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TWO NEW SPECIES OF PLANKTONIC FORAMINIFERA FROM THE LOWER PLEISTOCENE

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TWO NEW SPECIES OF PLANKTONIC FORAMINIFERA FROM THE LOWER PLEISTOCENE (1)

ABSTRACT - Two planktonic foraminiferal species, from DSDP Site 132 (Tyrrhenian Sea), are described as new: *Globorotalia laeta* and *Globorotalia tyrrhenica*. Both new species appear about 20 m above the FAD of *Globorotalia truncatulinoides excelsa* SPROVIERI, RUGGIERI and UNTI; they seem to cover a reduced stratigraphic range.

RIASSUNTO - Due nuove specie di Foraminiferi planctonici, provenienti dal pozzo DSDP n. 132 (Mar Tirreno), vengono qui descritte: *Globorotalia laeta* e *Globorotalia tyrrhenica*. Entrambe le specie compaiono nel Pleistocene inferiore, circa 20 m dopo il FAD di *Globorotalia truncatulinoides excelsa* SPROVIERI, RUGGIERI e UNTI, e sembrano avere una limitata distribuzione stratigrafica.

INTRODUCTION

The sedimentary sequence of Site 132 drilled during Leg 13 of the Deep Sea Drilling Project represents one of the most interesting deep sea Pliocene-Pleistocene sections cored in the Mediterranean Sea. More than two hundred meters were penetrated, over 70 of which representing the Pleistocene sequence.

Numerous studies have utilized the site material, both for biostratigraphic (CITA, 1973 and 1976 *cum bibl.*; RAFFI and RIO, 1979; THUNELL, 1979c) and paleoclimatic purposes (CIARANFI and CITA, 1973; CITA, 1976; CITA *et al.*, 1973 and 1974; THUNELL, 1979a, 1979b and 1979c). In progress investigations of COLALONGO, RIO and WEZEL are

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further dealing with planktonic foraminiferal and calcareous nannoplankton biostratigraphy.

This paper reports some preliminary results of a detailed paleontologic-systematic study regarding the most significant planktonic foraminifers of Site 132. It describes two new species coming from cores 3 and 4.

Globorotalia laeta n. sp.

(Pl. XIX, figs. 1-4)

DESCRIPTION - Test calcareous, finely perforate, with pores surrounded by circular, conical depressions whose size increases progressively from the final to the early chambers (as typical for the genus *Globorotalia* according to COLLEN and VELLA, 1973). Chambers 16 to 18, regularly increasing in size, arranged in 3 whorls of a low trochospire; 5 to 6 chambers in the final whorl where increasing rate is moderate, except for the eventual chamber, which is usually much more developed than preceeding one (fig. 1). Peripheral margin distinctly rounded and imperforate; axial profile flat-convex; equatorial profile distinctly lobate. Spiral side almost flat, with inflated chambers tangentially elongated. Intercameral and spiral sutures strongly depressed, the former ones moderately curved. Umbilical side strongly inflated, with subtriangular chambers; sutures depressed, sinuous, and radially arranged. Umbilicus moderately large and deep. Numerous small papillae cover the umbilical area; they are less common on spiral surface. Aperture a low, wide arch, umbilical-extraumbilical, bordered by a broad, irregular perforate lip.

Holotype: maximum diameter 0.39 mm; axial elevation 0.23 mm.

REMARKS - The new species is somewhat close, in overall morphology, to *Globorotalia tyrrhenica* n. sp., *Globorotalia exserta* ROMEO and *Globorotalia nicolae* CATALANO and SPROVIERI; the latter two species however cover a distribution range restricted to the Upper Tortonian and the Lower Messinian of the Mediterranean basin. *G. laeta* may be distinguished from *G. tyrrhenica* by its larger size; more chambers, with final one regularly to strongly developed; more inflated umbilical side; peripheral margin more rounded; relatively wider aperture; wider and deeper umbilicus; sinuous umbilical sutures; flat dorsal coil. It differs from *G. exserta* because it lacks an imbricate arrangement of the last chambers; it has a reduced number of chambers, with the final one less protruding; the aperture is lower; the test surface is finely perforate. *G. laeta* may be distinguished

