Taxonomy of Sepiella inermis and Sepioteuthis lessoniana
Taxonomy of *Sepiella inermis* and *Sepioleuthis lessoniana*

**Introduction**

The status of cephalopod systematics worldwide is decades behind that of other major marine taxa (Roeleveld, 1998). The reasons for this low level of understanding could be difficulties in obtaining funding and required materials. Apart from the common inshore cephalopod species they are difficult to be caught and are relatively sparse in the environment. Understanding of cephalopod ecology is also poor owing to the paucity of taxonomists and ecologists attracted to this group (Clarke, 1996). But the decline in fish stocks has increased the total value of cephalopod fisheries. In addition, the realization of the role played by cephalopods in the marine food chain is now emphasized from better understanding of cephalopods.

Although most families of living coleoid cephalopods are well defined, phylogenetic relationships among them are still controversial (Young and Vecchione, 1996). Since the works by Naef (1921-1923; 1928) cephalopod systematics has mainly described new orders, families, genera and species. But still confusion regarding the systematics of cephalopods prevails. A first general review of the world’s cephalopod resources, in particular in regard to their
exploitation and future potential was prepared for FAO by Voss (1973). This was followed by the publication of a species catalogue for FAO by Roper et al. (1984).

Voss (1977b) presented a historical account of major systematic works in cephalopods and pointed out reasons for the comparatively primitive state of our knowledge concerning cephalopod systematics. The basis of all modern systematics, of course, is morphology (Roper, 1983). In a sense, all morphological characters can be considered to be ontogenic because they have a progression of development from undifferentiated precursors (de Queiroz, 1985). But as the morphological characters of many species overlap, a thorough character analysis for individual species becomes essential.

The great majority of cephalopods are now extinct, known only from the shells they have left in the rocks. Very different methods are needed to study the living and extinct cephalopods, and we must be content with a very partial understanding of the fossil forms (Morton, 1979). The fossil record of coleoid cephalopods is meager with the exception of the hard structures of belemnites. The phylogeny of living cephalopods has to be compiled from hopelessly inadequate palaeontological evidence and it is not surprising that attempts to work it out have been made at long intervals and have been more or less unconvincing (Donovan, 1977).
Extant coleoids, particularly octopods have precise problems in systematics due to the lack of hard parts and the phenotypic plasticity of the soft parts (Ogden et al., 1998). The importance of radula in octopod taxonomy has been reviewed (Adam, 1941). Analysis of the lower beak has been applied to the major cephalopod groups (Clarke and Maddock, 1988). Now, it is possible to identify squid species from beaks found in the stomachs of vertebrate predators (Clarke, 1996; Croxall and Prince, 1996). Once caught, cephalopods must be fixed carefully, because lack of care with fixation can result in large distortions and, in decapods, loss of sucker rings, which drastically reduces the value of the specimens for systematics (Rocleveld, 1998). In taxonomy, which is the science of discovering, describing, naming and identifying species and groups of species (taxa), character analysis may be difficult in practice, but it is conceptually straightforward (Vecchione, 1998).

Studies on cephalopod taxonomy in India are nominal. Works done by Filippova (1967), Silas (1968), Silas et al., 1982 and Jothinayagam (1987) are worth mentioning. The spineless cuttlefish Sepiella inermis and the big fin squid Sepioteuthis lessoniana are cephalopods found in abundance in both east and west coast of India. They are important commercially, taxonomically dominant in certain regions and are relatively less studied. These two cephalopods form the substance for the current research.
Systematics of family Sepiidae

The family Sepiidae was first recognized by Keferstein (1866) and the genus Sepiella by Gray (1849). This family can be diagnosed by the oval to circular mantle which is dorsoventrally flattened. There are lateral fins occupying nearly all the mantle length and separated posteriorly. The eye is covered by cornea. In males, hectocotylization (where present) is on left arm IV (or both arms IV) which is marked by the reduction of suckers. Tentacles are retractable into pocket on ventrolateral sides of the head. The shell (cuttlebone or sepion) with phragmocone is usually calcified and flat which rarely bulge ventrally. The funnel-mantle locking apparatus is curved to angular and is not straight.

Generic diagnosis

In the family Sepiidae there are three recognized genera namely Sepiella Gray, 1849, Metasepia Hoyle, 1885 and Sepia Linnacus, 1758.

Sepiella :- Posterior gland and pore are present. The funnel-mantle locking apparatus is with a triangular tubercle on mantle component and corresponding depression on the funnel component. The sepion is elliptical in outline and the inner cone is wide and flat with very short limbs.

Metasepia :- The posterior gland and pore are absent. Mantle-funnel locking apparatus is semicircular without tubercle on mantle component and without corresponding depression on the funnel component. Sepion is rhomboidal in
outline which is much shorter than the mantle and is located in the anterior \(2/3 - 3/4\) of mantle. The sepion has a narrow and thickened inner cone with very short limbs.

*Sepia* :- The posterior gland and pore is absent. The mantle-funnel locking apparatus is with a semicircular tubercle in the mantle component and a corresponding depression on the funnel component. Sepion is elliptical to subrhomboidal or lanceolate in outline. The innercone is always with relatively long limbs (longer than *Sepiella* and *Metasepia*).

