

Taxonomy and description of the female *Candonocypris novaezelandiae* (Baird, 1843) (Crustacea: Ostracoda) from River Nile, Sohag Governorate, Egypt.

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ABSTRACT

The female of *Candonocypris novaezelandiae* (Baird, 1843) found in River Nile of Egypt. It is the first certain record of this species in North Africa. This species belongs to Podocopida-Cypridacea-Cyprididae-Herpetocyprinae and is characterized by prominent selvage, smooth carapace and furca with unequal claws. Scanning electron micrographs of the valves and soft parts are provided and discussion of their characteristics with those presented by former authors.

Keywords: Ostracoda, Taxonomy, *Candonocypris*, River Nile in Egypt.

INTRODUCTION

Ostracods are small (Typical length is 1mm) bivalved Crustacea which abound in all kinds of marine and non-marine even terrestrial environments (McKenzie, 1986). Living Ostracoda are generally divided into two subclasses; Myodocopa and Podocopa. The first subclass are marine but the latter have both marine and non-marine groups. Within the Podocopa, the order Podocopida has five suborders of which the Cypridocopina have the most non-marine species (Horne *et al.*, 2002). The family Cyprididae within this group contains up to 80% of all non-marine species (Martens, 1998).

Candonocypris novaezelandiae (Baird, 1843) is a freshwater species commonly found in farm dams, decaying vegetation and eutrophic waters (De Deckker, 1982). It was described in South Africa by Sars (1924), in Australia by De Deckker (1981b) and in South America by Martens (1989). Also, it has been recovered as fossil from pyramid by Hornibrook (1955). The presence of *Candonocypris novaezelandiae* or any *Candonocypris* species in any kind of water indicate that decaying vegetation was present at the bottom of water (De Deckker, 1982).

In Egypt, the knowledge of taxonomy and ecology of freshwater ostracods is very poor, although they play an important role in ecosystem. Klintz (1907) reported *Cypris sculpta* from the River Nile and Fangary (2003) described some ostracod species from Qena Governorate.

So, this paper presents data on freshwater ostracod species (*Candonocypris novaezelandiae*) which is the first certain record in North Africa according the Grant Museum of Zoology, University College London and University of Michigan Museum of Zoology. Also, this study presents data for use in future ecological, biological and paleontological studies, where ostracod species are important in oil and gas exploration (Athersush *et al.*, 1989).

MATERIALS AND METHODS

Samples were collected from the River Nile about 6Km North of Sohag Governorate. This site is rich in water plant especially *Eichhornia crassipes*. Roots of the aquatic plants collected and were shaken in buckets containing 10% formalin and the content filtered through a 50µm mesh hand nylon net. In laboratory ostracods were separated and stored in 70% ethanol, after that ostracods were dissected under a binocular stereomicroscope with aid of two fine needles and mounted in Hoyer's media. Drawing of appendages were done with Olympus microscope with camera Lucida. We used scanning electron microscope to study the surface structure of carapace from external and internal views. Identification of species was carried out by helping of Prof. Koen Martens in Royal Belgium Institute of Natural science, Freshwater Biology.

RESULTS AND DISCUSSION

Taxonomic description

Class: Ostracoda Latreille, 1806

Subclass: Podocopa Müller, 1894

Order: Podocopida Sars, 1866

Family: Cyprididae Baird, 1845

Subfamily: Herpetocyprididae Kaufmann, 1900

Genus: *Candonocypris* Sars, 1896

Candonocypris novaezelandiae (Baird, 1843)

(Pls. 1,2 and Figs. 1-3)

Measurements of carapace (in µm, n=15)

	Length	Height
Right valve	1550 - 1630µm	700 - 750µm
Left valve	1490 - 1540µm	680 - 700µm

Note: Right valve taller than left valve.

Description

Carapace:

Externally, carapace are large, elongate bean-shaped and smooth (Pl, 1A). Anterior and posterior margins are evenly rounded (Pl, 1A, B, C). Ventral margin slightly concave (Pl, 1C), while the dorsal one arched and the greatest height situated at mid-length (Pl, 1B). Anterior end is narrower than the posterior one, as well as right valve overlap the left valve at both ends, especially at the anterior (Pl, 1A, B, C). Carapace is semi-transparent containing a moderate number of normal pore canals with long sensillae (Pl, 1D).

