

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

The *O. (Asiobates) rugulosus* WOLLASTON species complex (Coleoptera: Hydraenidae)

M.A. JÄCH

Abstract

The *Ochthebius (Asiobates) rugulosus* WOLLASTON species complex (Coleoptera: Hydraenidae) is revised taxonomically. Three new species and one new subspecies are described: *O. hokkaidensis* [Japan], *O. lurugosus* [NE China], *O. nonaginta* [Kazakhstan], and *O. minervius semechonitis* [Israel, Egypt]. *Ochthebius remotus* is recorded for the first time from Europe. Morphometric standards for describing the length and shape of the aedeagus are introduced.

Key words: Coleoptera, Hydraenidae, *Ochthebius*, *Asiobates*, *Ochthebius rugulosus* complex, taxonomy.

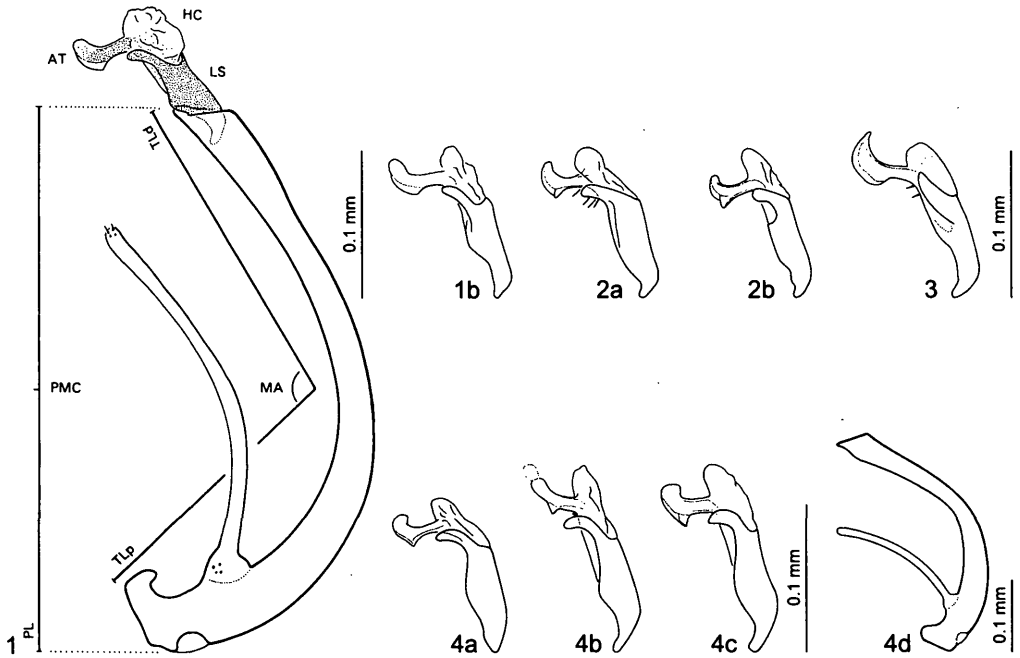
Introduction

The *Ochthebius (Asiobates) minimus* F. species group was revised by JÄCH (1990). *Ochthebius minervius* d'ORCHYMONT, *O. hungaricus* ENDRÖDY-YOUNGA and *O. alpinus* IENISTEA were regarded as synonyms of *O. rugulosus* WOLLASTON by JÄCH (1990). Re-examination of *O. rugulosus* sensu JÄCH (1990) has revealed that it is in fact a complex of closely related species. Consequently, all these synonyms, which were listed under *O. rugulosus* by JÄCH (1990) are resurrected herein. In addition, three new species and one new subspecies belonging to the same species complex are described. Morphometric standards useful for describing the length and shape of the aedeagus are introduced.

Material & Methods

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

BML	The Natural History Museum, London
CAL	Coll. Balfour-Browne, Coll. Angus, London
CCW	Coll. Cuppen, Wageningen
CMT	Coll. Mencl, Tynec
CPL	Coll. Pretner, Ljubljana
DEI	Deutsches Entomologisches Institut, Eberswalde
ISNB	Institut royal des Sciences naturelles de Belgique, Bruxelles
MHNG	Muséum d'Histoire naturelle, Genève
MTD	Museum für Tierkunde, Dresden
NMG	Naturhistoriska Museet, Göteborg
NMW	Naturhistorisches Museum, Wien
TMB	Természettudományi Múzeum, Budapest [= Hungarian Natural History Museum]
WUN	Women's University, Nagoya
ZISP	Zoological Institute (Academy of Sciences), St. Petersburg (Leningrad)
ZMH	Eläinmuseo (Zoologiska museet), Helsinki
ZML	Zoological Museum, Lund



Figs. 1 - 4: 1a) *Ochthebius rugulosus*, aedeagus, lateral view, Porto Santo (NMW), 1b) *O. rugulosus*, distal lobe, lateral view, Gran Canaria (NMW); 2a) *O. minervius semechonitis*, distal lobe, strictly lateral view, Israel, paratype, Lake Hula (NMW), 2b) *O. minervius semechonitis*, slightly ventro-lateral view, paratype, Golan, Sha'al (NMW); 3) *O. lurugosus*, distal lobe, lateral view, paratype (NMW); 4a - c) *O. minervius*, distal lobe, lateral view, a) Corsica (NMW), b) Sardinia, Terranova (NMW), c) same locality, different specimen (NMW); 4d) *O. minervius*, main piece with parameres, lateral view, a) Corsica (NMW). Long scale: 1 - 4c: short scale: 4d. AT: apical tube; HC: hyaline cone; LS: lateral sclerite; MA: minimal angle of curvature of main piece; PL: projected length of main piece; PMC: position of the maximum curvature on the main piece; TLd: distal arm of total length of main piece; TLp: proximal arm of total length of main piece.

Due to the fact that the aedeagus of *Ochthebius* LEACH (especially the main piece) presents much less significant characters than the aedeagi of many other genera of Hydraenidae (e.g. *Hydraena* KUGELANN, *Limnebius* LEACH) I have tried to work out some simple morphometric standards and a detailed terminology which is helpful for the characterization of the main piece.

All descriptions of the following standards of the main piece refer to its lateral view in which it is more or less regularly C-shaped.

