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On three species of *Periscyphis* Gerstaecker, 1873 from Kenya, Sudan and Oman (Crustacea: Isopoda: Oniscidea)

Stefano Taiti, Franco Ferrara & Andreas Allspach

Abstract. *Periscyphis brunneus* Budde-Lund, 1912 from Kenya is redescribed on the basis of the type-material and new material examined, and the lectotype is designated. Two new species, *P. sudanensis* from Sudan and *P. albomarginatus* from Oman, are described. All species presently included in *Periscyphis* are listed with their distributions.

Key words. Crustacea, Isopoda, Oniscidea, Eubelidae, *Periscyphis*, new species, Kenya, Sudan, Oman.

The genus *Periscyphis* Gerstaecker, 1873 belongs to the family Eubelidae which represents the most important fraction of the Oniscidean fauna of tropical Africa and the Arabian Peninsula. The genus is characterized by the pereonite 1 with the posterior corners entire (i.e. without a schisma) and no ventral lobes or teeth, antennal flagellum of two articles, inner branch of the maxillule with two penicils, exopods of pleopods 1 and 2 with monospiracular covered lungs. All species of *Periscyphis* populate arid or semiarid areas.

After Omer-Cooper's (1926) comprehensive revision, many new species have been ascribed to *Periscyphis* (Arcangeli 1929; 1934; 1940; Barnard 1940; 1941; Ferrara 1972; 1973; 1974; Schmölzer 1974; Ferrara & Taiti 1982; 1986; 1988; 1996; Taiti & Ferrara 1989; 1991; Erhard & Schmalzfuss in press) so that to date the genus has included with certainty 36 species distributed in northeastern Africa, Israel and the Arabian Peninsula.

In this contribution one poorly-known species, *Periscyphis brunneus* Budde-Lund, 1912 from Kenya, is redescribed and two new species from Sudan and Oman are described, bringing the number of species in the genus to 38 (Table 1).

Abbreviations: MZUF — Museo Zoologico "La Specola" dell'Università, Firenze; NRM — Naturhistoriska Riksmuseet, Stockholm; ONHM — Oman Natural History Museum, Muscat; SMF — Senckenberg-Museum, Frankfurt/Main.

Periscyphis brunneus Budde-Lund, 1912, Figs 1, 2

Periscyphis brunnea Budde-Lund, 1912 (in Lönnberg & Budde-Lund, 1912): 7, Fig. 5.

Periscyphis brunneus; Omer-Cooper, 1926: 398; Paulian de Félice, 1945: 342; Ferrara & Taiti, 1979: 135.

Lectotype (here designated): ♀, Kenya, Njoro, N of Guaso Nyiri river about 1°N lat., under the sheaths of palm leaf-stalks, leg. E. Lönnberg, 17. II. 1911, NRM 2648.

Paralectotype: 1 ♀, same data as lectotype.

Material examined: 4 ♂♂, 2 ♀♀, Kenya, Kora National Reserve, 00°02'S—38°37'E, leg. R. C. Davis, 2. II. 1984, MZUF 1579.

Redescription: Maximum dimensions: ♂, 6 x 2.5 mm; ♀, 6.5 x 2.8 mm. Brown with the usual pale muscle spots; uropods pale (red in vivo?). Dorsum smooth with inconspicuous

