

## Taxonomic revision of African Cypridini.

### Part I: the genera *Cypris* O.F. MÜLLER, *Pseudocypris* DADAY and *Globocypris* KLIE (Crustacea, Ostracoda).

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#### Summary

The tribe Cypridini is characterized by the presence of '8'-shaped loops in the internal spermiductus of the hemipenes. It appears that anatomy of the valve margins is far less important at this taxonomical level. The Cypridini at present comprise four genera: *Cypris*, *Pseudocypris*, *Ramotha* and *Globocypris*.

Nine African species are retained in *Cypris*, two of which are here described as new: *C. elburensis* n.sp. and *C. galefensis* n.sp., both from Somalian inland waters. *C. labiata* ROME is placed in the synonymy of *C. decaryi* GAUTHIER, and the male of this species is furthermore described for the first time. *C. neumanni* (G.W. MÜLLER) and *C. connica* LOWNDES are both retained as synonyms of *C. latissima* (G.W. MÜLLER), and *C. inflata* DADAY (nec SARS) is furthermore added to the list of synonyms of this species.

The ill-known *C. busingiensis* KLIE and *C. puberoides* VAVRA are redescribed on their type material.

Seven African species are retained in *Pseudocypris*. The type material of the type species, *P. bouvieri* DADAY, is extensively redescribed. *P. testudo* SARS is synonymized with *P. acuta* (G.W. MÜLLER). Males from all but one species (*P. spinosa*) are here described, some for the first time.

The ill-known *Globocypris trisetosa* KLIE was found in large densities in two South-African localities. An extensive redescription is offered and its position is discussed.

The distribution of all these taxa is given and new records are added.

**Key words:** morphology, zoogeography, ecology, temporary waters, new species.

#### Résumé

Les Cypridini se caractérisent par la présence de boucles en forme de «8» dans le conduit à sperme interne des hémipénis. Il semble que l'anatomie des marges de la valve soit beaucoup moins importante à ce niveau taxonomique. A l'heure actuelle, les Cypridini se composent de quatre genres: *Cypris*, *Pseudocypris*, *Ramotha* et *Globocypris*.

*Cypris* comprend neuf espèces africaines dont deux ici décrites comme nouvelles: *C. elburensis* n.sp. et *C. galefensis* n.sp., toutes les deux provenant des eaux intérieures somaliennes. *C. labiata* ROME est considérée comme synonyme de *C. decaryi* GAUTHIER; en outre, le mâle de cette espèce est décrit ici pour la première fois. *C. neumanni* (G.W. MÜLLER) et *C. connica* LOWNDES sont considérées toutes les deux comme synonymes de *C. latissima* (G.W. MÜLLER), et *C. inflata* DADAY (nec SARS) est également ajoutée à la liste de synonymes de cette espèce. *C. busingiensis* KLIE et *C. puberoides* VAVRA, mal connues, sont redécrites d'après leur matériel type.

Sept espèces africaines sont inclus dans *Pseudocypris*. Le matériel type de l'espèce type, *P. bouvieri* DADAY, est redécrit de façon très détaillée. *P. testudo* SARS est déclarée synonyme de *P. acuta* (G.W. MÜLLER). Les mâles de toutes les espèces sauf une (*P. spinosa*) sont décrits ici, certains pour la première fois.

*Globocypris trisetosa* KLIE, mal connue, a été trouvée, en densités considérables, dans deux localités sud-africaines. Une redescription détaillée est proposée ici, et sa place est discutée.

La distribution de tous ces taxa est donnée et des localités nouvelles sont ajoutées.

**Mots-clés:** morphologie, zoogéographie, écologie, eaux temporaires, nouvelles espèces.

#### Introduction

HARTMANN & PURI (1974) presented a comprehensive generic revision of the family Cyprididae and at that stage recognised 22 subfamilies. Since then, various new sub-

families have been described, while others were either raised to the rank of family or disappeared into synonymy. In all, we can recognise between 25 and 30 subfamilies to date. This extremely high number results mainly from two causes. Firstly, we are unable to rank various groups into a hierarchy without an extensive revision of the entire family and the introduction of new characters. Therefore, as we cannot properly distinguish between tribes and subfamilies, we classify them all at the same level, i.e. as subfamilies. Secondly, there is a tendency in part of the ostracod literature, largely originating from the palaeontological tradition, to ignore the existence of tribes altogether. This attitude, the refusal to accept a perfectly valid level, has two immediate results: inflation of taxonomic categories and hence the existence of incalculable forests of equally ranked groups. The Cyprididae, for example, would indeed become a much more workable unit if a number of taxa, presently recognised as subfamilies, were grouped together as tribes.

Another problem contributing to the present confused taxonomy of this family is no doubt the absence of workable characters to distinguish between some of the subfamilies. One of the best examples, at the same time one of the oldest groups, are the Eucypridinae, which can at best be described as a lineage without special features. This subfamily to date comprises at least two tribes: the nominal Eucypridini (with at least four genera) and the Australian Mytilocypridini. MARTENS (1989) provided a diagnosis for the Eucypridini, but failed to find characters which unite both tribes and the genera assigned to the subfamily s.l. (*Amphicypris*, *Liocypris*) and subsequently this subfamily is left without a proper diagnosis.

A similar problem arises with the group presently under discussion: the Cypridinae. HARTMANN & PURI (1974) included the following genera in this subfamily: *Afrocypris* SARS, *Chlamydotheca* SAUSSURE, *Cypris* O.F. MÜLLER, *Pseudocypris* DADAY (nec HERBST), *Riocypris* KLIE, *Sclerocypris* SARS and *Tanganyikacypris* KISS. DE DECKKER & MCKENZIE (1981) added their genus *Bennelongia* to the list. MARTENS (1986) transferred *Sclerocypris* to the Megalocypridinae. DE DECKKER & WOUTERS (1983) created a new subfamily, *Tanganyikacypridinae*, for *Tanganyikacypris*; this taxon was later lowered to the rank of tribe and lodged in the Megalocypridinae by WOUTERS *et al.* (1989). *Riocypris* is in all probability a Cyprinotinae, the position of *Afrocypris* and *Chlamydotheca* will briefly be discussed below and more extensively elsewhere. The exact place of *Bennelongia* needs to be re-evaluated.

While looking for a new classification in this group, it at once became clear that *Cypris* and *Pseudocypris* are more closely related to each other than to any of the other genera listed above. They at least belong to the same tribe in the subfamily, which, through the presence of *Cypris*, necessarily will be the nominate tribe, the Cypridini. These two genera share a striking feature which is absent in the other genera of the Cypridinae: the presence of '8'-shaped loops of the inner spermiductus in the hemipenis. We will here use this feature to characterize this group. Another lineage of large and globular species, grouped in a separate genus

*Ramotha* by MARTENS (in press), has the same type of hemipenis and is also allocated to the Cypridini. The monospecific *Globocypris*, finally, originally referred to the Eucypridinae, was collected in large numbers from two localities in southern Africa. Unfortunately, the male of *G. trisetosa* remains unknown to date. Nevertheless, this species shows far more features of the Cypridini than of the Eucypridini and it is therefore provisionally retained in the former tribe (MCKENZIE, 1971b) and redescribed here.

The present revision forms part of a general reassessment of the African non-marine ostracod fauna, the main aim of this work being to make this group accessible and the species identifiable to the layman. We will here deal with the African representatives of the Cypridini only. All four genera presently allocated to this tribe have representatives on the African continent.

## Material & Methods

### 1. List of Museums and collections

AM	Albany Museum, Grahamstown, RSA.
HNHM	Hungarian Natural History Museum, Budapest, Hungary.
KBIN	Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium.
MRAC	Koninklijk Museum voor Midden-Afrika, Tervuren, Belgium.
MCSN	Museo Civico di Storia Naturale, Firenze
OSLO	Zoological Museum, Oslo, Norway.
SAM	South African Museum, Cape Town, RSA.
SMN	State Museum of Namibia, Windhoek, Namibia.
ZIZM	Zoologisches Institut und Zoologisches Museum, Hamburg, FRG.
ZMB	Zoological Museum, Berlin.

### 2. Abbreviations used in text and figures

A1 = Antennula. A2 = Antenna. Cp = carapace. db = dorsal branch of furcal attachment. dls = dorsal lobe of lateral shield of hemipenis. fl = flange. H = height of valves. il = inner list. im = inner margin. L = length of valves. lc = line of concrescence. LV = left valve. Md = Mandibula. ms = medial shield of hemipenis. Mx1 = Maxillula. Mx2 = Maxilla. ol = outer list. r = Rome organ. RV = right valve. sl = selvage. T1 = first thoracopod. T2 = second thoracopod. vb = ventral branch of furcal attachment. vls = ventral lobe of lateral shield of hemipenis. vm = valve margin.

Chaetotaxy of the limbs follows the model proposed by BROODBAKKER & DANIELOPOL (1982), revised for the A2 by MARTENS (1987a).

3. A list of all non-type material investigated for the present revision, is given in an appendix. Lists of synonymies in the text deal with African literature only.

## Taxonomic Descriptions

Class	Ostracoda LATREILLE, 1806
Subclass	Podocopa G.W. MÜLLER, 1894
Order	Podocopida SARS, 1866
Family	Cyprididae BAIRD, 1845
Subfamily	Cypridinae BAIRD, 1845
Tribe	Cypridini BAIRD, 1845

*Diagnosis :*

Large (1.5-3 mm) and globular to semi-globular species; surface structure of valves smooth or weakly sculptured, rarely with large spines. Some species with 'porenwarzen'. Anterior selvages symmetrically (in both valves) or asymmetrically (in RV only) inwardly displaced. Hemipenis with '8'-shaped loops in the inner spermiductus. T1 with penultimate segment divided or undivided.

*Remark :*

The sexual dimorphism in the chaetotaxy of the A2 in this tribe is similar to the pattern described for the Megalocypridinae by MARTENS (1987a). There are the following differences: in males, z2 is transformed to a short claw in Cypridini (a long claw in Megalocypridinae), while G1 is transformed to a seta in Cypridini, instead of a short claw as in Megalocypridinae.

*Extant genera :*

*Cypris* O.F. MÜLLER, 1776; *Pseudocypris* DADAY, 1908; *Ramotha* MARTENS, in press; (?) *Globocypris* KLIE, 1939.

**Genus CYPRIS** O.F. MÜLLER, 1776

syn. *Eurycypris* G.W. MÜLLER, 1898.

## TYPE SPECIES

*Cypris pubera* O.F. MÜLLER, 1776

*Diagnosis :*

Both valves with anterior selvage largely inwardly displaced; structure of selvage in RV simple (complex in *Chlamydotheca*), antero-ventral valve margin in this valve lip-like produced; LV with an additional anterior inner list. LV furthermore overlapping RV caudally and ventrally. T1 with penultimate segment undivided, seta d1 c. 2-3x as long as d<sub>2</sub>.

*Distribution :*

A cosmopolitan genus; species can be holarctic (*C. pubera*), circumtropical (*C. subglobosa*, *C. decaryi*) or display more restricted distributions (see the two new Somalian species).

**Cypris pubera** O.F. MÜLLER, 1776

(Figs. 1, 2, 3(A-E), 4(A-E), 21(A))

*Cypris pubera* : GAUTHIER 1928 : 252, fig. 27.

*Distribution :*

Holarctic.

*Diagnosis :*

Valve margin of both valves set with individual spines, valve surface relatively smooth; in lateral view greatest height situated about 1/3 from the front.

♂ unknown.

*Additional redescription of ♀ :*

RV (Fig. 4B) with anterior and posterior selvage largely inwardly displaced; LV (Fig. 4A) with only anterior selvage prominent, also with a conspicuous inner list, anteriorly running up to the dorsal margin, posteriorly lining the inner margin. In dorsal view (Fig. 4C), anterior and posterior edges of neither valve protruding; LV overlapping RV ventrally (Fig. 4D). Length = c. 2.5 mm.

A1 and A2 (Figs. 1F,C) without special features.

Md-palp (Fig. 1A) with alpha-seta narrow and smooth, beta-seta narrow and hirsute, gamma-seta relatively slender and with distal half hirsute.

Mx1 with distal palpsegment (Fig. 2A) rectangular, c. twice as long as its basal width; third endite with 2 claw-like setae serrated (Fig. 2E); respiratory plate large, carrying c. 20 plumous rays and 4 basal setae.

Mx2 (Figs. 3D,E) with palp carrying 1 long and 2 shorter apical setae (1 smooth); respiratory plate with 5 long and 1 short plumous rays; endopodite with 2 'a'-setae, 1 'b' and 1 'd'-seta, apart from an apical brush of c. 12 subequal setae.

T1 (Fig. 2B) with segments 3a and 3b fused, this segment still relatively elongated, its lateral seta reaching the tip of this segment; d<sub>1</sub> c. 2.5 times the length of d<sub>2</sub>; distal seta on terminal segment (next to endclaw) also claw-like. T2 (Fig. 2C,D) with apical armature relatively short. Furca (Fig. 3A,B) elongated, with long and narrow claws. Furcal

Fig. 1 (p. 130) : *Cypris pubera* (♀, Belgium).

A. Md-palp, chaetotaxy of terminal segment not shown (OC.1512). B. Md-palp, showing chaetotaxy of terminal segment on a different scale (OC.1512-other palp). C. A2 (OC.1513). D. A2, detail of apical chaetotaxy (OC.1512). E. Rake-like organ (OC.1512). F. A1 (OC.1512).

Scales : 323 µm for C, F; 156 µm for A; 81 µm for B,D,E.

Fig. 2 (p. 131) : *Cypris pubera* (♀ - OC.1512, Belgium).

A. Mx1-palp. B. T1. C. T2. D. T2, detail of apical pincer. E. Mx1, detail of 'Zahn'-bristles on third endite.

Scale : 156 µm for B, 81 µm for A,C; 33 µm for D,E.

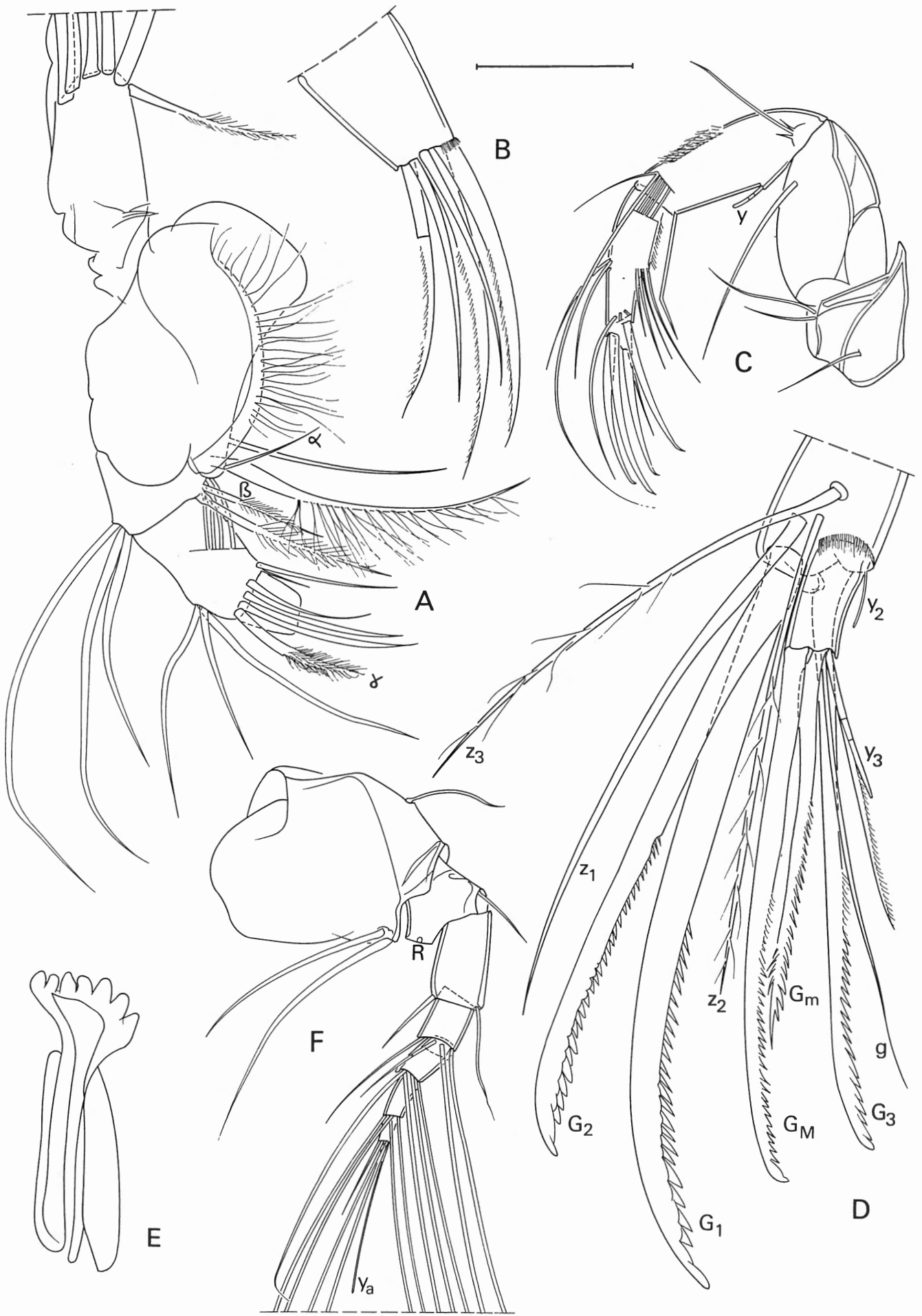


Figure 1 (caption p. 129)

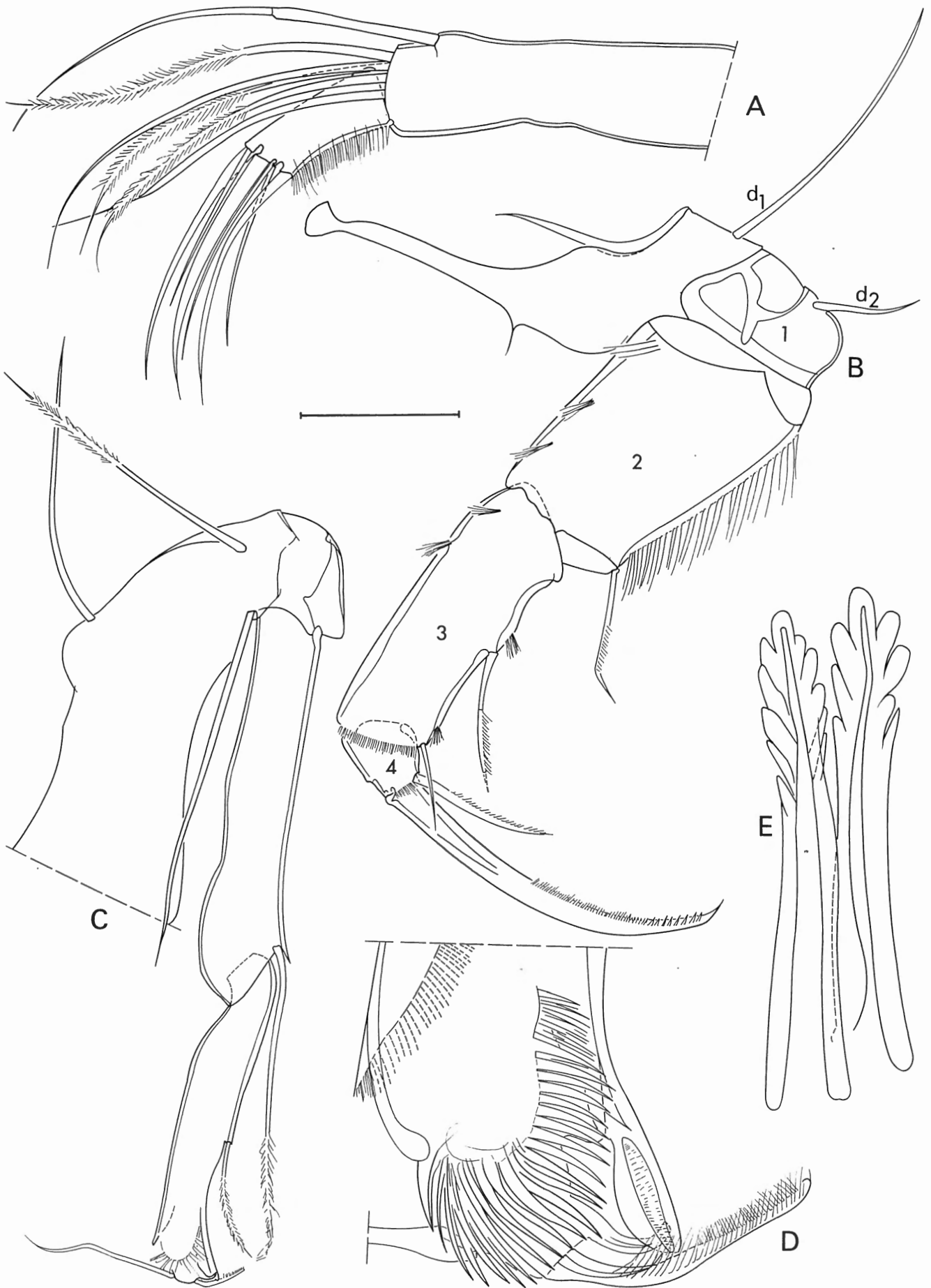


Figure 2 (caption p. 129)

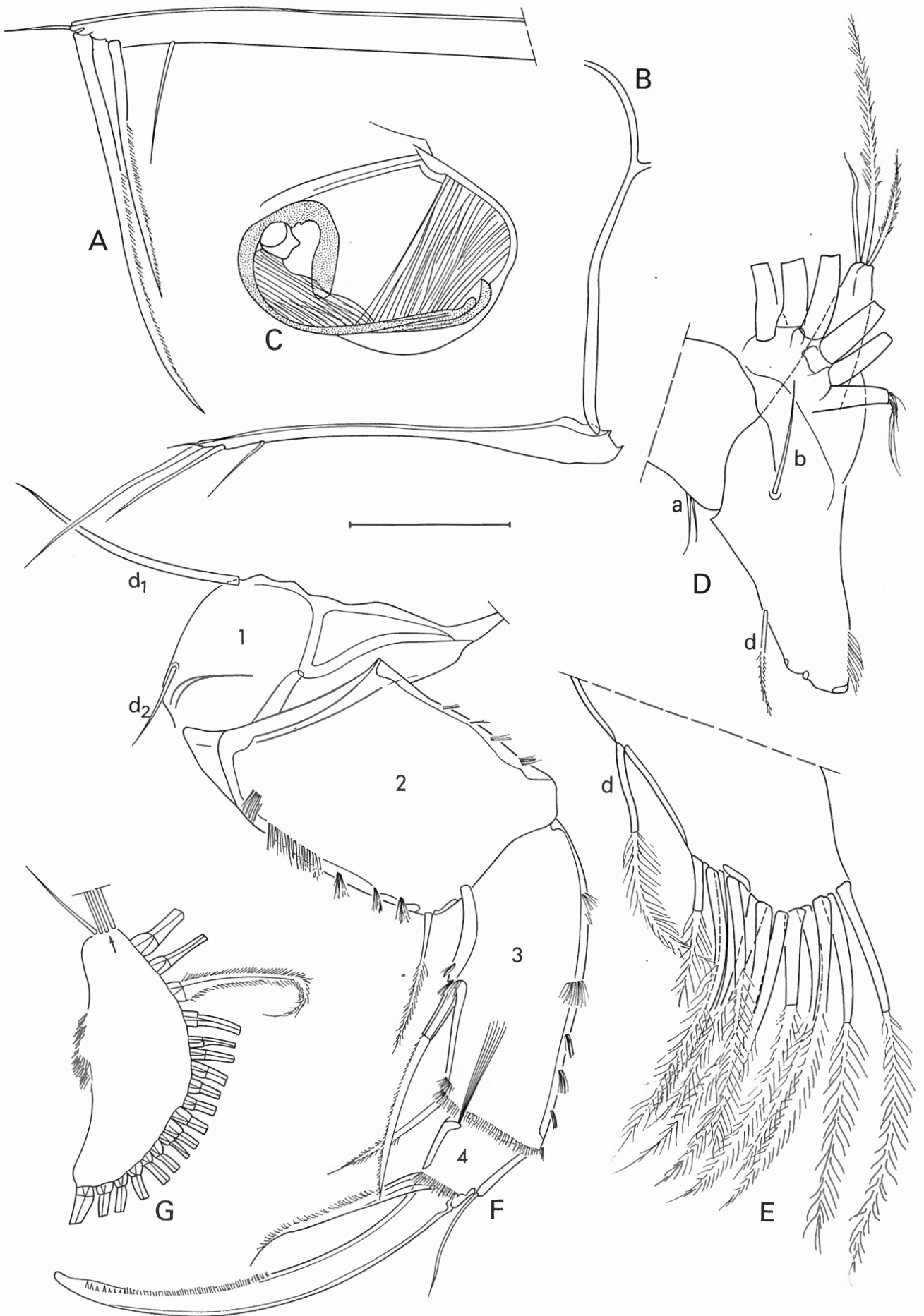


Figure 3 (caption p. 134)

