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# A revision of the European species of *Calodera* MANNERHEIM (Coleoptera, Staphylinidae, Aleocharinae)

With 11 figures

VOLKER ASSING

## Abstract

The types and further material of the European species of *Calodera* MANNERHEIM, 1831 are revised. 10 valid species are recognized: *C. nigrita* MANNERHEIM, *C. protensa* MANNERHEIM, *C. lapponica* J. SAHLBERG, *C. uliginosa* ERICHSON, *C. riparia* ERICHSON, *C. rufescens* KRAATZ, *C. aethiops* (GRAVENHORST), *C. cochlearis* sp. n., *C. stiliformis* sp. n. and *C. ligula* sp. n. Lectotypes are designated for *C. nigrita*, *C. protensa*, *C. lapponica*, *C. uliginosa*, *C. riparia*, *C. rufescens*, *C. aethiops* and *C. paludum* KRAATZ. *C. paludum* KRAATZ, a former synonym of *C. riparia*, is synonymized with *C. rufescens* KRAATZ. The synonymy of *C. humilis* ERICHSON with *C. protensa* is confirmed.

The descriptions of the species are supplemented by figures of the male genitalia, notes on distribution and bionomics, and a diagnostic key.

**Keywords:** Coleoptera - Staphylinidae - Aleocharinae - Calodera - Palaearctic - Europe - taxonomy - revision - new species

## Zusammenfassung

Eine Revision der Typen und weiteren Sammlungsmaterials der europäischen Arten der Gattung *Calodera* MANNERHEIM, 1831 ergab 10 valide Arten: *C. nigrita* MANNERHEIM, *C. protensa* MANNERHEIM, *C. lapponica* J. SAHLBERG, *C. uliginosa* ERICHSON, *C. riparia* ERICHSON, *C. rufescens* KRAATZ, *C. aethiops* (GRAVENHORST), *C. cochlearis* sp. n., *C. stiliformis* sp. n. und *C. ligula* sp. n. Für *C. nigrita*, *C. protensa*, *C. lapponica*, *C. uliginosa*, *C. riparia*, *C. rufescens*, *C. aethiops* und *C. paludum* KRAATZ werden Lectotypen designiert. *C. paludum* KRAATZ, bisher ein Synonym von *C. riparia*, wird mit *C. rufescens* KRAATZ synonymisiert. Die Synonymie von *C. humilis* ERICHSON mit *C. protensa* wird bestätigt. Die Artbeschreibungen werden durch Abbildungen der männlichen Genitalien, Angaben zur Verbreitung und Bionomie sowie einen Bestimmungsschlüssel ergänzt.

## Introduction

The genus *Calodera* was described by MANNERHEIM (1831), who included three new species, *C. nigrita*, *C. protensa* and *C. testacea* (now *Phloeopora testacea*), of which the first was designated as the type species by WESTWOOD seven years later (BLACKWELDER 1952).

While MANNERHEIM's description of the genus is primarily based on the shape of the maxillary palpi, the antennae and the general appearance and would, therefore, apply to several aleocharine genera, GANGLBAUER (1895) gives a detailed diagnosis including the construction of the mouthparts, the abdomen and the tarsi.

BERNHAEUER & SCHEERPELTZ (1926) list 61 species of *Calodera* in three subgenera from the Palaearctic, the Nearctic, the Neotropical, the Oriental and the Australian region. Since then more than 10 further species have been described; on the other hand numerous species have been transferred to other, in some cases new genera (BERNHAEUER 1943, CAMERON 1945, PACE 1987a, 1987b). In Europe, there have been no major taxonomic alterations or additions for more than a century; the last of the 7 European species listed in the catalogue by BERNHAEUER & SCHEERPELTZ (1926), *C. lapponica* J. SAHLBERG, was described in 1876.

Although the genitalia are known to be of high taxonomic significance in many other Aleocharinae, the sexual characters of the European representatives of *Calodera* have been completely neglected.

Even the most recent major taxonomic studies of Northern and Central European Aleocharinae (LOHSE 1974, PALM 1972) exclusively rely on external characters such as size, punctuation and colour, without any reference to the genitalia. However, due to the rarity of all European *Calodera*, except for *C. aethiops* (GRAV.), and the lack of abundant material in the collections, the intraspecific variability of morphological characters may have largely been underestimated. Accordingly, a study of *Calodera* material from various museum and private collections revealed numerous intrageneric misidentifications and many cases of confusion with species of related genera (e.g. *Phloeopora* ERICHSON, *Ityocara* THOMSON).

The present paper was initiated by an excursion to a locality near Hamburg, Germany, where series of specimens of five of the six known Central European species and, in addition, an undescribed species were collected together. A subsequent examination of further material then revealed that what has been treated as *C. aethiops* (GRAV.) in fact represents a complex of at least 4 species.

Material from the following collections was examined:

DEI	Deutsches Entomologisches Institut, Eberswalde (Dr. L. ZERCHE)
MHNG	Muséum d'Histoire naturelle, Genève, Geneva (Dr. I. LÖBL)
MNHUB	Museum für Naturkunde der Humboldt-Universität, Berlin (Dr. M. UHLIG)
NHMW	Naturhistorisches Museum Wien, Vienna (Mr H. SCHILLHAMMER)
TLMFI	Tiroler Landesmuseum Innsbruck (Mr M. KAHLN)
ZMH	Zoological Museum Helsinki (Dr. H. SILFVERBERG)
cAss	author's private collection
cLom	private collection, Dr. A. LOMPE, Nienburg
cMey	private collection, H. MEYBOHM, Stelle
cTer	private collection, Dr. H. TERLUTTER, Billerbeck
cWun	private collection, P. WUNDERLE, Mönchengladbach
cZan	private collection, Dr. A. ZANETTI, Verona

I am much indebted to the aforementioned colleagues, who arranged the loan of types and further material of *Calodera*. In particular I would like to thank Dr. LOTHAR ZERCHE for his helpful advice and his critical comments on an earlier draft of the manuscript.

## The European species of *Calodera* MANNERHEIM

After the revision 10 European species of *Calodera* are recognized. The data on the distribution of the species are still somewhat incomplete, not only because three new species are added, but also because misidentifications appear to have been rather common especially in older material. Many records indicated in the literature, particularly those for Southern Europe, are doubtful; they will have to be reexamined. Similarly, our knowledge concerning the ecological requirements of the species can, at present, only be considered preliminary. According to the literature and my own observations they all inhabit the litter layer in moist or wet situations, often near water (but see notes below *C. protensa* MANNERHEIM). As many as six species have been found to co-occur in the same locality. In addition, their life-histories appear to be highly similar, with a reproduction period in spring, larval development in summer and the emergence of new adults taking place in late summer and autumn (HORION 1967). Thus the question how the species of *Calodera* are ecologically segregated still remains to be answered. The vast majority of specimens in the material examined were collected in spring, particularly early spring; autumn records, on the other hand, were comparatively rare. For instance, in a wetland biotope near Laßrönne (SE Hamburg, Northern Germany), which I sampled by intensive sieving three times in 1995, 39 and 55 specimens (altogether 6 species) were collected on 24 February and 11 March, respectively, whereas no *Calodera* was found on 22 September apart from one specimen of *C. uliginosa* ERICHSON.

Based on the shape and the internal structures of the aedeagus as well as external characters (see key and descriptions) three groups of species can be distinguished: the *C. nigrita* species group (containing *C. nigrita* MANNERHEIM and *C. protensa* MANNERHEIM), the *C. lapponica* species group (only *C. lapponica* J. SAHLBERG) and the *C. uliginosa* species group (containing the remainder of the species). On account of the considerable intraspecific variability and interspecific overlap of external characters, such as size, punctuation and colour, an examination of the male genitalia is advisable for identification, particularly so in the last species group; it is essential in the *aethiops*-complex. Especially in the latter, but also for the distinction of *C. riparia* ERICHSON and *C. rufescens* KRAATZ the apical structures of the internal sac, which are best evaluated in ventral view, are of high diagnostic significance. The subapical structures, in contrast, are somewhat variable and, consequently, less useful. For the identification of some species a simple measurement of the size of the aedeagus, measured from the base of the bulbos to the apex of the median lobe, is sufficient. It is recommended that the aedeagi be mounted on transparent slides in such a position as to enable an examination in ventral aspect. The terminology of the anatomy of the aedeagus follows that in KLIMASZEWSKI (1984).

In contrast to the male genitalia, the spermathecae are of little taxonomic significance and therefore, except for that of the type species, not figured below. Their shapes and sizes may vary considerably within the species (see Figs 1a, 1b), the general construction is roughly uniform and appreciable interspecific differences are mostly absent.

For the measurements (in  $\mu\text{m}$ , if not stated otherwise) the following abbreviations are used: HL = head length from anterior margin of clypeus to hind margin of head; HW = maximal head width; PL = length of pronotum; PW = maximal width of pronotum; AL = length of median lobe. The data of collection, when available, are indicated in the following order: country, region, locality, ecological data, date, name of collector or collection. Geographical names are based on the Times Atlas (1994).

***Calodera nigrita* MANNERHEIM, 1831**

Figs 1, 1a, 1b

*Calodera nigrita* MANNERHEIM, 1831, p. 500

**Lectotype** ♂, here designated (remounted, aedeagus examined): small triangular label, Mus. Zool. H:fors, Spec. typ. No 202, *Calodera nigrita* MANN. (ZMH).

**Further material examined:**

GERMANY: Schleswig-Holstein: 1♀, Husum, Beltingharder Koog, VI.1991 (cAss).

Niedersachsen: 1♀, Hannover, Eilenriede, Grabenufer, 5.VII.1989, Assing (cAss); 3 ♂♂, 2 ♀♀, Winsen/Luhe, Laßrönne, Feuchthfläche, Gesiebe, 24.II./11.III.1995, Assing (cAss); 1♀, Winsen/Luhe, Laßrönne, Feuchthfläche, Gesiebe, 30.IV.1995, Wunderle (cWun).