Internally: In the right valve (Pl, 1E); selvage is broad, well developed, peripheral and prominent especially at postero-ventral margin (Pl, 2A) which is met by a depression in the left valve (Pl. 2F). While in the left valve (Pl, 2B) selvage is peripheral, less thickness and less prominent. On the other hand, the right valve containing vestibule with a number of radial pore canals (Pl, 1F), while in the left valve vestibule disappeared. Inner lamella of the right valve is broader than that of the left valve (Pl, 1F, 2B).

First antenna (Fig. 1A):

It consists of seven segments; the first one is wide and have three setae two of them are pilose. Second segment is short bearing a ventro-distal pilose seta. Third and fourth segments with two and four smooth setae, respectively. Fifth segment bearing a dorso-distal smooth seta. Sixth and seventh segments have four smooth setae at each one of them.

Second antenna (Fig. 1B):

It consists of protopodite, exopodite and endopodite. Protopodite is wide and long bearing three smooth setae one of them is long. Exopodite consists of cup-shaped plate with three unequal setae. Endopodite composed three articulated segments; the first segment is the longest one with two segmented Y-aesthetasc (sensory club), a pilose ventro-distal strong seta and six distal pilose setae. Second segment of endopodite have two pilose dorso-median setae, four medio-ventral T-setae (T₁-T₄), three sub apical smooth Z-setae (Z₁-Z₃) reaching to the tip of terminal claws, three distal uniserrated G-claws (G₁-G₃) and aesthetasc Y₂. The terminal segment of endopodite is the narrowest one with two claws G_M and G_m, smooth g seta, short Y₃ seta and a pilose seta.

Mandible (Fig. 2A):

It consists of coxa and mandibular palp; coxa consists of two segments. First segment of coxa with a pilose dorso-distal seta, while the second one bearing eight claws in two rows as well as, four setae. Mandibular palp consists of four segments; first segment is wide bearing a dorso-median fan-like structure of six plumose rays, four ventro-distal setae two of them are status strong setae (S₁, S₂), long smooth seta and alpha (α) seta. Second segment of mandibular palp have six smooth setae and a pilose beta (β) seta. Third segment with five median smooth setae and four distal setae one of them is gamma (γ) unihirsute peg-like structure seta. The terminal segment of mandibular palp have three claws and three pilose setae.

Maxillule:

It consists of respiratory plate (Fig. 2B), maxillary palp and three endites (Fig. 3A). Respiratory plate is wide, flattened and bearing twenty nine plumose rays. Maxillary palp composed of two segments; first segment have six long setae, while the second one have four terminal claws intercalated with two smooth setae. First endite with three claws, two of them are plumose and four smooth setae. Second endite have a smooth claw and eight setae one of them is pilose. Third endite with six claws, a long pilose ventro-distal seta and two pilose ventro-median setae.

Maxilla (First thoracic leg) (Fig. 3B):

It composed of epipodite with three pilose setae, endopodite bearing a strong claw and four pilose setae, while exopodite bearing two plumose claw and seven setae.

Walking leg (Second thoracic leg) (Fig. 3C):

It consists of five segments; first and second segments have two dorso-median setae and a long plumose seta, respectively. While, third and fourth segments with one and two ventro-distal pilose setae, respectively. In addition to, fifth segment is the shortest one with a hirsute long claw and two pilose setae.

Cleaning leg (Third thoracic leg T3) (Fig. 3D):

It consists of three segments; first segment have three hirsute setae, while second segment is the longest one with a long pilose seta. Third segment bearing two dorso-median pilose setae, two unequal distal smooth setae and two short dentate claws.

Furca (Fig. 3E):

It composed of long curved stem with two terminal setae and two unequal uniserrated claws.

