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1st record of *Sepia officinalis* (Linnaeus, 1758) from great Bitter Lakes at Fayed, Suez Canal Egypt

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ABSTRACT

Samples of the cuttlefish *Sepia officinalis* were recorded in the Bitter Lakes at Fayed, Suez canal. The morphology of this cephalopod was given in this study and discussed with previous studies on the same species in other areas of the world. The present study suggests that this species which is common in the Mediterranean sea may reach to the great Bitter lakes of Suez canal through lessepsian anti-lessepsian migration which are mainly demonstrated in Suez Canal.

Key words: Cephalopods, Suez canal, Bitter Lakes.

INTRODUCTION

When the Suez Canal was opened in 1869 and the additional new branch is added, the waters of the Mediterranean and the Red sea came to be increased especially regarding the exchange process of fauna and flora. Cephalopoda is the class that includes such forms as cuttlefish, Octopus, and squids, has also an indisputable claim to encompass not only the most highly organized Molluscs but the most highly organized of all invertebrate animals. Many species have been colonized in the shallow intertidal zone of the great bitter lakes such as many cephalopods especially the known species of *Sepia dullfusi*, *Sepia savignyi*, *Sepia pharoanis* and the new recorded *Sepia officinalis*. Lessepsian and anti-lessepsian migration are mainly demonstrated in Suez Canal, especially in the Bitter lakes.

Few studies have been given on *Sepia officinalis* especially in shallow intertidal coastal waters of Egypt. *Sepia officinalis* is generally known as European cuttlefish. Reid *et al* (2005) worked upon the family Sepiidae, Roper *et al.* (1984) and Norman (2000) published a scientific book under the name of Cephalopods of the world. Wang *et al.* (2003) published a research work including the spatial and temporal patterns of the cuttlefish *Sepia officinalis* abundance and environmental influence a case study using trawl fishery data in French Atlantic coastal waters.

The present study aims to describe the morphology of *Sepia officinalis* (Linnaeus, 1758) that was collected for the 1st time from the Great Bitter lakes at Suez canal.

Geographic Range:

Mediterranean sea (Forbes & Hanley, 1853), Tunesia waters (Azowz, 1969), Ktari & Salem, 1979), Adriatic sea (Riedle 1970, Mondic & Stzeocevic, 1981, Jukie, 1985), Western Mediterranean (Bolotzky, 1979) Spanish catalanian sea (Sanchez, 1989) Turkish waters (Katagan & Kocatas, 1990), Senegal waters (Bakhayakho, 1983). Atlantic from Baltic and North seas to South Africa (Roper *et al*, 1984).

Aquatic Biomes: Benthic; Coastal.

Habitat regions: Temperate; Salt water.

Local distributions:

Mediterranean sea, Eastern (Alexandria) Red sea – Suez Canal (Bitter lakes) Egypt.

MATERIALS AND METHODS

20 samples of *Sepia officinalis* were collected from the main fishing port in Suez canal Bitter lakes (near Fayed city) (Fig. 1) in the period between May and August 1916. The morphology of these specimens was described using photomicrographs and drawings of this species.

RESULTS

Systematic position:
Phylum: Mollusca
Class: Cephalopoda
Subclass: Coleoidea (Bather, 1888)
Supeorder: Decapodiformes (Young *et al.* 1998)
Order: Sepiida (Zitte, 1895)
Family: Sepiidae (Leach, 1817)
Sepia officinalis (Linnaeus, 1758)

Morphology:

The body of *Sepia officinalis* is broad, depressed, rounded and truncated posteriorly with terminal notch (Figs. 2, 3, 4). The head is much narrower than the body. The crested 4th pair of arms provided with a clear white line extending along its edge. *S. officinalis* has four pairs of arms which are stout, provided with stalked suckers on their inner surface (Fig. 3). Each sucker is provided with chitinous ring supplied with teeth (Fig. 10a). The fourth left arm of male is modified to form hectocotylus arm (Fig. 8) that bears horizontal rows of suckers (about 5 at its distal part.

There are two long tentacles which can be retracted into large pits at their bases. The retractile tentacle is formed of a long cylindrical stalk, carrying at its distal end an oval tentacular club (Figs. 3) which is provided with transverse rows of suckers (5 or 6 in each) (Fig. 9). The median longitudinal row of these suckers is obviously enlarged and carries a chitinous ring with teeth (Fg. 10b).

