
**Dinaria vjetrenicae* (Hadži, 1932) – Bosnia and Herzegovina.
Hadziana Roewer, 1935 [= *Peltonychia* Roewer, 1935, unavailable name, ICZN 13.3, = *Peltonychia* Martens, 1978].
Hadziana clavigera (Simon, 1879) new combination – France, Spain.
?*Hadziana gabria* (Roewer, 1935) new combination – "Italy".
Hadziana leprieurii (Lucas, 1860) new combination – Italy, Switzerland.
Hadziana navarica (Simon, 1879) new combination – France, Spain.
Hadziana piochardi (Simon, 1872) new combination – Spain.
?**Hadziana postumicola* Roewer, 1935 – "Italy, Slovenia".
Hadziana sarea (Roewer, 1935) new combination – France.
?*Hadziana tenuis* (Roewer, 1935) new combination – "Slovenia".
Travunia Absolon, 1920 [= *Absolonia* Roewer, 1915, homonym, = *Abasola* Strand, 1928]
Travunia borisi (Hadži, 1973) – Bosnia and Herzegovina.
Travunia hofferi (Šilhavý, 1937) new combination – Montenegro.
Travunia jandai Kratochvíl, 1937 – Croatia
* *Travunia troglodytes* (Roewer, 1915) – Bosnia and Herzegovina, Croatia.

RE-DESCRIPTION OF *URODIASPIS TECTA* (KRAMER, 1876) (ACARINA: MESOSTIGMATA: UROPODINA)

Durmuş Ali Bal* and Muhlis Özkan**

* Atatürk University, Education Faculty, Erzincan / TÜRKİYE. E-mail: bal@atauni.edu.tr
** Uludağ University, Education Faculty, Bursa / TÜRKİYE. E-mail: muozkan@uludag.edu.tr

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ABSTRACT: *Urodiaspis tecta* (Kramer, 1876) is redescribed and illustrated, based on the protonymph, deutonymph and on adult female specimens collected from Erzincan, Erzurum and Gümüşhane, Turkey. The genus has been recorded for the first time from Asian continent.

KEY WORDS: Acari, Uropodina, *Urodiaspis tecta*, redescription, Turkey.

Berlese created the genus *Urodiaspis* in 1916, with the type species *Urodiaspis* (*Diurodinychus*) *tecta* (Kramer, 1876). This genus has been studied by some authors since Berlese, and recently reviewed by Hirschmann (1984a). According to Hirschmann and Wiśniewski (1993), and Wiśniewski (1993) the genus is represented in the world with 21 species. Hirschmann (1984a) and his co-worker Wiśniewski (1993) divided the genus *Urodiaspis* into six species-groups for easy identification and he could not group some species and gave them the title "*Nicht eingeordnet*". Some species in this category have carried features of an independent genus, and the genus needs a serious revision (Athias-Binche & Błoszyk, 1985).

Species of the genus *Urodiaspis* live in litter, soil substrates, moss, decaying woods, rotten leaves, humus and heterogeneous decomposed organic materials of various types of broad-leaved deciduous or coniferous forests (also in tropical forest). Occasionally, they colonise specific subcorticolous habitats, nest of vertebrates (Aves, Mammalia), ants and bumble-bees (Hymenoptera: Formicoidea, Apoidea). They can also penetrate into cultivated landscape habitats (orchards, gardens and other degraded or agricultural stands in non-forested areas) (Hirschmann & Wiśniewski, 1993; Karg, 1989; Mašán, 2001).

Some uropodina specimens were collected from soil and litter under evergreen and deciduous trees, decayed and decaying woods, from the bark of trees and nests of ants at Gümüşhane and Erzincan provinces in Turkey. Among this material, *Urodiaspis tecta* is new for the Turkish and Asian fauna. Epigynium of Turkish specimens with web-like ornaments and with epistome having reduced middle apical branch. These characters were not recorded from European relatives of the species so far (Hirschmann & Zirngiebl-Nicol, 1965, 1967; Zirngiebl-Nicol, 1972, 1973; Hirschmann, 1972a, 1972b, 1979, 1984a, 1984b;

Hiramatsu, 1979; Wiśniewski, 1984; Hirschmann & Wisniewski, 1993; Wisniewski & Hirschmann, 1993).

Chaetotactic symbols are mainly adapted from Hirschmann and Zirngiebl-Nicol (1965), Karg (1989), and also from Evans (1957, 1972, 1992), Krantz (1978) and Evans and Till (1979). Specimen collection, extraction, preservation and preparation for examination were given by Bal and Özkan (2005). Specimens are mounted in Hoyer's medium and examined with a Nikon E-600 compound microscope equipped with differential interference contrast and phase contrast systems. All measurements are given in micrometers (μm). Materials are deposited in the Bal's mite collection, and in the Atatürk University Zoology Museum (AUZM).

Urodiaspis Berlese, 1916

Re-description. Dorsum with a solid or partly fused post-dorsal plate, idiosoma longer than wider. Dorsal plate connected anteriorly with marginal plate; with simple, acuminate, serrate or scimitar-shaped setae. Chelicera with small nodus; fixed digit with hyaline helmet-like ending and tip inclined downward; sensillum distale, proximale and ventrale on fixus digit present, sensillum distale situated on venter; cavicula fixi short and with or without serrula denticulata; movable digit with sensillum mobile and shorter than fixed digit; condylus cudgel-like and in moderate length. Corniculi horn-like, lacinae long, narrow and sharpened. Protosternum denticulated or smooth and with denticles at lateral edges. Deutosternum fused, with 3–5 rows of denticles in females, double rows in males; hypostomal setae C1 and C2 smooth and needle-like, C3 and C4 denticulated, C2 shortest, occasionally thickened and thorn-like, C1 and C3 longest, C4 in moderate length. Epistome narrowed, lancet-like, distally with 1–3 pointed tips and laterally with denticulated margins. Basal part of tritosternum vase- or sack-like, without or with small denticles anteriorly; lacinia 3-branched, denticulated middle branch longer than denticulate or smooth lateral branches (Hirschmann and Wiśniewski, 1993).

Urodiaspis tecta (Figs. 1–6)

Examined materials: 2♀♀ found in soil and litter under pine trees (*Pinus sylvestris*), Erzincan province, Ahmediye village (39° 86′ N, 39° 36′ E), altitude 1858 m, 9.V.2001; 3♀♀ found under bark of decaying stump of *Quercus infectoria*, same locality and date; 2♀♀, same locality, 17.III.2000; litter from deciduous forest with *Populus tremula, Quercus infectoria, Quercus petraea*, 1♀, 1 DN, 1 PN, Gümüşhane

province, Yeniyol village (39° 90′ N, 39° 38′ E), altitude 218 m, 4.VI.2005; moss and litter under *Carpinus betulus*, 1♀, Erzurum, İspir, Mescitli village, Mescit Mountains (40° 23′ N, 40° 66′ E), altitude 2238 m, 21.VII.2000; soil and litter under *Juniperus communis*, 1♀, Erzurum, İspir, south of Bademli village, Petekli forests (40° 41′ N, 40° 93′ E), altitude 2102, 31.V.2000; litter and soil from forest basin, 1♀, Erzurum, Olur, Dağtarlaları region (40° 85′ N, 42° 07′ E), altitude 1613 m, 31.V.2000.

Re-description. Female. Idiosoma oval, 740 long, 580 wide and egg-like. Body well sclerotized and brown. Marginal plate surrounding dorsal and post-dorsal plates. Dorsal plate differentiated from post-dorsal and marginal plate, all dorsal body setae short, thorn-like, not reaching insertions of following setae. Dorsal, marginal and post-dorsal plates with 40–50, 29 and 3 setae pairs, respectively. Some medially situated dorsal setae unpaired. Marginal setae short, smooth and simple. I4 setae on post-dorsal plate longer and thicker than all other dorsal body setae. Other post-dorsal setae I5 and Z5 small. Punctation of plates faint and dense (Fig. 1).

Sternal, ventrianal and endopodal plates densely ornamented with small subcircular depressions. Also, all ventral regions of idiosoma with polygonal pattern and fine punctations. Peritreme with a hook-like bend in anterior section and tip directed interiorly; posterior tip directed exteriorly and ended at level of coxae III (Fig. 2). Epistom half-moon-like; anterior margin densely roughed in camerostome, surface with small bright pores. Genital plate finely punctated, ornamented with polygonal pattern, iron-shaped, anteriorly concave, smooth in the posterior part and situated between coxae II–IV; 212 long and 130 wide. Setae *v1* just behind of coxae I, *v2* at level of coxae II, *v3* between coxae II-III, v4 between coxae III-IV and *v5* near posterior end of genital plate. Metapodal line absent. A distinctive ring-like sclerotization behind of pedofossae IV present. 2x-setae present. Adgenital setae *Ia–Ia*' and postanal seta *U* smooth, long and thickened.

Hypostomal laciniae extremely long, narrow, sharply pointed, third of the lower part jagged; *C2* short, smooth, adjacent to *C3*; *C3* a little longer than smooth *C1*, 3 1/2x*C2* long, with 4 denticles at one-side; *C4* is shorter than *C2* = 1 1/2x*C2* long; setae *C3* and *C4* branched; setae *C2* smooth ant not reach base of *C1* (Fig. 3C). Chelicerae with a small nodus (Fig. 3A). Corniculus horn-like. Hypostome articulated between *C3–C4* (Fig. 3C). Epistome lancet-like, anterior part two long branches, with margins denticulate, third middle branch fairly reduced (Fig. 3B). Tritosternum cup-shaped basally, its lacinia with three branches and branches with fine spines (Fig. 3D).

All pedofossae well developed. Coxae I broad, and hide tritosternum and gnathosomal apparatus (Fig. 2). All legs terminating with a

pulvillus and two claws, tarsi on all legs bear a pairs of digits at tip of ambulacral prolongation; setae on legs thorn-like. All femora bearing a membraneous flap (Fig. 4).

Deutonymph

Idiosoma 640 long, 520 wide. All idiosomal plates with micropores; all dorsal and ventral setae thorn-like. Sternal plate anvil-like, 280 long and 140 wide and bearing five pairs of setae (*v1–v5*). Setae *x1, x2, V2, V3, V4, V6* and *V8* on ventrianal plate, but *V7* pair arising from soft membraneous integument out of ventrianal plate. Ventrianal plate boat in shape, 280 long and 140 wide, and postanal seta *U* present. Distance between coxae II, III and IV: 93, 152 and 130, respectively. Metapodal plate IV with web-like ornaments finely punctated. A pair of lyrifissures occuring close to setae *v1*. Coxae I large, placed close to each other; pedofossae distinct. Ventrianal plate with a pair of lyrifissures close to anus laterally. Anterior prolongation of peritreme twisted, long and directed interiorly, its posterior part short, directed backward (Fig. 5).

Protonymph

Idiosoma 487 long, 370 wide; podonotal plate spear-like, 330 long and 290 wide. Five pairs of mediodorsal setae (*i2-5, z2*) on the plate. Lateral plates (158 long and 63 wide) tri-cornered and with micropores. Pygidial plate three cornered, 47 long and 173 wide. Seven pairs of setae arising laterally on the anterior half of the idiosoma (*i1, s1,2, s5-7, z1*), and setae *I1-3* and Z1 located on lateral plates. Setae I4 longer and stouter than all other dorsal setae. All dorsal setae neddle-like, smooth and slender (Fig. 6A).

Sternal plate 145 long and 85 wide, and with three pairs of short and straight setae. Anal plate widely oval, 52 long and 180 wide. Peritremes located at the level of coxae II–III, both prestigmatic sections turned externally. Setae *v5, V2, V6* and *V8* straight, needle-like and on soft membrane; *V4* robust and situated on anal plate, postanal seta *U* short and thorn-like. Inguinal plates with micropores and not bearing setae, located behind coxae IV. Coxae I large, placed close to each other; pedofossae distinct and well developed. Hypostomal setae, epistome, tritosternum, chelicerae and palps resembling those of female (Fig. 6B).

Larva: Unknown

Distribution:

Europe (Austria, Belgium, Czech republic, England, France, Germany, Hungary, Ireland, Poland, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Ukraine)

The species is new record for Turkey.

Remarks:

Urodiaspis tecta with widely rounded idiosoma, 6-setal postdorsum, increased number of marginal setae, strongly sclerotized form in metapodal regions, endopodal lines, adjacent v1 setae and without metapodal lines, together with another species *Urodiaspis stammeri* Hirschmann et Zirngiebl-Nicol 1969. *Urodiaspis tecta* is common in European countries and is known a continent endemic peculiar to European countries. Species is very tolerant to different microhabitats (grass, forest basin, humus, litter, moss and insect gallery). Turkish specimens have very similar morphological characters with Europeans specimens, but all ventral plates with web-like ornaments, and tectum split into 2 branches, middle part extremely reduced, useful diagnostic characters for the Turkish specimens. Turkish specimens resemble closely European specimens in all other features.

In the closely related species, *U. stammeri*, scabellum in the middle with funnel-like form, its lateral margins and widened exopodal plates abutting each other and forming "*joint coupling*", whole anterior margin of scabellum delicately serrated; in *U. tecta* scabellum in the middle without funnel-like form, exopodal plates not abutting to free lateral margins of scabellum, anterior margin of scabellum delicately serrated only in the middle part.

Abbreviations

C1-4: hypostomal setae; DN: deutonymph; *i-I*: dorsocentral setae series; Per: peritrema; PN: protonymph; *r-R*: marginal setae series; *s-S*: lateral setae series; Stg: stigma; *U*: postanal seta; *v-V*: ventral setae series; *z-Z*: mediolateral setae series.

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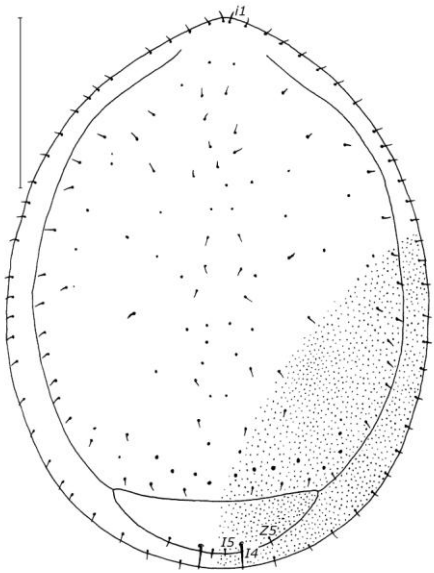

Fig. 1. *Urodiaspis tecta* (female): Dorsal view. Scale: 200 μm.

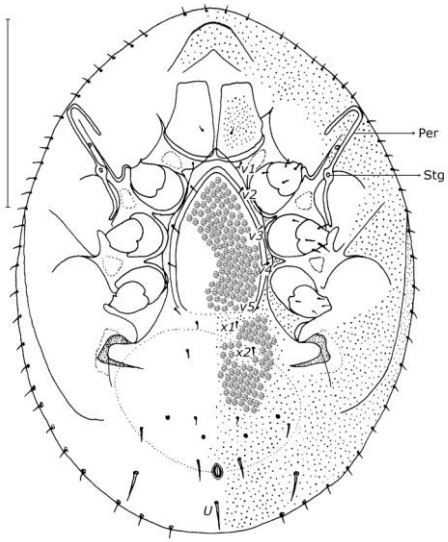

Fig. 2. *Urodiaspis tecta* (female): Ventral view. Scale: 200 μm.

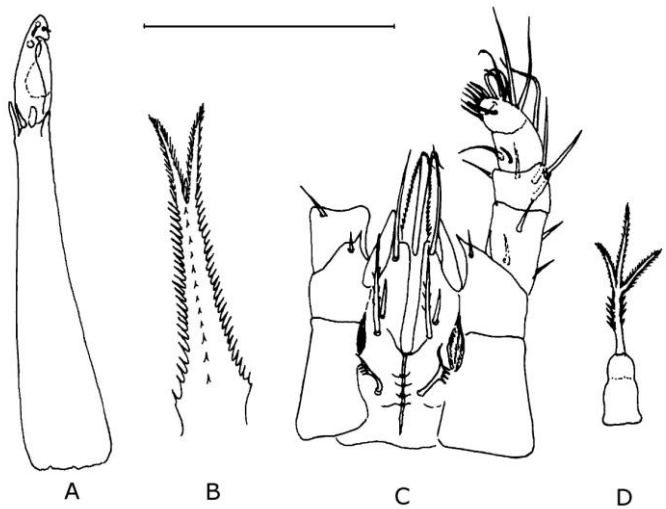

Fig. 3. *Urodiaspis tecta* (female): A – chelicera, B – epistome, C – venter of gnathosoma with palp, D – tritosternum. Scale: 100 μm.

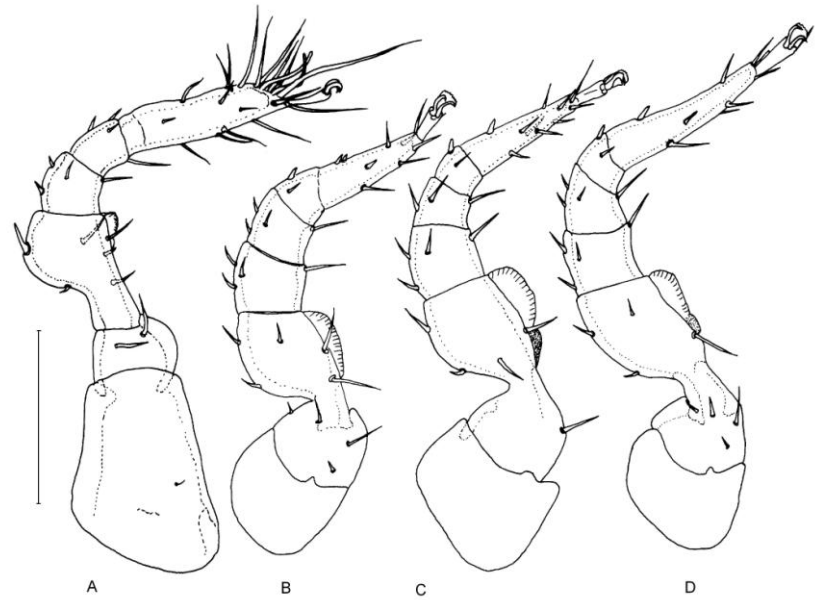

Fig. 4. *Urodiaspis tecta* (female): A – leg I, B – leg II, C – leg III, D – leg IV. Scale: 100 μm.

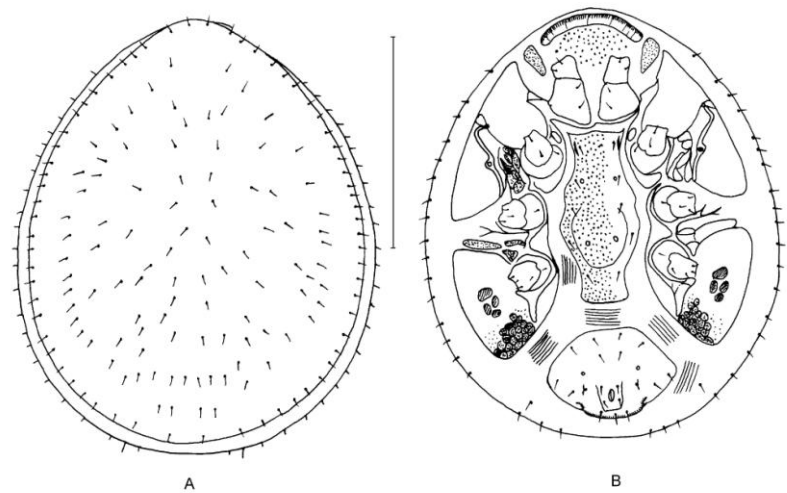

Fig. 5. *Urodiaspis tecta* (deutonymph): A – dorsal view, B – ventral view. Scale: 200 μm.

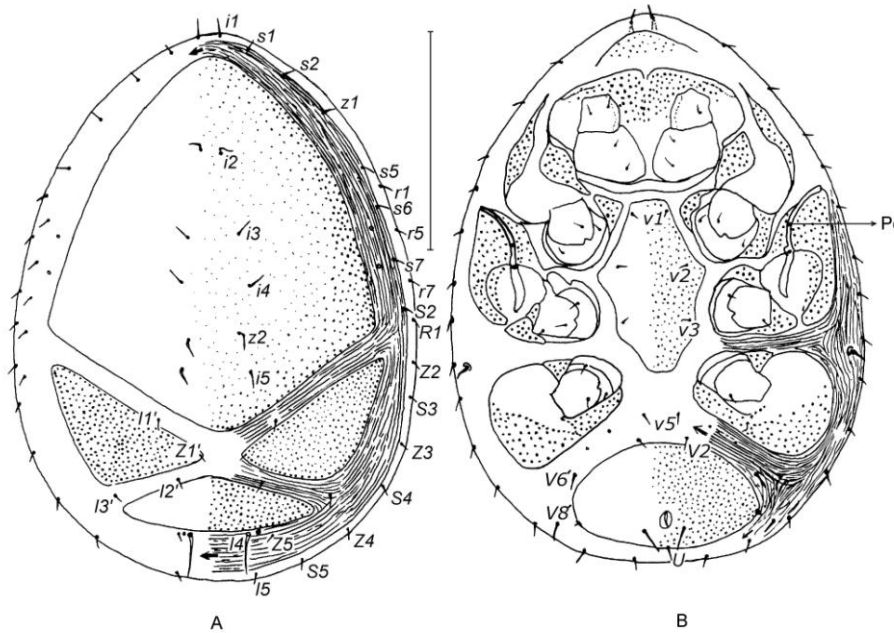

Fig. 6. *Urodiaspis tecta* (protonymph): A – dorsal view, B – ventral view. Scale: 200 μm.

NEW REPLACEMENT NAMES FOR THREE PREOCCUPIED LADYBIRD GENERA (COLEOPTERA: COCCINELLIDAE)

Hüseyin Özdikmen*

* Gazi Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, Ankara, 06500 TÜRKİYE, e-mail: ozdikmen@gazi.edu.tr

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ABSTRACT: Three junior homonyms were detected amongst the Coccinellidae and the following replacement names are proposed: *Semra* nom. nov. for *Cinachyra* Gorham, 1899 (Ortaliinae), *Meltema* nom. nov. for *Corystes* Mulsant, 1850 (Scymninae) and *Nurettinus* for *Discoceras* Sicard, 1909 (Coccidulinae). Accordingly, new combinations are herein proposed for the type species currently included in these genera: *Semra picta* (Gorham, 1899) comb. nov. from *Cinachyra* Gorham, 1899, *Meltema hypocrita* (Mulsant, 1850) comb. nov. and *Meltema cavifrons* (Weise, 1903) comb. nov. from *Corystes* Mulsant, 1850 and *Nurettinus fulvivestis* (Sicard, 1909) comb. nov. from *Discoceras* Sicard, 1909.

KEY WORDS: *Semra, Meltema, Cinachyra, Corystes,* homonymy, replacement names, Coccinellidae, Coleoptera.

In an effort to reduce the number of homonyms in Coccinellidae (Coleoptera), I systematically checked all generic names published. I found three ladybird genera whose names had been previously published for other taxa, making them junior homonyms. In accordance with the International Code of Zoological Nomenclature, I propose substitute names for these generic names.

Genus *Semra* nom. nov.

Cinachyra Gorham, 1899. Biol. Centr. Amer., Zool., Col. (Coleoptera: Cucujoidea: Coccinellidae: Ortaliinae: Ortaliini). Preoccupied by *Cinachyra* Sollas, 1886. Sci. Proc. R. Dublin Soc. (Porifera: Desmospongiae: Tetractinomorpha: Spirophorida: Tetillidae).

The generic name *Cinachyra* Sollas, 1886 was proposed for a genus of the sponge family Tetillidae (with the type species *Cinachyra barbata* Sollas, 1886). It is still used as a valid generic name in Porifera. For the present, *Fangophilina* Schmidt, 1880; *Spiretta* Lendenfeld, 1888; *Tethyopsilla* Lendenfeld, 1888 and *Kaira* de Laubenfels, 1936 are the junior synonyms of *Cinachyra* Sollas, 1886 (Hooper 2000). Later, the generic name *Cinachyra* Gorham, 1899 was introduced for a new ladybird genus (with the type species *Cinachyra picta* Gorham, 1899) of the family Coccinellidae. Also it is still used as a valid generic name in Coleoptera. (Fürsch 1990 and 2004). Thus, the genus *Cinachyra* Gorham, 1899 is a junior homonym of the genus *Cinachyra* Sollas, 1886. According to Article 60 of the International Code of Zoological Nomenclature, I propose for the genus *Cinachyra* Gorham, 1899 the

new replacement name *Semra* **nom. nov.** As a result of this application, *Cinachyra* Gorham, 1899 is replaced with *Semra* **nom. nov.** The following new combination is *Semra picta* (Gorham, 1899), **comb. nov.**

SYSTEMATIC ACCOUNTS

Order Coleoptera
Superfamily Cucujoidea
Family Coccinellidae
Subfamily Ortaliinae
Genus *Semra* **new replacement name**
For *Cinachyra* Gorham, 1899, junior homonym of *Cinachyra* Sollas, 1886.
Type species: *Cinachyra picta* Gorham, 1899
Gender: Feminine.
Etymology: Semra is given to honour my colleague Semra Turgut.
Species *Semra picta* (Gorham, 1899) **comb. nov.**

Genus *Meltema* nom. nov.

Corystes Mulsant, 1850. Ann. Sci. Phys. Nat., Lyon. (Coleoptera: Cucujoidea: Coccinellidae: Scymninae, Hyperapidini). Preoccupied by *Corystes* Bosc, 1802. Hist. nat. des Crustacés. (Crustacea: Malacostraca: Eucarida: Decapoda: Pleocyemata: Brachyura: Corystidae).

The generic name *Corystes* was initially introduced by Bosc (1802) for a type genus of the crab family Corystidae (with the type species *Cancer cassivelaunus* Pennant, 1777). It is still used as a valid generic name in Decapoda (Moyse and Smaldon 1990; Skewes 2001; VLIZ 2004). Subsequently, Mulsant (1850) described a beetle genus of the family Coccinellidae (with the type species *Corystes hypocrita* Mulsant, 1850) under the same generic name. It is still used as a valid generic name in Coleoptera too (Fürsch 1990 and 2004). Thus, the genus *Corystes* Mulsant, 1850 is a junior homonym of the genus *Corystes* Bosc, 1802. According to Article 60 of the International Code of Zoological Nomenclature, I propose for the genus *Corystes* Mulsant, 1850 the new replacement name *Meltema* **nom. nov.** As a result of this application, *Corystes* Mulsant, 1850 is replaced with *Meltema* **nom. nov.** The following new combination is *Meltema hypocrita* (Mulsant, 1850), **comb. nov.**

SYSTEMATIC ACCOUNTS

Order Coleoptera
Superfamily Cucujoidea
Family Coccinellidae
Subfamily Scymninae

Genus *Meltema* **new replacement name**
For *Corystes* Mulsant, 1850, junior homonym of *Corystes* Bosc, 1802.
Type species: *Corystes hypocrita* Mulsant, 1850
Gender: Feminine.
Etymology: Meltema is given to honour my wife Meltem Özdikmen.

Subgenus *Meltema* **new replacement name**
For subgenus *Corystes* Mulsant, 1850
Type species: *Corystes hypocrita* Mulsant, 1850
Species *Meltema* (*Meltema*) *hypocrita* (Mulsant, 1850) **comb. nov.**

Subgenus *Diazonema* Weise, 1903
Type species: *Diazonema cavifrons* Weise, 1903
Species *Meltema* (*Diazonema*) *cavifrons* (Weise, 1903) **comb. nov.**

Genus *Nurettinus* nom. nov.

Discoceras Sicard, 1909. Ann. Soc. ent. France, 78, 103, 110. (Coleoptera: Cucujoidea: Coccinellidae: Coccidulinae: Exoplectrini). Preoccupied by *Discoceras* Barrande, 1867. Syst. silur. Boheme, Rech. pal., 2, texte (Ceph.) pt. 1, 177. (Mollusca: Cephalopoda: Nautiloidea: Tarphycerida: Tarphycerina: Trocholitidae).

The generic name *Discoceras* was proposed by Barrande, 1867 with the type species *Clymenia antiquissima* Eichwald, 1842 (from the Ordovician of Estonia and Norway) for a macrofossil genus of the nautiloid family Trocholitidae. It is still used as a valid generic name in Cehalopoda (Kazlev, 2002). Later, the generic name *Discoceras* Sicard, 1909 was introduced for a new ladybird genus (with the type species *Discoceras fulvivestis* Sicard, 1909) of the family Coccinellidae. Also it is still used as a valid generic name in Coleoptera (Fürsch, 1990 and 2005). Thus, the genus *Discoceras* Sicard, 1909 is a junior homonym of the genus *Discoceras* Barrande, 1867. According to Article 60 of the International Code of Zoological Nomenclature, I propose for the genus *Discoceras* Sicard, 1909 the new replacement name *Nurettinus* **nom. nov.** As a result of this application, *Discoceras* Sicard, 1909 is replaced with *Nurettinus* **nom. nov.** The following new combination is *Nurettinus fulvivestis* (Sicard, 1909), **comb. nov.**

SYSTEMATIC ACCOUNTS

Order Coleoptera
Superfamily Cucujoidea
Family Coccinellidae
Subfamily Coccidulinae
Genus *Nurettinus* **new replacement name**
For *Discoceras* Sicard, 1909, junior homonym of *Discoceras* Barrande, 1867.
Type species: *Discoceras fulvivestis* Sicard, 1909

Gender: Masculine.
Etymology: Nurettinus is given to honour my father Nurettin Özdikmen.
Species *Nurettinus fulvivestis* (Sicard, 1909) **comb. nov.**

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FEEDING BIOLOGY AND DIGESTIVE ENZYMES OF *BUZURA SUPPRESSARIA* GUEN. AND *ETERUSIA MAGNIFICA* BUTL., TWO MAJOR DEFOLIATING PESTS OF *CAMELLIA SINENSIS* FROM DARJEELING PLAINS, INDIA

Mayukh Sarker*, Bina Pradhan and Ananda Mukhopadhyay*****

* Postgraduate Diploma in Tea Management, University of North Bengal, Darjeeling, 734 013, INDIA.
** Department of Zoology, Sikkim Govt. College, Gangtok, Sikkim, 737102, INDIA.
*** Entomology Research Unit, Department of Zoology, University of North Bengal, Darjeeling, 734 013, INDIA. e–mail: dr_amukherjee_nbu@rediffmail.com

[Sarker, M., Pradhan, B. & Mukhopadhyay, A. 2007. Feeding biology and digestive enzymes of *Buzura suppressaria* Guen. and *Eterusia magnifica* Butl., two major defoliating pests of *Camellia sinensis* from Darjeeling plains, India. Munis Entomology & Zoology 2 (1): 29-38**]**

ABSTRACT: The common looper caterpillar, *Buzura suppressaria* and the red slug caterpillar, *Eterusia magnifica* are serious defoliators of tea bushes (*Camellia sinensis*) of the Terai and Dooars areas of Darjeeling and N.E. India. While the former species prefers young leaves, the latter feeds on more mature leaves. This study aims to find the difference of the nutritional indices for the two folivores, such as relative consumption rate (RCR), relative growth rate (RGR), gross growth efficiency (ECI), net growth efficiency (ECD) and approximate digestibility (AD) and relate the same with their maintenance cost and production index (body mass). *B. suppressaria* has an edge over *Et. magnifica* as far as RCR and AD values are concerned. However, *Et. magnifica* could make up for the poor food quality (as they feed on mature tea leaves) by increasing their feeding period and better food conversion efficiencies. Higher value of AD in *B. suppressaria* may be due to higher quantity of the digestive enzymes in the midgut of this caterpillar. Significant differences in the activities of amylase, protease and lipase could be detected at salivary and midgut levels in the two folivores. The adaptive strategies in exploiting the different qualities of leaves, from two hampers of tea bushes is important for optimal food utilization by the two folivores with niche segregation.

KEY WORDS: *B. suppressaria*, *Et. magnifica*, *Camellia sinensis*, nutritional indices, digestive enzymes, Darjeeling

The common looper caterpillar, *Buzura suppressaria* Guen. and the red slug caterpillar, *Eterusia magnifica* Butl. are serious defoliating pests of tea, *Camellia sinensis* (L) O. Kuntze from Terai and the Dooars areas of Darjeeling and N.E. India (Anonymous, 1994). Of these folivores the former exercises preference for young and the latter for mature tea leaves. In case of severe infestation however, they may eat the entire leaf, as well as the woody parts of the bush. In order to have a better understanding of feeding biology of both the pests the present study was undertaken on their food consumption, utilization and digestive enzymes. The nutritional requirements of an insect change throughout development and such changes are typically reflected in changes of its food consumption and feeding behaviour (Barton

Browne, 1995). Numerous studies in the field of nutritional physiology have reviewed the effects of nutritive compounds (Mattson, 1980; Felton, 1996) on insect responses. Some of the nutritional responses are adaptive, such as preingestive increase in consumption of nutritionally poor food (Taylor, 1989; Woods, 1999) or postingestive increase in activity of digestive enzymes (Hinks & Erlandson, 1994; Lazarevic, 2000).

As the ability of *B. suppressaria* and *Et. magnifica* to utilize leaves of *C. sinensis* is largely dependent on three basic digestive enzymes viz. amylase, protease and lipase, these have been quantified in the salivary secretions and midgut of the larvae of both the pests. Further, an attempt has been made to relate and compare the enzyme quantity with the nutritional indices of these pests. Such information on digestive enzymes *vis a vis* food utilization can help contemplation of control of these pests through use of enzyme inhibitors and allelochemicals under host-plant resistance programmes.

MATERIAL AND METHODS

A commonly planted high yielding tea clone of Assam x Cambod origin was provided as food for the rearing of the pest larvae in a transparent container (27.5x 27cm) in aseptic conditions. Freshly emerged adults in laboratory were sexed, paired and allowed to mate in glass chimneys (19.5 cm x 8.5 cm), containing a twig with tea plant immersed in water of a conical flask to elicit oviposition. Larvae hatched from these eggs were reared at 28 ± 2°C, 75 ± 5% relative humidity and 12 hours L: D.

Nutritional ecology:

In order to find out the daily food consumption and weight changes in final larval instar freshly ecdysed Vth instar stages, 10 replicates each of *B. suppressaria and Et. magnifica* were monitored under controlled conditions (as mentioned earlier) in BOD incubator. Daily-preweighed fresh food (tea leaves with twig) was offered to each individual kept in (26cm×8.5cm) plastic containers. After 24 hours of feeding, leftover food and excrement were removed, oven dried and weighed. Dry weight of the actual food consumed was calculated by subtracting the dry weight of the leftover food from the dry weight of an equivalent amount of the food offered. Dry weight change of larva was calculated by drying a larva of similar weight in the oven at 50° C for 72 hours. Control was run concurrently by keeping tea leaves with their twig immersed in water of a conical flask having its mouth plugged with a cotton ball. Gravimetric (dry mass) technique was used to determine food consumption, and post ingestive food utilization efficiencies after Waldbauer (1968), Slansky & Scriber (1985), Petrusewicz & MacFadyen (1970), Muthukrishnan & Pandian (1987) and Farrar et al. (1989).

Activity of digestive enzymes:

Enzyme extraction was made from laboratory-reared Vth instar larvae of *B. suppressaria* and *Et. magnifica*. The dissections were carried out in an ice-cold sodium phosphate buffer (0.1 M, pH 7.0). Salivary gland and midgut were homogenized individually in fresh sodium phosphate buffer containing 0.01 M each of EDTA (Ethylene diamine tetra acetic acid) and 0.5% Triton X-100. The homogenate was centrifuged at 10,000g for 15 min at 4^{o} C. The supernatant of this preparation were used for measuring enzyme activities and stored at – 20^{o} C for future use.

Amylase assay:

Amylase activity in the salivary gland and midgut was determined after the method of Madhusudhan et al. (1994) followed by the method of Sadasivam & Manickam (1996) using dinitrosalicylic acid reagent; and quantification of enzyme product was deducted from a standard curve prepared using various concentration of maltose alone at 520 nm using UV-Vis spectrophotometer. The enzyme activity was expressed as µM / min/ mg of protein.

PROTEASE ASSAY:

Proteolytic activity was assayed after the methods of Kunitz (1947) modified by Jayaraman (1981). 1% (w /v) casein was used as the substrate. 1 ml of casein prepared in 0.1 N NaOH was incubated with equal volume of enzyme. After incubation for one hour, the reaction was terminated by the addition of 10% TCA and the acid-soluble peptides were quantified using the biuret reagent at 520 nm using UV-Vis spectrophotometer. The enzyme activity was expressed as µg / mg of protein.

LIPASE ASSAY:

Lipase activity was measured following the method of Sadasivam & Manickam (1996). The enzyme activity was calculated as milliequivalent activity of free fatty acid / min/ g sample.

RESULTS AND DISCUSSION

B. suppressaria and *Et. magnifica* showed considerable changes in the quantity of food ingested and development of body mass but with similar trends. Despite a greater quantity of leaf consumed (in total) by *Et. magnifica*, the relative consumption rate (RCR) value of *B. suppressaria* was recorded to be higher. Such a difference may be due to quality of leaf consumed. Leaves of different plants / varieties differ

in their suitability as insect food because of variations in nutrient content, water content, type and concentration of secondary plant compounds and degree of sclerophyll (toughness / fibre) (Gullan & Cranston, 1994). *B. suppressaria* consumed younger leaves of upper tier and *Et. magnifica* preferably fed more on mature leaves of middle tier of a tea bush. A better consumption rate of *B. suppressaria* is possibly due to consumption of leaves of higher nutritional quality, in which the percentage of nitrogen and moisture is more, than the mature leaves consumed by *Et. magnifica*. In a similar finding Scriber & Fenny (1979) showed that Swallowtails had a higher consumption rate on nitrogen and moisture-rich forbs than when feeding on tree foliage having relatively less values of nitrogen and moisture. In the two species, efficiencies of ingested (ECI) and digested food (ECD), showed that *B. suppressaria* had lower ECI and ECD values as compared to *Et. magnifica* (Table 1). This could be explained by a higher metabolic cost of processing the young leaves, which contain more allelochemicals. The young leaf of tea plants contains high levels of plant allelochemicals like polyphenolic compounds, caffeine (Roberts, 1962; Banerjee, 1993). These secondary plant compounds are associated with induction mechanisms at the level of digestion and detoxification. A reduction in ECD associated with allelochemical ingestion is a common phenomenon (Koul et al., 1990; Appel & Martin, 1992). Secondary plant compounds often inhibit growth and development of insects (Todd et al., 1971; Lindroth et al., 1988; Ayres et al., 1997). Secondary plant substances also frequently act at the behavioural level of insects as deterrents and feeding inhibitors (Kraft & Denno, 1982; Kelly & Curry, 1991; Van Dam et al., 1995). The above hypothesis is tested by a comparison of the life histories of two folivores in question on young and mature tea leaves and their adaptations to the different leaf quality and quantity.

The maintenance cost of *B. suppressaria* was higher in comparison with *Et. magnifica*. The increase in food consumption rate that enhanced the cost of maintenance of *B. suppressaria* than *Et. magnifica* may be due to its food quality. In *B. suppressaria* a large part of the ingested food is presumably utilized in maintaining of basal metabolism, resulting in low conversion for growth. In *Pseudaletia unipuncta,* similar phenomenon was observed by Mukerji & Guppy (1970). The suboptimal availability of nutrient often nitrogen or water reduces growth rate, increases maintenance costs and causes a lower metabolic efficiency (Schoonhoven et al., 1998). The production index of *Et. magnifica* was found to be higher than *B. suppressaria* and this might be due to the better suitability of the mature tea leaf as food in supporting the advanced life stages of the former species.

Study on approximate digestibility (AD) showed a higher value in *B. suppressaria* as compared with that of *Et. magnifica*. A higher AD and assimilation are known to be influenced by quality, specially of nitrogen, water and toxin contents of the plant food (Muthukrishnan &

Pandian, 1987). The increased AD in response to tea leaf quality could also be as a result of changes at the levels of digestive enzymes. Higher activity of digestive enzymes in relation to food composition have been reported by Hinks & Erlandson (1994) and Ishaaya & Swirski (1976). Deficiencies in the quality of a food resource can be balanced by various mechanisms of nutritional compensation as is evident in *Et. magnifica* that overcome poor food quality by increase in their feeding period and better food conversion efficiency (Fig. 1 and Table 1). Starch is the main reserve polysaccharide in tea (Banerjee, 1993). The amylase activity found both in salivary and midgut of *B. suppressaria* indicates greater digestion of polysaccharides in midgut than its break down at the time of ingestion in the oral cavity *vis a vis* in *Et. magnifica* amylase activity of equal quantity indicates almost similar polysaccharide digestion at salivary and midgut levels. This is possibly an adaptation for better digestion of starch through an increase of the feeding period and higher conversion efficiencies (Table 2). In unprocessed tea, protein makes upto 20% of the dry weight (Mulky, 1993). The protease activity in oral as well as midgut of *B. suppressaria* and *Et. magnifica* ensure an active protein digestion at both the levels. Nevertheless a higher protease activity in salivary secretion of *Et. magnifica* possibly ascertains a better digestion of the available protein of mature leaves, starting in the oral cavity followed by midgut (Table 2). The activity of lipase is much reduced than the other two digestive enzymes. In *B. suppressaria* the lipase activity is significantly higher than that of *Et. magnifica* both at salivary and midgut levels possibly because the former feeds on young tea leaves in which lipid make up 4% to 9% of the dry matter (Roberts, 1974; Mahanta et al., 1985). The lipase activity has also been reported in the midgut of *Manduca sexta* (Rubiolo et al., 2000) and *Spilosoma obliqua* (Anwar & Saleemuddin, 1997). The digestive enzymes are mainly reported from the midgut of different insects (Hori et al., 1981; Lenz et al., 1991). The present study on feeding biology and digestive enzyme activities reveals different exploitation strategies by the two folivores of two qualities of tea leaves (young and mature). Further, it establishes that *Et. magnifica* has a better adaptive flexibility than that of *B. suppressaria* because of its greater efficiency in converting both ingested and digested food. The study throws-up future research opportunities in non-conventional management of these two pests based on digestive enzyme inhibitors and other HPR strategies, which would be a necessity in developing IPM – programme of tea.

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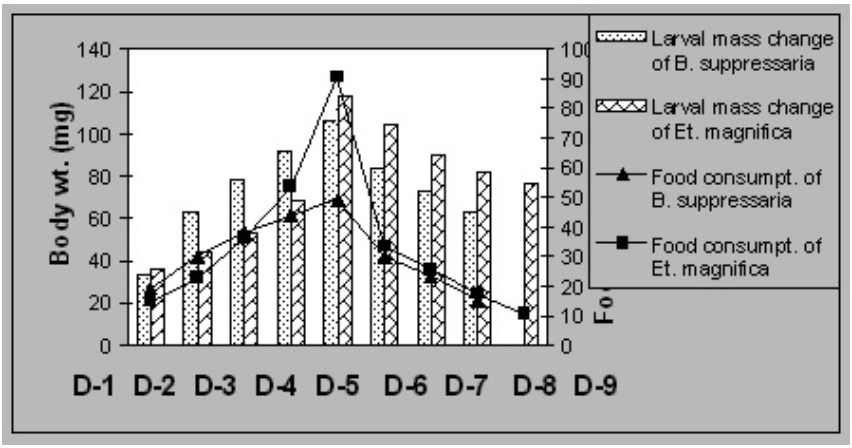

Fig. 1.Relation of dry mass (mg) changes (left ordinate) and daily food consumed (mg) (right ordinate) during development of Vth instar larvae of *Buzura suppressaria* and *Eterusia magnifica* (D = day)

Table 1. Nutritional Indices of *Buzura suppressaria* and *Eterusia magnifica* (Vth instars) on tea leaf (Mean ± SE).

Vth instars	**RCR**	**RGR**	**ECI**	**ECD**	**AD**	**Ment. Cost**	Prodn. Index
B. suppressaria	0.630a ± 0.008	0.078a ± 0.002	12.355a ± 0.246	24.761a ± 0.453	49.904a ± 0.441	3.056a ± 0.070	0.247a ± 0.005
E. magnifica	0.574b ± 0.004	0.080a ± 0.001	13.879b ± 0.212	31.241b ± 0.509	44.453b ± 0.243	2.212b ± 0.051	0.312b ± 0.005

Means followed by the same letter are not significantly different using t-test at $p > 0.05$

Table 2. Digestive enzymes of salivary gland (SG) and midgut (MG) homogenate of *Buzura suppressaria* and *Eterusia magnifica* (Mean ± SE) (n = 10)

Amylase (μM. mg protein $^{-1}$. min $^{-1}$)			***Protease*** (Amount of protein, casein, utilized)		***Lipase*** (Activity meq. / min /g of sample)	
	Salivary gland	Midgut	Salivary gland	Midgut	Salivary gland	Midgut
B. suppressaria	0.318± 0.71 aA	0.405 ± 0.62 bB	38.22 ± 0.19 aA	44.81 ± 0.38 bB	0.0076 ± 0.0002 aA	0.0328 ± 0.0013 bB
E. magnifica	0.331 ± 0.37 bA	0.348 ± 0.63 aB	44.45 ± 0.46 bA	43.49 ± 0.22 aB	0.0043 ± 0.0001 bA	0.0127 ± 0.0009 aB

Difference in lower case letters in columns indicate significance difference of mean using t-test at p> 0.001; Difference in upper case letters for each enzyme in rows indicate significance difference of mean using t-test at p> 0.001

CONTRIBUTIONS TO THE KNOWLEDGE OF TURKISH AUCHENORRHYNCHA (HOMOPTERA, FULGOROMORPHA AND CICADOMORPHA , EXCL. CICADELLIDAE) WITH A NEW RECORD, *SETAPIUS KLAPPERICHIANUS* DLABOLA, 1988

Emine Demir*

* Gazi University, Faculty of Science & Arts, Department of Biology, 06500 Teknikokullar, Ankara, TURKEY. E-mail: eminedemird@ yahoo.com

[Demir, E. 2007. Contributions to the knowledge of Turkish Auchenorrhyncha (Homoptera, Fulgoromorpha and Cicadomorpha , excl. Cicadellidae) with a new record, *Setapius klapperichianus* Dlabola, 1988. Munis Entomology & Zoology 2 (1): 39-58**]**

ABSTRACT: In this study, 2721 samples of Auchenorrhyncha (excl. Cicadellidae) species collected from Antalya region in south-west Turkey during field studies in the years 1999 and 2001-2003 are examined. 74 species belonging to 13 families are found to be distributed in the region. Among these, 14 species belong to the Family Cixidae, 13 species to Delphacidae, 1 species to Meenoplidae, 1 species to Achilidae, 6 species to Dictyopharidae, 1 species to Tropiduchidae, 6 species to Tettigometridae, 2 species to Caliscelidae, 11 species to Issidae, 1 species to Flatidae, 9 species to Cicadidae, 7 species to Cercopidae and 2 species to Membracidae. Distribution of these species in Turkey and their host plants are given along with their locality records. 47 of these examined species are new records for Antalya and *Setapius klapperichianus* Dlabola, 1988 is a new record for Turkey's fauna.

KEY WORDS: Homoptera, Fulgoromorpha, Cicadomorpha, fauna, new record, Turkey.

Turkey's first faunistic records of Auchenorrhyncha (excl. Cicadellidae) are given by Fahringer (1922), Dlabola (1957, 1971a, 1971b, 1974, 1977, 1979a 1979b, 1980, 1981, 1982, 1983a, 1983b, 1984a, 1984b, 1985, 1986, 1995), Linnavuori (1965), Boulard (1979), Asche (1982), Hoch and Remane (1985), Kalkandelen (1980, 1987, 1988) and Kartal (1978, 1980, 1981, 1983, 1985a, 1985b, 1986, 1987). Lodos and Kalkandelen (1980a, 1980b, 1980c, 1981a, 1981b, 1981c, 1988) compile the faunistic records of the studies until 1988 and state that 302 Auchenorrhyncha (excl. Cicadellidae) species are distributed in Turkey, in the checklist they prepared. Later, the studies of Kalkandelen (1989a, 1989b, 1990, 1993, 1994, 2000), Boulard (1993), Kartal, et. al. (1994), Güçlü (1996), Demir (1998, 2006), Emeljanov (2002) and Gnezdilov (2002) present 17 records of species belonging to Auchenorrhyncha (excl. Cicadellidae). According to the studies until recently, 319 species of Auchenorrhyncha (excl. Cicadellidae) were known to be distributed in Turkey.

