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A new species of the genus *Corynophrya* (Ciliophora: Suctorea) from the west coast of India, Arabian Sea

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Abstract:

The article presents the description of a new species of the suctorian genus *Corynophrya* inhabiting the body surface (cuticle) of harpacticoid copepod from the west coast of India, Arabian Sea. The diagnosis of the genus is also emended.

Résumé: L'article présente la description d'une nouvelle espèce du genre *Corynophrya* habitant la surface corporelle d'un copépode harpacticoïde de la côte ouest de l'Inde, la mer d'Arabie. Le diagnostic du genre est également amélioré.

Key words: suctorea ciliate, *Corynophrya*, epibiosis, harpacticoid copepod host.

Introduction

The genus *Corynophrya* Kahl, 1934 was established by Kahl (1934) and is characterized by the presence of aloricate, non-flattened body with single apical bundle of tentacles, rounded macronucleus and well developed stalk (Kahl, 1934; Curds, 1987). The reproduction by endogenous budding was postulated in previous reviews (Kahl, 1934; Curds, 1987; Dovgal, 2002) but Bartsch & Dovgal (2010) observed exogenous (vermiform) budding in *C. abyssalis* Bartsch & Dovgal, 2010. As a result, the family Corynophryidae was transferred from the subclass Endogenia Collin, 1912 into subclass Exogenia Collin, 1912 (Bartsch & Dovgal, 2010).

Epibiont ciliates from west coast of India were studied by many authors eg. Santhakumari & Gopalan (1980), Santhakumari (1985, 1986 & 1997), Santhakumari & Nair (1985), Chatterjee (1996), Dovgal et al. (2008 & 2009), Chatterjee et al. (2013, 2019a, b).

The present article is devoted to a description of a new species *Corynophryaelongata* from the west coast of India (Arabian Sea). The diagnosis of the genus *Corynophrya* is also updated.

Material and methods

The study area is located 5 kilometers south of Karwar, Lat: 14°46'38.57" Long: 74°06'59.92" (District: Uttar Kannada, Karnataka), which is near the Goa-Karnataka border, west coast of India, Arabian Sea. The mouth of river Kali is situated near Karwar (Fig. 1).

The water depth at this location was 7m in April, 2019 (Premonsoon). The top layer of sediment was collected with a Van-veen grab. Subsampling for meiofaunal sediment was done with an acrylic core of 4.5cm and the sample was immediately preserved with buffered formalin- Rose Bengal solution until further laboratory analysis.

Meiofaunal organisms, ciliate infested harpacticoid copepods were sorted under a stereo-zoom microscope. Slides were prepared by placing the specimen in 50% glycerol and ethanol solution, and sealed with DPX. Further microscopic analysis was carried out using Nikon Eclipse Ti2 Inverted microscope. Photomicrographs were obtained by using a Nikon DS-Ri2 digital camera.

Measurements of ciliates were made using the software TopView 3.7 for processing of digital images.

The terminology and systematic position of suctorian ciliates follows Dovgal (2002 & 2013).

A type series for new species is deposited and registered at CSIR—National Institute of Oceanography Taxonomic Reference Centre, Goa, India (CSIR-NIO).

Results and Discussion

Class Suctorea Claparède & Lachmann, 1859

Subclass Exogenia Collin, 1912

Order Vermigemmida Jankowski, 1973

Family Corynophryidae Jankowski, 1981

Genus *Corynophrya* Kahl, 1934

***Corynophrya elongata* sp.**

(Fig. 2A-D)

Diagnosis

Cell body elongate, cylindrical, with hemispherical apical surface, longitudinal ribs absent. There are up to 25 contractile, clavate, tentacles at the apical surface. The additional lateral bundle of tentacles might be also observed on posterolateral half of cell body (Fig. 2D) in some individual. Macronucleus, compact, rounded, centrally or subcentrally located. Stalk straight, equal in diameter for all of its length with the exception of zone of contact with base of body, where a good developed epicone is formed. Reproduction not observed.

Dimensions (in μm): (measurements were taken from 3 individuals).

Body length 75-86; body width 24-37; macronucleus diameter 10-13; stalk length 31-42; stalk diameter 7-10; epicone width 13-16; length of contracted tentacles 11-25.

Type locality

5 kilometers south of Karwar, Lat: 14°46'38.57" Long: 74°06'59.92" (District: Uttar Kannada, Karnataka, India)

Type host

Meiobenthic harpacticoid copepods

Type material

Type specimens on the host were deposited in the reference collection of the CSIR—

National Institute of Oceanography Taxonomic Reference Centre, Goa, India (CSIR-NIO) with the deposition no: NIO1017/20.