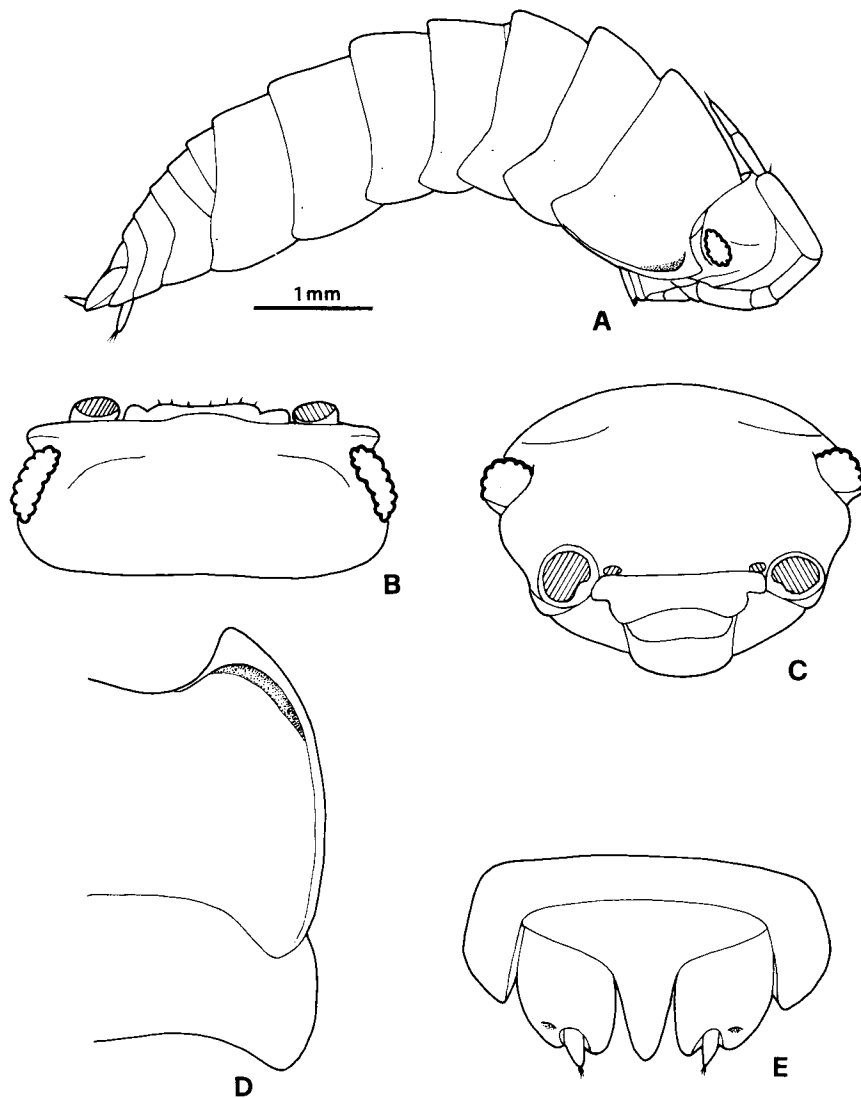


Fig. 1: *Periscyphis brunneus* Budde-Lund, 1912, ♂ from Kora National Reserve: A, adult specimen, lateral view; B, cephalon, dorsal view; C, cephalon, frontal view; D, right side of pereonites 1 and 2, dorsal view; E, pleonite 5, telson and uropods.

pointed scale-spines. Eye with about 25 ommatidia. Cephalon with broadly rounded lateral lobes; no frontal margin; interocular line visible only at sides; profrons slightly bulbous in the middle. Pereonite 1 with lateral margin slightly thickened; a shallow sulcus arcuatus only in the anterior third; posterior corners rounded, distinctly protruding backwards. Pereonites 2–7 with posterior corners progressively less protruding backwards. Telson with distal part narrow, triangular with narrowly rounded apex. Antenna short, reaching rear margin of pereonite 2 when pushed back; flagellar articles subequal in length. Uropodal protopod with convex outer margin and posterior margin indented, a small glandular area near postero-lateral corner; small exopod distinctly protruding backwards.

Male: Pereopods 1–3 carpus with a brush of pointed spines. Pereopod 7 without special modifications; ischium with straight sternal margin. Pleopod 1 exopod with quadrangular medial part. distal margin with a row of strong spines; endopod with a thickset distal part