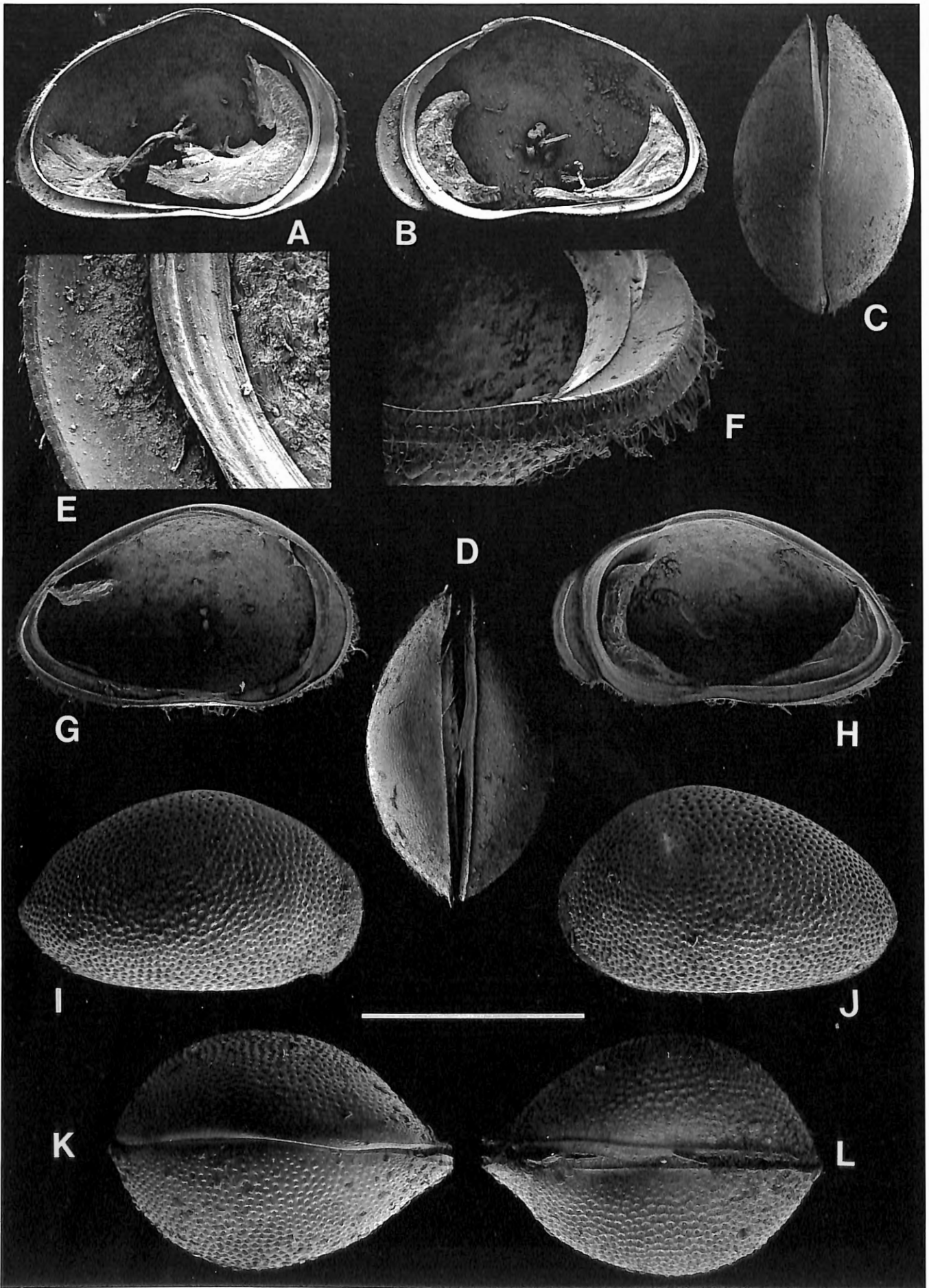


Figure 4 (caption p. 134)

attachment distally bifurcated. Rake-like organs (Fig. 1E) T-shaped, elongated, with 7 blunt teeth.  
Genital region (Fig. 3C) without special features.

*Remarks :*

*C. pubera* is by no means a typical African species and it occurs in the Palaearctic region of the northern part of the continent only. It is closely related to *C. maculosa* BRONSTEIN, from which it can be distinguished by the presence of caudal spines on the valve margins. *C. maculosa* was thus far not reported from Africa, but its abundance in the Middle East indicates that it could occur in North Africa as well.

***Cypris bispinosa* LUCAS, 1849**  
(Figs. 6(H-I))

*Cypris bispinosa* LUCAS, 1849 : 82-83, figs. 7-7b. GAUTHIER, 1928 : fig. 21a-c + various localities. KLIE, 1943 : 53-54, fig. 5. PETKOVSKI, 1963 : 53. THIERRY, 1987 : 241.

TYPE LOCALITY

Streamlet running down from Boudjma, Plaine de Bone (Algeria).

TYPE MATERIAL

Unknown.

*Distribution :*

North Africa and Southern Europe (circum-Mediterranean).

*Diagnosis :*

Species large and elongated, with posterior margins serrated and with a large protuberance on both valves, pointing in posterior direction in dorsal view. TETART (1982) indicates the following measurements for specimens from southern France : Mean length of LV= 3.13 mm (n=32), mean length of RV= 3.11 mm (n:31).

***Cypris busingiziensis* KLIE, 1938**  
(Figs. 11(E-K), 17(L,M))

*Cypris busingiziensis* KLIE, 1938 : 370-374, figs. 12-19.

TYPE LOCALITY

Busingizi, north of Lake Kivu, Lake Edward area, near Rutshuru (Zaire).

TYPE MATERIAL

ZIZM 1047 (tube with specimens in glycerine). Label "*Cypris busingiziensis* n.sp., Belg. Kongo : Busingizi, Dez. 1925, coll. SCHOUTEDEN". 4 in toto ♀, 1 soft part body of ♂ with penes missing (dissected : ZIZM/CR. 1047a, b), 1 soft part body of ♀, 1 LV + 1 RV of ♀, 2 LV of a ♂. As there is no complete ♂ specimen in this material, I prefer not to designate a lectotype here.

*Diagnosis :*

Large species, with a bluntly pointed dorsal margin; in dorsal view with greatest width situated somewhat anterior to the middle, anterior extremity concavely pointed. Hemipenis with vls strikingly elongated, ms large, subrectangular. Prehensile palps asymmetrical. Left palp with terminal

Fig. 3 (p. 132) : *Cypris pubera* (♀, A-E, Belgium) and *Cypris elburensis* n.sp. (♀, MCSN. 1306 - F,G).

*C. pubera* : A. Furca (OC.1513). B. Furca and furcal attachment (furcal ramus incompletely flattened) (OC.1512). C. Genital plate (OC.1512). D. Mx2, with chaetotaxy of endopodite incomplete (OC.1512). E. Mx2, apical chaetotaxy of endopodite (OC.1512).

*C. elburensis* : F. T1. G. Mx1, respiratory plate.

Scale : 323 µm for A,B,G; 156 µm for C,D,F; 81 µm for E.

Fig. 4 (p. 133) : *Cypris pubera* (A-E, Belgium) and *Cypris subglobosa* (F-L, Senegal) (all ♀).

*C. pubera* : A. LV, internal view (OC. 1512). B. RV, internal view (OC. 1512). C. Cp, dorsal view (OC.1511). D. Cp, ventral view (OC.1510). E. RV, internal view, detail anterior margin (OC.1512).

*C. subglobosa* : F. LV, internal view, detail of anterior margin under tilt (OC.1540). G. LV, internal view (OC.1540). H. RV, internal view (OC.1540). I. RV, external view (OC.1539). J.LV, external view (OC.1539). K. Cp, dorsal view (OC.1542). L. Cp, ventral view (OC.1541).

Scale : 1695 µm for A-D; 877 µm for G-L; 329 µm for E; 263 µm for F.

Fig. 5 (p. 135) : *Cypris decaryi* (A-E, ♂ OC.1515) and *Cypris galefensis* n.sp. (F-K, ♂ MCSN. 1304), all from Somalia.

*C. decaryi* : A. Hemipenis-outline. B. Left prehensile palp. C. Right prehensile palp. D. Hemipenis-outline (other hemipenis of same specimen). E. Hemipenis, detail of distal internal anatomy.

*C. galefensis* : F. Hemipenis, detail of distal internal anatomy. G. Idem. H. Left prehensile palp. I. Hemipenis outline. J. Idem, (other hemipenis of same specimen). K. Right prehensile palp.

Scale : 156 µm for A,D,I,J; 81 µm for B,C,E-H,K.



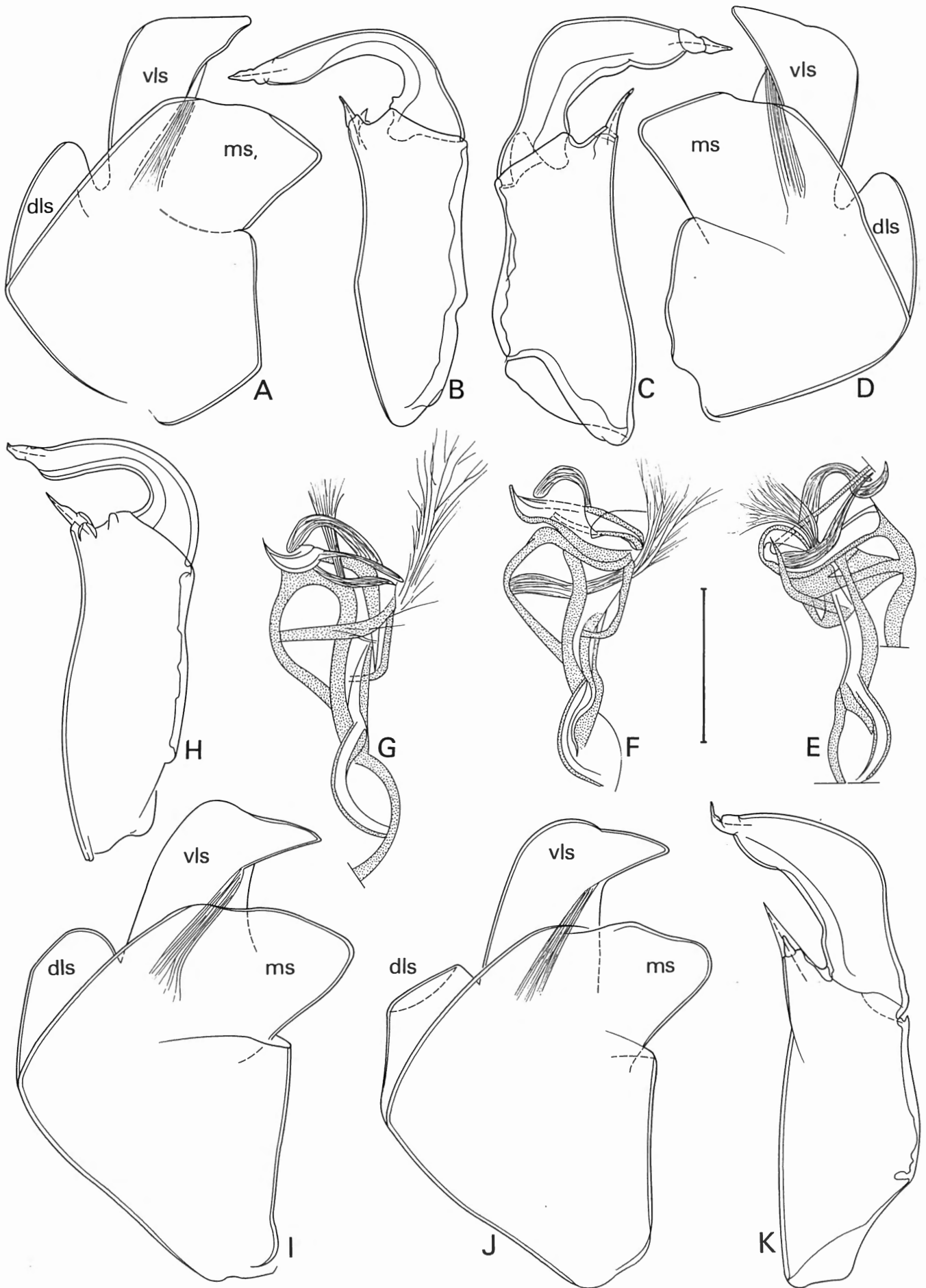


Figure 5 (caption p. 134)

segment long and narrow; penultimate segment with 1 short and 1 long apical sensory organ. Right palp with penultimate segment short and squarish, also with 2 unequal apical sensory organs; terminal segment wider, with a blunt angle on its distal margin.

*Measurements* (of syntypes - in  $\mu\text{m}$ ):

♂ (2 LV) L = 2517-2620, H = 1724-1793.  
 ♀ (LV) L = 2793, H = 1931. (RV) L = 2793, H = 1862.  
 ♀ (toto, n=4) L = 2715 ± 208, W = 2034 ± 185, W/L = 0.71-0.78.

*Remarks* :

(1) The type material was rather limited and from the single ♂ soft parts in the tube the hemipenes were furthermore missing. For the shape of the copulatory appendages, very diagnostic in this particular species, we thus have to rely on the original illustrations by KLIE (1938). The morphology of these hemipenes, however, is so aberrant, that the existence of an artefact cannot altogether be excluded. Additional material is thus necessary before this taxon can be adequately characterized.

(2) The illustrations of the valves offered by KLIE (1938) (see Fig. 11G,H in the present paper) show this species with an evenly rounded dorsal margin. SEM-micrographs of type specimens, however, clearly show a blunt angle in the dorsal margin (Fig. 17L,M).

**Cypris decaryi** GAUTHIER, 1933  
 (Figs. 5(A-E), 7(A-M), 9(A-F), 12(I))

*Cypris decaryi* GAUTHIER, 1933 : 209-215, figs. 1-4. GAUTHIER, 1939 : 193-194. KLIE, 1944 : 16-17. KISS, 1960 : 21. HARTMANN, 1964 : 144-145. MCKENZIE, 1971a : 265.

*Cypris labiata* ROME, 1962 : 128-132, fig. 34(A-V) nov. syn.

TYPE LOCALITY

Androy, southern part of the island of Madagascar.

TYPE MATERIAL

1. of *C. decaryi* : assumed lost.
2. Syntypes of *C. labiata* ROME : KBIN coll. Tang. 19, label 'Tang. stat. 58, Ujiji 9/1/1947, Det Dom. R. ROME 1962'. Two tubes : 14 adult ♀ + 5 larvae in first tube; c. 30 adult + juvenile ♀ in second tube. All specimens decalcified, the majority also crushed to some extent.

*Distribution* :

Africa, south of the Sahara, except in tropical West- and Central Africa; India and Malaysia; probably a global circumtropical species.

*Diagnosis* :

A relatively small species, with dorsal margin highly arched, in dorsal view pointed on both anterior and posterior extremities and with lateral margins evenly rounded; in ventral view right anterior valve margin strongly asymmetrical and extends lip-like; left anterior selvage inwardly displaced over a short distance only. LV without a row of tubercles between ventro-caudal valve margin and inner margin.

♂ (first description) : slightly more elongated than ♀, hemipenes with ventral lobe of lateral shield (vls) pointed, dorsal lobe small and narrow; medial shield asymmetrically produced towards the ventral side, with distal margin nearly straight. Left prehensile palp with terminal segment long and narrow, distally tapering. Right prehensile palp with a squarish distal margin, relatively narrow when compared with the other members of the genus.

*Measurements* (in  $\mu\text{m}$ , mean ± SD) :

♀ (Bujumbura, n=5) L = 1645 ± 63, H = 1097 ± 36, W = 1203 ± 61, W/L = 0.70-0.75. (Namibia, n=5) L = 1810 ± 74, H = 1165 ± 66, W = 1341 ± 108, W/L = 0.69-0.77. (Somalia, n=2) L = 1483-1586, H = 948-965.

♂ (OC.1515) : (RV) : L = 1448, H = 896. (LV) : L = 1500, H = 896.

Due to extreme decalcification of the material of *C. labiata*, no accurate new measurements were possible.

*Remarks* :

*C. decaryi* is widespread in the subtropical zone of Africa. It was also found in other parts of the world; see for example good illustrations of this species by NEALE (1976b) on material from Sri Lanka. In all probability, it also occurs in South America. Although this species occasionally occurs south of the Tropic of Capricorn, its global distribution can most adequately be described as circumtropical.

*Cypris labiata* ROME, 1962, from the surroundings of Lake Tanganyika, but not from the lake itself, is doubtlessly a synonym of *C. decaryi*. All round shape and size of the valves of *C. labiata* match the range of variability of *C. decaryi*, while the former nominal taxon also has the typical lip-like produced ventral projection of the anterior

Fig. 6 (p. 137) : *Cypris galefensis* n.sp. (A-D, Somalia), *Cypris elburensis* n.sp. (E-G, ♀ MCSN.1306, Somalia) and *Cypris bispinosa* (♀, H-I, redrawn after MAST, 1909).  
*C. galefensis* : A. ♀, right A2 in lateral view, detail of apical chaetotaxy (MCSN.1305). B. ♂, idem (OC.1529). C. ♂, T1 (OC.1529). D. ♀, T1, epipodite (MCSN.1305).  
*C. elburensis* : E. genital operculum. F. rake-like organ. G. palp of Mx2.  
*C. bispinosa* : H. LV, internal view. I. outline of RV in dorsal view. (L of valves = c. 3 mm for both figures).  
 Scale : 156  $\mu\text{m}$  for C-E,G; 81  $\mu\text{m}$  for A,B,F.

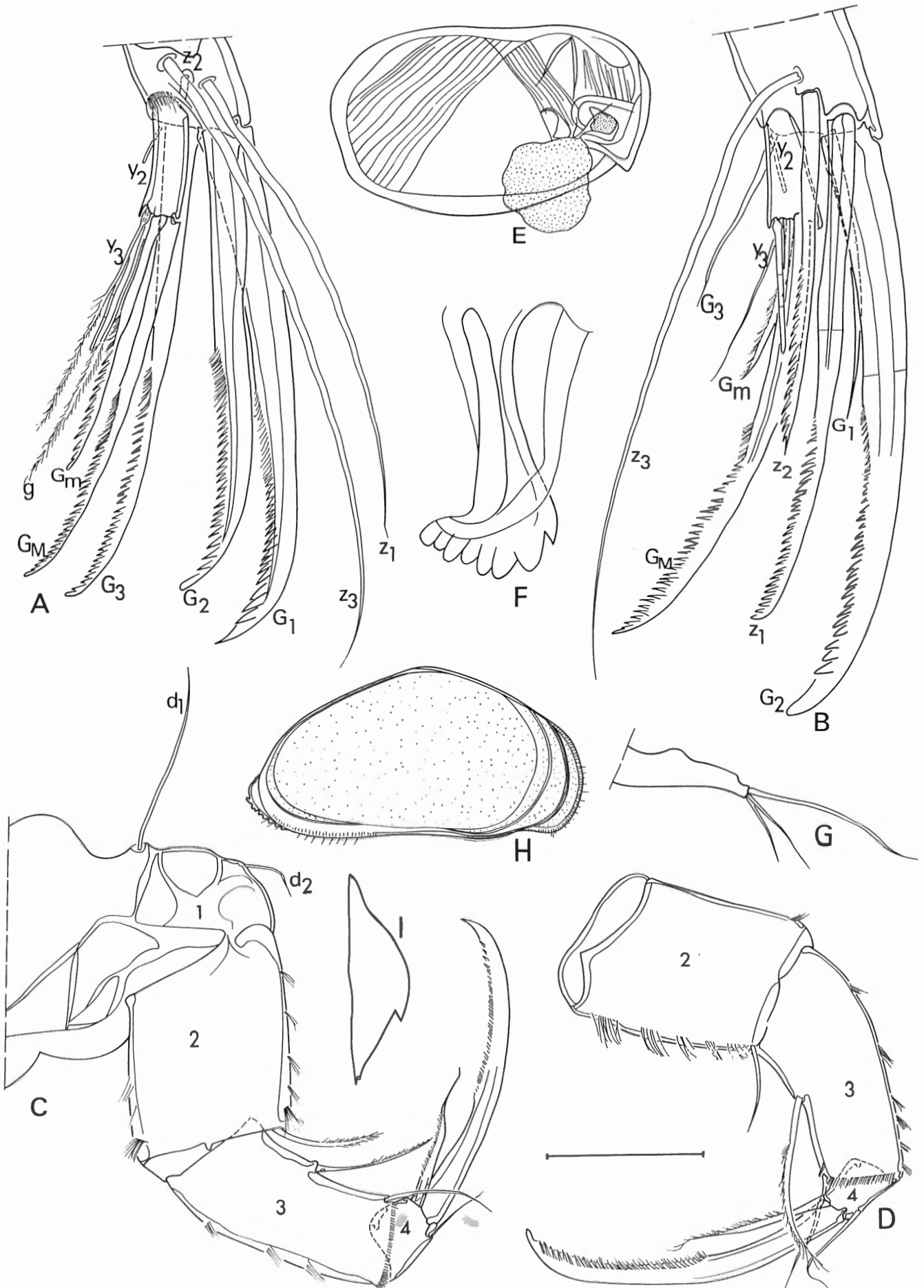


Figure 6 (caption p. 136)

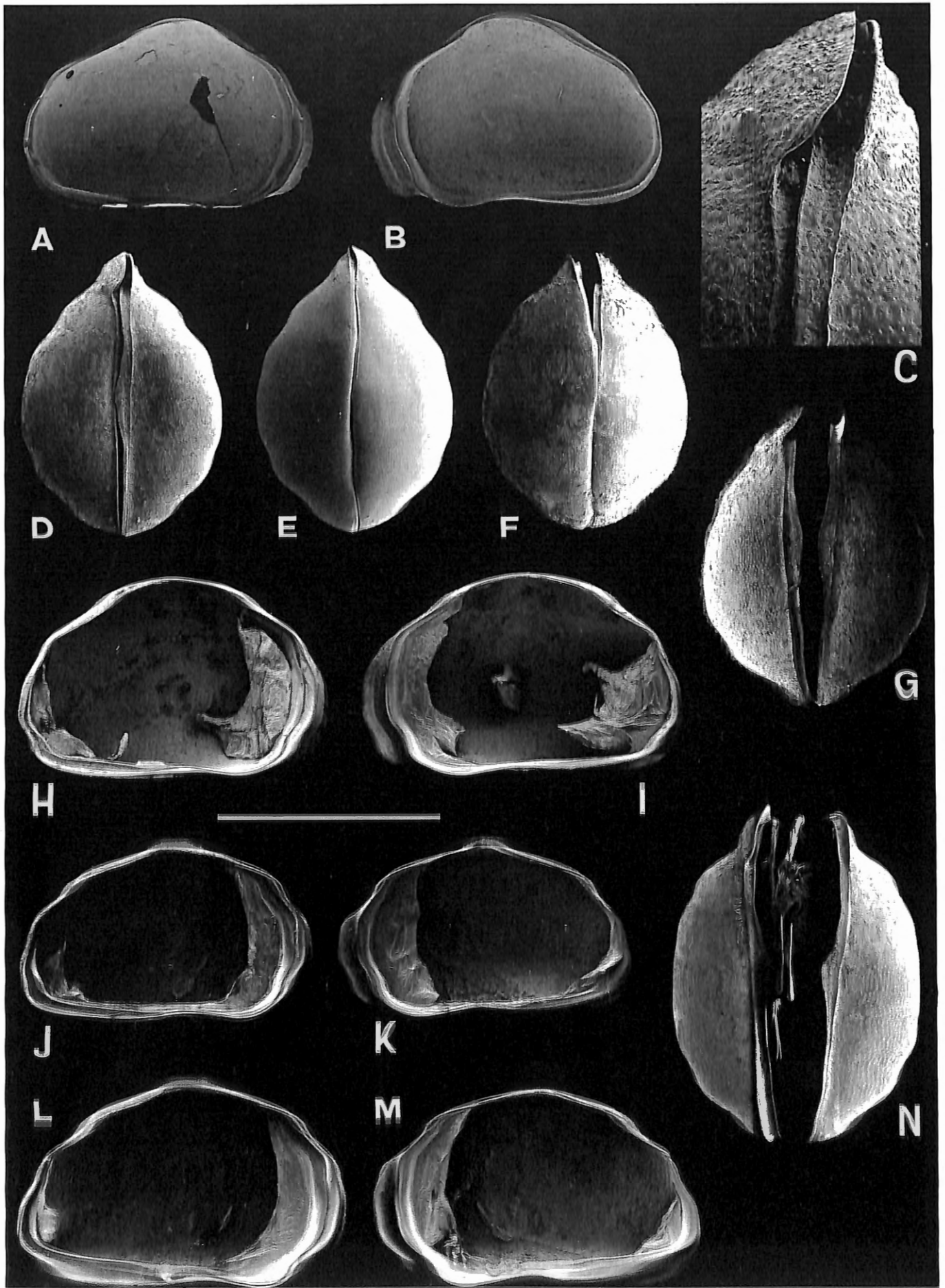


Figure 7 (caption p. 139)

valve margin in the RV (hence even its specific name). *C. labiata* ROME, 1962 is also a junior homonym of *C. labiata* SARS, 1901, described from South America and later transferred to *Chlamydotheca*. Through the present synonymy, however, this problem of homonymy disappears.

