ON THE MOLLUSCAN FISHERIES OF THE KAKINADA BAY

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Fishermen belonging to 15 villages exploit the molluscan shellfish in about 100 sq. km. area in the Kakinada Bay. An estimated 6020 tons of molluscs, valued at Rs. 1,95,000 were landed in 1968. Of the ten species of Bivalves and Gastropods fished, the window-pane oyster is most important (4000 tons) followed by the ark shell (1000 tons). None of these shellfish are eaten locally. They are burnt into lime with meats intact. Detailed information on the fishing season, the species fished and the extent of these fisheries are given in this article.

Several species of molluscan shellfish, belonging to the classes Bivalvia and Gastropoda are regularly fished in the Kakinada Bay and based on these resources, estimated at several thousand rupees, an organised lime burning industry exists in a number of villages adjoining the Kakinada Bay. Except for some general information on the fisheries of some species in the works of Alagarswamy and Narasimham (1968), Jones and Alagarswamy (1968) and Narasimham (1969) no other published information is available on the molluscan fisheries of the Kakinada Bay. Based on a survey conducted by the author in 1968 the present state of these fisheries are given in this note.

The Kakinada Bay, located between 82° 15' E to 22' E longitude and 16° 51' N to 17° N latitude is enclosed on all the three sides excepting the north from where it opens into the Bay of Bengal by a wide mouth of 9 km (see Narasimham, 1969). The total area of the Bay is about 130 sq. km. In addition to the Gaderu and the Koringa rivers a number of creeks and irrigation canals open into the Bay on its southern and western sides. The Bay is very shallow in the southern and western sections with less than 2 m depth, but the depth is about 9 m in some areas in the northern section. During low tide vast stretches of the Bay are exposed. The total area fished for molluscs in the Bay is about 100 sq. km., mostly confined to a maximum of 4 m depth with practically no fishing in the northern section. The bottom for the major part of the Bay is made of soft fine clay with good amount of silt. The eastern side of the Bay is sandy while the western side, bordering the Kakinada canal is rocky.

Fishermen belonging to 15 villages namely Dummulapeta, Yetimoga, Putrayapakalu, Boddu Chinna Venkataipalam, Lakshmikanthapuram, Gadimoga,

Tirthalamondi, Bhairavipalem, Girijampeta, Yerragaruvu, Balusutippa, Kothapalem, Mulletimoga, Masanitippa and Neelapurevu exploit the molluscan fishery resources of the Kakinada Bay. Yetimoga, Gadimoga, Balusutippa and Mulletimoga are both fishing and lime manufacturing villages while Yerragaruvu is exclusively a lime producing village. Fishermen of this village purchase the molluscs from the other 14 villages. A total of 225 adult fishermen (women included) were engaged full time either in conducting the fishing or in lime preparation. A total of 551 adult fishermen were connected with the molluscan fisheries during their off time i.e. in January May. In addition a large number of children were also engaged in the fishery at the intertidal zone. Two types of non-powered craft namely Kakinada nava and Shoedoni were used in these fisheries. Their constructional details were given by Ziener and Rasmussen (1958). Out of a total of 308 fishing craft (38 navas and 270 donis) engaged in the molluscan fisheries, 228 conduct actual fishing while the remaining 80 were deployed in the transport of the molluscs and marketing of the lime.

