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CYMBASOMA JANETAE N. SP., A NEW MONSTRILLOID (COPEPODA, MONSTRILLOIDA) FROM THE GULF OF AQABA (RED SEA, EGYPT)

BY

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ABSTRACT

Cymbasoma janetae n. sp. is described from three adult females collected from the Gulf of Aqaba (Red Sea, Egypt). The new species is closely similar to *C. longispinosum* (Bourne, 1890), *C. morii* Sekiguchi, 1982, *C. chelemense* Suárez-Morales & Escamilla, 1997, and *C. californiense* Suárez-Morales & Palomares-García, 1999. The new species can be distinguished by the body proportions, the absence of the seta on the first segment of the P1-P4 exopods, the structure of the fifth legs, the relative length of the ovigerous spines, and the presence of eight shallow cuticular wrinkles on the lateral margin and dorsal surface of the genital double somite.

RÉSUMÉ

Cymbasoma janetae n. sp. est décrite à partir de trois femelles adultes collectés dans le golfe d'Aqaba (mer Rouge, Egypte). La nouvelle espèce est très proche de *C. longispinosum* (Bourne, 1890), de *C. morii* Sekiguchi, 1982, de *C. chelemense* Suárez-Morales & Escamilla, 1997, et de *C. californiense* Suárez-Morales & Palomares-García, 1999. Elle se distingue par les proportions du corps, l'absence de la soie sur le premier segment des exopodites de P1-P4, la structure des cinquièmes pattes, la longueur relative des épines ovigères et la présence de huit replis superficiels sur le bord latéral et la surface dorsale du double somite génital.

INTRODUCTION

Monstrilloids do not differ “completely from all other Copepoda” in terms of life history, because the life history of the Thaumatosyllidae is quite similar. Also, they are not “semi-parasitic”, which implies temporary attachment, like a mosquito; the larvae are fully parasitic (Huys et al., 2007). Monstrilloids have non-feeding, reproductive, and free-swimming adults that lack appendages between

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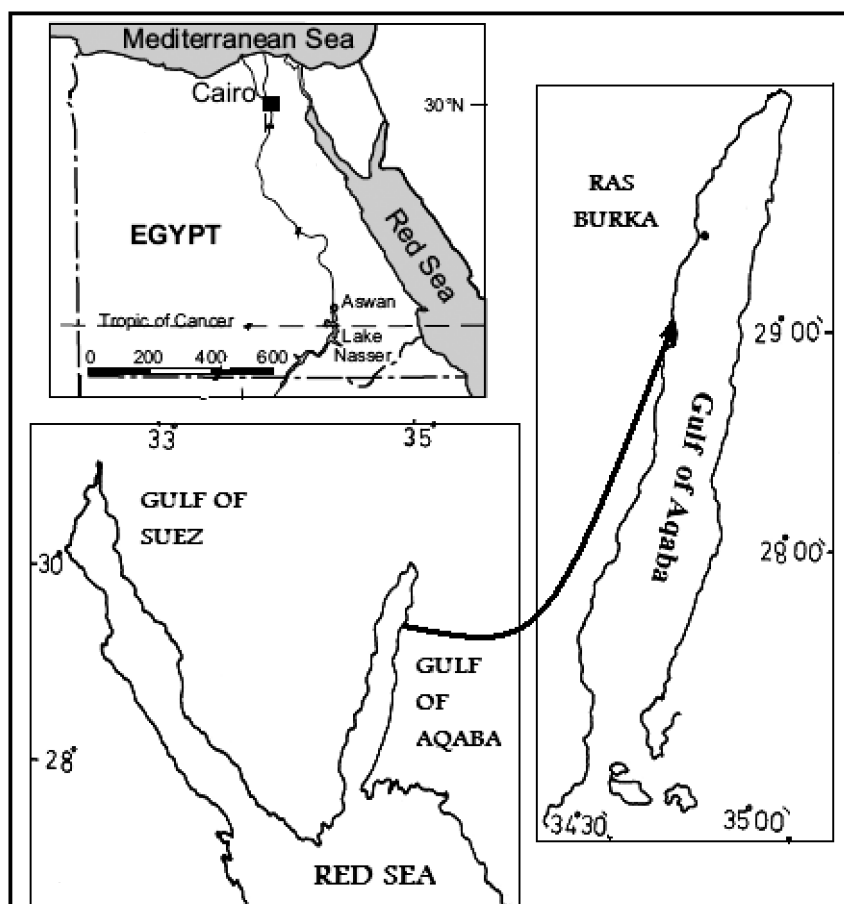