Genus *Candonocypris* belongs to Subfamily Herpetocypridinae and have the following characteristics; smooth elongated carapace, broad inner lamellae anteriorly, selvage raised posteroventrally in the right valve, two segmented sensory seta on the second segment of first antenna and cleaning leg have two setae at mid-length on the last segment (Sars, 1894). All the above mentioned characteristics already present in the present studied species *Candonocypris novaezelandiae*, so this species belongs to genus *Candonocypris*. This finding of *Candonocypris novaezelandiae* is the first in any Egyptian freshwater and in North Africa. This species is synonymous with *Candonocypris candonioides*. As well as, in many collection taken in waters, morphs representing both *Candonocypris candonioides* and *Candonocypris assimilis* as illustrated by Sars (1894), who suggested that they represent the same species.

The present species is closely related to *Candonocypris novaezelandiae*, which was described by Okubo, 1975 from Japan but is much taller and has relatively higher valves. Additionally, it is closely related to *Candonocypris novaezelandiae*, which were described by De Deckker (1981 and 1982) from Australia and Tasmania, respectively and Martens (1989) from South America but is much smaller and has relatively narrower valves. In the present study we discussed characteristics of the present studied species with those presented by former authors in the following table.

Table 1: A comparison of diagnostic and specific characters between the present species and the other published species of the genus *Candonocypris*.

Characters	<i>C.novaezelandiae</i> (studies species)	<i>C. novaezelandiae</i> (DeDeckker,1981)	<i>C. novaezelandiae</i> (Okubo,1975)	<i>C. incosta</i> (DeDeckker,1981)
Carapace Dorsal margin Ventral margin Selvage Vestibule	Slightly arched Slightly concave Prominent Present	Moderate arched Moderate concave Prominent Present	Slightly arched Slightly concave Prominent Present	Moderate arched Moderate concave Less prominent Absent
First antenna Pilose setae Smooth setae	Three setae Fifteen setae	Three setae Fifteen setae	Three setae Fifteen setae	Four setae Fourteen setae
Second antenna Protopodite Exopodite Endopodite First segment Second segment Third segment	With three setae With three setae Composed of three segments With eight setae With ten setae and three claws Have two claws and three setae	With three setae With three setae Composed of three segments with eight setae with ten setae and three claws Have two claws and three setae	With three setae With three setae Composed of three segments With eight setae with ten setae and three claws Have two claws and three setae	With two setae With three setae Composed of three segments With eight setae With nine setae and three claws Have two claws and three setae
Mandible coxa Mandibular palp Fan First segment Second segment Third segment Fourth segment	With eight claws and five setae With six rays Have three claws and one seta Have six claws and one seta Have nine setae and minute setae Have three claws and three setae	With eight claws and five setae Have three claws and one seta Have six claws only Have nine setae Have three claws and three setae	With eight claws and five setae With six rays Have three claws and one seta Have six claws and one seta Have nine setae Have three claws and three setae	With six claws and five setae Have three claws only Have six claws Have nine setae Have three claws and two setae
Maxillule Respiratory plate	With 29 plumose rays
Maxilla Epipodite Endopodite Exopodite	With three setae With one claw and four setae With two claws and seven setae	With three setae With one claw and four setae With two claws and seven setae	With three setae With one claw and four setae With two claws and seven setae	With two setae With seven setae With two setae
Walking leg First segment Second segment Third segment Fourth segment Fifth segment	With two setae With one seta With one seta With two seta With one claw and two setae	With two setae With one seta With one seta With two setae With one claw and two setae	With two setae With one seta With one seta With two setae With one claw and two setae	With three setae With two setae With one seta With one seta With one seta With one claw and two setae
Cleaning leg First segment Second segment Third segment	With three setae With one seta With four setae	With three setae With one seta With four setae	With three setae With one seta With four setae	With three setae With one seta With four setae
Furca	With three unequal claws and one seta	With three unequal claws and one seta	With three unequal claws and one seta	With two unequal claws and two seta

