

Distribution of Wood-borers in the Vembanad Backwaters

N. Balakrishnan Nair

CSIR Emeritus Scientist

Department of Aquatic Biology and Fisheries

Trivandrum - 695 007, India

The nature of destruction of cellulose materials in the Vembanad backwaters has been examined. Teredinids such as *Lyrodus pedicellatus*, *L. massa*, *Teredo furcifer*, *Nausitora hedleyi* and *Bankia carinata*; pholads namely, *Martesia striata* and *Lignopholas fluminalis* and sphaeromatids like *Sphaeroma terebrans* and *S. annandalei* were the wood-borers. The molluscs and crustaceans were represented almost equally, damaging timber in the region north of the Thanneermukkam bund. The incidence and relative abundance of these pests are discussed in relation to the salinity profile of the estuary.

A large volume of information has been published in India on the taxonomy, functional morphology, and ecology of timber destroying organisms that occur along the coasts of India, the Andaman and Nicobar Islands and the Lakshadweep Archipelago (Nair & Saraswathy, 1971; Nair, 1984; Nair, 1987; Nair & Dharmaraj, 1983; Santhakumaran & Sreenivasan, 1988). Yet our information is still incomplete regarding their incidence, activity and ecology in the estuaries and backwaters of the southwest coast of India. The present paper provides information relating to the nature of organisms involved, their spatial distribution and relative abundance in the Vembanad backwaters.

Materials and Methods

Collections were made from 40 representative localities along the shores of the backwater (Fig. 1). A fixed volume of infested sample (1000 cm³) was carefully sawed out of a stationary pile from each station, its surface cleaned of the attached fouling and the number of entry holes of the respective borers counted. Then the samples were dissected out to remove the borers for specific identification. The hy-

drographic parameters such as temperature, salinity, pH and oxygen of the ambient water from each station were recorded using standard procedures (Martin, 1970)

Results and Discussion

Data on the hydrographic features and the incidence of the different groups of borers are presented in Fig. 2.

Atmospheric temperature varied from 28.5 to 36.0°C. The temperature minima were noticed at stations 31 and 37 and the maximum at station 40. The surface water temperature fluctuation had a range of 6.5°C. The lowest, 26.5°C was at station 13 and the highest 33°C at station 8.

The values of pH ranged between 6.1 and 8.5. From stations 1 to 17 in the riverine zone the water remained acidic ranging from 6.1 to 6.7 and from station 21 to 40 a distinct alkaline zone was discernible.

Fairly high values of salinity were noticed from stations 21 to 40 fluctuating between two extremes 0.09 and 32.43‰. A distinct gradient was observed, the values

increasing gradually from the riverine zone to the bar mouth region, dividing the backwaters into three regions namely the riverine zone covering stations 1-11; the middle region incorporating stations 12 - 29 and the bar mouth region including stations 30 - 40. In the riverine zone the salinity ranged from 0.09 to 1.48‰; in the middle region from 4.66 to 23.53‰ and in the bar mouth region from 20.74 to 32.43‰.

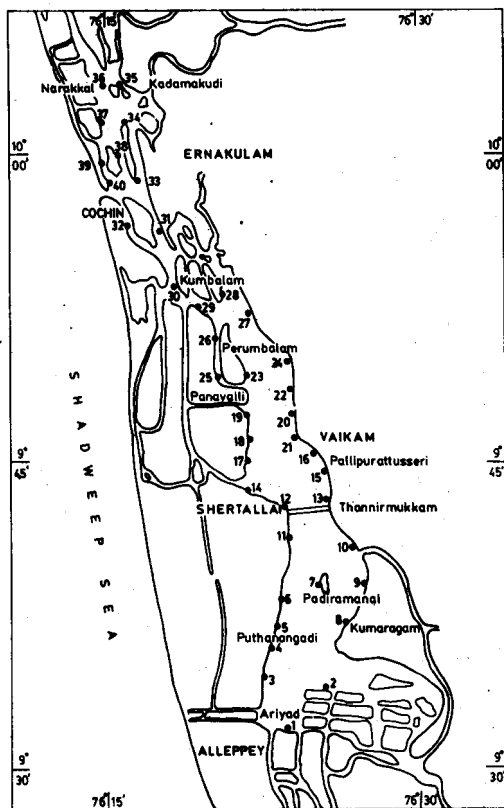


Fig. 1. Map of Vembanad backwaters showing the location sampling stations

The dissolved oxygen content varied from 3.34 to 8.63 ml l⁻¹. The minimum value was at station 14 and the maximum at station 18. In the majority of the stations relatively high values were recorded for this parameter. Regionally, maximum concentration of dissolved oxygen was noticed at the riverine zone. In the middle region

and at the bar mouth the average values were 5.20 and 3.87 ml l⁻¹, respectively.

