THE *Macrobrachium* FISHERY OF THE LOWER TAYLOR CREEK, NIGER DELTA, NIGERIA

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ABSTRACT

The Macrobrachium fishery of the Lower Taylor Creek was studied from June 2008 to May 2010. The aim was to present the status of Macrobrachium fishery in the Lower Taylor Creek with regard to catch rates and the socio - economics of the fishery. The fishers and traders involved in the shrimp business were extensively interviewed and samples were collected from the catches in the various towns along the creek. Macrobrachium fishing took place mainly between August and October each year. All the fishers/marketers were women. The fishing gear used in harvesting shrimps was the basket trap known locally as Ingo. Many women exercised customary access rights to the dugout channels (called 'Adẹ') where 'Ingo' traps were mostly placed during the fishing season. The catch rate (kg per trap and day) ranged from 0.01 ± 0.006kg (August 2008) to 0.079±0.006kg (October 2009). The catch rate (kg per canoe and day) was lowest in August 2009 (0.563±0.027kg) and highest in September 2009 (4.95±0.054kg). The mean price per kilogram of shrimp was estimated as ₦ 795. 59k (1 US$ = ₦ 152). The price of shrimps was always in the order August > September > October (P < 0.001). A fishing unit consisting of one canoe, a fisherwoman and several traps, was estimated to land 102.89kg of fresh shrimps, thereby fetching a gross income of ₦ 81, 856. 66 (or $538. 53) per annum (using the mean price of ₦ 795. 59k/kg of shrimps and 36 active fishing days per annum).

Keywords: artisanal, catch per unit effort, Palaemonidae

INTRODUCTION

The *Macrobrachium* fishery is one of the specialized artisanal shrimp fisheries in the mangrove creeks, estuaries and coastal lagoons of Nigeria (Enin, 1998). Powell (1980) in his study of the Niger Delta reported that five shrimp species are very important in their economy. These species include four of the Palaemonidae family, namely: *Nematopalaemon hastatus*, *Palaemon maculatus*, *Macrobrachium felicinum*, and *Macrobrachium macrobrachion*. The fifth species is of the Penaeidae family: *Penaeus notialis*.

Shrimping is practised according to locality, available gear material, abundance and consumer's preference (Enobong, 1982). But, Udolisa *et al.* (1994) and Nwosu and Holzlohner (2003) reported that *Macrobrachium* is exploited by three fishing gear such as beach seine, push net (active) and trap (passive). In freshwaters of the Delta, the most usual method of capture is by basket traps set along River banks (Powell, 1983). This is done mainly by women operating from canoes: the yield included *M. felicinum* and in some places *M. Macrobrachion.*

It has already been reported by Powell (1983), that little interest is directed at our fresh and brackish water shrimp species, which support the traditional artisanal fisheries in Nigeria. Rather, more fisheries attention is given to the marine penaeid species found offshore and targeted by commercial trawlers. This paper aims to present the status of *Macrobrachium* fishery in the Lower Taylor Creek with regard to catch rates and the socio - economics of the fishery.

MATERIALS AND METHODS

Study Area

The study was carried out in the Lower Taylor Creek (called Gbaraintoru by indigenes), Yenagoa Local Government Area of Bayelsa State. The study area stretched from Koroama to Polaku along the Taylor Creek. The Lower Taylor Creek is situated between 5º 01ˈN; 6º 17ˈE and 5º 02ˈN; 6º 18ˈE (Fig. 1). Several creeks and floods channels interconnect freshwater swamp forests, linking the Nun River and Taylor Creek at various points and form a mass of water body during the high flood. These creeks and swamps with their associated floodplain lakes and fishing ponds constitute the main fishing systems. Okoso Creek is at present the most prominent creek connected to the Taylor Creek which subsequently empties into the Nun River at its confluence at Polaku. In the dry and low water period, the Taylor Creek in the Zarama axis reduces to disjointed series

of pools linked by sections of shallow water. The Taylor Creek is subject to mild tidal influence in the dry season. Water flows in one direction during the flood period but it is gentle in the low water period. At the peak of the dry season, the direction of flow is slightly reversed in the Taylor creek during the rising tide, while at full tide, the flow almost stagnates.