The Oslo-museum possesses a tube, labelled "Cypris labiata, Syd- Afrika?". The specimens contained in this tube, however, clearly belong to the above mentioned *Chlamydotheca labiata*. A similar locality indication was found in a tube with *Neocypris gladiator*, described in the same paper. Both tubes form part of the SARS-collection of South American material and these taxa do not belong to the African fauna.

### *Cypris elburensis* n.sp.

(Figs. 3(F,G), 6(E-G), 12(A-C))

#### TYPE LOCALITY

Subterranean waterbody at El Bur, Somalia (approx. coordinates : 04°40'N, 46°37'E). Waters at this locality were surprisingly rich in Ca, Mg and SO<sub>4</sub>. The species is named after its type locality.

#### TYPE MATERIAL

3 adult ♀ + 1 stage 8 larva, collected from the above locality by Drs. G. MESSANA and L. CHELAZZI (Firenze, Italy) on 5.12.1982 (sample OS.120). No other ostracod species were present in this material.

Holotype : a ♀, with soft parts dissected in glycerine on a sealed slide and with valves stored dry (MCSN.1306).

Paratypes : the remaining 3 specimens (used for SEM) are the paratypes of this new species (nos. OC.1553 and MRAC.56778).

Deposition : the holotype is lodged in the MCSN (Firenze), two paratypes are kept in the KBIN (Brussels), the third paratype is lodged in the MRAC (Tervuren).

#### Diagnosis :

Valves in lateral view subtriangular, without an angle between dorsal and caudal margins; dorsal margin in both valves showing a characteristic internal overlap. LV ventro-caudally only with traces of tubercles on the inner lamella, ventral margin nearly straight, in the anterior third with a weak sinuation. Cp in dorsal view with lateral sides evenly rounded, greatest width situated slightly behind the

middle. Surface of valves set with shallow ridges. Soft parts without special features. ♂ unknown.

#### Measurements (in µm) :

♀ (toto) L = 1776-1845 (n=2), H = 1121 (n=1), W = 1396 (n=1), W/L = 0.76 (n=1). ♀(RV) L = 2207, H = 1293. (LV) L = 2172, H = 1379 (n=1).

#### Remarks :

See under the following species.

### *Cypris galefensis* n.sp.

(Figs. 5(F-K), 6(A-D), 7N, 8)

#### TYPE LOCALITY

Subterranean waterbody at Gal Ef, Somalia (approximate coordinates : 04°12'07"N, 46°28'10"E). Accompanying ostracod fauna : *Plesiocypridopsis* n.sp., *Potamocypris chelazzii* MARTENS, *Sclerocypris pardii* MARTENS. The present new species is named after its type locality.

#### TYPE MATERIAL

All type material was collected from the above locality by Drs. G. MESSANA and L. CHELAZZI on 2.12.1982. OS.111 : 14 ♂+♀. OS.112 : 25 ♂+♀. OS.113 : c. 30 ♂+♀.

Holotype : a ♂, with soft parts dissected in glycerine on a sealed slide and valves stored dry (no. MCSN.1304).

Allotype : a ♀, dissected and stored as the holotype (no. MCSN.1305).

Paratypes : all other specimens are paratypes (nos. KBIN.-OC.1524-1225 and MRAC.56777).

Deposition : the holotype and the allotype are lodged in the MCSN (Firenze). Two ♀ paratypes are kept in the MRAC (Tervuren), the remaining paratypes are lodged in the KBIN (Brussels).

#### Diagnosis :

Relatively small species, very elongated, in dorsal view pointed anteriorly and rounded posteriorly, with lateral sides running straight and parallel to each other over 1/4-1/3 of their total length. In ventral view, the lip-like right anterior valve margin less produced than in *C. decaryi*. In lateral view, left anterior selvage narrow; LV in both sexes posteriorly with a row of tubercles between selvage and inner list. ♂ even more elongated than ♀, hemipenes and prehensile palps similar to *C. decaryi*.

Fig. 7 (p. 138) : *Cypris decaryi* (A-M) and *C. galefensis* n.sp. (N). (A-E from Ethiopia, F-I from Namibia and J-N from Somalia). *C. decaryi* : A. ♀, LV, internal view (OC.1521). B. ♀, RV, internal view (OC.1521). C. ♀, Cp, ventral view, detail of anterior edge (OC.1521). D. ♀, Cp, ventral view (OC.1521). E. ♀, Cp, dorsal view (OC.1519). G. ♀, Cp, ventral view (OC.1520). H. ♀, LV, internal view (OC.1518). I. ♀, RV, internal view (OC.1518). J. ♀, LV, internal view (OC.1517). K. ♀, RV, internal view (OC.1517). L. ♂, LV, internal view (OC.1515). M. ♂, RV, internal view (OC.1515). *C. galefensis* : N. ♀, Cp, ventral view (MRAC.56777). Scale : 1389 µm for A,B,D-G; 1111 µm for H-N; 347 µm for C.

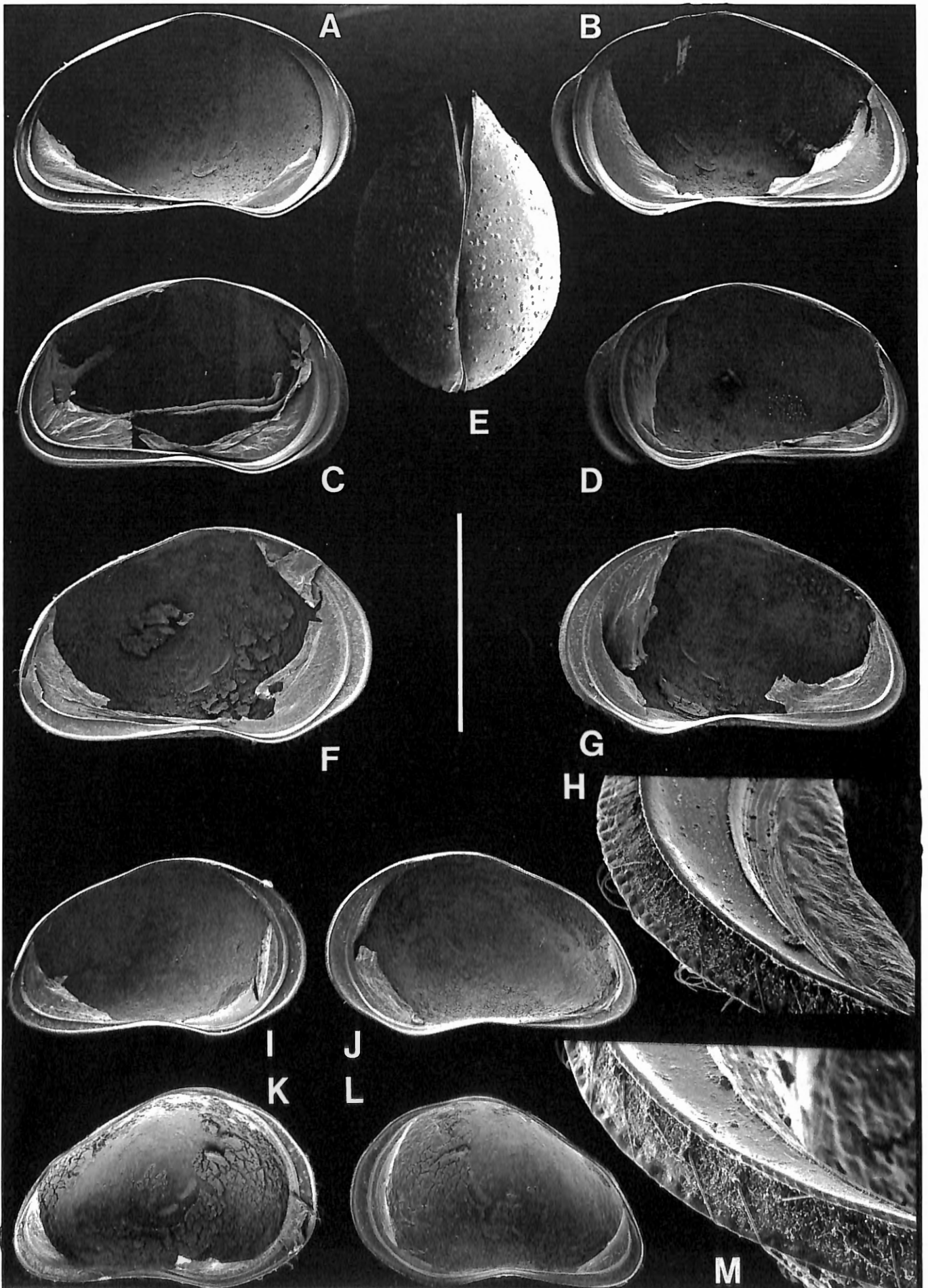


Figure 8 (caption p. 141)

## Description of larval stages :

Little is known about the larval morphology in the various groups of freshwater ostracods. Nevertheless, ontogeny can offer valuable information when attempting to construct Linnean hierarchies or when performing cladistic analyses (MARTENS & COOMANS, 1990). As long series of specimens of *C. galefensis* n.sp. were available, we will here offer brief descriptions of the larval stages present in the material.

## 8TH LARVAL STAGE (♂, no. OC.1530, Figs. 8F-H)

Outline of valves generally as in adults, caudal margin slightly more pointed and dorsal margin somewhat more sloping to the caudal side. Valve margins, however, drastically different. RV with anterior selvage still inwardly displaced, but far less so than in the adult, and with valve margin furthermore not produced to form a lip-like structure; additionally with a prominent inner list along the entire anterior margin; the latter margin furthermore weakly crenulated. LV also with a prominent anterior inner list, but with selvage completely missing. Caudal inner list in both valves caudally situated on the inner margin.

A2 with 5 long natatory setae (short one missing). Md-palp with gamma-seta flanked by two (not three) other setae, beta-seta slightly hirsute, alpha-seta as in adult. Mx1 with length of second palp segment c. 2.5-3 times basal width; claws on third endite serrated. Mx2 with palp already of the '*Candona*'-type, i.e. dilated and of irregular shape, but still consisting of 1 segment only, and with a long lateral seta. T1 with setae d1 and d2 short and subequal; penultimate segment fused; terminal seta claw-like. T2 with all segments much shorter than in the adult. Furca with complete chaetotaxy; ramus much shorter and wider than in the adult.

## 7TH LARVAL INSTAR (♀, OC.1531, Figs. 8I-J)

Both valves with dorsal margin more sloping and with caudal margin even more pointed than in the 8th larval stage. Anatomy of valve margins basically as in the final instar, but anterior selvage of RV now submarginal.

A2 with 4 long natatory setae and 2 'z'-setae. Md-palp with gamma-seta flanked by one other seta only. Mx1 with distal palpsegment c. 2-2.5x basal width; claws on third endite serrated. T1 with seta d1 missing, d2 short; penultimate segment fused. Furca with ramus still shorter and wider; 2 claws and 2 setae, but distal seta minute.

## 6TH LARVAL INSTAR (♀, OC.1532, Figs. 8K-M)

Valves with typical 'larval' shape in lateral view, i.e. with the posterior part poorly developed, short and narrow, but with anterior margin still broadly rounded. Anterior inner lists in the larval stage nearly on the inner margin. Anterior selvage of RV even more submarginally situated.

A2 with 3 long natatory setae and 2 'z'-setae. Md-palp with gamma-seta now isolated; alpha-seta long. Mx1 with distal palp segment c. 2-2.5x basal width; claws on third endite serrated. T1 with seta d1 missing, d2 minute; penultimate segment fused and without lateral seta. Furca with ramus c. 5x basal width; distal seta missing; distal claw short, c. 1/2 the length of the proximal claw, the latter longer than ramus; proximal seta well developed.

## Remarks :

Three species of *Cypris* are here reported from Somalia and all three are closely related: *C. elburensis* n.sp. and *C. galefensis* n.sp. are both new and the common *C. decaryi* is here found for the first time in bisexual populations. *C. elburensis* n.sp. has a very typical subtriangular shape in lateral view, with a nearly perfectly straight ventral margin. It can be quite variable in size, but is generally larger than the other two species (up to 2.2 mm). *C. galefensis* n.sp. is much more elongated in lateral view than *C. decaryi*, and has a row of tubercles between the selvage and the inner margin on the ventro-caudal side of the LV. These two features are sufficient to distinguish this species from *C. decaryi*. Indeed, although the latter taxon shows some variability in the shape of its valves, it is never so elongated as is *C. galefensis* n.sp. The H/L ratio is therefore sufficient to key out both species.

It is here believed that both new taxa are endemic to Somalia, as are most ostracod species thus far described from this country (MASI 1925, MARTENS 1982, 1987).

***Cypris latissima* (G.W. MÜLLER, 1898)**  
(Figs. 9(G-M))

*Eurycypris latissima* G.W. MÜLLER, 1898 : 264, pl. 13(15-21).

*Eurycypris neumanni* G.W. MÜLLER, 1900 : 259-261, pl. 23(14-21).

*Cypris neumanni* : DADAY, 1910a : 165-166, pl. 9(14-17); 1910b : 257-258; 1910c : 194. KLIE, 1938 : 374-375; 1944 : 16.

*Cypris inflata* DADAY, 1910a : 164-165, pl. 9(9-13) (= juvenile !) nov. syn.

Fig. 8 (p. 140) : *Cypris galefensis* n.sp. (Somalia). A. Adult ♀, LV, internal view (MCSN.1305). B. Adult ♀, RV, internal view (MCSN.1305). C. Adult ♂, LV, internal view (MCSN.1304). D. Adult ♂, RV, internal view (MCSN.1304). E. Adult ♂, Cp, dorsal view (OC.1525). F. ♀ (8th larval instar), LV, internal view (OC.1530). G. ♀ (8th larval instar), RV, internal view (OC.1530). H. ♀ (8th larval instar), RV, internal view, detail anterior in tilt (OC.1530). I. ♀ (7th larval instar), LV, internal view (OC.1531). J. ♀ (7th larval instar), RV, internal view (OC.1531). K. ♀ (6th larval instar), LV, internal view (OC.1532). L. ♀ (6th larval instar), RV, internal view (OC.1532). M. ♀ (6th larval instar), RV, internal view, detail anterior in tilt (OC.1532).

Scales : 1111 µm for A-E; 781 µm for F-G; 595 µm for I-J; 439 µm for K-L; 133 µm for H; 60 µm for M.

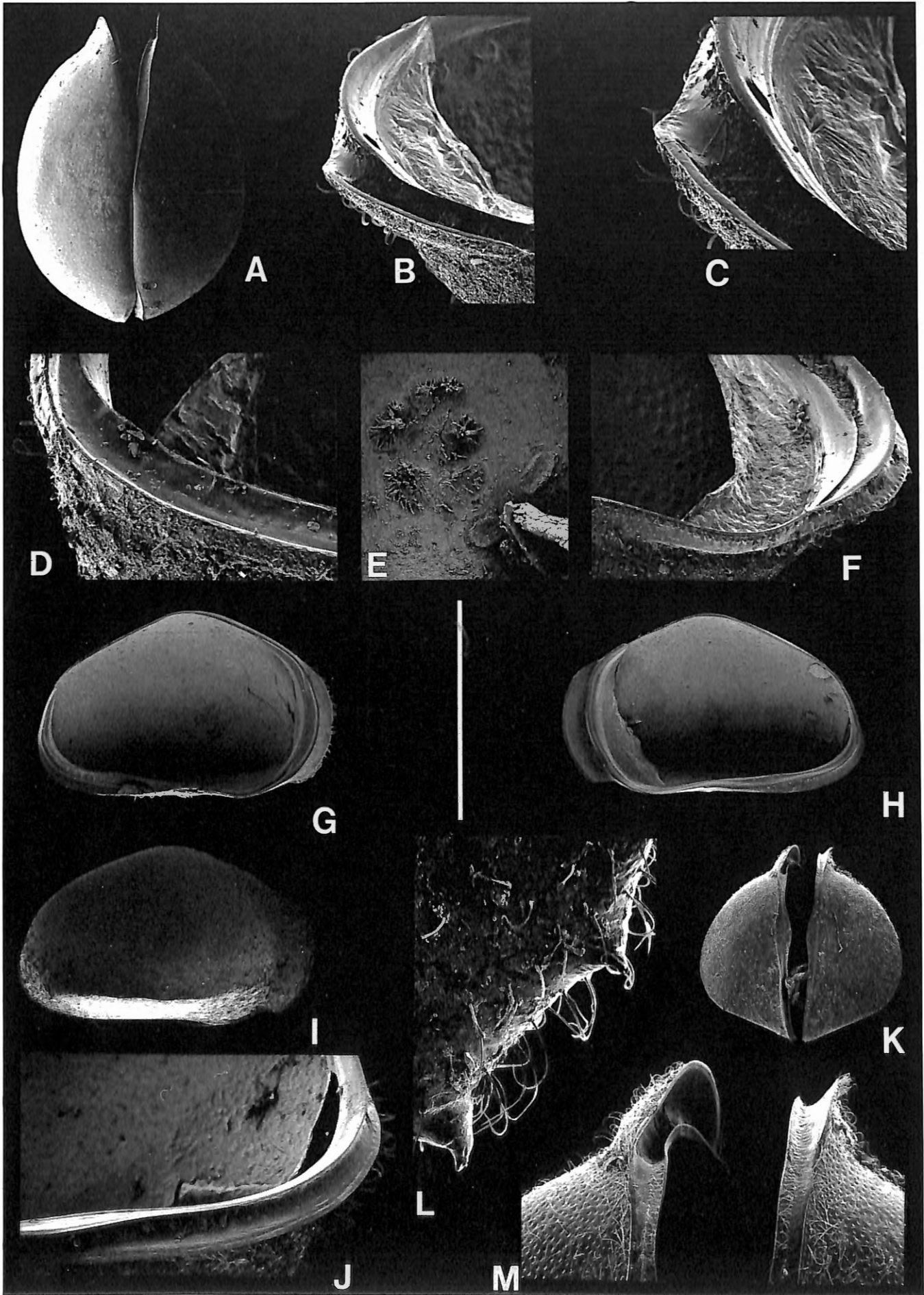


Figure 9 (caption p. 143)



*Cypris latissima* : G.W.MÜLLER, 1912 : 179. BREHM, 1939 : 116-118, fig. 14. GAUTHIER, 1939 : 189-193, fig. 12(a-j). KLIÉ, 1939 : 106-108. KISS, 1960 : 20-21. HARTMANN, 1964 : 145. ?McKENZIE, 1971a : 172.

*Cypris connica* LOWNDES, 1936 : 17, fig. 4(H-M).

#### TYPE LOCALITY

Morondava, Madagascar. Paratypes of this species are curated in the zoological collections of the Ernst-Moritz-Arndt Universität at Greifswald (GW - Dr. G. MÜLLER, pers. comm. 6.3.1985).

#### Diagnosis :

Both valves with long lateral ala (at least 1/2 to 2/3 of the entire length), carrying short spines (number is variable). Carapace in dorsal view wide ( $W > 0.8 \times L$ ); anterior tip of LV curving to the exterior; lateral sides rounded, greatest width situated at c. 2/3 of the anterior; posterior margin bluntly pointed. LV relatively short and high. Soft parts without special features. ♂ unknown.

*Measurements* (♀ from Bujumbura, in µm, mean ± SD, n=5) :

(toto) L = 1979 ± 67, W = 1731 ± 51, W/L = 0.83-0.91.

(RV) L = 2034 ± 129, H = 1241 ± 91,

(LV) L = 2034 ± 136, H = 1276 ± 98.

#### Remarks :

*C. latissima* is a widespread and easily recognisable species, it can at once be distinguished from most African congeners by its superior width. Furthermore, only the closely related *C. puberoides* also has lateral ala with small spines. This species, however, is less wide and has a different shape of the valves (both in dorsal and in internal view - see below),

HARTMANN (1964) reported *C. latissima* from India, but his identifications were later referred to *Cypris dravidensis* by VICTOR & FERNANDO (1979). For this decision, these authors relied on the re-description of the so-called type material of *C. latissima* offered by SWAIN & GILBY (1969). According to this paper, there are two specimens in the British Museum labelled 'type' and these were used for their illustrations. However, as was already mentioned by SYLVESTER-BRADLEY in the discussion following that paper, the identity of these specimens should be doubted, as they by no means match the descriptions offered by

G.W. MÜLLER (1898 : plt 13(14-21)) for *C. latissima* itself and (1900 : plt 23(14-21)) for *C. neumanni*, the latter correctly synonymized with *C. latissima* by GAUTHIER (1939). The specimens illustrated in the present revision do agree with the above descriptions. Relying on the drawings offered by SWAIN & GILBY (loc. cit.), I suspect that they were dealing with quite another species of *Cypris*, perhaps *C. decaryi* (see above), but definitely not with *C. latissima*. Therefore, I see no reason not to accept HARTMANN'S identification of this species from Indian inland waters. NEALE (1977) furthermore offered excellent illustrations of specimens from Sri Lanka, which conform in nearly every detail to the descriptions of *C. latissima*, the only difference being the absence of spines on the lateral ala, a feature which is indeed known to be quite variable in this species. The number of spines was indeed primarily used to distinguish between *C. neumanni* and *C. latissima*. We can thus conclude that *C. latissima* also occurs outside Africa, and should probably be regarded as a global circumtropical species, and hence that the validity of *C. dravidensis* needs to be re-evaluated.

### *Cypris puberoides* VAVRA, 1897

(Figs. 10, 11(A-D), 12(D-H))

*Cypris puberoides* VAVRA, 1897 : 27-28, fig. 11(1-6).

#### TYPE LOCALITY

Ugogo, Tanzania.

#### TYPE MATERIAL

ZMB 9498 (tube with specimens in spirit). Label : "Cypris puberoides, Deutsch Ost-Afrika (Tanzania) Ugogo, EMIN PASCHA u. STUHLMANN, 3/7/1890". 5 adult ♀ + 1 adult ♂ + c. 100 larvae (mainly stage 6 and 7), all slightly decalcified, but generally in good condition.

Lectotype (here designated) : a ♂, with soft parts dissected in glycerine and valves stored dry (3 slides : nos. ZMB.4140-2). All other specimens become paralectotypes.

#### Diagnosis :

Valves relatively elongated, as in the preceding species with lateral ala with at least one short spine, but these ala prominent over less than 1/4 of the length of the valves,

Fig. 9 (p. 142) : *Cypris galefensis* n.sp. (A), *Cypris decaryi* (B-F) and *Cypris latissima* (G-M) (all ♀, A-D,F from Somalia, E from Namibia, G-M from Zaire).

*C. galefensis* : A. Cp, dorsal view (OC.1525).

