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Revision of the freshwater ostracod species *Cypridopsis hartwigi* and *Cypridopsis elongata.* With a generic key to the European Cypridopsinae (Crustacea, Ostracoda)

by

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Abstract: *Cypridopsis hartwigi* G.W. Müller, 1900 and *Cypridopsis elongata* Kaufmann, 1900, two freshwater ostracod species belonging to the Podocopida - Cyprididae - Cypridopsinae, are revised: complements of description of both species and a table for rapid distinction between the two species are given. The taxonomic history of each species is discussed. The paper also includes (1) a differential diagnosis of the genus *Cypridopsis* s.str. and (2) a key to the European genera of the Cypridopsinae, i.e. *Cypridopsis* s.str., *Cavernocypris, Plesiocypridopsis, Sarscypridopsis* and *Potamocypris.*

Introduction

The specific determination as well as the taxonomic status of *Cypridopsis hartwigi* G.W. Müller, 1900 and *Cypridopsis elongata* Kaufmann, 1900 cause some difficulties at present. This is partly due to the fact that both species have rather rarely been collected and hence examined. The taxonomic confusion about both species in the literature is not so much due to insufficiencies in the original descriptions - on the contrary, these descriptions are fairly good - but rather to misinterpretations by later authors (see explanations below). The examination of three samples with different geographic origin of each species allowed me to clarify the taxonomic status of the two species as well as to stress the differential diagnostic features.

The genus *Cypridopsis* s.str. belongs to the subfamily Cypridopsinae Kaufmann, 1900 (also called the cypridopsines) a subfamily which at present includes 15 living and 2 fossil genera (for a list of the genera, see Marmonier et al., 1989; add the

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genera *Bryocypris* Roen, 1956 and *Klieopsis* Martens et al., 1991). The Cypridopsinae show the following diagnostic features: (1) the furcal rami are strongly reduced, flagellum-like in the female (see fig. 3D), absent in the male; (2) the carapace shows an enlarged crescent-shaped fused marginal zone in the antero-ventral region of both valves (for explanations and figures see Malz 1977, who first described this feature; the fused marginal zone has to be observed in the transmitted light of the microscope).

Until recently the Cypridopsinae were commonly placed in the Cypridopsidae Kaufmann, 1900, a family within the Cypridoidea (see above all Hartmann & Puri, 1974). Hitherto, all the cypridid-like genera with whip-like furcal rami were placed in the Cypridopsidae. But recently, serious doubts have arisen about the monophyly of the cypridopsides. If the cypridopsides are not monophyletic, then the Cypridopsinae should be reintegrated in the Cyprididae (see De Deckker, 1979). Martens (1985) and Marmonier et al. (1989) are of the same opinion. The same opinion is adopted here: the Cypridopsinae are considered as forming a subfamily within the Cyprididae. But it should be noticed that the discussion about this taxonomic problem is not closed on the present date.

Abbreviations used in the text: LV and RV = left and right valve; L = length of the carapace; B/L = width/length ratio; A2Swset = swimming setae of the antenna; Mx1 = maxillula; Mx2 = maxilla; T1 = 1st thoracopode (walking leg); fem. = female; ad. and subad. = adult and subadult specimens; SEM = scanning electron microscope; reg.n. = registration number; ZM = Zoological Museum.

Genus *Cypridopsis* s.str. Brady, 1867

Syn.: *Pionocypris* Brady & Norman, 1896

Cypridopsis hartwigi G.W. Müller, 1900 and *Cypridopsis elongata* (Kaufmann, 1900) which are revised here, belong to the genus *Cypridopsis* s.str.

Some 25 years ago, it became evident that the genus *Cypridopsis* sensu lato, with about 200 recent and fossil species, comprises several phylogenetic lineages which are best separated at generic level. In a first stage, Rome (1965) created the subgenus *Plesiocypridopsis* within the genus *Cypridopsis* s.l.. Then, McKenzie (1971 and 1977) proposed to split the genus *Cypridopsis* s.l. into 3 genera:

(1) *Cypridopsis* s.str. (type-species: *C. vidua*),
(2) *Plesiocypridopsis* (type-species: *P. newtoni*),
(3) *Sarscypridopsis* (type-species: *S. aculeata*).

Hartmann (1964) created the closely related genus *Cavernocypris* for *C. lindbergi* from Afghanistan. Wouters (1983) transferred *Cypridopsis* s.l. *subterranea* Wolf, 1920 into the genus *Cavernocypris*. *Cavernocypris lindbergi* was synonymized by Marmonier et al. (1989) with *Cavernocypris subterranea*. More recently, Martens et al. (1991) established the genus *Klieopsis* for *K. horai*, this species having been ranked formerly in *Cypridopsis* s.l.

A key to the above genera and the genus *Potamocypris* is given below.

Differential diagnosis of the genus *Cypridopsis* s.str.

A genus of the Cypridopsinae in which the LV ventrally overlaps the RV when the carapace closes. Posterior marginal zone of LV with a distinct double folded inner list. Swimming setae of the antennae well developed or more or less strongly reduced. Terminal joint of the maxillular palp cylindrical (not distally enlarged), bearing distal setae. Branchial plate of the maxilla with 1 to 5 filaments. Genital lobe of the female without a copulatory hook (this hook is present in *Potamocypris* and *Plesiocypridopsis*). Seminiferous tubules of the male with a simple loop in the anterior part of the carapace (not spirally enrolled as in *Potamocypris*). Furcal rami whip-like, the furcal trunk not cylindrical, but progressively narrowing towards its distal end.

Cypridopsis hartwigi G.W. Müller, 1900

1900 *Cypridopsis hartwigi* G.W. Müller, Zoologica 12 (H. 30): 82, pl. 18: 5, 20-22.
1925 *Pionocypris elongata* - Sars, An Account of the Crustacea of Norway 9 (Ostracoda): 138, pl. 64: 3.

Type-material: According to Müller (1900), only a few specimens were captured near Berlin. This material does not exist in the G.W. Müller collection in the Zool. Inst. of the Ernst-Moritz-Arndt-University at Greifswald (Germany) (pers. comm. of Dr G. Müller). The type-material has to be considered as lost.

Material examined

1. Greece, isle of Corfu. 1 glycerine tube labelled '*Cypridopsis hartwigi* G.W. Müller, coll. Stephanides, Korfu, März 1935'. Klie collection, reg. n. 1115, ZM Hamburg. The tube contains about 15 ad. fem. and 40 juv. specimens. Lad = 0.79 - 0.84 mm. See Stephanides (1948) under *C. hartwigi*. These specimens obviously were sent to Klie by Stephanides. (2 dissections by C.M.).
2. Morocco, Casablanca, 1 glycerine tube labelled '*Cypridopsis hartwigi*, Marokko: Casablanca Dezember 1909 coll. Ch. Alluaud'. Klie collection, no 1133, ZM Hamburg. The tube contains 5 specimens with strongly decalcified valves. L = 0.76 - 0.81 mm. See Gauthier (1928) under *C. hartwigi*. These specimens were sent to Klie by Gauthier. (No dissection by C.M.).
3. Algeria, Algiers. 1 alcohol tube labelled: '*Pionocypris elongata* (Kaufm.), Algier, det. G.O. Sars'. Sars collection, ZM Oslo, reg.n. F 20846. The tube contains 42 ad. and subad. fem. specimens; valves hard, not decalcified. L = 0.74 - 0.79 mm. See Sars (1925) under *Pionocypris elongata*. For explanations on Sars's erroneous determination, see below. (1 diss. by C.M.; see the valves of this specimen on Fig. 2A-C herein).