The community of wood-boring organisms was shared more or less equally by the molluscan (59.0%) and the crustacean (41.0%) borers. Of the molluscan group, the shipworms constituted as much as 35.3% and the pholads 27.5%. *Lyrodus pedicellatus*, *L. massa*; *Teredo furcifera*; *Nausitora hedleyi* and *Bankia carinata* were the shipworm species recorded from this system. The pholad group was represented by two species *Martesia striata* and *Lignopholas fluminalis*. *Sphaeroma terebrans* and *S. annandalei* were the sphaeromatids obtained from this backwaters.

The maximum activity of boring organisms was noticed at the bar mouth region of the lake. The riverine zone up to the Thanneermukkam bund was found to be devoid of any boring organisms. Up to this zone the water retains a fresh water nature. In the rest of the zones, the trend in the distribution and relative abundance of the different groups and species exhibited significant difference, mainly on the basis of the prevailing salinity.

Regarding shipworms, maximum percentage abundance was noted at station 24 (67.8%) and minimum at station 34 (5.7%). High levels of infestation were recorded in the majority of the study sites. Regionally, incidence of shipworms in the bar mouth and middle region was more or less uniform. A distinctive relationship could be seen in the nature of distribution of the different species in relation to the salinity of the ambient water.

N. hedleyi, was the most dominant species of shipworms in this backwaters with a total incidence of 77.1%. At stations 12 to 22 where salinity ranged between 4.6 and 12.9‰ and at stations 23 to 29 where the range was from 11.4 to 23.6‰, *N.*

