

## Some Aspects of Biology of Bombay Duck, *Harpodon nehereus* (Ham) Inhabiting the Coastal Waters of Goa

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Intensity of feeding was maximum in *H. nehereus* of size group II (15.1-17 cm) with higher feeding in males than in females. About 44.61% of the fish had empty stomachs. The food of the fish chiefly consisted of fish-components (69.83%) followed by crustaceans (21.13%) and decayed organic matter (9.04%). Length-weight relationship of the fish showed that the weight of the fish increased at a rate more than the cube of the length.

Occurrence and abundance of *Harpodon nehereus* in waters of Goa are restricted to a short period (mid July to early August). No information is available on the biology of *H. nehereus* from this region and hence an attempt has been made to study some aspects of biology, viz. food, feeding habits and length-weight relationship of the species.

During mid July to early Aug. 1983, a total of 326 specimens of *H. nehereus* were collected from the fish landing site at the mouth of Mandovi estuary, Goa (lat. 15° 28' N; long. 73° 47' E). In the laboratory, the length of each specimen was measured from the tip of the snout to the longest ray of the caudal fin and the whole sample was divided into appropriate size groups [size (cm) I:13.1-15; II:15.1-17; III:17.1-19 and IV:19.1-21]. The fishes were weighed to the nearest 0.1 g and then sexed.

For analysing the food and feeding habits, the guts were dissected carefully, weighed to the nearest 0.1 g and preserved in 10% formaldehyde solution. Feeding intensity of the fish, with reference to size and sex was studied by determining the gastro-somatic index (gut weight expressed as a percentage of body weight) and the percentage of fish with empty stomachs were also recorded. The gut contents were analysed following the number method<sup>1</sup>. Food items were identified up to generic level and enumerated for each fish, separately. Relative abundance of food items was represented as percentage of total number of food items in the gut.

Length-weight data of the fish were analysed according to the method of LeCren<sup>2</sup> and lines were fitted to the scatter diagrams following the exponential equation  $W = aL^b$  and transformed to linear equation  $\text{Log } W = a + b \text{Log } L$  where  $W$  and  $L$  are the weights and the lengths of the fish, respectively and  $a$  and  $b$  the 2 constants to be determined, empirically.

Average feeding intensity in relation to size and percentage of empty stomachs in each size group are represented in Fig. 1a. Maximum feeding intensity was

recorded in fish of size group II followed by moderate feeding in size groups III and IV. Low feeding in fish of size groups III and IV might be due to development of gonads<sup>3</sup>. Rate of feeding was always higher in males than in females (Fig. 1b). Gastro-somatic index in males was maximum in the size group II. Values of gastro-somatic index in both the sexes were inversely proportional to the percentage of empty guts (Fig. 1).

Of the sampled fish 44.61% indicated empty stomachs, which is comparable to value reported

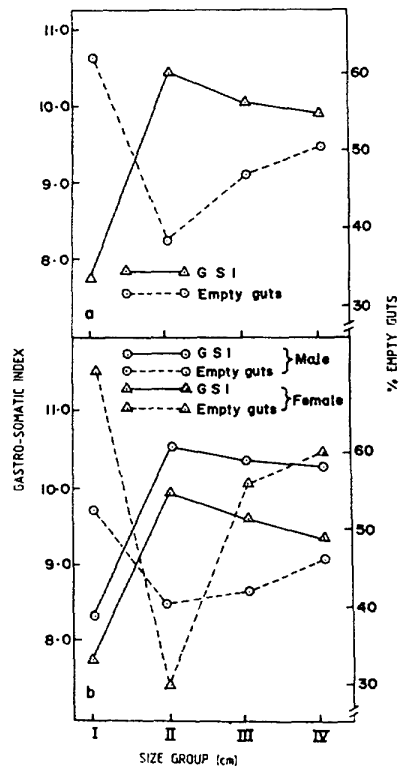


Fig. 1—Variations in intensity of feeding with size (a) and sex (b) [G S I = gastro somatic index]

earlier<sup>4,5</sup>. Analysis of gut contents showed that the fish-component which contributed about 69.83% was the main food of *H. nehereus*. Other items of food were crustaceans (21.13%) and decayed organic matter (9.04%). However, some reports indicated that crustaceans are the main food of these fishes, followed by juveniles of *H. nehereus* and other fishes<sup>5,8</sup>. Fish-component was reported to be the chief food of *H. nehereus* in the Bombay region also<sup>9</sup>.

The fish-components were mainly of *Bregmaceros maclellandi* (30.68%), *Coilia dussumeiri* (17.98%), *Anchoiella* sp. (12.69%), *Otolithus* sp. (6.34%) and *H. nehereus* (2.12%). A different pattern in the abundance of fish-components was reported in the guts of fishes collected during August from the Bombay region (*C. dussumeiri*, 45.37%; *Anchoiella* sp., 27.0%; *H. nehereus*, 13.54%; and *B. maclellandi*, 3.17%)<sup>9</sup>.

Crustaceans were constituted mainly by *Acetes indicus* (9.86%) followed by *Parapenaopsis styliifera* (5.64%) and *Metapenaeus brevicornis* (4.85%). Megalopa larvae constituted about 0.78% of the total food consumed by the fish. These larvae were not reported in the gut contents of the specimens of Bombay region<sup>5</sup>. However, during August, Pillay<sup>5</sup> encountered megalopa larvae in appreciable quantities (37.9%) in the specimens of Matlah estuary. Crustaceans were the main food item and constituted about 50% of the total food in the fishes of Bombay region<sup>4</sup> and 60.3% in the fishes of Matlah estuary<sup>5</sup>.

Decayed organic matter constituted about 9.04% of the total food ingested. The percentage of detritus was high in estuarine water during southwest monsoon<sup>10</sup> and as the fish is a voracious feeder, it perhaps consumes an appreciable amount of detritus along with other prey organisms. In the gut content of fishes of Matlah estuary, about 2.3% of detritus and 1.9% of plant matter were reported<sup>5</sup> whereas, no such decaying matter was noticed in the gut content of fishes of the Bombay region<sup>4</sup>.

A parabolic relationship was obtained for length and weight data where smooth curve represented calculated weight at each length interval whereas,

straight line represented the calculated regression line. The values estimated for either relationships were:

$$W = 0.7567 \times 10^{-5} L^{3.2381}$$

and

$$\text{Log } W = 5.5596 + 3.2381 \text{ Log } L, \text{ respectively.}$$

Length-weight relationship in *H. nehereus* showed that the weight of the fish increases at a rate more than the cube of the length and hence follows the cube law. Similar values of *b* being more than the cube of the length for either sex (i.e. 3.7169 for male and 3.4444 for females of the species) collected from Bombay region, were reported<sup>4</sup>.

Occurrence of juveniles for a short period during southwest monsoon in Goa coast, is an important finding on the distribution of *H. nehereus*, in the Indian waters. Earlier, the distribution of this species was reported only from Gulf of Cambay to Ratnagiri on the west coast of India<sup>11</sup>. A marked decline in catch from 27 to 1 t during 1978 to 1981 in the fisheries of *H. nehereus* in Goa<sup>12</sup>, calls for detailed studies on the factors responsible for its occurrence, relative abundance and biology.

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