The province of Antalya, which is selected as the survey area, is located on the Mediterranean coastline in southwest of Turkey, between 29°.15′-32°.36′ eastern longitudes and 36°.06′-37°.27′ nothern latitudes. The elevation ranges between 0 and 3070m This province is

important because of its biological diversity with four national parks and three nature protection areas; namely, Olympos Beydağları Coastal National Park, Termessos Güllük Mountain National Park, Köprülü Kanyon National Park, Altınbeşik National Park, Çığlıkara Nature Protection Area, Dibek Nature Protection Area and Alacadağ Nature Protection Area. 40 Auchenorrhyncha (excl. Cicadellidae) species are found to be distributed in the survey area, as a result of compilation of the records in the studies of the authors mentioned above.

Climate of the Study Area:

The region is under the influence of a Mediterranean climate that is an outer tropical climate, in which photoperiodism is daily and seasonal, precipitation occurs mostly in cold or relatively colder seasons, summer is the dry period and summer drought coincides with maximum summer temperature. All the stations except Gazipaşa (796.3 mm), which is the easternmost station, receive precipitation over 1000mm, according to Akman (1995). On the coastline, 60-65% of precipitation is received in winter and 0.5-2% in summer.

Vegetation of the Survey Area:

There are communities dominated by *Pinus brutia* forest, garrigue and maquis along the coastline at approximately up to 1000 m above sea level, although they are damaged by human activity in many places. *Pinus brutia* can sometimes be seen above 1000 meters and on the coast it is mixed with *Pinus pinea*. *Ceratonia siliqua*, *Pistacia lentiscus*, *Euphorbia dendroides*, *Myrthus communis*, *Clematis cirrhosa*, *Rubia tinctoria*, *Teucrium creticum* and *Capparis spinosa* are examples of common characteristic species of the coastline. Examples of common characteristic species of the zone just above the coastline are *Quercus coccifera*, *Pistacia terebinthus* ssp. *palaestina*, *Crataegus aronia* ssp. *aronia*, *Fontanesia phillyreoides*, *Rhamnus oleoides* ssp. *graecus*, *Arbutus andrachne*, *Melica eligulata*, *Eryngium falcatum* and *Rubia tenuifolia*. On the eastern half of the region at elevations of 1500m and higher, there are forests comprising of *Cedrus libani*, *Abies cilicica*, *Pinus nigra* ssp. *pallasiana*, *Quercus infectoria* ssp. *boissieri*, *Quercus libani*, *Juniperus excelsa*, and *Junuperus drupacea*. The western parts of the region are covered with *Cedrus libani* forests at elevations of 1500m and higher. Although cedars here show floristic structure, blackpine forests are extremely poor. *Lonicera nummulariifolia* ssp. *glandulifera*, *Digitalis cariensis* and *Acer hyrcanum* ssp. *sphaerocaryum* are examples of characteristic species in this part Akman (1995).

MATERIALS AND METHODS

Field studies in 143 different localities were carried out during the months of March-October in the years 1999 and 2001-2003. In this

study, 2721 adult Auchenorrhyncha (excl. Cicadellidae) samples were collected by sweeping the plants with a wooden shaft net and the of samples collected from only one species of plant were determined. Homopterans, found in the net after sweeping were collected with an aspirator. The samples in the aspirator were then killed by ethyl acetate in a jar and put in standard envelopes and prepared according to the standard methods to produce museum material. The studied samples are preserved in the collection of the author.

RESULTS

There were found to be 74 species of Auchenorrhyncha (excl. Cicadellidae) in the survey area. These are listed below, together with their distribution in Turkey and the plants found to be their host. Out of these examined species 47 are new records for Antalya and *Setapius klapperichianus* Dlabola, 1988 is a new record for Turkey.

Family: Cixiidae Spinola, 1839

***Cixius* (*Ceratocixius*) *pallipes* Fieber, 1876**

Materials: Manavgat, Değirmenli, 04.08.1999 1♀ on *Salix*. **Distribution in Turkey:** Adana, Adıyaman, Afyon, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bartın, Çanakkale, Çankırı, Diyarbakır, Düzce Erzincan, Erzurum, Eskişehir, Gaziantep, Giresun, Gümüşhane, Hakkari, Iğdır, İzmir, Karaman, Kırşehir, Konya, Kütahya, Kahramanmaraş, Malatya, Mardin, Muğla, Ordu, Sakarya, Samsun, Tokat, Şanlıurfa, Yozgat (Lodos & Kalkandelen, 1980a; Dlabola, 1981; Kalkandelen, 1988). **Remarks:** Known to Antalya.

***Cixius* (*Ceratocixius*) *remotus* Edwards, 1888**

Materials: Manavgat, Yukarışıklar-Tilkiler, 460 m., 14.05.2001 1♂1♀ on *Cistus creticus*. **Distribution in Turkey:** Adana, Erzurum, Konya (Kalkandelen, 1988). **Remarks:** New for Antalya.

***Duilius seticulosus* (Lethierry, 1874)**

Materials: Serik: Aspendos, 18.07.2002 14♂2♀; Manavgat: Taşağıl, 60 m., 27.08.2003 11♂5♀; Hacıobası, 26.08.2003 6♂ on *Tamarix*. **Distribution in Turkey:** Antalya, Erzincan, Kahramanmaraş, Nevşehir (Lodos & Kalkandelen, 1988; Kalkandelen, 1989). **Remarks:** Known to Antalya.

***Eumecurus gyaurus* (Dlabola, 1957)**

Materials: İbradı: Üzümdere, 470 m., 18.08.1999 1♀; Düzlerçamı, 280 m., 22.07.2001 1♀ on maqius shrubs. **Distribution in Turkey:** Adana, Antalya (Dlabola, 1957; Kalkandelen, 1989b). **Remarks:** Endemic to Turkey and known to Antalya.

***Pentastiridius* (*s. str.*) *leporinus* (Linnaeus 1761)**

Materials: Finike, 06.06.2001 1♀. It has been collected from weeds in *Vitex*-shrubs. **Distribution in Turkey:** Antalya, Konya, Mersin, Toros Dağları. (Linnavuori, 1965; Dlabola, 1981; Kalkandelen, 1990). **Remarks:** Known to Antalya.

***Reptalus* (*s. str.*) *horridus* (Linnavuori, 1962)**

Materials: Manavgat: Demirciler, 10 m., 17.08.1999 2♂; Demirciler, 40 m., 24.07.2001 1♂1♀; Akseki: Murtiçi, 540 m., 25.07.2001 1♂; İbradı: Başlar, 1440 m., 21.08.2002 2♂2♀ on *Quercus*. **Distribution in Turkey:** Adana, İzmir (Kalkandelen, 1994). **Remarks:** New for Antalya.

***Reptalus oleae* Dlabola, 1987**

Materials: Manavgat: Tilkiler, 470 m., 14.05.2001 1♂; Beşkonak, Köprülü Kanyon, 495 m., 07.06.2001 1♂3♀; Demirciler, 105 m., 18.05.2002 4♂2♀; Demirciler, 105 m., 21.06.2002 1♂1♀; Korkuteli: Korkuteli-Kargalık, 1060 m., 06.06.2001 1♂; Gündoğmuş: Güneycik, 210 m., 22.06.2002 1♀; Akseki: Güçlüköy, 575 m., 22.06.2002 1♀ on *Arbutus andrachne, Pinus brutia*, *Celtis australis* and *Verbascum*. **Distribution in Turkey:** Antalya; Kaş, Mersin, Muğla. (Kalkandelen, 1994). **Remarks:** Endemic to Turkey and known to Antalya.

***Setapius klapperichianus* Dlabola, 1988**

Materials: Manavgat: Bucakşeyhler, 24.07.1999 2♀; Manavgat, 21.07.1999 1♀; Manavgat, 10.08.1999 1♂1♀; Manavgat, 10 m., 20.07.1999 1♀; Değirmenli, 04.08.1999 1♀; Demirciler, 65 m., 21.07.1999 1♂; Manavgat, 18.09.1998 2♂3♀; Beşkonak, 145 m., 07.06.2001 2♂; Örenşehir, 15.10.2001 1♀; Çakış, 16.10.2001 1♂; Manavgat, 10 m, 07.09.2001 1♂4♀; Kemer: Böğürtlenözü, 18.04.2001 1♂3♀; Kemer, 06.06.2001 1♂; Alanya: Okurcalar, 20.05.2002 1♀; Serik: Dikmen, 18.07.2002 1♂; Finike: Yeşilyurt, 18.04.2001 1♂2♀. It has been collected from weeds in fields and *Pinus brutia* forest. **Distribution in Turkey:** This species is the first record in Turkey. **Remarks:** New for Turkey.

***Pentastira major* Kirschbaum, 1868**

Materials: Manavgat: Demirciler, 10 m., 17.08.1999 1♂ on *Quercus*. **Distribution in Turkey:** Adana, Ankara, Antalya; Alanya, Bolu, Çankırı, Çorum, Diyarbakır, Gaziantep, Giresun, Hatay, Isparta, İzmir, Konya, Karaman, Kahramanmaraş, Manisa, Mardin, Muş, Niğde, Samsun, Tekirdağ, Tokat, Şanlıurfa, Van, Yozgat (Linnavuori, 1965; Lodos & Kalkandelen, 1980a; Kalkandelen, 1993). **Remarks:** Known to Antalya.

***Pentastira megista* Emeljanov, 1978**

Materials: İbradı: Ormana, 1000 m., 21.08.2002 1♂ on maqius shrubs. **Distribution in Turkey:** Adana, Ankara, Çankırı, Diyarbakır, Erzurum, Konya, Karaman, Muş, Niğde, Yozgat (Kalkandelen, 1993). **Remarks:** New for Antalya.

***Hyalesthes luteipes* Fieber, 1876**

Materials: Manavgat: Demirciler, 40 m., 17.07.2002 1♂ on *Fontanesia phillyreoides*. **Distribution in Turkey:** Ankara, Aydın, Çorum, Diyarbakır, İstanbul, Kırşehir, Kahramanmaraş, Karaman, Kayseri, Konya, Mersin, Nevşehir, Van, Yozgat (Linnavuori, 1965; Dlabola, 1957, 1981; Lodos & Kalkandelen, 1980a, Hoch & Remane, 1985; Kalkandelen, 2000). **Remarks:** New for Antalya.

***Hyalesthes mavromoustakisi* Dlabola 1959**

Materials: Gündoğmuş: Serinyaka, 700 m., 25.07.1999, 1♀; Korkuteli: Korkuteli, 30 km W, 670 m., 28.08.2003 2♀ on weeds and maqius shrubs. **Distribution in Turkey:** Diyarbakır (Lodos & Kalkandelen, 1980a). **Remarks:** New for Antalya.

***Hyalesthes mlokosiewiczi* Signoret, 1879**

Materials: Korkuteli: Koru Dağı, Kartal Yaylası, 1600 m., 23.06.2002 1♀ on *Salix*. **Distribution in Turkey:** Adana, Adıyaman, Afyon, Ankara, Aydın, Bilecik, Burdur, Çankırı, Diyarbakır, Gaziantep, Isparta, İzmir, Kahramanmaraş, Kilis, Malatya, Mardin, Mersin, Muğla, Siirt, Şanlıurfa, Tokat (Dlabola, 1957, 1981; Lodos & Kalkandelen, 1980a, Kalkandelen, 2000). **Remarks:** New for Antalya.

***Hyalesthes obsoletus* Signoret, 1865**

Materials: İbradı: Üzümdere, 470 m., 18.08.1999, 3♂2♀; Manavgat: Demirciler 40 m, 11.05.2001 1♀; Hacıobası, 14.10.2001 1♂; Hacıobası, 22.06.2002 1♀; Taşağıl, 60 m., 27.08.2003 4♂; Hacıobası, 26.08.2003 4♂; Akseki: Erenkaya, 630 m., 22.06.2002 3♂2♀; Finike: Dağbağ, 475 m., 13.07.2002 1♂1♀; Kale: Kale, 20.08.2002 1♀. It has been collected from weeds in fields and *Vitex agnus-castus*. **Distribution in Turkey:** Adana, Afyon, Adıyaman, Ağrı, Ankara, Antalya, Aydın, Balıkesir, Bolu, Burdur, Bursa, Çanakkale, Çankırı, Çorum, Diyarbakır, Düzce, Edirne, Elazığ, Erzincan, Erzurum, Eskişehir, Gaziantep, Giresun, Hakkari, Iğdır, Isparta, , İstanbul, Kahramanmaraş, Konya, Malatya, Mardin, Mersin, Muğla, Nevşehir, Ordu, Rize, Sakarya, Sinop, Sivas, Tokat, Trabzon, Şanlıurfa, Van (Fahringer, 1922; Dlabola, 1957, 1981; Hoch & Remane, 1985; Lodos & Kalkandelen, 1980a; Kalkandelen, 2000). **Remarks:** Known to Antalya.

Family: Delphacidae Leach, 1815

***Asiraca clavicornis* (Fabricius, 1794)**

Materials: Manavgat: Evrenleryavşı, 10 m., 16.03.2002 1♀. It has been collected from weeds in *Pinus brutia*. **Distribution in Turkey:** Amasya, Ankara, Antalya, Aydın, Çorum, Denizli, Erzurum, İstanbul, İzmir, Konya, Kütahya, Muğla, Nevşehir, Samsun, Sinop, Yozgat (Fahringer, 1922; Lodos & Kalkandelen, 1980b; Dlabola, 1981; Asche, 1982; Güçlü, 1996). **Remarks:** Known to Antalya.

***Kelisia ribauti* Wagner, 1938**

Materials: Akseki: Geriş, 700 m., 17.04.2001 7♂11♀. It has been collected from weeds in *Pinus brutia*. **Distribution in Turkey:** Ankara, Aydın, Bitlis, Denizli, Diyarbakır, Erzurum, Hakkari, Konya, Malatya, Siirt, Van (Dlabola, 1957, 1981; Lodos & Kalkandelen, 1980b; Asche, 1982; Güçlü, 1996). **Remarks:** New for Antalya.

***Kelisia yarkonensis* Linnavuori, 1962**

Materials: Manavgat: Boztepe, Alara, 15.10.2001 1♀; Bucakşeyhler, 70 m., 23.04.2002 1♂; Kale, Eseler, 55 m, 15.05.2001 1♀. It has been collected from weeds in fields. **Distribution in Turkey:** Konya (Asche, 1982). **Remarks:** New for Antalya.

***Tropidocephala tuberipennis* (Mulsant et Rey, 1855)**

Materials: Manavgat: Bucakşeyhler, 24.07.1999 1♀; Bucakşeyhler, 13.08.1999 2♀; Hacıobası, 14.10.2001 1♂; Demirciler, 40 m., 20.06.2002 43♂35♀; Kemer: Kemer, 06.09.2002 1♀. On Graminae. **Distribution in Turkey:** Adana, Antalya, Aydın, Mersin (Dlabola, 1957; Asche, 1982). **Remarks:** Known to Antalya.

***Chloriana ponticana* Asche, 1982**

Materials: Gazipaşa: Çalıpınar-Kahyalar, 20 m., 20.05.2002 1♀ on *Arundo donax*. **Distribution in Turkey:** Antalya (Asche, 1982). **Remarks:** Known to Antalya.

***Chloriana flaveola* Lindberg, 1948**

Materials: Manavgat: Demirciler, 65 m., 15.04.2001 1♀; Kumluca: Kumluca, 06.06.2001 6♀; Alanya: Konaklı, 25 m, 24.04.2002 1♀; Düzlerçamı: 280 m., 22.07.2001 1♀ on *Arundo donax*. **Distribution in Turkey:** Adana (Dlabola, 1957). **Remarks:** New for Antalya.

***Laodelphax striatellus* (Fallen, 1826)**

Materials: Manavgat: Bucakşeyhler, 13.08.1999 1♂2♀; Bucakşeyhler, 18-28.06.1997 1♀; Beşkonak, 145 m., 07.06.2001 5♂2♀; Demirciler, 65 m., 05.06.2001 1♂; Demirciler, 20 m., 18.05.2002 2♂2♀; Demrciler, 40 m, 18.08.2001 6♂13♀; Manavgat, 10 m, 07.09.2001 3♂5♀; Alanya: Obaköy, 25 m., 12.08.1999 1♂3♀; Elmalı: Akçay, 1100 m., 28.07.1999 1♂; Kemer: Kemer, 06.06.2001 8♂4♀; Böğürtlenözü, 18.04.2001 5♂8♀; Çamyuva, 18.04.2001 2♂11♀; Kemer, 06.09.2002 1♂1♀; Finike: Turunçova, 50 m., 06.06.2001 6♂13♀; Serik: Aspendos, Köprüçayı, 16.10.2001 2♀; Camili, 26.07.2001 6♂4♀; Güllük Dağı: Araştırma Ormanı, 750 m., 21.05.2002 1♂; Korkuteli: Datköy, 960 m., 13.07.2002 15♂16♀; Kale: Köşkerler, 240 m, 15.05.2001 3♂9♀; Kumluca, Kavakdibi, 130 m, 24.06.2002 7♂; Gazipaşa: Macarköy, 09.09.2001 5♂1♀; Kaş: Kalkan, Üzümlü, 285 m, 15.05.2001 4♂5♀. It has been collected from weeds in *Pinus brutia* forest and fields. **Distribution in Turkey:** Adana, Adıyaman, Ankara, Antalya, Bilecik, Bitlis, Diyarbakır, Erzincan, Erzurum, Iğdır, İzmir, Kahramanmaraş, Kars, Malatya, Malatya, Mersin, Muğla, Nevşehir, Niğde, Ordu, Rize, Siirt (Dlabola, 1971, 1981; Lodos & Kalkandelen, 1980b; Asche, 1982; Güçlü, 1996). **Remarks:** Known to Antalya.

***Sogatella vibix* (Haupt, 1922)**

Materials: Kaş: Kalkan, Yeşilköy, 29.07.1999 1♂; Manavgat: Bucakşeyhler, 15-26.08.1997 1♂; Çakış, 16.10.2001 2♀; Örenşehir, 15.10.2001 1♀(Graminae); Taşağıl, Kilimli, 40 m, 08.09.2002 1♂5♀; Ilıca, 07.09.2001 2♀; Demirciler, 40 m, 18.08.2001 2♂; Gazipaşa: Çalıpınar-Kahyalar, 20 m., 20.05.2002 1♀; Asarcık, 24.04.2002 3♂18♀; Finike: Yeşilyurt, 18.04.2001 3♂1♀; Erenkavak, 65 m, 24.06.2002 1♂4♀; Yeşilyurt, 06.09.2002 3♂7♀; Serik: Dikmen, 26.07.2001 1♂8♀; Aksu: Topallar, 26.07.2001 2♂13♀; Kale: Eseler, 55 m, 24.06.2002; 6♂15♀; Kemer: Böğürtlenözü, 21.08.2001 5♂2♀; Kemer, 06.09.2002 2♂; Alanya: Konaklı, 25 m, 24.04.2002 4♂. It has been collected from weeds in *Pinus brutia* forest and fields. **Distribution in Turkey:** Ankara, Aydın, Bitlis, Diyarbakır, Erzurum, Hatay, Mersin, Van (Dlabola, 1971, 1981; Asche, 1982; Güçlü, 1996). **Remarks:** New for Antalya.

***Muirodelphax aubei* (Perris, 1857)**

Materials: Elmalı: Çığlıkara, 1600 m., 28.08.2003 35♂39♀. It has been collected from weeds in *Cedrus libani*. **Distribution in Turkey:** Ankara, Denizli, Erzurum, İzmir, Van (Dlabola, 1957, 1981; Lodos & Kalkandelen, 1980b; Asche, 1982; Güçlü, 1996). **Remarks:** New for Antalya.

***Toya propinqua* (Fieber, 1866)**

Materials: Manavgat: 21.07.1999 1♂1♀; Bucakşeyhler, 13.08.1999 2♂1♀; Bucakşeyhler, 24.07.1999 1♂2♀; Manavgat, 18.09.1998 1♂; Demirciler, 10 m., 17.08.1999 1♀; Belenobası, 130 m., 15.04.2001 2♀; Beşkonak, 145 m., 07.06.2001 3♂9♀; Demirciler, 40 m., 05.06.2001 1♂; Bucakşeyhler, 70 m., 23.04.2002 2♂; Demirciler, 20 m., 18.05.2002 1♂; Demirciler, 105 m., 21.06.2002 1♀; Demirciler, 40 m., 20.06.2002 3♀; Hacıobası, 22.06.2002 1♂1♀; Alanya: Obaköy, 25 m., 12.08.1999 1♂3♀; Okurcalar, 12.05.2001 1♂; Okurcalar, 09.09.2001 2♂2♀; Konaklı, 25 m, 24.04.2002 3♂2♀; Kaş: Kalkan, Yeşilköy, 29.07.1999 3♂3♀; Finike: Turunçova, 50 m., 06.06.2001 1♂; Kumluca: Kavakköy, 18.04.2001 2♂6♀; Kale: Eseler, 55 m, 15.05.2001 1♂3♀; Serik: Dikmen, 26.07.2001 1♂7♀; Gazipaşa. Asarcık, 24.04.2002 4♂9♀; Kemer. Karabucak, 85 m, 25.05.2002 1♂4♀; Kemer, 06.09.2002 1♂8♀. It has been collected from weeds in *Pinus brutia* and fields. **Distribution in Turkey:** Adana, Afyon, Amasya, Ankara, Antalya, Aydın, Çanakkale, Denizli, Diyarbakır, Erzurum, Gaziantep, Hatay, Kastamonu, Mardin, Mersin, Muğla, Ordu, Samsun, Siirt, Sinop (Dlabola, 1957, 1971; Linnavuori, 1965; Lodos & Kalkandelen, 1980b; Asche, 1982; Güçlü, 1996). **Remarks:** Known to Antalya.

***Pseudaraeopus lethierryi* (Mulsant et Rey, 1879)**

Materials: Manavgat. Bucakşeyhler, 24.07.1999 1♂; Örenşehir, 15.10.2001 1♀; Düzlerçamı: 280 m., 22.07.2001 1♀; Gazipaşa: Çalıpınar-Kahyalar, 20 m., 20.05.2002 1♀; Macarköy, 09.09.2001 1♀; Kemer: Olimpos Milli Parkı, 20.08.2002 1♀; Finike, Erenkavak, 65 m, 24.06.2002 1♀. It has been collected from weeds in fields. **Distribution in Turkey:** Aydın (Asche, 1982). **Remarks:** New for Antalya.

***Delphacodoides anaxarchi* (Muir, 1926)**

Materials: Manavgat, Bucakşeyhler, 13.08.1999 4♀; Alanya, Kargıcak, 09.09.2001 3♀; Serik, Camili, 20.08.2001 1♂1♀; Manavgat, Demirciler, 40 m, 18.08.2001 1♀. It has been collected from weeds in *Pinus brutia* forest. **Distribution in Turkey:** Antalya, Mersin (Dlabola, 1957, 1981; Asche, 1982). **Remarks:** Known to Antalya.

***Perkinsiella dorsata* (Melichar, 1905)**

Materials: Manavgat, 18.09.1998 1♂; Manavgat, 10.08.1999 1♂; Demirciler, 40 m., 20.06.2002 2♀; Karaöz, 70 m, 18.08.2001 1♂; Kemer, Çamyuva, 18.04.2001 3♀; Aksu, Topallar, 26.07.2001 1♂2♀; Alanya, Okurcalar, 09.09.2001 2♀. It has been collected from weeds in *Pinus brutia* forest. **Distribution in Turkey:** Mersin, Muğla (Kalkandelen, 1980; Dlabola, 1981; Asche, 1982). **Remarks:** New for Antalya.

Family: Meenoplidae Fieber, 1872

***Meenoplus albosignatus* Fieber, 1866**

Materials: Termessos, Güllük Dağı, 900-1000 m., 22.07.2001 1♂; Gündoğmuş, Serinyaka, 625 m., 22.06.2002 1♂; Gazipaşa, Macarköy,

22.08.2002 1♀; İbradı, Başlar, 1440 m., 21.08.2002 1♂3♀ on *Quercus*. **Distribution in Turkey:** Adıyaman, Ankara, Bolu, Gaziantep, Hakkari, Malatya, Mardin, Muş (Dlabola, 1957, 1981; Linnavuori, 1965; Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

Family: Achilidae Stal, 1866

***Cixidia pilatoi* D'Urso & Guglielmino, 1995)**

Materials: Manavgat, Demirciler, 105 m., 18.05.2002 2♂3♀ on *Pinus brutia* and *Myrthus communis*. **Distribution in Turkey:** Adana (Linnavuori, 1965). **Remarks:** New for Antalya. The record of Adana has been reported as *C. marginicollis*. This record possibly belongs to *C. pilatoi.*

Family: Dictyopharidae Spinola, 1839

***Callodictya krueperi* (Fieber, 1876)**

Materials: Gündoğmuş, Çiçekoluk, 960 m., 25.07.1999 1♀; Akseki, Murtiçi, 540 m., 25.07.2001 5♂7♀; Manavgat, Demirciler, 40 m., 24.07.2001 2♂; Demirciler, 40 m., 17.07.2002 1♂; Serik, Sarıabalı, 18.07.2002 1♀; Kaş, Kemerköy, 260 m., 13.07.2002 2♀; Dirgenler, 265 m., 13.07.2002 1♂; İbradı, Başlar, 1440 m., 21.08.2002 1♂3♀ on *Quercus*, *Myrthus communis* and *Centaurea*. **Distribution in Turkey:** Hatay, İzmir, Tunceli (Linnavuori, 1965; Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

***Dictyophara* (*s. str.*) *asiatica* Melichar, 1912**

Materials: Kaş, Beldibi, 1400 m., 29.07.1999 1♂3♀; Manavgat, Bucakşeyhler, 45 m., 24.07.1999 1♂; Demirciler, 10 m., 17.08.1999 1♂1♀; Bucakşeyhler, 13.08.1999 1♀; Alanya, Obaköy, 25 m., 12.08.1999 1♀; Gündoğmuş, Çiçekoluk, 960 m., 25.07.2001 8♂17♀; Akseki, Murtiçi, 540 m., 25.07.2001 4♀; Manavgat, Demirciler, 40 m., 24.07.2001 3♂5♀; Bucakşeyhler, 45 m., 19.07.2001 3♂1♀; Alanya, Kargıcak, 21.07.2001 2♂; Manavgat, Demirciler, 20 m., 21.06.2002 1♀; Demirciler, 40 m., 20.06.2002 1♂2♀; Demirciler, 40 m., 17.07.2002 1♀; Kaş, Dirgenler, 265 m., 13.07.2002 1♀; Güllük Dağı, Araştırma Ormanı, 750 m., 19.07.2002 1♂; Serik, Dikmen, 18.07.2002 1♀; Hisarçandır, 770 m., 20.08.2002 1♂1♀; Kemer, Çamyuva, 20.08.2002 1♀; Olimpos Milli Parkı, 20.08.2002 1♂1♀; Sarıçınar Dağı, 20.08.2002 2♀; Manavgat, Hacıobası, 26.08.2003 1♀ on *Verbascum*, *Pistacia*, *Centaurea*, *Phlomis*, *Fontanesia phillyreoides*, *Quercus*, *Ficus carica*, *Myrthus communis, Vitex agnus-castus* and *Populus*. **Distribution in Turkey:** Adana, Amasya, Ankara, Aydın, Balıkesir, Bilecik, Bolu, Burdur, Denizli, Diyarbakır, Elazığ, Eskişehir, Erzincan, Isparta, İzmir, Kırklareli, Kütahya, Manisa, Muğla, Sakarya, Tunceli, Urfa, Van (Dlabola, 1957, 1981; Linnavuori, 1965; Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

***Dictyophara iranica* Linnavuori, 1962**

Materials: Manavgat, Boztepe, Alara, 15.10.2001 1♀; Serik, Aspendos, Köprüçayı, 16.10.2001 1♀; Aspendos, 18.07.2002 1♂; Taşağıl, 60 m., 27.08.2003 1♂2♀ on *Tamarix*. **Distribution in Turkey:** Siirt (Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

Dictyophara *(s. str.)* lindbergi *Metcalf, 1955*

Materials: Manavgat, 10 m., 20.07.1999 1♀; Serik, Dikmen, 18.07.2002 2♂1♀; Akseki, Güneykaya, 570 m., 25.07.1999 1♂1♀; Güllük Dağı, Araştırma Ormanı,

550 m., 19.07.2002 3♂1♀. It has been collected from weeds in *Pinus brutia* forest, *Ficus carica* and *Salix*. **Distribution in Turkey:** Adana, İzmir, Kütahya, Muğla, Tekirdağ (Dlabola, 1957; Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

***Dictyophara* (*Euthremma*) *multireticulata* Mulsant et Rey, 1855**
Materials: İbradı, Başlar, 1440 m., 21.08.2002 1♀ on *Quercus*. **Distribution in Turkey:** Denizli, Van (Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

***Dictyophara* (*Chanithus*) *xiphias* Puton, 1884**
Materials: Manavgat, Demirciler, 10 m., 17.08.1999 1♂2♀; Demirciler, 40 m., 21.07.1999 1♀; Gündoğmuş, Çiçekoluk, 960 m., 25.07.2001 1♀; Manavgat, Bucakşeyhler, 45 m., 19.07.2001 1♂; Güllük Dağı, Araştırma Ormanı, 750 m., 19.07.2002 1♂3♀; Gazipaşa, Macarköy, 22.08.2002 2♀. On *Phlomis*, *Fontanesia phillyreoides*, *Pistacia terebinthus*, and *Quercus*. **Distribution in Turkey:** İzmir (Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

Family: Tropiduchidae Stal, 1866
***Trypetimorpha occidentalis* Huang et Bourgoin, 1993**
Materials: Düzlerçamı, 280 m., 22.07.2001 1♀. It has been collected from weeds in *Pinus brutia* forest. **Distribution in Turkey:** Ankara (Demir, 1998). **Remarks:** New for Antalya.

Family: Tettigometridae Germar, 1821
***Tettigometra* (*Hystrigonia*) *hexaspina* Kolenati, 1857**
Materials: Korkuteli, Koru Dağı, Kartal Yaylası, 1600 m., 23.06.2002 1♂1♀; Söğütcük, 1010 m., 13.07.2002 1♀. It has been collected from weeds in fields. **Distribution in Turkey:**Ağrı, Ankara, Edirne, Gaziantep, Giresun, Isparta, Tekirdağ, Urfa (Dlabola, 1957; Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

***Tettigometra* (*Metroplaca*) *longicornis* (Signoret, 1866)**
Materials: Manavgat, Yukarışıklar-Tilkiler, 460 m., 14.05.2001 1♂1♀; Korkuteli, Koru Dağı, Kartal Yaylası, 1600 m., 23.06.2002 1♂4♀. It has been collected from weeds in fields. **Distribution in Turkey:**Ankara, Sivas (Dlabola, 1957, 1981). **Remarks:** New for Antalya.

***Tettigometra* (*Mitricephalus*) *eremi* Lindberg, 1948**
Materials: Manavgat, Yukarışıklar-Tilkiler, 460 m., 14.05.2001 11♂18♀; Güllük Dağı, Araştırma Ormanı, 750 m., 21.05.2002 3♂4♀; Korkuteli, Koru Dağı, Kartal Yaylası, 1600 m., 23.06.2002 8♂14♀. It has been collected from weeds in *Pinus brutia* forest, fields and *Salix*. **Distribution in Turkey:** Ankara, Aydın, Burdur, Çanakkale, İzmir, Kayseri, Kocaeli, Kütahya, Manisa, Sivas, Uşak (Lodos & Kalkandelen, 1980c; Dlabola, 1981). **Remarks:** New for Antalya.

***Tettigometra* (*Mitricephalus*) *leucophaea* (Preyssler 1792)**

Materials: Korkuteli, Söğütcük, 1010 m., 13.07.2002 5♂6♀; İbradı, Başlar, 1440 m., 21.08.2002 1♀; Elmalı, Çığlıkara, 1600 m., 28.08.2003 1♀. It has been collected from weeds in *Juniperus-Abies cilicia* forest and *Quercus*.

Distribution in Turkey: Adana, Ankara, Adıyaman, Ağrı, Bilecik, Bolu, Burdur, Çanakkale, Çankırı, Çorum, Diyarbakır, Edirne, Elazığ, İstanbul, İzmir, Mardin, Nevşehir, Sivas, Tekirdağ, Urfa (Dlabola, 1957; Linnavuori, 1965; Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

***Tettigometra* (*s. str.*) *sulphurea* Mulsant et Rey, 1855**

Materials: Manavgat, Belenobası, 130 m., 15.04.2001 1♀; Bucakşeyhler, Seleukeia, 250 m., 23.04.2002 1♀; Bucakşeyhler, 70 m., 23.04.2002 1♂1♀. It has been collected from weeds in *Pinus brutia* forest. **Distribution in Turkey:** Adana, Ankara, Artvin, Aydın, Bilecik, Bursa, Diyarbakır, Elazığ, İzmir, Kütahya, Nevşehir, Sakarya, Urfa, Uşak, Van (Dlabola, 1957; Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

***Tettigometra* (*s. str.*) *virescens* (Panzer, 1799)**

Materials: Kemer, Ovacık, 1150 m., 20.08.2002 1♂. It has been collected from weeds in *Cedrus libani* forest. **Distribution in Turkey:** Adana, Adıyaman, Ankara, Bursa, Diyarbakır, Elazığ, Erzincan, Gaziantep, Hatay, Iğdır, Mardin, Tunceli, Urfa, Van (Fahringer, 1922; Lodos & Kalkandelen, 1980c). **Remarks:** New for Antalya.

Family: Caliscelidae Amyot & Serville, 1834

***Bruchoscelis peculiaris* (Horvath, 1904)**

Materials: Manavgat, Demirciler, 40 m., 20.06.2002 1♀. On Graminae. **Distribution in Turkey:** Ankara, Yozgat (Dlabola, 1957; Kartal, 1985). **Remarks:** New for Antalya and endemic to Turkey.

***Ommatidiotus longiceps* Puton, 1896**

Materials: Serik, Dikmen, 18.07.2002 1♀. It has been collected from weeds in *Pinus brutia* forest. **Distribution in Turkey:** Diyarbakır, Mardin, Urfa (Lodos & Kalkandelen, 1988). **Remarks:** New for Antalya.

Family: Issidae Spinola, 1839

***Mycterodus* (*s. str.*) *lodosicus* Dlabola, 1980**

Materials: Termessos, Güllük Dağı, 900-1000 m., 22.07.2001 3♀; Güllük Dağı, 540 m., 22.07.2001 2♂; Araştırma Ormanı, 550 m., 19.07.2002 1♂; Araştırma Ormanı, 750 m., 19.07.2002 1♂ on *Phlomis*, *Quercus* and *Cytisus laburnum*. **Distribution in Turkey:** Aydın (Dlabola, 1980). **Remarks:** New for Antalya and endemic to Turkey.

***Mycterodus* (*Comporodus*) *spinicordatus* (Dlabola, 1983)**

Materials: Manavgat, Beşkonak, Köprülü Kanyon, 495 m., 07.06.2001 10♂6♀; Gündoğmuş, Güneycik, 210 m., 08.06.2001 1♂; Gazipaşa, Kahyalar, 22.08.2002 1♂; Manavgat, Beşkonak, Köprülü Kanyon, 495 m., 27.08.2003 1♂ on *Arbutus andrachne*, *Ceratonia siliqua* and *Nerium oleander*. **Distribution in Turkey:** Antalya (Dlabola, 1983). **Remarks:** Endemic to Turkey and known to Antalya.

***Mycterodus* (*Comporodus*) *tekneticus* (Dlabola, 1982)**

Materials: Manavgat, Yukarışıklar-Tilkiler, 460 m., 14.05.2001 3♂1♀; Akseki, Güçlüköy, 550 m., 21.04.2002 2♂; Gündoğmuş, Güneycik, 210 m., 21.04.2002 7♂1♀; Güneycik, 240 m., 21.04.2002 2♂1♀; Çiçekoluk, 960 m., 19.05.2002

1♂3♀; Güneycik, 210 m., 22.06.2002 3♂; Akseki, Erenkaya, 630 m., 22.06.2002 1♀; Kemer, Ovacık, 1150 m., 20.08.2002 1♀ on *Phlomis*, *Fontanesia phillyreoides*, *Cercis*, *Arbutus andrachne* and *Quercus*. **Distribution in Turkey:** Antalya (Dlabola, 1982). **Remarks:** Endemic to Turkey and known to Antalya.

***Tshurtshurnella alanyana* Dlabola, 1982**

Materials: Gündoğmuş, Çiçekoluk, 960 m., 25.07.1999 8♂17♀; Manavgat, Bucakşeyhler, 24.07.1999 1♂; Demirciler, 40 m., 21.07.1999 2♂; Demirciler, 40 m., 05.06.2001 1♂; Taşağıl, Kilimli, 40 m., 03.06.2001 2♂3♀; Gündoğmuş, Çiçekoluk, 960 m., 25.07.2001 17♂22♀; Alanya, Keşefli, 21.07.2001 4♂2♀; Manavgat, Bucakşeyhler, 45 m., 19.07.2001 1♀; Demirciler, 40 m., 24.07.2001 1♂; Termessos, Güllük Dağı, 900-1000 m., 22.07.2001 1♂; Manavgat, Demirciler, 40 m., 20.06.2002 6♂7♀; Akseki, Erenkaya, 630 m., 22.06.2002 1♂1♀; Gündoğmuş, Güneycik, 210 m., 22.06.2002 1♂; Güneycik, 210 m., 14.07.2002 1♀; Güllük Dağı, Araştırma Ormanı, 750 m., 19.07.2002 2♀; İbradı, Başlar, 1440 m., 21.08.2002 1♂1♀; Hisarçandır, 770 m., 20.08.2002 1♂3♀; Kemer, Sarıçınar Dağı, 1245 m., 20.08.2002 12♂7♀ on *Verbascum*, *Centaurea*, *Phlomis*, *Capparis*, *Fontanesia phillyreoides*, *Quercus*, Graminae, *Cistus creticus* and *Euphorbia*. **Distribution in Turkey:** Antalya (Dlabola, 1982). **Remarks:** Endemic to Turkey and known to Antalya.

***Latematium cingulatum* Dlabola, 1983**

Materials: Manavgat, Beşkonak, Köprülü Kanyon, 495 m., 07.06.2001 1♀; Termessos, Güllük Dağı, 900-1000 m., 22.07.2001 10♂4♀; Güllük Dağı, 540 m., 22.07.2001 2♂; Termessos, Güllük Dağı, 900-1000 m., 21.05.2002 1♂1♀; Güllük dağı, 900-1000 m., 19.07.2002 5♂3♀; Araştırma Ormanı, 550 m., 19.07.2002 1♂; Çığlık, 330 m., 19.07.2002 1♂ on *Arbutus andrachne*, *Cytisus laburnum* and shrubs. **Distribution in Turkey:** Antalya, Kütahya (Dlabola, 1983). **Remarks:** Endemic to Turkey and known to Antalya.

***Latilica antalyica* (Dlabola, 1986)**

Materials: Kaş, Kemerköy, 260 m., 13.07.2002 2♂2♀ on *Arbutus andrachne*. **Distribution in Turkey:** Antalya, Hatay (Dlabola, 1986). **Remarks:** Endemic to Turkey and known to Antalya.

***Latilica maculipes* (Melichar, 1906)**

Materials: Manavgat, Demirciler, 40 m., 24.07.2001 1♂1♀; Gündoğmuş, Çiçekoluk, 960 m., 25.07.2001 1♀; Serik, Sarıabalı, 18.07.2002 2♂1♀; İbradı, Başlar, 1440 m., 21.08.2002 1♀ on *Quercus*, *Myrthus communis* and maqius shrubs. **Distribution in Turkey:** Antalya, Hatay, Manisa, Muğla (Linnavuori, 1965; Dlabola, 1971, 1986; Lodos & Kalkandelen, 1981a). **Remarks:** Known to Antalya and known to Antalya.

***Latilica oertzeni* Matsumura, 1910**

Materials: Hisarçandır, 770 m., 20.08.2002 1♀; Kemer, Çamyuva, 20.08.2002 1♀. On *Cistus creticus* ve *Myrthus communis*. **Distribution in Turkey:** Antalya (Lodos & Kalkandelen, 1988). **Remarks:** Known to Antalya.

***Latilica retamae* (Linnavuori, 1962)**

Materials: Manavgat, Demirciler, 65 m., 14.04.2001 1♀; Demirciler, 40 m., 24.07.2001 1♂; Akseki, Murtiçi, 540 m., 25.07.2001 1♂ on *Quercus* and maqius

shrubs. **Distribution in Turkey:** Antalya (Lodos & Kalkandelen, 1988). **Remarks:** Known to Antalya.

***Agalmatium bilobum* (Fieber, 1877)**

Materials: Korkuteli, Yazır-İmrahor, 950 m., 27.07.1999 1♀; Akseki, Erenkaya, 680 m., 25.07.1999 1♀; Alanya, Okurcalar, 12.05.2001 1♂1♀; Gazipaşa, Çalıpınar, 25 m., 12.05.2001 6♂6♀; Manavgat, Tilkiler, 470 m., 14.05.2001 1♂1♀; Yukarışıklar, 200 m., 14.05.2001 165♂152♀; Demirciler, 105 m., 11.05.2001 39♂2♀; Taşağıl, Kilimli, 40 m., 03.06.2001 1♂2♀; Beşkonak, 145 m., 07.06.2001 5♂2♀; Taşağıl, Kilimli, 60 m., 03.06.2001 7♂5♀; Taşağıl, Sağırin, 40 m., 03.06.2001 3♂; Taşağıl, 55 m., 07.06.2001 1♂; Demirciler, 40 m., 05.06.2001 2♂2♀; Demirciler, 65 m., 05.06.2001 1♂1♀; Kemer, 06.06.2001 1♀; Gündoğmuş, Çiçekoluk, 960 m., 25.07.2001 1♂3♀; Akseki, Murtiçi, 540 m., 25.07.2001 2♂; Manavgat, Demirciler, 105 m., 22.04.2002 1♂; Güllük Dağı, Araştırma Ormanı, 750 m., 21.05.2002 6♂; Alanya, Okurcalar, 20.05.2002 1♂; Gazipaşa, Çalıpınar-Kahyalar, 20 m., 20.05.2002 11♂18♀; Manavgat, Demirciler, 105 m., 18.05.2002 20♂40♀; Demirciler, 20 m., 21.06.2002 2♂; Demirciler, 105 m., 21.06.2002 2♂3♀; Demirciler, 40 m., 20.06.2002 2♀; Gündoğmuş, Güneycik, 210 m., 22.06.2002 5♂5♀; Akseki, Erenkaya, 630 m., 22.06.2002 10♂11♀; Elmalı, Gökpınar, 1200 m., 13.07.2002 1♂4♀; Akçay, 1210 m., 13.07.2002 2♂; Güllük Dağı, Araştırma Ormanı, 550 m., 19.07.2002 2♂1♀; Araştırma Ormanı, 750 m., 19.07.2002 17♂8♀; Finike, Dağbağ, 475 m., 13.07.2002 1♀; Çığlık, 330 m., 19.07.2002 1♂; Korkuteli, Söğütcük, 1010 m., 13.07.2002 1♂1♀; Kaş, Kemerköy, 260 m., 13.07.2002 2♂1♀. It has been collected from weeds in *Pinus brutia* forest, on *Asphodelus aestivus*, *Verbascum*, *Phlomis*, *Fontanesia phillyreoides*, *Cytisus laburnum*, *Vitex agnus-castus* and *Cistus creticus*. **Distribution in Turkey:** Adana, Adıyaman, Afyon, Ankara, Aydın, Balıkesir, Bilecik, Burdur, Bursa, Çanakkale, Çorum, Denizli, Eskişehir, Gaziantep, Gümüşhane, Hatay, İzmir, Kırklareli, Kırşehir, Kocaeli, Kütahya, Malatya, Manisa, Muğla, Sakarya, Sivas, Tekirdağ, Tokat, Uşak, Yozgat (Linnavuori, 1965; Dlabola, 1981; Lodos & Kalkandelen, 1981a; Kartal, 1985). **Remarks:** New for Antalya.

***Bubastia* (*Acrestia*) *suturalis* (Fieber, 1877)**

Materials: Manavgat, Bucakşeyhler, 45 m., 19.07.2001 3♂1♀; Termessos, Güllük Dağı, 900-1000 m., 22.07.2001 1♂; Düzlerçamı, 280 m., 22.07.2001 1♀; Güllük dağı, Araştırma Ormanı, 750 m., 19.07.2002 2♂; Çığlık, 330 m., 19.07.2002 3♂; Güllük Dağı, Araştırma Ormanı, 550 m., 19.07.2002 1♀; Kaş, Kemerköy, 260 m., 13.07.2002 1♀; Çamyuva, 20.08.2002 1♂1♀; Ovacık, 1150 m., 20.08.2002 1♀; İbradı, Akşahap-İbradı, 530 m., 21.08.2002 1♂; Manavgat, Beşkonak, Köprülü Kanyon, 495 m., 27.08.2003 1♂; Beşkonak, 180 m., 27.08.2003 1♂ on *Fontanesia phillyreoides*, *Quercus*, *Pistacia terebinthus* and *Myrthus communis*. **Distribution in Turkey:** Adana, Burdur, Hatay, İzmir, Muğla (Dlabola, 1957, Linnavuori, 1965; Lodos & Kalkandelen, 1981a). **Remarks:** New for Antalya.

Family: Flatidae Spinola, 1839

***Phantia subquadrata* (Herrich-Schaffer, 1838)**

Materials: Akseki, Güçlüköy, 610 m., 18.08.1999 1♀; Korkuteli, Kargalık, 1250 m., 27.07.1999 1♀; Akseki, Murtiçi, 540 m., 25.07.2001 12♂19♀; Termessos, Güllük Dağı, 540 m., 22.07.2001 1♀; Güllük Dağı, 900-1000 m., 22.07.2001 1♂; Araştırma Ormanı, 550 m., 19.07.2002 1♀; Araştırma Ormanı, 750 m.,

19.07.2002 1♂1♀; İbradı, Akşahap-İbradı, 530 m., 21.08.2002 1♀; Kemer, Sarıçınar Dağı, 1245 m., 20.08.2002 1♀. *Cytisus laburnum*, *Genista*, *Spartium junceum* and *Sesamum indicum*. **Distribution in Turkey:** Adana, Ankara, Aydın, Bilecik, Denizli, Diyarbakır, Edirne, Gaziantep, Isparta, İzmir, Konya, Manisa, Mardin, Muğla (Fahringer, 1922; Dlabola, 1957; Lodos & Kalkandelen, 1981b). **Remarks:** New for Antalya.

Family: Cicadidae Leach, 1815

Lyristes plebejus (Scopoli, 1763)

Materials: Manavgat, Bucakşeyhler, 15-26.08.1997 3♂3♀; Demirciler, 65 m., 21.07.1999 1♂1♀ ; Akseki, Güneykaya, 570 m., 25.07.1999 1♂; Manavgat, Demirciler, 70 m., 22.07.1999 3♂; Akseki, Erenkaya, 680 m., 25.07.1999 3♂; Alanya, 24.07.1999 2♂; Korkuteli, Söğütcük, 570 m., 27.07.1999 1♂; Kaş, Beldibi, 1400 m., 29.07.1999 2♂1♀; Manavgat, Değirmenli, 26.07.1999 1♂; Termessos, Güllük Dağı, 900-1000 m., 22.07.2001 1♀; Araştırma Ormanı, 550 m., 19.07.2002 1♂; Gündoğmuş, Güneycik, 210 m., 14.07.2002 4♂2♀; Kemer, Sarıçınar Dağı, 1245 m., 20.08.2002 1♂. On *Pinus brutia, Olea europaea*, *Amygdalus*, *Vitex agnus-castus*, *Quercus*, *Pistacia terebinthus*, *Arbustus* and maquis shrubs. **Distribution in Turkey:** Adana, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bursa, Denizli, Erzincan, Gaziantep, İzmir, İstanbul, Kırklareli, Manisa, Mardin, Muğla, Kütahya (Fahringer, 1922; Dlabola, 1957; Lodos & Kalkandelen, 1980b). **Remarks:** Known to Antalya.