Differential diagnosis

The new species differs from other *Corynophrya* representatives (Table 1) by the elongate, cylindrical cell body, and presence the additional lateral bundle of tentacles in some individuals.

Etymology

The specific epithet is given after the characteristic elongated cell body.

Remarks

The vermiform suctorian swarmer near dorsal region of basibiont at Fig. 2A possible is a migratory stage of *Thecacineta calix*, present on the same copepod host. Two individuals of *T. calix* present near the tail region of same copepod host at Fig 2A in which *Corynophrya* new species was found.

The presence of peculiar character such as ‘additional lateral bundle of tentacles might be also observed on posterolateral half of cell body’ in the new species, which were not previously noted in other representatives of the genus, requires an amendment of the generic diagnosis of *Corynophrya*, which is presented below.

Genus *Corynophrya* Kahl, 1934 (charact. emend.)

Diagnosis. Mainly marine, aloricatesuctorians with spherical to ovoid or cylindrical, rounded in cross section cell body. Tentacles retractile in a single group that is restricted to the apical region on the body. The presence of additional lateral bundle of tentacles is also possible. Actinophores absent. Macronucleus usually rounded. Epizoic on hydroids, crustaceans and polychaetes but also noted on marine algae. Type species – *Acinetalyngbyi* (Ehrenberg, 1834).

The genus *Corynophrya* includes nine species to date (including the present new species): *Corynophryalyngbyi* (Ehrenberg, 1834), *C. abyssalis* Bartsch & Dovgal, 2010, *C. columbiae* (Wailes, 1943), *C. conipes* (Mereschkowsky, 1877), *C. francottei* (Sand, 1895), *C. macropus* (Meunier, 1910), *C. symbiotica* Jankowski, 1981, *C. troid* (Claparède & Lachmann, 1859) Jankowski, 1981 and *C. elongata* n. sp.

Table 1 is showing comparison of some characters in species of the genus *Corynophrya* along with host, localities and references

Suctorians of the genus *Corynophrya* are rare in occurrence. Among recent observations, we can mention the presence of *C. abyssalis* on hydrothermal vent halacarid mites (Bartsch & Dovgal, 2010), *Corynophrya columbiae* from Slovenian coastal water, Bay of Piran, Adriatic Sea on

harpacticoid copepod *Typhlamphiascus* sp. (Fernandez-Leborans et al., 2012) and the occurrence of the type species *C. lyngbyion* harpacticoid copepods in the Bosphorus Strait's outlet area of the Black Sea (Sergeeva&Dovgal, 2014).

The species described as *C. anisostyla* Fernandez-Leborans& del Arco, 1996 (Fernandez-Leborans& del Arco, 1996) has been transferred to *Paracineta* Collin, 1912 by Dovgal (2002) on the ground of presence of the lorica in the species.

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Legends for figures:

1. Map of sampling location near Karwar, west coast of India, Arabian Sea.
2. Suctorian *Corynophryaelongata* n. sp. A: attached on harpacticoid copepod (arrows indicating new species); B: Magnified view of *Corynophryaelongata*; C. Camera lucida diagram of *Corynophryaelongata*; D: Another specimen of *Corynophryaelongata* showing additional lateral bundle of tentacles on posterolateral half of cell body. Scale Bars: 2A = 100 μm ; B-D = 50 μm .

Legend for Table:

Table 1. Comparison of some characters in species of the genus *Corynophryaelongata* along with host, localities and references

Table 1. Comparison of some characters in species of the genus *Corynophrya* along with host, localities and references

