

A NOTE ON THE FISHERY AND SEED RESOURCE OF THE NORTH COAST OF GULF OF CAMBAY

P. GOPALAKRISHNAN*, P. K. KOSHY AND MUKUND M. JANI**

Prawn Culture Research Unit, Marine Biological Research Station, Bhavnagar

ABSTRACT

The characteristics of traditional fisheries on the north coast of the Gulf of Cambay are described. The result of a comprehensive survey to explore the feasibility of coastal aquaculture are also discussed.

INTRODUCTION

IT HAS been estimated that there are approximately 2.02 million hectares of cultivable area of brackishwater in India with a potential to produce 4.3 lakh tonnes of fish (Gopalakrishnan, 1970). Most of such areas in Gujarat, are tidal wastelands with mangrove growth. The fishermen living in the villages along the 175 Km coastal belt of Gulf of Cambay are economically backward and fish traditionally, in the intertidal areas; they seldom venture to sea for fishing. The present communication describes the status of the traditional fisheries carried out in the region and indicate the prospects existing for development of coastal aquaculture.

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MATERIAL AND METHODS

The data on the fishery are based on 278 random samples of prawns and fishes collected from the commercial catches at Surtanpur, a fishing village (21° 18' N 72° 06' E) near Gopnath Port, in the Gulf of Cambay in Bhavnagar District.

The lunar periodicity was worked out totalling catches of newmoon and full-moon fortnights separately. The shooting net was operated in the Surtanpur creek during high tide to collect the seed. Other gears like, mosquito cloth drag net 4.5×1.25m, coarse cloth Hapa net of 1.8×1.0 m and funnel shaped bag net 'Gunja' were also operated for some months to find out the gear efficiency. The collections were made during both high tide and low tide to know the difference in ingressions of seed related to tide. Shooting net and Gunja net collections were made for 30 minutes each for every spring and ebb tide. The 'hapa net' was operated for 15 minutes during ebb tide. The soil samples were analysed with 'Gunty' soil testing kit. A townet 0.25 m diameter made from 14 HD nylobolt cloth was operated for 10 minutes in the creek to collect plankton. Totally 48 samples were collected.

*Present Address: Tata Chemicals Limited, Mithapur-361 345, Gujarat, India.

**Present Address: Gujarat Fisheries Aquatic Research Station, Sikka-361 140, Gujarat, India.

The atmospheric and surface water temperature were recorded and samples for salinity and pH collected during high and low tides on all days of seed collection. The tidal recordings were taken by fixing graduated wooden gauges in the creek and adjoining intertidal areas. The data on rainfall were obtained from the Central Salt and Marine Chemicals Research Institute, Bhavnagar.

TOPOGRAPHY AND CLIMATE

The Gulf of Cambay is intercepted by several inlets of sea and creeks formed by the confluence of rivers Ghelo, Kalubhar, Shetrunji and Bagad. Of these, only the confluence area of Shetrunji with the Gulf of Cambay is estuarine throughout the year making it the biggest fishing area on this coast.

The Surtanpur creek, is about 2 Kms long and on either side has tidal wastelands. The monthly tidal range in the creek is 150–480 cm. On the land this range is 0–135 cm. There is an upper estuarine zone followed by marine zone, which extends to the Gulf.

There is more than 100 hectares of tidal land on either side of the creek. The bushy mangroves dominated by *Avicinnia alba* grow sparsely. The soil is fertile, the analysis showed richness of potassium 70–90 Kg/acre and phosphate 30–40 Kg/acre and availability of nitrate in moderate quantities i.e. 135 Kg/acre. The soil is hard clay with top silt with a pH of 8.5. The area received an average annual rainfall of 591.33 mm. The atmospheric temperature ranged from 24.3°C to 30°C during the period under study.

HYDROLOGY AND PLANKTON

Hydrology

The monthly average temperature of the surface water in the creek ranged from 21.4°C to 29.8°C. It showed a bimodal distribution with primary peak in May and secondary peak in November. The monthly distribution of surface salinity was erratic, due to drainage of freshwater from the upstream of the river following SW monsoon and unusual rains in November. However, it was found to follow two peaks, in February and November.

Plankton

The tow net collections from the creek during high and low tides indicated rich planktonic biomass during newmoon and fullmoon days. The phytoplankton was poor, represented by diatoms such as *Navicula* sp., *Pleurosigma* sp., *Closterium* sp., *Coscinodiscus oculis-iridis* and other macroalgal parts.

The zooplankton dominated the plankton biomass (95%). Several species such as *Neanthes* sp., *Pulvinulina* sp., *Calanus* sp., *Acrocalanus* sp., *Paracalanus* sp., *Oncae* sp., *Euchaeta marina*, *Oithona nana*, *Labidocera* sp., *Sagitta enflata* and mysids were present. The larval forms like trochophere of *Neanthes* sp. nauplii and meta-nauplii of copepods, nauplii of barnacles, megalopa of crab *Scylla serrata*, alima of *Squilla* sp., glochidium of bivalves, veliger of freshwater gastropods and postlarvae of prawns *Panaeus indicus* and *Metapenaeus monoceros* were observed. Among the holoplankton, copepods were present throughout the year except for the SW monsoon period of June-July when freshwater cyclops were observed. Postlarvae

of penaeids were the important meroplankton throughout the year. *Sagitta enflata* and mysids were observed in some months only. The embryos of mysids were plenty from November to January. Gravid mysids with brood pouch were seen from December to April. In the shooting net the mysids were caught during these months 227, 105, 172, 189 and 80 per hour respectively. It also appeared that the breeding peak of November to January coincided with the period of low salinity.

