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A NEW SPECIES OF *CYMBASOMA* (COPEPODA, MONSTRILLOIDA)
FROM THE NORTHERN COAST OF TURKEY (BLACK SEA) WITH
COMMENTS ON THE *C. LONGISPINOSUM* SPECIES-GROUP

BY

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ABSTRACT

Cymbasoma sinopense sp. nov. is described from an adult female collected off the Sinop coast, in the southern Black Sea, Turkey. This is the first species of this genus recorded from the Black Sea coast of Turkey. The new species is a member of the widespread *Cymbasoma longispinosum* species-group, and it closely resembles *C. chelemense* Suárez-Morales & Escamilla, 1997 from the Yucatan Peninsula and *C. californiense* Suárez-Morales & Palomares-García, 1999 from the Gulf of California. This species can be distinguished by a combination of subtle characters, including the body proportions, the structure and armature of the fifth legs, the ornamentation of the genital somite, and the relative length of the ovigerous spines. A previous report of *C. longispinosum* from the northern Black Sea probably represented a misidentified record of *C. sinopense* sp. nov. The Mediterranean reports refer to a species that is different from the one of the Black Sea. Comparative comments and data including the main taxonomic characters of members of the *Cymbasoma longispinosum* species-group are presented. Overall, it is confirmed that records of this species from different geographic areas should be revised carefully because they could represent undescribed species. A key for the identification of the females of the currently known species assigned to the *Cymbasoma longispinosum* species-group is included.

Key words. — Copepods, zooplankton, *Cymbasoma* cf. *longispinosum*, Sinop, Black Sea

RÉSUMÉ

Cymbasoma sinopense sp. nov. est décrite à partir d'une femelle adulte collectée au large de Sinop, dans le sud de la mer Noire, en Turquie. C'est la première espèce de ce genre enregistrée au large de la côte de la mer Noire en Turquie. La nouvelle espèce appartient au groupe d'espèces *Cymbasoma longispinosum*, largement répandu, et elle ressemble étroitement à *C. chelemense*

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Suárez-Morales & Escamilla, 1997 de la péninsule du Yucatan et à *C. californiense* Suárez-Morales & Palomares-García, 1999 du golfe de Californie. Cette espèce peut être distinguée par une combinaison de caractères subtils, incluant les proportions de corps, la structure et l'armature de la cinquième patte, l'ornementation du somite génital et la longueur relative des épines ovifères. Un précédent signalement de *C. longispinosum* du nord de la mer Noire correspond probablement à *C. sinopense* sp. nov. Les signalements de Méditerranée se réfèrent à une espèce qui est différente de celle de la mer Noire. Des commentaires comparatifs et des données complémentaires, incluant les principaux caractères taxonomiques des membres du groupe d'espèces *Cymbasoma longispinosum* sont présentés. Globalement, il est confirmé que les citations de cette espèce provenant de différentes zones géographiques devraient être révisées avec soin, car ils pourraient représenter des espèces non décrites. Une clé d'identification des femelles des espèces actuellement attribuées au groupe d'espèces *Cymbasoma longispinosum* est incluse.

Mots clés. — Copépodes, zooplancton, *Cymbasoma* cf. *longispinosum*, Sinop, mer Noire

INTRODUCTION

Members of the copepod order Monstrilloida Sars, 1901 are rarely observed in regular plankton surveys, as only two phases of their life cycle, i.e., the early naupliae and the adult, are free-living forms (Suárez-Morales, 2011). Their postnaupliar and juvenile stages are endoparasites of benthic invertebrates like polychaetes, molluscs and sponges (Huys et al., 2007; Suárez-Morales et al., 2010, 2014). Adults lack appendages between the antennules and swimming legs, they are non-feeding, exclusively reproductive stages (Grygier & Ohtsuka, 2008). In some coastal areas they can be caught frequently during plankton samplings (Suárez-Morales & Dias, 2001; Suárez-Morales, 2011). The order is currently represented by five genera: *Monstrilla* Dana, 1849, *Cymbasoma* Thompson, 1888, *Monstrillopsis* Sars, 1921, *Maemonstrilla* Grygier & Ohtsuka, 2008 and *Australomonstrillopsis* Suárez-Morales & McKinnon, 2014 (Suárez-Morales, 2011; Suárez-Morales & McKinnon, 2014). *Cymbasoma* and *Monstrilla* are currently the most speciose genera.

There are extensive areas in which the monstrilloid copepod fauna remains unknown. The Black Sea is one of the most interesting seas of the world, both from a scientific and human perspective. It harbours a diverse marine planktonic fauna that is known to be influenced by long- and short-term (geological, climatic, hydrological) events but also by anthropogenic factors (Kovalev et al., 1999, 2001). Although the zooplankton has been extensively surveyed in this system, the information of the Monstrilloida is still limited. Currently, there are eight species of *Cymbasoma* known from the adjacent Mediterranean Sea (Isaac, 1974; Razouls et al., 2014) and three of these species, including a record of *Cymbasoma* cf. *longispinosum*, have been reported from the Black Sea (Suárez-Morales, 2011; Razouls et al., 2014). Most of the zooplankton studies in the Black Sea emphasize

its northern area (Kovalev et al., 1999, 2001). There are no records of monstrilloid copepod species in the southern sector of the Black Sea, along the northern coast of Turkey. During a zooplankton survey off the Sinop Peninsula, on the northern Turkish coast, a female individual of a monstrilloid copepod was collected. The taxonomic examination of this specimen revealed that it represents an undescribed species of *Cymbasoma*. The purpose of this study is to describe this species and compare it with its closest congeners. A general comparison of the species assignable to the species-group around *Cymbasoma longispinosum* (Bourne, 1890) is also provided, together with a key to the known species of the group.

