

**A new records *Mesocyclops pehpeiensis* Hu, 1943
(Copepoda: Cyclopoida) from AL-Najaf AL-Ashraf
Governorate /Iraq.**

**تسجيل جديد للنوع *Mesocyclops pehpeiensis* Hu, 1943
من محافظة النجف الاشرف / العراق (Copepoda/Cyclopoida)**

Hanan Zwair Mukhlif Hussain

University of Karbala/ College of Education for pure sciences /Department of
Biology

الكلمات المفتاحية Key words

Copepoda ,Cyclopoida , " *Mesocyclops pehpeiensis* " new records ,Iraq

Abstract

The present study introduced a new records species. *Mesocyclops pehpeiensis* Hu, 1943. This species is firstly recorded to the Iraqi fauna .Samples of the study were collected from Al-Kufa river at Al-Abasiyah district Al-Najaf AL-Ashraf governorate / Iraq .The external morphological characters of both female and males were studied with the fact that the males were mostly rare in the sampling sites. Many important taxonomic characters were including the body form and its appendages such as the number of segments of the antennule in the male and female .

الخلاصة

تناول البحث تسجيل جديد للنوع *Mesocyclops pehpeiensis* Hu ،1943 ، من نهر الكوفة/ محافظة النجف الاشرف/ العباسية , تم وصف المظهر الخارجي للأنثى وكذلك المظهر الخارجي للذكر الذي يعد وصفه وتسجيله نادراً في الدراسات التصنيفية . تم تشخيص ووصف النوع اعتماداً على الصفات المظهرية للشكل الخارجي للجسم والواحق , وقد اعتمدت بعض الصفات المهمة للتشخيص منها الطول الكلي للجسم والشكل , وعدد قطع اللامس الاول للأنثى والذكر.

Introduction

Species of the order Cyclopoida were firstly recorded since the 18th century. They usually live in freshwater and marine water at the surfaces , underground waters ,springs and caves, and parasitic on some invertebrates and fishes [1].

Cyclopidae is the largest Family of the Order Cyclopoida and it is an important group characterized by high of diversity on the bases of their occurrence in all ecological aquatic systems and they include approximately 800 species belonging to 59 genera.(2)(3)(4)

Members of the Order cyclopoida are important component the food chain of the ecological aquatic system [5], they regarded as important source of food to larva and juveniles of fishes[2],[6],[7].

Individuals of *mesocyclops pehpeiensis* are characterized by complex taxonomic history because their close relation to their relative species [8], though[9] formulate a revised description of *mesocyclops pehpeiensis* and placed it a distinct constant taxonomic characters in compare with other related species of the genus.

In tropical regions, species of *Mesocyclops* and *Thermocyclops* are mostly abundant in distribution [10] while individuals of *Mesocyclops pehpeiensis* are widely distributed especially in India, China, Sri Lanka ,and Japan.[11]

Methods and materials

Samples of the present study were collected from Al-Abasiyah district in Al-Najaf Al-Ashraf governorate in 30.9.2015 at 11am by using zooplankton net, with a mesh-size 335mm. Four females and 2 males were collected and placed in glass vial and preserved with 80% ethanol and 20% glycerol. Lactic acid was used for fixation with a few drops of red rose Bengal stain for clearance. For dissection process ,a stereo microscope was used and suitable dissecting needles and pins for separation of the appendages. All isolated body parts and their appendages were drawn with the aid of Camera Lucida. Procedure [1] [12] [13] [14]

