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# Taxonomic revision of the Palearctic species of the genus *Limnebius* LEACH, 1815

## (Coleoptera: Hydraenidae)

M. A. JÄCH

### Abstract

Eighty Palearctic species (including all known species from China and Taiwan) of the genus *Limnebius* LEACH are treated. The subgenus *Bilimneus* REY is here regarded as a synonym of *Limnebius* s.str. Seventeen new species are described: *Limnebius attalensis* sp.n. (Turkey), *L. boukali* sp.n. (Russia), *L. calabricus* sp.n. (Italy), *L. claviger* sp.n. (Turkey), *L. externus* sp.n. (Spain), *L. ferroi* sp.n. (Turkey), *L. graecus* sp.n. (Greece), *L. irmelae* sp.n. (Tunisia), *L. levantinus* sp.n. (Turkey, Israel), *L. loeblorum* sp.n. (Pakistan), *L. manus* sp.n. (Spain), *L. reuvenortali* sp.n. (Turkey, Israel), *L. sanctimonis* sp.n. (Egypt), *L. schoenmanni* sp.n. (Greece), *L. shatrovskiyi* sp.n. (Russia), *L. spinosus* sp.n. (Turkey) and *L. taiwanensis* sp.n. (Taiwan). Lectotypes are designated for *Hydrophilus lutosus* MARSHAM, *H. minutissimus* GERMAR, *H. mollis* MARSHAM, *H. parvulus* HERBST, *H. truncatellus* THUNBERG, *H. truncatus* THOMSON, *Limnebius adjunctus* KUWERT, *L. affinis* STEPHENS, *L. aluta* BEDEL, *L. angusticonus* KUWERT, *L. appendiculatus* SAHLBERG, *L. asperatus* KNISCH, *L. ater* STEPHENS, *L. baudii* KUWERT, *L. bonnairei* GUILLEBEAU, *L. crinifer* REY, *L. dissimilis* KUWERT, *L. fallaciosus* GANGLBAUER, *L. fallax* KUWERT, *L. fretalis* PEYERIMHOFF, *L. gracilipes* WOLLASTON, *L. grandicollis* WOLLASTON, *L. gridellii* PRETNER, *L. immersus* KNISCH, *L. kaszabi* CHIESA, *L. laticonus* KUWERT, *L. marginalis* STEPHENS, *L. mauritii* GUILLEBEAU, *L. mesatlanticus* THERY, *L. mundus* BAUDI, *L. myrmidon* REY, *L. nitiduloides* BAUDI, *L. oblongus* REY, *L. paganettii* GANGLBAUER, *L. papposus* MULSANT, *L. perparvulus* REY, *L. punctatus* WOLLASTON, *L. punctillatus* REY, *L. rubropiceus* KUWERT, *L. rufescens* KNISCH, *L. sericans* MULSANT & REY, *L. simplex* BAUDI, *L. stagnalis* GUILLEBEAU, *L. subglaber* REY. Neotypes are designated for *Limnebius atomus* (DUFTSCHMID), *L. kwangtungensis* PU and *L. testaceus* DALLA TORRE. The following new synonymies are established (junior synonyms in brackets): *Limnebius atomus* (= *L. cuspidatus* FERRO syn.n.), *L. fretalis* (= *L. normalis* THERY syn.n.), *L. hispanicus* ORCHYMONT (= *L. triparamerus* FRESNEDA, LAGAR & FERRO syn.n.), *L. ignarus* BALFOUR-BROWNE (= *L. fuentei* FRESNEDA, LAGAR & FERRO syn.n.), *L. kweichowensis* PU (= *L. japonicus* NAKANE syn.n.), *L. myrmidon* (= *L. janssensi* CHIESA syn.n.), *L. parvulus* (= *L. truncatus* syn.n.), *L. perparvulus* (= *L. subglaber* syn.n.), *L. tibialis* KUWERT syn.n.), *L. pilicauda* GUILLEBEAU (= *L. aegatensis* CHIESA syn.n., *L. lawrencei* BALFOUR-BROWNE syn.n.) and *L. rufipennis* REGIMBART (= *L. kwangsiensis* PU syn.n.). *Limnebius similis* WOLLASTON stat.n. is regarded as a species propria, not as a subspecies of *L. punctatus*. The aedeagi of all known Palearctic species (except *L. clavatus* PU) and of *L. immersus* (Philippines) and *L. clayae* BALFOUR-BROWNE (Assam) are illustrated.

Key words: Hydraenidae, *Limnebius*, taxonomy, new species, Palearctic

The genus *Limnebius* was erected by LEACH (1815). The type species (by monotypy) is *Hydrophilus picinus* MARSHAM [= *Limnebius nitidus* MARSHAM].

A diagnosis and description of the genus was given by HANSEN (1991). The chromosomes of 4 species (*L. furcatus* BAUDI, *L. nitidus* MARSHAM, *L. papposus* MULSANT and *L. truncatellus* THUNBERG) were described by ANGUS & DIAZ PAZOS (1991).

Based on the examination of the types and the aedeagi, all Palearctic species (so far known) of the genus *Limnebius* are here revised taxonomically.

All species are tentatively assigned to species groups. A brief diagnosis, including important

diagnostic characters, is provided for each species. A key to the European species (males and females), including illustrations of the pygidial sclerites of the females will be published later (JÄCH, in prep.).

**MATERIAL & METHODS:** This study is based on approximately 8 000 specimens; in addition to those deposited in the Natural History Museum, Vienna (ca. 6 000 specimens) I have examined specimens from 50 additional institutions and private collections as indicated under "acknowledgement and abbreviations" (see below).

Specimens were examined with the following microscopes: Wild M5A stereoscopic microscope with direct lighting and Wild M10 stereoscopic microscope with diffuse lighting. In addition to these stereoscopic microscopes, aedeagi were also examined with an Olympus BH-2 transmitted light microscope. Aedeagus illustrations were made with the aid of a drawing tube attached to the Olympus BH-2.

Male genitalia were placed in concentrated lactic acid in a cavity slide for at least several hours before they were examined.

Although some of the species from south China (*L. clavatus* Pu, *L. kwangtungensis* Pu, *L. rufipennis* REGIMBART and *L. wui* Pu) and Taiwan (*L. kwangtungensis* and *L. taiwanensis* sp.n.) should be more properly assigned to the Oriental fauna they are all included in this revision as they may be also found in the very poorly known northern (Palearctic) parts of China. *Limnebius conoideus* REGIMBART, described from Eritrea is briefly treated because it also may occur in the Palearctic region. Strictly Himalayan species (see check list) are excluded from this study.

The body length is measured from the front margin of the labrum to the elytral apex.

Scale next to figures represents 0.1 mm.

**ACKNOWLEDGEMENT AND ABBREVIATIONS:** The material used for this study was borrowed from the following institutions and private collections (abbreviations are used to refer to collections in the text):

BML	The Natural History Museum, London (E. de Boise) [formerly: British Museum (Natural History)]
CAL	Coll. Balfour-Browne, Coll. Angus, London
CBG	Coll. Bellstedt, Gotha
CBHB	Coll. Balke & Hendrich, Berlin
CFA	Coll. Foster, Ayr
CFB	Coll. Fery, Berlin
CFE	Coll. Fresneda, El Pont de Suert
CFL	Coll. Ferro, Lancenigo
CHB	Coll. Hendrich, Berlin
CHD	Coll. F. Hebauer, Deggendorf [+ Coll. H. Hebauer, Rain]
CKH	Coll. Kahlen, Hall in Tirol
CKK	Coll. Kiener, Kerzers
CMH	Coll. Matsui, Hondo
CMW	Coll. Malkin, Warszawa
CNC	Coll. Nakane, Chiba-shi
CNU	Coll. Nilsson, Umeå
CPL	Coll. Pretner, Ljubljana (B. Drovnik)
CSOM	Coll. Sondermann, Marburg/Wehrda
CWW	Coll. Wewalka, Wien
DEI	Deutsches Entomologisches Institut, Eberswalde (L. Zerche)
HUB	Museum der Alexander Humboldt Universität, Berlin (F. Hieke)
ISNB	Institut royal des Sciences naturelles de Belgique, Bruxelles (K. Desender)
MCM	Museo Civico di Storia Naturale, Milano (C. Leonardi)

MFT	Museum Frey, Tutzing [now incorporated into Zoologische Staatssammlung, München (ZSM)]
MGL	Musée Guimet d'Histoire Naturelle, Lyon (J. Clary)
MHNG	Muséum d'Histoire Naturelle, Genève (I. Löbl)
MHNP	Muséum national d'Histoire Naturelle, Paris (Y. Cambefort)
MMB	Musée Municipal de Brou, Bourg-en-Bresse (F. Poiret, M.D. Niviere)
MNS	Staatliches Museum für Naturkunde, Stuttgart (W. Schawaller)
MRT	Museo Regionale di Scienze Naturali, Torino
MTD	Museum für Tierkunde, Dresden (R. Krause, O. Jäger)
MZF	Museo Zoologico de "La Specola", Firenze (S. Rocchi)
MZT	Museo di Zoologia Sistematica della Universita, Torino (A. Rolando) - not accessible at present, collection will be transferred to MRT (A. Rolando, letter of 12.XI.1992)
NMB	Naturhistorisches Museum, Basel (M. Brancucci)
NMP	Národní Museum v Praze (J. Jelínek)
NMW	Naturhistorisches Museum, Wien
RMS	Riksmuseum, Stockholm (P. Lindskog)
OLL	Oberösterreichisches Landesmuseum, Linz (F. Gusenleitner)
SIW	Smithsonian Institution, Washington, D.C. [= National Museum of Natural History] (P. Spangler)
SNMB	Slovenské Národné Muzeum, Bratislava (I. Okálf)
TMB	Természettudományi Múzeum, Budapest (O. Merkl, G. Szél)
TLFI	Tiroler Landesmuseum Ferdinandeaum, Innsbruck (G. Tarmann, M. Kahlen)
UMS	Dept. of Entomology, University of Minnesota, St. Paul (Ph.J. Clausen)
WUN	Women's University, Nagoya (M. Satō)
ZIL	Zoological Institute (Academy of Sciences), St. Petersburg (Leningrad) (A. Kirejtshuk)
ZMH	Universitetets Zoologiska Museum, Helsingfors (H. Silfverberg)
ZML	Zoological Museum, Lund (R. Danielsson)
ZMM	Zoological Museum, Moscow
ZMU	Zoological Museum, Uppsala University, Uppsala (S. Jonsson)
ZSM	Zoologische Staatssammlung, München (G. Scherer)

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**MORPHOLOGICAL CHARACTERISTICS:** Within the Hydraenidae the genus *Limnebius* is clearly defined by two autapomorphies: the continuous body outline and the tufts of long hairs on the abdominal tergite X. The length of the species of *Limnebius* ranges from 0.75 - 2.8 mm.

**SEXUAL DIMORPHISM:** All legs (especially fore and middle leg) are dilated in the male; suction setae are present on the basal 3 pre- and mesotarsal segments in all males. In smaller species (e.g. *L. atomus* group) these characters are hardly visible. In addition to these characters present in all species, the legs of certain males may display other sexual characters: tibiae curved

or emarginate, inner margin of protibia and metafemur angulate, presence of swimming hairs.

Male abdominal sternite VIII (= ventrite VI) modified in many species: bearing a fringe of long setae (*L. parvulus* group) or an apical protuberance (*L. truncatellus* group) or it is just slightly longer (*L. mundus* group) than in female. Dimorphism of sternite IX and tergite X less apparent; tufts of setae on sternite X usually more widely separated in males.

Elytral apices of female frequently more acuminate than in male (especially in *L. mundus* group).

In many species of the *L. truncatellus* group, males are often much larger than the respective females.

Shagrination more apparent and distinct in females of a few species.

The sexual dimorphism is generally more apparent in larger species.

**AEDEAGUS:** The shape of the aedeagus of the species of *Limnebius* varies from very simple (*L. atomus* group) to very complex and intricate (*L. parvulus* group and *L. truncatellus* group). A general distinction between main piece and distal lobe (as seen in most species of *Hydraena* KUGELANN and *Ochthebius* LEACH) is not possible.

Phallobasis forming a closed, strongly sclerotized ring which is more or less symmetrical in the smaller species (*L. atomus* group) and slightly asymmetrical in the larger ones (*L. parvulus* group and *L. truncatellus* group).

In most species of the genus the main piece is slightly or strongly inflated and more strongly sclerotized near the phallobasis. In this inflated part the ejaculatory duct is strongly widened and it contains a thin, conspicuously coiled sclerotized rod. The widened area of the ejaculatory duct is here called "capsule". In most species of the *L. atomus* group the capsule is usually situated in the middle or the upper third of the main piece and it contains no apparent coils. Only in a few species of the *L. atomus* group (*L. atomus* DUFTSCHMID, *L. clayae* BALFOUR-BROWNE, *L. kwangsiensis* Pu) the capsule is found in the basal third of the aedeagus, near the phallobasis.

I have seen only one aedeagus (see Fig. 19b) with the sclerotized rod of the ejaculatory duct extended. The extended condition is certainly not due to contractions caused by alcohol, as this specimen was killed (as almost all specimens which I have collected) with ethyl acetate.

The main piece of the aedeagus of *Limnebius* is further characterized by the presence of numerous setae (single or arranged in groups) which can be generally found all over the main piece and on the left paramere. For some of these setae (or groups of setae) homology can be assumed throughout the genus or within one species group (e.g. the four ventral setae in the *L. mundus* group) and some of them seem to represent the vestigial left paramere (see below).

The most remarkable apomorphy of the *Limnebius* aedeagus is the presence of long, strongly sclerotized appendages emerging from various ventral and dorsal (not apical) positions on the main piece. These appendages are completely missing in the *L. atomus* group and the *L. mundus* subgroup, in a few species of the *L. nitidus* group (*L. aluta* subgroup; *L. nitigeus* subgroup, probably secondary reduction) and in the *L. furcatus* subgroup (? secondary reduction). There is usually one appendage in the two remaining subgroups of the *L. nitidus* group (*L. nitidus* subgroup, *L. cordobanus* subgroup), in the *L. parvulus* subgroup and in one species of the *L. truncatellus* group (*L. kocheri* BALFOUR-BROWNE). In the remaining species of the *L. truncatellus* group and in *L. claviger* sp.n. there is more than one appendage. In some of the more highly evolved species of the *L. truncatellus* group a bunch of various intricately shaped and strongly sclerotized appendages can be developed (see Fig. 66b). Some of these appendages have a rather paramere-like appearance, especially in those species in which only one appendage (here called "pseudoparamere") is developed (e.g. in the *L. nitidus* subgroup). Previous authors have considered it as the right paramere. There are three reasons why I believe that these appendages are an apomorphy not homologous with the right paramere of *Hydraena* and *Ochthebius*: 1) In a

number of species of different groups (*L. bacchus* BALFOUR-BROWNE, *L. fallaciosus* GANGLBAUER, *L. hilaris* BALFOUR-BROWNE, *L. irmelae* sp.n., *L. maurus* BALFOUR-BROWNE) the surface of the appendage is distinctly striate longitudinally as if composed of coalescent setae. A group of connected setae near the base of the left paramere of *L. truncatellus* seem to represent such a "nascent" (in the phylogenetical sense) appendage. 2) I have never seen any seta or any micropore on any of these appendages whereas any left paramere in *Limnebius* and almost any paramere in other genera of the family is characterized by the presence of at least a few small apical setae, and in those species in which the apical setae on the parameres are reduced (e.g. some species of *Ochthebius*) their "former" (in the phylogenetical sense) position is still recognized by the presence of small micropores. 3) The single appendage in (the obviously primitive species) *L. grandicollis* WOLLASTON which is certainly homologous with the appendage ("pseudoparamere") present in other species of the *L. nitidus* group has a very "seta-like" appearance.

Some of the appendages of the aedeagi of the *L. truncatellus* group are very strongly sclerotized and prominent, but the homologies between different species are not well understood. At least 3 (probably homologous) appendages ("A", "B" and "C") can be recognized in the larger species. Appendage "A" is always the most ventrally situated appendage, and appendage "C" is the most dorsally situated one. The latter is very prominent in *L. nitiduloides* BAUDI (see Fig. 68), appendage "B" is very large and prominent in *L. freatalis* PEYERIMHOFF (see Fig. 69). Appendage "C" (present only in the more evolved species of the *L. truncatellus* group) is probably not a product of coalescent setae but obviously just a dorsally situated process of the main piece. Some of the appendages are very intricately shaped (they can be strongly sinuous and forked or bear several branches) and they can be partly hidden behind other appendages, thus their exact shape is often difficult to recognize without dissection.

The single ventral appendage (the so-called "pseudoparamere") found in the *L. nitidus* subgroup, the *L. cordobanus* subgroup, the *L. parvulus* subgroup and in *L. kocheri* is probably homologous with the appendage "A" of the more evolved species of the *L. truncatellus* group.

Only one "true" paramere (the left one) seems to be developed in *Limnebius*. I cannot find any trace or rudiment of the right paramere in any of the species examined. The left paramere is well developed in all members of 4 species groups (*L. claviger* group, *L. nitidus* group, *L. parvulus* group, *L. truncatellus* group) and it is apparently missing or rudimentary in the two remaining groups (*L. atomus* group, *L. mundus* group).

The aedeagus of *Limnebius* is often strongly twisted and diagnostic characters are often very difficult to see. In order to point out diagnostic and significant morphological characters, the aedeagus had to be depicted in various orientations, sometimes differing from species to species. As the morphology of the evolved species of the *L. truncatellus* group is unusually intricate and complex (see Fig. 66b) I was not able to depict all appendages and all morphological items for every species as - to do so - I should have dissected all aedeagi with more than 2 appendages and illustrate their parts separately from different sides. Instead I concentrated (in some species of the *L. truncatellus* group) only on significant diagnostic characters (outlines, left paramere) and on the more prominent or ventrally situated appendages.

More than in any other genus of the family the aspect of the aedeagus illustrated depends on the exact orientation, which - due to its twisted and asymmetrical nature - cannot be determined satisfactorily by the terms "ventral", "lateral", etc. Even the slightest rotation of the organ may alter its contours significantly (see *L. kweichowensis* PU, Fig. 19). Thus the aedeagus should always be examined floating freely and not as an immovable micropreparation, which does not allow comparison of several "dorsal" or "ventral" aspects.

**BIOLOGY:** Many species are found along the shores of running waters, preferably among gravel or seepage water, but others prefer various kinds of (plant-rich) stagnant water.

**GEOGRAPHY:** The genus *Limnebius* has an almost world-wide distribution. Sixteen species have been recorded from the Western Hemisphere and a few species were described from the Ethiopian and the Oriental regions. The genus occurs in the Australian region (several undescribed species) but it is probably absent from South America and New Zealand. The majority of the species live in the Palearctic region (see below). As in *Hydraena* and *Ochthebius*, the greatest diversity is found in Turkey.

### Check list of the Palearctic and Himalayan species of the genus *Limnebius*

The Himalayan species, *L. almoranus* KNISCH, *L. championi* BALFOUR-BROWNE, *L. clayae* BALFOUR-BROWNE, *L. distinctus* KNISCH and *L. nigritus* BALFOUR-BROWNE are listed below, but not treated in the present revision - they are probably confined to the Himalayan region and do obviously not penetrate into the Palearctic.

1. *almoranus* KNISCH
2. *aluta* BEDEL
3. *arabicus* BALFOUR-BROWNE
4. *asperatus* KNISCH
5. *atomus* (DUFTSCHMID)
  - = *cuspidatus* FERRO syn.n.
  - = *minutissimus* (GERMAR)
6. *attalensis* sp.n.
7. *bacchus* BALFOUR-BROWNE
8. *boukali* sp.n.
9. *calabricus* sp.n.
10. *canariensis* ORCHYMONT
11. *championi* BALFOUR-BROWNE
12. *clavatus* PU
13. *claviger* sp.n.
14. *clayae* BALFOUR-BROWNE
15. *conoideus* REGIMBART
16. *cordobanus* ORCHYMONT
17. *corfidius* ORCHYMONT
18. *corybus* ORCHYMONT
19. *crassipes* KUWERT
20. *crinifer* REY
  - = *barbifer* KUWERT
  - = *grouvellei* GUILLEBEAU
21. *distinctus* KNISCH
  - = *singularis* KNISCH (acc. BALFOUR-BROWNE 1956)
22. *distinguendus* FERRO
23. *doderoi* GRIDELLI
24. *evanescens* KIESENWETTER
  - = *pectoralis* GUILLEBEAU
25. *externus* sp.n.
  - [= *extraneus* ORCHYMONT (name not available)]
26. *fallaciosus* GANGLBAUER
27. *ferroi* sp.n.
28. *fontinalis* BALFOUR-BROWNE
29. *fretalis* PEYERIMHOFF
  - = *normalis* THERY syn.n.
30. *furcatus* BAUDI
  - = *adjunctus* KUWERT
  - = *mauritii* GUILLEBEAU
  - = *similis* BAUDI (= junior homonym)
  - = *uncigaster* KUWERT
31. *gerhardtii* HEYDEN
32. *glabriventris* SHATROVSKIY
33. *gracilipes* WOLLASTON
34. *graecus* sp.n.
35. *grandicollis* WOLLASTON
36. *gridellii* PRETNER
37. *hilaris* BALFOUR-BROWNE
38. *hispanicus* ORCHYMONT
  - = *triparamerus* FRESNEDA, LAGAR & FERRO syn.n.
39. *ibericus* BALFOUR-BROWNE
40. *ignarus* BALFOUR-BROWNE
  - = *fuentei* FRESNEDA, LAGAR & FERRO syn.n.
41. *irmelae* sp.n.
42. *kaszabi* CHIESA
43. *kocheri* BALFOUR-BROWNE
44. *kwangtungensis* PU
45. *kweichowensis* PU
  - = *japonicus* NAKANE syn.n.
46. *levantinus* sp.n.
47. *loeblorum* sp.n.
48. *lusitanus* BALFOUR-BROWNE
49. *maurus* BALFOUR-BROWNE
50. *mesatlanticus* THERY
51. *montanus* BALFOUR-BROWNE
52. *mucronatus* BAUDI
53. *mundus* BAUDI
54. *murcus* ORCHYMONT
55. *murentinus* ORCHYMONT

56. *myrmidon* REY  
     = *janssensi* CHIESA syn.n.  
     = *punctillatus* REY
57. *nanus* sp.n.
58. *nigritus* BALFOUR-BROWNE
59. *nitiduloides* BAUDI
60. *nitidus* (MARSHAM)  
     = *dissimilis* KUWERT  
     = *fallax* KUWERT  
     = *fussii* GERHARDT  
     = *marginalis* STEPHENS  
     = *piscinus* (MARSHAM)  
     = *piscinus* LEACH (= unjustified emendation)  
     = *sericans* MULSANT & REY
61. *nitifarius* ORCHYMONT
62. *nitigeus* ORCHYMONT
63. *oblongus* REY
64. *paganettii* GANGLBAUER
65. *papposus* MULSANT
66. *paranuristanus* FERRO
67. *parvulus* (HERBST)  
     = *truncatulus* (THOMSON) syn.n.
68. *perparvulus* REY  
     = *subglaber* REY syn.n.  
     = *tibialis* KUWERT syn.n.
69. *pilicauda* GUILLEBEAU  
     = *aegatensis* CHIESA syn.n.  
     = *appendiculatus* SAHLBERG  
     = *bonnairei* GUILLEBEAU  
     = *lawrencei* BALFOUR-BROWNE syn.n.
70. *punctatus* WOLLASTON
71. *rubropiceus* KUWERT
72. *rufipennis* REGIMBART  
     = *kwangsiensis* PU syn.n.
73. *reuvenortali* sp.n.
74. *sanctimontis* sp.n.
75. *schoenmanni* sp.n.
76. *shatrovskiyi* sp.n.
77. *similis* WOLLASTON stat.n.
78. *simplex* BAUDI  
     = *angusticonus* KUWERT  
     = *baudii* KUWERT  
     = *laticonus* KUWERT
79. *simulans* ORCHYMONT
80. *spinosus* sp.n.
81. *stagnalis* GUILLEBEAU
82. *taiwanensis* sp.n.
83. *theryi* GUILLEBEAU  
     = *coxalis* GUILLEBEAU
84. *truncatellus* (THUNBERG)  
     = *truncatellus* (PAYKULL)  
     = *affinis* STEPHENS  
     = *ater* STEPHENS  
     = *lutosus* (MARSHAM)  
     = *mollis* (MARSHAM)  
     = *rufescens* KNISCH  
     = *testaceus* DALLA TORRE
85. *wui* PU
86. *Limnebius* sp.n. JÄCH & MATSUI, in prep.

## Species incertae sedis:

*cassidioides* REY*pusillus* O. MÜLLER

Two species (*granulus* MOTSCHULSKY and *gyrinooides* AUBE in GRENIER), originally described in the genus *Limnebius*, were later transferred to the genus *Hydroscapha* LECONTE (Hydroscaphidae).

**SUBGENERA & SPECIES GROUPS:** The following 6 names are synonyms of *Limnebius*: *Limnocharis* HORN, 1872, *Bilimneus* REY, 1883 (= syn.n.), *Crepilimnebius* KUWERT, 1890, *Embololimnebius* KUWERT, 1890, *Odontolimnebius* KUWERT, 1890, *Tricholimnebius* KUWERT, 1890 (see HANSEN 1991).

Two subgenera, *Limnebius* s.str. and *Bilimneus* - based primarily on the absence or presence of parameres - were hitherto recognized for the genus *Limnebius* (ORCHYMONT 1938, HANSEN 1991). Since I am not able to decide whether the groups of subapical setae present on the left side of the aedeagus of most species of the *L. mundus* group, the species from North America and some of the species of the *L. atomus* group represent vestigial parameres or not I am not able to maintain the subgeneric status for *Bilimneus*. The reduction of the left paramere in *Limnebius* seems to be a clinal process, with the intermediate condition displayed by the members of the *L. mundus* group. A small subapical paramere-like process present on the right side of *L. boukali* sp.n. and *L. rufipennis* probably cannot be regarded as a rudimentary paramere. In the members of the *L. parvulus* subgroup the left paramere is dorsally distinctly (*L. parvulus*) or enormously (*L. papposus*) enlarged and encircles large parts of the aedeagus.

It might be possible to find "good" autapomorphies for the species of the *L. atomus* group after carrying out more detailed morphological studies on the peculiarities (e.g. capsule, ejaculatory duct, ...) of the aedeagus which may justify a subgeneric (or generic) separation of *Bilimneus*. The presence or absence of parameres is certainly not eligible to justify such a separation.

Based on similarities (usually - but not necessarily - representing synapomorphies) in the aedeagus and the male ventrite VI the Palearctic species are here tentatively assigned to 10 species groups and subgroups.

#### *Limnebius atomus* group:

*L. arabicus*, *L. atomus*, *L. boukali* sp.n., *L. clavatus*, *L. conoideus*, *L. evanescens*, *L. externus* sp.n., *L. immersus*, *L. kwangtungensis*, *L. kweichowensis*, *L. loeborum* sp.n., *L. myrmidon*, *L. nanus* sp.n., *L. oblongus*, *L. perparvulus*, *L. rufipennis*, *L. taiwanensis* sp.n., *L. wui*, *L.* sp.n. JÄCH & MATSUI, in prep.

Members of this group are 0.9 - 1.3 mm long, usually brownish; body form wide and drop-like (*L. atomus* and related species) or narrow and sometimes even parallel-sided. Elytra usually impunctate, elytral apices usually quite similar in both sexes. Male ventrite VI without any peculiarities.

Aedeagus: Main piece usually long, slender and cylindrical, usually with groups of subapical setae (? rudimentary paramere). Ejaculatory duct not strongly coiled up; capsule usually situated in the middle or in the apical third of the main piece, rarely (*L. atomus* and related species) in the basal third. Parameres obviously absent. Short subapical appendages found in a few species (*L. boukali* sp.n., *L. rufipennis*) probably do not represent parameres.

#### *Limnebius mundus* group:

*L. attalensis* sp.n., *L. distinguendus*, *L. ferroii* sp.n., *L. fontinalis*, *L. kaszabi*, *L. mundus*, *L. mucus*, *L. murentinus*, *L. paranuristanus*, *L. sanctimontis* sp.n.

Members of the *L. mundus* group are 1.1 - 1.7 mm long, usually black. Body form rather elongate and parallel-sided. Elytral apices usually truncate in male and slightly or strongly acuminate in female. Male ventrite VI usually longer than in female.

Aedeagus: Main piece usually straight, stout and cylindrical; a group of 4 ventro-median setae is developed in most species. Ejaculatory duct strongly coiled up; capsule usually situated near phallobasis, only rarely near middle (*L. mundus*, *L. sanctimontis*). Aedeagus without apparent parameres. Some groups of subapical setae may indicate a vestigial left paramere.

#### *Limnebius nitidus* group:

*Limnebius aluta* subgroup: *L. aluta*, *L. lusitanus*

*Limnebius cordobanus* subgroup: *L. bacchus*, *L. cordobanus*, *L. corfidius*, *L. corybus*, *L. grandicollis*, *L. ibericus*

*Limnebius nitidus* subgroup: *L. gerhardtii*, *L. hilaris*, *L. irmelae* sp.n., *L. maurus*, *L. montanus*, *L. nitidus*, *L. nitifarus*

*Limnebius nitigeus* subgroup: *L. graecus* sp.n., *L. nitigeus*

Members of this group are 1.2 - 1.7 mm long, usually dark brown or black. Body form usually rather wide. Elytral apices more or less truncate in both sexes or slightly or distinctly acuminate. Male ventrite VI without modifications.

Aedeagus: Main piece rather short and simple (*L. cordobanus* subgroup, *L. aluta* subgroup) or rather long and more intricately shaped (*L. nitidus* subgroup, *L. nitigeus* subgroup), with a long apical appendage and without "pseudoparamere" (*L. aluta* subgroup), with one simple straight "pseudoparamere" (*L. cordobanus* subgroup), with a more complicated sinuous "pseudoparamere" (*L. nitidus* subgroup) or without distinctly visible "pseudoparamere" (*L. nitigeus* subgroup). The "pseudoparamere" of the *L. nitigeus* subgroup is obviously completely

fused to the main piece and thus not clearly visible. Ejaculatory duct strongly coiled; capsule situated near phallobasis. Left paramere well developed in all species.

#### *Limnebius truncatellus* group:

*L. asperatus*, *L. calabricus* sp.n., *L. canariensis*, *L. crassipes*, *L. fallaciosus*, *L. fretalis*, *L. gracilipes*, *L. hispanicus*, *L. ignarus*, *L. kocheri*, *L. levantinus* sp.n., *L. mesatlanticus*, *L. mucronatus*, *L. nitiduloides*, *L. paganettii*, *L. pilicauda*, *L. punctatus*, *L. schoenmanni* sp.n., *L. similis*, *L. simplex*, *L. simulans*, *L. spinosus* sp.n., *L. theryi*, *L. truncatellus*

Members of the *L. truncatellus* group are 1.4 - 2.8 mm long, dark brown or black. Body form rather wide and ovoid. Elytral apices truncate in both sexes. Male ventrite VI with an apical protuberance which can be very short and acute (*L. kocheri*) or long, oblique and medially impressed (larger species).

Aedeagus: Main piece usually stout and straight; without any conspicuous apical appendages, but with at least one (*L. kocheri*), two (*L. gracilipes* and related species) or more than two ventral and dorsal appendages (remaining species). Ejaculatory duct strongly coiled; capsule situated near phallobasis. Left paramere always distinctly developed, short and straight, rarely hook-like (*L. fallaciosus*, *L. paganettii*).

*Limnebius kocheri* is a very interesting species as it combines characters of the *L. nitidus* group (only appendage "A" present - shaped as in the *L. cordobanus* subgroup) and the *L. truncatellus* group (protuberance on male ventrite VI). On account of the modified male ventrite VI I have decided to place this species in the *L. truncatellus* group.

#### *Limnebius claviger* group:

*Limnebius claviger* sp.n.

General appearance (size, colouration, body form) as in the more highly evolved species of the *L. truncatellus* group, but male ventrite VI without protuberance, but with a distinct impression delimited by ridges.

Aedeagus: Main piece deeply furcate, strongly inflated near phallobasis (lateral aspect); with numerous ventral and dorsal appendages. Ejaculatory duct strongly coiled; capsule situated near phallobasis. Left paramere well developed, large, not clearly seen in ventral aspect.

#### *Limnebius parvulus* group:

*Limnebius parvulus* subgroup: *L. crinifer*, *L. glabriventris*, *L. papposus*, *L. parvulus*, *L. rubropiceus*, *L. shatrovskiyi* sp.n.

*Limnebius furcatus* subgroup: *L. doderoi*, *L. furcatus*, *L. gridellii*, *L. reuvenortali* sp.n., *L. stagnalis*

Females of the *L. parvulus* group are 1.7 - 2.2, males 1.95 - 2.5 mm long, brownish or black. Body form rather wide and ovoid. Elytral apices truncate in both sexes. Male ventrite VI with a very dense fringe of long setae which is (quite remarkably) missing only in *L. glabriventris*.

Aedeagus: Main piece long, curved, intricately shaped, usually quite distinctly inflated near phallobasis; apex with a conspicuous large appendage; "pseudoparamere" short, straight and inconspicuous (*L. parvulus* subgroup) or obviously completely reduced (*L. furcatus* subgroup). Ejaculatory duct strongly coiled; capsule situated near phallobasis. Left paramere always developed; with a long and very weakly sclerotized lateral process (best seen in dorsal aspect of the aedeagus) which is densely covered with moderately long setae, micropores or small scale-like structures (due to its hyaline nature this process can be hardly seen in the stereomicroscope) (*L. parvulus* subgroup); without lateral process but instead with a fringe of very long setae (*L. furcatus* subgroup).

***Limnebius aluta* BEDEL**

*aluta* BEDEL 1881: 315. - KNISCH 1924. - ORCHYMONT 1938. - HORION 1949. - WÖRNLE 1950. - F. BALFOUR-BROWNE 1958. - CHIESA 1959. - BRAKMAN 1966. - ENDRÓDY 1967. - FRANZ 1970. - IENISTEA 1970, 1978. - LOHSE 1971. - BURAKOWSKI et al. 1976. - BERCIO & FOLWACZNY 1979. - HEBAUER 1980. - PIRISINU 1981. - NIEUKERKEN 1982. - GIRLING 1984. - A. FOSTER 1984. - A. FOSTER & G. FOSTER 1984. - G. FOSTER 1986, 1990. - KODADA & MAJZLAN 1987. - HANSEN 1987. - IRWIN 1987. - FRIDAY 1988. - ANGUS 1989. - KODADA 1990. - BELLSTEDT 1993b.

TYPE LOCALITY: Marly, Paris, France.

TYPE MATERIAL: Lectotype ♂, by present designation (MHNP, Bedel collection): "sp. ? Marly VIII.77". Four paratypes are deposited in the same collection. Number of syntypes unknown. These are the only specimens in the Bedel collection which agree with the description.

DIAGNOSIS: 1.3 mm long. Body form more or less drop-like (length:width = 1.8 - 1.9). Black, margin of pronotum and elytra usually brown. Palpi long, longer than width of frons between eyes. This species is easily recognized by the regular shagreenation of the pronotum. Elytral apices of female not acuminate; thus sexes very difficult to distinguish externally. Sixth abdominal ventrite of male not significantly longer than in female. Ventrite VII of male not transversely impressed, apically strongly convex, with a faint gibbosity. Ventrite VII of female long, not transversely impressed, apically slightly arched.

Aedeagus (Fig. 31): Very characteristic. Left paramere well developed, with numerous setae. Apex of main piece with a long peculiar apical appendage, which is apparently homologous with the apical appendage of *L. lusitanus*.

DISTRIBUTION (Fig. 86): Great Britain to Slovakia.

**ADDITIONAL MATERIAL EXAMINED:**

F R A N C E: PAS-DE-CALAIS: Canche River, Marles, 19.XII.1919 (NMW).

I T A L Y: SÜDTIROL: "Tirolis merid.", coll. Ammann (TLFI); GORIZIA: Monfalcone, 15.X.1911, leg. Springer (CPL, NMW); VITERBO: Lago di Bolsena, 3.VIII.1990, leg. Jäger (MTD).

G E R M A N Y: BERLIN: Berlin, coll. Kaufmann (NMW); SACHSEN-ANHALT: Beidersee nr Halle, 19.VIII.1979, leg. Bellstedt (CBG); THÜRINGEN: Großbettbach nr Gotha, 21.VI.1979, leg. Bellstedt (CBG); BAYERN: Oberpfalz, Schafhöfen, 28.V.1977, leg. Hebauer (CHD).

A U S T R I A: WIEN: Lobau, Fasangartenarm, 26.VI.1983, leg. Jäch (NMW); Lobau, different pools ("Bombentrichter"), 1983, leg. Jäch (NMW); NIEDERÖSTERREICH: Mödling, 15.V.1980, leg. Jäch (NMW); Triesting nr Tattendorf, 20.V.1993, leg. Jäch (NMW); BURGENLAND: Neusiedler See, Purbach, 15.VIII.1984, leg. Jäch (NMW); Leithagebirge, nr Purbach, 19.V.1990, leg. Jäch (NMW); OBERÖSTERREICH: Ibm, 22.-24.V.1920, leg. Priesner (NMW, OLL); SALZBURG: Salzburg, Glanwiese, leg. Frieb (TLFI, CKL); KÄRNTEN: "Carinthia", leg. Klimsch (NMW); OSTTIROL: Tristacher Moor, 14.V.1960, 20.IV.1963, leg. Kofler (CKL); VORARLBERG: Feldkirch, leg. Moosbrugger (NMW).

C Z E C H I A: BOHEMIA: Polabí - Prerov, 19.IX.1939, leg. Roubal (SNMB); Borkovice, VII.1932, leg. Roubal (SNMB); MORAVIA: Cernovice, leg. Formanek (NMW, SIW, ZIL); Strelice, leg. Formanek (NMW, OLL); "Znaim" [= Znojmo], leg. Scheerpeltz (NMW).

S L O V A K I A: Bratislava, 29.XI.1927, leg. Roubal (SNMB); Latorica, 18.X.1991, leg. Jäch (NMW).

H U N G A R Y: Batorliget, IX.VI.1988, Moorwiese, leg. Mahunka (TMB).

***Limnebius arabicus* BALFOUR-BROWNE**

*arabicus* J. BALFOUR-BROWNE 1951: 202.

TYPE LOCALITY: Wet shingle in wadi at foot of Jebel Harir, 5000 ft., Yemen.

TYPE MATERIAL: I have seen the holotype ♂ (BML): "Type \ W.ADEN PROT. Wadi at foot of Jebel Harir, ca.5,000 ft. 31.x.1937. \ Limnebius (Bilim-neus) arabicus Type. J.Balfour-Browne det." and all 12 paratypes (BML).

DIAGNOSIS: Recognized by its very small size: 0.95 - 1.1 mm long. Surface of pronotum smooth and glabrous; in *L. myrmidion*, pronotal declivities usually shagreened - especially near

front angles. Elytral margin gently rounded, less parallel than in *L. myrmidon*. Elytral surface smooth or superficially shagreened (especially in apical half).

Due to the variability of *L. perparvulus* there are not many significant external differences between the latter and *L. arabicus*. *Limnebius perparvulus* is usually larger and its elytra are more distinctly shagreened. The elytral suture is slightly convex in its apical half in *L. perparvulus* and more or less flat in *L. arabicus* (Caution: this character is very difficult to see; a magnification of at least 80x and a good diffuse lateral lighting and direct comparison with well determined reference material is necessary for a determination on the basis of this character).

Aedeagus (Fig. 10): Without apparent parameres. Main piece with groups of subapical setae; apically with a short tapering appendage.

DISTRIBUTION (Fig. 84): Yemen, Israel.

#### ADDITIONAL MATERIAL EXAMINED:

I S R A E L: DEAD SEA AREA: Nahal Arugot, 28.V.1985, 31.VIII.1985, leg. Jäch (NMW); Nahal Zeelim, 23.V.1985, leg. Jäch (NMW).

### *Limnebius asperatus* KNISCH

*asperatus* KNISCH 1922: 88. - KNISCH 1924. - CHIESA 1959.

TYPE LOCALITY: "Italia"; Italy, no precise data known.

TYPE MATERIAL: Lectotype ♂, by present designation (ZSM): "♂ \ Italia. \ Sammlung Cl. Müller \ Holotypus Limnebius asperatus Knisch Staatssamml. München \ asperatus Knisch \ Limnebius asperatus Knisch". Paralectotype: 1 ♀: "Italia \ Sammlung Cl. Müller" (ZSM). The two specimens are possibly not conspecific.

DIAGNOSIS: 1.5 - 1.6 mm long. Somewhat related with *L. pilicauda* and *L. punctatus*. Body form of male as parallel as in *L. pilicauda*. Upper surface evenly and moderately densely punctate; punctures less deeply impressed than in *L. punctatus*. Pronotal disc superficially shagreened. Male ventrite VI with a long protuberance (as in *L. pilicauda*), but disc near basis of protuberance only very shallowly impressed.

Aedeagus (Fig. 67): Main piece strongly inflated near phallobasis; apex of main piece very intricately shaped, with different layers of appendages which are difficult to discern. Left paramere long and slender.

*Limnebius asperatus* can be easily distinguished from *L. nitidus* (with which it was synonymized by CHIESA 1959) by the more parallel body form, by the distinct punctuation of pronotum and elytra and by the male ventrite VI. It differs from *L. mucronatus* in the more parallel body form and the more distinctly punctate (single punctures larger and more deeply impressed) elytra and the shagreened pronotal disc.

DISTRIBUTION: So far known only from the type locality.

### *Limnebius atomus* (DUFTSCHMID)

*atomus* DUFTSCHMID 1805 (I): 245 (*Hydrophilus atomus*). - KNISCH 1924. - J. BALFOUR-BROWNE 1938, 1978. - ORCHYMONT 1938. - HORION 1949. - BRAKMAN 1966. - FRANZ 1970. - IENISTEA 1970, 1978. - LOHSE 1971. - BURAKOWSKY et al. 1976. - BANGSHOLT et al. 1979. - BERCIO & FOLWACZNY 1979. - BIESIADKA 1980. - DANNAPFEL 1980. - HEBAUER 1980. - NIEUKERKEN 1982. - KODADA & MAJZLAN 1987. - BELLSTEDT & MERKL 1987.

*minutissimus* GERMAR 1824: 96 (described as *Hydrophilus minutissimus*). - KNISCH 1924. - J. BALFOUR-BROWNE 1938. - ORCHYMONT 1938. - F. BALFOUR-BROWNE 1958.

*cuspidatus* FERRO 1989: 278 (= syn.n.).

TYPE LOCALITY: "Austria" - no precise data known.

TYPE MATERIAL: The collection of C.E. Duftschmid (1767 - 1821) is irretrievably lost (GUSENLEITNER 1984,

BALFOUR-BROWNE 1938: 103), thus a neotype of *Limnebius atomus* must be designated to ensure taxonomic stability: Neotype ♂ of *Limnebius atomus* (pres.des.): "Austria \ alte Samml. \ picinus Marsh. \ det.M.Priesner \ NEOTYPUS Limnebius atomus Duftschm. des. M. Jäch 1993", deposited in the OLL. Since this species is part of the historical collection of the OLL ("alte Samml.") it cannot be excluded that this specimen had been seen and used for his description of *L. atomus* by Duftschmid.

**SYNONYMS:** Lectotype ♀ of *Hydrophilus minutissimus* (by present designation): "minutissimus Hydroph[min] Germ Berol. [= Berlin] [+ one illegible word] \ atomus Duft. Europ.med. Berol. \ Hist. - Coll. Nr. 10691 \ Zool. Mus. Berlin", deposited in the HUB. Paralectotypes: 5 specimens with the same collection number belong to *L. atomus* (3 exs.) and *L. aluta* (2 exs.).

I have not examined the holotype ♂ of *Limnebius cuspidatus* (described from Hungary), deposited in the CFL. But according to the illustration of the aedeagus in the original description (FERRO 1989: Fig. 2) I have no doubt that it was depicted after a mutilated (distal half broken off; torn sclerotized rod of ejaculatory duct visible) specimen of *L. atomus*.

