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First record of *Nipponocythere* Ishizaki, 1971 and *Swainocythere* Ishizaki, 1981 (Ostracoda) in the Late Quaternary in the Mediterranean Basin

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KEY WORDS - Ostracoda, Nipponocythere, Swainocythere, *Benthic Foraminifers, Quaternary, Mediterranean Basin.*

ABSTRACT - The presence of Nipponocythere *Ishizaki, 1971 and* Swainocythere *Ishizaki, 1981 is reported for the first time in Late Quaternary sediments of the Mediterranean Basin (Isle of Ischia, Campania, Southern Italy).* Swainocythere, *previously reported from Recent sediments of the Tunisian shelf, was previously unknown in the fossil record while* Nipponocythere *has never been previously cited from the Mediterranean Basin. The study of the benthic foraminifers and ostracods assemblages associated to the cited genera allowed to define a paleobathymetry of 70-100 m. The new subspecies* Nipponocythere drapalaensis *Bonaduce, Abate & Barra* pithekoussaii *n. ssp. is described and illustrated.*

RIASSUNTO - [Prima segnalazione di *Nipponocythere* Ishizaki, 1971 and *Swainocythere* Ishizaki, 1981 (Ostracoda) nel tardo Quaternario del bacino mediterraneo] - *Viene segnalata per la prima volta nel Mediterraneo la presenza di* Nipponocythere *Ishizaki, 1971 rappresentato da* N. drapalaensis pithekoussaii *n. spp. e* Swainocythere *Ishizaki, 1981 rappresentato da* S. *aff.* S. chejudoensis, *in sedimenti tardo-quaternari (Isola d'Ischia, Campania, Sud Italia). Il genere* Swainocythere, *già segnalato in sedimenti recenti della piattaforma tunisina e del Mar della Cina, non era ancora conosciuto nel record geologico, mentre per il genere* Nipponocythere, *noto dal Miocene al Recente dell'Atlantico e del Pacifico, questa rappresenta la prima segnalazione in area mediterranea. Lo studio dei foraminiferi bentonici e degli ostracodi associati ai due generi ha permesso di ipotizzare per l'ambiente di deposizione una batimetria compresa tra 70 e 100 m. Viene infine descritta ed illustrata* N. drapalaensis *Bonaduce, Abate & Barra* pithekoussaii *n. ssp.*

INTRODUCTION

In the frame of an interdisciplinary research on the geological evolution of the Isle of Ischia (Napoli, Southern Italy), the oldest marine sediments outcropping at the top of Mount Epomeo, a resurgent volcanic block forming the highest relief of the island (787 m), have been studied (Text-fig. 1).

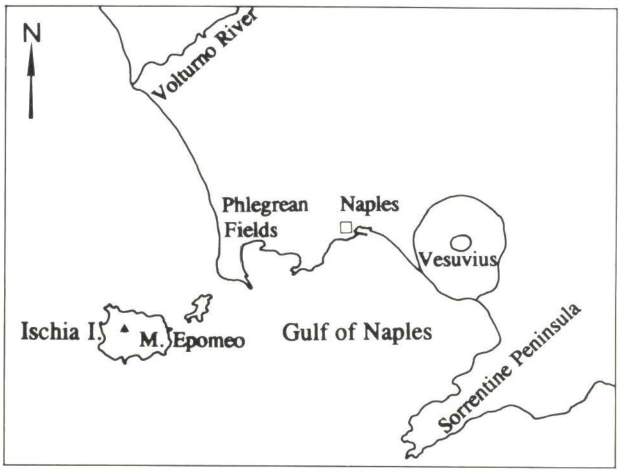
These sediments characterize patchy outcrops of reduced extent overlying the Tufo Verde Formation, which is dated 55000 years B.P. (Gillot, 1988). They yielded a relatively diversified and abundant foraminiferal and ostracod assemblages, which have been utilized for a paleoenvironmental interpretation and correlation with other marine sediments outcropping in the island.

The ostracod assemblage resultes also in the presence of some taxa for which the knowledge of the areal and stratigraphical distribution is improved.

MATERIAL AND METHODS

The benthic foraminiferal and ostracod assemblages yielded by one sample collected in a deposit of Toccaneto locality (500 m above sea level) along the southern slope of M. Epomeo (Ischia, Campania) have been quantitatively analyzed. This outcrop represents the residue of a marine succession almost completely destroied by subaerial erosion sedimented after the deposition of the volcanic Tufo Verde Formation.

The sample mainly consists of greenish marly-clayey sediment. It has been washed with a 170 mesh screen and dried at 60°C. A fraction of 1/64 of the residue obtained from a 200 g dry weight sample has been examined for the foraminifers; for the ostracods the residue of a 500 g (dry weight sample) has been completely picked.