Results and discussion

Systematics

Phylum :Arthropoda Latreille, 1829

Class: Crustacea Brünnich, 1772

Subclass :Copepoda H. Milne-Edwards, 1840

Order :Cyclopoida Burmeister, 1934

Family :Cyclopidae G. O. Sars, 1913

Subfamily :Cyclopinae G. O. Sars, 1913

Genus: *Mesocyclops* Sars,1914

Species: *Mesocyclops pehpeiensis* Hu, 1943

Description

Body, Adult female (Fig.1A B) Relatively large; overall length from the anterior end of the cephalothorax region to the posterior region of the Furcal rami except the Furcal setae is 1.3 mm. **Prosoma;** Big and enlarged, oval, comprising cephalothorax incorporation first pedigerous somite and 3 free pedigerous somites; antennule extends near the center of the second somatic segment. **Urosoma:** thin and long , consist of 5- segments different in size and shape; the fifth segment is narrow; **Genital- Double Somite** thin and long , anterior part slightly swallowed laterally and narrowed toward the end , the seminal receptacle (hammer-like) . third abdominal segment quadrate and slightly bigger than the fourth one, the anal segment is connected to a pair of furcal rami, a row of short spinules along the dorsal and ventral sides of the posterior margin of anal segment .**Furcal Rami** ;Short , broad and equal in length, each branch with 3 unequal setae different in sizes and lengths; there is a short lateral seta situated in the beginning of the last third of each furcal rami and the other ; terminal end bear four setae, one external short and the internal longer and two middle setae one long and the other slightly shorter.

Antennules (Fig.2A) :17- segmented ; differ in shape and length , first segment enlarged; fourth and seventh segments are large but both smaller than the first one ; the sixteenth and seventeenth segments enlarged; external margins narrow with transparent membrane and distinct node; terminal segment with toothed grooved transparent membrane; the seta (se)and the sensory setae(aesthetes, ae) are arranged as following

1(9se) ,2(4se) , 3(1se) , 4(6se) , 5(0se) , 6(1se+1ae) , 7(1se) , 8(1se) , 9(1se) , 10(0) , 11(1se) , 12(1se + 1ae) , 13(0se) , 14(1se) , 15(2se) , 16(2se) , 17(9se).

Antenna(Fig.2B) 4-segmented, basal segment long and convex externaly , internal margin with 2 setae, anterior surface with longitudinal row of sub lateral spinules ; caudal surface with minute scattered spinules followed by a row of sublateral spines and a row of minute spines obliquely arranged near the internal margin followed by a group scattered spines; posterior margin with a row of spines .Exopod reduced to a relatively spinous long seta on outer angle of the basal segment; Endopod 3- segmented, first segment with a middle internal seta, with a row of short external spines; the second segment narrow at base and gradually enlarged toward tip and bears 7 internal setae with hooked ends; external margin with a row of short spines; third segment long and tubular with a row of external hairs with 7 terminal seta .

Labram (Fig2.C) One segmented ; anterior margin with 10- teeth increase in size towards the outside .

Mandible (Fig3.A) Base broad , narrowed toward the top and ends to from the coxal mandibular base supplied by 11 -teeth graduated in size and length and ends by two ciliated setae ; the mandibular palp reduced and bear a pair of long , stout , pulmonary setae and a short non-ciliated one.

Maxillule (Fig3.B) Precoxal enlarged narrowing towards the top and with 3 terminal stout claws, internal with one plumose seta; maxillary palp of two segments, first long with 2 apical setae and a stout setose spine; second segment is laterally situated , small and bear three long , thin , smooth setae and a lateral smooth one.

Maxilla (Fig3.C) 4-segmented; posterior margin precoxal segment , circular, internal margin with a lobe.like process bears 2 ciliated long setae . Coxa large with inner stouts spine ,there is an internal lobe supplied by stout spine and thin smooth seta, endopod consist of two segments , first with one stout spine , base broad while its internal margin bear a row of spinules and one thin seta supplied by spinules along its both sides; second segment small and bears three setae supplied by a row of serrated spinules and two short terminal hooked setae.

Maxilliped (Fig3.D) 4-segmented; Syncoxa large and elongated, internal margin with 3 setae, first one short supplied by two spines on each side, second one is long middle supplied by two spinules on one side , third one with a spinules on inner side; the basal segment enlarged, internal margin waved with six long spinules on both sides and other short supplied by three spinules, surface with two groups of spinules; endopod 2-segmented , first bear stout seta supplied by spinules on both sides, second segment is smaller than the first , surface with 4 asmooth hairs and a long seta with fine spinules on both sides .second segment with two setae one short and smooth the other seta with spinules on both side ,

First pedigerous P1 - Fourth Pedigerous P4(Fig4.A,B,C,D)