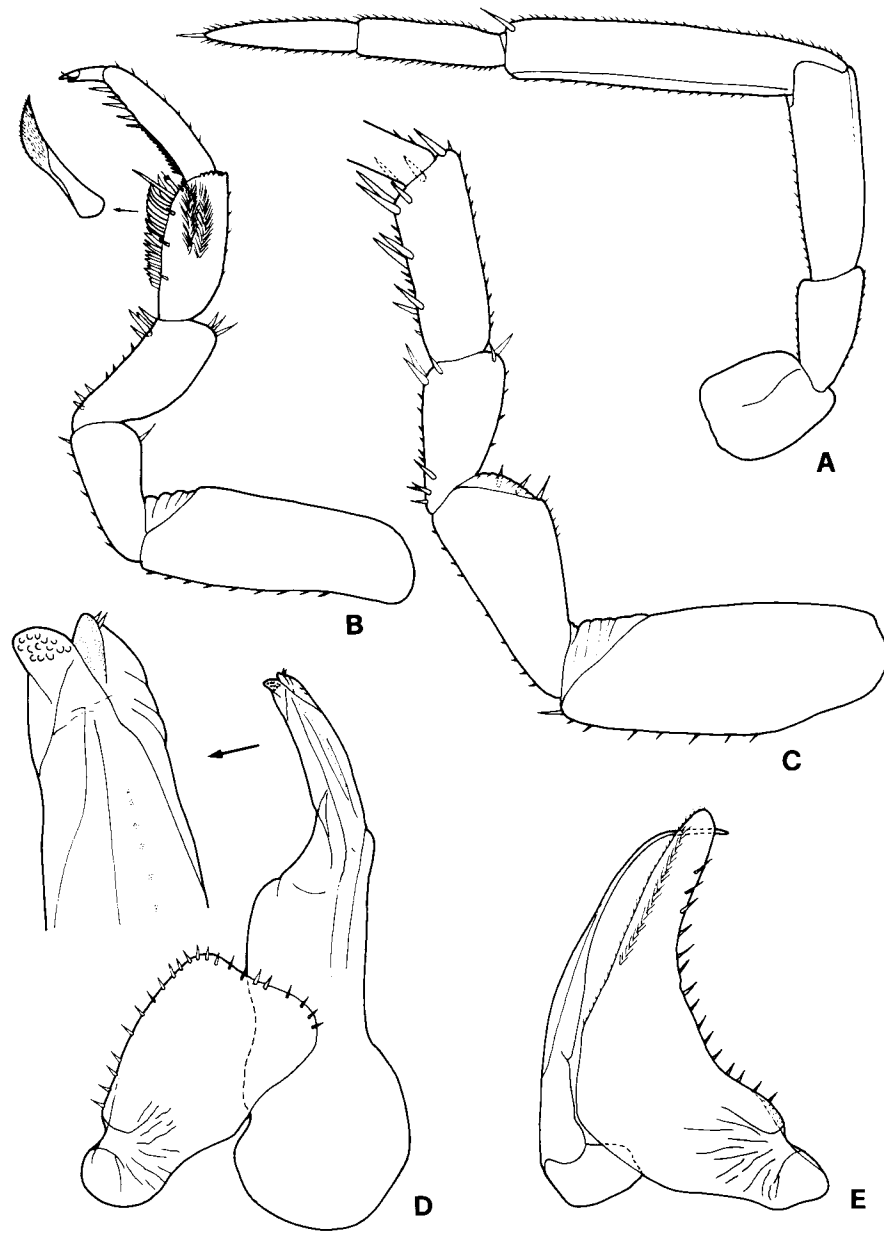


Fig. 2: *Periscyphis brunneus* Budde-Lund, 1912, ♂ from Kora National Reserve: A, antenna; B, pereopod 1; C, pereopod 7; D, pleopod 1; E, pleopod 2.

and bilobed apex, outer lobe with some small rounded scales, inner lobe triangular with two spines. Pleopod 2 as in Fig. 2E.

Remarks: Since no illustrations, except for the apex of the maxilliped, were provided by Budde-Lund (1912) in the description of *Periscyphis brunneus*, this species is redescribed here and its diagnostic characters are illustrated. It is characterized by the cephalon with no frontal line and distinct interocular line on the vertex, the pereonite 1 with the lateral margin slightly thickened and the sulcus arcuatus present only in the anterior third, and by the male pleopod 1 endopod with a bilobed apex. The colour pattern (brown with pale uropods) is also a useful distinguishing character.