**Systematic position of Sepiella inermis Orbigny, 1848**

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>: Animalia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phylum</td>
<td>: Mollusca</td>
</tr>
<tr>
<td>Class</td>
<td>: Cephalopoda Cuvier, 1797.</td>
</tr>
<tr>
<td>Subclass</td>
<td>: Coleoidea Bather, 1888.</td>
</tr>
<tr>
<td>Super order</td>
<td>: Decabrachia Boettger, 1952.</td>
</tr>
<tr>
<td>Order</td>
<td>: Sepiida Zittel, 1895.</td>
</tr>
<tr>
<td>Family</td>
<td>: Sepiidae Leach, 1817</td>
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<tr>
<td>Genus</td>
<td>: Sepiella Gray, 1849.</td>
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Diagnostic features of *Sepiella inermis* Orbigny, 1848

The mantle is elongate and oval in shape. There is a pigmented gland and pore at the posterior tip of the mantle on the ventral side. The tentacular clubs are with 16 to 24 equal sized minute suckers in transverse rows. The swimming keel is shorter than the club. The protective membranes are narrow and extend proximally on stalk as low ridges. The shell is spineless hence the common name spineless cuttlefish. The shell width is generally 40% of the shell length. The colour of the animal is grayish brown with a series of reddish patches along the bases of the fins (Fig 1a & b).

![Fig 1a. Sepiella inermis dorsal view](image1)

![Fig 1b. Sepiella inermis ventral view](image2)

Synonyms of *Sepiella inermis* Orbigny, 1848

*Diphtherosepion martini* Rochebrune, 1884

*Sepia affinis* Souleyet, 1852

*Sepia microcheirus* Gray, 1849
*Sepia tourannensis* Souleyet, 1852

*Sepiella curta* Pfeffer, 1884

*Sepiella maindroni* Rochebrune, 1884

**Distribution**

The distribution is mainly Indo-Pacific, Southern Red Sea, Gulf of Aden to Andaman Sea and the South China Sea.

**Systematics of family Loliginidae**

The family loliginidae was first recognized by Lesueur (1821) and the genus *Sepioteuthis* by Lesson (1830). The members of family Loliginidae are found to vary their shapes from short and stout to long and slender. The fins are terminal or marginal but unlike the Sepiidae are always fused posteriorly. The funnel locking apparatus is simple with straight groove. The eyes are covered with a transparent corneal membrane. In the arms there are two rows of suckers and in tentacles there are four rows. Hooks are never present on the tentacular clubs. In males usually the IV left arm is hectocotylized. Loliginids are usually reddish brown with a darker dorsal side, but this character is quite variable depending on the behavioural situation.
Generic diagnosis


*Sepioteuthis* :- Fins are broad, muscular, *Sepia* like and runs about 90% of the mantle length. The mantle is very robust in *Sepioteuthis*.

*Lolliguncula* :- The fins are round to elliptical in shape. In males, 50% of the left IV arm is hectocotylized by the modification of the suckers. The mantle is very robust, muscular and bluntly rounded in the posterior part.

*Uroteuthis* :- The mantle is very long and narrow with the posterior end drawn out into a long pointed tail. The buccal membrane is having suckers and there is presence of trabeculae on the protective membranes of tentacular clubs which are equal in number to the adjacent suckers.

*Loliolus* :- Nearly the entire length of the hectocotylized arm in the males are modified by suckers, membranes and trabeculae. The fins are elliptical to broadly heart-shaped in appearance. The mantle is delicate, stout and broadly rounded posteriorly.

*Loligo* :- The fins are lateral and rhombic in outline with posterior borders straight or slightly concave. The fins are relatively long and run over 60% of the mantle length. The mantle is elongate, bluntly or sharply pointed and the males are having their left IV arm hectocotylized.
Systematic position of *Sepioteuthis lessoniana* Lesson, 1830

Kingdom : Animalia  
Phylum : Mollusca  
Class : Cephalopoda Cuvier, 1797.  
Subclass : Coleoidea Bather, 1888.  
Super order : Decabrachia Boettger, 1952.  
Family : Loliginidae Lesueur, 1821  
Genus : *Sepioteuthis* Blainville, 1824.

Diagnostic features of *Sepioteuthis lessoniana* Lesson, 1830

In *Sepioteuthis lessoniana* the mantle is long, robust and its width is about 40% of the total length. The fins are very large and their lengths are usually over 90% to 100% of the mantle length. The greatest width of the fins is near the midpoint. The tentacular clubs are long and expanded with the central row of suckers enlarged. Suckers in the tentacles bear 14 to 23 sharp teeth. The arm sucker rings are with 18 to 29 sharp triangular teeth. The distal $\frac{1}{3}$ to $\frac{1}{4}$ of the left arm IV is hectoctylized in the males. Fig 2a and 2b
Synonyms of *Sepioteuthis lessoniana* Lesson, 1830

*Sepioteuthis arcticpinnis* Gould, 1852
*Sepioteuthis brevis* Owen, 1881
*Sepioteuthis doreiensis* Quoy, 1835 in Férussac and D’Orbigny, 1834-1848
*Sepioteuthis guinensis* Quoy and Gaimard, 1832
*Sepioteuthis hemprichii* Ehrenberg, 1831
*Sepioteuthis indica* Goodrich, 1896
*Sepioteuthis krempfi* Robson, 1928
*Sepioteuthis lunulata* Quoy and Giamard, 1832
*Sepioteuthis malayana* Wülker, 1913
*Sepioteuthis mauritiana* Quoy and Giamard, 1832
*Sepioteuthis neoguinaica* Pfeffer, 1884
*Sepioteuthis sieboldi* Joubin, 1898
*Sepioteuthis sinensis* D’Orbigny, 1848 in Férussac and D’Orbigny, 1834-1848

**Distribution**

*Sepioteuthis lessoniana* is found in the Indo-Pacific, Red Sea, Arabian Sea, northern Australia, North to central Japan and eastward to the Hawaiian Islands.