MATERIAL AND METHODS

Zooplankton material was obtained during a biological survey of the Turkish coasts. Samples obtained at one of the stations (42°00'53"N 35°11'41"E) in coastal waters of the Sinop Peninsula in the southern Black Sea, Turkey on 28 June 2010 (fig. 1) contained an unidentified female monstrilloid copepod of the genus *Cymbasoma*. Zooplankton was collected by subsurface horizontal hauls with a standard plankton net (mesh size = 500 μ m, mouth diameter = 50 cm). Samples were fixed and preserved in 4% buffered formalin. The specimen was sorted out and processed for identification. The separation and preliminary observations were made under an Olympus SZX 16 stereomicroscope and a Leica CME

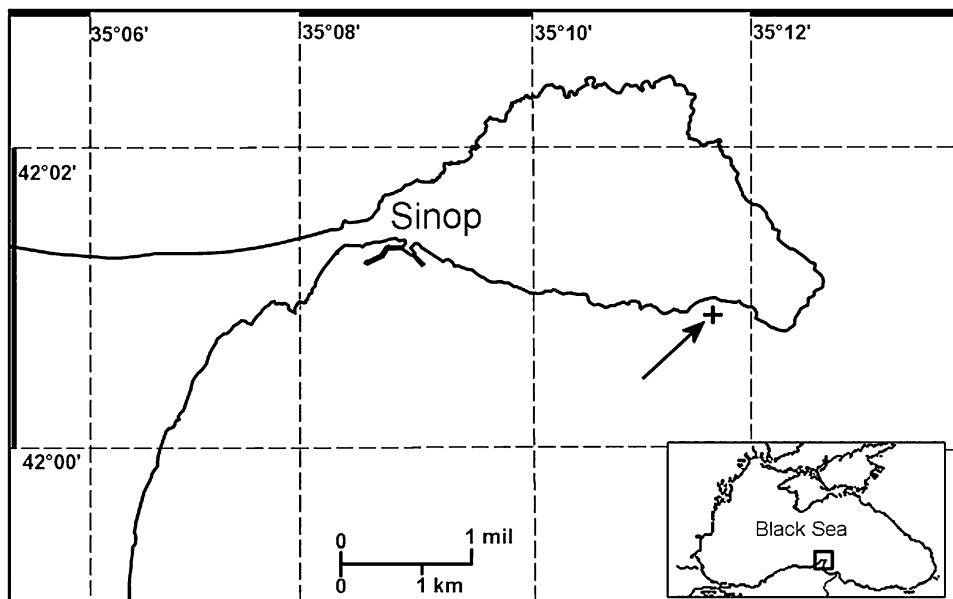


Fig. 1. Study area and location of sampling station in the Sinop Peninsula, northern Turkey, in the Black Sea.

compound microscope. The specimen was placed in glycerol and lightly stained with Methylene Blue for taxonomic examination and dissection. The dissected appendages were mounted on slides using glycerol as mounting medium and sealed with nail varnish or with Entellan[®]. Drawings were prepared at 400-1000 \times magnification with the aid of a camera lucida mounted on an Olympus BX51 compound microscope with Nomarski DIC. The specimen was deposited in the collection of zooplankton at El Colegio de la Frontera Sur (ECOSUR), Chetumal, Mexico. The description, including the terminology of the antennular armature follows the descriptive standards set by Grygier & Ohtsuka (1995).

SYSTEMATICS

Order MONSTRILLOIDA Sars, 1903

Family MONSTRILLIDAE Dana, 1849

Genus *Cymbasoma* Thompson, 1888

***Cymbasoma sinopense* sp. nov.**

(figs. 2-5)

Type material.— Adult female holotype from Sinop Peninsula, northern Turkey (42°00'53"N 35°11'41"E), Black Sea, partially dissected. Selected appendages on slide mounted in glycerine, sealed with Entellan[®]. Date of collection: 28 June 2011. Plankton sample. Slides deposited in the collection of Zooplankton at El Colegio de la Frontera Sur (ECOSUR), in Chetumal, Mexico (ECO-CHZ-09186).

Description. Female.— Body elongate, slender; body length of holotype measured from anterior end of cephalosome to the posterior margin of the anal somite = 2.50 mm. Cephalothorax (incorporating first pedigerous somite) approximately 1.26 mm long, representing 66% of total body length. Oral papilla located at 18% of way back along ventral surface of cephalothorax. Pair of relatively large ocelli present, pigment cups moderately developed, medially conjoined, weakly pigmented; ventral cup and lateral cups equally sized (fig. 2A). Cephalic area with conspicuous area of deep, regularly and longitudinally arranged cuticular ridges on “forehead” (figs. 3A, 4B) between the antennule bases; sensillae not observed on cephalic area. Additional cephalic cuticular ornamentation including longitudinal, shallow cuticular ridges overlying posterior surface of region of ocelli on dorsal surface; ridges only on right side and central surface, left side smooth. Ventral surface with (1) shell-like cuticular process between antennule bases (arrowed in fig. 3B) and (2) two pairs of nipple-like processes on anterior ventral surface; anteriormost pair simple, without adjacent ridges or wrinkles, conical in shape; second pair well-developed, with conspicuous concentric reticulation (fig. 3B). Other ventral cuticular ornamentation includes a small single process on anterior surface anterior to oral cone.