**DIAGNOSIS:** 1.1 - 1.3 mm long. Body form comparatively wide and drop-like. Length:width = ca. 1.7 - 1.8 (1.9 - 2.1 in *L. arabicus* and *L. perparvulus*) Caution: teneral specimens tend to be more parallel-sided than mature ones. Colouration usually dark brown, middle of pronotum and head usually black; unicolourous (dark brown or almost black) specimens occur. Palpi rather short, shorter than width of frons between eyes. Pronotal disc usually very sparsely punctate, smooth and glabrous; pronotal declivities shagreened. Elytra distinctly shagreened. First 3 pre- and metatarsal segments of male slightly enlarged, with suction setae. Ventrite VI about equally long in both sexes, but posterior margin more strongly sinuate laterally in female. Male ventrite VII very long, without any significant impressions or gibbosities; apex strongly arched.

*Limnebius atomus* is very similar to *L. perparvulus* from which it can be mainly distinguished by the less drop-like body form (see above). Meshes of elytral shagrination longer and more transverse than in *L. perparvulus*. Females of the two species can be easily distinguished by the abdominal sternite IX, which is distinctly shorter and wider in *L. atomus* and by the abdominal tergite X, which is much longer in *L. atomus*.

Several authors (LOHSE 1971, PIRISINU 1981) have used the convexity of the elytral suture as a distinguishing character for *L. atomus* and *L. myrmidon*. The elytral suture of *L. atomus* is very slightly, but noticeably convex in its apical half, but less strongly convex than in *L. perparvulus*. And since this character is rather difficult to observe (see above, under *L. arabicus*) I cannot recommend it for the non-specialist. *Limnebius myrmidon* is more easily distinguished from *L. atomus* by the parallel-sided body form (length:width = ca. 2.0 - 2.1), the paler colouration of pronotum and elytra, the usually more distinctly punctate and laterally usually shagreened pronotum and the slightly more densely and less transversely shagreened elytra. Abdominal sternite IX of female of *L. myrmidon* apically truncate (rounded in *L. atomus*) and tergite X shorter than that of *L. atomus*.

**Aedeagus (Fig. 17):** Without parameres. Main piece with 2 groups of subapical setae, with an inconspicuous swelling near the basal third and a small notch on the left side (ventral aspect) posterior of the middle.

**DISTRIBUTION (Fig. 85):** Eurosiberian.

#### ADDITIONAL MATERIAL EXAMINED:

N O R W A Y: "Norwegen", coll. Grundmann, coll. Petz (NMW, OLL).

F I N L A N D: "Finlandia" (HUB).

F R A N C E: AIN: Villars les Dombes, 13.IV.1990, leg. Schödl (NMW); Belley (NMW, SNMB); ISERE: Vienne, leg. Perret (OLL); AUBE: Anse des Oiseaux, 15.IV.1989, leg. Foster (CFA).

I T A L Y: SÜDTIROL: Bozen, Moritzinger Moor, 15.V.1910, leg. Ratter (CKL); Rovereto, leg. Halbherr (NMW); Kalterer See, at light (!), 8.VII.1990, leg. Kahlen (CKH, NMW); LUCCA: Viareggio, 1922, leg. Marchi (NMW, CPL); GROSSETO: Lago Acquato, 28.VII.1992, leg. Jäger (MTD, NMW).

G E R M A N Y: "Neuraer Wald" (NMW); BERLIN: Zehlendorf, 7.IV.1990, leg. Hendrich (CBHB);

## RHEINLAND-PFALZ: Grünstadt (NMW).

A U S T R I A: WIEN: "Umg. Wien", 21.IX.1902, leg. Pinker (NMW); Lobau, Fasangartenarm, 26.VI.1983, leg. Jäch (NMW); Lobau, different pools ("Bombentrichter"), 1983, leg. Jäch (NMW); Neuwaldegg, 8.V.1980, leg. Jäch (NMW); Prater, 22.V.1980, leg. Jäch (NMW); Prater, Heustadtwasser, IV.1949, leg. P. Meyer (NMW); Danube River, Floridsdorf, 28.IV.1943, leg. Scheerpeltz (NMW); NIEDERÖSTERREICH: Greifenstein, leg. Curti (NMW); Stockerau, 20.V.1980; Herrnbaumgarten nr. Poysdorf, 29.VII.1986, leg. Jäch (NMW); Haslau, 30.VI.1988, leg. Schillhammer (NMW); Herzogenburg, coll. Grundmann (NMW); Triesting River nr Tattendorf, 20.V.1993, leg. Jäch & Ji (NMW); BURGENLAND: "Neusiedler See", various collectors (NMW, SIW); Neusiedler See, 20.VI.1977, leg. Hebauer (CHD); Neusiedl am See, 20.V.1936 (NMW); Rosaliakapelle, Apetlon, 14.VI.1990, leg. Jäch (NMW); Podersdorf, VI.1930, leg. Prock (NMW); Illmitz, 16.IV.1976, leg. Wewalka (NMW, CWW); Purbach, 10.VII.1984 (NMW); Wismuthinsel, Zurndorf, 18.VI.1986, leg. Jäch (NMW); OBERÖSTERREICH: Linz, 24.III.1920, leg. Schuberger (OLL); Linz, leg. Priesner (NMW); Ibm, 22.-24.V.1920, leg. Priesner (NMW); TIROL: Unterinntal, Terfens, Weißlahn, 30.IV.1977, leg. Kahlen (CKH); Innsbruck, Badlacke, 30.IX.1906, leg. Ratter (CKL); Schwaz, Pill, 28.III.1952, leg. Kofler (NMW); Schwaz, Strass, 10.X.1948, leg. Kofler (TLFI); KÄRNTEN: "Kärnten, Christen" (NMW); Warmbad Villach, 31.VII.1910, leg. Springer (CPL); VORARLBERG: Hard, leg. Moosbrugger (NMW); Höchst, 14.VI.1934, leg. Moosbrugger (NMW).

C Z E C H I A: BOHEMIA: Polabí - Prerov, 19.IX.1939, leg. Roubal (SNMB); Celakovice, IV.1944, leg. Roubal (SNMB); MORAVIA: "Moravia", leg. Formanek (NMW).

S L O V A K I A: Latorica, 18.10.1991, leg. Jäch (NMW); Kovacovce, V.1928, leg. Roubal (SNMB); Komárno, leg. Roubal (SNMB).

H U N G A R Y: Bükkí N.P., Repashuta, Tebepuszta, 300 m, 14.IX.1982, leg. Adam & Hamori (TMB).

P O L A N D: Krakow (NMW).

U K R A I N E: Kiew, 27.IX.1988, leg. Balke, leg. Jäch (NMW, CBHB); Kiew, VII.-VIII.1943, leg. Prock (NMW); "Czernowitz" [= Cernovcy], coll. Grundmann (NMW).

R O M A N I A: Danube Delta, Letea, 6.IX.1984, leg. Altner (NMW, CBG); Siebenbürgen, Ormay, 1888 (NMW).

Y U G O S L A V I A: SERBIA: Fruska Gora, Paragovo, IV.1930, leg. Pretner (CPL); CRNA GORA: Bar, 1917, coll. Strauss (NMW).

C R O A T I A: Metkovic, leg. Holdhaus (NMW).

M A K E D O N I A (former Yugoslav republic): Lake Ohrid, 20.VII.1988, leg. Jäch (NMW).

G R E E C E: Thraki, Ebros plain, 26.VII.1988, 16.V.1991 (NMW).

B U L G A R I A: Seimen, Marica, 21.III.1909, leg. Rambousek (CPL, NMW).

T U R K E Y: KIRKLARELİ: İğneada, 29.VII.1988, leg. Jäch (NMW); Istranca Mountains, 28.VII.1988, leg. Jäch (NMW); SAMSUN: Çarşamba, 27.V.1989, leg. Jäch (NMW); BURSA: Lake İznik, 31.VII.1988, leg. Jäch (NMW).

R U S S I A: SIBERIA: Novosibirsk oblast, Karasuk, 53.5N/78E, 22.-27.V.1970, leg. Angus (CAL, NMW).

*Limnebius attalensis* sp.n.

TYPE LOCALITY: Small stream and pools in dried-up stream bed, road between Saklikent and Antalya.

TYPE MATERIAL: Holotype ♂ (NMW): "TR-ANTALYA 23.V.1991 Saklikent-Antalya leg. Jäch (30)".

DIAGNOSIS: 1.3 mm long. Body form long and almost parallel-sided (length:width = 2.16). Broadest near posterior angles of pronotum and near anterior third of elytra. Upper surface very sparsely covered with very fine adpressed pubescence. Black, legs and palpi paler brown. Maxillary palpi rather long and slender, penultimate segment at least as long as ultimate; labrum smooth, sparsely punctate, front margin distinctly emarginate; labro-clypeal suture arched and distinctly impressed; middle of clypeus smooth, its sides shagreened; fronto-clypeal suture not well impressed; frons superficially shagreened. Middle of pronotum smooth and glabrous, only very finely and superficially punctate; sides of pronotum shagreened, meshes polygonal and moderately large. Elytra oblong; sides and apices evenly rounded; explanate margin narrow; surface evenly shagreened, meshes more transverse and slightly larger than on pronotum; suture not convex. Basal three segments of male pretarsus slightly dilated. Abdominal sternites as in *L. murentinus*.

Female unknown.

Aedeagus (Fig. 27): Very similar to that of *L. murentinus*, from which it can be distinguished by the longer apex (best observed in lateral view) and by some proportional differences.

*Limnebius attalensis* sp.n. is very closely related to *L. murentinus* from which it probably cannot be distinguished externally. For distinction from other related east Mediterranean species see under *L. murentinus*.

DISTRIBUTION (Fig. 84): So far known only from the type locality.

ETYMOLOGY: Named in reference to the type locality, which lies in the Turkish province of Antalya (Latin: Attalia).

### *Limnebius bacchus* BALFOUR-BROWNE

*bacchus* J. BALFOUR-BROWNE 1978 (? 1979): 88. - VALLADARES & MONTES 1991.

TYPE LOCALITY: Muddy gravel pocket in fast clear stream through limestone, 10 km SW Ronda, 800 - 900 m, Ronda - Gaucin road, Malaga Province, southern Spain.

TYPE MATERIAL: I have examined the holotype ♂ which is deposited in the BML.

DIAGNOSIS: 1.5 - 1.6 mm long (length:width = 1.9 - 2.0). Colouration and general appearance as in the species of the *L. nitidus* subgroup. Palpi more or less as in *L. nitidus*. Secondary sexual characters of legs as in *L. nitidus* subgroup. Ventrite VII of male shallowly transversely impressed, apically more strongly produced than in *L. nitidus*, thus somewhat resembling members of the *L. mundus* group.

Since I have examined only very few specimens of *L. bacchus* I was not able to find significant characters to distinguish *L. bacchus* from other Iberian members of the *L. nitidus* subgroup. *Limnebius bacchus* appears to be slightly more convex and less wide.

I have not examined any female.

Aedeagus (Fig. 34): Main piece rather simple, with a group of setae on the left margin; "pseudoparamere" comparatively large, wide, slightly longer than main piece. Left paramere long, with numerous short setae and a group of longer setae.

DISTRIBUTION (Fig. 86): So far known only from Malaga Province, southern Spain.

#### ADDITIONAL MATERIAL EXAMINED:

S P A I N: MALAGA: Marbella, IV.1960, leg. Palm (ZML); Rio Almancharas, 600 m, 19.X.1991, leg. Sainz-Cantero (NMW); Tolox, 5.1.1991, leg. Foster (NMW).

### *Limnebius boukali* sp.n.

TYPE LOCALITY: Kaimanovka, Primorskiy Kray, Russia.

TYPE MATERIAL: Holotype ♂ (NMW): "ROSSIA OR. 92 Primorskiy kray Ussuriysk \ Kaimanovka 2.-9.VIII. leg. Boukal". Paratypes: 61 exs labelled as holotype (BML, CAL, CMH, CNC, NMW, SIW, UMS, WUN, ZMH); 81 exs: "ROSSIA OR. 92 Primorskiy kray Tigrovyy 19.-21.VIII. leg. Boukal" (CBG, CHD, HUB, ISNB, MHNG, MTD, NMW, SNMB); 1 exs: "S Primorie 5.VIII.1982 Kamenushka bl. Ussurijsk na UF-svet [= at. U.V. light (!)] Nikitsky" [in Cyrillic script] (ZIL).

DIAGNOSIS: 1.1 - 1.35 mm long (females usually slightly longer than males). Body form oblong and almost parallel-sided (length:width = ca. 2.0). Broadest near posterior angles of pronotum. Upper surface very sparsely covered with very fine adpressed hairs. Colouration brown; head, middle of pronotum and elytral suture dark brown to black. Maxillary palpi comparatively short and stout, shorter than width of frons between eyes. Labrum sparsely punctate and laterally shagreened, front margin emarginate; labro-clypeal suture arched and distinctly impressed; middle of clypeus more or less impunctate and smooth, sides shagreened;

fronto-clypeal suture not well impressed; frons smooth and faintly punctate, shagrination reduced to sides and a few scattered patches. Pronotal disc smooth and glabrous, faintly punctate, lateral areas of declivities shagreened. Elytra elongate; sides only very gently rounded; apices separately truncately rounded in male, slightly more elongate (obliquely truncate) and acuminate rounded in female; explanate margin very narrow; surface superficially shagreened, meshes more or less round, moderately large; suture not convex.

**Sexual dimorphism:** All legs of male enlarged, basal three tarsal segments of male pre- and mesotarsus slightly dilated, with suction setae. Male ventrite VII considerably longer than that of female. Other abdominal sclerites very similar in both sexes. Apex of female sternite IX (ventrite VII) truncate, only very feebly arched.

**Aedeagus** (Fig. 5): Main piece short, with a subapical appendage (? paramere) on the right side. Apex of main piece and appendage with few short setae.

*Limnebius boukali* sp.n. can be distinguished from the two other east Palearctic members of the *L. atomus* group (*L. kweichowensis*; *L.* sp.n. JÄCH & MATSUI, in prep.) by the more parallel-sided body form and by the shape of the female sternite IX and tergite X.

**DISTRIBUTION** (Fig. 84): Eastern Russia.

**ETYMOLOGY:** Named for David BOUKAL, who collected the type series.

### *Limnebius calabricus* sp.n.

*Limnebius simplex*, sensu ANGELINI & FERRO 1974 (not BAUDI 1882).

**TYPE LOCALITY:** Gerace, Calabria, southern Italy.

**TYPE MATERIAL:** Holotype ♂ (NMW): "Gerace Calabrien S.Italien". Paratypes: 5 exs labelled as holotype (NMW); 1 ♂: "Calabria Sta. Eufemia d'Aspromonte 1905 Paganetti" (NMW); 3 exs: "Calabria Antonimina 1905 Paganetti" (NMW, ZIL); 1 ex.: "Calabria Antonimina Ig. Paganetti" (NMW); 4 exs: "Calabria Antonimina 1905 Paganetti \ coll Dr.J.Fodor \ Embololimnebius simplex Bdi. det.G.Ferro, 1980" (TMB); 20 exs from Antonimina (leg. Paganetti) with various different labels (DEI); 13 exs: "Gerace, Cal. Paganetti" (NMW, SIW); 1 ex.: "Gerace, Cal Paganetti \ nitiduloides \ Slov.nár.múzeum collectio J.ROUBAL" (SNMB); 1 ex.: "Gerace,Calab Paganetti \ Slov.nár.múzeum collectio J.ROUBAL" (SNMB).

**DIAGNOSIS:** 2.0 - 2.2 mm long. Body form oval, oblong, widest near anterior third of elytra. Upper surface very sparsely covered with very fine adpressed pubescence. Colouration black; sides of pronotum and elytra paler; appendages yellowish or brown. Labrum punctate, front margin slightly excised; labro-clypeal suture arched and distinctly impressed; middle of clypeus punctate, superficially shagreened between punctures; fronto-clypeal suture not well impressed; middle of frons punctate, more or less smooth between punctures. Middle of pronotum moderately densely punctate, smooth and glabrous between punctures; pronotal declivities usually more densely and irregularly punctate, occasionally even microreticulate, but without regular (or very superficial) shagrination. Sides of elytra gently rounded; apices more or less truncate or truncately rounded; explanate margin very narrow; surface of elytra moderately densely and superficially punctate and more or less superficially shagreened; suture not convex.

**Sexual dimorphism:** All legs enlarged in male; pre- and mesotarsi with suction setae. Metatibia long and straight, with long swimming hairs. Male ventrite VI with oblique protuberance as in other species of the species group; disc of ventrite VI deeply impressed near basis of protuberance.

**Aedeagus** (Fig. 71): Main piece somewhat similar to that of *L. simplex*, *L. fretalis* and *L. mesatlanticus*; with two prominent appendages ("A", "B"). Left paramere moderately long and straight. Appendage "A" distinctly shorter than in *L. simplex*; appendage "B" longer and apically curved, appendage "C" distinctly shorter and less wide than in *L. simplex*.

*Limnebius calabricus* sp.n. is very closely related with *L. simplex* (Sicily) from which it can probably not be distinguished externally.

DISTRIBUTION (Fig. 89): Probably endemic to Calabria (southern Italy).

ETYMOLOGY: Named in reference to its geographical distribution.

### *Limnebius canariensis* ORCHYMONT

*canariensis* ORCHYMONT 1938: 228. - ORCHYMONT 1940b.

TYPE LOCALITY: Barranco de San Bartolomé, San Bartolomé de Tirajana, 1000 m, Gran Canaria, Canary Islands, Spain.

TYPE MATERIAL: Holotype ♂ deposited in the ISNB, not examined.

DIAGNOSIS (based on one male, see below): 1.8 mm long. Recognized by the very distinctly curved metatibia, the inner surface of which is densely covered with moderately long hairs. Ventrite VI more or less as in *L. gracilipes*.

Females are probably very similar to females of *L. gracilipes*.

Aedeagus (Fig. 51): Surprisingly similar to that of *L. gracilipes*. Larger than the latter; right apical angle of main piece different.

A key to the 4 *Limnebius* species of the Canary Islands was published by Orchymont (1940b).

DISTRIBUTION (Fig. 83): Obviously a very rare species. So far known only from Gran Canaria (Canary Islands, Spain).

#### MATERIAL EXAMINED:

S P A I N: CANARY ISLANDS: Gran Canaria, Barranco de Tirajana, 1200 m, 6.VI.1989, leg. Balke & Hendrich, 1 ♂ (NMW).

### *Limnebius clavatus* PU

*Limnebius clavatus* PU 1951: 46.

TYPE LOCALITY: Hengshan, Hunan Province, southern China.

TYPE MATERIAL: Holotype ♂ and two male paratypes are deposited in the collection of C.-L. Pu. I have not seen any of these type specimens.

DIAGNOSIS: According to the original description (Pu 1951) this species is quite closely related with *L. taiwanensis* sp.n. The aedeagus (see Pu 1951, Fig. 1) is similar to that of *L. taiwanensis* sp.n. from which it can be distinguished by the shorter, subapically more distinctly widened main piece.

DISTRIBUTION (Fig. 84): So far known only from the type locality.

### *Limnebius claviger* sp.n.

TYPE LOCALITY: Aliova River, W Dursunbey, Balikesir Province, northwestern Turkey.

TYPE MATERIAL: Holotype ♂ (NMW): "NW-ANATOLIEN(53) Aliova Fl.2.3.88 w.Dursunbey;Jäch". Paratypes: 4 exs labelled as holotype (NMW).

DIAGNOSIS: 2.25 mm (female) - 2.7 mm (male) long. Body form oval, oblong, widest near anterior third of elytra. Upper surface very sparsely covered with very fine adpressed pubescence. Dark brown; appendages yellowish or brown. Labrum sparsely punctate, front margin slightly excised; labro-clypeal suture arched and distinctly impressed; clypeus shagreened, its middle portion usually only superficially shagreened; fronto-clypeal suture not well impressed;

frons moderately densely punctate, only faintly shagreened. Middle of pronotum smooth and glabrous, only very faintly punctate; pronotal declivities distinctly or superficially shagreened. Elytra obovate; sides gently rounded; apices more or less truncate or truncately rounded; explanate margin very narrow; surface of elytra superficially punctate and distinctly (female) or superficially (male) shagreened, meshes small; suture not convex.

**Sexual dimorphism:** All legs dilated in male; pre- and mesotarsi with suction setae. Basal three segments of hind leg with long swimming hairs. Disc of male ventrite VI distinctly impressed and glabrous; this impression laterally and apically delimited by a short carina.

**Aedeagus** (Fig. 58): Main piece basally dilated; intricately shaped, with numerous appendages one of which (? appendage "A" homologue) is very prominent, club-shaped and positioned transversally. Main piece deeply furcate in lateral aspect. Left paramere not clearly visible in ventral aspect, inserted in the dorsal half of the main piece.

Females of *L. claviger* sp.n. are easily distinguished from females of *L. spinosus* sp.n. and *L. levantinus* sp.n. by the only faintly punctate pronotal disc.

Due to the deviating morphology of the male ventrite VI and the aedeagus I place *L. claviger* sp.n. in a separate species group.

**DISTRIBUTION** (Fig. 89): So far known only from the type locality.

**ETYMOLOGY:** Clava (Latin) - club; gero (Latin) - I carry; refers to the club-like appendage of the aedeagus.

### *Limnebius conoideus* REGIMBART

*conoideus* REGIMBART 1904: 219. - KNISCH 1924. - BARTOLOZZI et al. 1985. - FERRO 1989.

**TYPE MATERIAL:** I have seen one female syntype, deposited in the MHNP (Regimbart collection). According to BARTOLOZZI et al. (1985) there are 8 syntypes in the MZF.

According to the aedeagus (see FERRO 1989, Fig. 7) it is a typical element of the Ethiopian fauna.

**DISTRIBUTION** (Fig. 84): So far known only from Eritrea.

### *Limnebius cordobanus* ORCHYMONT

*cordobanus* ORCHYMONT 1938: 281. - J. BALFOUR-BROWNE 1978. - IENISTEA 1978. - FRESNEDA et al. 1991. - VALLADARES & MONTES 1991.

**TYPE LOCALITY:** Monfragüe Natural Park, Arroyo de la Vid, Cáceres, western Spain.

**TYPE MATERIAL:** I have not examined the holotype ♂ or any of the 9 paratypes, all deposited in the ISNB. There is no doubt about the identity of this species.

**DIAGNOSIS:** 1.15 - 1.3 mm long. Body form elongate (length:width = 1.96 - 2.06). Brown, head black. Pronotal disc smooth, only very sparsely punctate. Pronotal declivities and elytra densely shagreened. Elytral suture flat. Elytral apices rounded in male, slightly acuminate in female. Male ventrite VII as in *L. bacchus*.

Due to its small size, its elongate body form and the distinctive colouration, this species is clearly distinguished from any other Iberian member of the *L. nitidus* group.

**Aedeagus** (Fig. 37): Main piece slender, with a few apical and a group of subapical (left margin) setae; slightly dilated near basis; "pseudoparamere" short and very slender. Left paramere somewhat separated from main piece, short and slender, with several setae.

**DISTRIBUTION** (Fig. 86): Southern Spain.

MATERIAL EXAMINED:

S P A I N: ALBACETE: R.Bogarra, 2.3.1989, leg. Delgado (NMW).

*Limnebius corfidius* ORCHYMONT

*corfidius* ORCHYMONT 1945b: 11

TYPE LOCALITY: "st. 96, Güme-dag, 1000 m" (ORCHYMONT 1945b); western Turkey.

TYPE MATERIAL: I have not seen the holotype ♂ or any of the 3 paratypes, all deposited in the ISNB. There is no doubt about the identity of this species.

DIAGNOSIS: 1.3 - 1.6 mm long (females usually longer than males). Body form elongate (length:width = 1.94 - 2.1). Brown, head black. Elytra of female distinctly acuminate. Elytral suture flat. Male ventrite VII as in *L. corybus*, but transverse impression more or less obsolete.

Aedeagus (Fig. 35): Surprisingly similar to that of *L. cordobanus* from southern Spain. Main piece slightly shorter than in *L. cordobanus*, "pseudoparamere" longer.

DISTRIBUTION (Fig. 86): So far known only from western Turkey (including European part).

MATERIAL EXAMINED:

T U R K E Y: ISTANBUL: 80 km W Istanbul, 30.VII.1987, leg. Jäch (NMW, ZIL); BURSA: Bursa-Orhaneli, 1.VIII.1988, leg. Jäch (NMW); Ulu Dağ, 1.VIII.1988, leg. Jäch (NMW); BALIKESİR: Kapıdağı Peninsula, Bandırma, 3.VIII.1988, leg. Jäch (NMW); Balıkesir-Susurluk, 2.VIII.1988, leg. Jäch (NMW); ÇANAKKALE: Ayvacık, 5.VIII.1988, leg. Jäch (NMW); E Umurbey, 6.VIII.1988, leg. Jäch (NMW, MHNG, SIW); MUĞLA: NW Karaçulha, 1300 m, 22.V.1991, leg. Jäch (NMW).

*Limnebius corybus* ORCHYMONT

*corybus* ORCHYMONT 1945b: 12.

TYPE LOCALITY: "st. 76, Tachtali Köi, ruisseau sur sol silicieux, 400 m" (ORCHYMONT 1945b); western Turkey.

TYPE MATERIAL: I have not seen the holotype ♂ or any of the 3 paratypes, all deposited in the ISNB. There is no doubt about the identity of this species.

DIAGNOSIS: 1.35 - 1.65 mm long, females generally longer than males. Body form rather wide, as usual in the *L. nitidus* group (length:width = 1.82 - 2.0). Colouration black, sides of pronotum and elytra brown; appendages brown. Pronotal disc sparsely or moderately densely punctate; pronotal declivities and elytra distinctly shagreened. Elytral apices truncate in male, slightly acuminate in female. Male ventrite VII intermediate between *L. nitidus* and members of the *L. mundus* group (similar to *L. bacchus*, but transverse impression deeper).

Aedeagus (Fig. 36): Main piece straight, apically truncate; "pseudoparamere" partly covered by a pocket formed by the main piece. Left paramere slender, slightly curved, inserted near middle of main piece.

DISTRIBUTION (Fig. 86): Greece (Euboea, Samothraki), western and northern Turkey.

MATERIAL EXAMINED:

G R E E C E: EUBOEA: Mt. Dhifris, 700 - 900 m, 29.IX.1992, leg. Jäch (NMW); SAMOTHRAKI: Fonias River, ca. 3 km E Therma, 14.VI.1993, leg. Jäch (NMW); Amos streamlet, ca. 1 km W Kremniotisa, 15. + 17.VI.1993, leg. Jäch (NMW); small stream, 1 - 2 m wide, SE Pirgos Fonia, 16.VI.1993, leg. Jäch (NMW).

T U R K E Y: BURSA: Bursa-Orhaneli, 1.VIII.1988, leg. Jäch (NMW); Ulu Dağ, 31.VII.1988, leg. Jäch (NMW); BALIKESİR: 20 km W Dursunbey, 2.VIII.1988, leg. Jäch (NMW); İvrindi River, 40 km W Balıkesir, 4.VIII.1988, leg. Jäch (NMW); ÇANAKKALE: E Umurbey, 6.VIII.1988, leg. Jäch (NMW); ORDU: Harcbeli Pass, 28.V.1989, leg. Jäch (NMW, SIW, ZIL); GÜMÜŞHANE: Kösedağı Pass, 29.V.1989, leg. Jäch (NMW); BITLIS: 60 km SE Tatvan, 8.VI.1987, leg. Jäch (NMW); MUĞLA: Salkim, 5 km W Kavaklıdere, 850 m, 28.V.1991, leg. Jäch (NMW).

### *Limnebius crassipes* KUWERT

*crassipes* KUWERT 1890: 92, 309. - KNISCH 1924. - ORCHYMONT 1945a. - CHIESA 1959. - IENISTEA 1978.

TYPE LOCALITY: Greece; no precise data known (see ORCHYMONT 1945a).

TYPE MATERIAL: I have examined the holotype ♂ (by monotypy): "Grèce 74 \ J. Lange.", deposited in the MHNP (Kuwert collection).

DIAGNOSIS: Closely related with *L. truncatellus* with which it agrees in size and general appearance. Males of *L. crassipes* differ from males of *L. truncatellus* in a number of characters: pro- and mesotibia not distinctly curved; hind tibia attenuate basally and apically, but not distinctly emarginate basally. Male ventrite VI more or less as in *L. truncatellus*, but apical margin more sinuous.

Aedeagus (Fig. 61): Appendage "A" significantly different from that of *L. truncatellus*. Left paramere wider and longer, apically truncate.

DISTRIBUTION (Fig. 88): So far known only from various Greek Islands (Naxos, Paros, Ios, Milos, Skyros).

#### ADDITIONAL MATERIAL EXAMINED:

G R E E C E: NAXOS: leg. Reiser (NMW); 4.V.1909, leg. Schatzmayer (NMW, DEI); Koronis, X.1980, leg. Malicky (NMW); PAROS: "Paros", 17.V.1976 (CHD); IOS: Milopotamos, 12.IX.1990, leg. Jäch, 9.IV.1981, leg. Schönmann (NMW); MILOS: 1 km E Siderianos, 19.IX.1990, leg. Jäch (NMW, SIW); SKYROS: Linaria, V.1926, leg. Holtz (HUB); 1 km W Skyros, 26.IX.1992, leg. Jäch (NMW, ZIL).

### *Limnebius crinifer* REY

*crinifer* REY 1884 (1885a): 15. - REY 1885b: 325. - KNISCH 1924. - HORIZON 1949. - CHIESA 1958, 1959. - BRAKMAN 1966. - ENDRÖDY 1967. - FRANZ 1970. - FICHTNER 1971. - LOHSE 1971. - BURAKOWSKI et al. 1976. - IENISTEA 1978. - BANGSHOLT et al. 1979. - BERCIO & FOLWACZNY 1979. - HEBAUER 1980, 1984. - PIRISINU 1981. - BELLSTEDT 1982, 1985, 1992, 1993b. - NIEUKERKEN 1982. - CARR 1983. - SPITZENBERG 1985, 1987. - HARTMANN & BELLSTEDT 1987. - G. FOSTER 1990. - BURMEISTER 1986. - KODADA & MAJZLAN 1987. - BELLSTEDT & MERKL 1987. - HANSEN 1987. - BUSSLER 1988. - FRIDAY 1988. - ANGUS 1989.

*barbifer* KUWERT 1890: 90, 308. - KNISCH 1924.

*grouvellei* GUIILLEBEAU 1892: CXXXIII. - KNISCH 1924.

TYPE LOCALITY: "la Suisse" (REY 1885b); Switzerland.

TYPE MATERIAL: Three specimens are deposited in the original Rey collection (box 23) in the MGL. The first one is a male (herewith designated as lectotype of *Limnebius crinifer*) and carries one small round yellow label which - according to Rey's catalogue - stands for Switzerland. The two other specimens are females: one labelled "Vienne Guilleb." belongs to *L. crinifer*, whereas the second - from Germany ("Dresden Puton") - is conspecific with *L. papposus*.

SYNONYMS: Lectotype ♂ (by present designation) of *Limnebius barbifer*, described from Holland: "Ridderborn 1 à 3.74 \ O. de Heusch \ M. R. Belg. \ ♂.". Paralectotypes: One ♀ labelled as lectotype and one ♀ without any label. All 3 deposited in the MHNP (Kuwert collection).

Lectotype ♂ (MMB) of *L. grouvellei* (described from Spain), by present designation: "♂ \ Espagne \ Grouvette \ Grouvellei \ Guilb. \ Coll. Guilleb.". One female paralectotype is housed in the same museum.

DIAGNOSIS: Length: 1.9 - 2.0 mm (female); 2.1 - 2.4 mm (male). Usually black (specimens from Kazakhstan paler brown). Pronotal disc usually always shagreened. This shagreenation can be rather superficial or more distinctly impressed, but it is usually always less distinctly impressed than the fine pronotal punctation.

Sexual dimorphism: Male ventrite VI very large, otherwise unmodified, but with a fan-like tuft

of long hairs, the lateral hairs being curved apically. Male hind femur distinctly thicker than in female; hind tibia of male longer and hardly noticeably sinuous in apical half.

Aedeagus (Fig. 78): Curved to right side (ventral aspect). Apex of main piece (apical appendage) significantly furcate. Left paramere strongly dilated dorsally, with numerous very faintly sclerotized bristles.

Females can be distinguished from females of *L. stagnalis* by the presence of numerous apical setae on the abdominal ventrite VII, by the apex of the abdominal tergite X (truncate or even slightly emarginate between tufts of setae in *L. stagnalis*) and by the shagrination of the pronotal disc.

Pronotal disc usually less strongly shagreened than in females of *L. parvulus*, but intermediates (rarely) seem to occur. Meshes of elytral shagrination smaller than in *L. crinifer* (direct comparison necessary!).

#### DISTRIBUTION (Fig. 84): Eurosiberian.

#### ADDITIONAL MATERIAL EXAMINED:

N E T H E R L A N D S: Dodewaard, 13.IX.1986, leg. Foster (CFA); Tiel, coll. Grundmann (NMW); Amby, 23.IV.1874 (MHNP).

G E R M A N Y: BERLIN: Zehlendorf, 7.IV.1990, leg. Hendrich (CBHB); SACHSEN: Leipzig, coll. Grundmann (NMW); THÜRINGEN: Gotha (NMW); Hubenthal (NMW); Kalbsrieth, leg. Thieme (HUB); BAYERN: Metten a.d. Donau, 7.IV.1977, leg. Hebauer (NMW).

L A T V I Y A: "Kurland Wallhof" [= SE Riga], 6.-10-IV.1916, leg. Bischoff (HUB); "Curonia Libau" [= Liepaja] (HUB).

P O L A N D: "Danzig" [= Gdansk], coll. Grundmann (NMW); "Jaroslaw" [= Jaroslaw], leg. Kuchta (NMW).

A U S T R I A: WIEN: "Umg. Wien", 21.IX.1902, 29.VIII.1910, leg. Pinker (NMW, CBG); "Umg. Wien", leg. Winkler (NMW); Lobau, Fasangartenarm, 26.VI.1983, leg. Jäch (NMW); Dornbach, leg. Schlereth (NMW); Laaerberg, (NMW); Prater, (NMW); Neuwaldegg, 8.V.1980, leg. Jäch (NMW); NIEDERÖSTERREICH: Rekawinkel, leg. Winkler (NMW); Tullnerbach (NMW); Giesshübl, coll. Grundmann (NMW); Herrnbaumgarten nr Poysdorf, 29.VII.1986, leg. Jäch (NMW); Greifenstein, leg. Curti (NMW); Bisamberg, leg. Otto (NMW, ZIL); Rohrwald, leg. Otto (NMW); Stockerau, leg. Bernhauer (NMW); Stopfenreuther Au, 2.VIII.1983, leg. Jäch (NMW); Zeiselmauer, 24.IX.1967, leg. Wewalka (NMW); Markthof, 11.IV.1970, leg. Wewalka (NMW); Moosbrunn, 23.III.1968, leg. Wewalka (NMW); Wiener Neudorf, leg. Scheerpeltz (NMW); Bad Vöslau (NMW); Hinterbrühl, leg. Ganglbauer (NMW); Laxenburg, 1.IX.1907, leg. Pinker (NMW); Laxenburg, leg. Pazourek (NMW); Triesting nr Tattendorf, 20.V.1993, leg. Jäch (NMW); Kleine Erlaf River nr Perwarth, N Gresten, 26.VIII.1980, leg. Jäch (NMW); Krems, Nesl Au, 5.VIII.1922, leg. Bachinger (NMW); Rosenburg, leg. Minarz (NMW); Plank, leg. Minarz (NMW); BURGENLAND: Neusiedler See, leg. Ganglbauer (NMW, NMW); Neusiedler See, Podersdorf, VI.1930, leg. Prock (NMW); Zurndorf, Wismuthinsel, 15.VI.1986, leg. Jäch (NMW); STEIERMARK: Wörschach, leg. Moosbrugger (NMW); OBERÖSTERREICH: Freistadt (OLL); Grünburg (OLL); Linz, Donauau, 5.V.1907, leg. Kloiber (OLL); Linz, VIII.1902, leg. Munganast (OLL); Linz, Bachl, 2.V.1916, leg. Priesner (NMW); TIROL: Unterinnatal, Münster, 21.VII.1968, leg. Kahlen (CKH).

C Z E C H I A: MORAVIA: "Mährisch Weisskirchen" [= Hranice], 1896, leg. Schuler (NMW); Hnojnik, SE Ostrava, leg. Wanka (NMW); "Ung. Brod" [= Uhersky Brod], VII.1927, leg. Prock (NMW); "Prossnitz Mähren" [= Prostejov], coll. Grundmann (NMW).

S L O V A K I A: Trencin, Selec Koci (SNMB); Latorica, 18.X.1991, leg. Jäch (NMW).

H U N G A R Y: Sopron, 31.V.1984, leg. Jäch (NMW); Bükk-hegys., Nagyvisnyo Elzalak, 12.VI.1956, leg. Kaszab & Szekessy (NMW, TMB); Bükk NP, Répáshuta, Tebepuszta, 15.V.1985, leg. Merkl (NMW, TMB).

R O M A N I A: Orsova, leg. Breit (NMW).

C R O A T I A: "Brazza" [= Brac] (NMW); "Canale" [= Konavli, between Dubrovnik and Hecegnovi], leg. Paganetti (HUB).

U K R A I N E: Kiew, X.1988, leg. Balke (CBHB), leg. Jäch (NMW); Lucynce [= S L'Vov], 28.VIII.1916, leg. Salchert (HUB); Kaniew, 29.IX.1988, leg. Jäch (NMW).

K A Z A K H S T A N: "Aulie" [= Dzhambul], leg. Sahlberg (ZMH); "Djarkent" [= Dzharkent, Panfilov], coll. Winkler (NMW); "Tschu" [= Chu River], leg. Sahlberg (ZMH).

M O N G O L I A: Dzungarian Gobi, Bodoncijn-gol 19.VII.1982, leg. Altner (CBG).

*Limnebius distinguendus* FERRO

*distinguendus* FERRO 1989: 278.

TYPE LOCALITY: Derpehan, 12 km E Senderk, southern Iran.

TYPE MATERIAL: I have not examined the holotype ♂, deposited in the CFL.

DIAGNOSIS: 1,24 mm (holotype) - 1,35 mm (specimen from Turkey, NMW) long. The single specimen which I have examined and which is unfortunately somewhat teneral is quite similar to *L. paranuristanus* and *L. ferroi* sp.n. from Turkey. Thus I am not able to name any significant distinguishing character. The frons and the pronotum of the specimens of *L. paranuristanus* and *L. ferroi* sp.n. which I have seen are more distinctly punctate and their elytra are more distinctly shagreened. But these characters are usually slightly variable in most species.

Aedeagus (Fig. 28): Very short and stout, wider (ventral aspect) than in any other species of the same group, with 4 ventro-median setae and numerous setae in the apical third. Apex very wide (ventral aspect) and medially notched.

DISTRIBUTION (Fig. 84): So far known only from the type locality (southern Iran) and southeastern Turkey.

MATERIAL EXAMINED:

T U R K E Y: SIIRT: Kızılısu River, N Cizre, 31.V.1987, leg. Jäch (NMW).

*Limnebius doderoi* GRIDELLI

*doderoi* GRIDELLI 1926: 43. - ORCHYMONT 1938. - CHIESA 1959. - PIRISINU 1970, 1981. - IENISTEA 1978.

TYPE LOCALITY: Sardinia, Italy.

TYPE MATERIAL: I have not examined any of the syntypes (exact number unknown) which are probably housed in the Museo Civico di Storia Naturale "Giacomo Doria", Genova. There is no doubt about the identity of this species.

DIAGNOSIS: Very similar to *L. furcatus*, with which it is very closely related. Males differ from *L. furcatus* in the hind tibia, which is not distinctly excised basally in *L. doderoi*.

Aedeagus (Fig. 73): Not as strongly curved as in *L. furcatus* (ventral aspect); shape of apical appendage significantly different. Left paramere less wide than in *L. furcatus*.

DISTRIBUTION (Fig. 87): Corsica, Sardinia, Tuscan Archipelago.

ADDITIONAL MATERIAL EXAMINED:

F R A N C E: CORSICA: Ajaccio, leg. Schneider (NMW).

I T A L Y: SARDINIA: "Sardinia", coll. Damry (TMB); Ozieri, 1892, leg. Dodero (NMW, MHNP); Cala Salinas (NMW).

*Limnebius evanescens* KIESENWETTER

*evanescens* KIESENWETTER 1865: 375. - KNISCH 1924. - GRIDELLI 1926. - J. BALFOUR-BROWNE 1938, 1978. -

ORCHYMONT 1938. - CHIESA 1959. - IENISTEA 1978. - LAGAR 1984. - VALLADARES 1889. - VALLADARES & MONTES 1991.

*pectoralis* GUILLEBEAU 1896: 229. - KNISCH 1924. - J. BALFOUR-BROWNE 1938. - ORCHYMONT 1938.

TYPE LOCALITY: "Habitat in rivulis prope Cordobam" (KIESENWETTER 1865); Cordoba, southern Spain.

TYPE MATERIAL: I have examined the lectotype ♂ (designated by ORCHYMONT 1938) and 8 paralectotypes which are housed in the ZSM. According to ORCHYMONT (1938) there should be 14 syntypes in the ZSM. One paralectotype ♂ is deposited in the ISNB. Number of syntypes unknown.

SYNONYMS: I have examined the holotype ♀ (MHNP) of *Limnebius pectoralis*: "ST CHARLES ALGÉRIE A. THERY \ *pectoralis* Guib. \ Type \ 12 - 93". Despite the note of

ORCHYMONT (1938): "Je n'ai pu voir le type unique de *pectoralis*" I have no doubt that this specimen which I found in the Sainte Claire-Deville collection (MHNP) is the true holotype of *L. pectoralis*, described after one specimen: "Un exemplaire Saint-Charles (A. THÉRY)". The Sainte Claire Deville collection contains numerous specimens collected by Théry (e.g. the types of *L. mesatlanticus*) and it seems that at least part of the Théry collection had been acquired by Sainte Claire Deville. I could not find any specimen labelled "*L. pectoralis*" in the MMB. The synonymy of *L. pectoralis* with *L. evanescens* has been established by KNISCH (1924: 60). It should be kept in mind that *L. pectoralis* could also be a synonym of *L. perparvulus* since I have hitherto been unable to distinguish females of *L. evanescens* and *L. perparvulus*.

**DIAGNOSIS:** 1.0 - 1.2 mm long (females usually longer than males). Body form elongate, subparallel. Pronotal disc smooth and glabrous, very faintly punctate, declivities smooth or faintly shagreened. Elytra evenly and distinctly shagreened, meshes small and round; elytral suture convex on elytral declivity. Elytral apices of female acuminate, more or less truncate in male. Male ventrite VII very long.

**Aedeagus (Fig. 13):** Main piece moderately long and slender, gently curved (lateral aspect), with several subapical hairs.

*Limnebius nanus* sp.n. is easily distinguished from *L. evanescens* by the shagreened pronotal disc. I was not able to find significant external distinguishing characters for *L. evanescens*, *L. perparvulus* and *L. externus*.

**DISTRIBUTION (Fig. 83):** Portugal to Algeria.

#### ADDITIONAL MATERIAL EXAMINED:

P O R T U G A L: EVORA: Axambuja, 25.VI.1986, leg. Bignal (CFA, NMW).

S P A I N: MALAGA: Marbella, VII.1962 (NMW); Tolox, 5.1.1991, leg. Foster (CFA).

A L G E R I A: Tarfaïa [= near Philippeville (= Skikda)], leg. Théry (NMW, OLL, TMB, MHNP, MTD).

### *Limnebius externus* sp.n.

*evanescens* forma *extraneus* ORCHYMONT 1938: 289 [name not available]. - J. BALFOUR-BROWNE 1978. - VALLADARES 1989. - VALLADARES & MONTES 1991.

**TYPE LOCALITY:** Small tributary of Rio Guadiato, 375 m, Cordoba (Arboles), southern Spain.

**TYPE MATERIAL:** Holotype ♂ (NMW): "E - CACARES 24.6. Monfrague NP Arroyo de la Vid leg. Sue Bignal 1986". Paratypes: SPAIN: 4 exs: "19-Coll. Sue Bignal, SPAIN 24.6.1986 Monfrague Natural Park, Arroya de la Vid, CACERES-riverbed pools" (CFA); 2 exs: "14 - Coll. S. Bignal 19.6.1986 Moradillo de Ros, BURGOS, Spain" (CFA); 17 exs: "Hisp.:Sa Cordoba,Arboles;affl.r.g.R.Guadiato, st 20,325m.23.9.35 ,Orch" (NMW, ISBN); 1 ex.: "Hisp.Granada,E. Rio Xenil st 15 680m,19.9.35 ,Orch"; 1 ♂: "18 Rio Cala S of Monesterio, BADAJOZ Spain 18 April 1985" (CFA). MOROCCO: 2 exs: "Tanger Rolph" (ISBN).