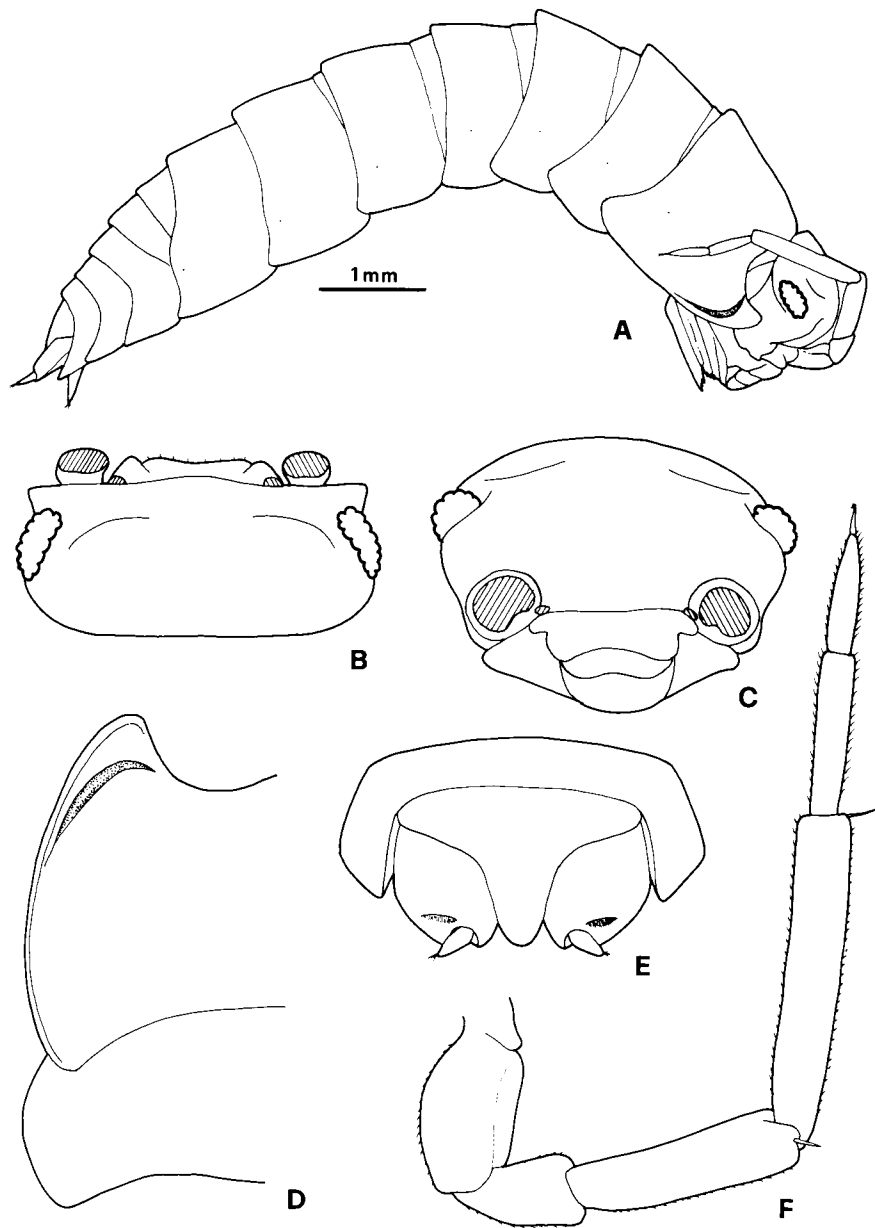


Fig. 3: *Periscyphis sudanensis* n. sp., ♀ from Erkowit: A, adult specimen, lateral view. ♂ from Erkowit: B, cephalon, dorsal view; C, cephalon, frontal view; D, left side of pereonites 1 and 2, dorsal view; E, pleonite 5, telson and uropods; F, antenna.

***Periscyphis sudanensis* n. sp., Figs 3, 4**

Periscyphis trivialis; Vandel 1964: 735, Fig. III.

Holotype: ♂, Sudan, village Erkowit at Mount Erkowit, ca. 50 km SW of Suakin, 1200 m, leg. A. Allspach, 2. III. 1987, SMF 22681.

Paratypes: 2 ♂♂, 1 ♀, 2 juvs, same data as holotype, SMF 22682; 1 ♂, 1 ♀, same data, MZUF 4778.

Additional material examined: 3 ♂♂, 4 ♀♀, Sudan, Sanganeb Island, N of Port Sudan, at lighthouse, leg. V. Neumann, 31. III. 1991, SMF 22683; 1 ♂, 1 ♀, same data, MZUF 4779.

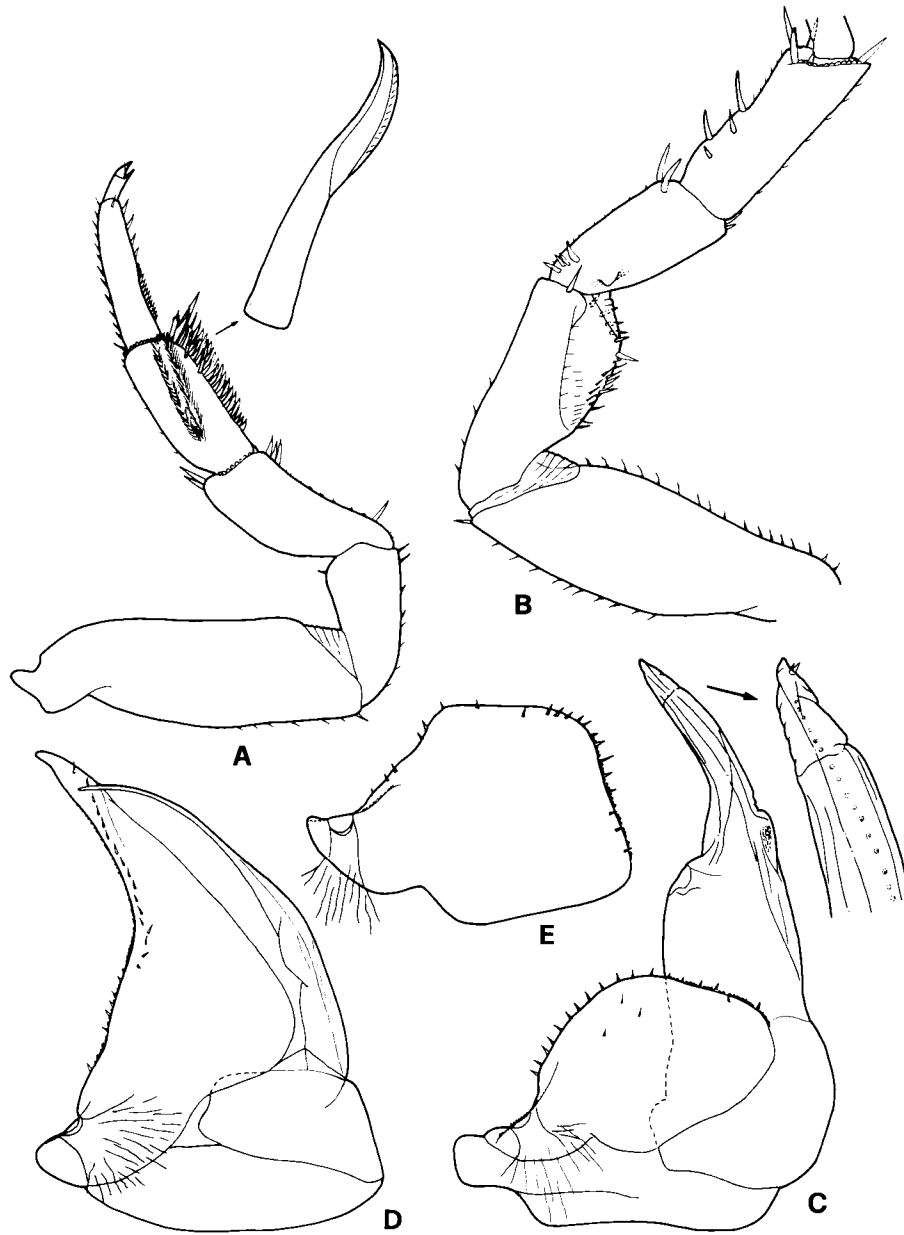


Fig. 4: *Periscyphis sudanensis* n. sp., ♂ from Erkowit: A, pereopod 1; B, pereopod 7; C, pleopod 1; D, pleopod 2. ♂ from Sanganeb Is.: E, pleopod 1 exopod.

