THE DYNAMICS OF LEIOGNATHIDAE

IN A TROPICAL DEMERSAL ICHTHYOFAUNAL COMMUNITY

Thesis submitted by

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DECLARATION

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma to any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

A S Cabanban
27 September 1991

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ABSTRACT

Cleveland Bay (Townsville), on the tropical northeastern shoreline of Australia, is a small bay (225 km^2) that historically has not been subjected to commercial trawling. However, the unexploited environment of Cleveland Bay is characterized by frequent disturbance by natural processes such as resuspension of sediments on the bottom due to currents generated by wind-waves and monsoonal trade winds, high terrigenous sedimentary input from riverine systems along the coast, and lowering of salinity due to increased flooding. This presents a rare opportunity to gain necessary biological and ecological information on the demersal ichthyofauna that may be typical of the unexploited bays in the Indo-Pacific region. The species composition and structure of the ichthyofauna of Cleveland Bay were studied using a strict sampling regime to provide a general view of the community. In addition, the distribution and abundance of leiognathids (Pisces: Leiognathidae) and their biology (growth, reproduction) were investigated. The extent of predation by synodontids (Pisces: Family Synodontidae) on leiognathids was estimated also. The ichthyofaunal community of Cleveland Bay was multispecific but consisted of only one assemblage at the scale of the whole bay (which is <20 m deep). Total biomass, leiognathid biomass, and leiognathid densities were highly variable at very small spatial and temporal scales (<20 m range of depth, $<$ 1,000 m; daily) and these patterns persist through time (over years) in the frequently disturbed sedimentary regime

of Cleveland Bay. The abundance of leiognathids persists despite high predation levels on recruits. This maintenance of high abundance may be explained by their fast growth and iteroparous reproduction. In addition, the leiognathids feed on zoobenthos and zooplankton that can respond rapidly to changes in the primary production of Cleveland Bay (due to resuspension of nutrients and recycling of nutrients by epibenthic biota). The strategy taken in studying this community (a combination of the **top-down** and **bottom-up** approaches) provided ecological bases for assessing the state of the ichthyofauna of Cleveland Bay and essential data for modelling multispecific, tropical demersal ichthyofauna and multispecies fisheries.

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