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A FIRST REPORT ON MUDLOBSTER (*Thalassina anomala*) AND ITS MOUND CHARACTERISTICS FROM SETIU WETLAND, TERENGGANU, MALAYSIA

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Abstract: Mudlobsters, belonging to the genus *Thalassina* are lesser known but are important crustaceans of the mangrove ecosystem. Nine *Thalassina* species are found in the Indo-Asian region, namely *Thalassina kelanang*, *Thalassina anomala, Thalassina australiensis, Thalassina gracilis*, *Thalassina krempfi, Thalassina spinosa, Thalassina squamifera, Thalassina spinirostris* and *Thalassina saetichelis*. *Thalassina* spp. were once common in the nipah palm areas around Kuala Terengganu until the areas were developed as residential and commercial areas. As such, this is the first report about the mudlobster in Terengganu, with samples collected from Setiu closely resembling *Thalassina anomala* based on the morphological characteristics. The species is indigenous to Setiu Wetland area, and was recorded from an area which was previously a forest of *Melaleuca* plants and uninhibited by humans prior to development. The habitat was destroyed and make them move to the agricultural area near by the canal. They become a pest because destroying the apical shoots of the melon at night. In this study, the mudlobsters of Setiu Wetlands are reddish brown in color with total body length of ranging from 18cm to 20cm long. The *Thalassina* species can be distinguished by differences in morphology, namely the shape of carapace, rostrum and length of dorso-lateral carina.

Keywords: *Thalassina*, indigenous species, pest, Setiu Wetland.

Introduction

The *Thalassina* species, commonly known as mudlobster or ghost shrimps, of the family Thalassinidea Latreille 1831 which is closely related to Callicinassidae, are least studied**,** although their presence have been reported in Singapore, Indonesia, India (Ngoc_Ho & de Saint Laurent, 2009), Japan (Karasawa & Nishikawa, 1991), Phillipines (Moh & Chong, 2009), Thailand (Voris & Murphy, 2002) and Malaysia (Sasekumar, 1974; Ng & Kang, 1988, Moh & Chong, 2009). Nine species of *Thalassina* were reported in the Indo-West Pacific region; *Thalassina anomala* Herbst, 1804*, Thalassina australiensis, Thalassina gracilis* Dana, 1852*, Thalassina kelanang* Moh & Chong, 2009*, Thalassina krempfi* Ngoc-Ho & de Saint Laurent, 2009, *Thalassina spinosa* Ngoc-Ho & de Saint Laurent, 2009, *Thalassina squamifera* De Man 1915*, Thalassina saetichelis* and *Thalassina spinirostris* Ngoc-Ho & de Saint Laurent, 2009 (Sakai & Türkay, 2012). However, *T. anomala*, appeared to be the ubiquitous species in the Indo-West Pacific region (Ngoc-Ho & de Saint Laurent 2009). In Malaysia, Thalassina species have been reported in isolated localities in Peninsular Malaysia, with *T. kelanang* in Selangor (Moh & Chong, 2009, Sasekumar, 1974), *T. anomala* in Selangor (Moh *et al*., 2015) and *T. gracilis* in Johore and Sarawak (Sasekumar, 1974). They are locally referred to as "ketam busut" or "udang ketak" and are generally associated with the mounds made by the species. The mounds are formed from filtered mud shovelled to the surface using its first pair of appendages as the mudlobster ingest the organic matter while burrowing into the soil to forage for food (Voris & Murphy, 2002). According to Moh *et al*. (2015), *T. anomala* was found living on higher ground while *T. kelanang* exhibited a greater tolerance to high salinity. However, there were no studies on the mudlobster from the Setiu wetlands, Terengganu. As such, this paper reports on the recent finding of the mudlobster and characteristics of its mould in the Setiu wetlands of Terengganu.

Material and Methods

Eight samples of the *Thalassina* species or mudlobster were collected from Setiu Wetland, Terengganu and brought back to the laboratory

for identification. Morphometric and meristic characters were measured according to Ngoc-Ho & de Saint Laurent (2009). Meristic characters such as number of dorsal spines on merus of large chela and small chela were counted under a dissecting microscope (Leica 750, Japan) while morphometric measurements such as total length, carapace length, abdomen length, carapace width, antennule length, were taken using a pair of digimatic calipers with a precision of 0.01 mm.