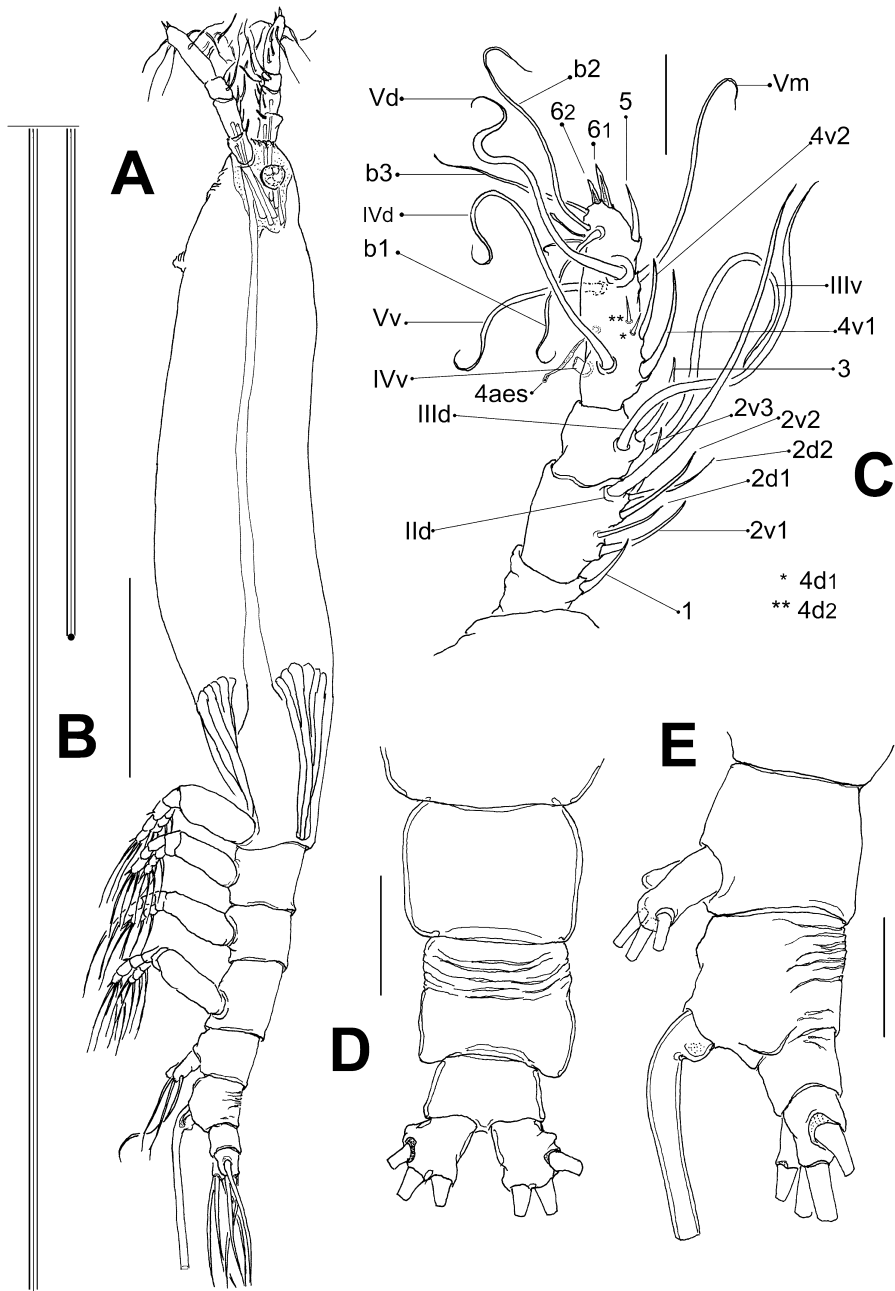


Fig. 2. *Cymbasoma sinopense* sp. nov., adult female holotype from Turkey. A, Habitus, lateral view; B, ovigerous spine showing length with respect to body; C, antennule showing armature following nomenclature by Grygier & Ohtsuka (1995); D, urosome, dorsal view; E, urosome, lateral view. Scale bars: A, B = 500 μ m, C-E = 100 μ m.

