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## On the Western Palaearctic species of *Carcinocephalus* (Coleoptera: Staphylinidae: Omaliinae)

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**Abstract:** The following synonymies are proposed: *Carcinocephalus* BERNHAUER 1903 = *Scribaia* LUZE 1906, nov.syn. (previously a subgenus of *Carcinocephalus*); *Carcinocephalus merkli* (EPPELSHEIM 1883) = *C. mehadiensis* (BERNHAUER 1902), nov.syn., = *C. bosnicus* SCHEERPELTZ 1934, nov.syn. Lectotypes are designated for *Omalius merkli* and *Carcinocephalus bosnicus*. *Carcinocephalus merkli* is a wing-dimorphic species, at the same time representing a remarkable case of ophthalmo-dimorphism. External characters and the male genitalia are illustrated. The distributions of the two Western Palaearctic representatives of the genus are illustrated. The habitat of *C. merkli* is evidently endogean.

**Key words:** Coleoptera, Staphylinidae, Omaliinae, *Carcinocephalus*, Western Palaearctic region, taxonomy, new synonymies, lectotype designation, pterodimorphism, ophthalmo-dimorphism, distribution, ecology.

### Introduction

*Carcinocephalus* was established by BERNHAUER (1903) as a replacement name for the preoccupied name *Astacops*, which was described by BERNHAUER (1902) to include two species from Romania and the Balkan region, *C. merkli* (EPPELSHEIM 1883) and *C. mehadiensis* (BERNHAUER 1902). Since then, three additional species have been described: *C. blandus* (LUZE 1906) from Italy, *C. bosnicus* SCHEERPELTZ 1934 from Bosnia-Herzegovina, and *C. satoi* HAYASHI 2007 from Japan (HAYASHI 2007; HERMAN 2001; SMETANA 2004). SCHEERPELTZ (1934) provided a key to the four Western Palaearctic species known at that time. NEWTON et al. (2000) tentatively place three Nearctic species in this genus. The Western Palaearctic species are currently attributed to two subgenera, the nominate subgenus with three species (*C. merkli*, *C. mehadiensis*, *C. bosnicus*) and *Scribaia* LUZE 1906 with only one species (*C. blandus*). Species from other zoogeographic regions are without subgeneric assignment (HAYASHI 2007; HERMAN 2001; SMETANA 2004).

An examination of *Carcinocephalus* material recently collected with endogean pitfall traps in Greece by Pier Mauro Giachino (Torino) and Dante Vailati (Brescia) and futile attempts at identifying the specimens based on the available keys and descriptions raised the suspicion that the names based on type material from southeastern Europe may in fact refer to one and the same species. The main distinguishing characters indicated in the

literature are the size of the eyes and the length of the elytra, so that it appeared possible that they referred to intra- rather than interspecific variation of a poly- or dimorphic species. A subsequent study of types and additional material confirmed this hypothesis.

## Material and methods

The material referred to in this study is deposited in the following public and private collections:

MCSNB ..... Museo Civico di Scienze Naturali di Brescia (D. Vailati)  
 MRSN ..... Museo Regionale di Scienze Naturali, Torino (P.M. Giachino)  
 NHMW ..... Naturhistorisches Museum Wien (H. Schillhammer)  
 cAss..... author's private collection  
 cFel ..... private collection Benedikt Feldmann, Münster  
 cZan ..... private collection Adriano Zanetti, Verona

The morphological studies were conducted using a Stemi SV 11 microscope (Zeiss Germany) and a Jenalab compound microscope (Carl Zeiss Jena). For the photographs a digital camera (Nikon Coolpix 995) was used.

The map was generated using the online generic mapping tool (GMT) of the Geomar website at [www.aquarius.ifm-geomar.de/omc](http://www.aquarius.ifm-geomar.de/omc).

## Results

### *Carcinocephalus* BERNHAUER 1903

*Astacops* BERNHAUER 1902: 61; preoccupied.

*Carcinocephalus* BERNHAUER 1903: 592; replacement name.

*Scribaia* LUZE 1906: 546; **nov.syn.**

**C o m m e n t :** According to SCHEERPELTZ (1934) and ZANETTI (1987), the subgenus *Scribaia* LUZE 1906 (type species: *Omalium blandum* LUZE 1906) is distinguished from *Carcinocephalus* (type species: *Omalium merkli* EPPELSHEIM 1883) primarily by longer and more slender legs and antennae. These differences may be interpreted as adaptations to different habitats and are most certainly evidence of interspecific differentiation. However, in view of the criteria and standards commonly applied in the systematics of Staphylinidae, they are insufficient to justify a distinction at the subgeneric level. Moreover, from a practical viewpoint, a conservation of *Scribaia* would seem unnecessary, since both subgenera would be monotypical (see below and remark in introduction). Therefore, *Scribaia* is formally placed in synonymy with *Carcinocephalus*.