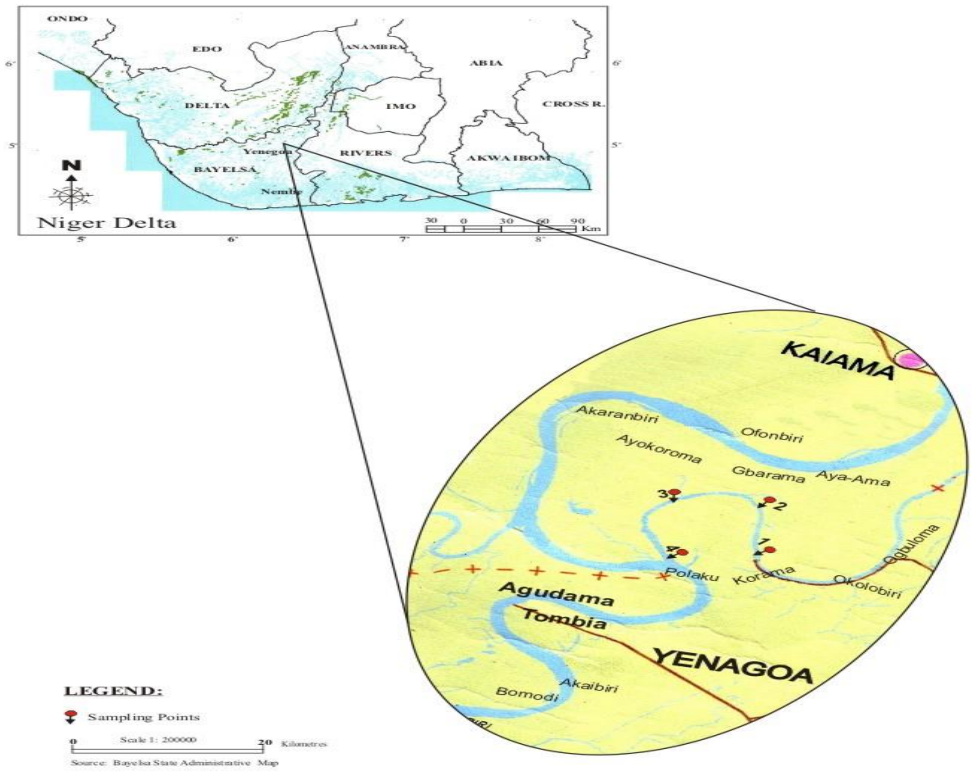

Fig. 1: Map of Niger Delta Showing Bayelsa State and Taylor Creek the Study Area

Taylor Creek runs through vegetation that has palm trees, silk cotton and mahogany trees which stand in the flood free farmlands close to the creek. According to Tuaweri (2008), the predominant vegetation could be classified as rainforest close to farmlands, then denser equatorial forest, and going further, one meets extensive freshwater swamps where a variety of canoe building trees grow. Presently, oil exploration and exploitation activities and other rural developmental programmes including road construction, sand mining, and land reclamation works are going on in the area.

Sampling procedure

The data and samples for the fishery study were collected from the artisanal catches in the various towns along the Lower Taylor Creek. The fishers and the traders involved in the shrimp business were extensively interviewed using well-structured interview schedule. The weights (kg) of the total shrimp catches per fisher were taken using weighing balance. The number of traps used by each fisher to catch the weighed samples was recorded. The trap and the canoes were the chosen units of efforts. The processing of some of the weighed shrimp catches was noted after sale.

The foregoing data allowed for the computation of monthly averages of CPUE (kg/trap/day/and kg/canoe/day). Also, monthly and annual averages of price per kilogram (Naira/kg and Dollar/kg) were computed. The relationship between the trends of catch rate and price per kilogram was examined using least square regression. Based on the interviews with fishers, the number of active fishing days per month was estimated. From all these, the annual shrimp yield per trap or canoe and the income to the fishers was estimated.

RESULTS

Fishers and shrimp marketers could only be interviewed between August and October each year because this was the period when fishing and

marketing of *Macrobrachium* shrimps mainly took place. All the fishers/marketers were women. The age of fishers/marketers ranged from 37 to 76 years with an average of 54.66±1 .16 years.

