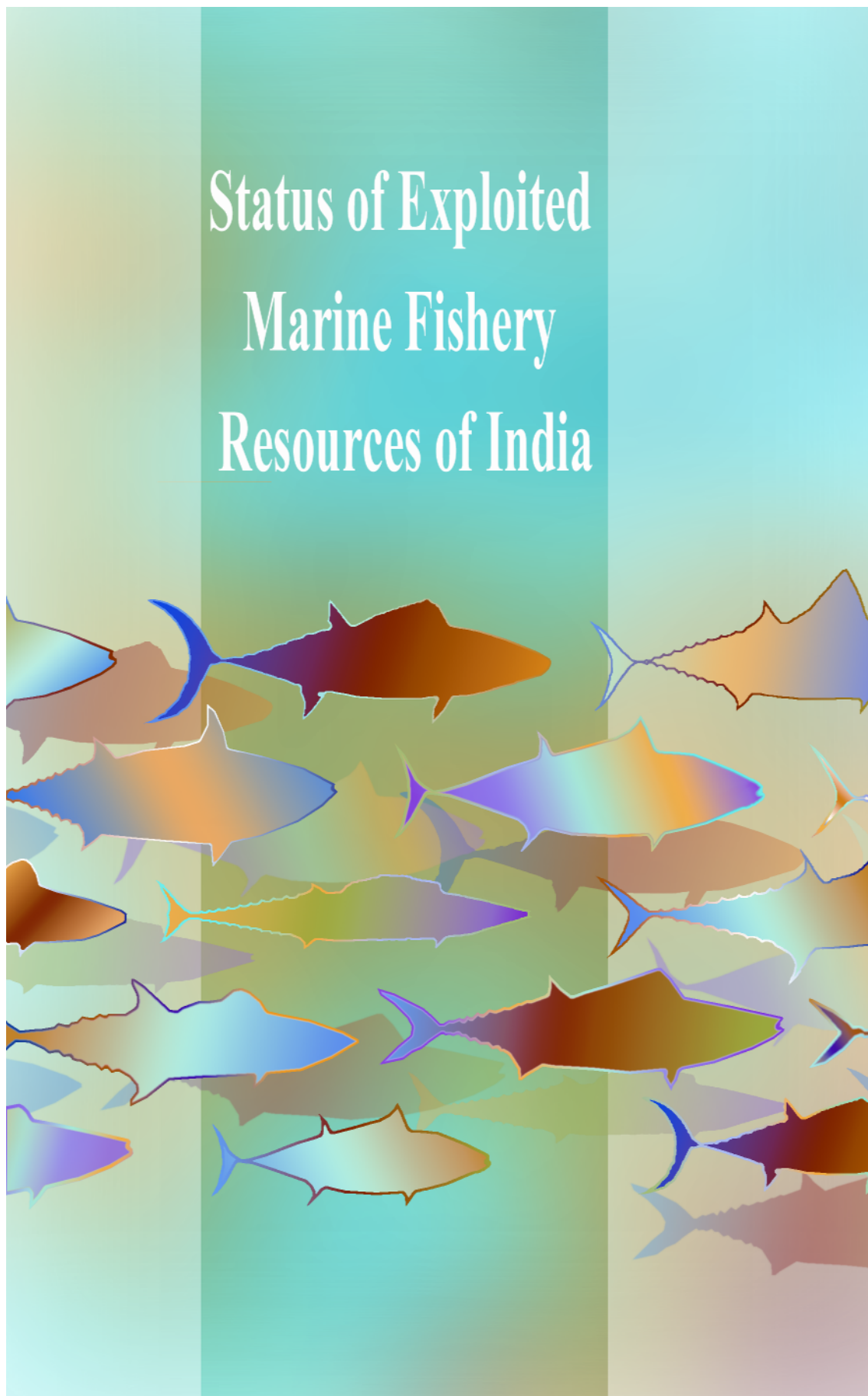


Status of Exploited Marine Fishery Resources of India



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MARINE FISHERY
RESOURCES OF INDIA**

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Non-Penaeid Shrimps

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1. Introduction

Non-penaeid prawns constitute one of the important fishery resources contributing to 5.8% of total marine fish production. The resource is characteristic of the northwest coast, which accounts for almost 90% of the total non-penaeid prawn production in the country. In Maharashtra and Gujarat, the non-penaeids account for 10.8% and 12.6% of the total marine fish landings in these states.

