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THE PRESENT STATUS OF POLYNEMID FISHERY IN INDIA

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ABSTRACT

The polynemid fishery which is not of a big magnitude has shown rise and fall in the catches during the last 30 years from 1956 to 1985. The fishery whenever dropped in the north west coast showed improvement along the east coast. Though represented by 9 species most of which have fisheries of very small magnitude, the overall fishery is supported mainly by *Polydactylus indicus* ('Dara') and to a lesser extent by *Eleutheronema tetradactylum* ('Rawas') both growing to over a meter in length and weighing more than 18kg. Because of the dominance of *P. indicus*, fluctuations in its catches are reflected on the fluctuations in the total polynemid catches. The decline in the catches in sixties is attributed to the heavy landings of 'Chelna' which are nothing but juveniles of 'Dara' in the fifties and sixties by the commercial trawlers. Added to this are certain biological facts 'Dara' matures in the IVth year and is a gonochoristic hermaphrodite in which the ovarian part of ovotestis becomes active alternatively with the testicular part and in this process the period for an individual to reproduce the progeny is reduced to half. Hermaphrodites are also encountered in other polynemid species.

Cessation of trawling in the nursery grounds of 'Dara' due to the concentration of fishing for prawns in other areas in late sixties and seventies has helped the fishery to revive in seventies and eighties and conserved the species at the present level. The traditional fishermen use a highly selective gear namely 'Waghra Jal', a bottom drift gill net for 3-4 months in a year during the spawning migration of this species towards the Gulf. This by itself is a good management policy to conserve such an important fishery, in spite of its moderate magnitude.

INTRODUCTION

Polynemids, though belong to a resource of a moderate magnitude, have attained a unique place among the quality fishes. They still command the age old popularity as highly esteemed table fish. They move in small schools and contribute to the coastal fisheries of this country. When trawling started in fifties on commercial scale, *Polydactylus indicus*, one of the polynemid species growing to over a meter in size and called as 'Dara' along the north west coast, gave an impressive sight of its abundance by its huge landings, not known earlier. The catches dwindled in sixties and gradually this species has become very rare these days in the trawlers landings. Similarly *Polynemus heptadactylus*, another species growing to less than about 1/3 of a meter which occurred in trawler landings in substantial quantity in the early years, has declined drastically these days. A critical study and analysis of such an important fishery of polynemids by virtue of its being a highly favoured one, is all the more important at present, no matter what its magnitude is Data available for the past 30 years from 1956-1985 with the Central Marine Fisheries Research Institute should hold the key to exploit, conserve and manage this fishery.

CATCH

Polynemids during the 10 year period 1956-65 were reported to form annually 0.80% of the total landings (Kagwade, 1968 a). Trend of the fishery (Fig 1) for this group of fishes for the past 30 years from 1956 to 1985 indicated that during the later half of fifties, the annual average catch of polynemids was 1.16% in the total fish landings. The catch declined in sixties and gave an annual average of 0.46%. The trend in the early part of seventies till 1976 was towards improvement, recording an annual average catch of 0.84% of the total landings. The catch declined again from 1977 onwards and fluctuated between 0.31% and 0.59% giving an annual average of 0.42% in the total landings till 1985.