Text-fig. 1 - Location of Ischia Island, Southern Italy, place of finding of the *Nipponocythere* and *Swainocythere*.

MICROFAUNA

BENTHIC FORAMINIFERS

The fraction of the sample studied yielded 341 specimens; 36 species (distributed on 26 genera) have been identified. The list of the species and their frequency are reported in Tab. 1. The systematics is based on Loeblich & Tappan (1964) integrated by Loeblich & Tappan (1988), as proposed by Sgarrella & Moncharmont Zei (1993).

All the species are presently living in the Mediterranean, *Bolivina aenariensis* excepted.

The paleoenvironmental interpretation is mostly based on the comprehensive paper of Sgarrella & Moncharmont Zei (1993) which deals with the systematics and bathymetrical distribution of the Recent species in the Gulf of Naples in the frame of the previous available data of the Mediterranean Basin.

The examined benthic foraminifers assemblage is characterized by the clear dominance of the different species of *Bolivina* which reach 43%; the genus *Bulimina* is also well represented especially by *Bulimina marginata* (6%). Following Bizon & Bizon (1984) the assemblage with «dominant *Bolivina*» is substituted by «dominant *Bulimina*» at about 80 m depth (continental shelf off Rhone River). The assemblage shows also a relative abundance of *Cassidulina carinata* (19%), followed by *Hyalinea baltica* and *Gyroidina umbonata* with percentages higher than 5%. The above mentioned taxa are frequent in the Recent of the circalittoral and bathyal muds deeper than 70/90 m.

FORAMINIFERIDA		
Species	S	%
Textularia calva Lalicker, 1935	1	0.29
Sigmoilina distorta Phleger & Parker, 1950	1	0.29
Sigmoilina tenuis (Czjzek, 1848)	1	0.29
Amphicoryna scalaris (Batsch, 1791)	1	0.29
Lagena sulcata (Walker & Jacob, 1798)	1	0.29
Oolina exagona (Williamson, 1848)	1	0.29
Fissurina castanea (Flint, 1899)	1	0.29
Fissurina clathrata (Brady, 1884)	2	0.59
Fissurina cucullata Silvestri, 1902	1	0.29
Bolivina aenariensis (O.G. Costa, 1856)	20	5.87
Bolivina alata (Seguenza, 1862)	48	14.08
Bolivina pseudoplicata Heron-Allen & Earland, 1930	4	1.17
Bolivina spathulata (Williamson, 1858)	94	27.57
Bolivina subspinescens Cushman, 1922	1	0.29
Bulimina aculeata d'Orbigny, 1826	6	1.76
Bulimina costata d'Orbigny, 1852	1	0.29
Bulimina marginata d'Orbigny, 1826	22	6.45
Globobulimina pseudospinescens (Emiliani, 1949)	2	0.59
Stainforthia complanata (Egger, 1893)	1	0.29
Uvigerina mediterranea Hofker, 1932	1	0.29
Angulogerina angulosa (Williamson, 1858)	1	0.29
Valvulineria bradyana (Fornasini, 1900)	9	2.64
Asterigerinata mamilla (Williamson, 1858)	1	0.29
Ammonia beccarii (Linneo, 1758)	1	0.29
Elphidium macellum (Fichtel & Moll, 1798)	1	0.29
Hyalinea baltica (Schroeter, 1783)	18	5.28
Cibicides lobatulus (Walker & Jacob, 1798)	1	0.29
Fursenkoina tenuis (Seguenza, 1862)	1	0.29
Cassidulina carinata Silvestri, 1896	65	19.06
Globocassidulina subglobosa (Brady, 1881)	4	1.17
Nonionella turgida (Williamson, 1858)	1	0.29
Gyroidina altiformis Stewart & Stewart, 1930	1	0.29
Gyroidina umbonata (Silvestri, 1898)	20	5.87
Cibicidoides pachyderma (Rzehak, 1886)	1	0.29
Melonis barleanum (Williamson, 1858)	1	0.29
Hoeglundina elegans (d'Orbigny, 1826)	5	1.47

Tab. 1 - Benthic foraminifers. List of species, number of specimens and percentages; S = number of specimens.

All the previous literature concur to define the assemblage as characteristic of the muddy lower circalittoral bottom (*sensu* Perez & Picard, 1964).

Moreover a reduced number of species generally characteristic of the sandy or with vegetated infralittoral bottoms (*Asterigerinata mamilla*, *Ammonia beccarii*, *Elphidium macellum*, *Cibicides lobatulus*) has been found even if represented by rare specimens. These species are considered displaced from shallower environments probably due to waves and/or bottom currents.

