

<i>Bollettino della Società Paleontologica Italiana</i>	34 (3), 1995	ISSN 0375-7633	275-282	1 pl.	Modena, Aprile 1996
---	--------------	----------------	---------	-------	---------------------

The genus *Cistacythereis* Uliczny, 1969 (Ostracoda, Trachyleberididae) in the Recent of the Mediterranean Sea with a taxonomic revision

Diana BARRA

Gioacchino BONADUCE

Dipartimento di Paleontologia
Università di Napoli Federico II

KEY WORDS – *Ostracoda*, *Trachyleberididae*, *Cistacythereis* (*Cistacythereis*), *Cistacythereis* (*Hiltermannicythere*), *Taxonomy*, *Mediterranean Sea*, *Recent*.

ABSTRACT – The systematic position of *Cistacythereis* and *Hiltermannicythere* is discussed and their subgeneric rank proposed. Samples collected in Recent sediments of the Mediterranean African coast and on the Tunisian shelf yielded two species of *Cistacythereis* (*Cistacythereis*) Uliczny, 1969 considered new for science, that is *Cistacythereis* (C.) *carthaginiensis* and *Cistacythereis* (C.) *hannibalis*, which are described and illustrated. The ecology of the subgenus is discussed, especially as far as the bathymetrical and climatic significance is concerned as a tool for paleoecological interpretations.

RIASSUNTO – [Il genere *Cistacythereis* Uliczny, 1969 (Ostracoda, Trachyleberididae) nel Recente del Mediterraneo con revisione tassonomica] – Si discute la posizione sistematica di *Cistacythereis* e di *Hiltermannicythere*, generi per i quali viene proposta la declassazione a sottogeneri. Una campionatura raccolta in sedimenti recenti lungo la costa africana mediterranea e sulla piattaforma tunisina ha fornito esemplari di due specie pertinenti al sottogenere *Cistacythereis* (*Cistacythereis*) Uliczny, 1969 considerate nuove per la scienza: *Cistacythereis* (C.) *carthaginiensis* e *Cistacythereis* (C.) *hannibalis*. Le due specie vengono descritte ed illustrate. Si discute l'ecologia del sottogenere, in particolare per quanto concerne la sua distribuzione geografica e batimetrica, per l'utilizzazione nelle interpretazioni paleoecologiche. La sua distribuzione è messa a confronto con quella del sottogenere *Hiltermannicythere*.

INTRODUCTION

Within the Trachyleberidinae 3 frequently accepted genera seem to have been «generated» from the same stem that is *Olimfalunia* Ruggieri, 1977 (type-species *Falunia stellata ornatissima* Ruggieri, 1967), *Cistacythereis* Uliczny, 1969 (type-species *C. cebrenidos* Uliczny, 1969) and *Hiltermannicythere* Bassiouni, 1970 (type-species *Cythereis turbida* G. W. Müller, 1894 nec *C. quadridentata* Baird, 1850). A phylogenetic relationship of the 3 genera (under different names) is suggested by Sissingh (1971).

Olimfalunia has been erected by Ruggieri to include part of the species previously attributed to *Falunia* Grekoff & Moyes, 1956. *Falunia* in fact has to be considered invalid because its type-species *F. girondica* Grekoff & Moyes, 1956 is a young instar of an undefined species of *Cytheretta* (Ruggieri, 1977, p. 185).

Hiltermannicythere has been erected by Bassiouni (1970) as subgenus of the invalid *Falunia* (now *Olimfalunia*), subsequently defined as a «group» (Sissingh, 1971) on the basis of the hinge characters and accepted by Neale (1973, p. 440) and later by Ruggieri (1977, p. 185) at generic rank for which especially Ruggieri gives more weight to the hinge characters as illustrated by Sissingh (1971) than to the external morphological ones.

Hiltermannicythere suffers of some problems because of the demonstrated specific differences between *Cythereis quadridentata* (previously designated as type-species) and *C. turbida*.

The original description of *Hiltermannicythere* is based on the characters of *C. turbida* G. W. Müller, 1894 collected in the Gulf of Naples instead than on the type material of *C. quadridentata* Baird described from England. *C. turbida* has consequently to be considered the type-species of *Hiltermannicythere* as also clearly stressed by Neale (1973). The real *C. quadridentata* has been subsequently designated as type-species of *Celtia* Neale, 1973.

Cistacythereis Uliczny, 1969 shows the hinge (RV) constituted by an anterior «stepped» tooth, the posterior one smooth and the groove crenulate.

Apart from the previously cited problems the 3 genera seem well defined especially for the differences of the hinge characters of the RV as defined by the previous AA:

Olimfalunia (in Sissingh, 1971 under the invalid name *Falunia*, *partim*): terminal teeth and groove crenulated.

Cistacythereis: anterior tooth consisting of a lower platform-like distal and higher conical proximal part («stepped»), posterior tooth smooth, groove crenulate.

Hiltermannicythere: anterior tooth as in

Cistacythereis and posterior tooth crenulate; groove crenulate.

