

An Annotated Checklist to the Commonly Harvested Crabs (Crustacea: Decapoda) from Marine and Brackish Water Ecosystems of Palawan, Philippines

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ABSTRACT

Despite the abundance of commercially important and edible crabs in Palawan, there is no consolidated information on their taxonomy, distribution, and ecology that will serve as baseline data for management and conservation of these decapod species. Thus, this paper provides a consolidated information on the commonly harvested crab species of the marine and brackishwater ecosystems of Palawan. Eighteen species belonging to seven families, namely Coenobitidae, Raninidae, Matutidae, Portunidae, Ocypodidae, Varunidae, and Gecarcinidae were listed. Majority of these crabs are widely distributed in the province. *Scylla* and *Portunus* are two of the genera that have high commercial value, marketed both as local and export commodities. Among the species listed, only *Birgus latro* is considered as threatened species while *Scylla* spp. have specific size restriction if marketed for export. Other edible crab species are allowed for collection with certain regulatory measures. It is vital to take necessary measures to protect these species including their habitats from overexploitation as these could be source of livelihood commodity and tourist attraction in the future.

Keywords: checklist, commonly harvested crabs, Palawan, Philippines

INTRODUCTION

The province of Palawan, located at the western part of the Philippine archipelago, holds a high diversity of marine, freshwater and terrestrial ecosystems (Katala Foundation, 2008). This is attributed to its historic geological connection with mainland Asia via northern Borneo (Heaney, 1985). It has the largest remaining mangrove forest in the Philippines, with more than 56,000 ha (Long and Giri, 2011). About 30% of the coral reefs in the Philippines are located in Palawan (Chou et al., 2002). The long and narrow island extends 425 km from north east to south west, and is flanked by the South China Sea on the west and the Sulu Sea on the east. It has been referred to as the “last ecological frontier” of the country because of its relatively intact ecosystems (Sandalo and Baltazar, 1997; Santiago and Buot, 2017).

In terms of fisheries resources, the Philippine waters are rich in crustacean fauna, which is mainly composed of shrimps, lobsters and crabs. There is a total of 2,007 species of decapod crustaceans recorded in the Philippines, of which, 319 species are anomurans and 878 species are brachyurans (Motoh, 1980). Crabs are among the major contributors of fisheries production in the country especially for the mudcrabs (*Scylla* spp.) and blue swimming crabs (*Portunus* spp.) (PSA 2016). Other species of edible crabs have not been reported because they are not commercially marketed but only utilized as subsistence food.

Despite the abundance of commercially important and edible crabs in Palawan, there is no consolidated information particularly on their taxonomy, distribution, biology, and ecology which can be a practical reference for those who study and utilize them. Hence, this paper is a consolidation of information on the commonly harvested crab species of the marine and brackish water environments in Palawan which will serve as baseline for management and conservation policies for these species in Palawan.

MATERIALS AND METHODS

The information here were based on visits to fish markets and small fish stalls (*talipapa*) in Puerto Princesa City, Palawan for survey and morphological examination of the crabs using the work of Ng (1998). Only two to three vendors per market were interviewed due to the limited number of crab vendors in the markets. Some fish vendors have provided information on the crabs that they sell such as the source and their local names. Information from published references and technical

reports from Food and Agriculture Organization of United Nations (FAO) Database on crabs were also gathered. Interviews with key persons from the Bureau of Fisheries and Aquatic Resources of the Department of Agriculture (DA-BFAR), Office of the Municipal Agriculture and other resource persons were also conducted. The World Register of Marine Species (WoRMS; <http://www.marinespecies.org>) was used to determine the updated taxonomic classification of the crab species. It is important to note that the crab species listed here serve as a preliminary checklist and could be updated should there be other edible species identified to occur in the Province.

RESULTS AND DISCUSSION

A total of 18 species belonging to seven families of commonly harvested crabs from the marine and brackish water ecosystems were listed to occur in the province of Palawan. All the species mentioned here belong to Subclass Malacostraca (shelled Crustacea), Order Decapoda (ten-footed crustacean). The following are some aspects of the biology, habitat, and distribution of the crab species. Table 1 shows the summary of the taxonomic classifications, the English names, the local names and price per kilo of the crabs.

Family Coenobitidae

***Birgus latro* (Linnaeus, 1767)**

This is the largest species among the hermit crabs and the only one that does not carry a mollusk shell as an adult (Krieger et al., 2016). Its common name (coconut or 'robber' crab) reflects an unsubstantiated reputation for removing nuts from the tops of coconut palms (Brown and Fielder, 1991). It can grow up to 12 cm in carapace length and can weigh between 2 to 4 kg (Drew et al., 2010). This species is widely distributed in tropical islands of the Indian Ocean and Pacific Ocean (Krieger et al., 2016) and in the Indo-West Pacific Region (Motoh, 1980). In the Philippines, it can be found in Zamboanga del Norte, Sulu, Tawi-Tawi Basilan and in Palawan (Fig. 1) specifically in the island municipalities of Cagayancillo and Balabac. Although catching and trading of this species is prohibited by the BFAR, local people gather it for family consumption.

