

AN ACCOUNT ON MARINE WOOD-BORING ORGANISMS OF OFFSHORE WATERS OF BOMBAY HIGH, INDIA

A. B. WAGH

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T. V. RAVEENDRAN

National Institute of Oceanography, Dona Paula, Goa 403 004, India.

ABSTRACT

The paper presents the incidence of wood-boring organisms in a water column of 75 mtrs depth 160 km off the Bombay coast. The destruction of untreated panels of mango wood exposed for periods varying from 1-12 months was caused by eight species of teredinid borers belonging to the genera *Lyrodus*, *Teredo*, *Teredora* and *Bankia*. It also reports for the first time the occurrence of *Teredo navalis* from Indian waters and *Lyrodus singaporeana* and *Teredo indomallica* from the west coast of India.

INTRODUCTION

Studies on marine wood-boring organisms of India were initiated only in mid 1950's. Since then, several papers relating to their systematics and distributional aspects along the coastal waters have been published. Among them, mention may be made of the works of Nair (1954, 1955, 1984), Nair & Dharmaraj (1980, 1983), Nagabhushanam (1955, 1960), Palekar & Bal (1955, 1957), Pillai (1961), Karande (1968), Santhakumaran (1973, 1976, 1985) and Santhakumaran & Pillai (1975). Apart from this a few studies have also been carried out for the oceanic islands such as Andaman and Nicobar Islands and Lakshadweep group of islands (Ganapati & Rao, 1960; Rajagopal & Daniel, 1972; Karande, 1978; Das & Devroy 1980 & 1981; Tewari *et al.*, 1980; Nair, & Dharmaraj, 1983). However, no investigations have been conducted so far in the vicinity of man-made offshore structures. This area, due to its locational peculiarities, is of great interest and is truly offshore in nature. Hence, in order to augment our knowledge of wood-boring organisms it was thought appropriate to present this account which describes for the first time in India an account of wood borers in a water column of 75 mtrs depth.

This study was carried out from an offshore platform located approximately 160 km, off Bombay. Untreated panels of mango wood (*Mangifera indica*) measuring 15 x 10 x 2.5 cm were exposed at four selected depths viz. 2, 22, 42 and 62m, where the depth of water column is about 75 mtrs. The exposure period varied from one month to twelve months. The study was carried for the total duration extending from May 1983 to February 1986.

The destruction of the panels was caused by the members of the family Teredinidae only. Eight species belonging to four genera (*Lyrodus* Gould-2 sp., *Teredo* Linn.-3 sp., *Teredora*-1 sp., and *Bankia* Gray-2 sp.) have been observed to be involved in the destruction of the panels. The borers belonging to the genus *Bankia* were abundant at upper depth (2m) whereas, those of *Lyrodus* and *Teredo* were dominant at bottom depths (42 and 62m). A brief account on some aspects of these wood-boring animals is presented here.

OBSERVATIONS

Genus *Lyrodus* Gould1. *Lyrodus pedicellatus* (Quatrefages)

It is one of the dominant borers at this station. A total of 861 pairs of pallets (Fig. 1) were collected. Although these forms were numerically abundant, they accounted for only 17% destruction of the panels. Intensity of attack was maximum at 42 and 62 m depths. Maximum length attained by these forms over eight-month period was 205 mm.

This species is reported to be active all along the east and west coasts of India and was described to be one among the most destructive borers in Indian waters (Santhakumaran, 1972, 1976; Santhakumaran & Jain, 1983 and Nair, 1984). The present study revealed that it dominated not only in coastal waters but also the offshore areas in the Arabian Sea.

Its occurrence is worldwide and has been reported from Europe, Mediterranean, Africa (West and East coasts), Madagascar, Red Sea, Persian Gulf, Australia, New Zealand, Pacific Islands, South-East Asia, Indonesia, New Guinea, Philippine Islands, Japan, Hawaiian and Midway Islands, North America (East and West coasts), Greenland, South America (East coast), Gulf of Mexico and Caribbean (Turner, 1966).

2. *Lyrodus singaporeana* Roch.

This species accounted for 23% destruction of the panels. A total of 163 pairs of pallets (Fig. 1) were collected. Maximum attack was at 42 and 62m depths. It grew to 265mm in one year period.

It is the first record of this species from the west coast of India. Along the east coast, Nagabushanam (1960) has reported its occurrence in Visakhapatnam harbour. Nair (1965) has collected this species from drifting wood species along the Madras coast.

It was also recorded from the East coast of Africa, Madagascar, Malacca, Singapore and Sumatra (Nair, 1965). Probably it might have been transported to Bombay High from the East African coast and Madagascar.

