

RESISTANCE OF SOME TIMBERS OF ANDHRA PRADESH AGAINST MARINE BORER ATTACK AT FOUR PORTS OF INDIA

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Observations on the underwater durability of thirteen species of timbers grown in Andhra Pradesh against marine borer attack at four ports of Naval interest are recorded. Intensity of borer attack was found to vary from port to port, maximum observed being at Port Blair, with Goa, Bombay and Visakhapatnam following in that order. Comparison of borer activity in the harbours studied with past observations has revealed that a change in eco-systems may be occurring at Visakhapatnam harbour.

Indian Navy employs a variety of timbers for its underwater structures and shore installations. Timber is normally employed in the construction of minesweepers, small boats, jetties, piles, pontoons etc., where atleast a part of the structure is frequently exposed to seawater. The timber submerged in seawater undergoes a severe deterioration through different agencies ranging from microorganisms to higher marine wood-boring animals necessitating frequent repair and replacement of the affected parts. It has been reported earlier that in India as many as 5,000 species of tropical trees yielding timber are available, though only 200 species have so far been put into extensive commercial use¹. As a result only a few known durable timbers have so far been employed for specific purposes requiring both strength and durability resulting in their faster depletion. It has, therefore, become necessary to examine the underwater durability of timbers available in different parts of the country and study the possibility of substituting the few timbers in constant use.

In the past, some workers have investigated a large number of timbers at specific ports²⁻⁶ and some of them have even suggested some substitutes for use⁵. However, these timbers were observed to vary in their resistance to wood borers when exposed at other ports during our investigations (unpublished data). It was, therefore, felt, that in order to obtain a fairly correct assessment of the performance of different timbers, they should be exposed at different ports at the same period, data collected and evaluated.

MATERIALS AND METHODS

In the present investigation, 13 species of timbers obtained from the Government Saw Mill, Rajahmundry, Andhra Pradesh, were exposed at four ports of interest to Navy viz. Bombay, Goa, Visakhapatnam and Port Blair. Timber panels 8"×4"×1" were used in all the exposures and the frames were exposed at one foot below the lowest low water mark. The frames were examined at the end of twelve months and the panels after drying, were cut open to assess their damage.

RESULTS AND DISCUSSION

It is observed that the pattern of deterioration of different timbers in the four ports was nearly uniform, irrespective of the local fauna (Table 1). Four species of timbers viz. *Schleichera oleosa*, *Lagerstroemia parviflora*, *Xylia xylocarpa* and *Tectona grandis* exhibited good resistance to wood borers for the duration of this investigation at the four ports.

Intensity of borer attack varied from port to port⁷, the maximum being at Port Blair, with Goa, Bombay and Visakhapatnam following in that order. The attack on timbers at Port Blair was by three groups of borers viz. teredid, pholadid and limnoriid species in equal proportion. Although limnoriids are believed to habitat in temperate zones the species is prevalent in water in the Andaman region represented by at least five known forms and one new species viz. *Limnoria* (*Limnoria*) *andamanensis*^{8,9}. The attack on only four timbers viz. *Albizia chinensis*, *Tectona grandis*, *Pterocarpus marsupium* and *Terminalia tomentosa* by *Limnoria* sp indicates that these four timbers are particularly susceptible to attack by *Limnoria*.

At Goa, both pholadid and teredid borers were responsible for damage to timbers, though intensity of pholadid attack was comparatively greater than that of teredid borers. The pholadid, *Martesia striata* was so competitive that many of the timber panels were destroyed by their attack leaving little scope for teredid damage. It has been reported earlier that no timber is naturally resistant to attack by *Martesia* spp which is reputed to live as long as 10 years¹⁰. Hence, the extensive activity by *Martesia* at Goa should be viewed with serious concern.

In the present studies, only teredid worms belonging to the genera *Teredo* and *Bankia* were encountered at Bombay. Stray occurrences of crustacean borer, *Sphaeroma annandalei* and *Limnoria* sp have been reported earlier¹¹, but neither crustacean wood borers nor pholadid borers were encountered in the present

TABLE 1

COMPARATIVE PERFORMANCE OF SOME TIMBERS FROM ANDHRA PRADESH AGAINST MARINE BORER ATTACK AT FOUR PORTS

Name of timber	Bombay				Goa				Visakhapatnam				Port Blair			
	Des-truction of tim-bers (%)	Intensity of borer attack			Des-truction of tim-bers (%)	Intensity of borer attack			Des-truction of tim-bers (%)	Intensity of borer attack			Des-truction of tim-bers (%)	Intensity of borer attack		
		Tere-did	Phola-did	Lim-norid		Tere-did	Phol-adid	Lim-norid		Tere-did	Phol-adid	Limn-orid		Tere-did	Phol-adid	Limn-orid
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Anogeissus latifolia</i>	70	+	—	—	40	++	+	—	5	—	+	—	100	++	+	—
<i>Bursera serrata</i>	100	+	—	—	80	+	+	—	5	+	++	—	100	++	+	—
<i>Diospyros melanoxylon</i>	100	+	—	—	100	+	+	—	10	—	+	—	100	++	+	—
<i>Schleichera oleosa</i>	10	+	—	—	5	+	+	—	5	—	+	—	50	++	+	—
<i>Lagerstroemia parviflora</i>	10	+	—	—	20	+	++	—	5	+	++	—	70	++	+	—
<i>Syzygium cumini</i>	100	+	—	—	100	++	+	—	40	+	+	—	100	++	+	—
<i>Xylia xylocarpa</i>	30	+	—	—	10	+	++	—	5	—	+	—	60	++	+	—
<i>Albizzia chinensis</i>	40	+	—	—	80	++	+	—	5	+	—	—	100	+	+	—
<i>Tectona grandis</i>	0	—	—	—	30	—	+	—	5	—	+	—	20 (100)*	+	—	++
<i>Hardwickia binata</i>	5	+	—	—	70	++	+	—	5	+	+	—	100	+	+	—
<i>Pterocarpus marsupium</i>	80	+	—	—	L	—	—	—	15	++	+	—	100	++	+	++
<i>Terminalia arjuna</i>	5	+	—	—	L	—	—	—	5	—	+	—	95	+	—	—
<i>Terminalia tomentosa</i>	L	—	—	—	L	—	—	—	5	—	+	—	100	++	+	++

+ Indicates presence of the responsible group of borer.
 ++ Indicates the dominance of the group over other groups.
 L Lost during trials.

*The surface of the timber was completely destroyed by Limnorids.

investigation. It is, however, felt that this harbour should be closely observed for stray occurrence of crustacean borers which would alter the present pattern of natural durability of timbers.

Visakhapatnam harbour, where least activity has been recorded in the present studies was a port of intense borer activity till the late sixties^{4,12}. Since 1969, it has been our experience that the borer activity has been progressively reduced to such an extent, that non-durable timbers like *Abies pindrow* (Himalayan fir) have not been attacked even after exposure for eight months or more. It appears that a change may be taking place in the ecosystems affecting the borer populations adversely. The factors responsible for this are not known, although influence of industrial pollutants of this fast developing industrial town is not ruled out. It would be interesting to know if such a change is occurring elsewhere. If so, reasons for this change ought to be studied.

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