Fig. 1. Study area showing the site at which specimens of the new species were collected.

the antennules and swimming legs (Grygier & Ohtsuka, 2008). The adult, non-feeding stage is indeed free-living (Hartman, 1961; McAlice & Jaeger, 1982; Huys & Boxshall, 1991; Grygier & Ohtsuka, 2008).

The Monstrolloida are in urgent need of revision (Huys & Boxshall, 1991). Currently, the order comprises a single family containing the genera *Cymbasoma*, *Maemonstrilla*, *Monstrilla*, *Monstrillopsis*, and a few others of doubtful validity: *Haemocera* and *Thaumatohessia*. In general, representatives of the species contained in this order are quite rare, with many species being known from only one or a few specimens (Suárez-Morales et al., 2006).

The genus *Cymbasoma* has been known to be represented in the area of study (cf. Grygier, 1995). Gurney (1927) recorded *Cymbasoma longispinosum* (Bourne, 1890) from the Suez Canal (Red Sea) and described a new species, *C. gracile* Gurney, 1927, from the same region. *C. longispinosum* has been recorded also

from the Indian Ocean, the Pacific Ocean, the Atlantic Ocean, the Mediterranean Sea, and the Arabian Gulf (Isaac, 1975; Thompson & Easterson, 1983). Suárez-Morales & Palomares-García (1999) concluded that the wide distribution reported for this species could be the result of overlooking closely related species. Al-Kholy (1963) recorded *C. reticulatum* (Giesbrecht, 1893), *C. bullatum* var. *ghardaqaanum* Al-Kholy, 1963 and *C. gracile* from the Red Sea.

During a study in the Gulf of Aqaba, an undescribed species of monstrilloid copepod belonging to the genus *Cymbasoma* was recorded, and it is described herein.

MATERIAL AND METHODS

In zooplankton samples collected in the Gulf of Aqaba (Red Sea) at Ras Burka (fig. 1), three specimens of a previously undescribed species of the monstrilloid genus *Cymbasoma* were found.

Samples were collected with horizontal surface hauls with a standard plankton net of 0.300 mm mesh size. They were collected during 1998 in the course of the Red Sea Project for Studying Zooplankton of the Gulf of Aqaba. The samples were fixed in 4% neutral formalin.

Drawings for figures were prepared with the aid of a camera lucida while the photos for the plates were taken with a digital camera. One of the three specimens was dissected and mounted on slides in gum-chloral according to Pantin (1964).

TAXONOMY

***Cymbasoma janetae* n. sp. (figs. 2-4, pls. 1-2)**

Material examined. — Holotype: one adult female, undissected, preserved in 5% formalin, deposited in the Natural History Museum, London, under number 2003-643.

Paratypes: one adult female, undissected, mounted on a slide in gum-chloral according to Pantin (1964), deposited in the Natural History Museum, London, under number 2003-643. One dissected adult female mounted on four slides is retained in the author's collection.

Type locality. — Gulf of Aqaba (Red Sea, Egypt) at Ras Burka (34°43'N 29°10'E); bottom depth: 10-12 m; sample collected at 3 m depth.

Etymology. — The species is named after Dr. Janet Bradford-Grieve, who introduced me to marine copepod taxonomy. The specific name thus is a noun in the genitive singular.

