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*Original Article*

## Distribution of intertidal flat macrobenthos in Buntal Bay, Sarawak, Borneo

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### Abstract

The distribution of macrobenthos in the intertidal area of Buntal Bay, Sarawak was studied based on systematic sampling conducted in 2014. This study aimed to determine the intertidal macrobenthic horizontal distribution and their relationship with environmental parameters. An analysis of the intertidal flat macrobenthos community suggested that polychaetes dominated the community in terms of the number of individuals and species followed by crustaceans and molluscs. Polychaetes of families Nephtyidae, Spionidae, Capitellidae, and Magelonidae contributed to the high densities of macrobenthos. Multivariate analysis performed by the Biotic and Environmental linking analysis indicated that communities in Transect 1 and Transect 2 were best correlated with food availability (sediment chlorophyll *a*), and heterogeneity of sediment type (percentage of fine sand and very fine sand). Heterogeneity of sediment characteristic and food availability were identified as potentially playing a key role in the shaping of the intertidal macrobenthic distribution in Buntal Bay.

**Keywords:** macrobenthos, intertidal flat, Buntal Bay, horizontal distribution, Sarawak, Borneo

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### 1. Introduction

Intertidal macrobenthos consists of a highly diverse group that is comprised mainly of polychaetes, crustaceans, and molluscs (Lastra *et al.*, 2006; Morais, Comargo, & Lana, 2016; Nakao, Nomura, & Satar, 1989; Netto & Lana, 1997; Peterson & Peterson, 1979; Whitlatch, 1982), as well as three lesser groups, namely echinoderms, nemerteans, and sipunculids (Morais *et al.*, 2016; Whitlatch, 1982). Early studies of intertidal macrobenthos were concerned mainly with macrobenthic zonation, classifying low, mid, and high intertidal zone on the basis of dominance species (Blanchet *et al.*, 2014; Rodil, Lastra, & Sánchez-Mata, 2006). Recently, enormous progress has been made towards comprehension of macrobenthic communities and ecosystem functioning in many parts of the world (Gerwhoing, Drolet, Hamilton, &

Barbeau, 2016; Magni, Como, Montani, & Tsutsumi, 2006; Shin, Lam, Wu, Qian, & Cheung, 2008).

Previous studies reported on the environmental factors that influenced macrobenthic communities coupled with variations in tolerance of the macrobenthic organisms (Lu, 2005; Magni *et al.*, 2006; Peterson & Peterson, 1979). Community structure embodies all of the various ways that individual members of communities relate and interact with one another, i.e. spatial and temporal abundance of macrobenthos, and how the community level properties arising from these relations with environment and biological factors (Giller, 1984; Tokeshi, 1993). Alterations in the environmental characteristic of the habitat can strongly affect the composition and abundance of species among sites which influences species diversity (Faraz *et al.*, 2016; Seiderer & Newell, 1999). However, the macrobenthos that inhabit the tropical regions, particular in Sarawak, has been poorly studied. Buntal Bay is one of the few intertidal flats in Sarawak that serves as an important fishery area for the economic species of razor clam *Solen* spp. (Rahim, 2011). To date, macrobenthic communities in this intertidal flat of

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