Intercoxa sclerites of P1-P2 quadrate , distal margin of P1,P4 with paired lobes produced,Intercoxa seta present in P1-P4 . Coxa ,Posterior margin of P1-P3 with hairs ,distal margin of P4 with two a rows of hairs ,Both endopods and exopods 3- segmented ,Setae /Spines terminal of P1-P4 as follows:

P1	Basis	1-0	exp 1-1; 1-1;II,1,3	enp 0-1;0-2;2,I+1,3
P2	Basis	1-0	exp 1-1; 1-1;III,1,3	enp 0-1; 0-2;1.I+1,3
P3	Basis	1-0	exp 1-1; 1-1;III,1,3	enp 0-1; 0-2;1,I+1,3
P4	Basis	1-0	exp 1-1; 1-1;III,1,3	enp 0-1; 0-2;1.II

Fifth Pedigerous P5(Fig4.E) 2- Segmented ; basal segment of the exopod enlarged with one spine and one ciliated seta.

Adult male : Body: (fig5.AB) Relatively small ; overall length from the cephalothorax to the end of the body except the furcal setae is 0.7mm. **Prosoma** large include the cephalothorax region which is determined with the segment of the first followed by three segment of the freely pedigerous ; antennule extends to the beginning of third cephalothorax segment.**Uropod:** thin and long , 6-segmented differ in shape and size; fifth somatic region narrow , **Genital- doubled segment** circular and swollen ; anterior part is slightly swollen from laterally side and is narrowing toward end, third abdominal segment quadrate followed by two slightly smaller segments ; anal segment is connecting by a pair of furcal rami ; at the point of junction between anal segment and furcal rami there is a row of short spinules along ventral and dorsal sides of the posterior margin .**Furcal rami:** Short and broad and equal in lengths and about , their internal margins hairy ; there are 6 plumose setae differ in lengths and sizes are connected to each furcal rami , 2 of which are short and subterminal length of the anal and last abdominal segment combined . and 4 terminal setae of which the inner penultimate is the largest. one seta is short, lateral situated in the beginning of the last third of each branch , another seta is twice as longer as the lateral seta situated on the dorsal surface near its terminal end, the terminal and bear four setae, one short external and one long internal and two middle one of them long and the other slightly shorter.

Antennule (Fig5.C) 15 -segmented , first segment the largest as longer the following 6-segments combined, the other remaining segments are graduating in size and shape; segment 10 broad and large; segment 13 enlarged . segment 14 is long and thin so as segment 15; each of segments 1-6 bear smooth curved seta and so as segment 9; segment 10 and 11 with two stout spines ; last segment terminal with 5 setae , three of them long and thin while the other two are short.

Sixth Pedigerous P6(Fig5.D) 15-segmented , basal segment broad plate like bear one stout spine and two ciliated setae: one short and the other long.

Examined specimens

4- females and 2- male Collected from Al-Abasiyah district ,Al-Najaf AL-Ashraf governorate.30-9-2015 11:00 am.T:42° c PH:8

