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## A NEW SPECIES OF *CYMBASOMA* (COPEPODA: MONSTRILLOIDA) FROM THE SULU SEA, PHILIPPINES

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### ABSTRACT

A specimen of a monstrilloid copepod collected by the U.S. Fisheries Steamer "Albatross" in the Sulu Sea, west coast of Mindanao, Philippines, and deposited in the U.S. National Museum of Natural History, was taxonomically restudied. The specimen had been originally identified as a male of *Monstrilla serricornis* Sars by C.B. Wilson. Reexamination revealed that the specimen represents a new species of the genus *Cymbasoma*, *C. mcalicei*. This species can be distinguished by its body proportions and body size, but mainly by the structure of the genital lappets, which have a serrated posterior margin unique in the genus. This is the seventh species of *Cymbasoma* reported from East or Southeast Asia.

### INTRODUCTION

In their book on Copepoda, Huys & Boxshall (1991) recognized three genera of Monstrilloida: *Monstrilla*, *Monstrillopsis*, and *Thaumaleus*. However, the genus *Thaumaleus* Krøyer, 1849 is not considered a valid genus by Grygier (1994a) and, except for the type (*T. typicus* Krøyer, 1849), which conforms to the current concept of *Monstrilla*, all the species described under this genus should be included under *Cymbasoma* Thompson, 1888. In the present work, Grygier's recommendation is followed.

During a preliminary revision of part of the

monstrilloid copepod collection deposited in the National Museum of Natural History, Washington, D.C., a single male specimen identified by C.B. Wilson (1950) as *Monstrilla serricornis* G.O. Sars, 1921 was found. This specimen was collected on February 6, 1908 at the Caldera Bay anchorage, Sulu Sea, Philippines, during a cruise of the United States Fisheries Steamer "Albatross" (sta. 5133). It is deposited under the number USNM 74005, which apparently includes more than one species, all from the same locality. There are two female specimens labeled as *Monstrilla leucopsis* G.O. Sars, 1921, one of which was recorded as *M. leucopsis* (sic) by

