



SPECIES IDENTIFICATION AND DISTRIBUTION OF HOLOTHUROID IN SEVERAL POPULATIONS OF TIOMAN ISLAND



Kamarul R. K.^{*1}, Gires U.² and Ridzwan H.³

¹Department of Biotechnology, Kuliyah of Science, International Islamic University Malaysia, Jalan Istana, Bandar Indera Mahkota, 25200 Kuantan, Malaysia; ²Marine Science Programme, School of Environmental & Natural Resource Sciences, Faculty of Science & Technology, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor Darul Ehsan, Malaysia; ³Department of Biomedical Science, Kuliyah of Science, International Islamic University Malaysia, Jalan Istana, Bandar Indera Mahkota, 25200 Kuantan, Malaysia.

Correspondence: Kamarul Rahim Bin Kamarudin. Tel. +609 5716400 ext. 2824. Fax +609 5716781. Email: kamarulr@iiu.edu.my

ABSTRACT

Three genera of sea cucumber or holothuroid (Echinodermata: Holothuroidea) were observed in several coastal regions of Tioman Island, Malaysia; with 15 species distributed among the genera. Species identification was performed using morphological characteristics such as body texture, existence and shape of papillae, and colour patterns on both dorsal and ventral part of holothuroid. Relatively, the most abundant genus is *Holothuria* representing 10 different species. *H. leucospilota* was relatively the most dominant species. Genus *Stichopus* represents the second largest genus with three species, followed by *Bohadschia* with two species. Of the total number of species observed, six species are without specific scientific name due to inadequate species information particularly in Malaysia. Overall, Tioman Island has large number of species from order Aspidochirotrida, and family Holothuriidae indicates the highest existence of unknown species. In the near future, further research is to be done to gain better update on the diversity and distribution of indigenous holothuroid in Tioman Island. It is expected that the actual number of holothuroid species in Tioman Island is much greater as Tioman Island is currently claimed as one of the top 10 beautiful islands in the world.

Keywords: holothuroid, Tioman Island, morphological characteristics, Aspidochirotrida

INTRODUCTION

Malaysia, resting within the Oriental region is among the top 12 mega diversity countries in the world, showing abundant and diverse groups of marine organism such as holothuroid. Holothuroid, preferably known as sea cucumber, is deemed a high-diversity group of echinoderm occurring in almost every part of marine environment (Kerr & Kim 2001, Kerr et al. 2004).

Six orders of Holothuroidea: Apodida, Elasipodida, Aspidochirotrida, Molpadiida, Dendrochirotrida and Dactylochirotrida are identified world-wide to date, with approximately 2000 species distributed among the orders. The classification of holothuroid into smaller groups is based on few features, and normally the number of tentacles and the shape of ossicles observed are among the main priorities in morphological identification of species status. Order Aspidochirotrida is currently the most abundant group showing great number of species (Allen & Steene 2002).

In Malaysia, holothuroid is locally known as 'timun laut', 'bat', 'balat' and 'gamat'. Of the species found in Malaysia, 'gamat' is well-known in traditional medicine industry (Ridzwan 1993). 'Gamat' is a local name given to few species of genus *Stichopus* such as *Stichopus hermanni*, *Stichopus horrens*, and *Stichopus chloronotus*. Bilaterally symmetrical, worm-shaped, soft-bodied, lacked-armed echinoderm with calcareous ossicles, and evolved respiratory tree are among its unique characteristics, apparently distinguishing holothuroid from the other echinoderms (Pechenik 2000).

MATERIALS AND METHODS

Samples of holothuroid were collected from several coastal sites within and around Tioman Island area such as Kampung Tekek, Renggis Island, Tulai Island and Kampung Air Batang. Species identification of holothuroids was done by referring to the previous data recorded by Ridzwan (1993), supporting references and also through the information given by local residents. In brief, the species identification was made based on morphological characteristics such as the body shape, body colour, the existence and shape of papillae, on both dorsal and ventral parts of holothuroid. Photographs were taken as soft-copy references. Dead specimens of holothuroid were stored in ice boxes containing ice cubes at the sampling site for short-term storage. In the laboratory, samples were transferred to -20°C fridge for long-term storage. Samples are also preserved in 70% ethanol, with proper cataloging.