1. Length:

1.1. The **projected length** (PL) of the main piece equals to the length of a line drawn from the dorsal tip of the phallobase to the apex of the main piece (see Fig. 1a).

1.2. The **total length** (TL) of the main piece is the sum of the length of the lines (TLp + TLd) drawn from the PMC (see below, 2.1.) on the ventral margin of the main piece to the ventral tip of the phallobase and to the apex of the main piece (see Fig. 1a).

2. Curvature:

2.1. The **position of the maximum curvature on the main piece (PMC)** is ascertained by marking the maximal distance between the PL line and the ventral margin of the main piece (see Fig. 1a).

2.1.1. The TLP:TLd index indicates the PMC in relation to the TL.

2.2. The **degree of the maximum curvature of the main piece, or minimal angle (MA)**, equals to the angle formed by the TLP and TLd lines (see Fig. 1a).

2.3. The **form of the curvature of the main piece** can also be described by comparing the proximal angle (MAP) with the distal angle (MAd) of the MA (see Fig. 5a), and by the PL:TL index. Note: $TLP:TLd = \cos MAd : \cos MAP$.

I should point out here that this is just a first attempt towards a unified standard for the description of the main piece of *Ochthebius*. Certainly, experience and time will improve these standards, especially with respect to accuracy and determination of fixed points (e.g., ventral tip of the phallobase).

Acknowledgements

I am indebted to the following persons for providing material or helpful information: R.B. Angus, D.S. Boukal, M.J.D. Brendell, J. Cuppen, R. Danielsson, K. Desender, B. Drovenik, H. Franz, P. Hammond, S. Hine, O. Jäger, A. Kirejtschuk, R. Krause, I. Löbl, R. Lompe, O. Merkl, A.N. Nilsson, T.v. Proschwitz, M. Sató, H. Silfverberg, G. Szél, D. Telnov, L. Zerche.

Ochthebius rugulosus species complex

The *Ochthebius rugulosus* species complex includes species of the *O. minimus* species group (as defined by JÄCH 1990) which are characterized by the following aedeagal peculiarities:

The distal lobe is composed of the following parts (see Fig. 1a): 1) right lateral sclerite (LS), 2) hyaline cone (HC) and 3) apical tube (AT). The LS is usually covering the proximal half of the right side of the distal lobe, and its apex is usually distinctly acuminate and curved ventrad. The surface of the HC can be smooth, slightly wrinkled or distinctly crenulate; it is always very weakly sclerotized and transparent. The AT branches subapically from the ventral margin of the distal lobe; the distal end of the AT is often modified (distinctly enlarged, branched, strongly curved) and usually margined by a very thin hyaline membrane. Ventral surface of distal lobe often with a few, very short setae near the proximal end of the AT.

Variability: Many characters, which appear to be good diagnostic characters at first sight, are found to be quite variable after examination of more specimens. Among the variable external characters are, for instance, the emargination of the anterior margin of the labrum, the density of the punctation of the pronotal disc, the shape and convexity of the pronotum, the shagreen of the elytra. Genitally, the degree of the curvature of the main piece, its total length and its width can be quite variable, even within the same population; the size of the hyaline cone, the short setae near the proximal end of the AT, and the apex of the LS can be variable to some extent.

Secondary sexual dimorphism: Anterior margin of male labrum faintly rimmed (all species); anterior margin of female more distinctly emarginate (*O. rugulosus*, *O. aeneus*, *O. flavipes*, hardly noticeably (and variably) also in a few other species); outer edge of male mandibles with a fringe of stiff bristles (all species); male elytra more strongly shagreened (not in all species and not constant within most species); lateral margin of elytra slightly more widely explanate in female (not very pronounced in most species); elytral apices more acuminate in female (not very pronounced in most species); first three protarsal segments of male widened and densely covered

with adhesive hairs on the underside (all species); protibia slightly more robust (few species); fourth mesotarsal segment of male enlarged (several species); fourth mesotarsal segment of male with a pair of conspicuous setae on the underside (all species); fifth mesotarsal segment of male more or less strongly curved in lateral aspect (all species); terminal abdominal sclerites dimorphic (all species).

Check list

Due to their aedeagal similarities the following Palearctic species are herewith tentatively assigned to the *O. rugulosus* complex:

<i>O. aeneus</i> STEPHENS	<i>O. minervius semechonitis</i> ssp.n.
<i>O. alpinus</i> IENISTEA	<i>O. nonaginta</i> sp.n.
<i>O. flavipes</i> DALLA TORRE	<i>O. perdurus</i> REITTER
<i>O. hokkaidensis</i> sp.n.	<i>O. pliginskyi</i> JÄCH
<i>O. hungaricus</i> ENDRÖDY-YOUNGA	<i>O. remotus</i> REITTER
<i>O. lurugosus</i> sp.n.	<i>O. rugulosus</i> WOLLASTON
<i>O. minervius minervius</i> d'ORCHYMONT	

Ochthebius yunnanensis d'ORCHYMONT, *O. coomani* d'ORCHYMONT and *O. hebaueri* JÄCH are not included because their aedeagus lacks a LS. On the other hand, a number of Afrotropical species (e.g. *O. andreinii* REGIMBART, *O. andronius* d'ORCHYMONT, *O. andriscus* d'ORCHYMONT, *O. androthenus* d'ORCHYMONT) and Nearctic species (e.g. *O. discretus* LECONTE) probably belong to the *O. rugulosus* complex. *Ochthebius depressus* SAHLBERG and *O. perkinsi* PANKOW might also be found to belong to this complex although (on account of external characters) they were included in the *O. bicolon* species group by JÄCH (1990).

Ochthebius rugulosus WOLLASTON

Ochthebius rugulosus WOLLASTON 1857: 28. - d'ORCHYMONT 1940, 1942. - JÄCH 1990 (in part). - BALKE 1990. - BALKE & al. 1990. - MALMQVIST & al. 1993.

TYPE LOCALITY: Porto Santo, Madeira Islands, Portugal.

TYPE MATERIAL: Lectotype ♂ (des. by JÄCH 1990): "Type / *rugulosus*, Woll." (BML). The type series consists of "...a few specimens...". I did not see any paralectotypes.