Nordrhein-Westfalen: 1 ex., Düsseldorf, 3.XII.1986, Koch (cWun); 1 ex., Neuss, 10.VII.1974, Koch (cWun); 2 ex., Köln, Worringen, Rhein, 26.X.1986, Köhler (cWun); 1 ex., Köln, Chorbush, 5.IV.1989, Köhler (cWun); 4 ♂♂, 1♀, 1 ex., Bergisches Land, Hückeswagen-Bever, V.1992, Wenzel leg. (cWun); 2 ♂♂, 2 ♀♀, Mönchengladbach-Gerkerath, Birken-Erlenbruch, 19.III.1995, Wunderle (cAss).

Berlin/Brandenburg: 5 ex., Berlin [without date], Erichson (MNHUB); 2 ex., Berlin, Finkenkrug [without date] (MNHUB); 3 ex., Berlin [without date], Ruthe (MNHUB); 1 ex., Berlin [without date] (MNHUB); 1 ex., Berlin [without date], Fischer (MNHUB); 1 ex., Spandauer Forst, 3.V.1931, Laß (MNHUB); 2 ex., Spandau, 14.IV.1922 (MNHUB); 1 ex., NW Berlin, Nieder Neuendorf, III.1924; (MNHUB) 13 ex., Brieselang near Nauen, 19.III.1916, 9.IV.1917, 12.III.1922, 20.IV.1922, 24.IV.1949 (MNHUB); 4 ex., Brieselang near Nauen [without date], H. Müller (MNHUB); 3 ex., Glambeck, Angermünde, 2.V.1926 (MNHUB); 1 ex., Chorin, 22.IV.16 (MNHUB).

Sachsen-Anhalt: 1 ex., Dessau, IV.1909 (MNHUB); 4 ex., Dessau, 10.IV.1924, Heidenreich (MNHUB); 2 ex., Dessau [without date], Duchon (MNHUB); 1 ex., Dessau [without date], Finck (MNHUB); 2 ex., Dessau, Kühnau, IV.1917, Heidenreich (MNHUB); 1 ex., Naumburg, Hennenwiesen, 31.III.1923, Maertens (MNHUB); 2 ex., Naumburg, Loischholz, 19.IV.1929, Maertens (MNHUB); 3 ex., Naumburg, Leißling, 19.IV.1928 (MNHUB); 1 ex., Teiche bei Pforta, 2.IV.1923, Maertens (MNHUB); 2 ex., Schönhausen, 17.IV./5.V.1920 (MNHUB); 1♀, Warenberg, Teich, 10.V.1993, Wunderle (cWun).

Sachsen: 3 ex., Leipzig, Elsterflutbett, Hochwasser, 16.III.1947, Dorn (MNHUB); 1♀, Sachsen, Guttau, Kr. Bautzen, car-net, 25.V.1985, Heinig & Schülke (cAss).

AUSTRIA: Niederösterreich/Wien: 1 ex., Marchfeld, 7.V.1956, Baumgarten (MNHUB); 2 ex., Wien, Prater [without date], Breit (MNHUB).

FRANCE: 1 ex., Bordeaux, Garonne, II.1952, coll. J. Ochs (MHNG).

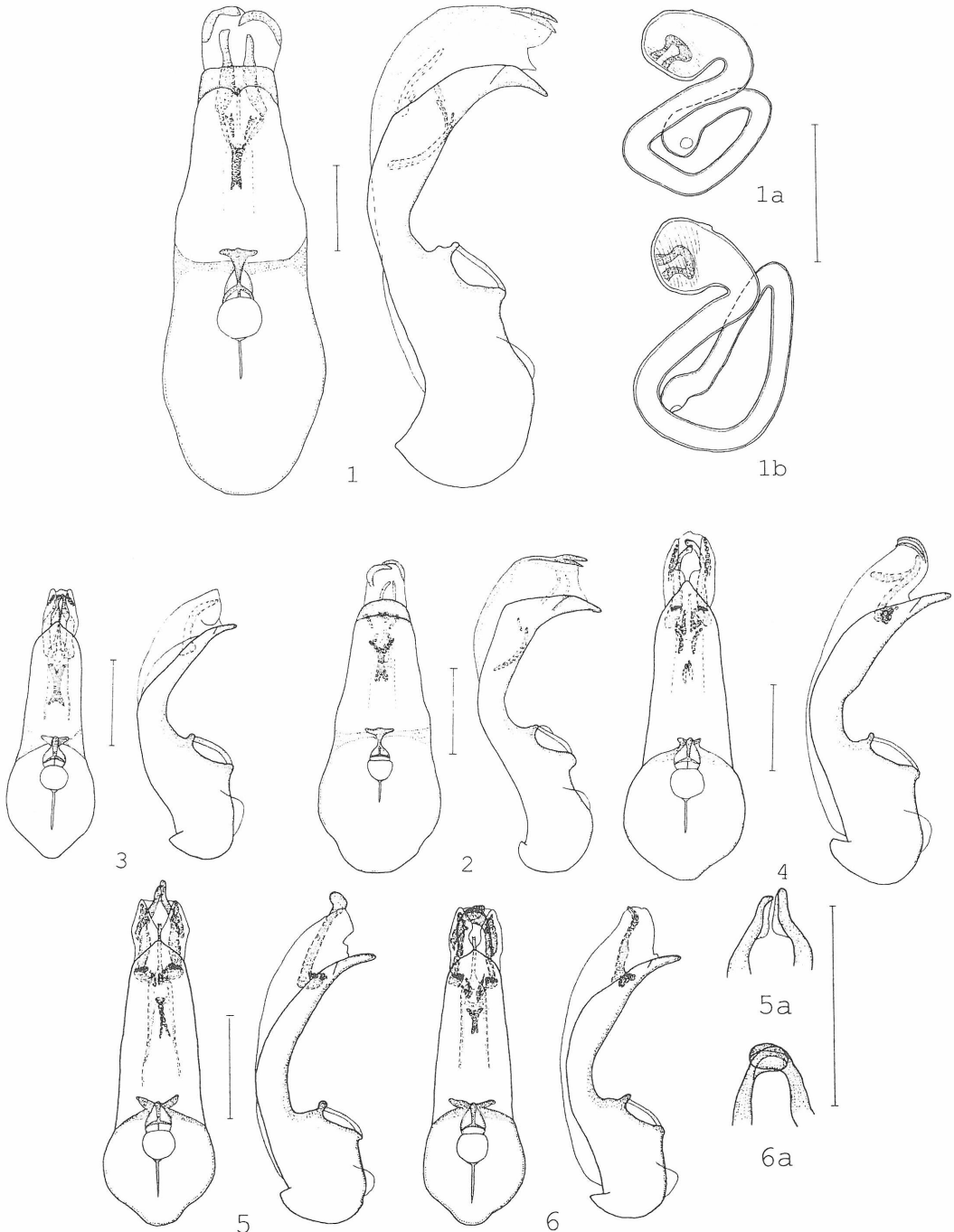
**Diagnosis**

Length (with abdomen fully extracted): 4.1-5.4 mm. Measurements: HL: 450-505; HW: 500-565; PW: 580-640; AL: 585-620.

Colour of body dark brown to black with the elytra and the basal and lateral parts of abdominal tergites III-VI often somewhat lighter; legs brown to black with the proximal part of the tibia and the tarsi yellowish brown to brown; antennae brown to dark brown.

Head 1.05-1.15x wider than long, 0.85-0.9x narrower than the pronotum with rather dense fine punctation and superficial microsculpture; neck ca. 0.8x narrower than HW.

Pronotum with characteristic punctation, which is extremely dense and slightly granulose, rende-



**Figs 1-6** Aedeagi in ventral and in lateral view (1-6), apical structures (5a, 6a) and spermathecae (1a, 1b) of *Calodera* spp.: 1, 1a, 1b *C. nigrita* MANN.; 2 *C. protensa* MANN.; 3 *C. lapponica* J. SAHLB.; 4 *C. uliginosa* ER.; 5, 5a *C. riparia* ER.; 6, 6a *C. rufescens* KR. Scale: 0.2 mm.

ring the pronotal surface rather mat in spite of absent or indistinct microsculpture; along median line often with shallow longitudinal impression.

Elytra distinctly wider and at suture longer than pronotum, very finely punctate and with superficial microsculpture.

Abdominal tergites with superficial, sometimes very indistinct microsculpture; punctation fine, decreasing in distinctness and density from tergite III to tergite VII. Sternite VIII obtusely pointed posteriorly in both sexes.

♂: aedeagus very large (see measurements); shape of median lobe, apical and subapical structures as in Fig. 1.

♀: spermatheca as in Figs 1a, 1b.

### Comments

*C. nigrita*, the largest of all European species of *Calodera* is readily identified by its size and the characteristic punctation of the pronotum. Nevertheless, in the collections examined this species was occasionally confused with *Parocyusa* spp. and *Ityocara rubens* (ER.). With the following species it shares such characters as the relatively wide and short occiput, the rather mat appearance and especially the general construction of the aedeagus, i.e. the strongly bent and pointed median lobe and the shapes of the apical and subapical structures.

According to HORION (1967) the area of distribution of *C. nigrita* ranges from Central and Northern Europe to Siberia. I have also seen one specimen from the vicinity of Bordeaux, France.

### *Calodera protensa* MANNERHEIM, 1831

Fig. 2

*Calodera protensa* MANNERHEIM, 1831, p. 500

*Calodera humilis* ERICHSON, 1837, p. 303f.

**Lectotype** ♂, here designated (remounted, aedeagus examined): Gyllhl., 9., Mus. Zool. H:fors, Spec. typ. No 201, *Calodera protensa* Mann. (ZMH).