*C. decaryi* : B. RV, internal view, detail anterior in tilt (OC.1517). C. Idem. D. LV, internal view (detail posterior in tilt) (OC.1517). E. LV, internal view, detail of central muscle scars (OC.1518). F. LV, internal view (detail anterior in tilt) (OC.1517).

*C. latissima* : G. LV, internal view (OC.1534). H. RV, internal view (OC.1534). I. RV, external view (OC.1534). J. RV, internal view, detail posterior in tilt (OC.1534). K. Cp, ventral view (ZIZM/K.34669a). L. RV, dorsal view, detail of lateral spines (OC.1535). M. Cp, ventral view (detail anterior) (ZIZM/K.34668a).

Scale : 2222 µm for K; 1563 µm for G-I; 1111 µm for A; 543 µm for J,M; 417 µm for E,F; 373 µm for B; 197 µm for L; 189 µm for C,D.

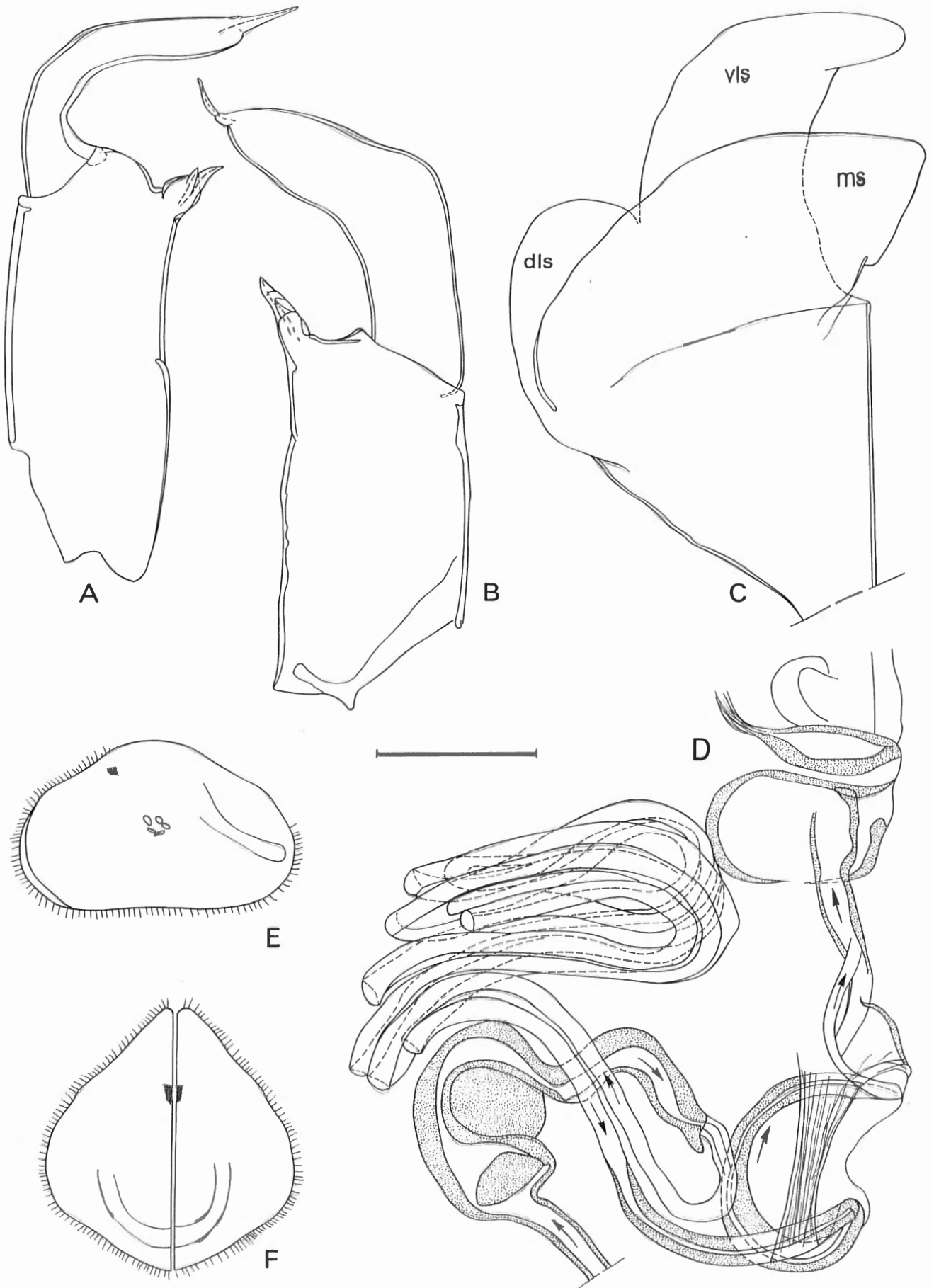


Figure 10 (caption p. 145)

Carapace in dorsal view less wide than *C. latissima* and with posterior edge more pointed than in that species; anterior tip of LV in dorsal view not curved exteriorly. Hemipenis with vls short and wide, with a narrow and rounded tip, dls minute and evenly rounded; ms large and squarish. Right prehensile palp with penultimate segment relatively large. Left prehensile palp with terminal segment long and narrow, but less so than in *C. busingiensis*.

*Measurements* (in  $\mu\text{m}$ , mean  $\pm$  SD, n=3):

♀: L = 2011  $\pm$  40, H = 1213  $\pm$  26, W = 1563  $\pm$  43, W/L = 0.77-0.79.

No good ♂ specimens were available to allow measurements.

*Remarks*:

*C. puberoides* is closely related to the preceding species, yet differs from it in a number of important morphological aspects, i.e. the shape of the carapace in dorsal and in (external) lateral view. Thus far, *C. puberoides* is known from its type locality only, while *C. latissima* is widespread in the subtropics.

**Cypris subglobosa** SOWERBY, 1840  
(Figs. 4(F-L))

(for a complete list of synonymies, see MARTENS & TOGUEBAYE, 1985).

*Diagnosis*:

A very typical species, at once recognisable by the heavily pitted external surface of the valves. Anterior selvage in LV nearly submarginal, but widely inwardly displaced in the RV, the latter valve also with an elongated posterior

margin carrying spines. Both valves furthermore elongated, LV relatively higher and wider and with a more broadly rounded anterior margin than RV. Carapace in dorsal view wide, lateral sides evenly rounded and greatest width situated in the middle.

*Measurements*:

All African specimens agree well with the measurements given by MARTENS & TOGUEBAYE (1985): L = 1.35-1.44 mm (n=6).

*Remarks*:

This species is at once recognisable from all its congeners by its aberrant surface structure. It has a global circumtropical distribution, as it is now also known from Paraguay (WOUTERS, pers. comm.). Nevertheless, as the two African localities thus far known are both artificial and man-made (fishponds in South Africa, pond at University Campus in Senegal), it could very well be that this species is actually an introduced exotic on the African continent. For a good description of material from Sri Lanka, see NEALE (1976a).

**Genus PSEUDOCYPRIS** DADAY, 1908  
(non *Pseudocypris* HERBST, 1958 = *Diacypris*)

TYPE SPECIES

*P. bouvieri* DADAY, 1908 by original designation.

*Diagnosis*:

Both valves with anterior selvage submarginal; valve margins often serrated; at least LV anteriorly with a large inner list. Most species with exterior, lateral ala. T1 with penultimate segment fused, seta  $d_2$  completely missing.

Fig. 10 (p. 144): *Cypris puberoides* (A-D ♂ lectotype ZMB.4140-2, E,F ♀ paralectotypes, redraw after VAVRA, 1897). A. Left prehensile palp. B. Right prehensile palp. C. Hemipenis. D. Idem, internal anatomy. E. Cp, left lateral view. F. Cp, dorsal view.  
Scale: 156  $\mu\text{m}$  for C, 81  $\mu\text{m}$  for A,B,D.

Fig. 11 (p. 146): *Cypris puberoides* (A-D) and *Cypris busingiensis* (E-K) (all type specimens - E-H,J redrawn after KLIE, 1938). *C. puberoides*: A. ♀, genital corner (ZMB.4143-5). B. ♀, furcal attachment (ZMB.4143-5). C. ♂, furca (ZMB.4140-2). D. ♀, furca (ZMB.4143-5). *C. busingiensis*: E. ♀, Cp, frontal view. F. ♀, Cp, dorsal view. G. ♀, RV, internal view. H. ♀, LV, internal view. I. ♂, left prehensile palp (ZIZM/CR.1047a,b). J. ♂, hemipenis outline. K. ♂, right prehensile palp (ZIZM/CR.1047a,b).  
Scale: 323  $\mu\text{m}$  for B-D; 156  $\mu\text{m}$  for A; 81  $\mu\text{m}$  for I,K. Length of specimens in F-H is c. 2.8 mm.

Fig. 12 (p. 147): *Cypris elburensis* n.sp. (A-C, ♀, Somalia), *Cypris puberoides* (D-H, type specimens) and *Cypris decaryi* (I, J, Ethiopia). *C. elburensis*: A. LV, internal view (MCSN.1306). B. RV, internal view (MCSN.1306). C. Cp, ventral view (MRAC.56778). *C. puberoides*: D. ♀, Cp, ventral view (ZMB.4146). E. Idem, detail anterior (ZMB.4146). F. ♀, LV, internal view (ZMB.4143-5). G. ♀, RV, internal view (ZMB.4143-5). H. ♂, RV, internal view (ZMB.4140-2). *C. decaryi*: I. ♀, Cp, ventral view, detail posterior ('poren-warzen' arrowed) (OC.1522). J. Idem, detail anterior.  
Scale: 1587  $\mu\text{m}$  for D,F-H; 1389  $\mu\text{m}$  for A-C; 581  $\mu\text{m}$  for E; 347  $\mu\text{m}$  for J; 140  $\mu\text{m}$  for I.

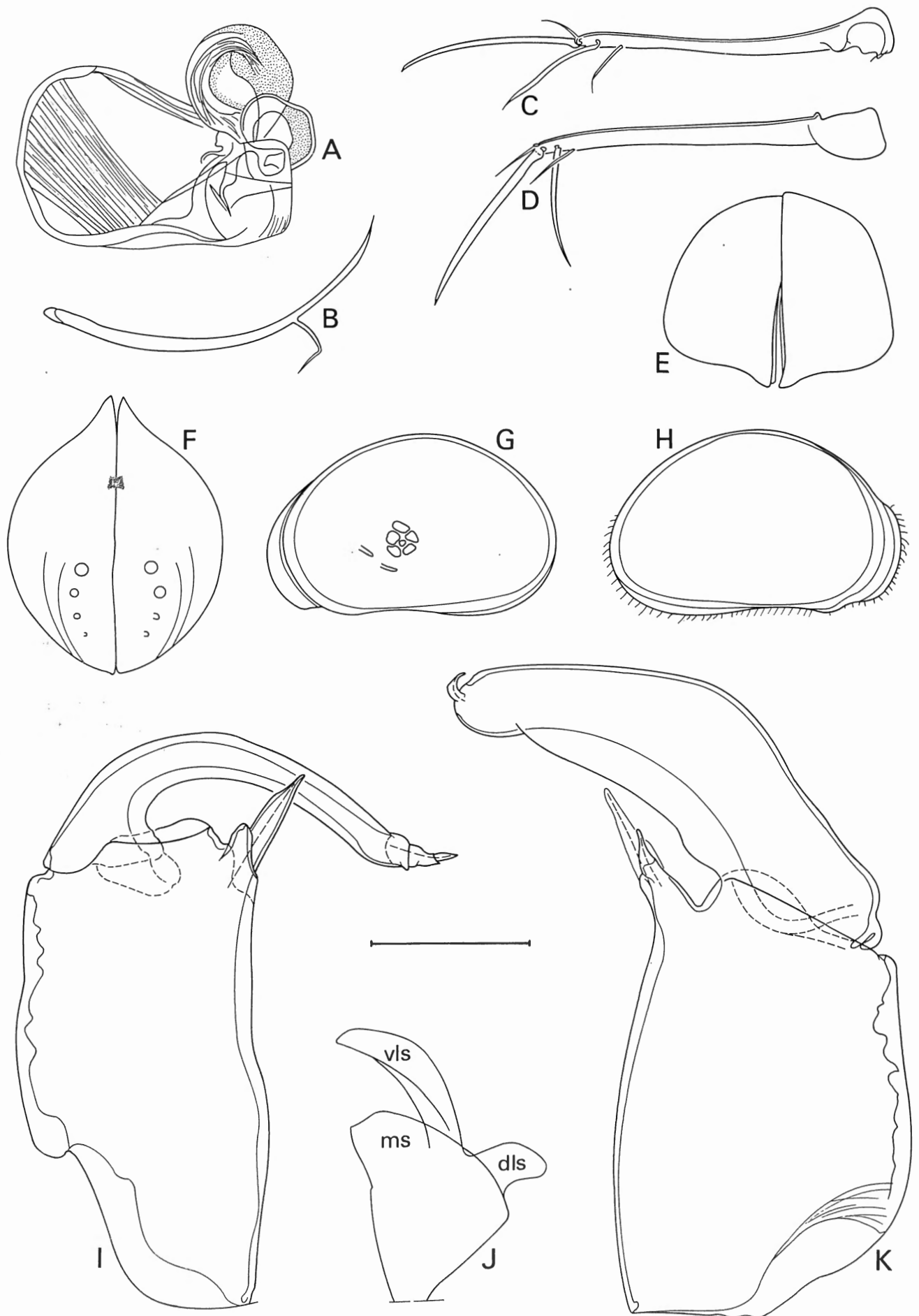


Figure 11 (caption p. 145)

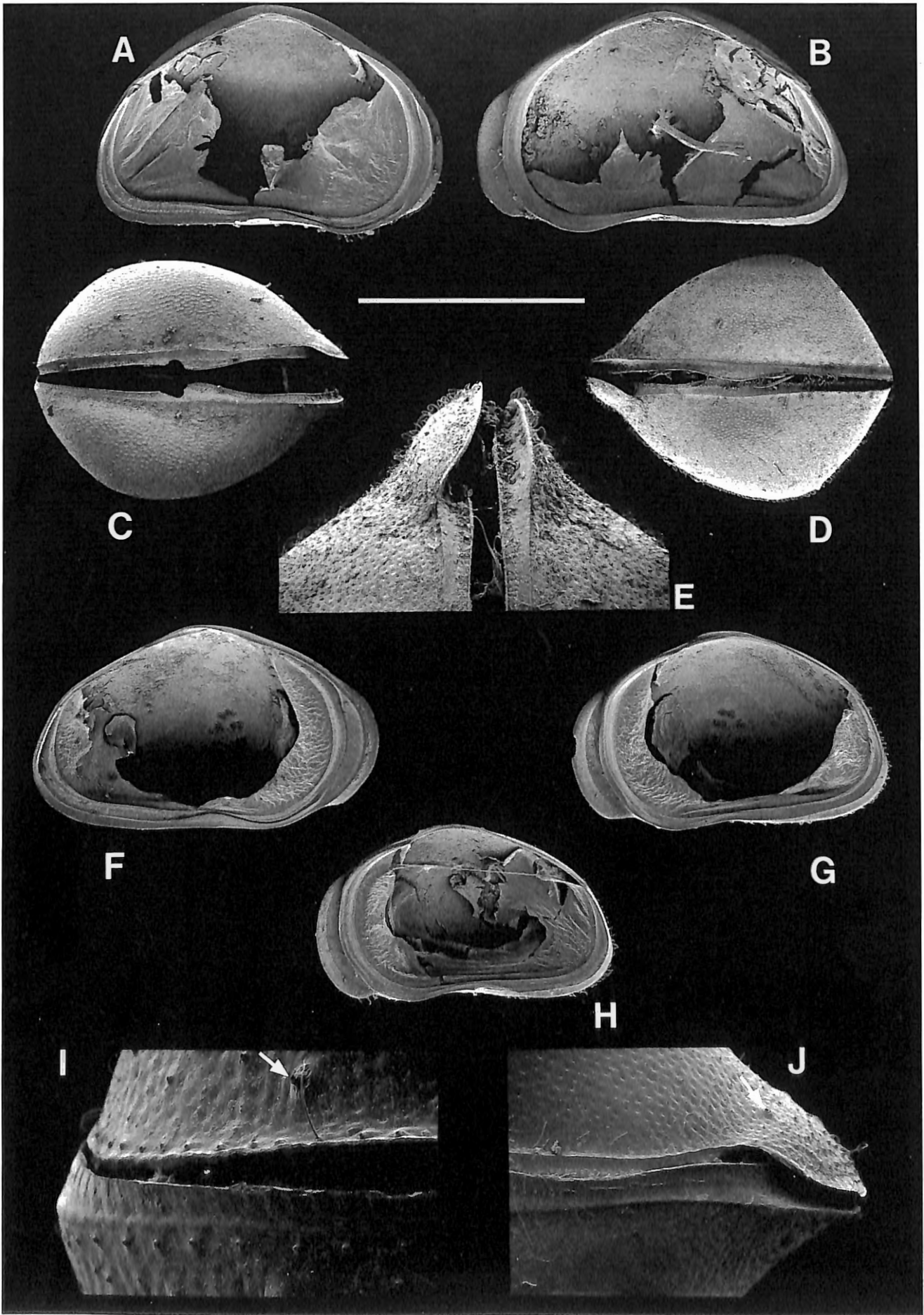


Figure 12 (caption p. 145)

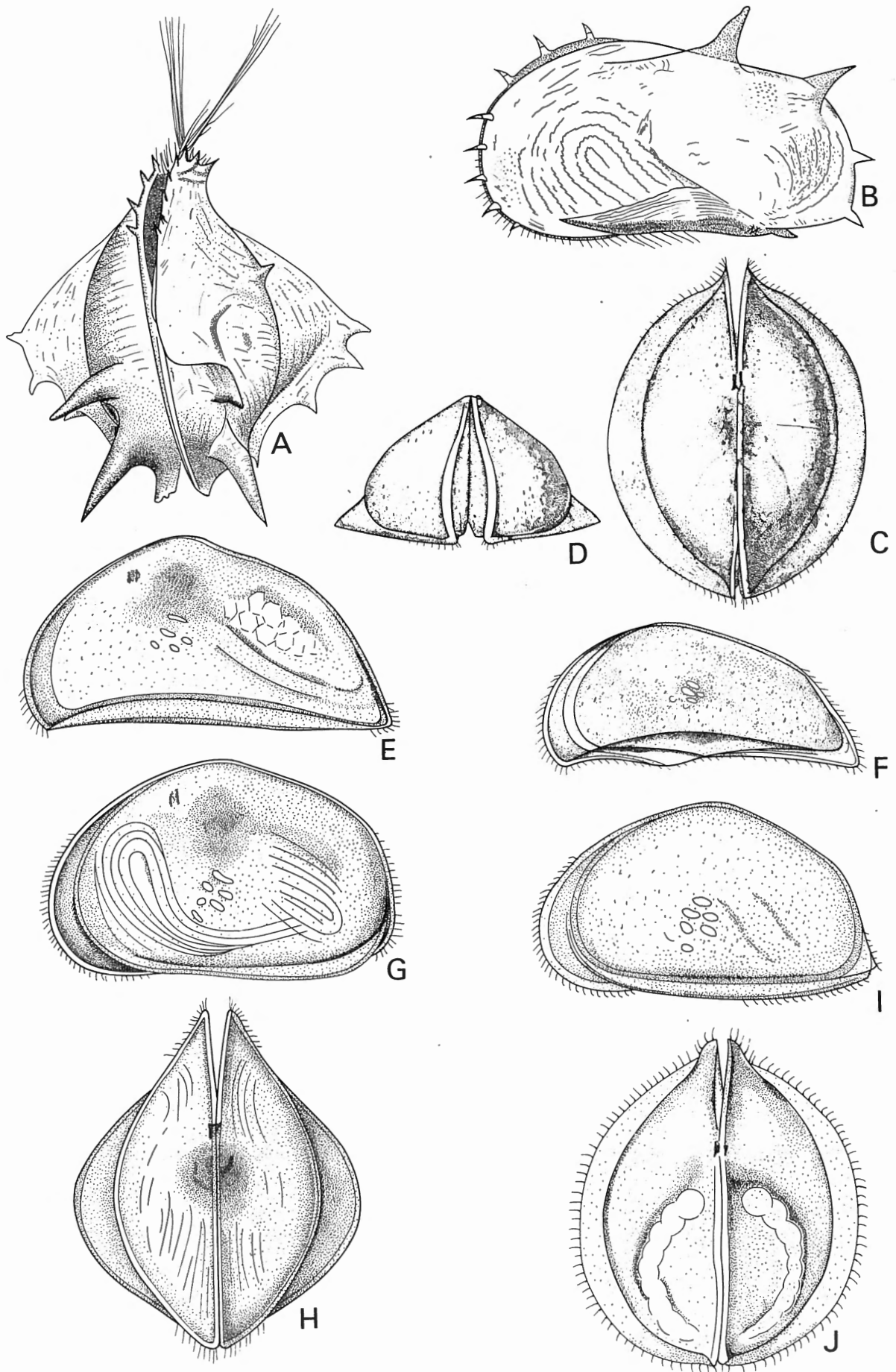


Figure 13 (caption p. 149)

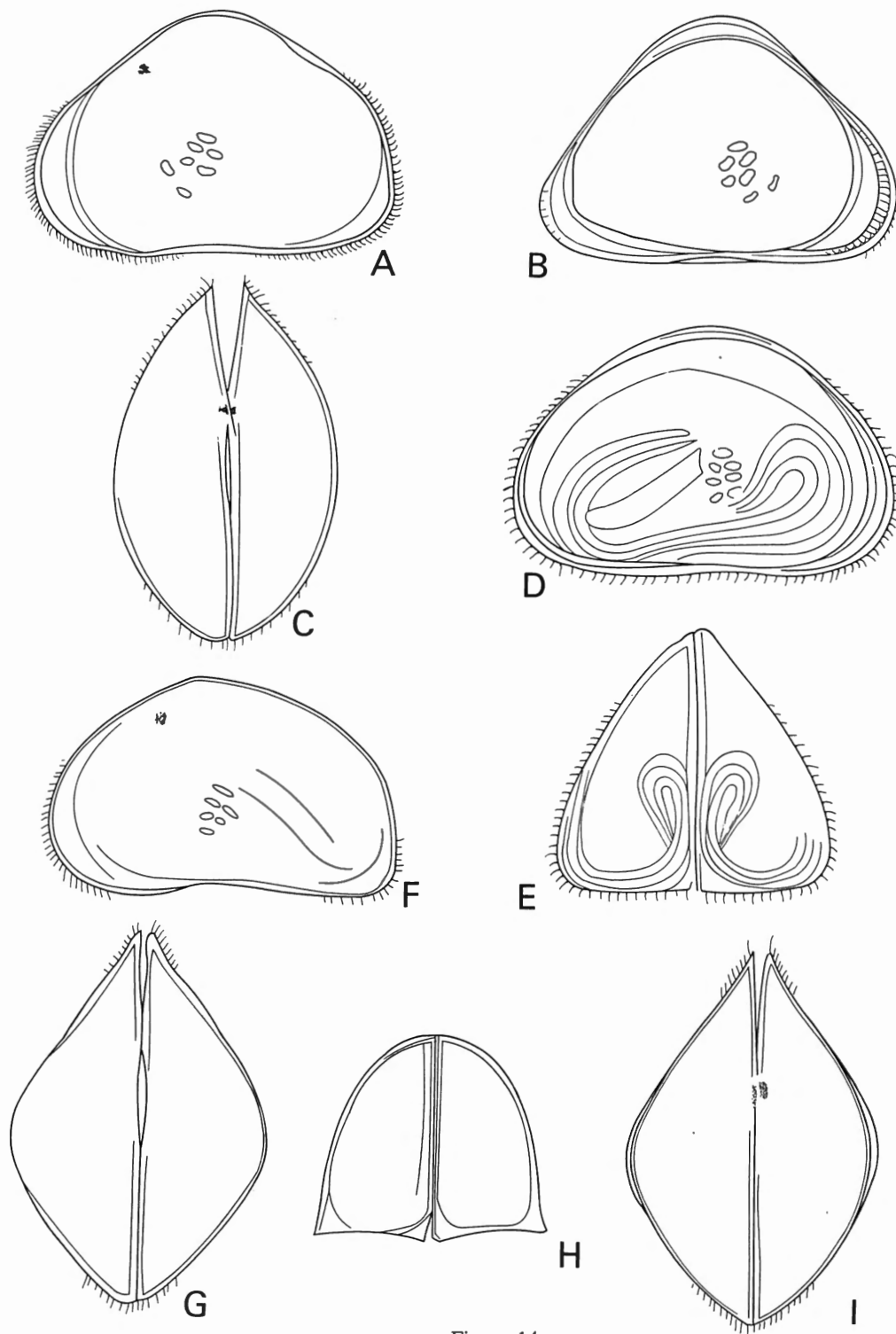


Figure 14

Fig. 13 (p. 148): *Pseudocypris spinosa*: A. ♀, Cp, ventro-lateral view (L = 3.3 mm). B. ♀, LV, external view (L = 3.3 mm).  
*Pseudocypris acuta*: C. ♀, juvenile, Cp, dorsal view (L = 2.40 mm). D. ♀, juvenile, Cp, frontal view. E. ♀, adult, Cp, left lateral view (L = 3.50 mm). F. ♀, juvenile, RV, internal view.  
*Pseudocypris expansa*: G. ♂, Cp, left lateral view (L = 2.90 mm). H. ♂, Cp, dorsal view (L = 2.90 mm).  
*Pseudocypris circularis*: I. ♀, Cp, left lateral view (L = 2.40 mm). J. ♀, Cp, dorsal view (L = 2.40 mm). (A,B redrawn after METHUEN (1910 - Proc. zool. Soc. Lond.), C-J redrawn after SARS, (1924A,B - Ann. s. afr. Mus.)).