The non-penaeid prawn resource is multi-species, mainly supported by tiny species of the genus *Acetes*, in addition to *Nematopalaemon tenuipes* and *Exhippolysmata ensirostris*. There are five species of *Acetes* namely *Acetes indicus*, *A. johi*, *A. sibogae*, *A. erythraeus* and *A. japonicus*. Among these the first two support the commercially important fisheries from marine waters while the rest are exploited on a low key from estuarine and near shore coastal seas along both northeast and northwest regions.

The species belonging to the genus *Acetes* are called paste shrimp in English, but locally

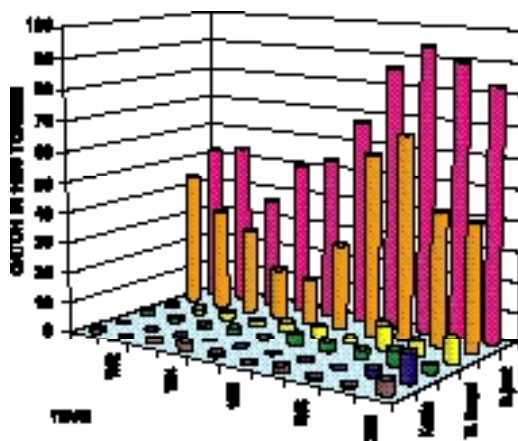


Fig. 1. State-wise production of non-penaeid prawns in India (1991-2000)

they are called Jawala in fresh and Kolim in dried form, in both Marathi and Gujarati. Similarly, the spider prawn *Nematopalaemon tenuipes* is known as Karandi in fresh and Ambad in dried state. The hunter shrimp, *Exhippolysmata ensirostris* is called Bhoba or Ghobi in Marathi and Gujarati respectively.

2. Production trends

Statewise contribution

The annual average landing of non-penaeid prawns was 1.14 lakh tonnes during 1991-2000. The annual production ranged from 69,221 tonnes in 1993 to 1,73,950 tonnes in 1998 contributing to 3.1-6.6% of the total marine fish production of the country. Among the maritime states, Gujarat contributed maximum (57.5%) followed by Maharashtra (33.1%), West Bengal (3.9%), Andhra Pradesh (2.6%) and Kerala (1.8%). Their catches in the other states were sporadic and in negligible quantities (Fig. 1).

Gears employed

Along the northwest coast the resource is mainly caught by the traditionally used fixed bag nets, locally called dol nets. Prior to 1988, Maharashtra accounted for 78% and Gujarat 11.4% of the non-penaeid prawn landings in the country. But thereafter, shrimp trawlers in Gujarat started commercial exploitation of *Acetes* spp. on large-scale. The annual average catch in Gujarat thereby increased from an average of 6,537 t during 1979-88 to 84,156 t in 1996-2000. Reduction of the cod-end mesh size of trawl nets from 25 mm to 12-15 mm and fishing operations in the coastal sea coupled with the development of fish meal industry at Veraval were responsible for the enormous landings of the resource in Gujarat. In Maharashtra, on the contrary the trawlers catch only *N. tenuipes*. In the Gangetic delta of West Bengal *Acetes indicus* and *N. tenuipes* are caught in bag nets, while in Krishna and Godavary estuaries of Andhra Pradesh at least five species of *Acetes* are caught along with *Macrobrachium* spp. by a multitude of indigenous gears.

