

Industry Status

Giant Freshwater Prawn Farming in the Philippines¹⁰

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Introduction

Freshwater prawn thrives in inland waters like rivers, lakes, swamps, irrigation canals, estuaries and even in rivers upstream. A recent survey in Luzon Island, Philippines identified 12 species of freshwater prawn found in the island (Agasen, unpublished). The country's interest on freshwater prawn fishery started in 1914 as explained by Cowles (1914), when the freshwater prawn was recognized as one of the important fisheries during that time. In late 1976, trials were made to culture the freshwater prawn, however, the efforts were not sustained. These trials were conducted in Misamis Oriental, Mindanao between 1976-1979 by Dejarme *et al.*, with the collection of wild spawners and the subsequent rearing of *M. rosenbergii* hatchlings.

In 1981, a local banker-industrialist established a 100-hectare commercial *Macrobrachium* farm in Sta. Rosa, Nueva Ecija and a hatchery in Bulacan. Services of experts from Israel were tapped for the project. Marketable prawns were sold live in Metro Manila utilizing in-house retail outlets. After a few years, the company diversified their operations to include tilapia culture. However, even the diversification attempt failed to save the first venture of commercial *Macrobrachium rosenbergii* production in the Philippines.

Economic Importance of Freshwater Prawn

Freshwater prawn culture in the Philippines is being promoted as an alternative commodity for freshwater aquaculture, which is currently dominated by tilapia. It is a high value species and prawn culture could offer better profits. Alternate cropping or polyculture with tilapia may also result to more than 20% increase in yield (Guerrero and Guerrero, 1976).

Freshwater prawns are hardy, fast growing, able to grow in freshwater and low brackishwater conditions. The species possesses many biological advantages for commercial culture such as maturation in captivity, a relatively large size, and rapid growth rate. They feed on almost anything, e.g. terrestrial animal feeds, fish feeds, kitchen refuse, etc. Their feed conversion ratio is comparable to tilapia. Under Philippine conditions, their growth rate is high even beyond sexual maturity. They reach 45g after four months and 90 to 100g after seven months of culture in earthen ponds (Rosario, 2002). The current market price of *M. rosenbergii* is more than PhP250.00/kg in Central Luzon.

Geographic Distribution

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. It is locally known as *ulang*, *udang*, *kising-kising*, *paje*, *padao*, *kalig*, *urang* and *budsang*. Table 1 lists the freshwater prawn species in Luzon, Philippines, while the estimated production, peak season, fishing gear used and market of freshwater prawns in major fishing grounds in the Philippines are shown in Table 2. Cowles (1914) reported that the Palaemons 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.

¹⁰paper presented during the 1st Roundtable Discussion



A study conducted by Dejarme *et al.* from 1976 to 1979 reported a collection of *Macrobrachium rosenbergii* in Naawan, Misamis Oriental. The 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.

Status of Production

There are no available data on aquaculture production of freshwater prawn because it is only recently that commercial hatcheries for *Macrobrachium rosenbergii* have been established. Preliminary investigations by BFAR-NIFTDC indicated that the species attain weights from 40 to 50g in four to five months of culture. After six to seven months of culture in earthen ponds, they may grow to a size larger than 90 g/pc (Rosario and Roxas, 2000; Rosario 2002). More information on production is yet to be collected from researchers and from established Farmer Pilot Projects.

Table 2 shows the production of wild-caught freshwater prawn from Luzon as recorded by Agasen (unpublished). The production of *M. rosenbergii* is estimated at 0.5 to 0.75 metric tons in Pamplona River and 15-30 metric tons in the Pampanga River Delta. *M. rosenbergii* is likewise caught in Iwahig River and its tributaries and Donsol River but the catch was not quantified. *M. rosenbergii* can be found during summertime in Pamplona River and Donsol River while it is found year-round in the Pampanga River Delta and its tributaries as well as Iwahig River and its tributaries. They are commonly caught using spear gun, shrimp pot, and scissors net. The prawns are sold to local tourists or exported abroad.