*Calodera humilis*, holotype sex?: Berol., Er., 5320, *humilis* Er., *protensa* Mannerh.?(MNHUB).

Further material examined:

SWEDEN: 2 ex., Lund [without date] (MNHUB); 2 ex., Lund, 14.V.1978, Lundberg (TLMFI, cAss).

DENMARK: 1 ex., Jylland, Stjenberg (MNHUB).

GERMANY: Niedersachsen/Hamburg: 2♂♂, 2 ex., Hameln, Großenwieden, Feldrain, 11.II.1989 (cAss, cWun); 1♀, Hameln, Großenwieden, Acker, 27.IV.1988 (cAss); 1 ex., D. Hannover, Ruderalfläche, 30.VI.1986 (cAss); 1♂, 2ex., Wendland, Gührde, car-net, 23.IV.1995, Meybohm (cMey); 1 ex., Hamburg-Wilhelmsburg, 6.II.1962, Meybohm (cMey).

Berlin/Brandenburg: 1 ex., Berlin [without date] (MNHUB); 2 ex., surroundings of Berlin, 22.IV.1928 (MNHUB).

Sachsen-Anhalt: 2 ex., Schönhausen, 30.X.1920 (MNHUB).

Sachsen: 4 ex., Leipzig, Eilenburg, 8.X.1922, 17.VIII.24, 19.II.1941, Linke (MNHUB, cWun).

AUSTRIA: 1 ex. [without locality and date] (MNHUB).

CZECH REPUBLIC: 2ex., Bohemia [without locality and date] (TLMFI).

LATVIA: Wallhof, 29.III.1916, Bischoff (MNHUB).

Locality not identified: 1 ex., Siegrila[?], Gerhardt, (MNHUB); 1 ex., Rjellby, III.1959 (MNHUB).

### Diagnosis

Length (with abdomen fully extracted): 2.8-4.0 mm. Measurements: HL: 400-430; HW: 430-470; PW: 490-540; AL: 515-545.

Colour of body  $\pm$  uniformly brown to blackish brown with the tarsi and the first antennomeres lighter.

Head 1.03-1.10x wider than long, 0.85-0.90x narrower than the pronotum, with very distinct microreticulation and inconspicuous fine punctation; neck extremely broad, only ca. 0.95x narrower than HW.

Pronotum with characteristic dense and coarse microreticulation rendering the pronotal surface almost completely mat; with dense whitish pubescence and very fine and indistinct punctation; along median line mostly without shallow longitudinal impression.

Elytra very finely punctate and with distinct microsculpture.

Abdominal surface with fine, dense and  $\pm$  evenly spaced punctation; microsculpture distinct, but weaker than on forebody; hind margin of sternite VIII convex in both sexes.

$\delta$ : aedeagus smaller than in *C. nigrita* (see measurements), but similar in general construction; median lobe, apical and subapical structures as in Fig. 2.

### Comments

Among the European members of the genus, from which it is easily distinguished by its coarsely microsculptured pronotum, *C. protensa* is most closely related to the preceding species (see comments below *C. nigrita*). In the collection it was rather often confused with *Ityocara rubens* (ER.), which is similar in size and mat appearance, but differs from *C. protensa* particularly in the lack of the basal tranverse impression on tergite VI, the even wider and shorter occiput, the more strongly microsculptured and therefore almost completely mat abdomen, and the genitalia. So far I have only seen specimens of *C. protensa* from Northern and Central Europe. HORION (1967) also reports it for the British Isles, Western Europe (France, Belgium), Bosnia, Russia and Japan. Due to the numerous misidentifications, however, these records cannot be trusted absolutely.

The observations regarding *C. protensa* in the Finkenkrug (Brandenburg) in HORION (1967) also refer to *Ityocara rubens*.

According to the literature *C. protensa* is ecologically similar to other *Calodera*, whereas my own observations suggest that this species may be less restricted to wet habitats. In the surroundings of Hannover it was collected in agricultural biotopes and in fallows. Three specimens were recorded in flight on 23.IV.1995.

### *Calodera lapponica* J. SAHLBERG, 1876

Fig. 3

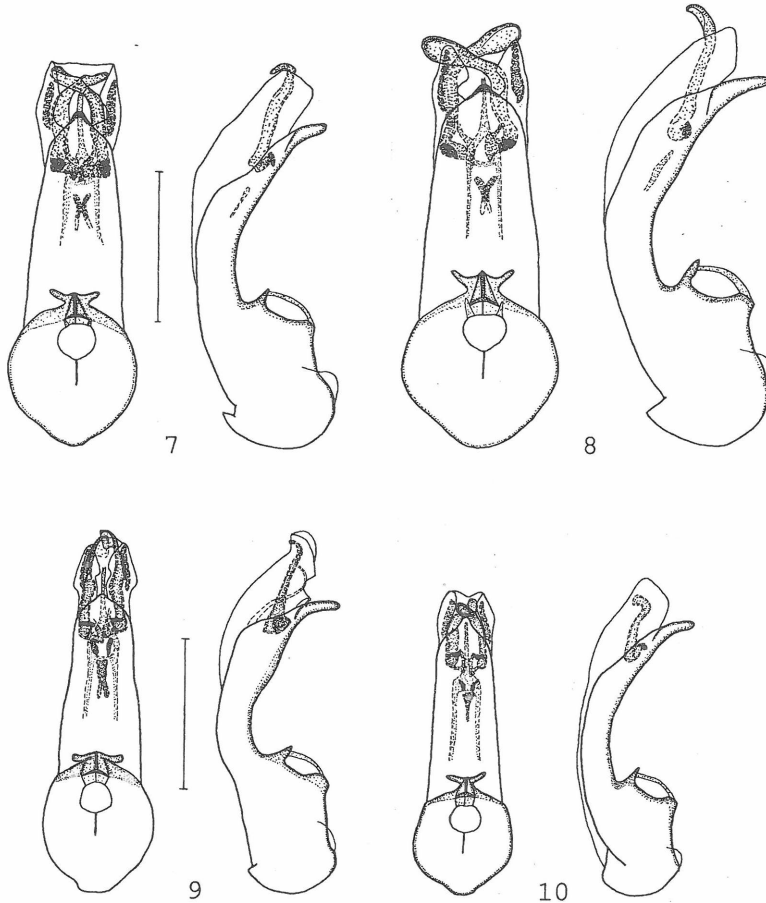
*Calodera lapponica* J. SAHLBERG, 1876, p. 96

**Lectotype**  $\delta$ , here designated: Muonio, J. Sahlb., 24, 318, Mus. Zool. H:fors, spec. typ. No 200, *Calodera lapponica* J. Sbg., Mus. Helv. No. 1067 (ZMH)-24

Paralectotype ♀, here designated: Muonio, J. Sahlb., lapponica J. Sahlb., Lapponia, J. Sahlb., 4 mk, 23, coll. Heyden (DEI).

Further material examined:

SWEDEN: Lappland: 1♂, Soppero, 9.-10.VI.1956, Palm (MNHUB); 1♂, 2♀♀, Soppero, 7.VI.1969, Lundberg (TLMFI, cAss); 1♂, Kiruna, 20.VII.1971, Lundberg (cAss).



Figs 7-10 Aedeagi ventral and lateral: 7 *C. aethiops* (GRAV.) (Laßrönne, Germany); 8 *C. cochlearis* sp.n. (holotype); 9 *C. stiliformis* sp. n. (holotype); 10 *C. ligula* sp. n. (holotype). Scale: 0.2 mm.

**Diagnosis**

Length (with abdomen fully extracted): 3.0-4.0 mm. Measurements: HL: 400-430; HW: 410-430; PW: 510-550; AL: 450-480.

Colour of body blackish brown to black, appendages brown to dark brown, with the proximal part of the tibiae, the tarsi and the first antennomeres often lighter.

Head about as wide as long (0.95-1.05x), 0.75-0.85x narrower than the pronotum, microsculpture indistinct or absent, punctures minute; neck ca. 0.6x narrower than HW.



Pronotum more weakly narrowed posteriorly than in the other species; with rather dense and distinct punctation, microsculpture indistinct or absent; usually without longitudinal impression. Elytra finely punctate and with indistinct microsculpture.

Abdominal surface with fine, rather dense and  $\pm$  evenly spaced punctation; microsculpture indistinct; hind margin of sternite VIII convex in both sexes.

$\delta$ : shape of median lobe similar to those of the *C. uliginosa* species group, but apical and subapical structures clearly different (Fig. 3).

### Comments

Among the other European members of the genus *C. lapponica* it is most similar to *C. uliginosa* and large dark specimens of *C. riparia*, from which it is, however, distinguished especially by the shape of the pronotum, whose lateral margins are clearly less strongly converging posteriorly than in the other European *Calodera*, the denser, more distinct and more evenly spaced punctation of the abdomen, and the aedeagus.

PALM (1972) reports the species for Northern Sweden, Norway and Finland, where it inhabits moist litter, moss and similar habitats, sometimes together with *C. nigrita* and *C. aethiops*. According to BERNHAUER & SCHEERPELTZ (1926) it also occurs in Eastern Siberia, but this record needs verification.

### *Calodera uliginosa* ERICHSON, 1837

Fig. 4

*Calodera uliginosa* ERICHSON, 1837, p. 305.