Economically, holothuroid is becoming promising in food industry, such as beche-de-mer or dry tunics, strengthening the economy growth of many countries in the world, including Malaysia. Besides, oil extract from 'gamat' is one of the commercial products in traditional medicine industry, and the product is very popular especially among people living in the northern part of Peninsular Malaysia. The toxins or holothurins produced by some species have been proven successful as anti-inflammatory agents and anticoagulants, subsequently as a treatment in bleeding wounds (Ridzwan 1993, Kerr 2000).

In view of taxonomic validity, Ridzwan (1993) identified morphologically 23 species of holothuroid in Sabah coastal region, Bornean part of Malaysia. Out of that, eight species have local names but without clear scientific names. This finding reveals the unclear taxonomic status of holothuroids in Malaysia specifically. Apart from that, subsequent attempts have been carried out to validate the taxonomic status of holothuroids in Malaysia, e.g. an effort taken by Massin et al. (2002) in describing two new species from genus *Stichopus* found at the Johore Marine Park, Malaysia namely *Stichopus ocellatus* n. sp. and *Stichopus rubermaculosus* n. sp. For such reasons, holothuroid has been chosen in this preliminary study as model system. The main objective of this study is to update the distribution and species identification of holothuroids in several coastal regions of Tioman Island by using morphological approach, as the species information of sea cucumber in Malaysia to date is still unclear and not up-to-date.

RESULTS AND DISCUSSION

Generally, only one order of holothuroid was observed in Tioman Island, Malaysia namely Aspidochirotrida. Order Aspidochirotrida consists of family Holothuriidae and Stichopodidae. In this study, 12 species found are from family Holothuriidae, followed by family Stichopodidae with three species. This finding is supported by Allen and Steene (2002) and Ridzwan (1993), making order Aspidochirotrida the most abundant and in the front rank of top species diversity. In total, the number of species distributed among the families is 15 species. Genus *Holothuria* is relatively the most abundant genus with 10 species. The second largest genus is *Stichopus* with three species. *Stichopus* species such as *S. ocellatus* are the most valuable species used commercially by people especially in Peninsular Malaysia as main source of traditional medicine. Apart from that, two species of genus *Bohadschia* were listed showing the least number of species, which are *B. sp. 2* (unidentified species) and *B. vitiensis*, or also known as chalky sea cucumber.

In view of dominance, *H. sp. 4* as one of the unidentified species; is dominant along large part of the rocky beach nearby Tioman Island Marine Park, while *H. leucospilota* is dominant along the rocky beach of Kampung Tekek as well as along small part of the rocky beach nearby Tioman Marine Parks Centre. In comparison, *H. leucospilota* was the most abundant species in Tioman Island. The dominant species were determined by referring to huge number of species individuals observed and recorded at particular sites.

Furthermore, the finding of six species without clear scientific name caused the taxonomic update of holothuroids in Tioman Island more problematic and challenging. This matter is due to the lack of update and species information of holothuroids currently in Malaysia. Further research and more studies need to be done, and molecular approach is required as an additional method to morphology in unraveling the unclear species identification or taxonomy of indigenous holothuroids in Tioman Island in particular and in Malaysia generally. Needless to say, organism groups with well-known taxonomies are important to ease the difficulties in listing the existing species in a population (Lévêque & Mounolou 2003).

In the future studies with wider and larger number of study sites, it is strongly believed that Tioman Island, as part of East Coast region of Peninsular Malaysia, will show greater diversity of holothuroids, based on the fact that the neighbouring islands especially Redang Island is currently the main coral playground of East Coast of Peninsular Malaysia (Ho 1992). Ho (1992) further stated that the distribution of coral reefs along West Coast of Peninsular Malaysia was deemed poor and the underwater visibility was not good; but opposite observation was obtained for East Coast region. The above expectation is also strengthened by few statements mentioning that holothuroid is deemed a high-diversity group of echinoderm occurring in almost every part of marine environment (Kerr & Kim 2001, Kerr et al. 2004) and this unique echinoderm can be found easily within shallow-water coral reef region (Ridzwan 1993).



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