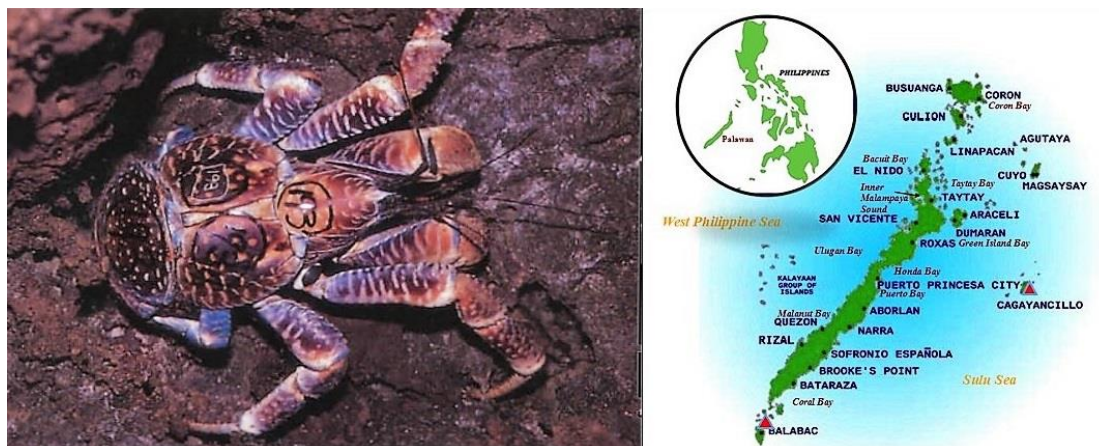


Figure 1. Dorsal view of a marked *Birgus latro*. Red triangles in the map indicate the known distribution of the crab in Palawan. (photo source: Brown and Fielder, 1991).

Family Raninidae

Ranina ranina (Linnaeus, 1758)

Ranina ranina is the only extant species of its genus. It is widely distributed all over the coastal waters from East Africa to the Indo-Pacific region (Motoh, 1980; Brown et al., 2001) at depths of 10 to 70 m on sandy substrata in which they bury (Skinner and Hill, 1987). In the Philippines, it was reported to be in abundance in the coastal waters of Sulu and Tawi-tawi (Tahil, 1983), Basilan (Tito and Alalano, 2008), in Zamboanga City (Baylon and Tito, 2012). The present study identified the species to occur in northern Palawan particularly in Cuyo Strait bordering the municipalities of Cuyo and Araceli (Fig. 2). The crab is known to be very palatable and is eaten wherever it is caught by gill net or crab trap.

In Zamboanga City, *R. ranina* is a delicacy and favorite seafood for the tourists. The increasing demand for local and foreign consumption resulted to high retail price in the local market. Accordingly, the fishing efforts for this particular crab in Basilan Province also increases (Tito and Alanano, 2008). It is marketed in different areas in Palawan but the source is only from Cuyo Strait.

Table 1. The taxonomic classifications, the English names, the local names and price per kilo of the commonly harvested marine and brackish water crab species of Palawan. Dash (-) indicates that the crab is not found in the market.

