

SOME CILIATES FROM THE MARINE WOOD-BORING ISOPOD *SPHAEROMA*

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ABSTRACT

Seven ectocommensalic ciliates, namely, *Vorticella companula*, *Zoothamnium rigidum*, *Cothurnia gammari*, *Legenophrys cochinensis* sp. nov., *Epistylis gammari*, *Folliculina producta* and *Folliculina boltoni*, all first-time recorded from the wood-boring isopod genus *Sphaeroma*, are described. These were collected from the appendages and body proper of *S. terebrans*, *S. annandalei* and *S. triste* from the southwest coast of India. *Legenophrys cochinensis*, because of its host specificity and distinct characters, is treated as a new species under the order Peritrichida and is described in more detail.

INTRODUCTION

Many aquatic arthropods harbour rich hordes of ectocommensalic ciliates, chiefly sessile peritrichs (Stilier 1953, Nenninger 1948, Precht 1935) and chonotrichs (Wallengreen 1895, Mohr 1948, 1959, Mohr et al 1963), and in addition suctorians and a number of free swimming ciliates. Mohr (1959) was the first to describe an associated fauna from the wood boring isopod *Limnoria*. Fenchel (1965) described the ectocommensalic sessile peritrichs from the amphipod genus *Gammarus*.

The present paper describes a few ciliates found associated with the marine wood-boring isopod *Sphaeroma* in the southwest and east coasts of India. All are newly recorded from the isopod.

The wood-boring isopod *Sphaeroma* comprises three species, namely, *Sphaeroma terebrans*, *S. annandalei* and *S. triste*, in these waters (Pillai 1961). Of these, *S. terebrans* is the abundant form.

MATERIAL AND METHODS

The marine wood-boring isopods were collected from submerged wooden structures such as jetty piles, country canoes, fenders, dealwood boxes and test

panels along the coast. The isopods were carefully removed from their burrows, washed in filtered sea water and examined for associates. Then the body surface of the host was scraped out with a scalpel and the scrapings were placed on a slide and the associated organisms were studied. 10-60 host specimens from all localities were examined and, in addition, specimens were also studied from selected localities.

Sessile peritrichs were studied alive and stained with methyl green in acetic acid. Smear method had produced little distortion of the animals and was a much easier way to obtain well-differentiated preparation of the organisms concerned. The fixing agents used were Schaudin's, Bonin's, Zenker's and formalin. Among the various stains used, Delafield's haematoxylin and Mallory's triple connective tissue stain are specially noteworthy.

TAXONOMIC DETAILS

All the seven species described hereunder are suspension feeders and all of them are sessile.

Order: PERITRICHIDA Stein
Suborder: Essilina Khal
Family: Vorticellidae Ehrenberg
Genus: *Vorticella* Ehrenberg

Inverted-bell form, either colourless, yellowish or greenish; peristome outwardly extended, pellicle sometimes annulated, with a contractile stalk, macronucleus band-form; 1-2 contractile vacuoles; solitary; in fresh water or salt water attached to submerged objects and aquatic animals or plants.

1. *Vorticella companula* Ehrenberg

Inverted-bell-shaped body, colourless, peristome outwardly extended, with a contractile stalk.

Endoplasm filled with refractile reserve granules, vestibule very large with an outer pharyngeal membrane. Animal measures 50-157 μ by 35-99 μ ; peristome 60-125 μ wide. Stalk 50-4150 μ by 5.6-12 μ (Fig. 1,a).

This is the first record of this species from the isopod *Sphaeroma terebrans*, which were collected from Ernakulam.

Genus: *Zoothamnium* Bory

Colonial, myonemes of all stalks of a colony are continuous with one another so that the entire colony contracts or expands simultaneously. Several species.

2. *Zoothamnium rigidum* Precht

Several specimens were collected from the appendages and body proper of *Sphaeroma terebrans* from Ernakulam and from those of *S. annandalei* from Aroor, a few miles south.