Additional description (females)

Surface of valves smooth. Dorsal view of the carapace: LV reaching beyond RV in front; posteriorly both valves reaching about to the same height. Ventral carapace closure: the LV 'embraces' the RV (ie the marginal zone of the LV overlaps the marginal zone of the RV).

Inner marginal zone of LV anteriorly smooth, without tubercles. This zone anteriorly and ventrally with a deep groove enclosed between the inner list and the selvage (fig. 1A,B); posteriorly with a distinct inner list but without a flange.

RV anteriorly with a row of about 10 to 17 marginal tubercles situated on the inner lamella, between the selvage and the very weak inner list. Posterior marginal zone with a distinct flange.

When the carapace closes, the marginal zone of the RV ventrally and anteriorly slips into the inner marginal groove (see above) of the LV. The anterior marginal tubercles of the RV, when introduced in the groove on the LV, act like knobs and reinforce the carapace closure.

Swimming setae of the antennae reaching moderately beyond the tips of the terminal claws (fig. 7A). Chaetotaxy of A2 similar to that of *C. elongata* (see below).

Distal joint of the Mx1 palp cylindrical, about twice as long as broad. 3rd masticatory lobe of Mx1 with 2 distinctly barbed teeth ('teeth bristles') (fig. 3A). Mx2 branchial plate with 2 branchial filaments (fig. 3B).

First thoracopode (T1, walking leg) elongate (not strikingly short and stout). Second joint distinctly elongate (not quadrate), distinctly longer than broad. (Fig. 3C). Furcal rami whip-like, their trunk progressively narrowing towards the distal end (fig. 3D).

L = 0.70 - 0.85 mm (most often 0.75 - 0.85 mm). Colour (according to Stephanides 1948): yellowish brown to olive brown, eggs light brown. The males are unknown. All the known populations reproduce parthenogenetically.

The ecology as well as the life-history of *C. hartwigi* are badly known. From Corfu, Stephanides (1948) reports the finding of the species in shallow pools filled with filamentous algae. The adults were found from October to May.

Remark: Deschiens et al. (1953) and Deschiens (1954) report on laboratory experiments in which specimens of *C. hartwigi* attack Ciliates, Rotifers, Insect larvae and Molluscs. About 10 to 15 ostracods added to an aquarium containing one aquatic snail cause the retraction and the death of the snail (*Bullinus contortus* and *Planorbis glabratus* were the snail species tested by the authors; both species are known to harbour the agent of bilharziosis).

Distribution: *C. hartwigi* has been reported from North-Africa, Europe and Asia. In Germany it was found near Berlin (Müller, 1900) and on the isle of Memmert in the North Sea (collected in 1910, see Klie 1938). It is known from France (Deschiens et al., 1953, without indication of the sampling locality), Sweden (Alm, 1915), Norway (Sars 1925, under *Pionocypris elongata*, see below under *C. elongata*), Corfu (Stephanides 1948) and Spain (Margalef 1953). It was also found in the USSR (near Saratov, Klie 1923) and in Iran (near the Caspian Sea, Hartmann 1964). In North Africa it was recorded from Algeria and Tunisia (Sars 1925 and Gauthier 1928) and from Morocco (Klie 1943).

Although distributed throughout Europe, *C. hartwigi* most certainly is a very rare species in central and western Europe. In Germany, which is the country in Europe the ostracod fauna of which is best known, the species has been recorded in 2 localities only (see above) and has not been collected after 1910. The species probably is more common in southern Europe.

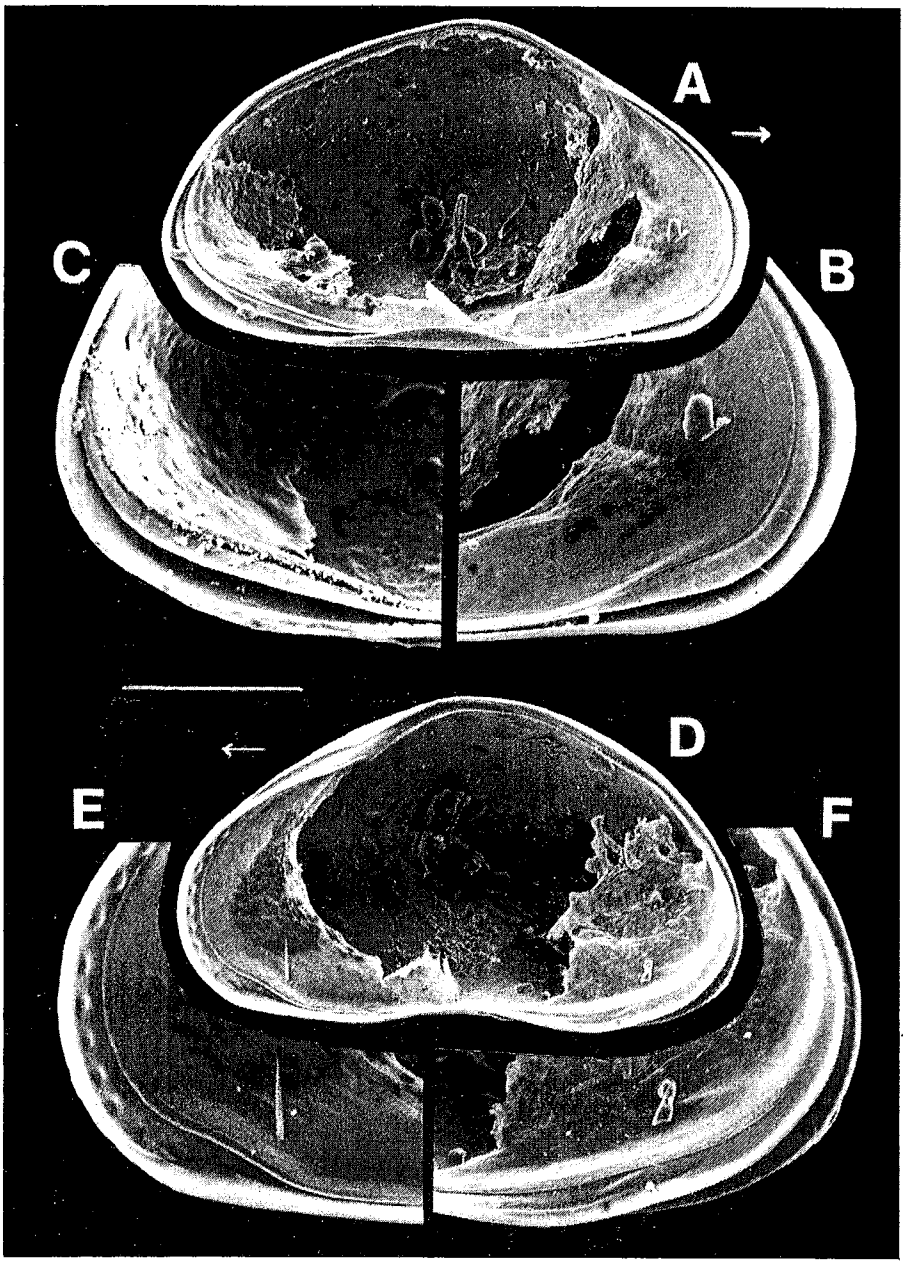


Fig. 1. - ***Cypridopsis hartwigi***. A: LV, inner view; B: marginal zone of the LV, see the marginal groove (detail of A); C: posterior marginal zone of the LV; D: RV, inner view; E: anterior marginal zone of the RV, see the inner marginal tubercles (detail of D); F: posterior marginal zone of the RV (detail of D). Scale: 0.25 mm for A and D. These specimens from Corfu (ZM Hamburg, Klie-collection, leg. Stephanides), except for C (Algeria, Sars-collection, ZM Oslo).