**NOMENCLATURE:** According to the original description "*Limnebius evanescens extraneus* f.nov." was expressly meant infrasubspecific by its author (ORCHYMONT 1938) and is thus excluded from zoological nomenclature [see Art. 1b (5), Art. 16 and Art. 45g (i) of the ICZN (1985)]. The name "*extraneus*" was not treated as subspecific and thus not made available by the publication of BALFOUR-BROWNE (1978: 100) ["so I am not, any more than d'Orchymont, inclined to give any of them an enhanced status"] which, as far as I am aware, is the only mention of the name "*extraneus*" prior to 1985.

**DIAGNOSIS:** 1.0 - 1.15 mm long. I was not able to find significant external distinguishing characters between *L. externus* sp.n. and *L. evanescens*. Pro- and mesotibia of male slightly less strongly dilated than in *L. evanescens*.

**Aedeagus (Fig. 14):** Main piece long and slender, distinctly curved (lateral aspect), with several subapical setae. Parameres absent. Very similar to the aedeagus of *L. perparvulus*, from which it can be distinguished by the further distally situated capsule and triangular ventral lamina, by the

(in exactly lateral or dorso-lateral aspect) evenly curved and not strongly sinuous (emarginate) subapical dorsal margin. Caution: If the aedeagus of *L. perparvulus* is examined in a more or less ventro-lateral position, the aspect of the subapical dorsal margin is quite similar to that of *L. externus* sp.n.; but the distance between capsule (and triangular lamina) and the apex of the main piece is always significantly greater in *L. perparvulus*. It can be distinguished from *L. evanescens* by the longer main piece and by the shape of the apex.

DISTRIBUTION (Fig. 83): Southern Spain, Morocco.

ETYMOLOGY: ORCHYMONT (1938) named the specimens which he had believed to be a variety of *L. evanescens* "forma extraneus", probably due to the slightly deviating morphology. The Latin word "externus" (= external) has the same meaning.

### *Limnebius fallaciosus* GANGLBAUER

*fallaciosus* GANGLBAUER 1904: 261 (described as *L. paganettii* var. *fallaciosus*). - ORCHYMONT 1945b. - IENISTEA 1970, 1978.

TYPE LOCALITY: "Canalethal" (GANGLBAUER 1904) [= Konavli, between Dubrovnik and Hecognovi, Dalmatia, Croatia].

TYPE MATERIAL: Lectotype ♂ (by present designation): "Canalethal Holdhaus \ v. *fallaciosus*", deposited in the NMW. Fifteen paralectotypes are housed in the NMW.

DIAGNOSIS: 1.4 - 1.6 mm long. Maxillary palpi of male short and dilated. Protuberance of male ventrite VI very short and inconspicuous. I cannot find significant characters to separate females of *L. fallaciosus* from females of *L. paganettii*.

Aedeagus (Fig. 55): Main piece straight, rather short; appendage "A" very long, apically dilated and furcate. Left paramere hook-like.

DISTRIBUTION (Fig. 89): Croatia, Crna Gora, Serbia, Rumania, Makedonia, Greece.

#### ADDITIONAL MATERIAL EXAMINED:

M A K E D O N I A (former Yugoslav republic): Babuna River, SW Titov Veles, 13.VIII.1988, leg. Jäch (NMW).

G R E E C E: MAKEDONIA: Orfanion, 50 km W Kabala, 25.VII.1988, leg. Jäch (NMW, ZIL); Pangaeon, Nikissiani, 26.VII.1988, leg. Jäch (NMW); Chalkidiki, Ag. Prodromos, 8.VI.1986, leg. H. Hebauer (CHD); THRAKIA: 15 km N Alexandroupolis, 27.VII.1988, leg. Jäch (NMW, SIW); PELOPONNESOS: Meligalas, 16.VI.1986, leg. H. Hebauer (CHD).

### *Limnebius ferroi* sp.n.

*nuristanus* FERRO 1989 (= nomen nudum).

TYPE LOCALITY: Stream, 3 - 5 m wide, W Çatallar (= 30 km N Finike), 300 m, Antalya Province, southern Turkey.

TYPE MATERIAL: Holotype ♂ (NMW): "TR-ANTALYA 22.V.1991 w Çatallar, 300m leg. Jäch (25)". Paratypes: 6 exs labelled as holotype (NMW); 2 exs: "TÜRKI 26.8.1981 Umg Namrun T11 leg M.JÄCH \ Kilik.Taurus" (NMW); 17 exs: "TÜRKI 22.8.81 Umg.Namrun \ leg.M.Jäch T8 Kilik.Taurus" (CAL, NMW, SIW); 7 exs: "TR 24.5.1987 Amanos Geb. leg.Jäch (20)" (NMW); 1 ex.: "TR 22.5.1987 Yayladagi leg. M.Jäch (15a)" (NMW).

DIAGNOSIS: 1.15 - 1.4 mm long. Body form long and almost parallel-sided (length:width = 2.0 - 2.1, in females sometimes 2.2 because of the acuminate elytra). Broadest near posterior angles of pronotum and near anterior angles of elytra. Upper surface very sparsely covered with very fine adpressed pubescence. Black, pronotal and elytral margins paler brown, legs and palpi brown. Labrum smooth, sparsely punctate, front margin emarginate; labro-clypeal suture arched and distinctly impressed; middle of clypeus and frons smooth, very faintly punctate, sides very superficially or more distinctly shagreened; fronto-clypeal suture not well impressed. Middle of

pronotum smooth and glabrous, only very faintly punctate; sides of pronotum usually only very superficially shagreened. Elytra elongate; sides only gently rounded; apices separately rounded in male, elongate and acuminate rounded in female; explanate margin narrow; surface superficially or distinctly shagreened, meshes more or less transverse; suture not convex. Basal three segments of male pre- and mesotarsus slightly dilated, with suction setae. Abdominal sternites as in *L. murentinus*.

Aedeagus (Fig. 22): Very similar to that of *L. kaszabi* and *L. paranuristanus*. More sinuous (lateral aspect) than in *L. kaszabi* and less sinuous than in *L. paranuristanus*. Admedian setae missing. A subapical appendage may be homologous with the appendage in *L. murentinus*.

*Limnebius ferroii* sp.n. is very closely related to *L. paranuristanus* and *L. distinguendus*. Shagrination and punctuation on head and pronotum usually more distinctly pronounced in *L. paranuristanus*.

DISTRIBUTION (Fig. 85): Southern Turkey (Antalya to Hatay).

ETYMOLOGY: Named for Comm. Giorgio Ferro (Lancenigo, Italy).

#### *Limnebius fontinalis* BALFOUR-BROWNE

*fontinalis* J. BALFOUR-BROWNE 1951: 203.

*frontalis* ALFIERI 1976: 111 (= misspelling).

TYPE LOCALITY: Spring on steep western face of Jebel Harir, 5000 ft., Yemen.

TYPE MATERIAL: I have seen the holotype ♂ (BML): "♂ \ Type \ FROM SPRING ON STEEP WESTERN FACE OF MOUNTAIN. \ W.ADEN PROT. Jebel Harir, ca.5,000 ft. 3,4.xi.1937. \ Limnebius (Bilim-neus) fontinalis Type. J.Balfour-Browne det." and all 3 paratypes (BML).

DIAGNOSIS: 1.4 - 1.7 mm long, thus a comparatively large species. Other characters (body form, shagrination) more or less as in other members of the *L. mundus* group. Pronotal disc finely but distinctly punctate.

Aedeagus (Fig. 20): Long and straight, ventro-median setae present.

*Limnebius fontinalis* is the only member of the *L. mundus* group in the Arabian Peninsula and thus not likely to be confounded with any other species. *Limnebius sanctimonitis* sp.n., externally very similar to *L. fontinalis* occurs in the Sinai Peninsula.

DISTRIBUTION (Fig. 84): Arabian Peninsula.

#### ADDITIONAL MATERIAL EXAMINED:

S A U D I A R A B I A: Wadi Aziza, 2400 m, 18°13'N/42°28'E, 17.-18.IX.1983, leg. Büttiker (NMW, NMB).

#### *Limnebius freatalis* PEYERIMHOFF

*freatalis* PEYERIMHOFF 1912: 517 (described as "*Limnobia Theryi* ssp. *freatalis*"). - KNISCH 1924. - ORCHYMONT 1935, 1945a. - J. BALFOUR-BROWNE 1978. - IENISTEA 1978. - FRESNEDA et al. 1991. - VALLADARES & MONTES 1991.

*normalis* THERY 1939: 132 (described as subspecies of *mesatlanticus*) (= syn.n.). - ORCHYMONT 1945a.

TYPE LOCALITY: Algeciras, Cadiz Province, southern Spain.

TYPE MATERIAL: Lectotype ♂ (MHNP - Sainte Claire Deville collection), by present designation: "Algeciras mai 1910 \ Theryi subsp. *freatalis* Payh. types". Paralectotypes: 8 specimens from Algeciras and Tangier (Morocco) are housed in the same collection. Number of syntypes not known.

SYNONYMS: I have dissected the holotype ♂ (by monotypy) of *Limnebius normalis*, described from Fez (Morocco) and deposited in the ISNB. Its aedeagus is identical with that of *Limnebius freatalis*.

**DIAGNOSIS:** 2.4 - 2.5 mm (female) and 2.6 - 2.8 mm (male) long. Thus largest species of the genus. Pronotal disc rather densely punctate. Metatibia straight and long. Apical protuberance on male ventrite VI longer than in other related species. Elytra of female very densely shagreened, almost microreticulate (meshes very small).

Aedeagus (Fig. 69): Very large, largest aedeagus of the genus, with appendage "B" very long and prominent; appendage "C" short and thin. Left paramere wide (ventral aspect).

**DISTRIBUTION** (Fig. 89): Southern Spain, Morocco.

#### ADDITIONAL MATERIAL EXAMINED:

S P A I N: MALAGA: Marbella, IV.1960, VII.1962, leg. Palm (ZML, NMW); Estepona, V.1967, leg. Budberg (NMW); CADIZ: Algeciras, 15-22.IV.1926, leg. Lindberg (NMW, ZMH).

M O R O C C O: Marrakech, Tahanaoute, 600 m, 17.IV.1985, leg. Wewalka (NMW); Amismiz, 24-26.V.1926, leg. Lindberg (ZMH).

### *Limnebius furcatus* BAUDI

*furcatus* BAUDI 1872: 37. - KNISCH 1924. - GRIDELLI 1926. - NORMAND 1933. - ORCHYMONT 1935, 1938, 1945a, 1945b. - CHIESA 1959. - ENDRODY 1967. - PIRISINU 1970, 1981. - LOHSE 1971. - ANGELINI & FERRO 1974. - BURAKOWSKI et al. 1976. - J. BALFOUR-BROWNE 1978. - IENISTEA 1978. - FERRO 1979. - MAZZOLDI 1982. - ANGUS & DIAZ PAZOS 1991. - DIAZ PAZOS 1991. - VALLADARES & MONTES 1991.

*uncigaster* KUWERT 1887: 43. - KNISCH 1924. - GRIDELLI 1926.

*adjunctus* KUWERT 1899(1890): 98, 312. - KNISCH 1924. - GRIDELLI 1926.

*similis* BAUDI 1872: 37 (= junior homonym of *similis* WOLLASTON). - KNISCH 1924. - GRIDELLI 1926. - ORCHYMONT 1938. - PIRISINU 1970.

*mauritii* GUILLEBEAU 1893a: 17, 1893b: XXXVI. - KNISCH 1924. - GRIDELLI 1926.

**TYPE LOCALITY:** Torino, northern Italy.

**TYPE MATERIAL:** The syntypes (exact number unknown) of *Limnebius furcatus* are probably deposited in the MZT which is not accessible at present. According to the description there is little doubt about their specific assignation.

**SYNONYMS:** Holotype ♂ (by monotypy) of *Limnebius uncigaster*: "Sicilia \ uncigaster Kuw. Sicilia \ Ex. Musaeo A. KUWERT 1894 \ furcatus Baudi \ Peyerimh. vidit 1906", deposited in the MHNP (Kuwert collection).

Lectotype ♂ (by present designation) of *Limnebius adjunctus*: "Type \ adjunctus Kuw. Algeria \ Peyerimh. vidit 1906. \ furcatus Baudi \ Ex. Musaeo A. KUWERT 1894", deposited in the MHNP (Kuwert collection).

I have not seen any of the syntypes (exact number unknown) of *L. similis* BAUDI (not WOLLASTON) which are deposited in the MZT. According to GRIDELLI (1926: 470) the type series comprises two species (*L. furcatus* and *L. doderoi*). No lectotype has been designated yet.

Lectotype ♂ of *L. mauritii*, by present designation (MMB): "M. Pic L'Ougasse \ Mauriti Guib. \ Coll. Guilleb.". One paralectotype ♀ is deposited in the same museum. *Limnebius mauritii* was described after 4 specimens. The 2 remaining syntypes are probably deposited in the Pic collection (MHNP).

**DIAGNOSIS:** 1.75 - 2.0 mm (female) and 2.2 - 2.4 mm (male) long. Black, shining. Body form oval and strongly convex. Pronotal disc usually very faintly punctate, shining and glabrous, but very superficially (hardly noticeably) shagreened.

*Limnebius furcatus* is very similar to *L. stagnalis*. Males are readily distinguished by the secondary sexual characters of the hind leg and the male ventrite VI. Setae of ventrite VI densely aggregated to form two apically strongly curved hook-like structures. Disc of ventrite VI hardly noticeably impressed, without other modifications (hooks or appendages). Hind femur strongly dilated and curved; inner margin of hind tibia distinctly excised basally. Females of *L. furcatus*

are easily recognized by the shape of ventrite VII (very short and wide, anterior angles more or less rounded) and tergite X (narrower than in *L. stagnalis*).

Aedeagus (Fig. 72): Strongly curved (ventral aspect); apical appendage long and intricately shaped. Left paramere large, its apex diagnostic.

DISTRIBUTION (Fig. 87): West Mediterranean, very rare (or probably extinct) in Central Europe.

#### ADDITIONAL MATERIAL EXAMINED:

P O R T U G A L: FARO: Rio de Figueira, 1.VII.1986, leg. Bignal (CFA); Cirio de Moinho, 27.II.1986, leg. Bignal (CFA); Aljezur, 5.VII.1986, leg. Bignal (CFA).

S P A I N: GERONA: Pals, 28.V.1986, leg. H. Hebauer (CHD, NMW); PALENCIA: Palencia, leg. Paganetti (NMW); NAVARRA: Uje, 15.VII.1986, leg. Bignal (CFA); CADIZ: Marisma del Chapatal, 17.IV.1985, leg. Foster (CFA); MALAGA: Marbella, IV.1960, leg. Palm (ZML).

F R A N C E: "St. Romain en Gier" (NMW); "Südfrankreich", coll. Wingelmüller (NMW); RHONE: Lyon (NMW).

G E R M A N Y: SACHSEN: Dresden (ISNB).

P O L A N D: "Hirschberg Silesia" [= Jelenia Gora, SW Wroclaw] (ISNB).

I T A L Y: TRIESTE: Zaule, 22.VIII.1909, 26.VI.1910, leg. Springer (NMW, CPL); EMILIA: "Emilia" (NMW); LUCCA: Viareggio, leg. Dodero (NMW); GROSSETO: Lago Acquato, 28.VII.1992, leg. Jäger (MTD); ROMA: "Roma", leg. Luigioni (NMW); SICILY: Agrigento, 26.VI.1978, leg. Wewalka (NMW).

C R O A T I A: Biograd, SE Zadar, 18.VIII.1977, leg. F. Hebauer (MTD); Martinscica, 22.VII.1929, leg. Orchymont (ISNB); Istra, Vesenice, 9.VII.1981, leg. H. Hebauer (CHD).

M O R O C C O: Gharb, 7.VII.1926, leg. Lindberg (ZMH); Knitra, Mamora, 20.VI.1926, leg. Lindberg (ZMH); Casablanca (MHNP); Volubilis (MHNP); Tanger (MHNP); Rabat, leg. Théry (MHNP).

A L G E R I A: La Calle [= El Kala, NE Algeria], leg. Henon (NMW, MHNP); Philippeville [= Skikda] (MHNP).

### *Limnebius gerhardti* HEYDEN

*gerhardti* HEYDEN 1870: 70. - KNISCH 1924. - J. BALFOUR-BROWNE 1938, 1978. - ORCHYMONT 1938. - IENISTEA 1978. - VALLADARES 1989. - GARRIDO GONZALES 1990. - DIAZ PAZOS 1991. - VALLADARES & MONTES 1991.

TYPE LOCALITY: Brañuelas, Leon Province, northwestern Spain.

TYPE MATERIAL: I have examined the holotype ♀ (by monotypy): "♀ \ Brañuelas 13.7. \ 205 \ Holotypus \ Dtsch. Entomol. Institut Berlin \ L.Gerhardt Heyden \ A.d'Orchymont rev. Gerhardt Heyden. ♂♂ aus dem Kantabrischen Gebirge abwarten (1938) \ coll. L.V. Heyden DEI Eberswalde"; deposited in the DEI.

DIAGNOSIS: A variable species. Externally, probably not distinguishable from *L. nitidus*, *L. maurus* and other species of the *L. nitidus* group.

Aedeagus (Fig. 41): Main piece slightly wider than in *L. nitidus*; left paramere not widely separated from the main piece.

DISTRIBUTION (Fig. 85): Western Iberian Peninsula.

#### ADDITIONAL MATERIAL EXAMINED:

P O R T U G A L: Portalegre, coll. Schaufuss (HUB); BRAGANCA: Miranda de Duoro, 11.VII.1986, leg. Bignal (CFA); EVORA: Axambuja, 25.VI.1986, leg. Bignal (CFA, NMW).

S P A I N: LEON: San Justo de la Vega, 18.VI.1983, leg. Valladares (NMW); CANTABRIA: Puerto de San Glorio, 8.VI.1990, leg. Carr (NMW); BURGOS: Najera, 12.VII.1986, leg. Bignal (CFA); MALAGA: Marbella, VII.1962 (NMW); Lentegi, 3.I.1992, leg. Foster (CFA); Tolox, 5.I.1992, leg. Foster (CFA).

### *Limnebius glabriventris* SHATROSKIY

*glabriventris* SHATROVSKIY 1989: 264. - SHATROVSKIY 1992.

TYPE LOCALITY: Jakovlewskij, Primorskij Krai, eastern Russia.

TYPE MATERIAL: I have not seen the lectotype ♂ [no holotype was designated in the original description; a

subsequent type designation was made by SHATROVSKIY (1992)] and the 3 paralectotypes of *L. glabriventris* deposited in the Institute of Soil-Biology (Vladivostock) but I have examined 4 (3 ♂♂ + 1 ♀) of the 8 paralectotypes of *L. glabriventris*, deposited in the ZIL. Two additional paralectotypes should be deposited in the ZMM. According to the illustration of the male labial palpus in the original description (SHATROVSKIY 1989: Fig. 16) and the aedeagus (SHATROVSKIY 1992: Fig. 4) there is no doubt that the paralectotypes which I have examined are conspecific with the lectotype.

**DIAGNOSIS:** Very closely related with *L. parvulus* from Europe. General appearance (size, body form, shagreenation) as in the latter. Males are easily recognized by the lack of the setal fringe on ventrite VI. When I had seen only few males from eastern Russia I had treated *L. glabriventris* as a synonym of *L. parvulus* because I thought that the setae on ventrite VI had been rubbed off. But now, after having seen numerous males from different localities I have no doubt that these setae - so typical for all other members of the *L. parvulus* group - are primarily missing in *L. glabriventris*. In addition to the lacking setae on male ventrite VI, males of *L. glabriventris* can be distinguished from males of *L. parvulus* by the inner margin of the protibia which is not distinctly angulate in apical third in *L. glabriventris* and by the metatibia, which is slightly more curved inwards in its apical half.

**Aedeagus (Fig. 81):** Very similar to *L. parvulus* from which it can be distinguished mainly by the shape of the apex (more like in *L. shatrovskii* sp.n.), by the distinctly shorter appendage "A" and by the smaller apex of the left paramere. The aedeagus of *L. shatrovskii* sp.n. is more slender and longer, with the shape of the apex of the left paramere distinctly different.

**DISTRIBUTION (Fig. 84):** So far known only from eastern Russia.

#### ADDITIONAL MATERIAL EXAMINED:

R U S S I A: Siberia: Irkutsk Oblast, Tibelti, Irkut Valley, 28 km W Lake Baikal, 8.-15.VI.1970, leg. Angus (CAL, NMW); Primorskij Krai: 22 km N Vladivostok, Sputnik Stn. ponds, 25.VII.1992, leg. Nilsson (RMS, NMW); Anisimovka Stn. pond, 20.VII.1992, leg. Nilsson (RMS); Tigrovyi, 19.-21.VIII.1992, leg. Boukal (NMW, SIW); Novoguchuevka, 26.-31.VII.1992, leg. Boukal (NMW); Ussuriisk, Kaimanovka, 2.-9.VIII.1992, leg. Boukal (NMW).

### *Limnebius gracilipes* WOLLASTON

*gracilipes* WOLLASTON 1864: 89. - KNISCH 1924. - ORCHYMONT 1940b.

**TYPE LOCALITY:** "I have taken it in the stream at Mogan, in the south-west of Grand Canary; in the vicinity of Sta Cruz, and at Las Mercedes, of Teneriffe; and in the Barranco de San Juan (near the Sources) of Palma; and it was captured by Dr. CROTCH in Gomera" (WOLLASTON 1864); Canary Islands, Spain.

**TYPE MATERIAL:** Lectotype ♂ (by present designation): "Type \ Limnebius gracilipes, type Woll.", deposited in the BML. Five paralectotypes are housed in the same institution. One paralectotype ♂ is deposited in the MHNP (Sainte Claire Deville collection). Number of syntypes not known.

**DIAGNOSIS:** 1.5 - 1.8 mm long. Pronotal disc distinctly punctate, smooth or superficially shagreened. Male ventrite VI with small asymmetrical protuberance; disc of ventrite VI impressed near basis of protuberance.

**Aedeagus (Fig. 50):** Main piece rather straight; appendage "A" long and slightly sinuous. Left paramere slender, curved.

A key to the 4 *Limnebius* species of the Canary Islands was published by ORCHYMONT (1940b).

**DISTRIBUTION (Fig. 89):** Endemic to the Canary Islands, Spain.

#### ADDITIONAL MATERIAL EXAMINED:

S P A I N: CANARY ISLANDS: TENERIFE: Bco.Afur, 10.IV.1991, leg. Nilsson (CNU); Bco.Taborno, 17.IV.1991, leg. Nilsson (CNU); Igueste, 13.IV.1991, leg. Nilsson (CNU, NMW); Pta.Hidalgo, 10.IV.1991, leg. Nilsson (CNU); Valle de Masca, 12.-13.V.1947, leg. Lindberg (ZMH); Los Mercedes, 28.-30.V.1947, leg. Lindberg (ZMH); Adeje, 900 m, 15.-17.III.1988, leg. Balke & Hendrich (HUB); Adeje, 700 m, 6.III.-

2.IV.1987, leg. Balke & Hendrich (HUB); Adeje, 21.I.1949, leg. Lindberg (ZMH); Barranco del Infierno, Adeje, 24.II.1950, leg. Lindberg (ZMH); Puerto de San Juan, 16.-22.I.1949, leg. Lindberg (ZMH); Igueste, 300 m, 3.IV.1992, leg. Zerche (DEI); GRAN CANARIA: Valle de Tejeda, 7.VI.1947, leg. Lindberg (ZMH); La Culata, 5.VI.1989, leg. Balke & Hendrich (NMW); San Bartholomé, Bco. de Tirajana, 800 m, III.-IV.1988, 6.VI.1989, leg. Balke & Hendrich (NMW, HUB, CBHB); San Bartholomé, 1100 m, 5.VI.1989, leg. Balke & Hendrich (NMW); GOMERA: Valle Hermigua, 18.III.1950, leg. Lindberg (ZMH); 2 km S Crio Anden, 20.III.1988, leg. Balke & Hendrich (NMW); LA PALMA: Bco. Las Angustias, 14.-21.III.1990, leg. Schawaller (CHD).

### *Limnebius graecus* sp.n.

TYPE LOCALITY: Stream, 1 - 2 m wide, 1.5 km N Elefthere, W Kabala, northern Greece.

TYPE MATERIAL: Holotype ♂ (NMW): "GR-MAKED 9.8.88 30km sw Kabala leg.Jäch (77)". Paratypes: 11 exs labelled as holotype; 12 exs: "GR-CHALK.22.7.88 Sithonia-Sarti leg.M.Jäch (12)" (NMW); 7 exs: "GR-CHALK.22.7.88 Sithonia (13) leg.Manfred Jäch" (NMW); 17 exs: "GR - Euböa (5) Steni-Stroponas 700-900m 29.IX. leg. Jäch 1992" (CAL, HUB, ISNB, MHNG, NMW, SNMB, ZIL); 6 exs: "GR - Euböa (7) Steni-Stroponas 700-900m 30.IX. leg. Jäch 1992" (NMW, SIW); 2 exs: "GR - Euböa (8) Steni-Stroponas 700-900m 30.IX. leg. Jäch 1992" (NMW); 3 exs: "GR Mt. Ossa Stomion 19.6.86 leg. H. Hebauer \ coll.H. Hebauer" (CHD).

DIAGNOSIS: 1.45 - 1.7 mm long. Body form oval (length:width = ca. 2.0). Upper surface very sparsely covered with very fine adpressed pubescence. Black, pronotal and elytral margins paler brown, legs and palpi brown. Labrum sparsely punctate, front margin emarginate; labro-clypeal suture arched and distinctly impressed; clypeus entirely shagreened; frons smooth, faintly or more distinctly punctate, sides superficially shagreened; fronto-clypeal suture not well impressed. Middle of pronotum smooth and glabrous and distinctly, but not very densely punctate; sides of pronotum shagreened. Elytra oval, oblong; sides only gently rounded; apices more or less identical in both sexes, only very feebly longer in female; explanate margin narrow; surface superficially or distinctly shagreened, meshes more or less round or slightly transverse; suture not convex. Fore and middle leg of male distinctly dilated. Basal three segments of male pre- and mesotarsus slightly dilated, with suction setae. Male ventrite VII rather short, medially (not transversely) impressed; apically distinctly produced, without gibbosity.

Aedeagus (Fig. 39): Very similar to that of *L. nitigeus*. Distinguished from the latter by the significantly different shape of the apex of the main piece.

*Limnebius graecus* sp.n. is very closely related to *L. nitigeus*, from which it probably cannot be distinguished externally. Females of *L. corybus* can be distinguished from *L. graecus* sp.n. by the acuminate elytral apices.

DISTRIBUTION (Fig. 86): So far known only from Greece.

ETYMOLOGY: Named in reference to the geographical distribution.

### *Limnebius grandicollis* WOLLASTON

*grandicollis* WOLLASTON 1854: 94. - KNISCH 1924. - ORCHYMONT 1940b. - IENISTEA 1978.

TYPE LOCALITY: "The only district in fact in which I have observed it is the region of the Cruzinhas (about 5000 feet above the sea),-where, during July 1850, I captured many specimens, adhering to the under sides of decaying leaves, in the small shallow pools and trickling streams with which those densely wooded uplands everywhere abound." (WOLLASTON 1854); Madeira, Portugal.

TYPE MATERIAL: Lectotype ♂ (by present designation): "583 \ The Madeira Is. T.V.Wollaston. B.M.1855-7 \ Limnebius (s.str.) grandicollis Woll.", deposited in the BML. One paralectotype ♂ is deposited in the same institution. One female paralectotype is deposited in the MHNP (Sainte Claire Deville collection). Number of syntypes unknown.

DIAGNOSIS: 1.7 mm long. Recognized by the distinctly and evenly shagreened (meshes small and round) and punctate surface. Male ventrite VI without protuberance.

Aedeagus (Fig. 33): Vaguely resembling *L. confidius*, *L. graecus* and some other species of the *L. nitidus* group. "Pseudoparamere" very thin, hardly visible. Left paramere short and distinctly separated from the main piece, as in most species of the *L. cordobanus* subgroup.

DISTRIBUTION (Fig. 83): Endemic to the island of Madeira, Portugal.

ADDITIONAL MATERIAL EXAMINED:

P O R T U G A L: MADEIRA: "Madeira", coll. Schaum (HUB); Rosario, 2. VII. 1957, leg. Lindberg (ZMH); Pico Ruivo, 27-29. VI. 1957, leg. Lindberg (ZMH); Pico da Cruzinha S., 1230 m, 22. VI. 1935, leg. Orchymont (ISNB, NMW); Rabagal, 1000 m, 7. VIII. 1975, leg. Vit (CHD).

*Limnebius gridellii* PRETNER

*gridellii* PRETNER 1929: 203. - ORCHYMONT 1945a, 1945b. - CHIESA 1959. - IENISTEA 1978.

TYPE LOCALITY: Crete, southern Greece.

TYPE MATERIAL: Lectotype ♂ (NMW): "Kreta Paganetti \ gridellii". Twenty-seven paralectotypes with similar labels in NMW and MTD. Additional syntypes are probably housed in the CPL. Number of syntypes not known ("von Herrn Paganetti in mehreren Exemplaren").

DIAGNOSIS: Very closely related to *L. doderoi* and *L. furcatus*. Hind tibia of male basally less strongly excised than in *L. furcatus*, but more distinctly so than in *L. doderoi*.

Aedeagus (Fig. 74): Very similar to that of *L. doderoi*, but shape of left paramere significantly different.

DISTRIBUTION (Fig. 87): Endemic to the island of Crete, southern Greece.

ADDITIONAL MATERIAL EXAMINED:

G R E E C E: CRETE: "Kreta", coll. Grundmann (NMW) - possibly syntypes.

*Limnebius hilaris* BALFOUR-BROWNE

*hilaris* J. BALFOUR-BROWNE 1978: 91. - FRESNEDA et al. 1991. - VALLADARES & MONTES 1991.

TYPE LOCALITY: Clay and stone bank of pool in bed of Rio Jauto, 15 km SW Vera, 100 m, Almeria Province, southeastern Spain.

TYPE MATERIAL: I have seen the holotype ♂ (BML): "Type \ SPAIN. Almeria Rio Jauto, 15km.SW: Vera 100 m. 29.v.1967 \ Limnebius (s.str) hilaris Type! J. Balfour-Browne det. I. 1974" and both paratypes (♂ + ♀) (BML).

DIAGNOSIS: 1.6 mm long. I have seen only 3 specimens and found no significant external distinguishing characters between *L. hilaris* and other species of the group (e.g. *L. gerhardti*, *L. nitidus*).

Aedeagus (Fig. 42): Very similar to that of *L. gerhardti* from which it can be distinguished by a number of characters: shape of apex of main piece; "pseudoparamere" shorter; left paramere more straight and more widely separated from the main piece and left margin of main piece characteristically excised after insertion of paramere.

DISTRIBUTION (Fig. 85): So far known only from the type locality.

*Limnebius hispanicus* ORCHYMONT

*hispanicus* ORCHYMONT 1941: 1. - ORCHYMONT 1945a. - CHIESA 1959. - J. BALFOUR-BROWNE 1978. - IENISTEA 1978. - VALLADARES & MONTES 1991.

*triparamerus* FRESNEDA, LAGAR & FERRO 1991: 173 (= syn.n.).

TYPE LOCALITY: Jaen, southern Spain.

TYPE MATERIAL: The holotype ♂, two male paratypes and "plusieurs ♀♀" are deposited in the ISNB. I have examined one of the male paratypes from Granada.

SYNONYMS: I have examined one male paratype of *L. triparamerus* from the type locality (Spain, Cadiz) which is deposited in the NMW. The aedeagus is identical with that of the paratype of *L. hispanicus*. The holotype of *L. triparamerus* is deposited in the CFE. Nine additional paratypes are housed in the CFE, CFL, Hernando private collection and in the Lagar private collection.

DIAGNOSIS (of male): 2.3 - 2.4 mm long. Pronotum rather densely punctate and metatibia of male gently curved; thus similar to *L. theryi* from North Africa. Apical protuberance of male ventrite VI very wide and short; disc of ventrite VI without any noticeable impression.

As I have not examined any female of *L. hispanicus* I do not know how they can be distinguished from females of *L. truncatellus*. Females of *L. hispanicus* are probably distinctly shorter than those of *L. freatalis*.

Aedeagus (Fig. 57): All appendages "A" and "B" strongly sclerotized and curved. Left paramere short, apically curved (ventral aspect).

DISTRIBUTION (Fig. 89): Southern Spain.

ADDITIONAL MATERIAL EXAMINED:

S P A I N: JAEN: Rio Madera, 28.VIII.1989, leg. Delgado (NMW).

### *Limnebius ibericus* BALFOUR-BROWNE

*ibericus* J. BALFOUR-BROWNE 1978: 93. - DIAZ PAZOS 1991. - VALLADARES & MONTES 1991. - DIAZ PAZOS & OTERO 1992.

TYPE LOCALITY: Side gravels of fast stream, Minho, Rio Gerês, 1 km S Leonte, Portugal.

TYPE MATERIAL: I have not examined the holotype ♂ (BML) or any of the approximately 100 paratypes (BML) since there is no doubt about the identity of this species. Three paratypes (2 ♂♂ + 1 ♀) are deposited in the CAL.

DIAGNOSIS: 1.4 - 1.6 mm long. General appearance quite similar to *L. bacchus*. Pronotal disc rather distinctly punctate. Elytral apices of female acuminate. Male ventrite VII as in *L. bacchus*.

Aedeagus (Fig. 32): Larger than in other species of the same subgroup. Main piece distinctly recurved (lateral aspect); "pseudoparamere" long and thin, almost straight, about as long as main piece. Left paramere short, apically tapering (ventral aspect) and widely separated from main piece.

DISTRIBUTION (Fig. 86): Portugal, northwestern Spain (Lugo).

MATERIAL EXAMINED:

P O R T U G A L: P. do Cabaçao, S. Estrela, 14.X.1988, leg. Ansemil (NMW); Chapel Guadalupe, 27.II.1987, leg. Bignal (CFA, NMW); GUARDA: Serra de Estrela, 5.VII.1986, leg. Bignal (CFA).

### *Limnebius ignarus* BALFOUR-BROWNE

*ignarus* J. BALFOUR-BROWNE 1978: 94. - VALLADARES & MONTES 1991.

*fuentei* FRESNEDA, LAGAR & FERRO 1991: 178 (= syn.n.).

TYPE LOCALITY: Gravel pockets of fast-flowing small stream, Ronda to Marbella road, 23 km SE Ronda, 1050 m, Malaga Province, southern Spain.

TYPE MATERIAL: I have seen the holotype ♂ (BML): "Type \ SPAIN: Malaga, Ronda-Marbella Rd. 23KM. S.E. of Ronda. 10-1100m. 18. v.1967. \ M.E.Bacchus & B.Levey. B.M.1968-20. \ Limnebius (s.str.) ignarus Type! J.Balfour-Browne det. XII. 1973" and 6 of the 7 paratypes (BML). One paratype ♂ is deposited in the CAL.

**SYNONYMS:** I have not seen the holotype ♂ of *L. fuentei* (described from Cadiz, southern Spain), deposited in the CFE, but I have examined 3 paratypes (2 ♂♂ + 1 ♀) from Cadiz and Malaga, deposited in the NMW.

**DIAGNOSIS:** 1.25 - 1.4 mm long. Pronotal disc glabrous, sparsely punctate. Sexual dimorphism as in other species of the group (e.g. *L. punctatus*, *L. gracilipes*) and (in addition) elytral apices of female more acuminate than in male.

Aedeagus (Fig. 52): Rather similar to that of *L. punctatus*. Appendage "A" strongly enlarged apically, appendage "B" very short and thin; left margin of main piece deeply excised in apical half. Left paramere short, club-shaped.

**DISTRIBUTION** (Fig. 88): Southern Spain (Malaga, Cadiz).

#### *Limnebius irmelae* sp.n.

**TYPE LOCALITY:** River, ca. 5 - 10 m wide, N of Menzel Bouzelfa, E of Tunis, northern Tunisia.

**TYPE MATERIAL:** Holotype ♂ (NMW): "TU: CAP BON 4.8.91 Menzel Bouzelfa leg. Schödl (10)". Paratypes: 3 exs labelled as holotype (NMW); 1 ♂: " 'subglaber' J. Sahlberg 1905 Dj. Ressas [= SE of Tunis] (Const.)" (MHNP).

**DIAGNOSIS:** 1.6 - 1.7 mm long. Colouration, body form, punctuation and shagrination of upper surface as in *L. nitidus*. Maxillary palpi very slightly longer and more slender than in *L. nitidus*. Fore and middle legs of male enlarged; but less strongly than in *L. nitidus*. Elytral apices more or less the same in both sexes, only very slightly longer in female.

Aedeagus (Fig. 45): Very similar to that of *L. maurus*, but main piece longer and more straight; "pseudoparamere" strongly sinuous, apically truncate. Left paramere inserted near middle of main piece.

**DISTRIBUTION** (Fig. 85): Northern Tunisia.

**ETYMOLOGY:** Dedicated to Mrs. Irmela Schödl, thanking her for her willingness to endure the hardships of being a waterbeetlers wife and enabling her husband to collect interesting material during their vacation.

#### *Limnebius kaszabi* CHIESA

*kaszabi* CHIESA 1967: 276. - PEDERZANI 1986.

**TYPE LOCALITY:** Bashgul Valley, 1200 m, Nuristan, northeastern Afghanistan.

**TYPE MATERIAL:** Lectotype ♂, by present designation (MCM): "Nuristan, 1200 m Bashgultal, 15.IV. \ NO. Afghan.1953 J.Klapperich \ ♂ \ PARALECTOTYPUS". Paralectotypes: 1 ♂ + 1 ♀ in MCM (aedeagus of male specimen missing); 5 exs in TMB (aedeagi of males missing); 1 ♀ in MTD; 1 ex. in MFT (not examined). The paralectotypes are labelled more or less as the lectotype. They were collected between April 14 and April 20, 1953, at elevations of 1100 and 1200 m. Number of syntypes not known.

**DIAGNOSIS:** 1.3 - 1.5 mm long. Elytra markedly parallel-sided. Pronotal disc finely punctate, glabrous in male, faintly shagreened in the female paralectotype (MCM).

Aedeagus (Fig. 25): Very similar to that of *L. paranuristanus*. Less sinuous (lateral aspect) than the latter. Ventro-median setae present.

**DISTRIBUTION** (Fig. 84): So far known only from northeastern Afghanistan.

***Limnebius kocheri* BALFOUR-BROWNE**

*kocheri* J. BALFOUR-BROWNE 1978: 102.

TYPE LOCALITY: "La Jacqueline, Korifla" (BALFOUR-BROWNE 1978); Morocco.

TYPE MATERIAL: I have not examined the holotype ♂ deposited in the Royal Sherifian Museum, Casablanca or any of the 6 paratypes (1 ♂ + 4 ♀♀ in Royal Sherifian Museum, 1 ♀ in CAL). There is no doubt about the identity of this species.

DIAGNOSIS (based on one male, see below): 1.7 mm long. General appearance very similar to that of *L. pilicauda*, from which it can be distinguished by the less parallel body form (elytra apically more acuminate), by the shorter and more straight tibiae and by the ventrite VI (protuberance very short and acute, medially not impressed; disc of ventrite VI without any impression). Ventrite VII truncate (as in *L. pilicauda*).

Aedeagus (Fig. 47): Main piece rather short and straight; apically obliquely dilated; with numerous setae in apical half. "Pseudoparamere" short, straight, moderately wide and very difficult to see as it is partly covered by a pocket formed by the main piece. Left paramere very short.

DISTRIBUTION (Fig. 88): So far known only from Morocco.

MATERIAL EXAMINED:

M O R O C C O: Khourigba, El-Khatouat, 800 m, 12.IV.1985, 1 ♂, leg. Wewalka (NMW).

***Limnebius kwangtungensis* PU**

*kwangtungensis* PU 1937: 149. - ORCHYMONT 1939. - PU 1951.

TYPE LOCALITY: Hoa Binh [= ca. 100 km SW of Hanoi], northern Vietnam.

TYPE MATERIAL: This species was originally described from "Chiang-ts'un", near Canton [= Guangzhou], Guangdong, southeastern China. According to PU (1951: 47) all type specimens (holotype ♂ and two female paratypes) which were all deposited in the "Department of Biology, Yenching University, Peking" were "destroyed during the World War II". To ensure taxonomic stability I herewith designate a neotype ♂: "HOA BINH TONKIN DE COOMAN" (MHNG). According to a letter of Ph.J. Clausen (June 9, 1993) there are 3 specimens labelled as paratypes of *L. kwangtungensis* in the UMS. These specimens were not mentioned by PU (1937, 1951). Thus they cannot be regarded as type specimens.

DIAGNOSIS: 1.0 - 1.1 mm long. Brown, middle of pronotum and head (except lateral parts of clypeus) dark brown. Body form more parallel than in *L. kweichowensis*. Pronotum smooth and glabrous, only very faintly punctate; very superficially shagreened near lateral margins.

Aedeagus (Fig. 8): Very similar to that of *L. immersus* KNISCH (Fig. 9), described from the Philippines (Luzon, Mt. Makiling). It can be distinguished from the latter by the slightly longer apex (best seen in dorsolateral view) and by the more sinuous basal half.

I have not seen any female of *L. kwangtungensis* so far and I was not able to find external distinguishing characters for *L. kwangtungensis*, *L. taiwanensis* sp.n. and *L. immersus*.

*Limnebius kwangtungensis* is obviously very closely related with *L. immersus*. Since KNISCH (1926) has not formally designated a holotype of *Limnebius immersus* I herewith designate one male of the 3 syntypes deposited in the ISNB as lectotype: "Mt. Makiling Luzon, Baker \ 19819 \ Coll. A. Knisch TYPUS \ TYPE \ Knisch det. 1924 Limnebius immersus m. \ Ex Coll. Knisch No860 1628 Coll d'Orchym". According to the original description (KNISCH 1926) there should be 4 syntypes.

DISTRIBUTION (Fig. 84): China (Guangdong), Taiwan, Vietnam.

ADDITIONAL MATERIAL EXAMINED:

T A I W A N: "S. Formosa Anping 4.10 Sauter S.V." (HUB, NMW).

V I E T N A M: Hoa Binh, leg. De Cooman (ISNB, NMW).

***Limnebius kweichowensis* Pu**

*kweichowensis* PU 1951: 49.

*japonicus* NAKANE 1965: 52 (= syn.n.). - SATO 1985.

TYPE LOCALITY: "Kweiyang", Guizhou Province, southern China.

TYPE MATERIAL: I have not seen the holotype ♂ and 53 paratypes which are deposited in the collection of C.-L. Pu but I have examined 8 paratypes which are housed in the UMS.

SYNONYMS: I have seen the holotype ♀ (not ♂, as stated in the original description) and the paratype ♀ of *L. japonicus* (described from Tabuse, Suwo, Yamaguchi Pref., Honshu, Japan), deposited in the CNC. Both specimens are mounted on the same pin, carrying the following labels: "Tabuse Suwo 30.X.1948 S.Miyamoto \ HOLOTYPE \ ALLOTYPE \ Limnebius (Bolimnius) japonicus Nakane Det. T.NAKANE 1965 \ Limnebius (Bolimnius) japonicus Nakane Det. T.NAKANE 1965 \ T. Nakane Collection". More material from China and Japan must be examined to decide whether *L. japonicus* can be regarded as a subspecies.

DIAGNOSIS: 1.1 - 1.2 mm long. This species can be distinguished from all other northeast Palearctic members of the *L. atomus* group (*L. boukali* sp.n.; *L. sp.n.* JÄCH & MATSUI, in prep.) by the *L. atomus*-like, drop-shaped body. *Limnebius* sp.n. from Japan and *L. boukali* sp.n. have a distinctly more parallel appearance.

Sternite IX and tergite X also differ significantly from the respective sclerites of the two other species. Sternite IX: longer, its front margin strongly arched; tergite X: basal margin distinctly notched.

Aedeagus (Fig. 19): Main piece very long and curved (ventral aspect), with a subbasal swelling and a series of approximately 10 setae on the left side of the apical third. A long apical flagellum (? extruded rod of the ejaculatory duct) can be observed in the specimen from Beijing.