Olimfalunia appears a well defined genus while looking for different species of *Hiltermannicythere* and *Cistacythereis* we noted that the previously cited differences between the hinges of the two genera are not so clearly defined as those related to the principal ornamentation characters. In fact in some cases the posterior tooth of *Hiltermannicythere* can be from crenulate to lobate and that of *Cistacythereis* from smooth to lobate. The hinge characters of the 3 genera and their variability are reported in Text-fig. 1.

In consideration of the evidently undefined differences between the hinge characters of *Hiltermannicythere* and *Cistacythereis*, *Hiltermannicythere* has to be considered subgenus of *Cistacythereis* which has the priority at generic level, in agreement with Ruggieri (pers. comm., 1995).

To separate *Olimfalunia*, *Cistacythereis* (*Cistacythereis*) and *Cistacythereis* (*Hiltermannicythere*) we used additionally the external characters as shown in Table 1. Particularly *Cistacythereis* (C.) differs from both *Olimfalunia* and *Cistacythereis* (H.) especially due to the presence of the anterior fossa (ornamented or smooth) split into two triangular areas by the median ridge which fuses with the anterior rib and to the arched and generally well developed connection between the dorsal and median ridge at the posterior extremity. Anyway some species, as far as their ornamentation is concerned, at present appear of uncertain subgeneric attribution.

The subgenus *Cistacythereis* (C.) Uliczny, 1969 is rather widely distributed in the Mediterranean Basin mostly in the fossil record from Late Miocene to Late Pliocene always from shallow-water sediments. Only *Cistacythereis* (C.) *reymenti* Stambolidis, 1985 from the North Aegean Sea has been up to now described from Recent sediments.

The species attributed to *Cistacythereis* (C.) as

reported by Kempf (1986: part. 1, index A, pp. 170, 171; 1992: part. 6, index A, supplement 1, p. 22) are the following:

Cistacythereis caelatura Uliczny, 1969 - Pliocene of Cephalonia Island (Greece)

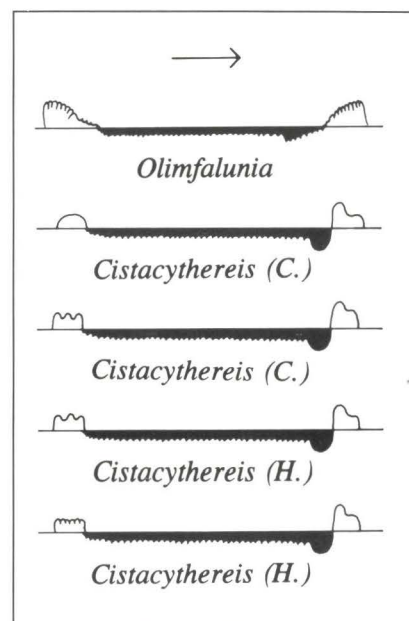
Cistacythereis cebrenidos Uliczny, 1969 - Pliocene of Cephalonia Island (Greece)

Cistacythereis equivalvis Doruk, 1981 - Tortonian of Turkey

Cistacythereis hellenica Uliczny, 1969 - Pliocene of Cephalonia Island (Greece)

Cistacythereis pokorny (Ruggieri, 1962) - Tortonian of Enna, Sicily (Italy)

Cistacythereis reymenti Stambolidis, 1985 - Recent of Evros-Delta, Aegean Sea (Greece)



Text-fig. 1 - Schematic drawings of the RV hinges in dorsal view of the compared taxa following Sissingh (1971), Ruggieri (1976) and our data.

TAXA	SHAPE IN LATERAL VIEW	RV HINGE	
		ANTERIOR TOOTH	POSTERIOR TOOTH
<i>Olimfalunia</i>	subrectangular	crenulate	crenulate
<i>Cistacythereis</i> (C.)	subrectangular, posterior truncated	stepped	from smooth to lobate
<i>Cistacythereis</i> (H.)	from subacuminate to truncated	stepped	from crenulate to lobate

TAXA	PRINCIPAL ORNAMENTATION	
	ANTERIOR FOSSA	RIDGES
<i>Olimfalunia</i>	absent	when present not converging back wards
<i>Cistacythereis</i> (C.)	from shallow to deep, generally subdivided	median and upper connected in a posterior ear
<i>Cistacythereis</i> (H.)	shallow or absent with small foveolae	converging backwards

Tab. 1 - Synthesis of the characters of *Olimfalunia*, *Cistacythereis* (*Cistacythereis*) and *Cistacythereis* (*Hiltermannicythere*).

Cistacythereis robusta Bonaduce, Ruggieri, Russo & Bismuth, 1992 - Late Miocene of the Gulf of Gabès (Tunisia)

Cistacythereis stimpsoni (Brady, 1868) - Recent of Vigo Bay (Atlantic) and ? Aegean Sea (Mediterranean)

Cistacythereis zibinica (Dieci & Russo, 1965) - Tortonian of Northern Appennines.

As far as the ornamentation is concerned *Cythereis stimpsoni* (as illustrated by Ruggieri, 1953) should be attributed to the genus *Costa* Neviani, 1928 instead than to *Cistacythereis* as proposed by Sissingh (1972).