Table 1. Freshwater prawn species caught in different fishing grounds in Luzon, Philippines (Agasen, unpublished)

Fishing Area	Species											
	1	2	3	4	5	6	7	8	9	10	11	12
1. Ilocos Norte												
- Bacara/Vintar river & tributaries		++						+		+		+
2. Cagayan												
-Cagayan River	+		++		+						+	
-Sta. Ana River	++		+		+							
-Pamplona River	++		+		+							
3. Isabela												
-Magat Dam					+	++						
4. Abra												
-Abra River & tributaries	+	++	+					+		+		+
5. La Union												
-Bararo River	+		+									
6. Pangasinan												
- Pantal River	+		+	+	+							
- Calasiao River												
-Bayambang Swamp	++		+									
7. Pampanga, Bulacan, Tarlac												
- Pampanga river delta	++		+	+					+	+		
8. Laguna												
- Laguna de Bay				+						+	+	
9. Camarines Norte												
- Lake Bato				+						+		
10. Sorsogon												
- Donsol River	+		+									
11. Palawan												
-Iwahig River	+					++				+		

1 - *M. rosenbergii*
5 - *M. malcolmsonii*
9 - *M. sp.2*
++ major species

2 - *M. lepidactylus*
6 - *M. rude*
10 - *M. lanchestri*
+ minor species

3 - *M. equidens*
7 - *M. mamillodactylus*
11 - *Cardina* spp.

4 - *M. adella*
8 - *M. sp.1* (medium sized)
12 - *Atya mollucensis*



Market

Freshwater prawns 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, freshwater prawn 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.

Table 2. The estimated production, peak season, fishing gear used and market of freshwater prawns in major fishing grounds (Agasen, unpublished 2001)

Area/ Species	Estimated Production (in MT)	Peak Season	Fishing Gear	Market
1. Pamplona River <i>M. rosenbergii</i>	0.5 to 7.5	summertime	Spear gun	Local tourists
2. Pampanga river delta and tributaries <i>M. rosenbergii</i>	15-30	Year-round	Shrimp pot, scissors net	Export and local
3. Donsol River <i>M. rosenbergii</i>	unknown	summertime	Prawn pot	Local tourist
4. Iwahig river and tributaries <i>M. mammillodactylus</i>	unknown	Year-round	Shrimp pot, scissors net	Export and local
5. Magat Dam <i>M. rude</i>	1 to 2	Summertime	Push net	Local
6. Cagayan River <i>M. spp.</i>	3 to 5	May-December	Push net, shrimp pot, cast net	Local
7. Bacarra/ Vintar <i>M. lepidactylus</i>	35 to 40	May-December	Barricades, shrimp pot, scissors net	Export and local
8. Abra River and tributaries <i>M. lepidactylus</i>	10 to 15	May-December	Barricades, shrimp pot, scissors net	Local
9. Lake Bato <i>M. idella</i>	900 - 3600	Year-round	Push net, seine net, fish corrals	Export and local

Commercial Hatcheries and Seed Quality

While freshwater prawn is a major commodity in other countries, the prospect of culturing *M. rosenbergii* in the Philippines was hampered by the lack of available seedstock. It was not until 2001 when the Philippine Government, through BFAR-NIFTDC in Dagupan City and BFAR-NFFTC in Muñoz City, embarked on a semi-commercial production of *M. rosenbergii*. At present, these two Aquaculture Technology Research Centers are dispersing freshwater prawn seedstock throughout the country. Specifically, the Centers accomplished the following developments:

BFAR-National Freshwater Fisheries Technology Center (NFFTC) in Muñoz, Nueva Ecija

In 1992, *M. rosenbergii* was imported from Thailand by BFAR and trials were conducted to breed the species. This was during the implementation of the ASEAN-EC-Aquaculture Coordination Development Program in the Philippines. It was during the AADCP that collection of Philippine founder stocks was conducted in the upper Pampanga River system, Bulacan; Chico River in Bugalla, Pangasinan; and Cavinti, Laguna. In 1998, breeding trials conducted in aquaria as well as mass larval production in tanks was successful. Figure 2 shows the production of post larvae at the NFFTC. In 2001, the freshwater prawn hatchery was further improved and finally a protocol for its commercial hatchery was established in Muñoz and later on at the National Integrated Fisheries Technology Development Center in Bonuan, Dagupan City, Pangasinan. Since then, BFAR continues to introduce various schemes to promote the technology to various stakeholders, e.g. conduct of trainings, dispersal programs and establishment of techno-demonstration sites for its culture using a farmer-cooperator scheme. Various national trainers' training for *ulang* hatchery and grow-out were also conducted to disseminate its potentials and opportunities. In addition, a task force for *ulang* promotion program was also created in the early part of 2004 (Tayamen, 2005).



BFAR-National Integrated Fisheries Technology Development Center (NIFTDC)

Studies on hatchery management at the NIFTDC started during the second quarter of 1999. The commercial protocol that entail lower production cost but with higher survival rate was developed in 2001. More than 903,000 PL 18 and juveniles were produced and dispersed to the different regions of the country. Different strains of *M. rosenbergii* are being collected, bred and evaluated for growth performance. The collection of strains will serve as the Center's genebank of the species for future genetic programs.

Collaboration with other institutions like SEAFDEC is encouraged particularly in larval nutrition and grow-out systems to facilitate the adoption of the species as a major aquaculture commodity by the Filipino farmers.