The aedeagus of *L. clayae* (Fig. 18), described from Assam, can be distinguished by the smaller size, by the differently shaped apex and by the presence of a peculiar protuberance on the middle of the right margin (best seen in ventral aspect).

DISTRIBUTION (Fig. 84): China (Kweiyang and Tushan, Guizhou Province; Beijing); Japan (Honshu).

ADDITIONAL MATERIAL EXAMINED:

JAPAN: SW HONSHU: Murozumi, 28.V.1949, leg. Miyamoto (CNC); Kami-ifuku, Okayama-si, 3.V.1945, leg. K. Sakaguti (CNC).

CHINA: PEKING: small stream, Fragrant Hills, 35 km NW Peking (Beijing), 2.VII.1992, leg. Jäch, 1 ♂ (NMW).

***Limnebius levantinus* sp.n.**

TYPE LOCALITY: Stream, 4 km W Yayladağı, road to Yeditepe, Hatay Province, southern Turkey.

TYPE MATERIAL: Holotype ♂ (NMW): "TR 23.5.1987 Yayladagi leg.Jäch (17)". Paratypes: 15 exs labelled as holotype (NMW, ISNB, SIW); 15 exs: "TR 22.5.1987 Bakaras Fl. Amanos,Jäch (15)" (NMW, MHNG); 11 exs: "TR 23.5.1987 Yayladagi leg.Jäch (15a)" (CAL, ISNB, NMW, SIW); 1 ex.: "TR 28.5.1987 (33) Karaçadağ bei Diyarbakir, Jäch" (NMW); 3 exs: "Asia minor Gazipasa 8.5.69 leg.Wewalka" (NMW); 1 ex.: "SO-TÜRKEI 31.5. Cizre-Şırnak Kızılısu-Fluß (43) leg.Jäch 1987" (NMW); 1 ex.: "TR 8.6.1987 Hizan-Tatvan leg.M.Jäch (68)" (NMW); 2 exs: "TR 26.5.1987 w.Kilis leg.Jäch (28)" (NMW); 4 exs: "TR 29.5.1987 (37) Silvan 100km ö.Diyarbakir,Jäch" (NMW); "TR Gaziantep Kilis 3.5.90 leg.H.Hebauer \ Coll.H.Hebauer" (CHD); Mt. HERMON: 1 ♂: "Ein Nimrod 3.7.87 R.ORTAL leg" (CHD); GOLAN: 8 exs: "ISRAEL 31.3.85 N.Yahudia [= Yahudiyya] Golan / Jäch" (NMW); 6 exs: "ISRAEL 31.3.85 N.Daliyot [= Daliyyot] Golan / Jäch" (NMW); 3 exs: "ISRAEL 31.3.85 Golan N.Daliyot [= Daliyyot]Jäch" (NMW); 2 exs: "ISRAEL 31.3.85 N.Meshushit [= Meshushim] Golan. leg.Jäch" (NMW); 1 ex.: "IL- 1.4.85 Golan/Jäch N.El-Al" (NMW); HULA VALLEY: 1 ex.: "Israel 8.85

Banyas IIa [= Nahal Hermon] Leg.Jäch" (NMW); KINNROT VALLEY: 5 exs: "ISRAEL 31.3.85 N.Samakh Golan / Jäch" (NMW); 1 ex.: "ISRAEL 12.4. Samakh Mdg. [= Samakh Lagoon] leg.Jäch 1986" (NMW); WESTERN GALILEE: 7 exs: "Israel 20.8.85 West-Gal. N.Bezet/Jäch" (NMW).

**DIAGNOSIS:** 1.9 - 2.2 mm (female) and 2.15 - 2.4 mm (male) long. Body form oval, oblong, widest near anterior third of elytra. Upper surface very sparsely covered with very fine adpressed pubescence. Dark brown; appendages yellowish or brown. Labrum punctate, front margin slightly excised; labro-clypeal suture arched and distinctly impressed; middle of clypeus and frons punctate, more or less smooth and glabrous between punctures; fronto-clypeal suture not well impressed. Middle of pronotum smooth and glabrous, faintly or distinctly and moderately densely punctate; pronotal declivities usually more densely punctate, occasionally even microreticulate, but without regular shagrination. Elytra obovate; sides gently rounded; apices more or less truncate or truncately rounded; explanate margin very narrow; surface of elytra moderately densely and superficially punctate and more or less superficially shagreened; suture not convex.

**Sexual dimorphism:** All legs enlarged in male; pre- and mesotarsi with suction setae. Hind leg with long swimming hairs. Male ventrite VI with oblique protuberance as in other species of the species group; disc of ventrite VI deeply impressed before basis of protuberance.

**Aedeagus (Fig. 63):** Smaller than that of *L. crassipes*; appendage "A" characteristically shaped; appendage "C" very long. Left paramere rather short.

**DISTRIBUTION (Fig. 89):** Southeastern Turkey to Israel.

**ETYMOLOGY:** Named in reference to its geographical distribution.

#### *Limnebius loeborum* sp.n.

**TYPE LOCALITY:** Jowar, 1100 m, Swat, northern Pakistan.

**TYPE MATERIAL:** Holotype ♂ (MHNG): "PAKISTAN: Swat Jowar 1100 m 19.V.1983 Besuchet - Löbl". Paratypes: 2 ♂♂ + 1 ♀ labelled as the holotype (MHNG, NMW).

**DIAGNOSIS:** 1.15 - 1.25 mm long. Body form oblong. Broadest near posterior angles of pronotum and anterior third of elytra. Upper surface only very sparsely covered with very fine adpressed hairs. Colouration brown; head (except lateral areas of clypeus), middle of pronotum and elytral suture usually darker brown or black. Maxillary palpi short and stout. Front margin of labrum slightly emarginate; labro-clypeal suture arched and distinctly impressed. Surface of head and pronotum smooth and glabrous, faintly punctate; shagrination confined to lateral areas. Elytra elongate; sides very gently rounded or almost parallel-sided; apices truncate in male, very slightly longer and more rounded (not distinctly acuminate) in female; explanate margin very narrow; surface of elytra superficially or more distinctly shagreened; suture not convex at elytral declivity. All legs of male enlarged, basal three segments of male pre- and mesotarsus slightly dilated, with suction setae.

**Aedeagus (Fig. 11):** Main piece distinctly curved (ventral aspect), strongly dilated and dorso-ventrally flattened in apical half; numerous short setae present; capsule rather short, situated near middle. Parameres absent.

*Limnebius loeborum* sp.n. is easily distinguished from all other Asian species of the *L. atomus* group by the shape of the aedeagus.

**DISTRIBUTION (Fig. 84):** So far known only from the type locality.

**ETYMOLOGY:** Named for my dear friend Ivan Löbl (Geneva) and his amiable family.

#### *Limnebius lusitanus* BALFOUR-BROWNE

*lusitanus* J. BALFOUR-BROWNE 1978: 95. - VALLADARES 1989. - DIAZ PAZOS 1991. - VALLADARES & MONTES

1991.

**TYPE LOCALITY:** Mosses on stones in fast stream, Alto de Rodicio, 940 m, Orense Province, northwestern Spain.

**TYPE MATERIAL:** I have not examined the holotype ♂ (BML) or any of the ca. 50 paratypes (BML) since there is no doubt about the identity of this species. Two paratypes (♂ + ♀) are housed in the CAL.

**DIAGNOSIS:** 1.2 - 1.5 mm long. Black. Pronotal disc smooth and very faintly punctate; shagrination confined to lateral declivities of pronotum. Elytral apices of female acuminate, more or less truncate in male.

Abdominal sternites VIII - IX more or less as in *L. aluta* but sternite IX shorter than in *L. aluta*.

Aedeagus (Fig. 30): Paramere relatively larger than in *L. aluta*; apical appendage distinctly shorter than in *L. aluta*.

*Limnebius lusitanus* is distinguished from *L. ibericus* by the more densely and distinctly punctate head and pronotum and by the more parallel body form.

**DISTRIBUTION** (Fig. 86): Western Spain, Portugal.

**MATERIAL EXAMINED:**

P O R T U G A L: GUARDA: Serra de Estrela, 5.VII.1986, leg. Bignal (CFA).

S P A I N: LEON: Pto. Leitariegos, 1.VII.1985, leg. Valladares (NMW); LUGO: Vilarido, 18.VIII.1988, leg. Paz (NMW); Viveiro, 14.II.1989, leg. Paz (NMW).

### *Limnebius maurus* BALFOUR-BROWNE

*maurus* J. BALFOUR-BROWNE 1978: 96. - VALLADARES 1989. - FRESNEDA et al. 1991. - VALLADARES & MONTES 1991.

**TYPE LOCALITY:** Muddy sides of small swift shaded stream, Granada to Jaen road, 21 km N Granada, Málaga Province, southern Spain.

**TYPE MATERIAL:** I have not examined the holotype ♂ (BML) or any of the ca. 50 paratypes (BML) since there is no doubt about the identity of this species. One paratype ♂ is housed in the CAL.

**DIAGNOSIS:** 1.6 - 1.9 mm long. Externally, probably not significantly different from *L. irmelae* sp.n., *L. gerhardti* and other species of the same group.

Aedeagus (Fig. 46): Main piece wide and flat as in *L. irmelae* sp.n., from which it can be distinguished by the following characters: main piece shorter; "pseudoparamere" more simple, not strongly sinuous, curved apically; left paramere inserted near basal third of main piece.

**DISTRIBUTION** (Fig. 85): Morocco, Iberian Peninsula, Balearic Islands.

**ADDITIONAL MATERIAL EXAMINED:**

P O R T U G A L: Caldas Monchique, 25.II.1987, leg. Bignal (CFA); Rio de Figueira, 19.II.1987, 29.VI.1986, leg. Bignal (CFA); SETUBAL: Marateca, 5.VII.1986, leg. Bignal (CFA).

S P A I N: PALENCIA: "Palencia", leg. Paganetti (NMW); LEON: Sotillo de Cea, 17.VI.1984, leg. Valladares (NMW); BADAJOZ: Rio Cala S Monasterio, 18.IV.1987, leg. Bignal (CFA); NAVARRA: Uje, 17.VI.1986, leg. Bignal (CFA); Sanzain, Tafella-Pamplona Road, 17.VI.1986, leg. Bignal (CFA); ALICANTE: Alcoy, 11.V.1992, leg. H. Hebauer (CHD); MURCIA: Rio Argos, 29.VII.1989, leg. Delgado (NMW); JAEN: Puerto de Zegri, 14.IV.1985, leg. Foster (CFA); GRANADA: Rio Dilar, 11.IX.1991, leg. Foster (CFA); Huéscar, 12.V.1992, leg. H. Hebauer (CHD); IBIZA: S San Miguel, 20.V.1978, leg. Malicky (NMW); MALLORCA: S Lluc, 6.X.1981, leg. Malicky (NMW); Canal de riego, 17.VII.1983, leg. Montes (NMW); Eixartell, 6.I.1990, leg. Foster (CFA).

M O R O C C O: Casablanca, coll. Reitter (TMB), leg. Kocher (MHNP); Rabat, leg. Théry (MHNP, NMW); Tanger (MTD).

### ***Limnebius mesatlanticus* THERY**

*mesatlanticus* THERY 1939: 130. - ORCHYMONT 1945a.

TYPE LOCALITY: Aïn Leuh, Moyen Atlas, Morocco.

TYPE MATERIAL: Lectotype ♂ (Sainte Claire Deville collection, MHNP), by present designation: "Ain Leuh Maroc A. Thery \ mesatlanticus Théry Bull. Maroc XIII, 39, 130". Paralectotypes: 1 ♂ + 2 ♀♀ in MHNP and NMW. Number of syntypes unknown. I have not seen any of the specimens from Azrou (oued Tigrigra), Ras el Ma and Arbalou n'Serdane (haute Moulouya), mentioned in the original description.

DIAGNOSIS: 2.3 - 2.4 mm long. Pronotal disc rather densely punctate. Pro- and mesotibia of male gently curved, only very feebly curved in female. Metatibia of male straight, without swimming hairs. Apical protuberance on male ventrite VI very short but deeply grooved. Elytra superficially shagreened in male; more densely shagreened and mat in female.

Aedeagus (Fig. 65): Main piece with appendages "A" and "B" very prominent. Left paramere very short.

DISTRIBUTION (Fig. 88): So far known only from Morocco.

### ***Limnebius montanus* BALFOUR-BROWNE**

*montanus* J. BALFOUR-BROWNE 1978: 98. - VALLADARES & MONTES 1991.

TYPE LOCALITY: Rio Alberche near San Martin, Sierra de Gredos, 1400 m, Avila, western central Spain.

TYPE MATERIAL: I have examined the holotype ♂ (BML): "Type \ SPAIN: Avila. Sierra de Gredos Rio Alberche, 1400 m., nr. San Martin 29.vi.1966 \ *Limnebius* (s.str.) *montanus* Type! J. Balfour-Browne det. IX.1966" and 17 paratypes (BML, NMW). Two paratypes (♂ + ♀) are deposited in the CAL. According to the original description there should be 21 paratypes.

DIAGNOSIS: 1.6 - 1.7 mm long. Externally, probably not significantly different from other Iberian species of the same group (e.g. *L. gerhardti*, *L. maurus*). The characters listed by BALFOUR-BROWNE (1978: 99) as distinguishing features (castaneous colour, incomplete transverse reticulation of elytra) are not useful.

Aedeagus (Fig. 44): Main piece very long and slender, in its distal part somewhat resembling *L. gerhardti* and *L. nitidus*; "pseudoparamere" very long, apically strongly curved. Left paramere very long and slender, not separated from main piece, inserted near phallobasis.

DISTRIBUTION (Fig. 85): Portugal, western Spain.

### ***Limnebius mucronatus* BAUDI**

*mucronatus* BAUDI 1872: 39. - KNISCH 1924. - GRIDELLI 1926. - ORCHYMONT 1945b. - CHIESA 1959. - ENDRÖDY 1967. - PIRISINU 1970, 1981. - J. BALFOUR-BROWNE 1978. - IENISTEA 1978.

TYPE LOCALITY: Italy (no lectotype designated).

TYPE MATERIAL: I have not examined any of the syntypes (exact number unknown) which are housed in the MZT (not accessible at present).

DIAGNOSIS: 1.15 - 1.55 mm long. Somewhat related with *L. pilicauda*. Pronotal disc usually distinctly (occasionally only faintly) punctate, glabrous between punctures. Elytral apices of female acuminate. Male ventrite VI with prominent protuberance, but disc not significantly impressed.

Aedeagus (Fig. 56): Vaguely resembling *L. ignarus*, *L. pilicauda*, *L. punctatus*, *L. similis*. Main piece rather straight, left margin excised near insertion of left paramere. Appendage "A" curved. Left paramere short, club-shaped.

DISTRIBUTION (Fig. 88): Corsica, Italy (incl. Sardinia and Tuscan Archipelago).

ADDITIONAL MATERIAL EXAMINED:

F R A N C E: CORSICA: Porto, 18.VIII.1981, leg. Wewalka (NMW); Ajaccio, leg. Schneider (NMW).  
 I T A L Y: SARDINIA: Carloforte, leg. Dodero (MHNP); S.Teresa, VI.1968, leg. Palm (ZML); S.Giorgio, VI.1967, leg. Palm (ZML, NMW); Terra Nova, leg. Paganetti (NMW, CPL); Terranova, Pausania, coll. Grundmann (NMW); Flumini, leg. Paganetti (NMW); Flumentorgiu, leg. Solari, coll. Hauser (NMW); Santadi, leg. Dodero (NMW); Domusnovas, 26.V.1892, leg. Dodero (NMW); Bosa, 24.VI.1976, leg. Wewalka (NMW, CWW); Gennargentu, 900 m, 16.VII.1992, leg. Jäger (MTD); Fonni, Nuoro, 2.VII.1976, leg. Wewalka (NMW); Nuoro, Pratobello, Rio Olai, 800 - 900 m, 15.VII.1992, leg. Jäger (MTD); ELBA: "Elba", leg. Winkler, leg. Moczarski, leg. Holdhaus (NMW, OLL, SIW, SNMB, ZIL); GIGLIO: alle Canelle, VIII.1899, leg. Gestro (NMW, CBG); LIGURIA: Genova, leg. Solari (NMW); EMILIA: "Emilia", leg. Fiori (MTD); Imola (NMW).

*Limnebius mundus* BAUDI

*mundus* BAUDI 1864: 223. - KNISCH 1924. - ORCHYMONT 1940a.

TYPE LOCALITY: Cyprus.

TYPE MATERIAL: Lectotype ♂ (by present designation), deposited in the DEI: "♂ \ mundus Baudi x Cypr. \ Coll. Kraatz \ histor. Exempl. vielleicht Type \ det. Kniz mundusBdi. \ DEI Eberswalde \ mundus Baudi". Two female paralectotypes are housed in the same institution. One paralectotype is housed in the ZSM. According to ORCHYMONT (1940a) there are no syntypes in the Baudi collection in the MZT.

DIAGNOSIS: 1.2 - 1.3 mm long. Colouration, body form, shagrination and sexual dimorphism as in other members of the species group.

Aedeagus (Fig. 29): Very short, stout, cylindrical.

DISTRIBUTION (Fig. 85): Obviously endemic to Cyprus.

ADDITIONAL MATERIAL EXAMINED:

CYPRUS: Stavromuni, 30.VI.1939, leg. Lindberg (NMW, ZMH); Larnaka, 25.VI.-1.VII.1939, leg. Lindberg (ZMH); Limassol, 2.VII.1939, leg. Lindberg (ZMH).

*Limnebius murcus* ORCHYMONT

*murus* ORCHYMONT 1945a: 21. - CHIESA 1959. - IENISTEA 1978.

TYPE LOCALITY: Murnies, 150 m, eastern Crete, Greece.

TYPE MATERIAL: I have examined the holotype ♂ (ISNB). I have not seen the three female paratypes which are housed in the same institution.

DIAGNOSIS: The holotype is 1.1 mm long, black. Elytra more or less parallel-sided. It differs from the remaining species of the *L. mundus* group in the slightly smaller size.

Aedeagus (Fig. 24): Straight and stout, constricted in middle (ventral aspect), with several groups of apical and subapical setae and two (one long and one short) pairs of ventro-median setae; dorsal margin strongly bisinuous; apex notched (ventral aspect).

DISTRIBUTION (Fig. 85): So far known only from Crete, southern Greece.

*Limnebius murentinus* ORCHYMONT

*murentinus* ORCHYMONT 1945a: 22.

*ab.narentinus*, CHIESA 1959: 75 (= lapsus linguae).

TYPE LOCALITY: Karyaes, Chios, Greece.

TYPE MATERIAL: I have not examined the holotype ♂ or any of the 50 paratypes, all deposited in the ISNB. There is no doubt about the identity of this species.

**DIAGNOSIS:** 1.3 - 1.55 mm long. Pronotal disc impunctate and smooth or moderately densely punctate; usually very superficially shagreened in female; sides of pronotum and elytra distinctly shagreened. Elytral apices of male evenly rounded, those of female acuminate rounded. Sixth abdominal ventrite of male longer than in female, its front margin convex. Seventh abdominal ventrite of male distinctly transversely grooved, its apex more or less gibbous. Seventh abdominal ventrite of female (sternite IX) larger, only shallowly transversely impressed, apical margin broadly convex.

**Aedeagus (Fig. 26):** Straight and stout, constricted in middle (ventral aspect); apex wide, obliquely truncate, with a short, faintly sclerotized appendage; with several groups of apical and subapical setae, some of which may indicate the position of reduced parameres.

**DISTRIBUTION (Fig. 85):** Western Turkey, northeastern Greece and eastern Greek islands (Lesbos, Chios, Samos, Kos, Rhodos).

#### MATERIAL EXAMINED:

G R E E C E: THRAKI: 3 km S Mikro Derio, 27.VII.1988, leg. Jäch (NMW); KOS: 5 km E Kos, 12.VI.1985, leg. Wewalka (NMW, SIW); RHODOS: Loutani Valley, stream above Arhipoli, 10.IV.1993, leg. Jäger (MTD), 2.5 km N Arhipoli, 12.IV.1993, leg. Jäger (MTD); Loutani River, below "7 springs", 12.IV.1993, leg. Jäger (MTD).

T U R K E Y: BURSA: Ulu Dağ, 31.VII.1988, leg. Jäch (NMW); BALIKESIR: 30 km E Dursunbey, 2.VIII.1988, leg. Jäch (NMW).

### *Limnebius myrmidon* REY

*myrmidon* REY 1883: 88. - KNISCH 1924. - J. BALFOUR-BROWNE 1938, 1978. - ORCHYMONT 1938, 1945a. - HORIZON 1949. - CHIESA 1959, 1964. - ENDRÖDY 1967. - FRANZ 1970. - IENISTEA 1970, 1978. - LOHSE 1971. - BURAKOWSKI et al. 1976. - PIRISINU 1981. - VALLADARES 1989. - GARRIDO GONZALES 1990. - VALLADARES & MONTES 1991.

*punctillatus* REY 1885a: 16. - REY 1885b: 328. - KNISCH 1924. - ORCHYMONT 1938.

*janssensi* CHIESA 1964: 316 (= syn.n.).

**TYPE LOCALITY:** Tarbes, Hautes Pyrénées, southern France.

**TYPE MATERIAL:** Lectotype ♂, by present designation (MGL - original Rey collection, box 23): "Tarbes Pandellé". Five paralectotypes are housed in the same collection.

**SYNONYMS:** Lectotype ♀ of *L. punctillatus* (MGL), by present designation: "[round label, pale brown, indicating the locality: Beaujolais] \ ♀ \ 18 \ myrmidon R. ex Fauv". This is the only specimen standing under the name "punctillatus Rey" in the original Rey collection (MGL).

I have seen the holotype ♂ of *L. janssensi*, deposited in the ISNB. I could not find any significant external differences between this specimen and material of *L. myrmidon* from Turkey. Unfortunately the aedeagus of the holotype seems to be lost (K. Desender, letter of 22.2.1993).

**DIAGNOSIS:** 0.95 - 1.2 mm long. Very similar to *L. perparvulus* with which it generally agrees (body form, size). It can be distinguished externally from the latter by the shagrination of the pronotal declivities (shagrination usually confined to lateral areas or angles in *L. perparvulus*, more developed in *L. myrmidon*) and the elytral suture (flat in *L. myrmidon*, convex at elytral declivity in *L. perparvulus*). Abdominal sternite IX of female rather short and truncate in *L. myrmidon*, very long and apically arched in *L. perparvulus*.

**Aedeagus (Fig. 2):** Main piece very short, slightly curved (lateral aspect).

**DISTRIBUTION (Fig. 85):** France to Turkey.

#### ADDITIONAL MATERIAL EXAMINED:

F R A N C E: HAUTES PYRENEES: Tarbes, leg. Rey (NMW); CHER: Bec d'Allier, leg. Sainte Claire Deville (ISNB); ARDECHE: 4 km S Ruoms, Ardèche River, V.1989, leg. Kiener (CKK); VAR: La Môle, leg. Sainte Claire-Deville (NMW); ALPES MARITIMES: l'Escarene, leg. Sainte Claire-Deville (MHNP).

I T A L Y: Sardinia: Fonni, VII.1911, leg. Dodero (ISNB); "Liguria", leg. Fiori (HUB, MHN); Liguria: Piacenza, Fontanigorda, Trebbia, VIII.1933, leg. Solari (ISNB).

A U S T R I A: STEIERMARK: Graz (ISNB).

P O L A N D: "Liegnitz" [= Legnica], leg. Letzner (ISNB); "Breslau" [= Wroclaw], leg. Letzner (ISNB).

S L O V E N I A: Istria, Risano [= Rizana], 15.VII.1929, leg. Orchymont (ISNB), III.9113, leg. Pretner (CPL, NMW); Zemon di Sotto Dulla Ruis, 21.VII.1929, leg. Orchymont (ISNB); Branica, IX.1912 (NMW, CPL).

B O S N I A: Sarajevo, Miljacka, 8.VIII.1929, leg. Orchymont (ISNB).

S E R B I A: Uzice, Djutina, 10.VIII.1929, leg. Orchymont (ISNB); Toplica River, 60 km W Nis, 19.VII.1988, leg. Jäch (NMW).

B U L G A R I A: Krapec, 18.VIII.1929, leg. Orchymont (ISNB).

T U R K E Y: ÇANAKKALE: 5 km W Yenice, 4.VIII.1988, leg. Jäch (NMW); E Umurbey, 6.VIII.1988, leg. Jäch (NMW); İSTANBUL: Ağva, 19.V.1987, leg. Jäch (NMW); BALIKESİR: Aliova River nr. Dursunbey, 2.VIII.1988, leg. Jäch (NMW); BURSA: Bursa-Orhaneli, 1.VIII.1988, leg. Jäch (NMW, CBG); MUĞLA: Zine River, 250 m, 28.V.1991, leg. Jäch (NMW); BITLIS: 60 km SE Tatvan, 8.VI.1987, leg. Jäch (NMW); Mutki, W Tatvan, 11.VI.1987, leg. Jäch (NMW, SIW, ZIL); ORDU: Melet River, 28.V.1989, leg. Jäch (NMW); MUŞ: Buglan Pass, 11.VI.1987, leg. Jäch (NMW).

### *Limnebius nanus* sp.n.

TYPE LOCALITY: Escorial, Madrid, central Spain.

TYPE MATERIAL: Holotype ♂ (NMW): "Escorial". Paratypes: 1 ♀: "Escorial" (NMW); 1 ♂: "Escorial \ L. evanescens Escorial. Ksw" (MHN); 2 exs: "Limnebius atomarius Guadarrama" (MHN); 1 ex.: "Guadarrama" (NMW).

DIAGNOSIS: 1.0 - 1.1 mm long. Body form oblong. Broadest near anterior third of elytra. Upper surface very sparsely covered with very fine adpressed hairs. Colouration brown; head, middle of pronotum and elytral suture usually darker brown or black. Maxillary palpi short and stout. Labrum sparsely punctate and shagreened, front margin emarginate; labro-clypeal suture arched and distinctly impressed; fronto-clypeal suture not well impressed; clypeus, frons and pronotum entirely (!) shagreened. Elytra elongate; sides only very gently rounded; apices separately truncately rounded in both sexes; explanate margin very narrow; surface of elytra shagreened, meshes small and round; suture slightly convex at elytral declivity.

Sexual dimorphism: All legs of male enlarged, basal three segments of male pre- and mesotarsus slightly dilated, with suction setae. Male ventrite VII considerably longer than that of female. Other abdominal sclerites very similar in both sexes. Apex of female sternite IX (ventrite VII) truncate, only very feebly arched.

Aedeagus (Fig. 12): Main piece comparatively short, slightly curved (lateral aspect). Shape of apex similar to that of *L. evanescens*. It can be distinguished from the latter by the distinctly shorter main piece.

*Limnebius nanus* sp.n. is easily distinguished from other related species of the *L. atomus* group by the entirely and distinctly (female) or more superficially (male) shagreened pronotum.

DISTRIBUTION (Fig. 83): So far known only from central Spain.

ETYMOLOGY: *Nanus* (Latin) - dwarf. Named in reference to the small size.

### *Limnebius nitiduloides* BAUDI

*nitiduloides* BAUDI 1872: 35. - KNISCH 1924. - ORCHYMONT 1945a. - CHIESA 1959. - ANGELINI & FERRO 1974. - IENISTEA 1978. - PIRISINU 1981.

TYPE LOCALITY: Apennines, Italy.

TYPE MATERIAL: Lectotype ♂ (by present designation): "Baudi Type. Apennines \ nitiduloides Baudi Italia Sicil" (MHN, Kuwert collection). Additional syntypes are probably deposited in the MZT. Number of syntypes not

known.

**DIAGNOSIS:** 2.4 - 2.5 mm (female) and 2.5 - 2.6 mm (male) long. Closely related with *L. truncatellus* and *L. crassipes*. Pronotum densely and deeply punctate as in these species. Metatibia of male long and straight, less widely enlarged than in *L. crassipes*; inner surface densely covered with long swimming hairs. Other sexual characters as in related species.

**Aedeagus (Fig. 68):** Very large. Appendage "C" very long, strongly curved and strongly sclerotized. Left paramere more or less straight.

**DISTRIBUTION (Fig. 89):** Italy. The species has been recorded from Corsica and Sardinia by Pirisinu (1981); I have never seen specimens from these islands.

#### ADDITIONAL MATERIAL EXAMINED:

I T A L Y: San Remo, leg. Schneider (MTD); Genova, 6.XI.1892, leg. Solari (NMW); Porretta, 1928, leg. Chiesa (MHNP, NMW); Abruzzi, Gran Sasso, F. Vomano, spring, 24.VIII.1992, leg. Schönmann (NMW); Abruzzi, VIII.1898, leg. Solari (NMW); Montecaprarro, 1898, leg. Solari (NMW); Latium: Fiume Fiora, 20.IV.1992, leg. Jäger (MTD); Sicilia, Failla, coll. Kaufmann (NMW); Monte Pagano, leg. Paganetti (NMW).

### *Limnebius nitidus* (MARSHAM)

*nitidus* MARSHAM 1802: 407 (described as *Hydrophilus nitidus*). - KNISCH 1924. - NORMAND 1933. - ORCHYMONT 1935, 1938. - J. BALFOUR-BROWNE 1938, 1978. - HORION 1949. - F. BALFOUR-BROWNE 1958. - CHIESA 1959, 1970. - BRAKMAN 1966. - ENDRÖDY 1967. - FRANZ 1970. - IENISTEA 1970, 1978. - LOHSE 1971. - G. FOSTER 1972, 1977, 1984, 1986, 1990. - BURAKOWSKI et al. 1976. - HODGE 1977. - NIEUKERKEN & TOL 1978. - BANGSHOLT et al. 1979. - BERCIO & FOLWACZNY 1979. - FOSTER & SINCLAIR 1980. - HEBAUER 1980. - PIRISINU 1981. - NIEUKERKEN 1982. - A. FOSTER 1984. - A. FOSTER & G. FOSTER 1984. - LAGAR 1984. - BELLSTEDT & MERKL 1987. - CARR 1987. - HANSEN 1987. - DRAKE 1988. - FRIDAY 1988, 1990. - FRESNEDA et al. 1991. - ANGUS & DIAZ PAZOS 1991. - VALLADARES & MONTES 1991. - GRAUVOGL 1992. - FOSTER et al. 1992. - LAGAR & FRESNEDA 1992. - BELLSTEDT 1993a, 1993b.

*picinus* MARSHAM 1802: 407 (described as *Hydrophilus picinus*). - KNISCH 1924. - J. BALFOUR-BROWNE 1938, 1978. - ORCHYMONT 1938. - WÖRNLE 1950. - F. BALFOUR-BROWNE 1958. - CHIESA 1959. - ENDRÖDY 1967. - ALFIERI 1976. - PIRISINU 1981. - FERRO 1983.

*picinus* LEACH 1815: 96 (= unjustified emendation of *picinus* MARSHAM). - KNISCH 1924. - J. BALFOUR-BROWNE 1938. - ORCHYMONT 1938.

*marginalis* STEPHENS 1829: 120. - KNISCH 1924. - F. BALFOUR-BROWNE 1958.

*sericans* MULSANT & REY 1861: 59. - KNISCH 1924. - J. BALFOUR-BROWN 1938. - ORCHYMONT 1938.

*sericatus*, HEYDEN 1870: 71 (= *sericans* MULSANT & REY, misprinted). - KNISCH 1924. - J. BALFOUR-BROWNE 1938. - ORCHYMONT 1938.

*fussii* GERHARDT 1876: 167. - KNISCH 1924 [*fussi*, unjustified emendation]. - J. BALFOUR-BROWNE 1938. - ORCHYMONT 1938.

*dissimilis* KUWERT 1890: 102. - KNISCH 1924. - J. BALFOUR-BROWNE 1938. - ORCHYMONT 1938.

*fallax* KUWERT 1890: 100. - KNISCH 1924. - ORCHYMONT 1945b.

**TYPE LOCALITY:** Great Britain, no precise data known.

**TYPE MATERIAL:** The lectotype ♀ (designated by BALFOUR-BROWNE 1938) is deposited in the BML. I have examined this specimen.

**SYNONYMS:** Jack BALFOUR-BROWNE (1938) has designated a lectotype (♂) for *Limnebius picinus* MARSHAM (described as *Hydrophilus picinus* from Great Britain) and established the synonymy. I have examined this specimen.

Emma de Boise (BML) has sent me 4 specimens of *L. nitidus* (no labels) which are probably syntypes of *L. marginalis*, described from London and Devonshire. I herewith designate one male as lectotype of *L. marginalis*.

Lectotype ♀ of *L. sericans* (by present designation: "Sericans Lyon \ sericans type de M.", deposited in the MHNP (KUWERT collection). Two paralectotypes are deposited in the MMB and 6 in the MGL.

There are no syntypes of *L. füssii*, described after 12 specimens from Ahrweiler (West Germany, leg. Fuß) and 1 ♀ from Silesia (Poland, leg. Gerhardt) in the Museum Alexander König, Bonn (H. Roer, letter of 18.2.1993). Part of the Fuß collection was acquired by the Gymnasium Collegium Josephinum, Bonn. Three specimens deposited in this collection under the name *L. nitidus* lack any label data. According to A. Slipinski (letters of 13.9.1986 and 20.1.1987) the collection of Gerhardt was probably destroyed during world war II. The synonymy of *L. nitidus* and *L. füssii* was established by KNISCH (1924).

Lectotype ♂ (by present designation) of *Limnebius dissimilis* described from "St. Remo [= San Remo, Italy] Reitt. i. litt." (NMW): "S.Remo Schneider \ difficilis [handwriting of Reitter] \ dissimilis Kuw. Type. [handwriting of Ganglbauer]". Four paralectotypes are housed in the NMW, three paralectotypes ("St. Remo") are deposited in the Kuwert collection (MHNP) and two are found in the HUB. It was probably Reitter's intention to name this species "difficilis", not "dissimilis".

The Kuwert collection in the MHNP contains 3 females (obviously conspecific with *L. crinifer*) standing over the label "fallax Kuw. Gall.mer.". They cannot be taken as syntypes of *L. fallax* since they are from Amby (Holland) and not from one of the countries listed in the original description: "Frankreich. Sardinien. Klein-Asien." As I could not find any other specimen labelled "fallax" in the Kuwert collection I designate one ♂ of the specimens which were sent to Ganglbauer as *Limnebius sericans* (= *L. nitidus*) by Guillebeau ("Guillebeau Frankreich \ ♂ \ Limnebius sericans REY") as lectotype of *Limnebius fallax*, since KUWERT (1890) added "sericans Guillebeau" [not Mulsant & Rey] and "sericans Muls. pars." to the original description.

**DIAGNOSIS:** 1.4 - 1.7 mm long (length:width = 1.75 - 1.9). Brown or black with elytral and pronotal margins paler brown. Pronotum moderately densely punctate; disc usually smooth and glabrous between punctures, only rarely (some females) superficially shagreened. Elytra and lateral declivities of pronotum shagreened. Elytral apices more or less truncate in both sexes. First 3 pretarsal segments of male enlarged, with suction setae. Ventrite VI of male longer than in female, but without any other significant modifications. Male ventrite VII transversely impressed, apically not strongly produced and not gibbous. Female ventrite VII long, apically strongly arched.

**Aedeagus** (Fig. 40): Main piece wide and stout until insertion of left paramere and "pseudoparamere", then very slender; apically slightly widening, with a few appendages; left margin with about 7 setae; "pseudoparamere" long and slender, apically curved. Left paramere distinctly separated from main piece, with numerous setae.

**DISTRIBUTION** (Fig. 86): Great Britain to Scandinavia and Slovakia. Along the northern fringe of the Mediterranean.

#### ADDITIONAL MATERIAL EXAMINED:

S W E D E N: "Suecia", leg. Merkl, coll. Hauser (NMW).

G R E A T B R I T A I N; ENGLAND: Didcot, 28.VIII.1991, leg. Dunn (CFA); Huntingdonshire, 11.V.1991, leg. Foster (CFA); SCOTLAND: Bute, 23.V.1990, leg. Foster (CFA); Devon, Christow (MHNP).

S P A I N: "Cataluña: Santa Caloma, 27.V.1984, leg. H. Hebauer" (CHD, NMW); GERONA: Tossa de Mar, VI.-VII.1963 (NMW); Vidreras, 31.III.1984, leg. H. Hebauer (CHD, NMW); BARCELONA: Tordera, 28.III.1984, leg. H. Hebauer (NMW).

F R A N C E: AIN: Le Plantay, coll. Guillebeau (NMW); ALPES MARITIMES: "Nizza" [= Nice], coll. Grundmann (NMW); ORNE: L'Aigle, IX.1931 (MHNP).

I T A L Y: Liguria, 6.VIII.1897, leg. Fiori (HUB, MHNP); Piemonte, VII-1907, leg. Fiori (HUB).

G E R M A N Y: BAYERN: Landau, Isaraltwasser, 9.VI.1984, leg. Foster (CFA); HESSEN: Kassel, Dönche, 9.VIII.1990, leg. Bellstedt (CBG); NORDRHEIN-WESTFALEN: Düsseldorf, Büderich, 16.IV.1938, leg. Ermisch (HUB); RHEINLAND-PFALZ: Wolfstein, coll. Eppelsheim (NMW).

A U S T R I A: WIEN: "Wien Umg.", leg. Winkler (NMW); NIEDERÖSTERREICH: Laxenburg, coll. Grundmann (NMW); Rußbach, 25.VI.1953, leg. Jäch (NMW); TIROL: Thaur, Fischteich, 13.XI.1948, 26.X.1951, leg. Wohlmann (TLFI, NMW).

S L O V A K I A: Blahovd, 6.IV.1985, 20.VIII.1985, leg. Kodada (NMW).

### *Limnebius nitifaros* ORCHYMONT

*nitifaros* ORCHYMONT 1938: 277. - J. BALFOUR-BROWNE 1978.

TYPE LOCALITY: Tarfaia, near Philippeville [= Skikda], northeast Algeria.

TYPE MATERIAL: I have seen the holotype ♂ and one female paratype which are deposited in the Sainte Claire Deville collection (MHNP). One male paratype is housed in the NMW. Number of paratypes unknown.

Since I could not examine the holotype of *Limnebius pilicauda* which was described from "Philippeville" [= Skikda] it should be kept in mind that *L. nitifaros* could be a junior synonym of *L. pilicauda*.

DIAGNOSIS: 1.7 mm long. Externally, probably not significantly different from other species of the same group (e.g. *L. gerhardti*, *L. irmelae* sp.n., *L. maurus*).

Aedeagus (Fig. 43): Apical two thirds of main piece rather long and slender, left side strongly sinuous; "pseudoparamere" sinuous, apically tapering. Paramere slightly arched, somewhat separated from main piece.

DISTRIBUTION (Fig. 85): Algeria.

#### ADDITIONAL MATERIAL EXAMINED:

A L G E R I A: Alger, coll. Perrot (MHNG); St. Charles, leg. Thery (MHNP).

### *Limnebius nitigeus* ORCHYMONT

*nitigeus* ORCHYMONT 1945b: 10. - CHIESA 1959. - LENISTEA 1978.

TYPE LOCALITY: Stream near Vladaja, Bulgaria.

TYPE MATERIAL: I have not seen the holotype ♂ or any of the two paratypes, all deposited in the ISNB. There is no doubt about the identity of this species.

DIAGNOSIS: Very closely related to *L. graecus* sp.n., from which it can probably not be distinguished externally.

Aedeagus (Fig. 38): Apex of main piece hook-like, which distinguishes this species readily from *L. graecus* sp.n.

DISTRIBUTION (Fig. 86): Bulgaria, Makedonia, northern Greece, northwestern Turkey.

#### MATERIAL EXAMINED:

M A K E D O N I A (former Yugoslav republic): Pretor, 4.VII.1963, leg. Pretner (CPL, NMW).

G R E E C E: MAKEDONIA: Drama-Livadero, 9.VII.1988, leg. Jäch (NMW); THRAKIA: 3 km S Mikro Derio, 27.VII.1988, leg. Jäch (NMW); Nestos, Paranestos, 8.VIII.1988, leg. Jäch (NMW); THASOS: Megalos Prinos, 11.IX.1991, leg. Jäch, leg. Preuler (NMW, SIW); Potamias, 9.IX.1991, leg. Jäch (NMW).

### *Limnebius oblongus* REY

*oblongus* REY 1883: 88. - KNISCH 1924. - J. BALFOUR-BROWNE 1938, 1978. - ORCHYMONT 1938, 1945a. - LENISTEA 1978. - PIRISINU 1981. - VALLADARES & MONTES 1991.

TYPE LOCALITY: Provence, southern France.

TYPE MATERIAL: Four specimens are deposited in the original Rey collection (box 23) under the name *Limnebius oblongus* in the MGL. All specimens carry a small round black label which - according to Rey's catalogue - stands for Provence. I have dissected one male which is herewith designated as lectotype of *Limnebius oblongus*. All specimens seem to be conspecific.

DIAGNOSIS: 1.2 - 1.3 mm long. Very closely related with *L. perparvulus*. Pronotal disc smooth and shining, very faintly punctate. Elytra rather elongate; apices more or less truncate in both sexes.

Aedeagus (Fig. 16): Very similar to that of *L. perparvulus*, but more heavy; apex more distinctly sinuous.

DISTRIBUTION (Fig. 83): France to Morocco.

#### ADDITIONAL MATERIAL EXAMINED:

F R A N C E: ALPES MARITIMES: Menton, 1905, leg. Sainte Claire-Deville (MHNP, NMW); Nice, leg. Sainte Claire-Deville (MHNP); l'Escarène, leg. Sainte Claire-Deville (MHNP).

S P A I N: MURCIA: R. Argo, 30.III.1989, leg. Delgado (NMW).

M O R O C C O: "Marocco", coll. Reitter (TMB); Casablanca, coll. Reitter (TMB); Kef-el-Rhar, Oued Cherif, Riff, 800 m, 23.VIII.1936 (MHNP).

### *Limnebius paganettii* GANGLBAUER

*paganettii* GANGLBAUER 1904: 261. - KNISCH 1924. - ORCHYMONT 1945b. - CHIESA 1959. - IENISTEA 1970, 1978.

TYPE LOCALITY: "Castelnuovo" (GANGLBAUER 1904) [= Hercegnovi, Crna Gora, Yugoslavia].

TYPE MATERIAL: Lectotype ♂ (by present designation): "Castelnuovo Hummler \ Paganettii" (NMW). Five paralectotypes in the NMW.

DIAGNOSIS: Very closely related with *L. fallaciosus*. Males can be distinguished from males of *L. fallaciosus* by the distinctly larger size (1.9 - 2.15 mm long) and by the distinctly curved meso- and metatibia, each of which bears a fringe of long swimming hairs. Other sexual characters as in *L. fallaciosus*.

Aedeagus (Fig. 54): Larger than that of *L. fallaciosus*. Ventral appendages and apex of left paramere significantly different. Appendages hidden behind fringes of setae in ventral aspect.

DISTRIBUTION (Fig. 89): Crna Gora, Serbia, Rumania, Greece, western Turkey.

#### ADDITIONAL MATERIAL EXAMINED:

M A K E D O N I A (former Yugoslav republic): Babuna River, SW Titov Veles, 13.VIII.1988, leg. Jäch (NMW); 25 km N Struga, 20.VII.1988, leg. Jäch (NMW).

G R E E C E: "Attica", coll. Reitter (TMB); MAKEDONIA: Orfanion, 50 km W Kabala, 25.VII.1988, leg. Jäch (NMW); 15 km E Kabala, 26.VII.1988, leg. Jäch (NMW); Chalkidiki, Ag. Prodromos, 8.VI.1986, leg. H. Hebauer (CHD); THRAKIA: Nestos, Paranestos, 8.VIII.1988, leg. Jäch (NMW, SIW, ZIL); 15 km N Alexandroupolis, 27.VII.1988, leg. Jäch (NMW); KORFU: Messongi, V.1964, leg. Palm (ZML); Ag. Matheos, 13.VIII.1978, leg. Fery (CFB, NMW).

T U R K E Y: ÇANAKKALE: E Umurbey, 6.VIII.1988, leg. Jäch (NMW).