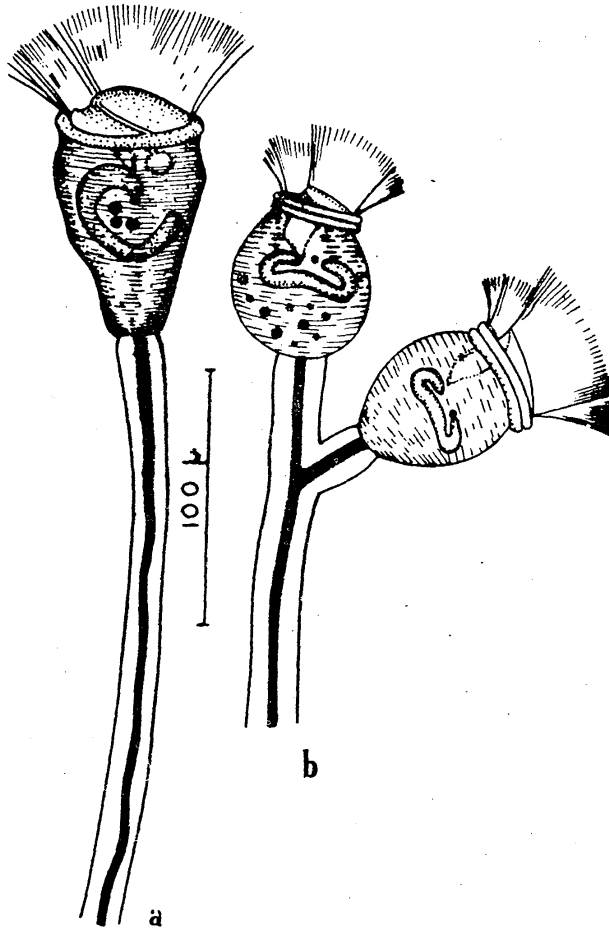


FIG. 1. a: *Vorticella companula* showing the details of macronucleus, micronucleus, food vacuoles, myoneme, etc. b: *Zoothamnium rigidum* showing the details of structure.

Measures up to 800 μ high, pine-shaped, colonies consisting of up to 50 individuals. Contractile elements are usually absent in the main stem of the large colonies. The zooid consists of 40-50 individuals and measures 40-80 μ by 30-45 μ . The sphincter collar is double, but its degree of development varies. The macronucleus is circular in cross section and often regularly twisted. The food vacuoles are often filled with a dark substance of algal origin making the ciliate very opaque (Fig. 1,b).

Family: Vaginicolidae Kent

Genus: *Cothurnia* Ehrenberg

Lorica with short stalk attached to the substratum directly with its posterior end. The body is elongated and cylindrical.

3. *Cothurnia gammari* Percht

Many specimens were collected from the appendages and body proper of *Sphaeroma terebrans* and *S. annandalei*.

