

**CYPRIS POLYGONIAE N. SP. (OSTRACODA: CYPRIDIDAE) COLLECTED  
FROM WASTEWATER OF SEWAGE STATION, SOHAG, EGYPT.**

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A new species of freshwater Ostracoda *Cypris polygoniae* collected from El-cola wastewater of the sewage station at Sohag, Upper Egypt was described and identified. Among the specific characters, carapace ornamentation is divided into three areas (Thimble-like depression, polygonal reticulation, Smooth area). The first antenna bears 3 rows of fine hairs pseudochaetae on the first segment, one spine on the third segment and  $\gamma$  seta on the sixth segment. Second antenna has three rod-like processes, two swimming setae and rows of fine pseudochaetae hairs on its segments. Mandibula has number of weak teeth, rod-like processes, rows of fine hairs pseudochaetae and a pair of strong setae with small setules on its different regions. Maxillula has two rows of fine pseudochaetae hairs on the second segment of maxillular palp and two claws with 11 teeth on the endite. There are several numbers of rows of fine pseudochaetae hairs of the three thoracopods. Additionally, there are fan-like setae on the fourth segment and one chelated process on the fifth one of third thoracopod. Furca has two rows of fine spines on each uropodal ramus.

**Key words:** Freshwater- Ostracoda- Cyprididae- *Cypris*.

## INTRODUCTION

Ostracods are small bivalved crustaceans and commonly known as “seed shrimps”. It is found in all aquatic ecosystems, viz. marine, brackish and freshwater [1]; [2]. In the present work, freshwater ostracods were classified under the order Podocopida, family Cyprididae and genus *Cypris* [3]; [4]; [5]; [6]. It is likely to note that, [6] pointed out that the positions of many species of freshwater Ostracoda within genera and many genera within subfamilies are not clear, and should undergo a taxonomic revision.

The systematic of freshwater Ostracoda has been studied in detail in different areas of the world by some authors as follows: in Russia [7]; in North America [8]; in South Africa [9]; [10]. in India [11], [12]; [13]; [14]; [15]and [16]; in Sudan [17] in New Zealand [18]; in Europe [1]; [6]; in Turkey [19]; in Australia [20]; in Romania [21]; in Japan [22], [23] and [24]; in Yemen [25] and in China [26].

Only a few studies on freshwater ostracods in Egypt have been reported. [27] and [28] studied the description and ecology of eight species of freshwater ostracods from Qena Governorate as *Cypridopsis vidiui*, *Potamocypris variegatf*, *Hemicypris*

*dematomarginata*, *Ilyocypris gibba*, *Uyocypris hiplicata*, *Fabaeformiscmdona holzkampfu*, *Pseudocandona semicognita* and *Limnocythere inopinata*. So this study aims to fulfill this gap and the present work is the first study in Sohag, which is concerned with wastewater ostracods.

### Materials And Methods

In the current study, specimens of *Cypris polygoniae* were collected from El-cola wastewater of sewage station, which is situated about 15km East of Sohag governorate. The collecting area is about 4km in length and 2km in width. The samples were collected by the plankton nylon net (50µm mesh size, 140cm length). In the laboratory, to separate the specimens of ostracoda from the water and debris, the glass container was shaken well for about 30 seconds. Then, a small amount of its content was poured in a petri-dish. Specimens of ostracoda were picked up by a fine camel's hair brush under a binocular microscope, then they preserved in 70% ethyl alcohol. Some individuals of specimens were dissected with the aid of two fine needles and mounted in a droplet of Hoyer's medium for drawing. Drawings were carried out using binocular research microscope with attached camera Lucida, and measurement by means of micrometer eye piece. For scanning electron microscopy, the remaining individuals of ostracod specimens were fixed in a mixture of three volumes of 4% glutaraldehyde and one volume of 1% of osmium tetroxide, they were dehydrated in a graded series of alcohol, critical point dried, gold coating, and viewed under a JEOL 3500 Scanning Electron Microscope at an operating voltage ranged from 10-30 V.

The females of the present species, *Cypris polygoniae* were identified according to the keys of [8], [11], [29] and [6]. The holotype and paratypes were kept in the Zoological Museum, faculty of science, Sohag University. No males were found, so they are not recorded in the present investigation. Terminology of Ostracoda setae is used according to [21], [6], [26] and [16].

### RESULTS

According to [30], the classification of Ostracoda is based on the morphology of both carapace and soft parts.

#### Diagnosis:

The right and left valves of the carapace are tumid, the width more than the height and have anterior selvage largely inwardly displaced. These valves have lip-like produced in the antero-ventral margins. In addition, there are antero-ventral and postero-ventral inner list in both valves. Left valve is overlapping right valve ventrally.

#### Description of holotype:

##### I-Carapace (shell): 1- External view

##### A- Dorsal and ventral: (Pl. 1A-C)

The ostracod body of the present species is enclosed between two calcified valves (carapace). This carapace is green in color when alive, tumid and sub-oval in shape. The

anterior end of the carapace is more depressed than that of the posterior one. Left valve of the carapace is overlapping right valve.

**B-Lateral: (Pl. 1D, E)**

The right and left valves of the carapace are symmetrical in shape and structure. The dorsal margin of each valve is strongly convex while the ventral margin is straight and slightly concave. The ventral margin of each valve is characterized with a prominent antero-ventral protuberance. The anterior margin of each valve is obliquely rounded while the posterior one is broadly rounded.

**C-Ornamentation: (Pls. 1F-H, 2A)**

The ornamentation of the carapace at its lateral surface is differentiated into three groups. The first group includes antero-dorsal, mid dorsal and postero-dorsal areas and decorated with thimble-like depression. The second group includes the central area without ornamentation (smooth area). While the third group includes anterior, antero-ventral, mid ventral, postero-ventral and posterior areas and decorated with polygonal network reticulation. In addition, there are many numbers of tubercles distributed on the anterior and posterior areas of the carapace. The surface and its margin are covered with different size of hairs (sensillae).

**2-Internal view: (Pl. 2B-F)**

The right and left valves of the carapace are distinguished with anterior selvage largely inward displaced and lip-like projection produced in the antero-ventral margins. Each valve has inner and outer lamellae. The outer lamella is calcified, while the inner lamella has fused calcified and free uncalcified parts. Each valve has an inner list between the calcified and uncalcified inner lamella, which is anteriorly running up to the dorsal margin. The hinge is lophodont with a pair of teeth and sockets at each end of the hinge.

The internal view of each valve has two groups of muscle scars. The first group of muscle scars has 7 adductor muscles which differ in shape and size (5 large and 2 small) in the center of the valve. The second group has a pair of frontal mandibular muscle scars, which slightly equal in size. The antero-ventral and postero-ventral margins of the valves carry one row of denticles on each of them. The postero-ventral denticles are stronger than that of the antero-ventral ones. Also, there are septa and pore canals pattern which bear bristles on the anterior and posterior margin of the valves.

**II-Appendages:**

**1-First antenna (antennule): (Pl. 3A) (Fig. 1A)**

The first antenna consists of 7 segments, the first and second segments called protopodite, while the remaining segments (3-7) called endopodite. The first protopodite segment is the largest one, slightly rectangular in shape and subdivided into two parts (posterior and anterior). The anterior part is subdivided into two slightly triangular regions (proximal and distal). The proximal region of the anterior part lacks any setation.

The distal region carries 2 setae on the anterior side, the antero-proximal seta transformed into wouters organ while the antero-distal seta is long and pilose in shape. The posterior part of the first protopodite segment is trapezoidal in shape and bears 2 long pilose setae on the postero-dorsal side and 3 rows of fine short pseudochaetae. The second protopodite segment is polygonal in shape and carries a short pilose seta on the anterior side and rome organ on the posterior side.

The first endopodite segment (third segment) is elongate, rectangular in shape and carries 2 short pilose setae on the terminal margin and a spine on the posterior side. The second endopodite segment (fourth segment) is nearly quadrate in shape and carries 4 setae (3 very long feathered natatory and 1 short pilose) on the terminal margin. The third endopodite segment (fifth segment) is rectangular in shape and bears 4 very long feathered natatory setae on the terminal margin. The fourth endopodite segment (sixth segment) is rectangular in shape and carries 4 very long feathered natatory setae on the terminal side and a short seta on the median side called alpha seta. The terminal segment (seventh segment) is smallest one and carries 4 free very long feathered setae; the most anterior one is transformed into an aesthetasc (ya), and a single short pilose seta on the posterior side.

## **2- Second antenna (antenna): (Pl. 3A-C) (Fig. 1B)**

The second antenna consists of first and second protopodite which attached to exopodite and 3 endopodite (3-5) segments. The first protopodite segment is nearly circular in shape with anterior lateral process and carries 3 pilose setae and 3 rod-like setae. One of them pilose and rod-like setae situated in the central region of the segment, while the two others of them situated on the distal side. The second protopodite segment is broad, rectangular in shape, attached to an exopodite plate and carries a long pilose seta, a short apical smooth seta and a row of fine short pseudochaetae. The exopodite plate is small and carries 3 setae on the distal margin; the anterior one of them is the longest and pilose in shape, followed by 2 considerably short setae.

The first endopodite segment (third segment) is elongated and bears an aesthetasc (y) organ, 7 setae, 8 short hairs and 2 groups of pseudochaetae. The aesthetasc (y) organ is segmented into three parts; the proximal part is smooth, while the two others are serrated. The setae arranged as follows: one pilose seta on the posterior side and 6 setae on the anterior side called swimming setae, 5 of the swimming setae are long feathered in shape exceeding the tips of the terminal claws, while the sixth seta is short and pilose in shape. In addition, there are eight short hairs on the antero-lateral margin of the segment. The first group of pseudochaetae is situated on the posterior side and consists of 6 rows of comb-like fine hairs, while the second group is situated on the posterior side and coated with fine hairs. It is likely to note that the median area of the segment lacks any fine hairs.