The mouth (Fig. 2) is surrounded by a circular muscular lip, protruding from it, 2 horny brown jaws or a beak (Figs. 6, 7), situated in the most anterior part of the buccal cavity. The radula is located directly posterior to the 2 jaws inside the buccal cavity.

The mantle is surrounding the basal part of the head forming what is called a collar at its ventral part (Fig. 3).

Two undulatory lateral fins (Figs. 2, 3) are extended along the outer wall of the mantle. Calcareous shell cuttlebone (Fig. 5) is embedded under the dorsal part of the integument as an endo-skeleton of the animal. The shell is antero-posteriorly round with posterior spine or rostrum.

A muscular funnel (Fig. 11) is attached to the postero-ventral part of the head. The funnel has an outer aperture and its inner aperture leads directly into the mantle cavity. The funnel has 2 sockets (Fig. 12) at its base in which 2 knobs of the inner wall of mantle to fit in them. The gill is formed of 45 lamellae (Fig. 13).

Sepia officinalis measures up to 45 cm in mantle length, reaching to 30 cm in Mature condition 1-2 kg in weight.

Mature animal exhibits a zebra strip pattern on its dorsal surface of the mantle. The internal cuttlebone (Fig. 11) is filled with gas and helps in buoyancy.

DISCUSSION

Lessepsian migration is a complex phenomenon and is related with the combined effects of the environmental parameters especially the temperature and the biology of the animal species and thus it is important and necessary to study more in depth, the biology and ecology of these lessepsian species.

The establishment of the second branch of the suez canal in 2014-2016, allow the opportunity to increase the Lessepsian and the anti-lessepsian migrations of the marine fauna and flora species from the Red sea to the Mediterranean sea through the Suez canal and the reverse route from the Mediterranean to the Red sea, passing through the Great Bitter Lake or Suez canal. These inhabiting the latter mentioned lake to be exotic (non-indigenous) animals.

The way through the Suez canal was usual for near shore immigrant species brought into the Mediterranean with along shore current originated from the mouth of the canal, as they inhabit the coastal sea water. Israel and Syria (Por 1978; Lakkis, 1998).

As the salt covering the bottom of the great Bitter lake, the salinity of the water is 45-46‰ near the bottom, and to 43-44 ‰ on the surface. More than 1000 algae and animals occur in the Suez Canal and its lakes (Pore, 1978).

Aswan dam reduced influx from the Nile which made the sea water near Port Said more saline as a result immigration of Red sea organisms into the Mediterranean increased and vise-versa.

It is very likely that some wide spread Marine animal species mainly the cuttlefish *Sepia officinalis* (Linaeus, 1758) would enter the Mediterranean waters through the Gibraltar strait and appears in the Suez canal (Great Bitter Lake).