Of particular interest is the finding (6%) of *Bolivina aenariensis* which does not seem to occur in the Recent sediments of the Mediterranean. Particularly it is absent in both the Recent and Holocenic sediments of the Gulf of Naples (Sgarrella & Moncharmont Zei, 1993), while it is frequent in the würmian ones (Sgarrella, 1992). Following Sgarrella (op. cit.) this species has to be considered a good climatic marker of the Mediterranean Pleistocene cold events in the circalittoral and upper bathyal environments.

OSTRACODS

The ostracod assemblage is represented by 83 specimens distributed on 37 species and 25 genera. The list of the species is reported in Tab. 2, following the systematics of Hartmann & Puri (1974).

Few forms are reported in open nomenclature; among them *Microxestoleberis* sp. 1, which is probably a new species, and *Polycope* sp., *Carinocythereis* sp., *Urocythereis* sp., *Sagmatocythere* sp. and *Paracytheridea* sp., which are represented only by juvenals and consequently of uncertain specific attribution.

Most of the species are presently living in the Mediterranean, with the exception of *Nipponocythere drapalaensis pithekoussaii* n. ssp. here described as new, of *Xestoleberis prognata* and *Argilloecia pseudoreticulata* reported from the Upper Miocene of Spain and Pliocene of Sicily (Bonaduce & Danielopol, 1988) and from the Late Pliocene - Early Pleistocene of Sicily (Barra *et al.*, in press), respectively.

The palaeocological and bathymetrical interpretation is based on the literature related to the distri-

OSTRACODA		
Species	S	%
Polycope sp.	j	
Tetracytherura angulosa (Seguenza, 1880)	1 j	1.20
Callistocythere gilva Bonaduce, Ciampo & Masoli, 1976	1j	1.20
Pontocythere turbida (G.W. Mueller, 1894)	j	
Parakrithe ambigua Ciampo, 1980	1	1.20
Carinocythereis sp.	j	
Costa edwardsi (Roemer, 1838)	1 j	1.20
Henryhowella sarsi (G.W. Mueller, 1894)	1j	1.20
Pterygocythereis jonesi (Baird, 1850)	1	1.20
Aurila convexa (Baird, 1850)	3 j	3.61
Urocythereis sp.	j	
Loxoconcha ovulata (O.G. Costa, 1853)	1 j	1.20
Loxochonchidea minima Bonaduce, Ciampo & Masoli, 1976	10	12.05
Nipponocythere drapalaensis pithekoussaii n. ssp.	9 j	10.84
Sagmatocythere littoralis (G.W. Mueller, 1894)	1	1.20
Sagmatocythere sp.	j	
Paracytheridea sp.	j	
Cytheropteron latum G.W. Mueller, 1894	1 j	1.20
Cytheropteron ruggierii Pucci, 1955	1	1.20
Eucytherura complexa (Brady, 1866)	1	1.20
Hemicytherura defiorei Ruggieri, 1953	1	1.20
Hemicytherura gracilicosta Ruggieri, 1953	8 j	9.64
Hemicytherura videns (G.W. Mueller, 1894)	11 j	13.25
Kangarina abyssicola (G.W. Mueller, 1894)	1	1.20
Semicytherura acuticostata (Sars, 1866)	1j	1.20
Semicytherura alifera Ruggieri, 1959	1	1.20
Semicytherura dispar (G.W. Mueller, 1894)	2j	2.41
Semicytherura rara (G.W. Mueller, 1894)	2	2.41
Swainocythere aff. *S. chejudoensis* Ishizaki, 1981	1	1.20
Microxestoleberis sp. 1	1j	1.20
Xestoleberis communis G.W. Mueller, 1894	5 j	6.02
Xestoleberis dispar G.W. Mueller, 1894	2 j	2.41
Xestoleberis parva G.W. Mueller, 1894	3 j	3.61
Xestoleberis plana G.W. Mueller, 1894	4 j	4.82
Xestoleberis prognata Bonaduce & Danielopol, 1988	2	2.41
Argilloecia gonzalezi Barra, Aiello & Bonaduce, in press	1	1.20
Argilloecia pseudoreticulata B. A. & B., in press	4 j	4.82

Tab. 2 - Ostracods. List of species, number of specimens and percentages; S = number of specimens; j = presence of juveniles.

bution of the Recent ostracods in the Mediterranean (Barbeito-Golzalez, 1971; Uffenorde, 1972; Breman, 1975; Bonaduce *et al.*, 1976; Bonaduce *et al.*, 1977; Puri *et al.*, 1964).

