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Revision of the Palearctic species of the genus *Ochthebius* LEACH

XXIII. The *O. (Asiobates) maculatus* species complex (Coleoptera: Hydraenidae)

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Abstract

The *Ochthebius (Asiobates) maculatus* REICHE, 1872 species complex (Coleoptera: Hydraenidae) is revised taxonomically. This species complex is characterized mainly by the bilaminate ventro-lateral margin of the aedeagal distal lobe. Two new species are described: *O. avdati* [Israel, Jordan] and *O. jaimiei* [Spain]. Two species, *O. abeillei* GUILLEBEAU, 1896 and *O. immaculatus* BREIT, 1908, are resurrected from synonymy. *Ochthebius infuscatus* SAHLBERG, 1913 is synonymized with *O. abeillei* GUILLEBEAU, 1896.

Key words: Coleoptera, Hydraenidae, *Ochthebius*, *Asiobates*, *Ochthebius maculatus* complex, taxonomy, new species.

Introduction

The Palearctic species of the subgenus *Asiobates* THOMSON, 1859 were revised by JÄCH (1990), who followed the concept of earlier authors (e.g. ORCHYMONT 1940a) by regarding *Ochthebius maculatus* REICHE as a single, highly polymorphic taxon.

However, it was already pointed out by MIFSUD et al. (2004), that *Ochthebius maculatus* sensu auct. in fact represents a complex of closely related species. Additional material became available recently, which allows a more detailed taxonomic review, which we present below. *Ochthebius maculatus* is split into five different species, two of which are new to science.

Material & Methods

The material used for this study is deposited in the following collections (abbreviations are used to refer to these collections in the text):

CCL	Coll. Castro Luque, Lucena
CCS	Coll. Constantin, Saint-Lô
CDM	Coll. Delgado, Murcia
CRB	Coll. Ribera, Barcelona
DEI	Deutsches Entomologisches Institut, Müncheberg [formerly: Eberswalde]
HUB	Museum der Alexander Humboldt Universität, Berlin
ISNB	Institut royal des Sciences naturelles de Belgique, Bruxelles
MHNG	Muséum d'Histoire naturelle, Genève
MHNL	Muséum d'Histoire naturelle de Lyon
MNCN	Museo Nacional de Ciencias Naturales, Madrid
NMB	Naturhistorisches Museum, Basel
NMW	Naturhistorisches Museum Wien



Figs. 1–4: Photographs of 1) *Ochthebius abeillei* (Israel, Akko, NMW), 2) *O. immaculatus* (Spain, Tarragona, CRB), 3) *O. jaimeii* (paratype; Spain, Murcia, type locality, NMW), 4) *O. maculatus* (Tunisia, Douz, NMW). A: median macula, B: admedian maculae, C: sublateral macula.



Figs. 5–8: *Ochthebius avdati*, photographs of paratypes, demonstrating colour variation, 5–7) En Aqev (type locality), 8) Ein Gedi.

OLL	Oberösterreichisches Landesmuseum, Linz
SNMB	Slovenské Národné Múzeum, Bratislava
TAU	Tel Aviv University
TMB	Természettudományi Múzeum, Budapest [= Hungarian Natural History Museum]
ZMH	Eläinmuseo (Zoologiska museet), Helsinki

PL: projected length of aedeagus (sensu JÄCH 1998).

All label data are cited precisely between quotations marks (“”).

The ink drawings were made by the first author, the distribution maps were compiled by the second author, the text of the species descriptions was written by both authors together.

Ochthebius maculatus species complex

The *Ochthebius maculatus* REICHE species complex forms part of the *O. bicolon* GERMAR species group (as defined by JÄCH 1990). Morphologically, *O. maculatus* and its allies are characterized mainly by the stout main piece and especially by the bilaminate ventral margin of the aedeagal distal lobe (e.g. Figs. 14–18).

Secondary sexual dimorphism: Anterior margin of male labrum faintly rimmed (except in *O. immaculatus*); anterior margin of female labrum slightly more emarginate (*O. abeillei*, *O. avdati*, *O. jaime*); outer edge of male mandibles with a well developed fringe of stiff bristles (*O. avdati* and *O. maculatus*, hardly apparent in *O. jaime*); elytral apices sometimes more acuminate and prolonged in female (especially in *O. maculatus*); first three protarsal segments of male widened; terminal abdominal sclerites dimorphic.

The elytral colouration is remarkably variable (Figs. 1–8). Unicoloured brown (Fig. 5) or yellowish elytra with distinct pattern of dark brown maculae (Figs. 1–4, 6–8), and intermediate stages often occur together within the same population. The number, extension and intensity of these maculae are usually most variable. However, in maculate specimens the colour pattern seems to follow a basal topology: A) one pair of more or less rounded “median” maculae is always present in the middle of the elytra on intervals 1–5 (these maculae do not always reach the elytral suture); B) two pairs of elongate “admedian” maculae on the anterior and posterior third of the elytra respectively, more or less equidistant from the median macula; C) two “sublateral” pairs of elongate to oval maculae can be present around the 8th interval slightly posterior of each “admedian” pair. However, there is a lot of variation in this basal pattern. For instance, the anterior admedian macula may be split into two maculae, and in a few cases all anterior maculae are distinctly enlarged, forming a single large macula reaching the suture and the anterior margin of the elytra, or they form – together with the median maculae – a large unpaired X-shaped macula (Fig. 8). The admedian and sublateral pairs are sometimes confluent. Very rarely, the elytral punctures/striae are darkened forming thus longitudinal stripes (see Fig. 2). In *O. abeillei*, *O. avdati*, and *O. immaculatus* unicoloured elytra are quite common.

Ochthebius auriculatus REY seems to be related to this species complex, especially due to its aedeagal shape (Fig. 13). However, the ventral margin of the distal lobe possesses only a single lamina. *Ochthebius auriculatus* is usually immaculate, but we have examined a few specimens (deposited in the NMW) with a pair of weakly developed “median” maculae.

In external characters, especially in the elytral colouration, *O. irenae* RIBERA & MILLÁN agrees quite well with *O. maculatus* and its allies. However, the shape of the aedeagus (main piece and distal lobe) of *O. irenae* is markedly different.

Check list of the *Ochthebius maculatus* species complex

- | | |
|--|---|
| 1) <i>O. abeillei</i> GUILLEBEAU, 1896 | Cyprus, Algeria, Tunisia, Egypt, Israel |
| 2) <i>O. avdati</i> DELGADO & JÄCH, 2007 | Israel, Jordan |
| 3) <i>O. immaculatus</i> BREIT, 1908 | NE Spain, Italy (Sardinia), Algeria; ?France |
| 4) <i>O. jaime</i> DELGADO & JÄCH, 2007 | Spain |
| 5) <i>O. maculatus</i> REICHE, 1872 | Italy (Sicily), Malta, Morocco, Algeria, Tunisia, ?Israel |

Ochthebius abeillei GUILLEBEAU

Ochthebius abeillei GUILLEBEAU 1896: 241. – KNISCH 1924 (catalogue). – ORCHYMONT 1927, 1940a. – JÄCH 1990 (partim). – ANGUS & DÍAZ 1991 (chromosomes; sub nomen *O. maculatus*). – HANSEN 1998 (catalogue). – JÄCH 2004 (catalogue).

Ochthebius infuscatus SAHLBERG 1913: 56 (described as a variety of *O. maculatus*). – KNISCH 1924 (catalogue). – ORCHYMONT 1940a. – SILFVERBERG 1987 (type catalogue). – JÄCH 1990 (partim). – HANSEN 1998 (catalogue). – JÄCH 2004 (catalogue) – **syn.n.**

TYPE LOCALITY: “Syrie” (historical Syria comprises parts of southern Turkey, Syria, Lebanon, and Israel; see also JÄCH & PÜTZ 2001).

TYPE MATERIAL: **Lectotype** ♂ of *O. abeillei* (MHNL), designated by JÄCH (1990: 68): “Abeillei Guilb.” / “Syrie” / “Abeille”. **Paralectotypes**: 1 ♂, 1 ♀ (MHNL): with similar labels.

Lectotype ♂ of *O. infuscatus* (ZMH), designated by JÄCH (1990: 68): “Haifa” / “Kison” [Kishon River] / “J. Sahlb. [Johan Reinhold Sahlberg, 1845–1920]” / “2288” / “Mus. Zool. Helsinki Loan n° 85 C721” / “Lectotypus *Ochthebius infuscatus* Sahlberg det. M. Jäch 1989” / “Mus. Zool. Helsinki Loan n: C07-92”.

