Bull. Soc. Nat. luxemb., 94 (1993) p. 219-232

New records of freshwater Ostracoda (Crustacea) from the Canary Islands

by

Angel BALTANÁS [1]) and Javier GARCÍA-AVILÉS [2])

Abstract: Records of 10 ostracod species occuring in freshwater habitats in the isles of Fuerteventura, Tenerife and Gomera (Canary Islands) are here reported. Five of them (*Ilyocypris gibba, Heterocypris incongruens, Potamocypris arcuata, Limnocythere inopinata* and *Cyprideis torosa*) are new for the fauna of the archipelago. A description of a *Herpetocypris* species, tentatively ascribed to *H. helenae*, is also included and its taxonomic position discussed.

Introduction

The knowledge of the aquatic fauna inhabiting the Canary Islands increased significantly in the last years. Prof Dr J. H. Stock played a major role in this process as the leader of a research project on the origin of insular groundwater biotas in the Atlantic. Recently, Meisch & Broodbakker (1990, 1993) reported the presence of several ostracod species in freshwater samples collected by Prof. Stock on the Canary and Cabo Verde islands from 1985 to 1988. Meisch & Broodbakker (1993) also provide a complete check-list of freshwater Ostracoda known to occur in the Macaronesian region. Those inhabiting the Canary islands are: *Pseudocandona albicans* (Brady, 1864); *Herpetocypris chevreuxi* (Sars, 1896); *Heterocypris salina* (Brady, 1868); *Cypretta seurati* Gauthier, 1929; *Cypridopsis vidua* (O.F. Müller, 1776); *Plesiocypridopsis newtoni* (Brady & Robertson, 1870); *Sarscypridopsis aculeata* (Costa, 1847) and *Sarscypridopsis lanzarotensis* (Mallwitz, 1984). Although most of the samples were collected in wells, none of these species belonged to the stygobiont fauna. Apart from this, no additional information exists on the ostracod fauna of the Canary islands except the description of four marine species in Hartmann (1959) and two anchialine species from a lava tunnel in Lanzarote, *Danielopolina wilkensi* Hartmann, 1985 and *Eusarsiella bedoyai* Baltanás, 1992.

Here we report new ostracod records from the isles of Fuerteventura, Tenerife and Gomera, with additional information on their habitats and ecology. Detailed

[1]) Centro de Investigaciones del Agua (CSIC), La Poveda. E-28500 Arganda del Rey (Madrid), Spain. Present address: Limnological Institute, Austrian Academy of Sciences, A-5310 Mondsee, Austria.

[2]) Centro de Investigación "Fernando González Bernáldez", E-28791 Soto del Real (Madrid), Spain.

description of a *Herpetocypris* species and discussion on its taxonomic position is also included.

List of localities

Isle of Fuerteventura

1. La Palma. Spring-brook with several small pools, the larger one measures 1 m in diameter and 10 cm deep. Substrate of sand and gravel, without detritus. Altitude: 380 m a.s.l. (UTM: 28RRFS017614). Sampling date: 04-XII-1990.

2. Valle de Santa Inés. Brook with slow flowing waters, 70 cm width and 10 cm depth. Bottom with sand and mud but no detritus. Altitude: 260 m a.s.l. (UTM: 28RES941486). Sampling date: 05-XII-1990.

* 3. Betancuria (road C-260, Km 37). Man-made container (Max. diameter: 7 m; depth > 1.5 m). Altitude: 360 m a.s.l. (UTM: 28 RES923441). Sampling date: 05-XII-1990.

4. Vega de Rio Palmas. Reservoir Las Penitas. Sampling site in the littoral zone with abundant reed and detritus. Substrate of mud and sand. Altitude: 200 m a.s.l. (UTM: 28RES886403). Sampling date: 05-XII-1990. From this locality an additional sample (27.02.1990), collected in a small pond, was provided by Dr Báez (Univ. La Laguna, Tenerife).

5. Tesgüare (road C-610, Km 7). River Cabras; slow-flowing waters (width: 1.5 m, depth: 20 cm) with Tamarix sp. trees in the margins. Altitude: 140 m a.s.l. (UTM: 28RFS050517). Sampling date: 05-XII-1990.

* 6. Taralejo (road C-640), Km 15). Pond (diameter: 20 m; depth: 15 cm) with muddy bottom and no aquatic plants. Altitude: 1 m a.s.l. (UTM: 28RES865187). Sampling date: 07-XII-1990.

7. Casas de Jorós. Man-made container (diameter: 15 m; depth > 1.5 m). Altitude: 40 m a.s.l. (UTM: 28 RES591042). Sampling date: 07-XII-1990.

* 8. Casas de las Salinas. Salt pan without aquatic plants but with a thick salt layer on the bottom (depth: 15 cm). Altitude: 0 m a.s.l. (UTM: 28RFS109382). Sampling date: 08-XII-1990.

9. Puerto de los Molinos. Brook with moderate flow and marine influence (width: 3 m; depth: 20 cm). Altitude: 2 m a.s.l. (UTM: 28RES919575). Sampling date: 08-XII-1990.

10. Los Molinos: Reservoir with dense aquatic vegetation on littoral zones (down to 40 cm depth). Substrate of gravel and sand, with abundant organic matter. Altitude: 120 m a.s.l. (UTM: 28RES949541). Sampling date: 08-XII-1990.

* 11. Cotillo. Source (diameter: 2.5 m; depth: 30 cm) with sandy bottom and poor in organic matter. Altitude: 1 m a.s.l. (UTM: 28RES970714). Sampling date: 08-XII-1990.