Description: Maximum dimensions: ♂, 8 x 3.2 mm; ♀, 9 x 3.5 mm. Light brown with posterior margin of pereonites, pleon and telson darker; epimera of pereonites and pleonites and uropods pale. Dorsum smooth with inconspicuous pointed scale-spines. Eye with about 21 ommatidia. Cephalon similar to the preceding species, i. e. with broadly rounded lateral lobes, no frontal margin, interocular line visible only at sides and profrons slightly bulbous in the middle. Pereonite 1 with lateral margin slightly thickened; a shallow sulcus arcuatus only in the anterior third; posterior corners rounded, protruding backwards. Pereonites 2—7 with posterior corners slightly protruding backwards. Telson with distal part triangular and rounded apex, reaching tips of uropodal protopods. Antenna reaching middle of pereonite 2

when pushed back; first flagellar article almost $3/2$ as long as second. Uropodal protopod large, with convex outer margin, a large indentation on posterior margin and a wide transverse glandular area near postero-lateral corner; small exopod distinctly protruding backwards.

Male: Pereopods 1—3 carpus with a brush of recurved and pointed spines. Pereopods 2—4 ischium and merus with some small verrucae on sternal margin. Pereopod 7 ischium with a large depression on distal rostral surface, sternal margin almost straight; merus proximally with a small rounded tubercle near tergal margin and a group of four spines near sternal margin. Pleopod 1 exopod subtriangular, with broadly rounded posterior margin equipped with short spines; endopod with distal part pointed and bent outward. In specimens from Sanganeb Island the pleopod 1 exopod is subtrapezoidal (cf. Fig. 4E). Pleopod 2 as in Fig. 4D.

Etymology: The name refers to Sudan where the specimens were collected.

Remarks: In the structure of the cephalon (without frontal margin) and pereonite 1 (with the sulcus arcuatus present only in the anterior third of the segment) *Periscyphis sudanensis* is similar to *P. cavernicolus*, *P. abyssinicus*, *P. jannonei*, *P. verhoeffi*, *P. somaliensis* and *P. brunneus*. It is readily distinguished from all these species by the male pereopod 7 merus with a distinct tubercle on the rostral surface and a basal group of spines near the sternal margin, and by the different shape of the telson. Moreover, it differs from *P. abyssinicus* and *P. jannonei* in the absence of a rectangular protrusion on the sternal margin of the male pereopod 7 ischium; from *P. verhoeffi* in the absence of a large lamellar lobe on the tergal margin of the male pereopod 7 merus; from *P. brunneus*, *P. cavernicolus* and *P. somaliensis* in the different shape of the apex of the male pleopod 1 endopod.

In the presence of a meral tubercle on the male pereopod 7, *P. sudanensis* corresponds to *P. vittatus* and *P. insularis*. It is easily distinguished from the former by the presence of the sulcus arcuatus (absent in *P. vittatus*) on pereonite 1 and the telson reaching the posterior margin of the uropodal protopod (it is distinctly shorter in *P. vittatus*) and from the latter essentially by the structure of the telson and uropods (compare Fig. 3E and Fig. 14 in Ferrara & Taiti 1989).

In the specimens from Sanganeb Is. the male pleopod 1 exopod is morphologically different from that of the specimens from Erkowit (compare Fig. 4C and Fig. 4E), while all the other characters correspond. With the material at our disposal we are not able to say whether this difference is within the intraspecific variability or, instead, it is indicative of distinct taxa. For the time being, we prefer to include the specimens from Sanganeb Is. in the new species without considering them as paratypes. Vandel (1964: 735) recorded *P. trivialis* from Suakin, Sudan. However, from his illustration of the male pleopod 1 exopod, it is clear that the specimens examined by Vandel do not belong to *P. trivialis* but to *P. sudanensis*, having affinity particularly with the specimens from Sanganeb Is. (compare Fig. III in Vandel 1964 and Fig. 4E).

Periscyphis albomarginatus n. sp., Figs 5, 6

Holotype: ♂, Oman, Masirah Island, near S tip, 20°12'N—58°40'E, 1100 m, under shrub on mountain side, leg. M. D. Gallagher, 5. VI. 1991, ONHM.

Paratype: ♂, same data as holotype, MZUF 4780.