### *Limnebius papposus* MULSANT

*papposus* MULSANT 1844: 92. - KNISCH 1924. - ORCHYMONT 1932, 1945b. - HORION 1949. - WÖRNDEL 1950. - F. BALFOUR-BROWNE 1958. - CHIESA 1959. - BRAKMAN 1966. - ENDRÖDY 1967. - HOCH 1968. - FRANZ 1970. - IENISTEA 1970, 1978. - LOHSE 1971. - G. FOSTER 1972, 1977, 1986, 1990. - BURAKOWSKI et al. 1976. - PALMER 1977a, 1977b. - J. BALFOUR-BROWNE 1978. - DRISCOLL 1978. - BANGSHOLT et al. 1979. - BERCIÓ & FOLWACZNY 1979. - BIESIADKA 1980. - HEBAUER 1980, 1984. - PIRISINU 1981. - GEISER 1982. - NIEUKERKEN 1982. - FERRO 1983. - ANGELINI & FERRO 1984. - A. FOSTER 1984. - A. FOSTER & G. FOSTER 1984. - NILSSON 1984. - BURMEISTER 1986. - KODADA & MAJZLAN 1987. - BELLSTEDT & MERKL 1987. - HANSEN 1987. - SPITZENBERG 1987. - FRIDAY 1988, 1990. - VALLADARES 1989. - ANGUS & DIAZ PAZOS 1991. - VALLADARES & MONTES 1991. - BELLSTEDT 1993a, 1993b.

TYPE LOCALITY: "Cette espèce paraît habiter toutes les parties tempérées de la France. Elle est moins commune que les autres dans les environs de Lyon." (MULSANT 1844); France, no precise data known.

TYPE MATERIAL: Since the original Mulsant collection was destroyed, I designate one male from the Rey collection as lectotype of *L. papposus*. Mulsant and Rey have cooperated through many years and exchanged specimens. Thus it is very likely that specimens from the Rey collection represent syntypes of species described by

Mulsant. There are 5 specimens of *L. papposus* from various parts of France deposited in the Rey collection (MGL). I herewith designate one male, labelled only "♂" as lectotype of *L. papposus*.

**DIAGNOSIS:** 1.8 - 2.2 mm (female) and 2.2 - 2.5 mm (male) long. Within the *L. parvulus* group this species is characterized by a number of deviating characters: colouration in mature specimens predominantly brown (instead of black), pronotal disc and head dark brown to black; mentum shallowly impressed longitudinally; second segment of male maxillary palpus strongly dilated and dorso-ventrally flattened. Female ventrite VII with apical setae.

Teneral females of *L. crinifer* are quite similar to females of *L. papposus*, but females of *L. papposus* are easily recognized by the impressed mentum.

**Aedeagus (Fig. 79):** Quite similar to that of *L. crinifer*; apical appendage longer and more intricately shaped; left apical angle of main piece (ventral aspect) acute, with a group of modified (dilated and flattened) setae. Left paramere with a long furcate setiferous appendage.

**DISTRIBUTION (Fig. 87):** Spain to Turkey.

#### ADDITIONAL MATERIAL EXAMINED:

S P A I N: GUADALAJARA: Anguela del Ducado, 19.II.1990, leg. Fery, 1 ♂ (CFB).

F R A N C E: Paris, Gorgan, 6.VI.1901 (NMW); ARDENNES: Saulces-Champenoise, 22.-27.IV.1918, leg. Salchert (HUB); SARTHE: Beaumont-sur-Sarthe, 24.IV.1985, leg. Foster (CFA); HAUTE-MARNE: Gudmont, leg. Sainte Claire-Deville (MHNP).

N E T H E R L A N D S: "Holland", leg. Everts (NMW).

I T A L Y: "Monte Pagano", leg. Paganetti (NMW, MTD); SÜDTIROL: Bozen, Moritzinger Moor, 14.IX.1912, leg. Ratter (CKL, TLFI); Vintschgau, Schluederns, Etschau, 24.IV.1973, leg. Kahlen (CKH); FRIULI VENEZIA GIULIA: "Carniola Weissenfels" [= Fusine nr Tarvisio] (NMW); "Tarvis" [= Tarvisio], 1892, leg. Ganglbauer (NMW); COSENZA: Camigliatello Silano, VI.1962, leg. Budberg (NMW).

G E R M A N Y: BRANDENBURG: Lehnitz nr Oranienburg, N Berlin, VIII.1923, leg. Knauß (HUB); NIEDERSACHSEN: Niederweser, 22.V.1952, leg. Budberg (NMW); SACHSEN-ANHALT: Köthen (NMW); BADEN-WÜRTTEMBERG: Stuttgart (NMW); THÜRINGEN: Kalbsrieth, leg. Thieme (HUB); BAYERN: Erlangen, leg. Rosenhauer (NMW).

GERMANY or POLAND: Neisse, 26.III.1986 (NMW).

A U S T R I A: WIEN: "Umg. Wien", 21.IX.1902, leg. Pinker (NMW); "Umg. Wien", leg. Winkler (NMW, SIW); "Umg. Wien", leg. Hoffmann (NMW); Laaerberg, leg. Schlereth (NMW); Augarten, 16.IV.1980, leg. Jäch (NMW); Prater, 5.X.1965, leg. Vogt (NMW); Prater, Lusthauswasser, 15.IV.1980, leg. Jäch (NMW); Albern, leg. Mintus (NMW); Lobau, Fasangartenarm, 26.VI.1983, leg. Jäch (NMW); Neuwaldegg, 8.V.1980, leg. Jäch (NMW); Dornbach, leg. Wingelmüller (NMW); Bisamberg (NMW); Floridsdorfer Brücke, 31.XII.1947, leg. Lechner (NMW); NIEDERÖSTERREICH: Giesshübl, coll. Grundmann (NMW); Mödling, leg. Winkler (NMW); Baden, leg. Stoltz (NMW); Laxenburg, 24.III.1968, leg. Wewalka (NMW); Laxenburg, leg. Smolik (NMW); Laxenburg, leg. Scheerpeltz (NMW); Laxenburg, 1.IX.1907, leg. Pinker (NMW); Bad Vöslau, leg. Paganetti (NMW); Triesting nr Tattendorf, 20.V.1993, leg. Jäch (NMW); Wiener Neustadt (NMW); Moosbrunn, 23.III.1968, leg. Wewalka (NMW); Ullrichskirchen, 29.VII.1986, leg. Jäch (NMW); Herrnbaumgarten nr Poysdorf, 29.VII.1986, leg. Jäch (NMW); Rohrwald, leg. Otto (NMW); Marchfeld, coll. Grundmann (NMW); Mistelbach, Zayawiese, 23.VII.1986, leg. Jäch (NMW); Kitzendorf, 25.X.1985, leg. Jäch (NMW); Spillern, III.1986, leg. Probst (CWW); Spillern, 13.V.1980, leg. Jäch (NMW); Stopfenreuther Au, 2.VIII.1987, leg. Jäch (NMW); Marchegg, 20.IV.1983, leg. Jäch (NMW); Zeiselmauer, 24.IX.1967, leg. Wewalka (NMW); Ernstbrunn (NMW); Neulengbach, 28.XI.1965, leg. Wagner (OLL); Würmla, 23.IV.1973, leg. Wagner (OLL); Zarnsdorf, N Wieselburg, 31.VIII.1980, leg. Jäch (NMW); Kienberg, N Gaming, Seebachlacke, 4.VIII.1984, leg. Jäch (NMW); Lunz (NMW); Kamptal, leg. Minarz (NMW); Wachau, leg. Minarz (NMW); Krems, Nesl Au, 5.VIII.1922, leg. Bachinger (NMW); Krems, Mautern Au, 15.X.124, leg. Bachinger (NMW); Krems, Alaunthal, 5.V.1925, leg. Bachinger (NMW); Krems, Reisperbach, 4.VI.1925, leg. Bachinger (NMW); BURGENLAND: Neusiedler See, Podersdorf, VI.1930, leg. Prock (NMW); Neusiedl, 20.V.1936 (NMW); Neusiedler See, V.-VI.1961, leg. Budberg (NMW); Zurndorf, Wismuthinsel, 15.VI.1986, leg. Jäch (NMW); Parndorf, Sandgrube, 14.V.1967, leg. Kahlen (CKH); Raab-Au E Jennersdorf, 15.V.1990, leg. Jäch (NMW); OBERÖSTERREICH: Linz, leg. Priesner (NMW); Linz, 28.III.1920, leg. Schuberger (OLL); Steyr (OLL); Grünburg (OLL); Freistadt (OLL); STEIERMARK: Graz, leg. Moosbrugger (NMW); Graz, Bründl, 2.IV.1930, coll. Praxmarer (NMW); Rein, Auerteiche, 27.V.1926, coll. Praxmarer (NMW); Selztal, leg. Moosbrugger (NMW); Wörschach, leg. Moosbrugger (NMW); Stainach, leg. Moosbrugger (NMW); Lannach, leg. Konschegg (NMW); OSTTIROL: Nikolsdorf, 2.IV.1937 (CKL); Lienz, Schwimmbecken, 19.IV.1975, leg. F. Ernstbrunner

(CKL).

- C Z E C H I A: MORAVIA: Paskau (OLL); Aussee, leg. Wingelmüller (NMW, CBG); "Ung. Ostra Mähren" [= Uhersky Ostroh], coll. Grundmann (NMW); "Prossnitz Mähren" [= Prostejov], coll. Grundmann (NMW).  
 S L O V A K I A: "Pressburg" [= Bratislava] (NMW); Bratislava (SNMB); Bolesov, N Trencin, leg. Laczo (SNMB); Bystrica, 1922, leg. Roubal (SNMB).  
 H U N G A R Y: Sopron, 31.V.1984, leg. Jäch (NMW).  
 S L O V E N I A: "Carniola Radmannsdorf" [= Radovljica] (NMW); "Pettau" [= Ptuj], leg. Scheibel (NMW).  
 C R O A T I A: "Pola" [= Pula] (NMW); Hrvovijani, Bjelovar, VII.1942, leg. Pretner (CPL); Zagreb, Maksimir, 1945, leg. Pretner (CPL).  
 B O S N I A: Gacko, 25.X.1961, leg. Pretner (CPL, NMW); Golubic, Bihać, VI.1944, leg. Pretner (CPL).  
 Y U G O S L A V I A: SERBIA: Ruma, VIII.1932, leg. Pretner (CPL); KOSOVO: Sar Planina, S Doganovic, 19.VII.1988, leg. Jäch (NMW); CRNA GORA: Stojkovac, 30.VII.1929, coll. Fodor (TMB).  
 M A K E D O N I A (former Yugoslav republic): Bitola, Pelister, 21.VII.1988, leg. Jäch (NMW); 6 km W Bitola, 21.VII.1988, leg. Jäch (NMW); Babuna River, SW Titov Veles, 13.VIII.1988, leg. Jäch (NMW); Lake Ohrid, 20.VII.1988, leg. Jäch (NMW).  
 B U L G A R I A: Sofia, Vitos Oldala, 8.VII.1927, coll. Fodor (TMB).  
 G R E E C E: Corfu (NMW); PELOPONNESOS: Nemea, 13.VI.1986, leg. H. Hebauer (CHD).  
 T U R K E Y: EDİRNE: 40 km E Edirne, 28.VII.1988, leg. Schödl (NMW); ÇANAKKALE: Truva, 12.VII.1983, leg. Wewalka (NMW); KASTAMONU: 30 km N Kastamonu, 25.VI.1989, leg. Jäch (NMW); GÜMÜŞHANE: Kösedagi pass, 29.V.1989, leg. Jäch (NMW); Bayburt, 1.VI.1989, leg. Jäch (NMW); ERZINCAN: Refahiye, 10.VI.1989, leg. Jäch (NMW); SİVAS: Zara, Kızılırmak River, 11.VI.1989, leg. Jäch (NMW); ERZURUM: Saç Pass, 8.VI.1989, leg. Jäch (NMW); Çoruh River, E Bayburt, 1.VI.1989, leg. Jäch (NMW); Pazaryolu-Bayburt, 1.VI.1989, leg. Jäch (NMW); ARTVIN: Çam Pass, 2500 m, 6.VI.1989, leg. Jäch (NMW); KARS: 50 km E Horasan, 8.VI.1989, leg. Jäch (NMW); Sarıkamış, 8.VI.1989, leg. Jäch (NMW); E Ardahan, 6.VI.1989, leg. Jäch (NMW); Kağızman, 8.VI.1989, leg. Jäch, leg. Schödl (NMW); Lake Çıldır, 7.VI.1989, leg. Jäch (NMW); VAN: Lake Van nr Van, 7.VI.1987, leg. Jäch (NMW); Güzeldere pass, 2600 m, 5.VI.1987, leg. Jäch (NMW); HAKKARI: Yüksekova, 3.VI.1987, leg. Jäch (NMW); BITLİS: Hizan-Tatvan, 8.VI.1987, leg. Jäch (NMW); DIYARBAKIR: Silvan, 29.V.1987, leg. Jäch (NMW); KONYA: 25 km SE Bozkır, 4.VIII.1990, leg. Wewalka (NMW); AFYON: 30 km S Afyon, 2.VIII.1983, leg. Wewalka (NMW); MUĞLA: Köyceğiz-Muğla, 27.V.1991, leg. Jäch, leg. Schödl (NMW).

### *Limnebius paranuristanus* FERRO

*paranuristanus* FERRO 1989: 279.

TYPE LOCALITY: Eyn Varzan, 2000 m, E Elburz, northern Iran.

TYPE MATERIAL: I have not examined the holotype ♂ or any of the 3 paratypes, all deposited in the CFL. I have no doubt about the identity of this species.

DIAGNOSIS: 1.2 - 1.5 mm long. Quite variable species. I have not found significant distinguishing characters between *L. paranuristanus* and other Turkish species of the *L. mundus* group (e.g. *L. murentinus*, *L. ferrei* sp.n., *L. attalensis* sp.n.).

Aedeagus (Fig. 23): Strongly sinuous (lateral aspect), 4 ventro-median setae and numerous apical and subapical ones present.

DISTRIBUTION (Fig. 85): Eastern Turkey (Gaziantep to Erzurum), northern Iran.

#### MATERIAL EXAMINED:

T U R K E Y: GAZIANTEP: W Kilis, 26.V.1987, leg. Jäch (NMW); ERZINCAN: Sakaltutan Pass, 29.V.1989, leg. Jäch (NMW); ERZURUM: Pazaryolu-Bayburt, 1.VI.1989, leg. Jäch (NMW); BITLİS: Mutki, W Tatvan, 11.VI.1987, leg. Jäch (NMW); Hizan, 8.VI.1987, leg. Jäch (NMW).

### *Limnebius parvulus* (HERBST)

*parvulus* HERBST 1797: 314, Tafel 114, Fig. X (described as "*Hydrophylus parvulus*"). - KNISCH 1924.

*truncatulus* THOMSON 1851: 132 (= syn.n.), 1853. - KNISCH 1924. - ORCHYMONT 1945b. - HORION 1949. - CHIESA 1959, 1964. - BRAKMAN 1966. - ENDRÖDY 1967. - FRANZ 1970. - IENISTEA 1970, 1978. - LOHSE 1971. - BURAKOWSKI et al. 1976. - J. BALFOUR-BROWNE 1978. - BANGSHOLT et al. 1979. - BERCIO & FOLWACZNY

1979. - HEBAUER 1980. - NIEUKERKEN 1982. - NILSSON 1984. - HANSEN 1987. - KORDYLAS 1990. - BELLSTEDT 1993b.

**TYPE LOCALITY:** "Er ist aus hiesiger Gegend" (HERBST 1797); Berlin, Germany.

**TYPE MATERIAL:** Five specimens (2 ♂♂ + 3 ♀♀) of the "historical collection" of the HUB are very probably syntypes of *Hydrophilus parvulus* (F. Hieke, letter of November 9th, 1993). The first specimen carries the following labels: "10685 \ Zool. Mus. Berlin \ truncatellus Leach, Hydroph. tr. F. Pk\* III\* [upper side] Truncatellus F. Pk\* Pr\* parvulus Hbst [back]". The 4 remaining specimens lack the third label, but undoubtably belong to the same series. Four of the 5 specimens belong to the species described as *L. truncatulus* by THOMSON (1853), the fifth specimen (a female) is conspecific with *L. crinifer*. I have designated the first specimen (male) as lectotype of *L. parvulus*.

**SYNONYMS:** Lectotype ♂ (by present designation) of *L. truncatulus* (ZML - original THOMSON collection), described from RAMLÖSA (nr Helsingborg, NW Skåne, Sweden): "♂ t \ Pal Ent. \ 1993 8". Although there is no evidence that the specimen (one in a series of 26 specimens) here designated as lectotype of *L. truncatulus* is really one of the original syntypes we cannot exclude this possibility. In case that the original type material was lost which I cannot prove at present, this specimen should be designated as neotype.

**DIAGNOSIS:** 1.8 - 2.1 mm (female) and 2.1 - 2.3 mm (male) long. General appearance (colouration and body form) as in *L. crinifer*. Shagrination of pronotal disc usually more strongly impressed and more dense (meshes smaller) than in *L. crinifer*; punctuation on pronotal disc usually very faint, only rarely as distinct as in *L. crinifer*; maxillary palpi very slightly (hardly noticeably) thinner than in *L. crinifer*. Males are recognized by the shape of the protibia (more strongly dilated, slightly curved and inner margin very slightly angulate preapically) and the metafemur (middle of hind margin slightly angulate). Other secondary sexual characters as in *L. crinifer*.

In some rare cases I found females with shagrination on pronotal disc only superficially impressed and rather distinctly punctate. Such specimens are very difficult to separate from strongly shagreened females of *L. crinifer* since I could not find significant distinguishing characters in the shape of the abdominal sternite IX and tergite X between these two species. The following characters may be used to distinguish such females: maxillary palpi very slightly thinner in *L. parvulus*; inner margin of protibia very slightly (hardly noticeably) angulate basally in *L. parvulus* (more or less straight in *L. crinifer*) and meshes of shagrination on elytral disc very slightly larger in *L. crinifer*. All these characters should only be compared directly !

**Aedeagus (Fig. 80):** Shape comparatively simple (caution: shape of apical appendage depends strongly on the orientation in which it is observed and thus appears variable). Dorsal appendage of left paramere with scale-like structures.

The shape of the parameres of 2 males from Siberia which I have examined differs slightly from European. They could be regarded as subspecies.

**DISTRIBUTION (Fig. 87):** Eurosiberian.

#### ADDITIONAL MATERIAL EXAMINED:

G E R M A N Y: BERLIN: Grunewald, 25.IV.1888, leg. Kolbe (HUB, CBG); Grunewald, Barasee, 3.IX.1989, leg. Balke & Hendrich (CBHB); Fürstenbrunn, 28.IV.1909, leg. Stobbe (HUB); Drei heilige Pfühle, 2 km ENE Wandlitz, 22.XI.1987, leg. Uhlig (HUB); THÜRINGEN: Thüringer Wald, Gabel, leg. Heymes (NMW); SACHSEN: Leipzig (SNMB); NORDRHEIN-WESTFALEN: Münster, leg. Perrot (NMW); NIEDERSACHSEN: Hannover (NMW).

P O L A N D: "Krakau" [= Krakow], leg. Natterer (NMW); "Jaroslau" [= Jaroslaw], leg. Kuchta (NMW); "Liegnitz" [= Legnica] (TLFI); Podkowa Lesna, 16.VIII.1980, leg. Malkin (CMW, NMW).

L A T V I Y A: "Curonia Libau" [= Liepaja], 27.VII.1936, 9.IV.1910 (HUB); "Friedrichstadt a.d. Düna" [= Jaunjelgava], 9.X.1916, leg. Salchert (HUB).

C Z E C H I A: BOHEMIA: Pisek, coll. Madar (SNMB); MORAVIA: Paskau (MTD).

S L O V A K I A: Latorica, 18.X.1991, leg. Jäch (NMW).

H U N G A R Y: Bükk-hegys. Nagyvisnyo Elzalak 12.VI.1956, leg. Kaszab & Szekessy (TMB, NMW).

R O M A N I A: Orsova, leg. Breit (NMW).

U K R A I N E: Kiew, 7.VIII.1943, leg. Prock (NMW, SIW); Kiew, 27.IX.1998, leg. Jäch, leg. Balke (NMW).

R U S S I A: Dachnaya, near Bolshoi Lug, 25 km SW Irkutsk, 3.-5.VI.1970, leg. Angus (CAL, NMW).

? ARMENIA: "Caucasus Leder" (TMB).

### *Limnebius perparvulus* REY

*perparvulus* REY 1884: 268. - KNISCH 1924. - ORCHYMONT 1938.

*subglaber* REY 1884: 268. - KNISCH 1924. - ORCHYMONT 1938.

*tibialis* KUWERT 1890: 106, 314. - PEYERIMHOFF 1909. - KNISCH 1924. - J. BALFOUR-BROWNE 1938. - ORCHYMONT 1938.

TYPE LOCALITY: Corte, Corsica, France.

TYPE MATERIAL: Lectotype ♂ (MGL), by present designation: "Corte". Paralectotypes: 2 exs: "Corte"; 1 ex.: "Corte Revel \ ♂" (MGL). One paralectotype is deposited in the MMB.

SYNONYMS: Lectotype ♀ of *L. subglaber* (MGL), by present designation: "Corte Revel. \ ♂". There are 3 paralectotypes (all ♀♀) housed in the REY collection (MGL).

I could not find any alleged syntype of *L. tibialis* (described from "Africa borealis. Algeria") in the Kuwert collection (MHNP). Under the name *L. tibialis* are numerous specimens of *L. perparvulus* from Algeria ("RÉGION DU MONT OUARSENSIS DE VAULOGER") which could have been seen by Kuwert; but they have no Kuwert labels. Unfortunately there is no detailed information in the original description about the collector, the locality or the depository of the type(s). Probably the type(s) is (are) destroyed. According to PEYERIMHOFF (1909) the type of *L. tibialis* comes from Morocco (Tanger, leg. Vaucher) and not from Algeria as indicated in the original description. But he provides no evidence why he believes this (these) specimen(s) to be the holotype or part of the type series. I could not find such a specimen in the MHNP (Peyerimhoff collection, Oberthür collection). According to HORN et al. (1990) the Vaucher collection was acquired by Oberthür in 1907. Provided that the type of *L. tibialis* was collected in Algeria this taxon is most probably a synonym of *L. perparvulus* or *L. evanescens*. If it was collected in Morocco as postulated (without evidence) by PEYERIMHOFF (1909) it may be a synonym of *L. evanescens*, *L. oblongus* or *L. externus* sp.n. Since it is very likely that the type-series of *L. tibialis* also (or only) contained specimens from Algeria I propose to consider *L. tibialis* a junior synonym of *L. perparvulus*.

DIAGNOSIS: 0.95 - 1.3 mm long (length:width = 1.9 - 2.1). Pronotal disc smooth and glabrous, only very faintly punctate. Elytra shagreened; shape of apices more or less identical in both sexes. Abdominal sternite IX of female very long and apically arched.

Aedeagus (Fig. 15): Very similar to that of *L. oblongus* and *L. externus* sp.n. For distinction refer to these species.

DISTRIBUTION (Fig. 83): Mediterranean (except west). Not sympatric with *L. externus* sp.n. and *L. oblongus*.

#### ADDITIONAL MATERIAL EXAMINED:

F R A N C E: CORSICA: Ajaccio, coll. Sainte Claire-Deville (NMW); Tavignano, 18.VI.1989, leg. Ponel (CFA).

I T A L Y: BOLOGNA: Bazzano, leg. Sekera (SNMB); LATIUM: Fiume Fiora, 10.VIII.1990, leg. Jäger (MTD);

Aquapedente, Paglia, 22.VIII.1991, leg. Jäger (MTD); Fiora, 26.VII.1992, leg. Jäger (MTD); CALABRIA:

Antonimina, leg. Paganetti (NMW). SICILY: Messina, nr Patti, 15.VI.1978, leg. Wewalka (NMW); Taormina,

Alcantara Gorge, 5.IX.1981, leg. Kiener (MHNG); SARDINIA: "Sardinia", coll. Reitter (TMB); Terra Nova,

leg. Paganetti, leg. Dodero (NMW, TMB); Oristano (NMW, CBG, MTD, SIW); Gennargentu, 900 m,

16.VII.1992, leg. Jäger (MTD); Nuoro, Pratobello, Rio Olai, 800 - 900 m, 15.VII.1992, leg. Jäger (MTD).

B O S N I A: Ilidze, coll. Apfelbeck (NMW, ZIL).

A L G E R I A: Mount Ouarsensis, coll. De Vaulogier (NMW); Mouzaïa, Oued Kebir, IX.1921 (MHNP); Tarfaïa [= near Philippeville (= Skikda)], leg. Théry (MHNP); Blidah, leg. Peyerimhoff (MHNP); Gorges de la Chiffa, Ruisseau des Singes, 280-380 m, 4.V.1988, leg. Besuchet, Burckhart & Löbl (MHNG, NMW).

T U N E S I A: 6 km E Nefza, 2.VIII.1991, leg. Schödl (NMW).

G R E E C E: Aliakmonas, nr. Lake Prespa, 13.IX.1992, leg. Sondermann (CSOM); Epirus, Zagoria, Kippi, 750 m, VI./VII.1981, leg. Malkin (CMW, NMW); Makedonia: 30 km SW Kabala, 9.VIII.1988, leg. Jäch (NMW); Orfanion, 50 km W Kabala, 25.VII.1988, leg. Jäch (NMW); Strimon River, N Loutra, 11.VIII.1988, leg. Jäch (NMW); Thraki: 10 km N Alexandroupolis, 27.VII.1988, leg. Jäch (NMW); Nestos/Paranestos, 8.VIII.1988, leg. Jäch (NMW); Kosintos River, N Xanthi, 8.VIII.1988, leg. Jäch (NMW); Chalkidike: N Pirgadikia, 23.VII.1988, leg. Jäch (NMW); Sithonia-Sarti, 22.VII.1988, leg. Jäch (NMW); Skyros: 3 km W Skyros, 28.IX.1992, leg. Jäch (NMW); Ios: Milopotamos, 12.IX.1990, leg. Jäch (NMW); Milos: 1 km E Siderianos, 19.IX.1990, leg. Jäch (NMW); Rhodos: Loutani Valley, 2.5 km N Arhipoli, 12.IV.1993, leg. Jäger (MTD); Loutani River, below "7 springs", 12.IV.1993, leg. Jäger (MTD); stream N Malonas, 16.IV.1993, leg. Jäger (MTD).

T U R K E Y: TEKIRDAĞ: NE Saray, 29.VII.1988, leg. Jäch (NMW); KOCAELİ (IZMIT): S Karamürsel, 31.VII.1988, leg. Jäch (NMW); ÇANAKKALE: 5 km W Yenice, 4.VIII.1988, leg. Jäch (NMW); N Ezine, 17.V.1991, leg. Jäch (NMW); BALIKESİR: Aliova River nr. Dursunbey, 2.VIII.1988, leg. Jäch (NMW); Balikesir-Susurluk, 2.VIII.1988, leg. Jäch (NMW); IZMİR: 40 km N Bergama, 4.VIII.1988, leg. Jäch (NMW); ANKARA: Karabogaş River, 70 km W Ankara, 20.V.1987, leg. Jäch (NMW); MUĞLA: Zine River, 250 m, 28.V.1991, leg. Jäch (NMW); ANTALYA: NE Kaş, 260 m, 25.V.1991, leg. Jäch (NMW); MERSIN: Namrun [= Çamlıayla], 22.+26.+28.VIII.1981, leg. Jäch (NMW); HATAY: Yayladağı, 22.+23.V.1987, leg. Jäch (NMW); Amanos Mountains, 23.V.1987, leg. Jäch (NMW); Bakaras River, 22.V.1987, leg. Jäch (NMW); MARDİN: Mardin Mountains, 30.V.1987, leg. Jäch (NMW); DIYARBAKIR: Silvan, 29.V.1987, leg. Jäch (NMW); ERZURUM: Çoruh River, E Bayburt, 1.VI.1989, leg. Jäch (NMW).

L E B A N O N: Beirut, 1878, leg. Appl (NMW).

I S R A E L: HULA VALLEY: Banyas River [= Nahal Hermon], 2.VIII.1985, leg. Jäch (NMW); Nahal Snir [= N. Senir], 31.VII.1985, 1.VIII.1985, leg. Jäch (NMW); Hazbani [= N. Senir II], 31.VII.1985, leg. Jäch (NMW); GOLAN: Golan, Nahal Daliyyot, 31.III.1985, leg. Jäch (NMW); Golan, Nahal Samakh, 31.III.1985, 12.IV.1985, leg. Jäch (NMW); Golan, Nahal Yahudiyya, 31.III.1985, leg. Jäch (NMW); KINNROT VALLEY: Nahal Yahudiyya, Syrian Road, 30.VII.1985, leg. Jäch (NMW); Bteha [= Buteiha], Majerasee, 7.IV.1986, leg. Jäch (NMW); Bteha [= Buteiha], Ein Aqev, 7.IV.1986, leg. Jäch (NMW); Bteha [= Buteiha], Zaki Lagoon, 30.VII.1985, leg. Jäch (NMW); Lake Kinneret, 12.IV.1986, leg. Jäch (NMW); Upper Jordan River, Almagor Bridge, 15.VII.1985 (NMW).

### *Limnebius pilicauda* GUIILLEBEAU

*pilicauda* GUIILLEBEAU 1896: 228. - KNISCH 1924. - NORMAND 1933. - J. BALFOUR-BROWNE 1978.

*bonnairei* GUIILLEBEAU 1896: 229. - KNISCH 1924.

*appendiculatus* J. SAHLBERG 1900: 192. - KNISCH 1924. - SILFVERBERG 1987.

*aegatensis* CHIESA 1970: 114 (= syn.n.). - IENISTEA 1978. - FERRO 1985.

*lawrencei* J. BALFOUR-BROWNE 1978: 103 (= syn.n.).

TYPE LOCALITY: "Algérie: Philippeville" (GUIILLEBEAU 1896) [= Skikda, northeast Algeria].

TYPE MATERIAL: *Limnebius pilicauda* was described after one specimen ("Un exemplaire ... (A. Thiry) [= ? Théry]") from Algeria. I found one female, deposited in the MHNP (Sainte Claire Deville collection) labelled: "Limnobius pilicauda Gui [obviously Guillebeau's handwriting] \ Type \ Col ALGERIE Coll. THERY \ identique à L. Bonnairei ♀ Edough 15 Sept. 1905". Although nothing indicates that this specimen was collected near "Philippeville" [= Skikda] it is quite possible that this is the holotype of *L. pilicauda*. I could not find any alleged holotype of *L. pilicauda* in the Guillebeau collection (MMB) or in the Peyerimhoff collection (MHNP), where - according to HORN et al. (1990) - the Thery collection should be deposited.

As long as the true identity of the holotype remains uncertain, it should be kept in mind that *L. pilicauda* could also be identical with *L. nitifarus*, described from Tarfaia [= near Philippeville (= Skikda)] by ORCHYMONT (1938).

SYNONYMS: Lectotype ♂ (by present designation) of *L. appendiculatus*, described from Algeria: "Constantine \ J. Sahlb. \ Spec. typ. \ 4709 \ pilicauda Guil. ex typ.t.Peyer \ Limnebius appendiculatus J. Sahlb.n.sp." and one paralectotype ♀ are deposited in the ZMH.

Lectotype ♂ (by present designation) of *L. bonnairei* (MMB): "♂ \ ♀ \ Edough \ Bonnaire \ Bonnairei Guib.". The lectotype is mounted on one pin together with one female paralectotype. Two additional paralectotypes are housed in the same museum.

I have seen the holotype ♂ of *Limnebius aegatensis* (MCM): "♂ Olotipo 5.4.69 LIMN.

(EMBOLOLIMNEBIUS aegatensis CHIESA GODENIGO legit \ I. Egadi MARETTIMO 1-9 APR. 67 GODENIGO 5.4.69". Since two male specimens are glued on the same cardbord it is not possible to tell which one is the holotype. One female paratype (allotype) is housed in the same institution. The aedeagi of the two males are absolutely identical with other North African specimens of *Limnebius pilicauda*. I do not know where the remaining 8 paratypes of *L. aegatensis* are deposited today (? Godenigo collection).

I have seen 10 paratypes (1 ♂ + 9 ♀♀) of *Limnebius lawrencei*, deposited in the BML, described from Morocco (type locality: "Ijoukak, Grand Atlas occ."). They are all conspecific with *Limnebius pilicauda*. I have not examined the holotype ♂ and the remaining 3 paratypes which are housed in the Royal Sherifian Museum, Casablanca and CAL.

**DIAGNOSIS:** 1.5 - 1.6 mm (female) and 1.7 - 1.95 mm (male) long. Surface of pronotal disc variable, faintly or distinctly and rather densely punctate; interstices usually smooth and glabrous, rarely superficially shagreened.

Male ventrite VI with long and slender protuberance; disc of ventrite VI distinctly impressed at both sides of basis of protuberance. Maxillary palpi of male longer. Metatibia of male very slightly sinuous, straight in female. Sexual dimorphism of fore and middle legs as in other related species.

Aedeagus (Fig. 53): Apex of main piece more or less truncate; shape of appendage "A" quite characteristic, appendage "B" thin. Left paramere short, apically excised.

**DISTRIBUTION** (Fig. 89): Maghrebinian.

#### ADDITIONAL MATERIAL EXAMINED:

M O R O C C O: Boumaine du Dades, Gorges du Dades, 1300 m, 7.IV.1985, leg. Wewalka (NMW); Amismiz, 24-26.V.1926, leg. Lindberg (ZMH).

A L G E R I A: "Algérie", leg. Reitter, coll. Hauser (NMW); Alger, coll. Reitter (TMB); Alger, Littré, leg. Surcouf (MHNP); Bou Saada, 1908 (ZMH); Bou Berak nr Dellys (NMW, MHNP); Mouzaïa (MHNP); Edough (MHNP); Biskra, leg. De Vaulogier (MHNP); Gorges de la Chiffa, Ruisseau des Singes, 280-380 m, 4.V.1988, leg. Besuchet, Burckhart & Löbl (MHNG, NMW).

T U N I S I A: H.Bourgiba, 15.V.1982, leg. Malicky (NMW); Tunis, El Feidja (NMW, MHNP); Le Kef, leg. Normand (SNMB).

### *Limnebius punctatus* WOLLASTON

*punctatus* WOLLASTON 1864: 90. - KNISCH 1924. - ORCHYMONT 1940b.

**TYPE LOCALITY:** "The only locality in which I have myself observed *L. punctatus* is the little stream which flows through the Agua Garcia of Teneriffe, where it is tolerably common; it has however been taken at Ycod el Alto, in the same island, by Dr. CROTCH." (WOLLASTON 1864); Tenerife, Canary Islands, Spain.

**TYPE MATERIAL:** Lectotype ♂ (by present designation): "Type \ Limnebius punctatus type Woll.", deposited in the BML. Three paralectotypes are deposited in the same institution. One paralectotype ♂ is deposited in the MHNP (Oberthür collection). Number of syntypes not known.

**DIAGNOSIS:** 1.7 - 1.8 mm long. Maxillary palpi short and stout. Pronotum and elytra conspicuously pubescent. Punctures of pronotum and elytra very deeply impressed and rather densely arranged. Pronotal disc only very superficially shagreened.

Apex of male ventrite VI with a small asymmetrical protuberance. Other secondary sexual characters (tibiae and tarsi) as usual, but not very strongly pronounced.

Aedeagus (Fig. 48): Main piece straight; apex rather wide and dorso-ventrally flattened; left margin conspicuously excised behind insertion of left paramere (ventral aspect); at least two distinct appendages ("A", "B") can be discerned. Left paramere short and slender, inserted behind middle of main piece.

A key to the 4 *Limnebius* species of the Canary Islands was published by ORCHYMONT (1940b).

DISTRIBUTION (Fig. 83): So far known only from Tenerife, Canary Islands, Spain.

#### ADDITIONAL MATERIAL EXAMINED:

S P A I N: CANARY ISLANDS: Tenerife: Monts Anaga, El Carmen de Las Mercedes-Torneros, 675 m, 9.V.1935, leg. Orchymont (ISNB); Barranco del Taborno, 28.II.1993, leg. Nilsson (NMW, CNU).

#### *Limnebius reuvenortali* sp.n.

TYPE LOCALITY: En Teo, Lake Hula Nature Reserve, northern Israel.

TYPE MATERIAL: Holotype ♂ (NMW): "Israel 26.8.85 En Teo leg. Jäch". Paratypes: 1 S R A E L: HULA VALLEY: 2 exs: "N. Israel 20.3.85 leg. Jäch Hula Reserve" (NMW); 1 ex.: "Israel, 19.4.81 Upper Galilee Hula reserve leg. Wewalka I41" (NMW); 4 exs: "Israel 2.8.85 Banyas IIa [= Nahal Hermon] leg. Jäch" (NMW); 5 exs: "ISRAEL 31.7.85 N.Dan in Kibbutz Dafna" (NMW); 2 exs: "Israel 1.8.85 N.Snir I [= N. Senir I] leg. Jäch" (NMW); 1 ex.: "Israel 1.8.85 leg. Jäch Syr.Kanal I" (NMW); 1 ♀: "Israel 26.8.85 En Avazim leg. Jäch" (NMW); 2 exs: "ISRAEL 6.4. En Shehunit leg. Jäch 1986" (NMW); Mt. HERMON: 1 ex.: "ISRAEL 6.4. Mt.Hermon leg. Jäch 1986 \ En N.Nimrod I" (NMW); GOLAN: 13 exs: "ISRAEL 8.4. Golan Quelle leg. Jäch 1986 \ 2248/2595" (NMW); 3 exs: "ISRAEL 8.4. Golan Quelle leg. Jäch 1986 \ 2274/2593" (NMW); 3 exs: "ISRAEL 8.4. Golan Tümpel leg. Jäch 1986 \ 2264/2585" (NMW); 1 ex.: "ISRAEL 16.7.85 Golan/Jäch Saarta pool [= Za'arta rainpool]" (NMW); 5 exs: "ISRAEL 15.7.85 Golan/Jäch En Jalabina [= Ein Jalabina]" (NMW); 1 ex.: "ISRAEL 15.7.85 Golan/Jäch En a-tina [= Ein a-Tina]" (NMW); 1 ex.: "ISRAEL 1.4.85 Golan/Jäch N.Meitsar [= Mezar]/elion" (NMW); 3 exs: "ISRAEL 1.4.85 N.El-Al Golan/Jäch" (NMW); 1 ex.: "ISRAEL 1.4.85 Golan Qatzrin [= Qazrin]/Jäch" (NMW); 1 ex.: "ISRAEL 31.3.85 N.Daliyot [= Daliyot] Golan/Jäch" (NMW); 1 ex.: "ISRAEL 3.8.85 Bab el Hawa Golan/Jäch" (NMW); 2 exs: "ISRAEL 16.7.85 Golan/Jäch Ayun a-tariq" (NMW); 1 ex.: "Israel 3.8.85 Sha'al Golan/leg. Jäch" (NMW); 2 exs: "Israel 27.8.85 Ein Juwiza Golan/Jäch" (NMW); 1 ♂: "ISRAEL Eln Abu Mashag [= Ein Abu.Mashaq] 12.9.1989 ORTAL" (CHD); KINNROT VALLEY: 1 ♂: "ISRAEL 7.4. Bteha [= Buteihah] EinAqueb [= Ein-Aqeb] leg. Jäch 1986" (NMW); 2 exs: "ISRAEL 8.4. Samakh Mdg. leg. Jäch 1986" (NMW); 2 exs: "ISRAEL 12.4. P.Yarden [= Park HaYarden] leg. Jäch 1986" (NMW); 3 exs: "ISRAEL 12.4. Ein Mashpa leg. Jäch 1986 \ Jordanmdg. in Kinneret" (NMW); 1 ex.: "Israel 27.8.85 En Yezer leg. Jäch" (NMW); 1 ex.: "ISRAEL 7.4. En Yezer leg. Jäch 1986" (NMW); 1 ♂: "ISRAEL HUJ IES 5109 21.7.1986 \ I S R A E L Samakh ORTAL/FURTH" (CHD); ARAVA VALLEY: 1 ♀: "Israel 26.5.87 Ta'alat kinet Elat; leg. G.Gafni \ IES 5123 Col 2726" (NMW); T U R K E Y: 3 exs: "TR.(Antalya) Olympos bei Kumluça leg. Wewalka 28.7.1983" (NMW).

DIAGNOSIS: Very closely related to *L. stagnalis*. 1.8 - 2.0 mm (female) and 2.1 - 2.4 mm (male) long. Body form oval, widest near anterior third of elytra. Upper surface very sparsely covered with very fine adpressed pubescence. Black, posterior and lateral margin of pronotum and elytral apices usually brown; appendages yellowish or brown. Labrum sparsely punctate, front margin slightly excised; labro-clypeal suture arched and distinctly impressed; clypeus shagreened, its middle portion occasionally completely glabrous and without shagrination; frontoclypeal suture not well impressed; frons faintly punctate, usually without any shagrination. Middle of pronotum smooth and glabrous, only very faintly, but moderately densely punctate; pronotal declivities superficially shagreened. Elytra obovate; sides gently rounded; apices more or less truncate or truncately rounded; explanate margin very narrow; surface of elytra distinctly shagreened, meshes small; suture not convex.

Sexual dimorphism as in *L. stagnalis*.

*Limnebius stagnalis* and *L. reuvenortali* probably can be only distinguished by their aedeagi.

Aedeagus (Fig. 76): Apical appendage characteristically shaped. Left apical angle of left paramere distinctly produced laterad.

DISTRIBUTION (Fig. 88): Southern Turkey to Israel.

ETYMOLOGY: I take pleasure in dedicating this species to Reuven Ortal (The Hebrew University of Jerusalem, Israel), one of the worlds most remarkable and most efficient water beetle collectors.

*Limnebius rubropiceus KUWERT*

*rubropiceus* KUWERT 1890: 99, 312. - KNISCH 1924. - IENISTEA 1978.

TYPE LOCALITY: "Asia minor", no precise data known.

TYPE MATERIAL: I have seen 5 females (all teneral and obviously conspecific) under the name "rubropiceus Kuw. Asia min" in the Kuwert collection (in coll. Oberthür, MHNP) which I believe to be syntypes of *L. rubropiceus*, because they agree fairly well with the original description (colouration, setae on apical segments) and they are the only specimens under that name in the Kuwert collection. Two of these specimens carry a locality label: "Asia minor." which is not quite concordant with the type locality mentioned in the original description ("Caucasus"), the remaining three specimens are without any locality label. Although KUWERT (1890) had also seen at least one male (which may be lost today) I herewith designate one of these 5 females as lectotype of *Limnebius rubropiceus*. Number of syntypes not known.

DIAGNOSIS: 1.8 - 2.1 mm (female) and 2.15 - 2.4 mm (male) long; black. A variable species, closely related to *L. crinifer*. Specimens from Europe and western Turkey more or less as *L. crinifer*, specimens from eastern Turkey more strongly punctate. Females can be distinguished from females of *L. stagnalis* by the presence of numerous apical setae on the distinctly shorter abdominal ventrite VII, by the apex of the abdominal tergite X (truncate or even slightly emarginate between tufts of setae in *L. stagnalis*, pointed in *L. rubropiceus*) and by the usually shagreened pronotal disc of *L. rubropiceus*.

Aedeagus (Fig. 77): Very similar to that of *L. crinifer*, but differs significantly in the shape of the apex (ventral aspect). Hyaline appendage of left paramere usually smaller than in *L. crinifer*.

DISTRIBUTION (Fig. 87): Makedonia to Caucasus.

## ADDITIONAL MATERIAL EXAMINED:

M A K E D O N I A (former Yugoslav republic): Babuna River, SW Titov Veles, 13.VIII.1988, leg. Jäch (NMW).

G R E E C E: THRAKIA: 15 km N Alexandroupolis, 27.VII.1988, leg. Jäch (NMW).

T U R K E Y: EDIRNE: 40 km E Edirne, 28.VII.1988, leg. Schödl (NMW); TEKIRDAG: NE Saray, 29.VII.1988, leg. Jäch (NMW); ISTANBUL: 80 km W Istanbul, 30.VII.1987, leg. Jäch (NMW); BOLU: E Gerede, 24.V.1989, leg. Jäch (NMW); KAYSERI: Incesu, 24.VII.1987, leg. Wewalka (NMW); RIZE: Ovitdağı pass, 31.V.1989, leg. Jäch (NMW); KARS: S Posof, 6.VI.1989, leg. Jäch (NMW); Lake Çıldır, 7.VI.1989, leg. Jäch (NMW).

? ARMENIA: "Caucasus, Armen. Geb. Leder.Reitter" (TMB).

*Limnebius rufipennis REGIMBART*

*rufipennis* REGIMBART 1903: 336 (described as "*Limnobia rufipennis*"). - KNISCH 1924a. - ORCHYMONT 1928. - J. BALFOUR-BROWNE 1956. - FERRO 1989.

