

## NOTE

### Occurrence of milkfish *Chanos chanos* (Forsskal) postlarvae in the continental slope northwest of Cochin, as collected by FORV Sagar Sampada

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#### ABSTRACT

Postlarvae of *Chanos chanos* were collected in April 1985 by FORV *Sagar Sampada* from the continental slope at a distance of 52 km off Cochin where the depth to bottom measured 1,125 m. Three stages of development were available, measuring 5.23, 8.38 and 8.36 mm in total length, which are about 3 to 10 days old and hitherto undescribed from India. The diagnostic characters by which the present postlarvae can be distinguished from those of allied groups such as *Elops*, *Megalops* and Clupeidae are given. The present record highlights their occurrence in the oceanic regions thereby suggesting that the spawning grounds of this fish might extend to such distant and deep areas.

The milkfish *Chanos chanos* which is a monotypic species is one of the most ideal finfishes for coastal aquaculture, occurring throughout the Indo-Pacific area. Although it does not form any significant portion in marine capture production at any place, its rank in estuarine and culture fisheries sectors is important. According to Pillay (1990), the rates of its culture production in kg/ha, are about 300, 600 and 2,000 in Indonesia, Philippines and Taiwan, over areas of 1,83,000, 1,76,000 and 15,600 ha respectively. In India the culture industry is yet to be developed, although it is more common along the coasts of Orissa, Andhra, Tamil Nadu, Kerala and Karnataka. It has become obvious from the work of Vanstone *et al.* (1976), Chaudhuri *et al.* (1978) and Liao *et al.*

(1979) that this fish can spawn only in the sea and not in estuaries, brackishwater or freshwater. However, in Philippines they have experimentally succeeded in its induced spawning, artificial fertilization and larval rearing.

Based on the occurrence of its fry, Tampi (1973) has inferred that the milkfish spawns in the sea during February - May off the southeast coast and April - July off the southwest coast of India. But the exact spawning grounds are not yet located. Although there are a number of reports of its fry from the coastal regions of the country, the eggs are documented only on two occasions, by Chacko (1950) and Bensam (1984, 1987) from the southeast. Hence, the

record of its postlarvae from a much deeper locality namely the continental slope northwest off Cochin by the FORV *Sagar Sampada* assumes interest.

The present postlarvae were identified while analysing the fish eggs and larvae sampled by FORV *Sagar Sampada* during her cruises off the southwest coast from February to June 1985. The sample was collected during the cruise SS/03B/85 from the station 76, on 25.4.1985 at 0030 hrs. The depth to bottom was 1,125 m. The geographical position of collection was lat. 10°29.6' N and long. 75°29.5'E, about 52 km perpendicular to the coast. The net used was Bongo-60 net, (Mc Gowan and Brown, 1966) with 0.33 mm mesh size. The characteristic features of the milk fish postlarvae described by previous workers (Delsman, 1929; Chaudhuri *et al.*, 1978; Liao *et al.*, 1979; Bensam,

1984, 1987) have aided in the identification of the material.

Among the postlarvae, three stages of development measuring 5.23, 8.38 and 8.36 mm in total length were discernible (Fig. 1). Only those postlarvae measuring in length from 10.5 mm and above had been described so far from India (Bensam, 1984, 1987). The present larvae formed a still younger series, showing all the essential developmental features of progressive reduction in the width of the fin-fold, development of fins and pigmentation, as described by Liao *et al.* (1979). Apart from these features and the general morphology, the vital characters which aid in the identification of milkfish postlarvae are the parallel arrangement of muscle fibres, the number and disposition of the myomeres and the vertebrae which were counted 26 preanal and 16 postanal

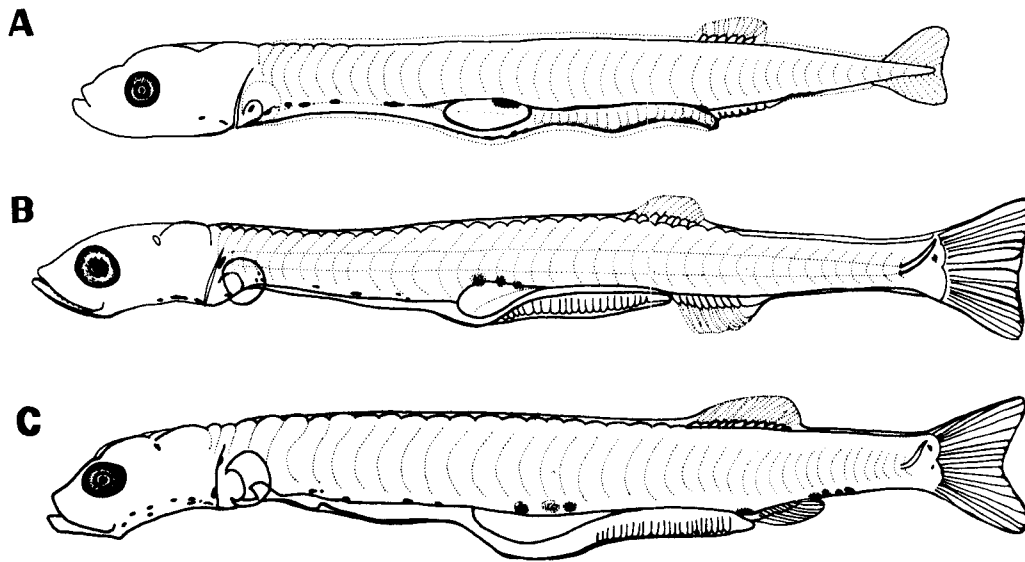


Fig. 1. Three stages of Milkfish (*Chanos chanos*) postlarvae collected by FORV *Sagar Sampada* from the continental slope northwest of Cochin in the cruise No: SS/03 B/85, Station No : 76, on 25-4-1985 at 0030 hours. A. 5.23 mm; B. 8.38 mm and C. 8.36 mm in total length.

in all the three stages. Rao (1976) and Senta and Kumagai (1977) found a range of 41 to 43 vertebrae in the specimens which they examined from Godavari Estuary and a range of 42 to 44 from Tuticorin respectively, both in the east coast of India. These authors, based on a study of vertebral variations of *Chanos fry* from various parts of the Indo-Pacific, have opined that there may be atleast four subpopulations of *C. chanos* in the tropical Indo-Pacific waters.