12. Barranco del Esquinzo. Brook (width: 1.5 m; depth: 10 cm) with slow-flowing current and macrophytes. Sandy bottom poor in organic matter. Altitude: 3 m a.s.l. (UTM: 28RES961677). Sampling date: 09-XII-1990.

Isle of Tenerife:

13. Punta del Hidalgo (Dr Báez coll.). Sampling date: 17-V-1990.

Isle of Gomera:

14. Degollada de Peraza (D. Moreno coll.). Small man-made reservoir for water supply (without aquatic plants). Maximum diameter: 2 m. Altitude: 980 m a.s.l. Sampling date: 14-VII-1990.

(* No ostracods in these samples)

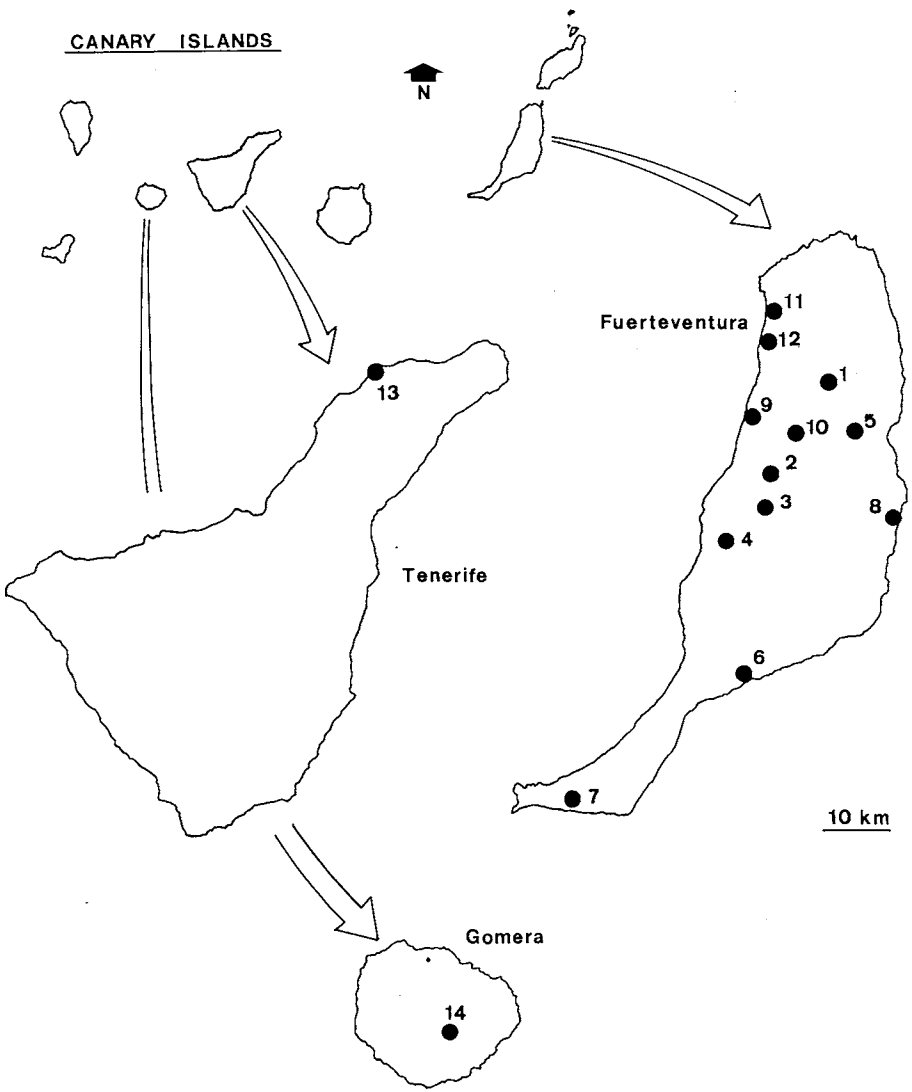


Fig. 1. - Sampling localities in the Canary Islands.

Taxonomic results

Superfamily Cypridoidea Baird, 1854

Family Ilyocyprididae Kaufmann, 1900

Ilyocypris gibba (Ramdohr, 1808)

Occurrence: Fuerteventura (locs 4, 5 and 10).

Dimensions: Length = 0.71-0.77 mm. Height = 0.35-0.37 mm (n = 5).

No living animals, but only rare valves, were found. All specimens studied lack the typical lateral projections, a character which is known to be highly variable in this species (Meisch, 1987). This is the first record of *Ilyocypris gibba* for the Macaronesian region. However, because this species has an holarctic distribution and is known to occur also in Northern and Western Africa (Martens, 1984) its occurrence in other islands in the area is expected as well. *Ilyocypris gibba* lives in a wide variety of environments (lakes, ponds, brackish waters, etc).

Family Cyprididae Baird, 1845

Subfamily Herpetocypridinae Kaufmann, 1900

Herpetocypris cf. helenae G.W. Müller, 1908

= ? *Herpetocypris chevreuxi* (Sars, 1896)
= ? *Herpetocypris palpiger* Lowndes, 1932

Occurrence: Gomera (loc. 14) and Fuerteventura (locs 4, 5 and 7).