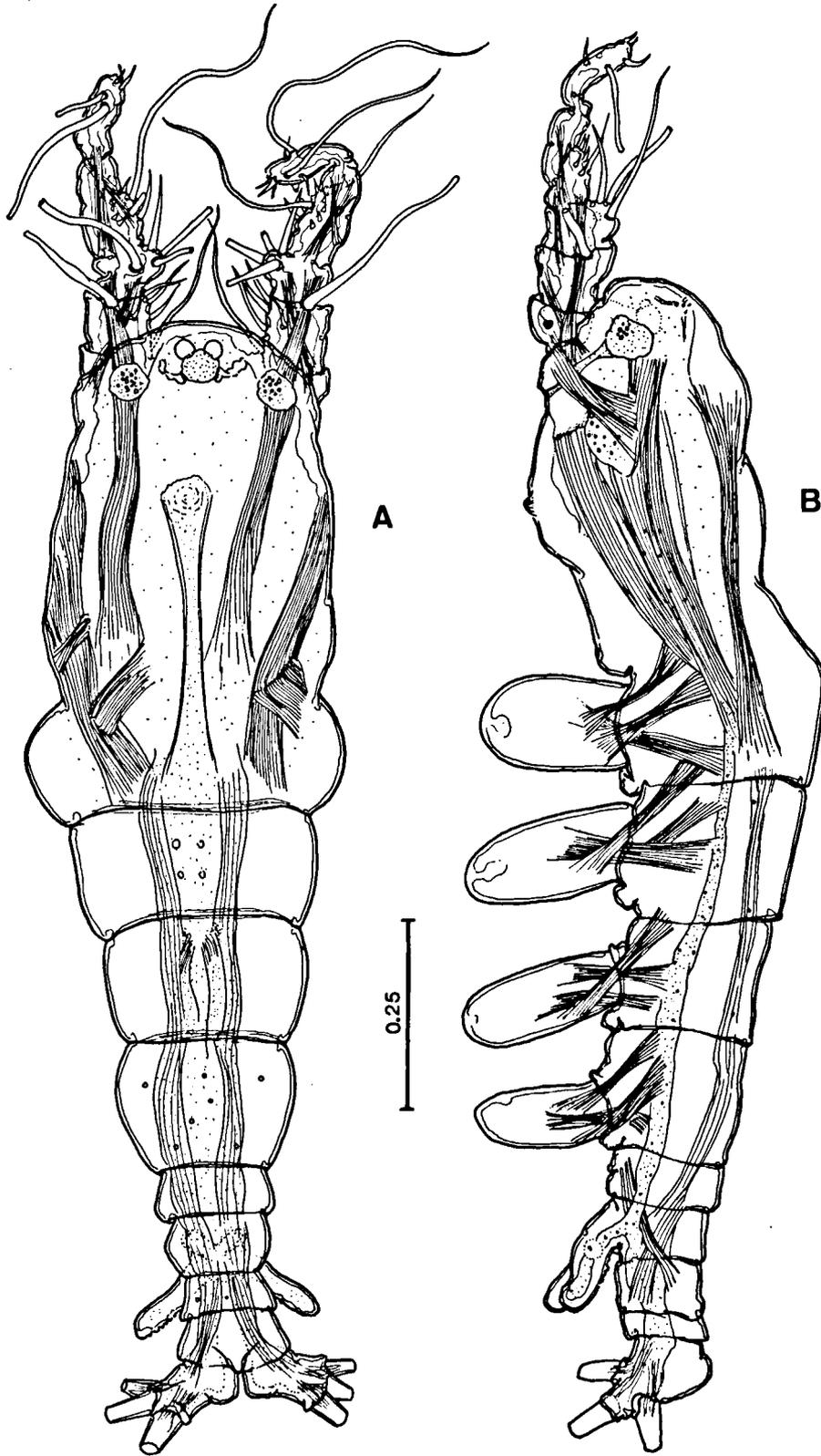


Fig. 1. *Cymbasoma mealicei* adult male. Holotype. A) habitus, dorsal; B) habitus, lateral. Scales in mm.

C.B. Wilson (1950) from the same "Albatross" locality (st. 5133). Two other female specimens catalogued under this number were identified as *M. clavata* G.O. Sars, 1921 by Wilson (1950). More recent labels indicate that this material was examined by B.J. McAlice in 1981; he confirmed one of the specimens as *M. leucopsis* and corrected the identification of one of the *M. clavata* females. From the same locality Wilson (1950) also reported two males of *Monstrilla serricornis*. One of those specimens is a *Monstrilla*, possibly undescribed (McAlice, 1985). The other specimen was reviewed before - again in 1981 - by B.J. McAlice, who labeled it as an unidentified species of *Thaumaleus* (McAlice, 1985). A detailed analysis of this male specimen showed that it belongs to a previously undescribed species of the genus *Cymbasoma*. The new species is described here according to newly upgraded standards for monstrilloid copepods (Grygiel & Ohtsuka, 1995).

## SYSTEMATIC DESCRIPTION

### *Cymbasoma mcalicei* sp. nov.

#### MATERIAL

Holotype: One adult male, vial deposited at the National Museum of Natural History, Smithsonian Institution (USNM 74005).

#### TYPE LOCALITY

Caldera Bay, Sulu Sea, Philippines, plankton trawl, surface waters. "Albatross" cruise sta. 5133 (February, 1908).

#### DESCRIPTION

*Male*: Total body length (measured in dorsal view from anterior end of cephalothorax to posterior margin of anal somite): 1.39 mm. Cephalothorax short and broad, 0.65 mm long, representing slightly more than 47% of total body length (Fig. 1A). Oral papilla located 35% of way back along ventral surface of cephalothorax (Fig. 1B). Cephalic region wide, tapering slightly at posterior end, anterior margin of forehead slightly rounded. Ocelli present, pigment cups small and widely separated, poorly developed, almost unpigmented, round in dorsal view. Except for some scars, pores (not all paired, and mainly on the

dorsal surface of the second and fourth thoracic somites) and faint scattered ridges, no cuticular ornamentation was observed.

Antennules relatively short, 0.48 mm long (measured from base of first segment), representing almost 29% of total body length, and ca. 64% as long as cephalothorax. Four-segmented, but with constriction on proximal third of second segment, representing partial intersegmental division (Figs. 2A,B).