Freshwater Prawn Culture

The NFFTC has been conducting studies on freshwater prawn culture. Since the preliminary results (Table 3, Figure 2) have been promising, the technology developed has been packaged and disseminated to the fish farmers. BFAR, through the NFFTC has promoted the establishment of techno-demonstration projects involving: (1) small-scale backyard ponds; (2) integrated prawn-rice culture; and (3) grow-out culture with tilapia in fishponds. One of the techno-demo projects in Cauayan, Isabela produced 150 kg in 500 m² ponds after a 4-6 month culture period. A technical feasibility study based on this demonstration project is found in Annex 1.

Table 3. Average growth of freshwater prawn farmed at BFAR-NFFTC

Treatment	Final Weight	Survival %
3 PL/m ²	87.50	71
5 PL/m ²	73.47	64
10 PL/m ²	55.97	45

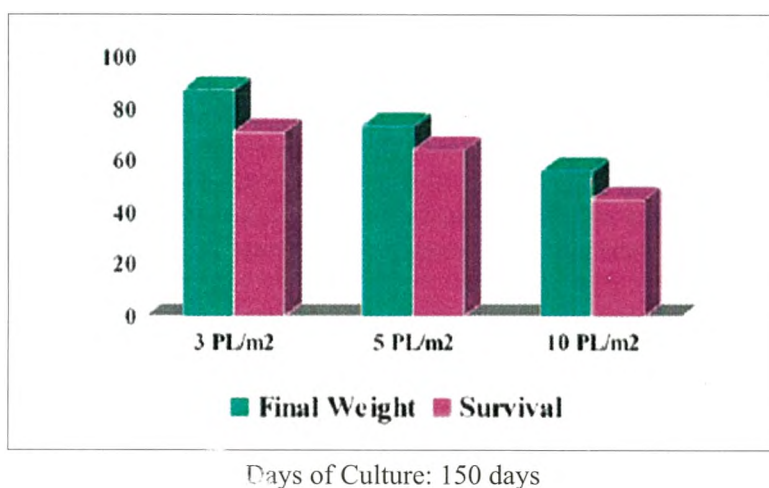


Figure 2. Final weight of freshwater prawn cultured at BFAR-NFFTC



Potentials for Development

The culture of freshwater prawn in the Philippines is still in its infancy stage. Much is yet to be done to lower the cost of seedstock production. More efforts are necessary to encourage farmers to produce the species as an aquaculture commodity. The market for the species is yet to be established for *Macrobrachium* farming to evolve into an industry similar to that of tilapia and milkfish.

Recommendations

To ensure success in the promotion of commercial *Macrobrachium rosenbergii* aquaculture in the Philippines, the following strategies and policies are recommended:

- An assessment of freshwater prawn stocks in major lakes, rivers, marshes, estuarine, reservoirs and other inland waters should be conducted to ensure adequate supply/source of broodstock for propagation purposes
- Freshwater prawn hatchery technology should be commercialized
- Environmental impact studies should be conducted in major inland waters where these species are abundant
- On-site grow-out culture demonstration through technology verification/dissemination on the monoculture or polyculture of freshwater prawns should be conducted
- Pilot testing in local government freshwater stations and collaborative projects with private prawn farmers should be pursued
- Available sites in Central Luzon especially in the *Lahar* area and other prospective areas for prawn culture should be identified
- Given the positive results of the current undertakings of BFAR with regard to freshwater prawn farming, feasibility studies should be made to encourage potential investors
- Credit financing in banks and financial institutions should be made available and in the process, promote the industry as an identified priority in the fisheries sector
- A national master plan for freshwater prawn aquaculture should be formulated and designed to identify sources of supply (abundance and deficit) and necessitate definite market linkages so that benefits shall accrue to producers and consumers
- An inter-agency collaboration is necessary during the research program implementation to optimize all available resources, e.g. manpower, facilities/laboratories, equipment, financial, etc.
- Development of marketing and distribution systems for marketable sized prawns should be conducted

Future Plans for *Macrobrachium rosenbergii* Aquaculture in the Philippines

- Development of the NFFTC and NIFTDC as the National Centers for the production of quality broodstock and post larvae of freshwater prawn
- Improvement of the quality of *Macrobrachium rosenbergii* through crustacean genetic research implemented as a collaborative effort among the academe, government, and international research agencies
- Development of appropriate technology for the mass production of *M. rosenbergii* post larvae
- Development of technology for grow-out culture adopting the different farming systems
- Distribution/dispersal of quality post larvae for grow-out culture in various areas of the country
- Dissemination of freshwater prawn technology to new entrepreneurs and the principal stakeholders, the fisherfolk



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