

lobes pale yellowish, filament yellow (Fig. 2). Though the species is reported (FAO Fisheries Synopsis No. 125, Vol. 12) to have a widespread distribution in the Indo-Pacific from north-western Australia, the Indo-Malay Archipelago and Andaman Sea, it is being reported for the first time along Andhra Pradesh coast. The total length of specimens collected ranged from 18.0 cm to 21.5 cm and is known to attain a maximum length of 25 cm (Fishbase). The collected specimens have been preserved in formalin and kept in the Marine Museum of the Visakhapatnam Regional Centre of Central Marine Fisheries Research Institute.

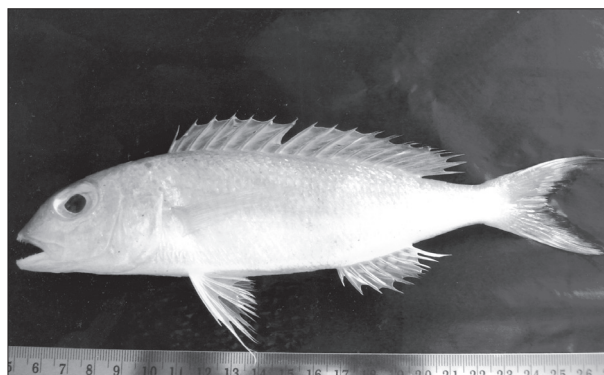


Fig. 2. *Nemipterus zysron* collected from Visakhapatnam Fishing Harbour

## Record of cuttlefish, *Sepia elliptica* Hoyle, 1885 off Maharashtra coast

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Cephalopods have a good export demand and is the second most sought after commodity next to prawns by trawl operators. With the increased exploitation and expansion of fishing grounds, new records of cephalopods are being reported from various places all along the Indian coast.

A new entrant in to the cuttlefish fishery at New Ferry Wharf, Mumbai, Maharashtra is *Sepia elliptica* Hoyle, 1885 (Fig. 1). The species constituted the fishery during December-February with peak landings in January. This species is commonly known as 'oval bone cuttlefish' and locally all cuttlefishes are called as 'goti'. The mantle length of the species landed at New Ferry Wharf ranged from 87 mm to 118 mm with corresponding weight ranging from 82.6 to 182.4 g. The depth of operation was about 30-40 m at 70-80 km north off Mumbai coast. The occurrence of *S. elliptica* is reported for the first time from Maharashtra waters.

Some of the important distinguishing characters of *S. elliptica* are as follows: The mantle is oval with the dorsal anterior margin triangular. The arm length is sub-equal and the arm suckers are tetra serial. Club sucker-bearing surface flattened, with 10-12 minute suckers in transverse rows. Swimming



Fig. 1. *Sepia elliptica* Hoyle, 1885

keel of the club extends well proximal to carpis. The cuttlebone is oval and angular 'V-shaped' anteriorly, bluntly rounded posteriorly and the dorsal surface is greyish white (Fig. 2 and 3).

*S. elliptica* is often misidentified as *Sepia esculenta*, world over. In *S. esculenta*, the inner cone ledge is thick and directed anterior ventrally and it also has prominent lateral stripes on the dorsal surface and they are commonly called as 'golden cuttlefish' due to its distinct colouration. They seem to get confused with *Sepia aculeata* and because of



Fig. 2. Dorsal view of cuttlebone of *S. elliptica*

this, they may not have been reported from Maharashtra waters. *S. elliptica* can be easily identified from *S. aculeata* by its cuttlebone which is distinctly shaped and also by the presence of prominent markings on all the arms (Fig. 4).

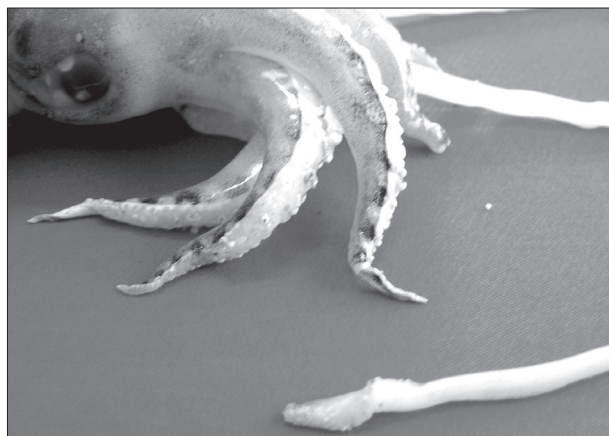


Fig. 4. Distinct markings on the arms of *S. elliptica*

*S. elliptica* is a tropical Indo-Pacific species extending from northern to western Australia, Exmouth Gulf, Queensland, Capricorn Island group, Gulf of Carpentaria and Vietnam and occur mainly in coastal waters at a depth range of 16 to 142 m (Jereb *et al.*, 2005). According to Jereb *et al.* (2005), the occurrence of this species from Indian waters is doubtful. However, Silas *et al.* (1985) has reported the occurrence of this species from Indian waters.