Cicadatra adanai Kartal, 1980

Materials: Gündoğmuş, Çiçekoluk, 960 m., 25.07.1999 1♀; Manavgat, Bucakşeyhler, 15-26.08.1997 1♂; Manavgat, 26.07.1999 3♂; İbradı, Üzümdere, 470 m., 18.08.1999 1♀; Manavgat, 30.07.1999 1♂; Demirciler, 40 m., 21.07.1999 1♂3♀; Demirciler, 70 m., 22.07.1999 1♂; Bucakşeyhler, 13.08.1999 1♂; Manavgat, 01.08.1999 1♂; Bucakşeyhler, 45 m., 19.07.2001 2♂1♀; Manavgat, 10 m., 26.07.2001 1♂; Gündoğmuş, Güneycik, 210 m., 22.06.2002 1♀; Güneycik, 210 m., 14.07.2002 1♂; Manavgat, Demirciler, 105 m., 21.06.2002 1♂; Güllük Dağı, Araştırma Ormanı, 550 m, 19.07.2002 1♀. On *Zea mays*, *Ficus carica*, *Olea europaea*, *Sesamum indicum*, *Fontanesia phillyreoides*, *Cistus creticus*, *Pinus brutia*, *Salix* and weeds. **Distribution in Turkey:** Adana (Kartal, 1980). **Remarks:** New for Antalya and endemic to Turkey.

Cicadatra hyalina (Fabricius, 1798)

Materials: Manavgat, Demirciler, 40 m., 17.07.2002 1♀. On *Olea europaea*. **Distribution in Turkey:** Adıyaman, Ankara, Elazığ, Erzincan, Gümüşhane, Hakkari, Isparta, İzmir, Konya, Kahramanmaraş, Nevşehir, Niğde, Siirt, Urfa, Van (Dlabola, 1957; Lodos & Kalkandelen, 1981b; Kartal & Zeybekoğlu, 1999). **Remarks:** New for Antalya.

Cicada mordoganensis Boulard, 1979

Materials: Manavgat, 29.07.1999 1♀; Demirciler, 70 m., 22.07.1999 13♂9♀; Demirciler, 65 m., 21.07.1999 7♂2♀; Değirmenli, 26.07.1999 1♂1♀; Alanya, Keşefli, 21.07.2001 7♂2♀; Manavgat, Demirciler, 105 m., 21.06.2002 2♂1♀. On *Olea europaea*, *Acacia*, and *Pinus brutia*. **Distribution in Turkey:** Antalya, İzmir, Muğla (Boulard, 1979; Lodos & Kalkandelen, 1981b). **Remarks:** It is only known from Antalya.

***Cicada lodosi* Boulard, 1979**

Materials: Düzlerçamı, 280 m., 22.07.2001 4♂1♀; Çığlık, 330 m., 19.07.2002 4♂3♀. *Pinus brutia* and *Olea europaea*. **Distribution in Turkey:** İzmir, Manisa (Boulard, 1979; Lodos & Kalkandelen, 1981b). **Remarks:** New for Antalya and endemic to Turkey.

***Cicada permagna* (Haupt, 1917)**

Materials: Manavgat, Bucakşeyhler, 18-28.06.1997 6♂3♀; Bucakşeyhler, 45 m., 19.07.2001 5♂; Akseki, Erenkaya, 630 m., 22.06.2002 1♂; Güllük Dağı, Araştırma Ormanı, 750 m., 19.07.2002 1♂1♀; Gündoğmuş, Çiçekoluk, 960 m., 14.07.2002 1♀; Kemer, Olimpos, 23.07.2003 1♂. On *Pinus brutia* and *Olea europaea*. **Distribution in Turkey:** Antalya, Mersin (Boulard, 1979; Dlabola, 1981). **Remarks:** Endemic to Turkey and known to Antalya.

***Tibicina haematodes* (Scopoli, 1763)**

Materials: Kaş, Beldibi, 1400 m., 29.07.1999 1♂. On *Pinus brutia*. **Distribution in Turkey:** İstanbul (Fahringer, 1922). **Remarks:** New for Antalya.

***Pagiphora aschei* Kartal, 1978**

Materials: Manavgat, Demirciler, 40 m., 21.07.1999 1♀; Akseki, Güneykaya, 570 m., 25.07.1999 1♂; Termessos, Güllük Dağı, 900-1000 m., 22.07.2001 1♀; Güllük dağı, 540 m., 22.07.2001 1♂1♀; Araştırma Ormanı, 550 m., 19.07.2002 1♀; Araştırma Ormanı, 750 m., 19.07.2002 1♂1♀; Manavgat, Demirciler, 17.07.2002 1♂. On *Ficus carica*, *Quercus*, *Arbutus andrachne* and *Ulmus*. **Distribution in Turkey:** Antalya (Kartal, 1983). **Remarks:** Known to Antalya.

***Cicadetta dimissa* (Hagen, 1856)**

Materials: Manavgat, Bucakşeyhler, 18-28.06.1997 1♂. On shrubs. **Distribution in Turkey:** Antalya, Aydın, Gümüşhane, Isparta, İzmir (Lodos & Kalkandelen, 1981b). **Remarks:** Known to Antalya.

Family: Cercopidae Leach, 1815

***Triecphorella geniculata* (Horvath, 1881)**

Materials: Gündoğmuş, Güneycik, 210 m., 17.03.2002 1♀; Güneycik, 210 m., 21.04.2002 1♀; Serinyaka, 640 m., 19.05.2002 1♀. It has been collected from weeds in *Pinus brutia* forest and *Myrthus communis*. **Distribution in Turkey:** Adana, Kahramanmaraş, Konya, Samsun (Fahringer, 1922; Kartal, et. al., 1994). **Remarks:** New for Antalya.

***Lepyronia coleoptrata* (Linnaeus, 1758)**

Materials: Manavgat, Değirmenli, 04.08.1999 2♂2♀; Bucakşeyhler, 13.08.1999 11♂7♀; Demirciler, 10 m., 17.08.1999 2♂2♀ Bucakşeyhler, 24.07.1999 5♂2♀; Bucakşeyhler, 30 m., 23.07.1999 1♂1♀; Manavgat, 10.08.1999 1♂; Demirciler, 65 m., 21.07.1999 1♀; Bucakşeyhler, 45 m., 24.07.1999 1♂2♀; Aksu, Perge, 27.07.1999 1♂1♀; Manavgat, 10 m., 20.07.1999 1♀; Demirciler, Külcüler, 150 m., 22.07.1999 1♂; Alanya, Okurcalar, 12.05.2001 1♂; Manavgat, Tilkiler, 220 m., 14.05.2001 2♂2♀; Demirciler, 40 m., 11.05.2001 1♂3♀; Demirciler, 40 m., 05.06.2001 1♂6♀; Finike, 06.06.2001 1♂; Gündoğmuş, Güneycik, 210 m., 08.06.2001 1♀; Manavgat, Bucakşeyhler, 45 m., 19.07.2001 1♂; Demirciler, 40 m., 24.07.2001 1♀; Alanya, Keşefli, 21.07.2001

1♀; Yeşilköy, 20.05.2002 2♂3♀; Okurcalar, 20.05.2002 3♀; Gazipaşa, Çalıpınar-Kahyalar, 20 m., 20.05.2002 1♂1♀; Manavgat, Demirciler, 20 m., 18.05.2002 2♂; Demirciler 40 m., 20.06.2002 3♂6♀; Korkuteli, Sülekler, 1300 m., 23.06.2002 3♂1♀; Koru Dağ, Kartal Yaylası, 1600 m., 23.06.2002 4♂3♀; Manavgat, Demirciler, 65 m., 15.07.2002 1♂; Finike, 13.07.2002 1♀; Gazipaşa, Macarköy, 22.08.2002 2♀. It has been collected from weeds in *Pinus brutia* forest, on *Populus*, *Salix*, *Verbascum* and maquis shrubs. **Distribution in Turkey:** Adana, Afyon, Ankara, Artvin, Aydın, Bilecik, Bursa, Çanakkale, Çankırı, Çorum, Diyarbakır, Edirne, Erzincan, Gümüşhane, İzmir, Kars, Kütahya, Manisa, Mardin, Muğla, Muş, Sakarya, Samsun, Siirt, Tokat (Fahringer, 1922; Dlabola, 1957; Lodos & Kalkandelen, 1981c; Kartal, et. al., 1994). **Remarks:** New for Antalya.

***Neophilaenus campestris* (Fallen, 1805)**

Materials: Manavgat-Çeltikçi, 14.04.2001 1♀; Belenobası, 130 m., 15.04.2001 1♂5♀; Alanya, Okurcalar, 12.05.2001 3♀; Keşefli, 12.05.2001 8♂18♀; Gazipaşa, Çalıpınar, 25 m., 12.05.2001 2♂; Manavgat, Yukarıışıklar-Tilkiler, 460 m., 14.05.2001 1♂3♀; Tilkiler, 220 m., 14.05.2001 2♂1♀; Yaylaalan, 540 m., 14.05.2001 1♀; Tilkiler, 470 m., 14.05.2001 1♂1♀; Demirciler, 40 m., 11.05.2001 1♂; Bucakşeyhler, Seleukeia, 250 m., 23.04.2002 2♀; Demirciler, 105 m., 22.04.2002 1♂2♀; Demirciler, 40 m., 22.04.2002 1♀; Gündoğmuş, Güneycik, 240 m., 21.04.2002 1♂; Çiçekoluk, 960 m., 19.05.2002 3♂1♀; Alanya, Okurcalar, 20.05.2002 2♀; Gazipaşa, Çalıpınar-Kahyalar, 20 m., 20.05.2002 1♂3♀. It has been collected from weeds in *Pinus brutia* forest and fields. **Distribution in Turkey:** Adana, Adıyaman, Ankara, Artvin, Bitlis, Bursa, Çanakkale, Eskişehir, Giresun, Hatay, İzmir, Kırklareli, Kütahya, Manisa, Muğla, Nevşehir, Samsun, Siirt, Sinop, Trabzon, Van (Linnavuori, 1965; Lodos & Kalkandelen, 1981c). **Remarks:** New for Antalya.

***Neophilaenus minor* (Kirschbaum, 1868)**

Materials: Korkuteli, Koru Dağı, Kartal Yaylası, 1600 m., 23.06.2002 4♂4♀. It has been collected from weeds in *Juniperus* forest. **Distribution in Turkey:** Ankara, Konya, Sivas (Dlabola, 1957, 1981). **Remarks:** New for Antalya.

***Aphrophora corticea* Germar, 1821**

Materials: Manavgat, Yaylaalan, 545 m., 14.05.2001 1♂; Yukarıışıklar-Tilkiler, 460 m., 14.05.2001 1♂3♀; Gündoğmuş, Serinyaka, 640 m., 19.05.2002 3♀; Güneycik, 240 m., 19.05.2002 1♀; Akseki, Güçlüköy, 575 m., 22.06.2002 1♀. It has been collected from weeds and shrubs in *Pinus brutia* forest and on *P. brutia*. **Distribution in Turkey:** Afyon, Aydın, Bilecik, Çanakkale, Isparta, Kütahya, Muğla, Tokat. (Lodos & Kalkandelen, 1981c). **Remarks:** New for Antalya.

***Philaenus signatus* Melchar, 1896**

Materials: Termessos, Güllük Dağı, 900-1000 m., 21.05.2002 1♂. On shrubs. **Distribution in Turkey:** Adana, İzmir, Kahramanmaraş, Muğla (Dlabola, 1957, 1971; Lodos & Kalkandelen, 1981c). **Remarks:** New for Antalya.

***Philaenus spumarius* (Linnaeus, 1758)**

Materials: Gündoğmuş, Güneycik, 210 m., 17.04.2001 2♂3♀; Manavgat, Demirciler, Külcüler, 170 m., 15.04.2001 7♂8♀; Manavgat-Çeltikçi, 14.04.2001 1♂; Belenobası, 130 m., 15.04.2001 13♂17♀; Demirciler, 65 m., 14.04.2001

6♂8♀; Saraçlı, 15.04.2001 1♂1♀; Hocalı, 215 m., 15.04.2001 2♂; Demirciler, 40 m., 14..04.2001 3♀; Yaylaalan, 540 m., 14.05.2001 25♂17♀; Tilkiler, 470 m., 14.05.2001 7♂2♀; Demirciler, 65 m., 11.05.2001 14♂25♀; Alanya, Okurcalar, 12.05.2001 4♂5♀; Keşefli, 12.05.2001 6♀; Manavgat, Tilkiler, 220 m., 14.05.2001 21♂18♀; Yaylaalan, 545 m., 14.05.2001 3♂3♀; Gazipaşa, Çalıpınar, 25 m., 12.05.2001 3♂2♀; Yukarıışıklar-Tilkiler, 460 m., 14.05.2001 38♂51♀; Beşkonak, 145 m., 07.06.2001 1♂; Demirciler, 40 m., 05.06.2001 1♀; Evrenleryavşı, Söylerkale, 250 m., 16.03.2002 1♀; Demirciler, 40 m., 22.04.2002 5♂7♀; Bucakşeyhler, 70 m., 23.04.2002 9♂6♀; Bucakşeyhler, Seleukeia, 250 m., 23.04.2002 2♂3♀; Demirciler, Külcüler, 230 m., 22.04.2002 2♂1♀; Demirciler, 105 m., 22.04.2002 2♂3♀; Demirciler, 65 m., 22.04.2002 14♂12♀; Gündoğmuş, Güneycik, 240 m., 21.04.2002 2♂1♀; Serinyaka, 640 m., 19.05.2002 15♂5♀; Çiçekoluk, 960 m., 19.05.2002 3♂; Manavgat, Demirciler, 20 m., 18.05.2002 1♂3♀; Demirciler, 105 m., 18.05.2002 3♂; Gazipaşa, Çalıpınar-Kahyalar, 20.05.2002 2♂3♀; Alanya, Okurcalar, 20.05.2002 1♂; Akseki, Güçlüköy, 575 m., 22.06.2002 1♀. It has been collected from weeds in *Pinus brutia* forest, on *Myrthus communis*, *Pistacia terebinthus*, *Phlomis* and fields. **Distribution in Turkey:** Ağrı, Amasya, Ankara, Artvin, Aydın, Balıkesir, Bilecik, Bitlis, Bursa, Çanakkale, Elazığ, Erzincan, Erzurum, Giresun, Gümüşhane, Hakkari, İzmir, Kahramanmaraş, Kars, Kocaeli, Kırklareli, Kütahya, Malatya, Manisa, Mardin, Muğla, Ordu, Rize, Samsun, Siirt, Sinop, Sivas, Tekirdağ, Tokat, Trabzon, Van (Dlabola, 1957, 1981; Linnavuori, 1965; Lodos & Kalkandelen, 1981c; Kartal, et. al., 1994). **Remarks:** New for Antalya.

Family: Membracidae Rafinesque, 1815

***Gargara genistae* (Fabricius, 1775)**

Materials: Termessos, Güllük Dağı, 540 m., 22.07.2001 5♀; Güllük Dağı, 900-1000 m., 22.07.2001 2♂8♀; Güllük Dağı, 900-1000 m., 19.07.2002 7♂5♀; Araştırma Ormanı, 550 m., 19.07.2002 8♀; Araştırma Ormanı, 750 m., 19.07.2002 19♀; Çığlık, 330 m., 19.07.2002 3♀. On Fabaceae shrubs and *Cytisus laburnum*. **Distribution in Turkey:** Ankara, Aydın, Balıkesir, Çorum, Erzurum, İzmir, Muğla (Dlabola, 1957; Lodos & Kalkandelen, 1981c). **Remarks:** New for Antalya.

***Centrotus cornutus* (Linnaeus, 1758)**

Materials: Termessos, Güllük Dağı, 900-1000 m., 21.05.2002 1♂1♀. On Fabaceae shrubs. **Distribution in Turkey:** Artvin, Aydın, Bilecik, Bursa, Çorum, Denizli, Erzincan, Edirne, Giresun, İstanbul, İzmir, Kocaeli, Kütahya, Kırklareli, Ordu, Sakarya, Tekirdağ (Fahringer, 1922; Lodos & Kalkandelen, 1981c). **Remarks:** New for Antalya.

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NOMENCLATURAL CHANGES FOR ORIENTAL LONGHORNED BEETLES (COLEOPTERA: CERAMBYCIDAE)

Daniel J. Heffern* and Hüseyin Özdikmen**

* 10531 Goldfield Ln., Houston, TX 77064 USA, e-mail: titanusgiganteus@hotmail.com
** Gazi Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, Ankara, 06500 TÜRKİYE, e-mail: ozdikmen@gazi.edu.tr

[Heffern, D. J. & Özdikmen, H. 2007. Nomenclatural changes for Oriental longhorned beetles (Coleoptera: Cerambycidae). Munis Entomology & Zoology 2 (1): 59-62**]**

ABSTRACT: Three nomenclatural issues involving Cerambycidae are discussed and corrected.

KEY WORDS: *Janidera, Euchlanis, Microdebilissa, Cleonice, Sarawaka, Seuthes,* Cerambycidae, Oriental Region

Subfamily Cerambycinae
Tribe Dejanirini

Hüdepohl (1988) described the genus *Janidera*, but failed to properly validate the genus by designating a type species. Heffern (2005) validated the genus-group name *Janidera* by specifying a type species, *Dejanira biapiculata* Pascoe, 1866, and transferring the appropriate species into the genus. Inadvertantly, *Janidera insignata* Hüdepohl, 1992, was overlooked, and is hereby included with *Janidera* Heffern, 2005 (Cerambycinae: Dejanirini).

Subfamily Cerambycinae
Tribe Molorchini

Euchlanis Pascoe, 1869, (Cerambycinae: Molorchini), was described for *Euchlanis collaris* Pascoe, 1869, from Borneo. Pic (1925) described the genus *Microdebilissa* for *Microdebilissa bipartita* Pic, 1925, of China. *Neodeuteromma* Mitono, 1936, was described for *Neodeuteromma serratipenne* Mitono, 1936, of Taiwan. Gressitt (1951) synonymized *Neodeuteromma serratipenne* with *Microdebilissa testacea* Matshushita, 1933. Gressitt & Rondon (1970) synonymized *Microdebilissa* with *Euchlanis*. However, *Euchlanis* Pascoe, 1869, is a junior homonym of *Euchlanis* Ehrenberg, 1832, (Rotifera), and therefore the next available genus-group name, *Microdebilissa* Pic, 1925, must replace *Euchlanis* Pascoe, 1869, as the valid name of this genus-group. Eighteen (18) valid taxa are thus now included in *Microdebilissa* Pic, 1925. The species occur in China, India, and SE Asia, including Borneo. Therefore, to clarify the new nomenclature for *Microdebilissa*, the following list is prepared:

Microdebilissa Pic, 1925 (type species: *Microdebilissa bipartita* Pic, 1925)

syn. : *Neodeuteromma* Mitono, 1936 (type species: *Neodeuteromma serratipenne* Mitono, 1936)

not available: *Euchlanis* Pascoe, 1869 (type species: *Euchlanis collaris* Pascoe, 1869) (pre-occupied by *Euchlanis* Ehrenberg, 1832, Rotifera)

Microdebilissa collaris (Pascoe, 1869) **comb. nov.**
Microdebilissa bipartita Pic, 1925
Microdebilissa minuta Pic, 1927
Microdebilissa diversipes Pic, 1930
Microdebilissa testacea Matsushita, 1933
syn. : *Neodeuteromma serratipenne* Mitono, 1936
Microdebilissa atricornis Pic, 1940
Microdebilissa simplicicollis Gressitt, 1951 (new name for *M. serratipenne* Gressitt, 1937)

not available: *serratipenne* Gressitt, 1937 (pre-occupied by *N. serratipenne* Mitono, 1936)

Microdebilissa bicolor (Gressitt & Rondon, 1970) **comb. nov.**
Microdebilissa subviridis (Gressitt & Rondon, 1970) **comb. nov.**
Microdebilissa argentifera (Holzschuh, 1984) **comb. nov.**
Microdebilissa infirma (Holzschuh, 1989) **comb. nov.**
Microdebilissa robustula (Holzschuh, 1990) **comb. nov.**
Microdebilissa atripennis (Pu, 1992) **comb. nov.**
Microdebilissa breviuscula (Holzschuh, 1992) **comb. nov.**
Microdebilissa furva (Holzschuh, 1993) **comb. nov.**
Microdebilissa homalina (Holzschuh, 1993) **comb. nov.**
Microdebilissa posticina (Holzschuh, 1993) **comb. nov.**
Microdebilissa aethiops (Holzschuh, 1995) **comb. nov.**

Subfamily Cerambycinae
Tribe Glaucytini

The genus *Cleonice* was erected by Thomson (1864) with the type species *Cleonice vestita* Thomson, 1864 from Indonesia: Moluccas in Cerambycidae (Cerambycinae: Glaucytini). Later, the genus *Cleonice* was described by Robineau-Desvoidy (1863) with the type species *Cleonice nitidiusculata* (Zetterstedt, 1859) in the fly family Tachinidae. It is still a valid generic name in Diptera. Thus, the generic name *Cleonice* Thomson, 1864 is a junior homonym of the generic name *Cleonice* Robineau-Desvoidy, 1863. Recently, Özdikmen & Abang (2006) proposed a replacement name, *Sarawaka*, for the genus name *Cleonice* Thomson, 1864. On the other hand, Pascoe described the genus *Seuthes* in 1869 (type species: *Seuthes sericata* Pascoe, 1869). Later, *Seuthes sericata* was synonymized with *Cleonice vestita* Thomson, 1864. Both genera are monotypic. So, *Seuthes* Pascoe, 1869 is synonym of *Cleonice* Thomson, 1864 for the present. In this case, *Sarawaka* Özdikmen & Abang, 2006 is an unnecessary replacement name. Since the genus name *Cleonice* is not valid, as Özdikmen & Abang, 2006 discussed, then the genus name *Seuthes* Pascoe, 1869 must be used to replace *Cleonice* Thomson, 1864.

Summary of nomenclatural changes:

Seuthes Pascoe, 1869-651 (type species: *Seuthes sericata* Pascoe, 1869).
syn. : *Cleonice* Thomson, 1864-333, (type species: *Cleonice vestita* Thomson, 1864).
syn. : *Seuthes* Pascoe, 1869-651 (type species: *Seuthes sericata* Pascoe, 1869).
syn. nov. : *Sarawaka* Özdikmen & Abang, 2006-55 (unnecessary replacement name for *Cleonice* Thomson, 1864).
Seuthes vestitus (Thomson, 1864) **comb. nov.**
syn. : *Cleonice vestita* Thomson, 1864-333
syn. : *Seuthes sericata* Pascoe, 1869-652

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ADDITIONAL RECORDS FOR THE ODONATA FAUNA OF SOUTH-WESTERN ANATOLIA - PART I: ANISOPTERA

Ali Salur* and Suat Kıyak**

*Hitit Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, 19030 Çorum/TÜRKİYE, e-mail: alisalur@gmail.com
**Gazi Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, 06500 Ankara/TÜRKİYE, e-mail: skiyak@gazi.edu.tr

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ABSTRACT: In this study, anisopteran specimens collected from the provinces Antalya, Aydın, Burdur, Denizli, Isparta and Muğla in South-Western Anatolia, April-September in 2000- 2002 have been established faunistically. It has been determined that they belong to 43 species and subspecies of 21 genera of 5 families.

KEY WORDS: Odonata, Anisoptera, South-Western Anatolia, Turkey.

There have been many studies reported about the Odonata fauna of Turkey until now. Among this Demirsoy (1995) (unpublished project report) was the most detailed. We have been studying the Turkish fauna of Odonata detailed since 1998. The present study consists of faunistic data belonging to south-western Anatolia. This field was studied between 2000-2002 and it collected and identified approximately 1100 anisopteran specimens. Anisoptera of the field were given at first part of the study which is about the Odonata fauna of SW Anatolia. Faunistic data belonging to Zygoptera for the field will be published soon as a second part.

The aim of this study is not to compare obtained data with the data obtained before and regional fauna. The aim of the present study is to preserve the result of the fauna of SW Anatolian Anisoptera for scientists. For this reason, no reference to any manuscript or data belonging to this region is made.

All anisopteran samples were collected from SW region of Turkey in the years 2000-2002 and they were collected by using net trap and were killed in killing jars using ethyl acetate vapour. These samples are deposited in the Zoological Museum of Gazi University (=ZMGU). Some samples were just observed from the research field and such samples are marked with "(obs.)" in the present study.

RESULTS

Family AESHNIDAE

***Aeshna affinis* Vander Linden, 1823**
Materials: DENİZLİ: 6 males, Bozkurt (Plateau of Çambaşı, Karagöl), 37°44'N 29°29'E, 1280 m, 08.08.2000; ISPARTA: 1 male, 1 female, Keçiborlu

(Özbahçe), 38°00'N 30°19'E, 1300m, 22.06.2000; 1 female, Cankurtaran, 38°15'N 31°22'E, 1575 m, 20.06.2001; 1 male, Senirkent (Boyalı, Eğirdir lake), 38°03'N 30°50'E, 956 m, 19.06.2002.

***Aeshna mixta* Latreille, 1805**
Materials: MUĞLA: 1 male, 1 female, Milas (Kayabaşı), 37°19'N 27°51'E, 215 m, 23.06.2002.

***Anaciaeschna isosceles antehumeralis* (Schmidt, 1954)**
Materials: ANTALYA: 2 males, Kaş (Kalkan, Yeşilköy), 36°17'N 29°21'E, 15 m, 20.05.2000; 1 female, Kalkan, 36°17'N 29°24'E, 230 m, 20.05.2000; 1 female, between Bağlıağaç-Kayadibi, 22.05.2000; AYDIN: 1 male, Söke (Serçin lake), 37°33'N 27°23'E, 10 m, 16.04.2000; BURDUR: 1 male, Çavdır (Yamadı), 37°07'N 29°36'E, 960 m, 22.06.2002; ISPARTA: 1 male, Eğirdir (Kovada lake), 37°37'N 30°52'E, 930 m, 21.06.2002; DENİZLİ: 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 19.07.2000, 1 male, 17.07.2001, 1 male, 27.06.2001; 1 male, Çivril (Düzbel), 38°10'N 30°03'E, 845 m, 19.06.2002; MUĞLA: 1 male, Milas (Kazıklı-Taşlıova), 37°17'N 27°39'E, 20 m, 17.04.2000; 1 male, Dalaman (Kapıgargın, Kocagöl), 36°43'N 28°01'E, 22.05.2000; 1 female, Dalaman (Race of Yuvarlak stream), 36°54'N 28°44'E, 22.05.2000; 3 females, Dalaman (Kapıgargın, Kocagöl), 36°41'N 28°50'E, 21 m, 22.04.2002.

***Anax immaculifrons* Rambur, 1842**
Materials: ANTALYA: 2 males, Kemer (Göynük), 36°40'N 30°31'E, 65 m, 04.08.2000.

***Anax imperator* Leach, 1815**
Materials: ANTALYA: 1 male, Kaş (Gömbe, Girdev lake), 36°40'N 29°40'E, 1815 m, 24.06.2000; 1 male, Kemer (between Kuzdere-Kemer), 36°36'N 30°28'E, 360 m, 14.07.2001; 1 male, Kaş (Gelemiş, Patara), 36°16'N 29°19'E, 25 m, 14.07.2001; 1 male, Manavgat (Çolaklı), 36°49'N 31°19'E, 36°m, 19.08.2001; 1 female (obs.), Manavgat (Hocalar, Sarısu bridge), 36°52'N 31°15'E, 20 m, 19.08.2001; AYDIN: 1 male, Çine (Elderesi), 37°41'N 28°06'E, 625 m, 21.05.2001; BURDUR: 1 male (obs.), Çavdır (Yamadıburnu), 37°09'N 29°36'E, 975 m, 22.06.2002; DENİZLİ: 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 19.07.2000; 1 male, Tavas (Sarıabat), 37°37'N 29°12'E, 1120 m, 07.08.2000; 1 male, Çivril (between Emirhisar-Tuğlu), 38°15'N 29°50'E, 840 m, 26.06.2001; 1 male, Çivril (Bucak, Işıklı lake), 38°14'N 29°51'E, 838 m, 26.06.2001; 5 males, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 970 m, 27.06.2001; 1 male, Buldan (Süleymanlı lake), 38°03'N 28°46'E, 1170 m, 17.07.2001; 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 960 m, 17.07.2001; 1 female, Beyağaç (Akçay), 37°13'N 28°51'E, 655 m, 21.08.2001; ISPARTA: 1 female, Senirkent (Güreme), 38°03'N 30°47'E, 965 m, 21.06.2000; 1 male, Sütçüler (Kesme), 37°28'N 31°17'E, 1005 m, 26.06.2000; 1 male, Sütçüler (Kesme-Aşağı Yaylabel crossroads), 37°31'N 31°17'E, 892 m, 26.06.2000; 1 male, Aksu (between Yakaköy- Yenişarbademli), 37°43'N 31°16'E, 1753 m, 27.06.2000; 1 male, Yalvaç (Yarıkkaya), 38°27'N 31°02'E, 1450 m, 08.07.2000; 1 male, Yalvaç (Sücüllü, Yalvaç dam), 38°22'N 31°08'E, 1200 m, 20.06.2001; 1 male, between Gelendost-Afşar, 38°07'N 30°59'E, 965 m, 20.06.2001; 1 male, Eğirdir (Kovada dam), 37°20'N 30°52'E, 920 m, 21.06.2001; 1 male (obs.), Aksu stream, 37°47'N 31°06'E, 1305 m, 28.06.2001; 1 male, Yalvaç (Yarıkkaya), 38°28 146'N

31°08 672'E, 1824 m, 19.07.2001; 1 male, Sütçüler (between İncidere-Belence, Köprü river), 37°34'N 31°10'E, 730 m, 23.08.2001; 1 male, 4 females, Yalvaç (Aşağıkaşıkara, Eğirdir lake), 38°16'N 30°50'E, 930 m, 19.06.2002; MUĞLA: 1 female, Milas (Dibekdere, Sarıçay), 37°20'N 27°43'E, 41 m, 20.05.2001.

***Anax parthenope* (Selys, 1839)**
Materials: ANTALYA: 1 male, Gazipaşa (Yakacık), 36°06'N 32°33'E, 15 m, 18.08.2001; DENİZLİ: 1 female, Çivril (Beydilli, Işıklı lake), 38°15'N 29°56'E, 850 m, 18.05.2001; 2 males, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 970 m, 27.06.2001, 1 male, 17.07.2001; ISPARTA: 1 female, between Gelendost-Afşar, 38°07'N 30°59'E, 965 m, 20.06.2001; 1 female, Gölcük lake, 37°43'N 30°30'E, 1410 m, 28.06.2001; 1 male, Yalvaç (Aşağıkaşıkara, Eğirdir lake), 38°16'N 30°50'E, 930 m, 19.06.2002; MUĞLA: 1 male, Köyceğiz lake, 36°57'N 28°41'E, 75 m, 18.04.2000.

***Hemianax ephippiger* (Burmeister, 1839)**
Materials: AYDIN: 9 females, Söke (Serçin lake), 37°33'N 27°23'E, 10 m, 16.04.2000.

***Brachytron pratense* (Müller, 1764)**
Materials: MUĞLA: 1 male, 1 female, Dalaman (Kapıgargın, Kocagöl), 36°41'N 28°50'E, 21 m, 22.04.2002.

***Caliaeschna microstigma* (Schneider, 1845)**
Materials: ANTALYA: 1 male, Elmalı (Kemer-Elmalı road, Yapraklı), 36°50'N 29°45'E, 1541 m, 23.06.2000; 1 male, Manavgat (Beşkonak road 25.km, Köprü river), 37°04'N 31°14'E, 54 m, 25.06.2000; 3 males, Beşkonak (Kırkkavak-Tazı), 37°17'N 31°13'E, 510 m, 25.06.2000; 1 male, 1 female, Beşkonak (Çaltepe), 37°19'N 31°13'E, 487 m, 25.06.2000; 1 male, Alanya (Dim river), 36°33'N 32°11'E, 100 m, 11.07.2000; 1 female, Gündoğmuş (Alara river), 36°45'N 32°02'E, 314 m, 11.07.2000; 1 male, Gündoğmuş (Alara river), 36°49'N 32°00'E, 800 m, 29.06.2001; 1 female, Gündoğmuş (between Güneyköy-Soğukpınar, Kargı river), 36°40'N 31°53'E, 130 m, 29.06.2001; 1 male, Alanya (between Soğukbeli-Payallar, Deliçay), 36°37'N 31°52'E, 115 m, 29.06.2001; 1 male, Alanya road, 36°32'N 32°17'E, 1020 m, 12.07.2001; 1 male, Alanya (Beldibi), 36°28'N 32°21'E, 720 m, 18.08.2001; 1 male, Kaş (Gömbe, Sinekçi), 36°27'N 29°39'E, 1475 m, 28.06.2001; BURDUR: 1 female, Ağlasun-Yeşilbaş road, 37°39'N 30°27'E, 1400 m, 15.07.2000; 1 male, Yeşilova (Salda beli), 37°29'N 29°36'E, 1180 m, 16.07.2000; DENİZLİ: 1 male, Beyağaç (Uzunoluk), 37°14'N 28°59'E, 900 m, 21.05.2001; 1 male, Buldan (Süleymanlı-Buldan), 38°02' E 28°47'E, 1130 m, 25.06.2001; 1 male, Honaz (Aydınlar), 37°44'N 29°22'E, 950 m, 17.07.2001; 1 male, Çardak (between Beylerli-Hayriye), 37°39'N 29°38'E, 1140 m, 17.07.2001; ISPARTA: 9 males, 1 female, Sütçüler (Kovada river), 37°35'N 30°52'E, 890 m, 19.05.2000; 1 male, Aksu (Dedegöl mountains), 37°42'N 31°17'E, 1610 m, 13.07.2000; 2 males, Aksu (Dedegöl mountains, İnişdibi stream), 37°42'N 31°14'E, 1290 m, 13.07.2000; 1 male, Aksu (Yakaafsar), 37°44'N 31°10'E, 1260 m, 14.07.2000; MUĞLA: 1 male, Kavaklıdere (Dokuzçam), 37°24'N 28°29'E, 645 m, 16.07.2001; 1 female, Köyceğiz (Beyobası, Yuvarlak stream), 36°54'N 28°47'E, 110 m, 22.04.2002.

Family GOMPHIDAE

***Gomphus flavipes lineatus* Bartenev, 1929**
Materials: AYDIN: 1 male, Söke (Sarıkemer, Büyük Menderes river), 37°38'N 27°22'E, 24 m, 20.05.2001; 5 males, Nazilli (Büyük Menderes river), 37°52'N 28°19'E, 66 m, 25.06.2001.

***Gomphus schneideri* Sélys, 1850**
Materials: ANTALYA: 1 male, Korkuteli-Elmalı road 15. km, 36°56'N 30°09'E, 1360 m, 26.05.2002; DENİZLİ: 1 male, Çivril (Yuva), 38°17'N 29°54'E, 850 m, 18.05.2001; 1 male, Çivril (Sarıbeyli, Büyük Menderes river), 38°09'N 29°38'E, 827 m, 18.05.2001; 1 female, Çivril (DSİ watering regulator), 38°13'N 29°49'E, 842 m, 28.05.2002; 1 female, Acıpayam (Çakır), 37°18'N 29°20'E, 830 m, 22.06.2002; ISPARTA: 2 males, 1 female, Eğirdir (Aşağı Gökdere crossroads), 37°33'N 30°47'E, 365 m, 21.06.2002; MUĞLA: 1 male, Fethiye (Uğurlu), 36°37'N 29°20'E, 140 m, 22.05.2000; 2 males, Yatağan (Madenler stream), 37°20'N 28°09'E, 394 m, 27.05.2002; 1 male, 1 female, Yatağan (Kayırlı), 37°25'N 28°08'E, 300 m, 27.05.2002; 1 male, Köyceğiz (Sultaniye), 36°54'N 28°35'E, 15 m, 25.06.2002; 1 male, Köyceğiz (Hamitköy), 36°56'N 28°36'E, 13 m, 25.06.2002.

***Onychogomphus assimilis* (Schneider, 1845)**
Materials: ANTALYA: 1 female, Beşkonak-Köprülü Kanyon, 37°10'N 31°11'E, 164 m, 25.06.2000; 1 male, 1 female, Manavgat (Sağırini, Köprülü Kanyon), 37°03'N 31°13'E, 65 m, 25.06.2000; 1 female, Gündoğmuş (Güzelbağ), 36°45'N 32°01'E, 285 m, 29.06.2001; DENİZLİ: 1 male, Çameli (Kirazlıyaylı, Karabayır steram), 36°58'N 29°11'E, 840 m, 16.07.2000; ISPARTA: 1 female, Aksu (Anamas plateau), 37°49'N 31°13'E, 1896 m, 14.07.2000.

***Onychogomphus flexuosus* (Schneider, 1845)**
Materials: MUĞLA: 3 males, 4 females Kemer (Kaynazlı, Kaynazlı steram), 22.05.2000.

***Onychogomphus forcipatus albotibialis* Schmidt, 1954**
Materials: ANTALYA: 1 male, Finike (Alakır dam), 36°23'N 30°12'E, 55 m, 20.05.2000; 2 males, Kumluca (between Güzören-Karaağaç), 36°28'N 30°20'E, 535 m, 25.06.2000; 1 male, Gündoğmuş (Güneycik), 36°46'N 31°46'E, 500 m, 12.07.2000; 2 males, 2 females, Alanya (Demirtaş, Sedre river), 36°25'N 32°11'E, 30 m, 26.05.2001; 1 male, Gündoğmuş (Alara river), 36°49N 32°00'E, 800 m, 29.06.2001; 1 male, Alanya (Karapınar, Gevne bridge), 36°36'N 32°24'E, 1100 m, 12.07.2001; 1 male, Kemer, 36°36'N 30°29'E, 165 m, 14.07.2001; 1 male, Alanya (between Beldibi-Fakırcalı), 36°28'N 32°17'E, 520 m, 18.08.2001; 2 males, Finike (between Arifköy-Kilittepe, race of Akçay), 36°29'N 30°04'E, 380 m, 26.05.2002; AYDIN: 3 males, Kuyucak (between Başaran-Azizabat, Dandalaz river), 37°52'N 28°32'E, 115 m, 25.06.2001; BURDUR: 1 male, Yeşilova (Salda lake), 37°30'N 29°39'E, 1375 m, 18.07.2001; DENİZLİ: 1 male, Çivril (Gökgöl), 38°12'N 30°02'E, 850 m, 18.05.2001; 2 males, Acıpayam (Alaattin), 37°27'N 29°16'E, 1020 m, 22.06.2001; 1 male, Acıpayam (between Aliveren-Darıveren, Güre mountain), 37°14'N 29°27'E, 1140 m, 27.06.2001; 1 male, Çivril (Beyköy), 38°11'N 29°53'E, 841 m, 28.05.2002; ISPARTA: 1 male, Sütçüler (Kovada river), 37°35'N 30°52'E, 890 m, 19.05.2000; 1 male, Yalvaç (Aşağıkaşıkara, Eğirdir lake),

38°15'N 30°48'E, 940 m, 21.06.2000; 6 males, 3 females, Senirkent (Gençali, Eğirdir lake), 38°14'N 30°45'E, 950 m, 21.06.2000; 1 male, 1 female, Senirkent (Gençali, Eğirdir lake), 38°14'N 30°45'E, 950m, 21.06.2000; 1 male, Sütçüler (Ayvalıpınar), 37°40'N 31°01'E, 1070 m, 15.07.2000; 3 males, Yenişarbademli, 37°41'N 31°19'E, 1230 m, 13.07.2000; 2 males, Sütçüler (between Sütçüler-Boğazköy), 37°31'N 30°59'E, 960 m, 15.07.2000; 1 male, Senirkent (Gençeli, Eğirdir lake), 38°14'N 30°45'E, 950 m, 19.07.2000; 2 males, 1 female, Sütçüler (between Ayvalıpınar-Baklan, Köprü river), 37°41'N 31°01'E, 1145 m, 10.08.2000; 1 male, Sütçüler (Melihler-Çandır crossroads), 37°27'N 30°52'E, 310 m, 21.06.2001; 1 male, Yalvaç (Bağkonak), 38°13 195'N 31°17 252'E, 1245 m, 20.07.2001; 1 male, 1 female, Sütçüler (between Belence-Ayvalı), 37°39'N 31°04'E, 1100 m, 23.08.2001; 1 male, Yalvaç (Aşağıkaşıkara, Eğirdir lake), 38°16'N 30°50'E, 930 m, 19.06.2002; 3 males, 4 females, Senirkent (Boyalı, Eğirdir lake), 38°03'N 30°50'E, 956 m, 19.06.2002; 2 males, 1 female, Eğirdir (Aşağı Gökdere crossroads), 37°33'N 30°47'E, 365 m, 21.06.2002; MUĞLA: 1 female, Milas (Taşlı- Kızılağaç), 37°17'N 27°19'E, 20 m, 17.04.2000; 1 male, Kemer (Kıncılar, Kıncılar stream), 22.05.2000; 1 male, Köyceğiz (Karaböğürtlen, Balıklı river), 37°00'N 28°32'E, 70 m, 18.07.2000; 1 female, Köyceğiz (Karaböğürtlen, Fethiye deresi), 37°00'N 28°30'E, 90 m, 18.07.2000; 1 male, 3 females, Ula (Yaylasöğüt), 37°12'N 28°40'E, 925 m, 18.07.2000; 1 male, Kemer (Ceylan, stream), 36°49'N 29°33'E, 1140m, 06.08.2000; 3 males, Kemer (Bekçiler), 36°53'N 29°40'E, 1250m, 06.08.2000; 3 males, 1 female, between Kemer-Karahasantaşı (race of Esen Çayı), 36°56'N 29°38'E, 1390m, 06.08.2000; 1 male, Yatağan (between Şahinler-Madenler), 37°20'N 28°07'E, 350 m, 25.06.2001; 1 female, Milas (Yusufca), 37°19'N 27°51'E, 175 m, 16.07.2001; 1 male, Karacaören (race of Akçay), 37°13'N 28°45'E, 580 m, 21.08.2001; 1 male, between Beyağaç-Karacaören, 37°13'N 28°50'E, 625 m, 21.08.2001; 1 male, Ula (Yeşilçam), 36°59'N 28°25'E, 157 m, 25.06.2002; 1 male, Marmaris (Aksaz cove), 36°57'N 28°25'E, 370 m, 25.06.2002; 1 female, Köyceğiz (Aksaz cove), 36°55'N 28°25'E, 108 m, 25.06.2002; 1 male, Dalaman (Tersakan-II), 36°47'N 28°49'E, 13 m, 25.06.2002; 1 male, Fethiye, 03.05.2002; 2 males, Milas (Kayabaşı), 37°19'N 27°51'E, 215 m, 23.06.2002.

***Lindenia tetraphylla* (Vander Linden, 1825)**
Materials: AYDIN: 1 male, Nazilli (Esen, Akçay), 37°47'N 28°19'E, 80 m, 25.06.2001; MUĞLA: 1 male, 1 female, Dalaman (Kapıgargın, Kocagöl), 36°41'N 28°50'E, 4 m, 15.07.2001; 1 male, Köyceğiz (Hamitköy), 36°56'N 28°36'E, 13 m, 25.06.2002.

Family CORDULEGASTERIDAE

***Cordulegaster insignis insignis* Schneider, 1845**
Materials: ANTALYA: 2 males, İkizpınar (Yeşilbağ), 37°23'N 31°16'E, 754 m, 26.06.2000; BURDUR: 1 male, Karacaören, 37°32'N 30°13'E, 1435 m, 15.07.2000; 1 male, between Güney-Yeşilova (Salda beli), 37°29'N 29°36'E, 1165 m, 23.05.2000; 1 male, Karamanlı (Kayalı), 37°18'N 29°55'E, 1083 m, 23.06.2000; 1 male, Ağlasun-Yeşilbaş road, 37°39'N 30°27'E, 1400 m, 15.07.2000; DENİZLİ: 1 male (obs.), Çameli (Aliveren-Kınıkyeri, Güre mountain), 37°12'N 29°26'E, 1500 m, 27.06.2001; ISPARTA: 1 male, Yalvaç (between Bağkonak- Cankurtaran, Sultandağı), 38°15'N 31°20'E, 1663 m, 27.06.2000; 1 male, Cankurtaran, 38°17'N 31°26'E, 1349 m, 27.06.2000; 1 male, Aksu (Dedegöl mountains), 37°42'N 31°17'E, 1610 m, 13.07.2000; 1 male,

Keçiborlu (Özbahçe), 38°01'N 30°21'E, 1330 m, 19.07.2000; 1 male, Yenişarbademli, 37°43'N 31°20'E, 1445 m, 10.08.2000; 1 female, Yalvaç (Sücüllü, Yalvaç dam), 38°22'N 31°08'E, 1200 m, 21.06.2000; 1 male, Yalvaç (Yarıkkaya), 38°27'N 31°01'E, 1764 m, 26.07.2001; MUĞLA: 3 males, Köyceğiz (Yayla, Gölgeli mountains), 37°03'N 28°47'E, 1730 m, 17.07.2000; 1 male, Köyceğiz (Yayla), 37°01'N 28°45'E, 867 m, 15.07.2001; 1 male, Köyceğiz (Gölgeli mountains), 37°02'N 28°47'E, 1670 m, 15.07.2001; 1 male, Fethiye (Babadağ, near cistern), 03.05.2002.

***Cordulegaster picta* Sélys, 1854**
Material: DENIZLI: 1 male, Denizli (between Buldan-Süleymanlı), 38°02'N 28°47'E, 1120 m, 17.07.2001.

Family CORDULIIDAE

***Somatochlora flavomaculata* (Vander Linden, 1825)**
Material: MUĞLA: 1 male, Dalaman (Kapıgargın, Kocagöl), 36°42'N 28°50'E, 17 m, 13.07.2001.

Family LIBELLULIDAE

***Libellula depressa* Linnaeus, 1758**
Materials: DENİZLİ: 2 males, Acıpayam (Alaattin), 37°27'N 29°16'E, 1020 m, 22.06.2001; 1 male, Çivril (between Emirhisar-Tuğlu), 38°15'N 29°50'E, 840 m, 26.06.2001; ISPARTA: 1 female, Yalvaç (Özgüney), 38°15'N 31°12'E, 1120 m, 19.06.2002; 1 female, Aksu (between Karağı-Yakaafşar), 37°45'N 31°07'E, 1215 m, 28.06.2001; MUĞLA: 2 males, Milas (Geyik dam), 37°23'N 27°53'E, 486 m, 23.06.2001.

***Libellula fulva* Müller, 1764**
Materials: ANTALYA: 1 male, Kalkan (Yeşilköy), 36°17'N 29°19'E, 8 m, 27.05.2001; AYDIN: 1 male, Yenipazar (Donduran, Akçay), 37°50'N 28°13'E, 75 m, 21.05.2001; 1 male, Kuyucak (between Başaran-Azizabat, Dandalaz river), 37°52'N 28°32'E, 115 m, 25.06.2001; 1 male, Umurlu (Büyük Menderes river), 37°48'N 27°57'E, 56 m, 27.05.2002; MUĞLA: 1 female, between Göcek-Fethiye, 36°43'N 29°01'E, 599 m, 22.05.2000; 3 males, Dalaman (Kapıgargın, Kocagöl), 36°43'N 28°01'E, 22.05.2000; 1 male, Dalaman (Kapıgargın, Kocagöl), 36°41'N 28°50'E, 21 m, 22.04.2002.

***Libellula pontica* (Sélys, 1887)**
Materials: ANTALYA: 1 female, Kaş (Kalkan, Yeşilköy), 36°17'N 29°21'E, 15 m, 20.05.2000; DENİZLİ: 1 male, 1 female, Çivril (Yuva), 38°17'N 29°54'E, 850 m, 18.05.2001; 1 male, 1 female, Çivril (DSİ watering regulator), 38°13'N 29°49'E, 842 m, 28.05.2002; MUĞLA: 2 males, 4 females, Milas (Kazıklı-Taşlıova), 37°17'N 27°39'E, 20 m, 17.04.2000.