The molluscs in the deeper waters were hand-picked by divers without any diving aids while those in the intertidal zone were collected by scooping a small bag shaped hand net called *Nathudu vala*. The net consists of a rectangular (20 to 8 cm) iron frame or oval frame (largest diameter 20 cm) made by bending a twig and tieing it, from which is suspended the netting. The mesh size is 2 mm at the bottom which increases to 1 cm at the mouth. Many of the fishing villages are located 5 - 10 km away from the fishing grounds and as it takes 2 - 6 hours, depending upon wind direction to reach them and again similar time for the return journey, the following practice came into existence. The fishermen with their family, including children leave the village with provisions and drinking water in a boat. After fishing (see Narasimham, 1969) for about 4 - 5 hours in the Bay they move to the mouth of a river or irrigation canal and make it a base camp, where they unload the catch on the banks. They stay the nights in the boats and conduct continuous fishing from this base camp for about 10 days. After a break of a day or two to get the provisions, the fishing operations are continued for a month or two from the base camp before the fishermen return to their villages. However this practice does not apply to the fishing villages close to the Bay. Fishing is usually confined to day time at low tides. However, during the peak season (March-May) night fishing is also resorted to at low tides. The molluscs are fished throughout the year with distinct peak in March-May for all the species. In June-December the fishing intensity is considerably low due to switching over to prawn fishing by a majority of the fishermen, to whom prawn fishery is the main source of income and during their off time (January-May) molluscs form subsistance fishery.

Half a dozen bivalve species and four gastropod species constitute the molluscan fisheries of the Kakinada Bay. An estimated catch of 6020 tons (fresh weight), valued at Rs. 1,95,000 were landed in 1968. When converted into lime the

TABLE 1. *The various species of molluscs fished in the Kakinada Bay*

S. N.	Scientific name Telugu name in parenthesis	Fishing unit	Fishing method	Fishing area	Fishing season	Length range in mm with common size in parenthesis	Annual estimated catch in tons	Value in Rs	Market value per *kuchum* of lime (About 5 litres)	Remarks
1	2	3	4	5	6	7	8	9	10	11
1	Fa: Anomiidae *Placenta placenta* (Linnaeus) (*Talapu gulla*)	Shoe doni or Kakinada nava and 3-8 divers	Hand picked	Major part of the Bay upto 4 m of depth	Throughout the year. Peak in March-May. In fair weather secondary peak in Oct-November	70-160 (100-140)	4000	1,00,000	20 to 30 Ps.	Not fished in inter. tidal zone
2	Fa: Arcidae *Anadara granosa* (Linnaeus) (*Buditha gulla*)	Do	Do	Do	Throughout the year with peak in January-May	15-69 (20-60)	1000	50,000	25 to 60Ps	Also incidentally collected in the muddy intertidal zone in *Nathudu vala* used for *Cerethidea* spp.
3K	Fa:. Veneridae *Meretrix meretrix* (Linnaeus) (*Gangalichippa gulla*)	Do	Do	Do	Throughout the year with peack in March May	30-75 (35-65)	400	20,000	25 to 40Ps	Do
4	Fa: Veneridae *Katelysia opima* (Gmelin)	Do	Do	Common in the southern side of Bay	Do	13-35 (15-25)	40	2,000	Do	Do

TABLE 1. *(Continued)*

1	2	3	4	5	6	7	8	9	10	11
5	Fa: Veneridae *Paphia malabarica* (Chemnitz) (*Benda gulla*)	Do	Do	Major part of the Bay	Do	30-80 (45-70)	30	1,500	Do	Do
6	Fa: Donacidae *Donax cuneatus*	Individual fishermen Boats used for transport	Collected with *Nathudu vala*	Intertidal sandy stretches along eastern side of Bay and also opposite Dummulapeta	Do	9-22 (12-20)	30	1,000	20 to 30Ps	Incidentally collected when fishing for *Umbonium spp.*
7	Fa: Trochidae *Umbonium vestiarium* (Linnaeus) (*Nathudu gulla*)	Do	Do	Do	Do	0.7 - 0.1	150	5,000	20 to 25Ps	Not fished in deeper waters
8	Fa: Potomididae *Cerithidea* spp. (*Chitti gulla*)	Do	Do	Muddy intertidal areas. Also close to mangroove swamps	Do	5-25 (10-20)	300	12,000	Do	Do
9	Fa: Volemidae *Hemifusus pugilenus* (Born) (*Sankapu gulla*)	Do	Hand picked	Common in the eastern side of the Bay	Do	80-140 (90-120)	40	2,000	20 to 30Ps	
10	Fa: Potomididae *Telescopium telescopium* (Linnaeus) (*Bongarapu gulla*)	Do	Do	Muddy intertidal areas	Do	55-100 (60-90)	30	1,500	Do	