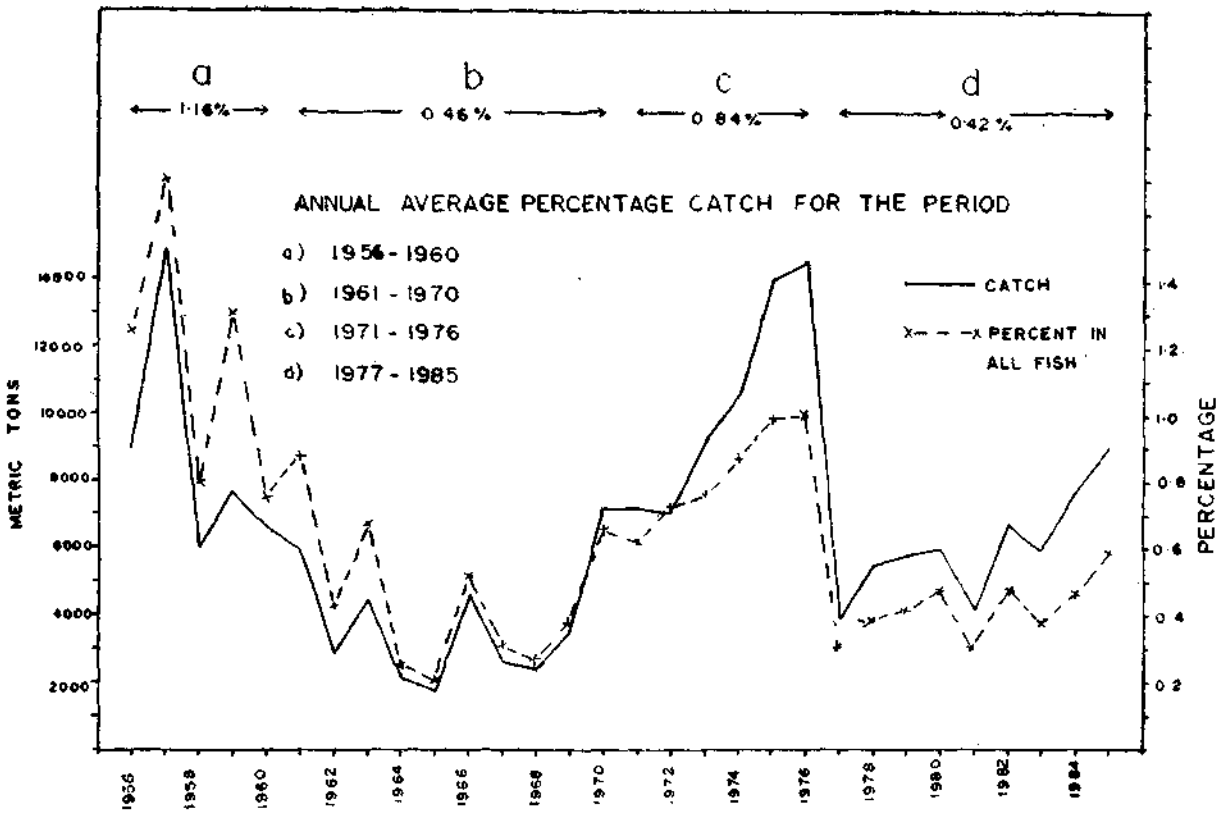

Fig. 1. Annual catch and percentage catch of polynemids in India for the period 1956-1985.

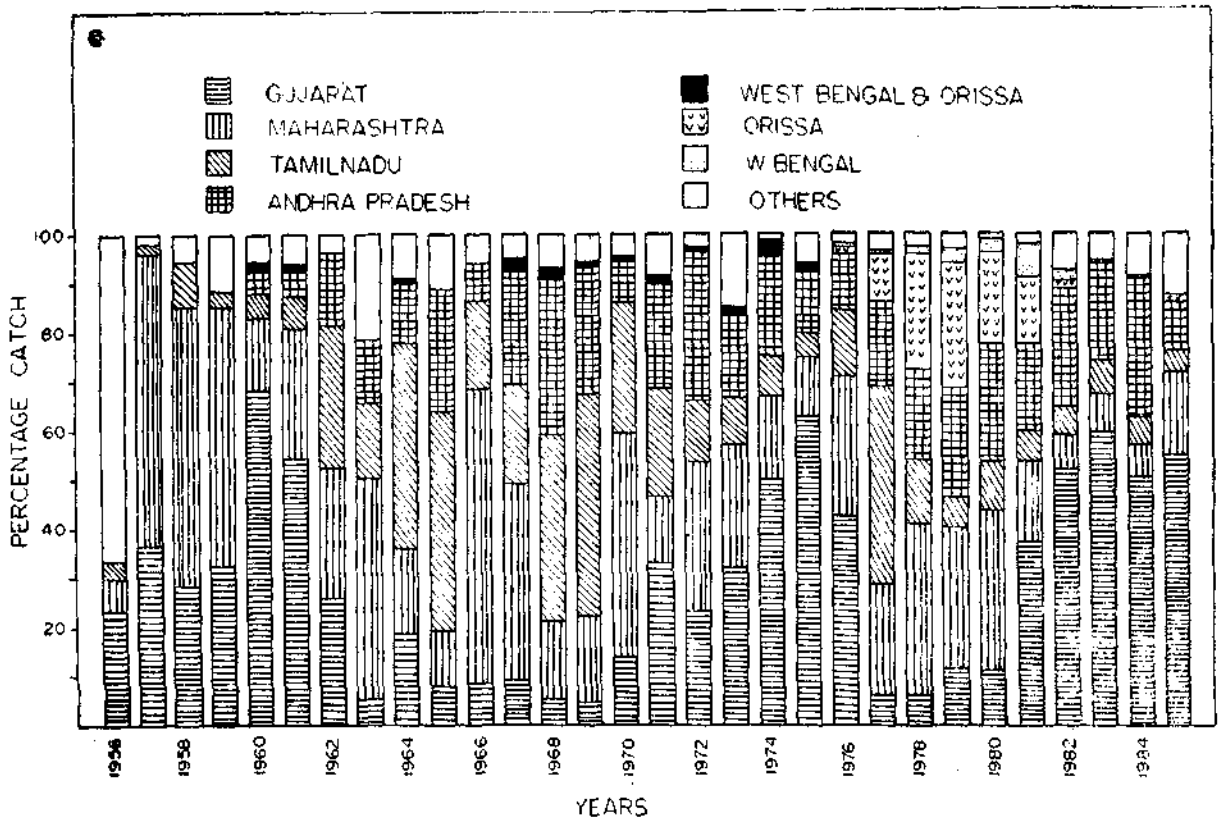

Fig. 2. State-wise percentage catch of polynemids during 1956-1985.