ADDITIONAL MATERIAL EXAMINED:

P O R T U G A L (MADEIRA ISLANDS): PORTO SANTO: 6 exs.: Serra de Dentro, 33°04'N 16°18'W, 1.IV.1996, leg. Lompe (NMW); 1 ex.: Serra de Dentro-Juliana, 13.VI.1959, leg. Lindberg (ZMH); 18 exs.: "Porto Santo", 6.-12.VII.1957, leg. Lindberg (ZMH); MADEIRA: 2 exs.: Sao Vicente, 24.IV.1959, leg. Lindberg (ZMH).

S P A I N (CANARY ISLANDS): TENERIFE: Adeje, Barranco del Infierno, 200 m (NMW); Adeje, 21.I.1949, leg. Lindberg (ZMH); Laguna, leg. Cabrera (MTD); Puerto de San Juan, 16.-22.I.1949, leg. Lindberg (ZMH); Barranco de San Antonio, 4.II.1949, leg. Lindberg (ZMH); Agua Garcia, 19.IV.1950, leg. Lindberg (ZMH); Los Mercedes, 28.-30.V.1947, leg. Lindberg (ZMH); GRAN CANARIA: Moya, leg. Franz (NMW); Barranco de Tirajana, 1200 m, 7.VI.1989, leg. Balke & Hendrich (NMW, CHB); Los Tilos, 27.VI.1957, leg. Lundblad (ZMH); Atalaya, leg. Storå (ZMH); FUERTEVENTURA: "Fuerteventura", leg. Polatzek (NMW, ZMH); LA GOMERA: Valle Hermingua, 18.III.1950, leg. Lindberg (ZMH).

DIAGNOSIS: Colouration of pronotum and elytra usually black with moderately wide brownish margins; occasionally elytra unicoloured cupreous. Mandibular denticles of *O. rugulosus* very large. Anterior margin of labrum very slightly upturned in male, gently emarginate in male, distinctly emarginate (or even excised) in female. Clypeus and anterior parts of frons usually very distinctly shagreened. Pronotal disc sparsely, moderately densely or very densely or rugulose punctate, interstices smooth and glabrous or more or less distinctly shagreened. Elytral intervals more or less flat or slightly convex, smooth or superficially shagreened in male, superficially or

strongly shagreened in female; elytral apices slightly more acuminate in female than in male. Terminal mesotarsal segment of male short, strongly curved.

Aedeagus (Fig. 1; see also JÄCH 1990: Fig. 13a): Main piece very large (PL: ca. 380 - 400 μm , TL: ca. 420 μm); quite evenly and not very strongly curved, MA ca. 100°, PMC near basal 0.45 of PL, TLP:TLd = ca. 0.9, PL:TL = ca. 0.9. Distal lobe: apex of LS rather long and thin; HC large, its surface slightly or distinctly wrinkled; AT apically upturned, apico-ventrally margined by a membrane, not bifurcate and without any subapical ventral projection.

Differential diagnosis: *Ochthebius rugulosus* is rather easily distinguished from its allies by the strongly microreticulate clypeus and by the aedeagus (PL of main piece, apex of LS and shape of AT); females are also characterized by the deeply emarginate labrum.

Variability: Body size, shagreen and density of punctation are generally somewhat variable. Specimens from Madeira are usually more strongly shagreened than specimens from the Canary Islands, with pronotum more densely punctate.

DISTRIBUTION: Endemic to the Madeira Islands (Madeira and Porto Santo) and the Canary Islands (Tenerife, La Gomera, Gran Canaria, Fuerteventura, La Palma) - see also d'ORCHYMONT (1940).

[The single female recorded by JÄCH (1990) from the Iberian Peninsula (Spain, Palencia) does definitely not belong to *O. rugulosus*; almost certainly it represents *O. minimus*. Males of *O. minimus* were collected in NW Spain by H. Fery (Palencia, 1977), by L.F. Valladares (León, 1983), and by C. Hernando (Burgos, 1996).]

Ochthebius alpinus (IENISTEA)

Homalochthebius alpinus IENISTEA 1979: 935. - IENISTEA 1988.

Ochthebius impressus, STRAND 1946 (in part).

Ochthebius rugulosus, JÄCH 1990 (in part). - CUPPEN & NILSSON 1991 - HANSEN 1996.

TYPE LOCALITY: Small lake near Stellisee [lake], Findeln-Alp, 2550 m a.s.l., above Zermatt, Wallis, Switzerland.

TYPE MATERIAL: The holotype δ ("4.VII.57 Findelalp alt 2550 \ petit lac pres de Stellisee \ Coll. M. Rehfous") is deposited in the MHNG; 14 paratypes (all collected by Rehfous in 1957 and 1959 in the same area at elevations between 2300 and 2550 m a.s.l.) are deposited in the MHNG (12) and in the NMW (2). According to the original description (IENISTEA 1979) there should be 17 paratypes - the missing 3 paratypes are probably deposited in the Ienistea collection.

ADDITIONAL MATERIAL EXAMINED:

N O R W A Y: "Syd-Herö" [= Sörheröy, near Alsten Isl., Helgeland, outer southern Nordland (Nsy)], VI.1900 (ZMH).

S W E D E N: Småland: Växjö, 7.VII.1952, leg. Lohmander (NMG); Jämtland: Ragunda, 5.VI.1987, leg. Cuppen (CCW, CNU, NMW); Ångermanland: Nordmaling, Mullsjö, 9.VI.1997, leg. Nilsson, 1 δ , teste Nilsson (CNU); Medelpad: Åsäng, 15.VII.1982, teste Nilsson (CNU); Västerbotten: Holmsund, 24.V.1983, teste Nilsson (CNU); Sävar, 25.V.1978, teste Nilsson (CNU); Hägnäs, 11.VII.1997, teste Nilsson (CNU); Strömfors, 9.VIII.1984, teste Nilsson (CNU).

F I N L A N D: Nylandia: Helsinge, 8.XI.1902, leg. Wellenius (ZMH); Ingå, 25.VI.1942, leg. Ekbohm (ZMH); Tavastia australis: Hämeenlinna, 14.IV.1938, leg. Renkonen (ZMH); Urjala, 11.V.1952, leg. Stenius (ZMH); Savonia borealis: Vehmersalmi, 3.VII.1946, leg. Hemdal (ZMH, NMW); Idensalmi, leg. Sahlberg (ZMH); Juuka, 26.VI.1940, leg. Wegelius (ZMH); Nurmes (Nurmis), leg. Sahlberg (ZMH); Joensuu, leg. Envald (ZMH); Karelia borealis: Kitee, 16.VII.1997, leg. Clayhills (coll. Clayhills); Ostrobothnia media: Haapavesi, leg. Helenius (ZMH, NMW); Ostrobothnia borealis: Liminka, leg. Wuorentaus (ZMH); Oulu, leg. Wuorentaus (ZMH); Lapponia kemensis: Pallasjärvi, 5.VII.1953, leg. Wegelius (ZMH).