In 1990, abundant material of a *Herpetocypris* species was collected from a man-made reservoir from the isle of Gomera (Diego Moreno coll.). The same species appeared, although in low numbers, in Fuerteventura locs 4 (one adult and one juvenile), 5 and 7 (empty valves). After unsuccessful attempts to assign this material to any of the extant Western European *Herpetocypris* species it was pointed out (Meisch, pers. comm.) that there is some similarity between the Canarian species and *Herpetocypris helenae* Müller, 1908, a species occurring in a spring on the isle of Saint Helena (Müller, 1908; McKenzie, 1978), an oceanic island in the South Atlantic, 5000 km south of the Canary islands.

However, the taxonomic status of *H. helenae* is far from clear. Some authors (Sars, 1924; Meisch & Broodbakker, 1993; Martens, pers. comm.) consider it to be a synonym of *Herpetocypris chevreuxi*, whereas others (McKenzie, 1978) think it a valid species. A similar unclear status pervades the taxonomy of several *Herpetocypris* species in the mediterranean area and Western Europe, e.g. *H. intermedia* Kaufmann, *H. caerulea* Rome, *H. agilis* Rome, *H. palpiger* Lowndes and *H. romei* Anichini. Most of them are placed into synonymy of *H. chevreuxi* by Sywula (1974) and Wouters (1989).

The specimens collected in Gomera and Fuerteventura fit fairly well with the description of *H. helenae* provided by Müller (1908), as translated by McKenzie (1978), and when compared with *H. chevreuxi* subtle differences were found (but see Meisch & Broodbakker, 1993 for a different opinion). So, the species we found in the Canary islands is here tentatively adscribed to *Herpetocypris helenae*, but the

urgent need for a complete revision of Western palearctic *Heterocypris* species is here stressed.

Description of the material:

Carapace (Fig. 1): Similar to that of other *Herpetocypris* species. Surface smooth and sparsely hirsute. Shape elongate sub-reniform; dorsal margin slightly convex, straightened medially; anterior and posterior margins broadly curved; ventral margin displaying a weakly medial sinuous inflexure. Left valve slightly larger than and overlapping right; valves compressed. Zone of fusion wide, with a large number of radial pore canals, closely spaced and in part branching toward outer margin. Calcified zone of the inner lamella wide. Inner margin regular and evenly curved, with the exception of an anteroventral angle. Inner lamella broader anteriorly than posteriorly, narrower ventrally.

Measurements (mean +-standard deviation; n = 20): Length (left valve) = 1.87+-0.04 mm. Height (left valve) = 0.82 +- 0.03 mm.

Appendages: Antennule (A1; Fig. 3A,B). I: A-11(pl), P-21(pl)/II: A-1s(pl), P-r (Rome organ; fig. 3B) / III: A-1l(pl), P-1m(pl) / IV: A-2l, P-2l(pl) / V: A-2l(pl), P-2l(pl) / VI: A-3l(pl), P-2l / VII: D-1m(ya)-1m(G:ser)-2l.

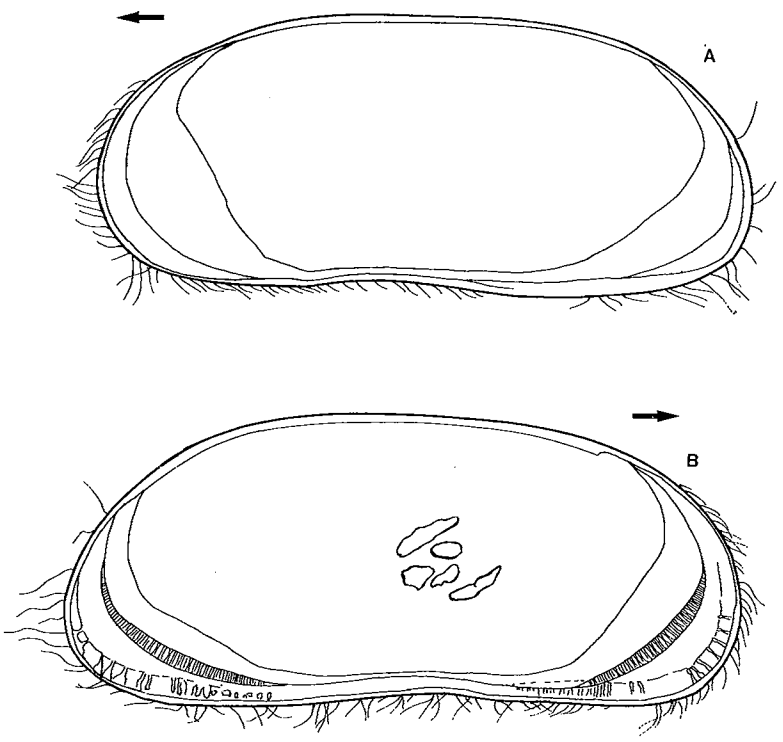


Fig. 2. - *Herpetocypris* cf. *helenae*, adult female. A: Right valve, internal view, B: Left valve, internal view. (Scale bar = 0.1 mm).

Antenna (A2; Fig. 2). Pr: P-3m(pu)-1l(pu) / Exo: 2s-1l(pu) / EI: I-5l(pu)-1s(pu), P-Y-1m(pu) / E(II+III): A-2m(pu), P-4m(t1-4: pu), D(P)-y2, D(Ex)-3l(z1,2,3)-1m(G2: 2ser), D(In)-2m(G1,3: 2ser) / EIV: D-1s-y3-1s(pu)-1s(Gm: ser). Natatory setae reaching the tips of the claws or slightly exceeding them.

Mandibular palp (Mdp, Fig. 3C). I: In-1l-2l(S1,2: pu)-alpha / II: In-4l-1m(pl)-beta, Ex-2l-1m / III: In-2s, Ex-1l-3m, A-3m-gamma (pa) / IV: D-4m(cs:ser)-3s(pl).