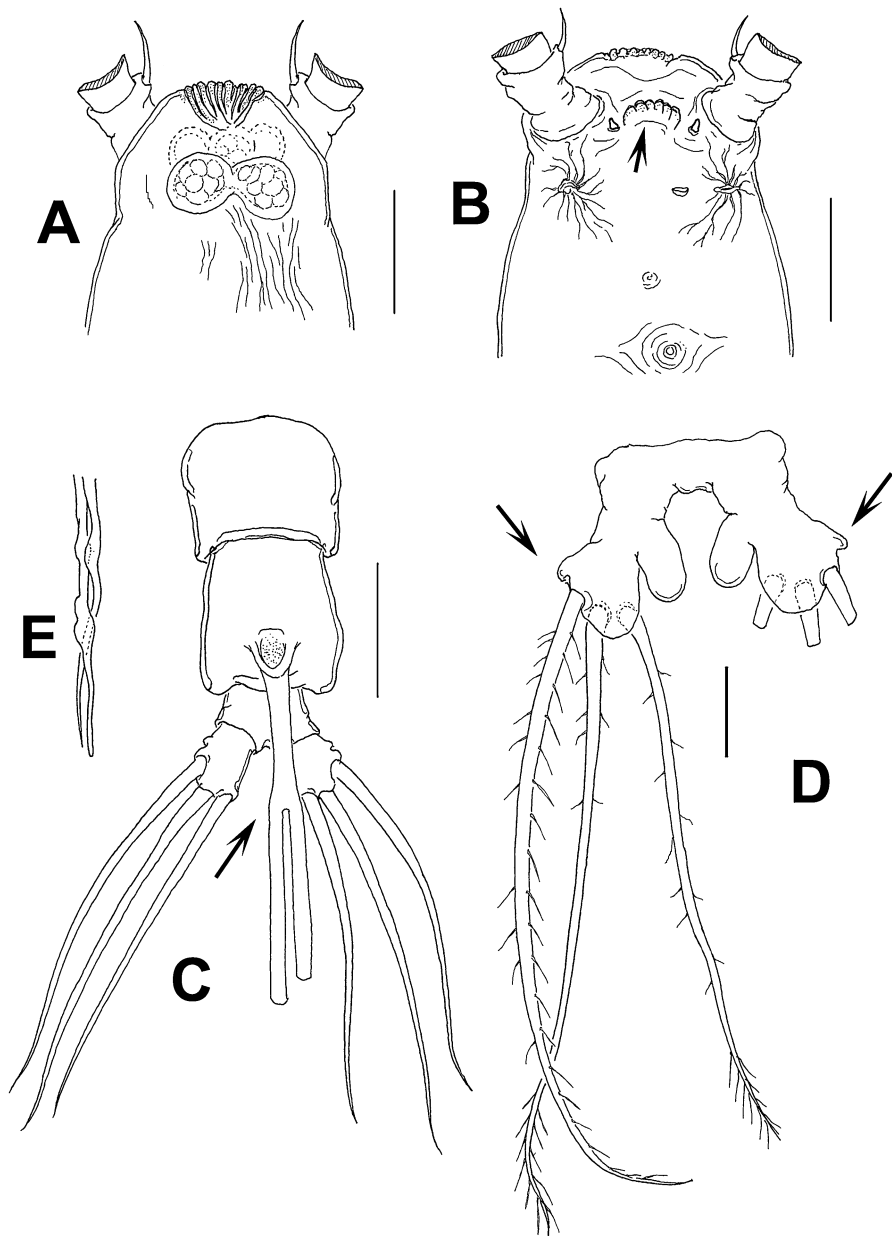


Fig. 3. *Cymbasoma sinopense* sp. nov., adult female holotype from Turkey. A, Cephalic area showing forehead ornamentation, dorsal view; B, cephalic area, ventral view, showing cuticular processes and ornamentation, shell-like ventral process arrowed; C, genital double and anal somites, ventral view showing insertion of ovigerous spines and point of bifurcation of spines (arrowed); D, fifth leg, ventral view showing globular processes on outer lobes (arrowed). Scale bars: A-C = 100 μ m, D = 50 μ m.

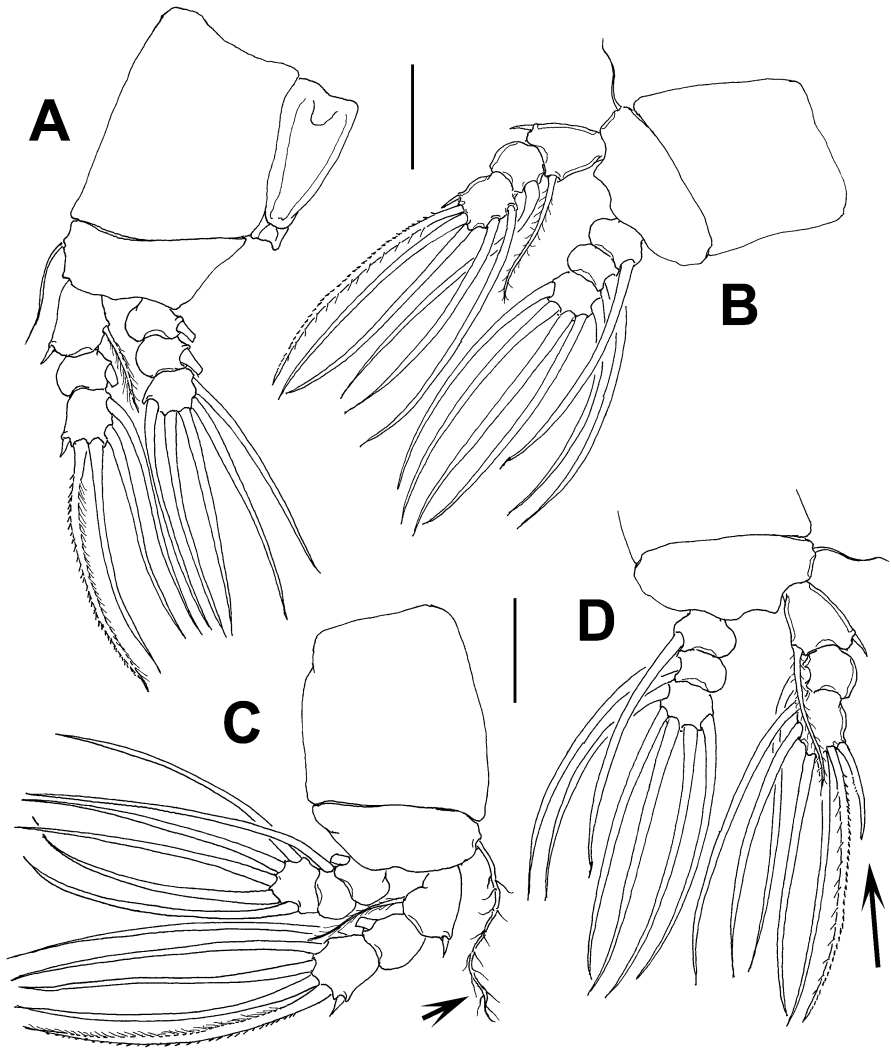


Fig. 4. *Cymbasoma sinopense* sp. nov., adult female holotype from Turkey. A, First swimming leg; B, second swimming leg; C, third swimming leg with longer basipodal seta (arrowed); D, fourth swimming leg showing modified, enlarged outer spine on third exopodal segment (arrowed). Scale bars = 100 μ m.