0.2mm

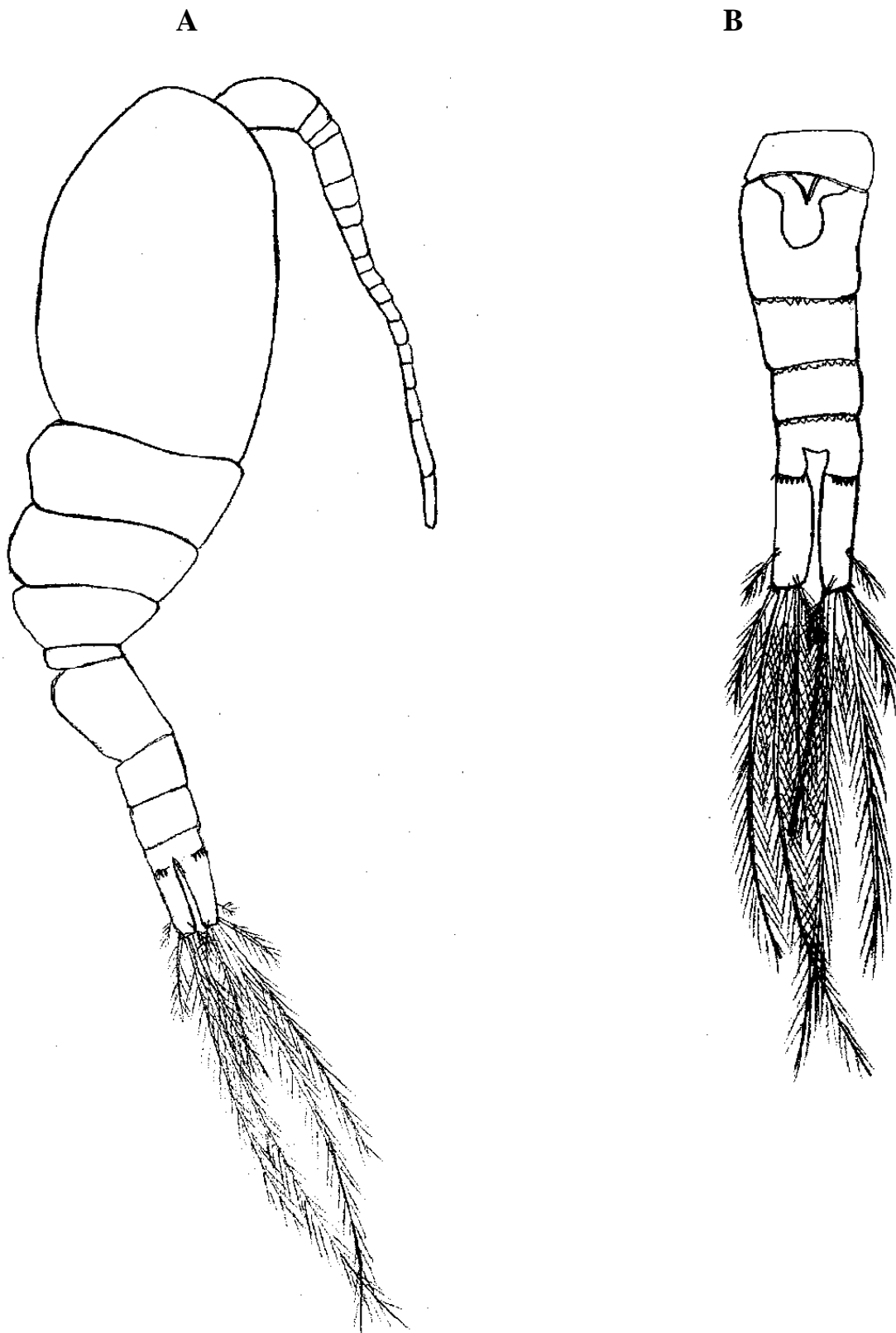


Figure1. *Mesocyclops pehpeiensis* Hu•1943 Adult female A-Lateral B-Urosoma

