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Collection of broodstock and juveniles of Macrobrachium vollenhovenii from the wild

Anyanwu, P. E. / Ayaobu–Cookey, I. K. / Ebonwu, B. I. / Hamzat, M. B. /

Pepple, P. C. G. / Ihimekpen, A. F. / Matanmi, M. A. / Ikoyo–Eweto, G. O. /

Afolabi, E. S. / Abass, M. A. / Benson, B. L. / Ajijo, M. R. /

Abdullahi, M. M. / Achilike, N. M. / Tafida, A. S.

Abstract

A total of 457 broodstock and 143,000 juveniles of Macrobrachium vollenhovenii were collected at Isheri Olofin area and Okunmanya River over a period of time. They were transported live to the shrimp hatchery of NIOMR in Lagos. Live transportation of the broodstock of M. vollenhovenii with body weight ranging from 71.0–264.5g in 50-liter-capacity plastic containers half-filled with water, recorded 98–100% survival rate between 80–110 minutes transportation time. However, live transportation of the juveniles in 50 liter capacity plastic containers without water recorded survival rates ranging from 20–66% while those carried with water and aerated recorded 12.5–93.75%. An air conditioned vehicle was used during the live transport. Higher mortality rates were recorded for the juveniles than the broodstock due the large numbers transported in addition to the small-sized gear used for trapping the juveniles. The study has developed a simple technology for collection and transportation of live specimens of broodstock and juveniles of M. vollenhovenii. Efforts will be made to increase survival of the juveniles through use of larger containers and gears.

Keywords: Transportation, broodstock, juveniles, M. vollenhovenii.

Introduction

The giant African River Prawn M. *vollenhoveni* is commonly found in fresh water which includes lakes, rivers, swamps, canals, ponds (and most cases those that have access to brackish water habitat) as well as in estuarine areas. The adults are available all year round while the juveniles occur during the peak heavy rainy season. The species is hardy as it can thrive in murky waters and even survive in water with very low dissolved oxygen. These attributes make the species a good candidate for aquaculture purposes. In West Africa, small seasonal commercial fisheries exist for the capture of *Macrobrachium vollenhovenii* and the main target species for fisheries in this area is the relatively large fresh water prawn (Jutta Wilfur-Nast, 1993; Abohweyere, 2008).

In Nigeria, *M. vollenhovenii* has been found to have high commercial potential (Ajuzie and Fagade, 1992, Abowei et al. 2006, Anyanwu et al, 2007). However, culture of the species is not well developed as there are very few prawn farms in the country. To kick start prawn farming in Nigeria, broodstock and juveniles can be collected from the wild prior to development and domestication of technology for hatchery production and grow-out. The rearing of organisms through recruitment from the wild is an age long practice. This culture mode could be used to ascertain the propagation potential of the specie. The collection from the wild usually involves selection of berried females and mature males. Once collected, they are carefully transported live to a hatchery where they can be quarantined and acclimatized to the ambient environment. This could serve as a prerequisite for culture of the prawns as natural systems of rearing *Macrobrachium* species have been carried out in Asia and other parts of the world with great success Ayoola et al (2009).

Broodstock and juveniles of *M. vollenhovenii* are abundant in the fresh water environment of Nigeria especially in the coastal waters (Bankole, 2007; Deekae, 2010; Olele et al, 2012). Location of sites for collection and standardizing the

technology for collection and live prawn transportation will kick start the culture of the species in Nigeria, diversify protein source for the populace, create employment opportunities and generate wealth. The aim of this project was to locate collection sites of broodstock and juveniles *M. vollenhovenii* and standardize technology for their live transportation.

Materials and Methods

Area of collection. Adult berried females, mature males and juveniles of *M. vollenhovenii* were collected from Ogun River at Isheri Olofin area and Okunmanya River (Plate 1) in Ogun State. The broodstock were caught with woven cane traps, a non return valve trap as shown in Plate 2 while the juveniles were caught with mosquito net trap (Plate 3).

Acclimatization. The prawns were transported in 50 liter plastic containers with or without water in an air conditioned car to NIOMR shrimp hatchery. On arrival at the hatchery, the prawns were treated with 5ppm formalin for disinfection before they were transferred to quarantine tanks and acclimatized to the new environment. The water temperature, pH and ammonia of the transport water before and after transport were also taken. The total length in centimeters and body weight in grammes of samples of the broodstock and juveniles collected were also taken and recorded. The time taken during transportation and survival rates for each batch of prawns transported was taken.