Description. — Female: length of holotype (measured in dorsal view from anterior end of cephalothorax to posterior margin of anal somite) 1.78 mm (fig. 2A). Cephalothorax (including first pedigerous somite) slightly dilated in middle, approximately 1.26 mm long, representing 71% of total body length. Cephalothorax

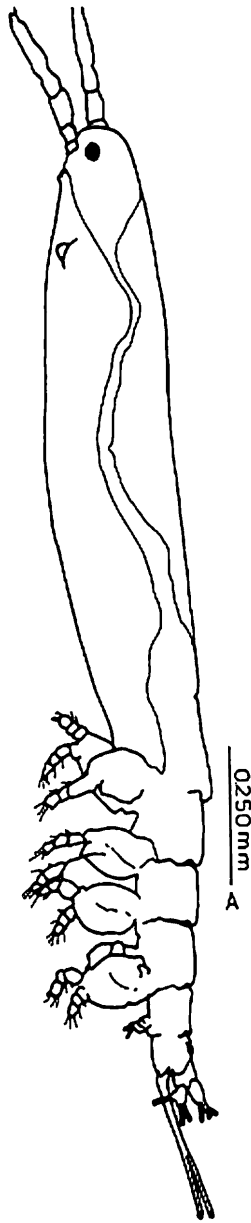
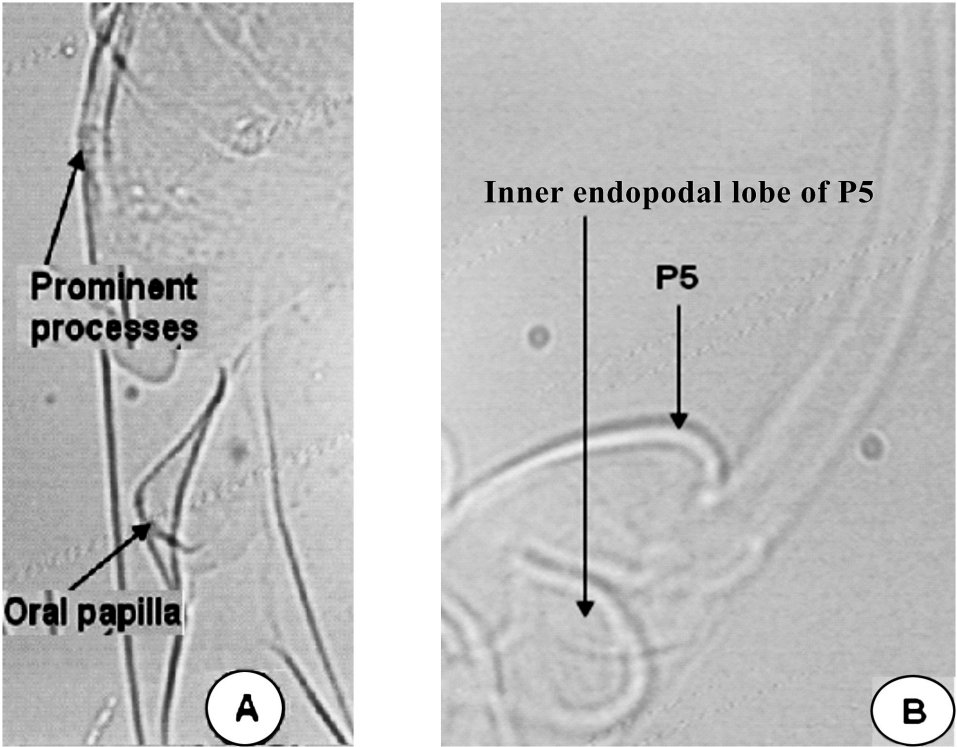


Fig. 2. *Cymbasoma janetae* n. sp., paratype female. Whole mount, lateral view.

without any obvious cuticular surface ornamentation. Oral papilla located at 17% along ventral surface of cephalothorax from anterior end. Prominent processes between oral papilla and bases of antennules at a distance of $94\ \mu\text{m}$ from those bases and $125\ \mu\text{m}$ from the oral papilla (pl. 1A). Eye present, well-developed. Front of



Pl. 1. *Cymbasoma janetae* n. sp., paratype female. A, oral papilla and prominent processes (120×); B, P5 (60×).

head smooth.

Incorporated first pedigerous somite and three succeeding pedigerous somites each bearing a pair of well-developed biramous swimming legs, with 3-segmented exopods and 3-segmented endopods (fig. 3). Legs 1-4 decreasing in size posteriorly. Armature of swimming legs as follows (spines in Roman and setae in Arabic numerals):

	Basis	Endopodite	Exopodite
Leg 1	0-1	0-1; 0-1; 0-1, 2, 2	I-0; 0-1; I-2, 2
Legs 2-4	0-1	0-1; 0-1; 0-1, 2, 2	I-0; 0-1; I-2, 3

Fifth legs each with inner, finger-like endopodal lobe, parallel to exopodal lobe. Exopodal lobe twice as long as wide (40 and 20 μ m, respectively); with three setae, innermost about half the length of the other two (pl. 1B).