The assemblage in the whole defines a bottom depth from 10 to about 100 m. It is clear anyway a «mixed» assemblage which show the presence of few species restricted to very shallow environment (*Aurila convexa, Loxoconcha ovulata, Pontocythere turbida, Sagmatocythere littoralis, Xestoleberis* spp.), of more numerous species whose depth distribution ranges from 10-20 m to about 100 m (*Costa edwardsi, Hemicytherura defiorei, H. videns*), of species deeper than 50 m (*Cytheropteron latum, C. ruggierii, Tetracytherura angulosa* and *Loxoconchidea minima*, particularly abundant) and others which characterize a depth beyond 70 m (*Eucytherura complexa, Henryhowella sarsi, Parakrithe ambigua* and *Pterygocythereis jonesi*). Numerous other species (*e.g. Hemicytherura gracilicosta, Semicytherura* spp.) show a wider depth distribution from shallow down to about 150 m.

The integration of the previous data from the Recent seems to indicate an assemblage which characterizes a depth range of about 70-100 m, with a minor contamination of relatively few shallower species probably due to waves and/or bottom currents. The particularly abundance of juveniles of *H. sarsi, E. complexa* and *L. minima* seems to confirm their autochthony.

This interpretation agree with the results obtained with the benthic foraminifers.

CHRONOLOGICAL AND PALEOECOLOGICAL REMARKS

The microfauna found is perfectly correlatable with that of the clays of Cava di Leccie, a thick clay-tufitic succession located on the northern slope of M. Epomeo and ascribed to the Colle Jetto Formation. In fact the benthic foraminifers and ostracods of the fossiliferous layers of Cava di Leccie correspond to a marine environment with bathymetrical range 70-120 m (Barra *et al.*, 1992).

The age correlatability between the two outcrops is also confirmed by the presence in both of them of *B. aenariensis*, a valid marker of the cold Late Pleistocene.

Moreover, on the base of direct stratigraphic relations with dated volcanic deposits, these marine sediments overlying the Tufo Verde of Mt. Epomeo might be attributed to the time span 55000-10000 y. B.P. Anyway other indirect stratigraphic and morphostructural evidences lead to refer them to the central portion of the previously cited span of time (Barra *et al.*, 1992).

TAXONOMIC NOTES

NIPPONOCYTHERE DRAPALAENSIS Bonaduce, Abate & Barra, 1994 PITHEKOUSSAII n. ssp.

