

Report of ciliate epibionts (Ciliophora, Suctorea) on meiobenthic invertebrates from the Indian coast near Karwar, Karnataka

Tapas Chatterjee¹, Igor Dovgal² and Mandar Nanajkar³

¹ Crescent International School, Bario, Govindpur, Dhanbad 828109, Jharkhand, India

² A. O. Kovalevsky Institute of Biology of the Southern Seas RAS, Sevastopol, 299011, Russia

³ CSIR, National Institute of Oceanography, Dona Paula, Goa-403004, India

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Summary

The article describes four epibiont suctorian ciliates, viz. *Thecacineta cothurnioides* (Collin, 1909) and *Trematosoma rotunda* (Allgén, 1952) on the nematode *Tricoma* sp., *Thecacineta calix* (Schröder, 1907) and *Acineta tuberosa* Ehrenberg, 1834 on the harpacticoid copepod, from the Karwar coast of India (Karnataka state), the Arabian Sea. *Trematosoma rotunda* is reported here first time as epibiont on the genus *Tricoma* representative. The systematic positions of the found suctorian species, their brief descriptions, measurements, and data on their distribution, hosts and localisations at the host body are presented.

Key words: ciliate epibiont, marine meiobenthos, India, Suctorea

Introduction

The phenomenon of epibiosis is common in marine biocenoses, and suctorian ciliates belong to epibiont ciliates that most frequently occur in aquatic habitats. Suctorians can be found on a wide diversity of hosts and substrates. The majority of these ciliates are commensals of various water invertebrates or vertebrates (Dovgal, 2002, 2013).

Epibiont ciliates from the west coast of India were studied by many authors (Santhakumari 1985, 1986; Chatterjee, 1996; Dovgal et al., 2008, 2009; Chatterjee et al., 2013, 2019a, 2019b).

The present article reports four suctorian ciliate species inhabiting meiobenthic invertebrate hosts (harpacticoid copepods and nematodes) from the Karwar coast of the Arabian Sea, Karnataka state, India.

Material and methods

The study area is located 5 kilometres south of Karwar (District: Uttar Kannada, Karnataka), Latitude: 14°46'38.57" N, Longitude: 74°06'59.92"E, which is near the Goa-Karnataka border, west coast

of India. The mouth of the river Kali is located close to Karwar. The study area is a subtidal region of a small bay (Fig. 1), which is lined by Kamat beach towards east. The composition of sediment was 81.6% sand, 3.4% silt and 13.2% clay. The bottom water temperature was 30.6 °C, salinity 34.9‰, and pH 7.1. The dissolved oxygen amounted 6.5 mg/l in the bottom water. The organic carbon at the location was 0.17%. The water depth at this location was 7 m in the study period (April 2019, Premonsoon).

The samples of the top layer of sediment were collected with the aid of a Van-Veen grab. Subsampling of the sediment with meiofauna was done with an acrylic core of 4.5 cm, and the samples were immediately preserved with buffered formalin-Rose Bengal solution until further laboratory analysis. Meiofaunal organisms infected by ciliates were individually picked under an Olympus dissecting microscope. Measurements were carried out using the program Toup View 3.7 for digital camera. The systematic position of suctorian ciliates follows Dovgal (2002, 2013). Specimens are kept in the collection of the third author (MN).

Results and discussion

Class Suctorea Claparède et Lachmann, 1859
Subclass Exogenia Collin, 1912
Order Vermigemmidia Jankowski, 1973
Family Thecacinetidae Matthes, 1956
Genus *Thecacineta* Collin, 1909

Thecacineta cothurnioides (Collin, 1909) (Fig. 2A)

Material examined. Numerous individuals of species are evenly distributed throughout the body surface of the nematode *Tricoma* sp.

Brief description. Marine loricate suctorian. Cell body entirely fills the lorica and attaches to its base. Apical part of the body conical. About 15 tentacles arise from the apical surface of body slightly projecting from the lorica. Macronucleus spherical in shape, located in the basal region of the cell. Contractile vacuole small, single and placed near macronucleus. Lorica smooth. Stalk long, slightly curved, equipped with very small widening (physon) in the junction with lorica.

Measurements based on four individuals (in µm): lorica length 37–42, lorica width 18–23, lorica mouth diameter 8–13, stalk length 9–18, stalk diameter 2, macronucleus diameter 7, tentacle length 3–7.

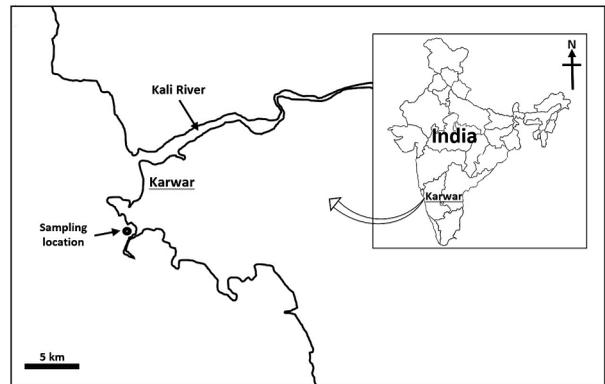


Fig. 1. Map of meibenthos sampling location near Karwar, west coast of India, the Arabian Sea.