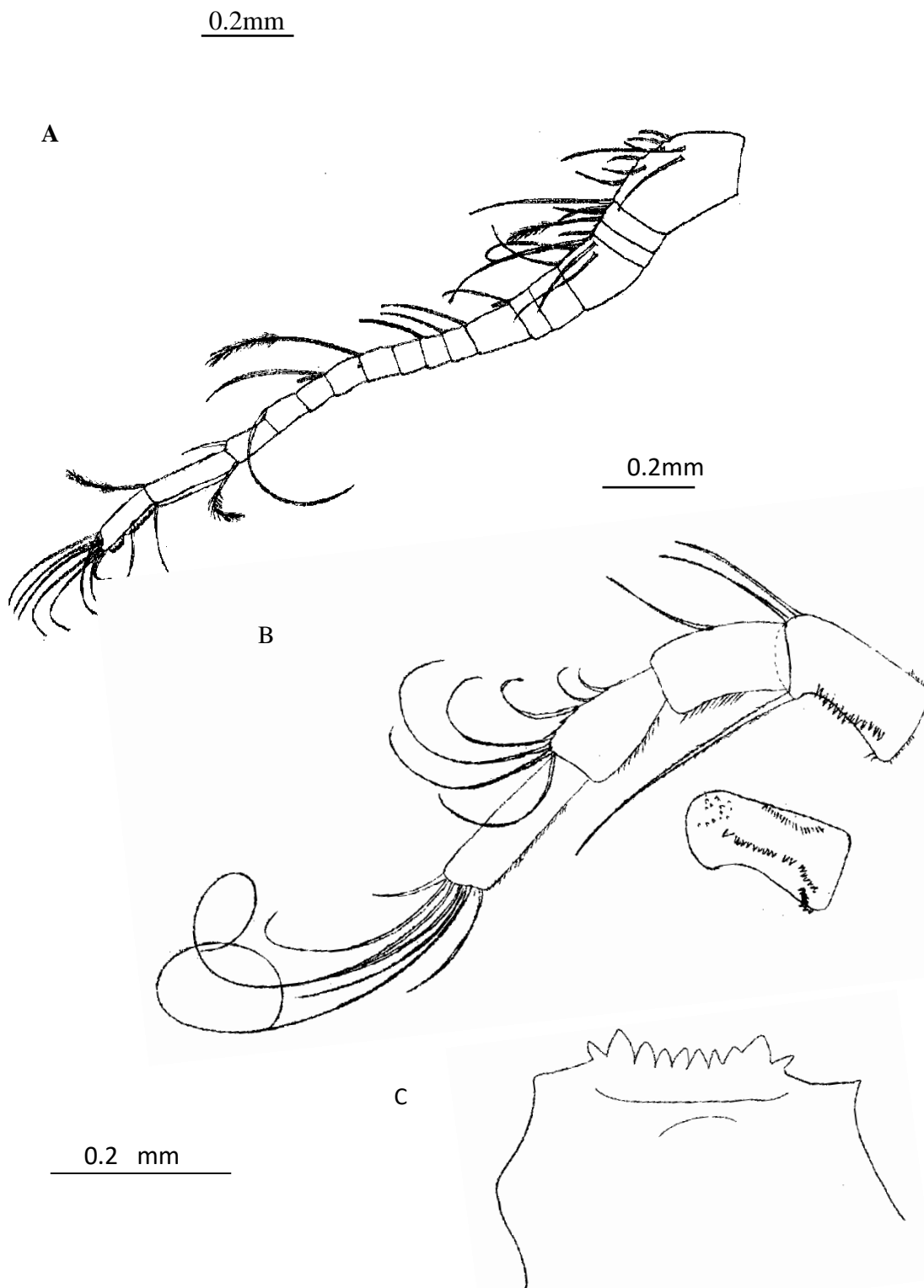


Figure2. *Mesocyclops pehpeiensis* Hu·1943 Adult female A: Antennula B:Antenna C:Labrum