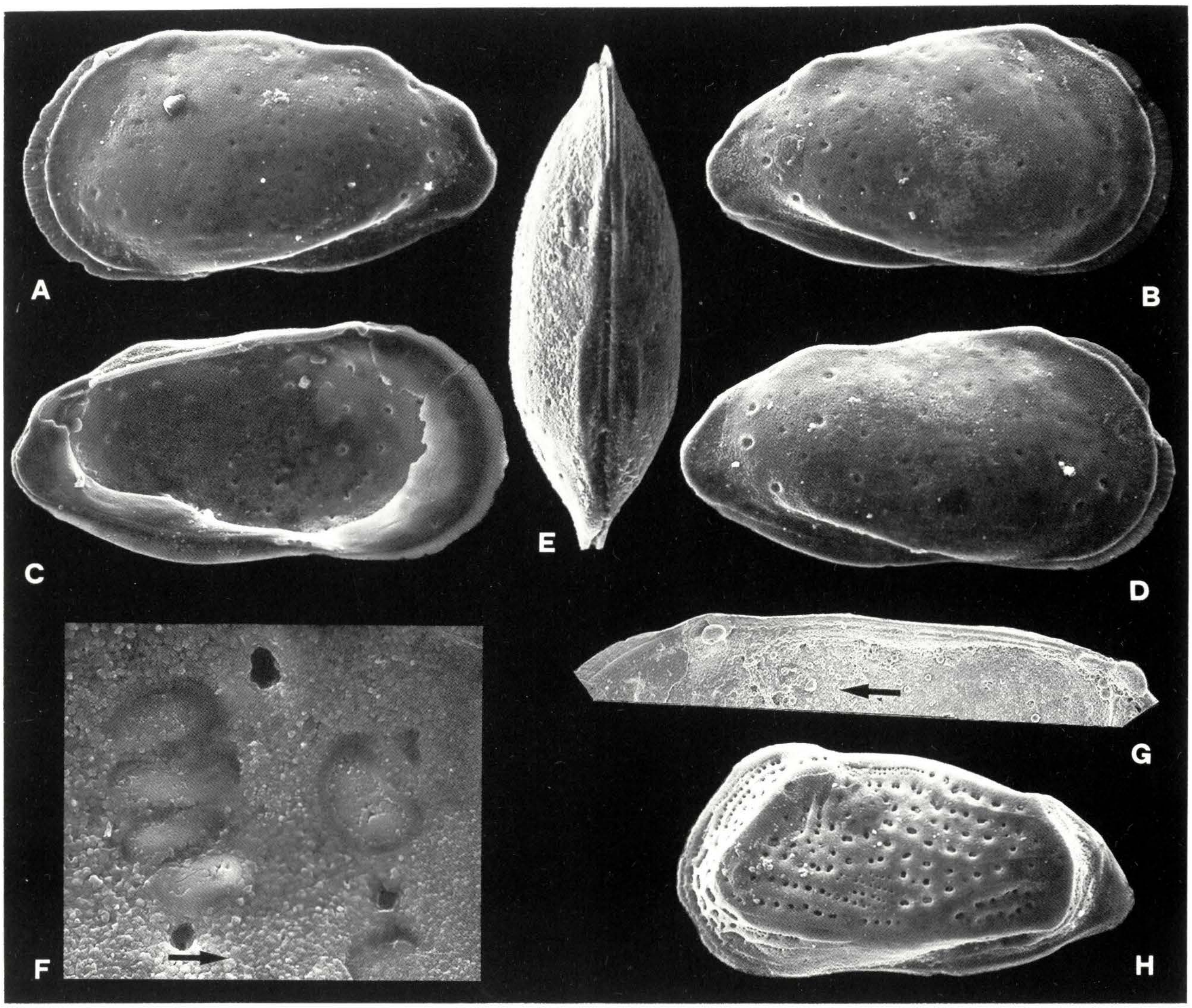
Text-figs. 2 A-G; 3 a-d

Etymology - From Pithekoussai, the greek name of Ischia Island (Campania, Italy), place of finding.

Holotype - 1 LV (Text-fig. 2 A). B.O.C. 2236.

Paratypes - 9 valves (5 of which figured in Text-fig. 2 B-G; Text-fig. 3 a-d). B.O.C. 2237, 2238, 2239, 2240, 2241.

Type locality - Ischia Island, Campania, Southern Italy, Toccaneto locality.



Text-fig. 2 - A-G - *Nipponocythere drapalaensis* Bonaduce, Abate & Barra, 1994 *pithekoussaii* n. ssp., Ischia Island. A) Holotype, LV female, B.O.C. 2236, (x 176); B) Paratype, RV female, B.O.C. 2237, (x 176); C) Paratype, LV male, from inside, B.O.C. 2238, (x 176); D) Paratype, RV male, B.O.C. 2239, (x 176); E) Paratype, CC male, in dorsal view, B.O.C. 2240, (x 176); F) Muscle-scars of same specimen of Text-fig. 2 C, (x 916); G) Hinge of same specimen of Text-fig. 2 D, (x 258).
H - *Swainocythere* aff. *S. chejudoensis* Ishizaki, 1981. Ischia Island, LV, (x 240).
LV = left valve; RV = right valve; DV = dorsal view.

Repository – All the specimens figured are stored in Bonaduce Ostracode Collection (B.O.C.), Department of Paleontology, University of Naples.

Generic attribution – The specimens figured are attributed to *Nipponocythere* for the characters specified in the following:

- Valves in lateral view elongate, subtriangular, with posterior extremity subacuminate;
- Carapace in dorsal view acuminate at both the extremities;
- Anterior maximum height of valve;
- Ventral ridge running just above the ventral margin;
- Anterior vestibule well developed;
- Hinge gongylodont;
- Muscle-scars consisting of a subvertical row of four adductor scars preceeded by a heart-shaped anterior scar.

Specific attribution – The species is attributed to *Nipponocythere drapalaensis* Bonaduce, Abate & Barra, 1994 [new name for *N. colalongoae* (Ciampo, 1986) *sensu* Drapala & Ayress (1993)] on the base of the following characters:

- Shape and general exterior characters in lateral view very similar;
- Ample rim running parallel to the anterior margin;
- Anterior inner lamella well developed with rather ample vestibule from which simple, straight and widely spaced marginal pore-canals depart.

Affinities - The proposed new subspecies differs from *N. drapalaensis drapalaensis* Bonaduce, Abate & Barra in the following:

- Carapace in dorsal view rather compressed for almost the whole length (Text-fig. 2 E) while in the latter it appears much more inflated with valves subtrapezoidal; in fact in the proposed new subspecies the L/W ratio is 2.94 while in *N. drapalaensis drapalaensis* is 2.24;
- Surface smooth with relatively fewer and larger normal pore canals which posteriorly are arranged in a row almost parallel to the posterior margin and defining the caudal process area;
- Absence of the delicate reticulation along the anterior margin;
- Absence of the very numerous small pits confined to the central area of the valve.