### *Carcinocephalus merkli* (EPPELSHEIM 1883) (Figs 1-11, Map 1)

*Homalium merkli* EPPELSHEIM 1883: 305 ff.

*Astacops mehadiensis* BERNHAUER 1902: 62; **nov.syn.**

*Carcinocephalus bosnicus* SCHEERPELTZ 1934: 86 ff.; **nov.syn.**

*Carcinocephalus mandli* SCHEERPELTZ i. l.

Type material examined: *C. merkli*: Lectotype ♂ [brachypterous], present designation: "33 / Merkli mihi, Kodscha Balkan. Merkl. / Merkli Epp., Wien. ent. Zeit. II.1883. p. 305 / c. Epplsh. Steind. d. / Typus / Lectotypus ♂ *Omalium merkli* Eppelsheim, desig. V. Assing 2008 / *Carcinocephalus merkli* (Eppelsheim), det. V. Assing 2008" (NHMW). Paralectotype ♀ [brachypterous]: "Merkli mihi, Kodscha Balkan. Merkl. / c. Epplsh. Steind. d. / Typus / Paralectotypus ♂ *Omalium merkli* Eppelsheim, desig. V. Assing 2008 / *Carcinocephalus merkli* (Eppelsheim), det. V. Assing 2008" (NHMW).

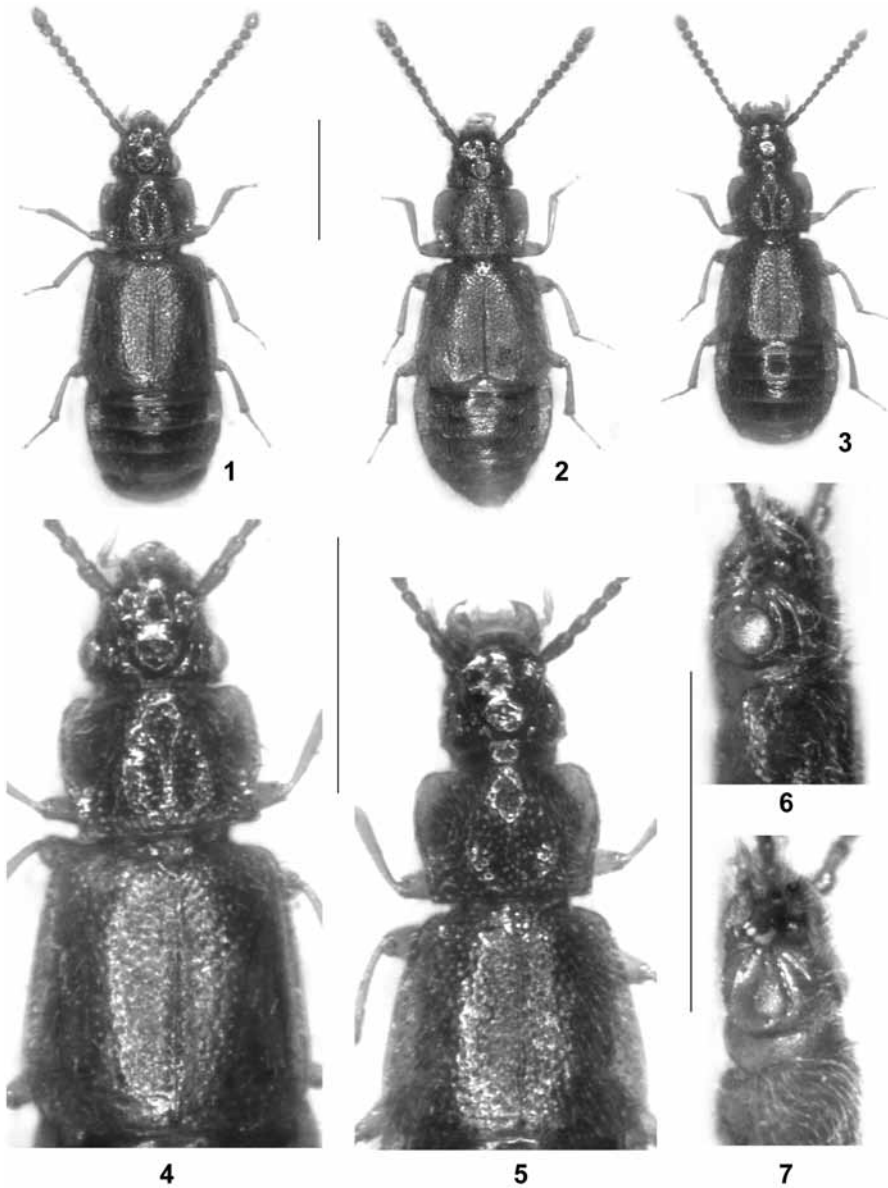
*C. bosnicus*: Lectotype ♂ [macropterous], present designation: "♂ / Ilidže [=Ilidža, W Sarajevo], V. Zoufal / Typus *Carcinocephalus bosnicus* O. Scheerpeltz / ex coll. Scheerpeltz / probably = *Carcinocephalus merkli* (Epp.), det. M. K. Thayer 1989 / Lectotypus ♂ *Carcinocephalus bosnicus* Scheerpeltz, desig. V. Assing 2008 / *Carcinocephalus merkli* (Eppelsheim), det. V. Assing 2008" (NHMW). Paralectotype ♀ [macropterous]: same data as lectotype (NHMW).