Scientific Name	Family	English Name	Philippine Name	Price (PHP/kg)
<i>Birgus latro</i>	Coenobatidae	Coconut crab, Palm thief crab, Giant robber crab	<i>Alimangong lupa</i> (Tagalog), <i>Umang</i> (Cebuano and Ilonggo)	-
<i>Ranina ranina</i>	Raninidae	Kona crab, Red frog crab, Spanner crab	<i>Mawik</i> (Cebuano), <i>Kuracha</i> (Cebuano, Chavacano, Palawenyoy/Cuyono), <i>Bacoco</i> (Surigaonon)	Araceli landing price (150-220); Roxas (280); Puerto Princesa (400-450)
<i>Ashtoret lunaris</i>	Matutidae	Armed crab, Moon crab, Yellow moon crab	<i>Parag-parag</i> (Cebuano); <i>Guetguetay</i> (Cuyono)	-
<i>Scylla serrata</i>	Portunidae	Mudcrab, Giant mudcrab, Mangrove crab, Serrated swimming crab	<i>Alimango</i> (Tagalog/Palawanen), <i>Alama</i> (Pangasinan), <i>Rasa</i> (Ilocano), <i>Amorongsod</i> , <i>Malaka</i> , <i>Mulaka</i> , <i>Manguilaud</i> (Ilonggo), <i>Lumayagan</i> , <i>Suga-suga</i> (Cebuano), <i>Kangrejo</i> (Chavacano)	Puerto Princesa (250-400); Manila (300-500);
<i>Scylla olivacea</i>	Portunidae	Mudcrab, Mangrove crab, Orange mudcrab	<i>Alimango</i> (Tagalog/Palawanen), <i>Pe-ye</i> (Cuyono); <i>Amorongsod</i> , <i>Malaka</i> , <i>Mulaka</i> , <i>Manguilaud</i> , <i>Lumayagan</i> , <i>Suga-suga</i> (Cebuano), <i>Kangrejo</i> (Chavacano)	Puerto Princesa (200-300)
<i>Scylla tranquebarica</i>	Portunidae	Mudcrab, Mangrove crab, Purple mudcrab	<i>Alimango</i> (Tagalog/Palawanen); <i>Amorongsod</i> , <i>Malaka</i> , <i>Mulaka</i> , <i>Manguilaud</i> , <i>Lumayagan</i> , <i>Suga-suga</i> (Cebuano), <i>Kangrejo</i> (Chavacano)	Puerto Princesa (200-300)
<i>Scylla paramamosain</i>	Portunidae	Mudcrab, Mangrove crab, Green mudcrab	<i>Alimango</i> (Tagalog/Palawanen); <i>Amorongsod</i> , <i>Malaka</i> , <i>Mulaka</i> , <i>Manguilaud</i> , <i>Lumayagan</i> , <i>Suga-suga</i> (Cebuano), <i>Kangrejo</i> (Chavacano)	-
<i>Portunus pelagicus</i>	Portunidae	Blue swimming crab, Swimming crab	<i>Alimasag</i> (Tagalog); <i>Suga-suga</i> , <i>Kasag</i> , <i>Lambay</i> , <i>Lampay</i> , <i>Dawat</i> (Cebuano); <i>Tarawis</i> (Cuyono)	Puerto Princesa (150-200); outside Palawan (100-200)
<i>Portunus sanguinolentos</i>	Portunidae	Blood-spotted swimming crab, Red-spotted swimming crab, Blue swimming crab, Three-spotted crab, Sand crab	<i>Alimasag</i> (Tagalog/Palawanen); <i>Bansaway</i> (Ilocano); <i>Suga-suga</i> , <i>Kagang</i> (Cebuano); <i>Tarawis/Layog-layog</i> (Cuyono)	Puerto Princesa (150-200); outside Palawan (100-200)
<i>Charybdis feriata</i>	Portunidae	Coral crab, Mask crab, Christian crab, Crucifix crab	<i>Corosan/Krusan</i> (Ilonggo); <i>Kasag</i> , <i>San Francisco</i> (Cebuano); <i>Lambay</i> (Surigaonon); <i>Tarawis</i> (Cuyono)	Puerto Princesa (150-200)
<i>Charybdis natator</i>	Portunidae	Swimming crab, Ridged swimming crab	<i>Kantugas</i> (Cebuano); <i>Kalintugas</i> (Cuyono)	Puerto Princesa (150-200)
<i>Thalamita crenata</i>	Portunidae	Crenate swimming crab, Spiny rock crab	<i>Dawat</i> (Cuyono); <i>Suga-suga</i> , <i>Kagang</i> (Cebuano)	Puerto Princesa (60)
<i>Podophthalmus vigil</i>	Portunidae	Red crab, Sentinel crab, Long-eyed swimming crab	<i>Alimasag</i> (Tagalog/Palawanen); <i>Kasway</i> (Cebuano), <i>Kasag</i> (Surigaonon); <i>Tarawis</i> (Cuyono)	-
<i>Ocypode ceratophthalma</i>	Ocypodidae	Horn-eyed ghost crab	<i>Biokoy</i> , <i>Bayokoy</i> (Ilonggo); <i>Agokoy</i> , <i>Agoykoy</i> , <i>Alagokoy</i> (Cebuano); <i>Taguykoy</i> (Cuyono)	-
<i>Ocypode cordimana</i>	Ocypodidae	Ghost crab, Sand crab	<i>Biokoy</i> , <i>Bayokoy</i> (Ilonggo); <i>Agokoy</i> , <i>Agoykoy</i> (Cebuano); <i>Guyod</i> (Cuyono)	-
<i>Varuna litterata</i>	Varunidae	Shore crab, Herring bow crab	<i>Talangka</i> (Tagalog); <i>Calampay</i> , <i>Katang</i> (Ilonggo); <i>Kalampay</i> (Cebuano); <i>Kalimpay</i> (Cuyono)	-
<i>Cardisoma carnifex</i>	Gecarcinidae	Land crab, Mangrove crab	<i>Kuray</i> (Ilonggo); <i>Kagang</i> , <i>Ung-kog</i> (Cebuano); <i>Alikumo</i> (Cuyono)	-
<i>Gecarcoidea lalandii</i>	Gecarcinidae	Land crab, Purple land crab	<i>Pag-asa kuday</i> , <i>Kuday</i> (Cuyono)	-

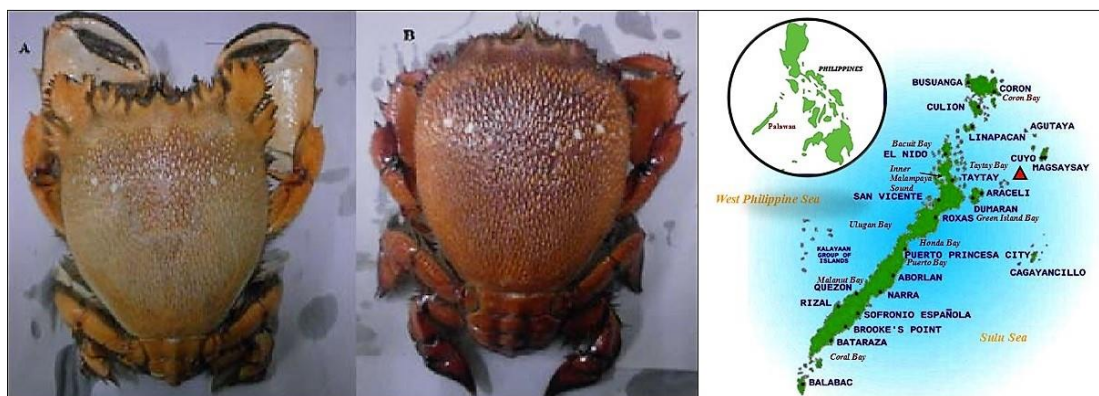


Figure 2. Dorsal view of *Ranina ranina*. A. adult male; B. adult female. Red triangle in the map indicates the known distribution of the crab in Palawan.

Family Matutidae

Ashtoret lunaris (Forskål, 1775)

Ashtoret lunaris (formerly *Matuta lunaris*) has a widespread distribution which extends from the Red Sea to South Africa, Asia and Australia (Chapgar, 1957; Sankarankutty, 1962; Guinot, 1966; Vannini, 1976) as well as in Japan, China and Philippines (Motoh, 1980). It commonly inhabits the shallow sand beach extending up to a depth of 15–20 m (Turan et al., 2015). In Palawan (Fig. 3), it was observed in some of the beaches during low tide burrowing in the sand and sometimes as a by-catch of the beach seine fishing nets in Puerto Princesa City specifically in Barangay Inagawan. It can also be found in Honda Bay. Some people from the coastal community catch this crab using their bare hands for family consumption.