**Lectotype**  $\delta$ , here designated (remounted, aedeagus examined): Berlin, Erichs., Nr. 5324 (MNHUB).

**Paralectotypes**: 4 sex?, here designated: same labels as lectotype (MNHUB).

### Further material examined:

GERMANY: Niedersachsen/Hamburg: 1♀, Laascher See, 14.V.1978, Lompe (cLom); 1 ex., Hannover, Caltha-Wiese, Falle, 31.V.1986 (cAss); 1♂, 1♀, Hannover, Langenhagen, Falle, 17.-31.V.1991, Sprick (cAss); 13♂♂, 14♀♀, Winsen/Luhe, Laßrönne, Feuchtfläche, Gesiebe, 24.II./11.III.1995, Assing (cAss); 5♂♂, 4♀♀, Winsen/Luhe, Laßrönne, Feuchtfläche, Gesiebe, 30.IV.1995, Wunderle (cWun); 1 ex., Wendland, Pevestorf, 31.VII.1962, Meybohm (cMey); 2 ex., Wendland, Restorf, Hochwassergenist, 29.VII.1981, Meybohm (cMey).

Berlin/Brandenburg: 1 ex., Berlin, Spandauer Stadtforst [without date], Greiner (MNHUB); 1 ex., Berlin, Moabit [without date] (MNHUB); 1 ex., Berlin, Finkenkrug [without date], Schubert (MNHUB); 1 ex., Potsdam [without date] (MNHUB); 4 ex., Brieselang near Nauen; 3.IV.1921, 19.III.1922, 14.IV.1922 (MNHUB); 3 ex., Brieselang near Nauen [without date], H. Müller (MNHUB, cAss); 4 ex., Brieselang, 6./8.V.1923, Lass (MNHUB); 3 ex., Brieselang, 9.IV.1917 (MNHUB); 2 ex., Brieselang, 20.IV.1922 (MNHUB); 1 ex., Potsdam, Wildpark Golm [without date] (MNHUB).

Sachsen-Anhalt: 1 ex., Lübars [without date], Siefko (MNHUB); 7 ex., Naumburg, Loischholz, 30.IV.1928, Maertens (MNHUB); 2 ex., Dessau, 10./16.IV.1924, Heidenreich (MNHUB); 1 ex., Dessau, Kühnau, Heidenreich (MNHUB); 2 ex., Leipzig, Merseburg, 22.I.1939, Linke (MNHUB, cWun).

Sachsen: 3 ex. Leipzig [without date] (MNHUB); 1 ex., Leipzig, Schkeuditz, 19.III.1939, Linke (MNHUB).

Thüringen: 2 ex., Aumühle, Genist, 6.I.1926, 23.VII.1920, Petry (MNHUB).

AUSTRIA: Niederösterreich: 2 ex., Marchfeld, 7./14.V.56, Baumgarten (MNHUB).

POLAND: 2 ex., Legnica, Bruch [without date], Kolbe (MNHUB).

FRANCE: 1 ex. [without locality and date], coll. Moser (MNHUB).

### Diagnosis

Length (with abdomen fully extracted): 3.4-4.4 mm. Measurements: HL: 430-475; HW: 445-485; PW: 500-570; AL: 590-630.

Colour of body in mature specimens black, with (parts of) the tibiae and sometimes also the pro- and mesofemora somewhat lighter, tarsi brown, the antennae dark to blackish brown.

Head as wide as or slightly wider than long (1.0-1.08x), 0.83-0.91x narrower than the pronotum, with minute punctation, microsculpture absent or very shallow; neck narrow, 0.55-0.60x narrower than HW.

Pronotum rather shiny, usually with small transverse impression near base, with  $\pm$  shallow fine punctation; microsculpture absent or very indistinct.

Elytra at suture slightly longer and clearly wider than pronotum; punctation somewhat variable, usually distinct and slightly granulose; interstices shiny.

Abdominal surface shiny; tergites IV-VI without microsculpture, tergite VII often with traces of microsculpture; punctation on tergite III rather coarse and dense, on tergites IV-VII increasingly sparse and fine; hind margin of sternite VIII  $\pm$  convex in both sexes.

$\delta$ : aedeagus clearly larger than in the other members of the *C. uliginosa* species group (see measurements); median lobe, apical and subapical structures as in Fig. 4.

### Comments

Unfortunately it was not possible to clarify the identity of *Aleochara rufitarsis* STEPHENS, a name tentatively placed in the synonymy of *C. uliginosa* by BERNHAUER & SCHEERPELTZ (1926). In his original description STEPHENS (1832) attributes the species to KIRBY. The types were looked for, but could be located neither in the STEPHENS nor in the KIRBY collection, which apparently does not contain any *Calodera* at all (HAMMOND, pers. comm.).

In the collections examined *C. uliginosa* was most often confused with large dark specimens of *C. riparia*, with which it shares the dark body colour and the shiny appearance. These two species differ, however, especially in size (see measurements) and in the male genitalia; in addition the tarsi, particularly the hind tarsi, are considerably longer, and tergite III is much more densely punctate in *C. uliginosa*.

The species is widely distributed but apparently rather rare in Northern and Central Europe. According to HORION (1967) it also occurs in the Caucasus, Siberia, France and the Northern Balkans. These records, however, need verification, since all the examined "*uliginosa*" from southern localities were in fact misidentifications (*C. riparia*, *C. rufescens*). Two specimens collected on 29.VII. were teneral.

### *Calodera riparia* ERICHSON, 1837

Figs 5, 5a

**Lectotype** ♂, here designated (remounted, aedeagus examined): *riparia* Er., Berol. Er., Nr. 5325 (MNHUB).

**Further material examined:**

NORWAY: 4♂♂, 4♀♀, 12 ex., Fiskum [without date], Münster (DEI, NHMW, cAss); 1 ex., Oslo [without date] (NHMW).

SWEDEN: Lappland: 1♀, Vittangi, 20.VIII.1981, Lundberg (cWun).

FINLAND: 4♂♂, 1♀, Kottby, VII.1927 (MNHUB, cAss).

DENMARK: 1♂, Sandmilen v. Skagen, 18.IV.1981, M. Hansen (DEI); 1 ex., [without locality and date], Seeland (NHMW).

GERMANY: Schleswig-Holstein: 2♂♂, 2♀♀, Eutin, Lindenbruch, 28.IV.1914, 23.V.1917, 14.V.1918, coll. Künnemann (DEI); 1 ex., Umg. Lauenburg, Sandkrug/Elbe, 24.IV.1988, Meybohm (cMey).

Niedersachsen/Hamburg: 1♂, 1♀, Celle, Allergebiet, Großes Moor, 8.-9.IV.1917, Uhmann (DEI); 1♂, Celle-Ehlershausen, 31.III.1923, coll. Ihssen (MNHUB); 1♀, Laascher See, 14.V.1978, Lompe (cLom); 1♂, 1♀, Hannover, Langenhagen, pitfall trap, 17.-31.V.1991, Sprick (cAss); 2♂♂, Winsen/Luhe, Laßrönne, Feuchtfläche, Gesiebe, 11.III.1995, Assing (cAss); 2♂♂, Winsen/Luhe, Laßrönne, Feuchtfläche, Gesiebe, 30.IV.1995, Wunderle (cAss, cWun); 1 ex., Wendland, Planken, car-net, 2.VII.1983, Meybohm (cMey); 1 ex., Wendland, Schreyahn, 5.VII.1983, car-net, 5.VII.1983, Meybohm (cMey); 2 ex., Hamburg-Wilhelmsburg, 20.II.1960, 19.IV.1963, Meybohm (cMey); 1♂, Bergedorf [without date], coll. Koltze (DEI).

Hessen: 1♀, [without locality and date], Schaufuss (MNHUB); 1 ex., Vogelsberg [without date], Scriba (NHMW); 1♂, 1♀, Vogelsberg, Ober Lais [without date], Scriba (DEI); 1♂, Marburg, Hochwassergenist, 8.II.1985, Wunderle (cWun); 1♂, 1♀, Marburg, Kirtorf, 10.IV.1988, Wunderle (cWun); 1♀, Marburg, Hochwassergenist, 22.III.1985, Wunderle (cAss).

Nordrhein-Westfalen: 1♀, Mönchengladbach, Großheide, Erlenbruchrest, III.89, Wunderle (cWun).

Rheinland-Pfalz: 1 ex., [without locality and date], Eppelsheim (NHMW).

Mecklenburg-Vorpommern: 1♂, Göldeitzer Moor [without date] (MNHUB); 2♂♂, Waren, Müritz, NSG 19.VI.1976, 1.V.1979, Uhlig (MNHUB).

Berlin/Brandenburg: 6♂♂, Berlin [without date], coll. Kraatz (DEI); 1♂, Berlin [without date], coll. Stierlin (DEI); 1♂, Berlin [without date], coll. Letzner (DEI); 1♂, 1 ex., Berlin [without date], Fischer (DEI, NHMW); 2♀♀, Berlin, coll. Ruthe (MNHUB); 1♂, 2♀♀, Spandauer Forst, 13.III.1944 (MNHUB); 1♀, Forst Bredow near Berlin [without date], coll. Neresheimer (DEI); 2 ex., Finkenkrug [without date], Schubert (MNHUB); 1♂, Finkenkrug, 17.IV.1904 (MNHUB); 10♂♂, 10♀♀, Wildpark Golm [without date] (DEI, MNHUB); 1 ex., Wildpark Golm, 6.II.1916 (cAss); 1♂, 1♀, Brieselang [without date], coll. Neresheimer (DEI); 1♀, Umg. Chorin, 24.IV.1916 (MNHUB).

Sachsen: 1♀, Frohburg, 21.V.1972, Uhlig (MNHUB).

Locality not specified: 1♀, [Deutschland] [without date], Leonhard (DEI); 1 ex., [Germ. boreal]; 1♀, coll. Letzner.

POLAND: 2♂♂, 1♀, 1 ex., Legnica [without date], Gerhardt (DEI, NHMW); 2♂♂, Legnica [without date] (MNHUB).

AUSTRIA: Tirol: 1♀, Rinn near Innsbruck, 29.III.1946, Kofler (TLMFI); 1♀, Schwaz, 14.III.1949, Kofler (TLMFI); 1♂, Schwaz, Stans, 13.III.1946, Kofler (TLMFI).