***Libellula quadrimaculata* Linnaeus, 1758**
Materials: DENIZLI: 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 19.07.2000; 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 970 m, 27.06.2001.

***Orthetrum albistylum* (Sélys, 1848)**
Materials: AYDIN: 2 females, Nazilli (Büyük Menderes river), 37°52'N 28°19'E, 66 m, 25.06.2001; ISPARTA: 1 male, between Gelendost-Afşar, 38°07'N 30°59'E, 965 m, 20.06.2001.

***Orthetrum brunneum* (Fonscolombe, 1837)**
Materials: ANTALYA: 1 male, Elmalı (Avlan lake), 36°34'N 29°57'E, 1033 m, 21.05.2000; 2 males, 2 females, Elmalı (Avşar), 36°33'N 29°43'E, 1116 m, 24.06.2000; 1 male, Finike (Arifköy), 36°29'N 30°04'E, 365 m, 24.06.2000; 1 female, Kumluca (Gölcükköy), 36°39'N 30°25'E, 1130 m, 25.06.2000; 1 female, Manavgat (between Değirmenözü-Yeşilbağ), 37°23'N 31°16'E, 677 m, 26.06.2000; 1 male, Akseki (Mahmutlar), 36°55'N 31°45'E, 1876 m, 12.07.2000; 1 female, Kemer (Beldibi), 36°44'N 30°32'E, 80 m, 04.08.2000; 1 male, Finike (Akyaka, Akçay), 36°28'N 30°05'E, 345m, 05.08.2000; 1 male, Kaş (Gömbe), 36°31'N 29°40'E, 1260 m, 05.08.2000; 2 females, Kaş (Sinekçibeli passageway), 36°27'N 29°39'E, 1470 m, 05.08.2000; 1 female, Kalkan (Yeşilköy), 36°17'N 29°19'E, 8 m, 27.05.2001; 1 male, Manavgat (Hocalar, Sarısu bridge), 36°52'N 31°15'E, 20 m, 19.08.2001; 1 male, Serik (Cumalar, Kayıburnu stream), 36°55'N 31°02'E, 30 m, 14.09.2001; AYDIN: 5 males, 2 females, Çine (between Subaşı-Dalama), 37°44'N 28°03'E, 150 m, 25.06.2001; 2 males, 1 female, Kuyucak (between Başaran-Azizabat, Dandalaz river), 37°52'N 28°32'E, 115 m, 25.06.2001; 1 female, Bozdoğan (Kazandere), 37°38'N 28°22'E, 140 m, 12.09.2001; 1 male, Çine (Eskiçine, Çine river), 37°31'N 28°04'E, 85 m, 27.05.2002; BURDUR: 1 female, Yeşilova (between Orhanlı-Yeşilova), 37°35'N 29°06'E, 1190 m, 22.06.2000; 1 female, Ağlasun-Yeşilbaş road, 37°39'N 30°27'E, 1400 m, 15.07.2000; 4 males, Yeşilova (Sazak), 37°32'N 29°56'E, 935 m, 15.07.2000; 1 male, Gölhisar (Gölhisar lake, Uylupınar), 37°06'N 29°36'E, 980m, 06.08.2000; 1 female, Gölhisar (Çamköy), 37°14'N 29°31'E, 933 m, 07.08.2000; 1 female, Yeşilova (Aşağıkırlı, Akgöl), 37°41'N 29°44'E, 1020 m, 08.08.2000; 1 male, Karaçal, Karaçal dam, 37°33'N 30°04'E, 930 m, 09.08.2000; 1 female, Yeşilova (Işıklar), 37°33'N 29°46'E, 1170 m, 18.07.2001; 1 male, Yeşilova (Dereköy), 37°39'N 29°48'E, 1080 m, 18.07.2001; 1 male, Kovacık, 37°42'N 29°58'E, 1206 m, 18.07.2001; 1 male, Karamanlı (stream), 37°25'N 29°49'E, 1196 m, 20.08.2001; DENİZLİ: 1 female, Acıpayam (Çakır, Dalaman river), 37°18'N 29°20'E, 825 m, 16.07.2000; 3 males, Çameli (Kirazlıyaylı, Karabayır stream), 36°58'N 29°11'E, 840 m, 16.07.2000; 1 female, Acıpayam (Karahöyük), 37°30'N 29°20'E, 876 m, 18.07.2000; 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 19.07.2000; 1 female, Çardak (Acıgöl), 37°49'N 29°25'E, 780 m, 19.07.2000; 1 male, Bozkurt (Plateau of Çambaşı, Karagöl), 37°44'N 29°29'E, 1280 m, 08.08.2000; 1 female, Akköy (Pamukkale, Travertens), 37°55'N 29°07'E, 285 m, 07.08.2000; 2 males, 1 female, Buharkent (Meyremoğlu, Büyük Menderes DSİ watering regulator), 37°56'N 28°42'E, 142 m, 19.05.2001;1 female, Acıpayam (Alaattin), 37°27'N 29°16'E, 1020 m, 22.06.2001; 1 male, Buldan (between Buldan-Süleymanlı), 38°02'N 28°47'E, 1120 m, 17.07.2001; 1 male, Honaz (Akbaş), 37°43'N 29°25'E, 1127 m, 17.07.2001; 1 male, Çardak (between Beylerli-Hayriye), 37°39'N 29°38'E, 1140 m, 17.07.2001; 1 female, Beyağaç (Akçay), 37°13'N 28°51'E, 655 m, 21.08.2001; 1 male, Honaz (Kaklık), 37°49'N 29°25'E, 580 m, 22.08.2001; 1 male, Çivril (Gümüşsu), 38°15'N 29°55'E, 850 m, 11.09.2001; ISPARTA: 1 male, Yalvaç (Celeptaş), 38°19'N 31°03'E, 1185 m, 21.06.2000; 1 male, Sütçüler (Kesme), 37°28'N 31°17'E, 1005 m, 26.06.2000; 1 male, 2 females, Sütçüler (between Sağrak-Sipahiler), 37°35'N 30°59'E, 1118 m,

26.06.2000; 1 male, Aksu (between Yakaköy- Yenişarbademli), 37°43'N 31°16'E, 1753 m, 27.06.2000; 1 male, Yenişarbademli, 37°42'N 31°24'E, 1180 m, 13.07.2000; 1 male, 2 females, Yenişarbademli, 37°41'N 31°19'E, 1230 m, 13.07.2000; 1 male, Aksu (between Aksu-Yakaköy), 37°43'N 31°17'E, 1820 m, 14.07.2000; 1 male, between Aksu-Yenişarbademli, 37°43'N 31°16'E, 1753 m, 14.07.2000; 2 males, 2 females, Aksu (Karağı), 37°45'N 31°07'E, 1230 m, 14.07.2000; 1 female, Aksu (Aksu river), 37°49'N 31°06'E, 1340 m, 14.07.2000; 1 male, 1 female, Sütçüler (Sipahiler, Taşlıkkır stream), 37°38'N 30°59'E, 1185 m, 15.07.2000; 1 male, 1 female, Keçiborlu (Özbahçe), 38°01'N 30°21'E, 1330 m, 19.07.2000; 1 female, Aksu (Yılanlı), 37°47'N 31°00'E, 1225 m, 14.07.2000; 8 males, Uluborlu (İleydağ), 38°03'N 30°24'E, 1160 m, 19.07.2000; 2 males, Eğirdir (Akbenli), 37°38'N 30°51'E, 930 m, 10.08.2000; 4 males, Sütçüler crossroads (Kovada river), 37°33'N 30°51'E, 630 m, 10.08.2000; 1 male, Aksu (Karağı), 37°45'N 31°07'E, 1210 m, 10.08.2000; 1 male, Uluborlu (İleydağı, Pupa river), 38°03'N 30°29'E, 1160 m, 15.09.2000; 1 male, Yalvaç (Özbeyaz), 38°15'N 31°12'E, 1120 m, 20.06.2001; 1 female, Sütçüler (Melihler-Çandır crossroads), 37°27'N 30°52'E, 310 m, 21.06.2001; 1 female, Sütçüler (Karacaören dam), 37°25'N 30°53'E, 280 m, 21.06.2001; 1 male, 1 female, Eğirdir (between Aksu-Yılanlı), 37°47'N 30°58'E, 1210 m, 28.06.2001; 1 female, Yalvaç (Bağkonak, Sultandağı), 38°13 890'N 31°17 654'E, 1260 m, 19.07.2001; 1 male, Yalvaç (Bağkonak), 38°13 110'N 31°17 536'E, 1327 m, 19.07.2001; 1 male, 1 female, Yalvaç (Bağkonak), 38°14 484'N 31°18 872'E, 1420 m, 19.07.2001; 1 female, Yalvaç (Bağkonak, Sultandağı), 38°14'N 31°22'E, 1665 m, 25.07.2001; 1 male, Yalvaç (Yarıkkaya), 38°27'N 31°02'E, 1365 m, 26.07.2001; 2 females, Yalvaç (Yarıkkaya), 38°27'N 31°02'E, 1753 m, 26.07.2001; 1 male, 1 female, Güneyce, 37°39'N 30°43'E, 666 m, 23.08.2001; 1 female, Eğirdir (Göktaş, Koysazı stream), 37°50'N 30°53'E, 1500 m, 25.05.2002; 2 males, Eğirdir-Isparta road, 37°58'N 30°46'E, 1220 m, 25.05.2002; MUĞLA: 1 male, Dalaman (Kapıgargın crossroads, Tersakan river), 36°47'N 28°51'E, 22.05.2000; 1 male, Dalaman (Tersakan-III), 36°47'N 28°49'E, 23 m, 17.07.2000; 4 males, 5 females, Köyceğiz (Yayla, Gölgeli mountains), 37°03'N 28°47'E, 1730 m, 17.07.2000; 2 males, 1 female, Kemer (Ceylan,), 36°49'N 29°33'E, 1140 m, 06.08.2000; 4 males, 2 females, Kemer (Bekçiler), 36°53'N 29°40'E, 1250 m, 06.08.2000; 1 male, between Kemer-Karahasantaşı (race of Esen river), 36°56'N 29°38'E, 1390 m, 06.08.2000; 4 females, Yatağan (Pınarbaşı), 37°18'N 28°07'E, 352 m, 23.06.2001; 1 male, Yatağan (between Gökgedik-Katrancı), 37°23'N 27°56'E, 595 m, 23.06.2001; 1 male, Menteşe (Sungur), 37°24'N 28°31'E, 660 m, 16.07.2001; 1 female, between Beyağaç-Karacaören, 37°13'N 28°50'E, 625 m, 21.08.2001; 1 male, Köyceğiz (Hamitköy), 36°56'N 28°36'E, 13 m, 25.06.2002.

***Orthetrum cancellatum* (Linnaeus, 1758)**

Materials: ANTALYA: 1 female, Manavgat (Manavgat dam), 36°50'N 31°31'E, 65 m., 21.04.2001; AYDIN: 2 females, Çine (Elderesi), 37°41'N 28°06'E, 625 m, 21.05.2001; 2 males, Çine (Kavşit, Çatak pool), 37°39'N 28°08 N, 705 m, 21.05.2001; 1 male, Çine (Topçam dam), 37°41'N 28°01' E, 135 m, 25.06.2001; BURDUR: 1 male, Bucak (Karacaören-II dam), 37°19'N 30°48'E, 210 m, 19.05.2000; 1 male, Tefenni (Hasanpaşa, Hasanpaşa pool), 37°15'N 29°53'E, 1217 m, 23.06.2000; 1 female, Yeşilova (Salda beli), 37°29'N 29°36'E, 1180 m, 16.07.2000; 1 male, Gölhisar (Gölhisar lake, Uylupınar), 37°06'N 29°36'E, 980m, 06.08.2000; 1 female, Yeşilova (Salda beli), 37°29'N 29°36'E, 1180 m, 09.08.2000; 1 male, Yeşilova (Salda lake), 37°30'N 29°39'E, 1375 m,

18.07.2001; 1 male, Karamanlı (Karataş lake), 37°22'N 29°57'E, 1067 m, 20.08.2001; DENİZLİ: 3 males, 1 female, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 19.07.2000; 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 07.08.2000; 3 females, Bozkurt (Plateau of Çambaşı, Karagöl), 37°44'N 29°29'E, 1280 m, 08.08.2000; 1 male, Çivril (Beydilli, Işıklı lake), 38°15'N 29°56'E, 850 m, 08.08.2000; 1 male, 1 female, Çivril (DSİ watering regulator), 38°13'N 29°49'E, 842 m, 28.05.2002; ISPARTA: 1 male, 1 female, Yalvaç (Eğirdir lake), 38°16'N 30°50'E, 948 m, 21.06.2000; 3 males, 8 females, Senirkent (Gençali, Eğirdir lake), 38°14'N 30°45'E, 950 m, 21.06.2000; 1 female, Sütçüler (between Sağrak - Sipahiler), 37°35'N 30°59'E, 1118 m, 26.06.2000; 1 male, Keçiborlu (Kozluca), 37°55'N 30°15'E, 1160 m, 19.07.2000; 1 male, Uluborlu (İleydağ), 38°03'N 30°24'E, 1160 m, 19.07.2000; 1 female, Gölcük lake, 37°43'N 30°30'E, 1430 m, 09.08.2000; 1 male, Eğirdir (Akbenli), 37°38'N 30°51'E, 930 m, 10.08.2000; 1 male, Sütçüler crossroads (Kovada Çayı), 37°33'N 30°51'E, 630 m, 10.08.2000; 1 male, Eğirdir (Kovada road), 37°41'N 30°52'E, 921 m, 21.06.2001; 3 males, Eğirdir (Kovada dam), 37°20'N 30°52'E, 920 m, 21.06.2001; 1 male, 1 female, between Gelendost-Afşar, 38°07'N 30°59'E, 965 m, 20.06.2001; 1 male, 1 female, Gölcük lake, 37°43'N 30°30'E, 1410 m, 28.06.2001; 1 male, 2 females, Yalvaç (Sücüllü, Yalvaç dam), 38°22'N 31°08'E, 1200 m, 21.06.2000; 1 female, Senirkent (Gençali, Eğirdir lake), 38°14'N 30°45'E, 950m, 21.06.2000; 2 females, Sütçüler (Melihler-Çandır crossroads), 37°27'N 30°52'E, 310 m, 21.06.2001; 1 male, between Aksu-Karağı (Aksu river and dam), 37°47'N 31°06'E, 1305 m, 28.06.2001; 1 female, Yalvaç (Sücüllü, Yalvaç dam), 38°22'N 31°08'E, 1190 m, 08.07.2001; 1 male, Sütçüler (between İncidere-Belence, Köprü river), 37°34'N 31°10'E, 730 m, 23.08.2001; 2 females, Yalvaç (Aşağıkaşıkara, Eğirdir lake), 38°16'N 30°50'E, 930 m, 19.06.2002; 1 male, Senirkent (Kayaağzı), 38°08'N 30°46' E, 830 m, 19.06.2002; 1 male, Eğirdir (Kovada lake), 37°37'N 30°52'E, 930 m, 21.06.2002; MUĞLA: 1 male, Yatağan (Memişler crossroad, Kayırlı bridge), 37°25'N 28°08'E, 340 m, 25.06.2001; 1 female, Dalaman (Kapıgargın, Kocagöl), 36°41'N 28°50'E, 5 m, 25.06.2002.

***Orthetrum chrysostigma* (Burmeister, 1839)**

Materials: ANTALYA: 1 male, Manavgat (Oymapınar dam), 36°54'N 31°31'E, 50 m, 19.08.2001; 1 male, 1 female, Manavgat (Hocalar, Sarısu bridge), 36°52'N 31°15'E, 20 m, 19.08.2001; 1 male, Serik (Sağırini, Köprü river), 37°00'N 31°12'E, 57 m, 26.06.2002; BURDUR: 1 female, Yeşilova (Karaatlı), 37°33'N 29°49'E, 1230 m, 09.07.2000; MUĞLA: 1 male, Fethiye (Uğurlu), 36°37'N 29°20'E, 140 m, 22.05.2000; 1 male, Köyceğiz (Karaböğürtlen, Fethiye stream), 37°00'N 28°30'E, 90 m, 18.07.2000; 1 male, Fethiye (Susambeleni stream), 36°41'N 29°06'E, 22 m, 15.07.2001; 1 male, Dalaman (Gürköy), 36°48'N 28°50'E, 32 m, 20.08.2001.

***Orthetrum coerulescens anceps* (Schneider, 1845)**

Materials: ANTALYA: 1 male, 1 female, Kale-Kaş road (Kekova), 36°14'N 29°45'E, 20.05.2000; 1 male, Alanya (Oba, Alacami), 36°33'N 32°11'E, 100 m, 11.07.2000; 1 male, Gazipaşa (Kocadere), 36°15'N 32°19' E, 30 m, 26.05.2001; 1 female, Alanya (Demirtaş, Sedre river), 36°25'N 32°10'E, 22 m, 29.06.2001; 1 male, Kemer (Between Kuzdere-Kemer), 36°36'N 30°28'E, 360 m, 14.07.2001; 1 male, Gazipaşa (Kahyalı, Delice bridge), 36°17'N 32°16'E, 2 m, 18.08.2001; AYDIN:1 female, Nazilli (Büyük Menderes river), 37°52'N 28°19'E, 66 m, 25.06.2001; female, Nazilli (Büyük Menderes river), 37°52'N 28°19'E, 85 m,

12.09.2001; 1 male, Kuyucak (between Başaran-Azizabat, Dandalaz river), 37°52'N 28°32'E, 115 m, 25.06.2001; 1 male, Çine (Yürükler, Çine river), 37°39'N 28°00'E, 65 m, 23.06.2002; BURDUR: 2 males, Yeşilova (Sazak), 37°32'N 29°56'E, 935 m, 15.07.2000; 10 males, 4 females, Yeşilova (Salda beli), 37°29'N 29°36'E, 1180 m, 16.07.2000; 2 females, Yeşilova (Büyükyaka), 37°37'N 29°53'E, 1280 m, 08.08.2000; 5 males, 4 females, Yeşilova (Salda beli), 37°29'N 29°36'E, 1180 m, 09.08.2000; DENİZLİ: 1 female, Akköy (Pamukkale, Travertens), 37°55'N 29°07'E, 285 m, 07.08.2000; 1 male, Çardak (Acıgöl), 37°49'N 29°25'E, 780 m, 19.07.2000; 1 male, Serinhisar, 37°37'N 29°17'E, 1100 m, 07.08.2000; 6 males, 1 female, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 07.08.2000; 1 male, Acıpayam (Alaattin), 37°27'N 29°16'E, 1020 m, 22.06.2001; 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 960 m, 17.07.2001; 1 male, Çardak (Gemiş, Acıgöl), 37°46'N 29°50'E, 860 m, 20.06.2002; ISPARTA: 1 male, Yenişarbademli, 37°41'N 31°19'E, 1230 m, 13.07.2000; 5 males, 3 females, Aksu (between Aksu-Yakaköy), 37°43'N 31°17'E, 1820 m, 14.07.2000; 7 males, Aksu (Yılanlı), 37°47'N 31°00'E, 1225 m, 14.07.2000; 1 male, Aksu (Karağı), 37°45'N 31°07'E, 1230 m, 14.07.2000; 1 male, Uluborlu (İleydağ), 38°03'N 30°24'E, 1160 m, 19.07.2000; 1 female, Gelincik, 37°45'N 30°24'E, 1140 m, 09.08.2000; 1 female, Sütçüler (Sipahiler), 37°38'N 30°59'E, 1200 m, 10.08.2000; 2 males, 1 female, Eğirdir (between Aksu-Yılanlı), 37°47'N 30°58'E, 1210 m, 28.06.2001; 1 male, 1 female, Yalvaç (Aşağıkaşıkara, Eğirdir lake), 38°16'N 30°50'E, 930 m, 19.06.2002; MUĞLA: 1 male, 1 female, Fethiye (Uğurlu), 36°37'N 29°20'E, 140 m, 22.05.2000; 1 male, Arpacık, 36°50'N 29°11'E, 1125 m, 16.07.2000; 1 female, Fethiye (Günlüklü), 36°43'N 29°01'E, 22 m, 17.07.2000; 2 males, between Kemer-Karahasantaşı (race of Esen Çayı), 36°56'N 29°38'E, 1390m, 06.08.2000; 1 male, Milas (Akgedik dam), 37°19'N 27°49'E, 90 m, 23.06.2001; 1 male, Köyceğiz (Köyceğiz lake), 36°57'N 28°41'E, 4 m, 20.08.2001; 1 male, between Beyağaç-Karacaören, 37°13'N 28°50'E, 625 m, 21.08.2001; 1 male, Köyceğiz lake, 36°57'N 28°41'E, 16 m, 13.09.2001; 1 female, Dalaman (Tersakan-II), 36°47'N 28°49'E, 28 m, 13.09.2001.

***Orthetrum sabina* (Drury, 1770)**

Materials: ANTALYA: 1 male, Finike (Hasyurt, Alakır river), 36°18'N 30°15'E, 5 m, 14.07.2001; AYDIN: 1 male (obs.), Nazilli (Esenköy, Akçay), 37°52'N 28°18'E, 76 m, 22.08.2001; 1 male, Çine (Tepeköy, Topçam dam), 37°41'N 28°00'E, 130 m, 27.05.2002; 1 male, Baltolay, 37°46'N 27°50'E, 50 m, 27.05.2002, 1 male (obs.), Söke (Yeşilköy, Azap lake), 37°34'N 27°26'E, 17 m, 23.06.2002; BURDUR: 1 male, Çavdır (Yamadı), 37°07'N 29°36'E, 960 m, 22.06.2002; DENİZLİ: 1 male, Sarayköy (Köprübaşı, Büyük Menderes river), 37°57'N 28°55'E, 155 m, 22.08.2001; MUĞLA: 3 males, 1 female, Milas (Söke road 6. km, Sarıçay), 37°20'N 27°43'E, 41 m, 23.06.2001; 1 male, Milas (Kapıkırı, Bafa lake), 37°28'N 27°32'E, 30 m, 23.06.2001; 1 female, Dalaman (Kapıgargın, Kocagöl), 36°41'N 28°50'E, 4 m, 15.07.2001; 1 male, Dalaman (Kapıgargın, Kocagöl), 36°42'N 28°50'E, 17 m, 13.09.2001; 1 male (obs.), Dalaman (Kapıgargın, Kocagöl), 36°41'N 28°50'E, 21 m, 22.04.2002; 1 male, Milas (Sarıçay), 37°20'N 27°43'E, 35 m, 23.06.2002; 1 female, Köyceğiz (Hamitköy), 36°56'N 28°36'E, 13 m, 25.06.2002;

***Orthetrum taeniolatum* (Schneider, 1845)**

Materials: ANTALYA: 1 female, Finike (Alakır dam and Alakır river), 36°27'N 30°13'E, 144 m, 20.05.2000; 1 male, Konyaaltı (Boğaz river), 36°51'N 30°37'E,

15 m, 26.05.2001; 1 male, Gazipaşa (Gazipaşa river), 36°15'N 32°19' E, 35 m, 29.06.2001; 1 female, Gazipaşa (Aydıncık, Bıçkıcı bridge), 36°17'N 32°17'E, 22 m, 29.06.2001; 1 female, Alanya (Demirtaş, Sedre river), 36°25'N 32°10'E, 22 m, 29.06.2001; 1 male, Manavgat (Kızılağaç, Nifrit river), 36°44'N 31°31'E, 13 m, 13.07.2001; 1 male, Manavgat (Oymapınar dam), 36°54'N 31°31'E, 50 m, 19.08.2001; 1 male, Manavgat (Alara river), 36°40'N 31°37'E, 14 m, 27.06.2002; 1 male, Gazipaşa (Macarköy, Beyrebucak-I), 36°14'N 32°21'E, 44 m, 27.06.2002; AYDIN: 1 female, Yenipazar (Hacıköseler), 37°42'N 28°08'E, 630 m, 21.05.2001; 1 male, 1 female Bozdoğan (Kazandere), 37°38'N 28°22'E, 140 m, 12.09.2001; 1 male, 1 female, Çine (Tepeköy, Topçam dam), 37°41'N 28°00'E, 130 m, 27.05.2002; BURDUR: 1 male, Yeşilova (Karaatlı), 37°33'N 29°49'E, 1230 m, 09.07.2000; ISPARTA: 1 female, Keçiborlu (Kozluca), 37°55'N 30°15'E, 1160 m, 19.07.2000; MUĞLA: 1 male, 1 female, Milas (Geyik dam), 37°23'N 27°53'E, 486 m, 23.06.2001; 1 male, Milas (Söke road 6. km, Sarıçay), 37°20'N 27°43'E, 41 m, 23.06.2001; 1 male, Dalaman (Tersakan-II), 36°47'N 28°49'E, 23 m, 15.07.2001; 1 male, Dalaman (Gürköy), 36°48'N 28°50'E, 32 m, 20.08.2001; 1 female, Dalaman (Dalaman river), 36°49'N 28°47'E, 30 m, 20.08.2001; 1 male, Kale (Köyceğiz crossroad), 37°06'N 28°29'E, 590 m, 21.08.2001.

***Crocothemis erythraea* (Brullé, 1832)**

Materials: ANTALYA: 1 female, Kumluca (Arifköy, Karacaören), 36°30'N 30°10'E, 1227 m, 24.06.2000; 1 male (obs.), Finike (Hasyurt, Alakır river), 36°18'N 30°15'E, 5 m, 14.07.2001; 1 male (obs.), Manavgat (Çolaklı), 36°49'N 31°19'E, 36°m, 19.08.2001; 1 male (obs.), Manavgat (Hocalar, Sarısu bridge), 36°52'N 31°15'E, 20 m, 19.08.2001; AYDIN: 1 male, Söke (Serçin lake), 37°33'N 27°24'E, 28 m, 20.05.2001; 1 male, Nazilli (Esen, Akçay), 37°48'N 28°19'E, 81 m, 21.05.2001; 1 male, Söke (Avşar, Azap lake), 37°35'N 27°26'E, 37°m, 23.06.2001; 1 female, Çine (between Subaşı-Dalama), 37°44'N 28°03'E, 150 m, 25.06.2001; 2 females, Nazilli (Büyük Menderes river), 37°52'N 28°19'E, 66 m, 25.06.2001; 1 male, Nazilli (Esenköy, Akçay), 37°47'N 28°18'E, 75 m, 12.09.2001; 1 male, Söke (Yeşilköy, Azap lake), 37°34'N 27°26'E, 17 m, 23.06.2002; BURDUR: 1 female, Tefenni (Hasanpaşa, Hasanpaşa pond), 37°15'N 29°53'E, 1217 m, 23.06.2000; 2 males, Tefenni-Çavdır road (between Çaylı-Yeşilköy), 37°14'N 29°50'E, 1176 m, 23.06.2000; 1 male, 1 female, Gölhisar (Gölhisar lake), 37°07'N 29°36'E, 956 m, 23.06.2000; 2 males, Gölhisar (Gölhisar lake, Uylupınar), 37°06'N 29°36'E, 980m, 06.08.2000; 1 male, Gölhisar (Gölhisar lake), 37°07'N 29°36'E, 960 m, 20.08.2001; 1 male (obs.), Çavdır (Yamadıburnu), 37°09'N 29°36'E, 975 m, 22.06.2002; 1 male, 2 females, Çavdır (Yamadı), 37°07'N 29°36'E, 960 m, 22.06.2002; DENİZLİ: 2 males, 4 females, Çivril (Beydilli, Işıklı lake), 38°11'N 30°03'E, 920 m, 22.06.2000; 9 males, 4 females, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 19.07.2000; 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 07.08.2000; 1 female, Akköy (Pamukkale, Travertens), 37°55'N 29°07'E, 285 m, 07.08.2000; 1 male, Denizli-Muğla border (Gazeller, Akçay), 37°20'N 28°43'E, 440 m, 22.06.2001; 1 female, Çivril (Yamanlar), 38°14'N 29°48'E, 835 m, 26.06.2001; 1 male, Çivril (between Emirhisar-Tuğlu), 38°15'N 29°50'E, 840 m, 26.06.2001; 2 females, Çivril (Bucak, Işıklı lake), 38°14'N 29°51'E, 838 m, 26.06.2001; 1 female, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 960 m, 17.07.2001; 1 male, Sarayköy (Köprübaşı, Büyük Menderes river), 37°57'N 28°55'E, 155 m, 22.08.2001; 1 male, Çivril (DSİ watering regulator), 38°13'N 29°49'E, 842 m, 28.05.2002; 1 male, Çivril

(Düzbel), 38°10'N 30°03'E, 845 m, 19.06.2002; ISPARTA: 1 male, Yalvaç (Yarıkkaya), 38°27'N 31°02'E, 1500m, 21.06.2000; 1 male, Yalvaç (Eğirdir lake), 38°16'N 30°50'E, 948 m, 21.06.2000; 1 female, Yenişarbademli, 37°42'N 31°24'E, 1180 m, 13.07.2000; 1 male, Yenişarbademli, 37°41'N 31°19'E, 1230 m, 13.07.2000; 1 female, Aksu (Karağı), 37°45'N 31°07'E, 1230 m, 14.07.2000; 1 male, Yalvaç (Sultandağı), 38°15'N 31°22'E, 1560 m, 20.07.2000; 1 male, Sütçüler crossroads (Kovada Çayı), 37°33'N 30°51'E, 630 m, 10.08.2000; 1 male, 1 female, Gelendost (Hacılar, Eğirdir lake), 38°02'N 30°57'E, 936°m, 20.06.2001; 1 male, 1 female, between Gelendost-Afşar, 38°07'N 30°59'E, 965 m, 20.06.2001; 1 male, Eğirdir, 37°41'N 30°52'E, 921 m, 21.06.2001; 2 males, 2 females, Eğirdir (Kovada dam), 37°20'N 30°52'E, 920 m, 21.06.2001; 1 male, Gölcük lake, 37°43'N 30°30'E, 1410 m, 28.06.2001; 1 male, Eğirdir (Kovada lake), 37°37'N 30°52'E, 935 m, 23.08.2001; 5 males, Yalvaç (Aşağıkaşıkara, Eğirdir lake), 38°16'N 30°50'E, 930 m, 19.06.2002; 1 male, 1 female, Eğirdir (Kovada lake), 37°37'N 30°52'E, 930 m, 21.06.2002; MUĞLA: 1 male, Köyceğiz lake, 36°57'N 28°41'E, 75 m, 18.04.2000; 1 male, Bodrum (Mumcular dam), 37°07'N 27°39'E, 110 m, 17.04.2000; 1 male,1 female, Dalaman (Kapıgargın, Kocagöl), 36°43'N 28°01'E, 22.05.2000; 1 male, 6 females, Fethiye (Murt deresi), 36°39'N 29°07'E, 37°m, 17.07.2000; 1 female, Fethiye (Günlüklü), 36°43'N 29°01'E, 22 m, 17.07.2000; 1 male, Ula (Gölcük), 37°07'N 28°31'E, 690 m, 18.07.2000; 1 male, Kemer (Bekçiler), 36°55'N 29°45'E, 1290m, 06.08.2000; 1 male, 1 female, Milas (Akgedik dam), 37°19'N 27°49'E, 90 m, 23.06.2001; 1 male, Milas (Söke road 6. km, Sarıçay), 37°20'N 27°43'E, 41 m, 23.06.2001; 2 males, Bodrum (Mumcular dam), 37°06'N 27°39'E, 65 m, 23.06.2001; 1 female, between Beyağaç-Karacaören, 37°13'N 28°50'E, 625 m, 21.08.2001; 1 male (obs.), Dalaman (Kapıgargın, Kocagöl), 36°41'N 28°50'E, 21 m, 22.04.2002; 1 male, Köyceğiz (Hamitköy), 36°56'N 28°36'E, 13 m, 25.06.2002; 1 male (obs.), Milas (Sarıçay), 37°20'N 27°43'E, 35 m, 23.06.2002.

***Sympetrum flaveolum* (Linnaeus, 1758)**

Materials: BURDUR: 1 female, Yeşilova (Karaatlı), 37°33'N 29°49'E, 1150 m, 08.08.2000; ISPARTA: 5 males, 7 females, Yalvaç (Celeptaş), 38°19'N 31°03'E, 1185 m, 21.06.2000; 1 female, Aksu (Yılanlı), 37°47'N 31°00'E, 1225 m, 14.07.2000; 3 males, 4 females, Yalvaç (Celeptaş), 38°19'N 31°03'E, 1180 m, 19.07.2000; MUĞLA: 1 female, Köyceğiz (Karaböğürtlen, Balıklı river), 37°00'N 28°32'E, 70 m, 18.07.2000; 1 female, Ula (Gölcük), 37°07'N 28°31'E, 690 m, 18.07.2000.

***Sympetrum fonscolombei* (Sélys, 1840)**

Materials: AYDIN: 3 males, 1 female, Çine (Tepeköy, Topçam dam), 37°41'N 28°00'E, 130 m, 27.05.2002; 1 male, Karacasu (Dandalaz), 37°43'N 28°38'E, 412 m, 22.06.2002; 1 male, 1 female, Karpuzlu (Yaylakavak dam), 37°34'N 27°48'E, 180 m, 23.06.2002; 1 female, Çine (Topçam dam), 37°41'N 28°00'E, 125 m, 23.06.2002; BURDUR: 1 male, Çavdır (Yamadıburnu), 37°09'N 29°36'E, 975 m, 22.06.2002; ISPARTA: 3 females, Yalvaç (Sücüllü, Yalvaç dam), 38°22'N 31°08'E, 1200 m, 21.06.2000; 1 male, Gölcük lake, 37°43'N 30°30'E, 1410 m, 28.06.2001; 1 male, Yalvaç (Yarıkkaya, Sultandağı), 38°27'N 31°08'E, 1880 m, 24.08.2001; 1 male, Keçiborlu (Özbaha), 38°00'N 30°19'E, 1356 m, 11.09.2001; MUĞLA: 2 females, Milas (Geyik dam), 37°23'N 27°53'E, 486 m, 23.06.2001.

***Sympetrum haritonovi* Borisov, 1983**
Materials: ANTALYA: 1 male, 2 females, Alanya (Ardıçpınarı fountain), 36°53'N 32°23'E, 1920 m, 16.08.2001; 1 female, Alanya (Tosmur plateau), 36°53'N 32°18'E, 2020 m, 16.08.2001.

***Sympetrum meridionale* (Sélys, 1841)**
Materials: ANTALYA: 1 female, Kaş (between Gömbe-Sütleğen, Sinekçibeli), 36°27'N 29°38'E, 1430 m, 24.06.2000; 1 male, Beşkonak (between Çaltepe-Değirmenözü, Kanlı river), 37°20'N 31°13'E, 492 m, 26.06.2000; 2 males, 2 females, Alanya (Gevne river, Beyreli), 36°51'N 32°29'E, 1585 m, 10.07.2000; 1 female, Akseki (Göktepe yaylası road), 37°03'N 31°51'E, 1415 m, 12.07.2000; 1 female, Manavgat (Oymapınar dam), 36°52'N 31°31'E, 40 m, 04.08.2000; 2 males, 1 female, Kaş (Sinekçibeli), 36°27'N 29°39'E, 1470 m, 05.08.2000; 1 male, Gündoğmuş (Güneycik), 36°46'N 31°44'E, 185 m, 13.09.2000; 4 males, 2 females, Kaş (Kalkan, Patara), 36°15'N 29°19'E, 12 m, 27.05.2001; 5 males, 2 females, Kaş (Kalkan,Patara), 36°16'N 29°19'E, 25 m, 26.05.2002; BURDUR: 2 males, 1 female, Karamanlı (Karataş lake), 37°22'N 29°57'E, 1054 m, 23.06.2000; 1 female, Yeşilova (Sazak), 37°32'N 29°56'E, 935 m, 15.07.2000; 1 male, Yeşilova (Salda beli), 37°29'N 29°36'E, 1180 m, 16.07.2000; 1 female, Altınyayla (Çatak), 37°01'N 29°32'E, 1300m, 06.08.2000; 1 male, Yeşilova (Karaatlı), 37°33'N 29°49'E, 1150 m, 08.08.2000; 2 females, Yeşilova (Salda beli), 37°29'N 29°36'E, 1180 m, 09.08.2000; 2 females, Hacılar, 37°34'N 30°05'E, 945 m, 09.08.2000; 2 females, Yeşilova (Dereköy), 37°39'N 29°48'E, 1090 m, 15.09.2000; DENİZLİ: 1 male, Çameli (Karabayır), 36°55'N 29°09'E, 1050 m, 16.07.2000; 2 females, Serinhisar (Yatağan), 37°35'N 29°23'E, 1080 m, 18.07.2000; 1 male, Honaz (Yukarıdağdere), 37°47'N 29°24'E, 1000 m, 18.07.2000; 2 females, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 19.07.2000; 1 male, Çardak (Acıgöl), 37°49'N 29°25'E, 780 m, 19.07.2000; 1 female, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 07.08.2000; 1 male, Honaz (Keklik kasabası), 37°49'N 29°45' 24, 595 m, 08.08.2000; 7 males, 4 females, Bozkurt (plateau of Çambaşı, Karagöl), 37°44'N 29°29'E, 1280 m, 08.08.2000; 1 male, Buldan (Süleymanlı lake), 38°03'N 28°46'E, 1170 m, 17.07.2001; 1 female, Çivril (İshaklı), 38°11'N 30°03'E, 850 m, 11.09.2001; 1 female, Çivril (Gümüşsu), 38°15'N 29°55'E, 850 m, 11.09.2001; 1 male, 7 females, Çivril (Beydilli, Işıklı lake), 38°17'N 29°54'E, 850 m, 11.09.2001; 3 females, Çivril (Düzbel), 38°10'N 30°03'E, 845 m, 19.06.2002; 1 female, Çardak (Gemiş, Acıgöl), 37°46'N 29°50'E, 860 m, 20.06.2002; ISPARTA: 1 female, Yenişarbademli, 37°41'N 31°19'E, 1230 m, 13.07.2000; 1 male, 1 female, Aksu (Dedegöl mountain), 37°42'N 31°17'E, 1610 m, 13.07.2000; 1 female, Aksu (Dedegöl mountain, İnişdibi stream), 37°42'N 31°14'E, 1290 m, 13.07.2000; 1 male, Aksu (between Aksu-Yakaköy), 37°43'N 31°16'E, 1622 m, 14.07.2000; 1 female, Aksu (Yakaafsar), 37°44'N 31°10'E, 1260 m, 14.07.2000; 1 male, Aksu (Aksu river), 37°49'N 31°06'E, 1340 m, 14.07.2000; 2 females, Keçiborlu (Kozluca), 37°55'N 30°15'E, 1160 m, 19.07.2000; 1 male, Uluborlu (İleydağ), 38°03'N 30°24'E, 1160 m, 19.07.2000; 1 male, Senirkent (Büyükkabaca), 38°10'N 30°41'E, 975 m, 19.07.2000; 1 male, Senirkent (Gençeli, Eğirdir lake), 38°14'N 30°45'E, 950 m, 19.07.2000; 1 male, 2 females, Keçiborlu (Kaplanlı), 37°56'N 30°12'E, 1100 m, 19.07.2000; 5 females, Yalvaç (Bağkonak, Sultandağı), 38°15'N 31°20'E, 1660 m, 20.07.2000; 1 male, 1 female, Gölcük lake, 37°43'N 30°30'E, 1430 m, 09.08.2000; 1 female, Sütçüler crossroads (Kovada river), 37°33'N 30°51'E, 630 m, 10.08.2000; 1 male, Aksu (Aksu river), 37°49'N 31°06'E, 1350 m, 10.08.2000; 1 female,

Yalvaç (Kuyucak), 38°14'N 31°12'E, 1125 m, 11.08.2000; 1 female, Uluborlu (İleydağı, Pupa river), 38°03'N 30°29'E, 1160 m, 15.09.2000; 1 female, Gelendost (Hacılar, Eğirdir lake), 38°02'N 30°57'E, 936°m, 20.06.2001; 1 female, Yenişarbademli (Dedegöl mountain), 37°41'N 31°20'E, 1524 m, 13.07.2000; 1 male, Yalvaç (Bağkonak), 38°11'N 31°17'E, 1390 m, 08.07.2000; 1 female, Senirkent (Gençali), 38°03'N 31°45'E, 950 m, 15.09.2000; 1 female, Yalvaç (Bağkonak), 38°15'N 31°20'E, 1660 m, 28.06.2001; 1 male, 1 female, Yalvaç (Yarıkkaya), 38°27'N 31°02'E, 1365 m, 26.07.2001; MUĞLA: 1 female, Köyceğiz (Yayla, Gölgeli mountains), 37°03'N 28°47'E, 1730 m, 17.07.2000; 1 female, Ula (Gölcük), 37°07'N 28°31'E, 700 m, 21.08.2001; 1 female, Köyceğiz (Örnek, Balıklı lake), 37°00'N 29°53'E, 100 m, 13.09.2001; 1 male, Fethiye (Uğurlu), 36°37'N 29°20'E, 140 m, 22.05.2000.

***Sympetrum sanguineum* (Müller, 1764)**

Materials: BURDUR: 2 females, Yeşilova (Karaatlı), 37°33'N 29°49'E, 1230 m, 09.07.1999; DENIZLI: 1 male, 1 female, Çivril (Gökgöl), 38°10'N 30°04'E, 940 m, 22.06.2000; 1 male, Çardak (Acıgöl), 37°49'N 29°25'E, 780 m, 19.07.2000; 1 female, Bozkurt (plateau of Çambaşı, Karagöl), 37°44'N 29°29'E, 1280 m, 08.08.2000; 2 males, Buldan (between Buldan-Süleymanlı), 38°02'N 28°47'E, 1120 m, 17.07.2001; ISPARTA: 2 males, Yenişarbademli (Gökyaka), 37°44'N 31°25'E, 1167 m, 27.06.2000; 3 females, Keçiborlu (Kaplanlı), 37°56'N 30°12'E, 1100 m, 19.07.2000; 1 male, Keçiborlu (Özbahçe), 38°00'N 30°18'E, 1300 m, 19.07.2000; 1 male, Keçiborlu (Özbahçe), 38°01'N 30°21'E, 1330 m, 19.07.2000; 1 female, Senirkent (Gençeli, Eğirdir lake), 38°14'N 30°45'E, 950 m, 19.07.2000; 1 male, Yalvaç (Celeptaş), 38°19'N 31°03'E, 1180 m, 19.07.2000; 1 male, Uluborlu (İleydağı), 38°03'N 30°29'E, 1160 m, 15.09.2000; 1 female, Eğirdir (Sütçüler crossroads), 37°33'N 30°57'E, 920 m, 21.06.2002; MUĞLA: 1 male, 1 female, Köyceğiz (Karaböğürtlen, Fethiye stream), 37°00'N 28°30'E, 90 m, 18.07.2000; 2 males, 1 female, Köyceğiz (Köyceğiz lake), 36°57'N 28°41'E, 4 m, 20.08.2001; 1 male, Köyceğiz (Sandras mountain, Kartal lake), 37°05'N 28°50'E, 1910 m, 21.08.2001; 1 female, Fethiye (Kargı, Yanıklar river), 36°42'N 29°02'E, 13 m, 25.06.2002.

***Sympetrum striolatum* (Charpentier, 1840)**

Materials: ANTALYA: 1 male, Alanya (Gevne river, Beyreli), 36°51'N 32°29'E, 1585 m, 10.07.2000; 1 female, Akseki (Güçlüköy), 36°46'N 31°44'E, 195 m, 12.07.2000; BURDUR: 1 female, Çavdır (Yamadı), 37°07'N 29°36'E, 960 m, 22.06.2002; DENIZLI: 1 female, Çivril (Gökgöl, Ahır stream), 38°11'N 30°03'E, 930 m, 22.06.2000; 1 male, Kale (Solmaz), 37°30'N 28°53'E, 920 m, 18.07.2000; 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 19.07.2000; 1 male, Honaz (Yukarıdağdere, Saklıgöl), 37°46'N 29°23'E, 990 m, 07.08.2000; 1 male, Bozkurt (Plateau of Çambaşı, Karagöl), 37°44'N 29°29'E, 1280 m, 08.08.2000; 1 female, Acıpayam (between Aliveren-Darıveren, Güre mountain), 37°14'N 29°27'E, 1140 m, 27.06.2001; 1 male, Çardak (Çaltı), 37°44'N 29°44'E, 920 m, 20.06.2002; ISPARTA: 2 females, Aksu (Dedegöl mountains), 37°41'N 31°20'E, 1524 m, 13.07.2000; 1 male, Yalvaç (Bağkonak, Sultandağı), 38°15'N 31°20'E, 1660 m, 20.07.2000; 2 males, Senirkent (Gençali), 38°03'N 31°45'E, 950 m, 15.09.2000; 1 female, Eğirdir (Kovada road), 37°41'N 30°52'E, 921 m, 21.06.2001; 1 female, Eğirdir (Kovada dam), 37°20'N 30°52'E, 920 m, 21.06.2001; 1 male, Sütçüler (between İncidere-Kasımlar), 37°34'N 31°07'E, 1450 m, 23.08.2001; MUĞLA: 1 female, Bodrum (Mumcular dam), 37°06'N 27°39'E, 65 m, 23.06.2001; 1 male, Köyceğiz

(Sandras mountain, Kartal lake), 37°05'N 28°50'E, 1910 m, 21.08.2001.

***Brachythemis fuscopalliata* (Sélys, 1887)**
Materials: ANTALYA: 1 male, 1 female, Manavgat (Hocalar, Sarısu bridge), 36°52'N 31°15'E, 20 m, 19.08.2001; 2 males, 1 female (obs.), Manavgat (Kızılot, Karpuzçay), 36°43'N 31°33'E, 10 m, 27.06.2002.

***Diplacodes lefebvrei* (Rambur, 1842)**
Materials: ANTALYA: 1 male, 1 female, Gazipaşa (Hacımusa river), 36°10'N 32°25'E, 62 m, 18.08.2001.