Urosome consisting of fifth pedigerous somite, genital double somite, anal somite and caudal ramus, together measuring 0.35 mm and representing 14% of total body length. Relative lengths of fifth pedigerous somite, genital double somite and free urosomite: $41.6:36.2:22.2 = 100$, respectively (fig. 2D, E). Genital somite with transverse pattern of deep cuticular wrinkles on proximal half of dorsal surface (figs. 2D, E, 4A); somite with ventral protuberance on anterior margin (figs. 2E, 4C). Caudal ramus subrectangular, 1.3 times as long as wide, armed

with three subequally long lightly setulated caudal setae (figs. 2D, 3C). Ovigerous spines paired, extremely long, about 1.6 times total body length (fig. 2B). Spines basally conjoined, individual spines arise at level of posterior margin of caudal ramus (arrowed in fig. 3C). Spines slender, straight at their base and along shaft, both with distally swollen sections and then tapering apically, one spine slightly shorter; spines 4 mm long (fig. 3E).

Antennule length = 0.39 mm, representing about 15.9% of total body length and 24% of cephalothorax length; antennule 4-segmented. Relative lengths of segments, from base to top: 11.6:23.3:16.3:48.8. Length of last antennular segment = 0.1876 mm (fig. 5). Armature: 0-I; 1-V; 2-I; 8-VIII setae (Arabic numerals) and spines (Roman numerals) (fig. 2C). In terms of pattern described by Grygier & Ohtsuka (1995) for female monstrolloid antennular armature, setae (Roman numerals) and spines (Arabic numerals), element 1 present on first segment; elements on second segment: 2d1, 2d2, 2v1, 2v2, 2v3 and IId. Third segment with elements 3, IIId and IIIV. Segment four bearing elements 4d_{1,2}, elements 4v_{1,2} well developed, element 4v₃ not observed; setae IVd, IVv, Vd, Vv, Vm and 4aes present. Element 5 spiniform. Subterminal elements b₁₋₃, 6aes, 6₁ and 6₂ unbranched; 6₁ longer than 6₂ (fig. 2C).

Incorporated first pedigerous somite and succeeding three free pedigerous somites each bearing a pair of biramous swimming legs. Pedigerous somites 2-4, together accounting for 24.5% of total length in dorsal view. Swimming legs 1-4 slightly increasing in size posteriorly. Intercoxal sclerites of legs 1-4 subrectangular, widest at base, tapering distally, surface and posterior margin smooth (fig. 4A). Basis of legs articulating with large, rectangular coxa along diagonal line. Basis of legs 1-4 with hair-like lateral seta (fig. 4A-D); on leg 3, this seta about 2.2 times longer, lightly setulated from proximal half and slightly thicker than those on the other legs (arrowed in fig. 4C). Endopodites and exopodites of swimming legs 1-4 triarticulated. Ramus setae all biserially plumose except spiniform outer seta on exopod 1 and 3, and inner seta of first exopodal segment, these latter being short and sparsely setulated (fig. 4A-D). Spine on distal exopodal segment of right leg 4 unusually long, almost twice as long as segment (arrowed in fig. 4D). Also, outermost apical exopodal setae of swimming legs 1-4 with inner margin naked lightly spinulose, outer margin spinulose.

Armature formula of swimming legs:

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

Fifth legs medially conjoined, bilobed, inner (endopodal) lobe rounded distally, well-developed, relatively large, reaching about halflength of outer (exopodal) lobe