The second endopodite segment (fourth segment) is rectangular in shape and consists of 12 pilose

setae, 2 feathered swimming setae, 3 claws and 2 groups of pseudochaetae. The pilose setae are arranged as follow: 2 setae antero-medially, 4 setae postero-medially called (t) setae t4 is more posteriorly and short seta. 3 long setae on the anterior side called (z) setae and 2 terminal setae; the anterior one is transformed into sensory organ (y2) while the posterior one called (g). The feathered swimming setae situated on the proximal margin, in addition, there is a short, smooth seta on the antero-medially side. The first group of the pseudochaetae is situated on the posterior side and consists of 3 rows of comb-like fine hairs, while the second group is situated on the anterior side coated fine hairs, the anterior and posterior margin of half segment bears fine hairs. It is noted that the median area of the segment devoid any fine hairs. Three claws are terminal and toothed in shape, the most anterior one is the largest claw. The terminal segment is quadrate in shape and carries 2 toothed claws and 4 setae. The anterior claw is large while the posterior one is short claw.

### **3- Mandibula: (Pls 3A, E, F; 4A) (Fig. 1C- E)**

This appendage consists of 3 clear parts which are coxa (protopodite), branchial plate (exopodite) and mandibular palp (endopodite). The coxa is a robust part and divided into masticatory process and longest part. The masticatory process consists of 7 strong teeth with different sizes, which accompanied by 7 pairs of setae (one pair of them is bipectinate and the others are smooth). In addition, there is a pair of short, strong setae which is densely covered with small setules, beside the largest tooth of the masticatory process. The coxal longest part is slightly triangular in shape, covered with fine hairs of pseudochaetae and carries 5 weak teeth and six pairs of pilose setae. The first segment of the mandibular palp is actually the basis of the mandibula and carries a branchial plate. The branchial plate consists of two segments; the first segment is slightly quadrate in shape and carries a row of fine hairs of pseudochaetae. The second segment is trapezoidal in shape and carries 7 long pappose setae, 2 rows of fine pseudochaetae hairs and 3 rod-like processes.

The mandibular palp consists of 4 segments; the first segment is rectangular in shape and carries 4 setae on the posterior side (two plumose stout S1, S2; one short smooth alpha ( $\alpha$ ) seta and long smooth seta). The second segment is slightly rectangular in shape and bears 3 setae on the anterior side (two smooth and one pilose) and 4 long setae on the posterior side (three smooth and one beta ( $\beta$ ) plumose). The third segment is rectangular in shape and carries 9 pilose setae, one short plumose gamma ( $\gamma$ ) on the terminal margin and 4 rows of fine pseudochaetae hairs. The terminal segment is the smallest one and carries a central claw with a broad base and 4 smooth setae (2 short and 2 long).

### **4- Maxillula: (Pl. 4B) (Fig. 2A, B)**

This appendage consists of an exopodite, endopodite and 3 endites. The exopodite is a branchial plate carries 30 pappose setae and 6 reflexed setae.

The endopodite (maxillular palp) consists of 2 segments, the first segment is elongated in shape and carries 5 antero-distally pappose setae and one plumose medially seta. The second segment is rectangular in shape and carries 4 claws, 2 pilose setae covered with fine pseudochaetae hairs.

The anterior endite segment is the largest one and carries 7 pilose setae, one plumose seta and two strong claws. The pilose setae arranged as follow; 3 setae on the antero-lateral margin and four setae accompanied with the base of the strongest claws. The plumose seta located in postero-proximal region of the endite. Each strong claw has 11 teeth; five teeth on each lateral margin and one tooth is terminal in position. It is likely to note that, each claw based on a rectangular base. The mid endite segment is the smallest one and carries 8 claws. The posterior endite bears 12 claws and a pair of pilose setae.

#### **5- First thoracopod: (Fig. 2C)**

The first thoracopod consists of protopodite, an exopodite and an endopodite segments. The protopodite segment carries 4 plumose setae (a1, a2, b and d) on its proximal part, 11 setae (8 pappose and 3 pilose) on the distal margin, 5 different size pappose setae on the lateral margin and carries 3 rows of fine hairs pseudochaetae. The exopodite segment is a branchial plate and carries 5 pappose rays. The endopodite segment bears 3 different size plumose setae on the terminal margin and a row of fine hairs pseudochaetae on each lateral margin of the segment.

#### **6- Second thoracopod: (Pls 3D; 4C, D) (Fig. 2D)**

It consists of 5 segments; the first two segments are incompletely separated, forming basal segment; each one of them bears a single antero-distally seta (d1, d2). The third segment is elongated and carries one antero-distally seta (e) and 6 rows of fine pseudochaetae hairs. The anterior margin of the third segment covered with fine pseudochaetae hairs, while the posterior one has 2 tiny smooth setae. The fourth segment is rectangular in shape and carries 2 pilose setae (f, g), a smooth seta and 4 tiny setae on the anterior margin. Also, there are 3 tiny setae and a short smooth seta on the posterior margin, additional to 5 rows of fine pseudochaetae hairs. The terminal (fifth) segment is the smallest one carries two setae (h1 and h3) and one large claw h2 and one row of fine pseudochaetae hairs at the distal margin of the segment.

#### **7- Third thoracopod: (Fig. 2E)**

This appendage consists of 5 segments, (one protopodite and 4 endopodite). The protopodite segment is elongated and carries 2 anteriorly pilose setae (d1 and d2), one posterior seta (dp) and a row of fine pseudochaetae hairs on the terminal margin of the segment.

The first endopodite segment carries one antero-distally pilose seta (e) and a row of fine pseudochaetae hairs on the terminal margin of the segment. The second and third endopodite segments are partially fused and carry one antero-distally pilose seta (f and g)

on the 2 segments. Also, the third endopodite segment bears 3 fan-like setae, a chelate process and a row of pseudochaetae hairs on its terminal margin. The fourth endopodite segment is the shortest one and carries 2 setae (h1 and h3), pincer organ (h2) and a chelate process at the terminal margin of the segment.

**8- Uropodal rami (furca): (Pl. 4E, F) (Fig. 2F)**

The uropodal rami consist of 2 rod-shape structure (rami); each ramus carries 2 claws; (anterior Ga and posterior Gp), 2 setae; (one smooth anterior (Sa) and one pilose posterior Sp) and caudal seta on the basal part. Also, there are 2 rows of fine spines along of each ramus. The caudal ramus is attached to the body by furcal attachments.

**9- Rake-like organ: (Fig. 2G)**

Rake-like organ is stout, solid and short with seven teeth.

**Measurements of the female carapace:**

The right and left valves of the carapace are equal in size. In holotype, each valve measures about 1.77 mm in length, 1.49 mm in width and 1.14 mm in height. In paratypes, table (1) shows the measurements of the carapace.

**Table 1: Measurements (mm) of female *Cypris polygoniae*. N=12**

Characters	Carapace valves		
	Minimum (mm)	Maximum (mm)	Mean± SD
<b>Length</b>	1.14	1.71	1.51± 0.25
<b>Width</b>	0.85	1.49	1.25± 0.21
<b>Height</b>	0.71	1.23	1.02± 0.19

**Discussion**

According to the diagnostic characters extracted from the keys of [8], [11], [29], [1], [31] and [6], the systematic position of the present species as follows:

**Order: Podocopa**

Most individuals are freshwaters. The Carapace is ovoid, inflated-subtriangular, and oblong elongated, or compressed. The valves of the carapace are overlapping around free margins. The exopodite of the second antenna is either absent or present as rudimentary scale or simple with long seta and small with no more than two podomeres. The endopodite of the second antenna is large with up to four podomeres [8]; [31].

**Family: Cyprididae**

The carapace of individuals varies in size (from 0.3 to 7mm), shape and structure. The external surface of the carapace is smooth or ornamented to different degrees. The inner list of the valves and fused zone are broad or narrow. The selvage is peripheral or inwardly displaced. Marginal pore canals of the valves are variable; rare or numerous. Swimming setae on the second antenna are well developed. The terminal segment of the third thoracopod is transformed into pincer organ. Uropodal rami (furca) is rod-like or whip-shaped [1]; [6].

**Subfamily: Cypridinae Baird, 1845**

The carapace of individuals is large (1.5-3mm length), subovate to globular in dorsal view. The external surface of the valves is smooth or weakly sculptured. Selvage on the right valve or on both valves is inwardly displaced. The terminal segment of the third thoracopod is transformed into a pincer organ [1]; [6].

**Genus: *Cypris* of Muller, 1776**

The valves of the carapace are tumid (width greater than height) and smooth or weakly sculptured. The antero-ventral margin of the right valve has lip-like projection. The left valve has well-developed inner list anteriorly and overlapping the right valve posteriorly and venterally. The posterior margin of the valves is rounded. Anterior selvage of both valves is largely and displaced inwardly. The natatory setae of the second antenna are well-developed and reaching to or beyond the tips of the terminal claws. Furca is moderate or strongly developed and has asymmetrical rami [11]; [29]; [1]; [6].

The present species has the characteristic features of the order Podocopa where, individuals are freshwater, and Carapace is ovoid. The valves of the carapace are overlapping. The exopodite of the second antenna is present as a rudimentary scale with long seta, while the endopodite of the second antenna is large with four segments.

Also, the present species displays the characters of family Cyprididae, where the external surface of the carapace is smooth or sculptured in different regions. The inner list of the valves and fused zone are broad or narrow. The selvage is inwardly displaced. Marginal pore canals of the valves are numerous. Swimming setae on the second antenna are well developed. The terminal segment of the third thoracopod is transformed into pincer organ.

The present species displays the characters of subfamily Cypridinae, where the carapace of individuals is large (1.5-3mm length). The external surface of the valves is smooth and weakly sculptured different regions. Selvage on both valves is inwardly displaced. The terminal segment of the third thoracopod is transformed into pincer organ.

The present species has tumid carapace (width greater than height). The external surface of the valves is smooth and weakly ornamented in different regions. The antero-ventral margin of the right valve has lip-like projection. The left valve has well-developed inner list anteriorly and is overlapping, the right valve posteriorly and venterally. The posterior margin of the valves is rounded. Anterior selvage of both valves is largely and displaced inwardly. The natatory setae of the second antenna are well-developed and reaching to or beyond the tips of the terminal claws. Furca is strongly developed. These characters are in accordance with the genus *Cypris*.