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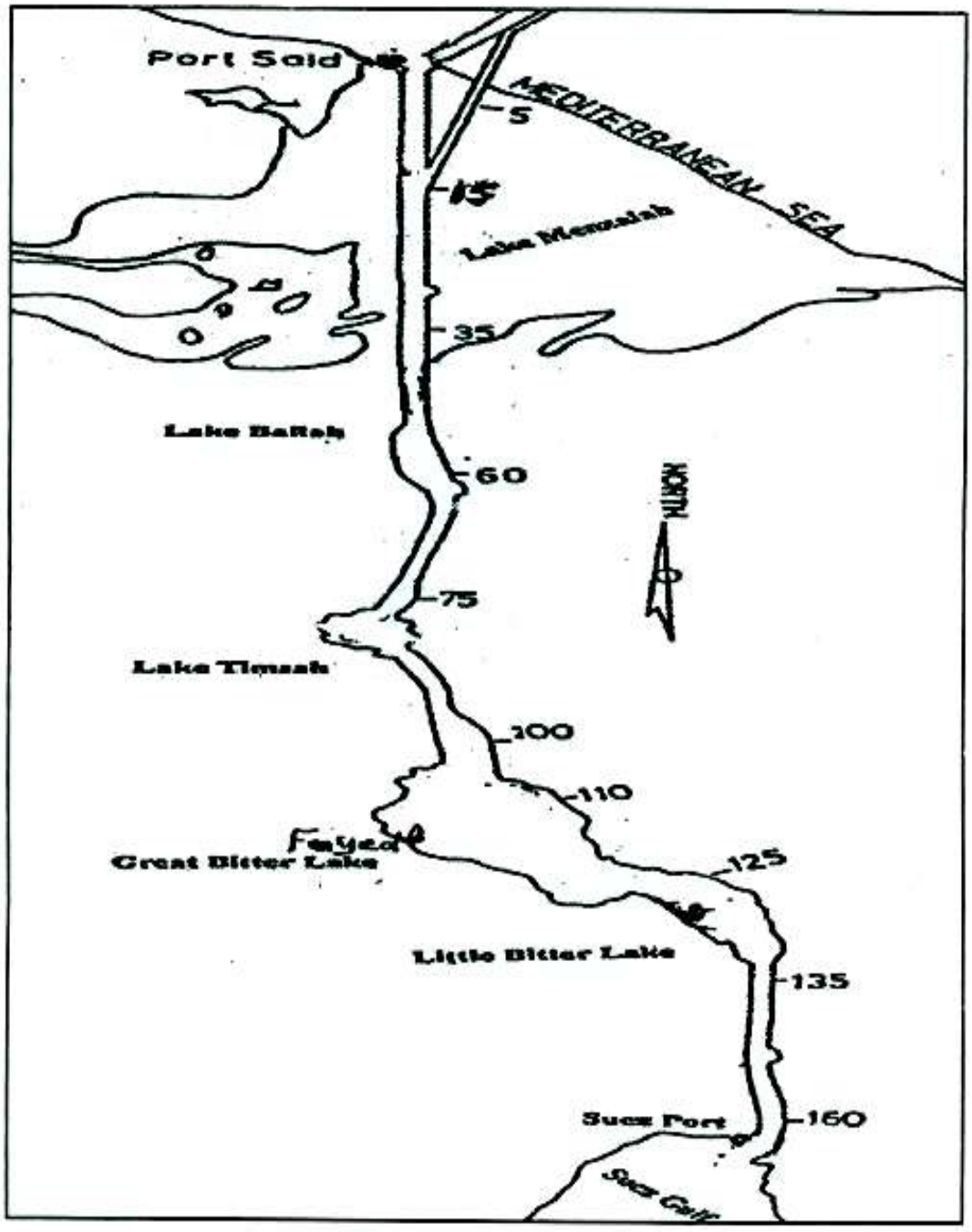

Fig. (1): A map of the Suez Canal showing the sampling station (Fayed)

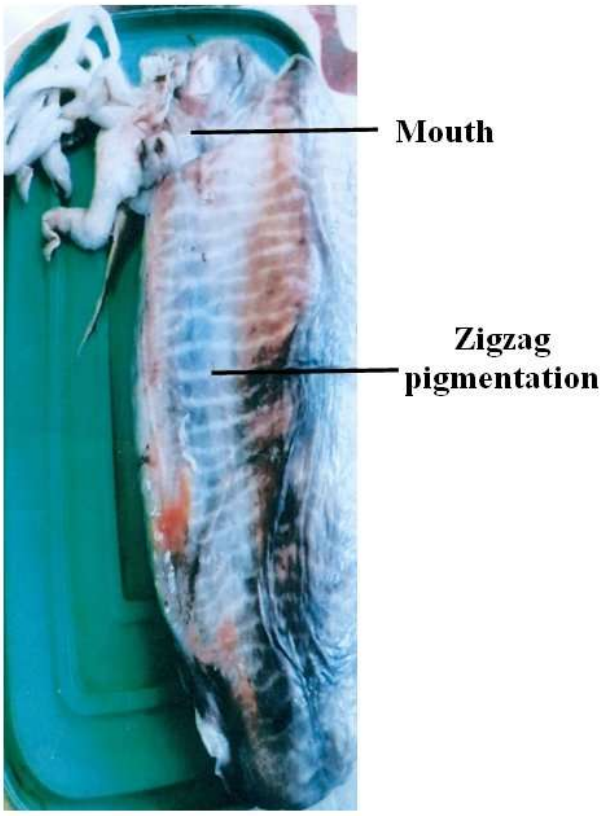

Fig. (2): Photomicrograph of the dorsal surface of *Sepia afficinalis* (half-sizeed)