Cistacythereis zibinica should be attributed to *Cistacythereis* (H.) Bassiouni, 1970 as stated by Ruggieri (1975) instead than to *Cistacythereis* (C.) as proposed by Uliczny (1969).

MATERIAL

During the ongoing revision of the shallow-water Recent ostracods of the Tunisian coast (Bonaduce & Masoli, 1968), of the Tunisian shelf (Bonaduce *et al.*, 1979) and of the beach sand sediments of Lybia (Bonaduce & Pugliese, 1975) we found well preserved specimens pertaining to *Cistacythereis* (C.) which without any doubt are of Recent age and part of a rich ostracod assemblage which will be redescribed and illustrated by one of us (Barra D., manuscript). The two forms of *Cistacythereis* (C.) identified are considered new and described and illustrated below.

SYSTEMATICS

Order PODOCOPIDA G. W. Müller, 1894

Suborder PODOCOPA Sars, 1866

Superfamily CYTHERACEA Baird, 1850

Family TRACHYLEBERIDIDAE Sylvester-Bradley, 1948

CISTACYTHEREIS (*CISTACYTHEREIS*) *CARTHAGINIENSIS*
n. sp.

Pl. 1, figs. 1-7, 14, 15; text-fig. 3A

1969 *Cistacythereis pokornyi hellenica* Uliczny, pl. 16, fig. 10; *nec* pl. 7, figs. 1, 2.

1975 *Cistacythereis caelatura* Uliczny - BONADUCE & PUGLIESE, p. 130, pl. 2, fig. 1.

1979 *Cistacythereis caelatura* Uliczny - BONADUCE *et al.*, p. 280, pl. 39, figs. 1-3.

Etymology - From latin *carthaginiensis* = Carthaginian.

Holotype - A left valve ♀ (Pl. 1, fig. 1). B.O.C. 2249.

Paratypes - 3LV, 6 RV, 4 CC (5 of which figured, Pl. 1, figs. 2-4, 6, 7). B.O.C. 2250, 2251, 2252, 2254, 2255.

Type locality - Tripoli (Lybia), beach sand sample (Bonaduce & Pugliese, 1975).

Diagnosis - A species of *Cistacythereis* (C.) characterized by massive and thick longitudinal ridges, the presence of a vertical thick ridge connecting posteriorly the median and the ventral ridge and a second one which starts from the posterior end of the median ridge and reaches the posteroventral extremity in correspondence to the lowest terminal spine.

Description - Left valve subrectangular with dorsal and ventral margins slightly converging backward. Anterior margin regularly rounded and posterior extremity truncated and furnished with 4 robust spines. Right valve a little more acuminate at the posterior extremity.

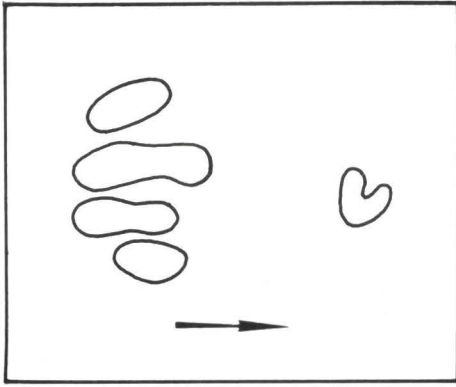
Ornamentation constituted by 3 well defined longitudinal rope-like ridges.

The dorsal ridge bends down anteriorly back of the large eye-tubercle and is separated from it by a deep oblique depression of limited length which is anteriorly defined by a subvertical ridge fused with the eye-tubercle and connected with the median ridge. At the posterior extremity it curves downward to form a ear and is connected with a regular arch to the median ridge. Another ridge departs from the lower part of the cited ear to reach with an ample concave arch the postero-ventral extremity where it defines with the caudal process a subtriangular area subdivided in undefined large irregularly shaped foveolae.

The median ridge is connected anteriorly with the protruding massive smooth submarginal anterior rib forming internally two depressed subtriangular areas. The anterior rib is fused antero-dorsally with the flat eye-tubercle and continue in the ventral ridge towards the caudal process before which it abruptly upturns vertically and fuses with the posterior part of the median ridge. The anterior depressed areas are generally smooth.

Two well developed pore-conuli have been noticed: a submarginal one protruding between the upper posterior spine and the concave posterior ridge and a second one on the cited ridge below the median and above the ventral one. The lateral surface of the valves is covered (the 2 anterior triangular areas and most of the principal ridges excepted) by large and deep foveolae irregularly shaped, sometimes anastomized, organized in subvertical

rows between the median and the ventral ridges, more irregularly organized above the median ridge and into 3 horizontal lines below the ventral ridge. The ventral ridge shows in the posterior part 4 - 5 elongate foveolae. Before the anterior submarginal ridge anterodorsally two series of subrounded foveolae parallel to the margin occur, followed by a series of 3 elongated foveolae located just above and below the median ridge, below which the foveolae reoccur into two series down to the antero-ventral area. A reduced asymmetry of the valves is detectable in dorsal view for which the posterior extremity of the dorsal ridge in the left valve appears more developed and thicker than that of the right one. The central muscle-scars pattern show a subvertical row of 4 scars the 2nd of which (from top) very elongated, preceded by an anterior one roughly U-shaped (Text-fig. 2).



