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Contribution to the knowledge of Tanganyikan cytheraceans, with the description of *Mesocyprideis* nom. nov. (Crustacea, Ostracoda)

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Abstract

Lake Tanganyika is known to have a widely radiated and primarily endemic cytheracean fauna. Both taxonomic position and origin of most of these genera is poorly understood. Relying on both new and type material, the type species of the genus *Mesocythere* KISS, 1959 is here extensively described. A number of previously unknown soft part features allowed us to determine the close relationships between this genus and the *Cyprideis* lineage, hence to transfer it to the tribe Cyprideidini in the subfamily Cytherideinae. As the name was furthermore preoccupied by *Mesocythere* HARTMANN, 1956, we here propose *Mesocyprideis* nomen novum for this genus.
Key words: Ostracoda, Lake Tanganyika, taxonomy, evolution.

Résumé

Le lac Tanganyika est connu pour sa faune de Cytheracés essentiellement endémique et ayant subi une grande diversification. La position taxinomique et l'origine de la plupart des genres sont mal comprises. Sur base de nouveau matériel et des types l'espece type du genre *Mesocythere* KISS, 1959 est ici abondamment décrite. De nombreuses caractéristiques des parties molles, précédemment inconnues, nous permettent de déterminer les étroites relations entre ce genre et la lignée *Cyprideis*, et par conséquent, de le transférer dans la tribu Cyprideidini de la sous-famille Cytherideinae. Comme, d'autre part, le nom est déjà occupé par *Mesocythere* HARTMANN, 1956, nous proposons pour ce genre *Mesocyprideis* nomen novum.
Mots-clés: Ostracodes, Lac Tanganyika, taxinomie, évolution.

Introduction

In spite of a number of relatively important contributions to the knowledge of the ostracod fauna of Lake Tanganyika (see MARTENS, 1984 and COULTER, 1991 for syntheses), the mainly cytheracean fauna of this lake remains largely unknown and in any case poorly understood. During the past decade, various schools of ostracod workers have concentrated on the taxonomy and the origin of this very diversified and primarily endemic cytheracean fauna. Unfortunately, the soft part morphology is all too often neglected by these workers. The chaetotaxy of various limbs will nevertheless repeatedly provide important clues with regard to the exact taxonomic position of these genera and species (see below).

One of the genera belonging to this widely radiated group of ostracods in the lake is the enigmatic *Mesocythere* KISS, 1959. The exact taxonomic position of this genus has long been a subject of dispute. A further problem is the fact that the name is preoccupied by *Mesocythere* HARTMANN, 1956, a marine genus described from Brazil.

New and fresh material with soft parts was recently collected from the northern part of the lake by one of us (K.M.), and a comparison between these specimens and the type materials provoked a redescription of the type species. This allowed us to determine the taxonomic place of this genus, for which we here also designate a new name. The present contribution is the first in a series of papers on taxonomy and ecology of Recent Tanganyikan cytheraceans.

Abbreviations used in text and figures

Soft parts.
A1 = antennula. A2 = antenna. fu = furca. Md = mandibula. Mx1 = maxillula. P(1-3) = walking limbs. R = Rome organ. Y, Ya = aesthetascs.

Valves.
Cp = carapace. fp = fulcral point. H = height of valves. L = length of valves. RV = right valve. LV = left valve.

Taxonomic descriptions

Subclass	Ostracoda LATREILLE, 1806
Order	Podocopida G.W. MÜLLER, 1894
Suborder	Podocopa SARS, 1866
Infraorder	Cytherocopina GRÜNDEL, 1967
Superfamily	Cytheroidea BAIRD, 1850
Family	Cytherideidae SARS, 1925
Subfamily	Cytherideinae SARS, 1925
Tribe	Cyprideidini KOLLMANN, 1960

Genus **Mesocyprideis** nomen novum

Mesocyprideis, nomen novum pro *Mesocythere* KISS, 1959 (non HARTMANN, 1956).

DIAGNOSIS

Valves subtrapezoidal, antero-median hinge element only slightly shorter than postero-median one. Small anterior vestibulum, numerous marginal pore canals often bifurcated or even branched. Ocular tubercle present. Valve surface pitted and with postero-dorsal and ventro-lateral blunt ridges.
Medio-lateral seta on penultimate segment of Al reaching beyond apical margin of this segment. Subapical claw of terminal segment of male A2 medially set with a group of long and sharp spines (absent in females). Reduced terminal part of right male P(2) sigmoid.