Remarks. Collin (1909) firstly described this species on the harpacticoid copepod *Cletodes longicaudatus* (Boeck, 1872) from Banyuls-sur-Mer at the Mediterranean coast of France. Dovgal et al. (2009) reported this species from Ratnagiri, Maharashtra state of India, Arabian Sea, central-west coast of India on the nematode *Tricoma* sp. Bhattacharjee (2014) reported this species from Rushikulya (Odisha State of India), north-western Bay of Bengal on the nematodes *Chromaspirina* sp. The present article recorded the new locality of *T. cothurnioides* from Karwar, Karnataka state of the west coast of India.

Thecacineta calix (Schröder, 1907) (Fig. 2 B)

Material examined. Two individuals found on a harpacticoid copepod, attached near the furca region of the host.

Brief description. Marine loricate suctorian. Cell body entirely fills the lorica and attach to its base. Apical part of body protrudes beyond the lorica aperture. Clavate tentacles (up to 30) arise from the apical surface of body. The walls of the lorica are covered with transverse ribs. Macronucleus ovoid, located in the basal region of the cell. Large contractile vacuole located in the basal region of the cell, usually near macronucleus.

Measurements based on two individuals (in µm): lorica length 77–120, lorica width 37–46, lorica mouth diameter 28–41, stalk length 12–21, stalk diameter 3–4, body length 75–103, body width 20–23, macronucleus diameter 10–13.

Remarks. *T. calix* has been reported as an epibiont on nematodes, copepods, and halacarid mites from the Atlantic, Pacific, Antarctic and Indian Oceans, from the intertidal region to the