Fig. 14 (p. 149): *Pseudocypris gibbera*: A. ♀, Cp, left lateral view (L=2.20 mm). B. ♀, LV, internal view (L = 2.20 mm). C. ♀, Cp, dorsal view (L = 2.20 mm). D. ♂, LV, internal view (L = 2.30 mm). E. ♂, Cp, frontal view.  
*Pseudocypris triquetra* (all ♀): F. Cp, left lateral view (L = 2.70 mm). G. Cp, ventral view (L = 2.70 mm). H. Cp, frontal view. I. Cp, dorsal view (L = 2.70 mm).  
 (all redrawn after SARS (1924A,B - Ann. s. afr. Mus.))

Hemipenis generally with more (6-8) '8'-shaped loops of the inner spermiductus than in species of *Cypris*.

*Distribution :*

East and southern Africa : all these taxa are discussed below. *P. patialaensis* BATTISH was reported from the Indian subcontinent (BATTISH, 1977). It is quite different from all other species in this genus; its closest congener is *P. circularis*.

*Remark :*

As will be shown below, species of *Pseudocypris* can generally be distinguished relying on the shape of the protruding ventral lobe of the lateral shield of the hemipenis. In this, they are different from the species in *Cypris*, where most hemipenes are very similar in outline.

***Pseudocypris bouvieri* DADAY, 1908**  
(Figs. 15, 16, 21D, 23(J-K))

*Pseudocypris bouvieri* DADAY, 1908 : 317-321; 1910a : 193-197, pl. 12(18-35), 13(1-6).

TYPE LOCALITY

Lake Rukwa, Tanzania.

TYPE MATERIAL

HNHM 1916-40 (IV-511). 'Lake Rikwa'. Fragments of c. 10 ♂, ♀ and juveniles. Lectotype (here designated) : a ♂, left undissected and kept in a separate tube in spirit (KM.1268). All other specimens become paralectotypes.

*Diagnosis :*

Both valves anteriorly with selvage submarginal and with a prominent inner list; ala less than one third of the width

of one valve, but equally prominent around nearly the entire circumference. Hemipenis with vls short and boot-shaped, with a long but blunt point and a rounded heel. Both prehensile palps with terminal segments long, narrow and curved. Furcal attachment with dorsal branch only weakly developed.

*Measurements :*

Lectotype : L = 1603 µm, H = 879 µm, W = 1345 µm, W/L = 0.84. All other specimens were too decalcified and/or crushed to allow reliable measurements. For the same reason, the outline of the valves could not be illustrated with S.E.M. However, two details of the anatomy of the anterior valve margins are here given.

*Additional description of ♂ :*

A2 with sexual dimorphism in chaetotaxy conform to the pattern of the tribe (see *Cypris*). Mx1 palp with distal segment c. 3 times as long as basal width; third endite with a long lateral seta and with 2 apical claws serrated. Mx2 (Fig. 16C) with a group of 4 setae on protopodite, distally of 'd'-seta, clearly separated from the bulk of the apical brush. Prehensile palps as in the diagnosis; apical sensory organs on both palps subequal. T1 (Fig. 16G) with d1 long and d2 absent; penultimate segment not divided and stout; apical seta on terminal segment claw-like. Furca (Fig. 16D) with ramus longer and narrower than in the ♀. Hemipenis (Fig. 16A) as in the diagnosis.

*Additional description of ♀ :*

Structure of valves as in the ♂. Chaetotaxy of A2 without special features. Md-palp (Fig. 15L) with both alpha and beta- setae long, narrow and smooth, gamma-seta long and relatively slender, with distal half hirsute. Md-coxa (Fig. 15M) with sigmoid setae between teeth. Mx2 (Fig. 15G) with palp short and wide, apical setae strikingly short; sometimes furthermore with an additional, short lateral seta. Furca with ramus shorter and wider (Fig. 15J) than

Fig. 15 (p. 151) : *Pseudocypris bouvieri* (A-D lectotype ♂ KM.1268; E,F ♂ paralectotype KM.1282; G-M paralectotype ♀ KM.1283). A. Cp, dorsal view. B. Cp, ventral view. C. Cp, right lateral view. D. Cp, frontal view. E. LV, internal view. F. RV, internal view. G. Mx2. H. Mx2-palp (other palp of same specimen). I. furcal attachment. J. Furca. K. T1. L. Md-palp, showing alpha, beta and gamma-setae. M. Md-coxa : molar teeth. Scale : 877 µm for A-F; 156 µm for G-K; 81 µm for L-M.

Fig. 16 (p. 152) : *Pseudocypris bouvieri* (paralectotype ♂ KM.1267). A. Hemipenis. B. Right prehensile palp. C. Left Mx2. D. Furca. E. Furcal attachment. F. Mx1 (respiratory plate not shown). G. T1, detail of terminal segment. Scale : 156 µm for A,D,E; 81 µm for B,C,F,G.

Fig. 17 (p. 153) : *Pseudocypris gibbera* (A-K, Namibia, D-E from a different population) and *Cypris busingiziensis* (L,M - paralectotypes).  
*P. gibbera* : A. ♂, LV, internal view (OC.1545). B. ♂, RV, internal view (OC.1545). C. ♀, Cp, right lateral view (OC.1546). D. ♂, LV, internal view (OC.1544). E. ♂, RV, internal view (OC.1544). F. ♀, Cp, dorsal view (OC.1546). G. ♀, Cp, ventral view (OC.1546). H. ♀, Cp, dorsal view, detail anterior (OC.1546). I. ♀, Cp, ventral view, detail anterior (OC.1546). J. ♂, RV, internal view, detail anterior (OC.1545). K. ♂, RV, internal view, detail posterior (OC.1545).  
*C. busingiziensis* : L. ♂, LV, internal view (ZIZMICR.1047c). M. ♀, LV, internal view (ZIZMICR.1047c). Scale : 1948 µm for L-M; 1724 µm for A-G; 391 µm for J; 329 µm for H-I; 164 µm for K.



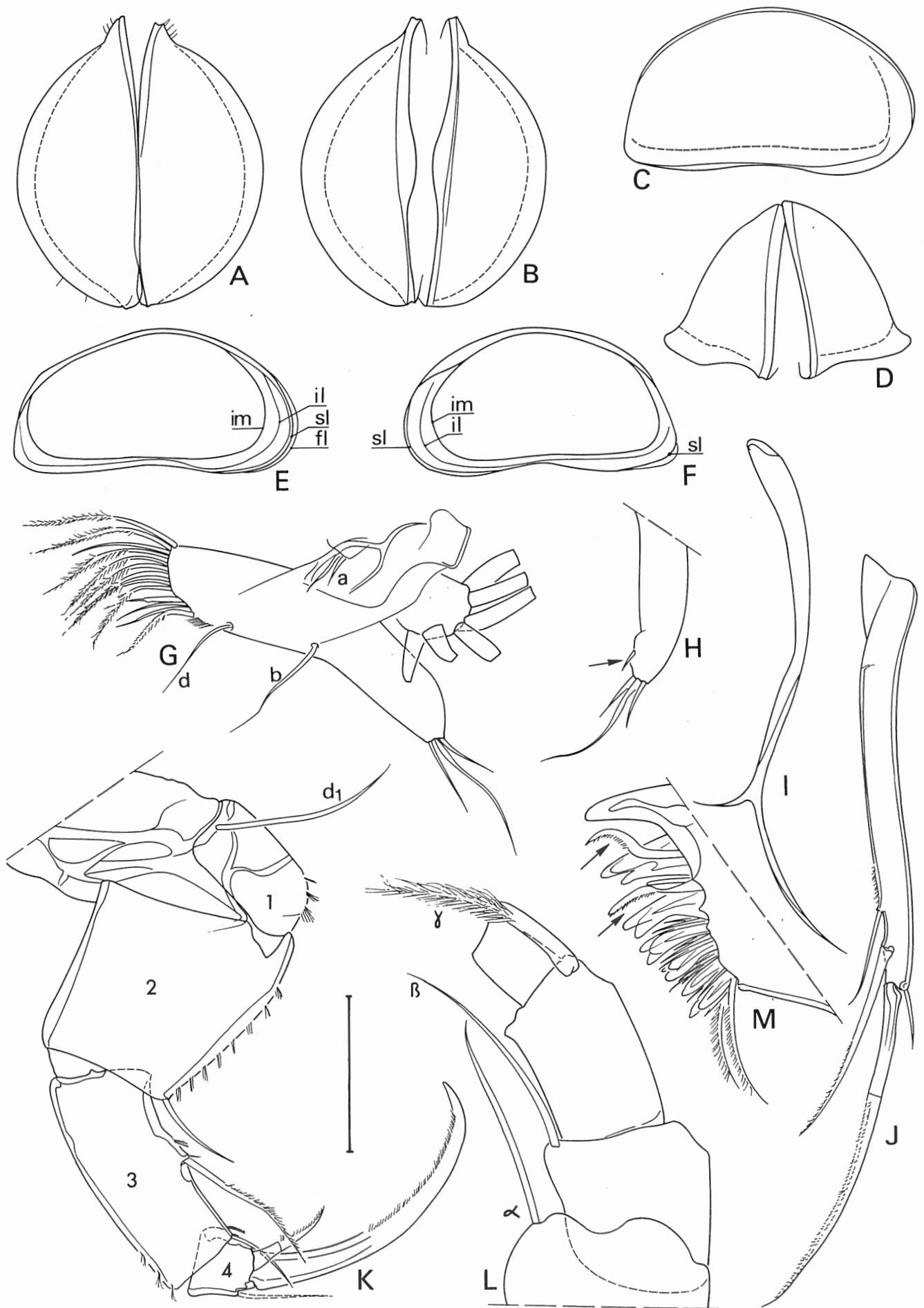


Figure 15 (caption p. 150)



Figure 16 (caption p. 150)

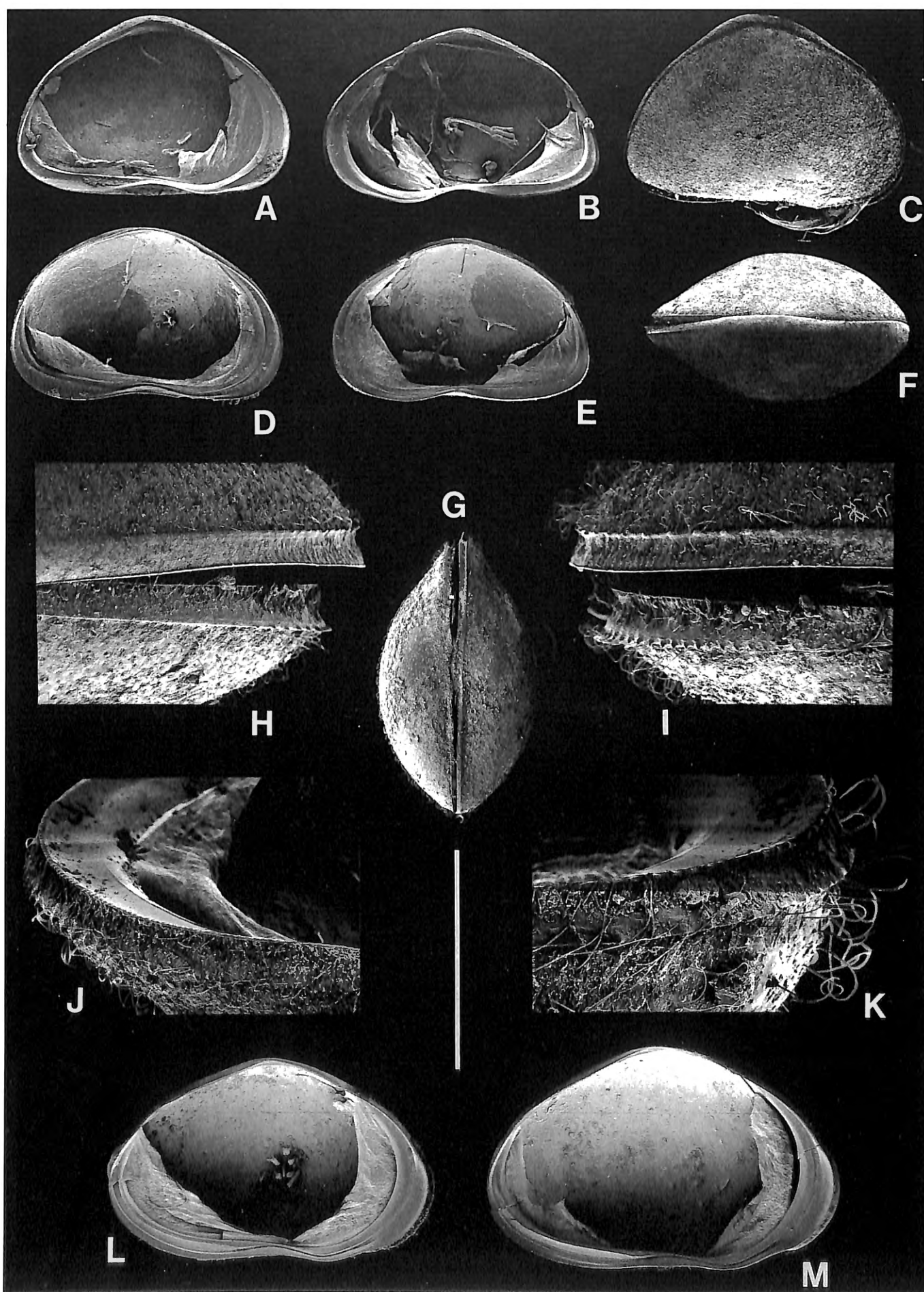


Figure 17 (caption p. 150)

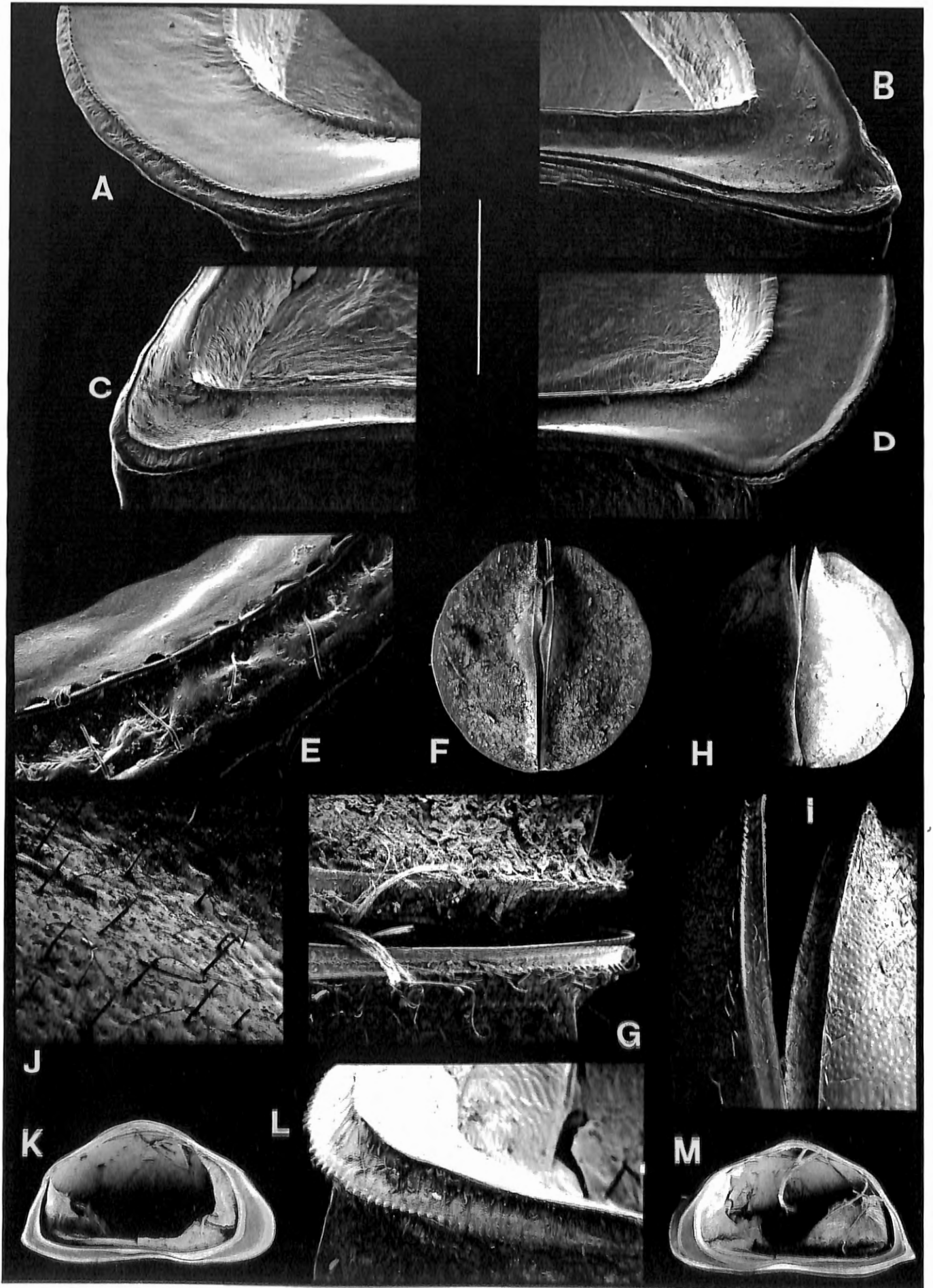


Figure 18 (caption p. 155)

in the ♂. Furcal attachment with dorsal branch better developed than in the ♂ (Fig. 15I). Other appendages as in the ♂.

***Pseudocypris acuta*** (G.W. MÜLLER, 1914)  
(Figs. 13(C-F), 18(A-E), 19(E-G), 23(L,M))

*Cypris acuta* G.W. MÜLLER, 1914 : 70-72, pl. 1(6), textfig. 1(1-9).  
*Pseudocypris testudo* Sars, 1924a : 113-114, pl. 3(11-17). nov.  
syn.

*Pseudocypris acuta* (G.W. MÜLLER) : MCKENZIE, 1971a : 173.

TYPE LOCALITY

Freshwater pool between Fishhoek and Chapmans Bay, near Plumstead (R.S.A.).

*Diagnosis* :

A large and very typical species, elongated in lateral view, elipsoid in dorsal view, with evenly rounded lateral sides. Lateral ala c. 1/3 of the width of one valve, equally prominent over nearly the entire circumference of the carapace (apart from anterior and posterior tip). In lateral view furthermore with concavely rounded ventral margin and with pointed antero- and postero-ventral corners. Selvage submarginal on both valves; valve margins not serrated. Hemipenis with vls subtriangular, wide and large; dls minute and pointed; ms rather pointed in ventral direction. Prehensile palps asymmetrical. Left palp with sickle-shaped distal segment. Right palp with distal segment hook-like, nearly equally wide over the entire length. Two sensory organs on penultimate segment of normal size and shape.

*Measurements* : (in  $\mu\text{m}$ ) ♂ (n=1) : L = 3000, H = 1483.

*Remarks* :

This species can at once be distinguished from its congeners by its typical appearance in lateral view and by the shape of the hemipenis. It is part of the indigenous Western Cape Fauna. The synonymy of *P. testudo* with *P. acuta* is obvious from the illustrations offered by both authors; the type localities are furthermore situated very close to each other (Green Point common and surroundings of Plumstead).

***Pseudocypris circularis*** Sars, 1924  
(Figs. 13(I,J), 18(F-M), 19(A-D))

*Pseudocypris circularis* Sars, 1924b : 197-198, pl. 22(8-12).

TYPE LOCALITY

Onambeke, Ovamboland, Namibia.

TYPE MATERIAL

SAM (registration number unknown) : 'Onambeke', det GOS : c. 5 fair specimens. These specimens are syntypes, but are not used here for the present redescription.

*Diagnosis* :

Valves relatively high in lateral view, with greatest height situated in the middle, caudally pointed. RV with anterior selvage somewhat further inwardly displaced than in the other species of this genus. In dorsal and ventral view almost circular; ala wide and, as in the two preceding species, equally developed along nearly the entire circumference.

Hemipenis large, with ms a large and bluntly rounded lobe; vls prominent, distally rounded and pointed in ventral direction, dls small. Both prehensile palps with penultimate segments each carrying one solid processus, about half as long as the terminal segments, the latter asymmetrical with the right one wider than the left one and both with an irregular shape.

*Measurements* (in  $\mu\text{m}$ , mean  $\pm$  SD, n=5) : ♀ : L = 2993  $\pm$  172, H = 1669  $\pm$  39, W = 2676  $\pm$  133, W/L = 0.86-0.99. ♂ : L = 3034  $\pm$  91, H = 1662  $\pm$  45, W = 2614  $\pm$  95, W/L = 0.84-0.90.

*Remarks* :

As the preceding species, *P. circularis* is typical and easily recognisable. It has both valve (circular shape in dorsal view, anterior selvage of RV) and soft part characters (shape of hemipenis and processi on prehensile palps) which are unique to this species. *P. circularis* is common in the temporary waters of Namibia (north of the Tropic of Capricorn), and is here also reported from the Hwange Nature Reserve in Zimbabwe (see appendix).

Fig. 18 (p. 154) : *Pseudocypris acuta* (A-E, ♂, OC.1543, Cape peninsula, RSA) and *Pseudocypris circularis* (F-M, ♂, Kalahari).  
*P. acuta* : A. RV, internal view, detail anterior. B. RV, internal view, detail posterior. C. LV, internal view, detail posterior. D. LV, internal view, detail anterior. E. Idem.  
*P. circularis* : F. Cp, ventral view (KM.1075 lost). G. Idem, detail anterior. H. Cp, dorsal view (KM.1076 lost). I. Idem, detail anterior. J. Idem, detail of surface structure. K. LV, internal view (SAM.A40042). L. RV, internal view, detail anterior in tilt (SAM.A40042). M. RV, internal view (SAM.A40042).  
Scale : 3000  $\mu\text{m}$  for F,H,K,M ; 595  $\mu\text{m}$  for I ; 521  $\mu\text{m}$  for L ; 463  $\mu\text{m}$  for G ; 357  $\mu\text{m}$  for C,D ; 263  $\mu\text{m}$  for A,B ; 44  $\mu\text{m}$  for E ; 24  $\mu\text{m}$  for J.

