

4

articles and review

A BRIEF ACCOUNT OF THE COMMENSALS, ASSOCIATES AND PREDATORS OF THE MARINE WOOD BORING ANIMALS

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Since the beginning of man's maritime activity, he has been confronting the rampage by marine timber destroying animals. The wood boring organisms especially shipworms are very important since they cause extensive damage to all kinds of submerged timber along the sea front. Despite the great interest shown on the taxonomy and biology of marine wood boring animals, it is strange that very little attention has been paid to a detailed study of the several associates taken together such as commensals, associates and predators of these pests. A perusal of the literature on this subject will show that several organisms are associated with the timber boring animals in their natural habitat. But they are only mere reporting of the casual occurrence of these associated forms.

Mohr (1959) has observed that as a rule gregarious animals, because they provide recurring contacts, are more likely to be parasitised than solitary organisms. Therefore, a heavily infested piece of timber containing molluscan and crustacean borers is apparently an ideal situation for such organisms as commensals, parasites and predators.

The present investigation pertains to a study of the commensals, associates and predators of the wood boring molluscs and crustaceans especially from taxonomical and biological point of view. The wood boring molluscs represented in this area are 10 species of shipworms of which two, namely, *Nausitora hedleyi* and *Teredo furcifera* are the most common species. The pholads are represented by two species, *Martesia striata* and *M. fragilis* (Nair, 1961) of which the former is the most destructive in the estuarine localities of the south west coast of India. Of the wood boring crustaceans only isopods have so far been collected from this area. They are *Sphaeroma terebrans*, *S. annandalei*, *S. annandalei* var. *travancorensis*, *S. walker* and *S. triste* (Pillai, 1961).

In the present study *N. hedleyi*, *T. furcifera*, *M. striata*, *S. terebrans* and *S. annandalei* were examined for associates. Very few specimens of *S. triste* collected from Pamban, Rameswaram and Tuticorin on the east coast also were examined.

The parasites and associates collected from these animals are a heterogenous assemblage drawn from the ciliata, the

Commensals, Associates and Predators of Marine Borers

hydrozoa, the ostracoda, the isopoda and the copepoda. The important predators and scavengers of molluscs are polychaetes and turbellarians which have been recovered from the burrows of shipworms. Apart from the above mentioned groups, casual crustacean associates were also found.

A list of species studied is given below :

Ciliata

<i>Nucleocorbula adherens</i>	Santhakumari and Nair
<i>Thigmozoon fencheli</i>	Santhakumari and Nair
<i>Boveria teredinidi</i>	Nelson
<i>Vorticella companula</i>	Ehrenberg
<i>Zoothamnium rigidum</i>	Precht
<i>Cothurnia gammari</i>	Precht
<i>Lagenophrys</i> n. sp.	(unpublished)
<i>Epistylis gammari</i>	Precht
<i>Trichodina macommarum</i>	Raabe and Raabe
<i>T. balakrishnia</i>	Santhakumari and Nair
<i>Stentor coeruleus</i>	Ehrenberg
<i>Nyctotherus marina</i>	Santhakumari and Nair
<i>Folliculina producta</i>	(Wright)
<i>F. boltoni</i>	Kent
<i>Licnophora</i> sp.	

Hydrozoa

<i>Eutima commensalis</i>	Santhakumari
<i>Clytia hendersonae</i>	Torrey

Ectoprocta

<i>Electra crustulenta</i>	(Pallas)
<i>Vorticella pavida</i>	Kent
<i>Bowerbankia gracilis</i>	Leidy

Polychaeta

<i>Lepidonotus tenuisetosus</i>	(Gravier)
<i>Phyllococe castanea</i>	(Marenzeller)
<i>Perinereis nuntia</i> var. <i>brevicirris</i>	(Grube)
<i>Eurythoe parvicarunculata</i>	Horst
<i>Polydora ciliata</i>	Johnston
<i>Terebella</i> sp.	

Crustacea

<i>Tanais philetaerus</i>	Stebbing
<i>Microsysistria indica</i>	Hart <i>et al.</i>
<i>Cirolana willeyi</i>	Stebbing

<i>C. fluviatilia</i>	Stebbing
<i>C. bovina</i>	Bernard
<i>Corallana nodosa</i>	Schioedte and Meinert
<i>Cymodoce longistylis</i>	Miers
<i>Iais singaporensis</i>	Menzies and Bernard
<i>Melita zeylanica</i>	Stebbing
<i>Corophium triaenonyx</i>	Stebbing

Of the above mentioned 36 species, 5 species of ciliates and one hydroids are new to science. All the ciliates except *Boveria teredinidi* (Ganapati and Naga-bhushanam, 1955), both the hydroids, all the polyzoans are new records from wood boring animals.

Morphological descriptions, taxonomical status and biological observations of the commensalic ciliates from wood boring molluscs, namely *Nucleocorbula adherens* (Santhakumari and Nair, 1970), *Thigmozoon fencheli*, *Boveria teredinidi*, *Trichodina macomarum*, *T. balakrishnia*, *Stentor coeruleus* and *Nyctotherus marina* (Santhakumari and Nair, 1973) have been published. The remaining ciliates are of *Sphaeroma* and it is under publication. Hydroid of *Eutima commensalis* was found from the gills of the shipworm (Santhakumari and Nair, 1969). Later on, the developmental stages and adults of the medusa got from the plankton collections of Cochin backwater and thus described the life cycle of *Eutima commensalis* (Santhakumari, 1970).

Apart from the taxonomical study an attempt was made to examine (i) the nature of organisms associated with wood boring animals, (ii) the nature of relationship of these associates and their morphological adaptations, (iii) the seasonal incidence of these organisms, (iv) observations on the salinity tolerance of these

associates and (v) certain aspects of their ecology together with the details of the nature of settlement and growth of marine fouling and wood boring organisms at three different estuarine stations. Papers on (1) seasonal infestation of the commensalic ciliates of the shipworm *N. hedleyi* and *T. furcifera* and (2) the survival rate of ciliates in seawater in relation to its infectivity (Santhakumari and Nair) are under publication.

The mantle cavity of the molluscs offers an ideal habitat for commensalic and parasitic forms and many seem to effectively exploit the several advantages within the mantle cavity, and in these boring bivalves there is additional protection on account of the boring habit of the host. The constant flow of the medium supplies oxygen for respiration and suspended particles of organic matter which can be used as food. However, in the case of isopods the association seems to be of a less intimate type, being of the nature of ectocommensalism. The associated organisms of *Sphaeroma* are chiefly ciliates. Any part of the body may be indiscriminately chosen as a site for attachment. While ciliates form the dominant group of ectocommensalic organisms, forms as hydroids, ostracods, isopods, copepods and bryozoans have also been noticed

Commensals, Associates and Predators of Marine Borers

in association with sphaeroma. Barnacles too have rarely been noticed settling over the body of this isopod.

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