Description: Maximum dimensions: 14 x 8 mm. Grey-brown with posterior part of cephalon, epimera of pereon and pleon, tip of telson and uropods pale; pereonites with a large pale spot in the middle and two pale paramedian spots in correspondence to the muscle insertions. Dorsum smooth with inconspicuous pointed scale-spines. Eye with 23—24 ommatidia. Cephalon with broadly rounded lateral lobes; frontal margin interrupted in the middle; interocular line reaching middle of the eyes; profrons bulbous in the middle. Pereonite 1 with a conspicuous lateral thickening and a deep narrow sulcus arcuatus in the anterior half; posterior margin slightly concave at sides; posterior corners broadly rounded. Telson with distal part triangular and rounded apex, slightly surpassing tips of uropods. Antenna long with first flagellar article almost twice as long as first. Uropodal protopod subquadrangular with posterior margin indented and small glandular area near exopod insertion; exopods minute. Pereopods 1—3 with a brush of recurved pointed spines on carpus and, progressively

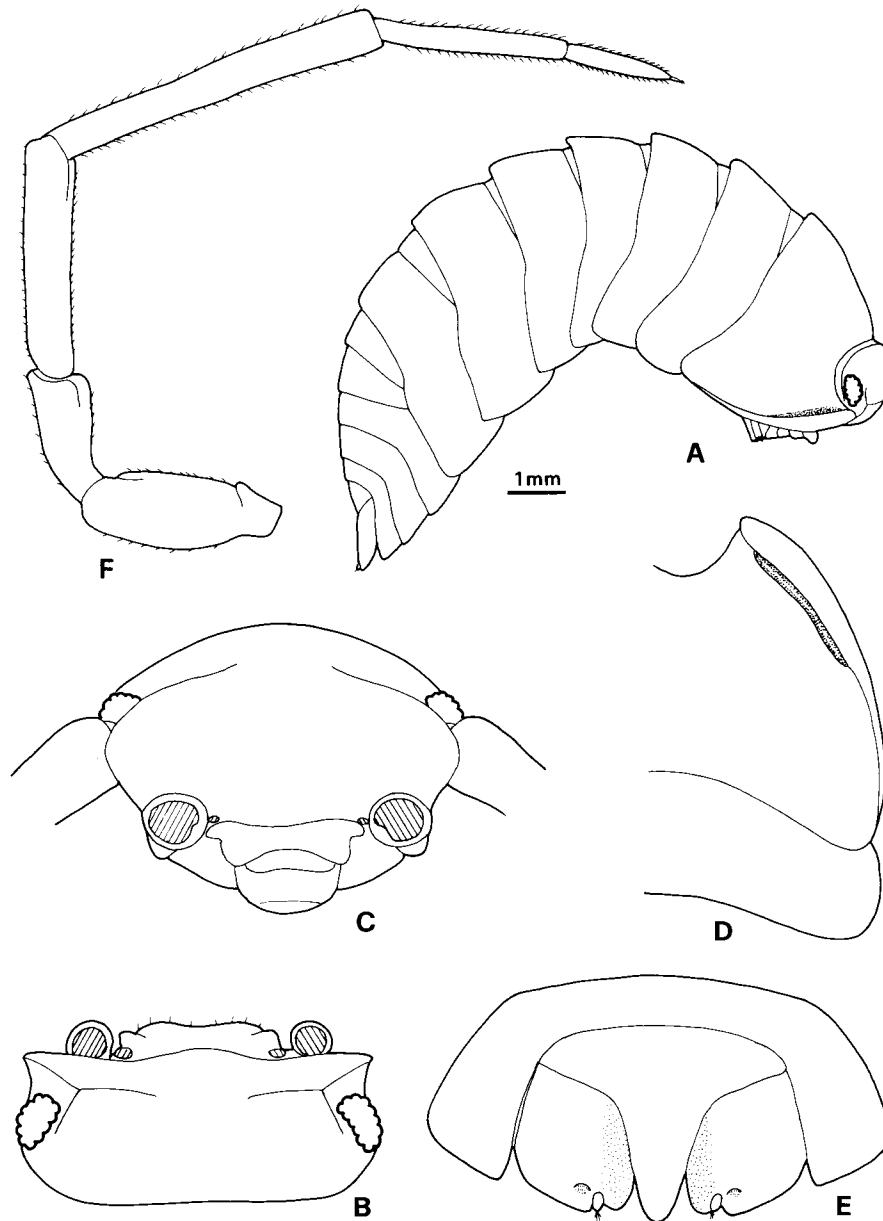


Fig. 5: *Periscyphis albomarginatus* n. sp., ♂: A, adult specimen, lateral view; B, cephalon, dorsal view; C, cephalon, frontal view; D, right side of pereonites 1 and 2, dorsal view; E, pleonite 5, telson and uropods; F, antenna.

more reduced, on merus. Pereopods 1—4 ischium and merus with some small verrucae on sternal margin. Pereopod 7 ischium with concave sternal margin and distally with a large depression on rostral surface; carpus flattened, recurved and slightly enlarged, with a distal lobe on caudal surface equipped with three strong spines. Pleopod 1 exopod with rounded distal margin; endopod with pointed apex slightly bent outwards. Pleopod 2 as in Fig. 6D.