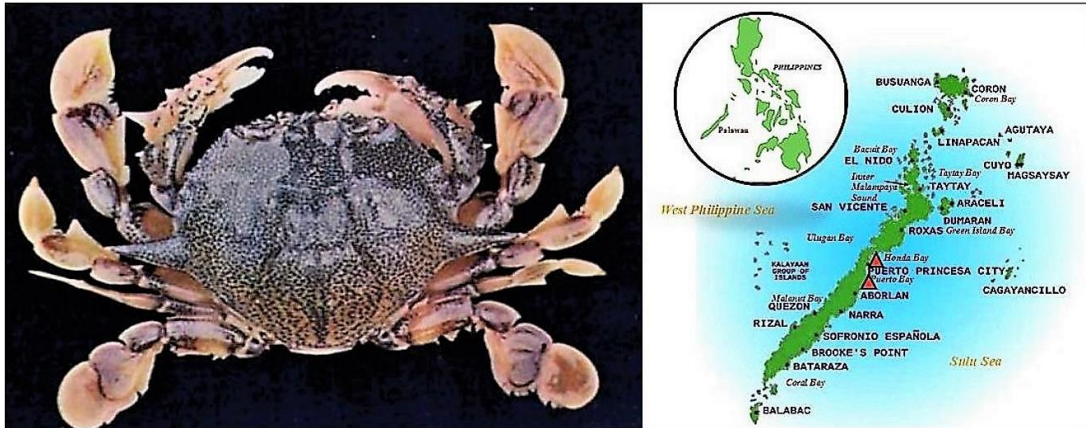


Figure 3. Dorsal view of *Ashtoret lunaris*. Red triangles in the map indicate the known distribution of the crab in Palawan. (source: Motoh, 1980).

Family Portunidae

Scylla serrata (Forskål, 1775)

Scylla olivacea (Herbst, 1796)

Scylla tranquebarica (Fabricius, 1798)

Scylla paramamosain (Estampador, 1950)

The four portunid species inhabit the muddy bottoms on brackish water along the shoreline, mangrove areas, and river mouths, hence known by the names mud crab or mangrove crab. *Scylla olivacea* is often associated with *S. tranquebarica*. In terms of morphology and coloration, *S. paramamosain* seems to be intermediate between *S. serrata* and *S. olivacea* but it can usually be distinguished by the form of its frontal margin and cheliped armature. The crabs are aggressive and are usually caught by gill net or crab lift net (locally known in the Philippines as *bintol*) baited with fish heads or other trash fish meat and set on the bottom in shallow brackish water creeks or ponds. Of the four mud crab species, *S. serrata* has the widest distribution, ranging from South Africa to the Indo-West Pacific including Australia (Keenan, 1999; Le Vay, 2001). The most common portunid species found in the markets in Southeast Asia is *S. olivacea* while *S. tranquebarica* is less common in the markets in Thailand and the Philippines (Ng, 1998). Among the four portunid species, *S. paramamosain* is the least common in the Philippines (Quinitio, 2017). In Palawan, the four species have widespread distribution (Fig. 4). *Scylla serrata* is the most preferred species for farming (Quinitio, 2017). The areas in Quezon and Roxas are

noted as the major source of *S. serrata* for commercial purposes, which are transported to and are sold live in Puerto Princesa City then to Manila. Similar to other species of mudcrab, *S. serrata* is one of the delicacies in Philippine dishes.

