(1991), the juveniles feed preferentially on ‘crustaceans’, whereas the main food for adults was found to be ‘fishes’.

This species has a sex-ratio of 1:0.46 and 68.7% of the specimens analysed for the maturity studies were ‘gravid’ followed by ‘mature’ (31.3%) specimens. According to Natsukari and Tashiro (1991), the spawning season extends throughout the year, with three detectable peaks in spring, summer and autumn which also seems to be the case in Mumbai waters as gravid specimens are found almost throughout the year. Most specimens from Japanese waters reached full maturity by 150-200 mm. The smallest size recorded for full maturity was 52 mm and 59 mm for males and females respectively. *L. edulis* in the north-western part of the Indian Ocean reaches sexual maturity at 70-80 mm (Shvetsova, 1974). The same trend was also observed in Mumbai waters with the smallest gravid females recorded at 70 mm. It was observed that *L. edulis* matured at a smaller size than *L. duvauceli* and the ova diameter of the species was also larger (up to 2 mm) than *L. duvauceli* and the fecundity ranged between 580 to 1620.

Some cephalopods are known to make seasonal migrations, which are influenced by breeding activity. It seems that in all probability this species may have come to nearshore waters for breeding. Regional distribution and relative abundance of different species of cephalopods have not been studied extensively along the Indian coast and therefore further efforts need to be taken in this direction.

**Observation on juvenile sea cucumber occurrence in the shallow waters of Hare Island (erstwhile Pandian Island), Tuticorin**

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Understanding juvenile sea cucumber habitat preferences is very much essential for determining the carrying capacity of a given habitat which enables the successful release of sea cucumber juveniles for restocking purpose. Holothurians occupy different habitats such as rocky shores, sandy beaches, muddy flats, coral reefs and mangrove swamps at different depths. In general, the juvenile sea cucumbers exist in the habitat occupied by the adult but are obscured from view within the sediment or crevices or beneath obscuring objects such as corals and rocks. Juveniles of 21 species of holothurians have already been reported from Indian waters, of which 17 were observed in the same habitat as adults and 4 in the absence of adult.

There are no reports on the availability of sea cucumber juveniles from Tuticorin waters. While doing the routine observations on sea cucumber species diversity in the shallow waters of Hare Island (erstwhile Pandian Island), juvenile sea cucumbers of three species were noticed under rocks (Fig. 1). They were found attached firmly to the rock surface and were covered with sand and extraneous particles concealing their presence from the surroundings.

After noting the morphological characters of the collected holothurian juveniles, spicules were separated from various parts of the body like dorsal as well as ventral tegument, tentacles, podia and pedicels using sodium hypochlorite. The isolated spicules were measured and photographed under microscope, for species identification. The juvenile
sea cucumbers collected were identified belonging to three species viz., *Holothuria cinerascens*, *Holothuria moebii* and *Holothuriapardalis*. The details of juveniles collected, their morphology and spicule characteristics are given in Table 1.

The general morphological features and the spicule structures of all three species of juvenile sea cucumbers are similar to their adults but with minor variations. The juvenile *H. cinerascens* have beautiful colouration with yellowish green or reddish green papillae and pedicels which were scattered all over the body, such characters are absent in the adults and the adults are reddish brown in colour with red markings in the body. The juveniles have only tables as spicule in the tegument, while adults have tables, rods and plates as spicules in the teguments.

The juveniles of *H. moebii* have three distinct rows of yellowish white pedicels, but adults have four rows of pedicels, which are darker on the dorsal side and lighter on the ventral side. Spicules like buttons are absent in the juvenile *H. moebii*, where as it is the major constituent in adults. The adult *H. pardalis* is light brown in colour with dark patches and have 8 - 15 pairs of brown spots on the dorsal side, whereas juveniles are whitish transparent with yellowish white pedicels arranged in three rows on the ventral side and have nine brown spots in three rows on the dorsal side. The characteristic curved rod spicules, which are present in the adults are absent in the juveniles.

The adult specimens of both *H. cinerascens* and *H. moebii* are two common species of the shallow waters of Hare Island, usually found attached to rocks but *H. pardalis* is a rare species and hence more studies have to be conducted to explore the habitat preference of both adults and juveniles of this species in the Gulf of Mannar area.

Table 1. Details of sea cucumber juveniles collected from Hare Island, Tuticorin

<table>
<thead>
<tr>
<th>Place</th>
<th>No. of specimens</th>
<th>Morphology</th>
<th>Spicules and measurements</th>
<th>Systematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hare Island</td>
<td>15 Nos.</td>
<td>Brownish black coloured body with 9 nos. of orange or brownish black spots on the dorsal side. Pedicels arranged in three rows which are sticky yellowish green coloured or sometimes red or green. Tentacles are reddish brown in colour. Length - 2.4 – 8 cm Wet weight – 3.24 -10 g</td>
<td>Table - (base = 0.04-0.055 mm, spire = 0.045 - .058 mm) Rods - 0.05 - 0.12 mm, Endplate - 0.2 - 0.37 mm, Tegument contains only tables. Pedicels and tentacles have rods and end plates.</td>
<td>Order : Aspidochirota, Family : Holothuroidea Genus : Holothuria Subgenus: Semperothuria Species : cinerascens</td>
</tr>
<tr>
<td>Hare Island</td>
<td>18 Nos.</td>
<td>Spindle shaped elongated body with 9 brown spots in three rows on the dorsal side. Pale whitish transparent body with yellowish white pedicels arranged in three rows on the ventral side. Tentacles are transparent light brown in colour. Small juveniles are highly transparent with two brown spots. Length - 1.6 - 7.2 cm Wet weight - 0.34 – 4.18 g</td>
<td>Tables - (base = 0.05 - 0.0825 mm) spire = 0.0425 - .0775 mm Rods - 0.08 - 0.13 mm Button - 0.05 - 0.125 End plate - 0.35 - 0.4 mm</td>
<td>Order : Aspidochirota Family : Holothuroidea Genus : Holothuria Subgenus: Lessonothuria Species : pardalis</td>
</tr>
<tr>
<td>Hare Island</td>
<td>9 Nos.</td>
<td>Dark brown spindle shaped body with brown pedicels arranged in three rows. Podia are scattered but sticky. Very small juveniles are highly transparent without any spots. Length - 2.1 - 11 cm Wet weight - 4.4 - 6.05 g</td>
<td>Rods - 0.06 - 0.2 mm End plate - 0.1 - 0.17 mm</td>
<td>Order : Aspidochirota Family : Holothuroidea Genus : Holothuria Subgenus: Selenkothuria Species : moebii</td>
</tr>
</tbody>
</table>