Maxillular palp (Maxup; Fig. 3E). I: Ex-4l-2m-2s / II: D-3m(cs)-3s / Mastic 3: In-1m, D-1m(pu)-2s(pu)-2m(cs:2ser)-1m-3s. Tha basal joint carry spines (2-3) on its dorsal margin. The chelate setae of mastic 3 are serrate at both sides. Mastics 1 and 2 are not illustrated.

Maxilla (Max; Fig. 4A). Pr: A-2s(a), In-1s(b:pu)-1s(d:pu) / Exo: P-6m(pu) / Mastic: D-12s(pu) / E: D-3s(pu). Three setae on the distal part of the endopodite significantly shorter than those in other Herpetocypris species.

Thoracopod 1 (T1; Fig. 4B). Pr-2s(d1,2) / EI: A-1s(pl) / EII: A-1s(pl) / EIII: A-2s(pl) / EIV: D-2s(pl)-1l(G:ser).

Thoracopod 2 (T2; Fig. 4E). As in *Herpetocypris* species.

Furca (Fu) and furcal attachment (Fuat) (Fig. 4C,D). Furcal rami asymmetrical, the left one almost straight, the right slightly concave. Both rami with small spine-like setae forming 5-6 groups along the distal half of the posterior side. Distal claws serrate. Posterior seta slender and hairy,measuring about 30% of posterior claw. Anterior seta smooth, reaching 2/3 of anterior claw length. Anterior claw being about 40% of length of furcal ramus. Posterior claw : anterir claw ratio about 60%.

Furcal attachments with a distal triangular process and a small dorsal branch perpendicularly below the principal branch in the proximal part.

Remarks: The species resembles *H. helenae* in size, carapace length/height ratio, and the presence of minute spines on basal joint of the maxillar palp (Fig. 3E). It differs from *H. chevreuxi* in carapace length (*H. chevreuxi*: 2.1-2.4 mm (Klie, 1939; Bronshtein, 1947; Sywula, 1974); *H.* cf. *helenae*: 1.87 mm), in furcal spines pattern (Fig. 5A,B) and the relative length of the posterior furcal claw (Posterior claw : Furcal length ratio), larger in *H.* cf. *helenae* (approx. 25%) than in *H. chevreuxi* (approx. 20%). Setae on the endopodite of the maxilla are also different in both species. *Herpetocypris chevreuxi* has a very long medial seta and a much shorter one on either side (Fig. 5C); *H.* cf. *helenae* bears three subequal setae, the medial being slightly longer than the other (Fig. 5D), resembling in this respect the british species *H. palpiger* (Lowndes, 1932). *Herpetocypris palpiger* was itself considered a synonym of *H. chevreuxi* by both Jancarik (1952) and Sywula (1974).

Herpetocypris cf. *helenae* bears small spines (<10 µm) on the posterior edge of the furca (Fig. 6B). Information on furcal spines in *H. chevreuxi* is, however, controversial. Klie (1938), Bronshtein (1947, fig. 69) and Fox (1966, fig. 4e) refer to a furcal pattern with broad and large spines, as in specimens collected from the Iberian peninsula (Baltanás, 1992) (Fig. 6A). Indeed, Fox (1966) compared his material from northern Italy with type material from Algeria deposited by Sars in the British Museum and found them similar. On the contrary, Ant & Herbst (1966, fig. 10) illustrated *H. chevreuxi* from Germany, bearing small spines on the furcal rami, and Müller (1912) described those spines as slender ('flacher Bogen').