Mesocyprideis irsacae (KISS, 1959) (Figs. 1-3)

1959 *Mesocythere irsacae* n.g. n.sp. KISS, p. 99-104, figs. 1-13.
1984 *Mesocythere irsacae* KISS, MARTENS, p. 40.
1987 *Mesocythere irsacae* KISS, COHEN & JOHNSTON, p. 430-431.
1991 *Mesocythere irsacae* KISS, COULTER, 248-251.

DIAGNOSIS

As *Mesocyprideis* is presently a monospecific genus, it is difficult to distinguish between specific and generic features. However, it would seem logical that especially the shape of male and female valves and to a lesser degree the shape of the apical lobes in the copulatory complex of the hemipenis will prove to be distinctive features on the specific level.

TYPE LOCALITY

Shallow water between emerging macrophytes, opposite beach at Uvira (Zaïre).

TYPE MATERIAL

All type material is registered in the Royal Museum of Central Africa (Tervuren, Belgium) as no. RC.50329 and consists of three slides (nos. D.I.T./34, D.I.T./35 and an unnumbered slide). As various specimens are dissected in one and the same sealed slide, we cannot designate a lectotype from these syntypes.

OTHER MATERIAL INVESTIGATED

All illustrated specimens originate from sample LT/91/12, collected on 26.9.1991 by K. MARTENS in the Bay of the village Karonda (Burundi). Approximate coordinates: 4°6'26"N, 29°28'48"E. The material was collected with a handnet at a depth of c. 1 m between a bamboo stand near the shore on a sandy bottom with detritus. The entire LT/91 collection is registered as no. IG.27828 at the Royal Belgian Institute of natural Sciences. The illustrated specimens, as well as specimens preserved in alcohol, are registered as nos. OC.1630-OC.1642 and are included in the ostracod collection of the R.B.I.N.Sc., Brussels.

ADDITIONAL DESCRIPTION OF ♂

RV (Figs. 3E,G) subtrapezoidal, with anterior margin evenly rounded and posterior margin produced in a blunt postero-ventral corner. Dorsal margin slightly sloping, ventral margin slightly sinuous. Selvage inwardly displaced, inner lamella narrow, inner margin almost coinciding with line of concrescence, numerous branching pore canals present along anterior margin, less so along posterior margin. Surface set with large and deep pits, with various ridges and with elongated subventral ala. Muscle scars: four central scars in a subvertical row, one large and elongated mandibular scar and one bean-like fulcral point.
Hinge (RV): anterior element consisting of 7 toothlets, antero-median element a crenulated groove, constituting about 31 % of the total hinge length; postero-median element a crenulated bar, constituting c. 35 % of the total hinge length; posterior element comprising 5 to 6 toothlets.
LV (Figs. 3F,H) with shape and anatomy similar to RV, but with anterior margin more broadly rounded, with ocular region more and with posterior margin less produced. Hinge of this valve is complementary.
Cp (Figs. 3I,J) relatively narrow, with bluntly pointed anterior and posterior margins, lateral sides not straight, seemingly producing three lobes. Ocular tubercule present on both valves.
A1 (Fig. 1C) with five segments, generally stout and broad. First and second segments set with apical and subapical brushes of setulae, second segment furthermore with an apical ringed seta on the internal side. Third segment subquandrangular, with one apical claw on the external side. Fourth segment of irregular shape, on the external side set with one large claw and one long seta, medially with a seta extending beyond the edge of the segment, subapically with one seta, extending beyond the margin of the terminal segment, apically with one claw and one long seta. Fifth segment small, rectangular, apically with one claw and one bifurcate aesthetasc, the latter about half as long as the accompanying seta.
A2 (Fig. 1D) with four segments and a large expodite. Second segment with one apical seta, reaching about halfway the third segment. The latter medio-dorsally with two unequal setae, medio-ventrally with one