The sampling area was a forest of *Melaleuca* species (locally known as Gelam tree) on acid sulphate soil, which had been deforested by the locals for food crop production. Many specimens of the mudlobsters were found during excavation of drainage and irrigation canals for planting of pumpkins, water melon and ground nuts. Mounds associated with the mudlobsters were also found along the newly constructed canals. The height of the mounds were measured using measuring tape while the opening of the main burrow to other small burrows close to it or surface burrow was determined by pouring water into the opening of the main burrow. The numbers of connected surface burrow openings were counted. Length and shape of the burrows were determined by inserting a hand into the burrow until a junction was reached. Most burrows were short and Y shaped. However, some of the burrows were deeper in depth and the shape was assumed to be Y or U shaped by observing the output of water from the respective burrow after pouring water into the main mound.

Results

Thalassina species

The *Thalassina* species collected from Setiu Wetland closely resemble *T. anomala* based on the morphological key by Moh & Chong (2009). Features of the rostrum appear to be an important morphological characteristic in identifying the different Thalassina species. The mudlobsters from Setiu Wetland, Terengganu, is reddish brown in color with a total body length ranging from 18 to 20 cm long. The dorsal carapace is oblong, similar to *T. kelanang* and *T. anomala,* but differ from *T. kelanang* and *T. squamifera* by having a long and hooked spine dorsal median margin which extended to the first abdominal tergite. The rostrum is triangular, with a shallow median sulcus and does not extend beyond the adrostrals, similar to *T. anomala* and *T. squamifere* but differ from the acute tip and deep median sulcus rostrum that extend behind adrostrals of *T. kelanang* (Figure 1a, b). However, the inverted Y-groove of the two petaloid depressions of the first abdominal somite is similar to three species, *T. anomala, T. kelanang* and *T. Squamifera* (Figure 1c). Thus, the specimens from Setiu Wetland, Terengganu is assumed to be *T. anomala.*

Mounds of Thalasina species or mudlobster

The sampling location is a higher ground area dominated by gelam (*Melaleuca* sp) forest, located about 1 km from the nipah or mangrove forest. There were more mounds seen among the undisturbed gelam trees. In areas where the gelam trees have been cleared and cultivated with watermelon, the mounds were found within a 1m area along the canal of the intertidal and subtidal region. The mudlobster mounds found along the constructed canals. The distance between two mounds is about 1m, while the height of the mound varies, with the highest mound recorded at 20 cm from the ground surface (Figure 2). The mounds were U-shaped with moist hard, smooth cemented lining (Figure 3) which can take in about more than 10 litre of water. Probably the burrow is Y-shaped because of the output of water from a few respective burrows after pouring water into the main mound.

Discussion

This is the first report on the presence of *T.* anomala from Setiu Wetlands, Terengganu, and possibly in the east coast states of Peninsular Malaysia. The sampling area was just developed from a forest of *Melaleuca* plants and uninhibited by humans. Based on information from the nipah palm crab hunters, the mudlobster was

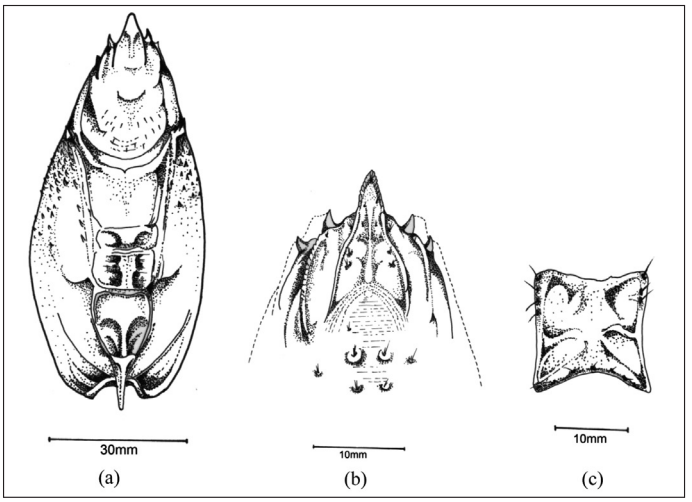

Figure 1: *Thalassina anomala.,* (a) Carapace, dorsal view; (b) Cephalothorax, dorsal view; (c) Pereopod, dorsal view.

very common in the nipah palm around Kuala Terengganu until the area was developed for residential and commercial areas (Hafiz, personal communication).