Narasimham *et al.* (1993), Kasim (1993), Mohamed (1999) and Meiyappan *et al.* (2000) have also mentioned the occurrence of this species from Cochin and Veraval waters. Sivasubramanian (1991) has reported this species from the Bay of Bengal up



Fig. 3. Ventral view of cuttlebone of *S. elliptica*

to a depth of 100 m. According to Meiyappan *et al.* (2000), this species is one of the neritic species occurring in commercial catches and is recorded mainly from Veraval (Gujarat) and Cochin waters where they form significant part of the catch, especially in Gujarat. According to Meiyappan and Mohamed (2003), *S. elliptica* exhibits bathymetric distribution and they are caught along Cochin and Veraval coasts by trawling beyond 40 m depth. The catch of *S. aculeata* is comparatively very less in Gujarat contributing only 0.7% towards the cephalopod fishery while *S. elliptica* contributes 27.5% and the period of abundance of this species is between October and January (Kasim, 1993). The overall contribution of this species to the cephalopod fishery from the west coast is 2% (Meiyappan and Mohamed, 2003).

Cuttlefish landings by trawlers in Mumbai consist of resources such as *Sepia aculeata*, *Sepia pharaonis* and *Sepiella inermis*. Generally in Mumbai waters, the abundance of cuttlefishes is during the post-monsoon period (Kuber, 1987). The occurrence of *Sepia prashadi* is highly seasonal in Mumbai waters occurring only during September-December (Sujit Sundaram and Sarang, 2004), wherein they replace the species *S. aculeata* during this period (Sujit Sundaram *et al.*, 2006). Similarly the species *S. elliptica* also seems to be seasonal and occurs during December-February. However they do not replace *S. aculeata*. According to Nair *et al.* (1992), *S. elliptica* was found occurring in Cochin and Veraval waters almost throughout the year.

The maximum dorsal mantle recorded for this species is 175 mm (Jereb *et al.*, 2005). The largest

sizes recorded for males and females of *S. elliptica* caught in trawlnet in Cochin area are 129 mm and 119 mm respectively (Silas *et al.*, 1985) and in Veraval waters it is recorded as 149 mm (Kasim, 1993). Sivasubramanian (1991) has reported the maximum mantle length as 130 mm from the Bay of Bengal. The maximum length recorded during the present observations from Mumbai waters was 118 mm.

Silas *et al.* (1985) studied the biology of this species from Cochin waters and Kasim (1993) reported on the age, growth and stock assessment from Veraval waters. Sixteen specimens of *S. elliptica* were analysed for gut contents of which 14 were males and all of them had empty to trace stomachs and 2 specimens were females with 'half full' stomach. This species seems to be extensively feeding on prawns. Silas *et al.* (1985) observed that penaeid prawns form the main item of this species in Cochin waters and the other food items, which occur in the stomachs, are fishes, *Acetes*, crabs and stomatopods. In general, females were observed to be broader than males

and the overall dominance of males was observed in the catch from Mumbai. Similarly dominance of males is reported in Cochin waters also (Silas *et al.*, 1985). All the males examined were in second stage of maturity and the females were in third stage of maturity. Males and females of this species of Cochin area attain sexual maturity at a minimum size of 75 mm, and all individuals of the two sexes mature when they reach a size of 115 mm and spawning females as well as males were recorded from October to December (Silas *et al.*, 1985). Meiyappan *et al.* (2000) reported the size at 50% maturity in the west coast as 93 mm for males and 96 mm for females.

There is a definite migration pattern followed by cephalopods and hence further studies on this species during this period would ensure their fishery potential and trend. This being a new entrant to the cephalopod fishery off Mumbai waters, a close monitoring of this resource is essential, as they seem to contribute substantially to the cephalopod fishery in Veraval and Cochin waters.

## By-catch of the gastropod *Tibia* spp. in gillnets operated along Gujarat coast

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The rocky coastal belt of Gujarat possesses an enormous potential resource of lobsters. Gillnets are regularly operated for lobster along the coast of Mangrol, Porbunder and Muldwarka. Gastropods such as *Tibia maculata* and *Tibia curta* occurred in large quantities as by-catch along with lobsters. Other gastropods such as *Archipecten* sp. and *Murex* sp. also make their occurrence in small quantities.

### Mangrol

Lobster fishing is being regularly conducted using old gillnets in this area. The net is operated at a distance of 2 to 3 km at a depth of 20 to 25 m and it is allowed to remain overnight and the next day morning the fishermen usually collect the net

with all the fish, lobsters and the gastropods. The gastropods living in the muddy or nearer to rocky area also get entangled with the gillnet thus forming a fishery. On enquiry, it was told that these gastropods are available in large numbers during high tide after the post-monsoon season. The catch rate was also very high ranging from 15 to 25 kg per unit during September-December (Fig. 1) and it was considerably lower during January-March with each unit bringing about 5 to 8 kg of gastropods. The gastropods are mainly constituted by *T. maculata* (Fig. 2) and *T. curta* (Fig. 3), forming about 94% while the sun shell *Archipecten* sp. and *Murex* sp. form 3% and 2% respectively and the remaining 1% by other miscellaneous gastropods. Majority (71%) of the gastropods (*Tibia* sp.) were