

# Present Distribution of Pedunculate Barnacle of Wild Mud Crab *Scylla olivacea* from Setiu Wetland, Terengganu Coastal Water, Malaysia

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## Abstract

Pedunculate, Goose or Stalked barnacles are commonly found in the hard substrate of marine or brackish area and it also recorded found attached on the living organisms as their host. Thirty seven wild mud crabs (*Scylla olivacea*) were sampled from Setiu Wetland (5°40'47.93"N, 102°42'45.04"E), Terengganu, Malaysia. The 625 sample of barnacles were collected and the samples were preserved in 70% alcohol and observed by using Table Top Scanning Electron Microscope (Hitachi TM1000). The morphology and characteristic of the barnacle were recorded based on the observation of their peduncle, capitulum, calcareous plates, carina, tergum and branched scutum. To our knowledge, there is no morphological study about the species of pedunculate barnacle that attached on gill of *S. olivacea* in Malaysia. Thus, this study provides the first report of pedunculate barnacle attached on *S. olivacea* in the east coast of peninsular Malaysia.

**Keywords:** Wild mud crab; Pedunculate barnacle; Wetland; Coastal water; Aquaculture

can cause serious effect to their host. Mud crab aquaculture will be faced serious effect if this problem not to be solved.

# Introduction

Malaysia is the only country that has been recorded found three over four species of mud crab genus *Scylla* spp. in the world. There is some previously misrecognized of *Scylla serrata* found in Malaysia but it already revise by referring to Keenan [1]. These advantages open the opportunity for Malaysian researcher to develop the culture and breeding techniques because of their own commercial value especially in Malaysia aquaculture industry. Hence, there is no proper study have been done especially for mud crab disease in Malaysia. Most of the paper published in journal discussed about *Scylla serrata* but no journals have been reported especially for these three species which is *S. olivacea*, *S. tranquebarica* and *S. paramamosain*. Most of the fishermen in Setiu Wetland catch the mud crab from the wild and the number of catches maybe decreases because of over-exploitation. Other than that, disease or parasite infection factor also must take into consideration if the mud crab culture industry need to be develop [2].

In Malaysia, there are some studies that have been reported especially for pattern and distribution of pedunculate barnacle. Jeffries et al. [3] mentioned that the infection of mud crab at Malay Peninsula but this report just mention the barnacle is from Scylla serrata. But this report is not identifying the specific host compared to this study that specialized only to the specific host that proven found in Malaysia. Barnacles for this study are from order Thoracica, suborder Lepadormorpha and genus Octolasmis spp. [3-6] which having peduncle and a capitulum which is usually protected by calcareous plates. There are specific part of identification have been described by Jeffries et al. [2] and Ihwan et al. [7]. The important parts of identification are scutum, carina and tergum or terga proved that these morphologies can be used as the main part of identification because of their significant different, p>0.05 [7]. Barnacle on the genus Octolasmis are potentially found in shallow littoral or pelagic waters and widely distributed in tropical and temperate area [5]. The objective of this study is to report the occurrence of barnacle attachment on gill of wild mud crab species S. olivacea from Setiu Wetland, Terengganu and also to identify the important part of barnacle morphology by using Tabletop Scanning Electron Microscope (Hitachi, TM-1000). This study of barnacle attachment is to prove that this barnacle

# Materials and Methods

A total of 37 mud crab Scylla olivacea were collected from Setiu Wetland, Setiu, Terengganu (5°40'47.93"N, 102°42'45.04"E) and brought back to Aquatic Parasitology Laboratory, Institute of Tropical Aquaculture for examination. The crabs were sexed, weighed and their carapace lengths were measured. The entire barnacles that have been collected were analyzed to carry out the percentage of prevalence and mean intensity. Good specimens of barnacles were selected and preserve in 70% alcohol before captured using Tabletop Scanning Electron Microscope (Hitachi, TM-1000) and Advanced Research Compound Microscope (Nikon Eclipse 80i). All selective sample were observed by using the mode of identification i.e; scutum, carina and tergum. The peduncle and capitulum length of parasites were measured and calcareous plates (including branched scutum, carina and the presence of tergum) were observed. The length and shape of the calcareous plates were also recorded. Other differentiations on morphological characteristic were also taken into consideration for species identification.

# **Results and Discussions**

From thirty nine samples that have been examined, 625 samples were collected and examine under compound and stereo microscope.