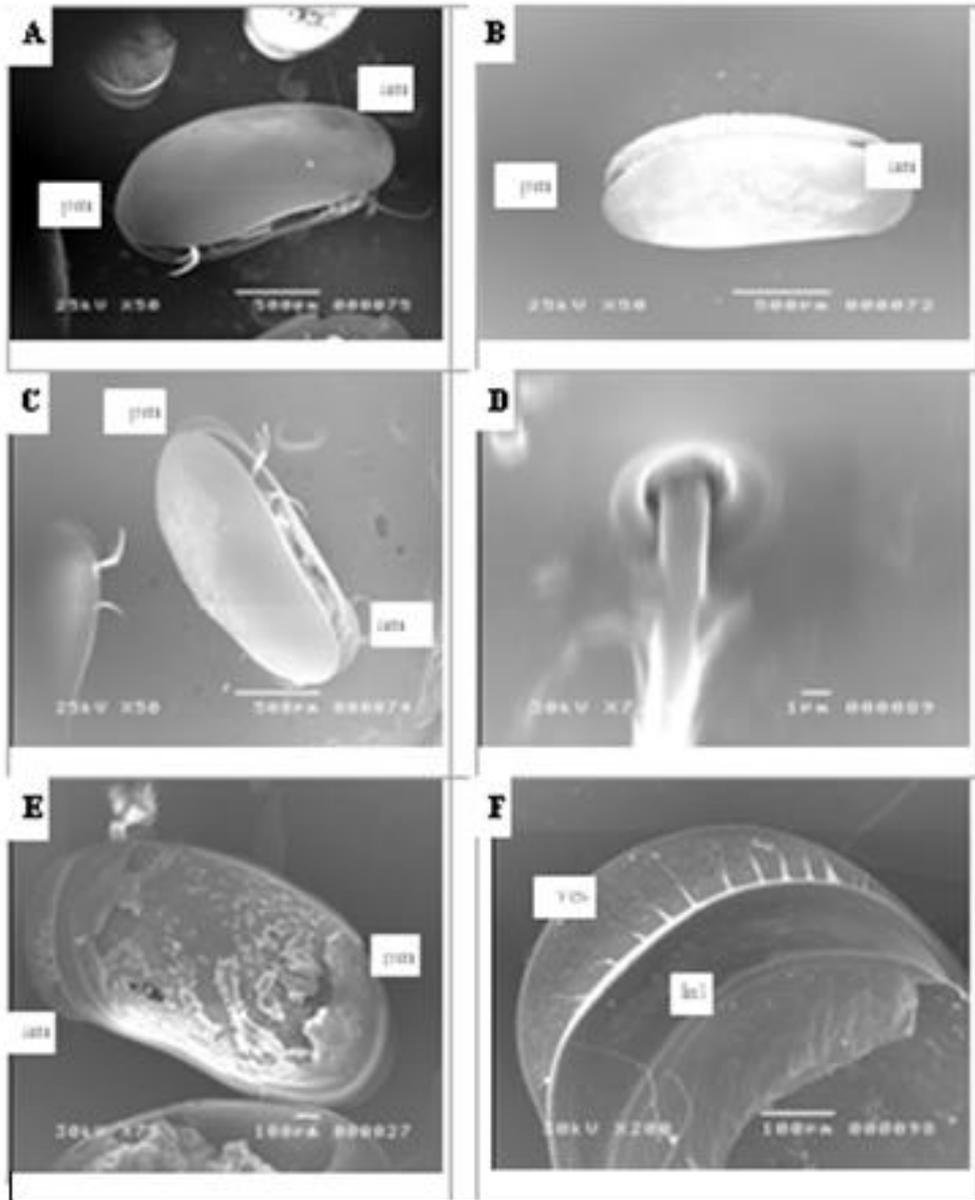


Plate 1: Scanning electron micrographs of female carapace of *Candonocypris novaezelandiae* showing: A- External view of carapace B- Dorsal margin of carapace C- Ventral margin of carapace D- Pore canal with sensilla E- Internal view of right valve F- Enlarged part of anterior margin of E showing inner lamella and vestibule.