Text-fig. 2 - Central muscle-scars pattern in *Cistacythereis* (*C.*) *carthaginiensis* n. sp. of LV from inside. B.O.C. 2268.

Sexual dimorphism evident with ♀ in dorsal view (Pl. 1, fig. 6) more inflated than the ♂ (Pl. 1, fig. 7) with maximum width after the mid-length in correspondence of the posterior end of the ventral ridge, while in the ♂ the maximum width occurs at about mid-length.

Variability - This species in some adult specimens shows in the two large anterior depression a hint of striae which simulate a reticulation which can be ascertained only by large magnification SEM pictures (Pl. 1, fig. 5).

Remarks - The study of some instars (probably A2, A3 and A4) show exactly the same scheme of ornamentation demonstrating the ontogenetic stability of the principal specific characters (Text-fig. 3A).

Size (in mm) - LV ♀: L = 0.65; H = 0.32 (Pl. 1, fig. 1)
 RV ♀: L = 0.70; H = 0.34 (Pl. 1, fig. 2)
 LV ♂: L = 0.66; H = 0.31 (Pl. 1, fig. 3)
 RV ♂: L = 0.66; H = 0.31 (Pl. 1, fig. 4)

Affinities - The proposed species differs from *Cistacythereis* (*C.*) *pokorny* (Ruggieri, 1962) especially due to the limited extension of the ventral ridge which ends abruptly its horizontal running before the posterior extremity. In the latter the ridge reaches the posterior extremity splitting into two arms.