The fishing gear used in harvesting shrimps was the basket trap known locally as *Ingo.* The soak time for traps was between 2 and 3 days, with number of fishing days ranging between 27 and 40 days in a year (mean 36 days). Many women exercised customary access rights to the dugout channels (called *Adẹ*) where *Ingo* traps were mostly placed during the fishing season. The catch rate (kg per trap and day) ranged from 0.01±0.006 kg (August 2008) to 0.079±0.006 kg (October 2009) (Fig. 2). The catch rate was significantly (P < 0.001) higher in 2009 (0.053±0.003 kg) than in 2008 (0.027±0.003kg), with an overall mean of 0.04kg/trap/day. The catch rate (kg per canoe and day) was lowest in August 2009 (0.563±0.027 kg) and highest in September 2009 (4.950±0.054 kg) (Fig. 3). However, there was no significant difference between September and October. There was also no difference between the catch rate (kg/canoe/day) of 2008 (2.578±0.315 kg) and 2009 (3.138±0.331 kg) (P > 0.05). The overall mean catch rate (kg/canoe/day) was 2.858 kg/canoe/day.

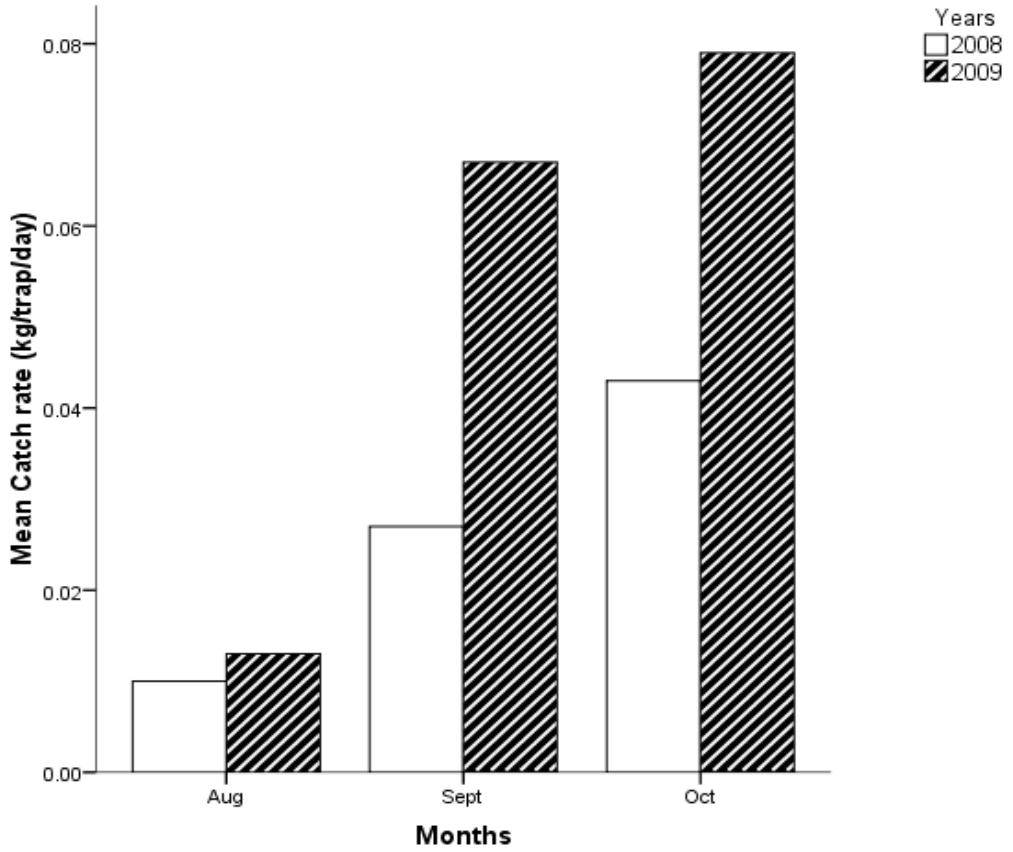

Fig. 2: Catch rates (Kg/trap/day) for *Macrobrachium* species in the Lower Taylor Creek

Fresh shrimps were sold in either milk cup or paint rubber measuring 150g and 2.30 kg of fresh shrimps respectively. A cup of shrimp was sold for between ₦ 100 – ₦ 150 while the rubber was sold for between ₦ 1,500 – ₦ 2,000 each. Nobody was seen selling smoked shrimps, except for smoked *Nematopalaemon hastatus* which were brought from the coastal marine areas. The overall mean price per kilogram of shrimp was estimated as ₦ 795. 59k (1 US$ = ₦ 152). There was no significant variation (P > 0.05) between the price of shrimps in 2008 (₦ 793.78k) and 2009 (₦ 797.40k). The price of shrimps was always in the order August > September > October (P < 0.001) (Fig. 4).