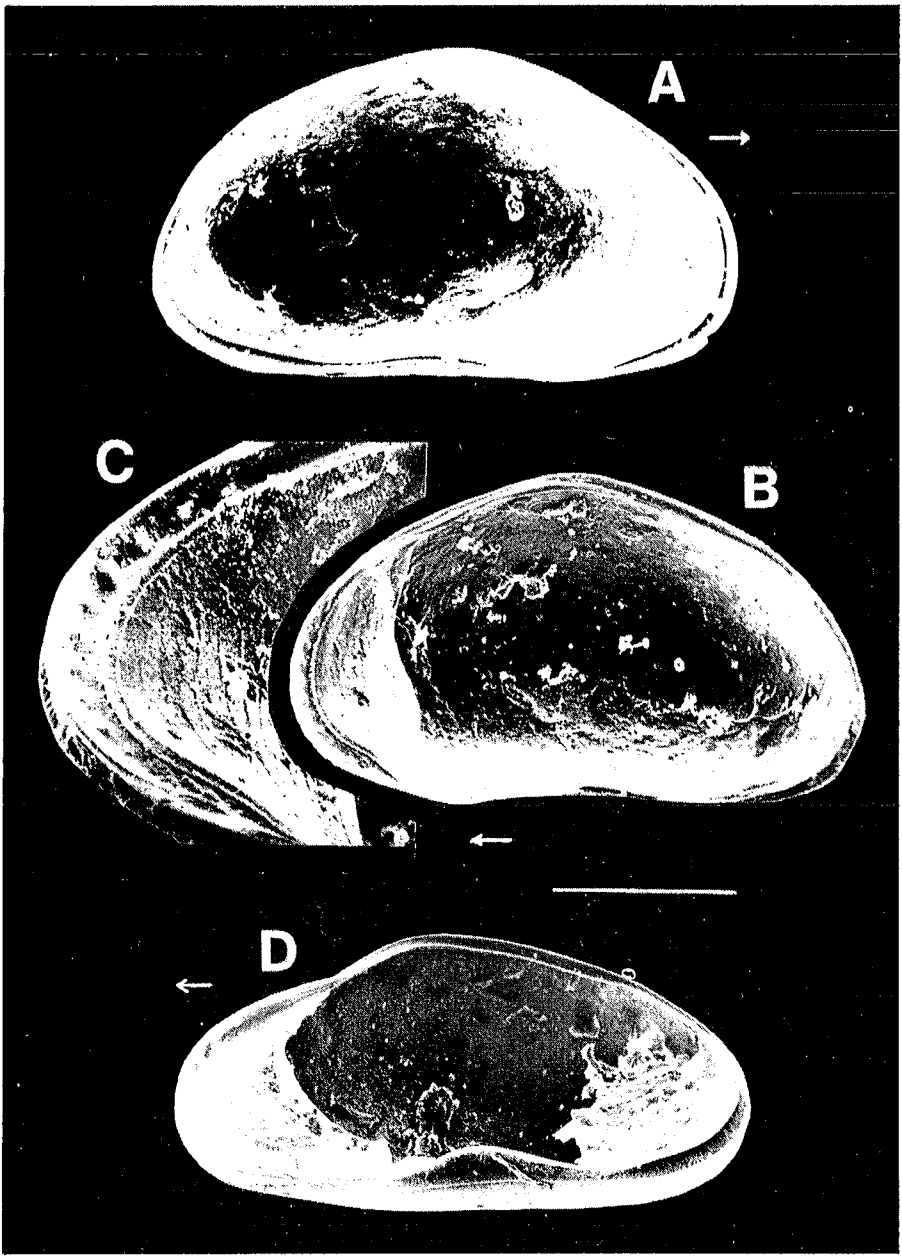


Fig. 2. - ***Cypridopsis hartwigi***. A: LV, inner view; **B**: RV, inner view; **C**: marginal zone of the RV, see the inner marginal tubercles (detail of B); **D**: RV, inclined inner view. Scale: 0.25 mm for A,B and D. These specimens from Algeria (ZM Oslo, Sars collection), except for D (from Corfu, leg. Stephanides). The shape of A and B is electronically distorted by the SEM (the cp actually is more elongate).

