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Re-maturation of Spent Female Broodstock of *Macrobrachium vollenhovenii* Fed Trash Fish

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ABSTRACT

Gravid female broodstock of *Macrobrachium vollenhovenii* were collected from Ogun River. Their body weight ranged from 17.2, 22.4 and 17.4 g, while the total length ranged from 9.7-11.7 cm. The broodstock were stocked in three plastic tanks and allowed to spawn naturally. Three spent female broodstock were stocked separately in plastic tanks containing 6 L of freshwater. They were fed trash fish twice daily at 5% body weight. The spent females started to develop eggs again in 21 days with full maturation at 35 days. The body weight after 35 days ranged from 8.5-24.1 g while the total length ranged from 11.4-11.9 cm. The result obtained have shown that spent female broodstock of *M. vollenhovenii* can become gravid again in plastic tanks in 35 days when fed fresh trash fish. This will ensure all year round production of broodstock for development of *M. vollenhovenii*.

Key words: Re-maturation, trash fish, *Macrobrachium vollenhovenii*

INTRODUCTION

The giant river prawn *Macrobrachium vollenhovenii* is the largest of the local palaemonid prawns with length of about 182-195 cm (Holthuis, 1980; Anetekhai and Fagade, 1988) thus making the species a good candidate for aquaculture. *M. vollenhovenii* and the gravid broodstock (Fig. 1) can either be sourced from the wild as reported by Marioghae (1982) or developed from grow-out operations. The major problem militating against development of prawn farming in Nigeria is irregular supply of broodstock and scarcity of post larvae for stocking. The collection of the prawn (Fig. 2-3) from the wild is seasonal and local fishermen or fisherwomen are the major suppliers. Murmur *et al.* (2007) reported that spent females of *M. rosenbergii* re-matured within 30 days in culture systems. The process of maturation of spent females is not a common feature especially where culture of shrimp and prawn is at an early stage in Nigeria. The single or combined effects of artificial feed and eyestalk ablation on gonadal maturation of spent *Macrobrachium rosenbergii* female brooders were studied by Murmur *et al.* (2007). The interval of maturation varies depending on the nutritional state of the prawn and environmental factors (Cuvin-Aralar *et al.*, 2011). However, there is dearth of information on time intervals for the re-maturation of ovaries of *M. vollenhovenii* (Fig. 4) in culture systems although,



Fig. 1: Broodstock of *Macrobrachium vollenhovenni*



Fig. 2: Orange eggs carried by the swimmeret of *Macrobrachium vollenhovenni*



Fig. 3: Grey coloured eggs (females ready to release nauplii)



Fig. 4: Spent female of *Macrobrachium vollenhovenii*



Fig. 5: Trash fish used for feeding broodstock

Anetekhai and Fagade (1988) employed combination of hormonal and environmental changes to induced maturation and spawning of *M. vollenhovenii*. This study was designed to determine the time interval for spent females of *M. vollenhovenii* to become gravid fed fish trash.

MATERIALS AND METHODS

The female broodstock of *M. vollenhovenii* were collected from Ogun River. The spent broodstock were obtained after natural spawning of the wild broodstock in the hatchery. The three spent females were each stocked in plastic tanks containing 6 L of water. The total body weight ranged from 17.2, 22.4 and 17.4 g while, the total length ranged from 9.7-11.7 cm. The broodstock were fed trash fish (Fig. 5) twice daily at 5% body weight. The study was carried out in the shrimp/prawn hatchery of Nigerian Institute for Oceanography and Marine Research, Lagos.

RESULTS AND DISSCUSION

The results obtained from this study shows that spent female broodstock of *M. vollehovenii* fed trash fish started to develop eggs again at three weeks and fully at five weeks (35 days). Cuvin-Aralar *et al.* (2011) reported that the shortest interval for ovaries of *M. rosenbergii* to re-mature was about 30 days or more. Successful maturation and reproduction of crustaceans in captivity generally depend on nutrition, hormonal control and manipulation of environmental factors (Hillier, 1984; Browdy and Samochoa, 1985; Aktas and Kumlu, 1999). The broodstock used in this study were fed only trash fish which is a high quality protein diet and hence enhanced the egg development. This corroborates observations made by Marioghae and Ayinla (1995) on the preferential feeding habit of this species for animal remains and cannibalism. The body weight of the broodstock at the end of the experiment ranged from 18.5-24.1 g while the total length ranged from 11.4-11.9 cm.

The water quality during the period showed that pH ranged from 6.8-6.9, ammonia 0.0-0.4 mg L⁻¹ and nitrite, 0.00-0.02 mg L⁻¹. Water temperature was between 30.1-30.6°C while air temperature was between 29.2-29.8°C. The water quality parameters recorded were within the range recommended by Murmur *et al.* (2007) for re-maturation of spent broodstock of *M. rosenbergii*. Details of the results are presented in Table 1. Result obtained from the preliminary study has shown that re-maturation of spent *M. vollehovenii* can be achieved in plastic tanks using trash fish. Observation on ovarian development was made through the carapace. Consequently, production of broodstock of the species can be carried out all year round for hatchery production of post larvae.

Table 1: Observation on ovarian development of spent broodstock of *Macrobrachium vollehovenii* fed trash fresh species

Weeks/prawns	Body weight (g)	Total length (cm)	Weight of feed given (g)	Observations on ovarian development
0 (start of experiment)				
A1	17.2	10.7	0.86	Spent ovary
A2	22.4	11.7	1.12	Spent ovary
A3	17.4	9.7	0.87	Spent ovary
1				
A1	17.8	10.8	0.89	Ovary not visible
A2	23.0	11.0	1.15	Ovary not visible
A3	18.7	9.9	0.94	Ovary not visible
2				
A1	17.9	10.9	0.90	Ovary not visible
A2	23.5	11.4	1.18	Ovary not visible
A3	18.9	10.9	0.95	Ovary not visible
3				
A1	18.1	11.0	0.91	Developing ovary visible (small) at the carapace
A2	23.7	11.6	1.19	Developing ovary visible (small) at the carapace
A3	19.2	11.2	0.96	Developing ovary visible (small) at the carapace
4				
A1	18.3	11.2	0.92	Developing ovary visible (large) at the carapace
A2	23.9	11.8	1.20	Developing ovary visible (large) at the carapace
A3	19.4	11.4	0.96	Developing ovary visible (large) at the carapace
5				
A1	18.5	11.4	0.93	Developed ovary visible (very large) at the carapace
A2	24.1	11.9	1.21	Developed ovary visible (very large) at the carapace
A3	19.6	11.6	0.98	Developed ovary visible (very large) at the carapace

CONCLUSION

This preliminary study showed that spent female of *M. vollenhovenii* can be developed to re-mature in captivity when fed with fresh trash fish. This aspect of broodstock development is very important for sourcing domesticated breeders for post larvae production of this species in Nigeria. Careful observation of the colour differences in the developing ovary was observed through the carapace. The results of this study can fast track the development of prawn hatchery for post larvae production in Nigeria.

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