ABSTRACT

A study on the effects of fish cage culture on mangrove macrobenthos diversity and abundance was carried out in the Matang mangrove estuary, Perak, Malaysia. Multiple investigations consisted of 4-month study, 12-hour study and 1-day "grid" sampling. Six samplings (Dec 1999 – May 2000) were conducted along Sungai (River) Sangga Besar (SSB) (cage culture area) and Sungai Sangga Kecil (SSK) (non-cage culture area) by using a 0.1 m^2 Petersen Grab. Forty-four families (1 nemertean, 12 polychaete, 5 bivalve, 11 gastropod, 7 decapod, 2 isopod, 2 amphipod, 1 ophiuroid and 3 fishes), comprising of 53 species were found, which increased in abundance towards the sea. Water parameters were stable but pH was lower in SSB which could be related to aquaculture activities. SSK was characterized by deeper waters, higher dissolved oxygen and salinity. The low dissolved oxygen in the rivers was suspected to cause stress to the macrobenthos especially in cage areas affecting the sessile bivalves although gastropod abundance was high. The nassarid and *Assiminea* gastropods were shown from the RDA analysis to prefer sandy substrate characterising the cage areas as well as attracted to the left-over feed materials that the cage culture provided. Higher macrobenthic abundance and higher dissolved oxygen point toward a more pristine SSK. Polychaetes, crabs (*Xenophthalmus pinnotheroides)* and isopods (*Sphaeroma terebrans*) were found to be higher, while bivalves and gastropod were found to be significantly lower in SSK than in SSB. The results indicate that human intervention through fish and cockle farming may have altered the macrobenthic community in SSB. Diel or tidal phases did not play a significant role in diversity or abundance of macrobenthos although there were some significant interaction affects.

ABSTRAK

Satu kajian terhadap kesan pemeliharaan ikan dalam sangkar ke atas kepelbagaian dan kelimpahan makrobentos kawasan bakau telah dijalankan di kawasan bakau muara sungai Matang, Perak, Malaysia. Beberapa jenis penyampelan dijalankan melibatkan penyampelan 4 bulan, perubahan pasang-surut serta malam-siang melalui penyampelan intensif 12 jam serta penyampelan grid sehari. Penyampelan tersebut dilakukan sebanyak 6 kali (Disember 1999-Mei 2000) sepanjang Sungai Sangga Besar (kawasan sangkar ikan) dan Sungai Sangga Kecil (kawasan tidak bersangkar) menggunakan 'grab Petersen' bukaan $0.1m^2$. Sejumlah 44 famili (1 nemertean, 12 poliketa, 5 bivalvia, 11 gastropoda, 7 dekapoda, 2 isopoda, 2 amfipoda, 1 ophiuroid dan 3 pieces) yang terbahagi kepada 53 spesies telah ditemui dan didapati kelimpahannya meningkat menuju ke arah laut. Parameter air didapati stabil kecuali pH air yang lebih rendah di SSB yang mungkin akibat dari aktiviti akuakultur. Sungai Sangga Kecil pula merupakan sungai yang lebih dalam, mempunyai kandungan oksigen terlarut (DO) serta saliniti yang lebih tinggi. Kandungan DO yang rendah di kawasan sangkar di Sungai Sangga Besar disyaki menyebabkan tekanan terhadap makrobentos terutamanya di kawasan dalam sangkar lebih-lebih lagi terhadap bivalvia yang sesil sungguhpun kelimpahan gastropod didapati tinggi. Analisis RDA menunjukkan bahawa gastropod nassarid dan *Assiminea* menggemari kawasan berpasir seperti yang dicirikan oleh kawasan sangkar selain tertarik kepada saki-baki makanan dari sangkar ikan. Kelimpahan makrobenthos serta DO yang lebih tinggi di Sungai Sangga Kecil menunjukkan ia merupakan kawasan yang kurang terganggu oleh aktiviti manusia. Poliketa, ketam *Xenophthalmus pinnotheroides* serta isopod *Sphaeroma terebrans* didapati dengan jumlah yang lebih tinggi di sini, manakala bivalvia serta gastropoda ketara rendah di Sungai Sangga Kecil berbanding Sungai Sangga Besar. Keputusan

mencadangkan bahawa aktiviti penternakan ikan dalam sangkar dan kerang mungkin telah merubah komuniti bentik di Sungai Sangga Besar. Arus pasang-surut serta perubahan siang-malam tidak mempengaruhi kepelbagaian dan kelimpahan makrobenthos sungguhpun terdapat kesan daripada interaksi faktor-faktor tersebut.