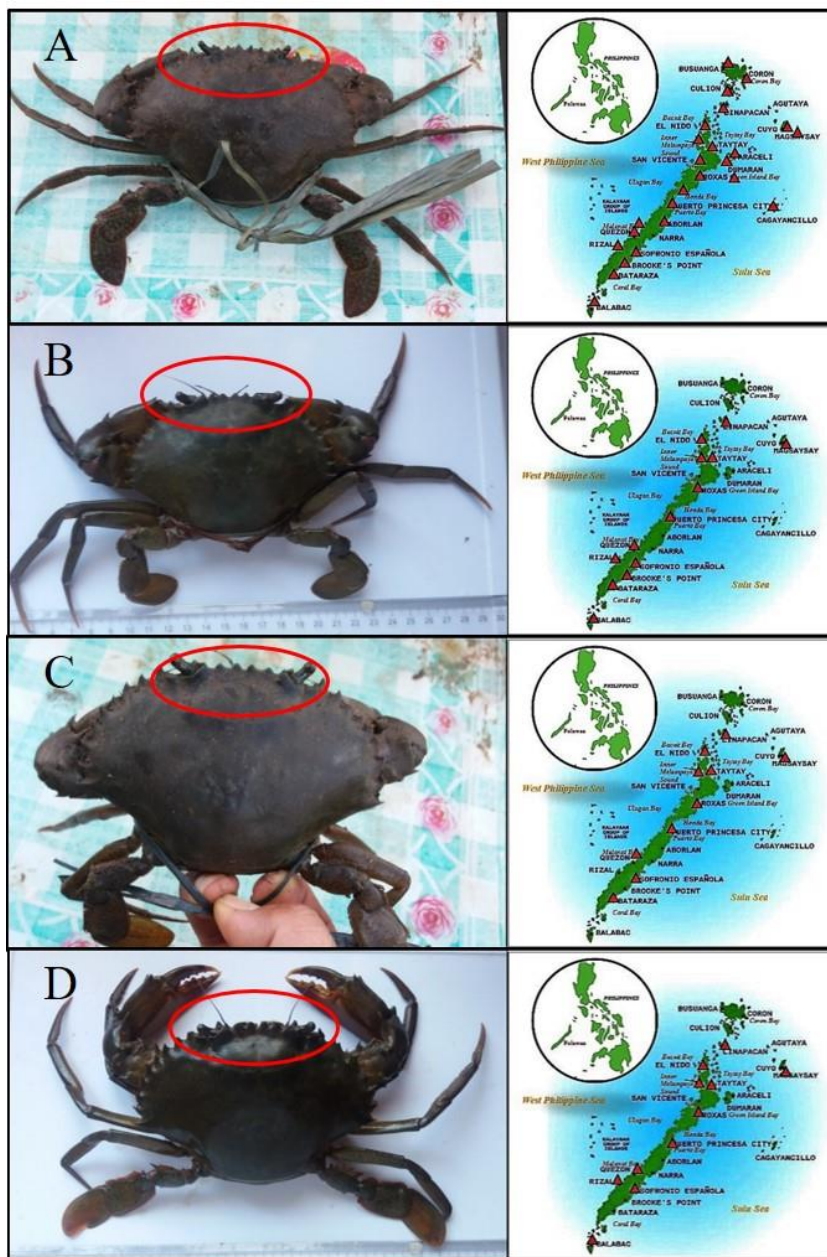


Figure 4. Dorsal view of A. *Scylla serrata*; B. *S. olivacea*; C. *S. tranquebarica*; and D. *S. paramamosain*. The red circles indicate the features of the frontal margin of the carapace distinct to each species. Maps show the wide distribution (red triangles) of the species in Palawan.

Portunus pelagicus* (Linnaeus, 1758)**Portunus sanguinolentus* (Herbst, 1783)**

These two *Portunus* species are distributed in the Indo-Pacific waters from Japan, Philippines, Tahiti, Australia westward to the Indian Ocean Red Sea and East Africa (Apel and Spiridonov, 1998; Dash et al., 2013; Soundarapandian et al., 2013; Kunsook and Dumrongrojwatthana, 2017) inhabiting the sandy or muddy sand bottoms from shallow brackish water to depths beyond 40 m (Motoh, 1980). In the Philippines, they are reported to occur in Aparri, Cagayan, Ticao Island, Masbate Island, Leyte, Bohol, Bantayan Island, Cebu, Negros Oriental, Negros Occidental, Panay Island and Tawi-Tawi (Sienes et al., 2014). The crabs have widespread distribution across Palawan (Fig. 5, 6). They are usually caught using crab trap, gill net, “*bintol*”, and trawler from the interior portion of a bay to offshore. *Portunus sanguinolentus* is smaller than *P. pelagicus*, thus, have lesser commercial value.



Figure 5. Dorsal view of *Portunus pelagicus*. A. male; B. female. Map shows the wide distribution (red triangles) of the species in Palawan.

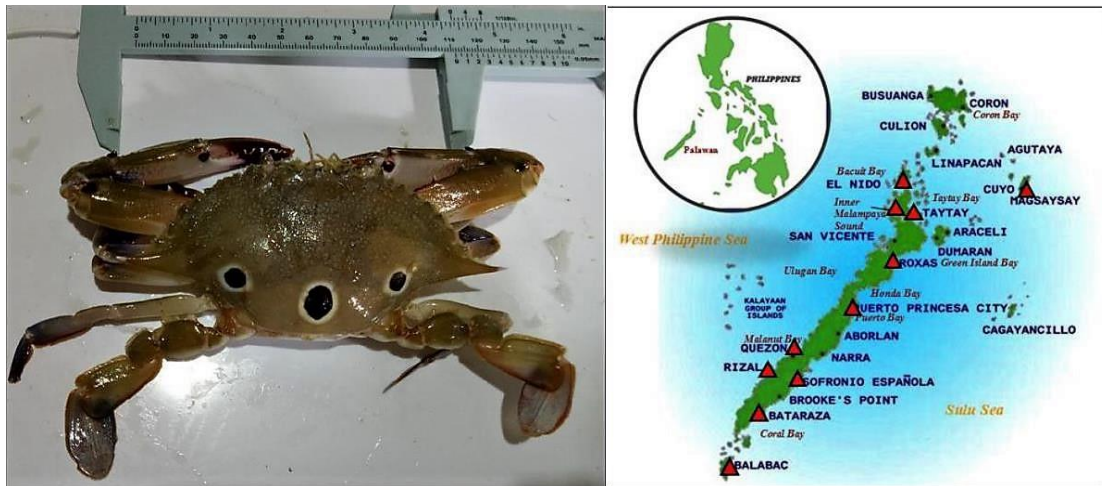


Figure 6. Dorsal view of *Portunus sanguinolentus*. Map shows the wide distribution (red triangles) of the species in Palawan.

***Charybdis feriata* (Linnaeus, 1758)**

***Charybdis natator* (Herbst, 1794)**

Charybdis feriata and *C. natator* are widely distributed from Hawaii and Australia westward to the east coast of Africa (Stephenson et al., 1958; Motoh, 1980; Sumpton, 1990; Dai & Yang, 1991). They mostly inhabit the bottoms of pebbles, sand, and sometimes rocks with depths from 10 to 40 m where they are caught by commercial trawlers (Motoh, 1980). Both species are recorded in Puerto Princesa City (Fig. 7, 8) as by-catch of *P. pelagicus* fishery. Breeding trials and seed production of *C. feriata* are undertaken in SEAFDEC Aquaculture Department, Iloilo City (Parado-Estepa, 2002).



Figure 7. Dorsal view of *Charybdis feriata*. Red triangle in the map indicates the known distribution of the crab in Palawan (photo source: Parado-Esteva et al. 2002).