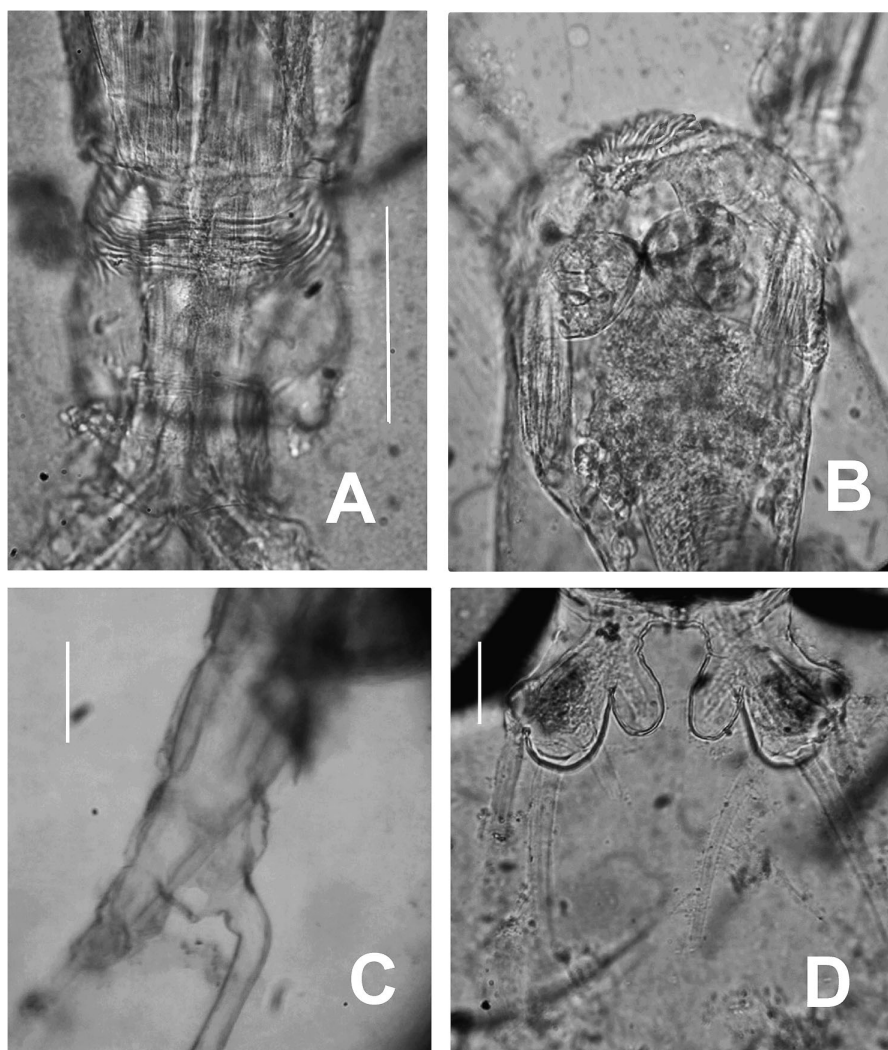


Fig. 5. Digital photographs of *Cymbasoma sinopense* sp. nov., adult female holotype from Turkey. A, Genital double and anal somite showing dorsal cuticular ridges; B, forehead, dorsal view showing pattern of cuticular ornamentation; C, genital double somite, lateral view, showing insertion of ovigerous spines and anterior ventral protuberance; D, fifth leg, ventral view. Scale bars: A-C = 100 μ m, D = 50 μ m.

(fig. 4D). Outer lobe with rounded protuberance on distal outer margin, at insertion of outermost seta (arrowed in fig. 3D); lobe armed with three setae, one distal, two inserted subdistally. Outermost seta longest, biserially and lightly setulated; innermost seta shortest, this and medial seta with light setulation (fig. 3D).

Type locality.— Sinop Peninsula, northern Turkey (42°00'53"N 35°11'41"E), Black Sea.

Etymology.— The specific epithet makes reference to the type locality, the Sinop Peninsula, Turkey. The name is proposed as an adjective with a neuter ending to match the (neuter) generic name.

Male.— Unknown.

Remarks.— This specimen from the Black Sea was assigned to the genus *Cymbasoma* by virtue of the presence of two urosomal somites, with only one free somite located between the genital double somite and the caudal rami (Isaac, 1975; Boxshall & Halsey, 2004; Suárez-Morales, 2011). It is assignable to the *Cymbasoma longispinosum* species-group (Grygier, 1994; Suárez-Morales, 2011). Since the publication of Bourne's (1890) original description of this species from the English Channel, the nominal *C. longispinosum* has been recorded in different geographic areas and latitudes including the Mediterranean (Giesbrecht, 1893; Rose, 1933), Norway (Sars, 1921), the Australian coast and Philippines in the Southern Pacific (Dakin & Colefax, 1940; Wilson, 1950), the Eastern Tropical Atlantic (Marques, 1961), the Red Sea (Gurney, 1921), India (Martin Thompson, 1973) and Brazil (Dias, 1996; Duarte, 1999; Dias & Bonecker, 2007; Leite et al., 2010). The improbability of a single monstrolloid species being so widely distributed aside, some of these authors noted morphologic differences between their specimens with respect to the original description of *C. longispinosum*. It was later realized that this group of species diverging represent cryptic species each with a limited geographic distribution. This notion supported the erection of the *longispinosum* species-group and the subsequent description of new species (Grygier, 1994; Suárez-Morales & Escamilla, 1997; Suárez-Morales & Palomares-García, 1999). The group is currently known to contain at least five nominal species showing subtle but consistent differences (see table I) and are distributed in distinct geographical areas, including Europe (*C. longispinosum* s. str.), the Gulf of Mexico (*C. chelemense* Suárez-Morales & Escamilla, 1997), the Gulf of California (*C. californiense* Suárez-Morales & Palomares-García, 1999), Japan, Vietnam and India (*C. morii* Sekiguchi, 1982) (Grygier, 1994), and the Red Sea (Egypt) (*C. janetae* Mageed, 2010). Records of *C. longispinosum* from India (Martin Thompson, 1973) have been tentatively assigned to *C. morii* (cf. Grygier, 1994), and the Brazilian specimens reported as *C. longispinosum* by Leite et al. (2010) probably represent an undescribed species (Suárez-Morales, 2011).

The new species from the Turkish coast of the Black Sea most closely resembles *C. morii*, *C. chelemense* and *C. californiense*, mainly by its body size (usually longer than 2 mm), relatively long cephalothorax (more than 2/3 of whole body length), the relatively long ovigerous spines and the position of oral papilla, among other characters. Distinctive characters of *C. sinopense* sp. nov. and other known species of the *C. longispinosum* species-group are presented in table I.