U K R A I N E: 1 δ , Kiev Region, Belaya Tzerkov', 17.VII.1904, (ZISP).

R U S S I A: Kola Peninsula (Lapponia): Olenitsa, leg. Levander (ZMH); Konosero, leg. Edgren (ZMH); Kusomen, leg. Edgren (ZMH); Karelia: Juustjärvi, leg. Sahlberg (ZMH); Kumsjärvi, 14.VI.1942, leg. Thuneberg (ZMH, NMW); Kuujärvi, leg. Platonoff (ZMH); Vaaseni, 1.X.1942, leg. Karvonen (ZMH); White Sea: Solovetsk

Island, leg. Edgren (ZMH); St. Petersburg District: Lesnoe, St. Petersburg, 12.VI.1917, leg. B. Il'in, 1 ♂ (ZISP); Bryansk District: Bryanskoe opytnoe lesniceshvo, 10.IV.1908, leg. Winogradoff-Nikitin, 1 ♂ (ZISP).

DIAGNOSIS: Upper surface usually entirely black or dark brown. Size of mandibular denticles quite variable, but never as strong as in *O. rugulosus*. Anterior margin of labrum very slightly emarginate in both sexes, narrowly rimmed in male. Upper surface of head smooth and glabrous or very superficially microreticulate between punctures. Terminal mesotarsal segment of male short, slightly less strongly and more regularly curved than in *O. rugulosus*.

Aedeagus (Fig. 5; see also JÄCH 1990: Fig. 13c): Main piece rather large (PL: 330 - 370 µm, TL: ca. 380 µm); quite unevenly curved, basal part rather short, MA ca. 105° (MAp/MAd = ca. 40°/65°), PMC near basal 0.45, TLp:TLd = 0.6 - 0.7, PL:TL = ca. 0.9. Distal lobe: ventral margin of distal lobe distinctly convex basally; apex of LS long and strongly curved, hook-shaped; AT with a distinct preapical ventral spine-like projection, apex upturned and strongly enlarged, tuberosus.

Differential diagnosis: *Ochthebius alpinus* is very easily recognized by the shape of the main piece of the aedeagus and by the "hook-shaped" apex of the LS and the very characteristic shape of the apex of the AT.

DISTRIBUTION: Switzerland, Norway, Sweden, Finland, Ukraine, Russia.

Ochthebius hokkaidensis sp.n.

TYPE LOCALITY: Shiretoko-rindo, Hokkaido, Japan.

TYPE MATERIAL: **Holotype** ♂ (WUN): "Shiretoko-rindo Hokkaido 1-VIII-1991 S.Kaneno leg.". **Paratypes** (WUN, NMW): 4 ♀♀, with same locality data as holotype; 1 ♀: "Sarobetsu Hokkaido 11-VII-1991 Y.Yasuda".

DIAGNOSIS: 1.8 - 2.0 mm long. Externally, this species can be distinguished from *O. hungaricus* and *O. lurugosus* sp.n. by the short and strongly convex elytra (length:width = 1.1 (♂) - 1.3 (♀)) which provide this species with a rather ovoid appearance. Pronotum distinctly convex horizontally, interstices smooth and glabrous. Elytral intervals only very slightly convex, interstices between punctures very smooth and glabrous in male, more or less strongly shagreened in female. Terminal mesotarsal segment of male strongly curved in basal third.

Aedeagus (Fig. 7): Main piece rather small (PL: ca. 320 µm, TL: ca. 350 µm); rather evenly and distinctly curved; MA ca. 100° (MAp/MAd = 41°/59°), PMC approximately at basal 0.47, TLp:TLd = ca. 0.8, PL:TL = ca. 0.9. Distal lobe: ventral margin of distal lobe distinctly convex basally; apex of LS rather short and bluntly rounded; AT bifurcate, apically not enlarged.

Differential diagnosis: *Ochthebius hokkaidensis* can be distinguished from its allies by the body form and the distinctly bifurcate AT apex.

DISTRIBUTION: Japan (Hokkaido).

ETYMOLOGY: Named in reference to the type locality.

Ochthebius hungaricus ENDRÖDY-YOUNGA

Ochthebius hungaricus ENDRÖDY-YOUNGA 1967: 9. - ENDRÖDY-YOUNGA 1968.

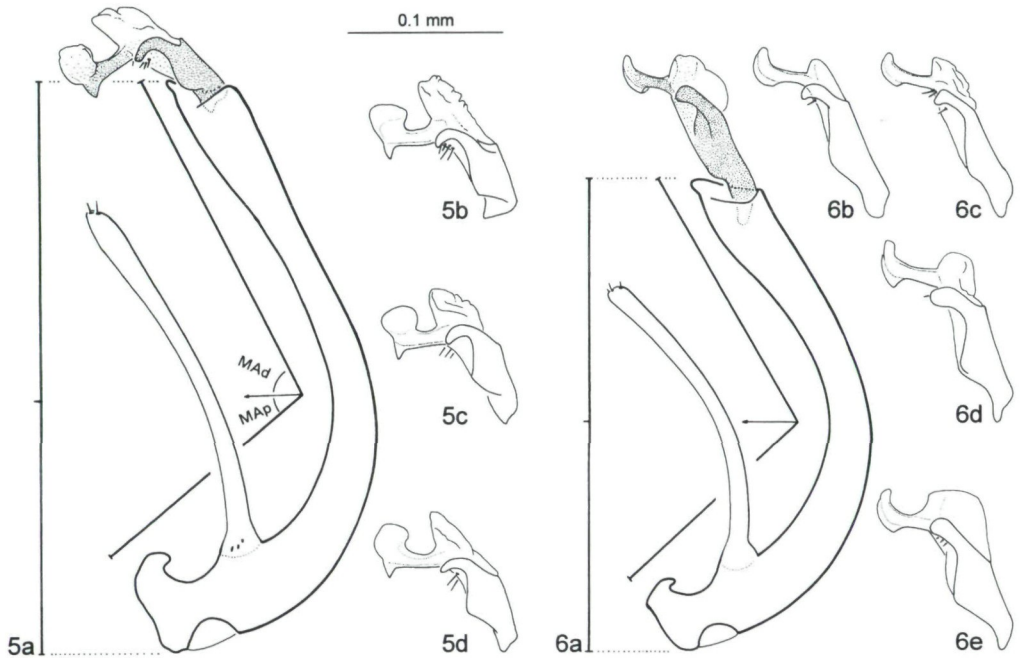
Ochthebius minervius, BIESIADKA 1988. - d'ORCHYMONT 1942 (in part).