Antennules armed with 0-I; 1-V; 6-VII; 5-II setae and spines, and one terminal short aesthesc. Distal antennular segment geniculated, with two longitudinal cuticular ridges, one along each side (Fig. 2A). Following as much as possible the setal nomenclature proposed by Grygiel & Ohtsuka (1995) for female monstrilloid copepod antennules, long seta borne on first segment instead of short spine; spine  $2v_1$  setiform, spines  $2v_2, 2v_3$  and  $2d_1, 2d_2$  almost as long as second segment. In the nextmost distal armature cluster, a large plumose seta is borne between IIIv and IIIId, only on right antennule. No large aesthesc (4aes) is found on either antennule, one spine (3) absent on left one, seta Vv present only on right antennule but its socket is visible on left. Three setae of female pattern (Vm,  $b_1$ ,  $b_2$ ) are not present. Scars on the middle portion of the terminal segment of the right antennule indicate that  $b_1$  and  $b_2$  were probably lost. Elements identified as spines  $4v_2, 4v_3, 4d_1$  and  $4d_2$  appear as an axially aligned cluster of short, basally wide, clawlike, non-socketed structures. Length ratio of antennular segments: 13.7: 19.3: 43.5: 23.4= 100 (Fig. 2A).

First pedigerous thoracic somite incorporated into cephalothorax. This and succeeding three pedigers each bearing well developed swimming legs, all with triarticulate endopodites and exopodites and with same armament pattern, except for leg 1 exopodite, with one seta fewer on distal segment than in other legs (Fig. 3A). Exopods longer than endopods in all cases. Legs 2 and 3 slightly larger (ca. 8%) than 1 and 4. Coxae of each pair joined by rectangular coupler (not illustrated). Basis separated from coxa by diagonal articulation on anterior face. Outer margin of basis of swimming legs 1, 2 and 4 with small, thin seta; seta in this position on leg 3 almost 2.4 times larger and thicker than in other legs (Figs.



3A-D). All natatory setae lightly and biserially plumose, outer distal exopod seta with denticles. Third segment of each ramus with cuticular pore (not illustrated), except for fourth leg; large sclerite present on proximal endopodal segment of leg 1.

Armament formula of swimming legs as:

	Basis	Exopod	Endopod
Leg 1	0-1	I-0;0-1;I,2,2	0-1;0-1;1,2,2
Legs 2-4	0-1	I-0;0-1;I,2,3	0-1;0-1;1,2,2

As usual in males, fifth leg absent. Pair of digitiform genital lappets present on genital somite. Both strongly divergent, distally rounded, serrated along posterior margin, and reaching almost half way along last - anal - somite (Fig. 3E). Marginal serration almost complete on left lappet (75% of margin), but irregular on the right lappet, along only the proximal 30%, and with scattered protuberances elsewhere (Fig. 3E).

Urosome consisting of four segments: fifth pedigerous somite (with no appendages), genital somite (with genital complex), plus two free somites; posterior one of the latter (anal somite) being largest in urosome. Ratio of lengths of genital double segment and following two free somites being: 39.3:21.4:39.3= 100. Anal somite with medial constriction, apparently vestige of intersegmental division (Fig. 3F).

Furcal rami nearly quadrate, with terminal margin as wide as proximal one. Approximately 1.5 times longer than wide, bearing three well developed terminal setae, innermost being slightly longer and wider than median and outer ones, the latter being thinner than the median seta (Fig. 3F).

#### ETYMOLOGY

The species is named after Dr. B.J. McAlice, for his work and interest on Copepoda Monstrilloida, including the first reexamination of the specimen studied here and the correction of the original generic identification.

#### REMARKS

The specimen is still in good condition considering the long time elapsed (87 years) since it was collected. However, the dorsal side of the cephalo-thorax appears depressed and several antennular setae are missing. The specimen was not dissected during examination.