In having a pallel arrangement of muscle fibres (as against a crossed arrangement in the postlarvae of clupeids), the postlarvae of *C. chanos* may be said to resemble those of the other two monotypic genera and species in Indian waters, *Elops machnata* (Forsskal) and *Megalops cyprinoides* (Broussonet). But the diagnostic character between the postlarvae of *C. chanos* on one hand and those of *E. machnata* and *M. cyprinoides* on the other is that the number of total vertebrae in *C. chanos* is only 41-43 (Delsman, 1929; Rao, 1976; Senta and Kumagai, 1977); while it is so high as 65-70 in *E. machnata* and 64 - 71 in *M. cyprinoides* (Delsman, 1926; Uchida *et al.*, 1958). In the larvae and postlarvae also, the number of myomeres ranges from 28 to 32 preanal and 11 to 15 postanal in *C. chanos*, whereas in *E. machnata* it is as high as 53-59 preanal and 7-12 postanal and in *M. cyprinoides* it is 46-51 preanal and 16-20 postanal. The average difference in the vertebral and myomere number in *E. machnata* and *M. cyprinoides* is vastly different as to range from 20 to 28 more than in *C. chanos*, which is adequate enough for the diagnosis of the postlarvae of the latter from those of the other two. Another diagnostic character is the

presence of a leptocephaline stage in the development of *E. machnata* and *M. cyprinoides*. It is distinctly absent in the development of *C. chanos* (Delsman, 1929, Uchida *et al.*, 1958; Chaudhuri *et al.*, 1978; Liao *et al.*, 1979).

In having a total number of 42/43 myomeres, the postlarvae of *C. chanos* may be said to resemble those of certain clupeids such as *Sardinella clupeoides*, *S. sirm*, *S. albella* and *Ilisha melastoma* (Bensam, 1986, 1987). But the most important distinction between similar postlarval stages of *C. chanos* on one hand and those of the above clupeids on the other is the parallel arrangement of the muscle fibres in the former as against the crossed arrangement in the latter. Also, the disposition of myomeres in the postlarvae of *C. chanos* as 26 preanal and 16 postanal is distinctly different from that of 31-38 preanal and 5-11 postanal in the postlarvae of the above clupeids. Besides the rudiments of an airbladder is present in the postlarvae of *C. chanos*; but absent in those of the above clupeids.

Still another clupeid which has a total of 42 vertebrae is the whitebait *Thryssa dussumieri* (Bensam, 1987). But, the muscle fibres in the postlarvae of *T. dussumieri* also have a crossed arrangement as against their parallel arrangement in the postlarvae of *C. chanos*. In addition to the above vital character, in the 5.1 - 5.3 mm (12 hours to 2 days old) larvae of *C. chanos* (Liao, *et al.*, 1979) the mouth has not yet developed and the eyes are unpigmented, whereas in the 4.6 mm stage of *T. dussumieri* (Bensam, 1987), the mouth is already formed and the eyes are pigmented. Such subtle characters also serve to distinguish the postlarvae of *C. chanos* from those of the allied species.

No information is available on the collection of egg/larva of milkfish from a greater distance from the coast and in deeper areas as in the present instance. Senta *et al.* (1980) recorded the eggs in Philippine waters at depths ranging from so shallow as 10 m to as deep as 900 m and the distance varying from 100 m to 23.4 km from the nearest land. The present record of postlarvae at 52 km off the nearest land where the water depth is 1,125m, in the continental slope, extends their occurrence still farther in the oceanic regions.

Many aspects of the spawning of the milkfish in India are still unknown, as is the case in the southeast Asian countries. The limited records of eggs from the coastal areas of the east and the west coasts point out that the main spawning grounds of this fish must be located far from the coast. Schuster (1960) noted that the spawning grounds of the milkfish are usually situated not more than 30 km from the shore. But Lin (1968) has opined that this fish "haunt the coastal waters of Taiwan and go as far north as South Japan for the purpose of feeding and spawning". The record of eggs at a depth of 900 m by Senta *et al.* (1980) off Philippines and the present record of early postlarvae which seem to be about 3 to 10 days old (Liao *et al.*, 1979) from such a deep locality as the continental slope suggests two alternatives: (1) that the collection locality may form a part of the spawning area and (2) that the locality is not so; but the postlarvae are brought there by waves or currents from the spawning grounds located at shallower or still deeper areas. Besides, the milkfish is known to occur in the Lakshadweep group of oceanic islands in the Arabian Sea (Jones and Kumaran, 1980) and its fry are also reported from

there (Tampi, 1973). The nearest one of these islands namely Kalpeni to the site of the present collection cannot be lesser than about 230 km in perpendicular distance. Hence, a question may arise as to whether these postlarvae belong to the stock from around the mainland or from the islands. In view of these reasons, much more data are required to determine whether the milkfish spawns in deep and distant waters or the postlarvae drift there from shallower spawning grounds.

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