Oberösterreich: 1 ex., Ostermiething, Ettenau, Hochwassergenist, 14.IV.1944, Leeder (NHMW).

Niederösterreich/Wien: 3 ex., Stockerau near Wien [without date], Skalitzky (NHMW); 2 ex., E Wien, Marchegg, 15.VI.1963, 23.II.1964, Gotz (NHMW); 3 ex., N Wien, Enzersdorf [without date], Luze (NHMW).

Burgenland: 1♀, Neusiedler See, Illmitz, Sandeck, Ulmenstrunk, 4.V.1991, Kahlen (TLMFI).

ITALY: Trentino: 2♂♂, 1♀, Bressano, Isarco, u. nassem Weidenlaub, 7.VI.1965, Kahlen (TLMFI); 6♂♂, 3♀♀, S Bolzano, Kalterer See, Schilfhaufer/am Fuß von Weiden, 14.III.1971, II.1974, 25.XI.1978, 8.XII.1980, 5.I.1986, Kahlen (TLMFI, cAss); 3♂♂, 1♀, [without locality and date], coll. Ammann (TLMFI); 2♂♂, 4♀♀, NE Trento, Albiano, in *Carex*, 15.X.1992, Barco (cAss, cZan); 1 ex., Albiano, Palude, 27.II.1993, Barco (cZan); 1 ex., E Rovereto, Folgaria, 15.IX./11.X.1992, Echen (cZan).

Lombardia: 9 ex., Valtellina-SE, Piano di Spagna, 8.XII.1984, Zanetti (cAss, cZan); 3 ex., Lago d'Idro, 18.IX.1992 (cZan).

Toscana: 1♂, 4♀♀, W Firenze, Padule di Fucecchio, 1.III.1994, Bordoni (cAss, cWun).

LATVIA: 1♂, [Curonia] Nogallen[?], 23.I.1921 (MNHUB).

### Diagnosis

Length (with abdomen fully extracted): 2.8-3.8 mm. Measurements: HL: 375-430; HW: 380-440; PW: 430-500; AL: 440-485.

Colour of body somewhat variable; head, pronotum, elytra and abdomen usually dark brown to black; appendages mostly brown to blackish brown with the tibiae, the tarsi and the first antennomeres lighter; occasionally legs and antennae light brown.

Head about as wide as long (0.95-1.05x), 0.82-0.90x narrower than the pronotum; punctation and microsculpture similar to *C. uliginosa*; neck narrow, ca. 0.5x narrower than HW.

Pronotum rather shiny, usually with small transverse impression or a pair of two small round impressions near base; punctures ± fine, their density variable; microsculpture absent or very indistinct.

Shape of elytra similar to *C. uliginosa*; punctation variable, but usually weaker and not granulose; interstices shiny.

Abdominal surface very shiny, usually without trace of microsculpture; punctation fine and mostly sparser than in *C. uliginosa* and *C. rufescens*, but density, which decreases from tergite III to tergite VI, may be subject to some variability.

♂: aedeagus of similar general construction as in all the other species of the *C. uliginosa* group, similar in size to *C. rufescens*; apices of apical structures of characteristic shape, in normal position not crossed (Figs 5, 5a); hind margin of sternite VIII bluntly pointed.

♀: sternite VIII convex posteriorly.

### Comments

Due to descriptions and keys relying on such variable external characters as pronotal punctation, leg colour and body size (e.g. LOHSE 1974, PALM 1972) *C. riparia* as often been confused with other species, particularly *C. uliginosa* (see comments below this species) and, most of all, *C. rufescens*; even the type series of *C. riparia* contained also specimens of *C. rufescens*. In addition, *C. riparia* may occur together with *C. uliginosa* and *C. rufescens* in the same locality, which indicates similar ecological requirements. The most reliable character for a safe distinction of *C. riparia* and *C. rufescens* is the shape of the apical structures of the aedeagus (see Fig.

5a). Specimens from all the Scandinavian countries, from Germany, Austria and Northern Italy were examined. Due to the frequent confusion with similar species the records from various localities, particularly those from Southern Europe and even North Africa (HORION 1967) will have to be revised.

Unfortunately, an attempt to locate the two syntypes of *Calodera atricapilla* SCRIBA, a name placed in the synonymy of *C. riparia* in BERNHAUER & SCHEERPELTZ (1926), in the Senckenberg Museum, Frankfurt a. M., was unsuccessful. However, judging from the description of certain external characters and the locality of collection it appears very doubtful that the specimens should be *Calodera*, e.g. "...das sechste Segment ist [...] oben ziemlich dicht mit erhabenen Könchen besetzt. [...] ... bei Gombo im Toskanischen am Meeresufer aus Genist ausgesiebt." (SCRIBA 1868).

Two flying specimens were collected in the first half of July 1983.

### *Calodera rufescens* KRAATZ, 1856

Figs 6, 6a

*Calodera rufescens* KRAATZ, 1856, p. 144

*Calodera riparia* ERICHSON, 1837, p. 305f., partim

*Calodera paludum* KRAATZ, 1858, p. 50f., syn. nov.

**Lectotype** ♀, here designated (remounted): *rufescens* mihi, Berolin, coll. Kraatz, Syntypus (DEI).

*Calodera riparia* ERICHSON syntypes: 2♀♀, Berolin, Erichs., Nr. 2325 [sic!]; 2♂♂, 2♀♀, Austria, Nr. 2325 [sic!] (MNHUB).

*Calodera paludum* KRAATZ: Lectotype ♀, here designated (remounted): *forficulata* Kiw. i.l., Graecia, 59, *paludum* mihi, Nauplia, coll. Kraatz, Syntypus (DEI).

Further material examined:

GERMANY: Niedersachsen/Hamburg: 1♂, 2♀♀, Hannover, Langenhagen, pitfall trap, 17.-31.V.1991, VI.1991, VII.1991, Sprick (cAss, cWun); 1♀, Hannover, Mähwiese, 16.V.1986 (cAss); 1 ex., Hannover, Caltha-Wiese, 31.V.1986 (cAss); 11♂♂, 11♀♀, Winsen/Luhe, Laßrönne, Feuchtfläche, Gesiebe, 24.II./11.III.1995, Assing (cAss); 2♀♀, Winsen/Luhe, Laßrönne, Feuchtfläche, Gesiebe, 30.IV.1995, Wunderle (cWun); 1 ex., Winsen/Luhe, Ohlendorf, car-net, 12.IV.1981, Meybohm (cMey); 2 ex., Wendland, Gartow, Elbholz, 22.XII.1975, III.1983, Meybohm (cMey); 3 ex., Hamburg-Wilhelmsburg, 19.I.1962, 8.IV.1963, Meybohm (cMey). Nordrhein-Westfalen: 1♀, Mönchengladbach-Gerkerath, Birken-Erlenbruch, 19.III.1995, Wunderle (cWun); 1♀, Mönchengladbach, Großheide, Erlenbruchrest, III.89, Wunderle (cWun). Brandenburg/Berlin: 2♀♀, Berlin (MNHUB); 1♀, Berlin [without date], Fischer (MNHUB); 1♂, Berlin, Machnow, feuchtes Laub, 23.IV.1922 (MNHUB); 1 ex., Berlin, Kaulsdorf, 20.II.1910, Kuntzen (MNHUB); 1♀, Berlin, Jungfernheide [without date], Wendeler (MNHUB); 1♀, surroundings of Berlin [without date], Schubert (MNHUB); 2 ex., Finkenkrug [without date], Schubert (MNHUB).

Sachsen: 1♂, Leipzig, Dübener Heide, Döberschütz, 15.IV.1911 (MNHUB); 1♀, Leipzig, Gundorf, 14.III.1915 (MNHUB); 13 ex., Leipzig [without date], Linke (NHMW); 2 ex., Leipzig, 18.III.1906, Linke (NHMW); 2 ex., Leipzig [without date], Dorn (NHMW); 1 ex., Leipzig [without date], Moczars (NHMW); 2 ex., Leipzig [without date] (NHMW).

AUSTRIA: Tirol: 1 ex., Kufstein [without date], Breit (NHMW).

Oberösterreich: 1 ex., Linz [without date], Priesner (NHMW).

Niederösterreich/Wien: 1♂, Stockerau near Wien, 27.IV.1900, Bernhauer (NHMW); 8 ex., [without locality and date], Zoufal (NHMW); 1 ex., Tullnetbach [without date] (NHMW); 1 ex., Wienerwald [without date], Breit (NHMW); 1♂, N Wien, Ulrichskirchen [without date] (cAss); 1♂, Waidling bei Klosternau, Burg, Prater, Scheerpeltz (NHMW); 3 ex., Donauauen [without date], Breit (NHMW).

FRANCE: 3♂♂, Rhone (MNHUB, cAss); 1♂, Camargue, Gut 'La Tour de Valat', Bodenstreu unter Baumbestand, VIII.1956, Schuster (NHMW); 1♂, Guyenne, Arcachon, 11.II.1955, Ardoin (MHNG).

ALBANIA: 1♂, Avlona [without date], v. Oertzen (MNHUB).

GREECE: 1♂, Elos, 20m, 11.V.1994, Sabella (cAss).

### Diagnosis

Length (with abdomen fully extracted): 2.9-3.6 mm. Measurements: HL: 370-410; HW: 360-410; PW: 420-490; AL: 440-480.

Colour of body somewhat variable; usually head and abdomen, blackish brown to black, pronotum and elytra dark brown to blackish brown; occasionally head and abdomen brown, pronotum and elytra reddish; colour of appendages very variable, reddish yellow to dark brown. Head about as wide as long (0.95-1.05x), 0.82-0.88x narrower than the pronotum; microsculpture variable, mostly present, but very shallow; punctuation as in *C. riparia*; neck narrow, ca. 0.5x narrower than HW.