Etymology: L. *albus* = white + *marginatus* = having a margin. The name refers to the characteristic colour pattern (in alcohol) with a large pale stripe all around the body.

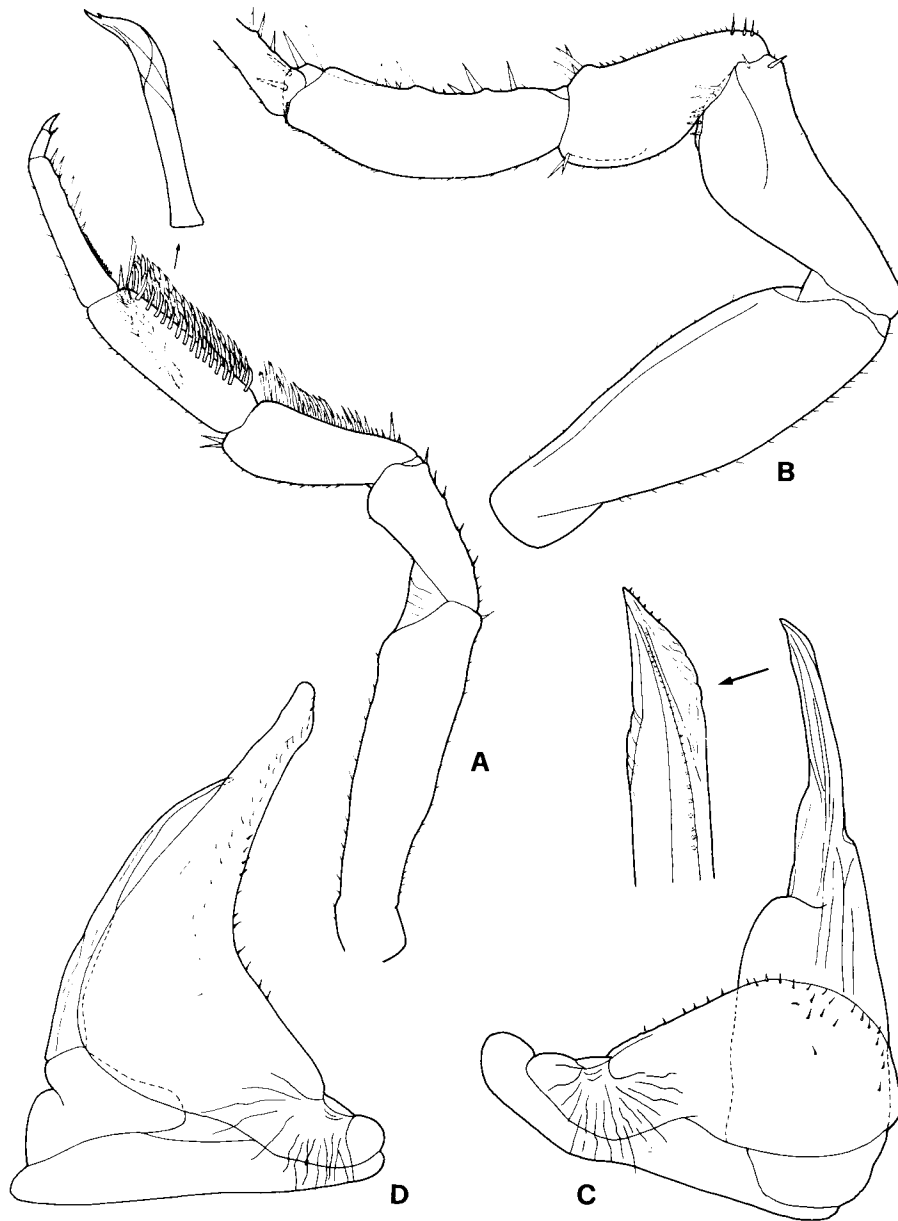


Fig. 6: *Periscyphis albomarginatus* n. sp., ♂: A, pereopod 1; B, pereopod 7; C, pleopod 1; D, pleopod 2.

Remarks: The new species belongs to the *granai*-group, characterized by the cephalon with large rounded lateral lobes which continue in a frontal margin, entire or interrupted in the middle, large quadrangular uropodal protopod, and male pereopod 7 with sexual modifications on the ischium and carpus. This group includes *P. granai*, *P. latissimus*, *P. arabicus*, *P. barnardi*, *P. omanensis*, *P. buettikeri*, *P. insularis* and *P. minor*. In the frontal margin interrupted in the middle, *P. albomarginatus* corresponds to *P. buettikeri* and *P. insularis* (all the other species in the group have a continuous frontal margin) and it is readily distinguished from both by the telson with rounded, instead of acute, apex surpassing the posterior margin

of the uropodal protopod. It also differs from *P. buettikeri* in the sulcus arcuatus anteriorly not bent inwards, the regularly convex lateral margin of pereonite 1 (it has a distinct depression in *P. buettikeri*) and the carpus of the male pereopod 7 with the tergal margin much less convex; and from *P. insularis* in the lack of a tubercle on the merus of the male pereopod 7.