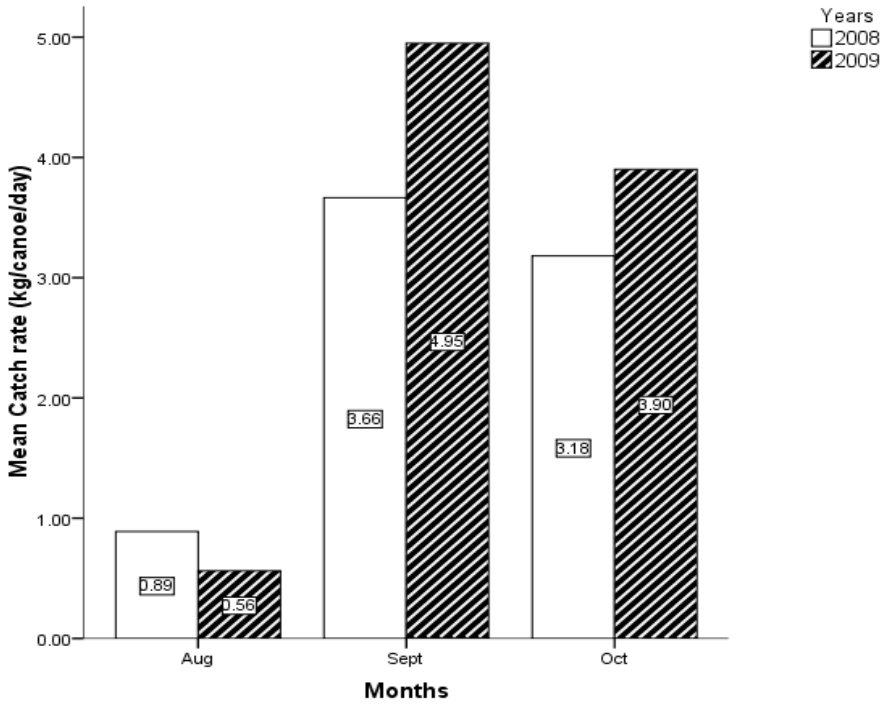

Fig. 3: Catch rates (Kg/canoe/day) for *Macrobrachium* species in the Lower Taylor Creek