Pronotum with variable punctuation and microsculpture; mostly less shiny than in *C. riparia*, punctuation often more distinct and denser than in the latter; basal impression(s) as in *C. riparia*. Shape of elytra as in *C. riparia*; punctuation variable, but usually more distinct than in the latter; often with microsculpture.

Abdomen usually less shiny, punctuation, particularly on tergites III and VI, usually more distinct and denser than in *C. riparia*.

♂: median lobe similar in size and shape to *C. riparia*; apices of apical structures of characteristic shape, spoon-like, in normal position crossed (Figs 6, 6a); hind margin of sternite VIII bluntly pointed.

♀: sternite VIII convex posteriorly.

### Comments

For distinction from *C. riparia* see comments below the latter. In the course of the present study specimens from Germany, Austria, France, Albania and Greece have been revised. Further records require verification, since this species has frequently been misidentified.

One of the examined specimens was collected in flight on 12.IV.1981.

### *Calodera aethiops* (GRAVENHORST, 1802)

Figs 7, 11: c1-c9

*Aleochara aethiops* GRAVENHORST, 1802, p. 77

*Calodera occulta* HEER, 1839, p. 347

**Lectotype** ♂, here designated (remounted, aedeagus examined): Berolin, Erichs., Nr. 5326 (MNHUB).

**Paralectotypes:** 5♀♀, 3 sex?, here designated: same labels as lectotype (MNHUB).

Further material examined:

GREAT BRITAIN: 7♂♂, Greater London, Richmond Park, 5.V.1986, Uhlig & Hammond (DEI, MNHUB); 2♂♂, GB. Derbyshire, Calver, 13 km SW Sheffield, Sumpf, 27.IV.1986, Uhlig (DEI, MNHUB).

DENMARK: 1♂, København [without date], Bernhauer (NHMW).

GERMANY: Schleswig-Holstein: 1♂, Amrum (North Sea), 1.-5.IV.1939, Weber (cAss).

Niedersachsen: 1♂, Wilhelmshaven, Neuenburger Urwald, Holzeklektor an Eiche, V.1993, Menke (cAss); 1♂, Celle-Ehlershausen, 13.IV.1914 (MNHUB); 2♂♂, Lüneburger Heide, Niederhaverbeck, 1.XII.1983, 26.IV.1984, Assing (cAss); 1♂, Hannover, Eilenriede, Grabenufer, 7.VIII.1989, Assing (cAss); 5♂♂, Hannover, Eilenriede, car-net, 28.V./29.V./8.VII.1991, Assing (cAss); 4♂♂, Neustadt/Rbg., Himmelreich, window trap, 6.V./21.V./3.VI.1990 (cAss); 1♂, W Hannover, Stadthagen, Waldsumpf, 25.VI.1991, Sprick (cAss); 7♂♂, Winsen/Luhe, Laßrönne, Gesiebe, Feuchtbläche, 24.II./11.III.1995, Assing (cAss); 1♂, Winsen/Luhe, Laßrönne, Feuchtbläche, Gesiebe, 30.IV.1995, Wunderle (cWun); 2♂♂, Wendland, Pevestorf, 8.IX.1986, Wunderle (cWun); 2♂♂, 1♀, Wendland, Pevestorf, Elbholz, 16.VI.1987, Wunderle (cAss, cWun); 1♂, Sonnenborstel, Moor, 21.III.1993, Lompe (cLom).

Nordrhein-Westfalen: 1♂, Zwillbrocker Venn near Vreden, *Glyceria*-Rasen, 24.IV.1992, Zerche (DEI); 1♂, Mönchengladbach, Großheide, Erlenbruchrest, III.1989 Wunderle (cWun); 2♂♂, 1♀, Mönchengladbach, Gerkerath, Waldsumpf, 25.III.1989, Wunderle (cWun); 19♂♂, Mönchengladbach-Gerkerath, Birken-Erlenbruch, 19.III.95, Wunderle (cAss); 1♂, W Mönchengladbach, Elmpt, Elmpter Bruch, 20.XI.1991 (cWun); 2♂♂, Ahaus, Bröke 19.V.1989, Terlutter (cTer); 1♂, Godelheim, Sumpf, 25.V.1991, Terlutter (cTer); 1♂, Münster, Davert/ Klosterholz, 4.V.1990, Terlutter (cTer); 1♂, Vreden, Ellewicker Feld, VII.1991, Terlutter (cTer).

Hessen: 1♂, Bad Hersfeld, Beiershausen, 5.IX.1977, Puthz (MNHUB).

Bayern: 1♂, Reichelsberg near Würzburg, 12.III.1938, Greiner (MNHUB).

Mecklenburg-Vorpommern: 1♂, Waren, Müritzhof, NSG "Ostufer der Müritz", Ziegeleigraben, Grasbulten, Anspülicht, 1.V.1979, Uhlig (MNHUB); 2♂♂, Waren, Müritz, Spukloch, 17.II.1977, Martin (MNHUB).

Berlin/Brandenburg: 1♂, surroundings of Gosen near Berlin, NSG Wernsdorfer See, aus Schilfhauften auf feuchter Wiese gesiebt, 11.II.1984, Schülke (MNHUB); 1♂, Döberitz, 11.IV.1922 (MNHUB); 1♂, Potsdam, Schlangenfenn, Bulten getreten, 18.V.1980, Uhlig (MNHUB); 1♂, Potsdam, 25.II.1951, Temptin (MNHUB); 3♂♂, Potsdam, N Babelsberg, 9.IV.1916 (MNHUB); 1♂, Potsdam, Wildpark Golm, Überschwemmungsgesiebe, II.1916 (DEI); 1♂, surroundings of Potsdam, Havelufer, 9.V.1978, Zerche (DEI); 1♂, Falkenhagen near Nauen, Tümpelufer, 1.IV.1985, Schülke (DEI); 1♂, Friedrichswerder near Berlin [without date], coll. Neresheimer (DEI); 1♂, Groß-Köris, 18.III.1984, Arnold (MNHUB); 1♂, Berlin, Gr. Machnow, 8.IV.1950 (MNHUB); 1♂, Brieselang near Berlin (DEI); 1♂, Berlin-Köpenick, Rahnsdorf, 11.VI.1950 (MNHUB); 4♂♂, 3♀♀, Hartmannsdorf near Lübben, car-net, 14.V.1984, Apel (DEI).

Sachsen-Anhalt: 1♂, Harz, Thale, Waldkater-Fenster, 26.VI.1953, Dorn (MNHUB); 1♂, Dessau [without date], IV.1909 (MNHUB); 2♂♂, Naumburg/Saale, Krumme Hufe, 10.II.1923, Maertens (MNHUB, cAss); 1♂, Naumburg/Saale [without date], Maertens (NHMW).

Sachsen: 1♂, Leipzig [without date], Linke (MNHUB); 1♂, Leipzig, Gundorf [without date], Linke (MNHUB); 1♂, Erzgebirge, Oelsnitz, 24.IV.1920, Uhmman (DEI); 1♂, Erzgebirge,

Stollberg, X.1915, Uhmann (DEI); 1♂, Sohl near Bad Elster [without date], Ermisch (cAss). SWITZERLAND: 1♂, Kanton Bern, Aerwangen, IV.1967 (NHMW); 1♂, Genève, Jussy, marais, 8.III.1991, Besuchet (MHNG); 2♂♂, Genève, Jussy, nid de Formica rufa, 8.III.1991, Besuchet (MHNG); 1♂, Genève, Les Bailleys, crue Allondon, 17.II.1990, Besuchet (MHNG); 1♂, Genève, Gimel, Sezeau, III.1879, Toumayeff (MHNG); 2♂♂, Kanton Vaud, Lac de Bret, II.1876, Toumayeff (MHNG, cAss); 1♂, Kanton Vaud, Eclépens, III.1876, Toumayeff (MHNG).

AUSTRIA: 1♂, Wien (NHMW).

CZECH REPUBLIC: Bohemia: 1♂, [without locality and date] (NHMW); 1♂, Brandýs n.L., 13.V.1890, Skalitzky (NHMW); 1♂, Krkonoše [Riesengebirge], Špindleruv Mlýn [Spindelmühle], 17.VIII.1893, Skalitzky (NHMW); 1♂, [without locality and date], Roubal (MHNG).

BOSNIA-HERZEGOVINA: 1♂, surroundings of Mostar, Bjelašnica, 13.VIII.1977 (cAss).

FRANCE: 8♂♂, Var, La Garde, IV./XII.1957 (MHNG, cAss).

Locality not identified: 1♂, Hoherlehme, 11.III.1945 (MNHUB).

Due to the lack of reliable diagnostic characters the ♀♀ examined (> 100 specimens) are not listed above.

### Diagnosis

Length (with abdomen fully extracted): 2.4-3.0 mm. Measurements: HL: 310-332; HW: 310-340; PW: 345-395; AL: 355-385.

Colour of body somewhat variable, light brown to black; pronotum, elytra, part of first abdominal tergites and tip of abdomen often somewhat lighter; legs yellow to blackish; antennae brown to dark brown, the first antennomeres often lighter.

Head about as wide as long (0.95-1.05x), 0.84-0.90x narrower than the pronotum; punctation and microsculpture variable, usually with fine punctures and shallow microsculpture; neck narrow, ca. 0.55-0.60x narrower than HW.

Pronotum usually with little shine, punctation and microsculpture variable; with shallow transverse impression near base.

Shape of elytra similar to *C. riparia*; usually with little shine, but punctation and microsculpture variable.

Abdominal surface less shiny and with denser punctation than in *C. riparia* and *C. rufescens*; microsculpture ± distinct; hind margin of sternite convex in both sexes.