Species	Arrangement and contractility of tentacles	Stalk	Shape of body	Macronucleus	Host/Substrate	Localities and References
<i>Corynophrya yngbyi</i> (Ehrenberg, 1834)	Located on the anterior body surface, retractile	Long, at least four times of body length	Oval in section, slightly wider anteriorly	Spherical or horse-shoe shaped	Marine algae, <i>Sertularia</i> sp., <i>Clytia</i> sp., harpacticoid copepods	The North Sea, the Baltic Sea, Copenhagen, the Mediterranean Sea, Sète (Kahl, 1934); Bosphorus Strait' south area of the Black Sea (Sergeeva & Dovgal, 204)
<i>Corynophrya byssalis</i> Bartsch & Dovgal, 2010	Located on the anterior body surface, non-retractile	Short, slightly widened towards cell body, with epicone	Body saciform, rounded in cross-section, with several longitudinal ribs	Rounded to slightly ovoid	Halacarid <i>Copidognathus nautili</i>	Mid-Atlantic Ridge, station Ashadze (Bartsch & Dovgal, 2010)
<i>Corynophrya olumbiae</i> (Wailes, 1943)	Located on anterior half of body, retractile	Short, less than three times of the body length	Spherical to ovoid, round in section	Spherical	Crustaceans Harpacticoid copepod <i>Typhlamphiscus</i> sp.	Strait of Georgia, the Pacific Ocean, Canada (Wailes, 1943); Slovenian coastal water, Bay of Piran, Adriatic Sea (Fernandez-leborans et al 2012)
<i>Corynophrya onipes</i> (Mereschkowsky, 1877)	Located on the anterior body surface, retractile	Long, 8-10 times of the body length	Ovoid to pyriform	Spherical	Algae <i>Ptilotaplumosa</i> , <i>Ceramium</i> sp.	The White Sea (Mereschkowsky, 1877)
<i>Corynophrya francottei</i> (Sand, 1895)	Located on the anterior body surface, retractile	Stalk long, at least three times of the	Spherical to ovoid	Oval to spherical	Hydroid <i>Sertularia</i> sp., algae <i>Ceramium rubrum</i>	Le Portel, Strait of Dover, France (Sand, 1901)

		body length				
<i>Corynophrya macropus</i> (Meunier, 1910)	Located on the anterior body surface, retractile	Long, at least three times of the body length, wider near the zooid, striated longitudinally	Spherical	Spherical		Tromsø, Norway (Kahl, 1934)
<i>Corynophrya symbiotica</i> Jankowski, 1981	Located on the anterior body surface, retractile	Short, slightly widened towards the body	Sacciform, elongated	Ovoid	Polychaete worms of family Aphroditidae	Arctic seas (Jankowski, 1981)
<i>Corynophrya tricola</i> (Claparède & Lachmann, 1859)	Radial distributed on body surface, with extended basis	Long, thin	Spherical	Not observed	Algae <i>Ceramium</i> sp.	North Sea, near Glesnaes, Norway (Kahl, 1934)
<i>Corynophrya longata</i> n. sp.	Located on the anterior body surface, retractile	Straight, with epicone	Elongated, cylindrical	Rounded	Harpacticoid copepods	Near Karwar, Karnataka, West coast of India, Arabian Sea – Present report

Fig 1.

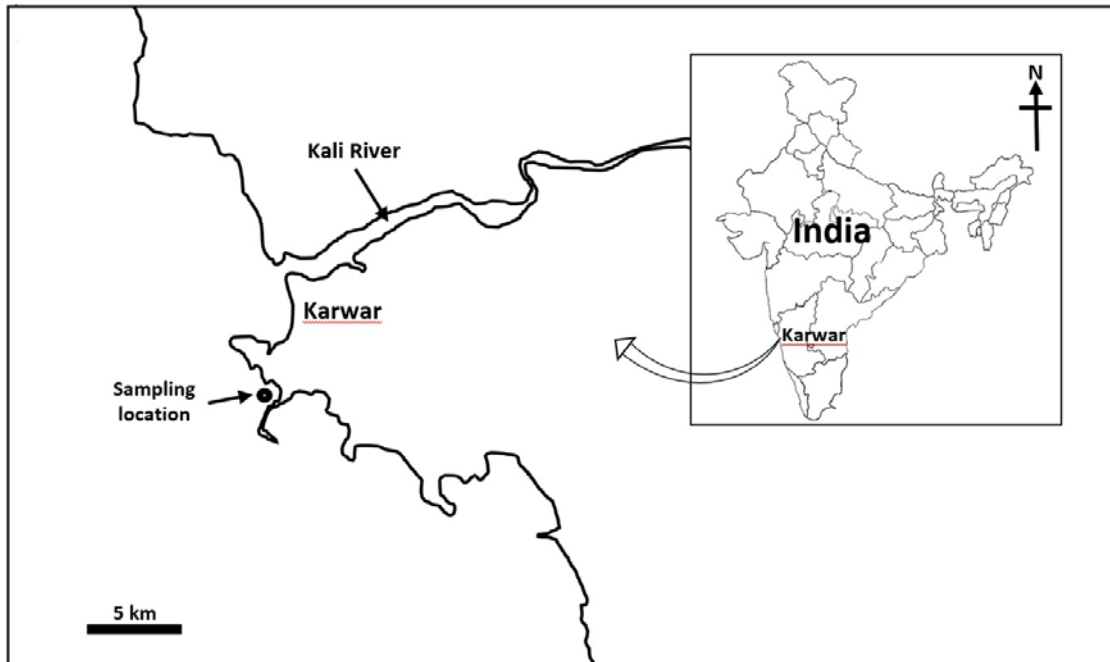


Fig.2.