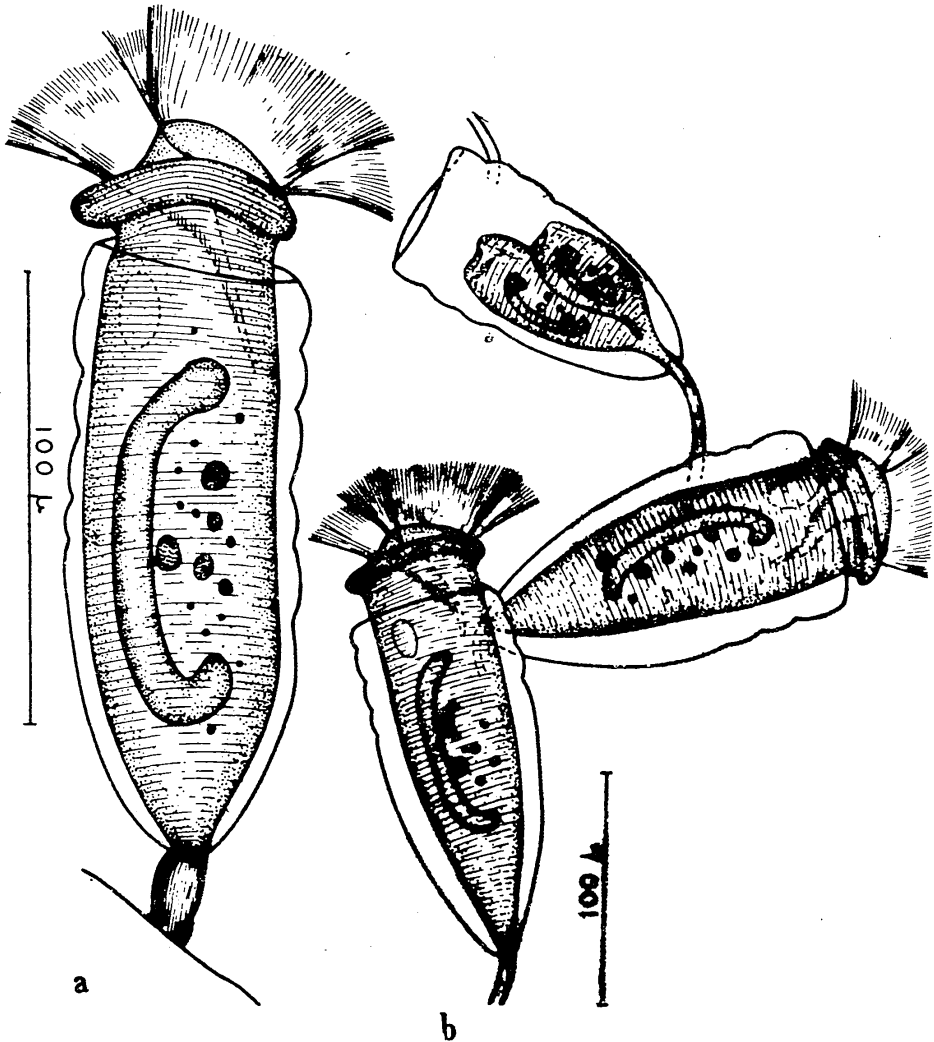


FIG. 2. a: *Cothurnia gammari* showing the structure. b: *C. gammari*, colony showing the nature of attachment.

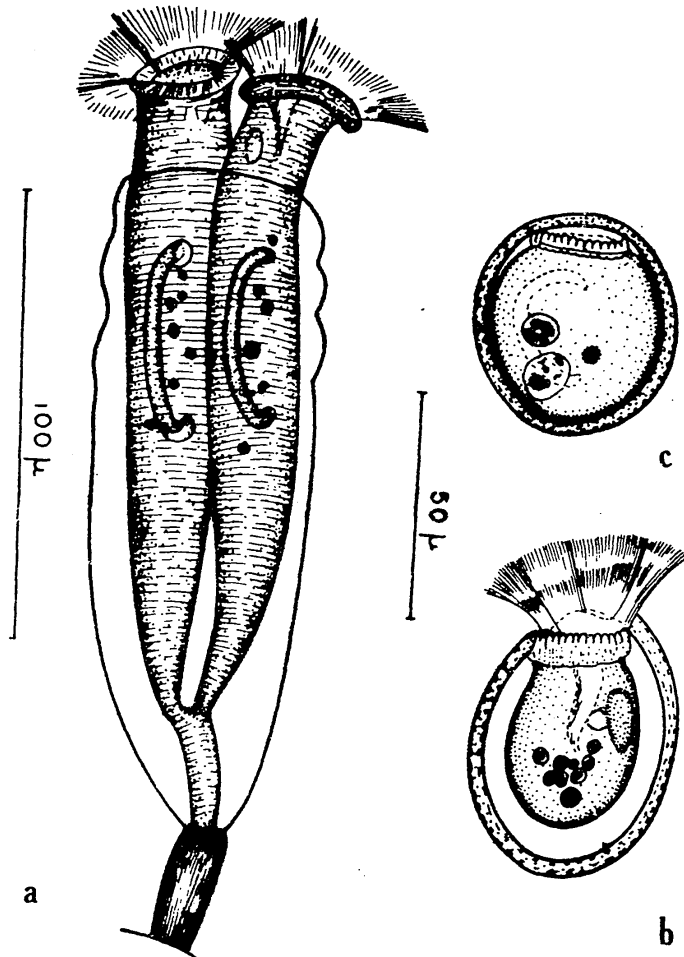


FIG. 3. a: *C. gammari*, after fission two individuals in a colony. b: *Lageiophrys cochinensis* sp. nov. showing the structure. c: *L. cochinensis* sp. nov., showing the stage of cilia withdrawn.