TABLE I
Comparison of taxonomic features and morphometry of females of *Cymbasoma sinopense* sp. nov. with those of the females of known species of the *Cymbasoma longispinosum* species-group: *C. morii* Sekiguchi, 1982, *C. chelemense* Suárez-Morales & Escamilla, 1997, *C. californiense* Suárez-Morales & Palomares-García, 1999, *C. janetae* Mageed, 2010 and *C. cf. longispinosum* from Brazil (Leite et al., 2010)

Species/character	<i>C. sinopense</i>	<i>C. morii</i>	<i>C. chelemense</i>	<i>C. californiense</i>	<i>C. janetae</i>	<i>C. cf. longispinosum</i>
Cephalothorax/total body relative length	70%	66-73%	68%	65%	71%	64%
Cuticular ridges on forehead	present, deep, longitudinal regular pattern,	absent	present, shallow, irregular swirl-like pattern	present, shallow, simple transverse pattern	absent	absent
Cuticular striae on urosome	present, genital double-somite	present, genital double-somite	present, genital double-somite	genital and anal somites, fifth pedigerous somite	present, genital double-somite	absent
Posterior margin of genital double-somite	straight in dorsal view	curved, convex in dorsal view	straight in dorsal view	straight in dorsal view	curved?	straight
Ventral process between antennules	present, shell-like	absent	absent	absent	present, rounded	present, rounded
Antennule/cephalothorax relative length	22%	25%	21%	25.5%	22%	25%
Relative length of last antennular segment	46%	51%	51%	51%	51%	50%

TABLE I
(Continued)

Species/character	<i>C. sinopense</i>	<i>C. morii</i>	<i>C. chelemense</i>	<i>C. californiense</i>	<i>C. janetae</i>	<i>C. cf. longispinosum</i>
Antennule/body length ratio	14.6%	17%	15%	> 17.5%	16%	17.4%
Protuberance on outer margin of leg 5 outer lobe	present	absent	present	present	absent	absent
Leg 5 inner seta/segment length ratio	3.6	1.4	2.5	1.0	—*	1.5
Outer/inner lobes of leg 5 length ratio	2.0	0.2	0.4	0.4	2.5	3.3
Length of ovigerous spines with respect to body length	1.8 times as long as body	1.5-2.4 times as long as body	1.1 times as long as body	1.3 times as long as body	1.1 times as long as body	1.6 times as long as body
Point of bifurcation of ovigerous spines	at distal end of caudal ramus	at distal end of caudal ramus	at distal end of anal somite	at distal end of caudal ramus	well beyond distal end of caudal ramus	not reaching distal end of caudal ramus
Genital double somite/anal somite length ratio	2.0	2.0	1.7	2	1.8	2.2
Total body length (mm)	2.5	2.2	2.3	2.1	1.78	1.8-2.4

* No data available from original description; it is mentioned that the inner seta is about half the length of the other two.

Particularly, the new species differs from its closest congeners, *C. chelemense*, *C. morii*, and *C. californiense* in several characters, one is the peculiar arrangement of the forehead ridges, which are absent in *C. morii* and have a distinctive pattern with parallel ridges in the new species thus diverging from that found in *C. chelemense* and *C. californiense* (see table I). This is a character that is probably more informative than previously thought (Suárez-Morales & Palomares-García, 1999) when comparing species in this group. The presence of a distinctive shell-like ventral process between the antennule bases is another relevant character of this new species, in most other congeners of the group it is absent, it is only an unornamented rounded process or no detail is provided about the process as in *C. janetae* (cf. Mageed, 2010) or in *C. longispinosum* from Brazil (Leite et al., 2010). The last antennular segment (46% of the antennule length) and also the antennule relative length (with respect to the body, less than 15%) are shortest in *C. sinopense* than in the other species compared, including both *C. chelemense* and *C. californiense* (table I). The armature of the fifth leg shows some additional characters, including (1) the longest inner seta with respect to the length of the outer lobe of the leg (3.6) and (2) a relatively large, well-developed inner lobe (outer/inner lobe length ratio = 2.0) (see table I). The point of bifurcation of the ovigerous spines at the distal end of the caudal ramus is a character shared with *C. morii*, *C. chelemense* and *C. californiense*, but it is a character useful to distinguish *C. janetae* and helps in recognizing *C. cf. longispinosum* from Brazil (Leite et al., 2010) as a different species (table I).

With a total body length of 2.5 mm, the female of *Cymbasoma sinopense* sp. nov. has a body length comparable with that of *C. morii* (1.9–3.2 mm) (Martin Thompson, 1973; Grygier, 1994). It is at the low limit of the length range known for specimens of *C. longispinosum* described by Giesbrecht (1893) and Rose (1933) from the Mediterranean and Sars (1921) from Norway (2.3–3.16 mm). Leite et al. (2010) specimens from northern Brazil appear to be even smaller, they ranged between 1.6 and 2.8 mm.

In present specimen, the cephalothorax represents 70% of the total body length. This value is similar to that found in *C. morii* (cf. Martin Thompson, 1973; Grygier, 1994) but diverge from the proportions reported in the species from the Mexican coasts (less than 68%) (Suárez-Morales & Escamilla, 1997; Suárez-Morales & Palomares-García, 1999) (see table I), and also from the value known in *C. longispinosum* (65%) from England (Bourne, 1890). The evidence presented in this paper seems to be enough to recognize a new species, *C. sinopense*, which represents the sixth nominal species actually assigned to the *C. longispinosum* species-group, aside the strict form. It is also the ninth confirmed species record of the genus *Cymbasoma* in waters of the Black Sea-Mediterranean area (Suárez-Morales, 2011). Overall, it is confirmed that the diversity of monstilloid copepods is still underestimated in this region (Suárez-Morales, 2011).