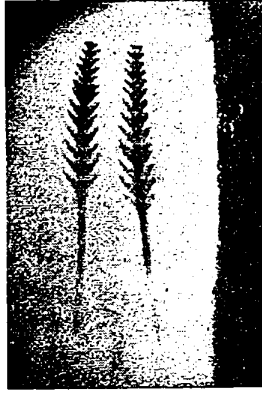
Genus *Teredo* Linnaeus3. *Teredo parksi* Bartsch

A total of 123 pairs of pallets (Fig. 1) were collected. It accounted for only 3% destruction which can be attributed to the smaller size of the individuals. Attack was maximum at 42 and 62m depths. The maximum length recorded was 93mm in four month period.

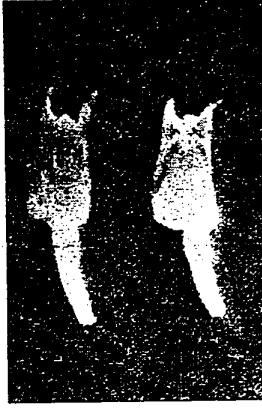
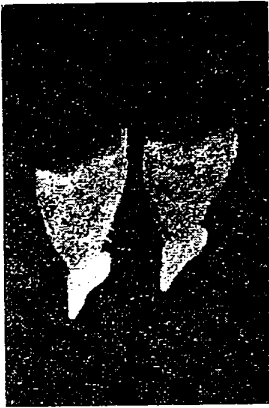
It showed a very patchy distribution along the coastal waters of India. Earlier reports stated its occurrence only from Madras and Tondi along the east coast and Bombay along the west coast (Santhakumaran *et al.*, 1985).



Bankia corinata



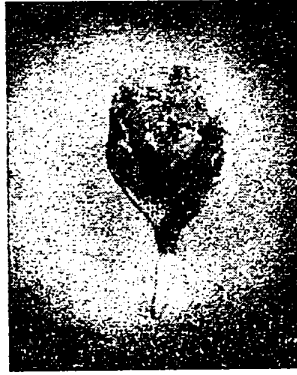
Bankia campanellata



Lyrodus pedicellatus



Lyrodus singaporeana



Teredora princeasae



Teredo sp.

Fig. 1. Pallets of different species of wood borers collected from offshore waters

4. *Teredo navalis* Linnaeus

Only a single pair of pallet of *T. navalis* (Fig. 2) was collected from this station from a panel exposed at 42m depth. It had attained a length of 55mm.

This is the first record of this species from Indian waters. It was reported to be a temperate species and was recorded from Europe, Australia, New Zealand, Pacific Islands, South-east Asia, Indonesia, New Guinea, Japan, North America (West and East coasts) and Greenland (Turner, 1966). The widespread distribution of this species was attributed to their greater tolerance to varying temperature and salinity conditions. Its occurrence on freshly exposed experimental panels indicate that the larvae of this species can survive and attack wood even under tropical marine conditions.

5. *Teredo indomalaica* Roch

It was of rare occurrence at this station. Of the 9 pairs of pallets (Fig. 1), 6 were collected from the panels exposed at 62m depth. The maximum length recorded was 57mm in four-month period.

The earlier report of this species from Indian waters was based on the collections from the floating wood pieces (Nair, 1965). This is the first record from the west coast of India.

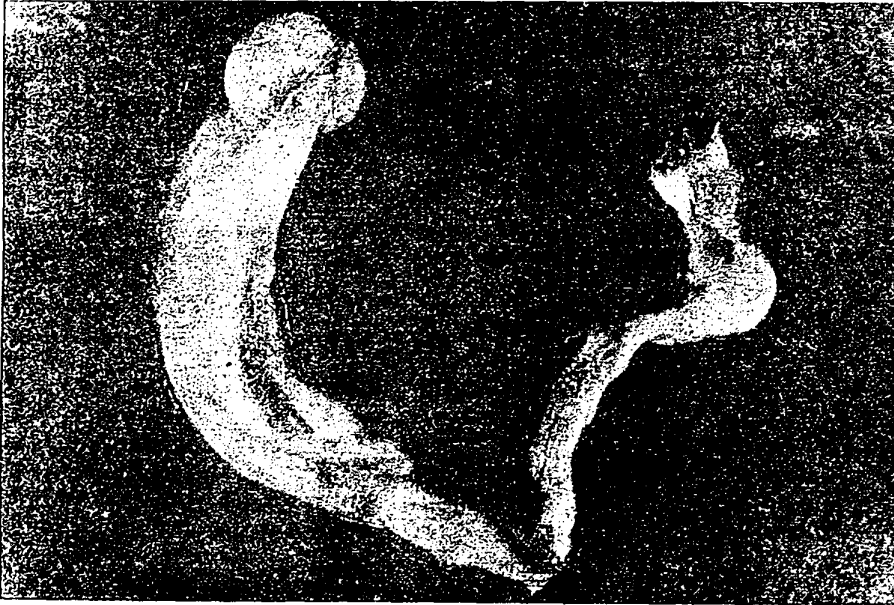


Fig. 2. *Teredo navalis* from offshore waters of India.