0.2mm

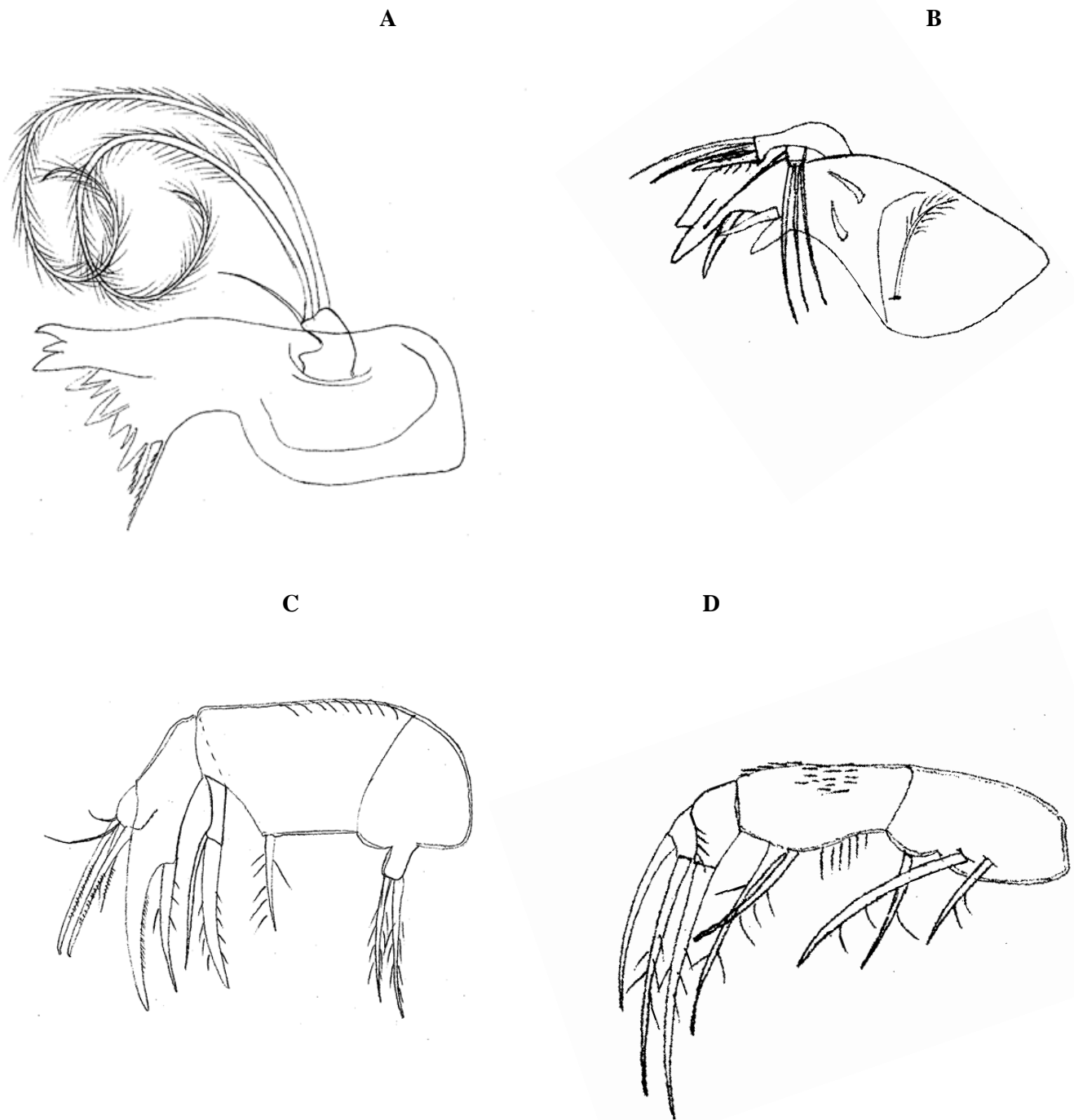
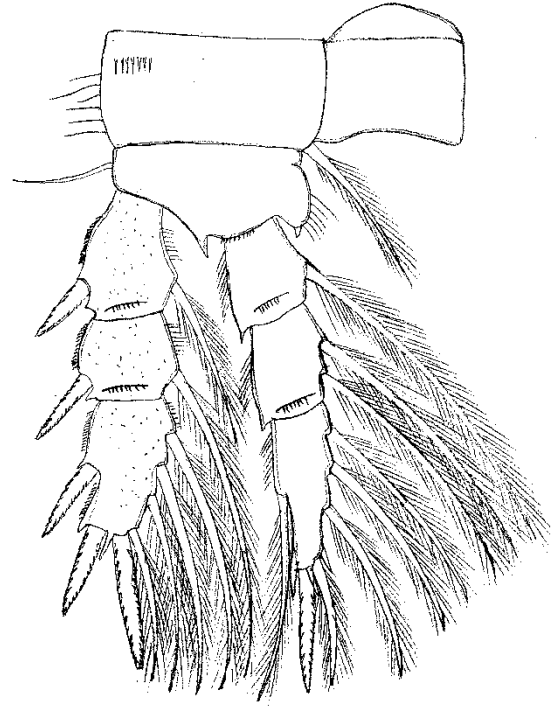
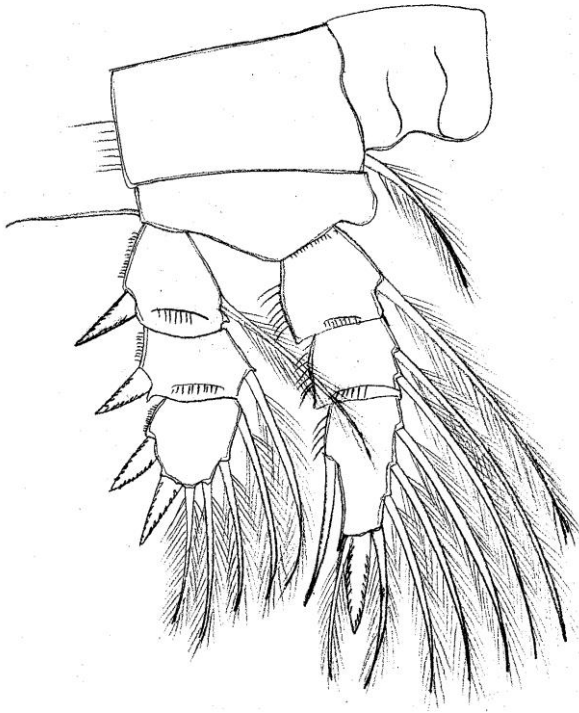