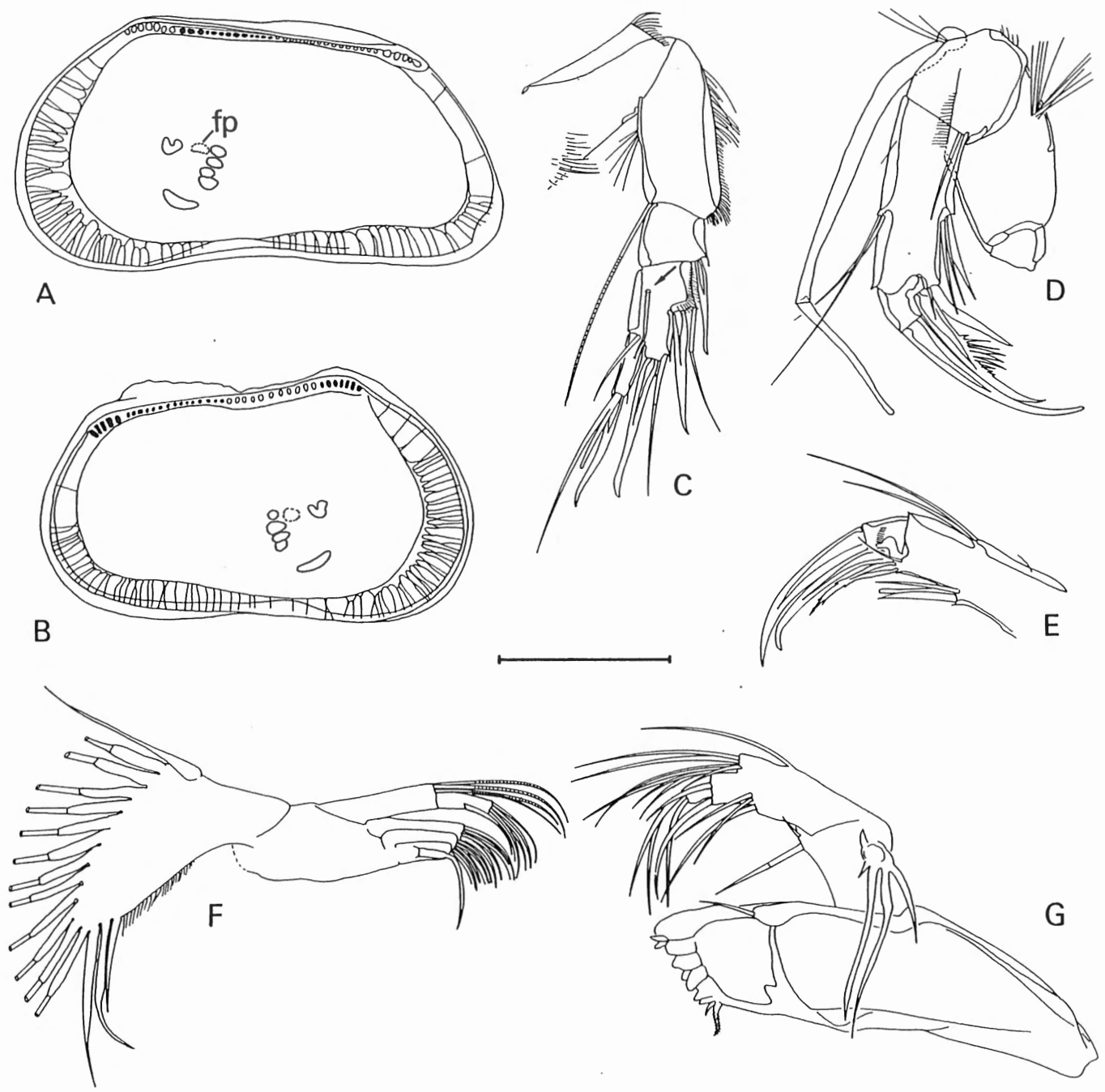


Figure 1. – Mesocyprideis irsacae *(Kiss)*.
A. ♂, RV, internal view (OC.1630). B. ♀, LV, internal view (OC.1636). C. ♂, A1 (OC.1630). D. ♂, A2 (OC.1634). E. ♀, A2, detail of teminal chaetotaxy (OC.1632). F. ♂, Mx1 (OC.1635). G. ♀, Md (OC.1635). Scale = 230 μm for A,B; 86 μm for C; 78 μm for D,E,F; 32 μm for G.