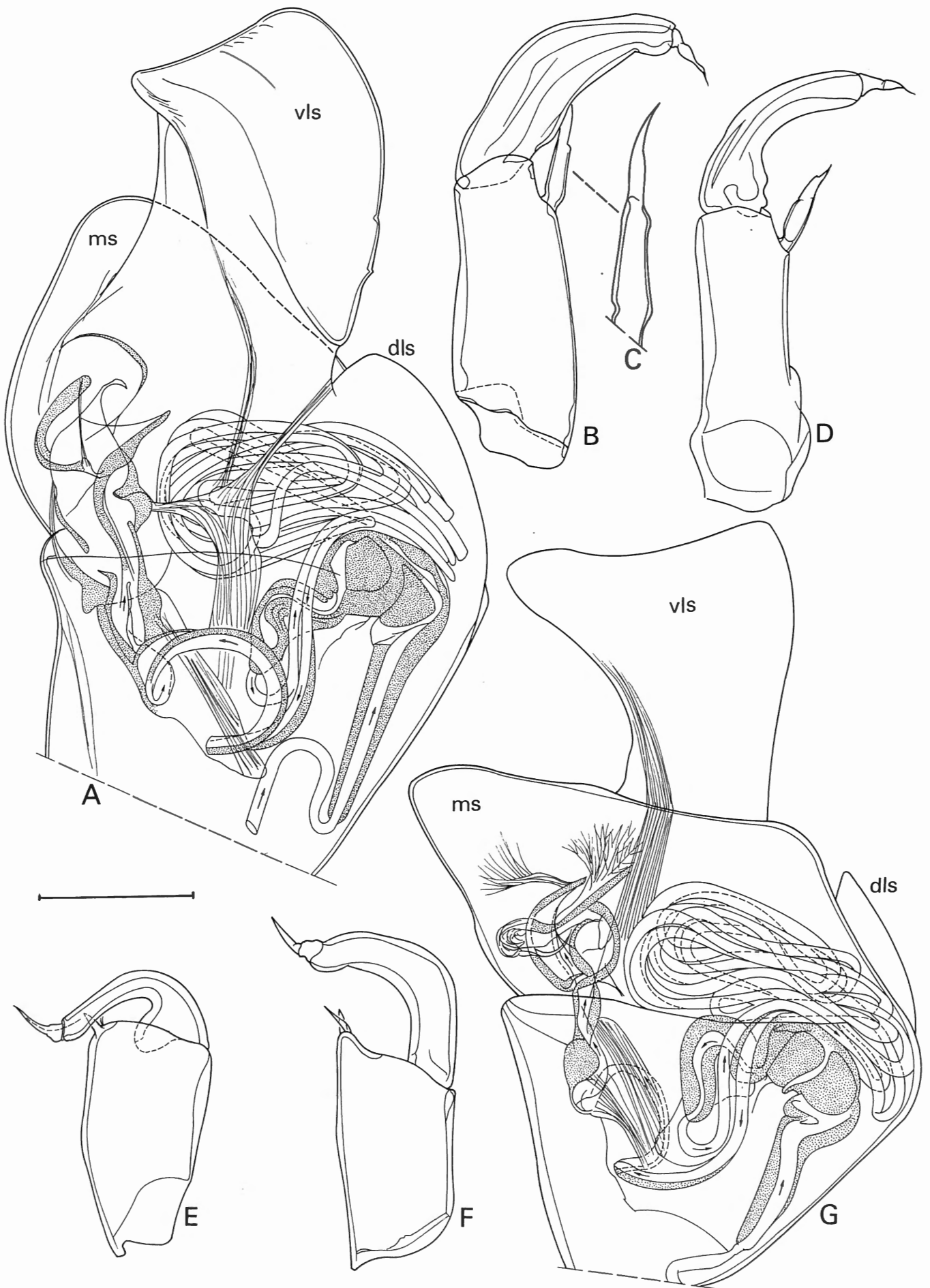


Figure 19 (caption p. 157)

***Pseudocypris expansa* SARS, 1924**  
(Figs. 13(G,H), 24(A-C))

*Pseudocypris expansa* SARS, 1924a : 179, pl. 18(1-2). HUTCHINSON *et al.*, 1932 : 149.

TYPE LOCALITY

Kimberley, RSA.

TYPE MATERIAL

SAM A 11934: 'Kimberley', 1 partly dissected ♂ in generally bad condition. This specimen is the holotype by monotypy. SARS (1924a : 179) indeed confirmed that he had only a single male specimen available for his descriptions.

*Diagnosis :*

Valves high in lateral view. In dorsal view, ala prominent on the central 2/3 of the valves only, not equally wide along the circumference of the carapace; greatest width of ala between 1/3 and 1/2 of the width of a valve.

Prehensile palps small, but with relatively large distal segments and with apical corner of basal segments extended and pointed. Right palp with sensory organs on this apical corner subequal; terminal segment wide, evenly rounded and with width subequal over most of the length of this segment. Left palp with apical sensory organs on basal segment unequal; terminal segment long and narrow, distally somewhat swollen. Hemipenis with large and prominent vls, with a long and nearly straight distal margin; ms broad, not pointed.

Size : SARS (1924a) indicated a length of 2.9 mm. No new measurements of the new material (see appendix) were possible, due to extreme decalcification of the valves.

*Remarks :*

*P. expansa* is one of the most easily recognisable taxa in the entirety of Africa, and we will therefore here accept the identification of HUTCHINSON *et al.* (1932) from the Transvaal. We here furthermore add a record of this species from the surroundings of Middelburg, c. 300 km N of Port Elizabeth (see appendix). The species thus appears to occur in most of South Africa.

***Pseudocypris gibbera* SARS, 1924**  
(Figs. 14(A-E), 17(A-K), 20)

*Pseudocypris gibbera* SARS, 1924b : 196-197, pl. 21(1-10), 22(1-7). BARNARD, 1935 : 491.

TYPE LOCALITY AND MATERIAL

SARS (1924b) listed 6 localities in Ovamboland and 1 in Damaraland (Namibia). The original material from the 6 localities in Ovamboland is available in the SAM (A11204-11207, A11209, A11210), and the lectotype should be selected from any of these tubes, which all contain between 10 and 30 good specimens. At that stage, the type locality will be specified.

*Diagnosis :*

A medium-sized species, the only representative of the genus without lateral ala. Shape of valves variable, with both highly arched (with LV overlapping RV dorsally) specimens and with individuals with evenly rounded dorsal margins occurring. In dorsal view, both anterior and posterior extremities convexly pointed. Valve margin on RV and outer lists on LV serrated.

Hemipenis with vls boot-shaped, in some specimens rather irregular; ms with a characteristic squarish ventral extremity. Prehensile palps with penultimate segments relatively long; terminal segment of left palp elongated, of right palp wider and distally swollen.

*Measurements* (in  $\mu\text{m}$ , mean  $\pm$  SD) :

SMN 51051 (= population with dorsal protuberance). ♀ (n=5) L = 2193  $\pm$  52, H = 1428  $\pm$  39, W = 1338  $\pm$  62, W/L = 0.57-0.66.

SMN 51043 (= population without dorsal protuberance). ♀ (n=5) L = 2220  $\pm$  46, H = 1358  $\pm$  31, W = 1296  $\pm$  53, W/L = 0.58-0.65.

♂ (n=3) L = 2034  $\pm$  69, H = 1241  $\pm$  88, W = 1161  $\pm$  53, W/L = 0.58-0.59.

*Remarks :*

*P. gibbera* is a variable species, and very common in the (mainly temporary) inland waters of Namibia and Botswana. It is the only species in the genus that never showed a trace of lateral ala in the numerous and rich collections that were studied for the present revision (see appendix). It is nevertheless a genuine *Pseudocypris*, as it conforms to all other characteristics of the genus.

Fig. 19 (p. 156) : *Pseudocypris circularis* (A-D, ♂ SAM.A40042, Kalahari) and *Pseudocypris acuta* (E-G, ♂ OC.1543, Cape peninsula, RSA).

*P. circularis* : A. Hemipenis. B. Right (?) prehensile palp. C. Idem, detail of sensory organ on first segment. D. Left (?) prehensile palp.

*P. acuta* : E. Left (?) prehensile palp. F. Right (?) prehensile palp. G. Hemipenis.

Scale : 156  $\mu\text{m}$  for A,B,D-G ; 81  $\mu\text{m}$  for C.

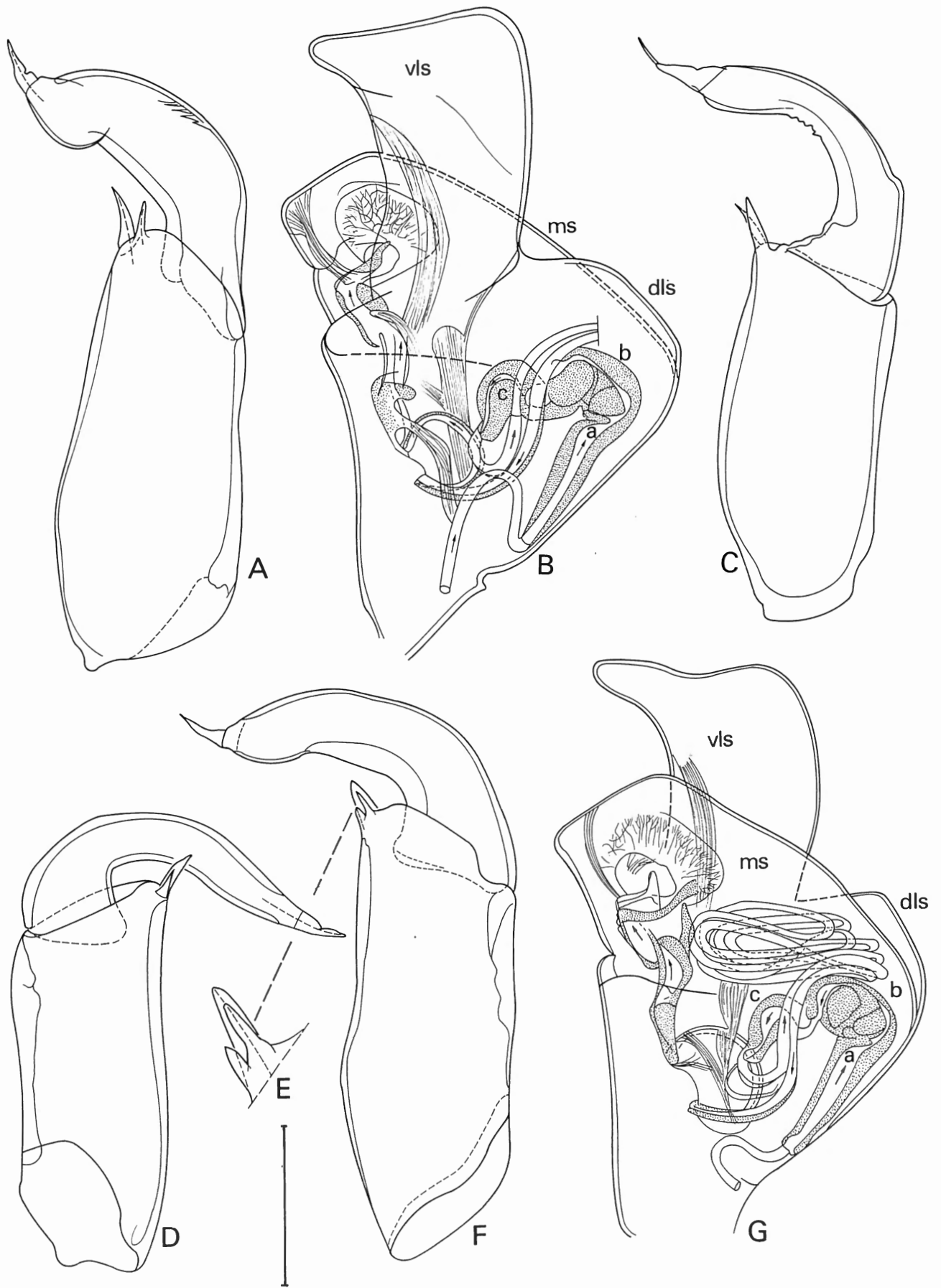


Figure 20 (caption p. 159)



***Pseudocypris spinosa* (METHUEN, 1910)**  
(Figs. 13(A,B))

*Cypris spinosa* METHUEN, 1910 : 151-153, pl. 8(1-4), 9(5-8), 10(9-12). HUTCHINSON *et al.*, 1932 : 149.

*Pseudocypris spinosa* (METHUEN) : MCKENZIE, 1971a : 174.

TYPE LOCALITY

Small reed pan near Lake Chrissie, Transvaal, RSA.

TYPE MATERIAL

Assumed lost. See discussion on the material of *Sclerocypris tuberculata* (METHUEN) in MARTENS (1986).

*Diagnosis :*

A large species (c. 3.3 mm), with elongated carapaces, set with numerous large spines. Anterior selvages submarginal. Soft part anatomy and morphology of ♂ copulatory appendages unknown.

*Remark :*

This easily recognisable species was thus far never found outside the direct range of its type locality (see also appendix).

***Pseudocypris triquetra* SARS, 1924**  
(Figs. 14(F-I), 24(D-I))

*Pseudocypris triquetra* SARS, 1924a : 178-179, pl. 20(1-15).

TYPE LOCALITY

Kimberley, RSA.

TYPE MATERIAL

SAM has 5 tubes with material of this species, (see appendix), but only the 5 specimens in SAM A11876 (label : 'SAM EE, Det GOS') could constitute syntypes. However, as this is by no means certain, no lectotype will be selected from these specimens.

*Diagnosis :*

Valves in lateral view squarish, short and high; anterior margin broadly rounded; posterior margins nearly vertical and straight, forming a rather sharp angle with the ventral margin. In dorsal view, carapace with lateral margins not evenly rounded, rather obtusely pointed in the middle. Lateral ala present in the centre only, minute.

Hemipenis with vls showing an elongated ventral tip, distal margin more or less sinuous. Both prehensile palps with penultimate segments apically somewhat dilating (but rather exaggerated by SARS (1924A)); left palp with terminal segment long and narrow, width subequal over most of the length, but distally swollen. Right palp with terminal segment wider.

SARS (1924a) gave a length for the adult ♀ of c. 2.60 mm. This value appears rather variable in the specimens from the AM (see appendix). Unfortunately, this material was in no condition to allow new measurements.

*Remarks :*

*P. triquetra* could at first glance be seen as a form of *P. expansa* with reduced ala. The morphology of the hemipenes and prehensile palps in the males, however, is rather different in both nominal species. Especially in *P. expansa* is the hemipenis far more solid and the vls more pronounced and squarish than in *P. triquetra*. The latter species furthermore has lateral sides with a central angle in dorsal view, whereas these margins are evenly rounded in

Fig. 20 (p. 158) : *Pseudocypris gibbera* (all ♂, A-C : OC.1545, Etosha National Park, Namibia (form with dorsal overlap); D-G : OC.1544, Naukluft Mtns, Namibia (form without dorsal overlap)).

A. Right prehensile palp. B. Hemipenis (loops of inner spermiductus not shown). C. Left prehensile palp. D. Idem. E. Right prehensile palp, detail of sensory organ on first segment. F. Right prehensile palp. G. Hemipenis. Scale : 156 µm for B,G ; 81 µm for A,C,D,F ; 33 µm for E.

Fig. 21 (p. 160) : *Cypris pubera* (A, ♀ OC.1512, Belgium), *Globocypris trisetosa* (B, E-M, all ♀, Grahamstown, RSA), *Ramotha elephantina* (C, allotype ♀ OC.1490, Olifantsberg RSA) and *Pseudocypris bouvieri* (D, paralectotype ♀ KM.1283, Lake Rukwa).

A-D : details of Rome-organ on A1.

G. *trisetosa* : E. Mx1, 3 endites (OC.1551). F. Mx1 palp (OC.1551). G. Furcal attachment (OC.1551). H. Furca (OC.1551). I. Mx2 (exopodite not shown) (OC.1551). J. Mx2, detail of apical chaetotaxy on endopodite (OC.1551). K. T1 (OC.1551). L. Rake-like organ (OC.1551). M. A1 (OC.1548).

Scale : 156 µm for G-I,K,M ; 81 µm for E,F,L ; 33 µm for A-D,J.

Fig. 22 (p. 161) : *Globocypris trisetosa* (all ♀).

A. Md-palp, respiratory plate not shown (OC.1551). B. Idem, detail of gamma-seta. C. Idem, detail of beta-seta. D. Idem, detail of alpha-seta. E. A2, distal chaetotaxy (OC.1551). F. Mx1, respiratory plate (OC.1552). G. T2 (OC.1552). H. Genital plate (OC.1552). I. Md-coxa (OC.1551).

Scale : 156 µm for F-I ; 81 µm for A,E ; 33 µm for B-D.

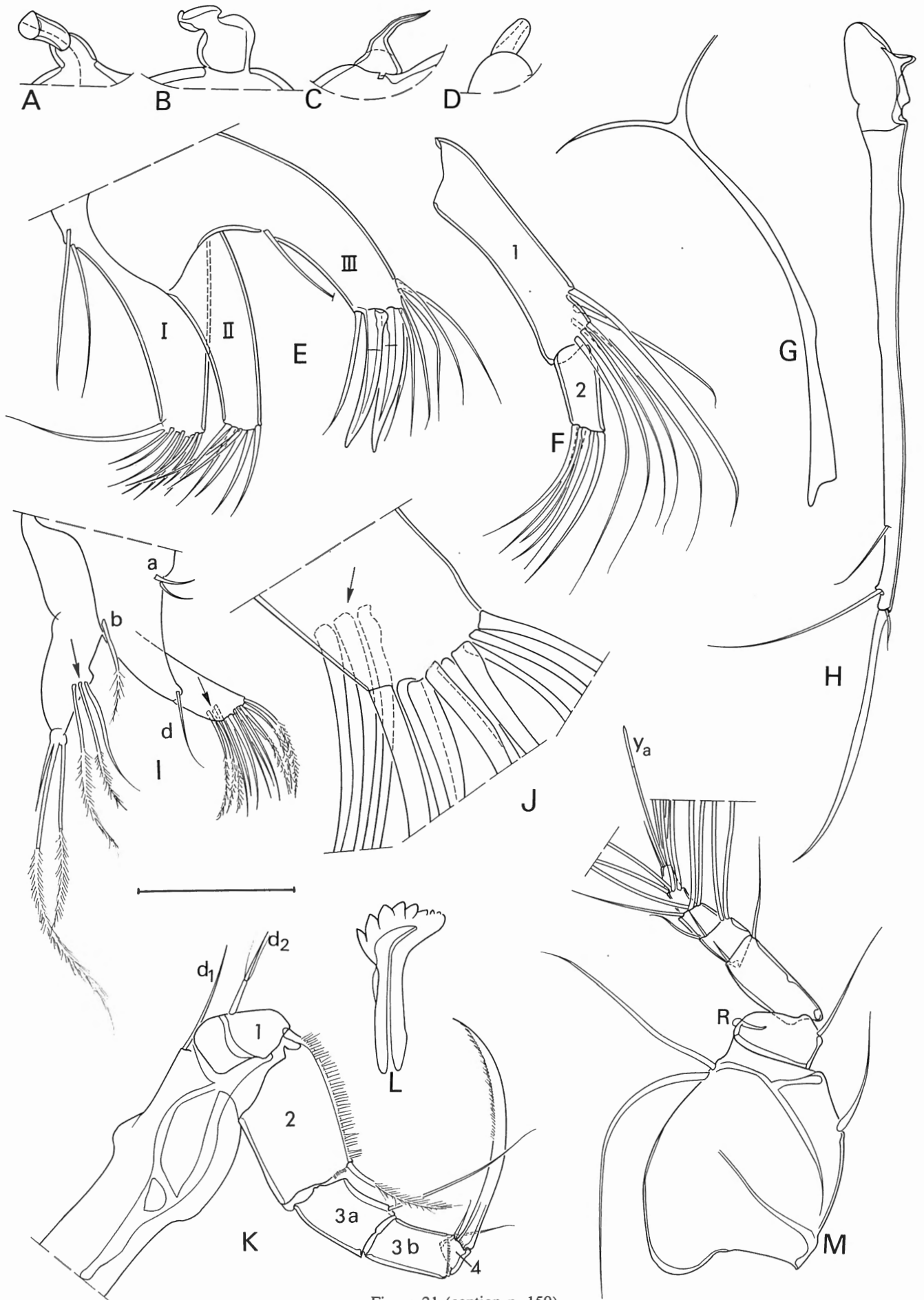


Figure 21 (caption p. 159)

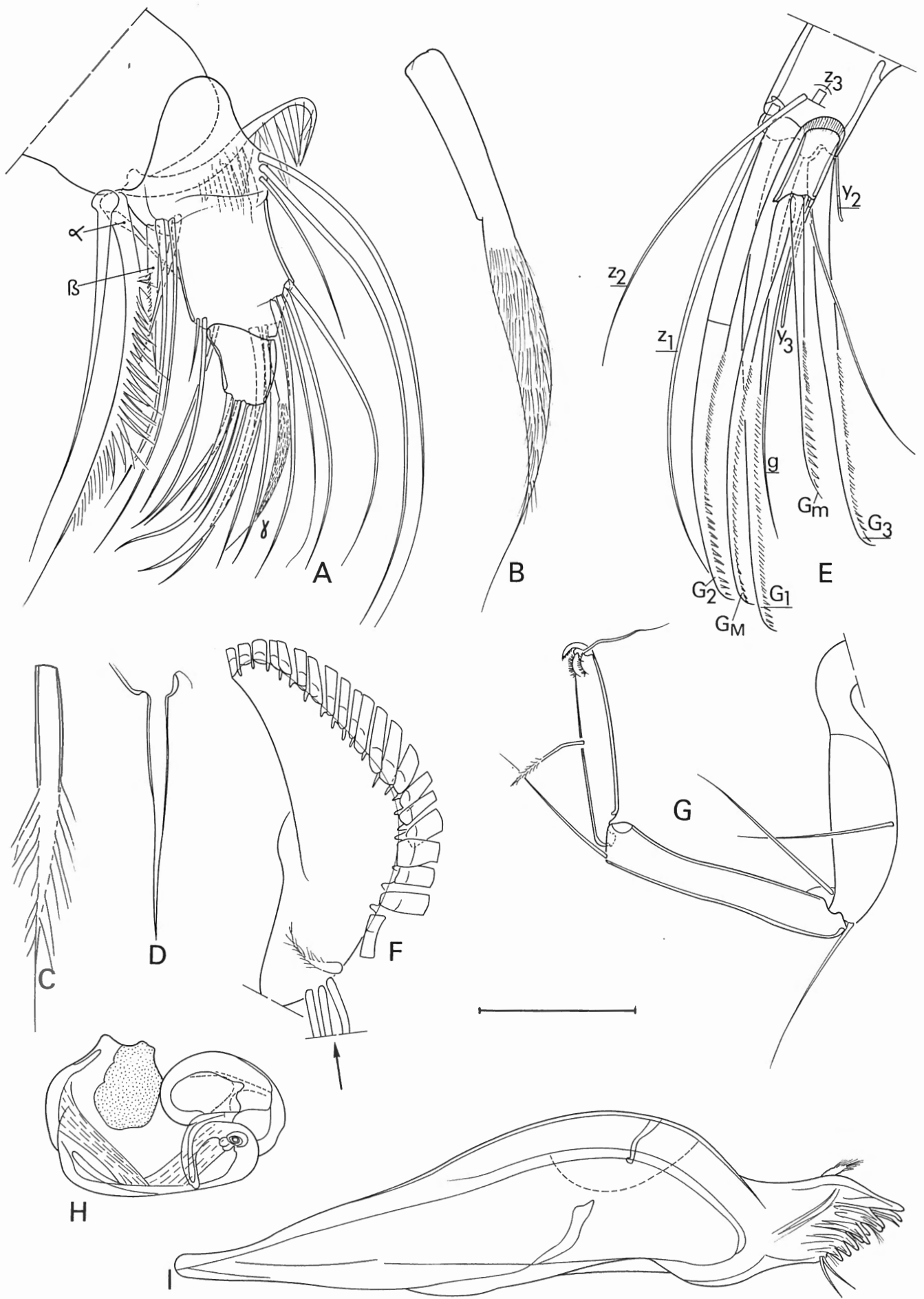


Figure 22 (caption p. 159)

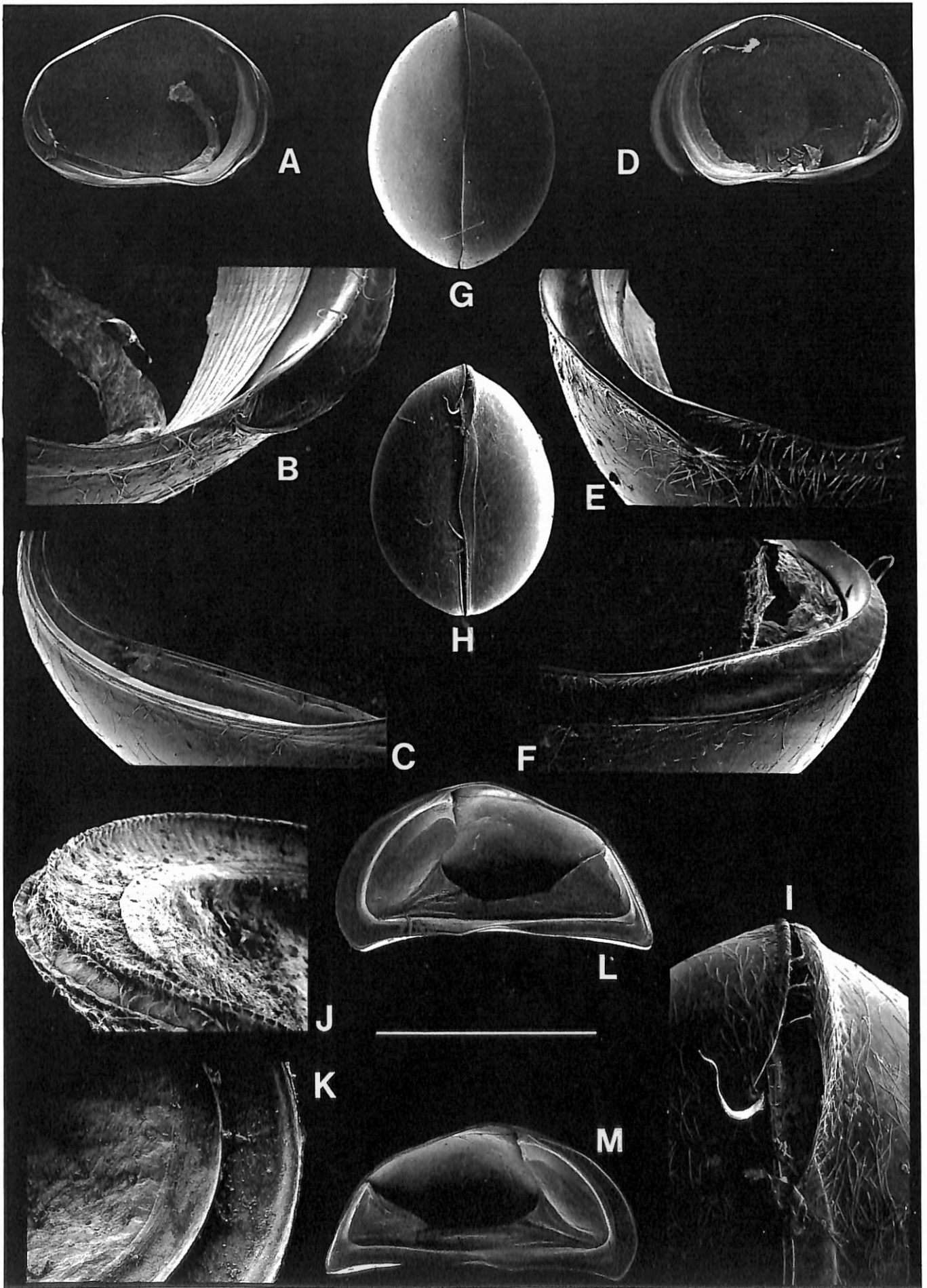


Figure 23 (caption p. 163)

*P. expansa*. We here maintain both species as valid taxa. MCKENZIE (1971a) reported that specimens previously identified as *Cypris latissima* from South Africa, actually belong to *P. triquetra*, but failed to indicate the exact locality. We here report (see appendix) a new locality for this species from the surroundings of Johannesburg. *P. triquetra* is thus not a Western Cape endemic.