Figure3. *Mesocyclops pehpeiensis* Hu,1943 A:Mandible B: Maxillula C: Maxilla D: Maxilliped

0.2mm

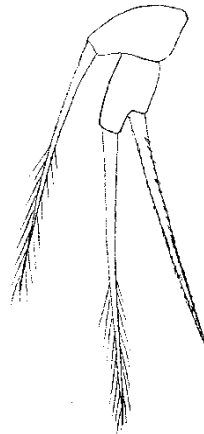
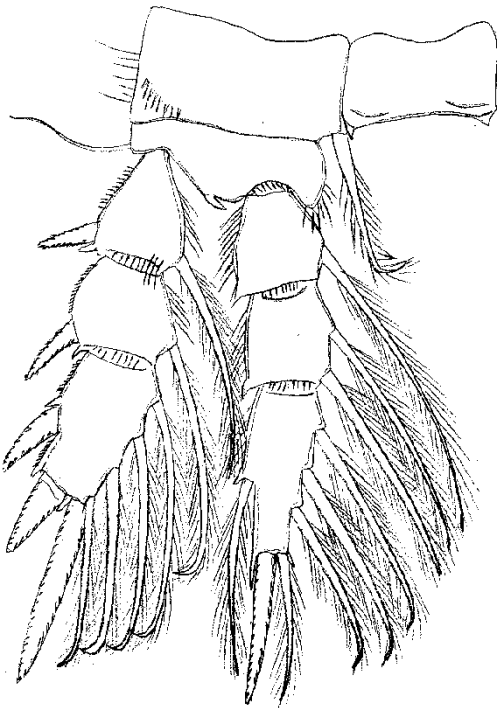
A

B



C

D



E

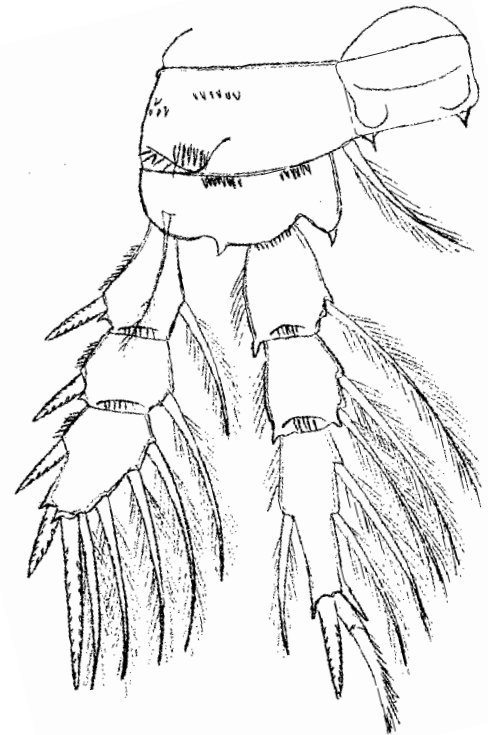


Figure4. *Mesocyclops pehpeiensis* Hu,1943 A: 1st pedigerous D:2nd pedigerous C: 3rd pedigerous D:4th pedigerous E:5th pedigerous