Measures 90-120 μ in height and 25-34 μ in width. The anterior oral portion is ciliated. The posterior end has a small stalk 9-14 μ long. The macronucleus is sausage shaped and is centrally located. Food vacuoles are present near the macronucleus.

Single as well as colonial forms (Fig 2, a & b) have been noticed during the study. Binary fission is seen to occur (Fig. 3, a). The chief site of attachment is on the paraeopods of *Sphaeroma*, collected from Ernakulam and Ayiramthengu.

Fenhel (1965) found this form on *Gammarus locusta* from Oresund and on *G. oceanicus* from Oresund and the Isefjord.

Family: Lagenophryidae Butschli

Genus: *Lagenophrys* Stein

These are loricate ciliates of which the peristomial disc lies at the tip of a stout neck, which is usually the only part of the body to be extended through the mouth of the lorica. They attach to fresh- or salt-water animals.

4. *Lagenophrys cochinensis* sp. nov.

A lot of specimens of this new species were collected from the appendages and body proper of the hosts, *S. terebrans* and *S. annandalei*. Another set of specimens were collected from *S. triste* from Pamban and Rameswaram on the east coast of India.

Description of the species: Lorica of the animal measures of 60-90 μ by 50-65 μ and is about 23 μ in height. The mouth of the lorica is 20-25 μ wide. Both the anterior and posterior lips are strongly developed. The posterior lip has a crescentic thickening resembling a transversally folded membrane. The animal measures 50-65 μ by 24-28 μ . The macronucleus is oblong, situated on the right side of the animal (the ventral side being the one turning against the substrate). The centre of the animal is occupied by large food vacuoles (Fig. 3,b).

Observations: The food of the ciliate consists mostly of particles which it obviously obtains from the food of the host. Vital staining helps to notice the movements of the animal inside the lorica. When disturbed, the ciliate suddenly

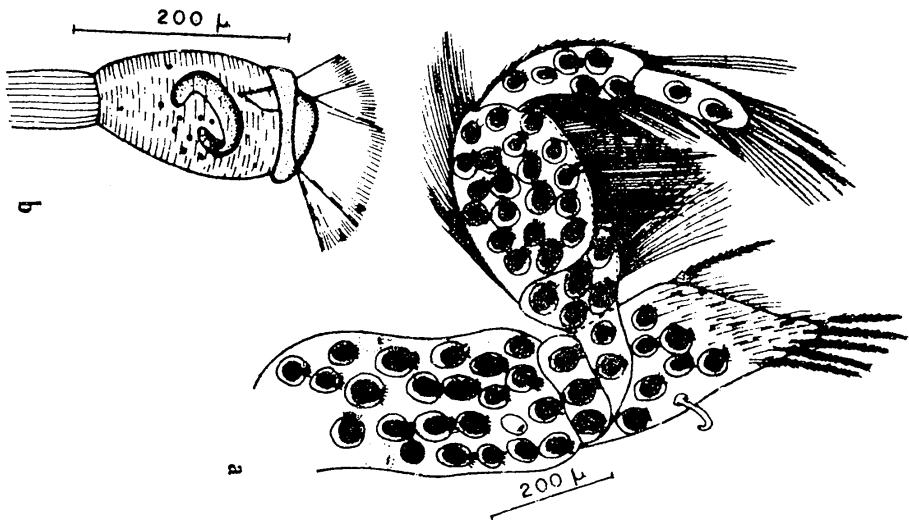


FIG. 4. a: *L. cochinensis* sp. nov., showing the attachment on the maxilliped of the host. b: *Epistylis gammari* showing the structure.

withdraws the neck, and contracts the cilia. Together with the withdrawal of the neck the animal assumes a different position within the lorica as shown in Fig. 3, c.