Seasonal abundance

During the years 1991-2000, the percentage contribution of *Acetes* spp., *N. tenuipes* and *E. ensirostris* were 81.2%, 18.2% and 0.6% in dol nets and 0.3%, 97.3% and 2.4% in trawlers in Maharashtra. In Gujarat, these species formed 68.9%, 21.9% and 9.2% in dol nets and 98.9%, 0.8% and 0.2% in trawlers respectively (Fig. 2). The non-penaeid prawns in Maharashtra as well as in Gujarat showed two peaks of abundance, in October-November and in April-May, but in Andhra Pradesh only one peak during July-September was noticed. Along the Gujarat-Maharashtra coast, *A. johni* occurs in huge quantities during October-November while other species abound almost throughout the year. *A. indicus* forms the bulk of the catch in March-April, *N. tenuipes* in May-June and *E. ensirostris* during June-August and December-January periods.

Utilization

On account of the increasingly prohibitive cost of penaeid shrimps, the non-penaeids have assumed greater importance in the diet of fish eating population of

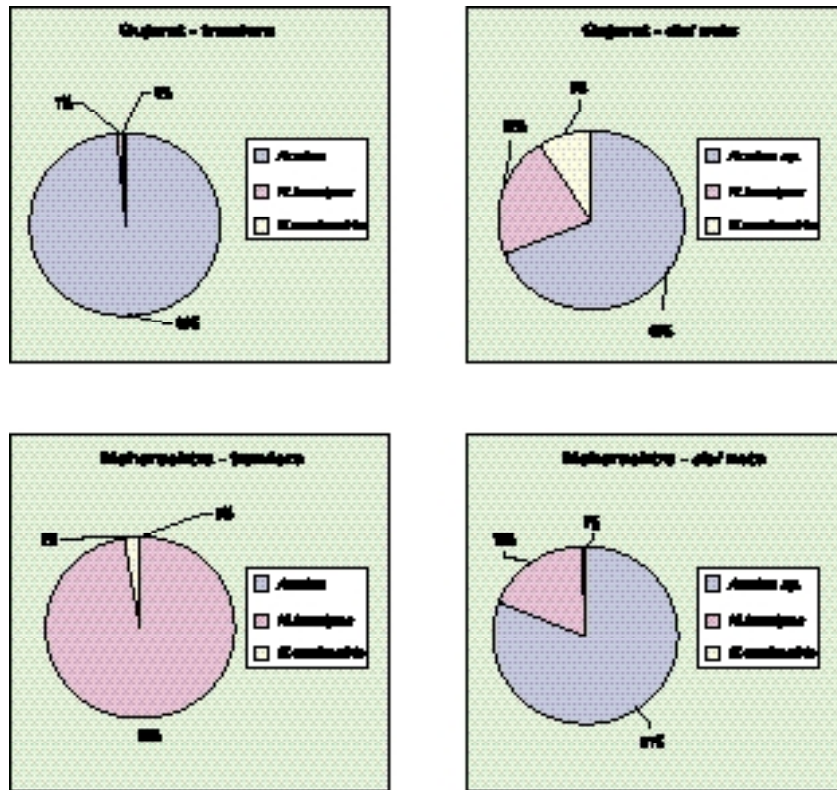


Fig. 2. Species composition of non-penaeid in different gears in Gujarat and Maharashtra.

Maharashtra. But in Gujarat, enormous quantities landed by trawlers are mostly reduced to fish meal. The *Acetes* spp. due to their small size and delicate nature get rapidly decomposed, therefore they are sundried (Fig. 3) and generally consumed by the poor people. However, unlike southeast Asian countries and as in China, fermentation products of *Acetes* spp., called Blachan, have not been attempted in India. Although protein concentrate powder of *Acetes* spp. has been developed by the Central Institute of Fisheries Technology, Cochin, it has not become popular among the Indian consumers. *N. tenuipes* has market acceptance in fresh



Fig. 3. Sundrying of *Acetes* spp.

and in dried form. Peeled meat of somewhat larger species like *E. ensirostris*, though insipid in taste, is salted and dried or consumed fresh.