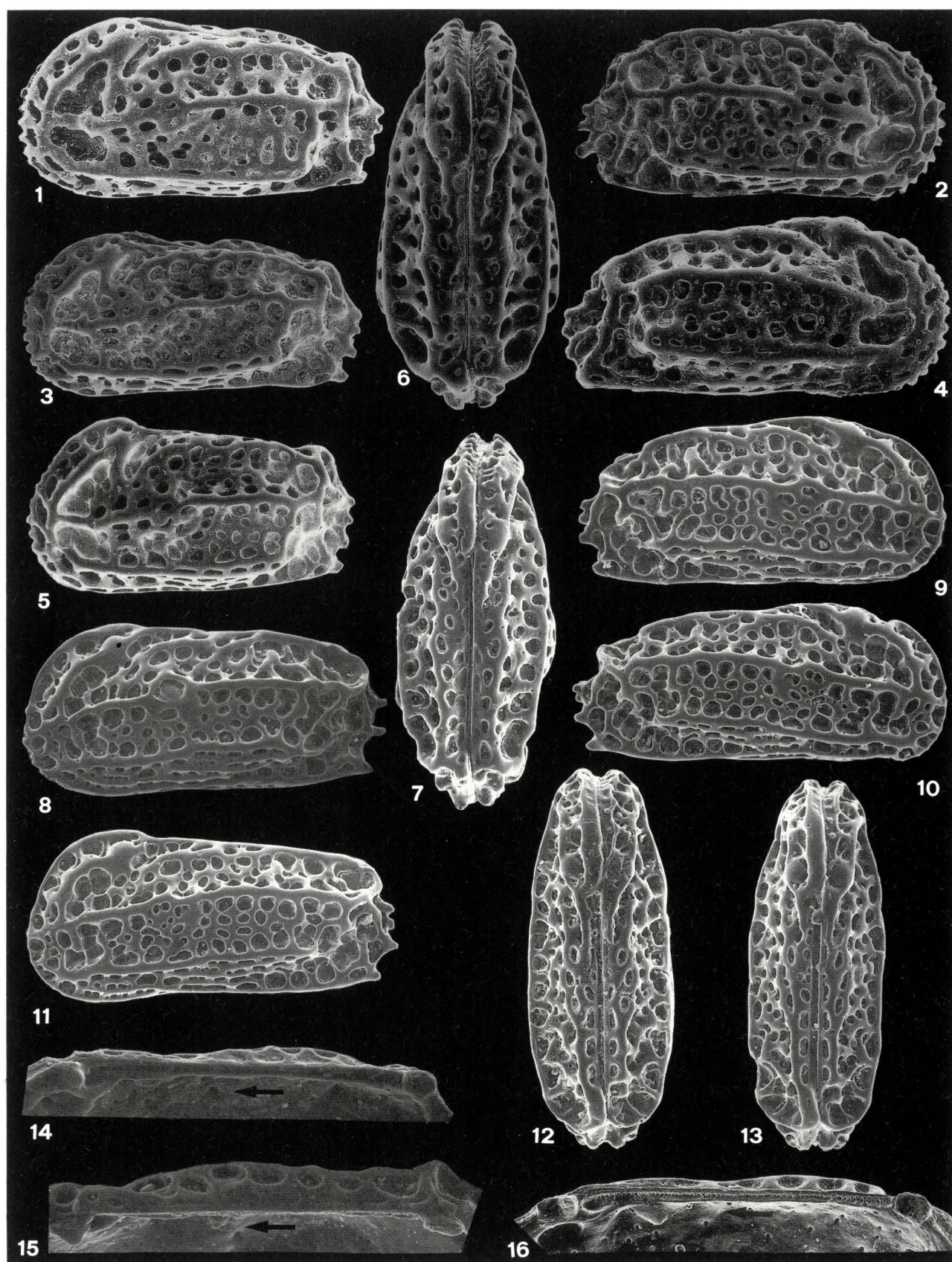
EXPLANATION OF PLATE 1

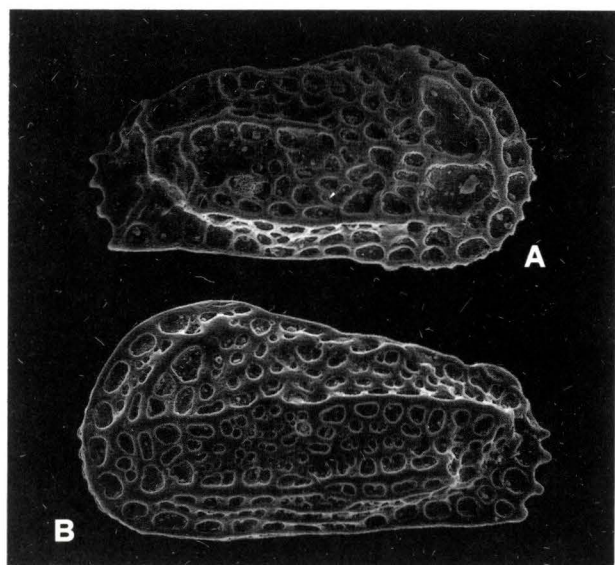
Figs. 1-7, 14, 15 - *Cistacythereis carthaginiensis* n. sp.

- 1) Holotype, LV ♀ of complete carapace, Tripoli (Lybia), B.O.C. 2249, (x 100);
- 2) Paratype, RV ♀, B.O.C. 2250, (x 93);
- 3) Paratype, LV ♂ of complete carapace, B.O.C. 2251, (x 93);
- 4) Paratype, RV ♂, B.O.C. 2252, (x 107);
- 5) RV ♀, Tor Vendicari (Sicily, Italy), B.O.C. 2253, (x 87);
- 6) Paratype, CC ♀ in dorsal view, B.O.C. 2254, (x 100);
- 7) Paratype, CC ♂ in dorsal view, B.O.C. 2255, (x 91);
- 14) RV, hinge, Tunisian Shelf, Stn. 52, 53 m, B.O.C. 2257 (x 124).
- 15) Oblique view of RV hinge of the same specimen of fig. 14 (x 135).

Figs. 8-13, 16 - *Cistacythereis* (*Cistacythereis*) *hannibalis* n. sp.

- 8) Holotype, LV ♀, Tripoli (Lybia), B.O.C. 2258, (x 80);
- 9) Paratype, RV ♀, B.O.C. 2259, (x 91);
- 10) Paratype, RV ♂, B.O.C. 2260, (x 91);
- 11) Paratype, LV ♂, B.O.C. 2261, (x 91);
- 12) Paratype, CC ♂ in dorsal view, B.O.C. 2263, (x 100);
- 13) Paratype, CC ♀ in dorsal view, B.O.C. 2264, (x 91);
- 16) Paratype, RV, hinge, B.O.C. 2265 (x 153).





Text-fig. 3 - A) *Cistacythereis* (*C.*) *carthaginiensis* n. sp., instar of RV, Tunisian Shelf, Stn. 60, 13 m, B.O.C. 2262 (x 91). B) *Cistacythereis* (*C.*) *hannibalis*, instar of LV, Tunisian Shelf, Stn. 81, 48 m, B.O.C. 2256 (x 77).

It differs from the holotype of *Cistacythereis* (*C.*) *hellenica* Uliczny, 1969 (Pl. 7, fig. 1), elevated to specific rank by Ruggieri & D'Arpa (1993), due to the different shape in lateral view especially in the ventral margin which in *Cistacythereis* (*C.*) *hellenica* is clearly concave instead than straight as in *Cistacythereis* (*C.*) *carthaginiensis* n. sp.; our species shows the presence of a subvertical arched ridge which connects the eye-tubercle with the median ridge, substituted in *Cistacythereis* (*C.*) *hellenica* by reticulation and due to the presence of the subvertical posterior ridge which connects the median ridge with the posterior extremity of the ventral one while in *Cistacythereis* (*C.*) *hellenica* this structure is substituted by an evident reticulation. Our species corresponds better to the picture of the paratype of Pl. 16, fig. 10 which is consequently listed in the synonymy.