**Diagnostic and specific characters of the present species:**

**1- Distribution:** Sohag, Egypt.

**2- Location:** wastewater of sewage station

**3- Specific characters:**



- 1- Carapace ornamentation is divided into three areas as follows:
  - A- Thimble-like depression (circular ornamentation) in antero-dorsal, mid dorsal and postero-dorsal areas.
  - B- Polygonal reticulation in anterior, antero-ventral, mid ventral, postero-ventral and posterior areas.
  - C- Smooth in the central area.
- 2- First antenna has:
  - A- 3 rows of fine pseudochaetae hairs on the first segment.
  - B- One spine on the third segment.
  - C-  $\gamma$  seta on the sixth segment.
- 3- Second antenna has:
  - A- Three rod-like process on the first segment.
  - B- One fine, smooth seta and one row of fine pseudochaetae hairs on the second segment.
  - C- Eight fine setae, six rows of fine pseudochaetae hairs and a group of fine pseudochaetae hairs on the third segment
  - D- Two swimming setae, one group of fine pseudochaetae hairs and three rows of fine pseudochaetae hairs.
- 4- Mandibula has:
  - A- Five weak teeth, six pairs of pilose setae, a group of fine pseudochaetae hairs, and four rows of fine pseudochaetae hairs on the coxa.
  - B- Three rod-like processes and three rows of fine pseudochaetae hairs on the branchial plate.
    - A- Four rows of fine pseudochaetae hairs on the third segment of the mandibular palp.
    - B- A pair of strong setae with small setules.
- 5- Maxillula has:
  - A- Two rows of fine pseudochaetae hairs on the second segment of maxillular palp.
  - B- Two claws with 11 teeth on the endite.
- 6- First thoracopod has:
  - A- Two fine setae and three of fine pseudochaetae hairs on protopodite.
  - B- Two rows of fine pseudochaetae hairs on endopodite.
- 7- Second thoracopod has:
  - A- Two fine setae, six rows of fine pseudochaetae hairs and a group of fine pseudochaetae hairs of the third segment.
  - B- One seta, one spine, seven fine setae and five rows of pseudochaetae on the fourth segment.
- 8- Third thoracopod has:

- A- One row of fine pseudochaetae hairs on the first and second segments.
- B- One row of fine pseudochaetae hairs and three fan-like setae on the fourth segment.
- C- One chelated process on the fifth segment.

9- Furca has two rows of fine spines on each Uropodal ramus

These combinations of specific characters easily distinguish the present new species from all other members of the genus *Cypris* described by [32], [8], [33], [11], [34], [18], [29], [1], [31], [35] and [6] (Table 2). The present species is recorded for the first time in wastewater of the sewage station at sohag governorate, Egypt.

**The nomenclature of the species:**

The name of the species is proposed in reference to polygonal reticulation of the carapace.

**Table 2:** Comparison of diagnostic and specific characters between the present species and other published species of genus *Cypris*

Characters	<i>Cypris polygoniae</i>	<i>C. pubera</i>	<i>C. floridensis</i>	<i>C. elburensis</i>	<i>C. protubera</i>

<b>Carapace</b>					
Shape :	Tumid	Oval	Tumid	Tumid	Tumid
Color :	Green	Green	Grayish white		
lip-like	Present	Present	Present	Present	Present
ornamentation site A-thimble-like depression	antero-dorsal, mid dorsal and postero-dorsal areas	All carapace surface	Absent	absent	Absent
B-polygonal Reticulation	anterior, antero-ventral, mid ventral, postero-ventral and posterior areas	Absent	Absent	Absent	Absent
C- smooth	central area	all carapace surface	Absent	Absent	All the carapace
the prominent protuberance	Present	Absent	Absent	Absent	Present
inner list	present in each valve	Running sub peripherally	Present	Present	Present
tubercles site	anterior and posterior areas	Absent	all carapace surface	Absent	Absent
Hairs setae	Present	Present	Present	Present	Present
Dorsal margin	Strong convex	Arched	rounded	Arched	Arched
Ventral margin	Straight with slightly concave	Slightly convex	Straight	Slightly convex	Straight
Hinge	Lophodont	Lophodont	Lophodont	Lophodont	Lophodont
denticles	Present in right valve	Present in left valve	Absent	Absent	Absent
<b>Appendages</b>					
<b>1-Frist antenna</b>					
Segment 1 Pilose setae	3 setae	3 setae	3 setae	3 setae	3 setae
Wouters organ	Present	absent	Absent	absent	absent

Fine hairs pseudochaetae	3 rows	Absent	Absent	absent	absent
Segment 2 Pilose setae	1 seta	1 seta	1 seta	1 setae	1 setae
Rome organ	Present	Present	Present	absent	absent
Segment 3 Pilose setae	2 setae	2 setae	2 setae	1 setae	1 setae
spine	1 spine	Absent	Absent	absent	absent
Segment 4 Feathered setae	3 setae	3 setae	3 setae	3 setae	3 setae
Pilose setae	1seta	1 seta	1 seta	1 setae	1 setae
Segment 5 Feathered setae	4 setae	4 setae	4 setae	4 setae	4 aetae
Segment 6 Feathered setae	4 setae	4 setae	4 setae	4 setae	4 setae
Sensory setae	1( $\alpha$ ) seta	1( $\alpha$ ) seta	1( $\alpha$ ) seta	absent	absent
Segment 7 Feathered setae	3 setae	3 setae	3 setae	3 setae	3 setae
Sensory organ	Present ( $y_a$ )	Present ( $y_a$ )	Present ( $y_a$ )	Present ( $y_a$ )	Present ( $y_a$ )
<b>2-Second antenna</b>					
segment 1 Pilose setae	3 setae	3 setae	3 setae	3 setae	3 setae
rod-like processes	3 processes	Absent	Absent	Absent	Absent
segment 2 Pilose setae	1 seta	1 seta	1 seta	absent	1 setae
Smooth setae	1 seta	Absent	Absent	2	2
fine hairs pseudochaetae	3 rows	Absent	Absent	absent	absent
segment 3 exopodite setae	3 setae	3 setae	3 setae	1 setae	1 setae
swimming setae	6 setae	6 setae	6 setae	5 setae	5 setae
pilose setae	1 setae	1 setae	1 setae	1 setae	1 setae
fine setae	8 setae	Absent	Absent	5 setae	8 setae
sensory organ	Present (y)	Present (y)	Present (y)	Present (y)	Present (y)
fine hairs	6 rows	Absent	Absent	3 group	absent

pseudochaetae					
segment 4 swimming setae	2 setae	Absent	Absent	absent	absent
Pilose setae	2, 4t, 3z setae	2, 4t, 3z setae	2, 4t, 3z setae	1, 2t, 2z setae	1, 4t, 3z setae
sensory organ	Present (y <sub>2</sub> )	Present (y <sub>2</sub> )	Present (y <sub>2</sub> )	absent	Present (y <sub>2</sub> )
claws	3claws G1,G2, G3	3claws G1,G2, G3	3claws G1,G2, G3	3claws G1,G2, G3	3claws G1,G2, G3
fine hairs pseudochaetae	3 rows & two groups	Absent	Absent	absent	absent
segment 5 sensory organ	2(g,y <sub>3</sub> )	2(g,y <sub>3</sub> )	2(g,y <sub>3</sub> )	absent	2 (g,y <sub>3</sub> )
claws	2claws GM, Gm	2claws GM, Gm	2claws GM, Gm	2claws GM,Gm	2claws GM,Gm
<b>3- mandibula</b>					
A-Coxa 1- masticatory process Strong teeth	7teeth	7teeth	7teeth	7 teeth	7 teeth
Strong setae with setules	2 teeth	1	1	Absent	Absent
Smooth setae	6 pairs	Absent	Absent	Absent	2
Bipectinate setae	One pair	Absent	Absent	One pair	One pair
2-Coxal longest part Teeth	5 teeth	Absent	Absent	Absent	Absent
Pilose Setae	6 pairs	Absent	Absent	Absent	Absent
Fine hairs pseudochaetae	Covered all the part	Absent	Absent	Absent	Absent
B-branchial plate Pappose setae	7 setae	7 setae	7 setae	7 setae	7 setae
Fine hairs pseudochaetae	3 rows	Absent	Absent	Absent	Absent
Rod-like processes	3 processes	Absent	Absent	Absent	Absent

C-mandibular palp					
Segment 1	2 (S1,S2)	2 (S1,S2)	2 (S1,S2)	2 (S1,S2)	2 (S1,S2)
Plumose setae				setae	setae
Smooth setae	1, $\alpha$ seta	1, $\alpha$ seta	1, $\alpha$ seta	1, $\alpha$ setae	1, $\alpha$ setae
Fine hairs pseudochaetae	absent	1 row	1 row	Absent	Absent
Segment 2					
Pilose setae	1 seta	1 seta	1 seta	1 setae	1 setae
Plumose setae	1( $\beta$ ) seta	1( $\beta$ ) seta	1( $\beta$ ) seta	1( $\beta$ ) setae	1( $\beta$ ) setae
Smooth setae	5 setae	2 setae	2 setae	5 setae	5 setae
Segment 3					
Pilose setae	9 setae	8 setae	8 setae	8 setae	8 setae
Plumose setae	1( $\gamma$ ) seta	1( $\gamma$ ) seta	1( $\gamma$ ) seta	Absent	Absent
Fine hairs pseudochaetae	4 rows	Absent	Absent	Absent	Absent
Segment 4					
Smooth setae	4 setae	4 setae	4 setae	4 setae	4 setae
Claws	1 claw	1 claw	1 claw	Absent	Absent
<b>4- Maxillula</b>					
A-branchial plate					
Pappose setae	30 setae	20 setae	20 setae	18 setae	18 setae
Reflexed setae	6 setae	4 setae	4 setae	4 setae	4 setae
B- maxillular palp					
Segment 1	5 setae	5 setae	5 setae	5 setae	5 setae
Pappose setae					
Plumose setae	1 seta	1 seta	Absent	1 setae	1 setae
Segment 2					
Pilose setae	2 setae	2 setae	1 seta	2 setae	2 setae
Claws	4 claws	4 claws	2 claws	4 claws	4 claws
Fine hairs pseudochaetae	2 rows	Absent	Absent	Absent	Absent
Anterior endite					
Pilose setae	7 setae	7 setae	7 setae	5 setae	5 setae
Plumose setae	1 seta	2 setae	2 setae	1 setae	1 setae
Strongest claws	2 claws	2 claws	2 claws	Absent	Absent
Teeth of	11 of each	8, 11	8.11	8,5 teeth	8,5 teeth