***Trithemis annulata* (Beauvois, 1807)**
Materials: ANTALYA:1 female, Kale-Kaş road (Kekova), 36°14'N 29°45'E,, 20.05.2000; 2 females, Finike (Alakır dam ve Alakır river), 36°27'N 30°13'E, 144 m, 20.05.2000; 1 male, 1 female, Finike (Alakır dam), 36°27'N 30°12'E, 55 m, 24.06.2000; 1 male, Alanya (Demirtaş, Sedre river), 36°25'N 32°11'E, 30 m, 26.05.2001; 1 female, Alanya (Demirtaş, Sedre river), 36°25'N 32°10'E, 22 m, 29.06.2001; 1 male, Gazipaşa (Gazipaşa river), 36°15'N 32°19' E, 35 m, 29.06.2001; 2 males, Alanya (Okçular, Okçular river), 36°39'N 31°39'E, 16 m, 13.07.2001; 1 male, Manavgat (Kızılağaç, Nifrit river), 36°44'N 31°31'E, 13 m, 13.07.2001; 1 female, Manavgat (Evrenseki), 36°49'N 31°20'E, 21 m, 13.07.2001; 2 males, Gazipaşa (Kahyalı, Delice bridge), 36°17'N 32°16'E, 2 m, 18.08.2001; 1 male, Manavgat (Oymapınar dam), 36°54'N 31°31'E, 50 m, 19.08.2001; 1 male, Manavgat (Oymapınar dam), 36°52'N 31°33'E, 102 m, 19.08.2001; 1 female, Manavgat (Ilıcaköy), 36°49'N 31°21'E, 15 m, 19.08.2001; 1 male, 2 females, Manavgat (Çolaklı), 36°49'N 31°19'E, 36°m, 19.08.2001; 1 male, Manavgat (Hocalar, Sarısu bridge), 36°52'N 31°15'E, 20 m, 19.08.2001; 1 male, Serik (Kadıburnu stream), 36°55'N 31°01'E, 21 m, 19.08.2001; 1 male, Serik (Gebiz crossroads), 36°56'N 30°55'E, 12 m, 19.08.2001; 1 male, Serik (Durumlar, Aksu river), 37°07'N 30°54' E, 55 m, 19.08.2001; 1 male, Serik (Kırbaş, Aksu river), 37°09'N 30°51'E, 65 m, 19.08.2001; 1 female, Serik (Kırbaş, Hatipler), 37°09'N 30°49'E, 57 m, 19.08.2001; 7 males, 1 female, Manavgat (Manavgat dam), 36°50'N 31°32'E, 60 m, 14.09.2001; 1 male, Serik (Sağırini, Köprü river), 37°00'N 31°12'E, 57 m, 26.06.2002; 1 male, Manavgat (Kızılot, Karpuzçay), 36°43'N 31°33'E, 10 m, 27.06.2002; 1 male, Manavgat (Alara river), 36°40'N 31°37'E, 14 m, 27.06.2002; 1 male, Gazipaşa (Kaledran), 36°06'N 32°33'E, 33 m, 27.06.2002; 1 male, Finike (Alakır dam), 36°27'N 30°13'E, 147 m, 20.05.2000; AYDIN: 1 male, Buharkent (Meyremoğlu, Büyük Menderes DSİ Regülatörü), 37°56'N 28°42'E, 142 m, 19.05.2001; 2 males, Yenipazar (Donduran, Akçay), 37°50'N 28°13'E, 75 m, 21.05.2001; 1 male, Çine (between Subaşı-Dalama), 37°44'N 28°03'E, 150 m, 25.06.2001; 1 male, Yenipazar (Alanlı, Akçay watering), 37°48'N 28°06'E, 65 m, 25.06.2001; 2 males, Nazilli (Esenköy, Akçay), 37°52'N 28°18'E, 76 m, 22.08.2001; 1 male, Kuşadası (Davutlar), 37°41'N 27°04'E, 50 m,, 25.05.2002; BURDUR: 1 female, Bucak (Çobanpınarı), 37°23'N 30°45'E, 736°m, 19.08.2001; 1 male, Gölhisar (Yamadıburnu), 37°08'N 29°36'E, 965 m, 20.08.2001; 4 females, Yeşilova (Karaatlı), 37°33'N 29°49'E, 1230 m, 09.07.2001; DENIZLI: 2 males, 1 female, Güney (Adıgüzel dam), 38°09'N 29°12'E, 460 m, 26.06.2001; ISPARTA: 1 male, Yalvaç (Yarıkkaya), 38°27'N 31°02'E, 1500m, 21.06.2000; 2 males, 4 females, Sütçüler (Karacaören dam), 37°25'N 30°53'E, 280 m, 21.06.2001; 1 male, Yalvaç (Bağkonak, Sultandağı), 38°13 332'N 31°17 411'E, 1216 m, 18.07.2001; 2 males, Güneyce, 37°39'N 30°43'E, 666 m, 23.08.2001; MUĞLA:

2 males, Fethiye (Karadere, Özlen river), 36°20'N 29°15'E, 9 m, 27.05.2001; 1 male, 1 female, Milas (Geyik dam), 37°23'N 27°53'E, 486 m, 23.06.2001; 1 male, 1 female, Milas (Akgedik dam), 37°19'N 27°49'E, 90 m, 23.06.2001; 2 females, Milas (Söke road 6. km, Sarıçay), 37°20'N 27°43'E, 41 m, 23.06.2001; 1 male, Dalaman (Tersakan-II), 36°47'N 28°49'E, 23 m, 15.07.2001; 1 male, 2 females, Ula (Ula dam), 37°07'N 28°23'E, 670 m, 21.08.2001; 3 males, 3 females, Milas (Çallı, Geyik dam), 37°22'N 27°53'E, 500 m, 12.09.2001; 2 males, 6 females, Dalaman (Kapıgargın, Kocagöl), 36°42'N 28°50'E, 17 m, 13.09.2001; 1 male, Milas (Sarıçay), 37°20'N 27°43'E, 35 m, 23.06.2002; 1 male, Köyceğiz (Aksaz koyu), 36°55'N 28°25'E, 108 m, 25.06.2002; 1 female, Köyceğiz (Sultaniye), 36°54'N 28°35'E, 15 m, 25.06.2002; 1 male, Dalaman (Kapıgargın, Kocagöl), 36°41'N 28°50'E, 5 m, 25.06.2002.

***Trithemis festiva* (Rambur, 1842)**
Materials: ANTALYA: 3 males, 1 female, Alanya (between Beldibi-Fakırcalı), 36°28'N 32°17'E, 520 m, 18.08.2001; 1 male, Serik (Sağırini, Köprü river), 37°00'N 31°12'E, 57 m, 26.06.2002; 2 males, Gazipaşa (Kaledran), 36°06'N 32°33'E, 33 m, 27.06.2002; 2 males, Akseki (Güçlüköy), 36°46'N 31°44'E, 195 m, 12.07.2000; DENIZLI: 1 female, Güney (Güney-Çal road 4. km), 38°09'N 29°07'E, 810 m, 28.05.2002; MUĞLA: 1 male, Fethiye (Susambeleni stream), 36°41'N 29°06'E, 22 m, 15.07.2001; 1 male, Dalaman (Tersakan-II), 36°47'N 28°49'E, 23 m, 15.07.2001; 2 males, Yörükoğlu (race of Akçay), 37°13'N 28°50'E, 628 m, 21.08.2001; 1 female, Ula (Ula dam), 37°07'N 28°23'E, 670 m, 21.08.2001; 1 male, Köyceğiz (Örnek, Balıklı lake), 37°00'N 29°53'E, 100 m, 13.09.2001; 2 males, 1 female, Ula (Yeşilçam), 36°59'N 28°25'E, 157 m, 25.06.2002; 1 male, Köyceğiz (Aksaz), 36°54'N 28°26'E, 85 m, 25.06.2002; 2 males, Köyceğiz (Gölgeli mountains, Balıklı river), 37°00'N 28°34'E, 125 m, 18.07.2000; 1 male, Fethiye, 03.05.2002.

***Leucorrhinia pectoralis* (Charpentier, 1825)**
Materials: DENIZLI: 2 females, Buldan (Süleymanlı-Buldan), 38°02' E 28°47'E, 1130 m, 25.06.2001; ISPARTA: 1 male, 1 female, Keçiborlu (Özbahçe), 38°00'N 30°18'E, 1290 m, 28.05.2002; 2 males, Uluborlu (Uluborlu dam, Üğüllü river), 38°03'N 30°24'E, 1110 m, 28.05.2002.

***Pantala flavescens* (Fabricius, 1798)**
Material: MUĞLA: 1 male, Dalaman (Gürköy), 36°48'N 28°50'E, 32 m, 20.08.2001.

***Selysiothemis nigra* (Vander Linden, 1825)**
Materials: ANTALYA: 1 female, Kaş (Gelemiş, Patara), 36°16'N 29°19'E, 25 m, 14.07.2001; 1 male, Kaş (Gelemiş, Patara), 36°16'N 29°19'E, 25 m, 26.05.2002; AYDIN: 1 female, Nazilli (Esen, Akçay), 37°47'N 28°19'E, 80 m, 25.06.2001; MUĞLA: 1 female, Milas (Sarıçay), 37°20'N 27°43'E, 35 m, 23.06.2002.

* Present study is a part of dissertation entitled "Odonata Fauna of Mediterranean Region of Turkey".

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REDESCRIPTION OF *MICROCYCLOPS CUNNINGTONI* (G.O. SARS, 1909) (COPEPODA, CYCLOPOIDA)

Iskandar M. Mirabdullayev*

* Institute of Zoology, Niyazov str. 1, Tashkent, 700095, UZBEKISTAN. E-mail: iskandar@tps.uz

[Mirabdullayev, I. M. 2007. Redescription of *Microcyclops cunningtoni* (G. O. Sars, 1909) (Copepoda, Cyclopoida). Munis Entomology & Zoology 2 (1): 79-85**]**

ABSTRACT: *Microcyclops cunningtoni*, a poorly known cyclopoid, is redescribed using specimens from Lake Tanganyika, the type locality. A differential diagnosis is presented.

KEY WORDS: Cyclopoida, Microcyclops cunningtoni, redescription, Lake Tanganyika.

The taxonomy of the genus *Microcyclops* is extremely confusing. There are many species which are inadequately described. *Microcyclops cunningtoni* (G.O. Sars, 1909) is one of the most poorly known representatives of the genus *Microcyclops* Claus, 1893. The species was originally described from Lake Tanganyika (Sars, 1909), and is so far known only from this waterbody. The original and subsequent descriptions by Kiefer (1929) and Lindberg (1951) are inadequate from the point of view of modern copepod taxonomy. In this paper I redescribe the female and male of *M. cunningtoni* based on specimens identified by K. Lindberg from Lake Tanganyika.

MATERIAL AND METHODS

Material examined: two females and one male from the lake Tanganyika, from the K. Lindberg Collection in the Royal Belgian Institute of Natural Sciences, Brussels.

All drawings were made using a drawing tube. Designations of furcal setae are given as follows: Ti, innermost apical furcal seta, Te, outer apical furcal seta, Sd, dorsal furcal seta. Pereopods (legs) 1-5 are designated as P1-P5, endopodite as enp.

RESULTS

Microcyclops cunningtoni (G.O. Sars)

Female. Body length 700 μm. Body widest at posterior part of cephalothorax, tapered anteriorly. Postero-lateral margins of 4th and 5th pedigerous somites rounded (Fig. 1). Lateral sides of 5th thoracic somite without ornamentation. Genital double-somite about as long as wide. Shape of seminal receptacle as in Fig. 2. Posterior margin of anal somite bearing two groups of 15 spinules on ventral and lateral sides (Figs. 3-4). Anal operculum moderately developed, convex (Fig. 3).

Furcal rami: parallel, 2.2-2.3 times as long as wide, with smooth inner surface. Insertions of Te furcal setae provided with spinules. Plumage of Tmi and Tme furcal setae homogenous. Lateral seta situated in posterior half, at 55% of total length of ramus. Ti about as long as caudal ramus and Sd slightly longer than Te.

Antennules (Fig. 5): 12-segmented, short, reaching middle of cephalothorax, armored as follows (segment number in Roman numerals, setal number in Arabic numerals, aesth = aesthetasc, sp = spine): I(8)-II(4)-III(2)-IV(5)-V(4)-VI(1+sp)-VII(2)-VIII(3)-IX(2)-X(2)-XI(2)-XII(7+aesth).

Antenna (Figs. 6, 7): basoendopodite bearing 3 setae, inner (exopodite) seta slightly shorter than outer setae. Caudal side of basoendopodite with 2 rows of spinules, frontal side with one straight and one curved row of spinules. A group of spinules near implantation of inner seta. Second endopodite bearing 9 setae.

Maxillule and maxilliped as in Figs. 8 and 10 respectively. Inner movable claw-like seta of basis of maxilla bearing 2 thin teeth on inner margin (Fig. 9, arrow).

Natatory legs with 2-segmented rami. Spine formula 3.4.4.3, setal formula 5.5.5.5 (Figs. 11-14). Inner margin of basis of P1 with long robust spine reaching beyond middle of P1enp2 (Fig. 11). Inner margin of basis of P1-P4 bearing setules, setules on P4 shorter than those on P1-P3 (Figs. 11-14). Intercoxal sclerites of P1-P3 smooth, these of P4 bearing 2 interrupted rows of spinules on caudal surface (Figs. 11-14). Outer margins of exopodite P1 smooth, outer margins of exopodites 1 of P2-P4 bearing spinules, those of exopodites 2 of P2-P4 bearing setules.

P4enp2 L/W = 1.9. Inner terminal spine slightly shorter than article and 2.2 times longer than outer terminal spine (Fig. 14). P5 relatively short (L/W=1.5-1.6), bearing long apical setae and tiny spinule on inner side (Fig. 2).

Male. Body length 480 μm. Morphology of legs and mouthparts similar to that of female. In contrast to female, spinules of caudal margin of anal somite are situated not only on ventral and lateral, but also on dorsal side (Figs. 15-16). Also in contrast to female the second endopodite of male antenna bearing 8 setae. Distal segment of endopodite of P4 of male demonstrates the same proportions as in female (Fig. 17). Outer seta of P6 are about 4 times as long as the middle seta and 7 times as long as inner spine (Fig. 18).

DISCUSSION

The morphology of the specimens studied and identified previously by K. Lindberg as *M. cunningtoni* in general readily corresponds to the description given by G. O. Sars (1909). However, Sars's specimens were

slightly larger (body length of female 860 μm), with a relatively shorter inner apical spine of P4enp2 (inner spine about 2.6 times as long as outer spine).

The only African species of *Microcyclops* which has 2 rows of spinules on the intercoxal plates of P4 is *M. rubelloides* Kiefer also inhabiting lake Tanganyika (Kiefer, 1952). Both species are apparently closely related, sharing such characters as:

- type of ornamentation of anal somite;
- 12-segmented antennules;
- presence of 9 setae on second endopodite of antenna in female;
- presence of spinules on outer margins of first segments of exopodites of natatory legs;
- presence of setules on inner margin of basis of P4;
- proportions of furcal rami;
- proportions of P4enp2.

M. cunningtoni differs from *M. rubelloides* mainly by the presence of spinules near the implantation of the Te, a relatively shorter Ti, and a relatively shorter outer apical spine of the endopodite of P4, which is about 0.7-0.8 times as long as the inner spine in *M. rubelloides* and only 0.4-0.5 in *M. cunningtoni* (unpublished observations of *M. rubelloides* in F.Kiefer's collection in Karlsruhe and U.Einsle' collection in Oldenburg).

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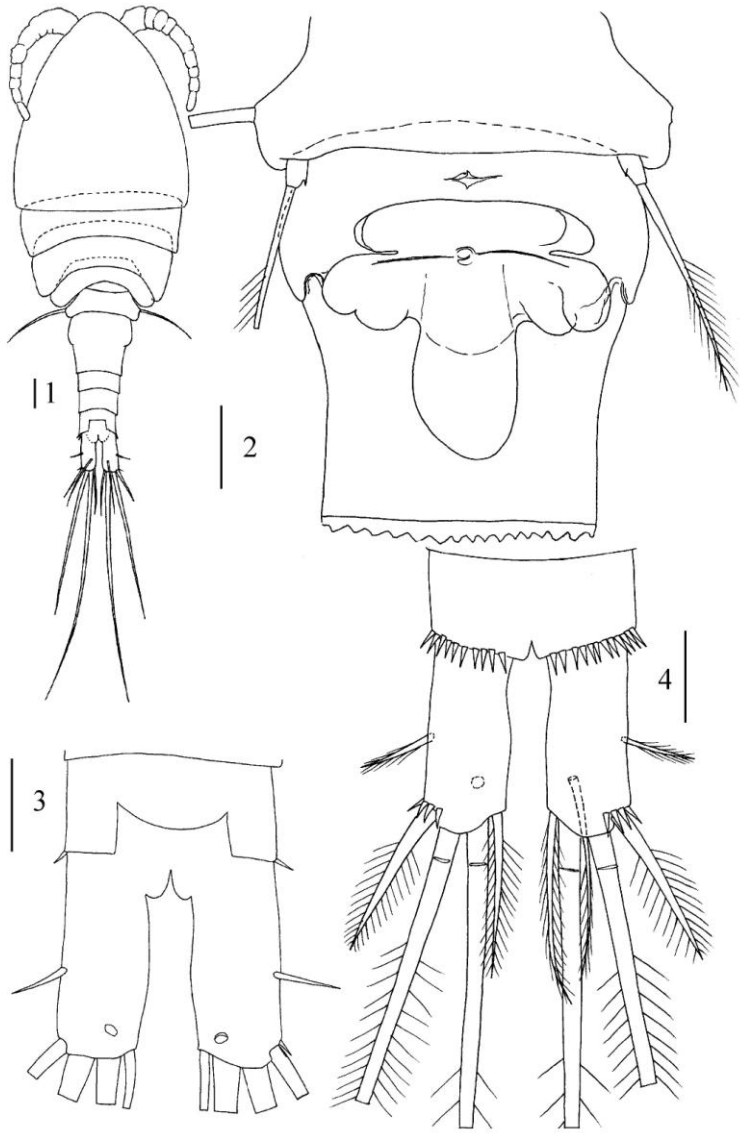
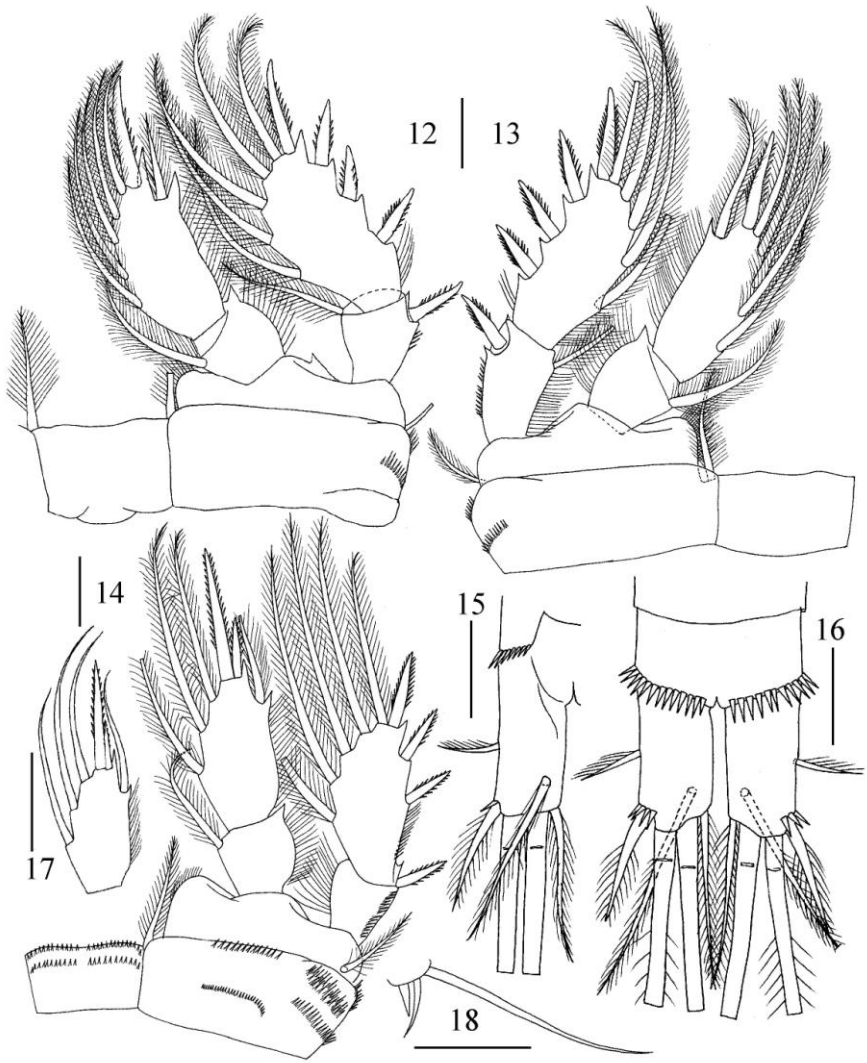


Figs. 1-4. *Microcyclops cunningtoni* Sars, 1909, female. 1, habitus; 2, last thoracic and genital somites; 3, furcal ramus dorsally; 4, furcal ramus ventrally. Scales: 1, 50 μm; 2-4, 25 μm.

Figs. 5-11. *Microcyclops cunningtoni* Sars, 1909, female. 5, antennule; 6, antenna, caudal side; 7, basipodite of antenna, frontal side; 8, maxillule; 9, maxilla; 10, maxilliped; 11, P1. Scales: 25 μm.



Figs. 12-18. *Microcyclops cunningtoni* Sars, 1909. 12, P2 of female; 13, P3 of female; 14, P4 of female; 15, caudal rami of male, dorsally; 16, caudal rami of male, ventrally; 17, Enp3P4 of male; 18, P6 of male. Scales: 25 μm.

CHECK-LIST OF THE TIGER BEETLES OF TURKEY WITH A REVIEW OF DISTRIBUTION AND BIOGEOGRAPHY (COLEOPTERA: CICINDELIDAE)

Serap Avgın* and Hüseyin Özdikmen**

* Department of Biology, Faculty of Science and Arts, Çukurova University, Balcalı, Adana / TURKEY, e-mail: serapavgin@hotmail.com
** Department of Biology, Faculty of Science and Arts, Gazi University, 06500 Ankara / TURKEY, e-mail: ozdikmen@gazi.edu.tr

[Avgın, S. & Özdikmen, H. 2007. Check-list of the Tiger Beetles of Turkey with a review of distribution and biogeography (Coleoptera: Cicindelidae). Munis Entomology & Zoology 2 (1): 87-102**]**

ABSTRACT: The present list is the first attempt to register all modern taxa of tiger beetles distributed to the whole territory of Turkey. A complete list of known Turkish Cicindelidae is given. It includes 2 tribes, 8 genera, and 46 taxa (including subspecies). Nominative subgenera or subspecies are not mentioned, if they do not occur in Turkey. Each name of a genus, species or subspecies is accompanied by the author's name and the description's date. Each name of species and subspecies is accompanied by a number of abbreviations divided in two sections indicating the names of countries (or territories) and the names of the Turkish provinces inhabited by the taxon. Geographical notes are also given. The list of used literature includes mostly contemporary publications.

KEY WORDS: Coleoptera, Cicindelidae, tiger beetles, Türkiye, check-list, review, distribution, biogeography.

Both, the adult and larva of tiger beetles are predators. Larva and adult tiger beetles occupy very different ecological niches. Adult tiger beetles are active, diurnal, predatory insects. The larvae are sedentary predators which construct narrow, usually permanent burrows in the substrate at the site of oviposition (Thiele 1977; Lindroth 1992; Luff 1993; Hoback et al. 1998). At any state, tiger beetles are a uniform group, highly adapted to hunting (Hurka 1996). They are very important as biodiversity indicators and prove to be useful for helping to identify areas of maximum collective diversity (Cassola & Pearson 2000).

The most important role of the tiger beetles (Cicindelidae) has been determined as being an appropriate indicator taxon for determining regional patterns of biodiversity (Pearson & Cassola 1992), because their taxonomy is stabilized, biology and general life history are well understood, they are readily observed and manipulated in the field and the family occurs world wide inhabiting many different habitat types. Each species tends to be specialized within a narrow habitat and the family includes species of potential economic importance (Pearson & Cassola 1992). In additon, tiger beetles are often correlated with that of other groups (Pearson & Cassola 1992; Rodriguez et al. 1998) and there is much interest in these natural predators as controls of certain crop pests (Rodriguez et al. 1998).

They have a worldwide distribution (except Tasmania, Antarctica and some remote oceanic Islands) which covers a variety of habitats ranging from alpine meadows to desert grasslands and tropical rain forests (Pearson 1988; Rodriguez et al. 1998). They frequently inhabitat flood prone habitats. More than 2000 species require habitats with access to bare ground, such as stream and pond edges, salt flats, dunes and open patches in grasslands (Pearson 1988; Hoback et al. 1998). Each species rarely occurs in more than one or a very few habitat types (Pearson 1984; Rodriguez et al. 1998). The total number of species presently known for the world tiger beetle fauna is 2328. There have been 26 records of these species until present day occuring in Turkey. 2 of these species (*Cephalota eiselti* (Mandl, 1967) and *Homodela ismenia* (Gory, 1833)) are endemic for Turkey (Cassola & Pearson 2000; Cassola 1999). Of the 38 taxa (species and subspecies) listed, 11 (28,9 %) are strictly Anatolian endemics, thus confirming Anatolia as an important center of endemic speciation (Cassola 1999).

The Anatolian tiger beetle fauna is poorly known. And there are only a few publications about them. In the first comprehensive publication 23 species of Anatolian tiger beetles were given (Korell 1984 and 1988). The latest comprehensive publication about the Anatolian tiger beetles has presented 26 species (Cassola 1999). Different studies were carried out, treating Anatolian tiger beetles, such as distribution and habitats of *Megacephala euphratica* in the Çukurova Delta, southern Turkey (Şekeroğlu & Aydın 2002), or the distribution of *Lophyridia aphrodisia* on the Turkish Mediterranean coast (Franzen 2001a).

The present list is the first attempt to register all modern taxa of tiger beetles in the whole territory of Turkey. In the text two abbreviations are used, DIT for distribution in Turkey and DIW for distribution in the world. Other abbreviations are as follows:

The abbreviations of the provinces of Turkey in the present text (in DIT):

Adana (AD)	Edirne (ED)	Kütahya (KU)
Adıyaman (ADY)	Elazığ (EL)	Malatya (MA)
Afyon (AF)	Erzincan (ER)	Manisa (MN)
Ağrı (AG)	Erzurum (EZ)	Mardin (MR)
Aksaray (AK)	Eskişehir (ES)	Muğla (MG)
Amasya (AM)	Gaziantep (GA)	Muş (MU)
Ankara (AN)	Giresun (GI)	Nevşehir (NE)
Antalya (ANT)	Gümüşhane (GU)	Niğde (NI)
Ardahan (AR)	Hakkari (HA)	Ordu (OR)
Artvin (ART)	Hatay (HT)	Osmaniye (OS)
Aydın (AY)	Iğdır (IG)	Rize (RI)
Balıkesir (BL)	Isparta (IP)	Sakarya (SA)
Bartın (BR)	İçel (IC)	Samsun (SM)
Batman (BA)	İstanbul (IS)	Siirt (SI)

Bayburt (BY)	İzmir (IZ)	Sinop (SN)
Bilecik (BI)	Kahramanmaraş (KA)	Sivas (SV)
Bingöl (BN)	Karabük (KR)	Şanlıurfa (SU)
Bitlis (BT)	Karaman (KM)	Şırnak (SK)
Bolu (BO)	Kars (KAR)	Tekirdağ (TE)
Burdur (BU)	Kastamonu (KS)	Tokat (TO)
Bursa (BS)	Kayseri (KY)	Trabzon (TB)
Çanakkale (CA)	Kırıkkale (KI)	Tunceli (TU)
Çankırı (CN)	Kırklareli (KK)	Uşak (US)
Çorum (CO)	Kırşehir (KIR)	Van (VA)
Denizli (DE)	Kilis (KL)	Yalova (YA)
Diyarbakır (DI)	Kocaeli (KO)	Yozgat (YO)
Düzce (DU)	Konya (KN)	Zonguldak (ZO)

The abbreviations of countries and territories in the present text (in DIW):

Afghanistan (AFG)	Afrotropical Region (AFR)	Albania (AL)
Algeria (DZ)	Andorra (AND)	Arab Emirates (UAE)
Arabian Peninsula (ARP)	Armenia (ARM)	Asian Turkey =Asia Minor (ATR)
Austria (AUS)	Azerbaijan (AZ)	Baikal (BAI)
Bahrain (BRN)	Balearic Islands (BAI)	Belgium (BEL)
Byelorussia (BRY)	Bosnia and Herzegovina (BAH)	Bulgaria (BG)
Caspian Sea (CS)	Caucasus (CAU)	Central Asia (CAS)
Central Europe (CEU)	Cephalonia (CEP)	China (CH)
Crete (CRE)	Crimea (UKC)	Croatia (CRO)
Cyprus (CYP)	Czechia (CZ)	Denmark (DEN)
Egypt (ET)	Estonia (EST)	Ethiopian Region (ETHR)
European Turkey (ETR)	Finland (FIN)	France (FR)
Georgia (GE)	Germany (GER)	Great Britain (GB)
Greece (GR)	Hungary (HU)	India (IN)
Iran (IR)	Iraq (IRQ)	Ireland (IRE)
Israel (IL)	Italy (IT)	Jordan (JOR)
Kashmir (KAS)	Kazakhstan (KZ)	Kopetdagh (KOP)
Kuwait (KWT)	Kyrgyzstan (KYR)	Latvia (LAT)
Lebanon (RL)	Libya (LAR)	Liechtenstein (LIE)
Lithuania (LIT)	Luxembourg (LUX)	Macedonia (MK)
Malta (M)	Moldavia (MOL)	Mongolia (MNG)
Morocco (MAG)	Nepal (NEP)	Netherlands (NET)
Norway (NOR)	Oman (OM)	Oriental Region (ORR)
Pakistan (PK)	Poland (PO)	Portugal (POR)
Rhodos (RH)	Romania (RO)	Central European Russia (RSC)
North European Russia (RSN)	South European Russia (RSS)	Saudi Arabia (KSA)
Serbia and Montenegro (SAM)	Siberia (SIB)	Slovakia (SK)
Slovenia (SLO)	South Europe (SEU)	Southeast Europe (SEE)
Southern Russia (RS)	Spain (ESP)	Sweden (SWE)
Switzerland (SW)	Syria (SYR)	Tadzhikistan (TJ)
Talysh (TAL)	Taurus (TAU)	Tian-Shan (TIA)
Transbaikalia (TBA)	Tunisia (TUN)	Turan (TUR)
Turkey (TR)	Turkmenistan (TM)	Ukraine (UK)
Uzbekistan (UZ)	West Asia (WAS)	West Europe (WEU)
Yemen (YE)	Yugoslavia (YU)	

Family CICINDELIDAE Csiki, 1906
Tribe MEGACEPHALINI Csiki, 1906

***Megacephala* Latreille, 1802**

***euphratica* Dejean, 1822** **#1**
DIT: AD, HT, IC, IZ
DIW: CAU, CYP, DZ, ESP, ET, GR, IL, IR, IRQ, JOR, KOP, KSA, KWT, LAR, MAG, OM, RL, SYR, TR, TUN, TUR, UAE, YE

Tribe CICINDELINI Sloane, 1906

***Cicindela* Linnaeus, 1758**

***sylvatica* Linnaeus, 1758**
ssp. *fasciatopunctata* Germar, 1845 **#2**
DIT: BS, IS, SV
DIW: TR

***monticola* Ménétries, 1832**
ssp. *monticola* Ménétries, 1832 **#3**
DIT: ART, KAR
DIW: ARM, GE, RSS, TAL,TR
ssp. *rumelica* Apfelbeck, 1904 **#4**
DIT: IC [locality certainly erroneous!], IS
DIW: BG, RO, TR
ssp. *tokatensis* Chaudoir, 1863 **#5**
DIT: BI, BO, BS, BU, CN, DE, EZ, GI, GU, IZ, KR, KS, OR, SA, SN, SV, TB, TO
DIW: ARM, AZ, CAU, GE, RS, TR

***campestris* Linnaeus, 1758**
ssp. *campestris* Linnaeus, 1758 **#6**
DIT: TR [doubtful record]
DIW: AL, AND, AUS, BAH, BEL, BG, BRY, CRO, CZ, DEN, DZ, ESP, EST, FIN, FR, GB, GER, GR, HU, IR, IRE, IT, KYR, KZ, LAT, LIE, LIT, LUX, M, MAG, MK, MOL, NET, NOR, PO, POR, RO, RSC, RSN, SAM, SIB, SK, SLO, SW, SWE, TU, UZ
ssp. *palustris* Motschulsky, 1840 **#6**
DIT: CA, IS, IZ, KO
DIW: ATR, ETR,TR
ssp. *pontica* Fischer, 1828 **#7**
DIT: AM, AN, ANT, BI, BO, BS, BU, CO, ES, GU [doubtful record], IP, IZ, KN, KS, MG, MN, OR, TO, US, YO, ZO
DIW: ARM, ATR, AZ, BG, CAU, CEU, CYP, GE, KZ, RSS, SEU, SIB, TBA, TIA, TR, UK, UKC

ssp. *olivieria* Brulle, 1832 **#7**
DIT: ETR [doubtful record]
DIW: AL, GR, TR, YU

***herbacea* Klug, 1832** **#8**
DIT: AD, AM [doubtful record], ANT, AY, HT, IC, IP, KA, KM, OS
DIW: ARM, IL, RL, SYR, TR

***desertorum* Dejean, 1825** **#9**
DIT: AD [doubtful record], AR, ART, BY, EZ, GI, GU, KAR, MR [doubtful record], OR, RI, SV, TB
DIW: ARM, AZ, CAU, GE, IR, RSS, TAL, TR

***turkestanicoides* W. Horn, 1938**
ssp. *turkestanicoides* W. Horn, 1938 **#10**
DIT: ATR [doubtful record]
DIW: IR
ssp. *perreaui* Deuve, 1987 **#10**
DIT: BN, BT, ER, HA, KA, MA, MU, TB [record, possibly due to mislabelling], TU, VA,
DIW: IR, TR

***asiatica* Audouin and Brullé, 1839** **#11**
DIT: AD, BN, HA, HT, KA, MU, OS, SU, TU, VA
DIW: ARM, AZ, IR, IRQ, KOP, SYR, TAL, TR

***Lophyridia* Jeannel, 1946**

***caucasica* (Adams, 1817)** **#12**
DIT: AD, AM, DI, EL, ER, GA, HA, IC, KAR, KM, KN, KY, MA, MR, NE, SI, SU, TO, TU
DIW: ARM, AZ, GE, IR, IRQ, RSS, TAL, TR

***concolor* (Dejean, 1822)**
ssp. *concolor* (Dejean, 1822) **#13**
DIT: AD, ANT, AY, GA, HT, IC, MG
DIW: CYP, GR, SYR, TR
ssp. *rouxii* Barthelemy, 1835 **#13**
DIT: ATR
DIW: SYR, TR

***fischeri* (Adams, 1817)** **#14**
DIT: AD, ADY, ANT, BN, BS, CN, CO, DE, EL, ER, EZ, GA, GU, HA, HT, IC, IZ, KA, KAR, KU, KY, MA, MG, MR, NE, SI, SU, TO, TU
DIW: AFG, ARM, ATR, AZ, BG, CAU, CYP, GR, IL, IR, JOR, MK, PK, RL, SEE, SYR, TAL, TM, TR

***littoralis* (Fabricius, 1787)**
ssp. *nemoralis* (Olivier, 1790) #15
DIT: BS, ED, ETR, IS, SA, TAU [doubtful record], TE
DIW: AL, AUS, BAH, BAI, BG, CAS, CEU, CRO, CS, CZ, ESP, FR, GR, HU, IT, MK, MOL, RO, RS, SAM, SEE, SEU, SK, WEU, TR, UK
ssp. *winkleri* (Mandl, 1934) #16
DIT: AD, ANT, AY, DE, HT, IC, IZ, MG, OS
DIW: AFG, ARM, AZ, CYP, GR, IL, IR, IRQ, JOR, RL, SYR, TM, TR, TUR
ssp. *mandli* Mandl, 1967 #17
DIT: AN, BU, CN, EL, EZ, IP, KIR, KN, KY, MR, NE, NI, OR, SI, SM, SU, SV, TB, TO, VA
DIW: IR, RL, SYR, TR
ssp. *aulicoides* Sahlberg, 1913 #18
DIT: GA
DIW: ARP, ET, IL, IR, IRQ, JOR, KSA, SYR, TR

***aphrodisia* Baudi, 1864**
ssp. *aphrodisia* Baudi, 1864 #19
DIT: AD
DIW: SYR, TR
ssp. *cypricola* Mandl, 1981 #20
DIT: ANT
DIW: CYP, RH, TR

***Lophyra* Motschulsky, 1859**

***hilariola* (Bates, 1874) #21**
DIT: GA, MR, SU
DIW: IR, IRQ, SYR, TR

***Cephalota* Dokhtouroff, 1883**
Subgen.: *Cephalota* Dokhtouroff, 1883

***turcica* (Schaum, 1859) #22**
DIT: BL, BS, ED, IS
DIW: ATR, BG, GR, MK, TR

***chiloleuca* (Fischer, 1820) #23**
DIT: TR [doubtful record]
DIW: BG, CH, CZ, HU, KZ, MNG, MOL, RO, RSC, RSS, SIB, TR

Subgen.: *Taenidia* Rivalier, 1950

***circumdata* (Dejean, 1822)**
ssp. *circumdata* (Dejean, 1822) #24
DIT: AF, AY, BL, CA, ED, IZ, MG

DIW: ATR, BG, ESP, FR, GR, IT, RS, TR, TUN

ssp. *cappadocica* Franzen, 1996 **#25**

DIT: AN, KIR, KY

DIW: TR

ssp. *hattusae* Franzen, 1996 **#26**

DIT: CO, YO

DIW: TR

***eiselti* (Mandl, 1967)**

ssp. *eiselti* (Mandl, 1967) **#27**

DIT: AK, AN, KY, SV

DIW: TR

ssp. *cankiriana* Korell and Kleinfeld, 1985 **#28**

DIT: CN, CO

DIW: TR

***deserticola* (Faldermann, 1836)** **#29**

DIT: KAR

DIW: AFG, ARM, AZ, CAU, CH, IR, KOP, KYR, KZ, MNG, RS, RSS, SYR, TJ, TM, TR, TUR, UK, UZ

***Homodela* Rivalier, 1950**

***ismenia* (Gory, 1833)**

ssp. *ismenia* (Gory, 1833) **#30**

DIT: AD, AM, AN, ANT, BI, CO, DE, IC, IP, IS, IZ, KIR, KN, KR, KS, KY, MG, OS, SM, TO, ZO

DIW: GR, SEU, SYR, TR

ssp. *kilikiensis* (Mandl, 1961) **#31**

DIT: AD, BN, GA, HT, IC, KA, NI, OS

DIW: TR

ssp. *walterheinzi* Franzen, 2003 **#31**

DIT: BN, MA, MU, VA

DIW: TR

***Cylindera* Westwood, 1831**

Subgen.: ***Cylindera* Westwood, 1831**

***germanica* (Linné, 1758)** **#32**

DIT: ART, BU, CN, EZ, IZ, RI, TB

DIW: AL, AND, ARM, ATR, AUS, AZ, BAH, BEL, BG, BRY, CAS, CH, CRO, CYP, CZ, DEN, ESP, EST, FIN, FR, GB, GER, GE, HU, IR, IRE, IT, KZ, LAT, LIE, LIT, LUX, MK, MNG, MOL, NET, PO, RO, RSC, RSN, RSS, SAM, SIB, SK, SLO, SW, SYR, TBA, TM, TR, UK, WAS

Subgen.: *Eugrapha* Rivalier, 1950

***arenaria* Fuessly, 1775**
ssp. *viennensis* (Schrank, 1781) #33
DIT: CN, CO, DE, EZ, GU, KU, NE, KY, OR, TB, TO
DIW: AL, AUS, BAH, BAI, BG, BRY, CAU, CEU, CRO, CZ, FR, GER, GR, HU, KZ, LIT, MK, MOL, PO, RO, RS, RSC, RSS, SAM, SEU, SIB, SK, TR, UK
ssp. *nudoscripta* (W.Horn, 1915) #33
DIT: ATR
DIW:; ARM, AZ, GE, RSS, TR

***trisignata* (Dejean, 1822)**
ssp. *trisignata* (Dejean, 1822) #34
DIT: AD, ANT, MG
DIW:; AL, CAU, DZ, ESP, IT, MAG, POR, RS, TR, UKC
ssp. *hellenica* Cassola, 1973 #35
DIT: IS, OR, SM
DIW: BG, GR, RO, RSS, TR, UK

***contorta* (Fischer, 1828) #23**
DIT: TR [doubtful record]
DIW: AFG, AZ, CH, GE, IR, KZ, MNG, MOL, RO, RSS, SIB, TJ, TR, TUR, UK, UZ

***pygmaea* (Dejean, 1825) #36**
DIT: AD, BA, GA, IC, MR, SI, SU, TO
DIW: IR, IRQ, SYR, TR

***sublacerata* Solsky, 1874**
ssp. *levithoracica* (W. Horn, 1891) #37
DIT: AG, KAR
DIW: AFG, ARM, AZ, CAU, GE, IR, KAS, PK, RSS, TAL, TR, TUR

***Myriochila* Motschulsky, 1858**

***melancholica* (Fabricius, 1798) #38**
DIT: AD, AN, ANT, AY, DE, GA, IC, IZ, MA, OS
DIW: AFG, AFR, ARM, AZ, BRN, CAU, CEP, CH, CRE, CYP, DZ, ESP, ET, ETHR, FR, GE, GR, IL, IN, IR, IRQ, IT, JOR, KOP, KSA, KWT, KYR, KZ, LAR, M, MAG, NEP, OM, ORR, PK, POR, RH, RL, SYR, TJ, TM, TR, TUN, TUR, UAE, UZ, YE

***orientalis* (Dejean, 1825) #39**
DIT: SU
DIW: ARM, AZ, CAU, CH, GE, IR, IRQ, KOP, KYR, KZ, RSS, SYR, TJ, TM, TR, TUR, UZ

REMARKS

The present zoogeographical characterization is based on the chorotype classification of the Anatolian fauna, recently proposed by Vigna Taglianti et al. (1999).

#1 The real status of distribution of this species in Turkey is not clear. According to known distribution of this species (especially the records from Iran and Caucasus) it could also occur at least in north-east Turkey. The exact distribution pattern of this species in Turkey still needs to be clarified. Known today are 2 distinct subspecies of *Megacephala euphratica* Dejean, 1822: *Megacephala euphratica* ssp. *euphratica* Dejean, 1822 occurring in TR (Cassola 1999; Löbl & Smetana 2003) and *Megacephala euphratica* ssp. *armenica* Laporte, 1834 occurring in AFG, ARM, AZ, CAU, EU, GE, IR, KZ, PK, TJ, TM, TUR, UZ (Kryzhanovskij et al. 1995; Cassola 1999; Löbl & Smetana 2003). According to Franzen (2001b), *Megacephala euphratica* has following distribution in Turkey: southwestern and southern coast (provinces Adana, Hatay, İçel, İzmir), locally common, but restricted to isolated, undisturbed coastal salt flats. **Chorotype:** Mediterraneo-Sindian.

#2 This subspecies is known only from north Turkey. 3 distinct subspecies of *Cicindela sylvatica* Linne*,* 1758 are known: *C. s.* ssp. *fasciatopunctata* Germar, 1845, occurring in TR (Cassola 1999; Löbl & Smetana 2003), *C. s.* ssp. *rubescens* Jeanne, 1967, occurring in ESP (Cassola 1999; Löbl & Smetana 2003) and *C. s.* ssp. *sylvatica* Linne*,* 1758, distributed from Europe to Japan (Kryzhanovskij et al. 1995; Hurka 1996; Cassola 1999; Löbl & Smetana 2003). **Chorotype:** Sibero-European for *Cicindela sylvatica* Linne*,* 1758.

#3 *Cicindela monticola* Ménétries, 1832 occurs mostly in north Turkey. In Turkey there are 3 distinct subspecies present: *C. m.* ssp. *monticola* Ménétries, 1832, occurring in north-east Turkey, *C. m.* ssp. *rumelica* Apfelbeck, 1904, occurring in north-west Turkey, and *C. m. tokatensis* Chaudoir, 1863, occurring in north Turkey, from Bolu to Erzurum and western Turkey, from Bolu to İzmir province (Cassola 1999). **Chorotype:** Turano-European for *Cicindela monticola* Ménétries, 1832.

#4 This subspecies occurs only in north-west Turkey.

#5 This subspecies is known in north Turkey, from Bolu to Erzurum and western Turkey, from Bolu to İzmir province.

#6 This subspecies is distributed in north-west Turkey, from European Turkey to İzmir province. In Turkey there are 2 distinct

subspecies of *Cicindela campestris* Linné, 1758: *C. c. palustris* Motschulsky, 1840, occurring in North-west Turkey and *C. c. pontica* Fischer, 1828, occurring in north Turkey, from Bolu to Ordu, in West Turkey, from Bilecik to İzmir, and in northern central Anatolia (Cassola 1999). All in all are 11 distinct subspecies of *Cicindela campestris* Linné, 1758 known. According to Cassola (1999), the last comprehensive taxonomic review of *Cicindela campestris* is that by Mandl (1944), who recognized 14 subspecies with a enormous geographical range. "Subsequently several populations were placed in this taxon that likely deserve a separate specific status. *C. campestris* populations from Anatolia appear to belong to two distinct and recognizable subspecies: *ssp. palustris* Motschulsky, 1840, apparently restricted to the Marmara Sea and Bosphorus area, and *ssp. pontica* Fischer, 1825, occurring from northern Pontus mountains eastwards to Armenia, Azerbaijan, and Caucasus (Mandl 1944; Wiesner 1992; Trautner & Geigenmüller 1987; Gueorguiev & Gueorgiev 1995; Kryzhanovskij et al. 1995). However, without precise detailed, labeled data, the subspecific identificatİon of most specimens is difficult, sometimes even impossible". **Chorotype:** W-Palaearctic for *Cicindela campestris* Linné, 1758.

#7 This subspecies *pontica* Fischer, 1828 is distributed in north Turkey, from Bolu to Ordu; in West Turkey, from Bilecik to İzmir, in northern central Anatolia. According to Cassola (1999) "subspecies *olivieria* Brulle has been recorded from "Türkei" by Mandl (1944) and Wiesner (1992), but it is more properly considered a Greek and south Balkan endemic (Cassola 1973c)".

#8 This species is distributed in south Turkey. Therefore the record of north Turkey (Amasya province) is very doubtful. **Chorotype:** SW-Asiatic.

#9 The species is distributed in north-eastern Turkey. The records of south Turkey (Adana and Mardin provinces) are very doubtful. **Chorotype:** Turanian.

#10 This subspecies is distributed mostly in south-eastern Turkey, from Kahramanmaraş to Hakkari. 2 distinct subspecies of *Cicindela turkestanicoides* Horn, 1938 are known: *C. t.* ssp. *perreaui* Deuve, 1987, occurring in Turkey (Cassola 1999, Löbl & Smetana 2003) and *C. t.* ssp. *turkestanicoides* Horn, 1938, occurring in Iran (Cassola 1999, Löbl & Smetana 2003). **Chorotype:** SW-Asiatic for *Cicindela turkestanicoides* Horn, 1938.

#11 This species is distributed mostly in south-eastern Turkey. There are 2 distinct subspecies of *Cicindela asiatica* Audouin and Brullé, 1839 known: *C. a.* ssp. *asiatica* Audouin and Brullé, 1839,

occurring in Turkey (Kryzhanovskij et al. 1995; Cassola 1999, Löbl & Smetana 2003) and *C. a.* ssp. *sumbarica* Putchkov, 1993, occurring in Asia: IR, TM, KOP (Kryzhanovskij et al. 1995; Löbl & Smetana 2003). **Chorotype:** SW-Asiatic.

#12 This species, originally described from the Caucasus area, species occurs mostly in central and eastern Turkey. **Chorotype:** Turanian.

#13 This species is distributed mostly in southern Turkey, from Aydın to Gaziantep. 2 distinct subspecies of *Lophyridia concolor* (Dejean, 1822) are known: *L. c.* ssp. *concolor* Dejean, 1822, occurring in TR (Cassola 1999; Löbl & Smetana 2003) and *L. c.* ssp. *rouxii* Barthelemy, 1835, occurring in SYR, TR (Löbl & Smetana 2003). The "*Cicindela rouxii*", described by Barthelemy, 1835 from Syria, has been recently re-established as a valid subspecies by Franzen (1999). **Chorotype:** E-Mediterranean.

#14 The Anatolian populations obviously belong to the nominate form (Cassola 1999). 2 distinct subspecies of *Lophyridia fischeri* (Adams, 1817) are known: *L. f.* ssp. *fischeri* (Adams, 1817), occurring in TR (Gueorguiev & Gueorgiev 1995; Kryzhanovskij et al. 1995; Cassola 1999; Löbl & Smetana 2003); and *L. f.* ssp. *elongatosignata* W. Horn, 1922, occurring in Asia: AFG, IR, IRQ, KOP, KYR, KZ, OM, PK, TIA, TJ, TM, TUR, UEA, UZ (Trautner & Geigenmüller 1987; Kryzhanovskij et al. 1995; Löbl & Smetana 2003). **Chorotype:** Primarily centralasiatic-European and SW-Asiatic.

#15 There are 12 distinct subspecies of *Lophyridia littoralis* (Fabricius, 1790) known. This species is represented in Turkey by the subspecies *L. l.* ssp. *aulicoides* Sahlberg, 1913, *L. l.* ssp. *mandli* Mandl, 1967, *L. l.* ssp. *nemoralis* (Olivier, 1790) and *L. l.* ssp. *winkleri* (Mandl, 1934) (Kryzhanovskij et al. 1995; Gueorguiev & Gueorguiev 1995; Cassola 1999; Löbl & Smetana 2003). *L. l.* ssp. *nemoralis* (Olivier, 1790) occurs only in north-west Turkey. **Chorotype:** Primarily Asiatic-European and Turano-Mediterranean for *Lophyridia littoralis* (Fabricius, 1790).

#16 This subspecies is distributed mostly in south-western Turkey from İzmir to Hatay.

#17 This subspecies is distributed mostly in central and East Turkey.

#18 This subspecies is distributed only in south Turkey.