Additional material examined: Romania: 1♂ [brachypterous], Băile Herculane, leg. Breit (NHMW); 1♀ [brachypterous], lake Motrul, leg. Winkler (NHMW); 1♀ [brachypterous; det. Zanetti], Munții Codru Moma, Borz-valea, Haigașului, 600-700 m, 26.V.1986, leg. Moravec (cZan). Serbia: 1♂ [brachypterous; det. Zanetti], Mt. Radan, Sokolovica, 1200 m, 17.V.1989, leg. Popović (cZan); Macedonia: 1♂ 2♀ ♀ [brachypterous], Perister, Sveta Petka, leg. Rambousek (cZan, NHMW). Bulgaria: 1♂ [macropterous], Botev ["Jumrukschal"], 1200-1600 m, V-VI.1941, leg. Mandl ["Typus *Carcinocephalus mandli* O. Scheerpeltz"] (NHMW); 1♀ [macropterous], Rhodope mts., Vasil Kolarov ["Pamporovo"], 28.VI.1966, leg. Ermisch ["Typus *Carcinocephalus mandli* O. Scheerpeltz"] (NHMW); 1 ex. [brachypterous], Vitoshka [locality illegible], 26.VIII.1909, leg. Rambousek (NHMW); 1♀ [brachypterous], Kalofer env., leg. Breit (NHMW); 1♀ [brachypterous], Sofia, Germanski monastir ["Germ. mon."], VIII.1908, leg. Rambousek (NHMW). Macedonia: 2♀ ♀ [brachypterous], Perister, Sveta Petka, leg. Rambousek (NHMW). Greece: 4♂ ♂, 3♀ ♀ [brachypterous], Grevená, Smixi, Vasilitsa, 1630 m, endogean pitfall trap, VI.2006-VI.2007, leg. Giachino & Vailati (cAss); 1♀ [macropterous], Ioánina, Pindos National Park, road to Vália Kálda, 1550 m, endogean pitfall trap, VI.2005-VI.2007, leg. Giachino & Vailati (cAss); 1♂ [brachypterous; det. Zanetti], Ioánina, Oros Lákmos, road Anilio-Haliki, endogean pitfall trap, VI.1991-VI.1992, leg. Giachino & Vailati (cZan); 1♀ [brachypterous; det. Zanetti], Imathía, Oros Vémio, road Séli-Náoussa, 1100 m, endogean pitfall trap, VI.1992-VI.1993, leg. Giachino & Vailati (MRSN); 1♀ [brachypterous; det. Zanetti], Tríkala, road Kalambáka-Kastanéa-Kranéa, near Amáranto, *Fagus* forest near pass, 1300 m, 20.VI.1993, leg. Giachino & Vailati (MRSN); 1♂, 1♀ [brachypterous; det. Zanetti], Tríkala, road Píli-Stourmaráika-Mesohóra, *Fagus* forest near pass, S-slope, 1220 m, endogean pitfall trap, VI.1992-VI.1993, leg. Giachino & Vailati (MCSNB, cZan); 1♀ [brachypterous], Evritanía, ca. 15 km SW Karpénision, Oros Helidó, 1530 m, endogean pitfall trap, VI.2005-VI.2006, leg. Giachino & Vailati (cAss); 2♂ ♂, 2♀ ♀ [macropterous; det. Zanetti], Fokída, Oros Gíona, N-slope above Kaloskopí, VI.1992-VI.1993, endogean pitfall trap, leg. Giachino & Vailati (cZan); 1♀ [brachypterous; det. Zanetti], Lárissa, Oros Ossa, 1000 m, 17.VII.1976, leg. Casale (cZan); 3♀ ♀ [brachypterous; det. Zanetti], Lárissa, Oros Ossa, 1220 m, 7.VI.1993, leg. Giachino & Vailati (MCSNB); 1♀ [brachypterous], Taygetos, Maganiari, Vavaras Bk., 36°58'N, 22°23'E, 1030 m, 15.V.2007, leg. Starke (cFel).