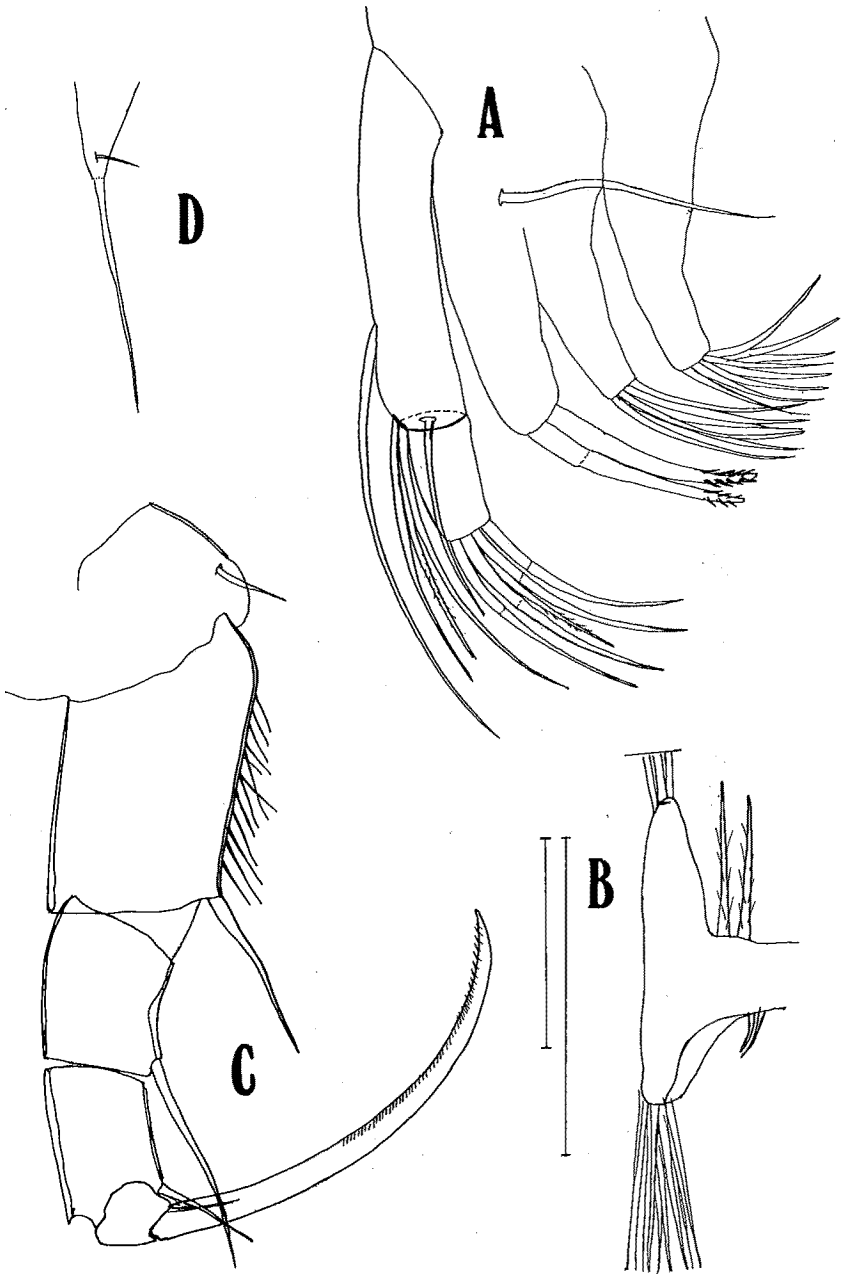


Fig. 3. - ***Cypridopsis hartwigi***. **A**: Maxillula (the setae on the 3rd mast. lobe are not shown); **B**: Maxilla; **C**: Thoracopode T1 (walking-leg); **D**: Furcal ramus. Small scale: 40 µm for A, 100 µm for B,D. Large scale: 100 µm for C.

Taxonomic discussion

1. The diagnostic features of *C. hartwigi* are (a) the presence of a row of tubercles on the inner anterior margin of the RV, (b) the A2 Swset which moderately reach beyond the tips of the terminal claws, (c) the 3rd masticatory lobe of Mx1 which has 2 distinctly barbed teeth, (d) the Mx2 with 2 branchial filaments, (e) the T1-2nd joint which is distinctly elongate (not square-shaped).

2. As already mentioned above (see under material examined), the specimens described as *C. elongata* by Sars (1925) actually belong to *C. hartwigi*. For details, see the discussion under *C. elongata* below.

3. Nüchterlein (1969) and Janz (1983 and 1988) recorded *C. hartwigi* from western Germany. The specimens of both authors actually belong to *C. elongata*. See the discussion under *C. elongata* below.

Cypridopsis elongata (Kaufmann, 1900) Müller, 1912

1900 *Cypridopsella elongata* Kaufmann, Rev. Suisse de Zool. 8: 314, pl. 19: 14-15, pl. 22: 20-23.
1925 *Pionocypris almi* Sars, An Account of the Crustacea of Norway 9 (Ostracoda): 139, pl. 55: 1.
1925 ?*Cypridopsis elongata* var. *orientalis* Bronstein, Arch. Naturgeschichte (A) 91 (9): 8.
1947 ?*Cypridopsis orientalis* Bronstein, Faune de l'URSS 2 (1): 206.

Type-material: it neither exists in the museum in Geneva nor in the museum in Berne where parts of Kaufmann's collections are deposited. It has to be considered as lost.

Material examined

1. Norway, 1 alcohol tube labelled: '*Pionocypris almi*, Sted: lok.?, leg. det. G.O. Sars'. Sars collection, ZM Oslo, reg.n. F1520a. The tube contains about 70 well preserved ad. and subad. fem. (valves not decalcified). (2 dissections). See the valves of 1 of these specimens on Fig. 6A-D). Type-material of Cypridopsis almi Sars, 1925.
2. West Germany, near Tübingen: (a) 1 alcohol tube labelled 'Schönbuch/FS 11, Material v. Sommer '82+'83', leg. H. Janz. About 45 ad. fem. and several juv.; (b) 1 glycerine tube 14 ad. fem. specimens. L (a and b) = 0.63-0.72 mm. These specimens were described as '*Cypridopsis* cf. *hartwigi*' by Janz in 1983 and as *C. hartwigi* in 1988. See the discussion below. (8 dissections). See figs 4 and 5 herein.
3. West Germany, Franconia: 1 alcohol tube with about 20 ad. fem. specimens, leg. H. Nüchterlein. L = 0.60 - 0.65 mm. These specimens were described as belonging to *C. hartwigi* by Nüchterlein (1969, p. 267). (1 dissection). See point 4 of the discussion below.

Additional description (females)

Surface of valves smooth. Carapace in dorsal view: anteriorly the LV distinctly reaches beyond the RV, posteriorly the RV slightly overlaps the LV or both valves reach to the same height. Ventral carapace closure: the LV embraces the RV.

Inner anterior marginal zone of both valves smooth, without tubercles. The anterior inner margin of the LV lacks the deep groove observed in *C. hartwigi* (compare fig. 5A and 6A for *C. elongata* with fig. 1 A,B for *C. hartwigi*).

Posterior marginal zones of RV and LV very similar to those of *C. hartwigi* (compare fig. 5A-D and 1A-F).

Antenna (A2): Swimming setae moderately reaching beyond the tips of the terminal claws, as in *C. hartwigi* (fig. 7A).

I would like to give a detailed description of the chaetotaxy of the 2 apical joints of the antenna of *C. elongata* (see fig. 8), in order (1) to compare this description with that given by Martens (1987) for species of the genus *Sclerocypris* ranked in the Cyprididae-Megalocypridinae and Martens & Meisch (1985) for *Potamocypris villosa* and (2) to try to homologize the apical claws and setae with those described for the species mentioned above.

For the description of the chaetotaxy of the 2 distal A2 joints, the nomenclature proposed by Broodbakker & Danielopol (1982) and revised by Martens (1987, 1989) is adopted. The 'ventral' margin of the A2 is the margin which bears the aesthetasc Y, the 'dorsal' margin being the opposite margin (see fig. 8). The swimming setae, attached on the inner side of the antenna, and the z-setae, attached on the outer side, should be used for orientation. For a better understanding of the chaetotaxy of the 2 apical joints of the antenna, see also the most helpful diagrams given by Martens (1987) for some species belonging to the genus *Sclerocypris*.

The penultimate A2 joint bears 3 strong claws of subequal length, designated as the G2, G1 and G3 claws. The G2 claw, which is inserted most dorsally and most externally, shows up distinctly serrate. I shall call it the saw-claw. The neighbouring G1 and G3 claws bear only very weak distal spines. This makes the identification of the G2 claw very easy. The G1 claw is attached more internally and ventrally with regard to the G2 claw. The G1 claw is remarkable by its basal attachment: its base is enclosed in two distinct chitin pieces forming a basal stop which prevents the claw from tilting (fig. 8). The tip of the G1 claw, here called the stop-claw, reaches slightly beyond the tips of the neigbouring claws. I examined the G1 claw of several species belonging in the Candonidae, Cyprididae and Cypridopsinae: in all the species examined, the G1 claw bears a similar basal chitinous stop. Possibly, this character of the G1 claw (a character which has not yet been described in the literature) is found in all species belonging to the ostracod families named above. This would considerably facilitate the quick identification of the G1 claw. The G3 claw is inserted most ventrally and internally. It does not show any particular character. For the remaining claws and setae see fig. 8.