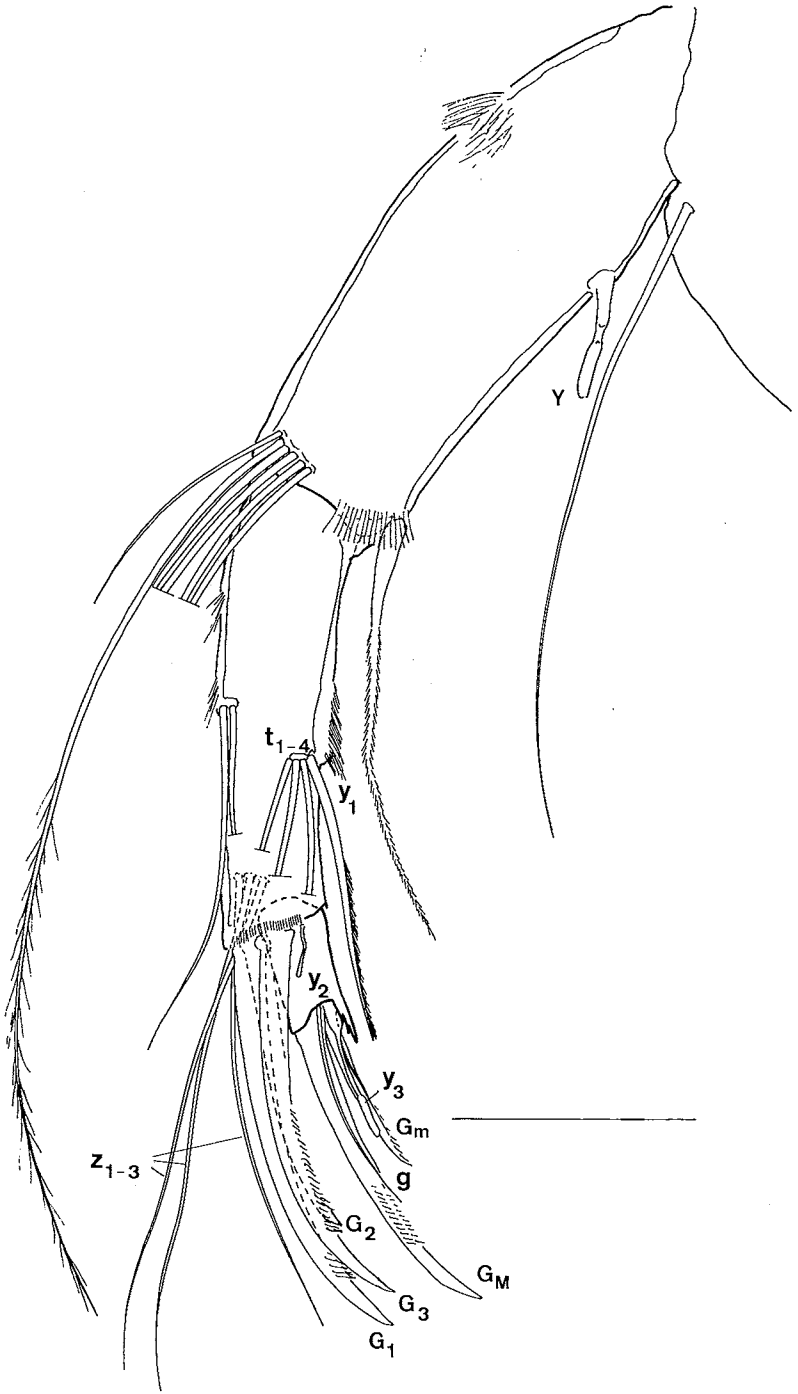


Fig. 3. - *Herpetocypris* cf. *helenae*, adult female: second antenna. (Scale bar = 0.1 mm).



Fig. 4. - *Herpetocypris* cf. *helenae*, adult female. A: Antennule, B: Rome's organ, C: Mandibular palp (setae on segment IV not illustrated). D: Mandible. E: Maxillula, palp and mastic 3. (Scale bars = 0.1 mm, except B = 0.01 mm).

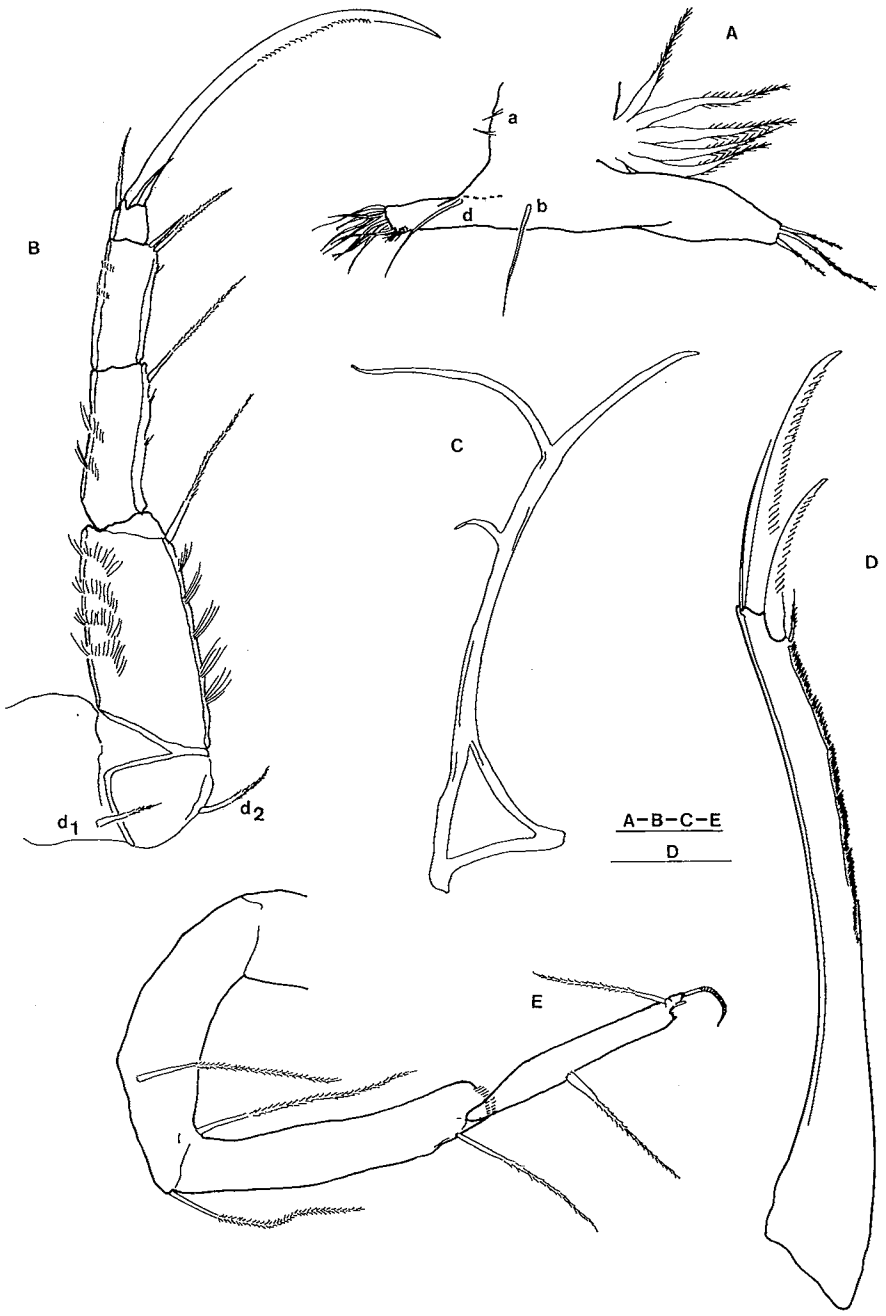


Fig. 5. - *Herpetocypris* cf. *helenae*, adult female. A: Maxilla. B: Thoracopod 1. C: Furcal attachment. D: Furcal ramus. E: Thoracopod 2. (Scale bars = 0.1 mm).