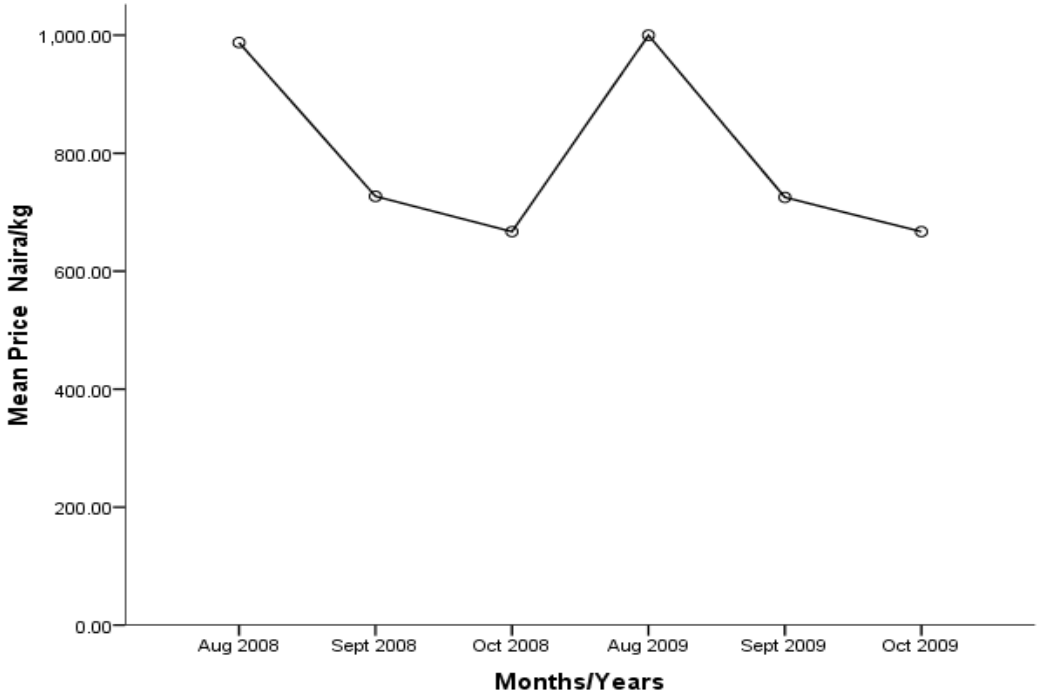

Fig. 4: Mean price/kg of *Macrobrachium* species in the Lower Taylor Creek

The relationships between the mean monthly price per kilogram and mean catch rates (kg/trap/day and kg/canoe/day) were negative using the least square method. While the regression coefficient was –0.616 ($P < 0.001$) for price per kilogram and mean monthly catch rate (kg/trap/day) relationship, it was –0.629 ($P < 0.001$) for price per kilogram and mean monthly catch rate (kg/canoe/day) relationship.

An estimated 1.44kg of shrimp can be landed by one trap annually, giving an income of ₦ 1, 145. 65k for each trap per annum. Most women in the fishery use 25–300 traps each. Thus, the fishers make gross incomes ranging from ₦ 28, 641. 25k to ₦ 343, 695 per annum. A fishing unit consisting of one canoe, a fisherwoman and several traps, was estimated to land 102.89kg of fresh shrimps, thereby fetching a gross income of ₦ 81, 856. 66 (or $538. 53) per annum (using the mean price of ₦ 795. 59k/kg of shrimps and 36 active fishing days per annum). Most of the shrimps were cooked fresh with very little processed into the smoked form. The fishing craft used by the women in the creek was the non–motorized dug-out canoe which had length overall (LOA) ranging from 4 to 7m.

DISCUSSION

The *Macrobrachium* fishery in the Lower Taylor Creek was between August and October each year. Emmanuel (2010) and Okogwu *et al.* (2010) had already reported that *Macrobrachium* species sustained viable artisanal fisheries during the rainy season in the Lagos Lagoon and Asu River respectively. But empirical results showed that the fishery could be extended to November/December (Kingdom, 2012). However, women of the area (being part time fishers) are more occupied with planting of crops during this period, taking advantage of the alluvial soil deposited during the flood recession. Farming is their main means of sustenance.

The high participation of women in actual fishing in the study area and *Macrobrachium* fishery particularly had been reported by Kingdom *et al.* (2008) and Kingdom and Kwen (2009). The absence of young and active women in the age bracket of 20 - 35 years, indicate that this fishery is gradually fading away especially when it is seen as fishery meant for older women. The customary access/ownership rights exercised by women to the dugout channels are passed on within the womenfolk in the family from generation to generation. This is similar to what obtains in the *Macrobrachium* fishery on the Nam Khan, a tributary of the Mekong River in Northern Lao PDR (Mollot *et al.*, 2005), where the tenure system reduces competition for setting traps in the fishing ground. The system also puts the responsibility of managing the fishing ground on the person who holds the access right.

The catch rates observed in this study (0.04 kg /trap/day and 2.858 kg/canoe/day) are far lower than the 2.3kg/net/day and 5.9kg/canoe/day reported in the *Nematopalaemon* and *Macrobrachium* fisheries respectively in the Cross River (Enin *et al.*, 1991; Enin, 1998). The reasons for the differentials could be traced to the differences in the environments, gear and fishing methods (Kingdom and Allison, 2007).

The prices of M*acrobrachium* shrimps in this study are higher than the $2 - $2.5/kg reported by Marioghae (1987) or the ₦ 410 – ₦ 450/kg reported in a tropical lagoon, Southern western Nigeria (Emmanuel, 2010). The inverse relationship between the monthly mean catch rates kg/trap/day and kg/canoe/day) and the monthly mean price per kilogram was also observed by Enin *et al* (1991) in the *Nematopalaemon* fishery in the Cross River. However, there was a direct relationship in the *Macrobrachium* fishery of the Cross River (Enin, 1991). The inverse relationships in this study agree with the price theory that prices fall when supply increases, which was also common in small –scale fisheries in Ghana and Senegal (Info fish, 2008). The annual gross income of ₦ 81,856.66k ($ 538.53) per fishing unit is quite high considering the fact that this amount is made within a period of three months.

CONCLUSION

The results of this study form a baseline data of this fishery that will form the basis for further studies including environmental factors that affect the variability in the abundance of these shrimps. Besides, the study has policy implications, since it is only women that are involved in the fishery.

ACKNOWLEDGEMENTS

Appreciation goes to the women in the Taylor Creek who allowed us to assess their catches.

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