Table 1: *Periscyphis* species* and their distributions.

1) <i>Periscyphis abyssinicus</i> Ferrara, 1972	Ethiopia
2) <i>Periscyphis albescens</i> (Budde-Lund, 1885)	Egypt and Sudan
3) <i>Periscyphis albomarginatus</i> n. sp.	Oman
4) <i>Periscyphis albus</i> Erhard & Schmalfuss, in press	Israel and Egypt
5) <i>Periscyphis arabicus</i> Barnard, 1941	Saudi Arabia and Yemen
6) <i>Periscyphis barnardi</i> Ferrara & Taiti, 1986	Yemen
7) <i>Periscyphis besi</i> Barnard, 1941	Yemen
8) <i>Periscyphis brunneus</i> Budde-Lund, 1912	Kenya
9) <i>Periscyphis buettikeri</i> Ferrara & Taiti, 1986	Saudi Arabia
10) <i>Periscyphis cavernicolus</i> Omer-Cooper, 1926	Ethiopia
11) <i>Periscyphis civilis</i> Budde-Lund, 1908	Somalia and Kenya
12) <i>Periscyphis convexus</i> (Budde-Lund, 1885)	Egypt, Sudan, Djibouti and Tanzania (?)
13) <i>Periscyphis felix</i> Taiti & Ferrara, 1989	Saudi Arabia
14) <i>Periscyphis granai</i> Arcangeli, 1929	Eritrea
15) <i>Periscyphis insularis</i> Ferrara & Taiti, 1988	Oman
16) <i>Periscyphis jannonei</i> Arcangeli, 1940	Sudan and Ethiopia
17) <i>Periscyphis lanzai</i> Ferrara, 1973	Somalia
18) <i>Periscyphis latissimus</i> Omer-Cooper, 1926	Eritrea
19) <i>Periscyphis laticarpus</i> Taiti & Ferrara, 1989	Saudi Arabia and Kuwait
20) <i>Periscyphis libycus</i> Arcangeli, 1934	Libya
21) <i>Periscyphis limbatus</i> Omer-Cooper, 1926	Kenya
22) <i>Periscyphis merolobatus</i> Ferrara & Taiti, 1982	Eritrea
23) <i>Periscyphis minor</i> Ferrara & Taiti, 1996	Yemen
24) <i>Periscyphis nigricans</i> Omer-Cooper, 1926	Ethiopia
25) <i>Periscyphis omanensis</i> Taiti & Ferrara, 1991	Oman
26) <i>Periscyphis pulcher</i> Budde-Lund, 1898	Tanzania
27) <i>Periscyphis rubroantennatus</i> Ferrara, 1974	Somalia
28) <i>Periscyphis ruficauda</i> Budde-Lund, 1908	Somalia and Kenya
29) <i>Periscyphis somaliensis</i> Ferrara, 1973	Somalia
30) <i>Periscyphis strouhali</i> Arcangeli, 1929	Eritrea
31) <i>Periscyphis subtransversus</i> Omer-Cooper, 1926	Egypt (?)
32) <i>Periscyphis sudanensis</i> n. sp.	Sudan
33) <i>Periscyphis trivialis</i> Gerstaecker, 1873	Ethiopia, Somalia, Kenya and Tanzania
34) <i>Periscyphis tschadensis</i> Schmölzer, 1974	Chad
35) <i>Periscyphis undulatus</i> Omer-Cooper, 1926	Ethiopia
36) <i>Periscyphis vandeli</i> Ferrara, 1973	Somalia
37) <i>Periscyphis verhoeffi</i> Arcangeli, 1929	Ethiopia and Kenya
38) <i>Periscyphis vittatus</i> Omer-Cooper, 1926	Saudi Arabia, United Arab Emirates, Oman, Yemen, Eritrea, Djibouti, Somalia and Mozambique

* Four species described in *Periscyphis* (*P. kalongensis* Arcangeli, 1950 from Zaire, *P. montanus* Schmölzer, 1974, *P. pallidus* Schmölzer, 1974 from Kenya, and *P. niger* Schmölzer, 1974 from Tanzania) certainly do not belong to this genus.

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Zusammenfassung

Periscyphis brunneus Budde-Lund, 1912 von Kenia wird auf der Basis des Typenmaterials und neuer Exemplare aus Kenia wiederbeschrieben und der Lectotypus bestimmt. Zwei neue Arten, *P. sudanensis* aus Sudan und *P. albomarginatus* aus Oman, werden beschrieben. Die bis heute bekannten Arten der Gattung *Periscyphis* werden mit ihrer Verbreitung tabellarisch zusammengestellt.

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Stefano Taiti and Franco Ferrara, Centro di Studio per la Faunistica ed Ecologia Tropicali del Consiglio Nazionale delle Ricerche, Via Romana 17, 50125 Firenze, Italy. — Andreas Allspach, Wetzlarer Straße 50, 35398 Gießen, Germany.