ADDITIONAL MATERIAL EXAMINED:

A L G E R I A: 1 ♂ (ISNB): “Sahara A.Lameere [Auguste A.L. Lameere, 1862–1942], Ouargla 20.V.[18]98.” / “A. d’Orchymont det., *Ochthebius* (*Asiobates*) *maculatus* Reiche”; 1 ♂ (ISNB): “Bône [Annaba], Desbrochers [Jules Desbrochers des Loges, 1836–1913], 1889” / “A. d’Orchymont det., *O. (Asiobates) maculatus* Reiche”.

T U N I S I A: 2 ♂♂ (ISNB): “Kebilli [or Qibili], 3/[18]91”.

C Y P R U S: 7 ♂♂, 12 ♀♀ (ISNB): “Chypre S.E. Larnaka, 16.XI.1932 A. Ball”.

E G Y P T: 1 ♂ (HUB): “Aegyptus Ramleh [close to Alexandria]” / “Gotschlich S. Dönitz G.” / “*Ochthebius aegypticus* .. [illegible] .. Kolbe [Hermann Julius Kolbe, 1855–1939]” / “Zool. Mus Berlin” / “*Ochthebius maculatus* det. Jäch 90”.

I S R A E L: 3 ♀♀ (ZMH): “Haifa” / “J. Sahlb.”, two of these exs. with another label: “6050” and “2459”, respectively; 1 ♀ (ISNB): “Haifa” / “U. Sahlb.” / “Boppe coll., *maculatus*”; 2 exs. (NMW, additional specimens in MHNG): “ISRAEL: côte [coast] Akko, N.[Nahal = River] Naaman 18.IV.1982 Besuchet, Löbl” (printed); 2 exs. with similar labels (handwritten); 1 ♂ (NMW): “Israel, 16.4.[19]81 North. Costal plain Akko leg. Wewalka 132”; 1 ♂, 2 ♀♀ (NMW): “ISRAEL IES [= Inland Water Ecological Service] 5527. Berekhat[pond] Atlit [= S of Haifa]. R. Ortal leg. 1990.” (one female with additional label: “Chromosome prep. ♀ 2. R. B. Angus & J. Diaz Pasos. [!] 1990”; 1 ♀ (ISNB): “Jerico” / “J. Sahlb.” / “A. d’Orchymont det. *maculatus* Reiche”; 2 ♂♂ (DEI, OLL): “Jericho” resp. “Jerico” / “A. Sahlberg”; 2 ♂♂, 1 ♀ (TMB): “Jordan” / “J. Sahlb.” / “*Ochth. maculatus* Reiche, Coll. Reitter” / “*Ochthebius maculatus* Reiche, det. M. Jäch”; 1 ♀ (ISNB): “Jordan” / “A. Sahlb.” / “E. v. Bodemeyer ita vend.: *O. maculatus*, Reiche.”; 1 ♂ (ISNB): “Jordan” / “A. Sahlb.” / “Coll. Boppe, *O. maculatus*” / “A. d’Orchymont ved. *O. Asiobates maculatus* Reiche”; 1 ♂ (ISNB): “Jordan” / “coll. d’Orchymont”.

DIAGNOSIS: 1.8–2.2 mm long. Habitus (Fig. 1). Head black, pronotal disc brown or dark brown, anterior and posterior margins and lateral explanate margins usually paler yellowish. Elytra maculate or unicoloured. Labrum matt and reticulate, with small punctures. Clypeus microreticulate or rugulose, distinctly punctate. Fronto-clypeal suture distinctly impressed and wide. Longitudinal median groove distinct. Surface of frontal area densely sculptured, distinctly punctate. Ocellar area distinct or hardly discernible. Ocular grooves large. Maxillary palpi long. Pronotal disc not very convex in cross section. Anterior margin of pronotum with distinct postocular tooth. Median sulcus and admedian foveae well impressed; anterior ones round,

posterior ones oblique, sharply defined, long. Explanate margin moderately densely or densely punctate. Metaventral disc more or less entirely pubescent. Elytral setae (Fig. 9) ca. 50 µm long.

Aedeagus (Fig. 14; see also JÄCH 1990: Fig. 51a). PL: 315–349 µm. Main piece basally distinctly enlarged near the insertion of parameres; maximum curvature/constriction near middle. Parameres moderately wide and strong, apices widened. Distal lobe spatuliform, slightly longer than wide.

DIFFERENTIAL DIAGNOSIS: Externally, this species is very similar to *O. avdati* and *O. maculatus*. It differs from these species mainly in the entirely pubescent metaventrite. The aedeagus is similar to that of *O. maculatus*, from which it can be distinguished by the shape of the main piece, which is basally more strongly enlarged, maximum curvature/constriction more or less exactly in the middle.

DISCUSSION: *Ochthebius infuscatus* was described from a specimen with confluent elytral maculation. We could not detect significant characters which would enable specific distinction between maculate and unicoloured specimens. Therefore we consider *O. infuscatus* a junior subjective synonym of *O. abeillei*.

DISTRIBUTION (Fig. 22): This species occurs in a few isolated populations in the western (Algeria, Tunisia) and the eastern Mediterranean (Cyprus, Egypt, Israel).

The specimens labelled “Jordan” (ISNB, TMB) were collected near the mouth of Wadi Nu’eima, northeast of Jericho (“in rivulis parvis ad ... Jordanem prope ostium rivi Vade en Nawaime PAL.”, SAHLBERG 1913: 54). There are, however, no recent records from the Dead Sea Area and the Jordan Valley.

Ochthebius avdati sp.n.

Ochthebius maculatus: JÄCH & MARGALIT 1987. – JÄCH 1990 (partim).

TYPE LOCALITY: Spring (En Aqev) in the northern Negev Desert, ca. 400 m a.s.l., ca. 8 km SSE Sde Boqer, ca. 50 km S Beer Sheva, southern Israel.

TYPE MATERIAL: **Holotype** ♂ (NMW): “Israel, 14.3.[19]85 En Aquev/Jäch s. SDE Boquer”. **Paratypes:** 13 exs. (NMW, TAU), same date and locality as holotype; 2 ♂ ♂ (NMW): “ISRAEL, Negev En Aqev, 400m 19.XI.1980” / “Israel IES[= Inland Water Ecological Service] 2099”; 1 ♀ (NMW): “Israel13.II.[19]85 En Aquev / BGU[= Ben Gurion University]319 Col.120404”; 1 ♀ (NMW): “ISRAEL 16.2.[19]85 SDE BOQUER En Avdat [ca. 4 km WNW of the type locality]”; 2 exs. (NMW): “Israel, 12.4.[19]81 Central Negev En Avdat leg. Wewalka I13”; 1 ♂ (NMW): “ISRAEL, Totes Meer [Dead Sea] Umg. [surroundings of] Ein Gedi, David-Quelle [Nahal David], 24.III.1993 leg. A. Pütz”.

ADDITIONAL MATERIAL EXAMINED:

I S R A E L (Lake Kinneret Area): 1 ♀ (NMW): “ISRAEL 7.4. Bteha, EinAqeb leg. Jäch 1986”.

J O R D A N (Dead Sea Area): 1 ♀ (NMW): “JORDAN bor. oc. [northwest] 12 km S Suweima 31. 3. 1994 31, 40N; 35, 345E; -300m lgt. S. BECVAR [Stanislav Bečvář] j. & s. [junior and senior]”.

DIAGNOSIS: 1.9–2.0 mm long. Habitus (Figs. 5–8). Head black; pronotum testaceous, margins paler in maculate specimens. Elytra unicoloured brown or yellowish with dark brown maculae; maculation most variable. Labrum and clypeus smooth and shining, sparsely punctate. Clypeus almost glabrous. Fronto-clypeal suture moderately impressed, narrow, with a small longitudinal median groove. Frontal area smooth and shining, sparsely punctate. Ocellar area not very prominent, usually glabrous. Ocular grooves moderately impressed, frequently shining, inconspicuously punctate. Pronotum with disc moderately convex in cross section. Anterior margin with distinct postocular tooth. Median sulcus and admedian foveae moderately impressed; anterior ones rather round to oval, posterior ones oblique. Explanate pronotal margin

sparsely punctate; punctures superficial to sharply defined. Metaventral disc with a central glabrous shining area. Elytral setae (Fig. 11) slightly shorter than 50 µm, slightly sinuous.

Aedeagus (Fig. 16; see also JÄCH 1990: Fig. 51b). PL: 320–340 µm. Main piece constricted before middle (lateral view). Distal lobe conspicuously longer than in the other members of the complex; quite narrow in ventral view. Parameres not distinctly widened apically.

DIFFERENTIAL DIAGNOSIS: Externally, this species is very similar to *O. maculatus* from which it probably cannot be distinguished externally. It differs from *O. abeillei* in the glabrous area of the metaventrite. Genitally, *O. avdati* is significantly different from all other species of this complex by the markedly elongate distal lobe.