♂: aedeagus as in Fig. 7; variability of apical structures as in Figs 11: c1-c9.

### Comments

While *C. aethiops* is easily separated from the preceding species by external characters such as size, the punctation of the abdomen, and the male genitalia, a safe identification of the species of the *aethiops*-complex (this and the three following species) is only possible on the basis of the ♂ sexual characters, particularly the shape of the apical structures and the size of the median lobe. While there is no character overlap with *C. cochlearis* sp. n. and *C. stiliformis* sp. n., the situation is more complex with *C. aethiops* and *C. ligula* sp. n. In the former, the shape of the apical structures (Figs 11: c1-c9) and the size of the median lobe may vary to some extent. Occasionally there are specimens with the shape of the apical structures somewhat approaching that in *C. ligula* (cf. Figs 11: c7, c8, d8); in addition there were occurrences of specimens with an aedeagus at the lower extreme (*C. aethiops*) and the upper extreme (*C. ligula*) of the



respective size range in the south of France (1♂, Fig. 11: c6) and Northern Italy (Toscany, 1♂, Fig. 11: d8). It is, however, improbable that this may be an expression of clinal variation, since in regions where the areas of distribution of both species overlap (Austria, Bosnia) no transitions were observed (cf. Figs 11: c4, d5). Whether or not the *aethiops*-complex may even contain more species than are recognized here, a possibility that cannot be completely ruled out, will have to be decided when further material (and characters) are available.

Unfortunately, it was not possible to examine the types of *C. occulta* HEER, which could not be located in Zürich, where the majority of the Heer collection is deposited, and which is unlikely to be in the British Museum (HAMMOND, pers. comm.), and of *Oxypoda angusticollis* HOCHHUTH, both names placed in the synonymy of *C. aethiops* (GRAV.) in BERNHAUER & SCHEERPELTZ (1926). HEER (1838) based his description of *C. occulta* on specimens collected in the surroundings of Geneva. All of the specimens from this region available in the MHNG proved to be *aethiops*, which confirms the synonymy of *C. occulta* with *C. aethiops* (GRAV.). Regarding *O. angusticollis* there are many passages in the original description indicating that the type is highly unlikely to be a *Calodera*, e. g. "... , obenauf ist er [der Kopf] gewölbt, doch bilden die inneren Augenränder schwache Leisten und der Raum zwischen ihnen erscheint deshalb flach eingesenkt. [...] Das Schildchen ist an der Spitze abgerundet, ... [...] ..., und an den 3 ersten [Hinterleibssegmenten] ist der Hinterrand eines jeden tief und breit quer eingedrückt, so dass der Oberleib drei Querfurchen zeigt, ..." (HOCHHUTH 1849).

In the course of the revision records of *C. aethiops* from England, Denmark, Germany, Southern France, Switzerland, Austria, Bohemia, Slovakia and Bosnia have been examined. *C. aethiops* inhabits various kinds of moist habitats. In Germany, it is apparently much more common than the following two species (and the other European *Calodera*). It has been observed to co-occur with *C. cochlearis* (2 localities), with *C. stiliformis* (1 locality) and with *C. ligula* (see above). Flight activity has been recorded especially in May, but also in June and July (ASSING, unpubl.).

### *Calodera cochlearis* sp. n.

Figs 8, 11a

**Holotype** ♂, D. Nds. Winsen/Luhe, Laßrönne, Feuchtlfläche, Gesiebe, 24.II.1995, Assing (cAss).

**Paratypes:** 4♂♂, same data as holotype (cAss); 7♂♂, locality as holotype, 11.III.1995 (cAss, DEI); 2♂♂, locality as holotype, 30.IV.1995, Wunderle (cWun); 1♂, Brandeis a.E. [= Brandýs n.L.], Skaliltzky (NHMW); 1♂, Brossnitz, V. Zoufal, Nord-Mähren (NHMW).

### Diagnosis

Length (with abdomen fully extracted): 2.6 - 3.0 mm. Measurements: HL: 315-340; HW: 330-355; PW: 370-410; HW/HL: 1.0-1.1; HW/PW: 0.85-0.90; AL: 395-415.

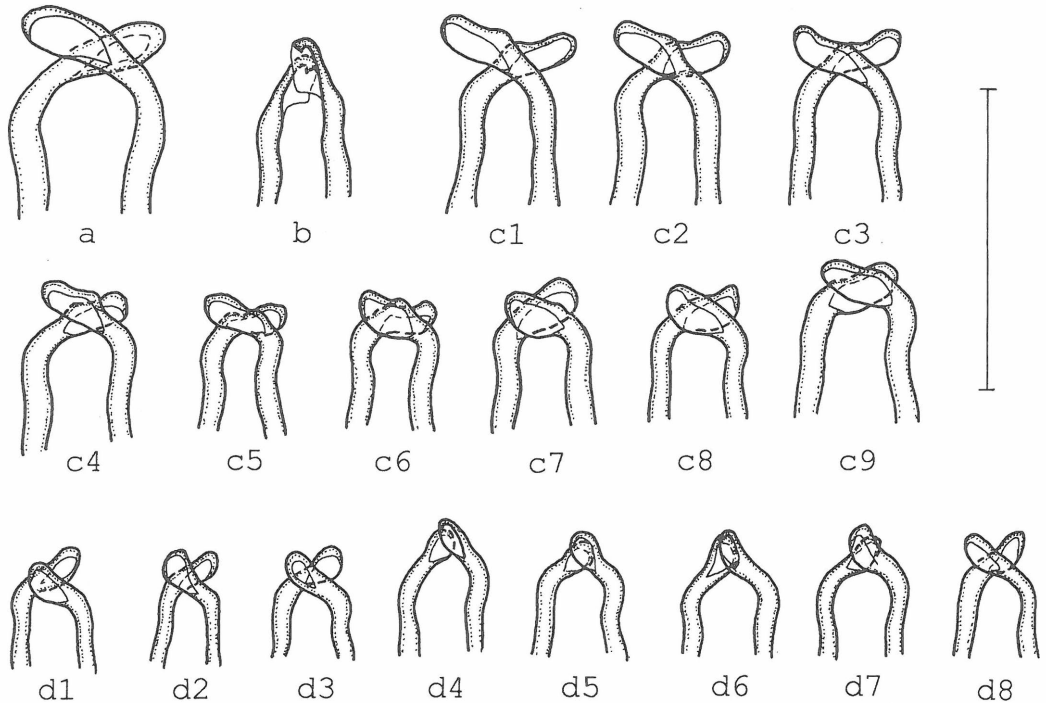
Apart from its, on average, slightly larger size, *C. cochlearis* is highly similar to *C. aethiops* in external morphology.

♂: median lobe larger than in *C. aethiops* (see measurements); apical structures with characteristic spoon-like dilatations (Figs 8, 11a).

Derivatio nominis: *cochlearis* (lat. (adj.): shaped like a spoon) refers to the shape of the apical structures.

### Comments

The localities where the types have been taken (Northern Germany, Czech Republic) indicate a wider distribution than is currently known.



**Fig. 11:** Variability of apical structures of the species of the *C. aethiops*-complex; a: *C. cochlearis* sp. n. (Brandýs, Czech Republic, PT); b: *C. stiliformis* sp. n. (PT); c1-c9: *C. aethiops* (GRAV.): c1: lectotype; c2: Brandýs (Czech Republic); c3: Wilhelmshaven (Germany); c4: Mostar (Bosnia); c5: Genève (Switzerland); c6, c7: Var (France); c8: Hannover (Germany); c9: Mönchengladbach (Germany); d1-d8: *C. ligula* sp. n. (PT): d1-d3: Aspromonte (Italy); d4: Emilia (Italy); d5: Bosnia; d6: Neusiedler See (Austria); d7: Romania; d8: Toscana (Italy). Scale: 0.2 mm.

### *Calodera stiliformis* sp. n.

Figs 9, 11b

**Holotype** ♂, NSG Zwillbrocker Venn, 23.III.1984, Molinia gesiebt, leg. H. Terlutter (cAss).

**Paratypes:** 2♂♂, 1♀, same data as holotype (cTer, DEI); 1♂, NSG Zwillbrocker Venn, 11.IV.1983, leg. H. Terlutter (cAss); 1♀, D. Umg. Osnabrück, Zwillbrocker Venn, 25.IV.1992, Assing (cAss).

### Diagnosis

Length (with abdomen fully extracted): 2.2-2.7 mm. Measurements: HL: 294-310; HW: 285-310; PW: 345-380; HW/HL: 0.95-1.05; HW/PW: 0.82-0.83; AL: 325-355.

Externally, *C. stiliformis* is distinguished from the other members of the *C. aethiops*-complex, which it closely resembles in other respects, by its relatively narrower head (see measurements). ♂: median lobe smaller than in *C. aethiops* and *C. cochlearis* (see measurements); apical structures of characteristic shape (Figs 9, 11b).

Derivatio nominis: *stiliformis* (lat. (adj.): shaped like a style) refers to the shape of the apical structures which somewhat resemble the back side of the Roman style, which was used to scrape off wax.

### Comments

At present *C. stiliformis* is only known from the type locality, which is located near Vreden (West Münster) in Nordrhein-Westfalen, Germany, very near the Dutch border.