The height of the mounds in the Setiu Wetland is lower than 1 meter as reported in Japan (Satoh & Hayaishi, 2007) and the 2 meters recorded in Singapore and Thailand (Voris & Murphy, 2002). It is possible that the soil is more compact in the higher area under the *Melaleuca* forest as compared to under mangrove vegetation and the mudlobster does not have to burrow deep to forage for food which contributes to a smaller volume of earth shoved to the surface. Moh *et al.* (2015) found

Figure 2: The mound (thin arrow) and the hole (thick arrow) build by mudlobster (*Thalassina* sp). The mudlobster lives under the mound and was connected with the hole and form U-shape tunnel

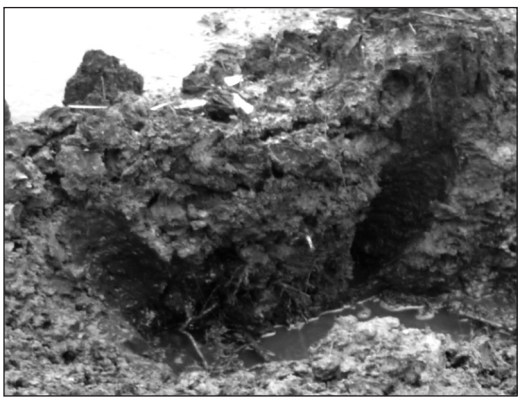

Figure 3: The mudlobster lives under the mound and was connected with the hole and form U-shape tunnel (arrow)

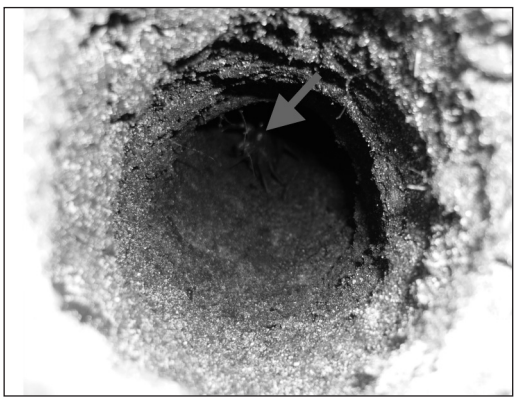

Figure 4: A small crab (arrow) hiding in the mudlobster tunnel. The tunnel wall looks hard like cement

the mudlobster distribution pattern not only influenced by sediment characteristics but also by tidal inundation and salinity. It could be the mud substrates are similar to the mangrove area. Most of the mounds were found close to the canal in the acid suphate soil which suggests the uniformity of the acidic environment between the tunnels and the water source from the canal for the mudlobster. According to Kartika & Patria (2012), the *T. anomala* built their nest not too far from the water resources. Apparently, the mudlobster is not able to survive when it is trapped in non-saline water.

Kartika & Patria (2012) found that the tunnel of mudlobster nest shaped like the letter I, L and Y. While other Thalassinidae group were reported have a type of tunnel like the letter U, Y and I (Mukai & Koike, 1984; Kinoshita, 2002). However, the burrow or *T. anomala* found from Setiu Wetland have U or Y shaped burrow. Kinoshita (2002) observed the form of burrow was related to feeding activity.

The mudlobster build the burrow and mound at night time. It was seen many new mounds with wet new mud at the morning. Mounds of mudlobster also found at the area of local people planting pumpkin and water melon because their area was disturbed. According to the local people working in the farm area where the samples were collected, the mudlobster is a pest, destroying the apical shoots of the melon at night. A living mudlobster was found crawling among the water melon plants while three dead samples were collected in a pool of trapped rain water in the depressed part of the farm from the previous night rain. Apparently, the mudlobster is not able to survive when it is trapped in non-saline water (Kartika & Patria, 2012).

Based on eight mudlobster collected, all of them are *Thalassina anomala.* There were no study about the populations of mudlobster at the area. According to local people, most of the mounds were abundance at the mangrove area and this is the first time they found at the area after the area disturbed. Based on history, the mudlobster have some health value as it is traditionally believed among the local community in Terengganu and Thailand that the essence from boiled mudlobsters can help to relief asthmatic problems. It is possible that the antibiotic produced by the mudlobster gastrointestinal flora can be a source for developing novel antibiotics and the shells which constitute the bulk of the mudlobster can be a primary source of chitosan.

Conclusion

Mudlobster found from Setiu Wetland is only *T. anomala*. The mound of the mudlobster closed to the canal and also found at the agricultural area. They moved to agricultural area and destroyed the apical shot of melon because the habitat was disturbed. They are very sensitive to the changes of salinity

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