Distribution and Abundance of *Macrobrachium* Populations in Palawan

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**Abstract.** Nothing is known about the population dynamics of *Macrobrachium* spp. or freshwater decapods in Palawan that hence received little attention to conservation studies that are imperative to establish sustainable management proposals. Thus, this paper provides information on the natural distribution and abundance of *Macrobrachium* spp. in Palawan to address threats to their survival. Preliminary findings through key informant’s interviews suggest the distribution and abundance of these species in Palawan’s river system. Generally, *Macrobrachium* spp. are present in all river systems in the province. However, the respondents observed that the population started to decline during the late 1990s attributed to the rampant use of organic pesticides/insecticides for agricultural purposes and intensive quarrying activities stretched along with the river systems in some of the municipalities in Palawan. Results also annotated that the local populations use these animals as food without official regulations, which may be additional pressure on freshwater prawns. The abundance of the *Macrobrachium* spp. is affected by human interventions and the destruction of their natural habitat and populations. Management measures should be considered from the economic conditions of freshwater prawns for effective management strategy and conservation efforts for future generations.

1. **Introduction**

Palawan, an archipelagic province that comprises 1,768 islands or 16% of the Philippines, is situated in the southwest part of the country’s island chain and has no land boundaries. It is a distinct biogeographic region characterized by a high concentration of endemic plants and animals, relatively intact ecosystems of high conservation value, and social and cultural diversity [1]. However, studies on the presence of freshwater animals, including freshwater prawns or *Macrobrachium* spp. have received little attention and are more limited than species inhabiting estuarine and marine ecosystems. *Macrobrachium* is a genus of freshwater prawns among the most abundant and most diverse widespread crustacean genera that inhabit seawater and freshwater in tropical and temperate waters [2] [3]. The genus *Macrobrachium* is well known because of the number of geographically distributed species with commercial importance [4] [5]. Approximately more than 240 species reported to exist worldwide are presently recognized and many of the species grow to a sufficient size to be used for
human consumption [6] [7] [8] [9]. Freshwater prawn thrives in inland bodies of water like rivers, lakes, swamps, irrigation canals, estuaries areas [11] [12]. They are distributed throughout the tropics and subtropics on all continents except Europe [13]. They are a remarkably successful group both in the number of living species and in the colonization of varied habitats. Although most of the Macrobrachium species inhabit freshwaters, some are entirely restricted to estuaries and many require brackish water during the early stage of development [14]. Freshwater prawns of the genus Macrobrachium are ecologically and economically important and as a result, support artisanal fisheries in many developing countries, especially in Africa [15]. Although studies about Macrobrachium populations have been conducted widely worldwide, its abundance and large distribution in different areas still need to be investigated.

In this present work, we reported the distribution and abundance of Macrobrachium populations in Palawan’s river systems to establish the population structure of the freshwater prawn’s stocks in the Philippines. Additionally, as considered to be the highly priced food commodity, and the aquaculture is most promising will be initiated, management measures to ensure the conservation of these species and sustainability of this resource should be developed for future generations.

2. Materials and Methods

2.1. Study Site

This study was conducted in the Southern and Northern municipalities in the province of Palawan through the DOST-PCARRD funded project entitled GeM-PHIL: Genetic Characterization of Macrobrachium populations in the Philippines for broodstock development and seed production implemented by the Western Philippines University. It aimed to map the genetic resources of Macrobrachium populations in the Philippines by subjecting both wild-caught and hatchery-produced Macrobrachium samples to genetic analyses to identify, develop, and produce appropriate/fit Macrobrachium strains for aquaculture production. The researchers presented the project overview, research framework, and schedule of activities to the Municipal Local Government Units (MLGUs) in Palawan to understand better the implications of the project and each activity in the municipality and its vicinities.

![Map of the Philippines highlighting the map of Palawan showing the municipalities visited during the project presentation and reconnaissance survey GeM-PHIL](image)

**Figure 1.** Map of the Philippines highlighting the map of Palawan showing the municipalities visited during the project presentation and reconnaissance survey GeM-PHIL
2.2. Data Gathering
This study used a descriptive research method. Data were obtained using a structured survey questionnaire through Key Informant Interviews (KII) conducted during the reconnaissance survey in each municipality.

![Figure 2](image1)

**Figure 2.** Project overview, research framework and schedule of activities presentations to the Municipal Local Government Units (MLGUS) in the province of Palawan

Structured questionnaires were translated into the local language “Tagalog” to facilitate better understanding by the informants. Information gathered from the KII are the distribution, abundance and seasonality of collection and observations of some threats to the *Macrobrachium* population in each municipality. The general physiography of the rivers systems was noted during the survey. Photo documentations were also provided during the survey.