ECOLOGY: JÄCH & MARGALIT (1987) recorded this species (under the name *O. maculatus*) from Nahal Arugot near Ein Gedi (Dead Sea Area). The salinity in this spring varied from 0.2–0.6 g/l. The habitat of *O. avdati* is depicted in Fig. 23.

DISTRIBUTION (Fig. 22): Israel (northern Negev, Dead Sea Area, Kinneret Area) and Jordan (Dead Sea Area).

ETYMOLOGY: This species is named for the famous Nabatean king Avdat I (Greek: Oboda). The Nabateans had developed a sophisticated system for collecting water, which enabled them to do some farming in the desert. The town of Avdat (also named after that famous king) was the most important Nabatean settlement in the Negev desert. Several paratypes of *O. avdati* were collected in a spring in Avdat National Park (see Fig. 23) in the vicinity of the ancient ruins of Avdat.

Ochthebius immaculatus BREIT

Ochthebius immaculatus BREIT 1908: 61 (described as a variety of *O. maculatus*). – KNISCH 1924 (catalogue). – ORCHYMONT 1940a. – PIRISINU 1981 (partim, sub nomen *O. maculatus*). – JÄCH 1990 (partim). – VALLADARES & MONTES 1991 (catalogue). – AUDISIO et al. 1995 (partim, sub nomen *O. maculatus*). – HANSEN 1998 (catalogue). – JÄCH 2004 (catalogue).

TYPE LOCALITY: Coll d'en Rabassa, Mallorca, Balearic Islands, Spain.

TYPE MATERIAL: **Lectotype** ♂ (NMB), designated by JÄCH (1990: 68). **Paralectotypes:** 23 exs. (DEI: 7, ISNB: 1, NMB: 3, NMW: 12) with same locality data and collector as lectotype. There are probably additional paralectotypes in various other museums.

ADDITIONAL MATERIAL EXAMINED:

S P A I N: GERONA: 1 ♂ (NMW): "CATALUNYA Baix Empordà M.[Mònica] Martinoy Leg. GIRONA" / "PLETERA joncar [humid ground covered by rushes] Toroella de M.[Montgrí] 25 - 1 - 2001"; TARRAGONA: 1 ♀ (CRB): "170594 Delta del Ebro TAR [Tarragona] Estany dell Canal Vell: canal 1 22665 IR&GF & DB [Ignacio Ribera, Garth Foster & David Bilton] leg"; MALLORCA: 1 ex. (NMW): "Ins. Mallorca Balearen"; 6 exs. (HUB): "Mallorca, Balears Wilh.[elm] Popp" / "Ochthebius maculatus" / "Zool. Mus. Berlin"; 3 exs. (ISNB): "Mallorca Balears, Wilh.[elm] Popp" / "det. Kniz, maculatus R." / "ex coll A. Knisch, n° 114-383 [resp. 114-384; third specimen without numbers]".

I T A L Y (SARDINIA): 1 ♀ (NMW): "U.Lostia [Umberto Lostia di Santa Sofia, 1862–1943] Sardinia" / "[18]94" / "Collectio Kaufmann"; 1 ♀ (NMW) with similar locality label (handwritten); 2 exs. (HUB): "Sardegna Quarto (Quartu) [Quartu Sant'Elena] [Umberto]Lostia A. Fiori [Andrea Fiori, 1854–1933]"; 1 ♀ (ISNB): "Sardinia, Cagliari, Frkl. Müller [Franklin Müller, 1860–1923]" / "coll. D'Orchymont".

A L G E R I A: 1 ♂ (ISNB): "Oran" / "maculatus" / "A. Théry coll. maculatus"; 1 ♀ (ISNB): "St. Leu- Arzew [east of Oran, northern Algeria] 5-4 - [19]26" (handwritten).

PROVENANCE UNCERTAIN: 1 ♂ (ISNB): "Fr. [?France]" / "C. Mandl [? Karl Mandl, 1891–1989]" / "O. steinbühleri" / "det. Kniz, maculatus" / "Ex coll. A. Knisch, n° 114-382, coll. A. d'Orchymont".

DIAGNOSIS: 2.10–2.35 mm long. Habitus (Fig. 2). Head black, pronotum and elytra chestnut brown, elytral colouration quite variable: unicoloured brown, faintly maculate or yellowish with distinct dark brown maculae. Head capsule conspicuously wide, subtriangular. Eyes

comparatively small. Clypeus wide, trapezoidal, deeply impressed and rugulose, punctures sharply defined, with strong whitish setae. Fronto-clypeal suture distinctly impressed and narrow. Longitudinal median groove usually deep and moderately long. Frontal area, including ocellar region, densely rugulose, thus ocelli hardly discernable. Ocular grooves moderately impressed and large. Maxillary palpi rather short. Pronotum rather wide, disc not markedly convex in cross section, densely punctate. Anterior margin rather straight; postocular tooth inconspicuous, often hardly discernable. Median sulcus moderately impressed, generally widest in posterior third; anterior admedian foveae rather well defined, large and shallow; posterior ones much larger, oblique. Explanate lateral margin sparsely or moderately densely punctate. Metaventral disc entirely pubescent. Each elytral puncture with a long seta (Fig. 10), distinctly longer than 50 µm. Elytral gutter margined by a row of conspicuous curved setae. Elytral apices rounded.

Aedeagus (Fig. 15) larger than in other species of the complex (PL: 370–395 µm). Main piece strong, distinctly arched. Parameral apices strongly dilated. Distal lobe approximately as long as wide (lateral view), ventral laminae well developed.

DIFFERENTIAL DIAGNOSIS: This species can easily be distinguished from the other members of this species complex by the combination of the following characters: large size; wide and triangular head, clypeus trapezoidal; pronotal explanate margin very wide; elytral punctures with long setae (more than 50 µm long); elytral margin with a row of strong curved setae; metaventral disc pubescent. The aedeagus is also quite distinctive due to the very wide distal lobe (lateral view) and the enlarged parameral apices.

DISCUSSION: This species was hitherto regarded as a “variety” or as a synonym of *Ochthebius maculatus*. However, its external and aedeagal characters warrant its specific status.

DISTRIBUTION (Fig. 22): So far known with certainty from the northeastern Iberian Peninsula (Gerona, Tarragona), the Balearic Islands, Sardinia, and Algeria. However, except for the Iberian Peninsula there are no recent records.

CHIESA (1959: 18) recorded *O. maculatus* (quite obviously referring to *O. immaculatus*) from Corsica; however, we have not seen any material from there.

One specimen deposited in the ISNB (see above) might have been collected in France. However, the label data are quite ambiguous.

Ochthebius jaimeí sp.n.

Ochthebius maculatus: JÄCH 1990 (partim). – VALLADARES & MONTES 1991 (catalogue, partim). – DELGADO & SOLER 1997. – MILLÁN et al. 1997. – SAINZ CANTERO et al. 1997. – HANSEN 1998 (catalogue, partim). – JÄCH et al. 1998. – RIBERA et al. 1999 (catalogue, partim). – MILLÁN et al. 2002. – ABELLÁN et al. 2004. – JÄCH 2004 (catalogue, partim). – SÁNCHEZ-FERNÁNDEZ et al. 2003, 2004.

TYPE LOCALITY (Fig. 24): Permanent stream (río Vélez, also known as río de los Vélez and río Corneros) near Balneario de la Fuensanta, Lorca, Murcia, southeastern Spain.