Strongest claws.	process	processes	processes		
Rectangular base of the claws	Present	Absent	Absent	Absent	Absent
Mid endite Claws	8 claws	8 claws	8 claws	8 claws	8 claws
Posterior endite Claws	12 claws	13 claws	13 claws	8 claws	8 claws
Pilose	2 setae	Absent	Absent	Absent	Absent
<b>5-First thoracopod</b>					
A-protopodite Plumose setae	4 setae	4 setae	2 setae	4 setae	2 setae
Pappose setae	13 setae	13 setae	9 setae	13 setae	9 setae
Pilose setae	3 setae	Absent	Absent	Absent	Absent
Fine hairs pseudochaetae	3 rows	Absent	Absent	Absent	Absent
B-branchial plate Pappose setae	5 setae	5 setae	5 setae	5 setae	5 setae
C- endopodite Plumose setae	3 setae	3 setae	3 setae	3 setae	3 setae
fine hairs pseudochaetae	One row	Absent	Absent	Absent	1 setae
<b>6-Second thoracopod</b>					
Segment 1 Pilose setae	1(d1) seta	1(d1) seta	1(d1) seta	1(d1) setae	1(d1) setae
Segment 2 Pilose setae	1(d2) seta	1(d2) seta	1(d2) seta	1(d2) setae	1(d2) setae
Segment 3 Pilose setae	1(e) seta	1(e) seta	1(e) seta	1(e) setae	1(e) setae
Tiny smooth setae	2 setae	2 setae	2 setae	Absent	Absent
Fine hairs pseudochaetae	6 rows & one group	3 rows	3 rows	9 rows	Absent
Segment 4 Pilose setae	2(f,g) setae	2(f,g) setae	2(f,g) setae	2(f,g) setae	1(f) setae
Smooth setae	2 setae	Absent	Absent	Absent	Absent
Tiny smooth	7 setae	Absent	Absent	Absent	Absent

setae					
Fine hairs pseudochaetae	5 rows	5 rows	5 rows	8 rows	Absent
Segment 5 Setae	2 (h1,h3) setae	2 (h1,h3) setae	2 (h1,h3) setae	2 (h1,h3) setae	2 (h1,h3) setae
Claws	1 claw (h2)	1 claw (h2)	1 claw (h2)	1 claw (h2)	1 claw (h2)
Fine hairs pseudochaetae	1 row	1 row	1 row	1 row	1 row
<b>7-Third thoracopod</b>					
Segment 1 Pilose setae	3(d1,d2,dp) setae	3(d1,d2,dp) setae	3(d1,d2,dp) setae	3(d1,d2,dp) setae	3(d1,d2,dp) setae
Fine hairs pseudochaetae	1 row	Absent	Absent	Absent	Absent
Segment 2 Pilose setae	1(e) seta	1(e) seta	1(e) seta	1(e) setae	1(e) setae
Fine hairs pseudochaetae	1 row	Absent	Absent	Absent	Absent
Segment 3 Pilose setae	1(f)	1(f)	1(f)	1(f) seta	1(f) seta
Segment 4 Pilose setae	1(g) setae	1(g) seta	1(g) seta	1(g) seta	1(g) seta
Fan-like setae	3 setae	1seta	Absent	Absent	Absent
Chelated process	1 process	1process	Absent	Absent	Absent
Fine hairs pseudochaetae	1 row	Absent	Absent	Absent	Absent
Segment 5 Pilose setae	2 (h1,h3) setae	2 (h1,h3) setae	2 (h1,h3) setae	1(h3) setae	1(h3) setae
Chelated process	1 process	Absent	Absent	Absent	Absent
Pincer organ	Present	Present	Present	Present	Present
<b>8-Uropodal rami</b>					
Each ramus Setae					



Smooth	1 seta (Sa)	1 seta (Sa)	1 seta (Sa)	1 setae (Sa)	1 setae (Sa)
Pilose	1 seta (Sp)	1 seta (Sp)	1 seta (Sp)	1 setae (Sp)	1 setae (Sp)
Claws	2 claws (Ga,Gp)	2 claws (Ga,Gp)	2 claws (Ga,Gp)	2 claws (Ga,Gp)	2 claws (Ga,Gp)
Fine hairs pseudochaetae	2 rows	Absent	Absent	Absent	Absent
rake organ Teeth	7 teeth	7 teeth	7 teeth	8 teeth	8 teeth
<b>Authors</b>	Present work	Eagar (1994) Gauthier (1928) Martens (1990)	Ferguson (1964)	Martens (1990)	Vector & Fernando (1976)
<b>Distribution</b>	Sohag, Egypt	New Zealand Africa	America	Africa	India

**Table Contu**

Characters	<i>C. decaryi</i>	<i>C. ciliata</i>	<i>C. subglobosa</i>	<i>C. nova</i>
<b>Carapace</b>				
Shape :	Tumid	Eplitical	Tumid	Reniform
Color :		Brown		Green
lip-like	Present	Present	Present	Present
ornamentation site A-thimble-like depression	Absent	Absent	all surface carapace	Absent
B-polygonal Reticulation	At all the carapace	Absent	Absent	Absent
C- smooth	Absent	all carapace surface	Absent	All carapaces with little punctuation.
the prominent protuberance	Absent	Absent	Absent	Absent
inner list	Present	Present	Present	Radially straight
tubercles site	Absent	Absent	Absent	Absent
Hairs setae	Present	Present	Present	Present
Dorsal margin	Arched	Arched	Convex straight	Convex

Ventral margin	Slightly convex	Straight	Straight	Slightly convex
Hinge	Lophodont	Adont	Lophodont	Lophodont
Denticles	Absent	Present in right valve.	Absent	Absent
<b>Appendages</b>				
<b>1-Frist antenna</b>				
Segment 1 Pilose setae	3 setae	2 setae	3 setae	3 setae
Wouters organ	absent	absent	absent	Present
Fine hairs pseudochaetae	Absent	Absent	absent	Absent
Segment 2 Pilose setae	1 setae	1 setae	1 setae	1 setae
Rome organ	Absent	Absent	absent	Absent
Segment 3 Pilose setae	1setae	1 setae	1 setae	2 setae
spine	Absent	Absent	absent	Absent
Segment 4 Feathered setae	3 setae	3 setae	3 setae	2 setae
Pilose setae	1 setae	1 setae	1 setae	1 setae
Segment 5 Feathered setae	4 setae	4 setae	4 setae	4 setae
Segment 6 Feathered setae	4 setae	6 setae	4 setae	4 setae
Sensory setae	Absent	Absent	absent	Absent
Segment 7 Feathered setae	3 setae	Absent	3 setae	3 setae
Sensory organ	Present (y <sub>a</sub> )	Present (y <sub>a</sub> )	Present (y <sub>a</sub> )	absent
<b>2-Second antenna</b>				
segment 1 Pilose setae	3 setae	1 setae	3 setae	3 setae
rod-like processes	Absent	Absent	Absent	3 processes
segment 2 Pilose setae	Absent	1setae	1 setae	1 setae
Smooth setae	2 setae	Absent	Absent	1 setae
fine hairs pseudochaetae	Absent	Absent	Absent	3rows

segment 3 exopodite setae	1 setae	2 setae	3 setae	3 setae
swimming setae	5	6	5 setae	6
pilose setae	1 setae	2 setae	1 setae	1 setae
fine setae	5	Absent	8 setae	8
sensory organ	Present (y)	Present (y)	Present (y)	Present (y)
fine hairs pseudochaetae	3 group	Absent	absent	6rows
segment 4 swimming setae	Absent	Absent	absent	1 setae
Pilose setae	1, 2t, 2z setae	1, 3t, 2z setae	2, 4t, 3z setae	1, 3t, 2z setae
sensory organ	Absent	Present (y <sub>2</sub> )	Present (y <sub>2</sub> )	Present (y <sub>2</sub> )
claws	3 claws G1,G2,G3	3claws G1,G2,G3	3claws G1,G2,G3	3claws G1,G2,G3
fine hairs pseudochaetae	Absent	Absent	absent	Absent
segment 5 sensory organ	Absent	1(y <sub>3</sub> )	2 (g,y <sub>3</sub> )	2(g,y <sub>3</sub> )
claws	2claws GM,Gm	2claws GM,Gm	2claws GM,Gm	2claws GM,Gm
<b>3- mandibula</b>				
A-Coxa 1- masticatory process Strong teeth	7 teeth	7 teeth	7 teeth	6 teeth
Strong setae with setules	Absent	Absent	Absent	Absent
Smooth setae	Absent	Absent	2	Absent
Bipectinate setae	One pair	Absent	One pair	Absent
2-Coxa longest part Teeth	Absent	Absent	Absent	Absent
Pilose Setae	Absent	Absent	Absent	Absent
Fine hairs pseudochaetae	Absent	Absent	Absent	Absent
B-branchial plate Pappose setae	Absent	Absent	Absent	Absent

Fine hairs pseudochaetae	Absent	Absent	Absent	Absent
Rod-like processes	Absent	Absent	Absent	Absent
C-mandibular palp Segment 1 Plumose setae	2 (S1,S2) setae	2(S1,S2) setae	2 (S1,S2) setae	2 (S1,S2) setae
Smooth setae	1, $\alpha$ setae	1, $\alpha$ setae	1, $\alpha$ setae	1, $\alpha$ setae
Fine hairs pseudochaetae	Absent	Absent	Absent	Absent
Segment 2 Pilose setae	1 setae	1 setae	1 setae	1 setae
Plumose setae	1( $\beta$ ) setae	1( $\beta$ ) setae	1( $\beta$ ) setae	1( $\beta$ ) setae
Smooth setae	5 setae	3 setae	5 setae	5 setae
Segment 3 Pilose setae	8 setae	8 setae	8 setae	8 setae
Plumose setae	Absent	1( $\gamma$ )	Absent	1( $\gamma$ )
Fine hairs pseudochaetae	Absent	2rows	Absent	Absent
Segment 4 Smooth setae	4 setae	4 setae	4 setae	4 setae
Claws	Absent	1 claws	Absent	Absent
<b>4- Maxillula</b>				
A-branchial plate Pappose setae	18 setae	18 setae	18 setae	18 setae
Reflexed setae	4 setae	4 setae	4 setae	4 setae
B- maxillular palp Segment 1 Pappose setae	5 setae	5 setae	5 setae	5 setae
Plumose setae	1 setae	1 setae	1 setae	1 setae
Segment 2 Pilose setae	2 setae	1 setae	2 setae	2 setae
Claws	4 claws	4 claws	4 claws	4 claws
Fine hairs pseudochaetae	Absent	Absent	Absent	2 rows
Anterior endite				