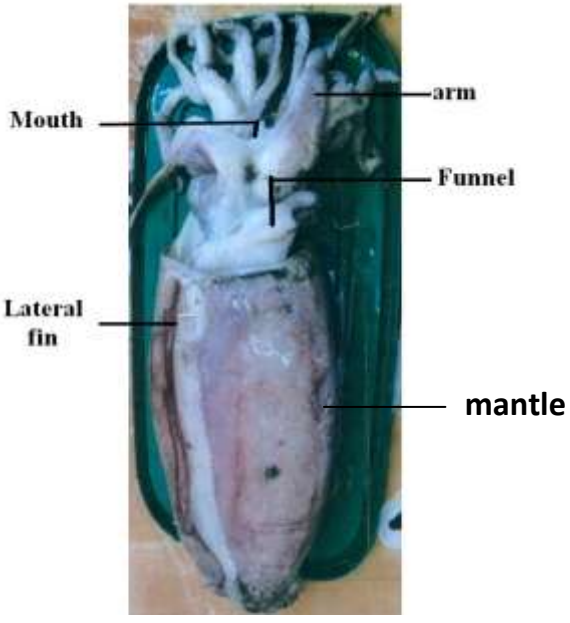

Fig. (3): Photomicrograph of the ventral surface of *Sepia afficinalis*

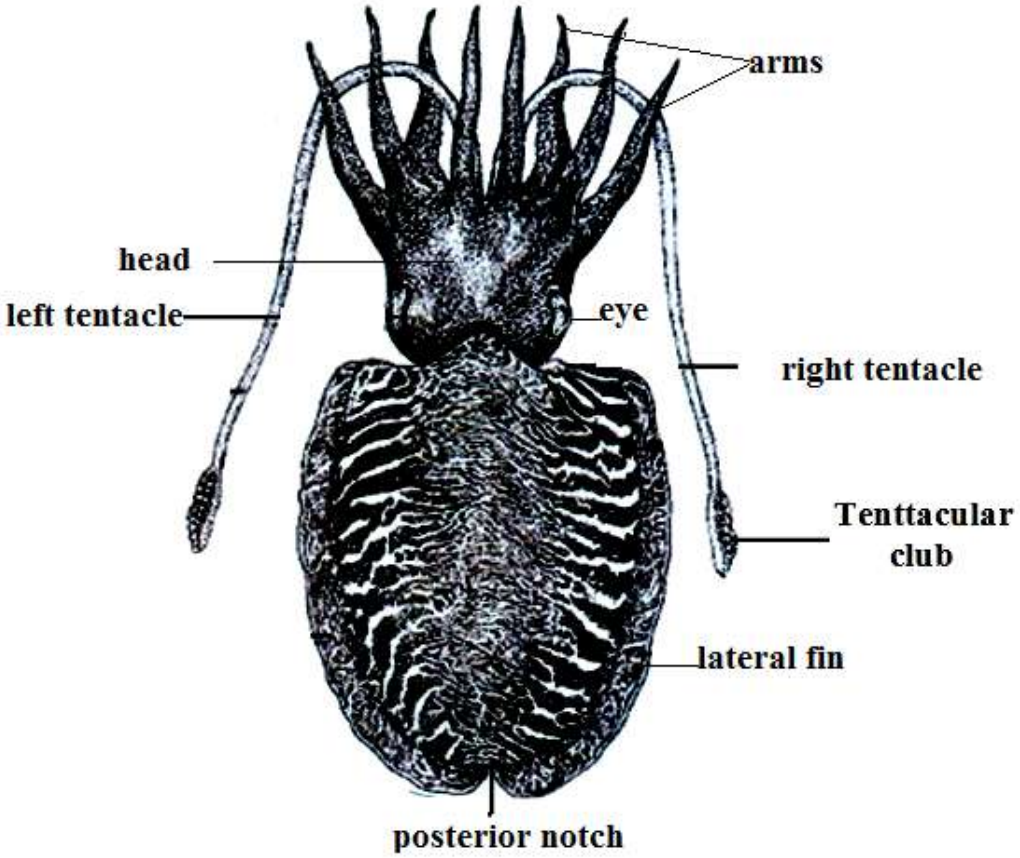

Fig. (4): Drawing of Dorsal view of *Sepia officinalis* from Bitter Lakes at Suez canal