The chaetotaxy of the furcal ramus of *Herpetocypris reptans* (Baird, 1835), a closely related species of *H. chevreuxi*, shows significant differences in the number of groups of spines, shape and size at the individual level (Wouters, unpublished observation). A plausible explanation for such a variety could be the existence of a high level of intra-specific variability along the distributional range of the species.

However, with regard to *H. chevreuxi* no conclusive studies have been done yet to support this.

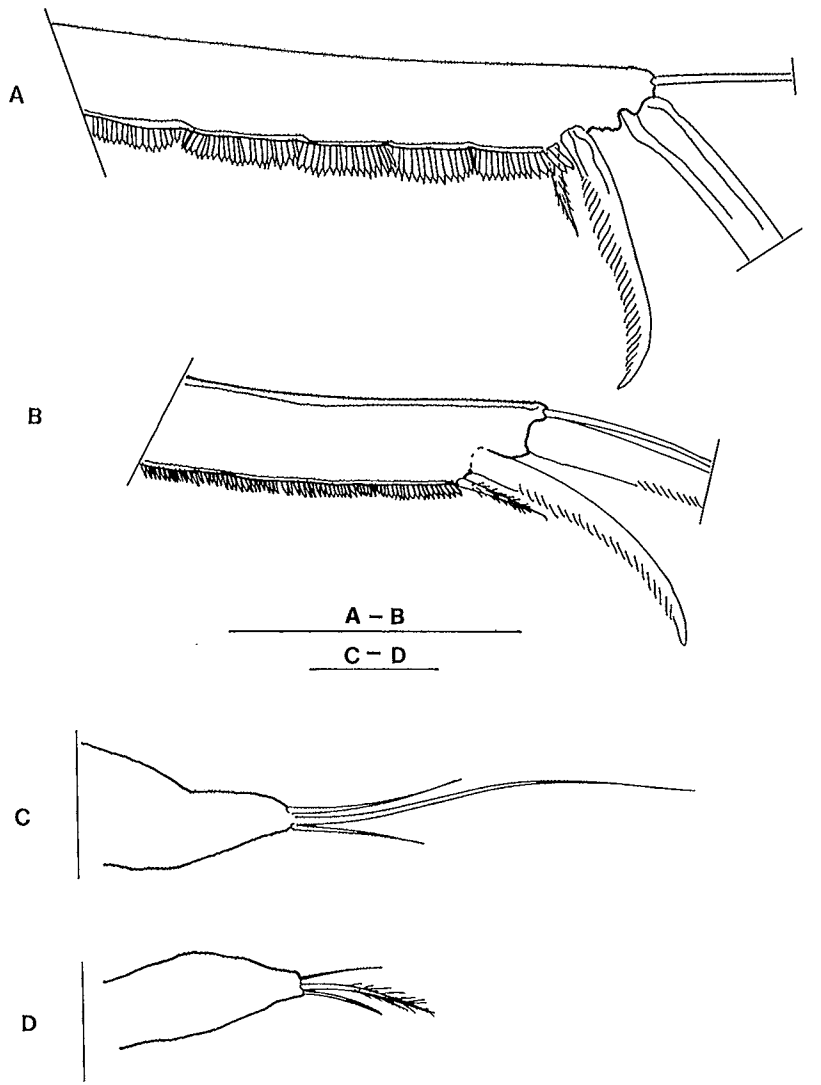


Fig. 6. - *Herpetocypris chevreuxi* (Sars), adult female. A: Distal part of the furca. C: Endopodite of the maxilla. *Herpetocypris* cf. *helenae*, adult female. B: Distal part of the furca. D.: Endopodite of the maxilla. (Scale bars = 0.1 mm).

Subfamily Cyprinotinae Bronshtein, 1947

Heterocypris incongruens (Ramdohr, 1808)

Occurrence: Fuerteventura (loc. 4), Tenerife (loc. 13).

Dimensions: Length = 1.44-1.68 mm. Height = 0.80-0.96 mm (n=20).

Only parthenogenetic populations were found. In Fuerteventura this species was collected from a small pond near the reservoir (Dr Báez coll.) with no accompanying ostracod species, except one individual of *H. salina*. *Heterocypris incongruens* is cosmopolitan with no strict ecological requirements and is mainly inhabiting small water bodies. In Northern Africa it is known from areas near the Canary islands (Mauritania, Morocco, Algeria) (Martens, 1984). It also occurs in the Azores (Meisch & Broodbakker, 1993).

Heterocypris salina (Brady, 1868)

Occurrence: Fuerteventura (locs 1,2,4 and 7).

Dimensions: Length = 1.00-1.10 mm. Height = 0.62-0.70 mm (n=10).

Fairly abundant populations in locs 2 and 4, but rare in loc. 1 and only valves in loc. 7. Valve length slightly smaller than usual (1.2 mm in Klie, 1939; up to 1.25 mm in Bronshtein, 1947); however, the presence of ovigerous adult females has been confirmed. No males have been found in these populations. *Heterocypris salina* is a typical halobiont species living is slightly saline waters, but also in freshwater. It has a holarctic range, also occurring in the Azores and Cape Verde islands (Meisch & Broodbakker, 1993).