The cited differences do not seem to justify the erection of a new species.

Size (in mm) - LV female: L = 0.386; H = 0.204; L/H = 1.89 (Text-fig. 2 A).

RV female: L = 0.382; H = 0.204; L/H = 1.87 (Text-fig. 2 B).

LV male: L = 0.408; H = 0.193; L/H = 2.11 (Text-fig. 2 C).

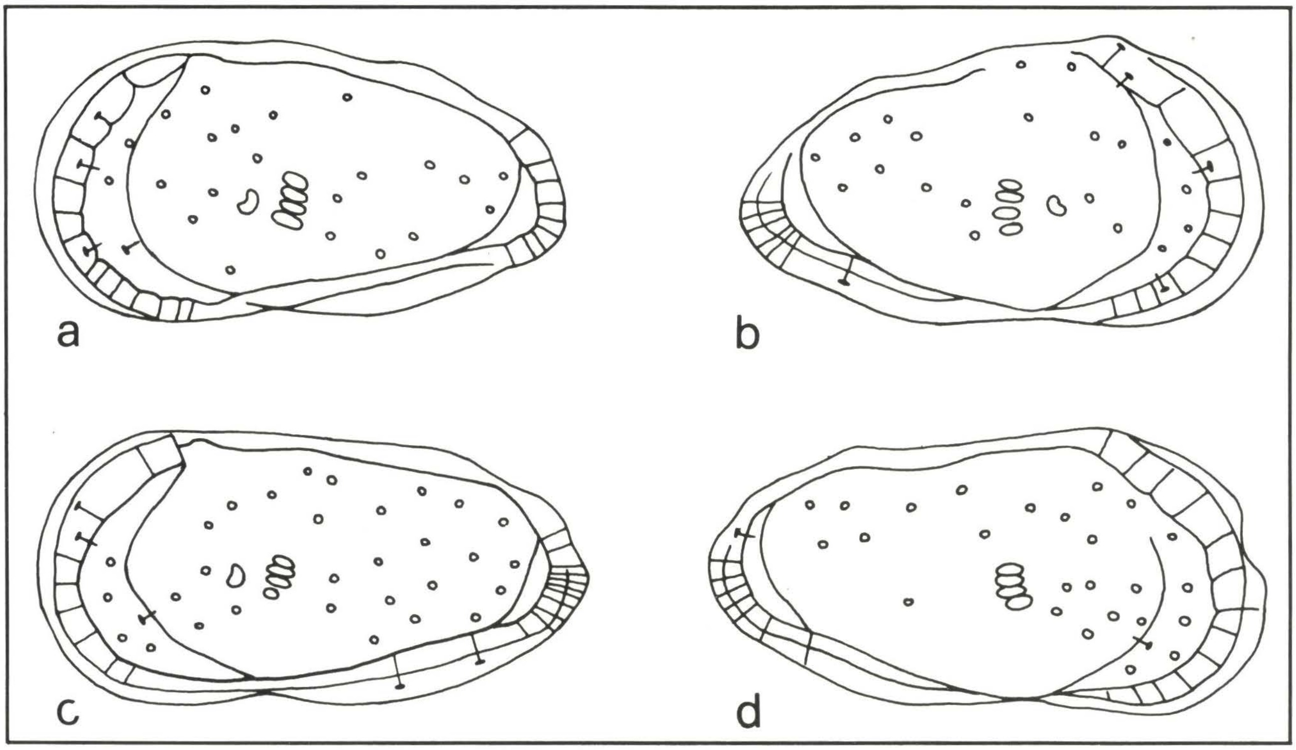
RV male: L = 0.405; H = 0.197; L/H = 2.05 (Text-fig. 2 D).

From these data the sexual dimorphism appears well defined by the relatively higher L/H ratio in the male.

SWAINOCYTHERE aff. S. CHEJUDOENSIS Ishizaki, 1981
Text-fig. 2 H

1979 ?*Cativella* sp. 1 BONADUCE, MASOLI, MINICHELLI & PUGLIESE, pl. 39, fig. 4.