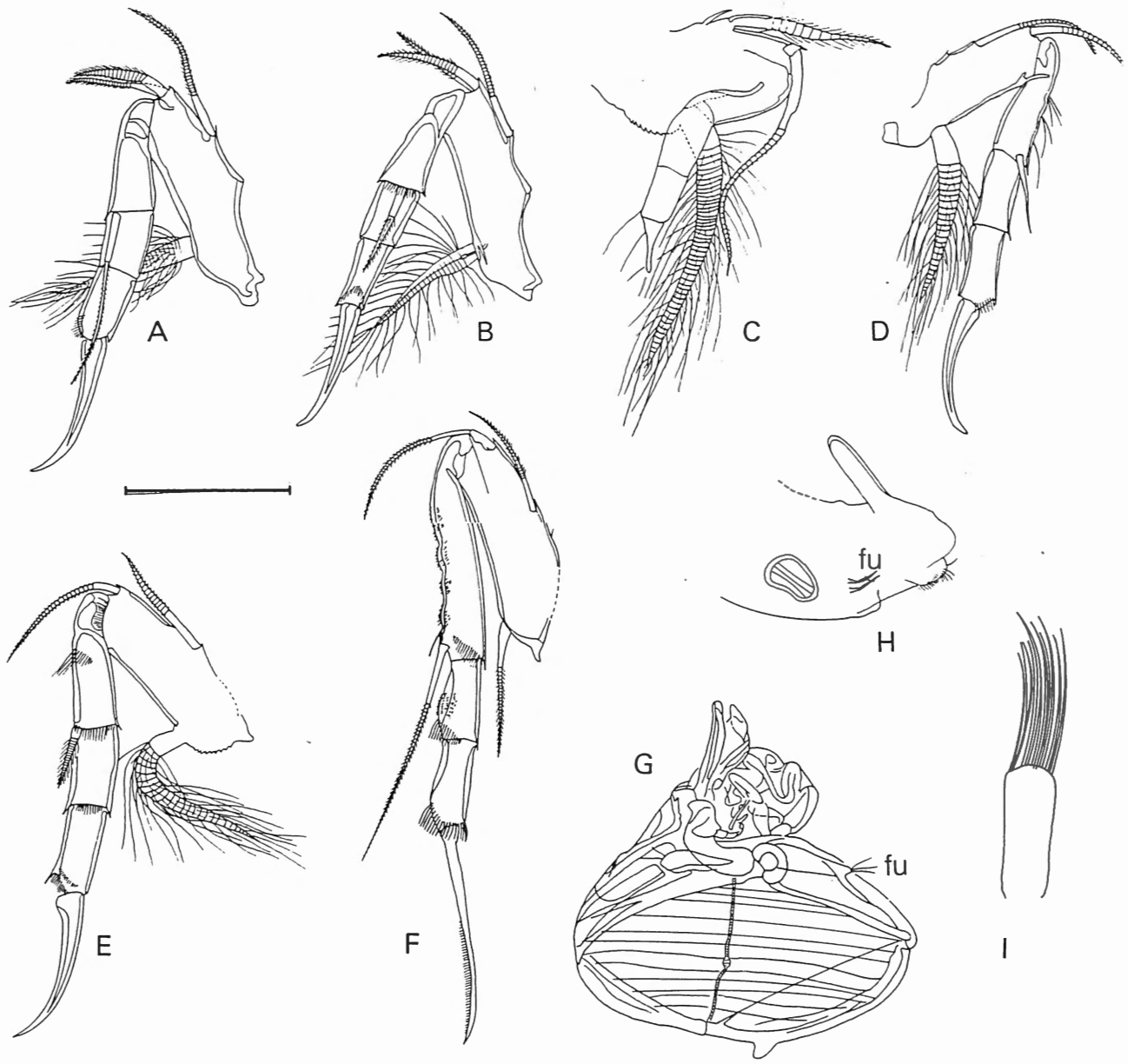