#19 This subspecies is clearly a relict species. And this species

occurs in south Turkey. **Chorotype:** E-Mediterranean for *Lophyridia aphrodisia* Baudi, 1864.

#20 This subspecies is probably distributed in south-west Turkey.

#21 This species is distributed mostly in south-eastern Turkey. **Chorotype:** SW-Asiatic.

#22 This species is basically a peri-Aegean species. The species distributes mostly in north-west Turkey. **Chorotype:** E-Mediterranean.

#23 *Cephalota chiloleuca* and *Cylindera contorta*: two Russian entomologists, Putchkov and Matalin (2003), cite these species from Turkey (in Löbl & Smetana 2003: Catalogue of Palaearctic Coleoptera, Vol. 1). Unfortunately no localities are given, so these records are doubtful.

#24 This species is a typical Mediterranean species. 5 distinct subspecies of *Cephalota circumdata* (Dejean, 1822) are described: *C. c.* ssp. *circumdata* (Dejean, 1822), occurring mostly in West Turkey, *C. c.* ssp. *cappadocica* Franzen, 1996, occurring mostly in central Turkey, *C. c.* ssp. *hattusae* Franzen, 1996, occurring in Çorum and Yozgat provinces of Turkey (Cassola 1999; Löbl & Smetana 2003), *C. c.* ssp. *imperialis* Klug, 1834, occurring in AL, ESP, IT, TUN (Gueorguiev & Gueorgiev 1995; Cassola 1999; Löbl & Smetana 2003), and *C. c.* ssp. *leonschaeferi* Cassola, 1970, occurring in FR, IT (Cassola 1999; Löbl & Smetana 2003). **Chorotype:** Primarily Mediterranean for *Cephalota circumdata* (Dejean, 1822).

#25 This subspecies is endemic for Turkey.

#26 This subspecies is endemic for Turkey.

#27 *Cephalota eiselti* (Mandl, 1967) is endemic for Turkey. There are 2 distinct subspecies: *C. e.* ssp. *eiselti* (Mandl, 1967), occurring in central Turkey and *C. e.* ssp. *cankiriana* Korell and Kleinfeld, 1985, occurring in the north of central Turkey (Cassola 1999; Löbl & Smetana 2003). **Chorotype:** central Anatolian endemic.

#28 This subspecies is endemic for Turkey. **Chorotype:** central Anatolian endemic.

#29 This species is distributed only in north-eastern Turkey. **Chorotype:** Turanian.

#30 There are 3 distinct subspecies of *Homodela ismenia* (Gory,

1833) in Turkey: *H. i.* ssp. *ismenia* (Gory, 1833), occurring in West, north and south Turkey; *H. i.* ssp. *kilikiensis* (Mandl, 1961), occurring in south-eastern Turkey, from Gaziantep to Bingöl (Cassola 1999; Löbl & Smetana 2003), and *H. i.* ssp. *walterheinzi* Franzen, 2003, occuring in from Karahan-Pass (west of Malatya) to Lake Van. **Chorotype:** The species is a Turkey endemic. Morever, old records from "Syria" clearly refer to present day Turkey (Hatay province) (Cassola, 1999).

#31 This subspecies are endemic to Turkey.

#32 This species is known to be widespread in the West-Palearctic. 4 distinct subspecies of *Cylindera germanica* (Linné, 1758) are known: *C. g.* ssp. *germanica* (Linné, 1758), occurring in Turkey (Cassola 1999; Löbl & Smetana 2003), *C. g.* ssp. *michaelensis* Vidaly Lopez, 1916, from France (Löbl & Smetana 2003), *C. g.* ssp. *muelleri* Magistretti, 1966, occurring in Europe: AL, BAH, CRO, GR, IT, MK, SLO, SAM (Löbl & Smetana 2003), and *C. g.* ssp. s*obrina* Gory, 1833, occurring in FR, ESP (Löbl & Smetana 2003). **Chorotype:** Primarily Sibero-European and Centralasiatic-European.

#33 3 distinct subspecies of *Cylindera arenaria* (Fuesslin, 1775) are known: *C. a.* ssp. *arenaria* (Fuesslin, 1775), occurring in AUS, BEL, CAU, FR, IT, LUX, RS, SIB, SW (Trautner & Geigenmüller 1987; Gueorguiev & Gueorgiev 1995; Kryzhanovskij et al. 1995; Trautner & Geigenmüller 1987; Cassola 1999; Löbl & Smetana 2003), *C. a.* ssp. *nudoscripta* W.Horn, 1915, occurring in ARM, AZ, GE, RSS, TR (Kryzhanovskij et al. 1995; Cassola 1999; Löbl & Smetana, 2003), *C. a.* ssp. *viennensis* Schrank, 1781, occurring in Turkey (Cassola 1999; Löbl & Smetana 2003). *Cylindera arenaria* ssp. *nudoscripta* in Turkey: Along the northeastern coast (Black Sea), according to Michael Franzen (pers. comm. Karl Werner). **Chorotype:** Sibero-European for *Cylindera arenaria* (Fuesslin, 1775).

#34 This species' distribution is known in West Mediterranean Region. 6 distinct subspecies of *Cylindera trisignata* (Dejean, 1822) are known. in Turkey this species is represented by the subspecies *C. t.* ssp. *hellenica* Cassola, 1973, and *C. t.* ssp. *trisignata* Dejean, 1822. *C. t.* ssp. *trisignata* Dejean, 1822 occurs in south Turkey. **Chorotype:** Mediterranean for *Cylindera* ssp. *trisignata* (Dejean, 1822).

#35 This subspecies is presented only in north Turkey.

#36 2 distinct subspecies of *Cylindera pygmaea* (Dejean, 1825) are known: *C. p.* ssp. *pygmaea* Dejean, 1825, occurring in Turkey (Cassola 1999; Löbl & Smetana 2003), and *C. p.* ssp. *laetula* Tschitscherine, 1903, occurring in Iran (Löbl & Smetana 2003). **Chorotype:** Centralasiatic-European.

#37 This is basically a Central Asian to Middle East species. 5 distinct subspecies of *Cylindera sublacerata* (Solsky, 1874) are described. This subspecies occurs only in north-east Turkey. **Chorotype:** Primarily Asiatic.

#38 This species is distributed mostly in central and southern Turkey. distinct subspecies of *Myriochila melancholica* (Fabricius, 1798) are known: *M. m.* ssp. *melancholica* (Fabricius, 1798) occurring in Turkey (Cassola 1999; Löbl & Smetana 2003) and widespread in Asia and Africa , *M. m.* ssp. *semicircumcincta* Mandl, 1959 occurring in Asia: Iran (Löbl & Smetana 2003), M. m. ssp. *trilunaris* (Klug, 1832), from Madagascar and Comores Islands, and M. m. ssp. perplexa (Dejean, 1825), occurring in the islands of Réunion, Seychelles, Comores, Mauritius, and Rodrigues. **Chorotype:** Centralasiatic-Mediterranean and Afrotropico Indo-Mediterranean for *Myriochile melancholica* (Fabricius, 1798).

#39 This species occurs probably in south-east and East Turkey. **Chorotype:** Primarily Turanian and Centralasiatic.

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DIVING BEETLES (COLEOPTERA: DYTISCIDAE, NOTERIDAE) OF THE SOUTHWESTERN ANATOLIAN REGION OF TURKEY

Suat Kıyak*, Mustafa Darılmaz*, Ali Salur and Savaş Canbulat*****

*Gazi University, Sciences and Arts Faculty, Department of Biology, 06500-Ankara/TURKEY. E-mail: skiyak@gazi.edu.tr, mdarilmaz@yahoo.com
**Hitit University, Sciences and Arts Faculty, Department of Biology, 19030, Çorum/TURKEY E-mail: alisalur@gmail.com
***Sakarya University, Sciences and Arts Faculty, Department of Biology, Sakarya/TURKEY E-mail: scanbulat@sakarya.edu.tr

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ABSTRACT: Thirty species of Dytiscidae and one species of Noteridae were collected from 80 sampling stations in various aquatic habitats of the southwestern Anatolian region of Turkey (provinces of Antalya, Aydın, Afyon, Burdur, Denizli, Isparta and Muğla) between 2000 and 2002. Species distributions within Turkey are presented as a catalogue of provincial records. Seventeen species are here recorded for the first time from the southwestern Anatolian region. The presence of the three following species in Turkey is confirmed: *Dytiscus semisulcatus* MULLER, *Eretes griseus* (FABRICIUS), *Hydaticus ponticus* SHARP. Several species known previously from only a few localities in Turkey have been shown to have much wider distributions in the country. In accordance with the present study and literature data 49 species of Dytiscidae and 3 species of Noteridae are known from the southwestern Anatolian region.

KEY WORDS: Coleoptera, diving beetles, Dytiscidae, Noteridae, faunistics, Turkey

The Dytiscidae and Noteridae water beetles are commonly called the diving beetles, since their hind legs are usually highly modified for swimming. Both families are cosmopolitan in distribution; although in contrast to the latter occur primarily in the tropical regions of the world (Zalat et. al., 1999).

Thirtytwo species of Dytiscidae and three species of Noteridae have been recorded from the studied region in the following published works: Balfour-Browne (1963), Guéorguiev (1968, 1981), Fery (1991), Fery & Nilsson (1993), Shaverdo (2004), Barclay et al. (2001), and Fery et al. (2001, 2005).

The purpose of this paper is to present a checklist of the diving beetles of the southwestern Anatolian region of Turkey, combining literature data and the results of our collecting trips between 2000-2002.

MATERIALS AND METHOD

This study is based on 208 specimens of adult dytiscids and noterids collected in the southwestern Anatolian region of Turkey (Fig. 1;

Antalya, Aydın, Afyon, Burdur, Denizli, Isparta and Muğla) between 2000 and 2002. Specimens were collected from various aquatic habitats, using a ladle or dip net having a 1 mm mesh size. The beetles were killed in 70 % ethanol and in the laboratory were cleaned of debris with a small paintbrush. Aedeagophore was dissected under the stereomicroscope and left in 10 % KOH solution for about 1–2 hours. Samples were identified using keys by Zaitzev (1972), Franciscolo (1979) and Nilsson & Holmen (1995). Materials have been deposited in the Zoological Museum of the Gazi University (=GUZM), Ankara, Turkey.

In the checklist nomenclature is based on Nilsson (2005, 2006).

Family NOTERIDAE
Subfamily Noterinae Thomson, 1860
Tribe Noterini Thomson, 1860

***Canthydrus diophthalmus* (Reiche & Saulcy, 1855)**
Literature records from Turkey: Antalya (Barclay et al., 2001).

***Noterus clavicornis* (De Geer, 1774)**
Material examined: Antalya: 1 ex. Kalkan (Yeşilköy), 36º 17' N 29º 19' E, 8 m, 27.05.2001; Aydın: 1 ex. Söke (Avşar-Azap Lake), 37º 35' N 27º 26' E, 37 m, 23.06.2001.
Literature records from Turkey: Aksaray, Ankara, Balıkesir, Bilecik, Bolu, Isparta, İzmir, Kayseri, Konya, Manisa (Balfour-Browne, 1963; Guéorguiev, 1968, 1981; Darılmaz & Kıyak, 2006).
Remarks: New to Antalya and Aydın.

***Noterus crassicornis* (O.F.Müller, 1776)**
Literature records from Turkey: Adana, Isparta (Guéorguiev, 1981).

Family DYTISCIDAE
Subfamily Agabinae Thomson, 1867
Tribe Agabini Thomson, 1867

***Agabus* (*Acatodes*) *congener* (Thunberg, 1794)**
Material examined: Antalya: 1 ex., Beşkonak (Köprü river), 37º 07' N 31º 12' E, 112 m, 25.06.2000; Denizli: 1 ex., Çameli (Güre Mountain, vicinity of Kınıkyeri), 37º 11' N 29º 25' E, 1580 m, 27.06.2001.
Literature records from Turkey: Kars (Guéorguiev, 1981).
Remarks: This species is new to the south and west Anatolia regions.

***Agabus* (*Agabus*) *zimmermanni* Scholz, 1920**
Literature records from Turkey: Aydın (Guéorguiev, 1981).

***Agabus* (*Gaurodytes*) *biguttatus* (Olivier, 1795)**
Literature records from Turkey: Adana, Aksaray, Ankara, Bilecik, Bursa, Çankırı, Elazığ, Gaziantep, Gümüşhane, Isparta, İzmir, Kastamonu, Sakarya, Trabzon, Yozgat (Guéorguiev, 1981; Darılmaz & Kıyak, 2006).

***Agabus* (*Gaurodytes*) *bipustulatus* (Linnaeus, 1767)**

Material examined: Antalya: 1 ex., Korkuteli, (vicinity of Söğütcük), 37º 02' N 30º 24' E, 904 m, 26.05.2002; Denizli: 1 ex., Çivril (Gökgöl), 38º 11' N 30º 03' E, 835 m, 20.04.2002; Isparta: 1 ex., Aksu (Anamas plateau, waterbed), 37º 49' N 31º 13' E, 1896 m, 14.07.2000; 1 ex., Yalvaç (Sultan mountains-brook), 38º 15' N 31º 22' E, 1565 m, 15.09.2000; 1 ex., Sütçüler (between İncidere and Kasımlar, spring water), 37º 34' N 31º 07' E, 1450 m, 23.08.2001; Muğla: 2 ex., between Yeniköy and Makıköy, 37º 02' N 27º 42' E, 350 m, 17.04.2000; 12 ex., Köyceğiz (Yayla village, Gölgeli Mountains), 37º 03' N 28º 47' E, 1730 m, 17.07.2000; 1 ex., Ula (Gölcük town, accumulation of brook), 37º 07' N 28º 31' E, 690 m, 18.07.2000.

Literature records from Turkey: Adana, Ankara, Bursa, Isparta, İzmir, Kars, Kastamonu, Kayseri, Konya, Trabzon, Van (Guéorguiev, 1968, 1981).

Remarks: New to Antalya, Denizli and Muğla.

***Agabus* (*Gaurodytes*) *conspersus* (Marsham, 1802)**

Material examined: Afyon: 1 ex., Başmakçı (Akpınar, the brook flows to Acıgöl), 37º 50' N 29º 59' E, 850 m, 20.06.2002; Antalya: 3 ex., Korkuteli (the brook flows to Korkuteli dam), 37º 05' N 30º 08' E, 1074 m, 22.04.2001; 2 ex., Elmalı (Armutlu village, brook), 36º 33' N 29º 43' E, 1130 m, 22.04.2001; Burdur: 1 ex., Karamanlı dam and its around), 37º 25' N 29º 49' E, 1200 m, 20.06.2002; 1 ex., Çavdır (Kozağacı), 37º 07' N 29º 41' E, 1035 m, 22.06.2002; Denizli: 1 ex., Buldan (Süleymanlı lake), 38º 03' N 28º 46' E, 1175 m, 19.05.2001; 1 ex., Çameli (Güre mountain, vicinity of Kınıkyeri), 37º 11' N 29º 25' E, 1580 m, 27.06.2001; Isparta: 1 ex., Yalvaç (Sultan Mountains, between Bağkonak and Cankurtaran, the brook flows to Akşehir lake), 38º 14' N 31º 21' E, 1657 m, 27.06.2000; 1 ex., between Aksu and Yenişarbademli , 37º 43' N 31º 16' E, 1753 m, 14.07.2000; 2 ex., between Gelendost and Afşar (the brook flows Eğridir lake), 38º 07' N 30º 59' E, 65 m, 20.06.2001.

Literature records from Turkey: Adana, Bursa, Isparta, İzmir, Konya (Guéorguiev, 1968, 1981).

Remarks: New to Afyon, Antalya, Burdur and Denizli.

***Agabus* (*Gaurodytes*) *didymus* (Olivier, 1795)**

Material examined: Antalya: 1 ex., Korkuteli (the brook flows to Korkuteli dam), 37º 05' N 30º 08' E, 1074 m, 22.04.2001; Isparta: 1 ex., between Aksu and Karağı (Aksu stream and dam lake), 37º 47' N 31º 06' E, 1305 m, 28.06.2001.

Literature records from Turkey: Afyon, Balıkesir, İzmir, Manisa (Guéorguiev, 1981).

Remarks: New to Antalya and Isparta.

***Agabus* (*Gaurodytes*) *dilatatus* (Brullé, 1832)**

Literature records from Turkey: Adana, Ankara, Bursa, Gümüşhane, Isparta, İzmir, İzmit, Konya, Rize, Trabzon, Van (Balfour-Browne, 1963; Guéorguiev, 1968, 1981).

***Agabus* (*Gaurodytes*) *faldermanni* Zaitzev, 1927**

Material examined: Isparta: 1 ex., Yalvaç (Sultan Mountains, between Bağkonak and Cankurtaran, the brook flows to Akşehir lake), 38º 14' N 31º 21' E, 1657 m, 27.06.2000; 1 ex., Muğla: Milas (between Taşlı and Kızılağaç), 37º 18' N 27º 39' E, 50 m, 17.04.2000.

Literature records from Turkey: Diyarbakır, Konya, Nevşehir (Guéorguiev, 1968, 1981; Nilsson, 1992).
Remarks: This species is new to the south and west Anatolia regions.

***Agabus* (*Gaurodytes*) *guttatus guttatus* (Paykull, 1798)**
Material examined: Antalya: 1 ex., Korkuteli (Öküzgözü I dam), 36º 53' N 30º 02' E, 1200 m, 22.04.2001; 2 ex., Elmalı (vicinity of Çobanisa village), 36º 52' N 30º 01' E, 1170 m, 26.05.2002; Denizli: 2 ex., Çameli (Güre mountain, vicinity of Kınıkyeri), 37º 11' N 29º 25' E, 1580 m, 27.06.2001.
Literature records from Turkey: Bolu, Kastamonu (Guéorguiev, 1981).
Remarks: This species is new to the south and west Anatolia regions.

***Agabus* (*Gaurodytes*) *nebulosus* (Forster, 1771)**
Material examined: Afyon: 1 ex., Dinar (Elmalı village, Pınarbaşı lake), 38º 04' N 30º 16' E, 1113 m, 22.06.2000; Antalya: 1 ex., Elmalı (Göltarla, Avlan lake), 37º 35' N 29º 57' E, 1200 m, 26.05.2002; Aydın: 1 ex., Söke (Yenidoğan road), 37º 37' N 27º 22' E, 15.04.2000; Burdur: 3 ex., Bucak (Onaç dam), 37º 39' N 30º 34' E, 831 m, 25.05.2002; Denizli: 1 ex., Çivril (between İnceköy and Seraserli), 38º 15' N 29º 47' E, 845m, 28.05.2002; Muğla: 8 ex., Yatağan (vicinity of Bozarmut, Alişar brook), 37º 17' N 28º 10' E, 400 m, 27.05.2002.
Literature records from Turkey: Adana, Bursa, Isparta, İstanbul, İzmir, Sinop, Trabzon (Guéorguiev, 1981).
Remarks: New to Afyon, Antalya, Aydın, Burdur, Denizli and Muğla.

***Ilybius fuliginosus fuliginosus* (Fabricius, 1792)**
Material examined: Isparta:2 ex., Aksu (between Aksu and Yılanlı), 37º 48' N 31º 00' E, 1215 m, 28.06.2001; Konya: 2 ex., Taşkent (Belpınarı), 36º 54' N 32º 20' E, 1738 m, 25.05.2001.
Literature records from Turkey: Bingöl, Kars, Mersin (Guéorguiev, 1981).
Remarks: New to the southwestern Anatolian region.

***Ilybius jaechi* (Fery & Nilsson, 1993)**
Literature records from Turkey: Aydın, Tekirdağ (Fery & Nilsson, 1993).

***Platambus maculatus* (Linnaeus, 1758)**
Material examined: Burdur: 2 ex., Karamanlı (vicinity of Kılavuz village, the brook flows to Karataş lake), 37º 22' N 29º 52' E, 1062 m, 23.06.2000; Muğla: 2 ex., Fethiye (south of Karahasan, Esen brook), 36º 56' N 29º 38' E, 1390 m, 20.08.2001; 3 ex., Fethiye (vicinity of Seki, Esen brook), 36º 49' N 29º 33' E, 1130 m, 20.08.2001; 10 ex., Kemer (Seki brook), 36º 50' N 29º 34' E, 1150 m, 13.09.2001.
Literature records from Turkey: Adana, Bilecik, Kars (Guéorguiev, 1981).
Remarks: New to the southwestern Anatolian region.

Subfamily Colymbetinae Erichson, 1837
Tribe Colymbetini Erichson, 1837

***Colymbetes fuscus* (Linnaeus, 1758)**
Material examined: Aydın: 2 ex., Söke (Yenidoğan road), 37º 37' N 27º 22' E, 15.04.2000; 1 ex., Söke (Büyük Menderes river), 37º 30' N 27º 20' E, 19 m, 23.06.2002; Burdur: 1 ex., Yeşilova (Bayındır village), 37º 39' N 29º 45' E, 1030

m, 20.06.2002; Konya: 1 ex., between Taşkent and Alanya (20 km), 36º 51' N 32º 31' E, 1740 m, 20.04.2001.
Literature records from Turkey: Afyon, Aksaray, Erzurum, İzmir, Nevşehir (Guéorguiev, 1981; Darılmaz & Kıyak, 2006).
Remarks: New to Aydın, Burdur and Konya.

Subfamily Dytiscinae Leach, 1815
Tribe Aciliini Thomson, 1867

***Graphoderus cinereus* (Linnaeus, 1758)**
Material examined: Afyon: 2 ex., Dinar (vicinity of Elmalı village, Pınarbaşı lake), 38º 04' N 30º 16' E, 1113 m, 22.06.2000; 1 ex., Dinar (Elderesi, Pınarbaşı lake), 38º 04' N 30º 16' E 1020 m 28.05.2002.
Literature records from Turkey: Ağrı Mountain (Guéorguiev, 1981).
Remarks: This species is new to the south and west Anatolia regions.

Tribe Cybistrini Sharp, 1882

***Cybister* (*Cybister*) *tripunctatus lateralis* (Fabricius, 1798)**
Material examined: Aydın: 1 ex., Söke (Avşar, Azap lake), 37º 35' N 27º 26' E, 37 m, 23.06.2001.
Literature records from Turkey: Adana, İzmir, Mersin (Guéorguiev, 1981).
Remarks: New to the southwestern Anatolian region.

***Cybister* (*Scaphinectes*) *lateralimarginalis torquatus* (Fischer von Waldheim, 1829)**
Material examined: Denizli: 4 ex., Çivril (vicinity of Beydilli village, Işıklı lake), 38º 11' N 30º 03' E, 920 m, 22.06.2000; 1 ex., Çivril (Bucak, Işıklı lake), 38º 14' N 29º 51' E, 838 m, 26.06.2001; 1 ex., Çardak (Gemiş, Acıgöl), 37º 46' N 29º 50' E, 860 m, 20.06.2002; Burdur: 2 ex., Yazır lake, 36º 59' N 29º 44' E, 1515 m, 23.06.2000.
Literature records from Turkey: Adana, Eskişehir, İzmir, Konya, Mersin, Van (Guéorguiev, 1981).
Remarks: New to the southwestern Anatolian region.

Tribe Dytiscini Leach, 1815

***Dytiscus circumflexus* Fabricius, 1801**
Material examined: Aydın: 1 ex., Söke (Yenidoğan road), 37º 37' N 27º 22' E, 15.04.2000.
Literature records from Turkey: Adana, Balıkesir, Iğdır, Isparta, Kars, Kütahya (Guéorguiev, 1981).
Remarks: New to Aydın.

***Dytiscus dimidiatus* Bergsträsser, 1778**
Literature records from Turkey: Manisa (Guéorguiev, 1981).
Remarks: This species is also known in Samsun province (ponds near the village of Çarşamba, 11.07.1992, 2 specimens, leg. M. Toledo) from Turkey (pers. comm.).

***Dytiscus marginalis marginalis* Linnaeus, 1758**

Material examined: Antalya: 1 ex., Beşkonak (between Çaltepe and Değirmenözü, Kanlı brook), 37º 20' N 31º 13' E, 492 m, 26.06.2000; 1 ex., Alanya (Güney village, Zeytinbükü brook), 36º 40' N 31º 53' E, 125 m, 11.07.2000; Denizli: 2 ex., Çivril (Gökgöl), 38º 11' N 30º 03' E, 835 m, 20.04.2002; Isparta: 4 ex., Yalvaç (Sultan mountains), 38º 15' N 31º 22' E, 1565 m, 15.09.2000; Konya: 1 ex., Hadim (vicinity of Ardıçpınarı fountain), 36º 53' N 32º 23' E, 1930 m, 11.07.2001; Muğla: 3 ex., Ula (Gölcük), 37º 07' N 28º 31' E, 690 m, 18.07.2000.

Literature records from Turkey: Adapazarı, Ankara, Iğdır, Kars, Kayseri, Nevşehir (Guéorguiev, 1968, 1981).

Remarks: This species is new to the south and west Anatolia regions.

***Dytiscus semisulcatus* O.F. Müller, 1776**

Material examined: Isparta: 1 ex., Aksu (Karağı village), 37º 45' N 31º 07' E, 1210 m, 10.08.2000; Muğla: 2 ex., Köyceğiz (Yayla village, Gölgeli mountains), 37º 03' N 28º 47' E, 1730 m, 17.07.2000.

Literature records from Turkey: Without detailed locality data (Guéorguiev, 1981; Nilsson, 2005).

Remarks: This species is confirmed for Turkey and the first detailed records are given.

Tribe Eretini Crotch, 1873

***Eretes griseus* (Fabricius, 1781)**

Material examined: Antalya: 1 ex., Serik (Kırbaş village, water accumulation), 37º 09' N 30º 49' E, 57 m, 19.08.2001.

Literature records from Turkey: Without detailed locality data (Miller, 2002; Nilsson, 2005).

Remarks: This species is confirmed for Turkey and the first detailed records are given.

Tribe Hydaticini Sharp, 1882

***Hydaticus* (*Guignotites*) *ponticus* Sharp, 1882**

Material examined: Aydın: 1 ex., Nazilli (Esenköy, Akçay), 37º 47' N 28º 18' E, 75 m, 12.09.2001; Burdur: 1 ex., Çavdır (Yamadı village), 37º 07' N 29º 36' E, 960 m, 22.06.2002.

Literature records from Turkey: Without detailed locality data (Guéorguiev, 1981; Nilsson, 2005).

Remarks: This species is confirmed for Turkey and the first detailed records are given.

***Hydaticus* (*Hydaticus*) *transversalis laevisculptus* Zaitzev, 1910**

Material examined: Denizli: 1 ex., Acıpayam (Yeniköy, water channel), 37º 22' N 29º 25' E, 863 m, 07.08.2000.

Literature records from Turkey: Adana, Kütahya (Guéorguiev, 1981).

Remarks: New to the southwestern Anatolian region.

Subfamily Hydroporinae Aubé, 1836
Tribe Bidessini Sharp, 1882

***Bidessus anatolicus anatolicus* Wewalka, 1972**
Literature records from Turkey: Adana, Antalya (Guéorguiev, 1981; Biström, 1987).

***Bidessus calabricus* Guignot, 1957**
Literature records from Turkey: Ankara, Antalya, Çanakkale, İstanbul, İzmir, İzmit, Muğla (Fery, 1991).

***Bidessus delicatulus* (Schaum, 1844)**
Literature records from Turkey: Ankara, Muğla, İzmir (Guéorguiev, 1981; Fery, 1991).

***Bidessus nasutus* Sharp, 1887**
Literature records from Turkey: Konya, Isparta (Guéorguiev, 1981).

***Hydroglyphus geminus* (Fabricius, 1792)**
Material examined: Muğla: 4 ex., border of Muğla (Gazeller, Akçay), 37º 20' N 28º 43' E, 440 m, 22.06.2001.
Literature records from Turkey: Adana, Aksaray, Ankara, Antalya, Aydın, Balıkesir, Bolu, Bursa, Edirne, Gümüşhane, İçel, İzmir, Kastamonu, Kayseri, Kilis, Konya, Manisa, Nevşehir, Tuz Gölü, Trabzon (Guéorguiev, 1981; Darılmaz & Kıyak, 2006).
Remarks: New to Muğla.

Tribe Hydroporini Aubé, 1836

***Deronectes parvicollis* (Schaum, 1864)**
Material examined: Isparta: 1 ex., Yalvaç (the northwest of Sultan mountains), 38º 15' N 31º 18' E, 1438º m, 19.07.2001.
Literature records from Turkey: Adana, Bilecik, Erzurum, Niğde, Yozgat (Guéorguiev, 1981; Fery et. al., 2001).
Remarks: New to the southwestern Anatolian region.

***Deronectes sahlbergi* Zimmermann, 1932**
Literature records from Turkey: İzmir, Bilecik, Muğla (Guéorguiev, 1981; Fery et. al., 2001).

***Deronectes wittmeri* Wewalka, 1971**
Literature records from Turkey: Antalya (Guéorguiev, 1981).

***Graptodytes veterator behningi* Zaitzev, 1927**
Literature records from Turkey: Afyon, Ankara, Balıkesir, Bingöl, Bursa, Erzurum, Konya, İzmir (Guéorguiev, 1981).

***Hydroporus bodemeyeri* Ganglbauer, 1900**
Literature records from Turkey: Adana, Adapazarı, Anlara, Bilecik, Bolu, Isparta, İzmir, Muğla (Guéorguiev, 1981).

***Hydroporus kozlovskii* Zaitzev, 1927**

Literature records from Turkey: Antalya, Artvin, Bingöl, Erzincan, Gümüşhane, Kars, Muş, Rize (Guéorguiev, 1981; Shaverdo, 2004).

***Hydroporus marginatus* (Duftschmid, 1805)**

Material examined: Muğla: 1 ex., Köyceğiz (Yayla village, Gölgeli mountains), 37º 03' N 28º 47' E, 1730 m, 17.07.2000.

Literature records from Turkey: Ankara, Kars, Konya, Sivas, Trabzon (Guéorguiev, 1981).

Remarks: This species is new to the south and west Anatolia regions.

***Hydroporus planus* (Fabricius, 1781)**

Material examined: Antalya: 1 ex., Elmalı (Armutlu village), 36º 33' N 29º 43' E, 1130 m, 22.04.2001.

Literature records from Turkey: Adana, Balıkesir, Bursa, Erzincan, İstanbul, Kars, Trabzon (Guéorguiev, 1981).

Remarks: New to the southwestern Anatolian region.

***Hydroporus pubescens* (Gyllenhal, 1808)**

Literature records from Turkey: Adana, Aksaray, Antalya, Bilecik, Bursa, Erzincan, Gümüşhane, İzmir, Manisa, Niğde, Ordu, Sakarya, Trabzon (Guéorguiev, 1981; Darılmaz & Kıyak, 2006).

***Nebrioporus* (*Nebrioporus*) *suavis* (Sharp, 1882)**

Material examined: Antalya: 6 ex., İbradı (Ürünlü village, Altınbeşik cave), 37º 02' N 31º 36' E, 800 m, 03.08.2000; 1 ex., Kaş (exit road of Gömbe) 36º 30' N 29º 35' E, 1275 m, 05.08.2000; Isparta: 1 ex., Yalvaç (Sultan mountains, Bağkonak), 38º 13' N 31º 17' E, 1260 m, 19.07.2001; Muğla: 1 ex., Dalaman (between Yanıklar and İnlice), 22.05.2000.

Literature records from Turkey: Adana, Amasya, Ankara, Antalya, Balıkesir, Bilecik, Bursa, Eskişehir, Gümüşhane, İstanbul, İzmir, Konya, Ordu, Sakarya, Sinop, Trabzon (Guéorguiev, 1981).

Remarks: New to Isparta and Muğla.

***Nebrioporus* (*Nebrioporus*) *turca* (Seidlitz, 1887)**

Material examined: Antalya: 1 ex., Finike (between Yazır and Kiltepe, Akçay), 36º 34' N 29º 57' E, 21.05.2000; 1 ex., between Bağlıağaç village and Kayadibi village, 22.05.2000; Isparta: 1 ex., Centrum, (vicinity of Güneyce) 37º 39' N 30º 43' E, 666 m, 23.08.2001; Konya: 1 ex., Hadim (vicinity of Ardıçpınarı fountain), 36º 53' N 32º 23' E, 1930 m, 11.07.2001

Literature records from Turkey: Adana, Antalya, Elazığ, İzmir, Trabzon (Guéorguiev, 1968, 1981).

Remarks: New to Isparta and Konya.

***Oreodytes davisii davisii* (Curtis, 1831)**

Material examined: Antalya: 2 ex., Elmalı (Akçay, exit road of Avşar village), 36º 33' N 29º 43' E, 1116 m, 21.05.2000.

Literature records from Turkey: Erzurum (Erman & Erman, 2002).

Remarks: The first record of *O. davisii davisii* from Turkey was given by Erman & Erman (2002). In this study the second record is given for Turkey. Also this species is new to the south and west Anatolia regions.

***Scarodytes halensis halensis* (Fabricius, 1787)**

Material examined: Antalya: 4 ex., Alanya (Yeşilöz brook), 36º 22' N 32º 11' E, 20 m, 26.05.2001; 7 ex., between Gazipaşa and Kocadere, 36º 15' N 32º 19' E, 30 m, 26.05.2001; 1 ex., Alanya (Demirtaş, Serde stream), 36º 24' N 32º 10' E, 10 m, 27.06.2002; 8 ex., Gazipaşa (Gazipaşa stream), 36º 15' N 32º 19' E, 25 m, 27.06.2002; Isparta: 1 ex., Sütçüler (the south of Sipahiler), 37º 38' N 30º 58' E, 1209 m, 26.06.2000; 1 ex., Sütçüler (Sipahiler, Taşlıkkır brook), 37º 38' N 30º 59' E, 1185 m, 15.07.2000; 6 ex., Yenişarbademli (Gedikli, edge of Beyşehir lake), 37º 56' N 31º 18' E, 1140 m, 02.08.2000; 3 ex., Aksu (Karağı village, brook), 37º 45' N 31º 07' E, 1220 m, 14.09.2000.

Literature records from Turkey: Afyon, Aksaray, Ankara, Bursa, Eskişehir, Gümüşhane, Isparta, İçel, İzmir, Kayseri, Van, Yozgat (Guéorguiev, 1968, 1981; Darılmaz & Kıyak, 2006).

Remarks: New to Antalya.

Tribe Hydrovatini Sharp, 1882

***Hydrovatus cuspidatus* (Kunze, 1818)**

Literature records from Turkey: Afyon, Adana (Guéorguiev, 1981).

Tribe Hygrotini Portevin, 1929

***Hygrotus* (*Coelambus*) *confluens* (Fabricius, 1787)**

Literature records from Turkey: Adana, Ankara, Bolu, Eskişehir, Isparta, İzmir, Kayseri, Konya, Mersin, Nevşehir (Guéorguiev, 1981).

***Hygrotus* (*Coelambus*) *lernaeus* (Schaum, 1857)**

Literature records from Turkey: Adana, Afyon, Ankara, Antalya, Aydın, Diyarbakır, Elazığ, Erzurum, Eskişehir, Kayseri, Kocaeli, Konya, Muğla, Niğde, Samsun, Sivas, Van, Yozgat (Guéorguiev, 1968, 1981; Fery et. al., 2005).

***Hygrotus* (*Hygrotus*) *inaequalis* (Fabricius, 1777)**

Literature records from Turkey: Bolu, Erzurum, Isparta, Konya, Manisa, Nevşehir (Balfour-Browne, 1963; Guéorguiev, 1981).

Subfamily Laccophilinae Gistel, 1856
Tribe Laccophilini Gistel, 1856

***Laccophilus hyalinus hyalinus* (De Geer, 1774)**

Material examined: Antalya: 1 ex., Finike (between Yazır and Kiltepe, Akçay), 36º 34' N 29º 57' E, 21.05.2000; 5 ex., Elmalı (Akçay, exit road of Avşar village), 36º 33' N 29º 43' E, 1116 m, 21.05.2000; 4 ex., Manavgat (Boztepe, Alara stream), 36º 39' N 31º 39' E, 20 m, 21.04.2001; 1 ex., Alanya (Yeşilöz stream), 36º 22' N 32º 11' E 20 m, 26.05.2001; 1 ex., Konyaaltı (Boğaz stream), 36º 51' N 30º 37' E, 15 m, 26.05.2001; 1 ex., Kalkan (Yeşilköy), 36º 17' N 29º 19' E, 8 m, 27.05.2001; 1 ex., Korkuteli (Söğütçük village), 37º 01' N 30º 20' E, 930 m, 26.06.2002; 1 ex., Manavgat (Hocalar village, Sarısu), 36º 52' N 31º 15' E, 22 m, 26.06.2002; Burdur: 2 ex., Karamanlı (Kılavuz village), 37º 22' N 29º 52' E, 1062 m, 23.06.2000; 4 ex., Gölhisar (Gölhisar lake), 37º 07' N 29º 36' E, 960 m, 13.09.2001; Isparta: 1 ex., Aksu (Karağı village, brook), 37º 45' N 31º 07' E, 1220 m, 14.09.2000; Konya: 1 ex., between Taşkent and Alanya (20km), 36º 51' N 32º 31' E, 1740 m, 20.04.2001.

Literature records from Turkey: Adana, Afyon, Aksaray, Aydın, Bolu, Isparta, İzmir, Kırşehir, Kilis, Manisa, Sakarya (Guéorguiev, 1981; Darılmaz & Kıyak, 2006).
Remarks: New to Antalya, Burdur and Konya.

Laccophilus minutus (Linnaeus, 1758)

Material examined: Antalya: 1 ex., between Bağlıağaç village and Kayadibi village, 22.05.2000; 1 ex., Manavgat (Boztepe, Alara stream), 36º 39' N 31º 39' E, 20 m, 21.04.2001; 1 ex., between Gazipaşa and Kocadere 36º 15' N 32º 19' E, 30 m, 26.05.2001; Aydın: 1 ex., Söke (Avşar, Azap lake), 37º 35' N 27º 26' E, 37 m, 23.06.2001; Burdur: 2 ex., Karamanlı (Karamanlı dam), 37º 24' N 29º 49' E, 1206 m, 27.06.2001; 1 ex., Gölhisar (Gölhisar lake), 37º 07' N 29º 36' E, 960 m, 20.08.2001; Denizli: 1 ex., Buldan (Süleymanlı lake), 38º 03' N 28º 46' E, 1175 m, 19.05.2001; Isparta: 1 ex., Eğridir (Kovada dam), 37º 20' N 30º 52' E, 920 m, 21.06.2001; 1 ex., Gölcük lake, 37º 43' N 30º 30' E, 1410 m, 28.06.2001.
Literature records from Turkey: Adana, Afyon, Aksaray, Ankara, Aydın, Balıkesir, Bolu, Bursa, Gümüşhane, Isparta, İzmir, Kayseri, Konya, Manisa, Sinop, Sivas, Trabzon (Guéorguiev, 1981; Darılmaz & Kıyak, 2006).
Remarks: New to Antalya, Burdur and Denizli.

Laccophilus poecilus Klug, 1834

Material examined: Antalya: 1 ex., Kalkan (Yeşilköy), 36º 17' N 29º 19' E, 8 m, 27.05.2001; Aydın: 1 ex., Söke (Avşar, Azap lake), 37º 35' N 27º 26' E, 37 m, 23.06.2001.
Literature records from Turkey: Adana, Antalya, Aydın, Bolu, Isparta, İzmir, Konya, Manisa, Nevşehir (Guéorguiev, 1981).

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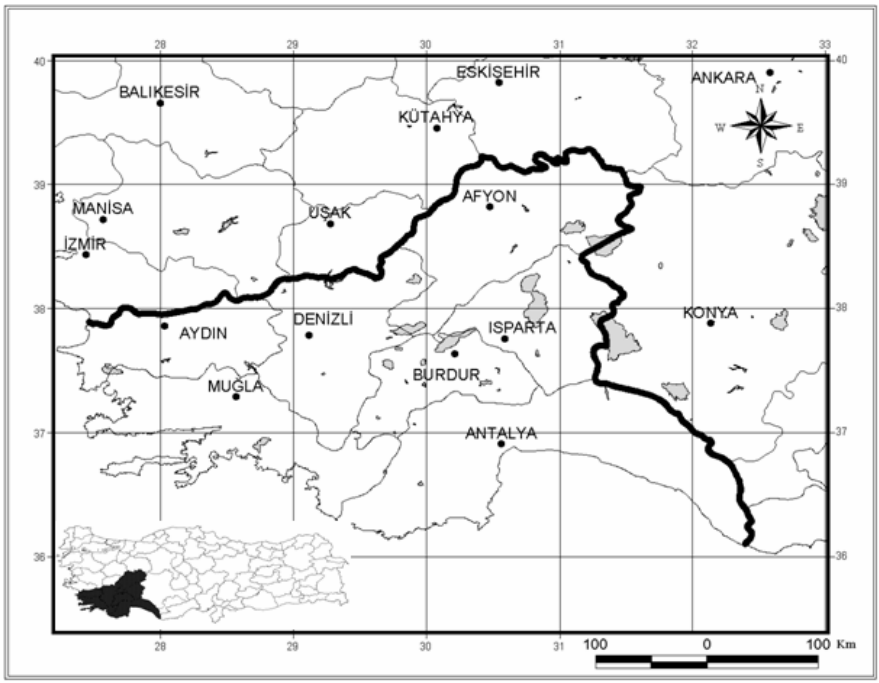

Fig. 1. Map of the southwestern Anatolian region of Turkey (delimited by bold line).

NEW SUBSTITUTE NAMES FOR THREE PREOCCUPIED LEPIDOPTERAN GENERA: *HERCYNELLA* BETHUNE-BAKER, 1893, *COLONEURA* DAVIS, 1964 AND *PARAGORGOPIS* VIETTE, 1951 (LEPIDOPTERA)

Hüseyin Özdikmen*

* Gazi Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, 06500 Ankara, TÜRKİYE, e-mail: ozdikmen@gazi.edu.tr

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ABSTRACT: Three junior homonyms were detected amongst the Lepidopteran genera and the following replacement names are proposed: *Tulaya* nom. nov. for *Hercynella* Bethune-Baker, 1893; *Neocoloneura* nom. nov. for *Coloneura* Davis, 1964; *Vietteogorgopis* nom. nov. for *Paragorgopis* Viette, 1951. Accordingly, new combinations are herein proposed for the species currently included in these genera: *Tulaya staudingeri* (Bethune-Baker, 1893) comb. nov. and *Tulaya margelana* (Bethune-Baker, 1893) comb. nov. from *Hercynella* Bethune-Baker, 1893; *Neocoloneura fragilis* (Barnes & McDunnough, 1916) comb. nov. from *Coloneura* Davis, 1964; *Vietteogorgopis foetterlei* (Viette 1951) comb. nov., *Vietteogorgopis jordani* (Viette 1956) comb. nov., *Vietteogorgopis nigrovenosalis* (Viette 1956) comb. nov., *Vietteogorgopis oreas* (Schaus 1892) comb. nov., *Vietteogorgopis pittionii* (Viette 1951) comb. nov., *Vietteogorgopis schausi* (Viette 1951) comb. nov. and *Vietteogorgopis spitzi* (Viette 1956) comb. nov. from *Paragorgopis* Viette, 1951.

KEY WORDS: nomenclatural changes, homonymy, replacement names, Lepidoptera.

Family Crambidae
Genus *Tulaya* nom. nov.

Hercynella Bethune-Baker, 1893. Ent. mon. Mag., 29, 204. (Lepidoptera: Pyraloidea: Crambidae: Odontiinae). Preoccupied by *Hercynella* Kayser, 1878. Abh. geol. Specialkarte Preuss. Théring. Staaten, 2, Heft 4, 101. (Mollusca: Bivalvia: Cryptodonta: Praecardioida: Antipleuridae: Antipleurinae).

Remarks: Bethune-Baker (1893) proposed the generic name *Hercynella* with the type species *Hercynella staudingeri* Bethune-Baker, 1893 by subsequent designation by Collins, 1962 in Lepidoptera. Fletcher & Nye (1984) mentioned that *Hercynella* was not placed in a family when established. It was placed in the Pyralidae: Pyraustinae by Hampson, 1899 and in Pyralidae: Odontiinae by Munroe, 1961. At present, the subfamily Odontiinae is in the family Crambidae. Unfortunately, the generic name was already preoccupied by Kayser, (1878), who had described the genus *Hercynella* for a fossil bivalve in Mollusca (Gill 1950; Prantl 1960; Vai 1965; Blotgett et al. 2001; Kříž, 2001). Thus, *Hercynella* Bethune-Baker, 1893 is invalid under the law of homonymy, being a junior homonym of *Hercynella* Kayser, 1878. In accordance with article 60 of the International Code of Zoological Nomenclature, fourth edition (1999), we propose for the genus

Hercynella Bethune-Baker, 1893 the new replacement name *Tulaya* **nom. nov.**

Etymology: The name dedicated to Tülay Özdikmen. The name is feminine in gender.

Summary of nomenclatural changes

Tulaya **new replacement name** = *Hercynella* Bethune-Baker, 1893 (non Kayser, 1878).
Tulaya staudingeri (Bethune-Baker, 1893) **comb. nov.** from *Hercynella* Bethune-Baker, 1893.
Tulaya margelana (Bethune-Baker, 1893) **comb. nov.** from *Hercynella* Bethune-Baker, 1893.

Family Psychidae
Genus *Neocoloneura* nom. nov.

Coloneura Davis, 1964. Bull. U.S. natn. Mus. No. 244: 89. (Lepidoptera : Tineoidea : Psychidae: Subfamily unassigned). Preoccupied by *Coloneura* Foerster, 1862. Verh. naturh. Ver. Rheinl., 19, 276. (Hymenoptera: Apocrita: Ichneumonoidea: Braconidae: Alysiinae).

Remarks: The name *Coloneura* was initially introduced by Foerster (1862) for a genus of the wasp family Braconidae (with the type species *Coloneura stylata* Foerster, 1862. Subsequently, Davis (1964) described a new moth genus of the family Psychidae (with the type species *Apterona fragilis* Barnes & McDunnough, 1916 by original designation) under the same generic name. This genus is monotypic. Thus, *Coloneura* Davis, 1964 is invalid under the law of homonymy, being a junior homonym of *Coloneura* Foerster, 1862. Furthermore, Nye & Fletcher (1991) also stated that *Coloneura* Davis, 1964 is a junior homonym of *Coloneura* Foerster, 1862. Unfortunately, there is no objective replacement name at the present. In accordance with article 60 of the International Code of Zoological Nomenclature, fourth edition (1999), I propose for the genus *Coloneura* Davis, 1964 the new replacement name *Neocoloneura* **nom. nov.**

Etymology: from current genus name.

Summary of nomenclatural changes

Neocoloneura **new replacement name** = *Coloneura* Davis, 1964 (non Foerster, 1862).
Neocoloneura fragilis (Barnes & McDunnough, 1916) **comb. nov.** from *Coloneura* Davis, 1964.

Family Hepialidae
Genus *Vietteogorgopis* nom. nov.

Paragorgopis Viette, 1951. Ann. naturh. Mus. Wien, 58, 140. (Lepidoptera: Hepialoidea: Hepialidae). Preoccupied by *Paragorgopis* Giglio-Tos, 1893. Boll. Mus. Zool. Anat. comp. Torino, 8, no. 158, 12. (Diptera: Ulidiidae).