Remarks - The only valve found is very similar to *S. chejudoensis* Ishizaki, 1981, type-species of the



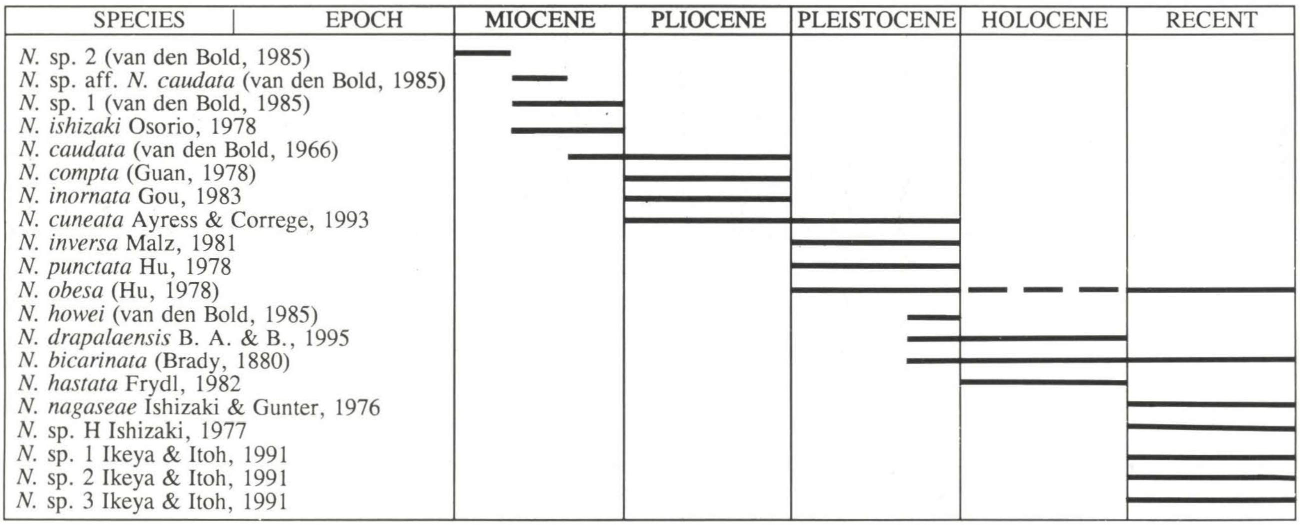
Text-fig. 3 - *Nipponocythere drapalaensis* Bonaduce, Abate & Barra, 1994 *pithekoussaii* n. ssp., Ischia Island, (x 201). a) left valve female, B.O.C. 2241; b) right valve female, same specimen of Text-fig. 2 B, B.O.C. 2237; c) left valve male, same specimen of Text-fig. 2 C, B.O.C. 2238; d) right valve male, same specimen of Text-fig. 2 D, B.O.C. 2239. Transmitted light drawings done by Visopan Reichert.

SPECIES	LOCALITY	EPOCH	LITERATURE
N. bicarinata (Brady, 1880)	Boso Peninsula (Central Japan)	Late Pleistocene	Yajima, 1982
	Boso Peninsula (Central Haiti)	Holocene to Recent	Frydl, 1982
	Inland Sea (Japan)	Recent	Brady, 1880; Puri & Hulings, 1976
	Aomori Bay (Northeast Honshu, Japan)	Recent	Ishizaki, 1971
	Northeastern Japan	Recent	Ikeya & Itoh, 1991
	Otsuchi Bay (Northeastern Japan)	Recent	Ikeya *et al.*, 1992
N. caudata (van den Bold, 1966)	Venezuela, Trinidad, Columbia	Late Miocene to Pliocene	Bold, van den, 1985
N. compta (Guan, 1978)	Guangdong Province (South China)	Pliocene	Gou *et. al.*, 1983
N. cuneata Ayress & Correge, 1993	Caribbean Sea	Pliocene	Bold, van den, 1985
	Coral Sea (SW Pacific)	Late Pliocene	Ayress & Correge, 1993
	Coral Sea (SW Pacific)	Late Pleistocene	Ayress & Correge, 1993
N. drapalaensis B. A. & B., 1995	Off Victoria (Australia)	Late Quaternary	Drapala & Ayress, 1993
N. hastata Frydl, 1982	Southern Boso Peninsula (Central Japan)	Holocene	Frydl, 1982
N. howei (van den Bold, 1985)	Mississippi River mouth (Louisiana)	Late Pleistocene	Bold, van den, 1985
N. ishizaki Osorio, 1978	Navidad Formation (Chile)	Upper Miocene	Osorio, 1978
N. inornata Gou, 1983	Guangdong Province (South China)	Pliocene	Gou *et. al.*, 1983
N. inversa Malz, 1981	Szekou Formation (SW Taiwan)	Pleistocene	Malz, 1981
N. nagaseae Ishizaki & Gunter, 1976	Gulf of Panama	Recent	Ishizaki & Gunter, 1976
N. obesa (Hu, 1978)	Toukoushan Formation (Taiwan)	Pleistocene	Hu, 1978
	East China sea	Recent	Ishizaki, 1981
N. punctata Hu, 1978	Toukoushan Formation (Taiwan)	Pleistocene	Hu, 1978
N. sp. H Ishizaki, 1977	East China Sea	Recent	Ishizaki, 1977
N. sp. aff. *N. caudata* (van den Bold, 1985)	Trinidad, Venezuela	Middle Miocene	Bold, van den, 1985
N. sp. 1 (van den Bold, 1985)	Thomonde Formation (Central Haiti)	Late Middle Miocene	Bold, van den, 1985
N. sp. 2 (van den Bold, 1985)	Costa Rica	Early to basal Middle Miocene	Bold, van den, 1985
N. sp. 1 Ikeya & Itoh, 1991	Pacific Coast of NE Japan	Recent	Ikeya & Itoh, 1991
N. sp. 2 Ikeya & Itoh, 1991	Pacific Coast of NE Japan	Recent	Ikeya & Itoh, 1991
N. sp. 3 Ikeya & Itoh, 1991	Pacific Coast of NE Japan	Recent	Ikeya & Itoh, 1991