Biology of *Acetes indicus*

The species is an epipelagic planktonic prawn, which forms large shoals in coastal waters. Generally, the size ranges from 8-38 mm and the males and females exhibit differential growth rates of 6.15 mm and 5.96 mm per month respectively. Their fishable life span is about 3-6 months. The males with spermatophores in genital coxae and females with mature ovaries occur as they attain a total length of 15-17 mm. The species breeds almost throughout the year in the shallow coastal waters showing peak spawning activity during September-January period. The females lay 4,300-10,300 eggs. The species mainly feeds on detritus consisting of fibrous and granular material of phyto and zooplankton origin.

Biology of *Nematopalaemon tenuipes*

The species (Fig. 4) exhibits differential growth rates with males and females reaching 57 mm and 64 mm in total length respectively at the completion of one year. The life span of the species is slightly more than a year. The smallest mature individual is 36 mm in length but 50% females become mature and attain ovigerous condition when they are 54 mm in total length. Being a caridean prawn, they carry yolky eggs attached to their pleopods for incubation. The fecundity varies from 242-3,648 eggs. The females undertake breeding migrations to offshore waters and accordingly the sex-ratio shows progressive dominance of males in the inshore waters and females in the offshore waters. The females spawn 5-6 times during March-October period. In addition to detritus, diatoms and foraminifers, the species feeds mainly on the planktonic crustacea.



Fig. 4. *Nematopalaemon tenuipes*

Biology of *Exhippolysmata ensirostris*

The species, largest among the coastal non-penaeids, is a hermaphrodite. It is highly predaceous and feeds on *Acetes*, polychaetes and young ones of fish and shrimps. It attains 64.8 mm in 6 months and 92.8 mm at the end of one year and the fishable life span is about one year. Being a continuous hermaphrodite, the ovaries produce sperms as well as large yolky eggs when the prawns attain 40-45 mm size. The fecundity ranges from 476-13,260 eggs in individuals varying from 45-99 mm in total length. *E. ensirostris* breeds throughout the year with peaks during May-September and December-January.

3. Stock assessment

Length based stock assessment studies on *A. indicus* and *N. tenuipes* in Maharashtra showed the Maximum Sustainable Yield (MSY) to be 52,000 t and 15,740 t respectively. In the light of increasing exploitation of the resource by trawlers, particularly in Gujarat, the equilibrium yield of non-penaeid prawns by Schaefer-Fox model has been attempted by standardization of the fishing effort, as dol net is a passive gear while shrimp trawl is an active gear. The studies showed that MSY of non-penaeid prawns is 64,685 t in Maharashtra and 76,550 t in Gujarat together forming MSY of 1.41 lakh tonnes for the entire northwest coast of India. In order to achieve this MSY, which is only 20% higher than the present annual average catch, the effort required would be more than double (1.3 times of the present level). Moreover, non-penaeid prawns are not the target species for either dol nets or trawlers, therefore further exploitation of the resource in both the states is not advisable.

4. Management

A search of food habits of majority of pelagic as well as demersal fishes, cephalopods and crustaceans of the northwest coast revealed that 96% of them are the direct predators of non-penaeid prawns. Being single most important group of forage organisms along the northwest coast, the non-penaeid prawns support huge biomass of economically important fishes such as Bombay-duck, sciaenids, polynemids, ribbonfishes, carangids, penaeid shrimp and the cephalopods in the region. Therefore, one of the reasons for the increase in abundance of non-penaeid prawns leading to their increased catches in the region may be attributed to the removal of these predators by intensive trawling in Gujarat and Maharashtra that commenced in late eighties and nineties. It is evident that on account of their low commercial value but great significance in the marine food chain of important food fishes of the region, large-scale exploitation of the resources of non-penaeid prawns will not be economically feasible.

A detailed investigation on the prey-predator relationship of non-penaeid prawns in future can throw light on the impact of exploitation on the prawn resources

5. Suggested reading

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