The chaetotaxy described here is almost identical with that figured by Martens & Meisch (1985) for the female antenna of *Potamocypris villosa*, another cypridopsine species. Furthermore, the general diagram (number and relative position of claws and setae) is identical with that figured and described by Martens (1987) for the females of *Sclerocypris*, a genus which belongs in the Megalocypridinae-Cyprididae. Most probably, this general diagram is a character of the superfamily Cypridoidea, which includes the Cyprididae among others.

Remark: I would like to point out that the A2 chaetotaxy is almost identical in *C. hartwigi* and *C. elongata* and that neither species can be distinguished by the morphology of the antenna.

Mx1 palp: distal joint cylindrical, about twice as long as broad. 3rd masticatory process with 2 slender, smooth teeth (only under very high magnification power, about 1000X, the inner tooth shows very fine distal barbs) (fig. 7B).

Mx2 branchial plate with 3 branchial filaments (fig. 7C). First thoracopode (T1, walking leg) short and stout. First joint generally nearly quadrate (for instance: B/L = 21/22 (fig. 7D). But this last feature shows some variability: in the specimens from Franconia (Germany), this joint shows more elongate: B/W = 16/19, 16-21, 18/21, 15/20 for instance. Furcal rami strongly reduced, whip-like (fig. 7E).

L = 0.56 - 0.72 mm (most often: 0.60 - 0.65 mm). Colour: uniformly light green. The males are unknown.

Ecology: The species has been found in ditches, small shallow ponds situated in meadows and in swampy ponds situated in forests.

Life-history: the species annually produces a first generation from May to June/July, a second generation from September to November (according to Wolf, 1920). Nüchterlein (1969) and Janz (1983 and 1988) (in both authors works see under *C. hartwigi*) collected it from May to October in Germany. According to Janz (1988), the species produces 2 or even 3 generations per annum.

Distribution: Switzerland (Kaufmann 1900, Wolf 1920), western Germany (Nüchterlein 1969, Janz 1983 and 1988, for both authors see under *C. hartwigi*), Austria (Löffler 1963), Sweden (Alm, 1915), Spain (Margalef 1958), the USSR (near Moscow, Bronstein 1925 under *C. elongata* var. *orientalis*; in the basin of the Dnjestr, Kovalenko 1976 fide Petkovski 1977), North Africa (Gauthier 1928, Sars 1925: for both authors see under *Pionocypris almi*).

Discussion

1. In spite of the fact that I was not able to examine the type-material of *C. elongata*, I rather believe that there can be no doubt that the species described here above is identical with that originally described by Kaufmann (1900) under *C. elongata*. All the different characters are in perfect agreement, except for one: Kaufmann indicated the presence of only 2 filaments on the Mx2 branchial plate (instead of 3 as indicated herein). But this branchial plate is very delicate and the filaments often break or cling together during dissection. I rather believe that Kaufmann's indication is likely to be erroneous. On the other hand, there is one character, expressly mentioned in the text and figured by Kaufmann, which, although not equally expressed in all the populations (see the discussion below), strongly supports the identity of Kaufmann's species with the species presented here: it is the nearly square-shaped 2nd joint of T1 (see Kaufmann 1900, p. 315 and pl. 22 fig. 21; compare with fig. 7D herein). In all of the *C. hartwigi* specimens which I examined, this T1 joint shows distinctly more elongate.

2. *Cypridopsis elongata* sensu Sars 1925: as already stated above, Sars's specimens, which were collected in Norway or were reared from dried mud collected in Algeria, actually do not belong to *C. elongata* but to *C. hartwigi*. Sars erroneously noted the presence of tubercles on the inner anterior margin of the LV of his specimens. He believed that Kaufmann (1900) merely 'overlooked' the marginal 'thickenings' on the LV of the type specimens of *C. elongata*. But the

examination of part of Sars's specimens, those reared from dried mud collected near Algiers, has allowed me to establish that Sars's observation is erroneous: Sars's specimens actually bear the tubercles on the inner margin of the RV (not on the LV!): see figs 2A-C herein which show the RV (with tubercles) and the LV (without tubercles) of one of Sars's specimens from Algeria.

Remark: it should be noted that the existence of tubercles on the inner margin of the LV as stated by Sars (1925) would not 'make sense', ie would be a highly non-adaptive character, in a species in which the marginal zone of the LV overlaps the marginal zone of the RV (this is the case in all *Cypridopsis* s.str. species). The inner marginal tubercles are adaptive only if they are situated on the inner margin of that valve (here the RV) which slips into the inner marginal groove of the opposite valve (the LV here). (See above under *C. hartwigi* for a short explanation on the function of the inner marginal tubercles on the RV).

Furthermore, I was able to notice that the remaining features of Sars's specimens (determined by the author as belonging to *C. elongata*) clearly prove that they have to be ranked in *C. hartwigi*: the Mx2 bears 2 branchial filaments (not 3 as in *C. hartwigi*), the T1-2nd joint is distinctly longer than broad and - but this is a less strong argument - the carapace size (0.74-0.79 mm) is characteristic for *C. hartwigi* (the size commonly observed in *C. elongata* is 0.56 - 0.72 mm).

3. It should be noticed that Klie (1938), whose work still at present serves as a reference book for the determination of European freshwater ostracods, adopted Sars's (1925) erroneous description and figures for the description of *C. elongata*. In conclusion, the description of *C. elongata* in Klie (1938) actually applies to *C. hartwigi* (except for the marginal tubercles: they are found on the RV, not on the LV).

4. The specimens from Germany which were assigned to *C. hartwigi* by Nüchterlein (1969) and Janz (1983 and 1988) actually belong to *C. elongata*. As both authors were so kind as to send me part of their specimens, I was able to check the specific identification of their material (see under 'material examined').

Janz's specimens, which the author described as belonging to *C.* cf. *hartwigi* (1983), respectively to *C. hartwigi* (1988), are in perfect agreement with *C. elongata* as described here above. I would like to point out that Janz's specimens, contrary to the author's statement, do not bear marginal tubercles on the inner margin of the RV (see the RV of one of Janz's specimens on fig. 5C herein).

Nüchterlein's specimens too are in perfect agreement with *C. elongata*, except for one character (the T1-2nd joint, see below). Nüchterlein (1969, p. 267) draws the attention to the relative small size (0.60-0.64 mm) and the more elongate carapace shape of his specimens and he questions their belonging to *C. hartwigi*. When dissecting four of these specimens, I was able to see that the Mx2 bears 3 branchial filaments (not 2 as in *C. hartwigi*; the number of Mx2 filaments was not mentioned by Nüchterlein). Furthermore I checked the inner margin of the RV under the SEM: this margin is smooth, without tubercles. All these features characterize *C. elongata*. The only difference with Kaufmann's original description is found on the 2nd T1 joint, which is not distinctly quadrate in these specimens, but is somewhat more elongate (see the B/L ratios in the description above). I believe that there may be not doubt that Nüchterlein's specimens belong to *C. elongata* and I would like to

conclude that the B/L ratio of the T1 2nd joint shows some variability in *C. elongata.*

6. *Cypridopsis almi* (Sars, 1925). As already stated to point 2 of the present discussion, Sars 1925) believed that Kaufmann (1900) merely 'overlooked' the presence of marginal tubercles on the LV of *C. elongata.* As Sars had also collected specimens without tubercles on the LV (as well as on the RV), the authors believed them to belong to a species not yet described and introduced for it the species name *Pionocypris almi.* (It should be noticed that *Pionocypris* is a junior synonym of *Cypridopsis*; see for instance Howe 1962, p. 61 and 179 for a discussion on this synonymy). The examination of the type-material of *Cypridopsis almi* allowed me to establish that this material is identical with *C. elongata* (Kaufmann). Thus Cypridopsis *almi* (Sars, 1925) has to be considered as a junior synonym of *Cypridopsis elongata* (Kaufm.). This synonymy was already foreseen by Petkovski (1977).

