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Full length article

Distribution of two species of Asian horseshoe crabs at west coast of Sarawak's Waters, East Malaysia



A.R. Noor Jawahir*, M. Samsur, M.L. Shabdin, A.R. Khairul Adha

Department of Aquatic Science, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

ARTICLE INFO

Article history:

Received 4 September 2016

Revised 22 February 2017

Accepted 26 March 2017

Available online 24 May 2017

Keywords:

Density

Physico-chemical parameters

*Tachypleus gigas**Carcinoscorpius rotundicauda*

Borneo

ABSTRACT

Conservation of horseshoe crabs worldwide has become challenging as the number of horseshoe crabs were decreased due to human activities. Therefore, this research was designed to assess the habitat of horseshoe crabs by determining their distribution at nine different locations in west coast of Sarawak's waters. A line transect method was used to determine species distribution where Pasir Putih Village had the highest density of *T. gigas* caught with of 1.72 individuals per hectare. Based on sediment analysis, *T. gigas* was found mainly in sandy beach of Pasir Putih Village, Pandan Beach, Sibul Laut Village, and Gerigat Beach with total organic matter and the sediment size ranging from 0.39% to 10.9% and 125 μm to 250 μm , respectively. Meanwhile, *C. rotundicauda* was mostly collected from mangrove area (high content silt-clay) with sediment size less than 63 μm and total organic matter ranging from 0.35% to 27.91%. The findings of this research indicated that the distribution of *T. gigas* and *C. rotundicauda* in different preferred habitat in west coast of Sarawak's waters were influenced by the *in-situ* physico-chemical parameters, type of sediment, lunar cycle and spawning season.

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Introduction

The habitat of horseshoe crabs are known to be at three different areas, which are at the coastal bay, intertidal mud or sand flat, and deeper water (Emily, 2011). Spawning activities of horseshoe crabs normally occurred in intertidal zone (Brockmann and Smith, 2009) during a full and new moon nights (Zaleha et al., 2012). Common natural habitat for *C. rotundicauda* is muddy and brackish areas (Robert et al., 2014). Meanwhile, *T. gigas* can be found in sandy to muddy areas (Tan et al., 2012). The spawning activity of horseshoe crabs was influenced by several environmental factors in habitat such as salinity, temperature, pH, dissolved oxygen (DO) level of water and sediment characteristics (Smith et al., 1991; Nelson et al., 2015).

To date, the distribution of horseshoe crabs in Sarawak is still unknown since most of the studies of horseshoe crab in Malaysia are in Peninsular Malaysia and Sabah (Sekiguchi and Shuster, 2009; Tan et al., 2012; Zaleha et al., 2012; Robert et al., 2014; Faridah et al., 2015). Besides that, human activities such as active consumption by local people, commercial purpose, habitat

destruction and natural causes (beach erosion) had caused concern which can contributed to extinction of horseshoe crab in west part of Sarawak waters. In addition, no conservation effort and no protection done by local government agencies to conserve this precious horseshoe crabs in Sarawak waters.

Therefore, this study is essential to determine the status of horseshoe crab in different habitats. The aim of this survey was to provide a baseline data of the two species of Asian horseshoe crab's distribution obtained from nine sites of the west coast of Sarawak's waters including their preferred habitat and related *in-situ* environmental factors such as particle size, total organic matter (TOM) and physico-chemical parameters.

Materials and methods

Sampling sites

Single sampling was conducted along the west coast of Sarawak waters which consists of nine sampling sites (Fig. 1). The survey was done from October 2013 to May 2014 either on the full moon or new moon days (Zaleha et al., 2012). Each sampling site was described in Table 1. The sampling sites were chosen on sandy beaches and mangrove areas. The distance of A (Kuching district), B (Samarahan district) and C (Kabong district) areas were approximately 87.5 km, 25 km and 87.5 km, respectively.

Peer review under responsibility of National Institute of Oceanography and Fisheries.

* Corresponding author.

E-mail address: noorjawahir@gmail.com (A.R. Noor Jawahir).

<http://dx.doi.org/10.1016/j.ejar.2017.03.002>

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