![Figure 3](image2)

**Figure 3.** Key Informant Interviews (KII) conducted during the reconnaissance survey in each municipalities.

2.3. Analyses
The data gathered through KII were analyzed and presented in a graph.

3. Results and Discussion
The genus *Macrobrachium* of freshwater prawns constitutes a group of economically important macroinvertebrate animals [17].
Generally, the genus *Macrobrachium* or freshwater prawn populations are present and widely distributed in Palawan’s freshwaters systems in different municipalities based on the informant’s responses during the reconnaissance survey. The species is endemic in the Philippines, where wild catch is available from river tributaries and lakes in the provinces of Ilocos, Cagayan, Pangasinan, Pampanga, Bulacan, Laguna, Palawan, Bicol region, Leyte, Samar, Cotabato, Lanao, Maguindanao, Agusan and some parts of Mindanao [16].

![Map of the Philippines showing the reported Palaemons or Freshwater prawns collected in the rivers and streams of Luzon Island, Visayas, and Mindanao](image)

**Figure 4.** Map of the Philippines showing the reported Palaemons or Freshwater prawns collected in the rivers and streams of Luzon Island, Visayas, and Mindanao

A report also revealed that the Palaemons or Freshwater prawns were collected from the rivers in Luzon Island namely, Marikina, San Juan, Pasig River near Manila and Pampanga River. Other sources include streams near Port Galera in Mindoro, Taytay in Palawan, Gandara in Samar, Lake Lanao in Mindanao and Jaro in Leyte [17]. Another cited study conducted from 1976 to 1979 [18]...
reported a collection of freshwater prawn species were mostly found in the upper tidal reaches of Agusan River, Cagayan de Oro River, Rio Grande de Mindanao, Sebuguey River and Panguil Bay. Generally, it is locally known as *ulang, udang, kising-kising, paje, padao, kalig, urang* and *budsang* [18] while in Palawan, it is locally known as *ulang, udang, paje, peon, urang* and *dangawan* to which most of the collectors are Indigenous People (IP) belonging to the ethnic group of Tagbanua, Palawán, Batak, Tao’t Bato, Cuyuno, and Molbog.

Freshwater prawns that are widely caught in Luzon islands are usually sold from the place of origin, and any excess is sold to local markets, in areas where wild stocks abound like in Bulacan, with an average weight of 30g, are sold at PhP250.00/kg or US$4.54/kg. Live prawns are likewise sold at PhP350.00/kg or US$ 6.36/kg. The biggest prawn from Bulacan was recorded to weigh about 500 g/pc [18]. Unfortunately, in Palawan, the local populations use these animals as food despite their great economic importance and high income-generating potential in other parts of the Philippines. The informants also mentioned that these animals are combined with small shrimps and sold to their neighbours and localities.

There are limited reports on the catch of freshwater prawns in the LGUs resulted in no official regulations implemented in the province of Palawan. This may be an important additional pressure on these freshwater prawn populations. According to the respondents, the capture of these prawns is abundant during high rainfall. This may suggest that prawn catches are strongly influenced by rainfall. However, findings revealed that the *Macrobrachium* populations started to decline during the late 1990s (Figure 5). Human activities such as the rampant use of organic pesticides for agricultural purposes and intensive quarrying activities stretched along the river systems can be attributed to human activities.

![Figure 5](image.jpg)

**Figure 5.** Graph showing the abundance of wild-caught *Macrobrachium* populations in different freshwater systems in the province of Palawan from the 1950S to the 1990s.

The increasing threat to the quality of the freshwater systems in the localities of Palawan impacted the urgently needed implementation of management measures to protect the freshwater prawn’s population in the province.
4. Conclusion
The present study elucidated the distribution and abundance of Macrobrachium populations in Palawan’s river systems to establish the population structure of the freshwater prawn’s stocks in the Philippines. Our report confirmed that Macrobrachium populations or freshwater prawn’s distribution and abundance in Palawan’s rivers system is promising for the potential development of aquaculture industry for the food security in the future must be initiated. Macrobrachium is a high-priced food commodity. It is recommended that to maintain the impressive abundance of their populations in Palawan, the following will be done: evaluate the possible human activities in their habitats; preserve their present environment in the river system; prohibit the use of insecticides/pesticides in the area. Such are reasonable management measures to ensure the conservation of Macrobrachium and sustainability of this resource for future generations.

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