### Genus GLOBOCYPRIS KLIE, 1939

#### TYPE SPECIES

*G. trisetosa* KLIE, 1939 by original designation.

#### Diagnosis :

Globular species, with a largely inwardly displaced anterior selvage in both valves; RV furthermore with this selvage sunk into the interior of the valve and with an inwardly displaced posterior selvage. LV with a large anterior inner list and with antero-ventral valve margin also lip-like produced. T1 with penultimate segment divided, setae d1 and d2 subequal.

#### *Globocypris trisetosa* KLIE, 1939 (Figs. 21(B,E-M), 22, 23(A-I))

*Globocypris trisetosa* KLIE 1939 : 111-114, figs. 13-17.

#### TYPE LOCALITY

Pools near Nairobi and near Kinangop (Kenya). No further specifications given.

#### TYPE MATERIAL

All type specimens are kept in the ZIZM (Hamburg). The material consists of : slide no. 1503 : soft parts of a ♀ ; slide no. 1504 : soft parts of a ♀ ; tube no. 625 (label 'G. trisetosa n.g.n.sp., Omo Exp., Kinangop Plateau, 11 April 1933, coll. CHAPPUIS') : c. 10 decalcified ♀ in glycerine ; tube no. 626 (label 'G. trisetosa n.g.n.sp., Omo Exp., Sumpf bei Nairobi, 23.XI.1932, coll. CHAPPUIS') : 3 decalcified ♀ in glycerine.

Lectotype : the ♀ in slide no.1503 is here designated the lectotype. All other specimens of the type series become paralectotypes.

#### Diagnosis :

A medium-sized species, with smooth valves, in lateral view with greatest height situated at c. 1/3 from the front; in dorsal view with lateral sides evenly rounded; greatest width situated in the middle. T1 with apical seta on segment 3a exceptionally long. Mx2 with 3 additional sub-apical setae on the palp.

*Measurements* : (specimens from surroundings of Grahamstown : GR/12, in µm, mean ± SD, n=5) :

L = 1393 ± 33, H = 855 ± 15, W = 948 ± 30, W/L = 0.65-0.71. Type specimens were too heavily decalcified to allow measurements.

#### Additional description :

Both valves with anterior margins more broadly rounded than posterior ones; posterior 2/3 of dorsal margin straight and sloping (Figs. 23A-F). In dorsal view (Fig. 23G), lateral sides evenly rounded and with greatest width situated in the middle. Ventral view (Fig. 23H) with striking morphology of anterior extremity : valve margins of both valves lip-like produced and abruptly ending on the valve surface (continuing as ridges in *Cypris*); at least LV with an additional ventral outer list (Fig. 23I).

A1 (Fig. 21M) with Rome organ (Fig. 21B) rather irregularly shaped.

A2 (Fig. 22E) with normal chaetotaxy; natatory setae reaching well beyond tips of claws.

Md-coxa without special features (Fig. 22I). Md-palp (Fig. 22A) with normal chaetotaxy; alpha-seta (Fig. 22D) proximally dilated, smooth and short; beta-seta (Fig. 22C) hirsute and relatively stout; gamma-seta (Fig. 22B) long and stout, set with setulae on its distal 2/3.

Mx1 with second palpsegment c. 2.5x as long as its basal width (Fig. 21F); third endite (Fig. 21E) with 2 smooth claws. Respiratory plate (Fig. 22F) with at least 3 basal, non-respiratory setae.

Mx2 (Fig. 21I) with palp bearing 3 unequal setae and an additional 3 subapical setae (see diagnosis). Another group of 3 separate setae subapically inserted on the protopodite; other aspects of chaetotaxy of this protopodite conform to the tribe.

T1 (Fig. 22K) with apical seta (= next to endclaw) not claw-like. Other aspects of this limb as in the diagnoses.

T2 (Fig. 21G) with an apical pincer, without special features. Furca (Fig. 21H) with ramus long and slender. Furcal attachment (Fig. 21G) with both branches well developed. Rake-like organs (Fig. 21L) 'T'-shaped, carrying c. 8 blunt apical teeth.

Fig. 23 (p. 162) : *Globocypris trisetosa* (A-I, all ♀, Grahamstown RSA), *Pseudocypris bouvieri* (J-K, paralectotype KM.1077 from Lake Rukwa) and *Pseudocypris acuta* (L-M, ♂ OC.1543 from Cape peninsula RSA).

*G. trisetosa* : A. LV, internal view (OC.1548). B. *Idem*, detail anterior. C. *Idem*, detail posterior. D. RV, internal view (OC.1548). E. *Idem*, detail anterior. F. *Idem*, detail posterior. G. Cp, dorsal view (OC.1550). H. Cp, ventral view (OC.1549). I. *Idem*, detail anterior.

*P. bouvieri* : J. RV, internal view, detail anterior in tilt. K. LV, internal view, detail anterior.

*P. acuta* : L. RV, internal view. M. LV, internal view.

Scale : 2206 µm for L-M ; 1111 µm for A,D,G,H ; 326 µm for C,E,F ; 288 µm for I ; 242 µm for B ; 224 µm for K ; 189 µm for J.

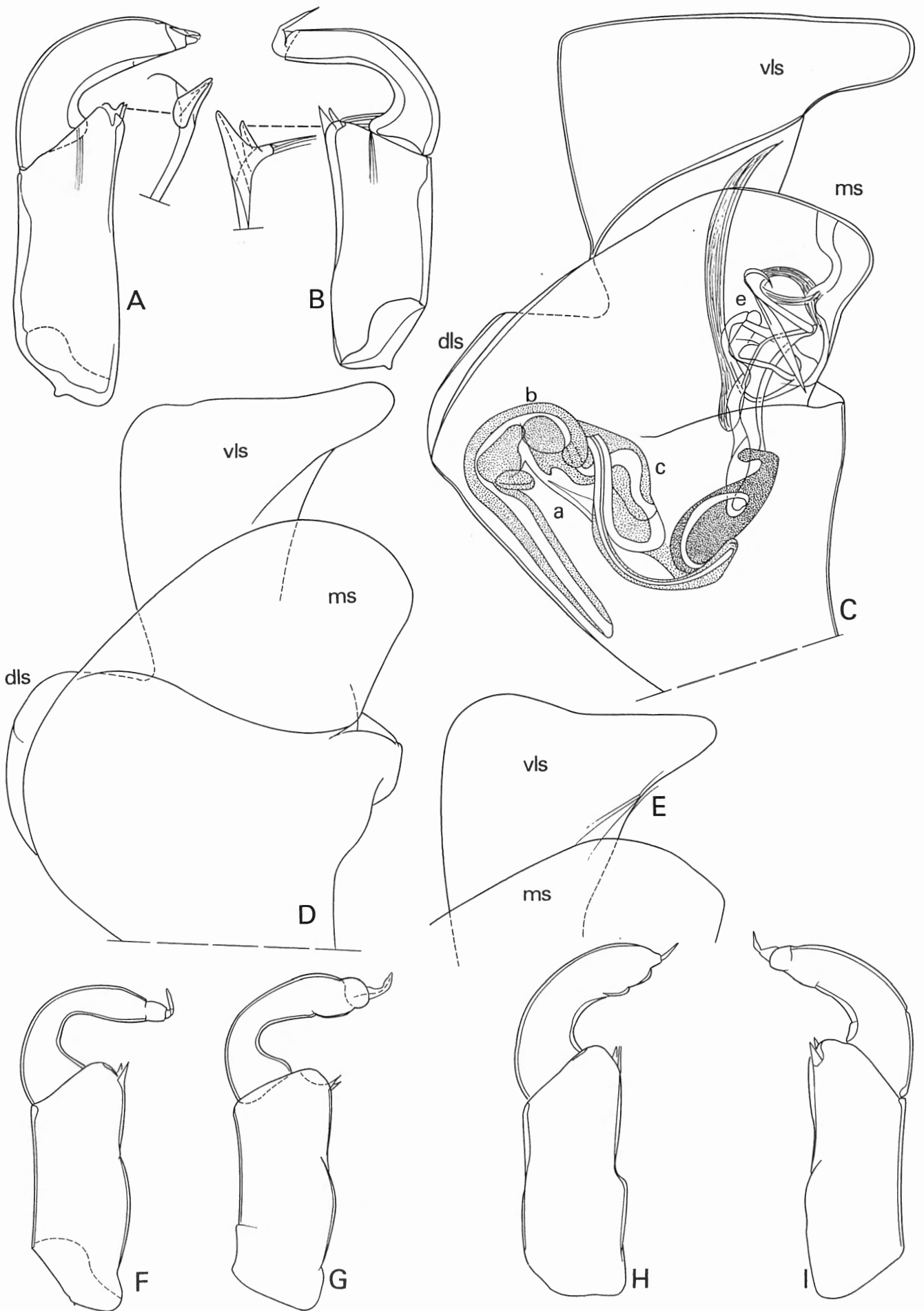


Figure 24 (caption p. 165)

**Remarks :**

McKENZIE (1971b) was the first to intuitively lodge *Globocypris* in the Cypridini. We here follow this decision, which will have to remain provisional, as long as no ♂ representatives of this genus are known. Only when presence or absence of the '8'-shaped loops in the hemipenis can be checked, will the present hypothesis (lodging *Globocypris* in the Cypridini as defined here) be falsified or corroborated. Meanwhile, there are a number of good indications to support this taxonomic alteration: in the anatomy of the valve margins, *Globocypris* is closely related to *Cypris* s.s.; the presence of a T1 with a divided penulti«

mate segment and the smooth claws on the third endite of the Mx1 indicate a close affinity with *Ramotha* (MARTENS, in press). The relative size of setae d1 and d2 on T1 and the structure of the anterior edge in ventral view, finally, are characters which *Globocypris* shares with none of the other genera in this tribe.

*G. trisetosa* prefers temporary habitats, where it can occur in quantities. It was thus far found in East Africa (type collection) and in the eastern and southern part of South Africa (see appendix).

**Keys***Key to the African genera of Cypridini :*

1. a. T1 with penultimate segment divided . . . . . 3
- b. T1 with penultimate segment undivided . . . . . 2
2. a. Both valves with prominent anterior selvage, the latter also lip-like produced in lateral view. d<sub>1</sub> on T1 c. 3x as long as d<sub>2</sub> . . . . . *Cypris*
- b. Both valves with anterior selvage submarginal, most species with lateral ala. d<sub>2</sub> on T1 missing . . . . . *Pseudocypris*
3. a. RV with anterior selvage inwardly displaced, LV without a selvage but with a large anterior inner list. d<sub>1</sub> on T1 c. 3x as long as d<sub>2</sub> (see part II of this revision) . . . . . *Ramotha*
- b. Both valves with anterior selvage inwardly displaced, selvage of RV furthermore sunk into the interior of the valve. d<sub>1</sub> and d<sub>2</sub> on T1 of approximately the same length (only one species: *G. trisetosa*) . . . . . *Globocypris*

*Key to the African species of Cypris*

1. a. Valves in dorsal view with 2 large, lateral spines (North Africa) . . . . . *C. bispinosa*
- b. No large lateral spines . . . . . 2
2. a. Valve surface conspicuously sculptured and pitted, but no lateral ala (circumtropical) . . . . . *C. subglobosa*
- b. Valve surface smooth or set with smaller and shallower pits . . . . . 3
3. a. Valve margin caudally with 3-5 conspicuous spines (North Africa) . . . . . *C. pubera*
- b. No caudal spines . . . . . 4

4. a. W/L = 0.75-0.90. Lateral ala present, mostly carrying minute spines . . . . . 5
- b. W/L = 0.65-0.80. No lateral ala or spines . . . . . 6
5. a. W/L > 0.80; in external view, ala prominent over more than 1/2 the length of the valve (circumtropical) . . . . . *C. latissima*
- b. W/L < 0.80; ala prominent over less than 1/4 of the length of the valve (East Africa) . . . . . *C. puberoides*
6. a. L > 2.5 mm (♂), > 2.7 mm (♀); hemipenis with lateral shield very elongated (Fig. 11J) (East Africa) . . . . . *C. busingiziensis*
- b. L = < 2.2 mm (♀); hemipenis (when ♂ are known) with plumper, boot-like lateral shield . . . . . 7
7. a. Valves in internal view subtriangular, i.e. with nearly straight ventral margin and without an angle between dorsal and caudal margin; both valves with an internal dorsal overlap; L = c. 2.2 mm (Somalia) . . . . . *C. elburensis*
- b. Valves always with an angle between dorsal and caudal margin, no internal dorsal overlap, L < 2 mm . . . . . 8
8. a. Valves highly arched (H/L > 0.60), LV posteriorly without a row of tubercles between selvage and inner margin . . . . . *C. decaryi*
- b. Valves elongated (H/L < 0.60), LV posteriorly with a conspicuous row of tubercles between selvage and inner margin . . . . . *C. galefensis*

Fig. 24 (p. 164): *Pseudocypris expansa* (A-C, ♂, AM-(GEN.591H-I)) and *Pseudocypris triquetra* (D-I, ♂, AM-(REA.77D)). All from RSA.

*P. expansa*: A. Right prehensile palp, with detail of apical sensory organs of first segment. B. Left prehensile palp, idem. C. Hemipenis, seven '8'-shaped loops distal to labyrinth not shown.

*P. triquetra*: D. Hemipenis-outline (AM-(REA.77C)). E. Outline of vls of hemipenis (AM-(REA.77D)). F. Left prehensile palp (AM-(REA.77D)). G. Idem (AM-(REA.77C)). H. Right prehensile palp (AM-(REA.77C)). I. Idem (AM-(REA.77D)).

Scale: 156 µm for A-I; 81 µm for details of A and B.

*Key to the African species of Pseudocypris*

- |   |   |
|---|---|
| <p>a. Valves elongated, set with long and stout spines (Lake Chrissie area, South Africa) . . . <i>P. spinosa</i></p> <p>b. No long spines on valves . . . . . 2</p> <p>2. a. No lateral ala or only traces in the center in dorsal view . . . . . 3</p> <p>b. Lateral ala more prominent, in the centre c. 1/3 or more of the width of one valve . . . . . 4</p> <p>3. a. Traces of ala present in the centre in dorsal view (South Africa) . . . . . <i>P. triquetra</i></p> <p>b. No ala (Namibia, Botswana) . . . . . <i>P. gibbera</i></p> <p>4. a. Ala prominent and evenly rounded along most of the circumference . . . . . 5</p> | <p>b. Ala prominent in the centre only, concavely curved toward posterior and anterior extremities . . . . . <i>P. expansa</i></p> <p>5. a. L = c. 1600 µm. Hemipenis as in Fig. 16A (Lake Rukwa in East Africa) . . . . . <i>P. bouvieri</i></p> <p>b. L = c. 3000 µm. Hemipenis different (South Africa) . . . . . 6</p> <p>6. a. Valves elongated in lateral view (H/L &lt; 1/2). Hemipenis as in Fig. 19G (Western Cape) . . . . . <i>P. acuta</i></p> <p>b. Valves higher (H/L &gt; 3/5). Hemipenis as in Fig. 19A (Namibia and Zimbabwe) . . . . . <i>P. circularis</i></p> |
|---|---|

## Discussion

### *Morphology and taxonomy*

The Cypridini, as defined above, now comprise genera with two inwardly displaced frontal selvages (*Cypris*, *Globocypris*), two marginal selvages (*Pseudocypris*) and an inwardly displaced selvage in the RV only (*Ramotha*), and these genera can furthermore have a T1 with a fused penultimate segment (*Cypris*, *Pseudocypris*), or with this segment divided (*Ramotha*, *Globocypris*). We here redefine the Cypridini on aspects of the internal anatomy of the hemipenis, rather than on the above features, because we feel such a classification better approaches the natural (Linnean) hierarchy of the Cyprididae. It should indeed be obvious that *Cypris* and *Pseudocypris* are closely related, in spite of the very different marginal valve anatomy. Furthermore, *Ramotha* is much more closely related to both of the above genera than to for example *Trajancypris*, which nevertheless has a very similar marginal valve anatomy. Which characters should be used at which taxonomic level of course largely depends on the appreciation of the scientist and will doubtlessly remain the subject of controversy in many years to come. Regardless of the outcome of such discussions, however, introducing new or even different diagnostic characters for higher taxa in geographically restricted revisions, will always cause a number of other taxa, not explicitly dealt with, to have an uncertain position for some time. The present revision is no exception.

*Chlamydotheca*, *Riocypris*, *Afrocypris* and *Bennelongia* were lodged in the Cypridinae, and as no tribe was specified, assumed to belong in the Cypridini. None of the first three genera, however, complies with the new diagnosis, while the inner anatomy of the hemipenis in *Bennelongia* remains unknown. Therefore, at least the first three genera require the erection of (a) new tribe(s). This, however, can only be done after a thorough evaluation of their position.

Should a new tribe in the Cypridinae be created, than this will at the same time necessitate the formulation of a diagnosis for the Cypridinae as a whole.

### *Linnean hierarchy in the Cypridini*

Without attempting to present a complete cladistic analysis, we will here briefly discuss a number of key-characters which might allow an arrangement of the different genera, according to their relative age.

1. Penultimate segment of T1 divided or fused. MARTENS & COOMANS (1990) considered the T1 with the fused segments the apomorphic condition in the Megalocypridinae. In the present revision, it is shown that larvae of *Ramotha* have this segment divided, whereas those of *Cypris* have this segment fused (as in their respective adult stages). Relying on ontogeny only, we cannot decide which of the character stages is to be considered most advanced in this group.
2. Serrated or smooth claws on third endite of Mx1. The same is true for this character, as larvae and adults have the same character states in both *Ramotha* (smooth claws) and *Cypris* (serrated claws).
3. Position of anterior selvages in both valves. Larvae of both *Ramotha* and *Cypris* have the same morphology of the anterior valve margins: an inwardly displaced selvage on the RV and no selvage but a large inner list on the LV. This is the same situation as in adult *Ramotha*, and we thus have an argument to consider this character state as the plesiomorphic condition and the one in *Cypris* (and in *Globocypris*?) as the apomorphic condition. The situation in *Pseudocypris* cannot be interpreted with certainty, but as submarginal selvages are present in both valves, this genus is more related to the situation in *Cypris* than to the one in *Ramotha*.