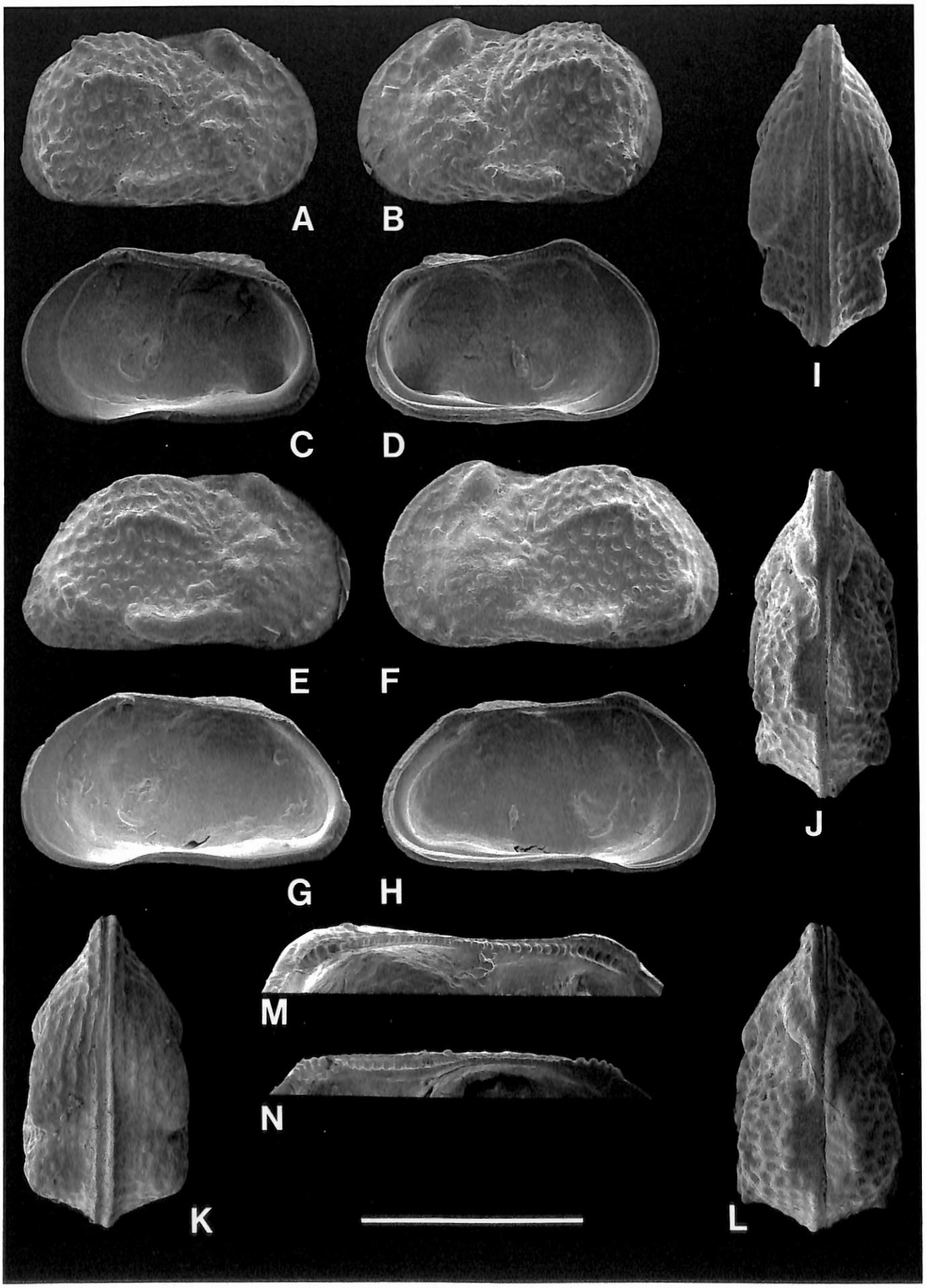