TYPE MATERIAL: **Holotype** ♂ (NMW): “SPAIN, Murcia, rio Velez Near B.[alneario de la] Fuensanta, 29-4-[20]07 J.A. Delgado leg.”. **Paratypes:** 1 ♂, 3 ♀ ♀ (NMW), same date and locality as holotype; 7 exs. (4: NMW, 3: CDM): “SPAIN: Murcia, río Vélez near B.[alneario] Fuensanta, 19-4-[20]06 J.A. Delgado Leg”; 23 exs. (7: NMW, 16: CDM): “SPAIN, Murcia, rio Luchena 29-4-[20]07. J.A. Delgado leg.”; 2 ♂ ♂, 2 ♀ ♀ (NMW): “SPAIN, Murcia, Rambla del Moro, 14-4-[19]98. J.A. Delgado leg.”; 3 exs. (NMW): “Rambla del Moro MURCIA. SPAIN 29-Oct-[19]95 J.A.Delgado Leg.”; 2 ♂ ♂, 1 ♀ (CDM): “Rbla.[Rambla] del Moro Murcia, Spain 20-10-[19]95 J.A. Delgado leg.”; 5 ♂ ♂, 10 ♀ ♀ (CDM): same locality, “20-5-1996”; 1 ♂ (CRB): “17.4.[19]94 Fortuna, Murcia Rambla Salada 2 I.Ribera & A.Millán leg”; 76 exs. (partly dry mounted, partly in alcohol) (CRB, MNCN): “19.iii.1997 SPAIN Murcia Lorca: rbla. Torrealvilla Hernando & Ribera leg”; 10 exs. (NMW): “SPAIN: Alicante Rio Seco 8.4.2000 leg. A. Castro”; 1 ♂ (NMW): “SPAIN: Alicante Rambla de Algueta Albatera, 2.5.1996 leg. A. Castro”; 1 ♂

(CDM): "Tabernas 27-XI-1975 Almería, L.S. Subías aluviones en Verdelecho [alluvial substrate in stream (Verdelecho)]"; 1 ♂ (CRB): "15.iii.1997 Molinos Río Aguas ALM [Almería] CH, IR & Am leg [Carles Hernando, Ignacio Ribera & Andres Millán]"; 2 ♂♂ (CDM): "Molinos [del] Río Aguas Sorbas, Almería 24-3-2007 J.A. Delgado leg."; 1 ♂, 1 ♀ (CDM): "Laguna Alboraj Albacete, Spain 6-4-06 J.A. Delgado leg."; 1 ♂ (CRB): "070796 [7.VII.1996] Pitillas NAV[Navarra] Laguna: drenaje IR&PA [Ignacio Ribera & Pedro Aguilera] leg."; 1 ♀ (CRB): "060796 [6.VII.1996] Mediana ZAR [Zaragoza] Río Ginel: riachuelo salado IR & PA [Ignacio Ribera & Pedro Aguilera] leg" (type locality of *Ochthebius caesaraugustae* JÄCH et al.).

Additional material is deposited in the CCL.

DIAGNOSIS: 1.7–2.0 mm long. Habitus (Fig. 3). Head black, pronotum brown, pronotal disc generally darker than lateral explanate margin, anterior and posterior margins of disc often yellowish. Elytra maculate; maculation very variable, sometimes (specimens from Navarra and Zaragoza) quite indistinct; unicoloured specimens so far not recorded. Labrum and clypeus superficially punctate, rarely shining, covered with short setae. Fronto-clypeal suture distinct, not very strongly impressed, narrow, with a short longitudinal median groove. Frontal area smooth and shining or microreticulate between punctures. Punctures small and densely arranged. Ocellar area generally distinctly shining, sometimes obscured by small punctures. Ocular grooves moderately impressed, reniform. Pronotal disc distinctly convex in cross section. Anterior pronotal margin with distinct postocular tooth. Median sulcus and admedian foveae moderately impressed; anterior ones rather round to oval, posterior ones oblique. Explanate margin sparsely punctate; punctures superficial or well defined. Metaventral disc with a central glabrous area. Elytra usually with four maculae; apices acuminate in both sexes.

Aedeagus (Figs. 17, 19). PL: 290–325 µm. Main piece rather distinctly arched, maximum constriction/curvature before middle (lateral view). Distal lobe subreniform, dorsal margin slightly concave; sclerotized part apically usually convex. Parameres strongly enlarged apically, thus resembling wooden spoons.

DIFFERENTIAL DIAGNOSIS: This species can be distinguished from *O. immaculatus* by the smaller size, by the pronotal morphology, by the glabrous area of the metaventrite, and by the considerably smaller aedeagus (distal lobe less wide).

Ochthebius jaimeí is very similar to *O. maculatus* from which it can hardly be distinguished externally. On average, specimen of *O. jaimeí* are smaller than those of *O. maculatus*. In the Andalusian specimens, the pronotal disc appears to be slightly more convex than in *O. maculatus*. Genitally, *O. jaimeí* differs from *O. maculatus* mainly in the parameres, which are longer (more or less reaching apex of main piece) and apically distinctly dilated. Furthermore, the sclerotization pattern of the distal lobe (when examined under stereoscopic microscope, see Fig. 19) differs significantly from *O. maculatus*. The distal lobe is usually more slender in *O. jaimeí*, and its dorsal margin is usually concave, but these characters are too variable to allow unambiguous distinction. The main piece is slightly more strongly curved in *O. jaimeí*, the maximum curvature/constriction is usually found very slightly further distal than in *O. maculatus*.

ECOLOGY: Ecological data for *O. jaimeí* were published (under the name *O. maculatus*) by ABELLÁN et al. (2004), DELGADO & SOLER (1997), JÄCH et al. (1998), MILLÁN et al. (1997, 2002), SÁNCHEZ-FERNÁNDEZ et al. (2003, 2004). In contrast to *Ochthebius immaculatus*, *O. jaimeí* seems to prefer inland waters.

DISCUSSION: Without any doubt, *Ochthebius jaimeí* and *O. maculatus* are most closely related. Their separation into discrete species probably occurred rather recently in terms of beetle phylogeny. However, we have decided to describe *O. jaimeí* as a new species, rather than as a new Iberian subspecies of *O. maculatus*, mainly because of the conspicuous parameral differences. Although the parameral length and the width of their apices varies slightly in both

species, we could not observe any intermediate condition. Therefore, we think that the gene flow between the Iberian and the North African populations has been interrupted for a sufficient amount of time.

DISTRIBUTION (Fig. 22): This species occurs in northern Spain (Navarra, Zaragoza) and southeastern Spain (Albacete, Alicante, Almería, Murcia).

ETYMOLOGY: Named after Jaime Delgado, youngest son of the first author.

Ochthebius maculatus REICHE

Ochthebius maculatus REICHE 1872: 27. – CAMERON & CARUANA GATTO 1907. – SAHLBERG 1913 (partim). – KNISCH 1924 (catalogue). – ORCHYMONT 1927 (partim), 1940a, b. – NORMAND 1933. – KOCHER 1958 (catalogue). – CHIESA 1959. – IENIȘTEA 1978 (catalogue). – PIRISINU 1981. – JÄCH & MARGALIT 1987 (misident.: *O. avdati*). – JÄCH 1990 (partim). – ANGUS & DÍAZ 1991 (misident.: *O. abeillei*). – GERECKE 1991: 286. – VALLADARES & MONTES 1991 (catalogue). – AUDISIO et al. 1995. – MILLÁN et al. 1997 (misident.: *O. jaimeí*). – SAINZ CANTERO et al. 1997 (misident.: *O. jaimeí*). – HANSEN 1998 (catalogue; year of original publication of *O. maculatus* cited as 1869). – JÄCH et al. 1998 (misident.: *O. jaimeí*). – RIBERA et al. 1999 (catalogue). – VALLADARES & GARCÍA-AVILÉS 1999 (misident.: *O. immaculatus*). – BENNAS et al. 2001. – MILLÁN et al. 2002 (misident.: *O. jaimeí*). – ABELLÁN et al. 2004 (misident.: *O. jaimeí*). – CHAVANON et al. 2004. – JÄCH 2004 (catalogue). – MIFSUD et al. 2004. – SÁNCHEZ-FERNÁNDEZ et al. 2003 (misident.: *O. jaimeí*), 2004 (misident.: *O. jaimeí*).

TYPE LOCALITY: Algeria (Oran) and Italy (Sicily) were mentioned in the original description (REICHE 1872: 27).

TYPE MATERIAL: Syntypes not traced (see JÄCH 1990). It is quite possible that the syntype(s) from Oran in fact represent *O. immaculatus*.

MATERIAL EXAMINED:

- I T A L Y (SICILY)**: 1 ♂, 2 ♀♀ (NMW): “4 Porto Empedocle. Sicily, Coll. M.D.Eyre” / “16.2.1998 ruts with weed”; 2 exs. (DEI): “Girgenti [Agrigento], Rottenberg [Arthur L.M.A.M. Rottenberg, 1843–1875]”; 1 ♂, 1 ♀ (ISNB): “Girgenti, Rottenberg” / “det. Kniz, maculatus” / “Ex. coll. A. Knisch, n° 114-381, coll. A. d’Orchymont” / “prep. Micr., n° 6691.3”.
- M A L T A**: 1 ♂, 1 ♀ (NMW): “Gozzo” / “Bittner [Alexander Bittner, 1850–1902] [18]94, Italien[!]” / “maculatus” / “Mit Abeillei Guilleb. Type von Syrien übereinstimmend” [“agreeing with type of abeillei Guillebeau from Syria” – probably in Ganglbauer’s handwriting] / “Abeillei Guilleb. Breit det.”; 1 ♂, 1 ♀ (NMW): “Maltese Islands. Gozo: 1 km SSW San Lawrenz Il-Qattara 30.3.2002 leg. Schuh & Mifsud”.
- M O R O C C O**: 1 ♀ (ISNB): “Marocco, Reitter”; 2 ♂♂ (ISNB): “O. Nor. Fis, Maroc, Coll. Thery” / “A. Thery coll., maculatus”; 1 ex. (DEI): “Marocco [Morocco]”; 4 ♀♀ (TMB): “Marocco Casablanca Reitter” / “Ochth. maculatus Reiche, Coll. Reitter”; 1 ♀ (MHNG): “Maroc. Rabat, Bou Regreg, 23.III.62, R.Mussard”; 1 ♂, 2 ♀♀ (CRB): “37 MARRUECOS [Morocco] 60698 El Kifane O. Domer Bouhduou”; 1 ♂ (ISNB): “Marrakech, Maroc, Coll. Thery” / “impressicollis, v. maculatus Reiche” / “Peyerimhoff det.”; 1 ♂ (MHNG): “Maroc - M.[oyen] Atlas, Sources de [source of] l’Oum, er Rhia 1100 m, 5.V.[19]60, Cl.[aude] Besuchet”; 1 ♀ (MHNG): “Maroc – Sud [southern Morocco], Oued Massa, 8.IV.[19]74, Cl.[aude] Besuchet”.
- A L G E R I A**: 21 exs. (NMW): “Environs de Biskra / De Vauloger”; 3 ♀♀ (ISNB): “Sidi bel Abbes” / “Kniz det., maculatus” / “Ex. coll. A. Knisch, n° 114-377 [the two other specimens with numbers “114-378” and “114-379”, respectively], coll. A. d’Orchymont”; 1 ♂ (ISNB): “Laghouat, Thery” / *Ochthebius maculatus*” / “Peyerimhoff det.” / “A. Thery coll. maculatus”; 1 ♂, 2 ♀♀ (ISNB): “Bou-Saada, Avril [April] 1908” / “impressicollis” / “Peyerimhoff det.”; 3 ♀♀ (ISNB): “Algérie, Djebel Metlili, gorges [gorge] d’El Kantara, v-1954 G. Fagel [Gaston Fagel, 1909–1973]”; 1 ♀ (TMB): “Edough” / “Ocht. maculatus, Reiche, Coll. Reitter”; 1 ex. (HUB): “Clairfontaine [El Aouinet]” / “Algeria” / “J. Sahlb.” / “4262” / “105” / “71656” / “Ochthebius/ (Hym.) maculatus Reich.” / “Zool. Mus Berlin”.
- T U N I S I A**: 1 ex. (DEI): “Tunis” / “J. Sahlb.”; 2 ♂♂ (NMW): “Tunis Hamm. Lif” / “Collect. Hauser”; 1 ♂ (NMW): “10 km nördl. [north] Kairouan Sepka 17.4.1986”; 11 exs. (NMW): “Tunesien, 14.4. Umg.[surroundings of] Douz Schillhammer [19]86”; 3 ♂♂, 2 ♀♀ (NMW: 1 ♂, ISNB: 4): “Kebilli [or Qibili] 3/[18]91”; 2 exs. (CCS): “T.[Tunisia] Nefta 11-1933 DR.NORMAND [Henri Normand, 1868–1959]”; 1 ♂, 1 ♀ (ISNB): “Nefta 4 [18]87” / “Ochthebius maculatus R. Peschet det. 1914”.
- [I S R A E L]**: 1 ♂ (SNMB): “Jericho” / “maculatus”.]

DIAGNOSIS: 1.85–2.25 mm long. Habitus (Fig. 4). Head black, pronotum brown to testaceous, disc frequently darker than the lateral expansions. Elytra always maculate. Labrum and clypeus smooth, with small punctures and short setae. Clypeus matt, rarely shining. Fronto-clypeal suture distinct, narrow and not very impressed, with a short longitudinal median groove. Frontal area superficially rugulose between punctures; punctures small. Ocellar area usually glabrous and prominent, sometimes obscured by small punctures. Ocular grooves moderately impressed, reniform. Pronotal disc moderately convex in cross section. Anterior margin with distinct postocular tooth. Median sulcus and admedian foveae moderately impressed; anterior ones round to oval, posterior ones oblique. Lateral fossula flat and shining. Explanate margin sparsely punctate; punctures superficial to sharply defined. Metaventral disc with a central glabrous area. Elytral setae (Fig. 12) distinctly less than 50 µm long.

Aedeagus (Figs. 18, 20; see also JÄCH 1990: Fig. 51c). PL: 295–335 µm. Main piece distinctly arched, maximum constriction/curvature before middle (lateral view). Distal lobe slightly longer than wide; subtriangular to spatuliform, rarely subreniform as in *O. jaimeí*; dorsal margin usually straight; sclerotized part distally more or less straight. Parameres short, apices slightly widened.

DIFFERENTIAL DIAGNOSIS: This species is very similar to *O. jaimeí* and *O. avdati*. Externally, it probably cannot be distinguished from these two species. *Ochthebius maculatus* differs from *O. immaculatus* and *O. abeillei* by the middle of the metaventrite being glabrous.

Genitally, *O. maculatus* is very similar to *O. jaimeí*, from which it differs mainly in the parameres, which are not strongly widened apically.

ECOLOGY: Very little is known about the habitat preferences of this species. It was collected in a permanent rainwater pool (MIFSUD et al. 2004) as well as in inland salt water pools (Schillhammer, pers. comm.).

DISTRIBUTION (Fig. 21): This species is rather widely distributed in the Maghreb (Morocco, Algeria, Tunisia). In addition, it occurs in Italy (Sicily) and Malta.

The single historical specimen from Israel (labelled “Jericho”, deposited in the SNMB) is the only record from the eastern Mediterranean and somewhat doubtful.

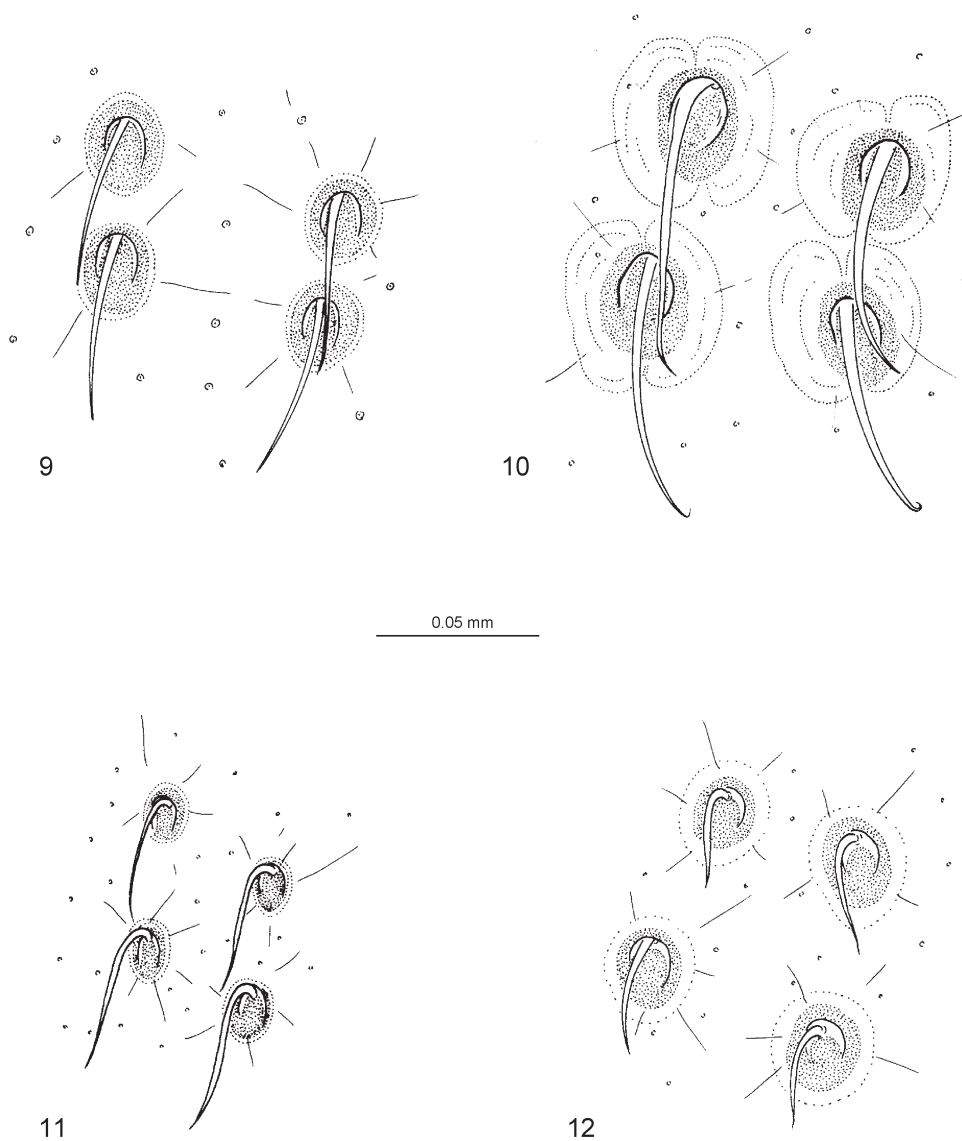
Discussion

The *Ochthebius maculatus* complex obviously can be split in two lineages. *Ochthebius abeillei* and *O. immaculatus* share for instance an entirely pubescent metaventrite, comparatively long elytral setae (at least 50 µm), and a basally enlarged aedeagal main piece. In *O. avdati*, *O. jaimeí*, and *O. maculatus* the middle of the metaventrite is glabrous, the elytral setae are shorter than 50 µm, and the aedeagal main piece is less distinctly enlarged basally. Within this second lineage, *O. avdati* deviates by its conspicuously elongate aedeagal distal lobe.