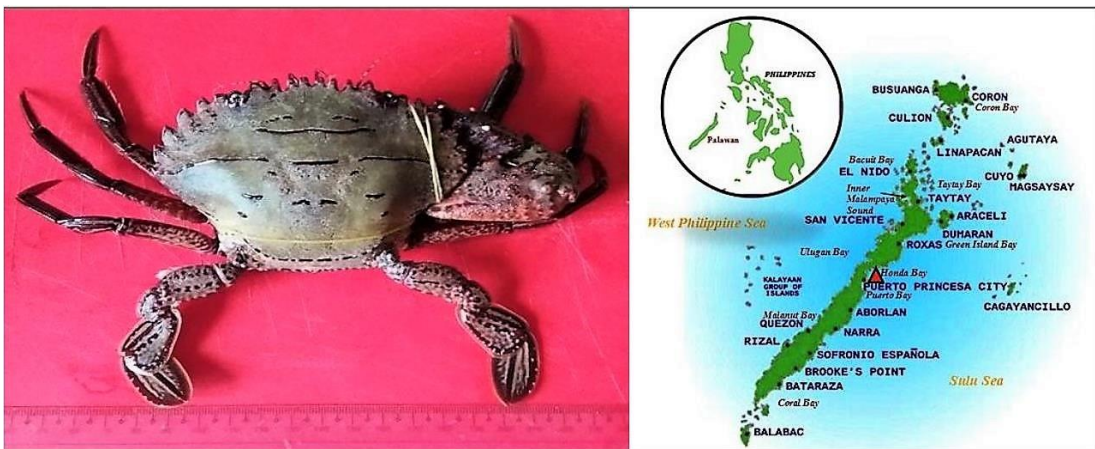


Figure 8. Dorsal view of *Charybdis natator*. Red triangle in the map indicates the known distribution of the crab in Palawan.

***Thalamita crenata* (Rüppell, 1830)**

Thalamita crenata is distributed in the entire tropical Indo-Pacific Region, western Pacific, Indian Ocean and Red Sea to the coast of Africa (Cannicci et al., 1996; Sigana, 2002; Chande and Mgaya, 2003), Thailand (Songrak and Choopunth, 2006), Taiwan (Chen et al., 2005) and the Philippines. It inhabits brackish water in the extreme seaward fringe of the mangrove swamp and the intertidal platform and is seldom found in clear seawater like in the coral reef (Motoh, 1980; Canicci et al., 1996). Breeding activities of this crab are observed throughout the year (Sigana,

2002). It is widely distributed in Palawan (Fig. 9) and is caught using crab pots or fishing nets. This relatively small-sized crab species is usually collected by artisanal fishermen for local consumption (Sigana, 2002) and is mostly caught with baby trawlers, skimming netters or crab traps in the inner portion of a bay or mangrove creek (Motoh, 1980).



Figure 9. Dorsal view of *Thalamita crenata*. Map shows the wide distribution (red triangles) of the species in Palawan.

Podophthalmus vigil (Fabricus, 1798)

The main characteristic of this crab is the presence of two long eyes, reaching to or extended beyond edge of its carapace. It is rarely caught by baby trawlers in shallow brackish waters and is also taken rarely by commercial trawlers operating offshore. It is distributed widely in the Indo-Pacific region from Hawaii through the South Pacific, Japan, Malaysia, Philippines westward to the Red Sea, and South Africa (Motoh, 1980; Jones et al., 2000). In Palawan (Fig. 10), it is sometimes collected in Honda Bay, Puerto Princesa City as by-catch of the *P. pelagicus* fishery.

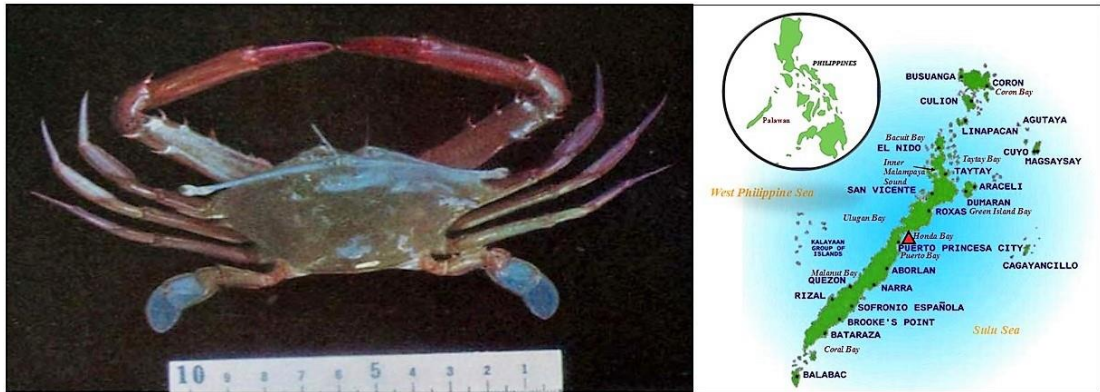


Figure 10. Dorsal view of *Podophthalmus vigil*. Red triangle in the map indicates the known distribution of the crab in Palawan (photo source: Motoh, 1980).

Family Ocypodidae

Ocypode ceratophthalma (Pallas, 1872)

Ocypode cordimana (Latreille, 1818)

Ghost crabs are the fastest crustaceans on land and have acute senses of sight, smell, and hearing (Lucrezi and Schlacher, 2014). They have a nocturnal behavior and are caught by hand by local people with the aid of kerosene torch. *Ocypode ceratophthalma* is pale during the day and becomes dark at night. It is possible that being pale during the day enables the crab to stay cool more effectively and the change in appearance significantly improves the degree of camouflage during the day to the light-yellow sandy substrate (Stevens et al., 2013). It is considered as a bio-indicator that is able to detect changes in the level of pollutants in beach habitats (Lim and Yong, 2015). *Ocypode cordimana* is usually smaller than *O. ceratophthalma*.