Figure 2. – Mesocyprideis irsacae *(KISS)*.
A. ♂, left P(1) (OC.1633). B. ♂, right P(1) (OC.1633). C. ♂, right P(2) (OC.1634). D. ♀, P(2) (OC.1636). E. ♂, left P(2) (OC.1633). F. ♀, P(3) (OC.1636). G. ♂, hemipenis (OC.1634). H. ♀, posterior extremity of abdomen (OC.1636). I. ♂, brush-like organ (OC.1630).
Scale = 138 μm for G; 96 μm for H; 40 μm for I; 35 μm for A,B,D-F; 29 μm for C.

Figure 3. – Mesocyprideis irsacae *(KISS)*.
A. ♀, RV, external view (OC.1632). B. ♀, LV, external view (OC.1632). C. ♀, RV, internal view (OC.1637). D. ♀, LV, internal view (OC.1637). E. ♂, RV, external view (OC.1634). F. ♂, LV, external view (OC.1634). G. ♂, RV, internal view (OC.1635). H. ♂, LV, internal view (OC.1635). I. ♂, Cp, ventral view (OC.1639). J. ♂, Cp, dorsal view (OC.1638). K. ♀, Cp, ventral view (OC.1641). L. ♀, Cp, dorsal view (OC.1640). M. ♀, LV, internal view, detail of hinge (OC.1637). N. ♀, RV, internal view, detail of hinge (OC.1637).
Scales = 431 μm for A-L; 238 μm for M,N.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aesthetasc and two setae, one stout and one slender, and apically with one smooth claw and one seta. Terminal segment minute, set with one apical and one subapical claw, the latter medially set with a number of long and pointed spines.

Md with a stout coxa without special features and a four-segmented palp; separations between these segments however not always evident. First segment with respiratory plate bearing two long and one short rays, this segment subapically with one long and one short seta. Second segment medio-dorsally with one long seta, medio-ventrally with a group of three setae (one long, two shorter), subapically on the dorsal side with a group of 7 setae of varying length but of similar appearance, apically with one long and one short seta. Teminal segment with three subequal setae.

Mx1 (Fig. 1F) with a large respiratory plate without special features, a two-segmented palp and three endites. First palp segment set with four apical ringed setae. Second segment subrectangular, c. 2.5 times as long as basal width, set with one lateral seta and four apical setae. Endites with an unknown number of apical setae; first endite with a large and stout lateral seta.

Left P(1) (Fig. 2A) a four-segmented walking limb. First segment almost as large as three terminal segments combined, bearing two knee-setae and one dorsal seta, all ringed in their distal two thirds and one huge root-like seta, the latter ringed and plumose. Second segment with a long apical seta, reaching almost halfway the apical claw. The latter claw slightly longer than two terminal segments combined. Right P(1) (Fig. 2B) as in the left limb, but with apical seta on second segment reaching only halfway the terminal segment. Remark: in this limb, the root-like ventral seta on the first segment appears to have an internal canal running along its entire length, and forming a bladder-like expansion near its base. This canal furthermore running into the segment.

Right P(2) (Fig. 2C) with terminal three segments reduced (typical of subfamily/tribe) : first segment with one dorsal seta and one knee-seta, both long and ringed, and with a very large root-like ventral seta, the latter ringed and plumose, almost one and a half times the length of the three terminal segments. The latter with divisions between segments unclear, building a very typical S-shaped curved; and terminating in a bluntly pointed remainder of the apical claw. No clear seta inserted on these segments. Left P(2) (Fig. 2E) a walking limb, with terminal segment bearing one dorsal and one knee-seta and one large root-like ventral seta. Second segment with a short apical seta, not reaching the distal margin of this segment. Apical claw shorter than length of two terminal segments combined. Both P(2) with a serrated ventral region near the base of the first segment.

P(3) a normal walking limb, with terminal segment bearing one dorsal seta, one knee-seta and a normal ventral seta, inserted close to base, claw long and slender (ratio claw/last 3 segments = 45/80), slightly longer than in the female.

Hemipenes (Fig. 2G) of the normal type, with a large muscular body and a copulatory complex consisting of at least one elongated and one subrectangular shield and a labyrinthal complex in which the ejaculatory ductus runs through various loops and cavities. Furcae reduced to a brush of fine setulae.

Brush-like organs (Fig. 2I) elongated, each set with c. 10 apical setae.

ADDITIONAL DESCRIPTION OF ♀

RV (Figs. 3A,C) subrectangular, with broadly rounded anterior margin and oblique posterior margin. Dorsal margin sloping, ventral margin slightly sinuous. Anatomy of valves as in the male, but postero-dorsal cavities more broadly produced, creating the image of a medial vertical sulcus. Ventral ala shorter. Hinge (Fig. 3N) as in the male.

LV (Figs. 3B,D) with ocular region more dorsally produced, posterior margin nearly straight. Hinge (Fig. 3M) as in the male.

Cp (Figs. 3K,L) wider than in the male, with anterior margin bluntly pointed, posterior margin sub-rectangular and lateral sides nearly parallel and straight.

A1, Md, Mxl and P(3) as in the male.

A2 (Fig. 1E) with subapical claw on terminal segment without the group of spines; apical seta on penultimate segment serrated.