Ochthebius rugulosus, JÄCH 1990 (in part). - JÄCH & MOOG 1995.

Homalochthebius hungaricus, IENISTEA 1979, 1988.

TYPE LOCALITY: Bog near Bátorliget, northeastern Hungary.

TYPE MATERIAL: The lectotype ♂ and 47 paralectotypes of *Ochthebius hungaricus* are deposited in the TMB. 26 specimens recorded under *Ochthebius hungaricus* ab. *decoloratus* by ENDRÖDY-YOUNGA (1968: 69) can be regarded as additional paralectotypes of *O. hungaricus*.



Figs. 5 - 6: 5) *Ochthebius alpinus*, a) aedeagus, lateral view, Sweden, Jämtland (NMW), b) distal lobe, lateral view, Switzerland, paratype (NMW), c) distal lobe, lateral view, White Russia (ZISP), d) distal lobe, lateral view, Russia, St. Petersburg (ZISP); 6) *Ochthebius hungaricus*, a) aedeagus, lateral view, Austria, Rohrwald (NMW), b) distal lobe, lateral view, Austria, Neusiedler See (NMW), c) distal lobe, lateral view, Slovakia, Ladmovce (NMW), d) distal lobe, lateral view, Estonia, Tartu (NMW), e) distal lobe, lateral view, Russia, Siberia, Novosibirsk (NMW). MAAd: distal angle of minimal angle of curvature of main piece; MAP: proximal angle of minimal angle of curvature of main piece.

No holotype was designated in the original description (ENDRÖDY-YOUNGA 1967). Thus the designation of a holotype published by ENDRÖDY-YOUNGA (1968: 68) must actually be regarded as a lectotype designation.

ADDITIONAL MATERIAL EXAMINED:

A U S T R I A: WIEN: Dornbach, leg. Schlereth (NMW); NIEDERÖSTERREICH: Bisamberg (NMW); Donauauen (NMW); Rohrwald, 1896, leg. Otto (NMW); Rosenberg, leg. Minarz (NMW); Gars, leg. Minarz (NMW); Plank, leg. Minarz (NMW); BURGENLAND: Neusiedler See, 1889, leg. Ganglbauer (NMW).

C Z E C H R E P U B L I C: MORAVIA: Brno, leg. Formanek (NMW).

S L O V A K I A: Ladmovce, 9.VIII.1982, leg. Mencl (CMT).

H U N G A R Y: leg. Rosenhauer (NMW).

B U L G A R I A: Varna, VII.1908, leg. Rambousek (NMW); Ciren, 17.VIII.1963, leg. Pretner (CPL, NMW).

U K R A I N E: Kiev, 7.VIII.1943, leg. Prock (NMW); Kiev, Dnjepir River, III.1913, leg. Zubowsky (ZISP); Kiev Region, Belaya Tzerkov', 17.VII.1904, (ZISP).

E S T O N I A: "Jurjev" [= Tartu], V./VI.1931, leg. Sumacov (NMW, ZISP).

B E L A R U S: Minsk Region, Bobruysk District, Yasyl' Village, 26.VI.1910, leg. Mordvilko, 1 ♂ (ZISP).

R U S S I A: Pskov Region, 12.-25.VI.1904, leg. Sumacov, 1 ♂ (ZISP); St. Petersburg, Kamenka River, VII.1898 (ZISP); St. Petersburg, Olgino, VII.1898 (ZISP); St. Petersburg Region, 28.VI.1902 (ZISP); Novgorod Region, Valday District, 26.VI.1908, leg. Zaitzev (ZISP); Kazan, 12.IV.1915 (ZISP); Moscow Region, Boblovo, 14.V.1906, leg. Zaitzev (ZISP); Yaroslavl Region, Berditzino Village, 16.VIII.1895, leg. Yakovleva (ZISP); KARELIA: Sodjärv (= Shotozero), 10.VII.1907 (ZISP); SIBERIA: Novosibirsk oblast, Karasuk, V./VI.1982, leg. Angus (CAL, NMW); Novosibirsk, 27.V.1982, leg. Angus (CAL); Irkutsk, leg. Ahnger (ZMH); Mal'ta [= NW Irkutsk], VI.1907, leg. Smirnov, 1 ♂ (ZISP).

FINLAND: Åbo: Lojo/Lohja, 7.VI.1916, 5.V.1918, 25.V.1922, 22.VIII.1933, 14.VI.1937, 26.VII.1940, VIII.1941, leg. Lindberg (ZMH, NMW), 28.IX.1942, leg. Stockmann (ZMH), leg. Platonoff (ZMH), leg. Krogerus (ZMH); Karjalohja, 25.VI.1938, leg. Renkonen (ZMH, NMW); Sammatti, 4.VII.1938, leg. Renkonen (ZMH); Nylandia: Esbo/Espoo, 3.V.1942, leg. Lindberg (ZMH), 2.VII.1971, leg. Biström (ZMH), leg. Platonoff (ZMH); leg. Linnaniemi (ZMH);

DIAGNOSIS: Externally, this species is quite similar to *O. alpinus*. Elytral intervals (especially inner ones) on the average, more distinctly convex than in *O. alpinus*, although I have seen a few males of *O. hungaricus* with rather flat elytral intervals. Elytral intervals usually superficially or even distinctly shagreened in male and very strongly shagreened in female, however, this character is too variable in both species to be significant; the same applies to the pronotal disc which is often (but not always) more convex in *O. alpinus*. Terminal mesotarsal segment of male longer than in *O. alpinus*, and more irregularly curved (maximum curvature in basal third).