*kwangsiensis* PU 1951: 48 (described as subspecies of *L. kwangtungensis*) (= syn.n.).

TYPE LOCALITY: Pondicherry, Tamil Nadu Province, southeastern India.

TYPE MATERIAL: A lectotype ♂ (from Pondicherry) was designated by BALFOUR-BROWNE (1956). I could not find this specimen in the MHNP (Régimbart collection), it was probably misplaced, but I have examined the second specimen (paralectotype ♂) which was also mentioned by BALFOUR-BROWNE (1956): "♂ \ COROMANDEL M. Maindon \ GENJI [= ? Gingee, northwest of Pondicherry] 25 août-15 sept. 1901 \ *rufipennis* Rég." (MHNP, Régimbart collection). Number of syntypes unknown (at least two).

SYNONYMS: I have not seen the holotype ♂ of *L. kwangsiensis* (described from "Hochih, Kwangsi Province" [= Guangxi], southeastern China) or any of the 3 female paratypes, which are deposited in the collection of C.-L. Pu. According to the accurate illustration of the aedeagus (see Pu 1951: Fig. 4) I have no doubt that *L. kwangsiensis* is a synonym of *L. rufipennis*.

DIAGNOSIS: 0.9 - 1.1 mm long. A wide-spread and variable species. General appearance (colouration, body form, shagreenation and punctuation of surface) as in other Asian species of the *L. atomus* group (e.g. *L. kwangtungensis*, *L. taiwanensis* sp.n.). *Limnebius kwangsiensis* can be distinguished by the larger size and the more drop-like body form.

Aedeagus (Fig. 6): Main piece moderately long and straight, with a characteristic subapical "paramere-like" appendage on the right side; capsule very long.

The aedeagus of the paralectotype agrees fairly well with the aedeagus of specimens from northern India and Nepal. Subapical appendage of two males from Sri Lanka which I have examined definitely shorter, thus they represent probably a distinct species. Subapical appendage of the male from Thailand only very slightly shorter than in the Indian specimens (? subspecies).

DISTRIBUTION (Fig. 84): Widely distributed in the Oriental region.

#### ADDITIONAL MATERIAL EXAMINED:

I N D I A: Delhi, nr Nilo thi, 29.XII.1959, leg. Ritcher (BML, NMW); UTTAR PRADESH: Dehra Dun Rispana R., 4.VII.1927, leg. Champion (BML, NMW); Haldwani Dist., Kumaon, leg. Champion (BML); Kumaon, Rangarh, 2000 m, 9.X.1979, leg. Löbl (MHNG).

V I E T N A M: Hoa Binh, SW Hanoi, leg. De Cooman (MHNG, ISNB, NMW).

N E P A L and T H A I L A N D: I have seen several specimens from these countries. They will be listed in a forthcoming revision of the Oriental species of *Limnebius*.

### *Limnebius sanctimontis* sp.n.

TYPE LOCALITY: Seepage water, ca. 1500 m, near St. Katharina Monastery, Mt. Moses (Djebel Musa), southern Sinai, Egypt.

TYPE MATERIAL: Holotype ♂ (NMW): "SINAI 18.3. winzige Quelle leg. Jäch 1986 \ zw. Kloster u. St. Katharina". Paratypes: 21 exs labelled as the holotype (NMW); 48 exs: "Near East Sinai 2 km NE St. Katharine 1580 m. 18. III. 1989 M. Balke Leg." (CBHB); 15 exs: "SINAI 18.3.1989 2 km NE St. Katharina, Balke" (CBHB, NMW, CFL - 3 exs, BML - 3 exs, SIW - 3 exs); 2 exs: "Afr. Sinai St. Katharina 17.4.87 Balke" (CHD).

DIAGNOSIS: 1.3 - 1.6 mm long. Body form long and almost parallel-sided (length:width = 2.0 - 2.1). Broadest near anterior angles of elytra. Upper surface very sparsely covered with very fine adpressed pubescence. Black, pronotal and elytral margins paler brown, legs and palpi brown. Labrum sparsely punctate and faintly crenulate, front margin emarginate; labro-clypeal suture arched and distinctly impressed; middle of clypeus and frons smooth, very faintly punctate, sides very superficially or more distinctly shagreened; fronto-clypeal suture not well impressed. Middle of pronotum smooth and glabrous, only very faintly punctate; sides of pronotum usually only very superficially shagreened. Elytra elongate; sides only gently rounded; apices separately rounded in male, elongate and acuminate rounded in female; explanate margin narrow; surface superficially or distinctly shagreened, meshes more or less round or slightly transverse; suture not convex. Basal three segments of male pretarsus slightly dilated, with suction setae. Abdominal sternites as in *L. murentinus*.

Aedeagus (Fig. 21): Stout, straight, cylindrical; apex excised (lateral aspect); ventro-median setae present.

Externally, *L. sanctimontis* sp.n. can hardly be distinguished from most other species (of comparable size) of the *L. mundus* group.

DISTRIBUTION (Fig. 83): So far known only from Mt. Moses, Sinai Peninsula, Egypt.

ETYMOLOGY: Sanctus (Latin) - sacred; mons (Latin) - mountain. In reference to the type locality the sacred Mount Moses (Djebel Musa).

### *Limnebius schoenmanni* sp.n.

TYPE LOCALITY: Small stream, ca. 100 m, ca. 10 km SW Monemvassia, southeastern Peloponnes, southern Greece.

TYPE MATERIAL: Holotype ♂ (NMW): "GR-PELOPONNES 90 Monemvassia 29.5 leg. Schönmann". Paratype

♂: "GREECE: Kipi, / Epirus; Zagoria / 750 m. 20. VI. 1981 B. and H. Malkin" (CMW).

**DIAGNOSIS** (based on the holotype): 2.5 mm long. Habitus (Fig. 1). Very closely related with *L. crassipes* from which it can probably not be distinguished externally.

Aedeagus (Fig. 60): Similar to that of *L. crassipes*, from which it differs in a number of features. Shape of appendage "A" (especially its apex) significantly different: Apex of appendage "C" wider and more oblique. Apex of left paramere acute.

Female unknown.

**DISTRIBUTION** (Fig. 88): So far known only from two localities in Greece.

**ETYMOLOGY:** Named for Dr. Heiner SCHÖNMANN, renowned entomologist and enthusiastic mountaineer.

### *Limnebius shatrovskiyi* sp.n.

**TYPE LOCALITY:** Kaimanovka, Primorskiy Kray, Russia.

**TYPE MATERIAL:** Holotype ♂ (NMW): "ROSSIA OR. 92 Primorskiy kray Ussuriysk \ Kaimanovka 2.-9.VIII. leg. Boukal". Paratypes: ca. 230 exs labelled as holotype (CBG, CHD, CMH, CNC, HUB, MHNG, MTD, NMW, SIW, UMS, WUN, ZIL, ZMH) - due to morphological overlap I was not able to distinguish all females with certainty from *L. glabriventris*; 11 exs: "ROSSIA OR. 92 Primorskiy kray Tigrovy 19.-21.VIII. leg. Boukal" (NMW, ISNB, SNMB); 2 ♂♂: "Russia:Primorskij Kr. 10 km N Slavjanka, ditch, 11.vii.1992 Leg AN Nilsson" (RMS, NMW); 1 ♂ + 1 ♀: "Russia:Primorskij Kr. 35 km NW Vladivostok 25/7-92 AN Nilsson" (RMS); 1 ♂: "Russia:Primorskij Kr. Ussuriisk Res. Komarovka R. by Kaminiushka 18/7-92 AN Nilsson" (RMS); 1 ♂: "Russia:Primorskij Kr. Ussuriiski Res. ponds Kaminiushka 18-19.vii Leg AN Nilsson 1992" (RMS); 1 ♂: "Russia:Primorskij Kr. Anisimovka R. by Anis. Stn. 20-21.vii.1992 Leg AN Nilsson" (RMS); 3 ♂♂: "Russia:Primorskij Kr. 22 km N Vladivostok, Sputnik Stn. ponds 25/7-92 AN Nilsson" (RMS, NMW); 8 exs: "ROSSIA OR. 92 Primorskiy kray Novoguchuievka \ 26.-31.VII. leg. Boukal" (CAL, NMW); 1 ex.: "Rossia or. Primorskii kraj Ussuriisk, Kaimanovka 2.-9-8-1992 lgt.Boukal" (NMW); 8 ex.: "Heilungkiang Harbin 3.7.66 P.M.Hammond" (BML, NMW).

**DIAGNOSIS:** Very closely related with *L. glabriventris*, with which it is found to live consociate. Size, shape, shagreenation and colouration as in the latter.

Males are easily distinguished from *L. glabriventris* by the maxillary palpi (penultimate segment slightly wider and slightly depressed dorso-ventrally in *L. shatrovskiyi* sp.n.), by the wider and dorso-ventrally slightly depressed protibia, by the metatibia (more straight in *L. shatrovskiyi* sp.n.) and by the presence of a conspicuous fringe of setae (as in *L. parvulus*) on ventrite VI.

Typical females of *L. shatrovskiyi* sp.n. can be distinguished from typical females of *L. glabriventris* by a number of very subtle characters: Maxillary palpi (especially penultimate segment) slightly wider; metatibia more stout and completely straight (very slightly curved in *L. glabriventris*); ventrite VII slightly longer, its apical angles more rounded and its yellow apical margin slightly wider; pronotal disc usually more distinctly shagreened (meshes more distinctly impressed). All these characters are very difficult to see and require well determined reference material, a high magnification (at least 80X) and some experience. However, morphological overlap does occur and one may find that single specimens cannot be determined with certainty (e.g. some females from Ussuriisk, Kaimanovka).

Aedeagus (Fig. 83): Very similar to that of *L. parvulus* and *L. glabriventris*. Main piece longer and more slender; shape of lateral margins (ventral aspect) significantly different from *L. parvulus* and *L. glabriventris*. Apex of left paramere significantly different, apical left angle prominent.

**DISTRIBUTION** (Fig. 84): Eastern Russia, northeastern China.

**ETYMOLOGY:** Named for my friend Alexander Shatrovskiy.

***Limnebius similis* WOLLASTON stat.n.**

*similis* WOLLASTON 1865: 77 (described as "L. punctatus var. B. similis"). - KNISCH 1924. - ORCHYMONT 1940b.

TYPE LOCALITY: "... and examples are now before me (differing a little from the Teneriffan ones) which were captured by the Messrs. Crotch in Gomera" (WOLLASTON 1865); Gomera, Canary Islands, Spain.

TYPE MATERIAL: According to E. de Boise (letter of September 1st, 1992) and S.L. Shute (letter of July 1st, 1993) there are no syntypes of "L. punctatus var. similis" deposited in the BML. Number of syntypes not known. The Crotch collection is deposited in the Cambridge University Museum. According to R. Angus (letter of July 5th, 1993) some Wollaston types are in Oxford. I have no doubt about the identity of this species.

DIAGNOSIS: 1.4 - 1.5 mm long, thus slightly but noticeably shorter than *L. punctatus*, with which it is very closely related. Apart from the smaller size *L. similis* can be distinguished from *L. punctatus* by the less deeply impressed punctures of pronotum and elytra and by the apically more truncate, less acuminate rounded elytral apices. Protuberance of male ventrite VI slightly more prominent than in *L. punctatus*.

Aedeagus (Fig. 49): The aedeagus of *L. similis* can be distinguished from the aedeagus of *L. punctatus* by the larger size (*L. punctatus*: ca. 0.37 mm long, *L. similis*: ca. 0.31 mm long) and by a number of features concerning the morphology of its appendages (ventral aspect): appendage "A" more distinctly curved in *L. punctatus*; apex of appendage "B" rather thin in *L. similis*, but blunt in *L. punctatus*; apex of appendage "A" very strongly curved (hook-like) dorsad in *L. similis* (this curvature can be observed only in lateral aspect), but only moderately strongly curved (to the left side) in *L. similis* (can be observed in ventral aspect). Left margin of aedeagus (posterior to insertion of left paramere) distinctly excised in *L. punctatus*, but roundly emarginate in *L. similis*.

I have examined 3 aedeagi of *L. similis* and 2 of *L. punctatus*. Variability was very modest and the characters mentioned seem to be constant. Thus I think that *L. similis* must be considered as a species propria.

A key to the 4 *Limnebius* species of the Canary Islands was published by ORCHYMONT (1940b).

DISTRIBUTION (Fig. 83): So far known only from Gomera, Canary Islands, Spain.

MATERIAL EXAMINED:

S P A I N: CANARY ISLANDS: Gomera: region of the l'Alto de Garajonai, 950 m, 28.IV.1935, leg. Orchymont (NMW, ISNB).

***Limnebius simplex* BAUDI**

*simplex* BAUDI 1882: 127. - KNISCH 1924. - ORCHYMONT 1929, 1940a, 1945a. - CHIESA 1959. - ANGELINI & FERRO 1974 (= *calabricus* sp.n.). - IENISTEA 1978. - PIRISINU 1981.

*angusticonus* KUWERT 1888: 234. - KNISCH 1924. - ORCHYMONT 1929.

*baudii* KUWERT 1888: 94, 309. - KNISCH 1924. - ORCHYMONT 1929.

*laticonus* KUWERT 1888: 225. - KNISCH 1924. - ORCHYMONT 1929.

TYPE LOCALITY: Sicily, Italy.

TYPE MATERIAL: Lectotype ♂ (by present designation): "[small round black label] \ simplex Type Baudi \ ♂" (MHNP, Kuwert collection). Two paralectotypes in the same collection, 2 paralectotypes in the TMB. Additional syntypes are probably housed in the MZT. Number of syntypes unknown.

SYNONYMS: Lectotype ♂ of *Limnebius angusticonus* (by present designation): "Palerme. \ Eté 73. \ E. Ragusa \ M.R.Belg.", deposited in the MHNP (Kuwart collection). Three paralectotypes (2 from Sicily and one from Bologna) are deposited in the same institution. The specimen from Bologna (♀) is conspecific with *L. nitiduloides*.

Lectotype ♂ of *Limnebius baudii* (by present designation): "Sicilia Baudii", deposited in the

MHNP (KUWERT collection). One paralectotype ♀: "Sicilia \ Baudii ♀", in the same institution.

Lectotype ♂ of *Limnebius laticonus* (by present designation): "Sicilia \ Reitter.", deposited in the MHNP (KUWERT collection). One paralectotype ♀: "Sicilia \ laticonus ♀", in the same institution.

**DIAGNOSIS:** 2.0 - 2.3 mm long. Pronotal disc rather distinctly punctate, smooth between punctures. Metatibia of male long and straight, with numerous swimming hairs. Other sexual characters as in other related species. *Limnebius nitiduloides* differs in its considerably larger size.

**Aedeagus** (Fig. 70): Very similar to that of *L. calabricus* sp.n. from which it can be distinguished by the shape and length of its appendages.

**DISTRIBUTION** (Fig. 89): So far known only from Sicily (southern Italy), where it is probably endemic.

**ADDITIONAL MATERIAL EXAMINED:**

I T A L Y: SICILIA: Palermo (HUB); Ficuzza (NMW); Failla (NMW); Patti, 15.VI.1978, leg. Wewalka (NMW, CWW).

*Limnebius simulans* ORCHYMONT

*simulans* ORCHYMONT 1940a: 20. - ORCHYMONT 1946b.

**TYPE LOCALITY:** Irrigation canal, Kythraea, northern Cyprus.

**TYPE MATERIAL:** I have not seen the holotype ♂ or any of the 5 paratypes, all deposited in the ISNB. There is no doubt about the identity of this species.

**DIAGNOSIS:** 1.9 - 2.0 mm (female) and 2.3 mm (male) long. Closely related with *L. spinosus* sp.n. Secondary sexual characters (metatibia, male ventrite VI) as in *L. spinosus* sp.n.

**Aedeagus** (Fig. 62): Appendage "A" very long and strongly curved, apically furcate.

**DISTRIBUTION** (Fig. 88): So far known only from Cyprus, where it is probably endemic.

**MATERIAL EXAMINED:**

CYPRUS: Stavromuni, 30.VI.1939, leg. Lindberg (NMW, ZMH); Lapithos, 13.VI.1939, leg. Lindberg (ZMH); Kythrea, 1.XI.1932, leg. Ball (ISNB).

*Limnebius spinosus* sp.n.

**TYPE LOCALITY:** Cool stream, ca. 5 m wide, S Kemer, Antalya Province, southern Turkey.

**TYPE MATERIAL:** Holotype ♂ (NMW): "TR-ANTALYA 25.V.1991 südl. Kemer, 50m, leg. Jäch (37)". Paratypes: 4 exs labelled as holotype (NMW); 4 exs: "TR-ANTALYA 25.V.1991 südl. Kemer, 50m, leg. Schödl (37)" (NMW, SIW); 3 exs: "TR-ANTALYA 25.V.1991 südl. Kemer, 50m, leg. Jäch (38 a)" (NMW); 6 exs: "TR-ANTALYA 25.V.1991 südl. Kemer, 50m, leg. Schödl (38 a)" (NMW, MHNG); 2 exs: "TR-ANTALYA 25.V.1991 südl. Kemer, 50m, leg. Jäch (38 b)" (NMW); 4 exs: "TR-ANTALYA 22.V.1991 w Çatallar, 300m leg. Jäch (25)" (NMW); 2 exs: "TR-ANTALYA 22.V.1991 w Çatallar, 300m leg. Schödl (25)" (NMW); 4 exs: "TR-ANTALYA 23.V.1991 E Kumluça leg. Jäch (28)" (NMW, SIW).

**DIAGNOSIS:** 2.0 - 2.2 mm (female) and 2.2 - 2.4 mm (male) long. Closely related with *L. levantinus* sp.n. from which it differs externally only in the more distinctly (and more densely) punctate pronotal disc and - in the male sex - in the longer and less strongly enlarged metatibia. Other sexual characteristics as in *L. levantinus* sp.n.

**Aedeagus** (Fig. 64): Appendage "A" characteristically curved. Another (unnamed) appendage with numerous spines in its apical part. Left paramere comparatively short.

**DISTRIBUTION** (Fig. 89): So far known only from Antalya Province, southern Turkey.

**ETYMOLOGY:** Spina (Latin) - spine. Named in reference to the spiny appendage of the aedeagus.

### *Limnebius stagnalis* GUILLEBEAU

*stagnalis* GUILLEBEAU 1890: 33 (described as "*Limnobia stagnalis*"). - KNISCH 1924. - ORCHYMONT 1945b. - HORION 1949. - CHIESA 1958, 1959, 1964. - ENDRÖDY 1967. - FRANZ 1970. - IENISTEA 1970, 1978. - LOHSE 1971. - PIRISINU 1981.

**TYPE LOCALITY:** "Reichenburg, dans la Basse-Styrie" (GUILLEBEAU 1890) [= Brestanica, eastern Slovenia].

**TYPE MATERIAL:** Lectotype ♂, by present designation (MMB): "♂ \ Styrie \ Stagnalis Guileb. \ Coll. Guilleb.". Two female paralectotypes are deposited in the NMW; they belong to *L. stagnalis* and *L. papposus* respectively.

**DIAGNOSIS:** 1.7 - 1.9 mm (female) and 1.95 - 2.3 mm (male) long. Black. Pronotal disc usually without any trace of shagrination, which distinguishes *L. stagnalis* readily from *L. crinifer*.

Female ventrite VII (sterite IX) short, without apical bristles. Tergite X more or less truncate between apical tufts of hairs. Both sclerites significantly different from those of *L. crinifer* and *L. furcatus*.

**Sexual dimorphism:** As in *L. crinifer*, but lateral hairs of male ventrite VI not curved apically and ventrite VI modified (apically truncate, disc shallowly impressed and densely punctate).

**Variability:** I have seen males from the same population (W Istanbul, NMW) with elytral apices either widely and shallowly separately excised or broadly and more or less commonly rounded.

**Aedeagus** (Fig. 75): Apical appendage characteristically shaped. Left apical angle of left paramere only very slightly produced laterad.

**DISTRIBUTION** (Fig. 88): Eastern Central Europe to eastern Turkey.

#### ADDITIONAL MATERIAL EXAMINED:

**A U S T R I A:** WIEN: "Umg. Wien", 20.II.1902, 19.VIII.1910, leg. Pinker (NMW); Dornbach, leg. Schlereth (NMW); NIEDERÖSTERREICH: Mödling, coll. Wantoch (NMW); BURGENLAND: Neusiedler See, leg. Ganglbauer (NMW); STEIERMARK: Graz, 19.VIII.1927, coll. Praxmarer (NMW); Lannach, leg. Konschegg (NMW); Ehrenhausen, VI.1957, leg. Budberg (NMW); Neustift, nr Kapfenstein, 24.VIII.1969, leg. Kahlen (CKH); OBERÖSTERREICH: Freistadt, ex. coll. Weissner, coll. Petz (OLL); Linz, leg. Priesner (NMW).

**C Z E C H I A:** MORAVIA: "Mährisch Weißkirchen" [= Hranice], 1896, leg. Schuler (NMW).

**S L O V A K I A:** "C. Trencsen Boleso - Peho" [= Bolesov, N Trencin], leg. Laczo (SNMB); B. Bystrica, 1922, leg. Roubal (SNMB).

**S L O V E N I A:** "Pettau" [= Ptuj] (NMW).

**C R O A T I A:** "Agram" [= Zagreb] (NMW); "Canaletthal" [= Konavli, between Dubrovnik and Hecegnovil], leg. Holdhaus (NMW, SIW).

**B O S N I A:** Tuzla, leg. Scheibel (NMW); "Dervent" [= Derventa], leg. Hilf (NMW); Sarajevo (NMW); Slav.Brod, 29.VII.1911, leg. Schumacher (HUB); Golubic, Bihac, VI.1944, leg. Pretner (CPL, NMW).

**Y U G O S L A V I A:** SERBIA: Pozarevac, leg. Hilf (NMW); Ruma, VIII.1932, leg. Pretner (CPL).

**M A K E D O N I A** (former Yugoslav republic): 6 km W Bitola, 21.VII.1988, leg. Jäch (NMW); Lake Ohrid, 20.VII.1988, leg. Jäch (NMW).

**B U L G A R I A:** Popov, IX.1986, leg. Eyre (CFA); Sofia, Vitos Oldala, 8.VII.1927, coll. Fodor (TMB); Ciren, 17.VIII.1963, leg. Pretner (NMW, CPL); Liljaka Reka, 16.VIII.1963, leg. Pretner (CPL, NMW).

**G R E E C E:** Thesprotia, Margariti, 10.VI.1977, leg. Wewalka (NMW); 20 km W Larissa, 9.V.1971, leg. Wewalka (NMW); Elasson, 10.V.1971, leg. Wewalka (NMW); CHALKIDIKE: Sithonia-Sarti, 22.VII.1988, leg. Jäch (NMW); N Pirgadikia, 23.VII.1988, leg. Jäch (NMW); THRAKI: Nestos, Paranestos, 8.VIII.1988, leg. Jäch (NMW); 3 km S Mikro Derio, 27.VII.1988, leg. Jäch (NMW); KORFU: Valianiti, V.1964, leg. Palm (ZML); Trikilion, V.1964, leg. Palm (ZML); Dassia, V.1964, leg. Palm (ZML); PELOPONNESOS: 10 km W Vitina, 1000 - 1100 m, VII.1981, leg. Malkin (CMW); Meligala, 16.VI.1986, leg. H. Hebauer (CHD).

**T U R K E Y:** EDİRNE: 40 km E Edirne, 28.VII.1988, leg. Schödl (NMW); KIRKLARELI: Istranca Mountains, 28.VII.1988, 29.VII.1988, leg. Jäch (NMW); 20 km E Kirkclareli, 28.VII.1988, leg. Jäch (NMW); TEKIRDAG:

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NE Saray, 29.VII.1988, leg. Jäch (NMW); ISTANBUL: W Istanbul, 9.IX.1981, leg. Jäch (NMW); 80 km W Istanbul, 30.VII.1987, leg. Jäch (NMW); Ağva, 19.V.1987, leg. Jäch (NMW); BOLU: E Gerede, 24.V.1989, leg. Jäch (NMW); BURSA: Bursa-Orhaneli, 1.VIII.1988, leg. Jäch (NMW); Ulu Dağ, 31.VII.1988, leg. Jäch (NMW); ÇANAKKALE: W Kalkım, 3.VIII.1988, leg. Jäch (NMW); S Ayvacık, 5.VIII.1988, leg. Jäch (NMW); BALIKESİR: Balıkesir-Susurluk, 2.VIII.1988, leg. Jäch (NMW); SINOP: Dranaz pass, 27.V.1989, leg. Jäch (NMW); ORDU: Melet River, 28.V.1989, leg. Jäch (NMW); N Mesudye, 28.V.1989, leg. Jäch, leg. Schödl (NMW); SIVAS: Zara, Kızılırmak River, 11.VI.1989, leg. Jäch (NMW); GÜMÜŞHANE: Bayburt, 30.V.1989, 1.VI.1989, leg. Jäch (NMW, CBG); ERZINCAN: Refahiye, 10.VI.1989, leg. Jäch (NMW); RIZE: E Rize, 2.VI.1989, leg. Jäch (NMW); ARTVIN: Karagöl, 1700 m, 5.VI.1989, leg. Jäch (NMW); Şavşat, 4.VI.1989, leg. Jäch (NMW); Veliköy, 5.VI.1989, leg. Jäch (NMW); ERZURUM: Saç Pass, 8.VI.1989, leg. Jäch (NMW); Çoruh River, E Bayburt, 1.VI.1989, leg. Jäch (NMW, ZIL); Pazaryolu-Bayburt, 1.VI.1989, leg. Jäch (NMW); KARS: Sarıkamış, 8.VI.1989, leg. Jäch (NMW); KAĞIZMAN, 8.VI.1989, leg. Schödl (NMW); Lake Çıldır, 7.VI.1989, leg. Jäch (NMW); BITLIS: Hizan, 8.VI.1987, leg. Jäch (NMW); VAN: Güzeldere pass, 2600 m, 5.VI.1987, leg. Jäch (NMW); DIYARBAKIR: 40 km S Bingöl, 12.VI.1987, leg. Jäch (NMW).

*Limnebius taiwanensis* sp.n.

TYPE LOCALITY: Hsinchu Hsien, Taiwan.

TYPE MATERIAL: Holotype ♂ (NMW): "TAIWAN 5.10.1991 Hsinchu Hsien Dalu forest Rd. \ 90 leg. M.L.Jeng". Paratypes: 8 exs labelled as holotype (NMW; MHNG; Laboratory of Insect Conservation, Department of Plant Pathology & Entomology, National Taiwan University, Taipei); 5 exs: TAIWAN 27.X.1991 Tainan Hsien (102) Gweidan, leg. Jeng" (NMW); 3 exs: "TAIWAN 21.10. Taipei 1991 Shihding \ 97 leg. M.L.Jeng" (NMW); 2 exs: "TAIWAN 31.1.1991 Taitong South Stream \ 49 leg. M.L.Jang" (NMW); 2 exs: TAIWAN 22.2.1991 Nantou Hsien Chingshuo Stream \ Hsio-fong 51 leg. M.L.Jang" (NMW); 2 exs: "1993 \ TAIWAN-Pingtung Kenting 12.III. leg. M.L.Jeng (113)" (NMW); 1 ex.: "TAIWAN 19.2.1991 Nantou Fonghwang Valley \ 50 leg. M.L.Jang" (NMW); 1 ex.: "TAIWAN 23.8.1991 Hsinchu Hsien Daping-Chingchen \ 69 leg. M.L.Jang" (NMW); 1 ex.: "TAIWAN 29.3.1991 Ilan Hsien Chiduan-Shulung \ 58 leg. M.L.Jeng" (NMW); 11 exs: "Shijyukei spa, Heito-ken, Taiwan \ 24.I.1983 Col.K.Baba" (ISNB, NMW, SIW, WUN).

DIAGNOSIS: 0.9 - 1.2 mm long. Body form oblong or almost parallel-sided. Broadest near posterior angles of pronotum and anterior angles of elytra. Upper surface only very sparsely covered with very fine adpressed hairs. Colouration brown; head (except lateral areas of clypeus), middle of pronotum and elytral suture usually darker brown or black. Maxillary palpi short and stout. Front margin of labrum slightly emarginate; labro-clypeal suture arched and distinctly impressed. Surface of head and pronotum smooth and glabrous, impunctate or only very faintly punctate; lateral margins of head and pronotum only rarely shagreened. Elytra elongate; sides very gently rounded or almost parallel-sided; apices truncately rounded in male, slightly longer and more acuminate in female; explanate margin very narrow; surface of elytra superficially or more distinctly shagreened; suture not convex at elytral declivity. All legs of male enlarged, basal three segments of male pre- and mesotarsus slightly dilated, with suction setae.

Aedeagus (Fig. 4): Very small, slender, slightly enlarged in apical half; with numerous short setae in apical third; apex with a short acute protuberance. It can be distinguished from the very similar *L. clavatus* by the longer and more slender shape.

So far I was not able to find external distinguishing characters for *L. taiwanensis* sp.n. and *L. kwangtungensis*.

DISTRIBUTION (Fig. 84): So far known only from Taiwan.

ETYMOLOGY: Named in reference to the geographical distribution.

*Limnebius theryi* GUILLEBEAU

*theryi* GUILLEBEAU 1891: 324 (described as "*Limnobia Theryi*"). - KNISCH 1924. - GRIDELLI 1926. - NORMAND 1933. - ORCHYMONT 1933, 1935, 1945a. - THERY 1939.

*coxalis* GUILLEBEAU 1893a: 17, 1893b: XXXVI. - KNISCH 1924. - NORMAND 1933. - ORCHYMONT 1933.

## TYPE LOCALITY: Eastern Algeria.

TYPE MATERIAL: I have examined the holotype ♂ (by monotypy) of *L. theryi* (MMB): "HAUTS PLATx ALGÉRIE EST A. THERY \ type \ Theryi Guib. \ Coll. Guilleb.".

SYNONYMS: I could not find any of the syntypes (number of syntypes unknown) of *L. coxalis* (described from "L'Ougasse") in the MMB or the MHNP. They are probably deposited in the Pic collection (MHNP): "Les espèces dont les descriptions précédent ont toutes été recueillies par M. M. Pic, de Digoin" (GUILLEBEAU 1893). Unfortunately the Pic collection is not very well arranged and my search for the types in 1987 and 1992 remained fruitless. *Limnebius coxalis* is very probably a synonym of *L. theryi* (see ORCHYMONT 1933).

DIAGNOSIS: 2.1 - 2.2 mm (female) and 2.5 - 2.6 mm (male) long. Pronotal disc rather densely punctate. Metatibia of male long, gently curved (cf. *L. hispanicus*), with numerous swimming hairs. Other sexual characters as in other related species of the group, but protuberance of male ventrite VI comparatively short.

Aedeagus (Fig. 66): Main piece with numerous intricately shaped appendages. Left paramere curved (ventral aspect).

DISTRIBUTION (Fig. 88): Algeria, Tunisia.

## ADDITIONAL MATERIAL EXAMINED:

A L G E R I A: Oran (HUB); Oran, Ain Fezza (MHNP); Oran, Magenta (MHNP); Constantine, leg. Sahlberg (ZMH); Mouzaïa, 29.IV.1922 (MHNP); Alger, Littré, leg. Surcouf (NMW, MHNP); Blidah - Medea, VII./VIII.1884, leg. Quedenfeldt (HUB).

T U N I S I A: "Tunesien" (NMW); Tunis, Souk el Arba (NMW); Teboursouk (MMB).

*Limnebius truncatellus* (THUNBERG)

*truncatellus* THUNBERG 1794: 73 (described as *Hydrophilus truncatellus*). - KNISCH 1924. - J. BALFOUR-BROWNE 1938, 1978. - ORCHYMONT 1945b. - HORION 1949. - WÖRNDLE 1950. - F. BALFOUR-BROWNE 1958. - CHIESA 1959. - BRAKMAN 1966. - ENDRÖDY 1967. - FRANZ 1970. - IENISTEA 1970, 1978. - HEISS 1971. - LOHSE 1971. - G. FOSTER 1972, 1977, 1984. - BURAKOWSKI et al. 1976. - PALMER 1977a. - SINCLAIR 1977, 1984. - DETHIER et al. 1978. - FICHTNER 1978. - OWEN 1978. - BANGSHOLT et al. 1979. - BERGIO & FOLWACZNY 1979. - FOSTER & SINCLAIR 1980, 1982. - HEBAUER 1980. - WIEMERS 1980. - BURMEISTER 1981. - PIRISINU 1981. - CARR 1982. - NIEUKERKEN 1982. - BILTON 1984. - A. FOSTER 1984. - G. FOSTER 1984. - NILSSON 1984. - BELLSTEDT & FICHTNER 1985. - BELLSTEDT 1987, 1993b. - HANSEN 1987. - BRETTFELD 1988. - DRAKE 1988. - FRIDAY 1988, 1990. - VALLADARES 1989. - ANGUS 1989. - GARRIDO GONZALES 1990. - ANGUS & DIAZ PAZOS 1991. - DIAZ PAZOS 1991. - VALLADARES & MONTES 1991. - FOSTER et al. 1991, 1992.

*truncatellus* PAYKULL 1798: 189 (described as *Hydrophilus truncatellus*). - HANSEN 1991.

*lutosus* MARSHAM 1802: 407 (described as *Hydrophilus lutosus*). - KNISCH 1924.

*mollis* MARSHAM 1802: 407 (described as *Hydrophilus mollis*). - KNISCH 1924. - J. BALFOUR-BROWNE 1938. - ORCHYMONT 1938. - F. BALFOUR-BROWNE 1958.

*affinis* STEPHENS 1829: 120. - KNISCH 1924. - F. BALFOUR-BROWNE 1958.

*ater* STEPHENS 1829: 119. - KNISCH 1924. - F. BALFOUR-BROWNE 1958.

*nigriceps*, STEPHENS 1829: 121 (= *nigrinus* MARSHAM, misprinted). - KNISCH 1924. - F. BALFOUR-BROWNE 1958.

*testaceus* DALLA TORRE 1877: 69. - KNISCH 1924.

*rufescens* KNISCH 1924: 59. - REY 1885b: 322 (= nomen nudum).

TYPE LOCALITY: "Habitat in Vestro-Gothia" (THUNBERG 1794); southern Sweden.

TYPE MATERIAL: Lectotype ♀ (by present designation): "Uppsala Univ.Zool.Mus. Thunbergsaml. nr. 4469 Hydrophilus truncatellus Mus.Thunb. TYP", deposited in the ZMU. This is the only specimen under the name *Hydrophilus truncatellus* in the Thunberg collection.

SYNONYMS: According to HANSEN (1991) *L. truncatellus* (PAYKULL) is a junior synonym and a primary junior homonym of *L. truncatellus* THUNBERG.

According to S.L. Shute (fax of July 1st, 1993) there are no "verified syntypes" of *Hydrophilus*

*lutosus* in the BML. As it cannot be excluded that one of the specimens in the Stephens collection (BML) is a syntype I herewith designate a lectotype ♂ labelled only "*lutosus*". Deposited in the BML.

According to BALFOUR-BROWNE (1938) there is "no specimen of *L. mollis* identifiable as being from Marsham's collection [in the BML]". The same author (without any further proof) places *L. mollis* in synonymy with *L. nitidus*. There are 4 "historical" specimens (3 ♀ plus one almost completely destroyed specimen) in the BML standing over the name *L. mollis*. These specimens were identified as *L. nitidus* by Balfour-Browne, but at least two of them are definitely conspecific with *L. truncatellus* (the third one being probably *L. papposus*, the fourth one unidentifiable). To ensure taxonomic stability I herewith designate one of the two specimens of *L. truncatellus* as lectotype (♀) of *Hydrophilus mollis* since it cannot be excluded that they have been used by MARSHAM (1802) for his description of *L. mollis*.

Emma de Boise (BML) has sent me 8 specimens of *Limnebius truncatellus*, 5 of which are probably syntypes of *Limnebius ater* and 3 of which are probably syntypes of *L. affinis*. I herewith designate one male as lectotype of *L. ater* and one male as lectotype of *L. affinis*.

In his diagnosis of *Limnebius nigricans*, STEPHENS (1829: 121) refers to "Dermestes nigricans. Marsham.-Li. nigricans. Steph. Catal. p. 58. No. 592.". As in the index on page 199 only the name *Limnebius nigrinus* appears, "nigricans" sensu STEPHENS (1829) has to be regarded as a misprinting of *Dermestes nigrinus* [= *Cercyon*]. Thus *Limnebius nigricans*, sensu STEPHENS (1829) cannot be regarded as a description of a new species. All specimens which were sent to me by E. de BOISE (BML) are conspecific with *L. truncatellus*.

DALLA TORRE (1877) described var. *testaceus* of *L. truncatellus* in his list of the insects of Upper Austria. The Dalla Torre collection is irretrievably lost (see JÄCH 1988: 135), thus a neotype must be designated to ensure taxonomic stability: Neotype ♂ of *Limnebius truncatellus* var. *testaceus* (pres.des.): "M. PRIESNER / Donau-Auen 15. 5. 1908 / Ob.-Oest. / truncatellus Thunbg. det. M. PRIESNER" (OLL).

Lectotype ♂ (present designation) of *L. rufescens*: "var" (MGL). There is only one syntype in the Rey collection (MGL). *Limnebius rufescens* was described from teneral specimens of "*truncatulus*" and was thus meant to be infrasubspecific. The name was made available by KNISCH (1924).

DIAGNOSIS: 2.0 - 2.2 mm (female) and 2.4 - 2.7 mm (male) long. Surface rather densely and distinctly punctate. Pronotal disc more or less smooth or superficially shagreened between punctures; elytra distinctly shagreened, meshes small.

Sexual dimorphism: All legs of male dilated; pre- and mesotarsi with suction setae; pro- and mesotibia curved; inner margin of hind tibia strongly emarginate basally; metatibia and -tarsi with long swimming hairs. Male ventrite VI with a distinct, oblique, medially impressed apical protuberance; disc of ventrite VI distinctly impressed before basis of protuberance.

Aedeagus (Fig. 59): Very intricately shaped, with numerous appendages, most of which can be seen only after dissection; thus not all appendages illustrated in Fig. 59. Shape of appendage "A" quite characteristic. Left paramere not very long, thin.

DISTRIBUTION (Fig. 88): Most of Europe, except extreme south.

#### ADDITIONAL MATERIAL EXAMINED:

G R E A T B R I T A I N: WALES: Pant-y-Llyn, 9.IX.1987, Wales University survey (CFA).

N O R W A Y: Bergen, 22.V.1987, leg. Eyre (CFA); Fanberg (NMW).

F I N L A N D: Kiuruvesi, 8.VIII.1973, leg. Fery (CFB).

S W E D E N: Mölndal, leg. Ericson (NMW).

F R A N C E: HAUTE-VIENNE: Limoges, coll. Grundmann (NMW); HAUTE SAVOIE: Les Houches, 5.VIII.1976, leg. Löbl (MHNG); VAR: St. Martin, coll. Grundmann (NMW).

P O R T U G A L: Portalegre, coll. Schaufuss (HUB).

**S P A I N:** PALENCIA: Palencia, leg. Paganetti (NMW); CANTABRIA: Suano, W Reinosa, 900 m, 6.V.1991, leg. Wunderle & Zerche (DEI, NMW); LEON: Astorga, Tabladillo, 26.VIII.1989, leg. Fery (CFB); NAVARRA: Sansoain, Tafella-Pamplona Road, 17.VI.1986, leg. Bignal (CFA); AVILA: Sierra de Gredos, Tormellas, 6.VII.1988, leg. Fery (CFB); MADRID: Escorial, coll. Grundmann (NMW); Rascafria, 14.VI.1991, leg. H. Hebauer (CHD); MALAGA: Sierra de Almijara, 15.V.1992, leg. H. Hebauer (CHD); GRANADA: Sierra Nevada, Lanjaron, coll. Grundmann (NMW); Veleta, 2000 m, 5.VIII.1978, leg. Fery (CFB).

**I T A L Y:** "Val Valasco", 18.VII.1909, leg. Pinker (NMW); "Campolario Italia bor.", leg. Wingelmüller (NMW); CUNEO: Terme di Valdieri, 1909, leg. Ganglbauer (NMW); SÜDTIROL: Eggenthal, 2.12.1913, leg. Pinker (NMW); Ritten, 1750 m, 14.VIII.1990, leg. Kahlen (CKH).

**S C H W E I Z:** Geneve: Malval, Allondon, 18.VIII.1990, leg. Kiener (CKK); Tessin: Sessa, Malcantone, V.1990, leg. Kiener (CKK); Graubünden, Lenzerheide (NMW).

**G E R M A N Y:** BAYERN: Fichtelgebirge, 24.V.1968, leg. Schüller (NMW); HESSEN: Darmstadt (NMW); RHEINLAND-PFALZ: Dürkheim, coll. Eppelsheim (NMW); BADEN-WÜRTTEMBERG: Allental, 22.VIII.1971, leg. Kahlen (CKH); SCHLESWIG-HOLSTEIN: "Holstein" (NMW); Bernitz River, B.Oldesloe, 17.+30.IV.1976, leg. Ullrich (MHNG); THÜRINGEN: Eisenach, Drachenschlucht, 22.V.1986, leg. Jäch (NMW); Thüringer Wald, Gabel, leg. Heymes (NMW); Thüringer Wald, Inselberg, 22.V.1986, leg. Jäch (NMW); Gotha, 23.V.1986, leg. Jäch (NMW); Hubenthal (NMW).

**A U S T R I A:** WIEN: "Umg. Wien", leg. Winkler (NMW); NIEDERÖSTERREICH: Scheibbs, Lueggraben, 8.IX.1980, 14.IV.1980, leg. Jäch (NMW); Scheibbs, Zehnbach, Erlaf River, 17.VIII.1980, leg. Jäch (NMW); Neubruck, S Scheibbs, spring, 30.XII.1979, leg. Jäch (NMW); Purgstall, Schlarassingbach, 27.VIII.1980, leg. Jäch (NMW); Oberndorf, E Purgstall, springfed pool, 22.IX.1980, leg. Jäch (NMW); Purgstall, Erlaf River, 22.VIII.1980, leg. Jäch (NMW); Schauboden, N Purgstall, Erlaf River, 18.VIII.1980, leg. Jäch (NMW); Randegg, Kleine Erlaf River, 18.IX.1980, leg. Jäch (NMW); Randegg, Schliefau, 1.IX.1980, leg. Jäch (NMW); Lunz, Ois River, 4.VII.1981, leg. Jäch (NMW); Lunz, leg. Sauruck (NMW); Waidhofen a. d. Ybbs, VII.1941, leg. Prock (NMW); Krems, leg. Bachinger (NMW); Komau, Kamp River, 27.X.1984, leg. Jäch (NMW); Karlstift (NMW); Gars, leg. Minarz (NMW); Zwettl, fountain in front of church (!), 3.V.1980, leg. Jäch (NMW); Kautzen, 25.VII.1990, leg. Jäch (NMW); Neulengbach, 8.IV.1964, 25.III.1973, leg. Wagner (OLL); Rekawinkel (NMW); Bad Vöslau (NMW); Kranichberg, 1887, leg. Ganglbauer (NMW); OBERÖSTERREICH: Zell, Zellhof, 500 m, leg. Moser (OLL); Freistadt (OLL); Zwettl, Rodl, 22.VI.1988, leg. Jäch (NMW); Kirchschlag, 4.IV.1921, leg. Schuberger (OLL); Linz, Diessenleiten, 16.VIII.1911, leg. Kloiber (OLL, NMW); Linz, Hornbachgr., 7.VIII.1911, leg. Kloiber (OLL); Linz, 4.IV.1921, leg. Schuberger (OLL); Linz, Donauauen, 15.V.1908, leg. Priesner (OLL, NMW, SIW); Steyr (OLL); Sarleinsbach, 19.VII.1917, leg. Kloiber (OLL); Scharfling, VII.1973, leg. Wagner (OLL); STEIERMARK: Turnau, VII.1931, leg. Prock (NMW); Rottenmann, Bärndorf, leg. Moosbrugger (NMW); KÄRNTEN: Eisenkappel, 9.VII.1941, leg. Scheerpeltz (NMW); KÄRNTEN or SALZBURG: Ankogel (NMW); ÖSTERRIOL: Klosterfrauen Alm, 10.VI.1982, leg. Kofler (CKL); TIROL: Sellraintal, 29.IX.1930, leg. Ratter (CKL); Thaur, 25.VII.1924, leg. Ratter (CKL); Innsbruck, Ahrental, 6.IV.1912, leg. Ratter (CKL); Patscherkofl, 18.V.1913, leg. Ratter (CKL, TLFI); Kitzbühl (NMW); Alpach, 4.III.1972, leg. Kahlen (CKH); Unterinntal, Langkampfeuer, Innau, 29.V.1988, leg. Kahlen (CKH); Außerfern, Zöblen, 19.VII.1967, leg. Kahlen (CKH); Forchach, Errach, 8.X.1943, leg. Kofler (TLFI); Stubai, Langental, 7.X.1941, leg. Pechlaner (TLFI); Mittelberg, Pitztal, 1950 m, 16.IX.1962 (TLFI); Umhausen, IX.1908, leg. Knabl (TLFI); VORARLBERG: Feldkirch, leg. Moosbrugger (NMW); Bludenz, leg. Moosbrugger (NMW); "Gamperdona", leg. Moosbrugger (NMW).