Remarks: Firstly, the genus *Paragorgopis* was established by Giglio-Tos, 1893 for the fly family Ulidiidae with the type species *Paragorgopis maculata* Giglio-Tos, 1893. At present, the genus *Paragorgopis* Giglio-Tos, 1893 includes 12 species as *Paragorgopis argyrata* Hendel, 1914; *Paragorgopis cancellata* Hendel, 1909; *Paragorgopis clathrata* Hendel, 1909; *Paragorgopis discrepans* Hendel, 1914; *Paragorgopis euryale* Kameneva, 2004; *Paragorgopis incus* Kameneva, 2004; *Paragorgopis maculata* Giglio-Tos, 1893; *Paragorgopis mallea* Hendel, 1909; *Paragorgopis medusa* Kameneva, 2004; *Paragorgopis schnusei* Hendel, 1909; *Paragorgopis stapes* Kameneva, 2004 and *Paragorgopis stheno* Kameneva, 2004. Later, the genus *Paragorgopus* was proposed by Viette, 1951 for the moth family Hepialidae with the type species *Paragorgopis pittionii* Viette, 1951 by original designation. Furthermore, *Paragorgopis* Viette, 1951, [a junior homonym of *Paragorgopis* Giglio-Tos, 1893 - Diptera] was downgraded to denote a subgenus of *Aepytus* Herrich-Schäffer, [1858] by Nielsen and Robinson, 1983. Also, Nye & Fletcher (1991) stated that *Paragorgopis* Viette, 1951 is a junior homonym of *Paragorgopis* Giglio-Tos, 1893. Unfortunately, there is no objective replacement name at the present. Thus, the name *Paragorgopis* Viette, 1951 is invalid under the law of homonymy, being a junior homonym of *Paragorgopis* Giglio-Tos, 1893. Also, In accordance with article 60 of the International Code of Zoological Nomenclature, I propose to substitute the junior homonym name *Paragorgopis* Viette, 1951 for the **nom. nov.** *Vietteogorgopis*.

Etymology: from Viette who current author name of preexisting genus *Paragorgopis*.

Summary of nomenclatural changes

Vietteogorgopis **new replacement name** = *Paragorgopus* Viette, 1951 (non Giglio-Tos, 1893).
Vietteogorgopis foetterlei (Viette 1951) **comb. nov.** from *Paragorgopis* Viette, 1951.
Vietteogorgopis jordani (Viette 1956) **comb. nov.** from *Paragorgopis* Viette, 1951.
Vietteogorgopis nigrovenosalis (Viette 1956) **comb. nov.** from *Paragorgopis* Viette, 1951.
Vietteogorgopis oreas (Schaus 1892) **comb. nov.** from *Paragorgopis* Viette, 1951.
Vietteogorgopis pittionii (Viette 1951) **comb. nov.** from *Paragorgopis* Viette, 1951.
Vietteogorgopis schausi (Viette 1951) **comb. nov.** from *Paragorgopis* Viette, 1951.
Vietteogorgopis spitzi (Viette 1956) **comb. nov.** from *Paragorgopis* Viette, 1951.

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SOME BIOLOGICAL AND ECOLOGICAL REMARKS ON *TRICHOUROPODA ORBICULARIS*, A PEST OF HARVESTED MAIZE GRAINS AND A LARVIPAROUS UROPODID MITE (ACARI: MESOSTIGMATA: UROPODINA)

Durmuş Ali Bal* and Muhlis Özkan**

* Atatürk University, Education Faculty, Erzincan / TÜRKİYE. E-mail: bal@atauni.edu.tr
** Uludağ University, Education Faculty, Bursa / TÜRKİYE. E-mail: muozkan@uludag.edu.tr

[Bal, D. A. & Özkan, M. 2007. Some biological and ecological remarks on *Trichouropoda orbicularis*, a pest of harvested maize grains and a larviparous uropodid mite (Acari: Mesostigmata: Uropodina). Munis Entomology & Zoology 2 (1): 119-128**]**

ABSTRACT: Morphological features and geographic distribution of *Trichouropoda orbicularis* are given and larva, deutonymph and adults of the species are described with original figures. Larviparity is reported for the species first time. Larva is extracted by microoperation from the body of female and then studied. It is emphasized that the species is a stored food mite and contaminate harvested maize grains.

KEY WORDS: Acari, Uropodina, *Trichouropoda orbicularis*, larviparity, Turkey

Hirschmann and Wiśniewski (1986, 1987, 1988, 1989, 1993) extensively studied the cosmopolitan genus *Trichouropoda*, which is includes 394 species (Wiśniewski, 1998).

Some uropodid specimens from corn threshing were collected in the Artvin, Rize and Trabzon provinces in Turkey. Among these materials, *Trichoropoda orbicularis* was new for the Turkish acarofauna (Özkan et al., 1988; 1994). Examinig the species, it was realized that females were apparently larviparous and containing about 2 small larvae in the body cavity. Here, the larva, deutonymph and adults of the species were described, based on our specimens, and presented additional morphological data for comparison with other populations.

MATERIALS AND METHOD

Samples were collected using standard methods for acarological studies. Specimen collection, extraction, preservation and preparation for examination were discussed by Bal (2005), and Bal & Özkan (2006). All measurements are in μm. Specimens are mounted in Hoyer's medium and examined with a Nikon E-600 compound microscope equipped with differential interference contrast and phase contrast systems.

The speciemens were deposited in Bal's mite collection, Erzincan Education Faculty, Erzincan, Turkey.

Systematics

Trichouropoda orbicularis (C. L. KOCH, 1839) - sensu HIRSCHMANN and WIŚNIEWSKI, 1988

Synonyms:
Notaspis orbicularis C.L. KOCH, 1839
Uropoda krameri G. Canestrini, 1882
Urodinychus krameri Trägardh, 1912
Urodinychus (Leiodinychus) krameri (G. Canestrini, 1882) – sensu Berlese, 1917
Leiodinychus orbicularis (C. L. Koch, 1882) – sensu Błoszyk, 1984

Female

Idiosoma oval, 720 long, 580 wide, slightly narrowed at the front end, well chitinized and brown. Dorsal plate intact, and surrounded an entire marginal plate, both plates with web-like patterns, and all dorsal-shields setae short, thorn-like, not reaching insertion of following setae (Figure 1A).

Epigynial shield 275 long and 180 wide, helmet-like, anterior prolongation spear-like, the shield begins behind coxae IV and ends in the space coxa I. Surface of the epigynial shield with a web-like pattern, and its inner surface denticled superficially at anterior half. Anterior prolongation of the peritremes starts at the level of coxae II, twisted between coxae II-III, its anterior prolongation hook-like and directed inner ward, and the stigmatal openings end with a very short prolongation. Surface of the sternal plate bears a web-like pattern and five pairs of short setae (*st1, st2, st3, st4, st5*). Ventral plates and all pedofossae with web-like ornamentation (Figures 1B, 2I). Pedofossal groove distinct and well developed. Anal opening 40 long and 27.7 wide. All ventral setae short and thorn-like, about 13 long. Postanal seta present and resembling the other ventral setae. Distance between coxae II, III and IV: 115, 165, 212 respectively (Figures 1B, 4).

Chelicerae with nodus, multidentate, the movable digit 30 μm, middle part 120 μm (Figure 2A). Setae *h1* thorn-like, almost reaching the end of the lacinae; setae *h2, h3* and *h4* branched. Corniculus three-pronged, with blunt ends. Hypostomal constrictions between *h3-h4* (Figures 2B, C, D); Epistome with a pyramid-like base, with gradually shortented denticles, the anterior part long, without denticles and dager-like (Figure 2 H). Tritosternum cup-shaped basally, bearing a denticle medio-laterally, and lacina with denticles laterally and splitted two feathered ends (Figures 2 E-F). Palps as in Figure 2 J.

Coxa I large, tarsi on all legs bear a pairs of digits at tip of ambulacral prolongation; setae on legs thorn-like, but some branched. All femora bear a membranous chitin flap (Figures 3 A-D).

Male

Idiosoma 720-740 long, 570-600 wide; epigynial shield horseshoe-shaped and placed between coxae II-III, surrounded by an arch posteriorly; opercular opening 62,5 long and 52,5 wide. Sternal plate large and with five pairs of setae (*st1, st2, st3, st4, st5*), thorn-like and straight; sternal setae in line, but *st5* and *st5'* close to each other. All ventral plates with a web-like pattern, including surface of genital cover. Sternal patterns horizontal. Sexual dimorphisme occurs hypostomal setae; *h2* short and knife-like, *h3* smooth and fairly long, *h1* smooth, and *h4* pilose (Figure 3B). Other morphological features, setal arrangement, body shape and patterns as in females (Figure 5).

Deutonymph

Idiosoma 560-580 long, 450-490 wide. Hypostomal setae *h2-h4* branched and pilose. All idiosomal plates with web-like pattern (Figure 6); all dorsal and ventral setae thorn-like (Figures 6A, B); sternal plate anvil-like, and bearing five pairs of setae (*st1, st2, st3, st4, st5*). Ventrianal plate setae *V2, V3, V4, V6* and *V8* occurs on the plate, but *V7 - V7'* arise out of soft leathery integument of sternal and anal plates. Anal plate boat in shape and postanal seta present. Distance between coxae II, III and IV: 97, 150, 195, respectively. Coxa I large, placed close to each other; pedofossae distinct, well developed. Anterior peritreme prolongation twisted, long, its posterior part straight and short (Figure 6B).

Larva

Idiosoma 390 long, 285 wide; podonotal plate lancet-like; pygidial shield half moon-like; peripheral platelets of the podonotal plate larger than central ones; margins of platelets indented or smooth; leathered area ornamented with bead-like small tubercles. Podonotal plate with five pairs of setae (*i2, i3, i4, i5, z2*), and five pairs of setae (*i1, s2, z1, s5, s7*) also occur laterally on anterior half of the body. Setae *i1, s2, z1, s5* branched and pilose, however all the other posterior setae not branched, short, smooth and thorn-like. One pair of setae (*I2*) arises on leathered area between posterior and pygidial plates; setae *S2, S3, S4, S5, I3, I4, I5* and *Z4* laterally from posterior leathered area (Figure 7A).

Sternal plate in two parts, setae *v1* located on the anterior ventral platelet. Posterior sternal plate rectangular, with setae *v2* and *v3*; a pair of inguinalia situated behind coxae III; setae *V2* and *V6* arise from ventral leathered area; setae *S2, S3, S4, Z3, S5, I5* arise from leathered area laterally; setae *V4, V6* and postanal seta (*U*) thorn like and not branched. Peritremae not clear. Surface of ventral plate ornamented with bead-like small tubercles (Figure 7A).

Examined Materials and localities

Artvin province: (41° 166′ N, 41° 833′ E), 9.IX.1993, 3 ♀ 2 ♂, 1 DN., each female bearing two larvae or two eggs; from corn, *Zea mays,* threshing.
Rize province: (41° 005′ N, 40° 527′ E), 19.V.2005, 1 ♀♀, female bearing two larvae, 1 ♂♂, from corn, *Zea mays,* threshing.
Trabzon province: (40° 957′ N, 39° 906′ E), 9.V.2003, 5 ♀♀, 3 ♂♂, 2 DN.; each female bearing two larvae or two eggs; *Zea mays*.
Samples were some wet.
Altitude: 100-300 m. a.s.l.

Distribution: *Trichouropoda orbicularis* is distributed in *Palearctic region* (Belgium, Germany, France, Great Britain, Iceland, Netherlands, Austria, Poland, Romania, Czech Republic, Slowakia, Ukraina, Hungaria, Algeria, Italy, Spain), *Oriental region* (India) and *Ethiopian region* (Congo) (Hirschmann and Wiśniewski, 1993).

The species is new for the Turkish fauna.

Remarks

T. orbicularis is collected from the provinces of Artvin, Rize and Trabzon on the coast of the eastern Black Sea Region, Turkey. Annual average temperature of this region ranges between 13-15˚C. With the oreographic precipitation caused by air masses from the north and northwest, the region shows the features of ocean-climate due to East Black Sea Mountains range up to 3000 meters high. This region is the wettest region in Turkey, and annual average precipitation varies from 1500 to 2500 mm. The general composition of the forests is made up of *Fagus orientalis, Carpinus orientalis, Prunus laurocerasus, Rhododendron caucasucus, R. ponticus, Tilia rubra, Castanea sativa, Acer platanoides, Ulmus campestris, Ulmus montana, Quercus petraea, Lonicera caucasica, Vibirnum lantana, Buxus sempervirens, Taxus baccata, Sorbus torminalis, Ribes beibersteinii, Euonymus europaeus, Ostrya carpinofolia, Corylus avellana*, *Rubus* sp. and some ferns. Cultural plants such as cor, tea, hazelnut grow in the fields at the height of 1500 meters on this coastal zone. The flora in the form of scrub and arboreal is dominant under the high level damp climatic conditions. The forests of spruce trees exist only in this region of Turkey. The region has alkali soil characteristics, while dark brown forest soil has appeared (Atalay and Mortan, 2003).

Larviparity is an interesting phenomenon in Uropodid mites. Four larviparous mites are reported from Uropodina, so far. *Trichouropoda orbicularis* is the fifth report for larviparity, no other record has been recorded for Uropodid mites. Two species of *Trichouropoda* (*T. obscura*, *T. ovalis*) were reported as larviparous by Kielczewski and Wiśniewski in (1977). Zugalev collected one *Macrodinychus* female

containing about 30 larvae in her body cavity, on May 1965. Bregetova first reported that females of mites of the genus *Macrodinychus* are apparently larviparous, at Acarological Congrees in Saalfaden in 1974 (Kielczewski and Wiśnewski, 1977). Recently, some larviparous or viviparous *Macrodinychus bregetovae* specimens have been collected from Turkey by Bal (2005). A *Macrodinychus* species, *Macrodinychus* (*M.*) *paraguayensis* Hirschmann 1975, collected by Balogh, was larviparous. Also, females of this species were containing about 30 small larvae in the body cavity.

Turkish specimens agree with other given Paleartic specimens, but deutonymphs are predominant, and a ventrianal setae is present additionally. Females of Turkish specimens are larviparous and contain two larvae in their body cavites (Fig. 4).

Bloszyk (1999) noted that *T. orbicularis* prefer unstable microhabitats (especially nests of birds), and Slovak specimens especially collected from nests of birds (personal communication with Dr. Mašán). Bloszyk (1999) says it would probably be phoretic species. It is possible that the species eat waste material of birds there.
As a final note for the species, each female bears two larvae or eggs; egg 275 long and 175 wide, and the size of the larva appropriate for birth. Pregnant females indicate that Larvae are give birth in the months December and January.

Abbreviations

bp: base part; *h1-h4*: hypostomal setae; Co: corniculus; DN.: deutonymph; fd: fixed digit; md: chelicer movable digit; mp: chelicer middle part; i-I: dorsocentral setae series; la: lacina; no: nodus; Pe: Peritrema; PN.: protonymph; r-R: marginal setae series; s-S lateral setae series; U: posterioanal seta; v-V: ventral setae series; z-Z: mediolateral setae series.

ACKNOWLEDGEMENTS

The author would like to thank Dr. Peter MAŠÁN (Institute of Zoology, Slovak Academy of Sciences, Bratislava), since he supported us with additional Eurepean *T. orbicularis* specimens to compare with the Turkish specimens.

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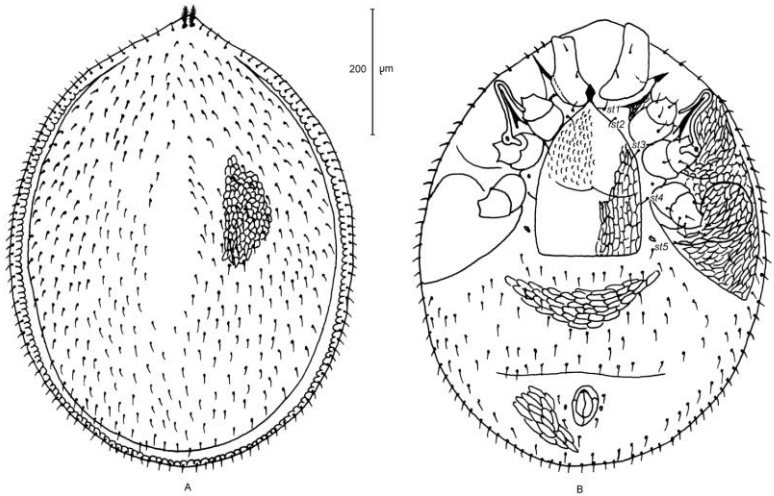

Figure 1. A) *Trichouropoda orbicularis*: Dorsal view of female; B) Ventral view of female.

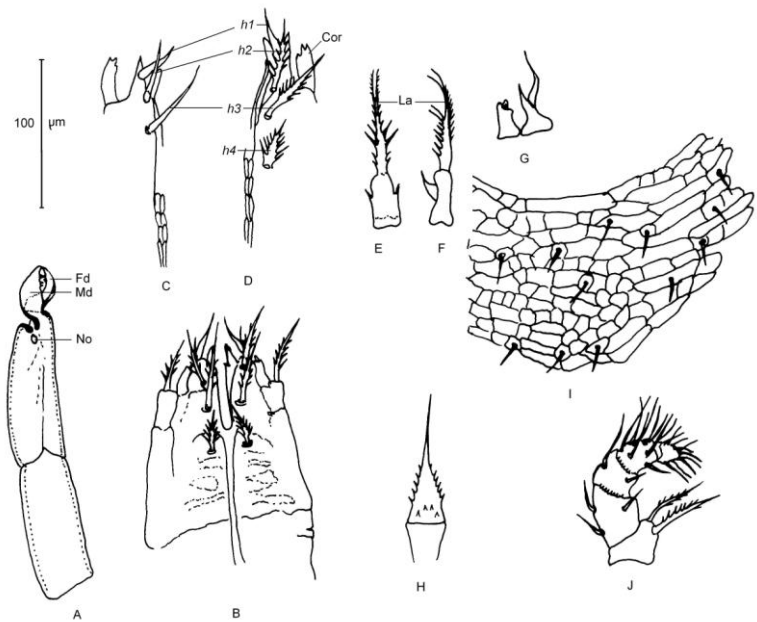

Figure 2. *Trichouropoda orbicularis*: female; A) Chelicera, B) Ventral view of gnathosoma, C) Lateral view of gnathosoma of male, D) Lateral view gnathosoma of female, E) Ventral view of tritosternum, F) Lateral view of tritosternum, G) Lateral view of *h1* and corniculus, H) Epistome of female, I) Ornementation of ventrianal plate and ventral setae, J) Palp of female.

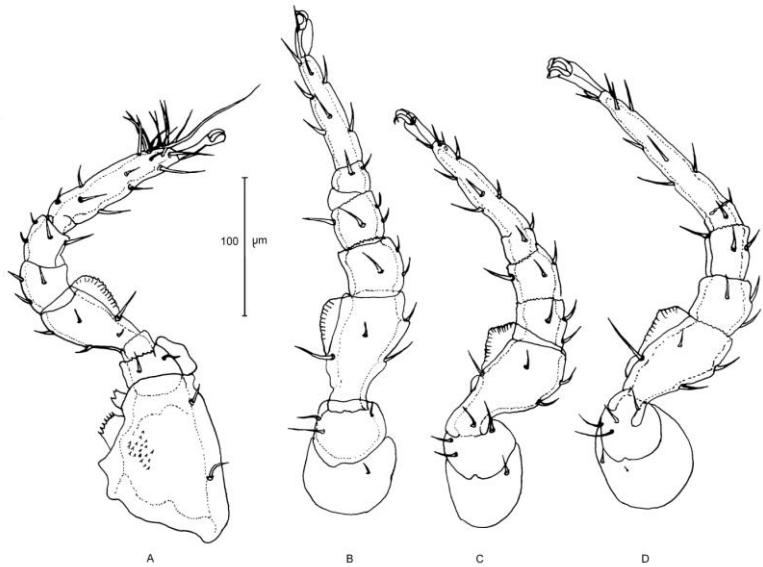

Figure 3. *Trichouropoda orbicularis*: male; A) Leg I, B) Leg II, C) Leg II, D) Leg IV

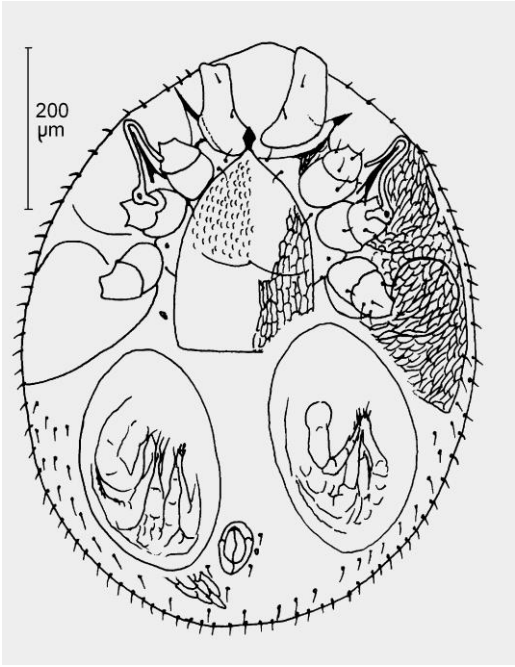

Figure 4. *Trichouropoda orbicularis*: Ventral view of female and larviparous larvae.

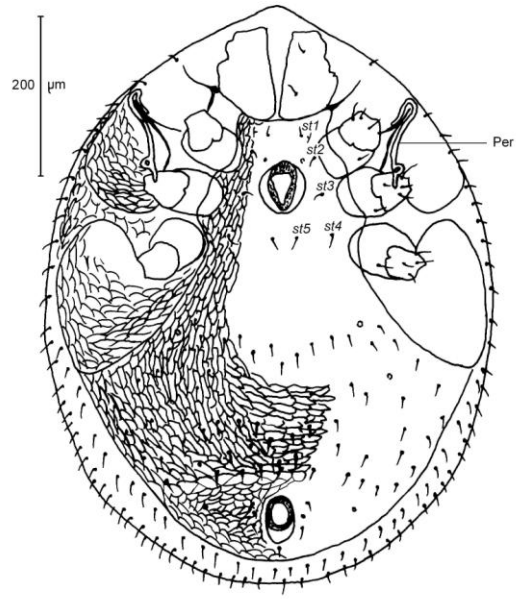

Figure 5. *Trichouropoda orbicularis*: Ventral view of male.

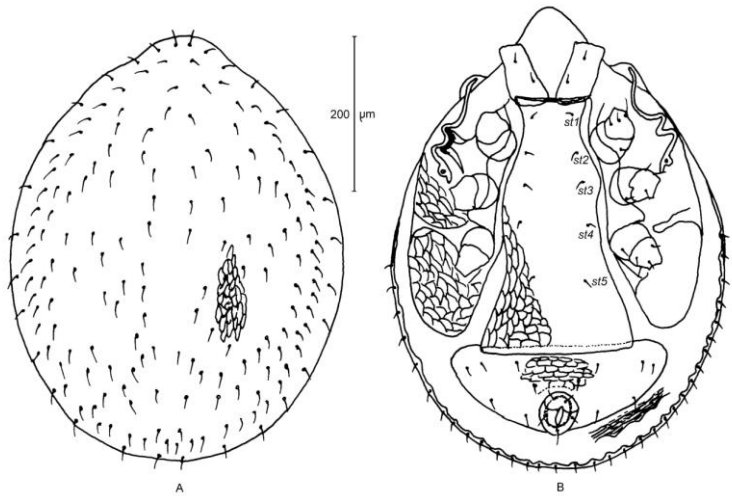

Figure 6. A) *Trichouropoda orbicularis*: A) Dorsal view of deutonymphe, B) Ventral view of deutonymphe.

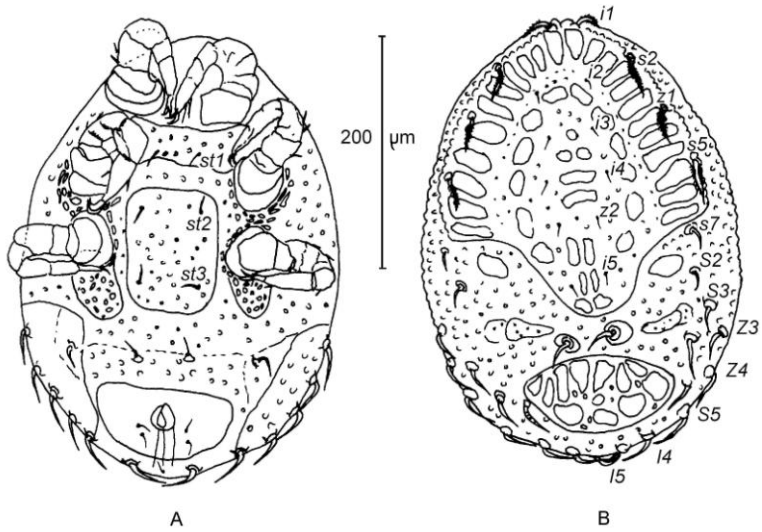

Figure 7. *Trichouropoda orbicularis*: A) Ventral view of larva, B) Dorsal view of larva.

TWO RECORDS NEW FOR THE TURKISH ARANEOFAUNA: *TMARUS PIOCHARDI* (SIMON, 1866) AND *MONAESES ISRAELIENSIS* LEVY, 1973 (ARANEAE: THOMISIDAE)

Abdullah Bayram*, Tarık Danışman*, Halil Bolu and İnanç Özgen*****

* Kırıkkale University, Sciences and Arts Faculty, Department of Biology, 71450 Yahşihan, Kırıkkale / TURKEY. e-mail: abdbayram@yahoo.com, tarikdani@yahoo.com
** Dicle University, Agriculture Faculty, Department of Plant Protect, 21000 Campus, Diyarbakır / TURKEY. e-mail: besni@dicle.edu.tr
*** Plant Protection Research Institute, 21100 Diyarbakır / TURKEY. e-mail: inancoz@yahoo.com

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ABSTRACT : In this study, characteristic features of *Tmarus piochardi* (Simon, 1866) and *Monaeses israeliensis* Levy, 1973 which are new records for the Turkish spider fauna are given together with their distributions in Turkey and the World.

KEY WORDS: *Tmarus*, *Monaeses*, Thomisidae, Araneae, Turkey, New records.

The members of Thomisidae have crab-like legs and are often brightly coloured. These kind of spiders usually live on flowers, and they are well camouflaged and ambush pollinating insects of considerable size. They make no web but females cover their eggs with a silken shelter, usually under leaves**.** Several species can change colour to a certain degree to mach the petals surface colour (Foelix, 1982 and Roberts, 1995). About 165 genera and 2000 species have been identified in Thomisidae across the world. In *Tmarus* Simon, has a wide distribution with approximately 170 described species worldwide while in *Monaeses* Thorell 27 species are known (Platnick, 2006).

From Europe the following species are known in *Tmarus*: *Tmarus horvathi* Kulczynski, 1895*, T. piger* (Walckenaer, 1802)*, T. piochardi* (Simon, 1866)*, T. rimosus* Paik, 1973*, T. staintoni* (Cambridge, 1873)*, T. stellio* Simon, 1875. Among these species *T. horvathi* and *T. rimosus* from Eastern Europe and Russia, *T. piger* is a cosmopolitan species and widespread across the whole of Europe and Russia, *T. piochardi* is distributed in the Mediterranian countries*, T. staintoni* from Western Europe and Italy, *T. stellio* from France, Austria and Eastern Europe are known (Canestrini & Pavesi, 1868; Kulczynski, 1903; Simon, 1932; Logunov, 1992; Blagoev, 2002; Blick *et al*., 2004; Platnick 2006). Three species of *Tmarus* are known from Israel; *T. piochardi, T. yerohamus* Levy, 1973 and *T. hazevensis* Levy, 1973 (Levy, 1973).

In *Monaeses, M. paradoxus* (Lucas, 1846) is known from Europe, Africa and Azerbaijan while *M. israeliensis* Levy, 1973 known from the Middle East and Central Asia (Simon, 1932; Levy 1973; Platnick, 2006).

Until this study no record was given in *Tmarus* and *Monaeses* except an unidentified specimen of *Tmarus* was given in Karol, 1967 (Bayram, 2002; Topçu *et al*., 2005).

This paper deals with the characteristic features and distributions of *Tmarus piochardi* and *Monaeses israeliensis* and adds two species to the spider fauna of Turkey.

MATERIALS AND METHOD

Specimens were collected from two different localities of Turkey: Southeast Anatolia (Diyarbakır, Çermik, 39°35´East-38°10'North) and Southwest Anatolia (Antalya, Serik, 31°7'East-36°55'North, **fig. 1**). The specimens were obtained from almond gardens, cornfields and meadows. The materials were placed into 70 % ethanol, carried to the zoological laboratory and identified with a SMZ800 Stereo microscope. The keys of Heimer & Nentwig, 1991; Roberts, 1995 and Tyschchenko, 1971 were used. The drawings was made by means of a camera lucida attached to the microscope. The specimens examined were stored in the Zoological Museum of Kırıkkale University.

RESULTS

Key for the genera

1. Carapace strongly convex, usually same length as width. Ocular area much elevated; anterior and posterior lateral eyes are on large separated tubercles and and distinctly larger than median eyes, distance between anterior median eyes slightly shorter than that of posterior median eyes. Legs spinous, two anterior pairs almost of same length, but clearly longer than two posterior pairs, there are no scopulae or claw tuft on the legs, claws with distinct denticles. Opisthosoma often angular and with a posterior large tubercle dorsally or whole posterior part rather elevated..... ***Tmarus***

-. Carapace slightly high and distinctly longer than wide. Ocular area slightly elevated, eyes on tubercles clearly separated from each other, lateral eyes distinctly larger than median eyes, distance between anterior median eyes shorter than that of posterior median eyes and forms a trapezium. Legs tick and very long, two anterior pairs clearly longer than posterior pairs, claws with large, distinct denticles. Opisthosoma long and slender, dorsally flat, posterior part cone-shaped, very elongated, extending far beyond spinnerets ..... ***Monaeses***

***Tmarus piochardi* (Simon, 1866)**

Thomisus piochardi Simon, 1866, Ann. Soc. ent. Fr., (4) 6: 284
Tmarus piochardi Simon, 1875, Les Arachnides de France, Paris, 2: 261
Tmarus piochardi judaorum-. Strand, 1915, Arch. Naturg. Berlin, 81: 147
Tmarus piochardi Simon, 1875, Levy, 1973, Isr. J. Zool., 116, f. 20-23.

Description

Body yellowish brown with scattered dark round dots. Carapace rounded, the length and width of carapace are approximately same (**fig. 2A**). Radial bands are brown and white. There are brown spins on brown dots on the radial bands. In lateral view, carapace is strongly convex. In lateral view, ocular area is much elevated; the anterior and posterior lateral eyes are on large separated tubercles. The lateral eyes are distinctly larger than the median eyes. The distance between the anterior median eyes is slightly shorter than the distance between the posterior median eyes. Clypeus narrow. Chelicerae toothless. Labium and maxilla are longer than wide.

Sternum is oval and yellow in colour. Anterior of sternum is straight. Legs are spinous. Leg formula is 2-1- 4- 3. The anterior pairs are clearly longer than the posterior pairs. There are no scopulae or claw tuft on the legs. Tarsi are with two claws that with distinct denticles. Opisthosoma is rather angular at the lateral margins. It is longer than wide, and with a posterior tubercle at the dorsum (f**ig. 2B**). Dorsal of opisthosoma is cowered with brown and chalk-white mottles. There is a light brownish longitudinal and two or three brown transversal bands on the dorsum. Ventrum of opisthosoma with a dark longitudinal band, anterior of the band is darker.

Male

Measurements. Based on three males, means (n=3): total length of body 4.53 mm (range 4.4-4.7); carapace length 1.70 mm; carapace width 1.63 mm; carapace index 1.03; opisthosoma length 2.86; femur II length 3.26 mm; femur II width 0.33 mm; femoral index 9.87.
Palpus. Ventral tibial apophysis looks like a finger in shape, apically curved, thicker than the retro-lateral apophysis (**fig. 2C**). The retro-lateral apophysis black, basal part very broad, upper part of the apophysis heavy sclerotized and ended with a sharp point, ventral side deeply notched (**fig. 2D**).

Female

Measurements. Based on six females, means (n=6): total length of body 5.5 mm (range 4.5-6); carapace length 2.27 mm; carapaee width 2.12 mm; carapace index 1.07; opisthosoma length 3.23 mm; femur II length 2.88 mm; femur II width 0.39 mm; femoral index 7.38.
Epigynum. The epigynum looks like a goblet. The upper part rounded,

base of this part pointed downward. Ratio of the holder width to goblet width is 1/2.8. The holder posteriorly narrowed, the sides sclerotized and black. There are double spots at anterior and posterior of epigynum (**fig. 2E**).

Material examined
Diyarbakır, Çermik Petrol (L1), 650 m (39°35´East-38°10'North), from almond trees (*Amygdalus* sp.), 05.VIII.2003, 3♂♂; 28.VII.2003, 2♀♀, 08.IX.2003, 3♀♀; Muğla, Datça (L2), 10 m (27 °40'East-36°45'North), from an almond tree, 10.VIII.2004, 1♀.

Habitat and occurrence
Prefers the woody places, adult in summer. The specimens were collected from branches of almond trees in july, august and september.

Distribution
The Mediterranean countries, Yemen, India.

***Monaeses israeliensis* Levy 1973**
Monaeses israeliensis Levy, 1973, Isr. J. Zool., 22:111, mf, f. 8-11.

Description
Prosoma reddish brown. Carapace slightly high and distinctly longer than wide (**fig. 3A**). Ocular area is slightly elevated. Eyes are on tubercles and clearly separated from each other. The lateral eyes are distinctly larger than the median eyes. The distance between the anterior median eyes shorter than that of the posterior median eyes. So, they form a trapezium. Legs yellow in colour, tick and very long. The first and second pairs clearly longer than the third and fourth pairs. The claws with large and distinct denticles. Opisthosoma pale yellowish grey. There is a light longitudinal band on the body. Also, venter of opisthosoma with a dark band along entire length. Opisthosoma is long and slender, dorsally flat. Posterior part of the opisthosoma is cone-shaped, very elongated and extending far beyond the spinnerets (**fig. 3B**).

Male
Measurements. Based on two males, means (n=2). Total length of body 6.5 mm (range 6.0-7.0), carapace length 2.1 mm, carapace width 1.4 mm, carapace index 1.49; opisthosoma length 4.4 mm; femur II length 3.1 mm, femur II width 0.28 mm, femoral index 11.07.
Palpus. Tibia with a ventral and retrolateral apophyses. The ventral apophysis is slightly curved, at lateral view the middle part is swollen, tip of the apophysis is terminating blunt. The retro-lateral apophysis is thick. The tip with three dents. The stem is stout, and there is a groove on the ventral side on the ventral view (**fig. 3C-D**).

Material examined

Antalya: Serik (L3), 40 m (31°7'East-36°55'North), from a cornfield, 15.VII.2005, 1♂; Beşkonak, Köprülü Kanyon National Park, 1200 m (31°20´East - 37°10'North), from a meadow, 22.V.2005, 1♂.

Habitat and occurrence

Prefers dense vegetations, adult in summer months. The specimens were collected from low branches of agricultural plants such as corn and wheat in a period of may-july. It catchs prey by ambush among lower branches of these plants.

Distribution

Israel, Lebanon and Central Asia.

DISCUSSION

There are great morphological variations in *Tmarus piochardi* especially in the opisthosoma shape as seen in some other species. As it is known the most familiar character is a horn-shape structure in *T. piochardi*. Sizes of this structure vary according to the specimen size. In some specimens, the structure looks like a blunt horn while in some others it is much more evident. In the latter, in lateral view, the opisthosoma is as if forked at the posterior. Even the horn part is greater and longer than the other part.

In this study, sizes of the Anatolian specimens were compared with the European and Israeli specimens. While the mean of the total length (body, males) is 4.5 mm, it is 4 in Europen specimens, and 5 in the Israeli specimens. The length mesurements of the females were also similar for the three populations. Also, carapace and femoral indexes of the males and females collected from Anatolia were found similar to that of European and Israeli specimens (Simon, 1932; Levy, 1973; Logunov, 1992).

As seen in *Tibellus* species, members of *Tmarus* stretch out their first and second legs in front, and take the colour of the branch for camouflage. For this reason like the body mesurements colour is also changeable.

In comparison of *Monaeses israeliensis* collected from Turkey and Israel, the body length of the males was 6-7 mm in Anatolian specimens, and 4-6 mm in Israeli specimens. Also, the carapace and femoral indexes of the two population were similar (Levy, 1973). *M. israeliensis* was recorded from Lebanon, Israel and Central Asia so far. In Turkey, *M. israeliensis* was collected from Antalya that a southern city. This species appear as a Mediterranean spider. It can be encountered in the southern, southeastern and even eastern parts of Turkey.

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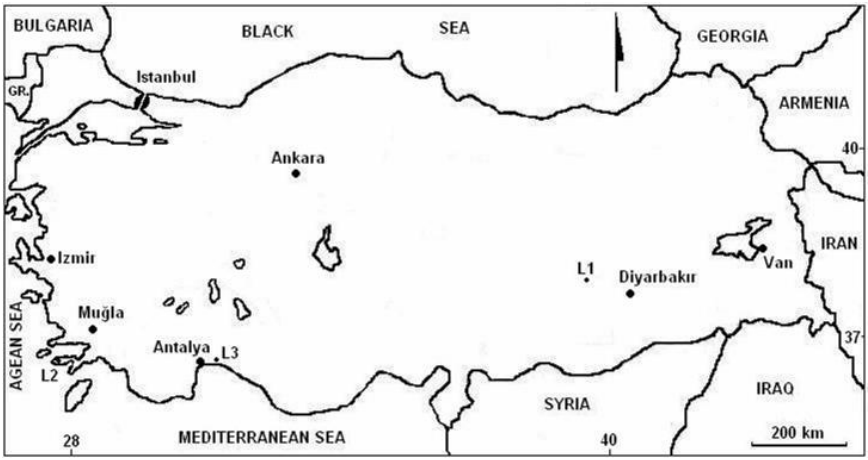

Fig. 1. The localities (L) where the spiders were collected in Turkey: *Tmarus piochardi* (Simon), L1, Çermik; L2, Datça; *Monaeses israeliensis* Levy, L3, Serik.

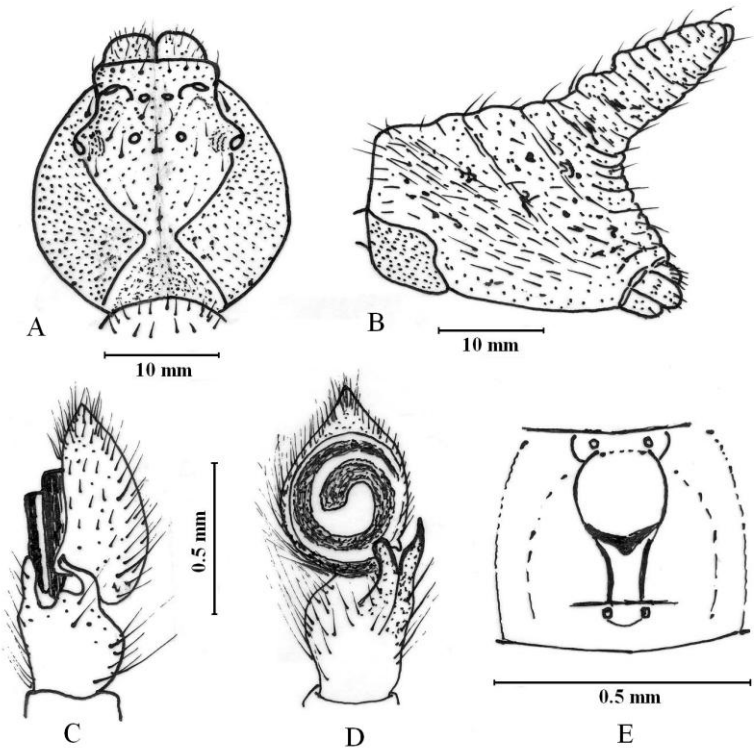

Fig. 2. *Tmarus piochardi:* Prosoma, female (Datça), dorsal view (A); Opisthosoma, female (Datça), lateral view (B); Male, left palpus (Çermik), lateral view (C); left palpus (Çermik), ventral view (D); Female (Çermik), epigyne, ventral view (E).

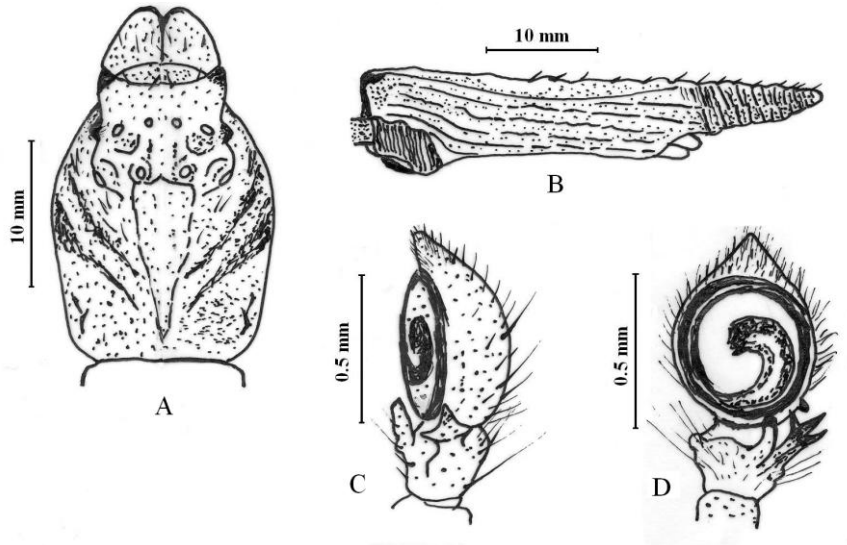

Fig. 3. *Monaeses israeliensis* (Serik): Prosoma, male, dorsal view (A); Opisthosoma, male, lateral view (B); Male, palpus, lateral view (C); palpus, ventral view (D).

NOMENCLATURAL CHANGES FOR SEVEN PREOCCUPIED SPIDER GENERA (ARACHNIDA: ARANEAE)

Hüseyin Özdikmen*

* Gazi Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, 06500 Ankara, TÜRKİYE, e-mail: ozdikmen@gazi.edu.tr

[Özdikmen, H. 2007. Nomenclatural changes for seven preoccupied spider genera (Arachnida: Araneae). Munis Entomology & Zoology 1 (2): 137-142**]**

ABSTRACT: Seven junior homonyms were detected amongst the Araneae genera and the following replacement names are proposed: *Mesudus* nom. nov. for *Manawa* Forster, 1970 (Desidae); *Locketella* nom. nov. for *Kuala* Locket, 1982 (Linyphiidae); *Millidgefa* nom. nov. for *Notiothauma* Millidge, 1991 (Linyphiidae); *Neovaldiviella* nom. nov. for *Valdiviella* Millidge, 1985 (Linyphiidae); *Eminella* nom. nov. for *Catuna* Mello-Leitão, 1940 (Philodromidae); *Necatia* nom. nov. for *Davidina* Brignoli, 1985 (Salticidae); *Eyukselus* nom. nov. for *Propetes* Menge, 1854 (Salticidae). Accordingly, new combinations are herein proposed for the species currently included in these genera: *Mesudus solitarius* (Forster, 1970) comb. nov., *Mesudus frondosus* (Forster, 1970) comb. nov. and *Mesudus setosus* (Forster, 1970) comb. nov. from *Manawa*; *Locketella versa* (Locket, 1982) comb. nov., *Locketella fissivulva* (Millidge & Russell-Smith, 1992) comb. nov. and *Locketella pusilla* (Millidge & Russell-Smith, 1992) comb. nov. from *Kuala*; *Millidgefa aurantiacum* (Simon, 1905) comb. nov. from *Notiothauma*; *Neovaldiviella trisetosa* (Millidge, 1985) comb. nov. from *Valdiviella*; *Eminella ctenops* (Mello-Leitão, 1940) comb. nov. from *Catuna*; *Necatia magnidens* (Schenkel, 1963) comb. nov. from *Davidina*; *Eyukselus felinus* (Menge, 1854) comb. nov. from *Propetes*.

KEY WORDS: nomenclatural changes, homonymy, replacement names, spider, Araneae.

TAXONOMY

Family DESIDAE
Genus *MESUDUS* nom. nov.

Manawa Forster, 1970. Otago Mus.Bull. No.3: 51. (Arachinda: Araneae: Desidae). Preoccupied by *Manawa* Hornibrook, 1949. Trans. Proc. Roy. Soc. N.Z., 77, 470. (Crustacea: Ostracoda: Palaeocophida: Beyrichicopida: Punciidae).

Remarks: The name *Manawa* was initially introduced by Hornibrook, 1949 for a genus of the ostracod family Punciidae (with the type species *Manawa tryphena* Hornibrook 1949 from New Zealand). Subsequently, Forster, 1970 described a new spider genus of the family Desidae (with the type species *Manawa solitaria* Forster, 1970 from New Zealand) under the same generic name (Platnick, 2005). Thus, the genus *Manawa* Forster, 1970 is a junior homonym of the genus *Manawa* Hornibrook 1949. According to Article 60 of the International Code of Zoological Nomenclature, I propose for the genus *Manawa* Forster, 1970 the new replacement name *Mesudus* **nom. nov.** The name is dedicated to my colleague Mesud Güven. The name is masculine in gender.

Summary of nomenclatural changes:
Mesudus **nom. nov.** = *Manawa* Forster, 1970 (nec Hornibrook 1949).
Mesudus solitarius (Forster, 1970) **comb. nov.** = *Manawa solitaria* Forster, 1970.
Mesudus frondosus (Forster, 1970) **comb. nov.** = *Manawa frondosa* Forster, 1970.
Mesudus setosus (Forster, 1970) **comb. nov.** = *Manawa setosa* Forster, 1970.

Family LINYPHIIDAE
Genus *LOCKETELLA* nom. nov.

Kuala Locket, 1982. Bulletin Br. arachnol. Soc. 5 (8): 370. (Arachnida: Araneae: Linyphiidae). Preoccupied by *Kuala* Durette-Desset & Krishnasamy, 1976. Bull.Mus.natn.Hist.nat.Paris (Zool.) 270: 709. (Nematoda: Heligmonellidae).

Remarks: The generic name *Kuala* Durette-Desset & Krishnasamy, 1976 was proposed for a genus of nematods. Subsequently, the generic name *Kuala* Locket, 1982 was introduced for a new spider genus (with the type species *Kuala versa* Locket, 1982) of the family Linyphiidae (Hormiga et al., 2003; Platnick, 2005). Thus, the genus *Kuala* Locket, 1982 is a junior homonym of the genus *Kuala* Durette-Desset & Krishnasamy, 1976. According to Article 60 of the International Code of Zoological Nomenclature, I propose for the genus *Kuala* Locket, 1982 the new replacement name *Locketella* **nom. nov.** The name is given in honour to G. H. Locket who is the current author of the genus name. The name is masculine in gender.

Summary of nomenclatural changes:
Locketella **nom. nov.** = *Kuala* Locket, 1982 (nec Durette-Desset & Krishnasamy, 1976).
Locketella versa (Locket, 1982) **comb. nov.** = *Kuala versa* Locket, 1982.
Locketella fissivulva (Millidge & Russell-Smith, 1992) **comb. nov.** = *Kuala fissivulva* Millidge & Russell-Smith, 1992.
Locketella pusilla (Millidge & Russell-Smith, 1992) **comb. nov.** = *Kuala pusilla* Millidge & Russell-Smith, 1992.

Family LINYPHIIDAE
Genus *MILLIDGEFA* nom. nov.

Notiothauma Millidge, 1991. Bull Am Mus Nat Hist No. 205: 125. (Arachnida: Araneae: Linyphiidae). Preoccupied by *Notiothauma* MacLachlan, 1877. Trans. ent. Soc. London, 1877, 427. (Mecoptera: Eomeropidae).

Remarks: The genus *Notiothauma* was erected by MacLachlan, 1877 with the type species *Notiothauma reedi* MacLachlan, 1877 by monotypy from Chile in the mecopteran family Eomeropidae. Later, the genus *Notiothauma* was described by Millidge, 1991 with the type species *Gongylidiellum aurantiacum* Simon, 1905 by monotypy from Argentina (Hormiga et al., 2003; Platnick, 2005). However, the name *Notiothauma* Millidge, 1991 is invalid under the law of homonymy, being a junior homonym of *Notiothauma* MacLachlan, 1877. In accordance with article 60 of the International Code of Zoological Nomenclature, I propose to substitute the junior homonym name

Notiothauma Millidge, 1991 for the nomen novum *Millidgefa*. The name is dedicated to A. F. Millidge.

Summary of nomenclatural changes:
Millidgefa **nom. nov.** = *Notiothauma* Millidge, 1991 (nec MacLachlan, 1877).
Millidgefa aurantiacum (Simon, 1905) **comb. nov.** = *Notiothauma aurantiacum* (Simon, 1905) = *Gongylidiellum aurantiacum* Simon, 1905.

Family LINYPHIIDAE
Genus *NEOVALDIVIELLA* nom. nov.