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Sample	Species	References
Species A	Octolasmis angulata	[7,8]
Species B	Not identified	-
Species C	Octolasmis cor	[2,5]
Species D	Not Identified	-
Species E	Not Identified	-

Table 1: Species of barnacle that have been found during this study.



Figure 1: Labeled parts of calcareous plates including (a) branched scutum, and (b) carina. (c) peduncle and the upper side of body are capitulum or (d) head (Magnification : 100X).



Figure 2: Species A are Octolasmis angulata because of their shape of calcareous plates (Ihwan, et al., 2014).

The prevalence and mean intensity of the barnacle infection are 78% and 16.9 respectively, which are 484 barnacles infect male crab with carapace length 8.67  $\pm$  0.14 and 141 barnacle infected female crab with carapace length 8.96  $\pm$  0.23. From all barnacles that have been observed, five species of barnacle in the genus *Octolasmis* spp. have been identified by comparing their different shape of scutum and carina (Table 1).

Most of the morphology are depends on the shape of calcareous plates that can be observed using the Tabletop SEM. The presence of Tergum, branched scutum and carina also were observed and recorded (Figure 1). The samples were labeled into Species A, Species B, Species C, Species D and Species E using naked eye depend on their shape and morphology.

Species A have a long and fine shape of calcareous plates, presence of carina and absence of tergum respectively. This character of their shape of carina and scutum is identified as *Octolasmis angulata* (Figure 2) and Species C morphology is identified as *Octolasmis cor* (Figure 3) but for the species B (Figure 3), D (Figure 5) and E (Figure 6) there are no report that have been described this type species. There have some barnacle that have been found never show clearly the shape of calcareous plates, it assume that this barnacle are still at the newly stage of development. But some characteristic showed that this species similar to *Octolasmis loweii* because of their short shape of branched scutum or look likes not well-developed of calcareous plates. Most of sample that have been collected showed most of the barnacle are matured. The maturation of these barnacles can be observed by using normal compound microscope.

Hence, it is hard to observe the maturation size of the barnacle because some of the barnacles are in cyprid larvae stage. The habitats of *S. olivacea* have been described respectively by Ikhwanuddin [8] and this can be related to the abundance of pedunculate barnacle attached on the gill of wild mud crab [7]. Most of this species live in the muddy area which is closely to mangrove area compared to other mud crab species. Jeffries et al. [4] has been described about *Octolasmis cor* by culturing in the laboratory for further identification. The lifecycle of this species also have been publicized.

# Conclusion

From the study, five different morphology characters have been observed and identified according to previous citation (Table 1). Only two samples that have been identified up to species is *Octolasmis* 



Figure 3: Species B are still not similar to the other identified of *Octolasmis* spp. that has been reported by Jeffries *et al.* (2005) and further DNA study for identification need to be done.



Figure 4: Species C are Octolasmis cor which has been reported by Jeffries et. al., (2005)



Figure 5: Species D are not similar to species *Octolasmis* spp. which has been reported by Jeffries *et al.* (2005) and further DNA study for identification need to be done.

Page 2 of 3

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Page 3 of 3



Figure 6: Species E are still not similar to the other *Octolasmis* spp. that has been reported by Jeffries *et al.* (2005) and further DNA study for identification need to be done.

*angulata* and *Octolasmis cor*. The detailed of description can be referred to study by Ihwan et al. [7] and Jeffries et al. [4,6]. DNA sequencing has to be done to confirm the differentiation of these species. Thus, a lot of study has to be done to relate the prevalence of the barnacle with the ecological habitat. The information about the crab natural habitat gives the key to the species abundance especially between muddy and sandy area. This *Octolasmis* spp. also can be one of the biological indicators to the ecosystem health because most of the barnacle species from the previous study are prove to be the heavy metal and pollution indicator. Hence, this pedunculate barnacle is one of the new scopes of species that have a potential to be biological indicator of natural environment.

## Recommendations

Barnacle infestation on mud crab body can be classified as an epibiota or ectosymbionts if the numbers of infection are low and can be parasitized if this barnacle growth in the area that can interrupt the normal physiology and biology (gill, swimming legs, sexual organ, etc.) of infected host [2]. The use of pedunculate barnacles as indicators of host migration and previous locations of inhabitation provides an opportunity to assess polluted areas and various aspects of the biology of the crab and other conditions. Thus, when one can age the instar of a crab based on the age classes of barnacles, the infestations become an even more valuable tool. There is a need to determine the effect of infestations on crabs that spawn two or three times as well as the life histories of barnacles in estuaries compared with those that occur offshore.

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