Particulars in column (8) and (9) for S. N. 1 to 4 are from Alagarswamy and Narasimham (1968)

value increases further. The window-pane oyster, *Placenta placenta* ranks first followed by the ark shell, *Anadara granosa*. In addition, small quantities of a variety of molluscs were always collected incidentally. Among such forms mention may be made of *Neritina* spp., *Littorina* spp., *Turritella* spp., *Natica* spp., *Cerithium* spp., *Tonna* spp., *Oliva* spp., *Murex* spp., *Thias* spp., *Nassarius* spp. etc. These molluscs were also used in the lime burning industry. There is a small rocky stretch bordering the Kakinada canal from which the green mussel, *Mytilus viridis* Linnaeus is fished (Jones and Alagarswamy, 1968). The meat of none of the molluscs fished in the Kakinada Bay is eaten locally. The ark shell meats are occassionally used as medicine and are said to be good for pregnant women. All the molluscs are burnt into lime in kilns, locally known as *batties* with the meat intact. There were 37 small cylindrical and 40 large rectangular kilns, mostly confined to Yetimoga, Yerragaruvu, Gadimoga and Balusutippa villages. The lime prepared is sold in a number of interior villages in Andhra Pradesh and is extensively used in white washing of the houses.

Since 1959 the Andhra Pradesh Government fisheries department introduced a licencing scheme for fishing the molluscs in the Kakinada Bay. By this scheme each boat was issued an annual licence on payment of Rs. 25|- as fees and unrestricted fishing was allowed with regard to the species, time, catch or size of the molluscs. About 300 boats per year were licenced during the last few years and the money realised by the state exchequer was over Rs. 7,000|-.

An examination of the present condition of the molluscan fisheries of the Kakinada Bay reveal many problems which require attention in order to manage these resources on scientific lines. The foremost among them is to introduce a suitable system, on a continuous basis, for the year round collection of the catch and effort particulars of different fisheries. Except for some information on the biology of the ark shell (Narasimham, 1969) there is no published information on the biology, relevent to fishery, of other species. The window-pane oyster deserves special merit for detailed study in view of its dominant position. Although its flesh is not eaten in our country it is suggested (Anonymous, 1963) that it can be used for the purpose. Alagarswamy and Narasimham (1968) pointed out that the development of the molluscan resources in our country involves two problems, the first being creation of demand for them as food and the second, the improved exploitation of the resources by improving the existing fishing methods, imposing the restrictive measures wherever necessary and resorting to culture of amenable species. These problems apply well to the molluscan fishery resorces of the Kakinada Bay. An approach to solve these problems on the lines suggested by the above authors is worth attempting.

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ON THE OCCURRENCE OF MATURE SPECIMENS OF *METAPENAEUS BURKENROADI* KUBO IN THE PULICAT LAKE

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Mature females and males of *Metapenaeus burkenroadi* with fully developed ovaries and petasmae were collected from the Pulicat lake in January 1972. The possibility of their breeding inside the lake and the feasibility of utilizing this species for culturing in the Pulicat lake are indicated. Some morphological features of the specimens which are at variance with previous descriptions of the species are pointed out.

Specimens of *Metapenaeus burkenroadi* Kubo, collected from the Pulicat lake near the bar mouth in January 1972 had well developed gonads. The dark green mature ovary was clearly visible through the transparent cuticle. The males had fully developed petasma and the spermatophore mass was visible at the base of the fifth peraeopods. The possibility of their spawning inside the lake is suggested, but can be confirmed only if eggs and early larval stages are collected from the lake. De Bruin (1965) states that *M. burkenroadi* is abundant in the high salinity lagoons of Jaffna but he does not indicate whether they were juveniles or mature adults.