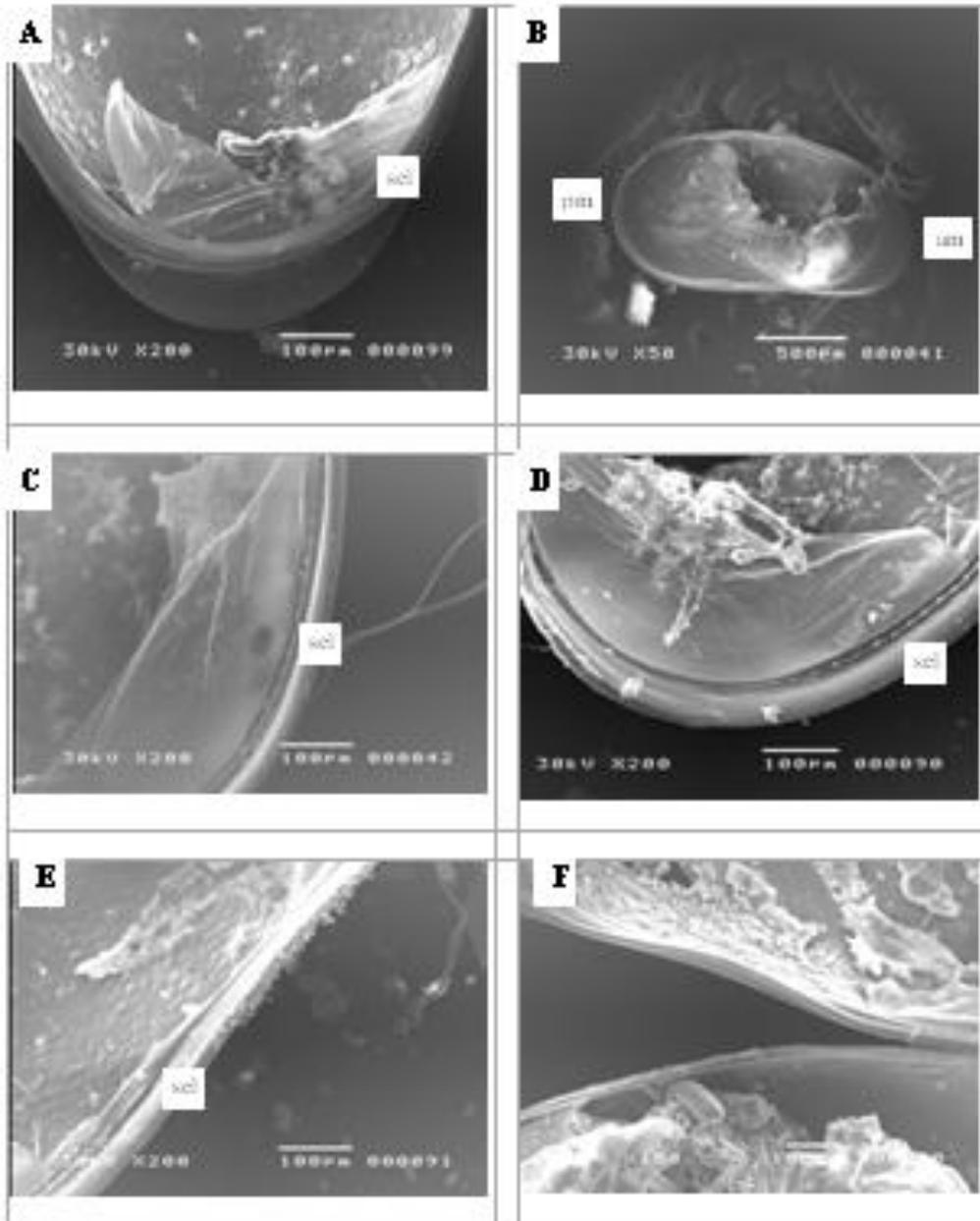


Plate2: Scanning electron micrographs of female carapace of *Candonocypris novaeseelandiae* showing: A- Enlarged part of posterior margin of Pl. 1E showing selvage B- Internal view of left valve C- Enlarged part of posterior margin of B showing selvage D- Enlarged part of postero-ventral margin of B showing selvage E- Enlarged part of ventral margin of B showing selvage F- Ventral margins of opened carapace.