Pilose setae	5 setae	7 setae	5 setae	7 setae
Plumose setae	1 setae	3 setae	1 setae	1 setae
Strong claws	Absent	3 claws	Absent	2 claws
Teeth of strong claws	8,5	Absent	8,5 teeth	Absent
Rectangular base of stronge claws	Absent	Absent	Absent	Absent
Mid endite Claws	8 claws	8 claws	8 claws	8 claws
Posterior endite Claws	8 claws	8 claws	8 claws	8 claws
Pilose setae	Absent	Absent	Absent	2 setae
<b>5-First thoracopod</b>				
A-protopodite Plumose setae	4 setae	4 setae	2 setae	1 setae
Pappose setae	10 setae	10 setae	10 setae	11 setae
Pilose setae	Absent	Absent	Absent	Absent
Fine hairs pseudochaetae	Absent	Absent	Absent	Absent
B-branchial plate Pappose setae	6 setae	6 setae	5 setae	6 setae
C- endopodite Plumose setae	3 setae	3 setae	3 setae	3 setae
fine hairs pseudochaetae	Absent	Absent	Absent	One row
<b>6-Second thoracopod</b>				
Segment 1 Pilose setae	1(d1) setae	Absent	1(d1) setae	1(d1) setae
Segment 2 Pilose setae	1(d2) setae	1(d2) setae	1(d2) setae	1(d2) setae
Segment 3 Pilose setae	1(e) setae	1(e) setae	1(e) setae	1(e) setae
Tiny smooth setae	3 setae	8 setae	6	2 setae
Fine hairs pseudochaetae	1row & one group	1row & one group	Absent	1row
Segment 4				

Pilose setae	1(g) setae	1(g) setae	2(f,g) setae	2(f,g) setae
Smooth setae	Absent	Absent	Absent	Absent
Tiny smooth setae	8 setae	1 setae	5 setae	2 setae
Fine hairs pseudochaetae	5 rows	Absent	Absent	Absent
Segment 5 Setae	2(h1,h3) setae	2(h1,h3) setae	2 (h1,h3) setae	2(h1,h3) setae
Claws	One claw (h2)	One claw (h2)	1 claw (h2)	One claw (h2)
Fine hairs pseudochaetae	One row	Absent	1 row	Absent
<b>7-Third thoracopod</b>				
Segment 1 Pilose setae	3(d1,d2,dp) setae	1 (dp) setae	3(d1,d2,dp) setae	3(d1,d2,dp) setae
Fine hairs pseudochaetae	Absent	Absent	Absent	Absent
Segment 2 Pilose setae	1(e) setae	1(e) setae	1(e) setae	1(e) setae
Fine hairs pseudochaetae	Absent	Absent	Absent	Absent
Segment 3 Pilose	1(f) setae	1(f) setae	1(f) seta	1(f) setae
Segment 4 Pilose setae	1(g) setae	Absent	Absent	1(g) setae
Fan-like	Absent	Absent	Absent	Absent
Bowl-shape	Absent	Absent	Absent	Absent
Fine hairs pseudochaetae	Absent	Absent	Absent	Absent
Segment 5 Pilose setae	1(h3) setae	1(h1) setae	1(h3) setae	Absent
Bowl-shape	Absent	Absent	Absent	1
Pincer organ	Present	Present	Present	Present
<b>8-Uropodal rami</b>				
Each ramus Setae	1 setae (Sa)	1 setae (Sa)		1 setae (Sa)

Smooth			1 setae (Sa)	
Pilose	1 setae (Sp)	1 setae (Sp)	1 setae (Sp)	1 setae (Sp)
Claws	2 claws (Ga,Gp)	2 claws (Ga,Gp)	2 claws (Ga,Gp)	2 claws (Ga,Gp)
Fine hairs pseudochaetae	Absent	Absent	Absent	Absent
rake organ Teeth	8 teeth	8 teeth	8 teeth	8 teeth
<b>Authors</b>	Gautheir 1933 Vector &Fernando (1976) Martens (1990)	Thomson 1879 Eagar( 1994)	Sowerby(1840) Vector &Fernando (1976) Harshey &Thilak (2011) Martens (1990)	Baird (1843) Eagar( 1994)
<b>Distribution</b>	India , Africa	New Zealand	India, Africa	New Zealand

**Abbreviations:**

A1: first antenna.	FHP: Fine Hairs Pseudochaetae	MXP: Maxillular palp	RS: Rod-like Setae.
A2: second antenna.	FS: fan-like setae	NS: natatory setae	SC: strong claw
CP: Chelated Process.	IL: Inner lamella	NS: natatory setae	SL: selvage
DN: Denticles.	LP: Lip-like shape	OL: outer lamella	TB: Tubercles
EA: anterior endite.	MD: Mandibula.	PO: pincer organ	WO: Wouters Organ
EM: mid endite.	MDS: Mandibular scars.	PS: pappose setae	
EP: posterior endite.	MSC: Muscular scars	RO: Rome Organ	

**Explanation of the plates**

**Plate 1:** Scanning Electron Micrographs of carapace for female *Cypris polygoniae* showing:-

- A. Lophodont hinge in dorsal view margin.
- B. Overlapping of the two valves in ventral view.
- C. Enlarged part of (pl. 1B) showing overlapping of two valves and marginal hairs.
- D. External surface of right valve
- E. External surface of left valve.
- F. Thimble-like ornamentation in right valve.
- G. Tubercles in right valve.
- H. Surface hairs and polygonal ornamentation of right valve.

**Plate 2:** Scanning Electron Micrographs of carapace for female *Cypris polygoniae* showing:

- A. Smooth area in the right valve.
- B. Internal view of right valve.
- C. Internal view of left valve.
- D. Lip-like projection and selvage of right valve.
- E. Muscular and mandibular scars in internal view of left valve.
- F. Strong posterior denticles in right valve.

**Plate 3:** Scanning Electron Micrographs of appendages for female *Cypris polygoniae* showing:

- A- First antenna, second antenna and mandibula in the internal view.
- B- Terminal claws of second antenna and the groups of fine pseudochaetae hairs on second thoracopod.



C- Enlarged part of (Pl. 3B) showing the terminal claws of second antenna.

D- Enlarged part of (Pl. 3B) showing FHP in second thoracopod.

E- Masticatory process (coxal teeth) of mandibula.

F- Plumose seta in mandibular palp of mandibula.

**Plate 4:** Scanning Electron Micrographs of appendages for female *cypris polygoniae* showing:

A- ( $\gamma$ ) Seta (plumose seta) in mandibular palp of mandibula.

B- Maxillular palp and three endites of maxillula.

C- Second thoracopod.

D- Enlarged part from (pl. 4C) showing terminal claw (h2) of second thoracopod.

E- Uropodal rami (furca).