Previous to this record of *C. mcalicei*, only six other species of *Cymbasoma* have been reported from the East Indies and Japanese waters. *Cymbasoma bullatum* (Scott, 1909) from off Japan (Sekiguchi, 1981), *C. gigas* (Scott, 1909) from the Sulu Sea (Scott, 1909), *C. longispinosum* (Bourne, 1890) from off Mindanao (Wilson, 1950), central Japan (Sekiguchi, 1982) and Vietnam (Rose, 1956); this species has been suggested as a species of which *C. morii* might be a subspecies (see Grygier, 1994b). *Cymbasoma rigidum* (Thompson, 1888) was recorded from off Mindanao (Wilson, 1950) and Japanese waters (Sekiguchi, 1982), and *C. agoense* Sekiguchi, 1982 and *C. morii* Sekiguchi, 1982 from Japanese waters (Grygier, 1994b). There is also an undetermined report of *Cymbasoma* sp. by Shen & Bai (1956) from Chefoo (China). The species *Haemocera danae* Claparède, 1863 has been included occasionally in *Thaumaleus* (i.e. *Cymbasoma*) (Davis, 1949; Isaac, 1975) and there is a record of *H. danae* from Vietnam (Rose, 1956); however, it is not accounted here as a *Cymbasoma* species.

McAlice (1985) reidentified four male specimens of *M. serricornis* collected in the Buritari Lagoon, Gilbert Islands (now Kiribati) during the "Albatross" cruise as *M. canadensis*. Sekiguchi (1982) recorded several males of *Monstrilla serricornis* Sars in central Japan; this was probably the first confirmed record of the species in the area, since the male reported by Wilson (1950) as *M. serricornis* in the Philippines was a misidentification of the species described here. McAlice (1985) stated that neither specimens from Caldera Bay, Mindanao, identified as *M. serricornis* by Wilson (1950) bears the slightest resemblance to that species. In *M. serricornis* the outer distal margin of the terminal antennular segment bears a serrate process, which has minimal similarity to the cuticular ridges present on the same segment of the studied specimen, which nonetheless may have brought about Wilson's misidentification of the specimen.

The male specimen studied here can be easily included in the genus *Cymbasoma* by the presence of two somites between the genital somite and the furcal rami (Isaac, 1975); furthermore, only in this genus are three furcal setae present.

The structure of the genital complex of the males is one of the most important taxonomic