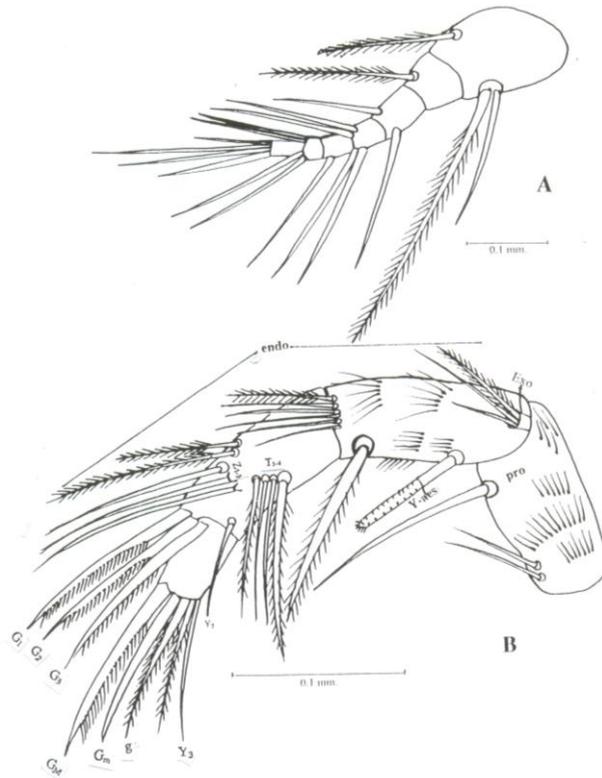


Fig. 1: Camera lucida drawing of *Candonocypris novaezelandiae* showing:
 A: First antenna B. Second antenna

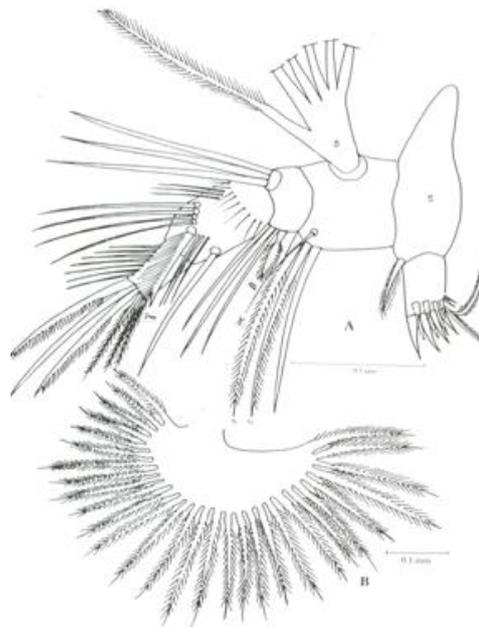


Fig. 2: Camera lucida drawing of *Candonocypris novaezelandiae* showing:
 A: Mandible B. Respiratory plate.