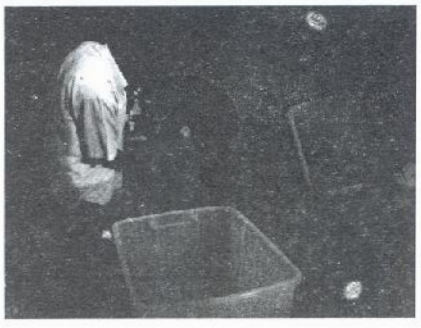

Plate 1: Fisherfolk returning with harvested prawns.

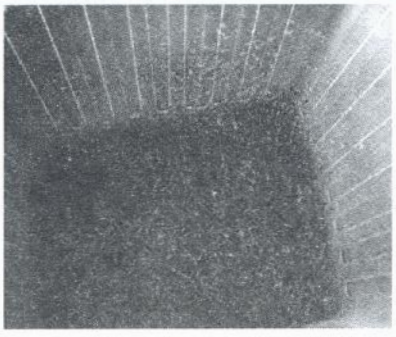

Plate 2: Trap for catching adult prawns.

Plate 3. Specially designed traps for harvesting live prawn juveniles.

Results

A total of 457 broodstock of *M. vollenhovenii* were collected and stocked at different stages of maturation while 143,000 specimens of juveniles were also collected in the period under review. The morphometric measurement of samples of the broodstock collected showed that, body weight ranged from 71.0–264.5g, total length 26.8–35.4cm and carapace length 8.5–14.2cm. The abdominal length ranged from 10.0–18.0cm while telson length ranged from 2.9-5.0cm. The number of broodstock collected was higher between March and October with a total catch of 352 specimens while fewer numbers were collected between mid October and November with a total catch of 105 specimens.

The method of transportation of live broodstock using aeration in 50 liter plastic containers with aeration and water was successful with records of 98–100% survival rates. This was carried out at a transportation time between 1hr 20 mins to 1hr 50mins. Details are presented in Table 1. The water quality parameters of the transport water for the broodstock and juveniles before and after transport are presented in Table 3. The values were within the tolerance range for the species.

Table 1: Collection of broodstock of *M. vollenhovenii* from the wild.

Date	No. of broodstock collected	Mode of transportation	No of hours of trip	% Survival
20/03/2012	50	Aerated in airconditioned car	1hr30mins	100%
11/04/2012	55	✓	1hr 45mins	100%
15/05/2012	88	✓	1hr 25mins	100%
27/08/2012	50	✓	1hr 35mins	100%
05/10/2012	109	✓	1hr 39mins	98%
12/10/2012	15	✓	1hr 45mins	100%
16/10/2012	29	✓	1hr 30mins	100%
30/10/2012	18	✓	1hr 35mins	100%
08/11/2012	8	✓	1hr 50mins	100%
29/11/2012	35	✓	1hr 40mins	100%
TOTAL	457			

For the juveniles, a total of 143,000 specimens of *M. vollenhovenii* were collected from the various stations and transported to the institutes shrimp hatchery at times between 2hrs 10mins and 2hrs 45mins. Live transportation of the juveniles in 50 liter capacity plastic containers without water (Plate 4) recorded survival rates ranging from 20–66% while those carried with water and aerated recorded 12.5–93.75%. The juveniles were stocked in earthen ponds for grow-out to table size (Plate 5) .The morphometric measurement of samples of the juveniles collected showed that, body weight ranged from 0.1-0.8g , total length 1.5-4.2cm and carapace length 0.5-1.7cm. The abdominal length ranged from 0.6-1.8cm while telson length ranged from 0.2-0.6cm. Details are presented in Table 2.

Table 2. Collection of *M. vollenhovenii* juveniles from the wild.