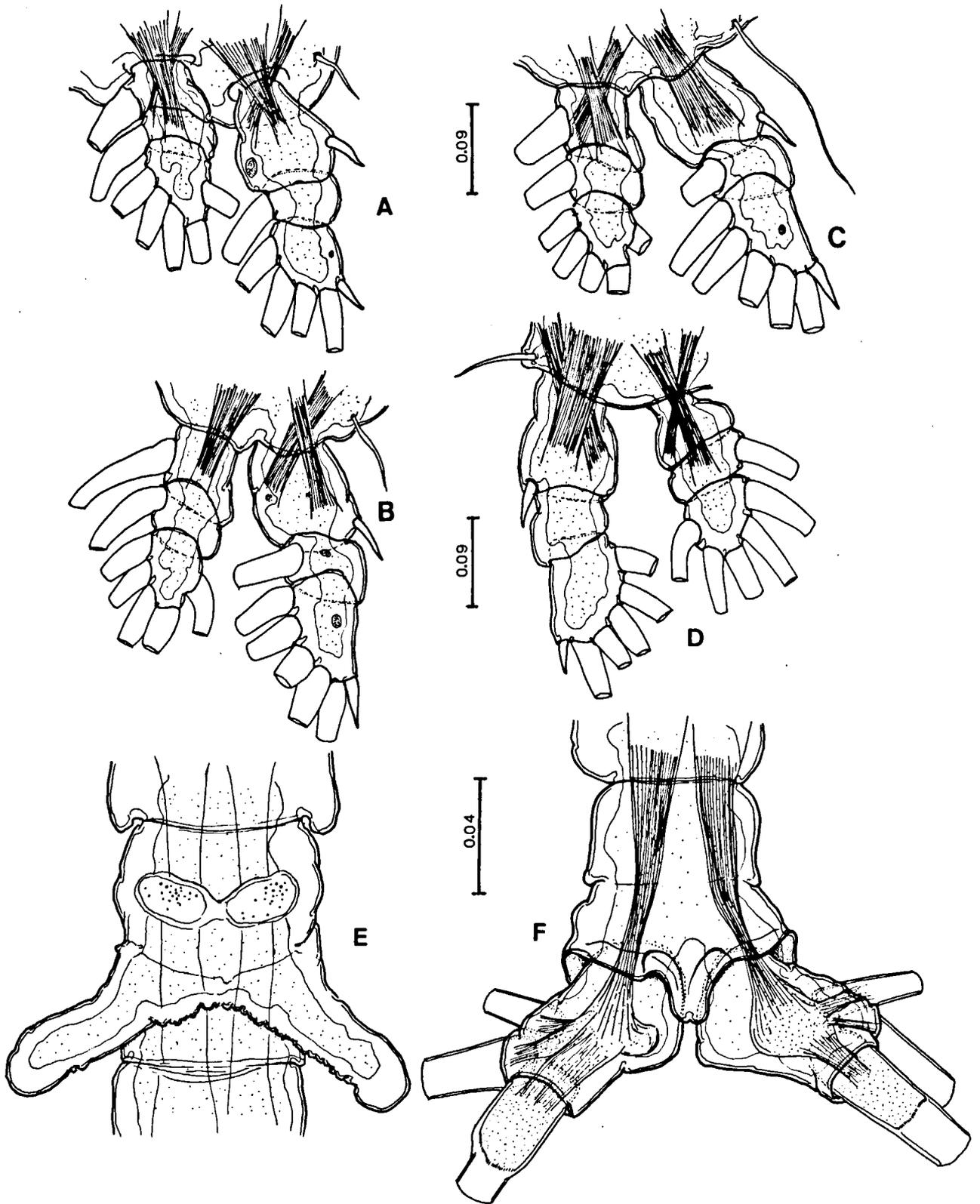


Fig. 3. *Cymbasoma mcaliceii* adult male. Holotype. A) first leg, posterior; B) second leg, posterior; C) third leg, posterior; D) fourth leg, anterior; E) genital complex, genital lappets, ventral; F) anal somite, dorsal. Scales in mm.

characters for male monstrilloids (Isaac, 1975). Several species of *Cymbasoma* have the same type of male genital apparatus as described for the new species. However, the new species differ from its congeners in several respects. *Cymbasoma similirostratum* (Isaac, 1974) is readily distinguishable by the forward prolongation of the forehead. Its genital complex is much like that of *C. mcalicei*, but it has a rounded medial protuberance between the lappets and the lappets are not serrated. The genital lappets of the new species are similar to those of *C. tenuis* (Isaac, 1974), but in the latter species there is a protuberance between the lappets (not present in the new species), a small subtriangular protuberance on the base of each lappet (Suárez-Morales & Riccardi, in prep.), and smooth margins. *Cymbasoma bullatum* bears four furcal setae, and among other differences (e.g. body proportions and general aspect), the genital complex is not serrated and has a quite different shape.

Along with *C. similirostratum*, *C. zetlandicum* and *C. rigidum*, *C. mcalicei* forms part of a group of *Cymbasoma* species characterized by a suture or constriction around the anal somite, which partly divides it into two distinct somites (see Isaac, 1975). *Cymbasoma rigidum*, which is probably most closely related to the new species, nonetheless, differs in its non-serrated genital lappets ending in a small papilla, fully separated antennular segments, four furcal setae, and larger size (1.75 mm). *Cymbasoma quadridens* Davis, 1947 is the only other species of the genus with processes on the posterior margin of the genital lappets; however, this species has four teeth on each side and a strong protuberance between the lappets. In the new species, serrations are irregular and do not form teeth, and there is no protuberance between the lappets. The body proportions also differ between the two species.

The antennular armature of monstrilloid copepods differ in male and females; differences are stronger on the distal half. This is why only the structures on the proximal half of the antennules are homologized with the female pattern proposed by Grygier and Ohtsuka (1995). A basic pattern for male monstrilloids should be constructed upon specimens in good condition of several species.

Finally, measuring just 1.39 mm in length, the

new species is, together with *C. tenuis* (1.15 mm) one of the smallest species of *Cymbasoma* recorded in the Far East area. The other five species are all more than 1.75 mm long, and *C. gigas* has been reported to be up to 8 mm. The morphological differences between the studied material and previously described species are considered significant enough to propose a new taxon.

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