The original description and most of the subsequently published records of this species lack the details that have been recently used in describing the species assigned to the *longispinosum* species-group. In this case, another comparison was made in order to explore if the Mediterranean record (Giesbrecht, 1893) differs from those from the Black Sea (Dolgopolskaya, 1948) and Turkey (present data) (table II). Based on this limited data set, and pending an examination of specimens, it is speculated that the Mediterranean *C. longispinosum* differs from those from the Black Sea in subtle characters including the absence of cuticular ridges on both the forehead area and the genital double somite and in the shape (subtriangular, distally tapered) and size of the inner (endopodal) lobe of the fifth leg (table II). Both forms of the Black Sea: Sevastopol Bay (Dolgopolskaya, 1948) and the Sinop

TABLE II

Comparison among illustrated records of *Cymbasoma longispinosum* (Bourne, 1890) from the Mediterranean (MED) (Giesbrecht, 1893), the northern Black Sea (NBS) (Dolgopolskaya, 1948), and the southern Black Sea (SBS) (present data)

Species/character	<i>C. sinopense</i> (SBS)	Dolgopolskaya (1948) (NBS)	Giesbrecht (1893) (MED)
Cephalothorax/total body relative length	70%	67%	65%
Cuticular ridges on forehead	present, deep, longitudinal regular pattern	present, shallow longitudinal pattern	absent?, forehead with medial notch
Cuticular striae on urosome	present, genital double-somite	present, genital double somite	absent
Posterior margin of genital double-somite	straight in dorsal view	straight in dorsal view	straight in dorsal view
Ventral process between antennules	present, shell-like	present, rounded	present, rounded
Relative length of last antennular segment	46%	43%	49%
Antennule/ cephalothorax relative length	22%	20%	19%
Protuberance on outer margin of leg 5 outer lobe	present	absent	absent?
Leg 5 inner seta/segment length ratio	3.6	3.5	2.2
Outer/inner lobes of leg 5 length ratio	2.0	4.0	1.6
Length of ovigerous spines with respect to body length	1.8 times length of body	2 times length of body	1.4 times length of body
Point of bifurcation of ovigerous spines	at distal end of caudal ramus	beyond distal end of caudal ramus	at distal end of caudal ramus

Peninsula (this study) share several characters including the same kind of forehead ornamentation, striation present on the dorsal surface of the genital double somite, the presence of a medial ventral protuberance near the antennule bases (details on its shape are unavailable from Dolgopolskaya, 1948), similar body proportions and last antennular segment, antennule/cephalothorax ratios, and a rounded inner lobe of the fifth leg (table II). They differ in other details: (1) the fifth leg of the Sevastopol material appears to have a very small inner endopodal lobe and (2) the bifurcation of the ovigerous spines is probably beyond the distal end of the caudal rami (Dolgopolskaya, 1948, fig. 9), although in other figures (Dolgopolskaya, 1948, figs. 5, 6) this bifurcation is located at the distal end of the caudal rami. Hence, considering that the size of the inner lobes of the fifth leg could also be inaccurately depicted, most of the characters suggest that the specimens reported from Sevastopol are assignable to the new species, *C. sinopense*. The divergence between the Mediterranean and Black Sea *Cymbasoma longispinosum*-species supports the general pattern stated by Kovalev et al. (2001), indicating that these two basins have little exchange of zooplanktonic forms.

This is the first record of a monstrolloid species in the Turkish coasts. It is expected that new records will arise from further examination of the zooplankton samples already collected in the area. Also, *C. sinopense* is described from a single specimen, a fact which due to the well-known rarity of monstrolloids is commonly linked to the taxonomy of this group (Suárez-Morales & Palomares-García, 1995; Suárez-Morales, 2000, 2011). Little is known about distribution of *C. sinopense* in other areas of the Black Sea but the record of *C. longispinosum* from the northern sector of the Black Sea (Sevastopol Bay) (Dolgopolskaya, 1948) suggest that it could be widely distributed in the Black Sea, but this cannot be fully confirmed with the available data.

KEY TO THE FEMALES OF SPECIES CURRENTLY ASSIGNABLE TO THE *CYMBASOMA*
LONGISPINOSUM SPECIES-GROUP

- | | |
|---|-------------------------|
| 1. Cuticular ridges present on forehead between antennule bases | 2 |
| – Cuticular ridges absent, forehead surface between antennule bases smooth | 4 |
| 2. Urosome cuticular striae on genital double somite only. Relative length of cephalothorax with respect to total body length more than 68% | 3 |
| – Urosome cuticular striae on genital double, anal, and fifth pedigerous somites. Relative length of cephalothorax with respect to total body length about 65% | <i>C. californiense</i> |
| 3. Forehead ridges arranged in longitudinal parallel pattern, medial ventral process between antennule bases present, shell-like, ovigerous spines 1.8-2.0 times the length of body | <i>C. sinopense</i> |
| – Forehead ridges arranged in complex, swirl-like pattern, medial ventral process between antennule bases absent, ovigerous spines relatively short, about as long as body | <i>C. chelemense</i> |
| 4. Posterior margin of genital double-somite straight in dorsal view | 5 |

- Posterior margin of genital double-somite clearly curved, convex in dorsal view *C. morii*
- 5. Cephalothorax representing less than 66% of total body length; point of bifurcation of ovigerous spines not reaching distal end of caudal rami
..... *C. cf. longispinosum* from Brazil (Leite et al., 2010)
- Cephalothorax representing more than 66% (usually 68-72%) of total body length; point of bifurcation of ovigerous spines beyond distal end of caudal rami 6
- 6. Point of bifurcation of ovigerous spines slightly beyond distal end of caudal rami; medial ventral process between antennule bases absent; fifth leg outer/inner lobes length ratio = 1.9
..... *C. longispinosum* s. str. (Bourne, 1890)
- Point of bifurcation of ovigerous spines well beyond distal end of caudal rami; medial ventral process between antennule bases present, rounded; fifth leg outer/inner lobes length ratio = 3.3
C. janetae

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