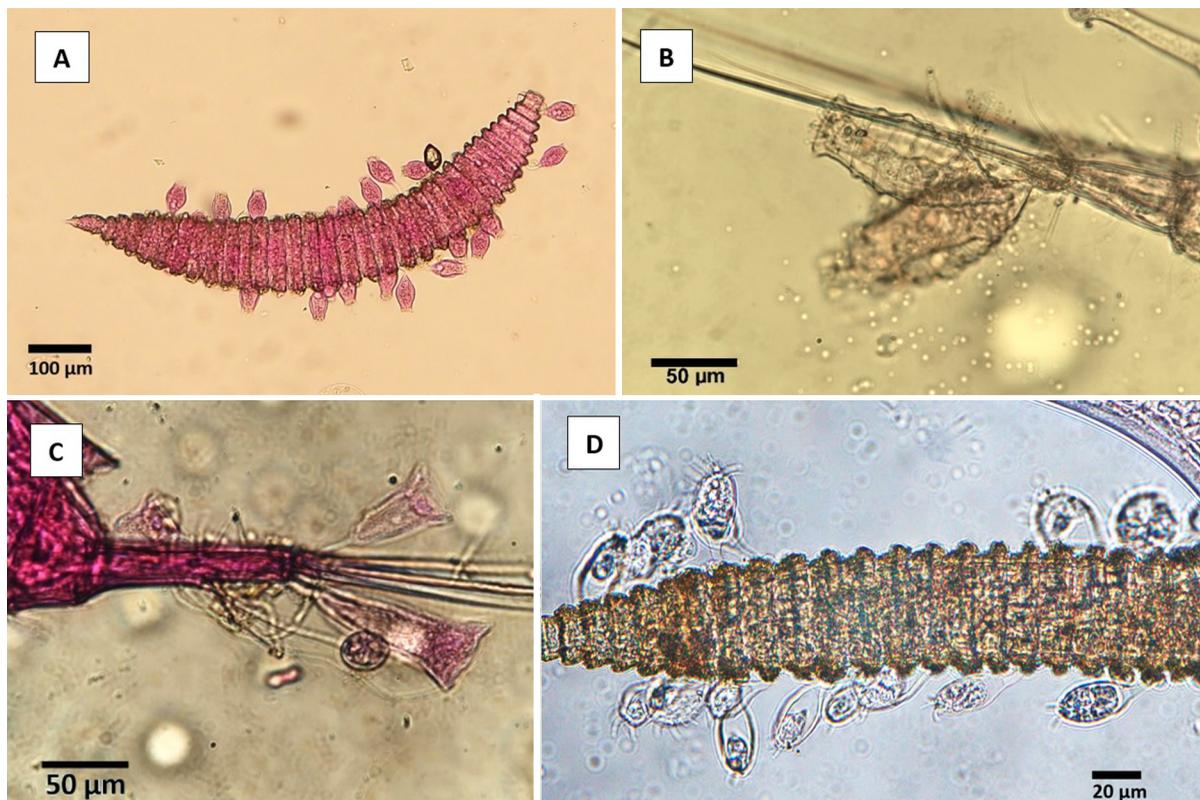


Fig. 2. Ciliate species found near Karwar, Indian coast. A – *Thecacineta cothurnioides* (Collin, 1909) on *Tricoma* sp.; B – *Thecacineta calix* (Schröder, 1907) on harpacticoid copepod; C – *Acineta tuberosa* Ehrenberg, 1834 on furca of harpacticoid copepod; D – *Trematosoma rotunda* (Allgén, 1952) on *Tricoma* sp.

deep sea. Details of distribution and host specificity of this species are given in Chatterjee et al. (2019).

Subclass Endogenia Collin, 1012
Order Acinetida Raabe, 1964
Family Acinetidae Ehrenberg, 1834
Genus *Acineta* Ehrenberg, 1834

Acineta tuberosa Ehrenberg, 1834 (Fig. 2 C)

Material examined. Two individuals found on a harpacticoid copepod, attached near the furca region of the host.

Brief description. Suctorian ciliate with a smooth, triangular or cup-shaped, laterally flattened lorica. The lorica aperture is dumbbell-shaped. The upper half of the lorica is characterized by sharp widening. The body is attached to the bottom of the lorica. Macronucleus spherical or elongated, medial, located along the longitudinal axis of the cell. The single contractile vacuole located subapically, above the macronucleus. The stalk is long, sometimes

curved, equipped with a well-developed attachment disk. In the area of connection with the lorica, the stalk is somewhat widened, in some cases might be dipped to the base of the shell.

Measurements based on two individuals (in µm): lorica length 57-96, lorica width 22-36, lorica mouth width 38-45, stalk length 18-24, stalk diameter 4-5, macronucleus diameter 14.

Remarks. The species was reported from marine and brackish waters as periphytic or nonspecific commensals of various aquatic invertebrates (Dovgal, 2013).

In India, this species was reported from Andhra Pradesh coast (Bay of Bengal) as epiphytic on algae (Radhakrishna, 1984; Kalavati and Raman, 2008). Chatterjee et al. (2013) reported this species on a harpacticoid copepod from the Dias beach, Dona Paula, Goa, India (the Arabian sea).

Genus *Trematosoma* Batisse, 1972

Trematosoma rotunda (Allgén, 1952) (Fig. 2 D)

Material examined. Numerous individuals distributed throughout the body surface of the nematode *Tricoma* sp.

Brief description. Marine loricate suctorian. Cell body short, rounded, laterally flattened, entirely fills up the lorica and clamped to their aperture border. Lorica delicate, gently striated. Tentacles clavate, short, arranged at the upper body surface as a row in two groups. Macronucleus spherical or oval, centrally located. Stalk short, thin, slightly ribbed.

Measurements based on four individuals (in μm): lorica length 26–29, lorica width 14–22, body length 19–39, body width 11–20, stalk length 5–15, stalk diameter 3–4, macronucleus diameter 6–8, length of tentacles 3–12.

Remarks. Allgén (1952) reported this species from Falkland Islands, located near the southern tip of Argentina and Antarctic Peninsula (Graham Land) on the nematodes *Desmodora tenuispiculum* Allgén, 1928 and *D. stateni* Allgén, 1928, respectively. Dovgal et al. (2009) provided remarks on systematics and nomenclature of this species. This species was reported from Ratnagiri, Maharashtra, west coast of India, the Arabian Sea, as epibiont on the nematodes *Pseudochromadora* sp. (Dovgal et al., 2009). The above-mentioned authors also identified this species from the intertidal zone of North-Eastern Queensland, Australia, based on microphotograph of Fisher (2003). Bhattacharjee (2014) reported it at the coast of Rushikulya (Odisha State of India) on the nematode *Chromaspirina* sp. Ansari and Bhadury (2016) reported it from the mangrove ecosystem of Sagar Island of Sundarbans from the north-western Bay of Bengal, on the nematodes *Dorylaimopsis punctata*. Ghosh and Mandal (2019) reported it on the nematodes *Desmodora scaldensis* de Man, 1889 from the subtidal region of the Matla estuary, Sundarbans, Bay of Bengal. In the present record, this species was registered near Karwar, Karnataka state of the west coast of India, on the nematode *Tricoma* sp. *Trematosoma rotunda* is reported here first time as an epibiont on the host from the genus *Tricoma*.

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Address for correspondence: Igor Dovgal. A.O. Kovalevsky Institute of Biology of the Southern Seas RAS, Nakhimov Ave. 2, Sevastopol, 299011, Russia; e-mail: dovgal-1954@mail.ru