### *Calodera ligula* sp. n.

Figs 10, 11: d1-d8

**Holotype** ♂, I. Aspromonte, Delianuova, castagneto, bivio Brandano, 1000m, 15.X.1993, leg. Angelini (cAss).

**Paratypes** (only ♀♀ from those regions were included in the type series, in which no other species of the *aethiops*-complex are known to occur):

ITALY: 1♂, 2♀♀, Lombardia, L. Sartirana Br., 27.III.1951, Bivio (NHMW, cAss); 1♀, Emilia (locality illegible), IV.1903, Fiori (MNHUB); 1♂, 1♀, Emilia (locality illegible), 15.III.1901 (MNHUB, cAss); 1♂, 1♀, I. Toscana (FI), Padule di Fucecchio, 1.III.1994, Bordoni (cWun, cAss); 8♂♂, 11♀♀, I. Aspromonte, Delianuova, castagneto, bivio Brandano, 1000m, 15.X.1993, leg. Angelini (cAss); 1♂, 4♀♀, Calabria, Catena Costiera, 1300m, L. Trifoglietti, leg. Angelini & Sabella (cAss); 1♂, Basilicata, Pollino, M. Caramola, Lago dell' Erba, ca. 1300m, V.1993, leg. F. Angelini (cWun); 1♂, 1♀, Aspromonte, Zomaro (RC), 1000m, Faggeta, 3.V.1993, leg. Angelini & Sabella (cWun); 3♀♀, Aspromonte, Antonimina, 800m, querceta base roccia, 3.V.1993, leg. Angelini & Sabella (cWun); 1♂, 3♀♀, 8 ex., Aspromonte, Piani Aspromonte (RC), 1000m, palude, 1.V.1993, leg. Angelini & Sabella (cWun, cAss).

AUSTRIA: 1♂, Stockerau b. Wien, 29.VI.1899, Skalitzky (NHMW); 1♂, Stockerau, Bernhauer (NHMW); 2♀♀, Austria, Donauauen, Breit (NHMW); 1♂, Donauauen bei Albern, A.i.O., Scheerpeltz (NHMW); 1♂, Wien (NHMW); 1♂, Spillern, Luze (NHMW); 1♂, Styr., Oberösterreich (NHMW); 2♂♂, Neusiedler See, Bernhauer (NHMW, cAss); 1♂, Neusiedler See, Illmitzer Wäldchen, 27.XI.1955, leg. Schuster (cAss); 1♂, Neusiedler See, Schuster (DEI).

HUNGARIA: 1♂, Hungaria, Neusiedler See, Paganetti, O. Leonhard (DEI).

BOSNIA-HERZEGOVINA: 1♂, Majevisa-pl., Bosnia b. or. (NHMW); 1♂, Bosnia, Koricna, 7.VI., O. Leonhard (DEI); 1♂, Maklen Pass, coll. Leonhard (cAss).

BULGARIA: 1♂, Samokov, 1911, M. Hilf, coll. O. Leonhard (DEI); 1♂, Bulgarien Ivanski b. Schumen, 15./30.VII.1969, Wallis (DEI).

ROMANIA: 1♂, 1♀, Roumanie, Comana Vlasca, Montandon, coll. Roubal (MHNG).

BESKIDY ZACHODNIE: 1♂, Beskiden, V. Zoufal (NHMW).

Further material not included in the type series:

AUSTRIA: 4♀♀, Niederösterreich, Donauauen near Albern [without date], Scheerpeltz

(NHMW); 2♀♀, Niederösterreich, Donauauen [without date], Breit (NHMW); 17♀♀, Burgenland, Neusiedler See, (Ganglbauer, Bernhauer, Schuster, Mandl, Jakob) (DEI, NHMW). BESKIDY ZACHODNIE: 2♀♀, [without date and locality] Zoufal (NHMW); BOSNIA: 1♀, Maklen Pass, coll. Leonhard (DEI). ITALY: 1♀, Sorent near Neapel, Zimmermann (NHMW).

**Diagnosis**

Length (with abdomen fully extracted): 2.2-2.8 mm. Measurements: HL: 285-320; HW: 285-330; PW: 325-385; HW/HL: 1.0-1.07; HW/PW: 0.84-0.91; AL: 300-330 (1♂ from Tuscany: 340).

In external morphology highly similar to the other species of the *aethiops*-complex; on average slightly smaller than *C. cochlearis* and *C. aethiops*.

♂: median lobe smaller than in *C. aethiops* and *C. cochlearis* (see measurements); apical structures of characteristic shape (Figs 10, 11: d1-d8).

Derivatio nominis: ligula (lat. (n.): small spoon) refers to the shape of the apical structures.

**Comments**

*C. ligula* appears to have a southeastern distribution. It has been recorded from Italy (numerous localities), Austria (numerous localities), Beskidy Zachodnie, Hungaria, Bosnia-Herzegovina, Romania and Bulgaria. For further comments see remarks below *C. aethiops*.

**Key to the European species of *Calodera* MANNERHEIM**

1. Pronotum ± mat due to either extremely dense punctation or very distinct microreticulation, often with shallow longitudinal impression; occiput very short and wide (>0.7 HW); ♂: median lobe with ventral process strongly bent in lateral view and with characteristic apical and subapical structures (Figs 1-2). The *C. nigrita* species group . . . . . 2
- Pronotum ± shiny, neither with extremely dense punctation nor with very distinct microreticulation, without longitudinal impression; occiput narrower (<0.7 HW); ♂: ventral process less strongly bent; internal structures different . . . . . 3
  
2. Large species, 4.1-5.4 mm; HL >440; HW >490; PW >570; pronotum with extremely dense and slightly granulose punctation; occiput narrower (ca. 0.8x HW); ♂: aedeagus (Fig. 1) very large (AL >580) . . . . . *C. nigrita* MANNERHEIM
- Smaller species, 2.8-4.0 mm; HL <440; HW <480; PW <550; pronotum with very distinct microreticulation and barely visible punctation; occiput wider (ca. 0.95x HW); ♂: aedeagus (Fig. 2) smaller (AL <550) . . . . . *C. protensa* MANNERHEIM
  
3. Pronotum weakly narrowed posteriorly; abdomen with ± evenly spaced and rather dense and distinct punctation; length >3.0 mm; ♂: aedeagus with characteristic apical and subapical structures (Fig. 3). Only in Northern Scandinavia, Siberia (?) . . . . .
- . . . . . *C. lapponica* J. SAHLBERG
- Pronotum more strongly narrowed posteriorly; either abdominal punctation less dense and posteriorly with decreasing density or body length <3.0 mm; ♂: aedeagus with internal structures of different construction. The *C. uliginosa* species group . . . . . 4

4. Larger species, 3.4-4.4 mm; HL >430; HW >445; PW >500; hind tarsi longer; ♂: median lobe larger (AL >590), with characteristic apical structures (Fig. 4) . . . . .  
 . . . . . *C. uliginosa* ERICHSON
- Smaller species, <3.8 mm; HL <430; HW <445; PW <500; hind tarsi shorter; ♂: median lobe smaller (AL <590); apical structures different . . . . . 5
5. Larger species, 2.8-3.8 mm; HL >360; HW >360; PW >420; abdomen ± shiny; ♂: median lobe larger (AL >440) . . . . . 6
- Smaller species, <3.0 mm; HL <340; HW <360; PW <410; abdomen ± mat due to ± distinct microsculpture and denser punctation; ♂: median lobe smaller (AL <440) . . . . . 7
6. 2.8-3.8 mm; abdomen, particularly tergites III and VI usually with sparser punctation and more shiny; ♂: apical structures of characteristic shape, in normal position not crossed, but ± parallel apically (Figs 5, 5a) . . . . . *C. riparia* ERICHSON
- 2.9-3.6 mm; abdomen with denser punctation and usually less shiny; ♂: apical structures spoon-like, in normal position distinctly crossed apically (Figs 6, 6a) . . . . .  
 . . . . . *C. rufescens* KRAATZ
7. Head relatively slender (HW: 285-310; HW/PW: 0.82-0.83); ♂: median lobe small (AL: 325-355); with characteristic apical structures (Figs 9, 11b) . . . . . *C. stiliformis* sp. n.
- Head relatively broader (HW/PW >0.83); ♂: apical structures different . . . . . 8
8. ♂: median lobe larger (AL: 395-415); apical structures with large spoon-like dilatations (Figs 8, 11a) . . . . . *C. cochlearis* sp. n.
- ♂: median lobe smaller (AL <390); apical structures different . . . . . 9
9. ♂: median lobe larger (AL: 350-385); apical structures as in Figs 7, 11: c1-c9 . . . . .  
 . . . . . *C. aethiops* (GRAVENHORST)
- ♂: median lobe smaller (AL: 300-330, rarely 340); apical structures as in Figs 10, 11: d1-d8 . . . . . *C. ligula* sp. n.

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**Author's address:**

VOLKER ASSING  
Gabelsbergerstraße 2  
D-30163 Hannover, Deutschland

**Besprechungen**

HARRIS, A. C.: **Sphecidae (Insecta: Hymenoptera)**.- Lincoln, Canterbury, New Zealand: Manaaki Whenua Press, 1994. - 111 S.: 129 Fig. - (Fauna of New Zealand; 32). - \$ 33.50

Der Autor gibt in dieser Arbeit die aus Neuseeland bekannten 18 Grabwespen-Arten wieder. Es handelt sich hier nicht nur um eine faunistische Abhandlung, sondern auch um eine Revision dieser Gruppe für Neuseeland. Drei Spezies werden in diesem Zusammenhang neu beschrieben, zwei synonymisiert. Eingeschleppte Arten, die zwar in Neuseeland nachgewiesen wurden, sich aber nicht eingebürgert haben (fünf *Sceliphron*-Arten), wurden nicht berücksichtigt. Fast 10.000 Exemplare dienten dieser Arbeit als Grundlage. Ein besonderer Schwerpunkt liegt in der Behandlung der Entwicklung und des Nistverhaltens der Arten. Die Arbeit ist reich illustriert, wobei die Abbildungen sich nicht nur auf die Illustration der Bestimmungsschlüssel für die Imagines beschränken, sondern auch die Präimaginalmorphologie sowie Nestformen und Eiablageverhalten berücksichtigen. Ein Wirtsverzeichnis und ein taxonomischer Index runden die Arbeit ab.

A. TAEGER

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