Aedeagus (Fig. 6; see also JÄCH 1990: Figs. 14a, b): Main piece rather short (PL: ca. 270 - 300 μm , TL: ca. 320 - 340 μm); moderately strongly or even very strongly curved, MA rather variable, ca. 93° - 104° (MAp/MAd = 40°/54°, 40°/57°, 42°/55°, 43°/61°, 45°/57°), PMC at ca. 0.5 of PL, TLP:TLd = 0.8 - 0.9, PL:TL = ca. 0.85 - 0.9. Distal lobe: ventral margin of distal lobe convex basally; LS rather short and bluntly rounded, not strongly curved; AT not bifurcate, and without any distinct subapical ventral projection (although such a projection is vaguely indicated in some specimens), apically upturned, ventro-apically margined by a membrane; the angle at which the AT branches from the distal lobe is usually very obtuse in this species (ca. 130°), much obtuser than for instance in *O. alpinus* (ϕ 115°).

Differential diagnosis: *Ochthebius hungaricus* is distinguished from its allies by the short, regularly curved aedeagal main piece and by the apex of the AT which is not bifurcate and lacking any distinct subapical ventral projection.

Variability: Besides the MA and the TL of the main piece the size of the HC and the apex of the LS were found to be quite variable.

DISTRIBUTION: Austria, Czech Republic, Slovakia, Hungary, Bulgaria, Ukraine, Estonia, Belarus, Russia (incl. Siberia), Finland; Poland (after BRESIADKA 1988); Romania, Croatia (after ENDRÖDY-YOUNGA 1968).

Ochthebius lurugosus sp.n.

Ochthebius rugulosus, JÄCH 1990 (in part).

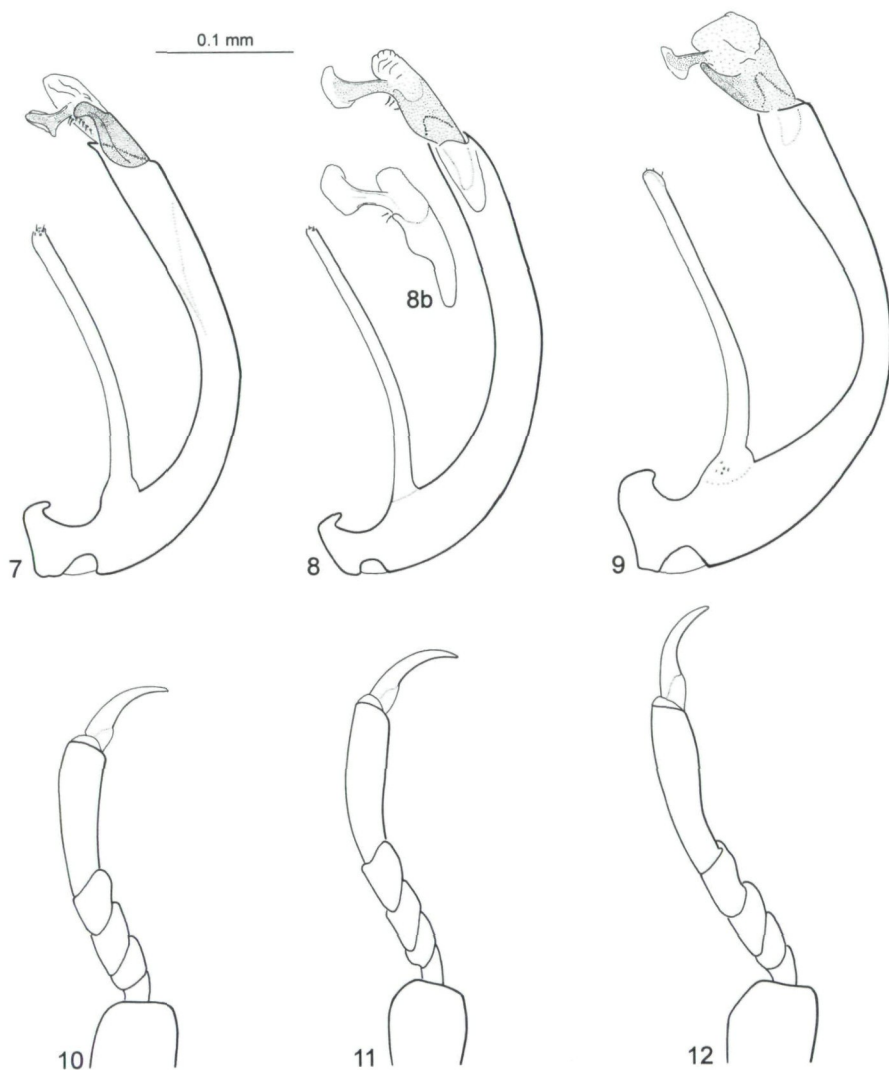
TYPE LOCALITY: Small pond on Taiyang Dao [= Sun Island], Harbin, Heilongjiang, north-eastern China. The paratypes were collected in a concrete-lined fountain pool in an urban park in Harbin, ca. 1 km south of the type locality.

TYPE MATERIAL: **Holotype** ♂ (BML): "1068 \ N.CHINA: P.M. Hammond. B.M. 1967-215. \ Heilungkiang [= Heilongjiang] Harbin 9.9.66 P.M. Hammond". **Paratypes:** 13 exs. (BML, NMW): "1043 [resp. 1046-1049, 1051, 1053-1056, 1058, 1059] \ N.CHINA: P.M. Hammond. B.M. 1967-215. \ Heilungkiang [= Heilongjiang] Harbin 11.6.65 [resp. 14.6.65] P.M. Hammond".

DIAGNOSIS: Externally, this species agrees fairly well with *O. hungaricus* in the convex elytral intervals. Pronotal and elytral punctures larger and more deeply impressed than in *O. hungaricus*. Elytral intervals usually smooth and glabrous in male and smooth or only superficially shagreened in female. Terminal mesotarsal segment of male short and strongly curved.

Aedeagus (Fig. 3, and JÄCH 1990: Fig. 14c): Main piece rather short (PL: ca. 270 - 300 μm); moderately strongly, irregularly curved, MA ca. 98° (MAp/MAd = 38°/61°), TLP:TLd = ca. 0.8. Distal lobe: AT large, apically upturned, not bifurcate, and without any subapical ventral projection, apically bordered by a narrow membrane; LS not curved ventrad.