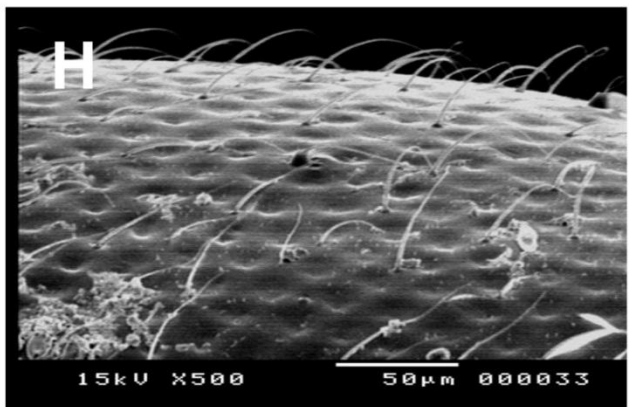
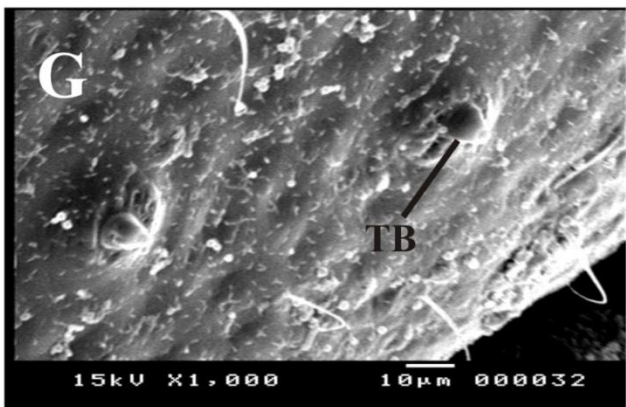
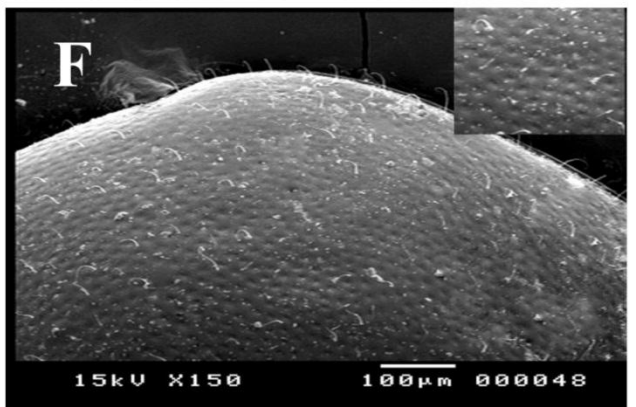
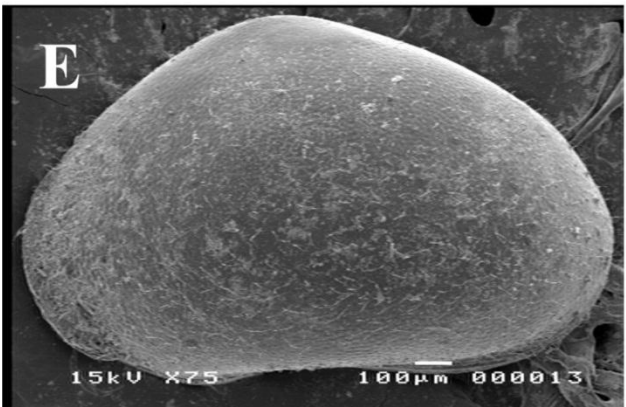
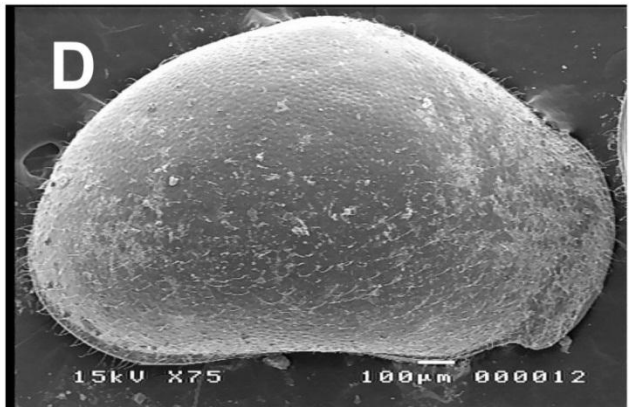
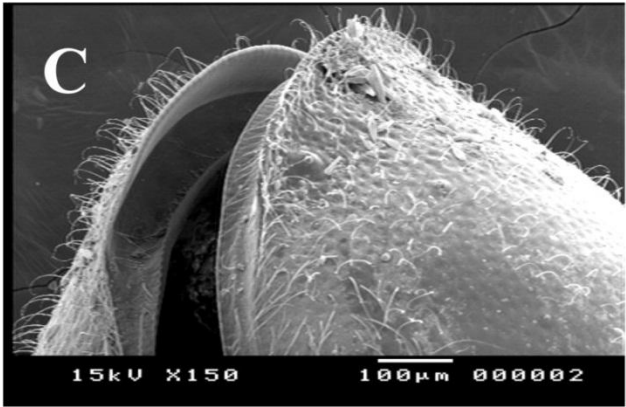
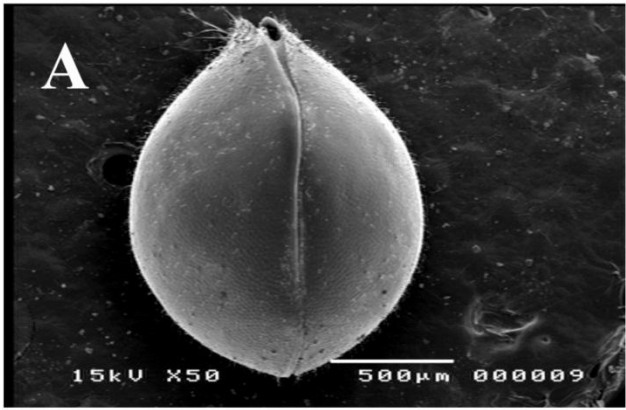
F- Enlarged from (pl. 4E) showing two rows of fine spines.