**C o m m e n t** : The original description of *Omalium merkli* is based on "zwei Exemplaren im Kodscha-Balkan in Gesellschaft von Anophthalmen aufgefunden" (EPPELSHEIM 1883). Both of them, a male and a female, were located in the collections of the NHMW. The male is designated as the lectotype.

*Astacops mehadiensis* was described from a single holotype specimen from "Mehadia in Südungarn" (today in southwestern Romania) (BERNHAEUER 1902). The holotype was not examined, but the description perfectly matches a male specimen seen from Băile Herculane, which is only some 5 km from the type locality.

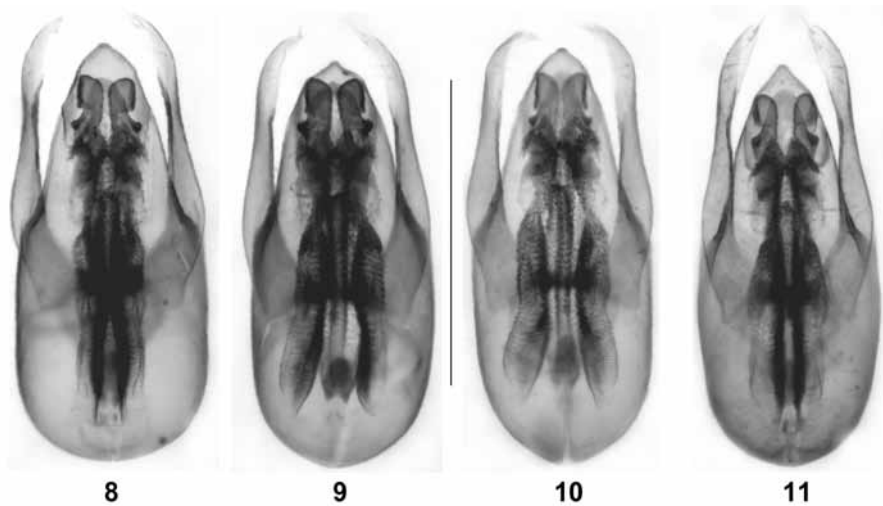
The original description of *Carcinocephalus bosnicus* is based on "ein Pärchen (1♂, 1♀ Typen)" from "Ilidže, Bosnien" (SCHEERPELTZ 1934). Both specimens were examined; the male is designated as the lectotype.



**Figs 1-7:** *Carcinoccephalus merkli* (EPPELSHEIM) (1, 4, 6: macropterous lectotype of *C. bosnicus* SCHEERPELTZ; 2: brachypterous male from Băile Herculane; 3, 5, 7: brachypterous male from northern Greece): (1-3) habitus; (4-5) forebody; (6-7) head in lateral view. Scale bars: 1.0 mm.

A comparative study of the types and additional material revealed that the distinguishing characters emphasised by SCHEERPELTZ (1934) (shape of pronotum, size of eyes, length of elytra, coloration) are all subject to pronounced, but not unusual intraspecific variation

(Figs 1-7). The primary and secondary male sexual characters are identical (Figs 8-11), so that both *Carcinocephalus mehadiensis* and *C. bosnicus* are placed in synonymy with *C. merkli*. The suspicion that all three names referred to the same species was only recently expressed by ZANETTI et al. (2008). The species is wing-dimorphic (Figs 1-5), which is not uncommon in the Omaliinae (ZANETTI 2006). What is remarkable, however, is that the macropterous morph has much larger and more convex eyes (Figs 4, 6) than the brachypterous morph (Figs 5, 7). A certain correlation of eye size and wing development has been observed for some omaliine species, e. g., *Omalius caesum* GRAVENHORST 1806, *O. littorale* KRAATZ 1857, and *Arpedium quadrum* (GRAVENHORST 1806) (ZANETTI 1987, 2008), but I am not aware of other omaliine examples of a pronounced ophthalmo-dimorphism like the one in *Carcinocephalus merkli*. Similarly extreme cases of eye dimorphisms or polymorphisms, however, have been shown for species of Staphylinidae from other subfamilies, e. g., for *Platyola* MULSANT & REY 1875 of the Aleocharinae, for *Vulda* JACQUELIN DU VAL 1853 of the Staphylininae, and for *Micrillus* RAFFRAY 1873 of the Paederinae (ASSING 2007, 2008, 2009). The eye- and wing-dimorphism in *C. merkli* is evidently not sex-related. The macropterous morph appears to be rarer than the brachypterous morph.