Date	Estimated number of juveniles collected	Mode of transportation	No. of hours of trip	% Survival	No. of live juveniles
25/09/2012	20,000	In A/C car without water	2hrs 45mins	20	4,000
28/09/2120	8,000	✓	2hrs 20mins	62.5	5,000
12/10/2012	3,000	✓	2hrs 30mins	66	2,000
16/10/2012	8,000	Aerated plastic bags	2hrs 30mins	93.75	7,500
19/10/2012	48,000	✓	2hrs 25mins	12.5	6,000
23/10/2012	30,000	✓	2hrs 20mins	33.3	10,000
30/10/2012	6,000	✓	2hrs 10mins	83.3	5,000
08/11/2012	20,000	✓	2hrs 25mins	40	8,000
TOTAL	143,000	✓			47,500

Plate 4: Harvested live prawn juveniles.

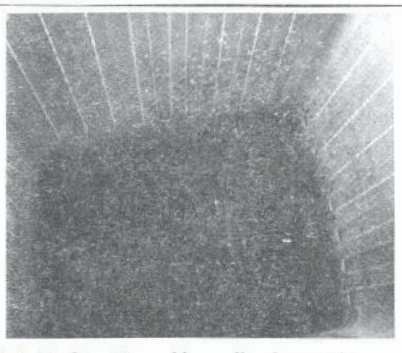

Plate 5 : Stocking of juveniles in ponds.

Table 3: Water quality parameter of transport water for broodstock and juveniles of *M. vollenhovenii.*

Parameter	Values before transport	Values after transport
Broodstock		
pH	7.2	7.3
Water Temperature (°C)	26.1	27.0
Ammonia (mg/L)	0	1.2
Nitrite (mg/L)	0	0.1
Alkalinity (mg/L)	52	40
Salinity (ppt)	0	0
Juveniles		
pH	7.0	6.8
Water Temperature	28	27.5
Ammonia (mg/L)	0	2.0
Nitrite (mg/L)	0	0.2
Alkalinity (mg/L)	56	34.2
Salinity (mg/L)	0	0

Discussion

The presence of broodstock and juveniles of Macrobrachium vollenhovenii in the study area is a testament to their viability and preponderance. The 457 broodstock and the 143,000 juveniles that were collected during the study at peak rainy season. This is in consonance with works done by (Nwosu et.al, 2006, Abowcyere, 2008 and Olele et.al, 2012). The broodstock and juveniles were caught with cone-shaped bamboo baskets (non-return valve traps) as described by (Solarin et al, 2003 and Jimoh et al. (2009). The body weight of the broodstock caught ranged from 71.0g-264.5g. This is much larger than those caught in other works done by (Bankole et. al, 2007, Lawal-Are, 2012). The broodstock caught in this work represented total lengths ranging from 26.8cm and 35.4cm; this is at variance with the work done by Marioghae and Ayinla (1995) and Olele et al. (2012) in other water bodies. The sex ratio of males and females of 1:4 representing 91 males and 366 females in this work is accordance with the findings of Olele et al. (2012) who posited that there were more gravid females than males of *M. vollenhovenii* that were caught during peak rainy season. Also Nwosu et al. (2006), reported that the species are available all year round during peak rainy season. George and Rao (1967) also reported similar sex differentials. On the contrary, Kingdom (2013) in his work reported catch of more males than females. The work done by (Inyang, 1981; Marioghae, 1982; Kavu, 1985) showed that males and females are of equal ratio. Although Tawari-fufeyin et.al. (2005), said that sex ratio may not always be static as they may vary from season to season and from year to year within the same population.

During transportation of the broodstock in 50 liter plastic containers containing water with aeration 98-100% survival was recorded. This was achieved through travel times of approximately 1-2hours. For the juveniles, they were transported via

two modes which were in 50 liter containers in an air conditioned car without water and in aerated plastic bags with water. Both transportation modes showed 20-66% and 12.5-93.75% survival respectively. The water quality parameters measured during transportation of both broodstock and juveniles of Macrobrachium vollenhovenii in this study were within the tolerance range for the species.

Conclusion

Availability of berried broodstock of *M. vollenhovenii* and the high survival rate recorded in this experiment showed that the species were abundant in the waters of Ogun State. The technology of collection and transportation developed in this study could be adopted for supply of live broodstock and juveniles. The presence of juveniles in the wild is an indication that aquaculture production of the species through wild recruitment and culture is possible. However, development of technology for successful wild collection of juveniles with increased survival rate should be addressed. The berried females stocked in the hatchery spawned easily in the plastic tanks and different developmental stages were recorded by identifying colour changes in the eggs, an indication of the possibility of hatchery propagation of the species. However, low survival of the larvae after 10 days is still a major challenge.

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