Tab. 3 - Previous findings of *Nipponocythere* species and their age distribution.

genus *Swainocythere*, from which it substantially differs due to the running of the posterodorsal ridge which appears concave toward the dorsal margin while in the type-species it is convex. No other peculiar differences seem to occur.

The specimen found is identical also in the details to that figured by Bonaduce *et al.* (1979) and consequently an extremely stable ornamentation is suggested. Because of this and the cited differences, at the present state of art, the species of Ishizaki is taken separated. This position can also be supported by the different geographic area of finding.



Text-fig. 4 - Stratigraphical distribution of the *Nipponocythere* species based on literature data.

Size (in mm) - LV: L = 0.276; H = 0.139; L/H = 1.98 (Text-fig. 2 H).

SYSTEMATICS AND DISTRIBUTION OF *NIPPONOCYTHERE* AND *SWAINOCYTHERE*

Nipponocythere Ishizaki, 1971 pertains to the family Loxoconchidae Sars, 1925; type-species *N. asamushiensis* Ishizaki, 1971, junior synonym of *N. bicarinata* (Brady, 1880) *fide* Hanai *et al.*, 1977.

The genus, accepting *Heinia* van den Bold, 1985 as junior synonym of *Nipponocythere* (Ayress & Correge, 1993; Bonaduce *et al.*, 1994), is known from Miocene to Recent. The findings of the related species are reported in table 3 and their stratigraphic distribution in Text-fig. 4. Taking into account the synonymies of the previous literature, this genus is represented by 20 species, 7 of which reported in open nomenclature.

Swainocythere Ishizaki, 1981 (Cytheruridae G. W. Mueller, 1894; Cytheropterinae Hanai, 1957) is a monospecific genus, represented by *S. chejudoensis* Ishizaki, 1981, described from Recent sediments of the outer shelf of the East China Sea.

Correge *et al.*, 1992 attribute to *Swainocythere* a second species, *S. nanseni* (Joy & Clark, 1981) ascribed by Bonaduce *et al.* (1994) to *Kunihirella* Bonaduce, Abate & Barra, 1994 a recently proposed new genus which differs from *Swainocythere* due to the presence of a well defined anterior vestibule, absent in *Swainocythere* (Ishizaki, 1992, pers. comm. to G. Bonaduce).

Swainocythere is also reported by Bonaduce *et al.*, 1979 as ? *Cativella* sp. 1 from Recent sediments of the Tunisian shelf.

CONCLUSIONS

The foraminiferal and ostracod assemblages studied allow to hypothesize a paleobathymetry of sedimentation not shallower than 70-100 m.

From the previous data of the literature, the genus *Nipponocythere* is represented from Miocene to Recent in different areas, and for the first time its occurrence is reported in the Mediterranean Basin (Late Quaternary). From the relatively scarce data of the literature, at species level the genus may have a stratigraphical importance. In fact different species appear characteristic of different ages from Miocene to Recent.

The genus *Swainocythere*, previously cited from the Mediterranean Basin only in the Recent, is reported in the fossil record (Late Quaternary) for the first time.

With the scarce stratigraphical data at disposal, the problem of radiative centre of the cited genera is still open, even if *Nipponocythere* seems to have reached the Mediterranean from the Caribbean area in relatively recent times. For *Swainocythere*, the few available data do not allow any hypothesis.

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