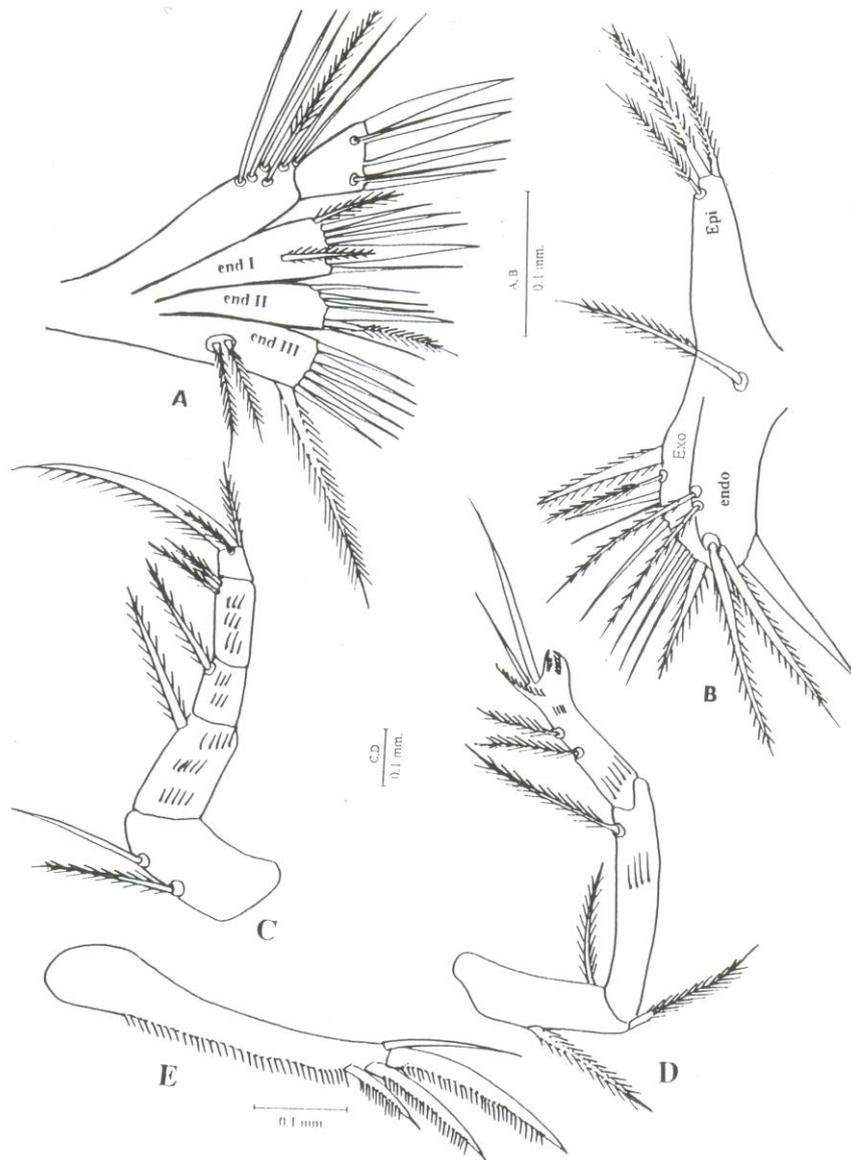


Fig. 3: Camera lucida drawing of *Candonocypris novaezealandiae* showing:
 A. Maxillary palp B: Maxilla C: Walking leg D: Cleaning leg F:

Abbreviation used in text and figures

am = Anterior margin	endo = Endopodite	pro = Protopodite
end I = Endite I	epi = Epipodite	sel = Selvage
end II = Endite II	exo = Exopodite	ves = Vestibule
end III = Endite III	pm = posterior margin	

Chaetotaxy of the limbs follows the model proposed by Broodbakker and Danielopol (1982).

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ARABIC SUMMARY

تصنيف ووصف لأنثى كندونوسيبيرس نوفياليزيلاندى (قشريات : قشريات صدفية) من نهر النيل, محافظة سوهاج, مصر.

ابتسام أحمد يوسف

قسم علم الحيوان – كلية العلوم – جامعة سوهاج

تناولت هذه الدراسة تصنيف ووصف لنوع واحد فقط من القشريات الصدفية (كندونوسيبيرس نوفياليزيلاندى) والذي يتبع رتبة بودوكوبيدا وعائلة سيبريديدى وقد تم تجميع هذا النوع من نهر النيل بمحافظة سوهاج- مصر. و هذا النوع من القشريات الصدفية يسجل للمرة الأولى في المياه العذبة المصرية وكذلك في شمال أفريقيا. ويتميز هذا النوع باحتوائه على إطار خارجي بارز وواضح بالإضافة إلي وجود درقة ملساء ووجود فوركا بها مخالب غير متساوية. ولقد تم استخدام الميكروسكوب الإلكتروني الماسح في وصف وتعريف هذا النوع وتم كذلك مقارنة الصفات الخاصة به بالأنواع الأخرى داخل نفس الجنس.