Differential diagnosis: *Ochthebius lurugosus* is easily distinguished from *O. hungaricus* by the morphology of the distal lobe.



Figs. 7 - 9: Aedeagus, lateral view, 7) *Ochthebius hokkaidensis*, holotype; 8) *O. nonaginta*, paratype (NMW), inset: distal lobe of holotype; 9) *O. remotus*, Russia, Velsk (NMW).

Figs. 10 - 12: Sketches of mesotarsi, lateral view, setae and bristles omitted, positions not absolutely congruent; 10) *O. alpinus*, 11) *O. hungaricus*, 12) *O. minimus*.

DISTRIBUTION: China (Heilongjiang).

ETYMOLOGY: The name *lurugosus* is an anagram of the name *rugulosus*.

***Ochthebius minervius minervius* d'ORCHYMONT**

Ochthebius minervius d'ORCHYMONT 1940: 43. - d'ORCHYMONT 1942 (in part). - PIRISINU 1981. - JÄCH 1990.

Homalochthebius minervius, IENISTEA 1979 (in part), 1988.

Homalochthebius rugulosus, IENISTEA 1988.

TYPE LOCALITY: "Sardaigne" (d'ORCHYMONT 1940) [= Sardinia], Italy.

TYPE MATERIAL: I have not seen the holotype ♂ (ISNB) or any of the four paratypes of *O. minervius* from Corsica (ISNB). The two paratypes from Egypt most probably belong to *O. minervius semechonitis* ssp.n. which is described below.

ADDITIONAL MATERIAL EXAMINED:

F R A N C E: CORSICA: Ajaccio, leg. Schneider (NMW, DEI, MTD); Aleria, leg. Leonhard (MTD, DEI); Monte Renoso, leg. Leonhard (DEI).

I T A L Y: SARDINIA: Terra Nova, leg. Paganetti (NMW); Assuni, leg. Krause (MTD).

DIAGNOSIS: This species is quite variable externally, clypeus microreticulate or glabrous, elytral intervals flat or convex, smooth or distinctly shagreened in male, more strongly shagreened in female, pronotal disc moderately densely or densely and almost rugulose punctate. Elytra black, with a moderately wide, brownish margin. Labrum gently emarginate in male, slightly more distinctly emarginate in female. Male tarsi as in *O. hungaricus*.

Aedeagus (Fig. 4, see also JÄCH 1990: Fig. 13b): Main piece moderately large (PL: ca. 310 - 330 µm, TL: ca. 350 - 380 µm); usually strongly to very strongly curved (see JÄCH 1990: Fig. 13b), but less strongly curved specimens occur as well (see Fig. 4d), MA ca. 90° - 114°, PMC between 0.45 and 0.50 of PL, TLP:TLd = 0.8 - 0.9, PL:TL = ca. 0.84 - 0.92; slightly thinner near middle than in proximal and distal parts (which enhances the impression of being strongly curved). Distal lobe: ventral margin of distal lobe slightly convex basally; LS rather long and slender, distinctly curved; AT with a subapical ventral projection, apically upturned, ventrally usually margined by a membrane between projection and apex.

Differential diagnosis: *Ochthebius minervius* is distinguished from its allies by the length of the main piece of the aedeagus and by the shape of the AT.

DISTRIBUTION: So far known only from Corsica and Sardinia.

***Ochthebius minervius semechonitis* sp.n.**

Ochthebius impressus, d'ORCHYMONT 1927.

Ochthebius minervius d'ORCHYMONT 1940: 42 (in part).

Ochthebius rugulosus, JÄCH 1990 (in part). - ANGUS & DIAZ 1991. - DIMENTMAN & al. 1991.

TYPE LOCALITY:

TYPE MATERIAL: **Holotype** ♂ (NMW): "N-Israel 20.3.85 leg. Jäch Hula Reserve". **Paratypes:** 33 exs. with same label data as holotype (NMW); 2 exs.: "Israel 20.3.85 leg. Jäch Hula Reserve" (NMW); 5 exs.: "ISRAEL 13.4. HULA 50 Dun. leg. Jäch 1986" (NMW); 1 ex.: "ISRAEL 13.4. HULA Res. leg. Jäch 1986" (NMW); 2 exs.: "ISRAEL 8.4. Golan Tümpel leg. Jäch 1986 \ 2264/2585" (NMW); 25 exs.: "Israel 3.8.85 Golan Sha'al / leg. Jäch" (NMW); 5 exs.: "Israel 3.8.85 Ein Juwiza Golan / Jäch" (NMW); 1 ex.: "ISRAEL 31.3.85 N. Daliyot Golan / Jäch" (NMW); 1 ex.: "ISRAEL 16.7.85 Ayoun a-tariq Golan leg. Jäch" (NMW); 1 ex.: "Israel 16.7.85 Yesud ha'Mala leg. Jäch" (NMW); 4 exs.: "Israel 27.8.85 En Yezer [= near L. Kinneret] leg. Jäch" (NMW); 1 ex.: "ISRAEL 12.4. Samakh Mdg. [= Golan, mouth of Samakh River] leg. Jäch 1986" (NMW); 1 ex.: "ISRAEL Kinneret Ufer [= shores of Lake Kinneret] leg. Jäch 1986" (NMW); 1 ex.: "ISRAEL P. Yarden [= Park ha'Yarden] leg. Jäch 1986" (NMW); 1 ex.: "Israel 26.8.85 Mt. Hermon B. Ativ / Jäch" (NMW); 1 ex.: "Luxor \ J.Sahlb." (ZMH); 3 exs.: "Cairo \ J.Sahlb." (ZMH).

I have not examined the two specimens from Egypt ("Kairo" and "Choubrah", probably deposited in the ISNB), which were designated as paratypes of *O. minervius* by d'ORCHYMONT (1940). I have no doubt that these 2 specimens also belong to the new subspecies.

ADDITIONAL MATERIAL EXAMINED:

E G Y P T: Cairo (MHNP); Ismailiya (MHNP).

DIAGNOSIS: Colouration and external morphology as in the nominative form.