CATCH DISTRIBUTION

It was reported that between 1956 and 1965 nearly 80% of the polynemid catch was coming from Gujarat and Maharashtra along the north west coast (Kagwade, 1968). However the data showed that it was true till 1961 only (Fig 2) and thereafter the catches and percentage catches began to drop reaching 337 t and 19.26% in 1965. The catch improved in 1966 recording 3158 t which formed 68.71%. It further fluctuated till 1970 and steadily increased to record a catch of 10460 t and a percentage catch of 74.48 in 1975. The years after 1977 when the catch was reduced to 1130 t forming 28.76%' the catch steadily improved year after year and reached the value of 6505 t forming 71.8% indicating that the fishery in north west coast is towards improvement. The status of Gujarat and Maharashtra appeared to be equal as far as polynemid catches were concerned because in some years the catches were more in Gujarat and in other in Maharashtra. However, the catches were improving and were very good in Gujarat from 1981 onwards while they were poor in Maharashtra during the same period, but showed a sign of improvement in 1985 with a yield of 1527 t forming 16.86%.

Along the east coast, polynemid catches improved with the passage of time. Tamil Nadu and Andhra Pradesh yielded good polynemid catches which in some years excelled those either in Gujarat or Maharashtra. Till 1975 data on catches of West Bengal and Orissa were combined. Catches forming less than 1% in the total landings were not shown in Fig. 2. Fluctuations in the catches and percentage catches were noticed in all the states but the variations were not as wide as in the north west coast. In Tamil Nadu maximum catch of 1944 t was in 1977 and the minimum of 236 t was in 1981. The highest percentage catch of 45.37 was in 1965 and it was also the highest among all states for that year. The minimum of 1.92% for this state was in the very beginning period, in 1957. In Andhra Pradesh the catches ranged between 298 t in 1964 and 2231 in 1974 while the percentage catch ranged between 4.54 in 1960 and 31.96 in 1968. The combined catches of West Bengal and Orissa from 1960 to 1975 were very poor, ranging between 3 and 313 t and between 0.06% and 3.63%. From 1976 onwards, the catches were recorded separately for these two states. The Orissa coast appeared to yield better polynemid catch than the West Bengal which can be graded as poor. Between 1978 and 1980 Orissa landed over 1100 t annually, the maximum being 1491 t forming 25.67% which is far above the catches at Gujarat or Maharashtra during their lean years. The south western coast covering Goa, Karnataka was very poor for polynemids.

SPECIES CONTRIBUTING TO THE FISHERY

The polynemid fishery along the north west coast was comprised of 3 species as mentioned earlier. *P. indicus* and *E. tetradactylum* growing to large sizes cost more than Rs. 100/- per piece and *P. heptadactylus* Rs. 6-7 per kg. Along the east coast the fishery of *P. indicus* exists near Madras and of *E tetradactylum* in Orissa and West Bengal. In addition to these *P. heptadactylus* and *P. sextarius* contribute to the fishery here. At Mandapam *P. microstoma* is another species adding to the list. In the Hooghly estuarine system *P paradiseus* contributes to the polynemid fishery. The last 4 mentioned species do not grow to large size.

LIFE HISTORY

Of the 9 species of polynemids found in India, the biology of *P. indicus* and *P. heptadactylus* in full, of *E. tetradactylum* and *P. paradiseus* in parts and some informations scattered here and there on other species are available. Except *E. teradactylum* which is conditioned for estuarine as well as marine environment, all other species are marine in habitat. *P. indicus* and *E. tetradactylum* which grow to large sizes, on the north west coast are traditionally caught by gill nets. 'Waghra' (Deshpande, 1962) is a special gill net used to capture *P. indicus*. The polynemids are also captured incidentally in the bag nets and seine nets operating along different parts of the coasts and also in trawl nets. In the Hooghly estuarine system *P. paradiseus* is captured by long lines with 200 to 500 hooks of No. 16 and 17 with prawns as bait (Jones & Menon, 1953).