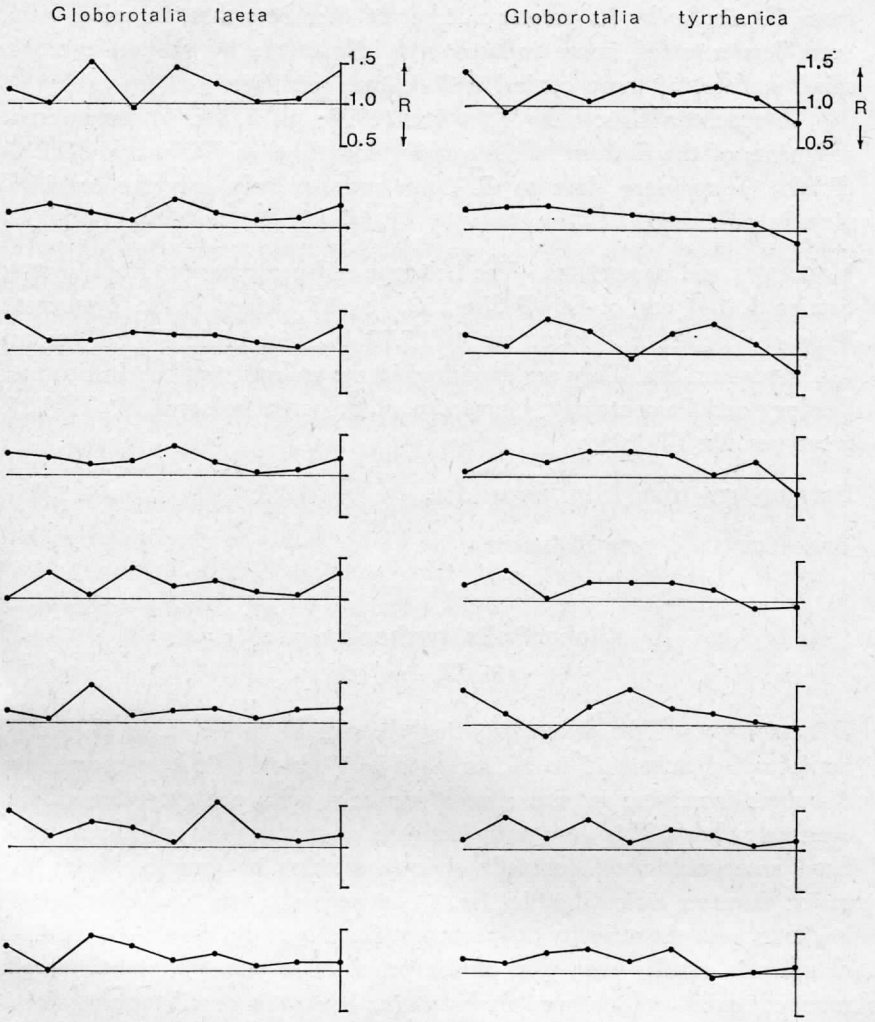

Fig. 1 - Diagrams showing the major diameter ratios between contiguous chambers (R ratio; in ordinates) regarding the last 10 chambers (in abscissas) in *Globorotalia leata* and *Globorotalia tyrrhenica.*
The ratio between the final and the penultimate chamber is the dot at the right of each diagram. A decrease in ratio means a slowing of the growth trend; this fact usually occurs during the late ontogenetic stage (BERGER, 1971; OLSSON, 1973).

In *G. laeta* the R ratio decrease, observed generally in the last 3-4 chambers, points out a slow down of growth, except for the final chamber which is more developed than the previous one. As to *G. tyrrhenica,* in most specimens, the final chamber exhibits a size smaller than that of the penultimate one.

from *G. nicolae* by its greater number of chambers that, in spiral view, seem less rounded, more inflated and imbricated; by the presence, in spiral surface, of more conical and delicate papillae.

A specimen figured by THUNELL (1978; pl. 2, fig. 3) from recent sediments of the Eastern Mediterranean, identified as *Globorotalia scitula* (Brady), seems very close to *G. laeta*; unfortunately only the umbilical view is published.