Subfamily Cypridopsinae Kaufmann, 1900

Sarscypridopsis aculeata (Costa, 1847)

Occurrence: Fuerteventura (locs 4,5,9,10 and 12).

Dimensions: Length = 0.60-0.65 mm. Height = 0.40-0.45 mm (n=30).

This species differs from *S. lanzarotensis* in its pitted valve surface with spine-like setae, most easily observable in the anterior zone (Meisch & Broodbakker, 1990). *S. aculeata* is widely spread in the isle of Fuerteventura with very dense populations (females only) in locs 4, 9 and 10. It typically inhabits oligohaline waters (< 2 g/l) (De Deckker, 1981) in the holarctic region, South Africa and Australia. It also occurs in the Azores (Meisch & Broodbakker, 1993).

Sarscypridopsis lanzarotensis (Mallwitz, 1984)

Occurrence: Tenerife (loc. 13)

Dimensions: Length = 0.72-0.78 mm. Height = 0.42-0.46 mm (n=10).

It was described from Lanzarote, the easternmost island in the Canarian archipelago, as *Cypridopsis lanzarotensis* by Mallwitz (1984) and was later transferred into the genus *Sarscypridopsis* by Meisch & Broodbakker (1990). It is known to occur also on the isles of La Gomera, El Hierro and La Palma (Meisch & Brood-

bakker, 1993) but it has not yet been found on the isle of Fuerteventura, although it is likely to occur there.

Plesiocypridopsis newtoni (Brady & Robertson, 1870)

Occurrence: Fuerteventura (loc. 7).

Dimensions: Length (fem.) = 0.77-0.81 mm. Height (fem.) = 0.48-0.52 mm;

Length (males) = 0.73-0.75 mm. Height (males) = 0.46-0.48 mm (n = 10).

The sample from locality 7 contained a large number of valves, but living animals were not abundant. Nevertheless, adult males and females were present. All populations known from the Canary islands are bisexual including that from Fuerteventura (this study and Meisch & Broodbakker, 1993) and the isles of Lanzarote, Hierro, Alegranza and Tenerife (Meisch & Broodbakker, 1993). Syngamic populations of *P. newtoni* are fairly common in the circum-mediterranean area whereas parthenogenetic populations occur in mid-latitudes in the holarctic regions. This species tolerates a wide range of salinities occurring in a variety of aquatic habitats and is frequently related with submerged vegetation.

Potamocypris arcuata (Sars, 1903)

Occurrence: Fuerteventura (loc. 7).

Dimensions: Length = 0.62-0.64 mm. Height = 0.38-0.39 mm (n=5).

It has been found in just one locality on the isle of Fuerteventura and only few specimens were present in the sample. *Potamocypris arcuata* has a wide circum-mediterranean distribution, inhabiting both fresh and slightly saline waters (Meisch, 1985). It is also known to occur in the Azores (Petkovski, 1963).

Superfamily Cytheroidea Baird, 1850

Family Limnocytheridae Sars, 1925

Subfamily Limnocytherinae Sars, 1925

Limnocythere inopinata (Baird, 1843)

Occurrence: Fuerteventura (locs 4 and 10).

Dimensions: Length = 0.52-0.54 mm. Height = 0.29-0.30 mm (n=2).

This species was poorly represented in the samples (only two adult females and several empty carapaces). Specimens found have a somewhat curved dorsal margin but postero-ventral tubercles are weakly developed. *Limnocythere inopinata* is distributed throughout Europe and North America but it was not previously known from northern Africa except for a fossil record in NW Sudan (Kempf, 1986). The presence of this species in Africa is not unexpected as some other *Limnocythere* species of palearctic origin (e.g. *Limnocythere gibbosa* Sywula, 1970 and *Limnocythere stationis* Vavra, 1891) are known to occur in the eastern part of the continent (see Martens, 1990 for a revision of African Limnocythere).

Family Cytherideidae Sars, 1925

Subfamily Cytherideinae Sars, 1925

Cyprideis torosa (Jones, 1850)

Occurrence: Fuerteventura (loc. 9).

Dimensions: Length = 0.98-1.04 mm. Height = 0.56-0.58 mm (n=4).

This species is defined as holeuryhaline and strongly eurythermic (Heip, 1976). Genetic polymorphism results in a gradient of morphotypes (from noded to smooth) related with habitat salinity (Kilenyi, 1972). Specimens found in Fuerteventura (two adult females and two adult males) are pitted or barely tuberculated indicating some saline influence from the nearby sea. Although we do not have conductivity or salinity measurements, the presence as accompanying species of *Sarscypridopsis aculeata*, another halobiont ostracod (see above) support this assumption. *Cyprideis torosa* has a palearctic distribution and is also known from Central Africa (Martens, 1984).

Acknowledgements

We are greatly indebted to Claude Meisch (Luxembourg), Koen Martens and Karel Wouters (Brussels), and Dan L. Danielopol and Walter Geiger (Mondsee) for their valuable comments and suggestions. Our gratitude also to Marcos Báez (Tenerife) and Diego Moreno (Almeria) who collected some of the samples.

References

Ant, H. & H.V. Herbst, 1966. - Erster Fund von *Herpetocypris chevreuxi* (Ostrac. Crust.) im deutschen Binnenland. - *Gewässer und Abwässer*, 43: 80-86.