**C Z E C H I A:** MORAVIA: Subirov, leg. Zoufal (NMW); "Hof" [= Dvorce, NE Olomouc], leg. Scheerpeltz (NMW); "Hof" [= Dvorce, NE Olomouc], "Lobingtal", VIII.1924, leg. Nietsch (CPL); "Mährisch Weißkirchen" [= Hranice], 1896, leg. Schuler (NMW); Hnojnik, SE Ostrava, leg. Wanka (NMW); "Ung. Brod" [= Uhersky Brod], VII.1927, leg. Prock (NMW); BOHEMIA: "Friedland Böhmen" [= Frydlant, northern Bohemia] (NMW); "Bohemia Prachatitz" [= Prachatic, W Ces. Budejovice] (NMW); 15 km SE Kaplice, 14.VI.1992, leg. Jäch (NMW); Dourov, leg. Heyrovsky (CPL).

**CZECHIA or POLAND:** "Silesia Teschen" [= Cesky Tesin (= Cieszyn)], leg. Wanka (NMW, CPL).

**S L O V A K I A:** Bolesov, N Trencin (SNMB).

**H U N G A R Y:** Bükk NP, Nagyvisnyo, Nagy-völgy, 500 m, 12.X.1984, leg. Adám & Hámori (NMW, TMB).

### *Limnebius wui* Pu

wui Pu 1942: 173. - Pu 1951. - NAKANE 1965. - HUA 1989.

**TYPE LOCALITY:** Chengkiang district, Yunnan, southern China.

**TYPE MATERIAL:** Holotype ♂ in the collection of C.-L. Pu; 113 paratypes in the Pu collection and in the

Zhongshan (Sun Yatsen) University, Guangzhou (Canton). According to a letter of Philip J. Clausen (June 9, 1993) there are 2 paratypes of *L. wui* deposited in the UMS. I have not seen any of these type specimens. There is no doubt about the identity of this species.

**DIAGNOSIS:** 1.15 - 1.25 mm long. Colouration dark brown, margins paler brown. Pronotal disc smooth and glabrous, impunctate. Elytra rather transversely shagreened. The elytral punctures along the suture and lateral margin of the elytra described by PU (1951) are not a distinctive character of *L. wui*. These punctures can usually be seen in teneral specimens of the *L. atomus* group.

**Aedeagus (Fig. 7):** Main piece moderately long and rather straight; apically acuminate and deeply furcate (lateral aspect); only few subapical setae present; capsule rather long.

**DISTRIBUTION (Fig. 84):** Yunnan (Chengkiang, Kunming, Kunyang, Chinning and Chingkung), southern China - see PU (1951).

**MATERIAL EXAMINED:**

CHINA: YUNNAN: "Yunnan", 1 ♂ + 1 ♀ (MHNP).

*Limnebius* sp.n. JÄCH & MATSUI, 1994, in prep.

This species was collected by E. MATSUI on Amami-oshima Island (southern Japan). It shall be described later in a synopsis of the Japanese species of the genus *Limnebius* (JÄCH & MATSUI 1994, in prep.).

**Aedeagus (Fig. 3):** Main piece short and stout, apically dilated, with a few ventral and subapical short setae.

**Distribution (Fig. 84):** Southern Japan.

Species incertae sedis:

*Limnebius cassidiooides* REY

*cassidiooides* REY 1885b: 325. - BAUDI 1864: 224 (= nomen nudum !). - KNISCH 1924. - ORCHYMONT 1938, 1940a..

**TYPE LOCALITY:** Cyprus or Cairo, Egypt.

**TYPE MATERIAL:** The MZT, where one syntype from Cyprus should be deposited is not accessible at present. The syntypes from Cairo should be deposited in the collection of Revelière. I do not know where the collection of Revelière (not mentioned by HORN et al. 1990) is deposited. There are definitely no syntypes in the Rey collection (MGL) where otherwise numerous specimens of Revelière are found.

BAUDI (1864) did not intend to describe this taxon ("specimen individuo unico pro novo describere non ausus, in collectione nomine cassidiooides designavi"). The name *L. cassidiooides* was later made available by REY (1885b): "Le *L. cassidiooides* BAUDI (p. 224) est moindre, moins convexe, d'un brun de poix, et surtout plus glabre et plus luisant [than *L. nitidus*]. Les élytres ♀ recouvrent entièrement l'abdomen comme dans mundus. La taille est celle de l'atomus. - Le Caire (collection REVELIERE), Chypre.". The syntype from Cyprus might be conspecific with *Limnebius mundus*, according to ORCHYMONT (1940a) it might even be a member of the genus *Hydroscapha*. The syntype(s) from Cairo most probably refer(s) to *L. perparvulus*.

### *Limnebius pusillus* MÜLLER

*pusillus* O. MÜLLER 1776: 69 (described as *Hydrophilus pusillus*). - KNISCH 1924.

*Hydrophilus pusillus* was described by MÜLLER (1776): "658. *H. pusillus* niger, elytris laevissimis; antennis tarsique fuscis. \* +".

According to HORN et al. (1990) a collection of Otto Friedrich Müller (1730 - 1785) never existed or has been completely destroyed. No specimens identifiable as being from the Müller collection are found in the Zoologisk Museum, Kobenhavn (M. Hansen, letter of November 5th, 1992).

*Hydrophilus pusillus* was transferred to the genus *Limnebius* by KNISCH (1924), where it was placed in synonymy with *Limnebius truncatellus*. In fact it predates any species described in that genus. Thus to ensure taxonomic stability the International Commission on Zoological Nomenclature should be asked to use its plenary powers to suppress the name *Hydrophilus pusillus* MÜLLER, 1776.

### Zusammenfassung

Achtzig paläarktische Arten (einschließlich aller bekannten Arten von China und Taiwan) der Gattung *Limnebius* LEACH werden in dieser Arbeit behandelt. Die Untergattung *Bilimneus* REY wird als Synonym von *Limnebius* s.str. eingezogen. Siebzehn neue Arten werden beschrieben: *Limnebius attalensis* sp.n. (Türkei), *L. boukali* sp.n. (Rußland), *L. calabricus* sp.n. (Italien), *L. claviger* sp.n. (Türkei), *L. externus* sp.n. (Spanien), *L. ferroii* sp.n. (Türkei), *L. graecus* sp.n. (Griechenland), *L. irmelae* sp.n. (Tunesien), *L. levantinus* sp.n. (Türkei, Israel), *L. loeborum* sp.n. (Pakistan), *L. nanus* sp.n. (Spanien), *L. reuvenortali* sp.n. (Türkei, Israel), *L. sanctimontis* sp.n. (Egypten), *L. schoenmanni* sp.n. (Griechenland), *L. shatrovskiyi* sp.n. (Rußland), *L. spinosus* sp.n. (Türkei) und *L. taiwanensis* sp.n. (Taiwan). Lectotypen werden für die folgenden Arten designiert: *Hydrophilus lutosus* MARSHAM, *H. minutissimus* GERMAR, *H. mollis* MARSHAM, *H. parvulus* HERBST, *H. truncatellus* THUNBERG, *H. truncatus* THOMSON, *Limnebius adjunctus* KUWERT, *L. affinis* STEPHENS, *L. aluta* BEDEL, *L. angusticonus* KUWERT, *L. appendiculatus* SAHLBERG, *L. asperatus* KNISCH, *L. ater* STEPHENS, *L. baudii* KUWERT, *L. bonnairei* GUILLEBEAU, *L. crinifer* REY, *L. dissimilis* KUWERT, *L. fallaciosus* GANGLBAUER, *L. fallax* KUWERT, *L. fretalis* PEYERIMHOFF, *L. gracilipes* WOLLASTON, *L. grandicollis* WOLLASTON, *L. gridellii* PRETNER, *L. immersus* KNISCH, *L. kaszabi* CHIESA, *L. laticonus* KUWERT, *L. marginalis* STEPHENS, *L. mauritii* GUILLEBEAU, *L. mesatlanticus* THERY, *L. mundus* BAUDI, *L. myrmidon* REY, *L. nitiduloides* BAUDI, *L. oblongus* REY, *L. paganettii* GANGLBAUER, *L. papposus* MULSANT, *L. perparvulus* REY, *L. punctatus* WOLLASTON, *L. punctillatus* REY, *L. rubropiceus* KUWERT, *L. rufescens* KNISCH, *L. sericans* MULSANT & REY, *L. simplex* BAUDI, *L. stagnalis* GUILLEBEAU, *L. subglaber* REY. Neotypen werden für *Limnebius atomus* (DUFTSCHMID), *L. kwangtungensis* PU und *L. testaceus* DALLA TORRE designiert. Folgende neue Synonymien werden vorgestellt (jüngere Synonyme in Klammer): *Limnebius atomus* (= *L. cuspidatus* FERRO syn.n.), *L. fretalis* (= *L. normalis* THERY syn.n.), *L. hispanicus* ORCHYMONT (= *L. triparamerus* FRESNEDA, LAGAR & FERRO syn.n.), *L. ignarus* BALFOUR-BROWNE (= *L. fuentei* FRESNEDA, LAGAR & FERRO syn.n.), *L. kweichowensis* PU (= *L. japonicus* NAKANE syn.n.), *L. myrmidon* (= *L. janssensi* CHIESA syn.n.), *L. parvulus* (= *L. truncatus* syn.n.), *L. perparvulus* (= *L. subglaber* syn.n., *L. tibialis* KUWERT syn.n.), *L. pilicauda* GUILLEBEAU (= *L. aegatensis* CHIESA syn.n., *L. lawrencei* BALFOUR-BROWNE syn.n.) und *L. rufipennis* REGIMBART (= *L. kwangsiensis* PU syn.n.). *Limnebius similis* WOLLASTON stat.n. wird als species propria, nicht als Subspezies von *L. punctatus* behandelt. Die Aedeagi aller bekannten paläarktischen Arten (außer *L. clavatus* PU) und von *L. immersus* (Philippinen) und *L. clayae* BALFOUR-BROWNE (Assam) sind abgebildet.

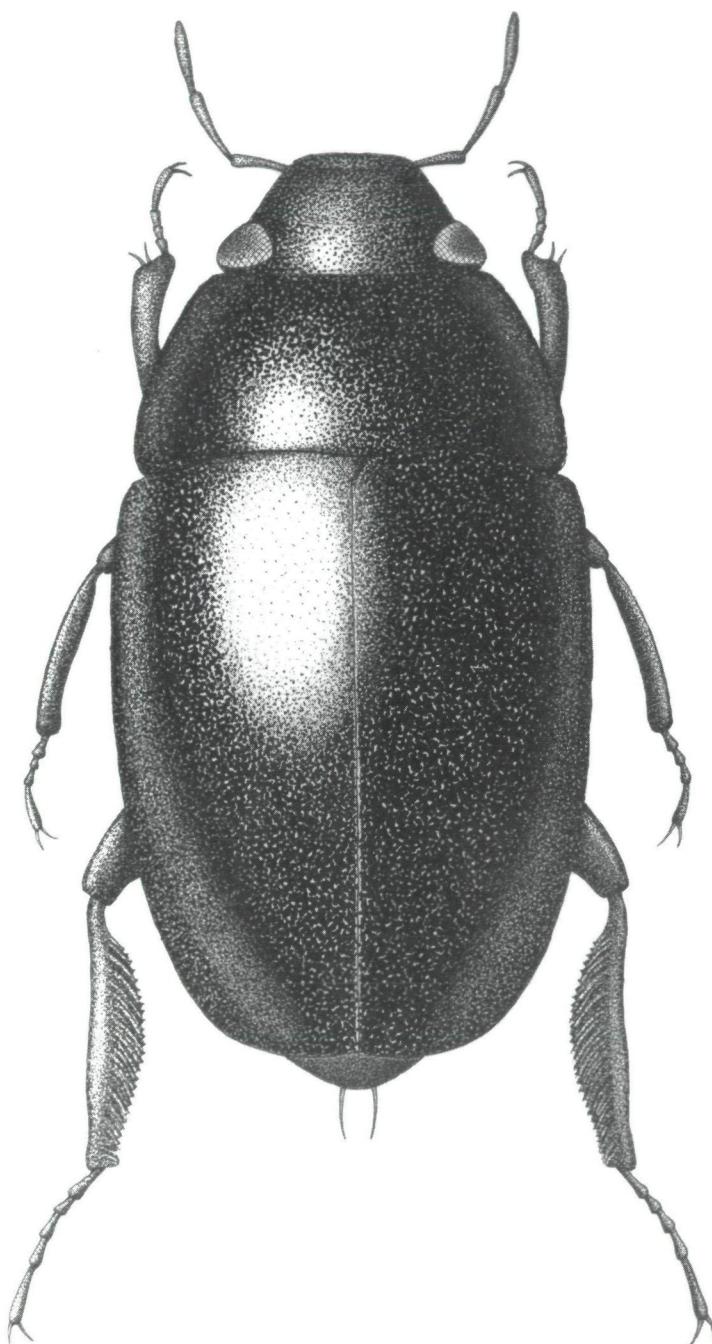
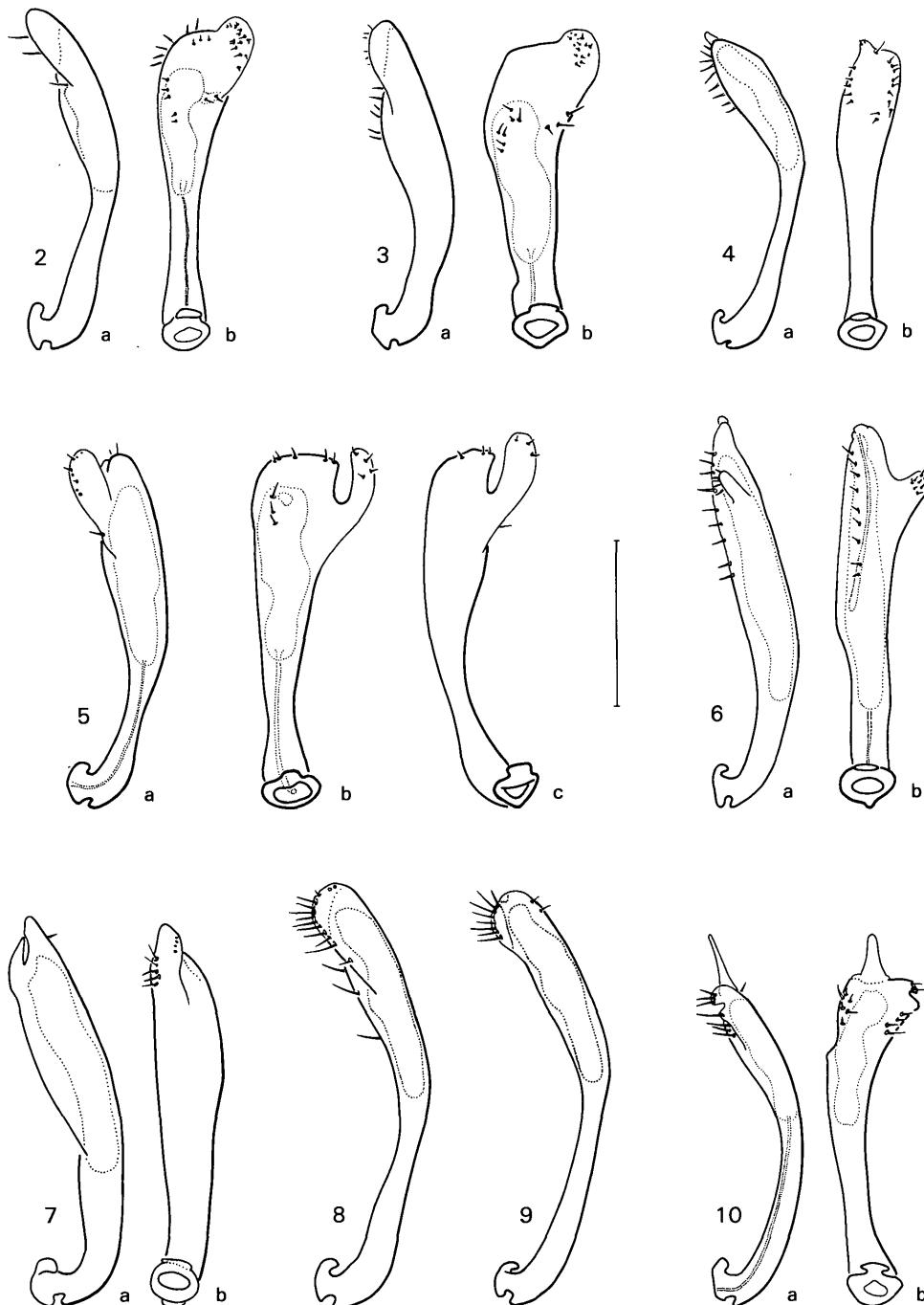
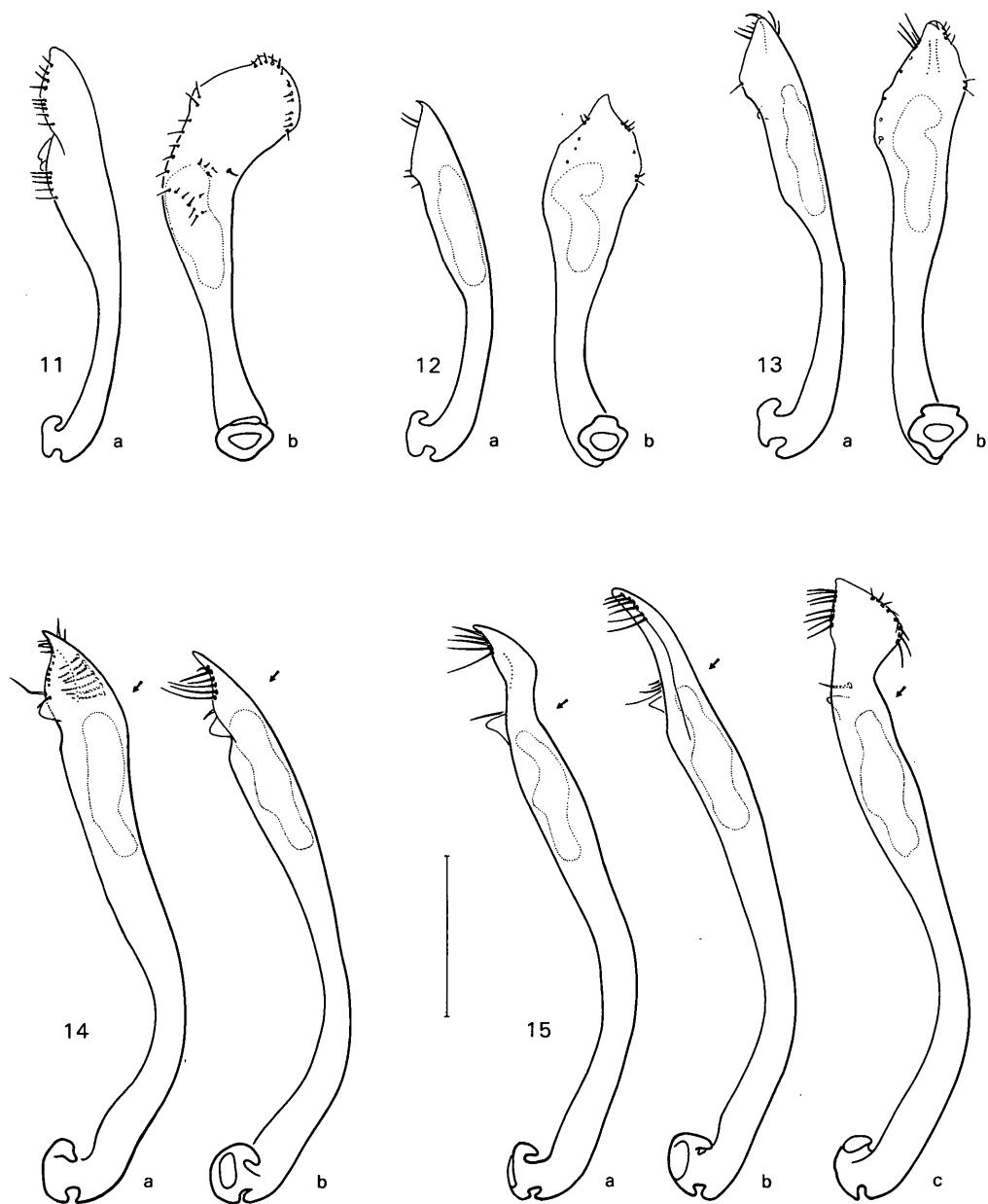


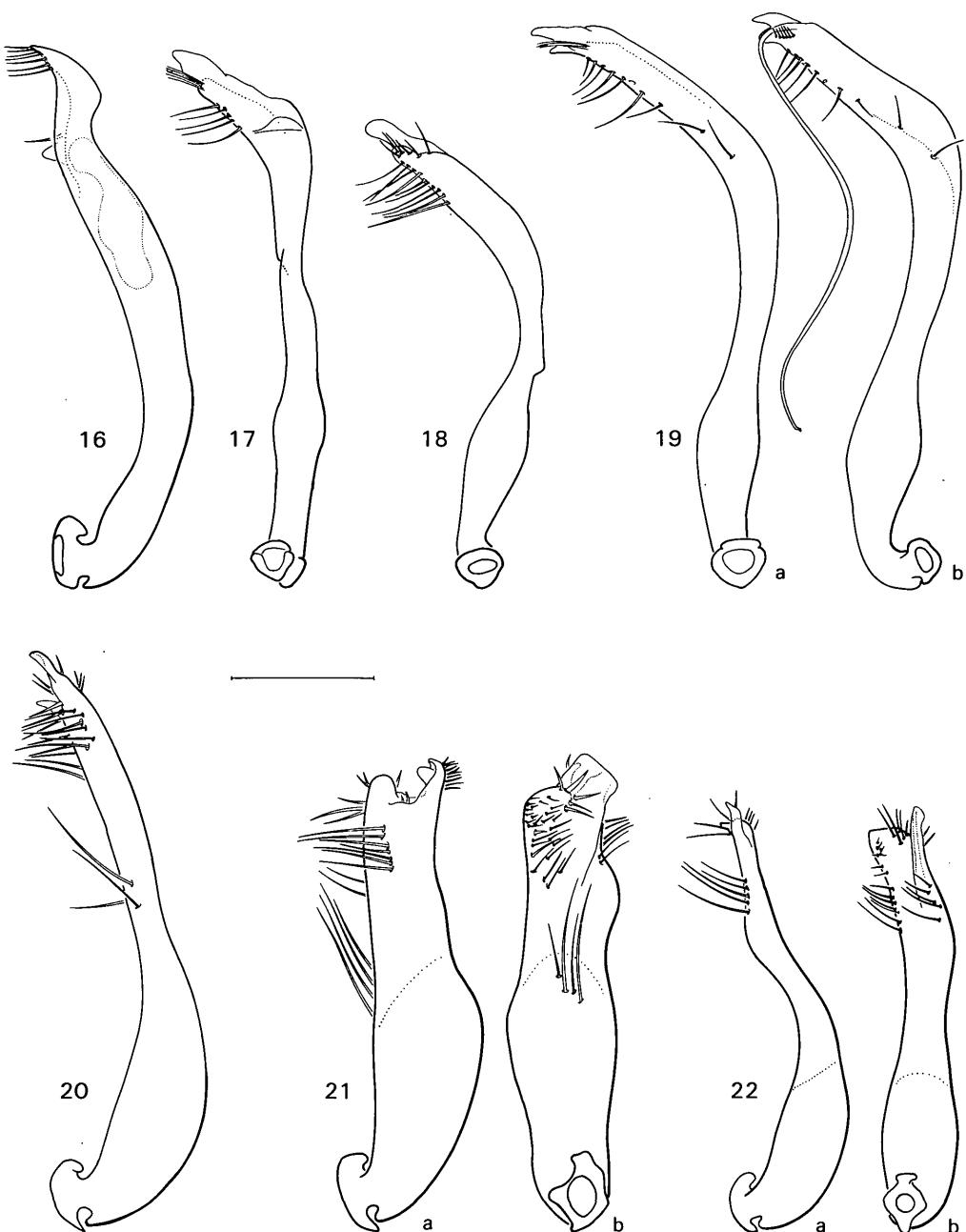
Fig. 1: *Limnebius schoenmanni* sp.n., habitus.



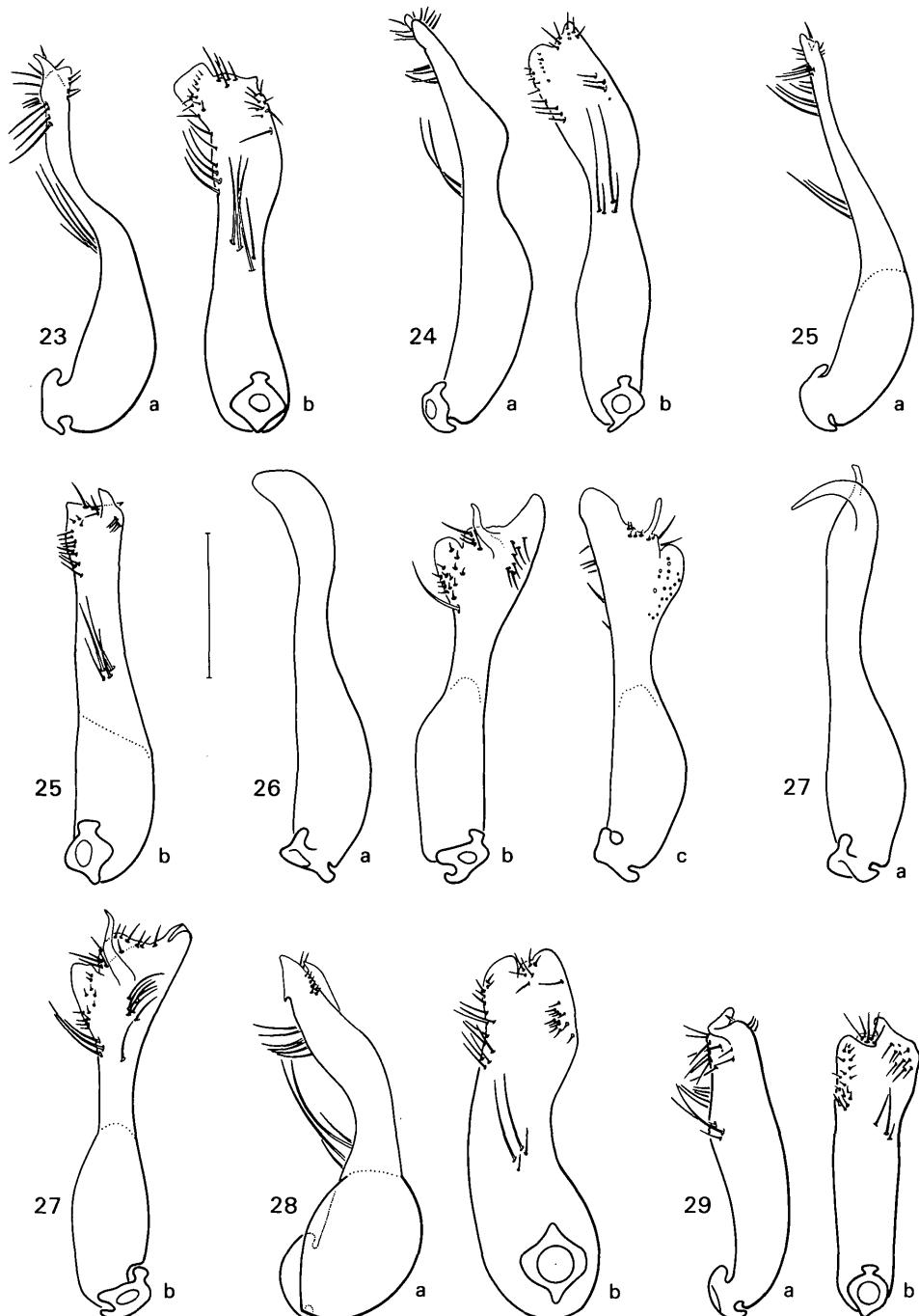
Figs 2 - 10: Aedeagus (a = lateral, b = ventral and c = ventro-lateral aspect) of 2) *Limnebius myrmidon* (France), 3) *L. sp.n.* JÄCH & MATSUI, in prep. (Japan), 4) *L. taiwanensis* sp.n. (Taiwan), 5) *L. boukali* sp.n. (paratype), 6) *L. rufipennis* (Nepal); 7) *L. wui* (Yunnan), 8) *L. kwangtungensis* (Taiwan), 9) *L. immersus* (lectotype), 10) *L. arabicus* (Israel).



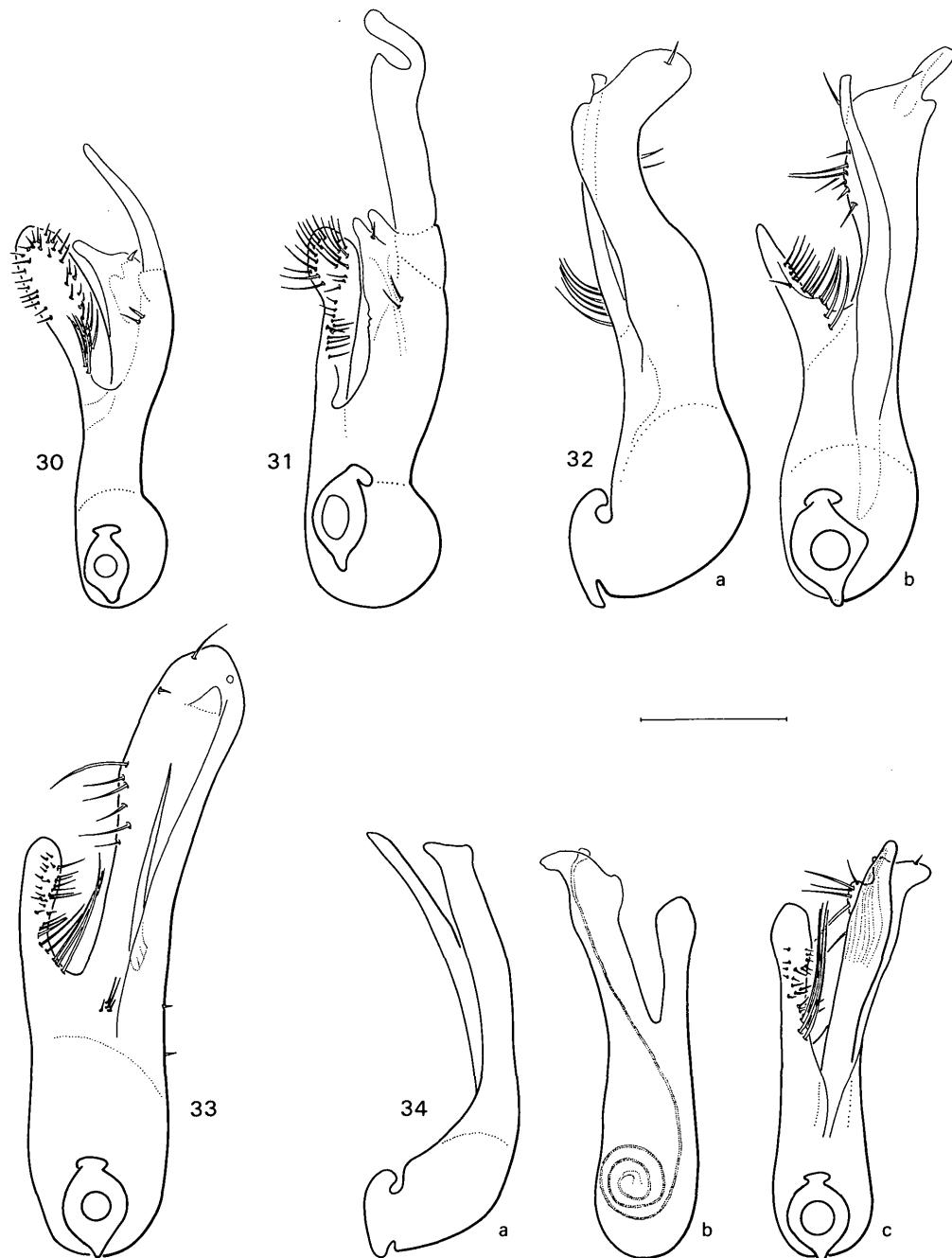
Figs 11 - 15: Aedeagus of 11) *Limnebius loeblorum* sp.n. (holotype), a) lateral and b) ventral aspect, 12) *L. nanus* sp.n. (holotype), a) lateral and b) ventral aspect, 13) *L. evanescens* (Algeria), a) lateral and b) ventral aspect, 14) *L. externus* sp.n. a) dorso-lateral (Spain) and b) ventro-lateral (Morocco) aspect, 15) *L. perparvulus*, a) lateral (Tunisia), b) ventro-lateral (Greece) and c) dorso-lateral (Greece) aspect.



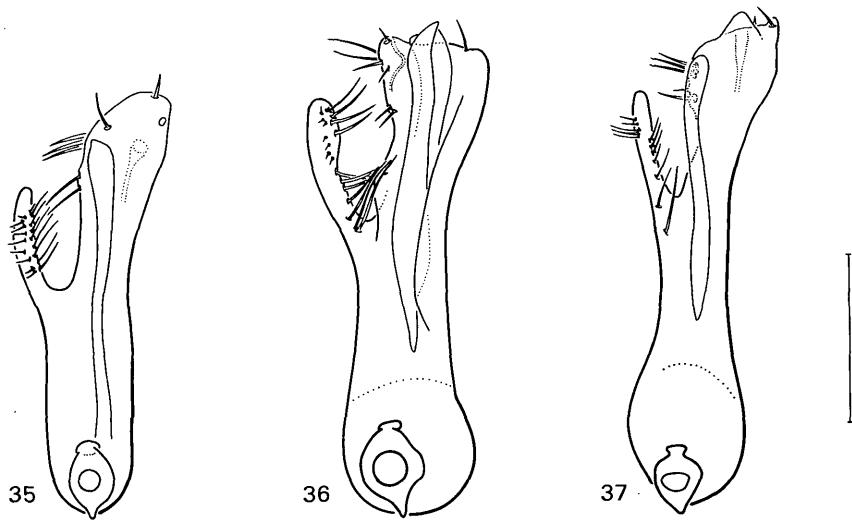
Figs 16 - 22: Aedeagus of 16) *Limnebius oblongus* (Morocco), lateral aspect, 17) *L. atomus* (Austria), ventral aspect, 18) *L. clayae* (holotype), ventral aspect, 19) *L. kweichowensis* (Beijing), a) ventral and b) ventro-lateral aspect, 20) *L. fontinalis* (Saudi Arabia), lateral aspect, 21) *L. sanctimontis* sp.n. (holotype), a) lateral and b) ventral aspect, 22) *L. ferroi* sp.n. (Turkey, Taurus), a) lateral and b) ventral aspect.



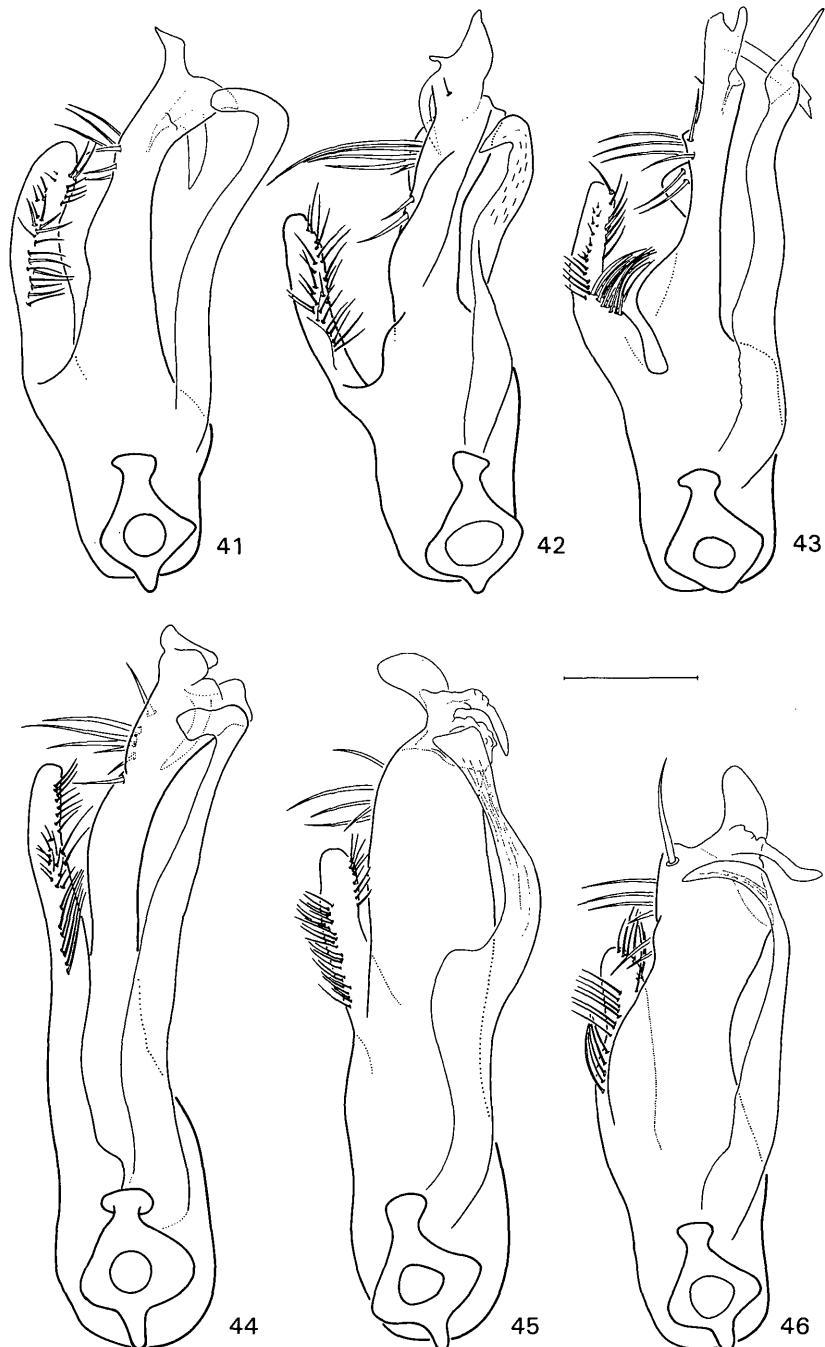
Figs 23 - 29: Aedeagus of 23) *Limnebius paranuristanus* (Turkey), a) lateral and b) ventral aspect, 24) *L. murcus* (Crete), a) lateral and b) ventral aspect, 25) *L. kaszabi* (lectotype), a) lateral and b) ventral aspect, 26) *L. murentinus* (Turkey, Bursa), a) lateral (setae not illustrated), b) ventro-lateral and c) dorso-lateral aspect, 27) *L. attalensis* sp.n. (holotype), a) lateral and b) ventro-lateral aspect, 28) *L. distinguendus* (Turkey, Cizre), a) lateral and b) ventral aspect, 29) *L. mundus* (Cyprus), a) lateral and b) ventral aspect.



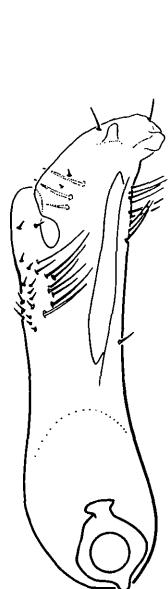
Figs 30 - 34: Aedeagus of 30) *Limnebius lusitanus* (Spain, Lugo), ventral aspect, 31) *L. aluta* (Austria), ventral aspect, 32) *L. ibericus* (Portugal), a) lateral and b) ventral aspect, 33) *L. grandicollis* (Madeira), ventral aspect, 34) *L. bacchus* (Spain, Malaga), a) lateral (no setae illustrated), b) dorsal (no setae illustrated) and c) ventral aspect.



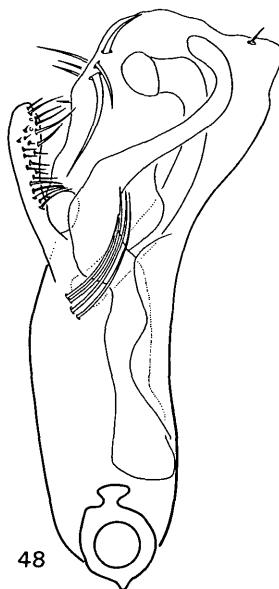
Figs 35 - 40: Aedeagus (ventral aspect) of 35) *Limnebius corfidius* (Turkey), 36) *L. corybus* (Turkey, Mugla), 37) *L. cordobanus* (Spain, Albacete), 38) *L. nitigerus* (Greece, Thraki), 39) *L. graecus* sp.n. (paratype, Greece, Kavala), 40) *L. nitidus* (France, Provence).



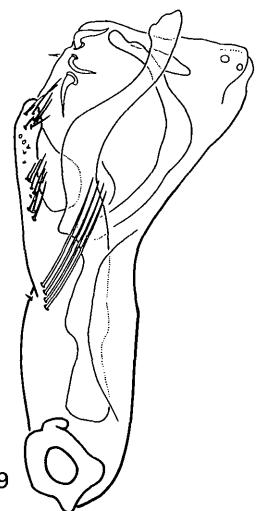
Figs 41 - 46: Aedeagus (ventral aspect) of 41) *Limnebius gerhardti* (Spain, Leon), 42) *L. hilaris* (paratype), 43) *L. nitifarus* (paratype, Tarfaia), 44) *L. montanus* (holotype), 45) *L. irmelae* sp.n. (holotype), 46) *L. maurus* (Mallorca).