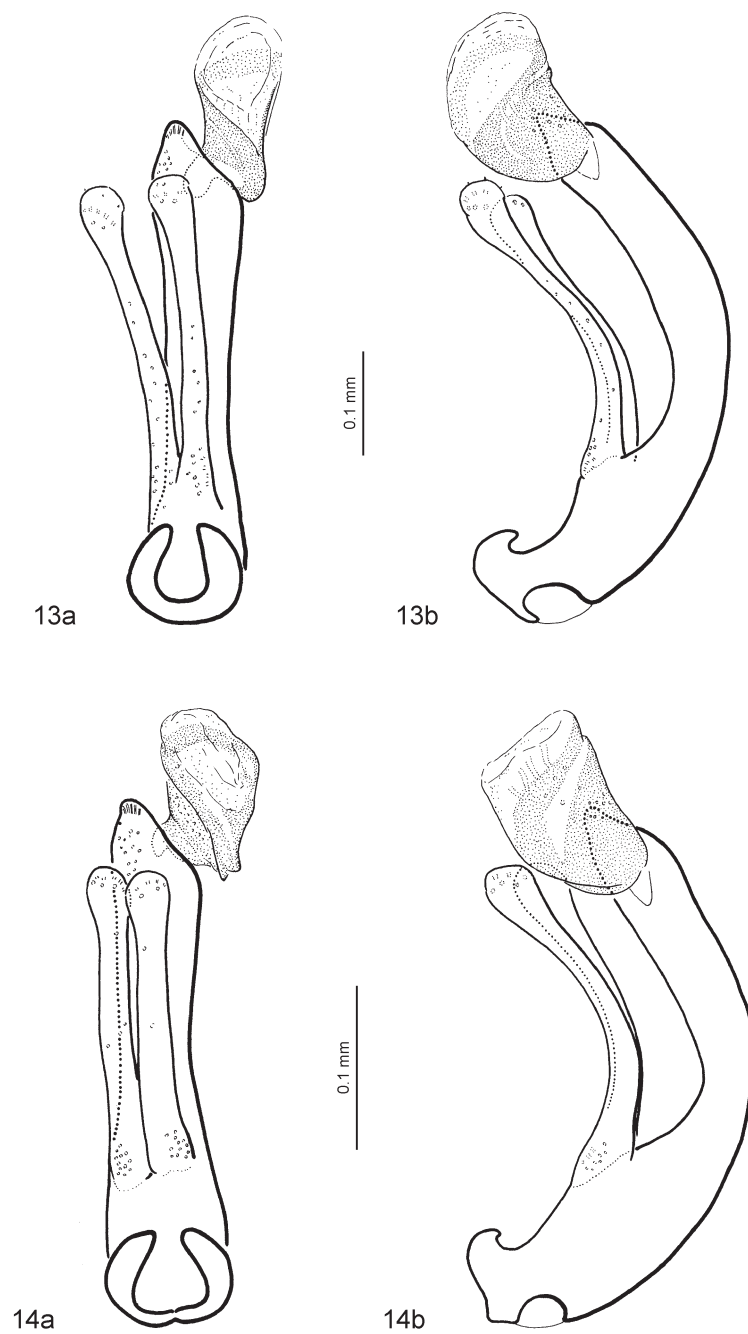
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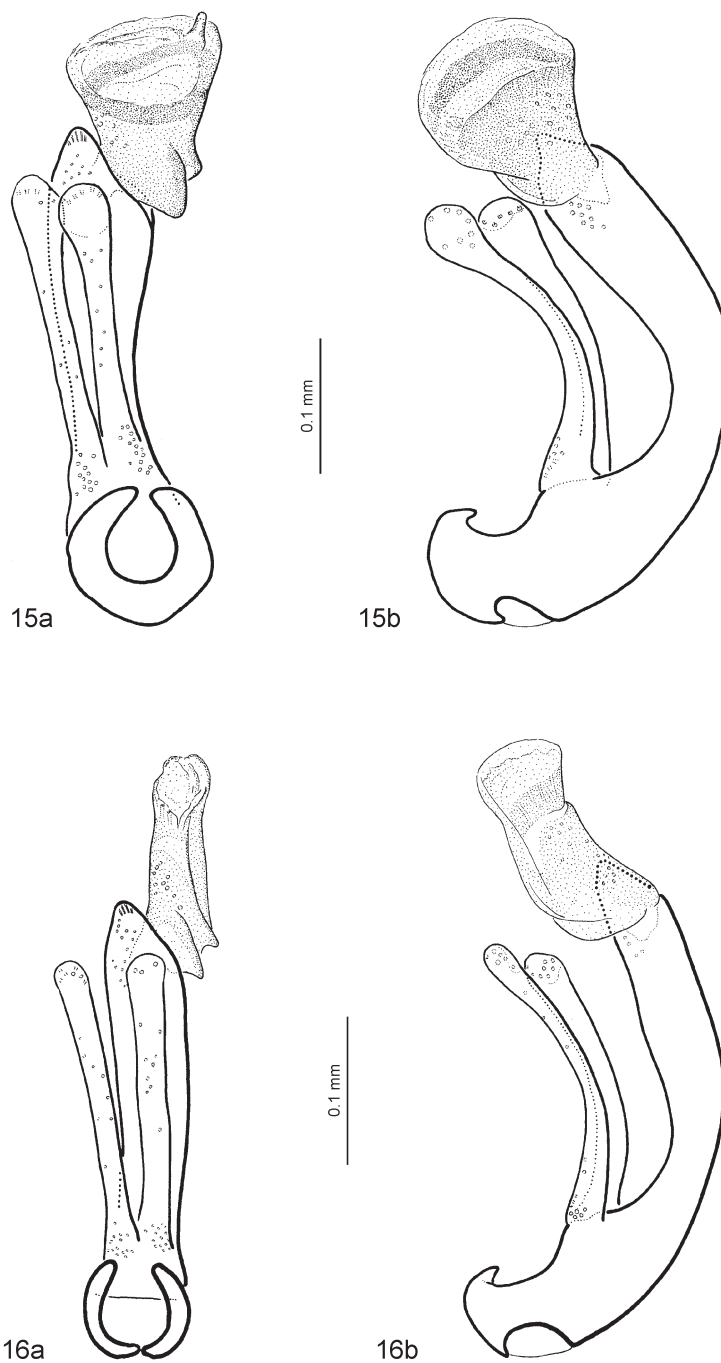
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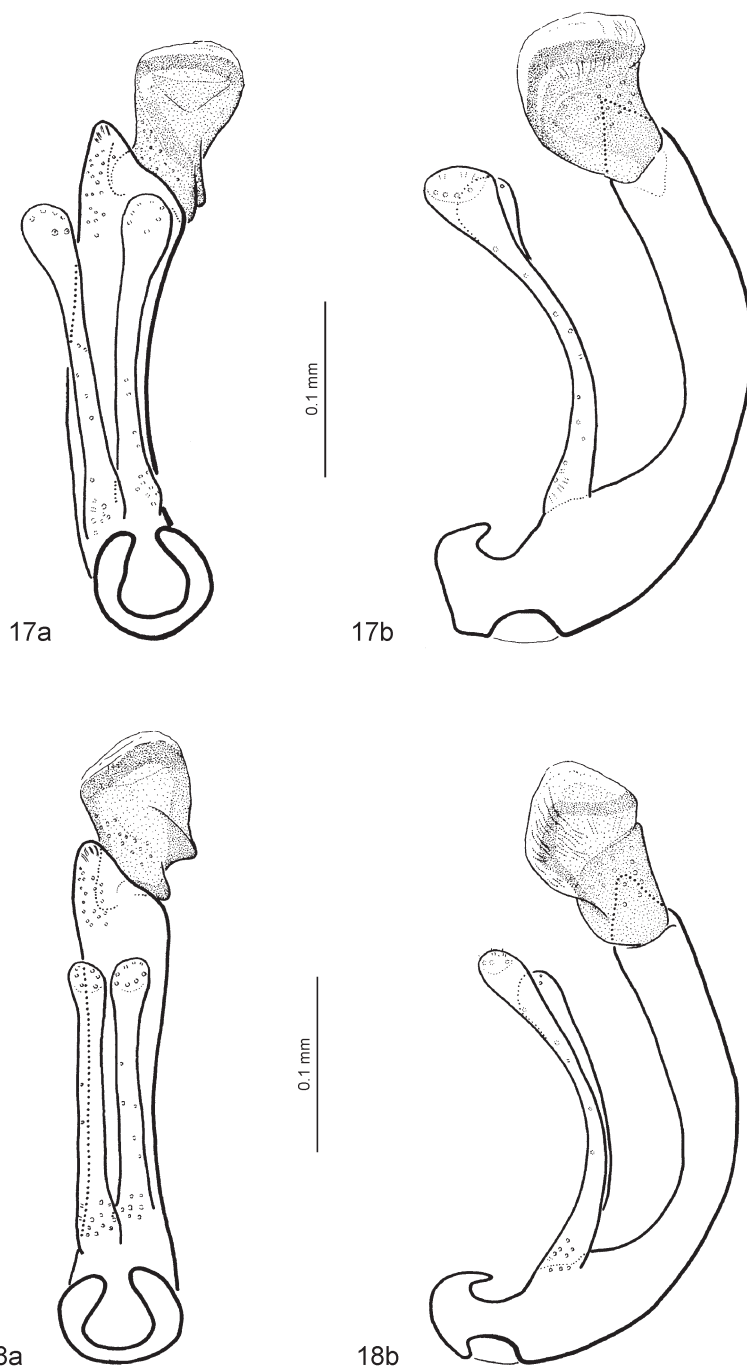
Figs. 9–12: Elytral punctures and setae of 9) *Ochthebius abeillei*, 10) *O. immaculatus*, 11) *O. avdati*, 12) *O. maculatus*.