Antennule length 0.24 mm, about 13.5% of total body length and 1.9 times as long as cephalothorax; 4-segmented. The pattern of armature of the antennules shown by the new species can be adequately described with the setal nomenclature proposed by Grygier & Ohtsuka (1995) for female monstrolloid antennules, as it is sufficiently similar. Element 1 is present on the first segment; elements

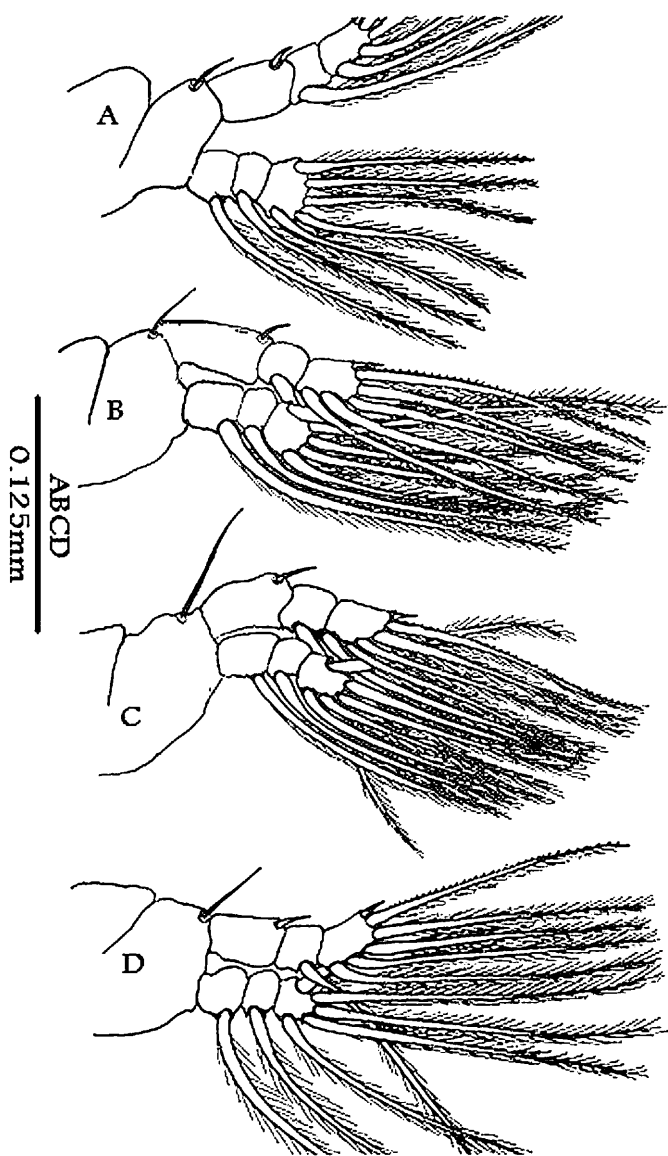


Fig. 3. *Cymbasoma janetae* n. sp., dissected paratype female. A, right leg 1, posteriorly; B, right leg 2, posteriorly; C, right leg 3, posteriorly; D, right leg 4, posteriorly.

2d₁, 2d₂, 2v₁, 2v₂, 2v₃, and IId on the second segment; the third segment has elements 3, IIIId, and IIIv; segment no. 4 has normally developed elements 4v₁, 4d_{1,2}, and 4v₂₋₃, as well as setae IVd, IVv, Vd, Vv, and Vm, and also element 5. The subterminal elements b₁₋₆ are present. The aesthetasc 4aes is well developed on the ventral surface, and terminal elements 6aes and 6₂ are present. Element 6₁ was not observed (may be broken), as shown in fig. 4.