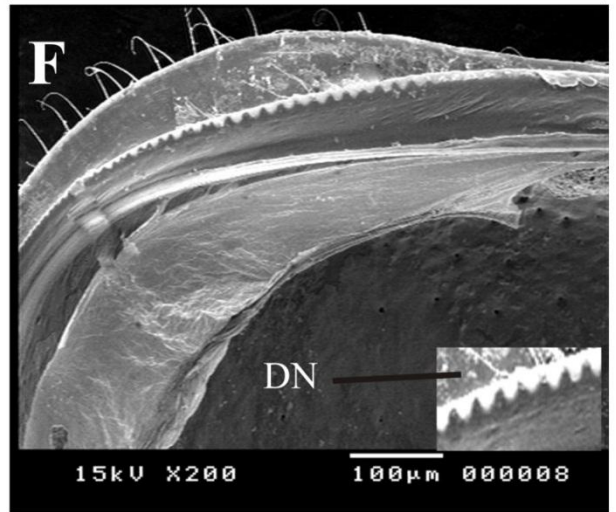
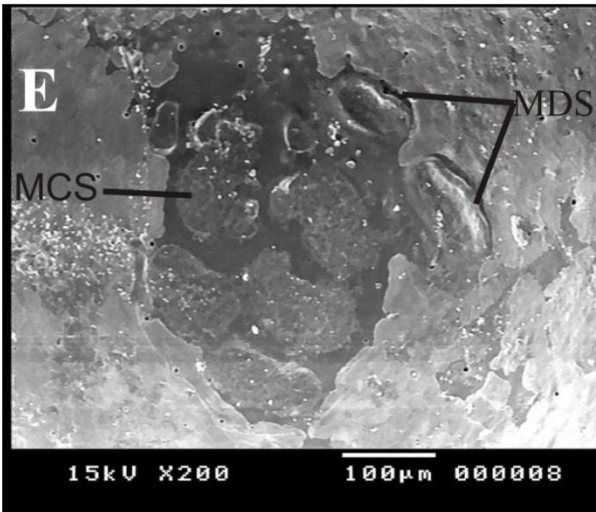
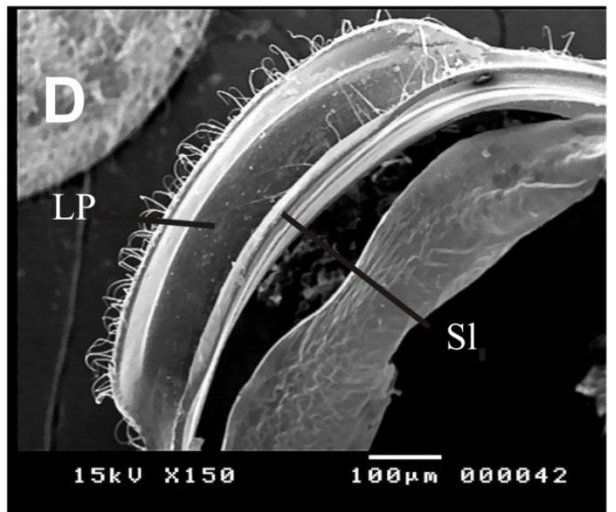
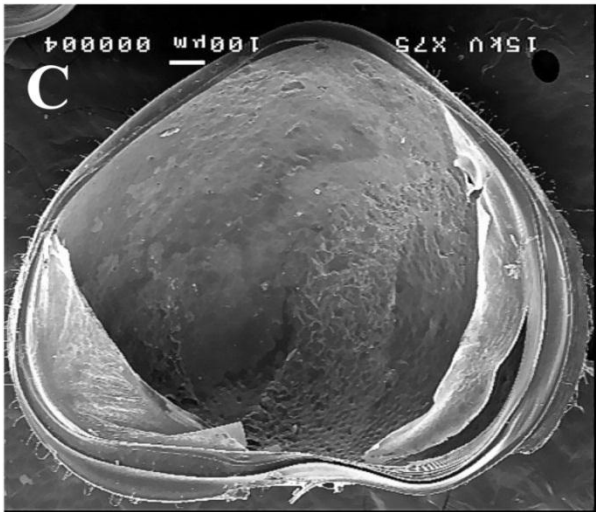
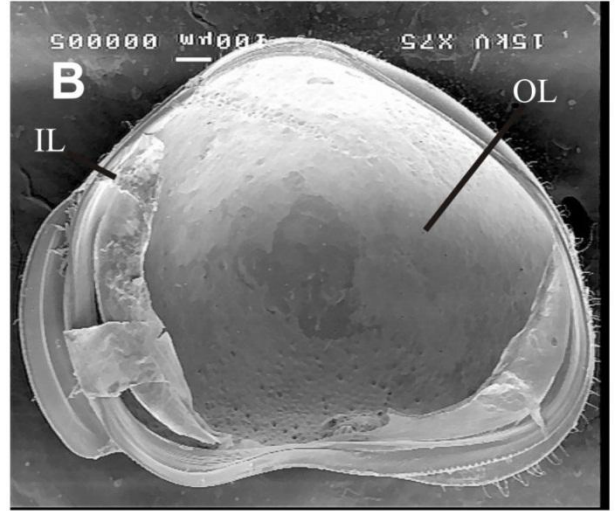
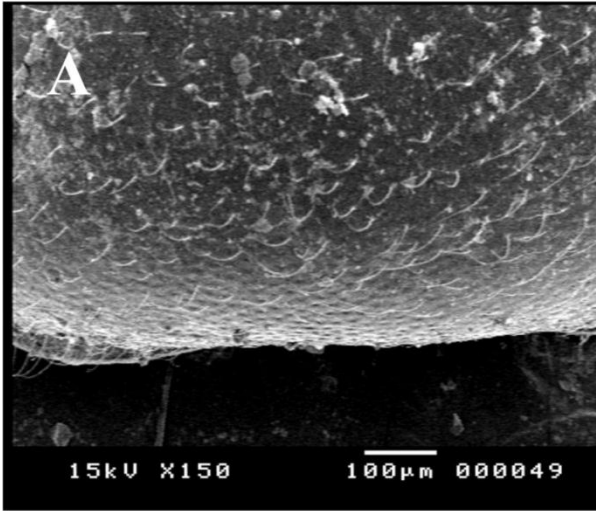
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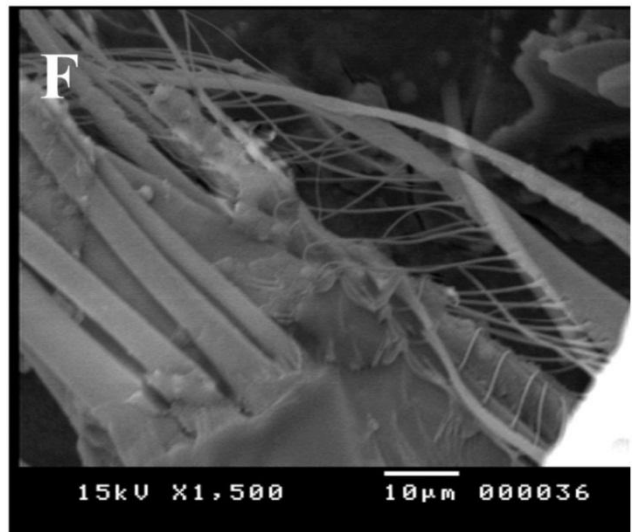
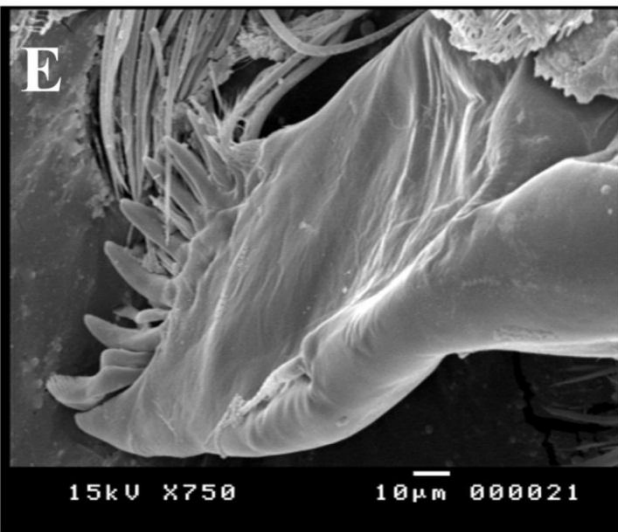
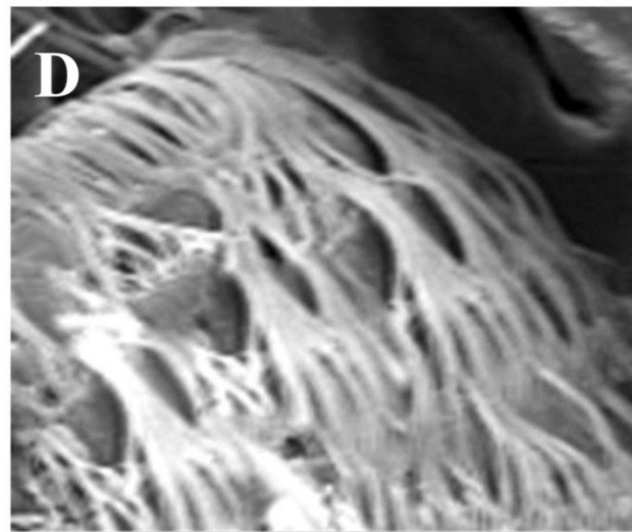
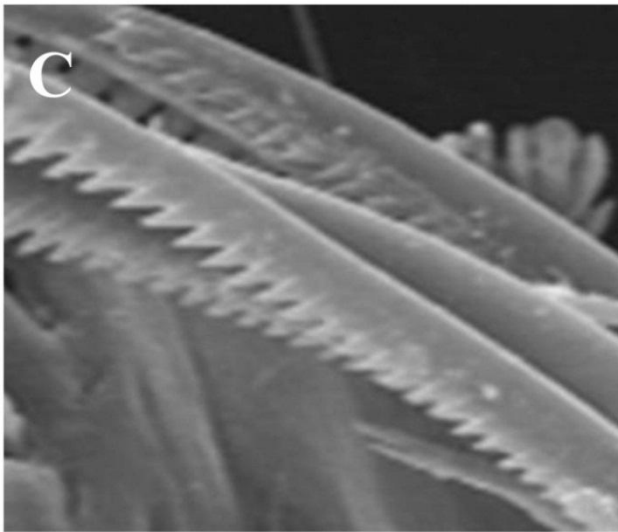
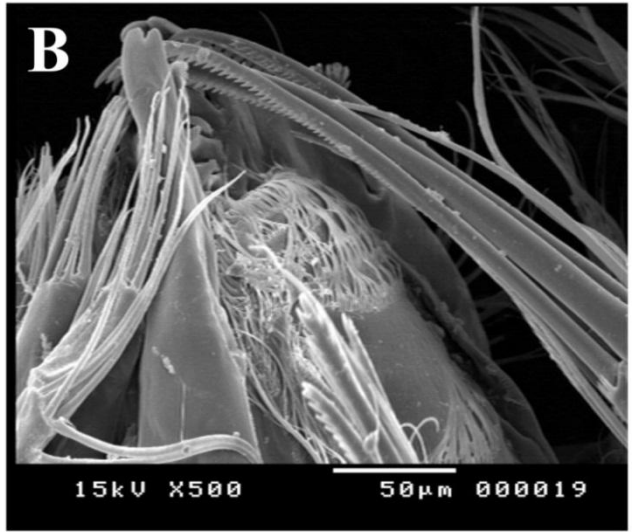
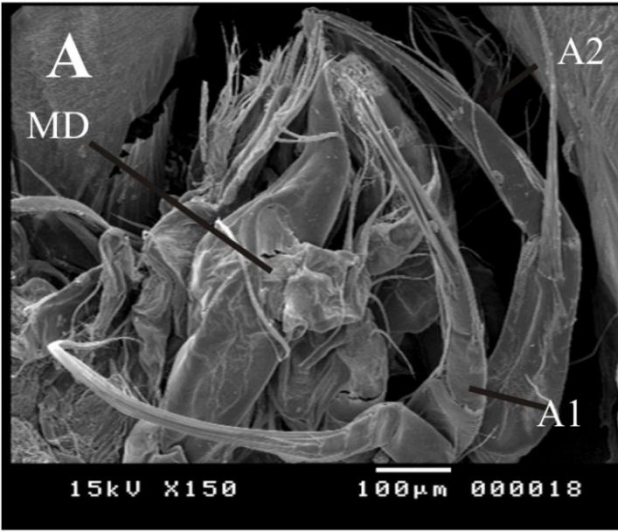
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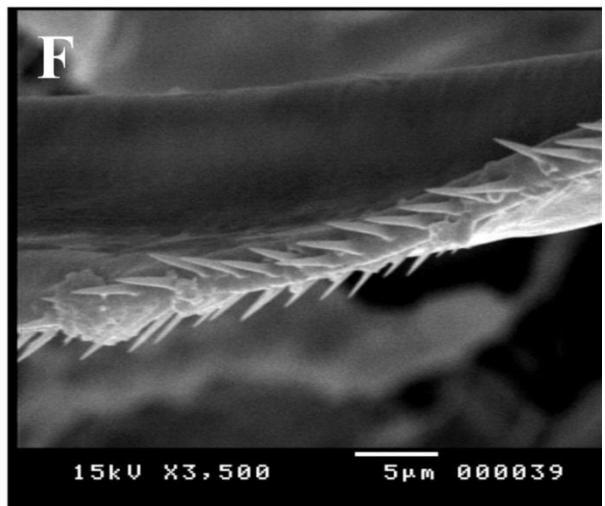
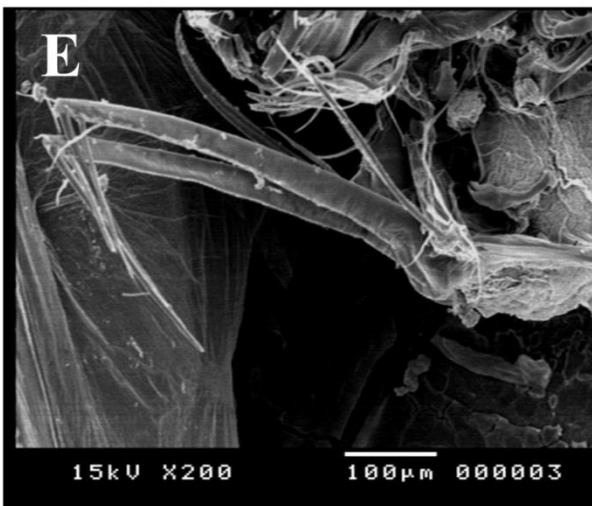
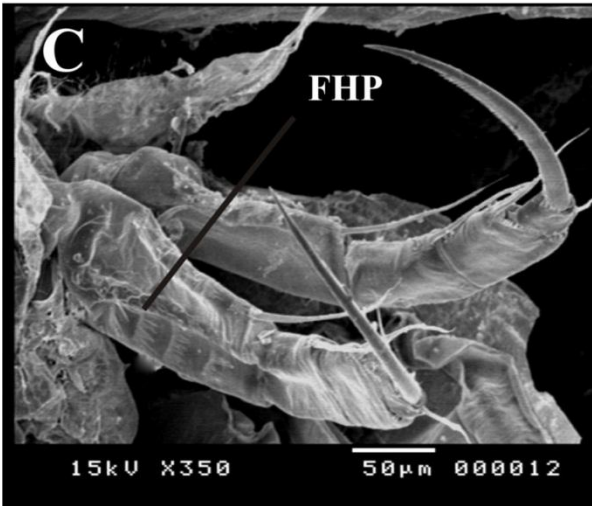
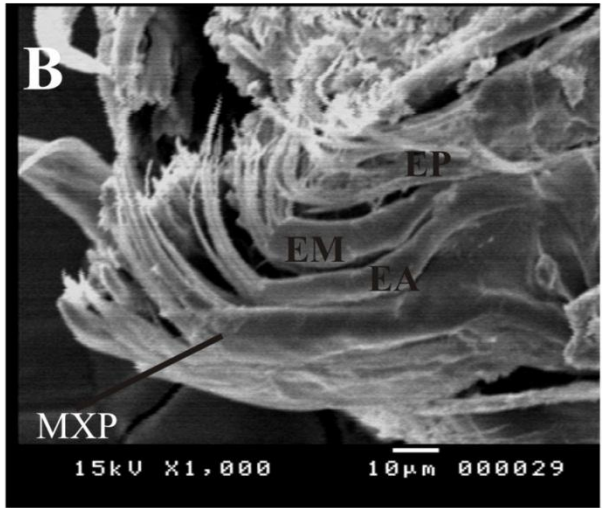
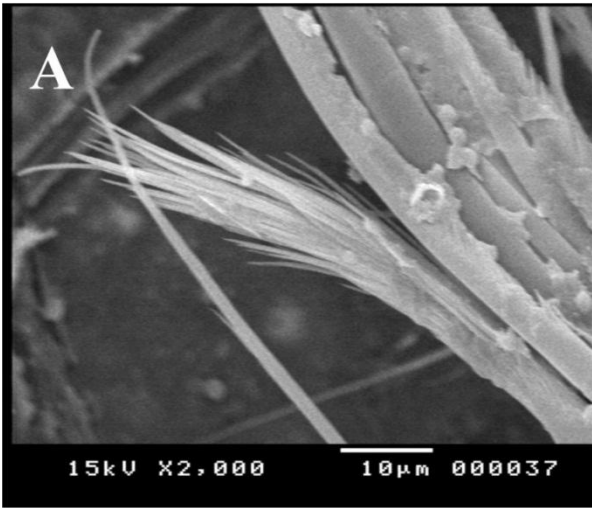
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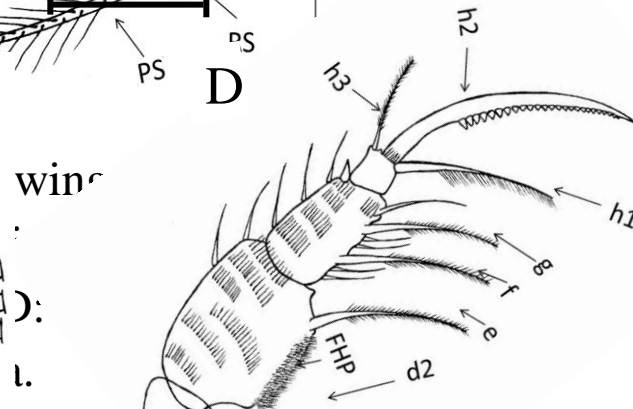
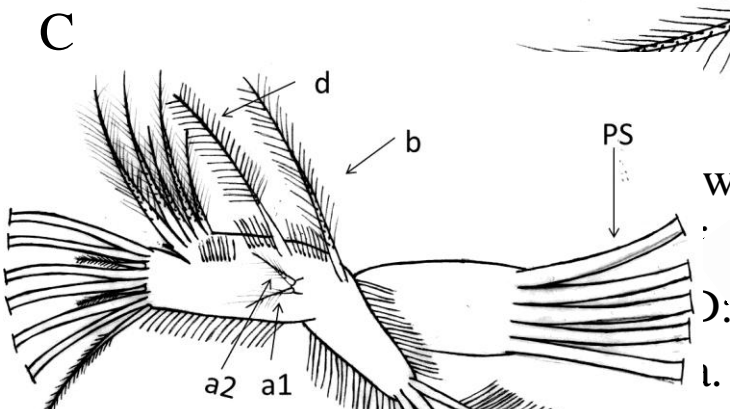
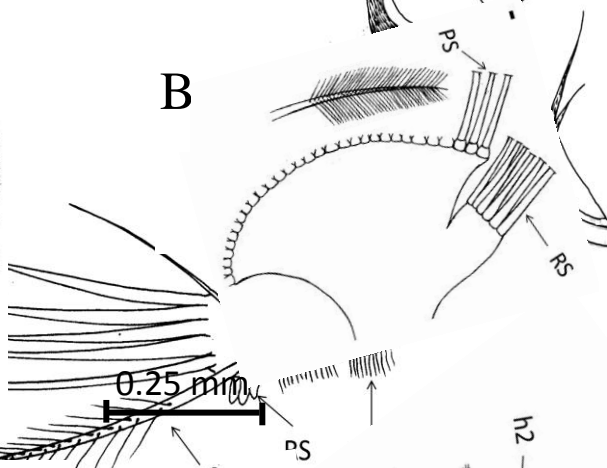
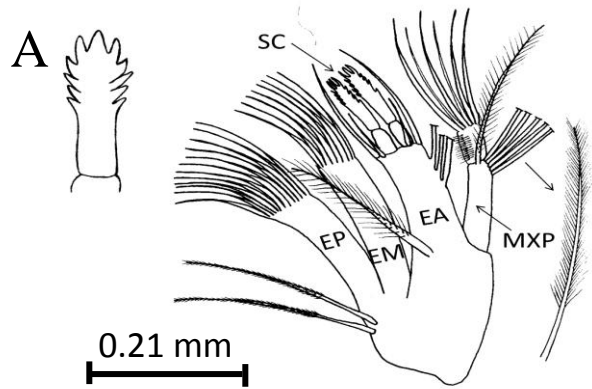
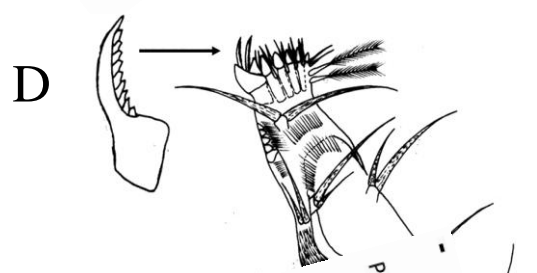
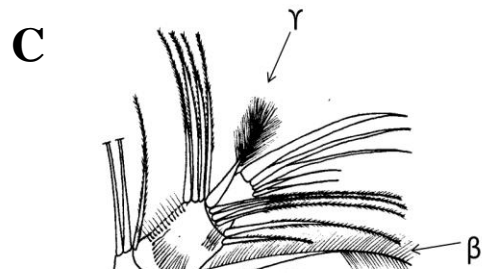
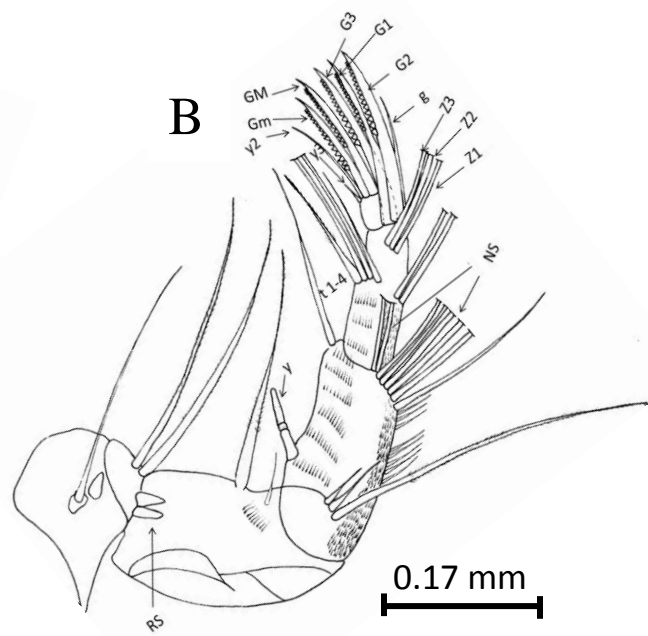
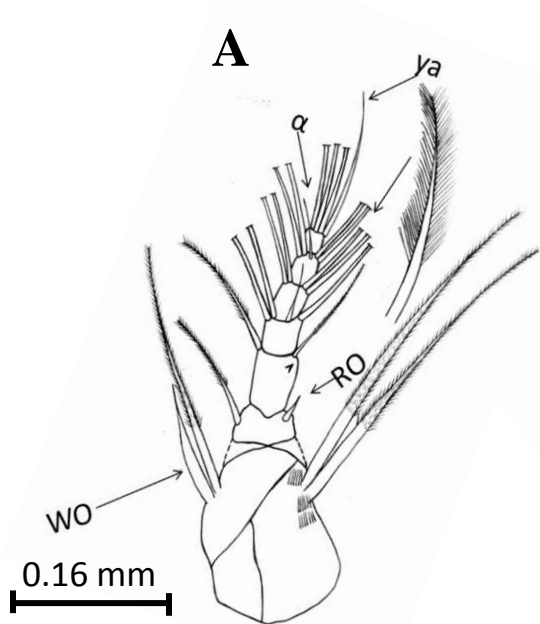