The two species are widely distributed Indo-West Pacific Ocean particularly in Hawaii, Central and Southern Pacific, China, Japan, Thailand, Indonesia, Indian Ocean, Madagascar, and Eastern and Southern Africa (Sakay and Turkey, 2013), in the Philippines southward to New South Wales, Australia, westward to the Red Sea, Arabian Gulf, and East and South Africa (Motoh, 1980), as well as in Singapore (Stevens et al., 2013; Lim and Yong, 2015). *Ocypode ceratophthalma* is widely distributed across Palawan (Fig. 11A) while *O. cordimana* is only recorded from the municipalities of El Nido and Sofronio Española (Fig. 11B).

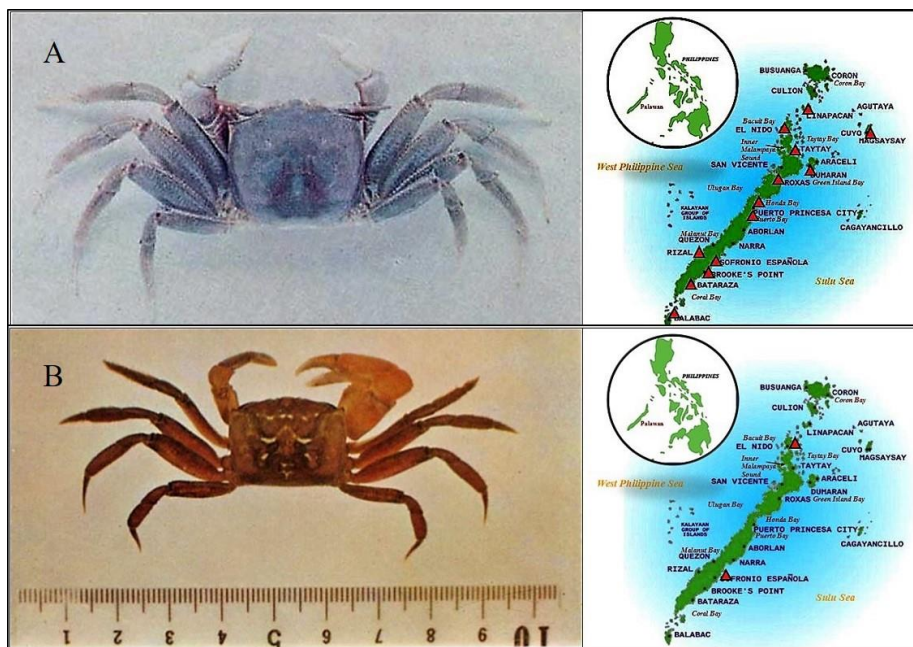


Figure 11. Dorsal view of A. *Ocypode ceratophthalma*; and B. *O. cordimana*. Red triangles in the map indicate the known distribution of the species in Palawan (photo source: Motoh, 1980).

Family Varunidae

Varuna litterata (Fabricius, 1798)

Varuna litterata usually inhabits mangrove creeks, rivers, fresh water canals, brackish water fishponds or even the rice fields (Ryan and Choy, 1990). This small-sized crab is mainly caught with baby trawlers or fish corrals at the mouth of the bay (Motoh, 1980). With its legs shaped as paddles used for swimming, it is sometimes called the ‘Paddler crab’ (Devi et al., 2013). It is distributed from the east coast of Africa and India to Japan, Madagascar, and the east coast of Africa (Motoh, 1980; Devi et al., 2013). It has less commercial value because of its small size. It is usually collected by the local people for own food consumption. *Varuna litterata* is found in Palawan particularly in the municipalities of El Nido, Balabac, Quezon, Sofronio Española, Brooke’s Point, Roxas and Puerto Princesa City (Fig. 12).

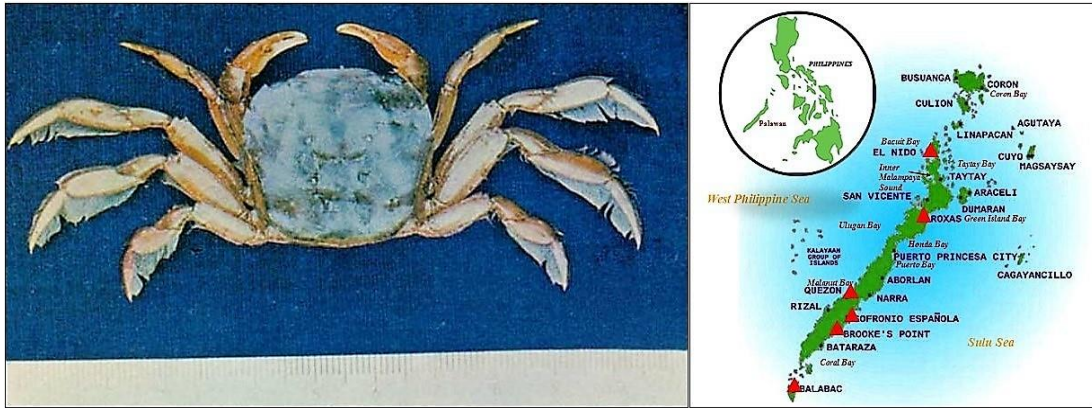


Figure 12. Dorsal view of *Varuna litterata*. Red triangles in the map indicate the known distribution of the crab in Palawan (photo source: Motoh, 1980).