0.2mm

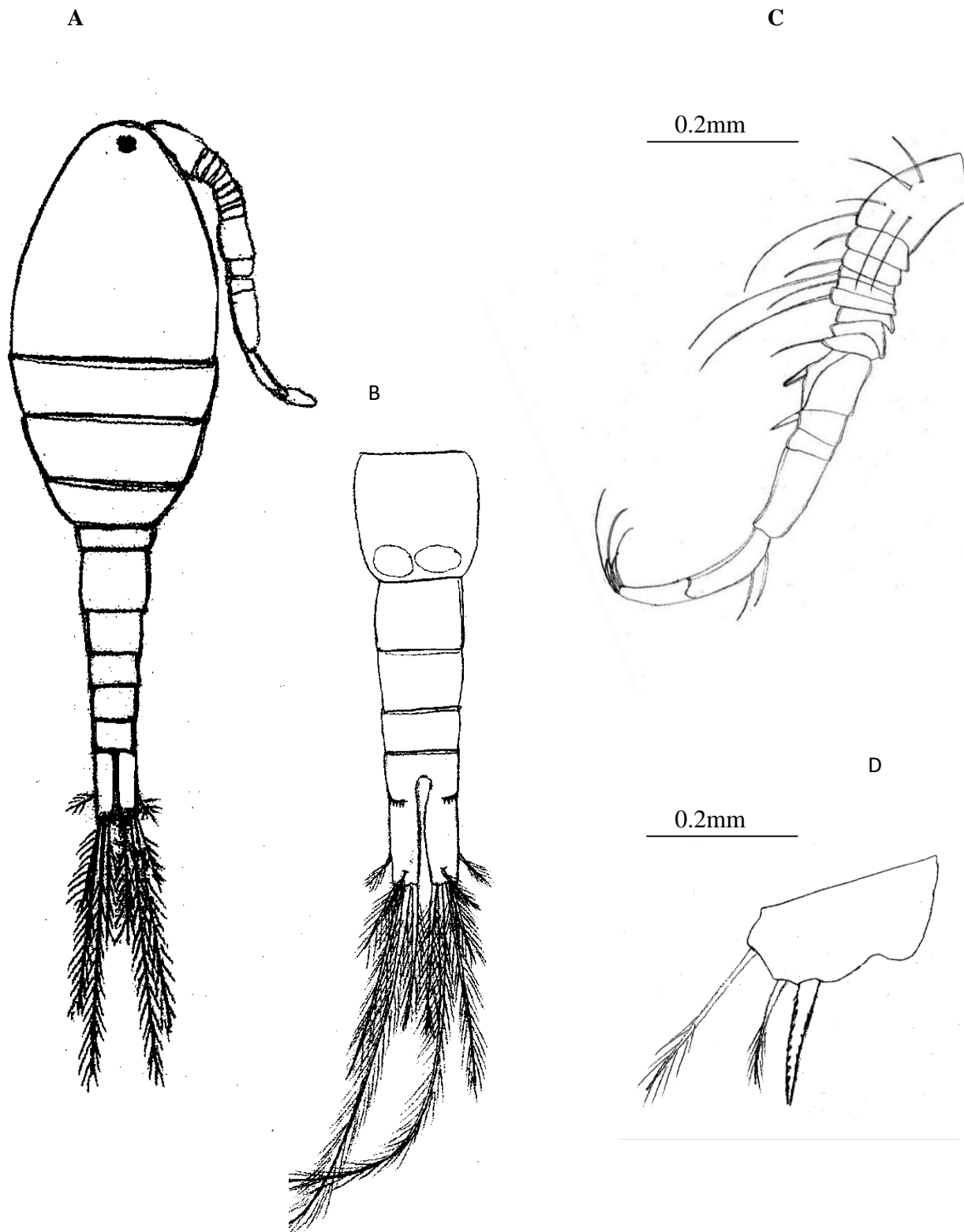


Figure 5. *Mesocyclops pehpeiensis* Hu•1943 Adult male A-surface B-Urosoma C: Antennule: D: 6th pedigerous

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