Aedeagus (Fig. 2; see also JÄCH 1990: Fig. 13d): Main piece moderately large (PL: ca. 330 - 380 μm , TL: ca. 370 - 400 μm); MA varying from 101° - 108° , TLp:TLd = ca. 0.74 - 0.89, PL:TL = ca. 0.87 - 0.95; more or less equally thick throughout its length. Distal lobe: ventral margin of distal lobe not distinctly convex basally; apex of LS moderately long, not very strongly curved; AT and with a subapical ventral projection, apically upturned, ventrally margined by a membrane between projection and apex.

Differential diagnosis: *Ochthebius minervius semechonitis* is distinguished from the nominative form by the main piece which is shorter, slightly attenuated medially and usually more strongly curved.

DISTRIBUTION: Israel, Egypt.

ETYMOLOGY: Named after Lake Hula (northern Israel), which was described by the Jewish historian Josephus Flavius (1st century A.D.) under the name "Lacus Semechonitis". The new subspecies is very common in northern Israel and also occurs in the remnants of Lake Hula.

Ochthebius nonaginta sp.n.

Ochthebius rugulosus, JÄCH 1990 (in part).

TYPE LOCALITY: Karabutak, northwestern Kazakhstan.

TYPE MATERIAL: Holotype δ (ZISP): "Kara-butak \ Turcest.". Paratypes (ZISP, NMW): 1 ex. with same locality data as holotype and 4 exs. labelled: "Kara-butak".

DIAGNOSIS: This species is obviously closely related to *O. lurugosus* sp.n. from which it can be distinguished by the aedeagus. Terminal mesotarsal segment of male gently curved.

Aedeagus (Fig. 8, see also JÄCH 1990: Fig. 13e): Main piece moderately long (PL: ca. 320 - 340 μm , TL: ca. 360 μm); evenly and not strongly curved, MA ca. 115° (MAp/MAd = $52^\circ/64^\circ$), PMC at ca. 0.5 of PL, TLp:TLd = ca. 0.95. Distal lobe: ventral margin of distal lobe slightly convex basally; apex of LS short and inconspicuous, not curved; apex of AT upturned and enlarged, not bifurcate and without any subapical ventral projection.

Differential diagnosis: *Ochthebius nonaginta* can be distinguished from *O. lurugosus* by the length and the shape (MA, TLp:TLd) of the main piece. Distal lobe similar to that of *O. lurugosus*, but apex of LS less distinct.

DISTRIBUTION: So far known only from the type locality.

ETYMOLOGY: Nonaginta [Latin: ninety], commemorating the 90th birthday of Univ.Prof. DI DDr. h.c. H. Franz.

Ochthebius remotus REITTER

In addition to the lectotype I was able to examine some specimens (NMW, ZML) from Russia (Vel'sk, 10.III.1975, leg. Lundberg).

Aedeagus (Fig. 9; see also JÄCH 1990: Fig. 15): Main piece rather large (PL: ca. 370 μm , TL: ca. 410 μm); strongly curved (MA ca. 97°), PMC near 0.5 of PL. Distal lobe comparatively wide, LS not well developed (not clearly discernible in the holotype, see JÄCH 1990: Fig. 15), its apex inconspicuous, not curved ventrad; AT apically widened, margined by a membrane, not bifurcate and without any subapical ventral projection.

DISTRIBUTION: Caucasus, Russia. First record for Europe.

Discussion

As already mentioned above, *Ochthebius rugulosus*, *O. alpinus*, *O. hungaricus* and *O. minervius* were regarded as synonyms by JÄCH (1990). Among these four species, *O. rugulosus* and *O. alpinus* are quite deviating genitally, *O. rugulosus* being even easily recognizable externally. The remaining two species, *O. minervius* and *O. hungaricus*, are presumably very closely related because they are very similar genitally and externally.

While *O. rugulosus* and *O. minervius* are geographically isolated, the remaining two species, *O. alpinus* and *O. hungaricus* have at least partly overlapping areas. In addition, *O. minimus* is also found to occur in large parts of the geographical distribution of these two species. While there is no problem to identify males of these three species, it is at present more or less impossible to distinguish their females. The colour of the legs is practically identical in all three species; if there are any noticeable differences (which I was unable to detect), they could be due to the individual age, collecting method, storage or habitat. The elytral shagreen, although often less strongly developed in *O. alpinus*, is, in consideration of the variability, not useful for the determination (I have seen very strongly shagreened females of *O. alpinus*). The lateral elytral margins of *O. minimus* are almost always brownish (at least distinctly paler than the elytral disc), whereas the elytra of *O. hungaricus* and *O. alpinus* are unicoloured. However, I have seen few unicoloured specimens of *O. minimus* and general specimens generally cannot be identified by using colouration. Other characters, such as body size, emargination of labrum, convexity of pronotum, punctation of pronotal disc, and shape and shagreen of elytra tend to be diagnostic on the basis of single populations, but on a wider scale they are too variable and insignificant.

Finally, the terminal mesotarsal segment was mentioned by CUPPEN & NILSSON (1991) as an appropriate distinguishing character for females. Eventually, I have dissected and examined the terminal mesotarsal segments of a few specimens of *O. alpinus*, *O. hungaricus* and *O. minimus* (see Figs. 10 - 12). I found the width and the length of the terminal mesotarsal segment of *O. alpinus* and its relative length in comparison with the first four segments to be indeed slightly smaller than in the two other species. However, these differences are not very strong and it is likely that subsequent studies (including different populations) will reveal that this character is not significant, as there appears to be at least some variability. The differences between the lengths of the terminal mesotarsal segments of *O. hungaricus* and *O. minimus* are obviously very small.

In addition to the difference in the length and the width, the terminal mesotarsal segment of *O. alpinus* appears to be more straight and more equally wide, whereas it is more slender and slightly curved in basal third in *O. hungaricus* and *O. minimus*. But it is doubtful whether this weak character does enable safe determination of single females.

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Dr. Manfred A. JÄCH

Naturhistorisches Museum, Burgring 7, A - 1014 Wien, Austria

E-mail: manfred.jaech@nhm-wien.ac.at

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Jahr/Year: 1998

Band/Volume: [68_1998](#)

Autor(en)/Author(s): Jäch Manfred A.

Artikel/Article: [Revision of the Palearctic species of the genus *Ochthebius* Leach XX. The *O. \(Asiobates\) rugulosus* Wollaston species complex \(Hydraenidae\) 175-187](#)