5. *Cypridopsis norvegica* Sywula, 1972. Sywula (1972) argued that *C. elongata* sensu Sars (1925), which according to Sars bears tubercles on the inner anterior margin of the LV, is not identical with *C. elongata* sensu Kaufm. 1900, which lacks these tubercles (both valves being smooth). So Sars's specimens should belong to a not yet named species; and Sywula proposed the name *C. norvegica* for that species. (Sywula himself did not examine specimens of the species). So, according to Sywula (1972): *Cypridopsis elongata* sensu Sars 1925 = *Cypridopsis norvegica* n.sp.

But as I have been able to show (see above) that the specimens described by Sars (1925) as belonging to *C. elongata,* actually belong in *C. hartwigi,* the most curious following situation arises: the name *C. norvegica* does not apply to an actually extant species. The name *C. norvegica* should not be used in the future as a valid species name.

7. *Cypridopsis elongata* var. *orientalis* Bronstein, 1925 was described from the environs of Moscow. This form is characterized above all by its small size (0.60-0.62 mm) and the presence of tubercles on the inner margin of the RV. In 1947, Bronstein elevates his form to species rank (*C. orientalis*). Sywula (1972) writes that he examined specimens of *C. elongata orientalis*: according to this author, the tubercles on the RV are not always present. As I did not examine specimens of this form, I am not able to clarify its taxonomic status.

8. *Cypridopsella nicki* Lindner, 1920, described from the USSR, at present is commonly placed in *Cypridopsis* s.l. The author writes that in his species the ventral marginal zone slips into a groove situated on the marginal zone of the RV. This means that the RV ventrally overlaps the LV. If this is true, then *C. nicki* does not belong to the genus *Cypridopsis* s.str. It most probably should be assigned to the genus *Plesiocypridopsis* or *Sarscypridopsis.*

9. *Cypridopsis pincta* (Straus, 1821) Brady & Norman, 1889 possibly is identical with *C. elongata.* But the original description is very poor and does not allow identification and synonymisation with *C. elongata.* I would like to suggest to let the name *C. pincta* sink into oblivion.

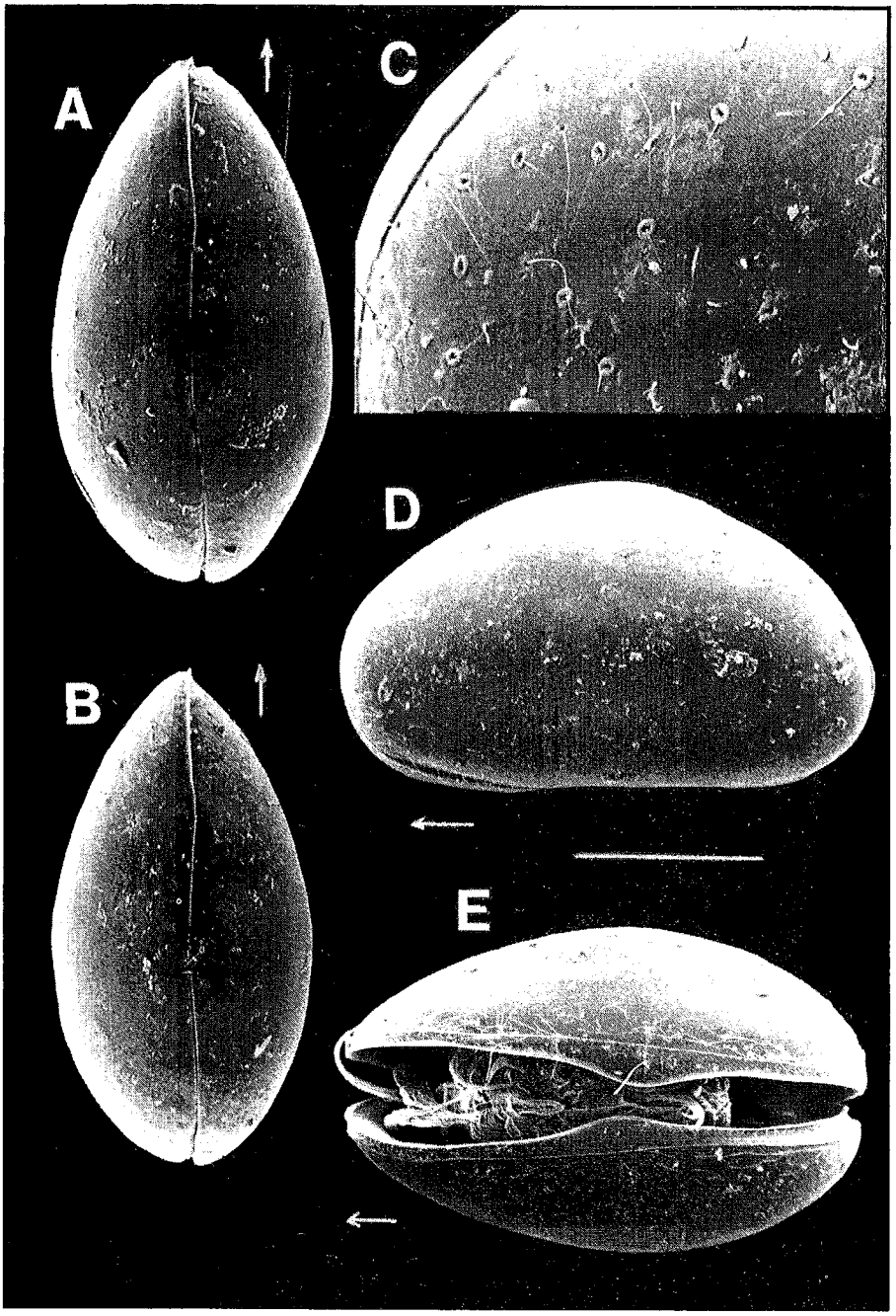


Fig. 4. - ***Cypridopsis elongata***. **A** and **B**: dorsal view of the carapace; **C**: surface of the valves (detail of D); **D**: lateral view of the carapace; **E**: ventral view of the carapace. Scale: 0.25 mm for A,B and D-E. These specimens from Germany (near Tübingen, leg. H. Janz).

