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## A SURVEY ON MARINE BIOFOULING IN PARTS OF WESTERN BORNEO

Dennis Hill, Fatimah Abang and Caroline Tie

### ABSTRACT

Biofoulers are organisms that attach to or bore into various solid substrates to be found in the sea or along coastal regions. A survey was made at four sites, namely Pulau Layang Layang off the coast of Sabah, and three coastal villages in Sarawak, Buntal Village, Muara Tebas Village and Telaga Air Village. Pulau Layang Layang is an oceanic island and almost all of the organisms found were sub-littoral species. The Sarawak villages are coastal in location in the intertidal zone. Test sites included a metal mooring chain and buoy anchored to a concrete block, a concrete jetty wall, wooden and cement covered stilts and reinforced concrete piers. Study parameters included species composition, numbers of species and abundance (measured as percentage cover). A total of 75 species, belonging to seven phyla, were found on concrete, wooden and metal substrates. On oceanic Layang-Layang algae, sponges, soft and hard corals, hydroids and ascidians were common. But in the littoral locations, molluscs and acorn barnacles were dominating. At Layang Layang encrusting algae and Coelenterata (corals, etc.) preferred the concrete substrate, whereas the filamentous algae, sponges and ascidians covered the metal mooring chain. At each site definite floral and faunal zonation was evident with each species in its own distinct habitat.

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## INTRODUCTION

Biofoulers are organisms that grow attached to solid structures, both natural and artificial, or bore into them, in the

sea. They are worldwide in distribution but most abundant and damaging in warmer waters where development is continuous and can be rapid.

Our main economic concern over the centuries has been the damage done to ships and wooden structures by the marine borers. Many a wooden ship has sunk at sea with its hull perforated and destroyed by shipworms. Hull destruction can take as little as 1-2 years in the warm Pacific, as the great maritime explorers of the 18<sup>th</sup> century knew to their cost. But the dense encrustations on ships' hulls is also a problem as they can slow the ships quite appreciably. This is a major concern to sporting yachtsmen for some races are won by a matter of a few minutes or even seconds. A recent paper in *Biologist* (Callow, 2002) states that the total cost of biofouling to the US Navy amounts to an estimated \$1 billion annually. Similarly wooden piers and jetties are subjected to the marine borers which can destroy them underwater in a matter of only a few years. Nowadays most piers and jetties are constructed of reinforced concrete which will support a large population of encrusting biofoulers, which might look a little unsightly but cause no damage to the structure. It should perhaps be remembered that there are trees, and some palms, whose trunks are quite resistant to borer attack, by both physical and chemical means.

The encrusting organisms concerned are those that occur naturally on rocks and boulders of the coastal littoral and sublittoral zones. The borers include the bivalve pholads (Pholadidae) that bore in soft sedimentary rocks (especially chalk), and the true shipworms (Teredinidae) that probably live in the wild in floating logs and submerged tree trunks.<sup>1</sup> The ubiquitous isopod *Limnoria* (the Gribble) makes small tunnels (1-2 mm diameter) along the grain of the wood, and wet ship timbers can be completely hollowed out. This crustacean can actually digest cellulose, but as yet has not been recorded locally.