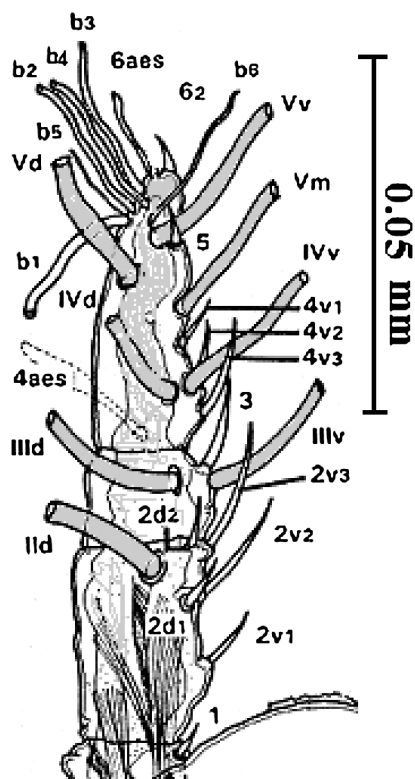
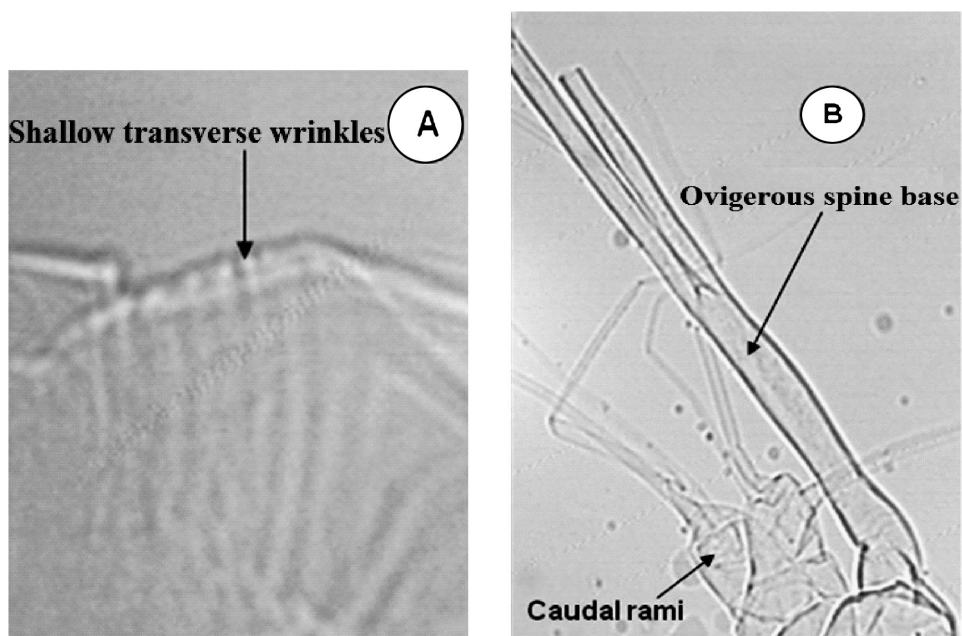


Fig. 4. *Cymbasoma janetae* n. sp., dissected paratype female. Left antennule, dorsal aspect (designation of armature elements follows Grygier & Ohtsuka, 1995).

Urosome consisting of fifth pedigerous somite, genital double somite, the free anal somite, and the caudal rami, together accounting for 0.296 mm and representing 16.6% of total body length. Length ratio of fifth pedigerous somite, genital double somite, and free anal somite $43 : 32 : 25 = 100$. Genital double somite slightly shorter than one-third of total length of urosome (32.4%). Eight shallow, transverse cuticular wrinkles present on lateral margin and dorsal surface of genital double somite (pl. 2A). Ventral portion of genital double somite swollen posteriorly, bearing two long ovigerous spines, these 1.96 mm long, 1.1 times total body length; fused proximally from base to beyond caudal rami; fused part 0.14 mm long (pl. 2B).

Caudal rami 1.37 times as long as wide, moderately divergent, bearing three terminal setae, as usual in this genus.

The male is unknown.



Pl. 2. *Cymbasoma janetae* n. sp., holotype female. A, genital double somite (120 \times); B, caudal rami and ovigerous spine base (30 \times).

