

# Status of Horseshoe Crabs Research in Myanmar: Preliminary Field Survey in Myanmar Citizen Science Approach

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**Abstract:** The occurrence of two horseshoe crabs, *Carcinoscorpius roundicauda* and *Tachypleus gigas* in Myeik, Tanintharyi, Rakhine and Ayeyarwady division were studied based on interview survey undertaken from January to April 2019. The objective of this study was to gather baseline data on survey interviews with fishermen to determine the abundance and distribution of *Tachypleus gigas* and *Carcinoscorpius roundicauda* in some coastal areas. During the survey, questionnaire was used to interview 30 fishermen from study sites about sightings and catches of horseshoe crabs from in-shore waters, to provide information on when and where horseshoe crabs may be found. The lower number of horseshoe crabs *Carcinoscorpius roundicauda* (23%) in mangrove and higher number of *Tachypleus gigas* (77%) in landing sites of three coastal regions. The population of horseshoe crabs is declining (30%) within 3 years (2016-2019) due to daily harvest. Tanintharyi division has 800 islands so ecotourism are more developed than other division in Myanmar and especially most of visitors were took on horseshoe crabs as food so there is no little knowledge or public awareness on horseshoe crab in Myeik environ. There is no market price so anybody won't take as food in Dawei in Tanintharyi region, Pauk –Taw in Rakhine and Shwe-Thaung-yan in Ayeyarwady division. The present study was the preliminary interview survey to approach on citizen science of horseshoe crabs for assessing the population status of horseshoe crabs and their level of threat in other areas of Myanmar.

**Key words:** Horseshoe crab; questionnaire survey; Coastal mangrove; Public awareness; ecotourism

## 1. Introduction

Myanmar is the largest country in mainland Southeast Asia with a continuous coastline of almost 3000 km extending along the Bay of Bengal and Andaman Sea. The three main coastal areas, from north to south, are the Rakhine Coast, the Ayeyawady Delta and the Taninthayi Coast, having the coastlines of more than 1700 islands. Myanmar's near shore areas provide a suitable habitat for populations of globally threatened

horseshoe crabs. In the southern waters of the Myeik Archipelago in the Taninthayi region are noted for their rich coral reefs and 800 islands. Myeik coastal region is critically and economically important areas as well as one of the most biologically rich and unique mangroves of Myanmar (Htay Aung, 2003). To understand the current state of marine resources in the country and to lay a foundation for future marine conservation activities and compiled over 600 papers and reports describing studies that have been primarily conducted by Myanmar scientists on the country's marine biodiversity and habitats (Holmes, K.E., et al., 2014). Despite the presumed intact nature of the marine biodiversity in this area, few assessments have thus far been done to determine the status of marine species and habitats. The horseshoe crabs are an important part of the ecology of coastal communities especially distributed throughout the coastline in Myeik Archipelago. There are four different species of horseshoe crab found inhabiting the warmer shallows off the coasts of India, Japan, Indonesia, eastern USA and Gulf of Mexico but only two species found in Myanmar. There is, however, little information is known about the present status of horseshoe crabs distribution in Myanmar. Moreover human activities such as local consumption, commercial purpose, habitat destruction and natural causes (infrastructure, fishing and boating, sea level rises, salinity and temperature changes) had caused concern which can contribute to extinction of horseshoe crab in Myanmar. In addition, there is no conservation effort and no protection done by local government agencies so that to conserve these precious horseshoe crabs in coastal regions. The main objective of this survey was to provide a baseline data of the two horseshoe crabs species and their distribution and usage of traditional methods.

## **2. Materials and Methods**

### Study area description and data collection

The sampling station was located in the coastal regions of Myanmar. Three coastal regions were conducted along the coastline of waters which consist of five sampling sites (Fig. 1). The survey was done from January to April 2019. A questionnaire survey was conducted as a prime method for data collection. The sampling sites were chosen on sandy beaches and mangrove areas.