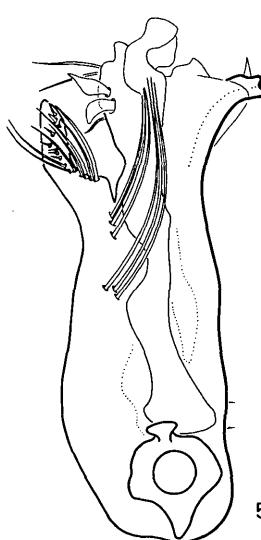
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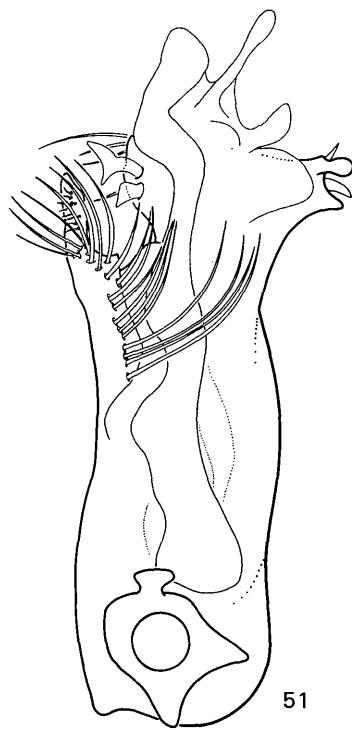
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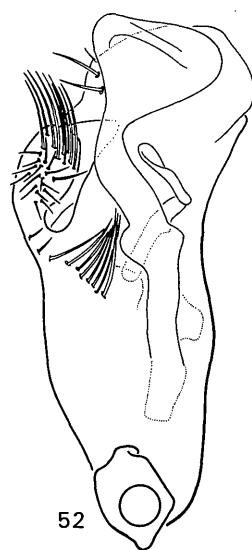
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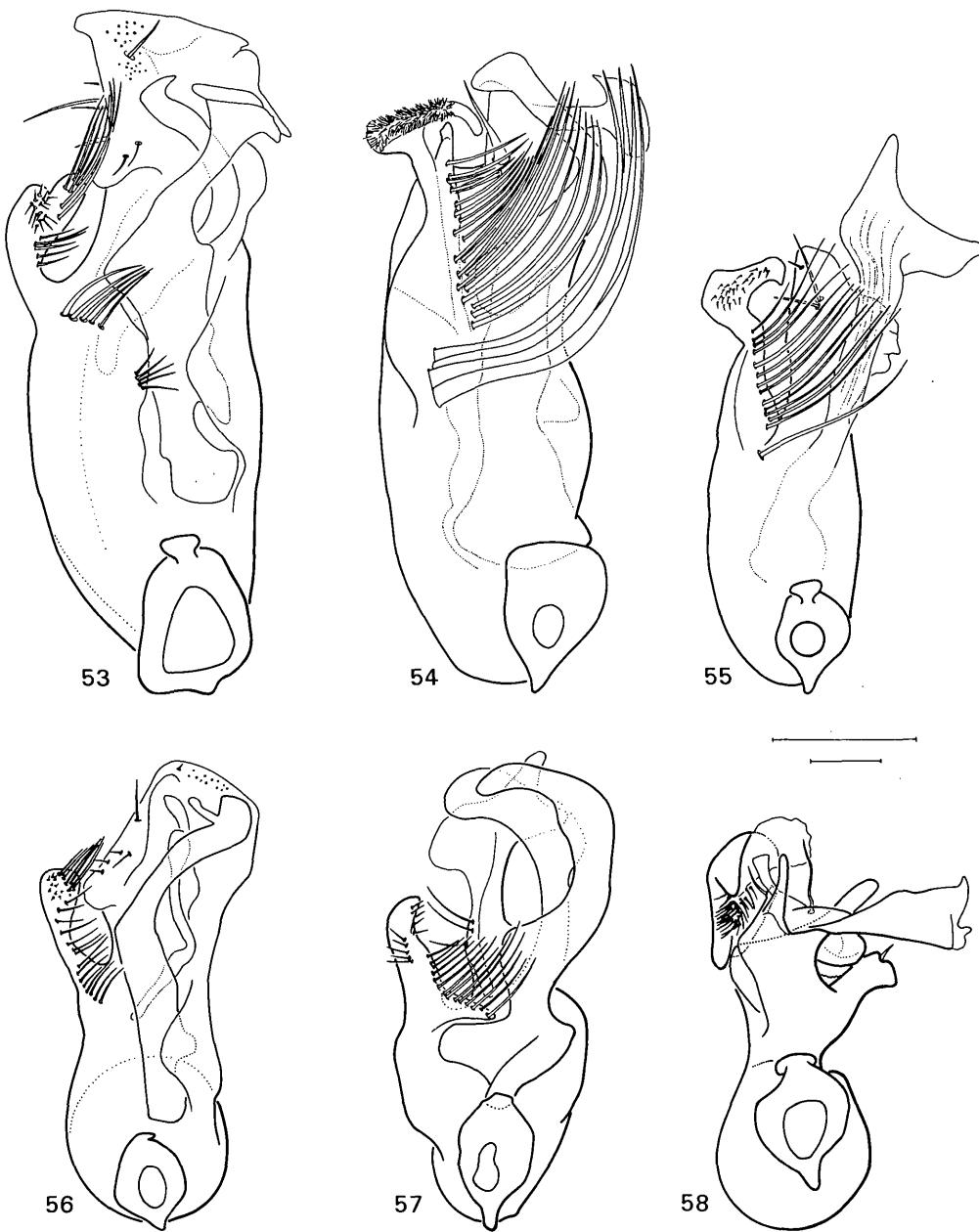


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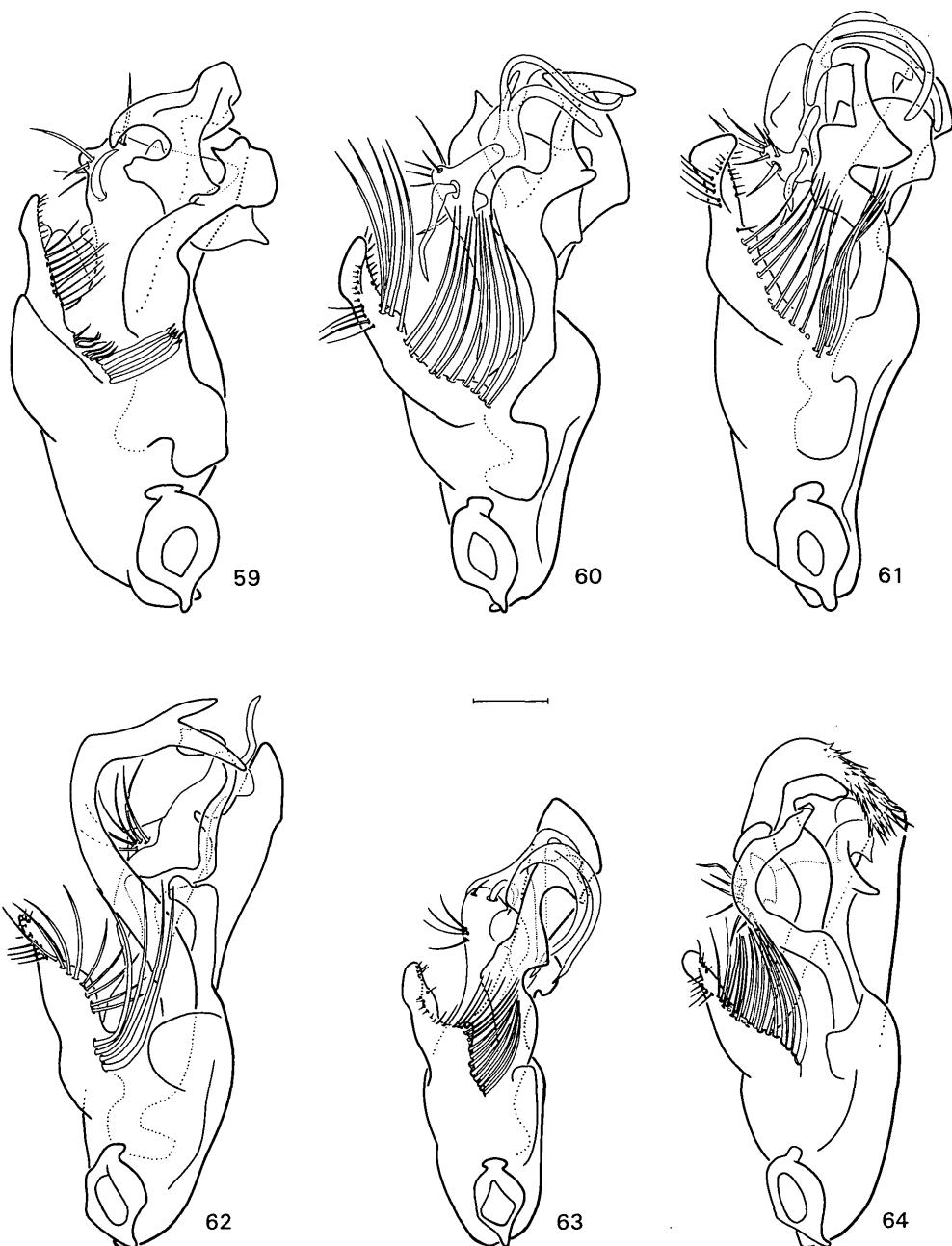


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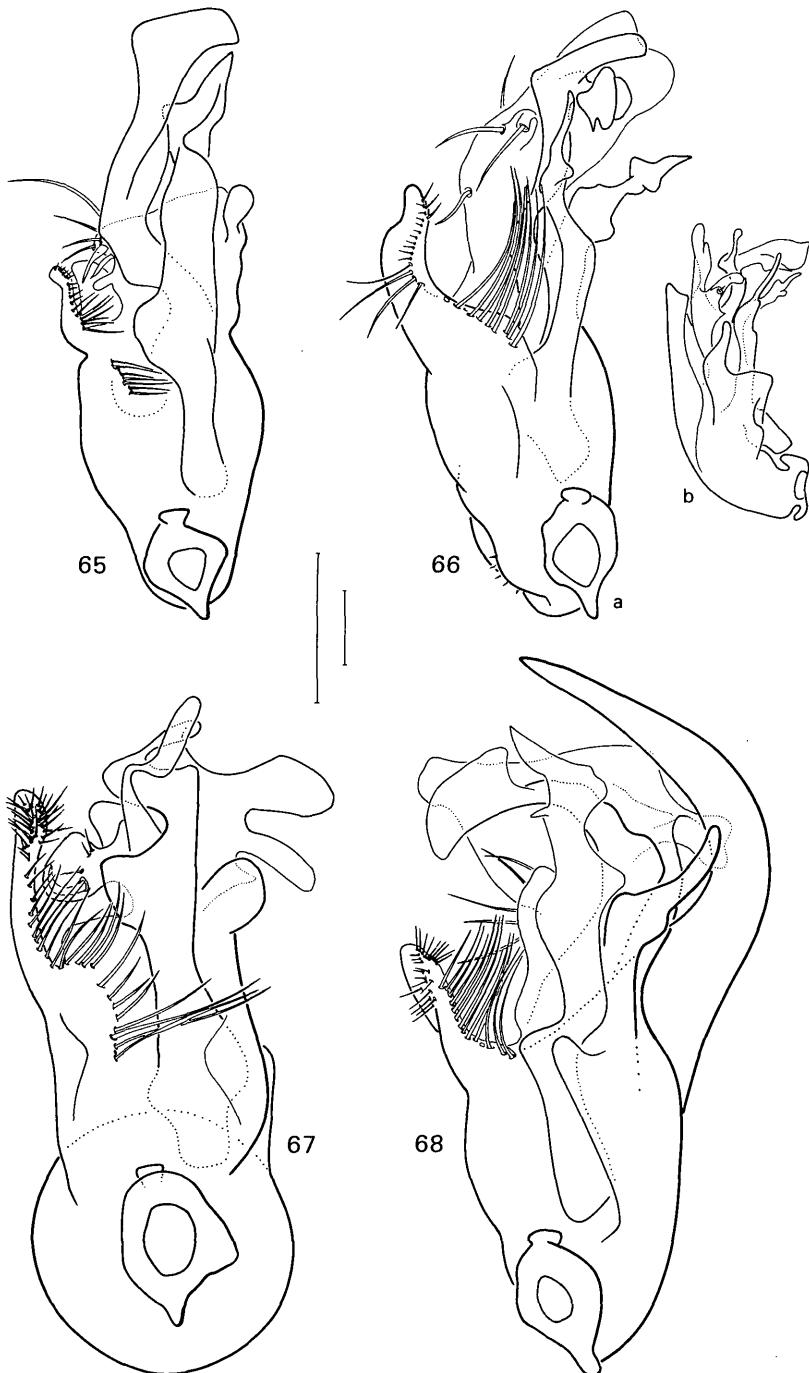
Figs 47 - 52: Aedeagus (ventral aspect) of 47) *Limnebius kocheri* (Morocco), 48) *L. punctatus* (paralectotype), 49) *L. similis* (Gomera), 50) *L. gracilipes* (paralectotype), 51) *L. canariensis* (Gran Canaria), 52) *L. ignarus* (paratype of *L. fuentei*).



Figs 53 - 58: Aedeagus (ventral aspect) of 53) *Limnebius pilicauda* (Algeria), 54) *L. paganettii* (lectotype), 55) *L. fallaciosus* (Makedonia), 56) *L. mucronatus* (Sardinia), 57) *L. hispanicus* (paratype, Grenada), 58) *L. claviger* sp.n. (holotype). Long scale = figs 53 - 56, short scale = figs 57 and 58.

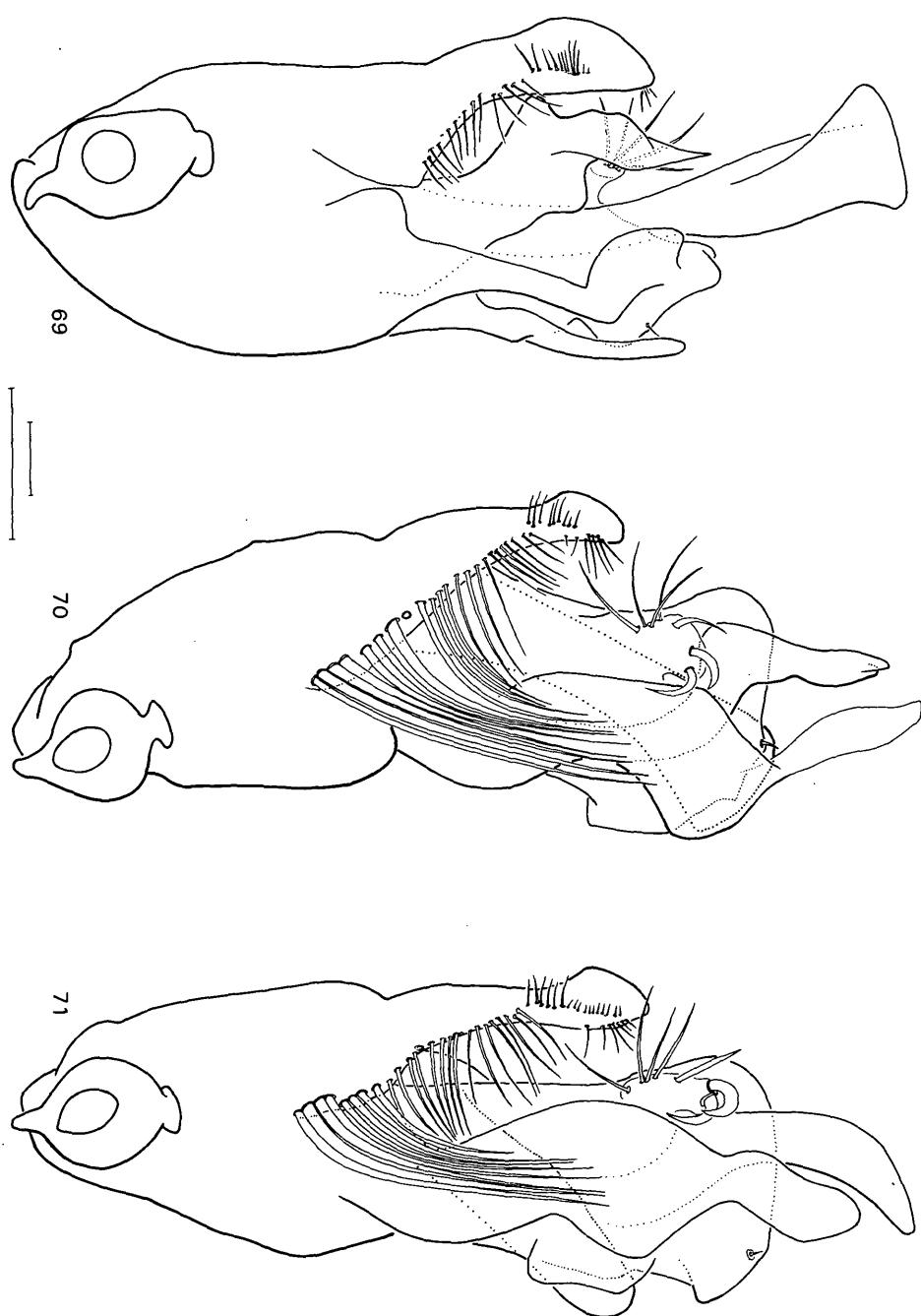


Figs 59 - 64: Aedeagus (ventral aspect) of 59) *Limnebius truncatellus* (France), 60) *L. schoenmanni* sp.n. (holotype), 61) *L. crassipes* (Greece, Milos), 62) *L. simulans* (Cyprus), 63) *L. levantinus* sp.n. (paratype, Hatay), 64) *L. spinosus* sp.n. (holotype).

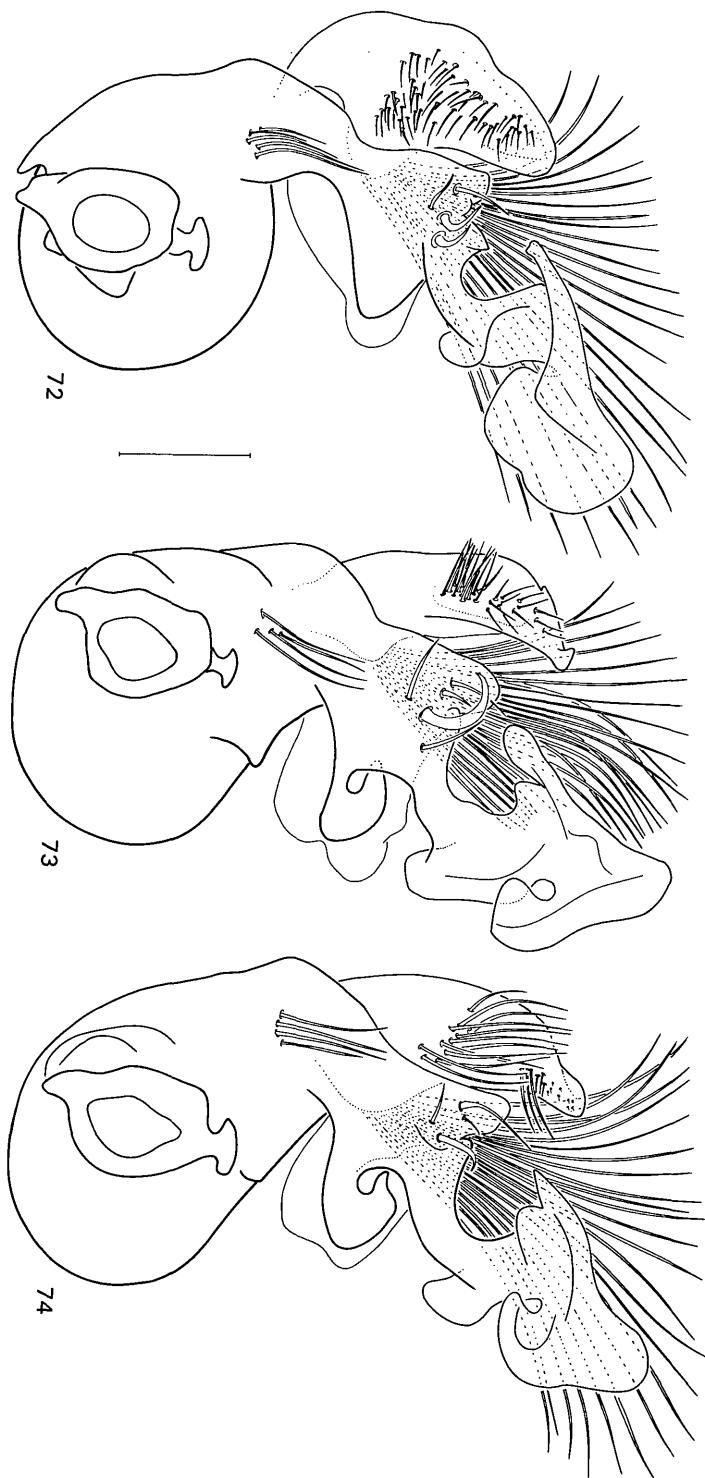


Figs 65 - 68: Aedeagus of 65) *Limnebius mesatlanticus* (lectotype), ventral aspect, 66) *L. theryi* (Tunisia), a) ventral aspect, b) same, lateral view, setae not illustrated, not to scale, 67) *L. asperatus* (lectotype), 68) *L. nitiduloides* (Sicily). Long scale = fig. 67, short scale = figs 65, 66a and 68.

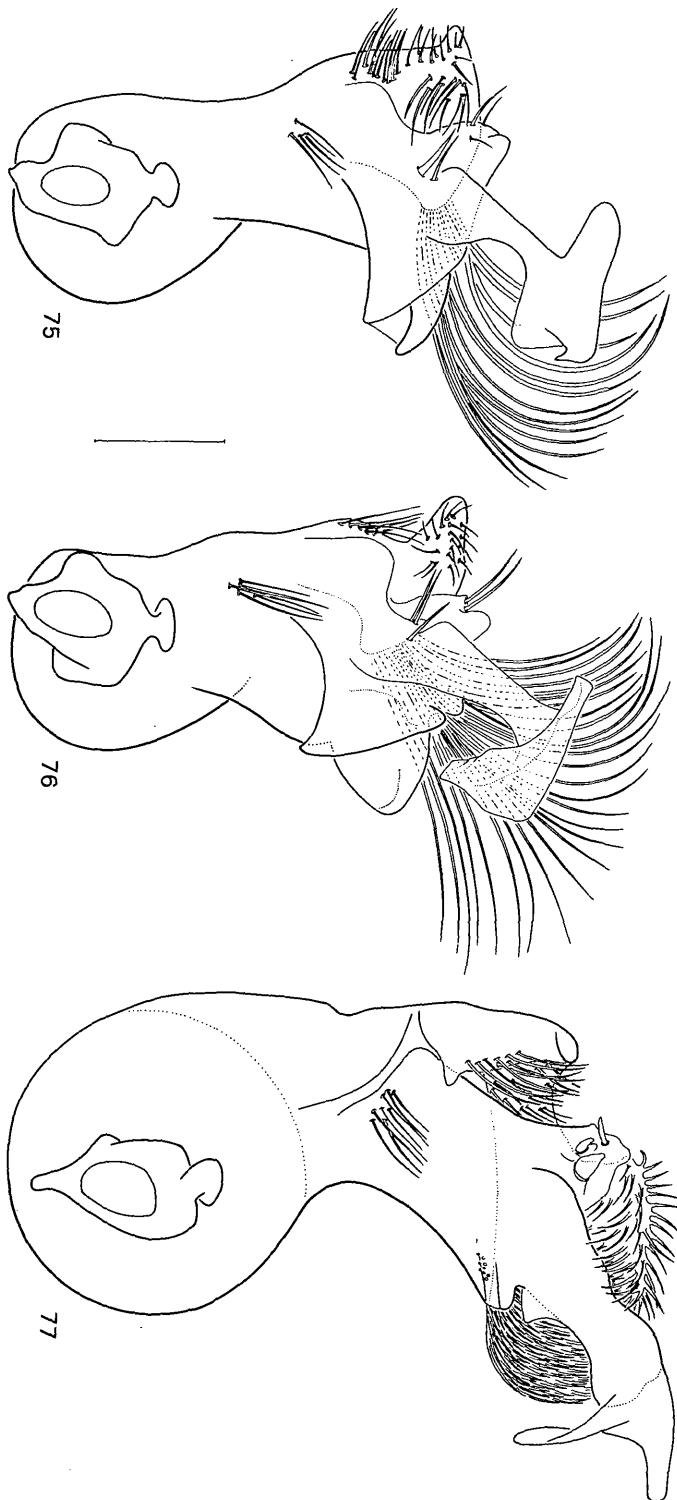
Figs 69 - 71: Aedeagus (ventral aspect) of 69) *Limnebius freatalis* (Morocco, Fez), 70) *L. simplex* (Sicily), 71) *L. calabricus* sp.n. (paratype). Long scale = figs 70, 71; short scale = fig. 69.



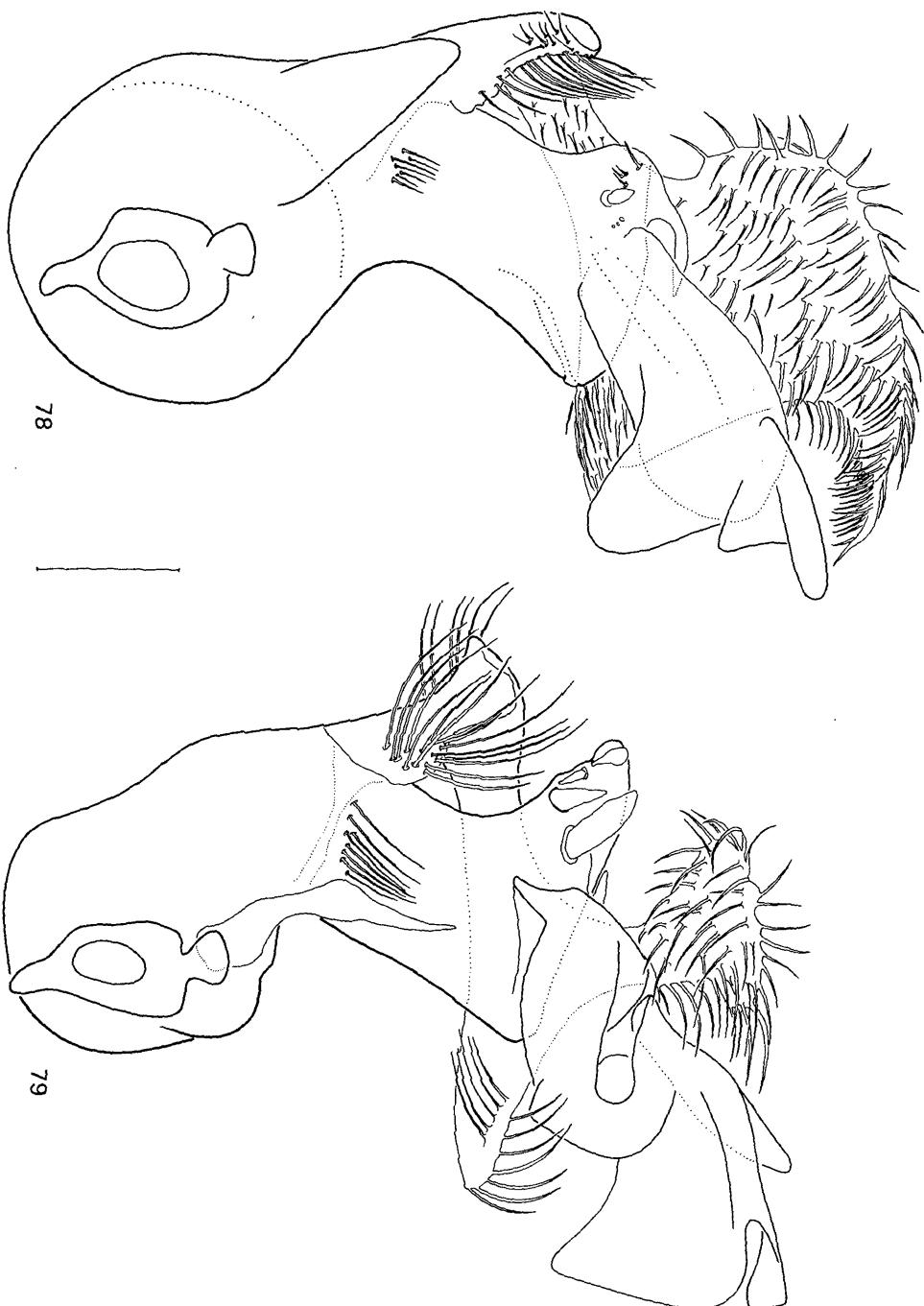
Figs 72 - 74: Aedeagus (ventral aspect) of 72) *Limnebius furcatus* (Croatia), 73) *L. doderoi* (Sardinia), 74) *L. gridellii* (paratype).



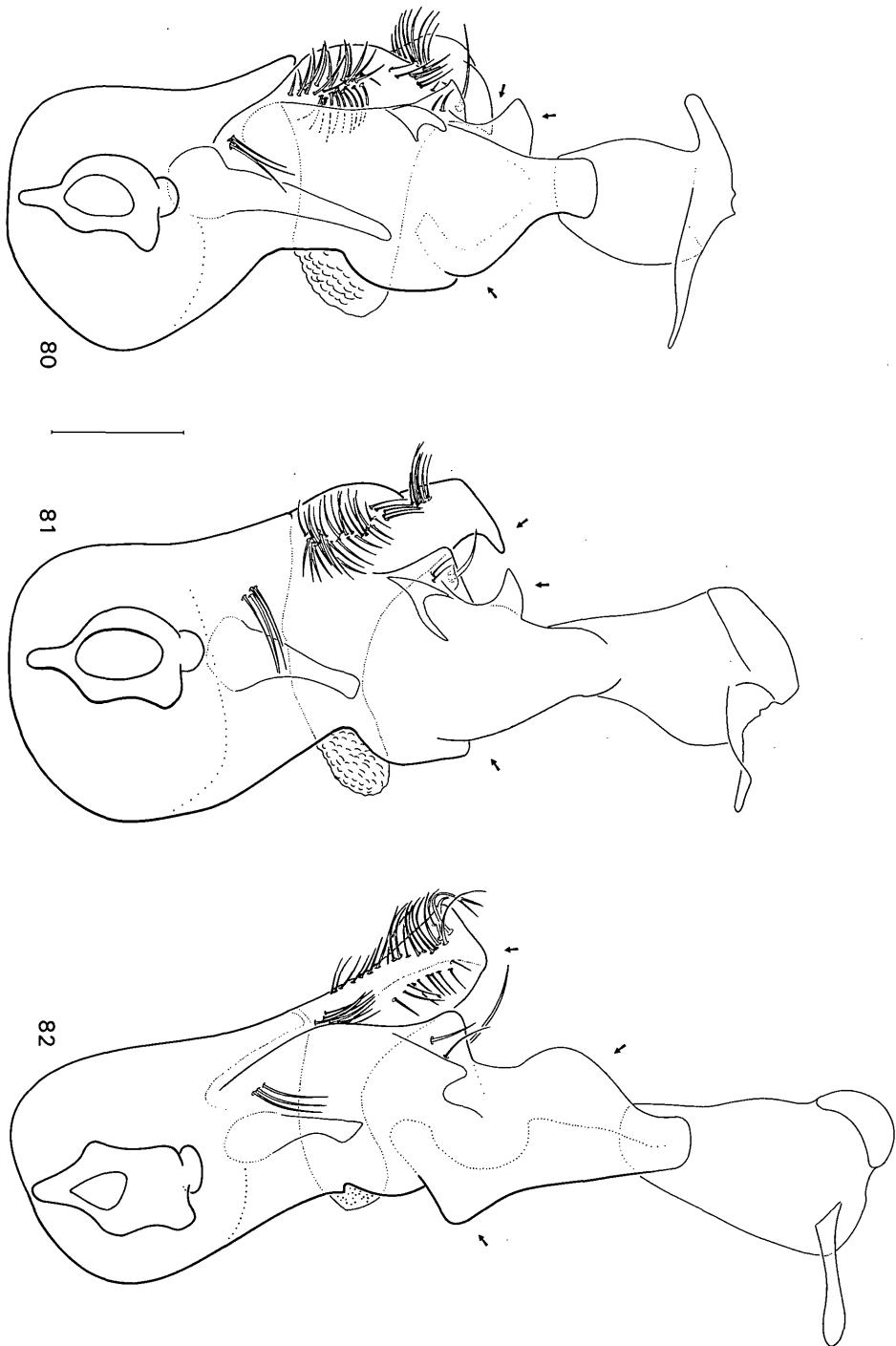
Figs 75 - 77: Aedeagus (ventral aspect) of 75) *Limnebius stagnalis* (Greece, Sithonia), 76) *L. reuvenorii* sp.n. (paratype, Antalya), 77) *L. rubropiceus* (Makedonia).



Figs 78 - 79: Aedeagus (ventral aspect) of 78) *Limnebius crinifer* (Lower Austria) and 79) *L. papposus* (Italy, Calabria).



Figs 80 - 82: Aedeagus (ventral aspect) of 80) *Limnebius parvulus* (Ukraine), 81) *L. glabriventris* (Primorye) and 82) *L. sharovskiy* sp.n. (paratype).



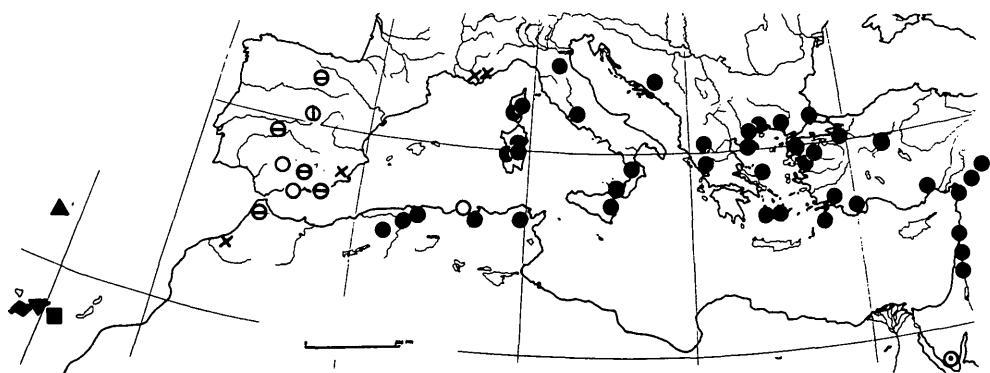


Fig. 83: Geographical distribution of (■) *Limnebius canariensis*, (○) *L. evanescens*, (◊) *L. externus* sp.n., (▲) *L. grandicollis*, (◑) *L. nanus* sp.n., (✗) *L. oblongus*, (●) *L. perparvulus*, (▼) *L. punctatus*, (◎) *L. sanctimontis* sp.n. and (◆) *L. similis*.



Fig. 84: Geographical distribution of (△) *Limnebius arabicus*, (◇) *L. attalensis* sp.n., (◎) *L. boukali* sp.n., (⊕) *L. clavatus*, (◑) *L. conoideus*, (●) *L. crinifer*, (◆) *L. distinguendus*, (◊) *L. fontinalis*, (○) *L. glabriventris*, (►) *L. immersus*, (□) *L. kaszabi*, (▲) *L. kwangtungensis*, (▼) *L. kweichowensis*, (■) *L. loeblorum* sp.n., (✗) *L. rufipennis*, (▽) *L. shatrovskiyi* sp.n., (■) *L. taiwanensis* sp.n., (▣) *L. wui* and (□) *L. sp.n.* JÄCH & MATSUI.

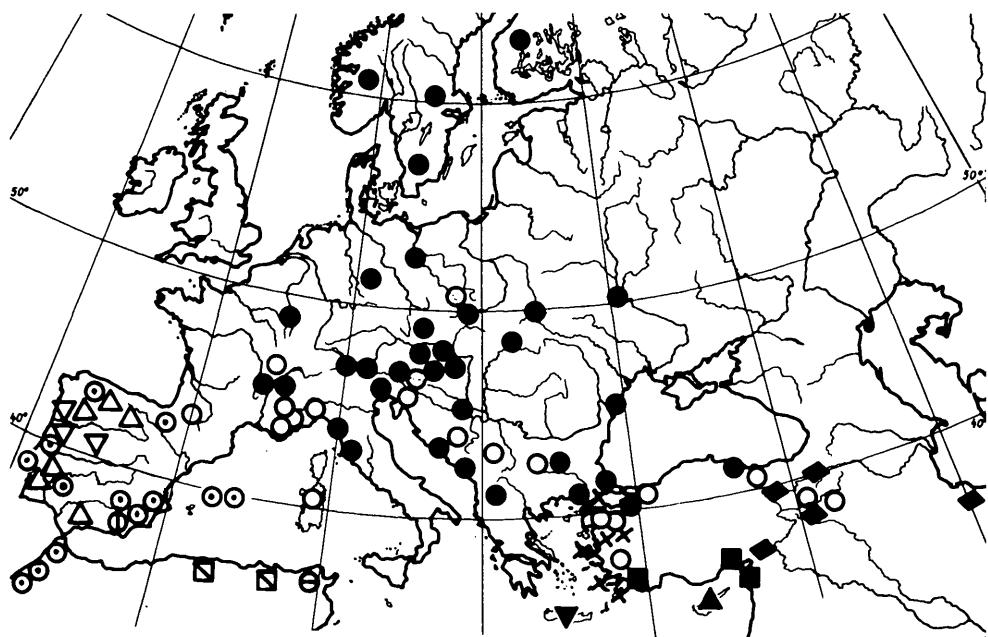


Fig. 85: Geographical distribution of (●) *Limnebius atomus* (without Siberian record), (■) *L. ferroii* sp.n., ( $\Delta$ ) *L. gerhardtii*, ( $\blacktriangle$ ) *L. mundus*, ( $\blacktriangledown$ ) *L. mucus*, ( $\times$ ) *L. murentinus*, ( $\circ$ ) *L. myrmidon*, ( $\odot$ ) *L. maurus*, ( $\text{◐}$ ) *L. irmelae* sp.n., ( $\text{◇}$ ) *L. hilaris*, ( $\nabla$ ) *L. montanus*, ( $\blacksquare$ ) *L. nitifarus* and ( $\blacklozenge$ ) *L. paranuristanus*.

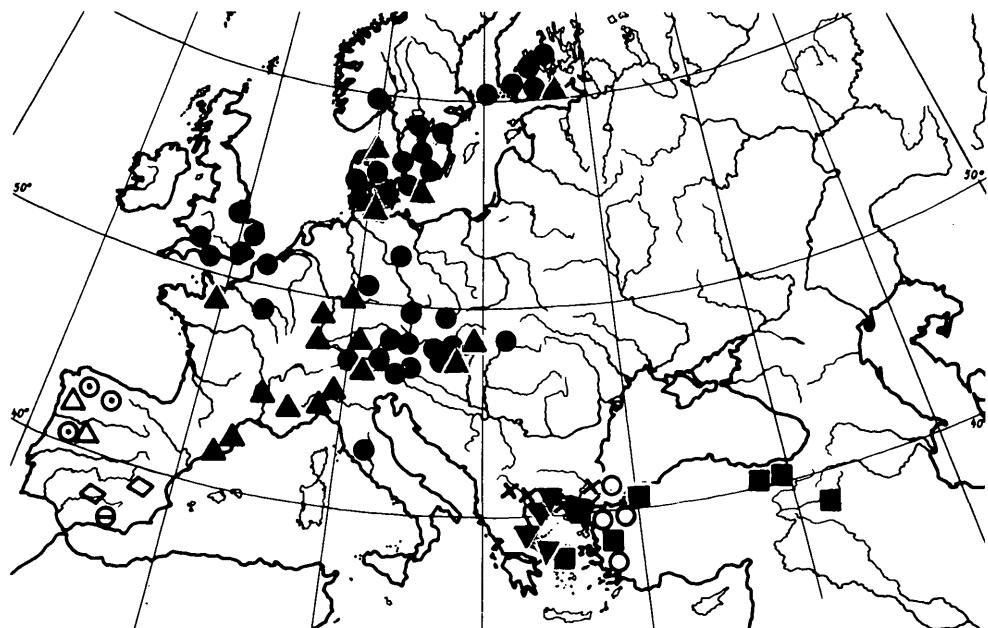


Fig. 86: Geographical distribution of (●) *Limnebius aluta*, (◐) *L. bacchus*, (◇) *L. cordobanus*, (○) *L. corfidius*, (■) *L. corybus*, (▼) *L. graecus* sp.n., ( $\Delta$ ) *L. ibericus*, ( $\odot$ ) *L. lusitanus*, ( $\blacktriangle$ ) *L. nitidus* and ( $\times$ ) *L. nitigeus*.

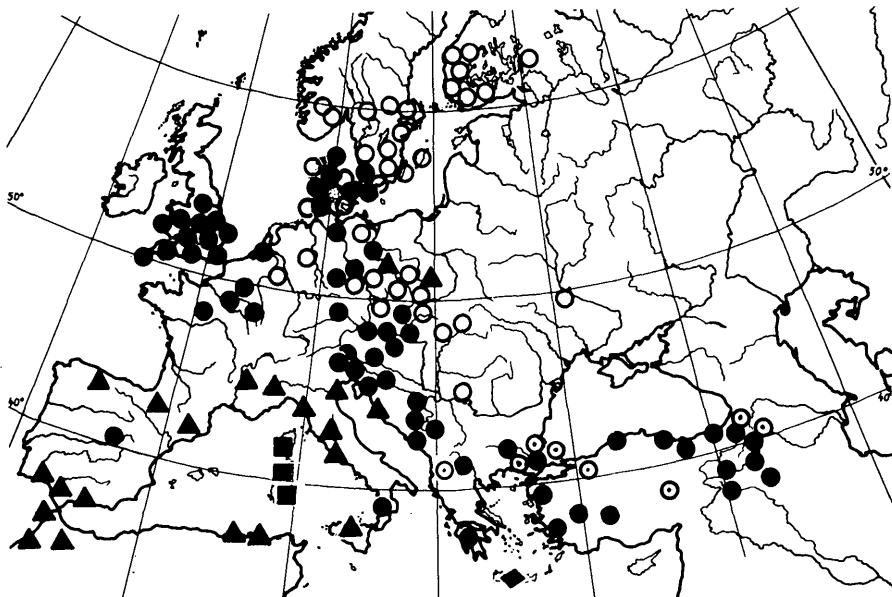


Fig. 87: Geographical distribution of (■) *Limnebius doderoi*, (▲) *L. furcatus*, (◆) *L. gridellii*, (●) *L. papposus*, (○) *L. parvulus* (without Siberian record) and (◎) *L. rubropiceus*.

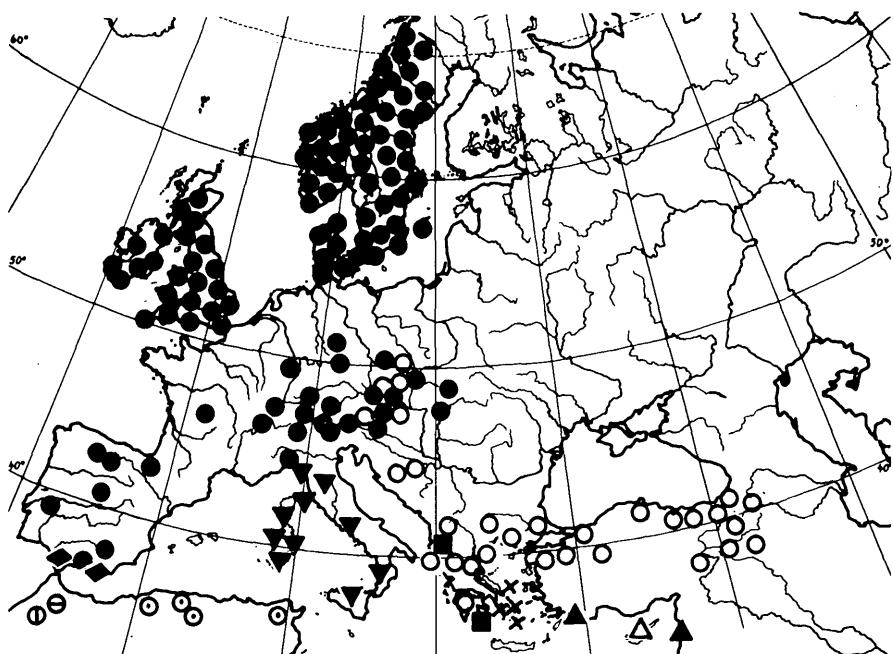


Fig. 88: Geographical distribution of (×) *Limnebius crassipes*, (◆) *L. ignarus*, (⊖) *L. kocheri*, (⊕) *L. mesatlanticus*, (▽) *L. mucronatus*, (▲) *L. reuvenortali* sp.n., (■) *L. schoenmanni* sp.n., (Δ) *L. simulans*, (○) *L. stagnalis*, (◎) *L. theryi* and (●) *L. truncatellus*.

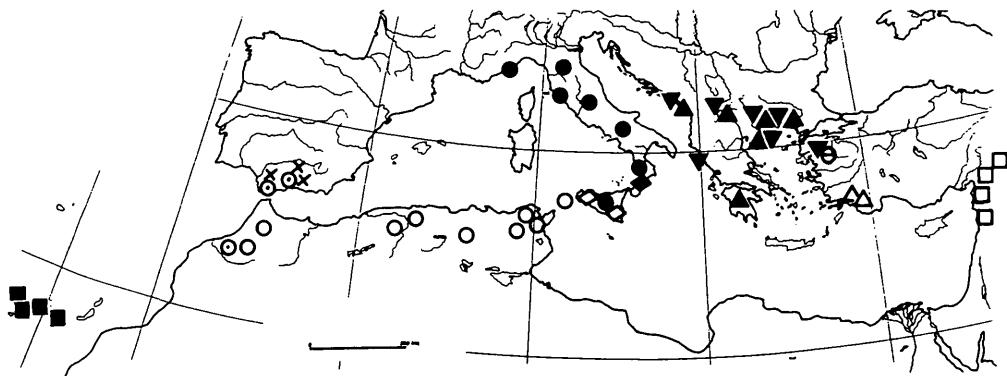


Fig. 89: Geographical distribution of (◆) *Limnebius calabricus* sp.n., (⊖) *L. claviger* sp.n., (▲) *L. fallaciosus*, (○) *L. fretalis*, (■) *L. gracilipes*, (✗) *L. hispanicus*, (□) *L. levantinus*, (●) *L. nitiduloides*, (▼) *L. paganettii*, (○) *L. pilicauda*, (◇) *L. simplex* and (Δ) *L. spinosus* sp.n.

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