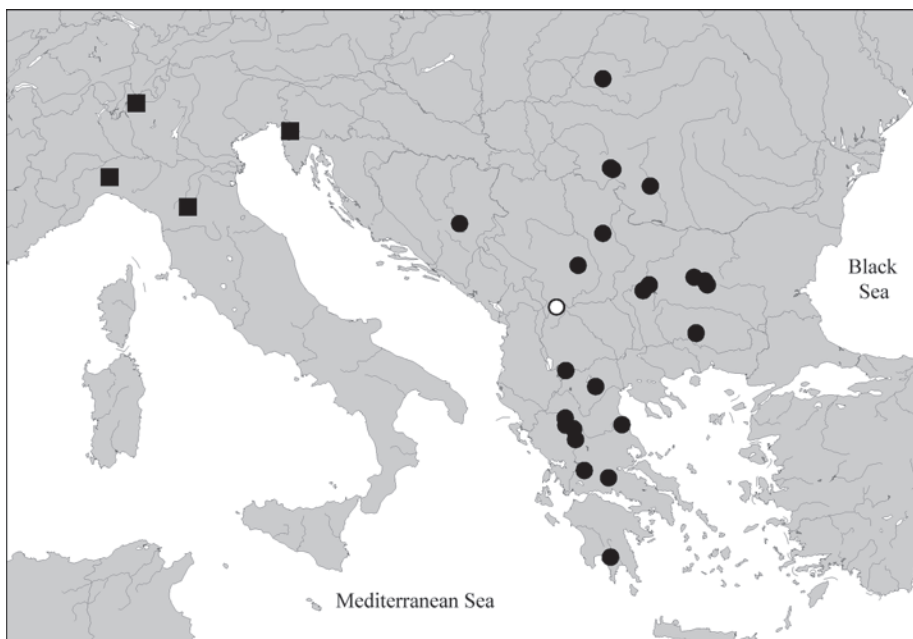
**Figs 8-11:** *Carcinocephalus merkli* (EPPELSHEIM): aedeagus of lectotype of *C. merkli* (8), of lectotype of *C. bosnicus* (9), of male from Băile Herculane (10), and of male from northern Greece (11). Scale bars: 0.5 mm.

**Distribution and bionomics:** *Carcinocephalus merkli* is rather widespread in the Balkan region and in southern Romania (Map 1); the macropterous morph is evidently capable of long-distance dispersal by flight. The species, including its synonyms, is listed by SMETANA (2004) for Bulgaria, Romania, and Bosnia-Herzegovina. SCHEERPELTZ (1934), however, reported the species also from Macedonia. ZANETTI et al. (2008) report it from two localities in Serbia (including Kosovo), and from Greece (without specifying localities). The geographically closest congener – and only other Western Palaearctic representative of the genus – is *C. blandus* (LUZE), of which only few records from northern Italy are known (ZANETTI 1987).

As can be inferred from the rarity of records, from the adaptive reductions of pigmentation, wings, and eye size of the brachypterous morph, as well as from the fact that a considerable number of the examined specimens were collected with subterranean pitfall traps, *C. merkli* evidently has an endogean habitat. RAMBOUSEK (1916) states that he collected the species from leaf litter in moist localities. Adult beetles have been found at altitudes of 600-1630 m during the period from May through August.

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**Map 1:** Distributions of *Carcinocephalus merkli* (EPPELSHEIM), based on revised (filled circles) and literature records (open circle), and of *C. blandus* (LUZE) (squares), based on ZANETTI (1987).

### Zusammenfassung

Drei Namen werden synonymisiert: *Carcinocephalus* BERNHAUER 1903 = *Scribaia* LUZE 1906 (previously a subgenus of *Carcinocephalus*), nov.syn.; *Carcinocephalus merkli* (EPPELSHEIM 1883) = *C. mehadiensis* (BERNHAEUER 1902), nov.syn., = *C. bosnicus* SCHEERPELTZ 1934, nov.syn. Für *Omalius merkli* und *Carcinocephalus bosnicus* werden Lectotypen designiert. *Carcinocephalus merkli* ist sowohl ptero- als auch ophthalmodimorph. Äußere Merkmale und die männlichen Genitalien werden abgebildet. Die Verbreitungsgebiete der beiden westpaläarktischen Vertreter der Gattung werden anhand von Karten illustriert. Offensichtlich ist das Habitat von *C. merkli* endogäisch.

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