### Sampling technique

The horseshoe crab specimens were collected by visual search technique and using gill net (Tan et al., 2012; Faridah et al., 2015). For visual search technique, the horseshoe crab specimens were collected during high tide by hired fishermen during sampling period. A gill net of size 20.0 m net size; 5.00 cm mesh size was used during sampling. The net was set up by fisherman at intertidal area (depth of 1–2 m), approximately 100–500

m offshore on the day before sampling was made. The net was checked on next day during low tide. The identification and sex of horseshoe crabs were determined based on published literatures such as Sekiguchi and Nakamura (1979).

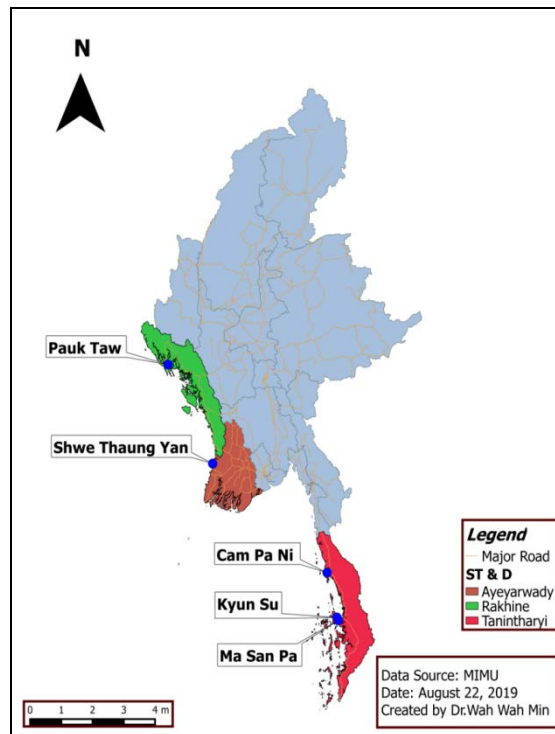


Figure1. Map of study sites

### 3. Results

The two horseshoe crabs species that were obtained from five sampling sites illustrated in Table 2. According to interview survey results, *Carcinoscorpius rotundicauda* was (23%) in mangrove and *Tachypleus gigas* (77%) in landing sites of three coastal regions but horseshoe crabs were currently under threat for many purposes especially for taking as food. The restaurants bake the horseshoe crab alive in the burning charcoal and as salad with beer and whisky. They cut the corner with knife and open where all the eggs were laying, the taste of the egg is similar like cooked fish eggs and the meat is similar to crab. Local restaurant “Shwe Yar Su” “Golden Century” in Myeik City is selling horseshoe crabs for customers. Horseshoe crabs salads call “Yam Khai” in Thailand. The local price is 3-5 USD for one horseshoe crab but when they arrive to border line; their prices were become almost triple in Myeik Tanintharyi division. Most of the fishermen can catch horseshoe crabs 40-50 per week. Myeik Kyun-Su is near to Thailand so most of the fishermen are well known the market

price in Myanmar for exporting to borderline countries. Local people have less awareness regarding the horseshoe crabs and their importance to conserve the biodiversity in global level. Some local inhabitants were keeping telson of horseshoe crabs for massaging with this spine on their body (the treatment of traditional massage). Some people were selling horseshoe crabs to visitors for releasing back it to the sea or kept it in their home to be lucky in their life. Some local people took piece of telson of horseshoe crabs tied with cotton ropes and put it on legs or arm of their children to be healthy. The highest percentage of horseshoe crab individuals was Ma-San-Pa (29%) followed by Kyun-Su (20%) but the percentage of male was greater than female in all study sites.