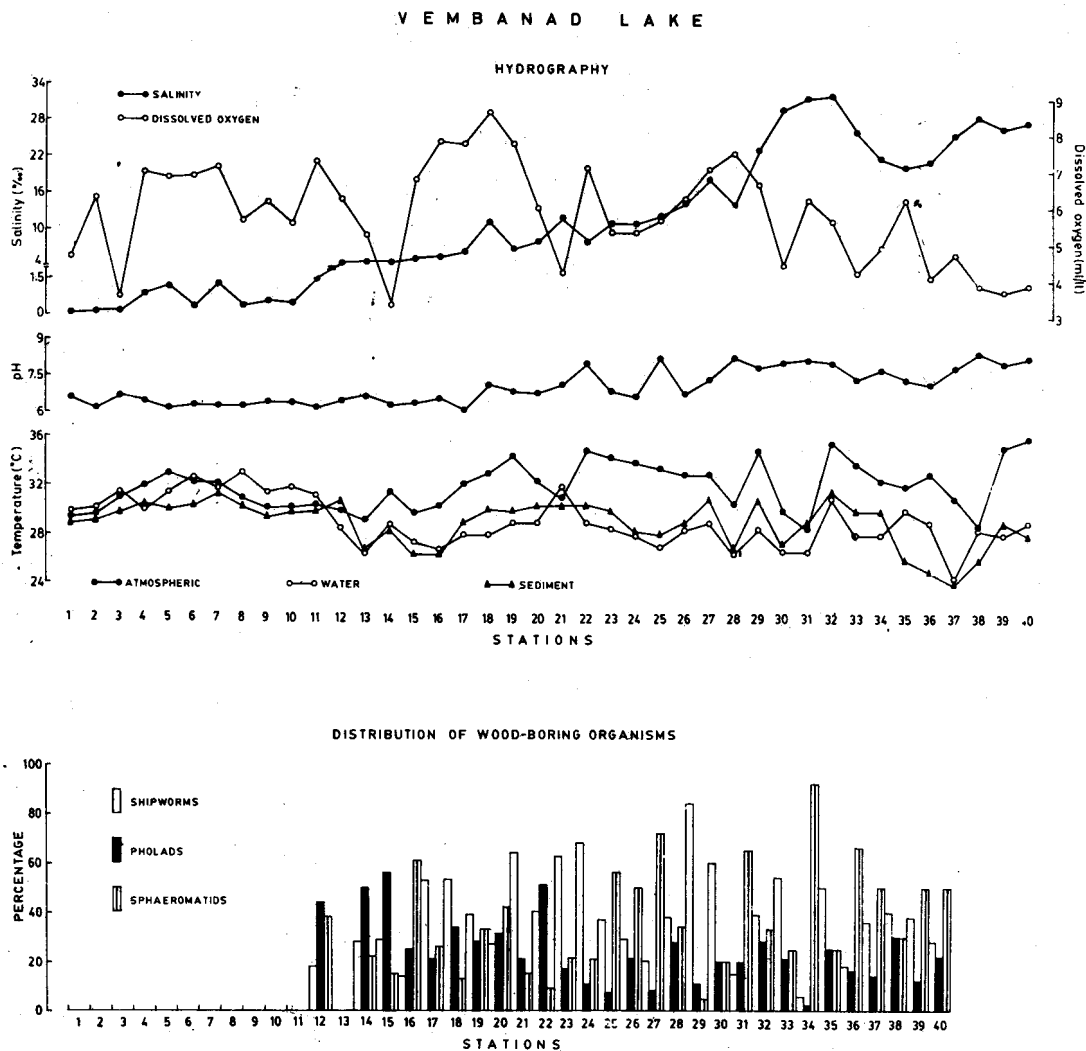


Fig. 2. Hydrographic features and incidence of the different groups of borers in Vembanad backwaters

hedleyi attained its maximum settlement and growth, clearly indicating its preference to brackish water conditions as reported earlier by Nair & Saraswathy (1971).

L. pedicellatus exhibited a slightly different pattern appearing only from station 18 upwards where the salinity was well above 11‰. *T. furcifera* on the other hand was restricted to the highly saline

areas of the lake at stations 32 upwards around the bar mouth where the salinity was above 21‰. *L. massa* and *B. carinata*, both well known marine species, appeared only very rarely in the system at a few stations towards the bar mouth and were similar to *T. furcifera* in their salinity preference. This study has clearly shown that *N. hedleyi* is a very serious pest of timber in the Vembanad lake causing

heavy destruction to submerged wood and water front structures.

Pholads were represented fairly well all along the backwater. *M. striata* appeared at all stations from station 22 upwards in fairly good numbers, suggesting that it needs a salinity of at least 8.2‰ and attained high densities in salinity above 11‰. The other species *L. fluminalis* on the other hand is a brackish water form, capable of tolerating low salinities appearing in areas where the salinity range was between 4.6 and 11.2‰. Thus this species was present only in the middle part of the estuary. The isopod community was composed of two species *S. terebrans* (76.5%) and *S. annandalei* (23.5%), the former occurring from the middle zone (Station 12) to the bar mouth (Station 40) continuously while the latter appearing only rarely at 9 stations avoiding the high saline zone around the bar mouth.

The present study thus reveals that all forms of timber exposed in the backwater

from the bar mouth to the Thanneermukkam bund are subject to the relentless attack of wood-borers which exhibit an interesting pattern of distribution influenced by the salinity, thereby sharing effectively a rare substratum such as wood, without too much competition.

References

- Nair, N.B. (1984) *Proc. Indian Acad. Sci. (Anim. Sci.)*, **93** (3) : 203
- Nair, N.B. (1987) *Proc. Indian Nat. Sci. Acad.*, **54** (1) : 7
- Nair, N.B. & Saraswathy, M. (1971) in *Adv. Mar. Biol.* Vol. 9 (Russel, F.S. and Yonge, C.M., Eds.), p. 335, Academic Press, London, UK
- Nair, N.B. & Dharmaraj, K. (1983) *Indian J. Mar. Sci.*, **12** (2) : 96
- Santhakumaran, L.N., & Srinivasan, V.V. (1988) *Mahasagar*, **21** (1) : 13
- Martin, J. (1970) *Marine Chemistry*, Vol. 1. Marcel Dekker Inc., NY, USA