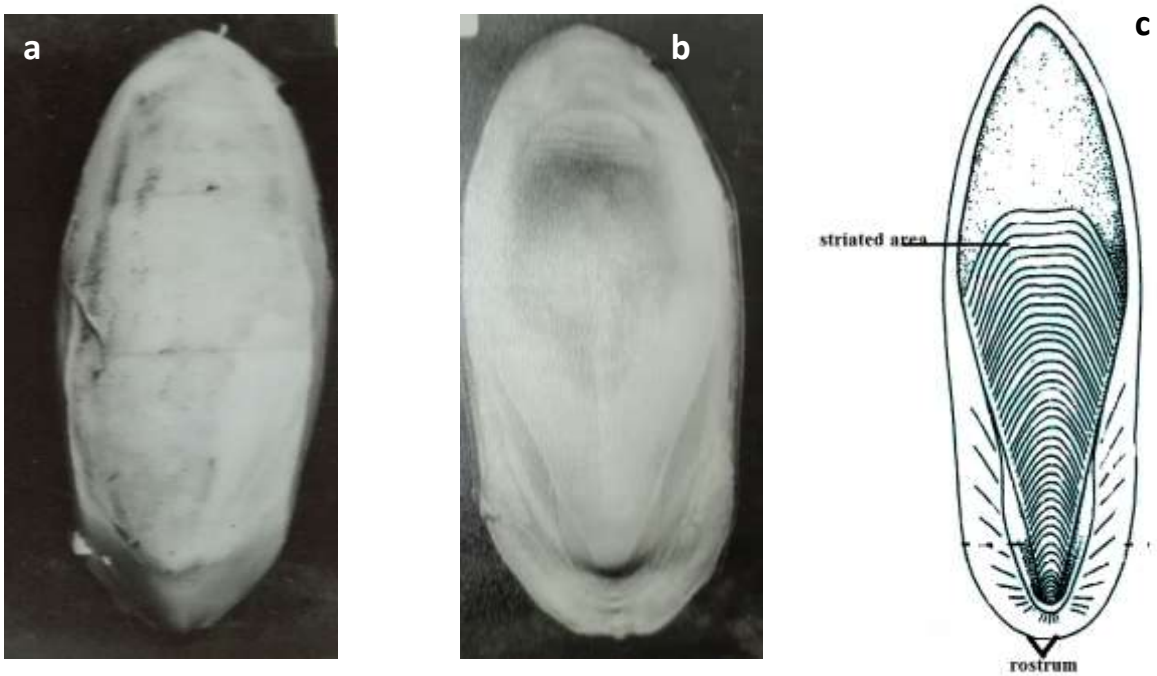

Fig. (5)::photomicrographs of cuttlebone of " *Sepi*
Ventral view and Diagrammatie drawings of its ventral side ©

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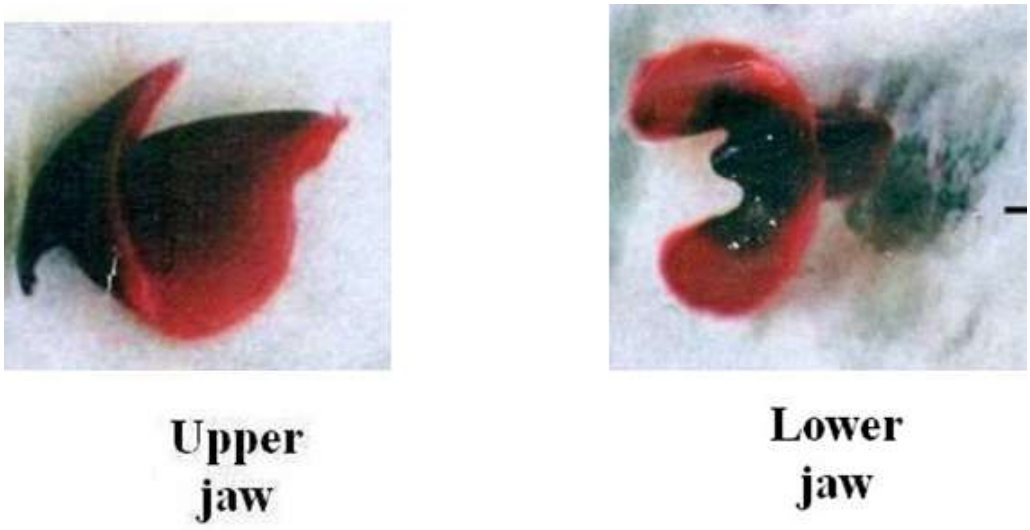