# Plate 4







سيبرس بوليغونى نوع جديد من القشريات الصدفية (أوستراكودا: سيبريديدى) جمع من مياه  
الصرف الصحى سوهاج- مصر

سمية أحمد رمضان- ابتسام أحمد يوسف- امال مختار محمد  
قسم علم الحيوان- كلية العلوم- جامعة سوهاج

تناولت هذه الدراسة وصف وتعريف نوع جديد من القشريات الصدفية التى تعيش فى المياه العذبة سيبرس بوليغونى و الذى تم تجميعه من مياه الصرف الصحى المعالجة من محطة الصرف بمنطقة الكولا بسوهاج، مصر العليا. تعتبر زخرفة الصدفة من الصفات التى تحدد النوع حيث تنقسم هذه الزخرفة الى ثلاث مناطق: (حفر تشبه قمع الخياط ، شبكة متعددة الأضلاع، منطقة ملساء). كما أن قرن الاستشعار الأول يحمل ثلاثة صفوف من الشعيرات الشوكية الكاذبة الرقيقة على العقلة الأولى ، شوكية على العقلة الثالثة و شعيرة تسمى ألفا على العقلة السادسة. أما قرن الاستشعار الثانى فيحمل ثلاث زوائد تشبه القضبان و شعيرتان للعموم و صفوف من الشعيرات الشوكية الكاذبة الرقيقة. للحي يحتوى على عدد من الأسنان الضعيفة، نتوءات تشبه القضبان، صفوف من الشعيرات الشوكية الكاذبة الرقيقة وزوج من الشعيرات القوية. الفك يحتوى على صفيين من الشعيرات الشوكية الكاذبة الرقيقة على العقلة الثانية من الملماس الفكى ومخلبان بهما ١١ سنه على الإنديت. الأرجل الصدرية الثلاثة تحمل عدة صفوف من الشعيرات الشوكية الكاذبة الرقيقة. بالإضافة إلى ما سبق يوجد شعيرات تشبه المروحة على العقلة الرابعة و نتوء على شكل كلاب على العقلة الخامسة من الزائدة الصدرية الثالثة. الشعبتان الذيليتان تحتويان على صفيين من الأشواك الرقيقة على كل شعبة.