Cistacythereis (*C.*) *cebrenidos* Uliczny, 1969 and *Cistacythereis* (*C.*) *caelatura* Uliczny, 1969 (considered probably conspecific by Ruggieri & D'Arpa, 1993 and by us) differ from *Cistacythereis* (*C.*) *carthaginiensis* n. sp. especially due to the presence of the irregularly denticulate dorsal ridge instead than rope-like.

Cistacythereis (*C.*) *carthaginiensis* n. sp. differs from *Cistacythereis* (*C.*) *pokorny* (Ruggieri) *sensu* Doruk, 1981 essentially due to the presence of the ridge connecting the eye-tubercle and the median ridge, to the much more developed anterior marginal rib and the rectilinear running of the

median ridge instead than sinuous. Following Ruggieri & D'Arpa (1993) the form illustrated by Doruk has to be anyway considered junior synonym of *Cistacythereis* (*C.*) *hellenica*.

Other findings – Tunisian shelf, less than 50 m and Tor Vendicari (Sicily), beach sand (Recent).

CISTACYTHEREIS (*CISTACYTHEREIS*) *HANNIBALIS*
n. sp.

Pl. 1, figs. 8-13, 16; Text-fig. 3B

1975 *Cistacythereis caelatura* Uliczny - BONADUCE & PUGLIESE, p. 130, pl. 2, fig. 1.

Etymology – From Hannibal, the army leader of Carthago.

Holotype – A left valve ♀ (Pl. 1, fig. 8). B.O.C. 2258.

Paratypes – 6 LV, 6 RV, 3 CC (6 of which figured, Pl. 1, figs. 9-11, 14-16). B.O.C. 2259, 2260, 2261, 2263, 2264, 2265.

Type locality – Tripoli (Lybia), beach sand sample (Bonaduce & Pugliese, 1975).

Diagnosis – A species of *Cistacythereis* (*C.*) characterized by the rectangular shape in lateral view, the badly developed anterior perimarginal rib, the anterior depressions occupied by well defined foveolae and 3 ventral riblets parallel to the margin. Number and position of the foveolae in the anterior depressions are diagnostic.

Description – Left valve in lateral view in both sexes rectangular with dorsal and ventral margins parallel, anterior margin obtusely rounded, posterior truncated. The dorsal ridge appears a little sinuous in the median part and bends down anteriorly disappearing within the foveolae before reaching the median ridge which fuses with the anterior perimarginal rib which is badly defined below the mid-height. Posteriorly the dorsal ridge shows a defined difference between LV and RV. In the LV it forms an acute hook which overlaps the posterior margin and is connected with the median ridge. In the RV it bifurcates with one arm which curves down much before the postero-dorsal margin and disappears before reaching the median ridge (from which it is separated by a large foveola) and the second, much thinner and less protruding, continuing to the posterior extremity.

The median ridge shows a more or less defined convexity around the muscle-scars area and in the LV it shows at the posterior extremity two bifurcations, one at the end of its straight part where one arm upturns just before the ear and the second downward directed reaches with an S-shaped running the posterior extremity of the ventral ridge; and a second one at the lower beginning of the ear where a ridge departs downward to reach the posterior extremity in correspondence with the second (from below) marginal spine with an arched concave running.

Large semifused irregularly shaped foveolae are located just before, after and between the cited posterior ridges.

The ventral ridge is badly connected anteriorly with the marginal rib through its undefined foveolate lower part and posteriorly is connected with the S-shaped oblique ridge.

The anterior depressed area, split into 2 parts by the median ridge is occupied above it by 4 large foveolae and below by 5 foveolae (2 anterior and 3 posterior) the last 3 of which can be semifused.

The anteroventral and central areas below the ventral ridge are occupied by 3 thin ridges, parallel to the ventral margin between which some lines of mostly elongated foveolae occurs. The posteroventral area is occupied by large subrounded foveolae. The remaining valve's surface is covered by large subrounded foveolae, arranged in subvertical rows between the median and ventral ridges, except in the muscle-scars area where the foveolae are few and peculiarly small. Above the median ridge the foveolae are of different sizes and without any peculiar organization. A large irregularly-shaped foveola occurs at the postero-dorsal extremity of the LV where it corresponds to the large depression contoured by the hook-shaped ridge.

The eye-tubercle is large and incised ventrally by the boundaries of the underlying foveolae.

In dorsal view the carapace is subtruncated anteriorly and posteriorly with lateral boundaries almost parallel in both sexes.

Muscle-scars as in *Cistacythereis* (C.) *carthaginiensis* n. sp.

Sexual dimorphism: The ♂ (Pl. 1, fig. 11) are more elongated in lateral view than ♀ (Pl. 1, fig. 8); in dorsal view both sexes do not show appreciable differences (Pl. 1, figs. 12, 13).

Size (in mm) - LV ♀: L = 0.81; H = 0.38 (Pl. 1, fig. 8)

RV ♀: L = 0.72; H = 0.33 (Pl. 1, fig. 9)

LV ♂: L = 0.73; H = 0.34 (Pl. 1, fig. 11)

RV ♂: L = 0.74; H = 0.30 (Pl. 1, fig. 10)

Variability - This species appears extremely stable in the ornamentation as far as the population studied is concerned. The variability is reduced to the more or less evident fusion or partition of foveolae, fact which anyway can be clearly detected especially in the anterior depressed area.