Fig. (6): Photomicrograph of (A) A upper jaw (B) Lower jaw of *Sepia afficinalis* (Normal size)

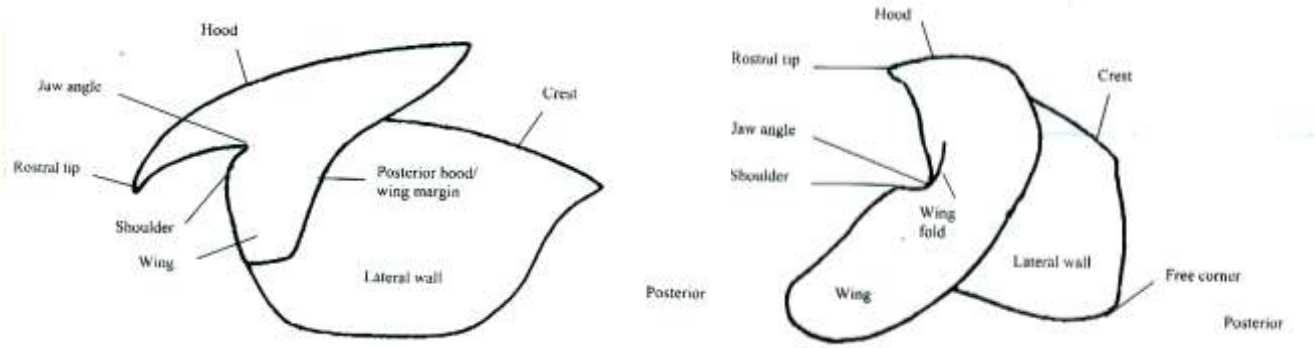

Fig. (7): Diagrammatic drawing of the beak of *Sepia afficinalis* (Enlarged) Beak characteristic used description; (A) of upper jaw, (B) of lower jaw.

Fig. (8): Ventral of the hectocotylized arm of male *Sepia afficinalis*

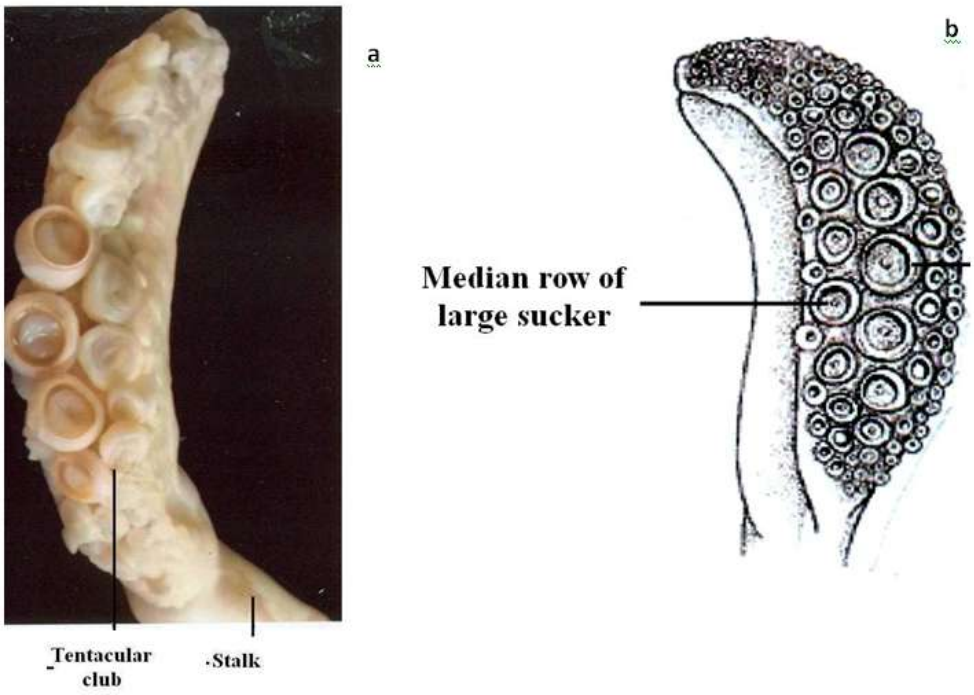

Fig. (9): Ventral view of tentacular club of *Sepia afficinalis* (Enlarged)