No asymmetry between left and right walking limbs.

P(1) as right P(1) in ♂, i.e. first segment with two knee-setae, one normal dorsal seta and one root-like long and plumose ventral seta. Second segment with one apical seta, reaching about halfway the terminal segment.

P(2) (Fig. 2D) a walking limb with a large, root-like ventral seta on the first segment, the latter segment also with one dorsal seta and one knee-seta. Second segment with one apical seta, reaching slightly beyond apical margin of this segment. Apical claw shorter than length of two terminal segments combined.

P(3) (Fig. 2F) a normal walking limb, with terminal segment bearing one dorsal seta, one knee-seta and a normal ventral seta, inserted close to base. Second segment elongated, with a (sub) apical seta reaching beyond apical margin of terminal segment. Apical claw long and narrow, serrated.

Posterior extremity with an elongated postero-dorsal lobe; furcae present as a pair of short setae.

Measurements

Female valves: L = 0.57-0.60 mm, H = 0.33-0.36 mm.

Male valves : L = 0.65-0.68 mm, H = 0.33-0.36 mm.

REMARKS

The present species is a brooder. In two of the dissected females, the postero-dorsal pouch contained both eggs and nauplii: 3 eggs and 2 nauplius larvae in no. OC.1636 and 10 eggs and 4 nauplius larvae in no. OC.1637.

Discussion

KISS (1959) originally described the genus *Mesocythere* from Lake Tanganyika and referred it to the family Cytheridae. HARTMANN & PURI (1974) accepted this view and placed the genus in the tribe *Cytherini*. These decisions were understandable as both the morphology of the right P(2) of the male and the anatomy of the hinge were at that stage unknown. Relying on type materials and on new specimens with soft parts, it is here shown that the right P(2) of the male is clearly reduced, which allows us to allocate the genus to the family Cytherideidae. The structure of the hinge, which shows an anteromedian crenulated groove in the RV, and the presence of the medio-lateral seta on the penultimate segment of the A2, both indicate that *Mesocyprideis* nom. nov. belongs to the *Cyprideis*-lineage. Both features unequivocally allow us to allocate *Mesocyprideis* nom. nov. to the tribe Cyprideidini. Within this group, *Mesocyprideis* nom. nov. can be distinguished from both *Cyprideis* JONES and *Romecytheridea* WOUTERS by its aberrant valve morphology. Species of *Cyprideis* have a much shorter antero-median segment of the hinge. The hinge in *Romecytheridea* is weakly developed, but also here the antero-median segment is longer than in *Cyprideis*. Other genera of the Cyprideidini have their median hinge segment not divided into an antero- and postero-median part (BABINOT & COLIN, 1976).

There is no dimorphism between left and right P(1) in the male of *Mesocyprideis* nom. nov., except in the length of the distal seta on the second segment, which is longer in the left limb. There is a much more significant dimorphism between left and right P(1) in both *Cyprideis* and *Romecytheridea*, as the three distal segments of the right P(1) are much broader and heavier than in the left limb (SANDBERG & PLUSQUELLEC, 1974).

Apart from the morphology of these limbs, the anatomy of the hinge and the presence of numerous branched marginal pore canals, the external morphology of the valves of *Mesocyprideis* nom. nov. is very similar to that of the genus *Perissocytheridea* STEPHENSON, 1938. Both HARTMANN & PURI (1974) and WOUTERS (1979) therefore suggested that *Mesocythere* (sic) might be a junior synonym of *Perissocytheridea*. The latter genus however has an entomodont hinge and lacks a reduced right P(2) in the male. *Perissocytheridea* belongs to the family Cytheridae, tribe Perissocytherideini. Nevertheless, in spite of all these anatomical differences, it should be stressed that the overall external morphology of the genera *Perissocytheridea* and *Mesocyprideis* nom. nov. is a very clear-cut example of convergence.

Finally, it should by no means be a surprise that *Mesocyprideis* nom. nov. proves to belong to the *Cyprideis*-lineage, as was already foreshadowed by both WOUTERS (1990) and DANIELOPOL *et al.* (1990). Detailed analysis of substantial materials with soft parts clearly illustrates that Lake Tanganyika has known an important and complex radiation of *Cyprideis*-like lineages. Many of these species and species-groups are endemic to Lake Tanganyika.

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