Valdiviella Millidge, 1985. American Mus. Novit. No. 2836: 61. (Arachnida: Araneae: Linyphiidae). Preoccupied by *Valdiviella* Steuer, 1904. Zool. Anz., 27, 593. (Copepoda: Calanoida: Aetideidae).

Remarks: Firstly, the genus *Valdiviella* was established by Steuer, 1904 for copepod family Aetideidae with the type species *Valdiviella oligarthra* Steuer, 1904. Later, the genus *Valdiviella* was proposed by Millidge, 1985 for spider family Linyphiidae with the type species *Valdiviella trisetosa* Millidge, 1985 by original designation and monotypy from Chile (Hormiga et al., 2003; Platnick, 2005). However, the name *Valdiviella* Millidge, 1985 is invalid under the law of homonymy, being a junior homonym of *Valdiviella* Steuer, 1904. In accordance with article 60 of the International Code of Zoological Nomenclature, I propose to substitute the junior homonym name *Valdiviella* Millidge, 1985 for the nomen novum *Neovaldiviella*.

Summary of nomenclatural changes:
Neovaldiviella **nom. nov.** = *Valdiviella* Millidge, 1985 (nec Steuer, 1904).
Neovaldiviella trisetosa (Millidge, 1985) **comb. nov.** = *Valdiviella trisetosa* Millidge, 1985.

Family PHILODROMIDAE
Genus *EMINELLA* nom. nov.

Catuna Mello-Leitão, 1940. Notas Mus. La Plata, 5, 253. (Arachnidae: Araneae: Philodromidae). Preoccupied by *Catuna* Kirby, 1871. Synon. Cat. diurn. Lep., 238. (Lepidoptera: Papilionoidea: Nymphalidae: Limenitidinae: Limenitidini).

Remarks: Mello-Leitão (1940) proposed the genus *Catuna* with the type species *Catuna ctenops* Mello-Leitão, 1940 by monotypy from Argentina in the spider family Philodromidae (Platnick, 2005). Unfortunately, the generic name was already preoccupied by Kirby (1871), who had proposed the genus name *Catuna* that was proposed with the type species *Papilio crithea* Drury, 1773 in the butterfly family Nymphalidae. *Catuna* Kirby, 1871 was introduced as a replacement name for *Euomma* Felder & Felder, [1867], which is invalid under the law of homonymy. Moreover, *Euomma* was a replacement name for *Jaera* Hübner, [1819], which is also invalid under the law of homonymy. Thus, the genus *Catuna* Mello-Leitão, 1940 is a junior

homonym of the generic name *Catuna* Kirby, 1871. According to Article 60 of the International Code of Zoological Nomenclature, I propose a new replacement name *Eminella* **nom. nov.** for *Catuna* Mello-Leitão, 1940. The name is dedicated to my colleague Dr. Emine Demir. The name is feminine in gender.

Summary of nomenclatural changes:
Eminella **nom. nov.** = *Catuna* Mello-Leitão, 1940 (nec Kirby, 1871).
Eminella ctenops (Mello-Leitão, 1940) **comb. nov.** = *Catuna ctenops* Mello-Leitão, 1940.

Family SALTICIDAE
Genus *NECATIA* nom. nov.

Davidina Brignoli, 1985. Bulletin Br. arachnol. Soc. 6 (9): 380. (Arachnida: Araneae: Salticidae). Preoccupied by *Davidina* Oberthür, 1879. Etudes entom., 4, 19. (Lepidoptera: Papilionoidea: Nymphalidae: Limenitidinae: Limenitidini).

Remarks: Firstly, the genus *Davidina* was described by Oberthür, 1879 with the type species *Davidina armandi* Oberthür, 1879 by monotypy in the butterfly family Nymphalidae. On the other hand, the genus *Davidia* was proposed by Schenkel, 1963 with the type species *Davidia magnidens* Schenkel, 1963 by original designation from China in the spider family Salticidae (Platnick, 2005). But *Davidia* Schenkel, 1963 is a junior homonym of *Davidia* Hicks, 1873 (Mollusca) and *Davidia* Ribeiro, 1915 (Pisces). Therefore, the name *Davidina* was proposed by Brignoli, 1985 as a replacement name for *Davidia* Schenkel, 1963 preoccupied *Davidia* Hicks, 1873 (Mollusca) and *Davidia* Ribeiro, 1915 (Pisces). At the moment, *Davidina* Brignoli, 1985 is still used as a valid generic name in Araneae (Song *et al.*, 1999; Proszynsky, 2005; Platnick, 2005). However, the name *Davidina* Brignoli, 1985 is also invalid under the law of homonymy, being a junior homonym of *Davidina* Oberthür, 1879. In accordance with article 60 of the International Code of Zoological Nomenclature, fourth edition (1999), I propose to substitute the junior homonym *Davidina* Brignoli, 1985 for the nomen novum *Necatia*. The name is dedicated to Necati Bingöl.

Summary of nomenclatural changes:
Necatia **nom. nov.** = *Davidina* Brignoli, 1985 (nec Oberthür, 1879).
Necatia magnidens (Schenkel, 1963) **comb. nov.** = *Davidina magnidens* (Schenkel, 1963) = *Davidia magnidens* Schenkel, 1963.

Family SALTICIDAE
Genus *EYUKSELUS* nom. nov.

Propetes Menge, 1854. in Berendt, Bernstein Reste, 1 (2), 93. (Arachnida: Araneae: Salticidae). Preoccupied by *Propetes* Walker, 1851. List Specimens Hom. Ins. Coll. Brit. Mus., 3, 797. (Homoptera: Cicadellidae: Cicadellinae: Proconiini).

Remarks: The name *Propetes* Walker, 1851 was proposed for a genus of leafhoppers family Cicadellidae (with the type species *Propetes compressa* Walker, 1851) (Young, 1968; MacKamey, 2001). Subsequently, the generic name *Propetes* Menge, 1854 was introduced for a new fossil spider genus (with the type species *Propetes felinus* Menge, 1854) of the family Salticidae (Moore, 1955; Keilbach, 1982). Thus, the genus name *Propetes* Menge, 1854 is a junior homonym of the generic name *Propetes* Walker, 1851. In accordance with article 60 of the International Code of Zoological Nomenclature, I propose to substitute the junior homonym name *Propetes* Menge, 1854 for the nomen novum *Eyukselus*. The name is dedicated to my colleague Prof. Dr. Eşref Yüksel. The name is masculine in gender.

Summary of nomenclatural changes:
Eyukselus **nom. nov.** = *Propetes* Menge, 1854 (nec Walker, 1851).
Eyukselus felinus (Menge, 1854) **comb. nov.** = *Propetes felinus* Menge, 1854.

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BIBLIOGRAPHY OF TURKISH EVEN-TOED UNGULATES (MAMMALIA: ARTIODACTYLA)

İrfan Albayrak*, Nahit Pamukoğlu* and M. Ali Kaya**

* University of Kırıkkale, Faculty of Sciences and Arts, Department of Biology, 71450, Yahşihan, Kırıkkale, TURKEY.
** University of Selçuk, Faculty of Education, Department of Biology, 42075, Meram, Konya, TURKEY.

[Albayrak, İ., Pamukoğlu, N. & Kaya, M. A. 2007. Bibliography of Turkish even-toed Ungulates (Mammalia: Artiodactyla). Munis Entomology & Zoology 2 (1): 143-162**]**

ABSTRACT: In this study, accessible publications on Turkish even-toed ungulates up to this date were compiled. The order Artiodactyla is represented by 13 species in Turkey, *Sus scrofa, Camelus ferus, Camelus dromedarius*, *Cervus elaphus*, *Dama dama*, *Capreolus capreolus*, *Gazella dorcas*, *Gazella subgutturosa*, *Bos taurus, Bubalus bubalis, Capra aegagrus, Ovis gmelini* and *Rupicapra rupicapra*. *Capra ibex* and *Gazella gazella* are now known to be extinct species.

KEY WORDS: Bibliography, Artiodactyla, Turkey

In Turkey, the Classis Mammalia is represented by Insectivora, Chiroptera, Carnivora, Cetacea, Perissodactyla, Artiodactyla, Rodentia and Lagomorpha orders.

A considerable amount of knowledge about the Turkish mammals is merely preserved on the library shelves of various governmental institutions because the results from investigations conducted by those bodies generally appear for public use only in their local publications which has no easy and academically accustomed access. The first bibliography of Turkish Fauna was published by The Scientific and Technical Research Council of Turkey (Aytuğ and Çakman, 1972). The other bibliographic study concerning the Turkish mammals was written by Kumerloeve (1975). The latests ones are The bibliographies of Turkish Carnivora, Insectivora and Chiroptera recently published by Albayrak et al. (1997, 1998, 2000).

The aim of this study is to contribute to the researches on the order Artiodactyla and the formation of the bibliography of Turkish Mammalian Fauna.

MATERIALS AND METHOD

For the bibliography of the order Artiodactyla, data was gathered by collaborating with the libraries and archives of Kırıkkale University, Selçuk University, Ankara University; Faculty of Science, Faculty of Letters, Faculty of Agriculture, Faculty of Veterinary; İstanbul University, Faculty of Science; Gazi University Faculty of Sciences and Arts; The National Library; The Ministry of Enviroment and Forestry; The Ministry of Agriculture and Rural Affairs; The Scientific and Technical Research Council of Turkey; The Higher Education Council of

Turkey; The General Directory of Mineral Research and Exploration of Turkey; The Grand National Assembly of Turkey and their relevant institutions.

Distributions of actual species being feral or domestic were shown in the maps prepared based on the provincial unit. Systematic orders and names of the taxa were given according to Ellerman and Morrison-Scott (1951), Corbet (1978) and Wilson and Reeder (1993). The status of species and subspecies were firstly determined according to IUCN.

RESULTS

The latest literary data obtained on the Turkish even-toed ungulates are given below. According to literature data, *Gazella gazella* (Pallas, 1776) lived in Southeastern Anatolia but is now an extinct species. Some species are represented by the domesticated species such as *Camelus ferus*, *Camelus dromedarius* and *Bos taurus*.

Order: Artiodactyla

Suborder: Suiformes

Family: Suidae Gray, 1821

Subfamily: Suinae Gray, 1821

Genus: *Sus* Linnaeus, 1758

Species: *Sus scrofa* Linnaeus, 1758

Type locality: Germany

Status: Vulnerable

Wild boar inhabits almost the whole Turkey (Fig. 1), but the population size decreases by over hunting.

Suborder: Tylopoda

Family: Camelidae

Genus: *Camelus* Linnaues, 1758

Species: *Camelus ferus* Przewalski, 1883

Type locality: “Bactria” (=Uzbekistan, Bokhora)

Status: Lower risk (Conservation dependent, Extinct in the wild)

Domesticated form of two humped or Asian camel exists in the Western Anatolia though it is rare (Fig. 2).

Species: *Camelus dromedarius* Linnaeus, 1758

Type locality: Africa

Status: Lower risk (Conservation dependent, Extinct in the wild)

Domesticated form of single humped desert camels or “hacin camel” exists in the Southwestern Anatolia (Fig. 3).

Suborder: Ruminantia

Family: Cervidae

Subfamily: Cervinae

Genus: *Cervus* Linnaeus,1758

Species: *Cervus elaphus* Linnaeus, 1758

Type locality: Europe

Subspecies: *Cervus elaphus maral* Gray, 1850

Type locality: Persia (Iran)

Status: Endangered

Deer is also called as red deer or great deer. It exists in various parts of Turkey (Fig. 4).

Subfamily: Cervinae

Genus: *Dama* Frisch, 1775

Species: *Dama dama* (Linnaeus, 1758)

Type locality: Europa (Sweden)

Subspecies: *Dama dama dama* (Linnaeus, 1775)

Type locality: Europe (Sweden)

Status: Critically endangered

It is called red deer or ‘yağmurca’. It was formerly seen in some part of the Mediterranean Region of Turkey. It is also taken under protection in Düzlerçamı near Antalya and in Gökova near Marmaris today. It is also rarely found in Çatalan near Adana and the Manavgat Mountains (Fig. 5).

Subspecies: *Dama dama mesopotamica* Brooke, 1875

Type locality: Luristan, Iran.

Status: Critically endangered

It is also called as 'sığın'. It was formerly reported to live in the Hakkari Province (Fig. 6). However, present status is not known.

Subfamily: Capreolinae

Genus: *Capreolus* Gray, 1821

Species: *Capreolus capreolus* Linnaeus, 1758

Type locality: Europe (Sweden)

Status: Endangered

It is also called karaca, elik or black deer. It formerly lived in the following regions: the Blacksea region, the Marmara region, the Northern Aegean Region, the provinces of İzmir, Antalya, Adana, Osmaniye, Hatay, Hakkari, Erzurum and Kars. It is rarely seen in the Turkish Thrace, the Central Blacksea Region and the Northwestern and Northeastern Anatolia today (Fig. 7).

Family: Bovidae

Subfamily: Antilopinae Gray, 1821

Genus: *Gazella* Blainville, 1816

Species: *Gazella dorcas* (Linnaeus, 1758)

Type locality: Africa (Lower Egypt)

Status: Critically endangered

It is also called "dorkas gazella" and "beatiful eyed gazella". It was formerly found in the Eastern Mediterranean and the Southeastern Anatolia (Fig. 8).

Species: *Gazella subgutturosa* Güldenstaedt, 1780

Type locality: Azerbaijan, Steppes of East Transcaucasia

Subspecies: *Gazella subgutturosa subgutturosa* Güldenstaedt, 1780

Type locality: North-Western Persia

Status: Critically endangered

It is also called "ahu", "ceren," "acem güzeli", "common gazella",

"mountain gazella". It is now under protection in Ceylanpınar near the Urfa province, but some escapers could rarely be seen in the mountains of Urfa (Fig. 9). Its wild population does not exist.

Subfamily: Bovinae

Genus: *Bos* Linnaeus, 1758

Species: *Bos taurus* Linnaeus, 1758

Type locality: Upsala, Sweden

Status: Lower risk (Conservation dependent, Extinct in the wild)

Domestic form of *Bos taurus* exists throughout Turkey (Fig. 10). *Bos taurus* formerly existed in central Anatolia, the western parts of Eastern Anatolia and the central and western part of Southeastern Anatolia till I. B.C. Horn and bone remains are present at Konya Archaeology Museum. Fossils belonging to this species were encountered at the excavations in Elazığ and Kahramanmaraş provinces.

Genus: *Bubalus* Smith, 1827

Species: *Bubalus bubalis* (Linnaeus, 1758)

Type locality: "Asia"? (Habitat in Asia, cultus in Italy)

Status: Lower risk (Conservation dependent, Extinct in the wild)

Domestic water buffalo, mandate or "camız" exists throughout Turkey (Fig. 11). *Bubalus bubalis* formerly lived in the central and western parts of the Eastern Mediterranean, and the Southeastern and Central Anatolia.

Subfamily: Caprinae Gray, 1821

Genus: *Capra* Linnaeus, 1758

Species: *Capra aegagrus* Erxleben, 1777

Type locality: Daghestan, East Caucasus

Subspecies: *Capra aegagrus aegagrus* Erxleben, 1777

Type locality: Daghestan, East Caucasus

Status: Critically endangered

It is also called wild goat, red mountain goat, mountain goat, red goat, yellow goat, rocky goat, big horned goat and bezoar goat. Generally it lives in the Eastern Anatolia and Taurus Mountains of Southern Turkey (Fig. 12).

Family: Bovidae Gray, 1821

Subfamily: Caprinae Gray, 1821

Genus: *Ovis* Linnaeus, 1758

Species: *Ovis gmelini* Blyth, 1840

Type locality: Erzurum, Asia minor

Subspecies: *Ovis gmelini anatolica* Valenciennes, 1856

Type locality: Bulgar Dagh Mountains, Cilician Taurus, Asia minor

Status: Critically endangered

It is called wild sheep, mountain sheep, rocky sheep, Anatolian wild sheep. It was formerly seen in the provinces of Eskişehir, Afyon, Konya and Karaman, and in the Central Taurus mauntains. It is under protection only in Bozdağ near the Konya province today (Fig. 13).

Subspecies: *Ovis gmelini gmelini* Blyth, 1841

Type locality: Erzerum, Asia minor

Status: Critically endangered

It is also called the mountain sheep and rocky sheep. It lives in the mountains between the provinces of Iğdır,Van and Hakkari (Fig. 14).

Family: Bovidae

Subfamily: Caprinae Gray, 1821

Genus: *Rupicapra* DeBlainville, 1816

Species: *Rupicapra rupicapra* Linnaeus, 1758

Type locality: Helveticis (Switzerland)

Status: Endangered

Subspecies: *Rupicapra rupicapra asiatica* Lydekker, 1908

Type locality: Trebizond, Asia Minor

Status: Critically endangered

It is also called the steppe goat, black goat, hook horned wild goat. It lives in some parts of Northeastern and Eastern Anatolia (Fig.15).

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Fig. 1. Distribution of *Sus scrofa* in Turkey

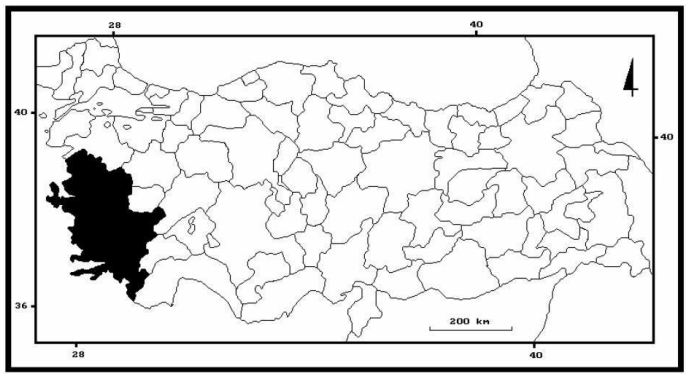

Fig. 2. Distribution of the domesticated form of *Camelus ferus* in Turkey

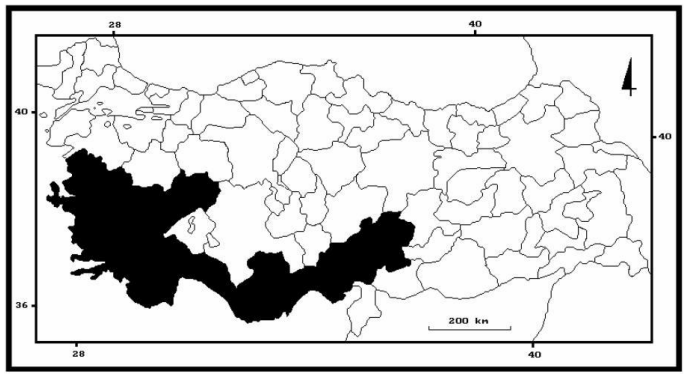

Fig. 3. Distribution of the domesticated form of *Camelus dromedarius* in Turkey

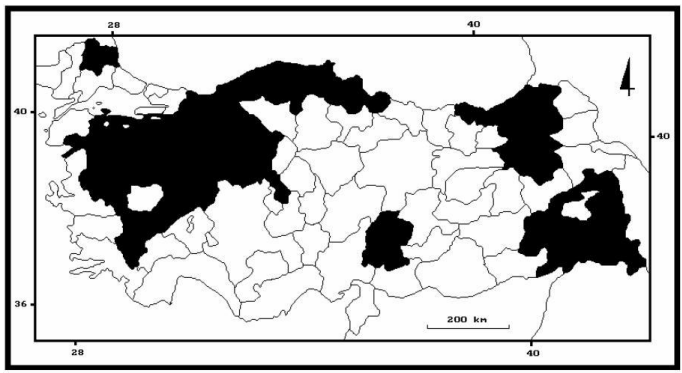

Fig. 4. Distribution of *Cervus elaphus maral* in Turkey

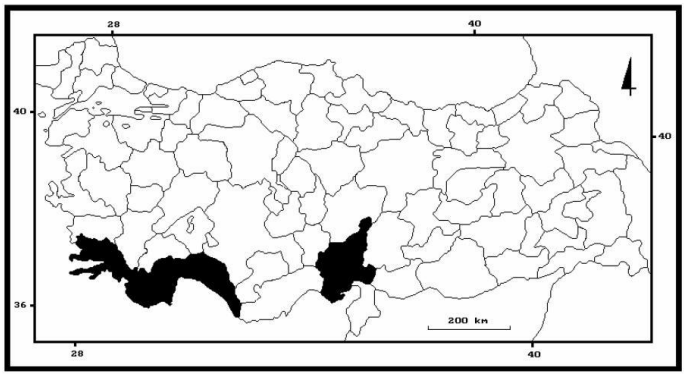

Fig. 5. Distribution of *Dama dama dama* in Turkey

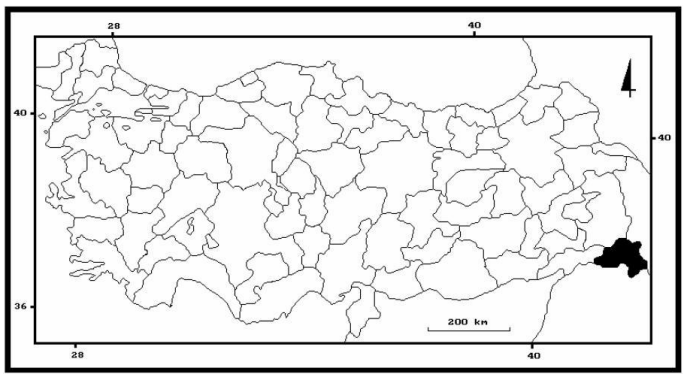

Fig. 6. Distribution of *Dama dama mesopotamica* in Turkey

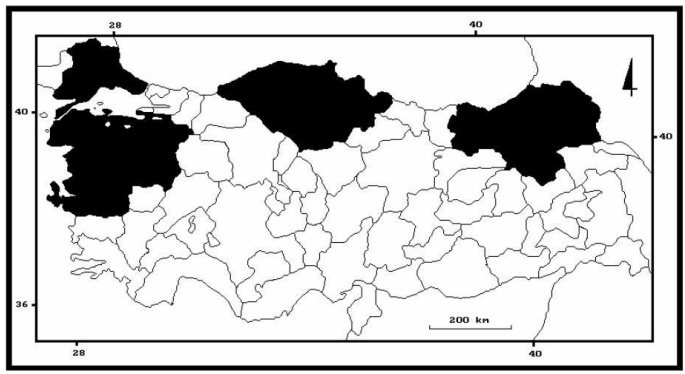

Fig. 7. Distribution of *Capreolus capreolus* in Turkey

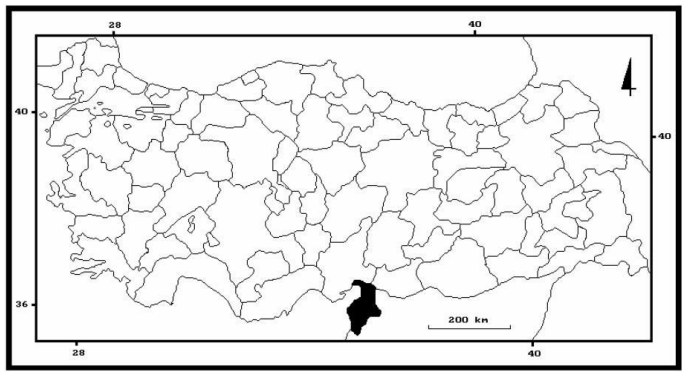

Fig. 8. Distribution of *Gazella dorcas* in Turkey

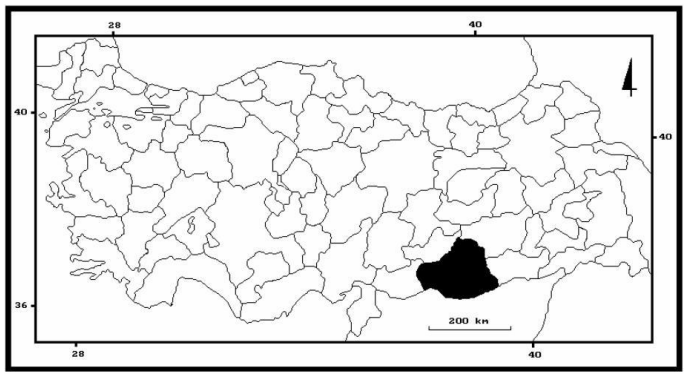

Fig. 9. Distribution of *Gazella subgutturosa subgutturosa* in Turkey

Fig. 10. Distribution of the domesticated form of *Bos taurus* in Turkey

Fig. 11. Distribution of the domesticated form of *Bubalus bubalis* in Turkey

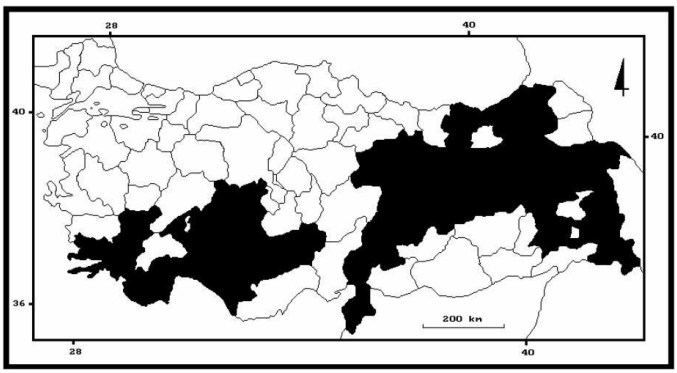

Fig. 12. Distribution of *Capra aegagrus aegagrus* in Turkey

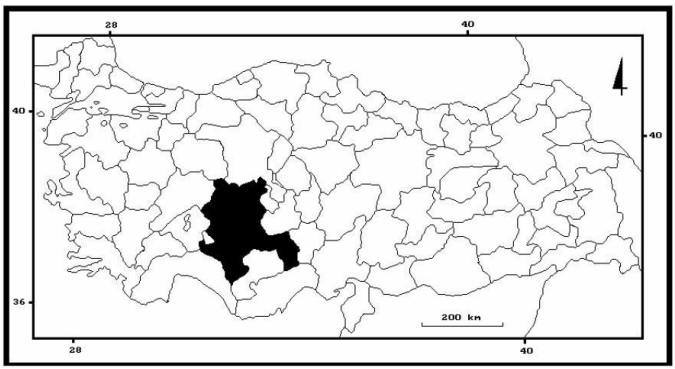

Fig. 13. Distribution of *Ovis gmelini anatolica* in Turkey

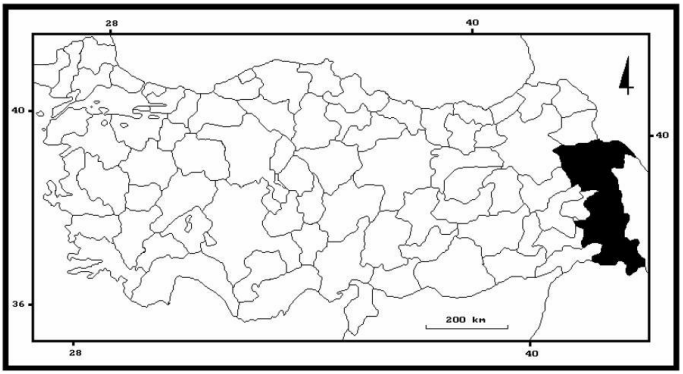

Fig. 14. Distribution of *Ovis gmelini gmelini* in Turkey

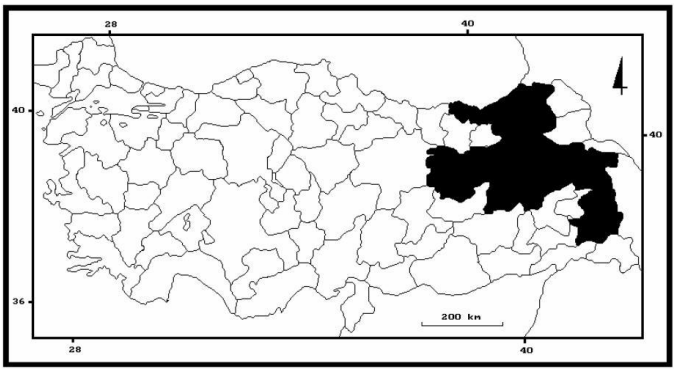

Fig. 15. Distribution of *Rupicapra rupicapra asiatica* in Turkey

A NOMENCLATURAL ACT: REPLACEMENT NAMES FOR HOMONYMOUS TACHINID GENERA WITH LEPIDOPTERAN GENERA (DIPTERA: TACHINIDAE)

Hüseyin Özdikmen*

* Gazi Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, 06500 Ankara, TÜRKİYE, e-mail: ozdikmen@gazi.edu.tr

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ABSTRACT: Five junior homonyms were detected amongst the Tachinidae genera and the following replacement names are proposed: *Currana* nom. nov. for *Doddiana* Curran, 1927; *Solomonilla* nom. nov. for *Illa* Baranov, 1938; *Bahrettinia* nom. nov. for *Psilopleura* Reinhard, 1943; *Mehmetia* nom. nov. for *Rhamnopteryx* Townsend, 1931; *Mesnilus* nom. nov. for *Ziminiola* Mesnil, 1978. Accordingly, new combinations are herein proposed for the species currently included in these genera: *Currana flavifrons* (Malloch, 1930) comb. nov., *Currana inermis* (Malloch, 1933) comb. nov., *Currana pallens* (Curran, 1927) comb. nov. and *Currana parviseta* (Malloch, 1930) comb. nov. from *Doddiana* Curran, 1927; *Solomonilla mirabilis* (Baranov, 1938) comb. nov. from *Illa* Baranov, 1938; *Bahrettinia arida* (Reinhard, 1943) comb. nov. from *Psilopleura* Reinhard, 1943; *Mehmetia retrorsa* (Townsend, 1931) comb. nov. from *Rhamphopteryx* Townsend, 1931; *Mesnilus cyanella* (Mesnil, 1978) comb. nov., *Mesnilus hexachaeta* (Mesnil, 1978) comb. nov., *Mesnilus nigella* (Mesnil, 1978) comb. nov., *Mesnilus plumosa* (Mesnil, 1978) comb. nov., *Mesnilus prasina* (Mesnil, 1978) comb. nov. and *Mesnilus setosa* (Mesnil, 1978) comb. nov. from *Ziminiola* Mesnil, 1978

KEY WORDS: nomenclatural changes, homonymy, replacement names, Tachinidae, Diptera.

TAXONOMY

Order Diptera
Family Tachinidae
Genus *Currana* nom. nov.

Doddiana Curran, 1927. Ent. Mitt., 16, 352. (Diptera: Tachinidae). Preoccupied by *Doddiana* Turner, 1902. V Trans. Proc. roy. Soc. S. Australia, 26, 187. (Lepidoptera: Pyraloidea: Pyralidae).

Remarks: Curran (1927) proposed the genus *Doddiana* with the type species *Doddiana pallens* Curran, 1927 by original designation in the fly family Tachinidae (Diptera) (Cantrell & Crosskey, 1989; O'Hara, 2006). Unfortunately, the generic name was already preoccupied by Turner (1902), who had described the genus *Doddiana* with the type species *Stericta callizona* Lower, 1896 by monotypy in the moth family Pyralidae (Lepidoptera). Thus, *Doddiana* Curran, 1927 is invalid under the law of homonymy, being a junior homonym of *Doddiana* Turner, 1902. In accordance with article 60 of the International Code of Zoological Nomenclature, fourth edition (1999), I propose to substitute

the junior homonym *Doddiana* Curran, 1927 for the **nom. nov.** *Currana*.

Etymology: from H. J. Curran who current author name of preexisting genus *Doddiana*.

Distribution: Known from Australian Region: Australia (Qld, NSW).

Summary of nomenclatural changes:

Currana **new replacement name** = *Doddiana* Curran, 1927 (non Turner, 1902)

Currana flavifrons (Malloch, 1930) **comb. nov.** from *Doddiana* Curran, 1927.

Currana inermis (Malloch, 1933) **comb. nov.** from *Doddiana* Curran, 1927.

Currana pallens (Curran, 1927) **comb. nov.** from *Doddiana* Curran, 1927.

Currana parviseta (Malloch, 1930) **comb. nov.** from *Doddiana* Curran, 1927.

Genus *Solomonilla* nom. nov.

Illa Baranov, 1938. Vet. Arhiv 8, 171. (Diptera: Tachinidae). Preoccupied by *Illa* Warren, 1914. Ann. S. Afr. Mus., 10, 487. (Lepidoptera: Geometroidea: Geometridae).

Remarks: The name *Illa* was initially introduced by Warren (1914) for a genus of the moth family Geometridae (with the type species *Illa nefanda* Warren, 1914 by original designation from South Africa: Cape Town). The genus is monotypic and Scoble et al. (1999) included only 1 species in the genus *Illa* Warren, 1914. Subsequently, Baranov (1938) described a new Australian fly genus of the family Tachinidae (with the type species *Illa mirabilis* Baranov, 1938 by original designation) under the same generic name (Cantrell & Crosskey, 1989; O'Hara, 2006). *Illa* Baranov, 1938 is monotypic genus too. Thus, *Illa* Baranov, 1938 is invalid under the law of homonymy, being a junior homonym of *Illa* Warren, 1914. In accordance with article 60 of the International Code of Zoological Nomenclature, fourth edition (1999), I propose for the genus *Illa* Baranov, 1938, 1926 the new replacement name *Solomonilla* **nom. nov.**

Etymology: from Solomon Islands.

Distribution: Known from Australian Region: Solomon Islands.

Summary of nomenclatural changes:

Solomonilla **new replacement name** = *Illa* Baranov, 1938 (non Warren, 1914).

Solomonilla mirabilis (Baranov, 1938) **comb. nov.** from *Illa* Baranov, 1938.

Genus *Bahrettinia* nom. nov.

Psilopleura Reinhard, 1943. Canad. Ent., 75, 165. (Diptera: Tachinidae). Preoccupied by *Psilopleura* Druce, 1898. *Ann. Mag. nat. Hist.* (7) 1: 407. (Lepidoptera: Noctuoidea: Arctiidae).

Remarks: The genus *Psilopleura* was erected by Druce, 1898 with the type species *Psilopleura polia* Druce, 1898 by monotypy from Brasil: Espiritu Santo in the moth family Arctiidae. Later, the genus *Psilopleura* was described by Reinhard, 1943 with the type species *Psilopleura arida* Reinhard, 1943 from America (O'Hara & Wood, 2004; O'Hara, 2006). However, the name *Psilopleura* Reinhard, 1943 is invalid under the law of homonymy, being a junior homonym of *Psilopleura* Druce, 1898. In accordance with article 60 of the International Code of Zoological Nomenclature, I propose to substitute the junior homonym name *Psilopleura* Reinhard, 1943 for the nomen novum *Bahrettinia*.

Etymology: The name is dedicated to Bahrettin Demirer.

Distribution: Known fromNearctic Region: America (California, Arizona, New Mexico).

Summary of nomenclatural changes:

Bahrettinia **nom. nov.** = *Psilopleura* Reinhard, 1943 (non Druce, 1898 and Hampson, 1898).

Bahrettinia arida (Reinhard, 1943) **comb. nov.** from *Psilopleura* Reinhard, 1943.

Genus *Mehmetia* nom. nov.

Rhamphopteryx Townsend, 1931. Rev. Ent. São Paulo, 1, 456. (Diptera: Tachinidae). Preoccupied by *Rhamphopteryx* Bryk, 1913. Arch. Naturgesch., 79, A3, 13. (Lepidoptera: Geometroidea: Geometridae).

Remarks: Firstly, the genus *Rhamphopteryx* was established by Bryk, 1913 for the moth family Geometridae with the type species *Rhamphopteryx grotesca* Bryk, 1913 from Sierra Leone. Scoble et al. (1999) included *Neuropolodes* Warren, 1895, *Rhamphopteryx* Bryk, 1913 and *Syndetodes* Warren, 1902 as junior synonyms of *Plegapteryx* Herrich-Schäffer, 1856. But, Pitkin & Jenkins (2004) included *Rhamphopteryx* Bryk, 1913 as a separate available genus and gave only *Ramphopteryx* Bryk, 1913 (incorrect original spelling of *Rhamphopteryx* Bryk, 1913) as junior name. Later, the genus *Rhamphopteryx* was proposed by Townsend, 1931 for the fly family Tachinidae with the type species *Rhamphopteryx retrorsa* Townsend, 1931. Thus, the name *Rhamphopteryx* Townsend, 1931 is invalid under the law of homonymy, being a junior homonym of *Rhamphopteryx* Bryk, 1913. In accordance with article 60 of the International Code of Zoological Nomenclature, I propose to substitute the junior homonym name *Rhamphopteryx* Townsend, 1931 for the nomen novum *Mehmetia*.

Etymology: The name is dedicated to Mehmet Nurullah Demirer.

Distribution: Known from the Neotropical Region.

Summary of nomenclatural changes:

Mehmetia **nom. nov.** = *Rhamphopteryx* Townsend, 1931 (non Bryk, 1913).

Mehmetia retrorsa (Townsend, 1931) **comb. nov.** from *Rhamphopteryx* Townsend, 1931.

Genus *Mesnilus* nom. nov.

Ziminiola Mesnil, 1978. Mitteilungen schweiz. ent. Ges. 51 (1): 112. (Diptera: Tachinidae). Preoccupied by *Ziminiola* Gerasimov, 1930. Dtsch. ent. Z., Iris, 44, 72. (Lepidoptera: Gelechioidea: Gelechiidae).

Remarks: The name *Ziminiola* Gerasimov, 1930 was proposed for a genus of the moth family Gelechiidae (with the type species *Ziminiola gussakovskii* Gerasimov, 1930). According to Pitkin & Jenkins (2004), Ziminiola Gerasimov, 1930 was downgraded to denote a subgenus of *Rhynchopacha* Staudinger, 1871 by Povolny, 1979. Subsequently, the generic name *Ziminiola* Mesnil, 1978 was introduced for a new fly genus of the family Tachinidae. Thus, the genus name *Ziminiola* Mesnil, 1978 is a junior homonym of the generic name *Ziminiola* Gerasimov, 1930. In accordance with article 60 of the International Code of Zoological Nomenclature, I propose to substitute the junior

homonym name *Ziminiola* Mesnil, 1978 for the nomen novum *Mesnilus*.

Etymology: from L. P. Mesnil who current author name of preexisting genus *Ziminiola*.

Distribution: Known from Afrotropical Region: Madagascan Region: Madagascar.

Summary of nomenclatural changes:

Mesnilus **nom. nov.** = *Ziminiola* Mesnil, 1978 (non Gerasimov, 1930).

Mesnilus cyanella (Mesnil, 1978) **comb. nov.** from *Ziminiola* Mesnil, 1978

Mesnilus hexachaeta (Mesnil, 1978) **comb. nov.** from *Ziminiola* Mesnil, 1978

Mesnilus nigella (Mesnil, 1978) **comb. nov.** from *Ziminiola* Mesnil, 1978

Mesnilus plumosa (Mesnil, 1978) **comb. nov.** from *Ziminiola* Mesnil, 1978

Mesnilus prasina (Mesnil, 1978) **comb. nov.** from *Ziminiola* Mesnil, 1978

Mesnilus setosa (Mesnil, 1978) **comb. nov.** from *Ziminiola* Mesnil, 1978

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SCIENTIFIC NOTE

ADDITIONAL RECORDS FOR THE ODONATA FAUNA OF ÇORUM PROVINCE (TURKEY)

Ali Salur* and Seda Mesci*

* Hitit University Arts and Sciences Faculty Department of Biology. 19030, Corum, TURKEY. E-mails: alisalur@gmail.com; sedamesci@yahoo.com

[Salur, A. & Mesci, S. 2007. Additional records for the Odonata fauna of Çorum province (Turkey). Munis Entomology & Zoology 2 (1): 169-170**]**

As a result of revised literature for determination of the odonatan fauna of Çorum and a few scientific excursion in Çorum, 20 Odonata species were established.

Çorum is in the Black Sea Region of Turkey. According to initial records, Demirsoy (1982), Demirsoy (1995), Kalkman et al., 2004 it was reported that 5 odonatan species collected from Çorum were mentioned. 15 species were added to the Odonata fauna of Çorum with the present study.

In this study, 168 odonatan samples were collected during a few short scientific excursions in 2005-2006 from Çorum province. Information about the localities is given below. All the specimens were deposited in a private collection of the authors. Initial records are marked with (*).

Localities: (Loc 1): Seydim (Seydim Lake), (Loc 2): Beydilli village (marsh), 864 m, 40º 37' N 34º 53' E; (Loc 3): Çorum (Centrum), 827 m, 40º 33' N 34º 57' E; (Loc 4): Göcenovacığı villege (small lake), 1157m, 40º 20' N 34º 50' E; (Loc 5): Gölünyazı Lake, 1101 m, 40º 41' N 34º 57' E; (Loc 6): İskilip (Elmabeli), 40º 53' N 34º 41' E; (Loc 7): near Ciftlikçayırı, 797 m, 40º 33' N 34º 56' E.

Calopterygidae

Calopteryx splendens amasina (Bartenef , 1911)*: 3♂♂, 1♀, (Loc 2), 01/07/2006; 4♂♂, (Loc 2), 10/07/2006;1♂, (Loc 2), 27/07/2006.

Lestidae

Sympecma fusca (Van Der Linden, 1820): 1♂, (Loc 7), 18/09/2005; 2♂♂, (Loc 1), 29/07/2006.

Lestes macrostigma (Eversmann, 1836): 1♂, (Loc 3), 18/05/2006

Platycnemididae

Platycnemis pennipes (Pallas, 1771) : 1♂,(Loc 1), 10/07/2006; 3♂♂, (Loc 2), 29/07/2006; 1♀, (Loc 2), 05/08/2006; 1♀, 3♂♂, (Loc 1), 05/08/2006.

Coenagrionidae

Erytromma viridulum (Charpentier, 1840)*: 2♀♀, 2♂♂,(Loc 1), 10/07/2006; 2♂♂, (Loc 1), 29/07/2006; 4♀♀,13♂♂, (Loc 1), 05/08/2006.

Ischnura elegans (Van Der Linden,1820)*: 5♂♂, 5♀♀, (Loc 1), 10/06/2006; 1♂, 3♀♀, (Loc 1), 30/06/2006; 2♂♂, 5♀♀, (Loc 1), 10/07/2006; 3♂♂; (Loc 1), 28/07/2006; 2♀♀, (Loc 1), 29/07/2006; 2♂♂,1♀, (Loc 1), 05/08/2006.

Ischnura pumilio (Charpentier, 1825)*: 1♂, (Loc 2), 05/08/2006.

Enallagma cyathigerum (Charpentier, 1840): 6♂♂, (Loc 1), 10/06/2006; 2♂♂, (Loc 1), 30/06/2006; 1♂, (Loc 1), 01/07/2006; 2♂♂, (Loc 1), 10/07/2006; 1♂, (Loc 1), 28/07/2006; 2♂♂, (Loc 1), 29/07/2006;5♂♂, (Loc 1), 05/08/2006.

Coenagrion puella (Linnaeus,1758): 1♂, (Loc 1), 10/06/2006; 1♂, (Loc 2), 10/07/2006; 4♂♂, 1♀, (Loc 1), 28/07/2006.

Coenagrion ornatum (Sélys & Hagen, 1850): 1♂, 3♀♀, (Loc 4), 17/06/2005.

Coenagrion scitulum (Rambur, 1824): 2♂, 1♀, (Loc 1), 10/07/2006.

Cercion lindenii (Selys,1840): 1♂, (Loc 1), 05/08/2006.

Aeshnidae

Anaciaeschna isosceles antehumeralis (Schmidt, 1915): 1♀, (Loc 5), 09/07/2006

Anax imperator (Leach, 1815): 1♂ , (Loc 2), 03/06/2006

Libellulidae

Libellula depressa (Linnaeus, 1758): 1♂, (Loc 7), 23/06/2005; 1♀, 2♂♂, (Loc 2), 03/06/2006; 2♂♂, (Loc 5), 03/06/2006; 1♂, (Loc 2), 10/07/2006.

Crocothemis erythraea (Brulle, 1832):1♂, (Loc 5), 09/07/2006; 1♀,(Loc 1), 19/08/2006

Orthetrum brunneum (Fonscolombe, 1837)*: 2♂♂, (Loc 2), 10/07/2006; 5♂♂, (Loc 2), 29/07/2006; 5♂♂, (Loc 2), 05/08/2006; 1♀, 4♂♂, (Loc 2), 19/08/2006.

Orthetrum cancellatum (Linnaeus, 1758): 1♂, (Loc 1), 10/06/2006; 1♂, (Loc 1), 30/06/2006; 1♂, (Loc 1), 29/07/2006.

Sympetrum fonscolombei (Selys, 1840): 4♀♀, (Loc 1), 29/07/2006; 5♂♂, 1♀, (Loc 1), 05/08/2006; 7♂♂, 5♀♀, (Loc 1), 19/08/2006;

Sympetrum sanguineum (Müller, 1764): 1♂, 3♀♀, (Loc 6),15/08/2005; 1♂, 1♀, (Loc 1), 05/08/2006.

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SCIENTIFIC NOTE

KNOWN SPECIES OF TURKISH *TACHYCIXIUS* WAGNER, 1939 (HOMOPTERA: AUCHENORRHYNCHA: CIXIIDAE: CIXIINAE)

Emine Demir*

* Gazi University, Faculty of Science & Arts, Department of Biology, 06500 Teknikokullar, Ankara, TURKEY. E-mail: eminedemird@ yahoo.com

[Demir, E. 2007. Known species of Turkish Tachicixius Wagner, 1939 (Homoptera: Auchenorrhyncha: Cixiidae: Cixiinae). Munis Entomology & Zoology 2 (1): 171-172**]**

The aim of the present study is to determine the species of the genus *Tachycixius* Wagner, 1939 have known from Turkey until now.

It is mentioned that only a few works on Turkish *Tachycixius* Wagner, 1939 are present as Dlabola, 1971; Kalkandelen, 1988 and Lodos & Kalkandelen, 1980. According to these works, the genus *Tachycixius* Wagner, 1939 is represented by five species in Turkey. These are *Tachycixius bidentifer* Dlabola, 1971; *Tachycixius creticus* Dlabola, 1974; *Tachycixius desertorum* (Fieber, 1876); *Tachycixius logvinenkovae* Dlabola, 1974 and *Tachycixius pilosus* (Oliver, 1791). Among these species, *Tachycixius bidentifer* Dlabola, 1971; *Tachycixius desertorum* (Fieber, 1876) and *Tachycixius pilosus* (Oliver, 1791) are more or less widely distributed in Turkey. *Tachycixius bidentifer* Dlabola, 1971 has been recorded by Dlabola, 1971 and Kalkandelen, 1988 from Adana, Gaziantep, Hakkari, İçel, Kahramanmaraş and Mardin provinces, *Tachycixius desertorum* (Fieber, 1876) has been recorded from Adıyaman, Antalya, Artvin, Diyarbakır, Edirne, Eskişehir, Gaziantep, Hakkari, Yalova, İzmir, Kastamonu, Konya, İçel, Manisa, Mardin, Muğla, Nevşehir, Sinop and Uşak provinces, and *Tachycixius pilosus* (Oliver, 1791) has been known from Adana, Ankara, Antalya, Balıkesir, Diyarbakır, Tekirdağ and Şanlıurfa provinces in Turkey. However, two of them have few records in Turkey. *Tachycixius creticus* Dlabola, 1974 has only been reported by Kalkandelen, 1988 from Hatay province. *Tachycixius logvinenkovae* Dlabola, 1974 has only been recorded by Dlabola, 1974 from the type localities Ankara and Van provinces.

In the present work, collected specimens by the author from Ankara province (Kalecik) in an open *Quercus* forest in the year 2000 were examined. The specimens were collected by swipping wild herbs in daylight. They were identified by using genitalia and determined as *Tachycixius logvinenkovae* Dlabola, 1974.

The species *Tachycixius logvinenkovae* Dlabola, 1974 was described by Dlabola based on 2 female specimens and 1 male specimen from

Ankara (Beynam) and Van (Başkale) in the year of 1974. It is endemic to Turkey.

After original description by Dlabola, 1974, any work is not present on *Tachycixius logvinenkovae* Dlabola, 1974. This species has been reported for the second time in Turkey with this study.

Material examined: Ankara, Kalecik, 950 m, 23.06.2001, leg. Emine demir & Lütfi Özden, 1 male, 1 female.

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