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The Bombay-Duck

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The Bombay-duck, popularly known as "Bombil" is of great economic importance to the fishermen of the west coast of India, north of Ratnagiri. It is supported by a single species *Harpodon nehereus* (Hamilton). It has a wide and discontinuous distribution along to the coasts of East Africa, Indian subcontinent, Malaya, Indonesia and China. In India it is taken in large quantities on the south and south east coasts of Saurashtra on the Gujarat coast and the Konkan coast of Maharashtra. It is also taken in appreciable quantities on the Andhra-Orissa coast and from the estuaries of Bengal. With the introduction of a programme of mechanisation of the fishing craft under the Five Year Plans, the fishing activity and the area of exploitation along the Maharashtra and Gujarat coasts have considerably increased, resulting in larger landings of Bombay-duck. The fishery today has attained the status of one of the major fisheries of India.

Table showing the Bombay-duck landings in relation to the total landings of marine fish in India:

Year	Bombay-duck landings (Metric tons)	Percentage of Bombay-duck
1950	14,160	2.44
1951	7,261	1.36
1952	24,646	4.66
1953	45,259	7.73
1954	36,050	6.13
1955	104,113	17.48
1956	128,880	17.93
1957	119,500	13.65
1958	67,188	8.89
1959	57,210	9.79
1960	108,564	12.38
1961	93,844	13.72
1962	83,933	13.02
1963	91,870	14.01
1964	81,342	9.46
1965	73,894	9.06
Average	71,107	10.46

Fishing for Bombay-duck is as varied as its discontinuous distribution. On the west coast the fishing is mainly by fixed bag nets, locally known as "Dol". The mode of fixing and operating the nets slightly varies from region to region along the coast, the principle remaining the same. The nets are lowered and hauled depending on the turn of the tide. They are operated 6-12 miles from the coast at a depth of 20-30 metres. On the Andhra coast fishing is mainly done by boat seines whereas in Orissa fixed bag nets are operated. In the estuaries of Bengal they are caught in the "Behundijal", a fixed type of bag net.

The importance of the Bombay-duck fishery in our economy can be seen from the annual landings from 1950-1965. Till 1952 the percentage of the catch was comparatively low. But from 1953 onwards the catch has been steadily on the increase due to the impetus the fishing industry has been receiving under the developmental programmes. The statistics available so far indicate the maintenance of the fishery at a fairly steady level without indication of any depletion in catches.

The average for the last ten years shows that the Bombay-duck contributes to more than 12% of the total marine fish landings, 90% of this coming from the Maharashtra and Gujarat coasts. Therefore the well being of the fishing community in this area depends to a large extent, on the success or failure of this fishery. Thus the Bombay-duck stands very high in the order of priorities, just as the sardine and the mackerel are to the Kerala and Kanara fisherman. However, the information available on the biology of the species, prior to the initiation of investigations at the Central Marine Fisheries Research Institute was very meagre and was limited to its food habits in Bengal and the spawning periodicity along the Bombay Coast. Hence, with a view to gain full knowledge of the biology of Bombay-duck, the Central Marine Fisheries Research Institute initiated investigations as an essential preliminary in the proper management of this fishery.

The commercial catches of Bombay-duck at Bombay are constituted of fish in the size range of 60-270 mm in total length, specimens above 210 mm being about 18%. As the minimum size at maturity is 210 mm, it can be said that the fishery is mainly supported by immature specimens. The length frequency studies indicate that the fish grows to a length of 127 mm at the end of the first year and reaches a length of 217 mm at the end of the second year. Thus it is seen that the Bombay-duck attains maturity at the end of 2 years. Although continuous recruitment is indicated, the major recruitment to the stocks takes place after the monsoon months during September-December.

The discontinuous distribution of Bombay-duck on the coasts of India raises some doubts as to whether a single stock supports the fishery or more than one stock. Morphometric and meristic studies and their statistical analysis shows that the fishery is supported by three independent stocks. The fishery at Versova and Janjira-Murud on the Maharashtra Coast is supported by a single or closely related stock, whereas the fisheries off Jaffrabad in Gujarat and Masulipatam in Andhra are supported by independent stocks. It has been noticed that greater the distance between two places, the more outstanding are the differences among the characters.

Studies on the "Ponderal index" or the "Condition factor" were made for males and females separately. In the case of the female an inflexion at 210 mm was indicated which coincided with the minimum size at maturity. The values were generally lower in the female, particularly so during the period November-March which incidentally happens to be the peak spawning season. Fecundity studies showed a wide variation in the number of mature ova produced. Fishes 210 mm or so in length and maturing for the first time produce about 20,000 mature ova, whereas in larger specimens within a size range 240-280 mm the number was around, 1,00,000. The females predominate in the commercial fish landings, the sex ratio being 171 females: 100 males. The species breeds almost throughout the year with a peak breeding season extending over a period of four months from November to March. The individual of the species spawn only once in a year.

The fish is a voracious feeder, carnivorous and even cannibalistic in nature. The food mainly consists of fish and prawns, the latter forming the second biggest item. The following species of fish and prawns are common in the diet in order of abundance: *Bregmaceros maclellundi*, *Harpodon nehereus*, *Coilia dussumieri*, *Polynemus heptadactylus*, *Otolithus* spp., *Anchoviella* spp., *Acetes* sp., *Leander* sp., *Parapeneopsis* spp., *Metapenaeus* sp., and *Penaeus* sp. It appears that the Bombay-duck does not have any special preference to a particular type of food and takes any item that comes in its way. The periods of intense feeding and spawning activity appear to coincide to some extent.

The discontinuous distribution of Bombay-duck along the coasts of India has been attributed to various factors, the principal ones being the distribution and movement of various food components, variation of salinity along the coast, the 80°F summer isotherm of July, etc. It is felt that the presence of low surface temperature in the area of occurrence is primarily responsible for the peculiar discontinuous distribution of the species.

Valuable information in regard to various aspects of the biology of the Bombay-duck has been collected by the Central Marine Fisheries Research Institute during the last twenty years of its existence. Ultimately it should be possible to apply the knowledge gained as a result of the investigations carried out here to obtain a maximum sustained yield for the fishery.