Family Gecarcinidae

Cardisoma carnifex (Herbst, 1796)

Cardisoma carnifex inhabits the landward fringe of the mangroves borrowing in the mud to hide and are well adapted to terrestrial habitats (Jones, 1984). It is also found throughout the high intertidal grove, but is densest in a belt between mean and extreme high-water spring tide. *Cardisoma carnifex* is active during the night and day, possibly because of its greater resistance to high temperature and low humidity (Micheli et al., 1991). It is distributed from the coasts of the Red Sea to Aldabra, Andamans, Japan, Formosa, Celebes and Polynesia and east Africa, Tahiti through southern Durban, and the Philippines (Motoh, 1980; Vannini and Valmori, 1981; Micheli et al., 1991). In Palawan, it is reported to occur in the municipalities of Magsaysay, Dumarang, Taytay, El Nido, and Puerto Princesa City (Fig. 13). This land crab is utilized as food by the people living in rural areas but is seldom sold in the local market of Palawan.



Figure 13. Dorsal view of *Cardisoma carnifex*. Red triangles in the map indicate the known distribution of the crab in Palawan (photo source: Motosh, 1980).

Gecarcoidea lalandii (Edwards, 1837)

Gecarcoidea lalandii, a nocturnal land crab, is widely distributed throughout Indo-West Pacific Region (Ng, 1998). It normally inhabits the shallow burrows or under trees and rocks in undisturbed forests in isolated islands. It is also found to live under the root system of *Cerebra* trees, locally known as *Alipata*, as well as in low profile rock crevices in the island. It is only occasionally collected for food, much the same as *Cardisoma carnifex*, which is usually caught by hand or traps. The species was only recorded in Kalayaan islands so far (Fig. 14). The market value of this crab is somewhat low, hence collection is for personal consumption only.



Figure 14. Dorsal view of *Gecarcoidea lalandii*. Red triangle in the map indicates the known distribution of the crab in Palawan (photo source: Gonzales, 2008).

Crab species mostly utilized for food in Palawan belong to family Portunidae and these are protected under some government regulations. The collection of mudcrabs, *Scylla* spp. is covered by Fisheries Administrative Order (FAO) No. 162, which prohibits the undersized and underweight crabs (i.e. carapace length must be 10 cm or over and weight must be 200 grams or over) for export. Also, the Philippine National Standard (PNS) for Live Mangrove Crab developed by the Bureau of Agriculture and Fisheries Standards (BAFS) through a Department of Agriculture (DA) Special Order No. 734, Series of 2014 aims to provide a common understanding on the scope of the standard, product description, process description, essential composition and quality factors, food additives, contaminants, hygiene and handling, packaging and labeling, methods of sampling, and examination and analysis. On the other hand, the Blue Swimming Crab Management Plan (BSCMP) was created in 2012, which aims to ensure the sustainability of the blue swimming crab (*P. pelagicus*) resources in the Philippines considering that it is one of the export commodities of the country. Its long term goals encompass the development and improvement of breeding, hatchery and grow-out technology for the blue swimming crab and maintenance of its catch and effort to a sustainable level. Moreover, the management measures of other portunid crabs such as *C. feriata*, *C. natator* and *P. sanguinolentus* are included in this plan as a precautionary approach subject to further studies by National Fisheries Research and Development Institute (NFRDI). This plan was strengthened by the issuance of Fisheries Office Order No. 233 for the blue swimming crab industry and supported by the following Administrative Orders issued by BFAR, which include: FAO No. 155 (Regulating the use of fine-meshed nets in fishing); FAO No. 222 (Regulations on the operation of Modified Danish seine); FAO No. 201 (Ban of fishing with active gear); FAO No. 233 (Aquatic Wildlife Conservation); and Department of Agriculture Administrative Order No. 1, 2004 (Guidelines on the delineation of municipal waters).

Other commonly harvested crab species in Palawan such as *Cardisoma* spp., *Ocyropode* spp., *Thalamita crenata*, *Varuna litterata* and *Ranina ranina* are not strictly regulated in the Philippines, hence the collection is not prohibited, unless otherwise caught in marine protected areas, fishery reserves, refuge, and sanctuaries, which is not allowed under section 101 of the Philippine Fisheries Code. The coconut crab, *Birgus latro* is protected in some areas, with required minimum sizes for taking and are prohibited for harvest during breeding periods. It is considered as a rare species in IUCN red list from 1983–1994 (Eldredge, 1996). In the Philippines, it is protected under the DA-BFAR Fisheries Administrative Order No. 208 (Conservation of Rare, Threatened and Endangered Species) as well as in sections 102, 104 and 105 of

Republic Act 8550 (Philippine Fisheries Code of 1998) as amended by RA 10654 (An Act to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing). Hence, taking, catching, and trading of this species is unlawful. Furthermore, exportation of all the fishery/aquatic species (including crabs) particularly the breeders, spawners, and fry is also prohibited under sections 104 of the Fisheries Code.

In Palawan, the Palawan Council for Sustainable Development is the primary agency that implements the Wildlife Act (RA 9147), subjecting all the aquatic species for regulation and permitting system especially if collection is intended for commercial purposes. Since the exploitation of these crab species is unregulated, it is vital to take necessary measures to protect these species including their habitats from overexploitation as these could be source of livelihood commodity and tourist attraction in the future. It is also important to undertake more studies and documentation of the commonly harvested crabs in the province of Palawan.

ACKNOWLEDGMENT

We would like to express our gratitude to the fish vendors at the fish markets of Puerto Princesa City as well as the key persons from the BFAR-Puerto Princesa and the Office of the Municipal Agriculture for their support and cooperation during the conduct of the interviews. We also extend our appreciation and recognition to our colleagues and families for their inspiration and understanding.

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