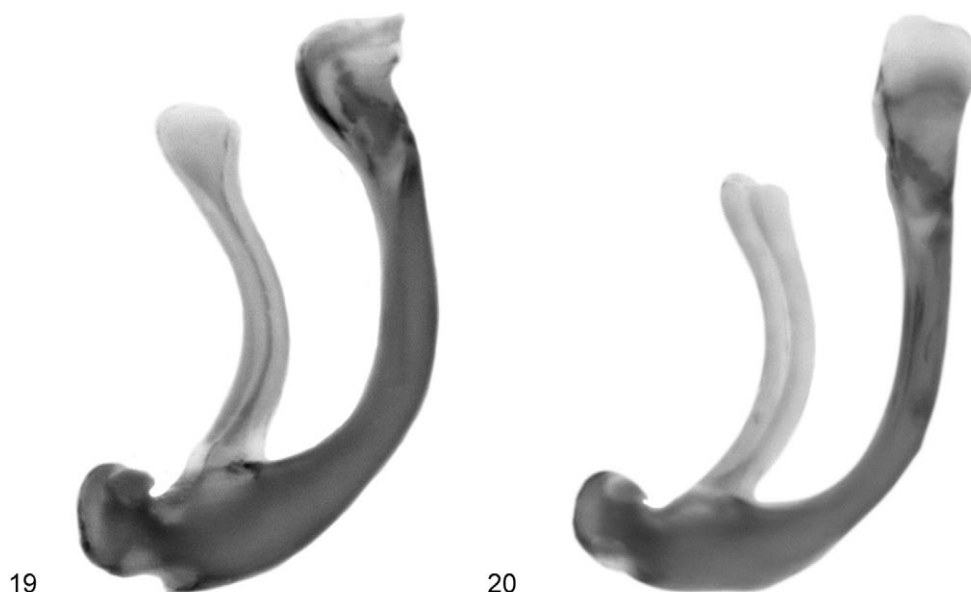
Figs. 13–14: Aedeagus, in ventral (a) and lateral (b) view, 13) *Ochthebius auriculatus*, 14) *O. abeillei*.



Figs. 15–16: Aedeagus, in ventral (a) and lateral (b) view, 15) *Ochthebius immaculatus*, 16) *O. avdati*.



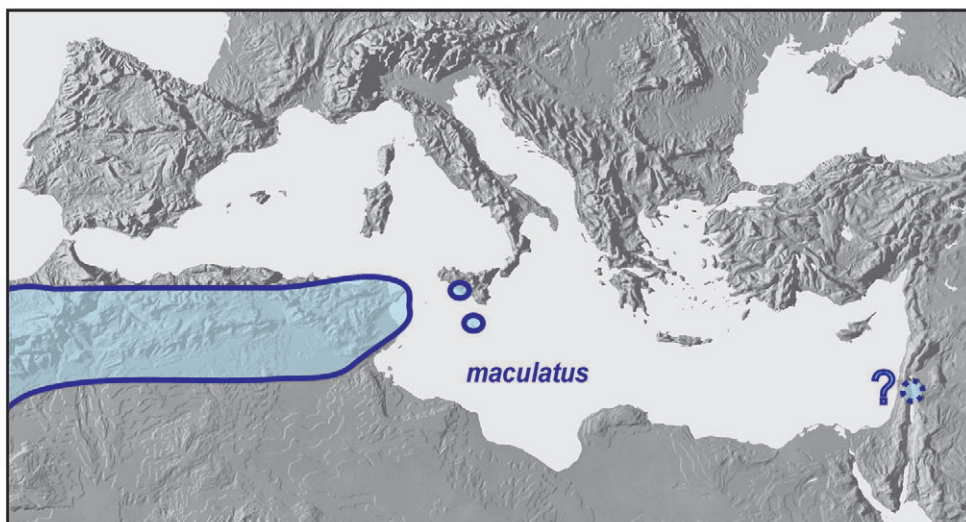
Figs. 17–18: Aedeagus, in ventral (a) and lateral (b) view, 17) *Ochthebius jaime*, 18) *O. maculatus*.



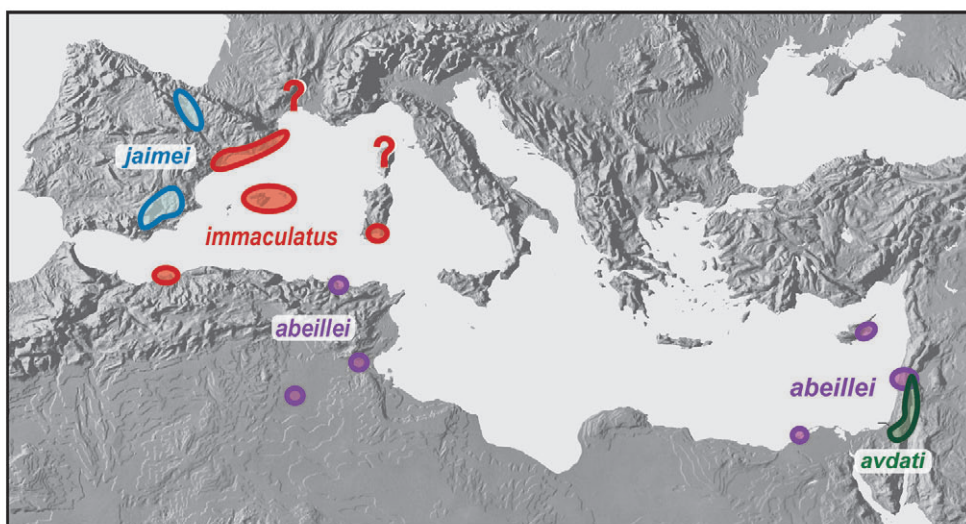
Figs. 19–20: Photographs of aedeagi, as seen under stereoscopic microscope, 19) *Ochthebius jaimeii* (Murcia, Fortuna, CRB), 20) *O. maculatus* (Morocco, El-Kifane, CRB).