DISCUSSION

The new species described here from the Gulf of Aqaba is placed in the genus *Cymbasoma* because of the presence of three urosomites in the female: pedigerous somite 5, the genital double somite, and one free somite (Isaac, 1975). The species is most closely similar to *C. longispinosum* (Bourne, 1890), mainly on account of its relatively long cephalothorax, the general structure of the fifth legs, and the relatively long ovigerous spines conjoined at the base. Also, it is closely similar to *C. morii* Sekiguchi, 1982 (cf. Grygier, 1994), *C. chelemense* Suárez-Morales & Escamilla, 1997 (cf. Suárez-Morales & Escamilla, 1997), and *C. californiense* Suárez-Morales & Palomares-García, 1999 (cf. Suárez-Morales & Palomares-García, 1999) mainly in the presence of the dorsal cuticular wrinkles on the genital double somite in addition to the other characters that distinguish it from *C. longispinosum*. However, the new species differs from these others in several key structures, generally regarded as important in monstilloid taxonomy, such as the body proportions, spines on the apex of the last segment of the antennules, shape of the dorsal wrinkles on the genital double somite, the armature of the first segment of the exopod of P1-P4, and the morphological details of the fifth legs.

In the female of *C. janetae* n. sp., the cephalothorax represents 71% of the total body length, while in *C. longispinosum*, *C. morii*, *C. chelemense*, and

C. californiense this proportion is 58%, 70%, 70%, and 65%, respectively. In the new species, the prominent processes between the oral papilla and the antennular bases are at a distance of 0.094 mm from the antennular bases and 0.125 mm from the oral papilla, but this structure has not been described in the other species. The oral papilla in the new species is relatively longer than that of *C. longispinosum* and *C. californiense*, but looks like that of *C. chelemense*.

In the new species, the first four swimming legs are without a seta on the inner edge of the first segment of the exopodite. This character is similar to the conditions in *Thaumaleus boxshalli* Suárez-Morales, 1993, recorded from the east coast of the Yucatan Peninsula, Mexico (Suárez-Morales, 1993), *C. mcalicei* Suárez-Morales, 1996 recorded from the Sulu Sea, Philippines (Suárez-Morales, 1996), and *C. tenue* (Isaac, 1975), redescribed by Suárez-Morales & Riccardi (1997) from the Mediterranean Sea.

The endopodal lobe of the fifth leg in the new species is finger-like and oriented parallel to the exopod, but in *C. longispinosum* it is triangular, of elongate shape, and set at right angles to the axis of the leg (Giesbrecht, 1893; Sars, 1921; Rose, 1933; Isaac, 1975; Thompson, 1976). In *C. chelemense* and *C. morii*, this lobe is rounded and placed at midlength of the inner margin of the leg. In *C. californiense*, the endopodal lobe is rounded and at about a right angle to the axis of the leg in the figure of Suárez-Morales & Palomares-García (1999). The armature of the antennules is similar to that described by Grygier & Ohtsuka (1995) for species of *Cymbasoma*. Some elements were broken off from the fourth segment (e.g., the “6₁” spiniform seta) in the dissected specimen.

In the new species, the genital double somite has eight shallow, transverse cuticular wrinkles on the lateral margin and dorsal surface. In *C. californiense*, there are strong wrinkles on the lateral margins and dorsal surface, as well as along the lateral margins of the fifth pedigerous somite and the anal somite, and on the posterior margins of the cephalothorax. In *C. chelemense*, transversely aligned cuticular ridges are present on the anterior half of the dorsal surface of the genital double somite. In *C. morii* the double somite has shallow cuticular wrinkles. However, this character has not been figured or described for *C. longispinosum*.

The total body length of the new species is similar to that of *C. gracile* (1.8–1.84 mm), which was recorded near the region of collection of the new species. It is smaller than *C. longispinosum*, *C. morii*, *C. chelemense*, and *C. californiense* (2.6–3.16 mm, 2.3 mm, 2.18 mm, and 2.1 mm, respectively). The ovigerous spines in the new species are 1.11 times the total body length. However, these spines are 1.0 times as long as the body in *C. californiense* and *C. chelemense*, and about twice the body length in *C. longispinosum* and *C. morii*.

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