T. indomalaica has been reported earlier from Madagascar, Malacca, Singapore and Sumatra (Nair, 1965). Probably this species might have been transported to the present field from Madagascar coast.

Genus *Teredora* Bartsch

6. *Teredora princesae* (Sivickis)

Only two pairs of pallets (Fig. 1) were collected, one from 2m and another from 22m depth. Its distribution along the Indian coast indicated that this species is mainly active along the south-west and south-east coasts of India (Santhakumaran *et al.*, (1985). Nair (1968) has reported its occurrence in drifting wood pieces.

It has been reported from east coast of Africa, Red sea, Persian Gulf, Pacific Islands, South-east Asia, Indonesia, New Guinea, Philippine Islands, Hawaiian and Midway Islands (Turner, 1966).

Genus *Bankia* Gray

7. *Bankia carinata* (Gray)

The most destructive species at this station was *B. carinata*. About 35% destruction was caused by this species. However, it stands only second in numerical abundance since a total of 266 pairs of pallets (Fig. 1) were collected. It was found to be active throughout the water column, with the maximum abundance at 2m depth. The greatest length recorded was 199mm in four-month period.

B. carinata is active all along the coastal waters of India and is reported to be one among the most destructive species (Santhakumaran, 1976; Santhakumaran & Jain, 1983; Nair, 1984). It has been reported from Mediterranean, West coast of Africa, Pacific Islands, South-east Asia, Indonesia, New Guinea, Philippine Islands, Japan, Gulf of Mexico and Caribbean (Turner, 1966).

8. *Bankia campanellata* Moll and Roch

Bankia campanellata is also one of the highly destructive species at this station. It accounted for 22% destruction. A total of 70 pairs of pallets (Fig. 1) were collected. A relatively high destruction caused by this species inspite of its relatively small number can be explained by the fact that most of the specimens were of larger size. Moreover, it was found to be the fast growing species. As in the case of *B. carinata*, maximum specimens were found at 2m depth, though they were present at all depths of panel exposure. It has reached a maximum length of 360mm in eight-month period from February to October 1984. It has also been reported from majority of the stations along the east and west coasts of India (Santhakumaran *et al.*, 1985).

According to Santhakumaran (1986), *Teredo parksi*, *Teredo indomalaica* and *Lyrodus singaporeana* earlier synonymised under *Teredo furcifera*, *Teredo fulleri* and *Lyrodus massa* respectively, are valid species. Thus, he has reported the occurrence of thirty seven species

of teredine borers from Indian waters including those from Andaman and Nicobar Islands and Lakshadweep Archipelago. With the present new record of *Teredo navalis*, the total number is increased to thirty eight.

It may be mentioned here that unlike in the case of fouling organisms, the offshore steel structures can not support a borer population and therefore, whatever attack has been observed on freshly exposed experimental panels has to depend on the larvae transported to this field either from their coastal brood sites through currents or the floating wood pieces harbouring mature borers. Similarly, while there are ample opportunities for the transportation of foulers through the agency of ships and supply boats, which are frequently in operation between the offshore and coastal sites, due to their steel hulls, can not transport mature borers and therefore, their larvae. Furthermore, it is quite interesting to see that different species initiated the attack of timber panels in different months.

The probability of their transport through the floating wood pieces is quite high, because of the eight species of borers recorded from this station, five of them i. e. *B. carinata*, *B. campanellata*, *Teredora princesae*, *T. indomalaica* and *L. singaporeana* were reported earlier to be collected from floating wood pieces or nuts (Nair, 1965, 1968; Nair & Dharmaraj, 1980). Apart from this, the currents towards this area (Gouveia & Kurup, 1977) may also be playing some role in transporting larvae of borers such as *L. pedicellatus*, *B. campanellata*, *B. carinata* and *T. parksi*, the first three of which are dominant borers along the coastal waters of India.

Finally it may be stated that these studies have posed quite an interesting set of problems which deserve further detailed studies.

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