The ciliate is usually seen attached to the body of the host, irrespective of appendages or the main body (*see* Fig. 4a). Maximum attachments (523) have been noticed on the pleopods. Fenchel (1965) noticed these only on the underside of the maxillipeds of *Gammarus locusta* and *G. oceanicus*. The dispersal of the organism from host to host has not been observed so far. In a certain host specimen empty lorica were also noticed.

There are several recent papers dealing with such aspects as the ecology, life cycle, and systematics of *Lagenophrys* (Corliss and Brough 1965, Debaiseux 1959, Kane 1965) in which the authors are of opinion that the host specificity, to some extent, can be used as a taxonomic criterion. On the basis of this suggestion, and because of the differences exhibited by this form, it is treated as a new species. Hitherto nobody had described *Lagenophrys* sp. from the wood boring isopod *Sphaeroma*.

Family: Epistylidae Kent

Genus: *Epistylis* Ehrenberg

Inverted-bell shaped, individuals usually on dichotomous non-contractile stalk forming large colonies, attached to fresh- or saltwater animals.

5. *Epistylis gammari* Precht

A few colonies of this species were collected from the antennae of *S. terebrans* from the Ernakulam channel, and also a few from the upper lip of *S. triste* from Tuticorin.

A colony may measure up to 600 μ in height. Macronucleus is sausage shaped and situated transverse to long axis (Fig. 4,b). There is a ciliated wall in the gullet. As many as 12 individuals were counted in a single colony.

This is the first record of this species from the isopod *Sphaeroma*. Previous record of this species was from *Gammarus* sp.

Order: HETEROTRICHIDA Stein

Suborder: Heterotrichina Stein

Family: Folliculinidae Dons

Genus: *Folliculina* Lamark

Horny or chitinous lorica attached on broad surface, neck of the lorica oblique to perpendicular, sometimes with a collar or spiral ridge, neck uniform in diameter. In salt- or freshwater.

6. *Folliculina producta* (Wright)

A few specimens were collected from the body of *S. triste* from Pamban.

Lorica about 250 μ long, yellowish brown in colour (Fig. 5, a). This species has been previously recorded from the Atlantic coast. This is the first record from *S. triste*.

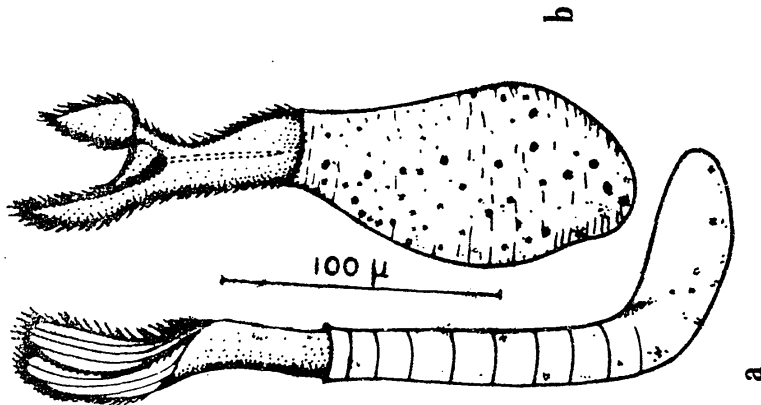


FIG. 5. a: *Folliculina producta*. b: *F. boltoni*.

7. *Folliculina boltoni* Kent

Several specimens were collected from the body of *S. terebrans* and *S. annandalei* during the monsoon from the Ernakulam channel (Fig. 5,b).

Lorica about 200 μ long, bluish green in colour. Aperture only slightly enlarged and neck oblique.

This species has been previously recorded from the Atlantic and the Pacific Oceans. This is the first record of the species from these hosts.

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