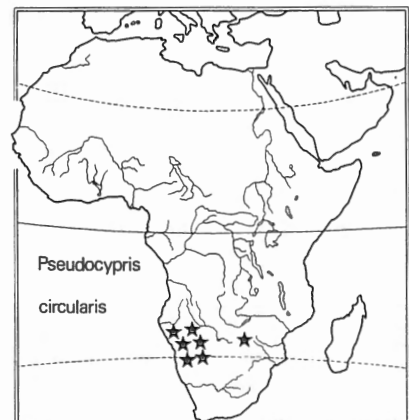
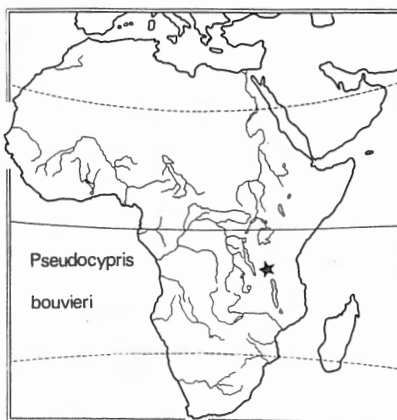
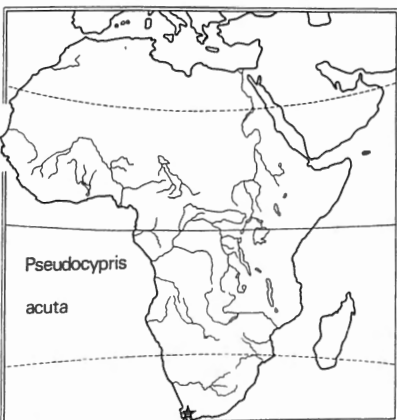
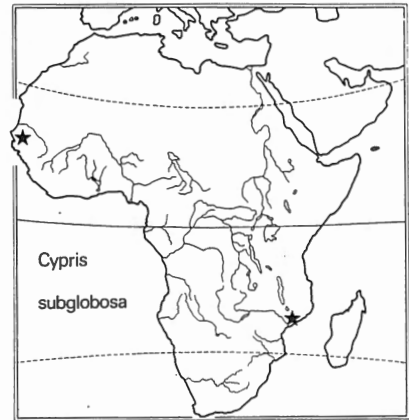
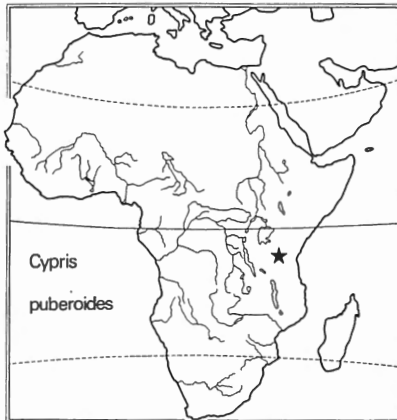
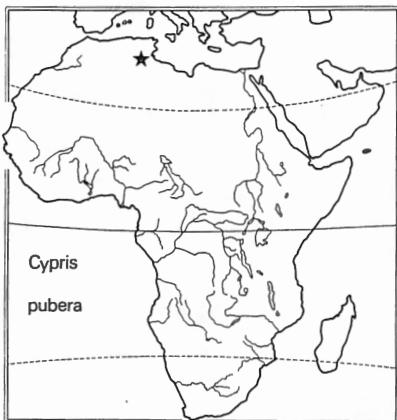
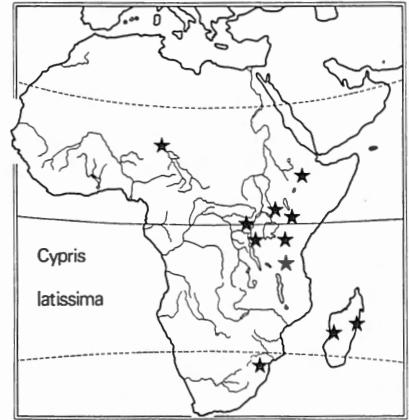
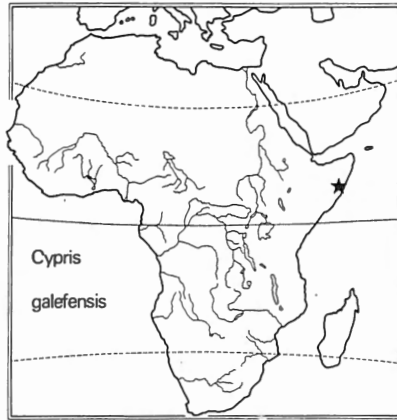
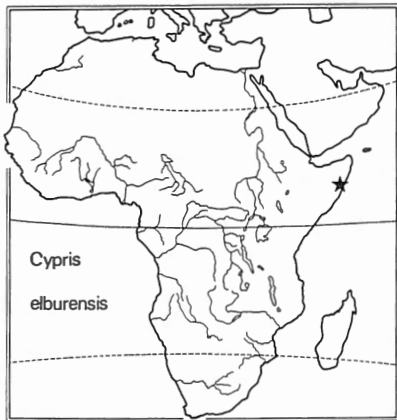
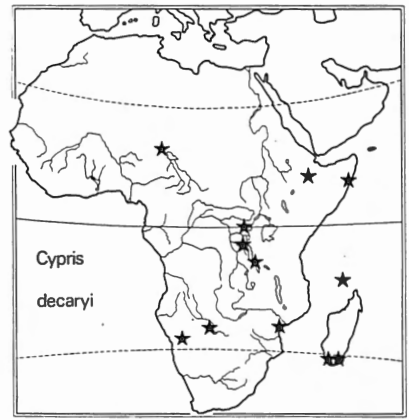
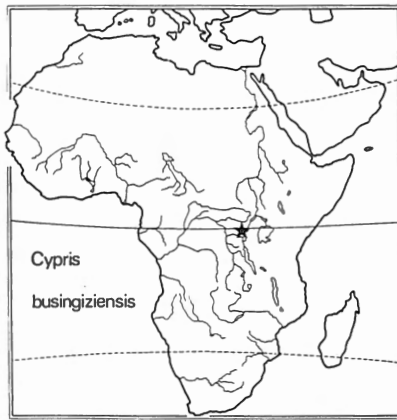
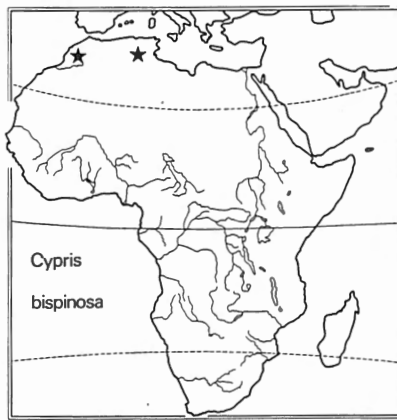


Figure 25 (caption p. 166)

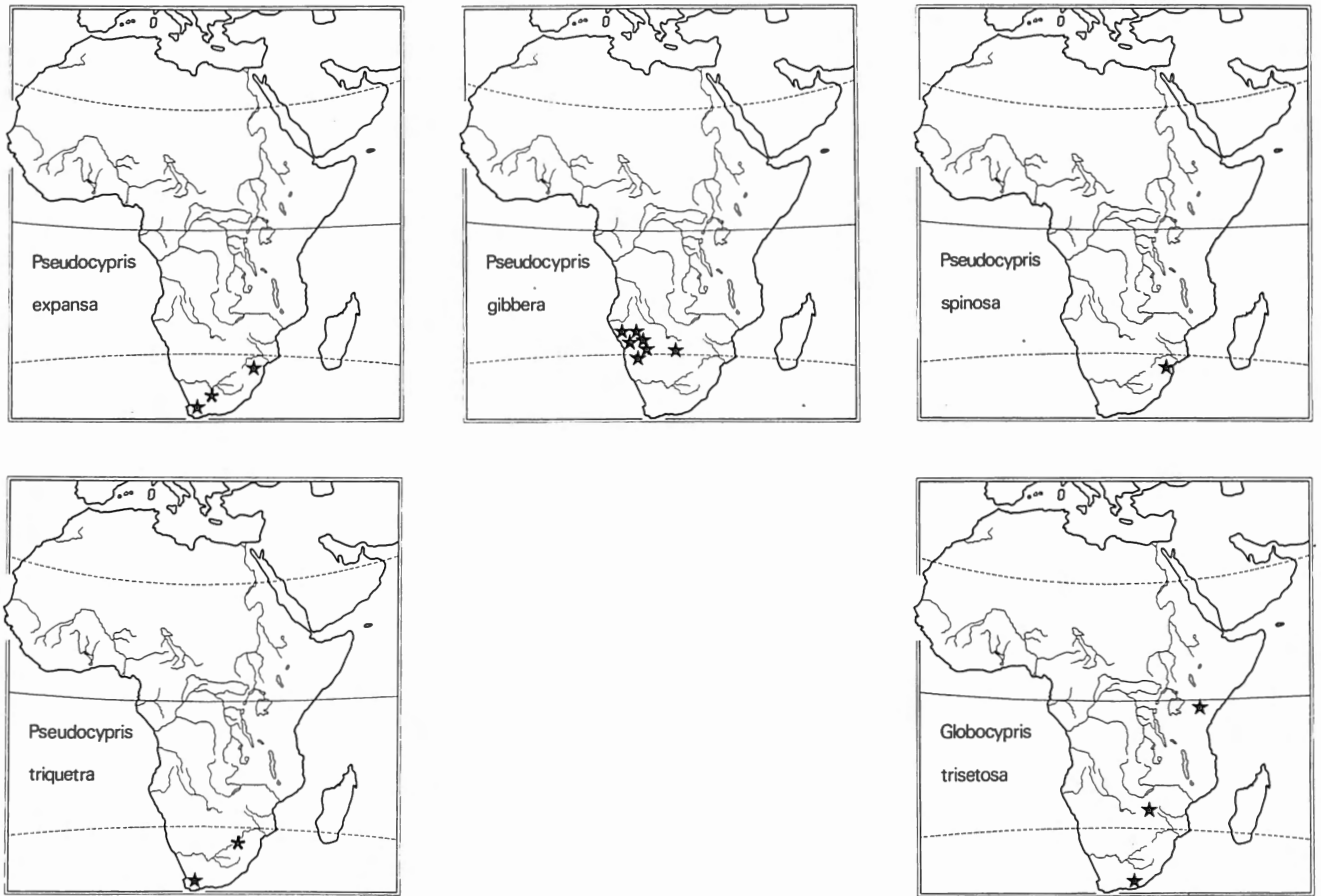


Fig. 25 (cont.): Distribution maps of the African species of *Pseudocypris* and *Globocypris* (localities both from the literature and from new records).

#### 4. Relative length of setae $d_1$ and $d_2$ on T1.

Larvae of both *Ramotha* and *Cypris* have these two setae subequal, whereas adults in both genera have a  $d_1$  which is at least 3x as long as  $d_2$ . Relying on this aspect of the ontogeny, it would seem that in the present group, setae of equal length represent the plesiomorphic condition. In this case, *Pseudocypris*, with a long  $d_1$  and with  $d_2$  completely missing, has the most apomorphic condition.

As we cannot use any outgroup comparison here (the adelphotaxon, the other tribe(s) in Cypridinae, remains unrevised and even undescribed), the results of this discussion should be interpreted with care. Nevertheless, it would seem that *Ramotha* is the best candidate for the most plesiomorphic group in the tribe, whereas *Cypris* and *Pseudocypris* both appear to have more apomorphic character states.

#### Ecology

Thus far, most of the African representatives seem linked to temporary habitats. Only species of *Pseudocypris* (*P. bouvieri* and *P. spinosa*) and of *Ramotha* (see MARTENS, in press) occur in permanent, yet small lakes. We do not know of any representative typical of specialised habitats

(salt lakes, hot springs, etc.), apart perhaps from *C. elburensis*, which is here described from a rather mineral-rich, subterranean habitat in Somalia.

#### Distribution (Fig. 25)

*Cypris decaryi* and *C. latissima* appear widespread on most of the African continent; their distribution can roughly be described as circumtropical, although they were occasionally found south of the Tropic of Capricorn. *Globocypris* occurs both in East and South Africa. *Pseudocypris gibbera* and *P. circularis* appear restricted to the zoogeographical province comprising most of Namibia, Botswana and Zimbabwe, but are very common there. *P. triquetra* and *P. expansa* are known from few, but geographically distant localities and therefore seem to occur in most of South Africa. All other species of the Cypridini, including those of *Ramotha*, display restricted distributions. Such observed patterns can of course be the result of a lack of a good collection grid over most of the continent, but this does not entirely explain the phenomenon. There is indeed a large degree of endemism in the temporary pool fauna of the Ethiopian Realm. This also became obvious from the large number of *Sclerocypris* species, retained in the revision of the Megalocypridinae (MARTENS 1986, 1988,

and other papers). What exactly caused this endemism and which factors determine the difference between widely distributed species and those with narrow geographical ranges remains largely unknown. Answers to these questions could have far reaching implications.

The tribe Cypridini now appears to have a largely African distribution, as all four genera at least have African representatives. Furthermore, although *Cypris* indeed has circumtropical and Holarctic species and *Pseudocypris* has at least one Indian representative, both *Globocypris* and *Ramotha* thus far have to be regarded as African endemics. This, however, could very well be a result of the limited geographical validity of the present revision. Before such a conclusion can be acceptable, similar faunas in at least the Americas and Asia should be reassessed.

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## Appendix

Non-type material used for part I of the present revision

*Cypris pubera*

KBIN-IG.9302 c. 20 ♀ from Overmere Donk, Belgium. Coll. : 30.6.1909. Det. : Dom. R. ROME. (Dissected and figured specimens : OC.1510-1512).

KBIN-OC.1513 : 1 ♀ from Hoboken Polder, Belgium. Coll. : 12.9.1981. Det. : K. MARTENS.

*C. decaryi*

KBIN-OC.1514 (SOM.127) : c. 10 ♂ + ♀ from Uageer, Somalia (approx. coördinates : 3°8'N 43°38'E). Coll. : G. MESSANA & L. CHELAZZI, 9.3.1984. Det. : K. MARTENS. Accomp. fauna : *Potamocypris chelazzii* MARTENS, *Acocypris uegitia* MASI. Dissected and figured specimens : OC.1515-1517.

SMN.50887 : 12 ♀ from Xae-Sea, Bushmanland, Namibia. Coll. : C. MEYER, 23.2.1985. Det. : K. MARTENS. Dissected and figured specimens : OC.1518-1520.

SMN.51172 : 10 ♀ from Katima Mulilo, new sewage works, E. Caprivi, Namibia. Coll. : B.A. CURTIS & V. SIMONA, 1.11.1988. Det. : K. MARTENS. Accomp. fauna : *Pseudocypris circularis* SARS.

KBIN-OC.1521-1523 : 5 empty carapaces (Subrecent) from Lake Haik, Ethiopia. Coll. : C. TUDORANCEA, 11.7.1984. Det. : K. MARTENS. Dissected and figured : OC.1522-1523.

AM-CAB.24R : 2 ♀ from Cabora Bassa, Zambezi delta region, at Sombo, 10 km from Chinde. Coll. B.R. DAVIES, 13.3.1974. Det. : K. MARTENS. Accomp. fauna : *Zonocypris costata* (VAVRA), *Acocypris capillata* VAVRA, *Cypris subglobosa* SOWERBY (see below), *Gomphocythere* spec., *Hemicypris* spec., *Neocypridella* spec.

AM-MVD.7c : 100 ♀ from Marble Hall Fish Ponds, pond 57, Transvaal, RSA. Coll. : 6.3.1968. Det. : K. MARTENS.

*Cypris galefensis* n.sp.

KBIN-OC.1526 (SOM.91) : 20 ♂ + ♀ + c. 40 larvae from Siggia, Somalia. Coll. G. MESSANA & L. CHELAZZI, 6.12.1979. Det. : K. MARTENS. Accomp. fauna : *Potamocypris chelazzi* MARTENS, *Zonocypris* spec. Dissected and figured specimens : OC.1529-1532.

KBIN-OC.1527 (SOM.108) : 32 ♂ + ♀ from Bud-Bud, Somalia. Coll. : G. MESSANA & L. CHELAZZI, 29.11.1982. Det. : K. MARTENS. Accomp. fauna : *Sclerocypris pardii* MARTENS, *Physocypris dumonti* MARTENS, *Hemicypris* spec., *Plesiocypridopsis* sp.n.

*Cypris latissima*

KBIN-DE WITTE 1956/158 : 100 ♀ and larvae from Kisisie, S. of Lake Edward. Coll. : DE WITTE, 1.10.1956. Det. : K. MARTENS. Accomp. fauna : see MARTENS (1988), typelocality of *Sclerocypris virungensis* MARTENS. Dissected and figured specimens : OC.1533- 1535.

ZIZM.K34669a : 1 ♀ (dissected and figured) from "Ousbimana Sumpf" on Zanzibar. Coll. : 23.10.1871. This specimen, together with a few other ♀ of this species, originated from tube ZIZM.K19113, labelled '*Strandesia mercatorum*' and containing some 500 ♂ and ♀ of this species, as well as specimens of *Neocypridella lemurensis* (VAVRA), *Centrocypis horrida* VAVRA, "*Stenocypris*" *acuta* VAVRA and *Strandesia* spec. Det. : K. MARTENS.

AM-GEN.537a : c. 100 ♀ from Leeupan, RSA. Coll. 28.6.1960. Det. : K. MARTENS.

*Cypris subglobosa*

KBIN-OC.1536 : c. 20 ♀ from a pond at University Campus, Dakar, Senegal. Coll. : B. TOGUEBAYE, 1983. Det. : K. MARTENS. Accomp. fauna : *Stenocypris major*. Dissected and figured specimens : OC.1537-1542.

AM-CAB.24R : c. 50 ♀ (condition fair) from Cabora Bassa, Zambezi delta Region, Sombo, 10 km from Chinde. Coll. : B.R. DAVIES, 13.3.1974. (see also *C. decaryi*). Det. : K. MARTENS.

*Pseudocypris acuta*

KBIN-OC.1543 : 1 ♂ (dissected and figured) from a temporary pool near Fishhoek. Raised from dried mud. Coll. : J. DAY, 11.1982. Det. : K. MARTENS.

AM-FRW.10 : c. 30 ♂ and ♀ (completely decalcified) from Rietvlei (Vaarsche Vlei) near Salt River, RSA. Coll. : June 1947. Det. : K. MARTENS.

AM-FRW.112e : 5 ♀ (condition fair) from Cape Flats, vlei on Klipfontein-Wynberg road, near P. Tower 'Phillipi'. Coll. : 27.9.1955. Det. : K. MARTENS.

*Pseudocypris circularis*

SAM.111869 : c. 10 ♂ and ♀ from Onambeka, Ovamboland, Namibia. Coll. : K.H. BARNARD, April 1923. Det. : D.H. ECCLES, 1963.

SAM.A11846 : c. 100 ♂ and ♀, collected by the Vernay-Lang Kalahari expedition 1930 (no locality specified). Det. : D.H. ECCLES, 1963. Dissected and figured specimens : SAM.A40042.

AM-SED.36/98/91 : c. 20 ♂ and ♀ over the three samples, all from Shopi Pan, Hwange Game Reserve, Zimbabwe. Coll. : OMER-COOPER, 4-11.9.1948. Det. : K. MARTENS. Accomp. fauna : see MARTENS (in press), under *Ramotha curtisae*.

*Various other collections from Namibia. The following list gives abbreviated data. All identified by K. MARTENS.*

SMN.50251 : c. 100 ♂ and ♀ from Gautsche Pan, Bushmanland. Coll. M.J. PENRITH & L. COENEN, 9-13.6.1971. Accomp. fauna : *Heterocypris oblonga* (SARS), *Potamocypris (Cyprilla) mastigophora* (METHUEN), *Sclerocypris sarsi* MARTENS. Dissected and figured specimens : : SMN.50251b.

SMN.50249 : 20 spec. from Nama Pan, Bushmanland. Coll. : M.J. PENRITH & L. COENEN, 11.6.1971. Exact locality descriptions and coördinates will be given in MARTENS *et al.* (in prep.).

SMN.50841 : 5 ♀ + larvae from Makuri Pan, Bushmanland. Coll. : C. HINES, 26.12.1984.

SMN.50896 : c. 100 ♂ + ♀ from the same locality. Coll. : C. HINES, 3.3.1985.

SMN.51063 : 5 ♀ from Aroc, Etosha National Park. Coll. : ?

SMN.51172 : 2 ♀ from Katima Mulilo, new sewage works, E. Caprivi. Coll. : B.A. CURTIS & V. SIMONA, 10.11.1986. (see also *C. decaryi*).

SMN.51300 : >100 ♂ + ♀ from a grassy pool, near Nyae-nyae Pan, Bushmanland. Coll. : B.A. CURTIS, 10.3.1988.

SMN.51303 : c. 100 ♂ + ♀ from Makuri Pan, Bushmanland. Coll. : B.A. CURTIS, 13.3.1988.

SMN.51309 : 2 ♀ from a pool N of Nyae-nyae Pan, Bushmanland. Coll. : B.A. CURTIS, 12.3.1988.

SMN.51320 : 7 ♂ + ♀ from Nama Pan, Bushmanland. Coll. B.A. CURTIS, 15.3.1988.

SMN.51323 : 1 ♀ from Kuru/Xhauru Pan, Bushmanland. Coll. : B.A. CURTIS, 16.3.1988.

SMN.51324 : 15 ♂ + ♀ from a pan, c. 1 km from Nama Pan, Bushmanland. Coll. : B.A. CURTIS, 16.3.1988.

*Pseudocypris expansa*

AM-GEN.591C : 1 ♂ (AM-GEN.591H-I - dissected and figured) + 3 ♀ from a pan between Middelburg and Belfast, RSA. Coll. : 23.6.1960. Det. : K. MARTENS.

*Pseudocypris gibbera*

SAM.A11853 : few spec. from the Vernay-Lang Kalahari Expedition ? No locality specified. Det. : D.H. ECCLES 1963.

Various collections from Namibia. The following list gives abbreviated data only. More complete locality description and coördinates will be given in MARTENS *et al.* (in prep.).

SAM.A11208 : c. 40 spec. from Onolongo, Ovamboland. Coll. : K.H. BARNARD 1923 - this locality not listed in SARS (1924b). Det. : ?.

SAM.A11337 : 100 spec. from Tamansu, Ovamboland. Coll. : K.H. BARNARD 1923. Det. : D.H. ECCLES 1963 ?

SAM.A11946 : few spec. from Omaramba, Ovamboland. Coll. : Lightfoot 1919. Det. : D.H. ECCLES 1963.

SAM.A11358 : 50 spec. from Ukualonkathi, Ovamboland, Namibia. Coll. : K.H. BARNARD 1923. Det. : D.H. ECCLES 1963.

SAM.A11360 : 30 spec. from Onolongo, Ovamboland. Coll. & Det. : idem.

SAM.A11336 : 2 ♀ from Onambeka, Ovamboland. Coll. & Det. : idem.

SAM.A11862 : 50 spec. from Ukualuthi, Ovamboland. Coll. & Det. : idem.

SAM.A11351 : 30 spec. from Onambeka, Ovamboland, Namibia. Coll. & Det. : idem.

SAM.A11883 : 1 ♀ from Ondangua, Ovamboland. Coll. & Det. : idem.

SAM.A11333 : 50 spec. from Eunda, Ovamboland. Coll. & Det. : idem. The following all identified by K. MARTENS.

SMN.xxxxx : 1 ♀ from a pan on Farm Kaya, reared from dried mud. Coll. : B.A. CURTIS, 23.2.1989.

KBIN-OC.1544 (JD.N15) : 1 ♂ from central Namib, grass pool on Naukluft Mountains. Coll. : J. DAY, 23-27.1.1980.

SMN.50928 : 2 ♂ + 1 ♀ from gravelpit, c. 50 km from Maltahöhe, on Mariental road. Coll. : B.A. CURTIS, 5.4.1986.

SMN.51033 : 4 ♀ from Sossusvlei. Coll. B.A. CURTIS, 30.3.1986.

SMN.51040 : 1 ♂ + 10 larvae from Warlencourth Farn (99), Otjiwarongo District, pool at edge of a large shallow pan. Coll. : B. CALAHAN, 17.4.1986.

SMN.51041 : c. 10 ♂ + ♀ from same locality.

SMN.51043 : c. 100 ♂ + ♀ from same locality.

SMN.51051 : c. 100 ♂ + ♀ from Klipdam, Etosha National Park. Coll. : ?. Dissected and figured specimens : OC.1545-1546.

SMN.51206 : 1 ♀ from a rainwater pool near turn-off on road to Osire, at Omatako Mountains. Coll. : C. BETHUNE, 26.1.1984.

SMN.51219 : 7 ♀ from Omatako, Omarambo, pool c. 14 km E of Otjituno, Hereroland West. Coll. : B.A. CURTIS, 24.4.1987.

KBIN-IG.27350/04 : 5 ♀, same locality as SMN.51206. Coll. : K.MARTENS & B.A. CURTIS, 29.9.1987.

KBIN-IG.27350/20 : 10 ♀ from a dried vlei on road to Oshakati, c. 35 km from Ruacana, Ovamboland. Coll. K. MARTENS & B.A. CURTIS, 5.10.1987.

KBIN-IG.27350/28 : 1 ♂ from Eunda pan (dried), c. 5 km from the villaga, Ovamboland. Coll. : K. MARTENS & B.A. CURTIS, 6.10.1987.

KBIN-IG.27350/33 : 4 ♀ + 2 ♂ from a dried pool on road to Oshakati, c. 95 km from Ruacana, Ovamboland. Coll. : K. MARTENS & B.A. CURTIS, 6.10.1987.

*Pseudocypris spinosa*

SAM.A11197 : 3 specimens (valves decalcified), from Weltevreden W. Pan, near Lake Chrissie, Transvaal, RSA. Coll. : 8.7.1928.

*Pseudocypris triquetra*

AM-REA.77c : c. 100 ♂ + ♀ from a temporary vlei at Benoni, Witkoppie, near Johannesburg, RSA. Coll. : 31(?)4.1971. Dissected and figured specimens : AM-REA.77C, AM-REA.77D.

*Globocypris trisetosa*

KBIN-OC.1547 : originally 5 ♀ (now 2 left) in spirit from Allan Ridge, Station Road, RSA (approx. coord. : 27°45'S 26°40'E). Coll. : E.R. DEMPSTER, 8.12.1988. Det. : K. MARTENS. Accomp. fauna : '*Parastenocypris junodi*, *Plesiocypridopsis* spec. Dissected and figured specimens : OC.1548-1550.

KBIN-IG.27549/GR.12 : 100s of ♀ from a temporary pool at Rhino's ridge, Thomas Baines Nature Reserve, Grahamstown, RSA. Coll. : K. MARTENS, F.C. DE MOOR & H. BARBER, 27.11.1989. Det. : K. MARTENS. Accomp. fauna : *Ramotha producta* (SARS), *Cypricercus* n.sp., *Heterocypris capensis* G.W. MÜLLER, *Physocypris* spec., *Paracyprretta* spec., *Parastenocypris* spec., *Sarsocypridopsis* spec. Dissected and figured specimens : OC.1551-1552.