References

- ABELLÁN, P., SÁNCHEZ-FERNÁNDEZ, D., VELASCO, J. & MILLÁN, A. 2004: Selección de áreas prioritarias de conservación en la provincia de Albacete utilizando los coleópteros acuáticos. – Albacete: Instituto de Estudios Albacetenses “Don Juan Manuel”, Serie I - Estudios 151, 161 pp.
- ANGUS, R.B. & DÍAZ, J.A. 1991: A chromosomal investigation of some European Hydraenidae. – *Koleopterologische Rundschau* 61: 95–103.
- AUDISIO, P., DE BIASE, A., FERRO, G., MASCAGNI, A., PENATI, F., PIRISINU, Q. & VIENNA, P. 1995: Coleoptera Myxophaga, Polyphaga I (Hydrophiloidea, Histeroidea). – In Minelli, A., Ruffo, S. & La Posta, S. (eds.): Checklist delle specie della fauna italiana 46. – Bologna: Calderini, 19 pp.
- BENNAS, N., SÁINZ-CANTERO, C.E. & OUAROUR, A. 2001: Nouvelles données sur les coléoptères aquatiques du Maroc: les Hydraenidae Mulsant, 1844 (Coleoptera) du Rif. – *Zoologica Baetica* 12: 135–168.
- CAMERON, M. & CARUANA GATTO, A. 1907: A list of the Coleoptera of the Maltese Islands. – *Transactions of the Entomological Society of London* 59 (3): 383–403.
- CHAVANON, G., BERRAHOU, A. & MILLÁN, A. 2004: Apport à la connaissance des coléoptères et hémiptères aquatiques du Maroc Oriental: Catalogue faunistique. – *Boletín de la Sociedad Entomológica Aragonesa* 35: 143–162.
- CHIESA, A. 1959: *Hydrophilidae Europae* (Coleoptera: Palpicornia). – Bologna: Arnaldo Forni, 200 pp.



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22

Figs. 21–22: Geographical distribution of 21) *Ochthebius maculatus*, 22) *O. abeillei*, *O. avdati*, *O. immaculatus*, and *O. jaimiei*.



Fig. 23: Habitat of *Ochthebius avdati*; En Avdat, Negev, southern Israel.



Fig. 24: Type locality of *Ochthebius jaime*; río Vélez near Balneario de la Fuensanta, Murcia, southeastern Spain.

- DELGADO, J.A. & SOLER, A.G. 1997: El género *Ochthebius* Leach, 1815 en la cuenca del río Segura (Coleoptera: Hydraenidae). – Boletín de la Asociación española de Entomología 21 (1–2): 73–87.
- GERECKE, R. 1991: Taxonomische, faunistische und ökologische Untersuchungen an Wassermilben (Acari, Actinedida) aus Sizilien unter Berücksichtigung anderer aquatischer Invertebraten. – Lauterbornia 7: 1–303.
- HANSEN, M. 1998: Hydraenidae. – In Hansen, M. (ed.): World Catalogue of Insects 1. – Stenstrup: Apollo Books, 168 pp.
- IENIȘTEA, M.A. 1978: Hydradephaga und Palpicornia, pp. 291–314. – In Illies, J. (ed.): Limnofauna Europaea. – Stuttgart: G. Fischer.
- JÄCH, M.A. 1990: Revision of the Palearctic species of the genus *Ochthebius* Leach V. The subgenus *Asiobates* (Coleoptera: Hydraenidae). – Koleopterologische Rundschau 60: 37–105.
- JÄCH, M.A. 1998: Revision of the Palearctic species of the genus *Ochthebius* Leach XX. The *O. (Asiobates) rugulosus* Wollaston species complex (Coleoptera: Hydraenidae). – Koleopterologische Rundschau 68: 175–187.
- JÄCH, M.A. 2004: Hydraenidae, pp. 102–122. – In Löbl, I. & Smetana, A. (eds.): Catalogue of Palaearctic Coleoptera, Vol. 2. – Stenstrup: Apollo Books, 942 pp.

- JÄCH, M.A. & MARGALIT, Y. 1987: Distribution of Dytiscids in springs of the western Dead Sea Area (Coleoptera: Dytiscidae). – The Coleopterists Bulletin 41 (4): 327–334.
- JÄCH, M.A. & PÜTZ, A. 2001: *Erichia* is a cephalobyrrhine limnichid! (Coleoptera: Limnichidae). – Bollettino della Società entomologica italiana 133 (3): 195–197.
- JÄCH, M.A., RIBERA, I. & AGUILERA, P. 1998: Revision of the Palearctic species of the genus *Ochthebius* Leach (Coleoptera: Hydraenidae) XV. Additional notes on the *lobicollis* group. – Aquatic Insects 20 (4): 197–202.
- KNISCH, A. 1924: Hydrophilidae. – In Schenkling, S. (ed.): Coleopterorum Catalogus, Part 79. – Berlin: W. Junk, 306 pp.
- KOCHER, L. 1958: Catalogue commenté des Coléoptères du Maroc. – Travaux de l'Institut Scientifique Chérifien, Série Zoologie 14: 247 pp.
- MIFSUD, D., JÄCH, M.A. & SCHUH, R. 2004: The Hydraenidae (Insecta: Coleoptera) of the Maltese Archipelago (Central Mediterranean). – Annalen des Naturhistorischen Museums in Wien 105B [2003]: 429–440.
- MILLÁN, A., MORENO, J.L. & VELASCO, J. 1997: Coleópteros y heterópteros acuáticos del complejo Lagunar del río Arquillo (Albacete). – Revista de estudios albacetenses 40: 29–69.
- MILLÁN, A., MORENO, J.L. & VELASCO, J. 2002: Los coleópteros y heterópteros acuáticos y semiacuáticos de la provincia de Albacete: catálogo faunístico y estudio ecológico. Albacete: Instituto de Estudios Albacetenses “Don Juan Manuel”, 180 pp.
- NORMAND, H. 1933: Contribution au catalogue des Coléoptères de la Tunisie. – Bulletin de la Société d'Histoire naturelle de l'Afrique Noire 24: 295–307.
- ORCHYMONT, A. d' 1927: Coléoptères Hydrophilides recueillis en Egypte. – Bulletin de la Société Royale Entomologique d'Egypte 11: 3–7.
- ORCHYMONT, A. d' 1940a: Palpicornia de Chypre. Voyage de M. A. Ball (Octobre-Novembre 1932). – Mémoires du Musée Royal d'Histoire Naturelle de Belgique 19: 1–31.
- ORCHYMONT, A. d' 1940b: Notes sur quelques *Ochthebius* (*Asiobates*) du group *bicolor*. – Bollettino della Società Entomologica Italiana 72: 53–61.
- PIRISINU, Q. 1981: Palpicorni (Coleoptera: Hydraenidae, Helophoridae, Spercheidae, Hydrochidae, Hydrophilidae, Sphaeridiidae). – In: Guide per il riconoscimento delle specie animali delle acque interne italiane, 13. – Roma: Consiglio Nazionale delle Ricerche, 97 pp.
- REICHE, M.L. 1872: Catalogue des Coléoptères de l'Algérie et contrées voisines avec description d'espèces nouvelles. – Mémoires de la Société Linnéenne de Normandie XV (4) [1869]: 1–44.
- RIBERA, I., HERNANDO, C. & AGUILERA, P. 1999: An annotated checklist of the Iberian water beetles (Coleoptera). – Zapateri 8 [1998]: 43–111.
- SÁINZ-CANTERO, C.E., GARRIDO, J. & VALLADARES, L.F. 1997: Los coleópteros Hydraenidae Mulsant, 1844 de Andalucía (Sur de España): Nuevas aportaciones y análisis faunístico (Coleoptera, Hydraenidae). – Nouvelle Revue d'Entomologie (Nouvelle Série) 14 (3): 193–209.
- SÁNCHEZ-FERNÁNDEZ, D., ABELLÁN, P., VELASCO, J. & MILLÁN, A. 2003: Los coleópteros acuáticos de la región de Murcia. Catálogo faunístico y áreas prioritarias de conservación. – Monografías S.E.A. 10: 1–71.
- SÁNCHEZ-FERNÁNDEZ, D., ABELLÁN, P., VELASCO, J. & MILLÁN, A. 2004: Selecting areas to protect the biodiversity of aquatic ecosystems in a semiarid Mediterranean region using water beetles. – Aquatic Conservation: Marine and Freshwater Ecosystems 14: 465–479.
- SILFVERBERG, H. 1987: List of the insect types in the Zoological Museum, University of Helsinki. 4. Coleoptera: Hydrophiloidea. – Acta Entomologica Fennica 48: 41–45.

VALLADARES, L.F. & GARCÍA-AVILÉS, J. 1999: Distribution, habitats and biogeography of four families of aquatic Coleoptera of the Balearic Islands (Spain) (Coleoptera: Hydraenidae, Helophoridae, Hydrochidae, Hydrophilidae). – *Koleopterologische Rundschau* 69: 187–206.

VALLADARES, L.F. & MONTES, C. 1991: Lista faunística y bibliográfica de los Hydraenidae (Coleoptera) de la Península Ibérica e Islas Baleares. – Madrid: Asociación Española de Limnología, Listas de flora y fauna de las aguas continentales de la Península Ibérica 10: 1–93.

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