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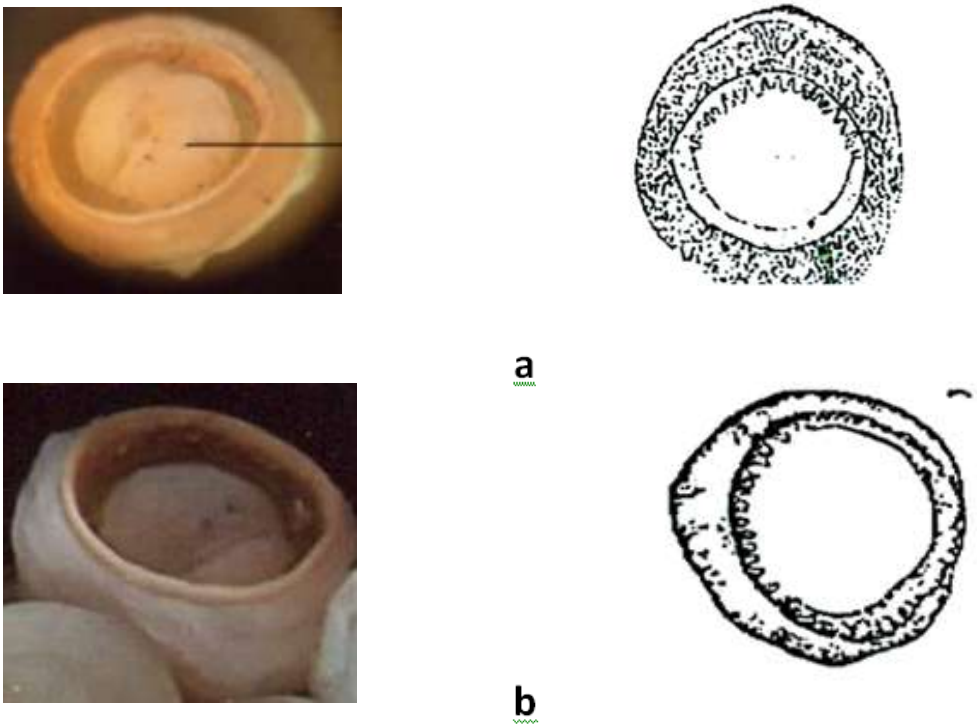

Fig. (10): Photomicrograph and Drawing of a- Sucker ring of arm b- Tentacular club sucker ring of median row c-Funnel of *Sepia afficinalis.*

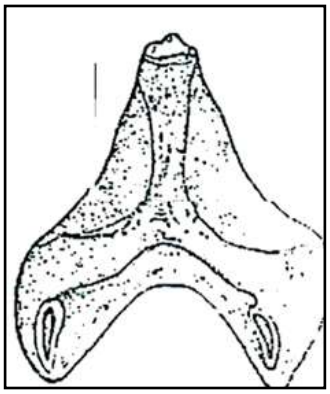

Fig. (11): Photomicrograph of Tentacular club of *Sepia afficinalis* (Enlarged)

Fig. (12): Photomicrograph of the gill (*Sepia afficinalis*) (Leteral view)

التسجيل الاول *للسيبيا أوفيسينلس* (لينياس 1758) من البحيرات المرة العظمى فى فايد بخليخ السويس-مصر

سمير البلتاجى
قسم العلوم البيولوجية والجيولوجية- كلية التربية-جامعة عين شمس

المستخلص
تم جمع عينات من *السيبيا أوفيسناليس* من البحيرات المرة العظمى فى منطقة فايد بقناة السويس. تم فى هذه الدراسة أعطاء الوصف المورفولوجى لهذا الحيوان وتم مناقشنه مع الدراسات السابقة لهذ النوع من مناطق أخرى من العالم.
وأوضحت الدراسة ان هذا الحيوان الرأسقدمى والشائع فى البحر المتوسط قد وصل الى قناة السويس من خلال البحر المتوسط عن طريق قناة السويس.