FISHERY

Fishing methods

Fishing is carried out in the wide intertidal areas with 'wadas' (stake net) fabricated from 3 to 4 ply monofilament. A unit is 300 to 500 m long, has a hung depth of 2 m with mesh size of 1.8 cm and is mounted on mono filament head and foot ropes. The stakes are tied to the net at an interval of 2.25 meter in the periphery and 2.5 to 3 m in the centre. The net is set against the receding tide in an elliptical manner. During the period of investigation 12 nets from February to June and 8 nets from July to January were operated by the fishermen. Fishing is conducted throughout the year.

Production trend

The estimated annual landing for the year (February 1976 to January 1977) was 22,796 tonnes. The prawns (82.1%) formed the bulk of catch followed by mullets (7.1%) and miscellaneous fish.

TABLE 1. Monthly fluctuations of salinity and landings in Surtanpur

Month and year	Salinity (ppt)	Prawn (tonnes)	Mullet (tonnes)	Misc. fishes (tonnes)
February, 76	39.1	132.8	12.0	19.1
March, 76	36.1	103.3	10.3	15.3
April, 76	37.1	155.6	7.5	11.2
May, 76	34.7	95.9	4.8	—
June, 76	18.1	94.0	2.0	11.4
July, 76	14.4	190.1	21.2	17.0
August, 76	10.6	165.7	24.3	20.2
September, 76	10.2	191.2	31.9	59.5
October, 76	11.5	228.7	4.9	24.5
November, 76	17.4	202.5	19.0	43.7
December, 76	11.3	258.7	23.2	32.2
January, 77	14.1	232.2	19.2	23.6

The rainfall and prawn catch for past 8 years did not show any direct relationship. However, the monthly average salinity and catch indicated that from July to January the landings were more than the remaining period (Table 1).

Catch composition

The prawns comprised *Penaeus indicus* (1.10%) with a dominant size range of 89–120 mm, *Metapenaeus monoceros* (35.75%) with dominant size of 36–113 mm, *Metapenaeus brevicornis* (3.29%) with prominent size of 37–74 mm, *Parapenaeopsis sculptilis* (49.36%) with dominant size range of 38–146 and *Palaeomon styliferus* (10.50%) with a dominant size range of 39–89 mm. Occasionally, during monsoon

months, gravid *Macrobrachium rosenbergii* and *Macrobrachium malcomsonii* were also observed.

The mullets formed 7.1% of total fish landed. *Mugil parsia* and *Mugil cunnesius* were the dominant species. *Mugil cephalus* and *Mugil tade* were present in small numbers. *Mugil parsia* had a size range of 23–370 mm.

The other miscellaneous fish catch was formed by *Harpodon nehereus*, *Sillago sihama*, *Otolithus* sp., *Platycephalus insidator*, *Hemiramphus georgii*, *Gobius ocellatus* and *Scolidon sorakowah*.

SEED RESOURCES

The availability of adequate quantity of seed is a vital factor concerning suitability of site for aquaculture. It has been observed that the seed of prawns and mullets are available in creeks in this area.

Prawn seed

The term seed here denotes all stages of prawns measuring 6 mm to 85 mm. The relative efficiency of the gears was found more for shooting net compared to others, with a ratio of 19:5. It was found that all gears recorded more collections during the high tide.

The distribution of the seed of economically important species namely, *Penaeus indicus* and *Metapenaeus monoceros* showed abundance during the months of low temperature. There was no correlation between their peaks and low salinity.

Penaeus indicus were available throughout the year in small numbers. Peak collections of 92.6 to 94.8 nos/net/hr were recorded in March–April. The ratio of abundance between fullmoon and newmoon fortnight was 51.94:48.06 showing only marginal variation in the fullmoon fortnight.

Metapenaeus monoceros showed two maxima, a primary one in April–May with a catch/net/hr value of 313.2 to 351.3 and a secondary maximum of 168.1 nos/net/hr during February. The fullmoon to newmoon relationship in the case of this species was inverse, with a ratio of 48.90:51.10. But there was neither any definite pattern of abundance during different days of the fortnight nor the collections were highest during fullmoon or newmoon days.

Mullet seed

The mullet fry and fingerlings measuring 2 to 50 mm were present in the collection. There were two peaks, a primary one with 30.8 to 58.6 nos/net/hr in October–November and a minor peak with 12.8 nos/net/hr in July. *Mugil parsia* dominated the collections throughout the year whereas *Mugil cunnesius* was present only from December to March in small numbers.

PROSPECTS FOR AQUACULTURE

The data presented above show that the exploited fishery of the north coast of Gulf of Cambay contributes to less than 0.5% of the fish produced from the coasts.

However, the availability of prawn and fish seed, particularly of *Penaeus indicus* and *Mugil* spp., the fertile nature of the soil and tidal water supply indicate to the prospects of developing culture fisheries for prawn and fishes in the area.

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