P. indicus is a major species contributing to the bulk of polynemid fishery of the country (Kagwade, 1968 and 1970). Preferring shallower waters up to 45 meters, the species is recorded in depths upto 70 meters (Rao *et al*, 1968). It has a specific size distribution along the north west coast. The young ones of the sizes 30-75 cm. called 'Chelna' are found in the shallower waters of Dwarka and Kutch (Kagwade, 1968 a). At this stage they are all immature and aged from 1 to 3 years After they mature in the fourth year, they move towards shore and enter Gulf of Kutch and Gulf of Cambay for spawning. Of the 2 spawning seasons April-June and October-December (Nayak, 1959), the former is the major one. It is during this major spawning migration that the gill netters of Gujarat and of the fishing villages Satpati and Dahanu in Maharashtra go towards Gulf of Kutch and Gulf of Cambay respectively for fishing. The specimens caught at this time are mostly mature in the beginning and later on, are in running condition followed by a number of spent ones. Though specimens as large as 142 cm is on record the size range of *P. indicus* caught by 'Waghra' net is generally 84 to 110cm and the dominant size group is 91-100 cm (Kagwade, 1970) and the individuals weigh over 18 kg. (Kagwade, 1966). Another important aspect of biology of this species is that it is a regular hermaphrodite with gonochoristic ovo-testis (Kagwade, 1974). When the ovary is active, the testicular part is dormant and is difficult to see through the naked eyes. When the testis is active, a careful observation reveals ovarian part in immature condition running side by side of the testis from one end to the other. The alternate development and functioning of ovary and testis is repeated thoughout. A fecund of 5,611,650 ova in this species has been recorded by Karekar and Bal (1960).

P. heptadactylus growing to a small size has its juveniles inhabiting the inshore waters. Its adults are found in appreciable quantities in the trawler landings operating upto 80 meters (Kagwade, 1968 b). This species is also a hermaphrodite (Kagwade, 1967) and is found to breed throughout the year with two peak periods during March-June and August November (Kagwade 1970). Maximum of 61,943 eggs has been recorded as the fecundity in this species.

E tetradactylum which grows to a recorded size of 180 cm. matures comparatively very early at 36 39 cm (Kagwade, 1970), a size nearly half of that when *P. indicus* matures. This species also records 2 peak spawning periods (Karandikar and Palekar, 1950). The findings of Jones and Sujansingani (1954) that there was total absence of females in the III-IV stages of maturity in the Chilka lake suggest that this lake may be a nursery for *E teradactylum*. The availability of females with oozing ova and their larvae and post larvae in the creeks around Bombay indicate that this species breeds in the inshore waters.

Jones and Menon (1953) observed only juveniles of *P. paradiseus* upto 70 cm and adults above 12.5 cm and later on David (1954) too found only the juveniles upto 8 cm and adults above 15.0 cm in the Hooghly river while the sizes between these 2 lengths did not appear here at any time of the year. Hida (1967) reported the sizes between 8 and 14.3 cm in the Bay of Bengal along the Burmese coast at a depth between 15 and 27 meters. It appears from this that *P. paradiseus* also demonstrates a specific size distribution, similar to that noticed in *P. indicus*. Just as the shallow waters of Dwarka and Kutch are the nursery grounds for *P. indicus*, the shallow grounds along the Burmese coast may be the nursery grounds for *P. paradiseus*. After maturation they may be moving towards Hooghly river for spawning.

DISCUSSION

The polynemid fishery on the north west coast showed a decline of alarming nature in the sixties while in the years that followed it improved on the east coast. The bulk of the fishery on the north west coast was formed by *P indicus*. When the trawling started especially, in the nursery grounds of Dwarka in fifties and later on of Kutch in sixties, large quantities of medium sized juveniles in their I to III years measuring upto 75 cm and weighing upto 7 kg., were landed. This species attains maturity only in the fourth year. The fecundity of over 5.5 million eggs has been estimated in some individuals. Being a gonochoristic hermaphrodite, the female phase is restricted to nearly half the time that a normal female would take

if it were to exist independently. The heavy exploitation of the juveniles, late maturity in the fourth year and restriction in reproducing progeny brought about by the hermaphroditic character, must have all been the combined force for the decline of polynemid fishery along this coast.

Concentration of trawling in late sixties and seventies for prawns which by then were under great demand because of their export potential, the trawling for 'Dara' was forgotten and this must have helped in the revival of its fishery accompained by natural fluctuations during seventies and eighties. In the absence of any meaningful catch of polynemid by the trawlers, the improved polynemid catch is only due to the traditional fishermen fishing by the indigenous methods during the spawning migration of the species. The gear used by them is highly selective and the size of species caught in it is mostly between 91 and 100 cm. This helps the bigger and smaller individuals left for propagation. Since the fishery is of very small magnitude, the species can be conserved by restricting to the the traditional way of fishing and prohibiting trawling in the nursery grounds. Further the traditional fishermen fish during 3-4 months in a year and this itself acts as a good enough management measure for this fishery.

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