Remarks - The young instars (probably A5 - A6) show the same ornamentation pattern; also the distribution of the foveolae, especially in the anterior depressed area, corresponds almost perfectly to that of the adults. The shape of the young instars is naturally different as usual in this group of ostracods, with valves more triangular and less defined posterior ornamentation (Text-fig. 3B).

Other findings - Tunisian shelf, less than 50 m, Recent.

ECOLOGICAL AND PALEOECOLOGICAL REMARKS

The finding in the Recent of the Mediterranean Sea of 3 species of *Cistacythereis* (*Cistacythereis*), that are *Cistacythereis* (C.) *carthaginiensis* n. sp., *Cistacythereis* (C.) *hannibalis* n. sp. and *Cistacythereis* (C.) *reymenti* Stambolidis, allows some ecological hypotheses especially on the climatic and depth distribution of this subgenus. The study of several hundreds samples all around the Mediterranean shows that:

1 - *Cistacythereis* (C.) seems to occur only at depths shallower than 50 m;

2 - its geographical distribution appears limited to the southern part of the Basin that is to the Mediterranean African coast, to Sicily and to the area of the Evros Delta (Greece), represented by *Cistacythereis* (C.) *carthaginiensis*, *Cistacythereis* (C.) *hannibalis* and *Cistacythereis* (C.) *reymenti*.

It appears consequently reasonable to accept this subgenus as a valid warm-temperate climatic marker.

This conclusion appears to be a valuable tool in the interpretation of fossil environments at least from Miocene to Recent. The fossil record of this subgenus especially in the Moroccan Rifian Corridor during Tortonian and Pliocene where the ostracod assemblages clearly show shallow warm-water environments (G. Bonaduce, unpublished data) seems to confirm this paleoclimatic and paleobathymetrical interpretation.

The subgenus *Cistacythereis* (*Hiltermannicythere*) shows a much wider both geographical and bathymetrical distribution; in fact its occurrence is registered all around the Mediterranean down to a depth of about 170 m (Müller, 1894; Puri *et al.*, 1964; Uffenorde, 1972; Bonaduce *et al.*, 1976; Bonaduce *et al.*, 1977; Bonaduce *et al.*, 1980-81; Peypouquet & Nachite, 1984; Bonaduce *et al.*, 1988).

ACKNOWLEDGEMENTS

We are deeply indebted to Prof. Giuliano Ruggieri, University of Palermo and to Prof. Antonio Russo, University of Modena, for the criticism, discussions and suggestions especially on the taxonomic problems.