Baltanás, A., 1992. - A contribution to the knowledge of the cypridid ostracode fauna (Crustacea, Ostracoda, Cyprididae) on the Iberian peninsula, and a comparison with adjacent areas. - *Arch. Hydrobiol./Suppl.* 90 (3): 419-452.

Bronshtein, Z.S., 1947. - Fauna of the URSS, vol. II, no 1. Academy of Sciences of the USSR.

De Deckker, P., 1981. - Ostracods of athalassic saline lakes. - *Hydrobiologia*, 81: 131-144.

Fox, H.M., 1966. - Ostracods from the environs of Pallanza. - *Mem. Ist. Ital. Idrobiol.*, 20: 25-39.

Hartmann, G., 1959. - Neue Ostracoden von Teneriffa. - *Zoologischer Anzeiger*, 162: 161-171.

Hartmann, G., 1985. - *Danielopolina wilkensi* n. sp. (Halocyprida, Thaumatocyprididae), ein neuer Ostracode aus einem marinen Lava-Tunnel auf Lanzarote (Kanarische Inseln). - *Mitt. hamb. zool. Mus. Inst.*, 82: 255-261.

Heip, C., 1976. - The life-cycle of *Cyprideis torosa* (Crustacea, Ostracoda). - *Oecologia*, 24: 229-245.

Jancarik, A., 1952. - *Herpetocypris chevreuxi* (Ostracoda) a new plant parasite of vegetable. - *Fol. Zool. Entom.*, 1: 111-114.

Kempf, E.K., 1986. - Late Quaternary environmental changes in the eastern Sahara (Lybian desert) documented by an ostracode diagram. - In: Changements globaux en Afrique durant le Quaternaire: Passé-Présent-Futur (INQUA-ASEQUA Symposium international à Dakar, 21-28 avril 1986). Editions de l'ORSTOM, Travaux et Documents, 197: 235-238.

Kilenyi, T.I., 1972. - Transient and balanced genetic polymorphism as an explanation of variable noding in the ostracode Cyprideis torosa. - *Micropaleontology*, 18: 47-63.

Klie, W., 1938. - Ostracoda, Muschelkrebse. - In: Die Tierwelt Deutschlands (F. Dahl, ed.), 34:1-234. G. Fischer, Jena.

Lowndes, A.G., 1932. - *Herpetocypris palpiger*, a new species of fresh-water Ostracod. - *Annals and Magazine of Natural History*, 9 (50): 155-157.

Mallwitz, J., 1984. - *Cypridopsis lanzarotensis* n.sp., ein neuer Ostracode von Lanzarote (Kanarische Inseln) (Crust.: Ostracoda: Podocopida). - *Mitt. hamb. zool. Mus. Inst.*, 81: 171-176.

Martens, K., 1984. - Annotated check-list of non-marine ostracods (Crustacea, Ostracoda) from African inland waters. - *K. Mus. Midden-Afrika (Tervuren, Belg.), Zool. Dok.*, 20: 1-51.

Martens, K., 1990. - Revision of African Limnocythere s.s. Brady, 1867 (Crustacea, Ostracoda); with special reference to the Rift Valley Lakes: morphology, taxonomy, evolution and (palaeo-)ecology. - *Arch. Hydrobiol./Suppl.*, 83 (4): 453-524.

McKenzie, K.G., 1978. - La faune terrestre de l'île de Sainte-Hélène. 3. Ostracoda. - *Ann. k. Mus. Midden-Afrika (Tervuren, Belg.), zool. Wet.*, 220 (1977): 444-451.

Meisch, C., 1985. - Revision of the Recent West European Species of the Genus *Potamocypris*. Part II. - *Trav. sci. Mus. Hist. Nat. Luxemb.*, 6: 1-95.

Meisch, C., 1987. - Ostracodes récoltés dans le sud-ouest de la France. - *Bull. Soc. Nat. luxemb.*, 87: 89-118.

Meisch, C. & N. Broodbakker, 1990. - On freshwater Ostracoda (Crustacea) collected on the Canary Islands. - *Beaufortia*, 41 (21): 151-157.

Meisch, C. & N.W. Broodbakker, 1993. - Freshwater Ostracoda (Crustacea) collected by Prof. J.H. Stock on the Canary and Cabo Verde Islands. With an annotated checklist of the freshwater Ostracoda of the Azores, Madeira, the Canary, Selvagens and Cape Verde islands. - *Trav. Sci. Musée nat. d'Hist. nat.*, 19: 3-47.

Müller, G.W., 1908. - Die Ostracoden der Deutschen Südpolar-Expedition 1901-1903. - In: Deutsche Südpolar-Expedition (E. v. Drygalski, ed.), 10: 51-182.

Müller, G.W:, 1912. - Ostracoda. - In: Das Tierreich (F.E. Schultze, ed.), 31: 1-434. R. Friedlander & Son, Berlin.

Petkovski, T.K., 1963. - Über Süßwasser-Ostracoden der Azoren. - *Bol. Mus. Munic. Funchal*, 17: 49-65.

Sars, G.O., 1924. - The freshwater Entomostraca of the Cape Province (Union of South Africa). Ostracoda. - *Ann. S. Afr. Mus.*, 20: 105-193.

Sywula, T., 1974. - Malzorackzki (Ostracoda). - Fauna Slodkowodna Polski, 24: 1-315. Warszawa-Poznan.

Wouters, K., 1989. - Check-list of the recent non-marine Ostracoda (Crustacea) of Belgium. - *Verhandelingen van het Symposium "Invertebraten van Belgie"*: 153-158.