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TIMBER VULNERABILITY TO TEREDENID (MOLLUSCA: BIVALVIA) INFESTATIONS AT MANGALORE*

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ABSTRACT

Five species of timber commonly used in marine environs along the Dakshina Kannada Coast *viz.*, Teak *(Tectona grandis)*, Jack *(Artocarpus integrifolia)*, Aini *(Pterocarpus hirsuta)*, Sampige *(Michaelia champaka)* and Neralu *(Eugenia* sp.) have been evaluated for their vulnerability to teredenid infestations, when submerged for 360 days in the sea at Hoige Bazar fish landing jetty, Mangalore. The timber Species were graded in respect of their susceptibility to shipworm attack, in the order Teak (least susceptible) Jack, Sampige, Aini and Neralu (most susceptible). Intensity of infestation on the exposed panel surfaces were found to be more along the bottom followed by the top and the side. Submergence of timber for certain duration in sea water was found to be necessary for the onset of teredenid settlements.

INTRODUCTION

CONSIDERABLE work has been done on the vulnerability of different timber species used in marine environments in relation to the marine borer infestations in the maritime States of India by Nagabhushanam (1960), Nair (1955,1956 a, 1956 b, 1957) and Srinivasan (1961, 1968). Studies indicate that the period of usefulness of untreated timber exposed to sea water is very short and depends on the duration of submergence and the texture of wood involved. The major wood destroying organisms in tropical India are reported to be the teredenids and pholadids. Howevei, since works on allied lines were not available from Dakshina Kannada Coast on commonly utilised timber species, the present study has been undertaken.

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MATERIAL AND METHODS

Wooden panels of 20 x 15 x 2.5 cm of Teak *(Tectona grandis)*, Jack *(Artocarpus integrifolia)*, Aini *(Pterocarpus hirsuta)*, Sampige *(Michaelia champaka)* and Neralu *(Eugenia* sp.) were submerged in the sea by using a suitable immersion design, described by Srinivasan and Chandramohan (1973) at Hoige Bazar fish landing jetty from September 1980 to September 1981. The design, in essence, is comprised of a main PVC tube with five alternating branches 45 cms apart. Each branch held the panels of Teak, Jack, Aini, Neralu and Sampige, arranged in the same order. These are separated from each other by PVC washers. The design had weight on one end and was hung from a suitable pillar. The last washer of each branch had been nailed with copper wires, as the branches were fastened with the main line to prevent from sliding.

Bimonthly observations on the settlements of teredenid borers were made for the duration of submergence. The foulers were periodically scrapped so as to enable an easy assessment of borers settlement rates. The number of boreholes were counted on the exposed surfaces of all the submerged panels. A possible recount

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was eliminated by avoiding the areas previously examined.

Results and Discussion

The results of the processed data are presented in Table 1. It can be descerned that a specific gradation existed in timber vulnerability as far as their resistance to teredenids is concerned. The order of resistance in timbers used is Teak (most resistant), Jack, Sampige, Aini and Neralu, the last two being equally least resistant and most vulnerable.

Regarding the surfaces of panels exposed, significant difference existed between the tops and bottoms and the sides and bottoms. No such difference was observed between the sides and tops of panels. Also, the overall settlement rates considerably more during the second phase of submergence *viz.* 180 days onwards and upto 360 days. This may probably be due to the preference of teredenids for the precolonized and preconditioned timber surfaces than the relatively fresher timber substrates.

Table 1. *Analysis of variance due to timber species, exposed areas of panels and the duration of exposure in the sea*

Source of variation	Degrees of freedom	Sum of squares	Mean sum of squares	F. ratio
Due to timber species	4	149.49	37.37	7.08*
Due to exposed areas	2	82.47	41.24	7.81*
Due to periods of exposure	1	140.83	140.83	26.67*
Error	22	116.16	5.28	
Total	29	488.95		

*Significant at 5% level

It has been observed that a significant difference existed on the rates of settlements of borers on the test panels. Through the analysis of variance technique, a 5% level significant difference was found to be existing due to timber species used, due to exposed areas of test panels and also due to the periods of submergence, on the settlement of teredenid borers. No statistical significant difference in vulnerability has been observed due to Teak and Jack and also due to Sampige, Aini and Neralu. Similarly, though no significant difference for vulnerability existed between Jack and Sampige, differences were noticed between Jack and Aini, Jack and Neralu, Teak and Sampige, Teak and Aini, and Teak and Neralu.

Actual settlements of teredenids on the timber surfaces commenced only after the formation of primary film complex upon the submerged surfaces. An examination of the primary film prior to the settlements of teredenids has been attempted by culturing the materials in Wynogradsky medium mentioned in Rodina (1972), for the occurrence of cellulolytic bacteria. Pure cultures of *Cytophaga, Sporocytophaga, Cellulomonas* and *Cellvibrio* were obtained from the timber species used. Perhaps a preconditioning of cellulosic timber material by such microbial components of primary film may trigger off the onset of wood borer activities towards which some work has been done by Meyers and Reynolds (1957), Schafer and Lane

(1957), Ray and Stuntz (1959) and McGinnes *et al.* (1976).

Hence it is evident that the species of timber are not responding identically to teredenid settlements. Several factors such as the texture, chemistry of the timber, rate and extent of their conditioning in the sea water may be ascribed to this.

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