Plate 1. Occurrence of horseshoe crab salad and traditional usage found in local



Plate 2. Catching horseshoe crab from landing sites collected by fishermen

Table 1. Occurrence of horseshoe crabs percentage found in different study sites

Sr. No	Study sites	Species				Total
		<i>Carcinoscorpius rotundicauda</i>		<i>Tachypleus gigas</i>		
		M	F	M	F	
1	Kyun-Su	(6.45%)	(1.61%)	(8.06%)	(4.83%)	(20.95%)
2	Ma –San- Pa	(4.83%)	(3.22%)	(12.90%)	(8.06%)	(29%)
3	Cam-Pa-Ni	(1.61%)	(0%)	(6.45%)	(8.06%)	(16.12%)
4	Pauk –Taw	(1.61%)	(0%)	(8.06%)	(8.06%)	(17.73%)
5	Shwe Thaug-Yan	(1.61%)	(1.61%)	(6.45%)	(6.45%)	(16.12%)
	Total	(16.11%)	(6.44%)	(41.92%)	(35.46%)	(100%)

#### 4. Discussion

According to interview survey overall results, most of the fishermen won't catch horseshoe crab except in Myeik environs. Anybody won't take as food in Cam-Pa-Ni, Pauk–Taw and Shwe- Thaug-Yan. When they got it in their net they released it because there was no market price. Telson of horseshoe crab spine was very useful to mix with some medicinal oil for their health. Dead body of horseshoe crabs hanging at cowshed and bullock cart to prevent foot and mouth disease. Some old people assumed that 'one villa equals one hundred cattles' and when a piece of telson is put in the hair of a pregnant woman can give easily birth. According to the occurrence record, *Carcinoscorpius rotundicauda* was absent along the coast of Myanmar (Thapanand-Chaidee et al., 2010) and even though their models indicated suitable habitat. They concluded that *C. rotundicauda* probably was present along the coast of Myanmar, and that were missing records of horseshoe crabs due to lack of studies in that area. *C. rotundicauda* is present in Tanintharyi division, Rakhine State and Ayeyarwaddy division in Myanmar (Vestbo S. et.al .,2018) also suggested that *Tachypleus gigas* is present along the coast of Myanmar even though occurrence data are missing, due to the lack of research. In the present study, the greater number of horseshoe crabs found in Ma-San-Pa and followed by Kyun-Su and least number

in Cam-Pa-Ni and Shwe- Thaug Yan. The previous finding was agreed with the finding of present study which was more population abundance in Kyun-Su and Ma-San-Pa. The two species of *C. rotundicauda* and *Tachypleus gigas* were reported in Myeik coastal region but the number of female horseshoe crab population is more than male (Nway Thingyan Oo,2017). In the present study, results showed that fishermen only take female horseshoe crabs so that the sex ratio of female is less and less especially in Myeik environs it may lead to be extinction in future. In Myanmar, Khin Soe Nwe (1979) recorded one species of horseshoe crab around Thanbyuzayat Township in Mon State. Thi Thi Mar also recorded one species of horseshoe crab around Lat-kok- kone beach in Kun-chan-kone Township. According to the Atlantic coastal report of horseshoe crabs were caught by various types of fishing gears and methods are used for catching horseshoe crabs in different regions such as trawl, dredge, hand and gill net (HCTC, 1998). In Myeik environs, horseshoe crabs were caught by holding their telson in landing site and captured by net while swimming in water. Khin Soe New, 1979 reported on various kind of catching method such as trawl, dredge, hand and gill net and caught size of horseshoe crab. The horseshoe crab population was to deplete in the natural habitat because of indiscriminate exploitation of small sized horseshoe crabs for using many purposes. The population has recently decreased due to habitat loss caused by coastline development and environmental degradation including water pollution. (Itow *et al*,1998) The present study findings were agreed with horseshoe crab number decreasing day by day, it may be probable that loss of habitat degradation and over-harvesting in the coastline of study areas.

## **5. Conclusion**

In Myanmar, many people were living near coastal line and widely known that on the usefulness of horseshoe crabs as the local medicine but there is no awareness on horseshoe crab so we need to do for raising public awareness of and transforming attitudes towards authorities to give update data and information for conservation of horseshoe crab and other wildlife conservation programmes.

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Conflict of interest

The author declares no conflict of interest.

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