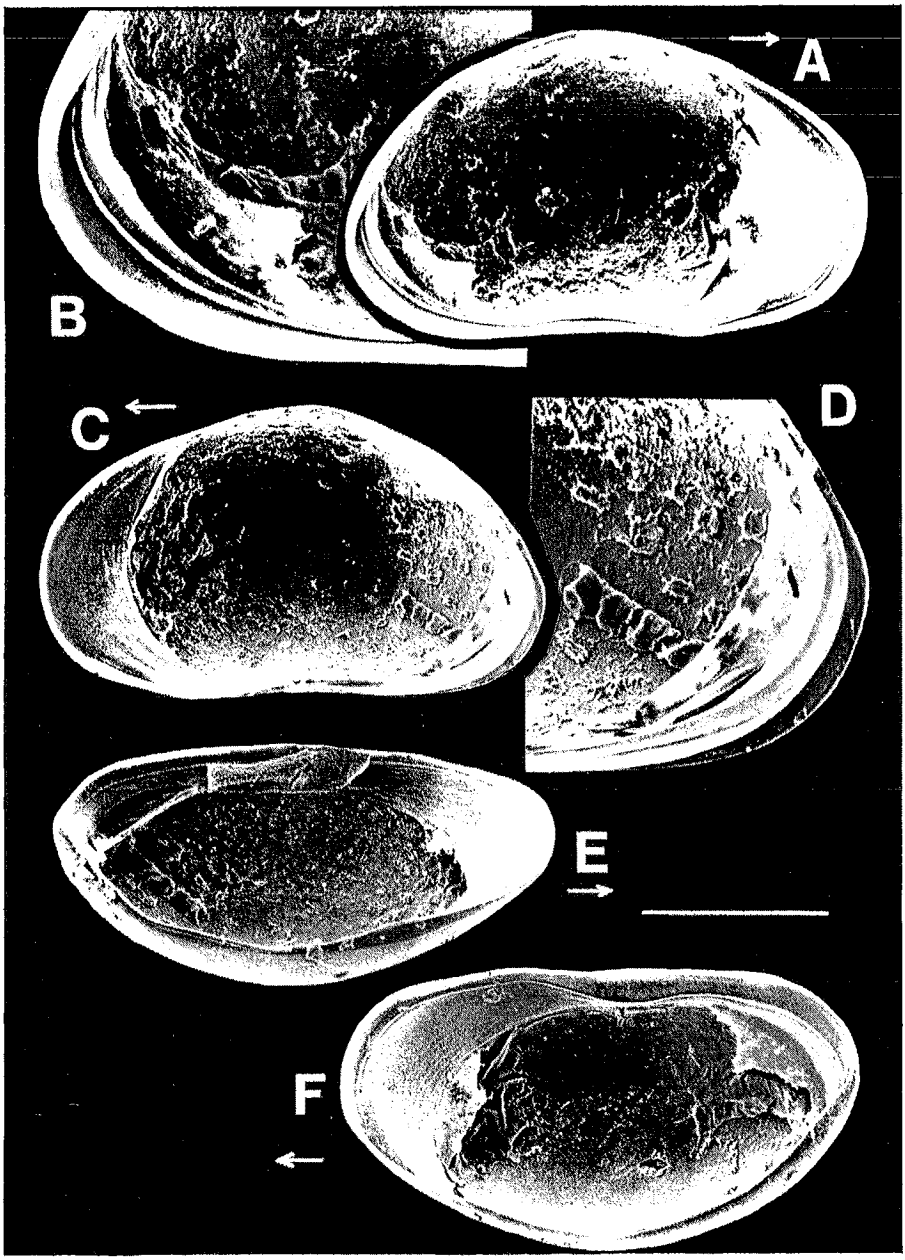


Fig. 5. - ***Cypridopsis elongata***. A: LV, inner view (see the absence of the inner marginal groove); B: posterior marginal zone of the LV (detail of A); C: RV, inner view; D: posterior marginal zone of the RV (detail of C); E: RV, inclined inner view; F: LV, inclined inner view. Scale: 0.25 mm for A, C, E and F. These specimens from Germany (near Tübingen, leg. H. Janz).

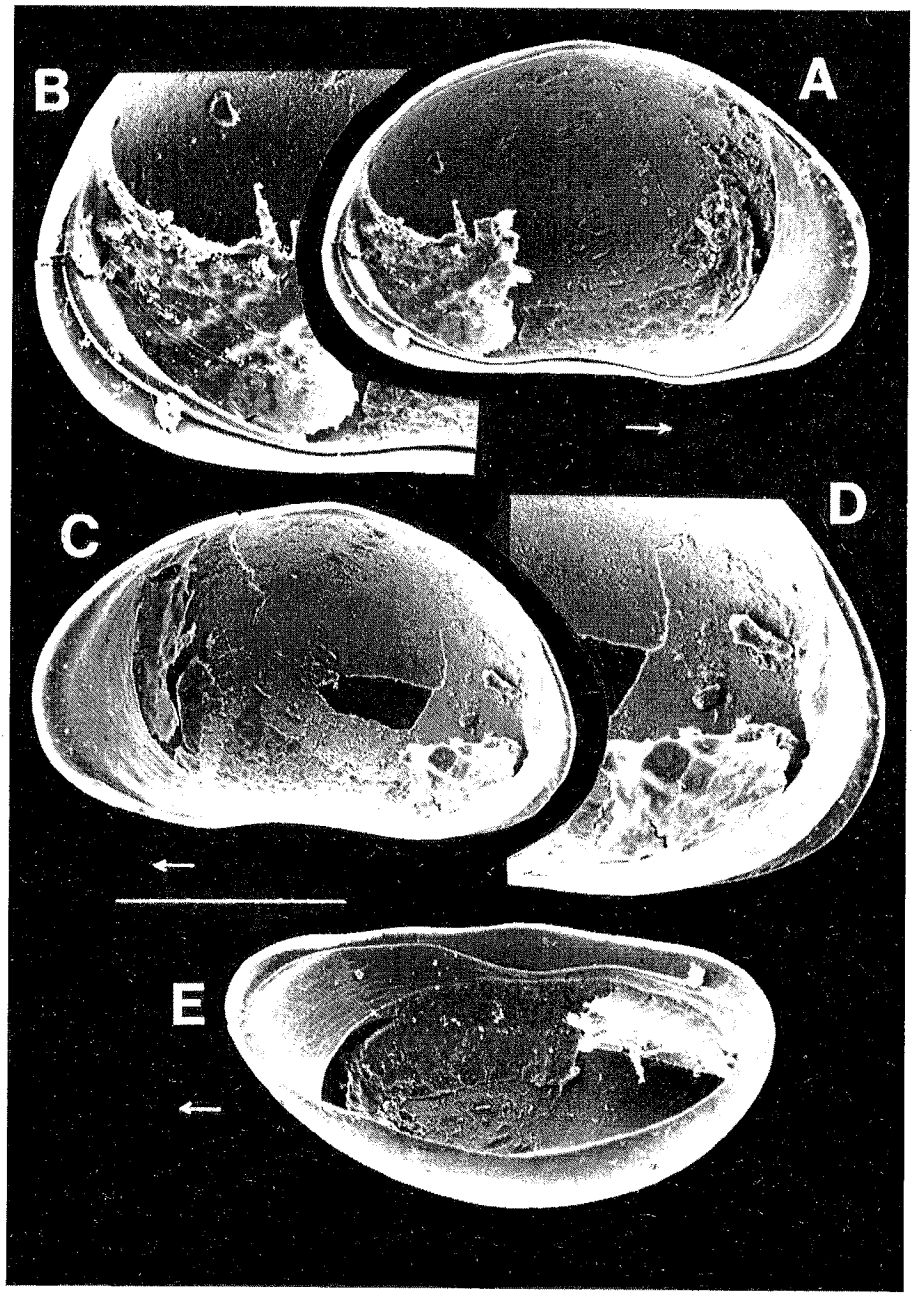


Fig. 6. - ***Cypridopsis elongata***. A: LV, inner view; B: posterior marginal zone (detail of A); C: RV, inner view; D: posterior marginal zone of the RV (detail of C); E: Left valve, inclined inner view, same valve as 6A. Scale: 0.25 mm for A, C and E. These specimens from Norway (ZM Oslo, leg. G.O. Sars). Type-specimen of *Pionocypris almi* Sars, 1925.