REFERENCES

- BAIRD, W., 1850, The Natural history of the British Entomostraca: Ray Soc. London: 1-364, 36 pls.
- BASSIOUNI, M.A., 1970, *Falunia* (*Hiltermannicythere*), a new subgenus from the Gulf of Naples, and related fossil forms: Rev. Esp. Micropal., 2 (2): 117-130, 2 pls.
- BONADUCE, G., CIAMPO G. & MASOLI, M., 1976, Distribution of Ostracoda in the Adriatic Sea: Pubbl. Staz. Zool. Napoli, 40, suppl.: 1-304, 73 pls.
- , MASCELLARO, P., MASOLI, M. & PUGLIESE, N., 1980-81, In Belfiore *et al.*, La sedimentazione recente del Golfo di Taranto (Alto Ionio, Italia): Ann. Ist. Univ. Navale, Napoli: 49-50 (3): 177-188.
- , & MASOLI, M., 1968, Marine Ostracoda of Tunisia: Pubbl. Staz. Zool. Napoli, 36: 458-470.
- , —, MINICHELLI, G. & PUGLIESE, N., 1979, The benthic Ostracods. La Mer Pélagienne: Géol. Médit., 6 (1): 280-284, pl. 39.
- , —, & PUGLIESE, N., 1977, Ostracodi bentonici dell'alto Tirreno: Studi Trentini Sc. Nat. Acta Biologica, 54: 243-261.
- , —, & —, 1988, Remarks on the Benthic Ostracoda on the Tunisian Shelf. Proceed. 9 Int. Symp. on Ostracoda, Shizuoka, Japan 1985: 449-466.
- , & PUGLIESE, N., 1975, Ostracoda from Lybia: Pubbl. Staz. Zool. Napoli, 39 9: 129-135, 2 pls.
- , RUGGIERI, G., RUSSO, A. & BISMUTH, H., 1992, Late Miocene Ostracods from Ashtart 1 well (Gulf of Gabés, Tunisia): Boll. Soc. Paleont. Ital., 31 (1): 3-93, 26 pls.
- BRADY, G.S., 1868, Description of Ostracoda. In Folin L. de & Perier, L., 1867/1871, Les fonds de la mer, étude internationale sur les particularités nouvelles des régions sous-marine, 1: 49-112, pls. 7-13.
- DIECI, G. & RUSSO, A., 1965, Alcune specie nuove di ostracodi tortoniani dell'Appennino settentrionale: Atti Soc. Nat. Mat. Modena, 95: 78-94, 4 pls.
- DORUK, N., 1981, On *Cistacythereis pokornyi* (Ruggieri): Stereo-Atlas of Ostracod Shells, 8 (13): 71-74, 2 pls.
- , 1981, On *Cistacythereis equivalvis* Doruk sp. nov.: Stereo-Atlas of Ostracod Shells, 8 (14): 75-78, 2 pls.
- GREKOFF, N. & MOYES, J., 1956, Un nouveau genre d'Ostracode du Bassin d'Aquitaine, *Falunia girondica*, n. g., n. sp.: Bull. Soc. Géol. Franc., ser. 6, 5: 331-335, pl. 19b.
- KEMPE, E.K., 1986, Index and bibliography of marine Ostracoda: Cologne Database of Ostracoda. Part 1, index A: 762 pp.
- , 1992, Index and bibliography of marine Ostracoda: Cologne Database of Ostracoda. Part 6, index A, supplement 1: 101 pp.
- MÜLLER, G.W., 1894, Die Ostracoden des Golfes von Neapel und der Angrenzenden Meeres - Abschnitte. Fauna und Flora, 21 (1-8): 1-404, 40 pls.
- NEALE, J.W., 1973, *Celtia* gen. nov., a new genus of marine Ostracoda (Crustacea) from the Celtic Province and Neogene deposits: Rev. Esp. Micropal., 5 (3): 435-445.
- NEVIANI, A., 1928, Ostracodi fossili d'Italia - 1: Vallebajia (Calabrian): Mem. Pont. Acc. Sci., Nuovi Lincei, ser. 2, 11: 1-120, 2 pls.
- PEYPOUQUET, J.P. & NACHITE, D., 1984, Les ostracodes en Méditerranée nord-occidentale: Ecomed, ass. Franc. Techn. Petrôle, Paris: 151-169.
- PURI, H.S., BONADUCE, G. & MALLOY, J., 1964, Ecology of the Gulf of Naples: Pubbl. Staz. Zool. Napoli, 33, suppl.: 87-199.
- RUGGIERI, G., 1953, Età e faune di un terrazzo marino sulla costa ionica della Calabria: Giorn. Geol., Ann. Mus. Geol. Bologna, ser. 2, 23 (1951): 20-168, pls. 1-6.
- , 1962, Gli ostracodi marini del Tortoniano (Miocene medio-superiore) di Enna, nella Sicilia centrale: Giorn. Geol., Ann. Mus. Geol. Bologna, ser. 2, 31: 1-5, 1 pls.
- , 1967, Due ostracofaune del Miocene alloctono della Val Marecchia (Appennino settentrionale): Riv. It. Paleont. Strat., 73 (1): 351-384, 1 pl.
- , 1975, Revisione della ostracofauna marina quaternaria di Imola (Bologna): Rev. Esp. Micropal., 6 (3): 419-446.
- , 1977, Ostracofauna tortoniana di Camporosso (Peticara, Appennino Romagnolo): Boll. Soc. Paleont. Ital., (1976), 15 (2): 175-187, 1 pl.
- , & D'ARPA, C., 1993, Ostracodi marini del Pliocene superiore di Altavilla (Palermo). Contributo primo: Naturalista sicil., ser. 4, 17 (3-4): 195-229.
- SARS, G.O., 1866, Översigt af Norges marine ostracoder: Forhandlinger I Videnskabs - Selskabet I Christiania (1865): 1-130.
- SISSINGH, W., 1971, Tricostate Trachyleberidinae (Ostracoda) from Neogene - Recent deposits of Europe: Proc. Koninkl. Nederl. Akad. Wetensch., ser. B, 74 (2): 195-205.
- , 1972, Stratigraphy of Late Cenozoic deposits in the western Iraklion Province, Crete (Greece): Utrecht Micropal. Bull., Utrecht, 6: 1-187.
- STAMBOLIDIS, E.A., 1985, Zur Kenntnis der Ostracoden des Evros-Delta (Nord-Ägäisches Meer) Griechenland: Mitt. hamb. zool. Mus. Inst., 82: 155-254, 8 pls.
- SYLVESTER-BRADLEY, P.C., 1948, The ostracode genus *Cythereis*: Journ. Paleont., 22 (6): 792-797, pl. 122.
- UFFENORDE, H., 1972, Ökologie und jahreszeitliche Verteilung rezenter benthonischer Ostracoden des Limski Kanal bei Rovinj (nördliche Adria): Gottinger Arb. Geol. Paläont.: 121 pp, 12 pls.
- ULICZNY, F., 1969, Hemicytheridae und Trachyleberididae (Ostracoda) aus dem Pliozän der Insel Kephallinia (Westgriechenland): Diss., Univ. Muenchen: 1-152, 18 pls.

(manuscript received September 19, 1995
accepted January 3, 1996)

Diana BARRA

Giacchino BONADUCE

Dipartimento di Paleontologia
Largo S. Marcellino 10, 80138 Napoli, Italia