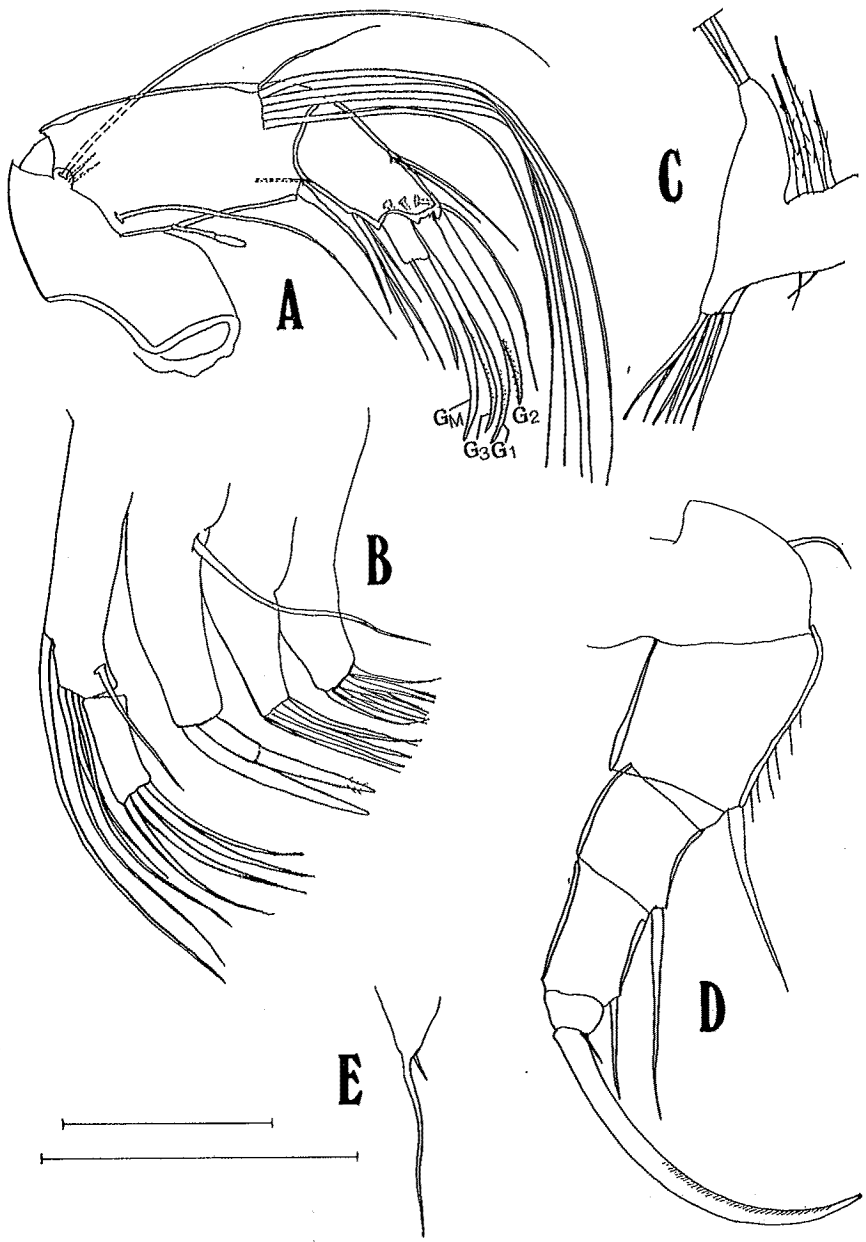


Fig. 7. - ***Cypridopsis elongata.*** **A**: Antenna (inner view); **B**: maxillula (the setae on the 3rd mast. lobe are not shown); **C**: maxilla (Mx2); **D**: thoracopode T1 (walking-leg), see the nearly quadrate 2nd joint; **E**: furcal ramus. Small scale: 100 µm for A,C,E, 40 µm for B. Large scale: 100 µm for D.

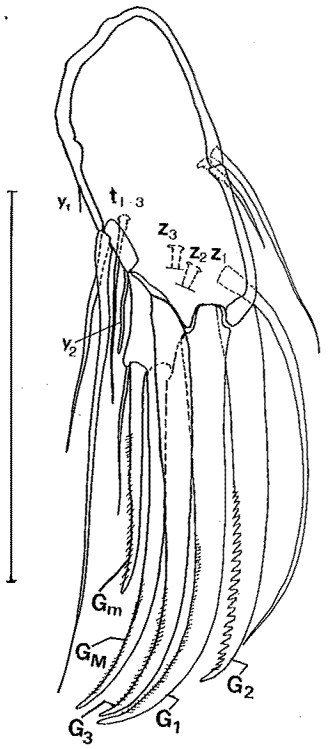


Fig. 8. - ***Cypridopsis elongata***. Chaetotaxy of the two distal joints of the antenna (inner view). Scale: 100 µm.

Comparison of *Cypridopsis hartwigi* with *Cypridopsis elongata*

The descriptions above allow easy distinction between the 2 species. The table below resumes the differences:

Cypridopsis hartwigi	*Cypridopsis elongata*
Lcp = 0.70 - 0.85 mm (most often: 0.75-0.85 mm)	Lcp = 0.56-0.72 mm (most often: 0.60-0.65 mm)
Inner anterior margin of the RV with a row of tubercles	RV (and LV) smooth (without tubercles on the inner margin)
Mx1: 3rd masticatory lobe with 2 distinctly barbed teeth	these teeth smooth (only under 1000x the inner tooth shows very slightly barbed)
Mx2: resp. plate with 2 branch. fil.	this plate with 3 branch. filaments
T1: 2nd joint distinctly longer than broad	this joint nearly square-shaped or slightly longer than broad

Key to the European Cypridopsinae genera

1 (4) Ventral carapace closure: the LV ventrally overlaps the RV 2

2 (3) In dorsal view, the carapace is subovoid, nearly half as broad as long. Posterior marginal zone of LV with a distinct double folded inner list *Cypridopsis* s.str.

3 (2) In dorsal view, the carapace is elongate, distinctly less than half as broad as long. Posterior marginal zone of LV without such a list *Cavernocypris*

4 (1) Ventral carapace closure: the RV overlaps the LV 5

5 (6) Terminal joint of the maxillular palp distally enlarged (not cylindrical), spatula-like *Potamocypris*

6 (5) Terminal joint of the maxillular palp cylindrical, not distally enlarged 7

7 (8) Furcal rami: trunk cylindrical, distally abruptly narrowing *Plesiocypridopsis*

8 (7) Furcal rami: trunk not cylindrical, but progressively narrowing towards the distal end *Sarscypridopsis*

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