HOLOTYPE and PARATYPES - The holotype and paratypes are from Core 4, Section 1, 145 cm, of DSDP Site 132, Leg 13, drilled in the Tyrrhenian Basin at a depth of 2835 m, lat. 40°15.70′ N., lon. 11°26.47′ E, Western Mediterranean Sea. They are deposited in the collection of the Institute of Geology and Paleontology, University of Bologna: holotype N° TT 105, paratypes N° TT 106.

ETYMOLOGY: from latin *laetus*: fat.

TYPE LEVEL: Lower Pleistocene.

Globorotalia tyrrhenica n. sp.

(Pl. XX, figs. 1-5)

DESCRIPTION - Test calcareous, finely perforate (pores as in *G. laeta*), number of chambers 15 to 16, arranged in 3 whorls of a low trochospire; chambers increasing in size almost regularly, with the exception of the eventual whorl. This constantly consists of 5 chambers which, at least from antepenultimate, generally show a slowing of growth. Hence the major diameter ratio (R ratio, fig. 1) between the two final chambers is less than 1 for the majority of specimens. Consequently, the size of the final chamber is smaller than that of the penultimate one. Peripheral margin rounded; axial profile unequally biconvex; equatorial profile strongly lobate. Spiral side slightly convex; chambers inflated, tangentially elongated; sutures strongly depressed and curved; a series of irregularly placed papillae is present. Umbilical side much more convex than the spiral one; chambers strongly inflated, subtriangular; final chamber often stretches towards the umbilical area, reducing the umbilicus width; sutures depressed, curved or slightly sinuous, radial. Umbilical area densely covered by papillae. Umbilicus small and deep. Aperture a low arch, umbilical-extraumbilical, bordered by a perforate, irregular lip.

Holotype: maximum diameter 0.34 mm; axial elevation 0.23 mm.

REMARKS - In overall morphology *Globorotalia tyrrhenica* n. sp. may be considered similar to *Globorotalia laeta* n. sp., *Globorotalia scitula scitula* (BRADY), *Globorotalia crozetensis* THOMPSON and *Globorotalia suterae* CATALANO and SPROVIERI. About the relations with the former species see the previous « remarks » of *G. laeta*. *G. tyrrhenica* may be easily distinguished from *G. scitula scitula* in having chambers strongly inflated, a more rounded peripheral margin, intercameral sutures more rectilinear, a different development of the final chamber. The new species may be separated from *G. crozetensis* by its rounded peripheral margin; chambers substantially more inflated; spiral and intercameral sutures more distinctly depressed, the latter ones straighter on dorsal side; larger aperture and umbilicus; more reduced size. Finally, the new species differs from *G. suterae* in having less imbricate chamber arrangement peripheral margin more rounded; reduced umbilicus width and lower apertural arch.

HOLOTYPE and PARATYPES - The holotype and paratypes are from Core 4, Section 1, 145 cm, of DSDP Site 132, Leg 13, drilled in the Tyrrhenian Basin at a depth of 2835 m, lat. 40°15.70′ N., long. 11°26.47′ E, Western Mediterranean Sea. They are deposited in the collection of the Institute of Geology and Paleontology, University of Bologna: holotype No. TT 107, paratypes No. TT 108.

ETYMOLOGY: the name of the species is proposed because of the type locality in the Tyrrhenian Sea.

TYPE LEVEL: Lower Pleistocene.

STRATIGRAPHIC RANGE

The two new species appear in the Site about 20 m above the FAD of *Globorotalia truncatulinoides excelsa*, a new subspecies whose stratigraphic meaning has been emphasized by SPROVIERI, RUGGIERI and UNTI (1980) as a marker for the Sicilian (Lower Pleistocene). Both new species cover a reduced stratigraphic range. *G. tyrrhenica* occurs only in two samples: 4-2 (47 cm) and 4-1 (145 cm), where it is quite frequent. *G. laeta* has a wider distribution, ranging from samples 4-3 (80 cm) to 3-3 (130 cm), where it is generally common. We have identified rare specimens of this form also in recent sediments from a piston core drilled in the Tyrrhenian Sea; furthermore, referring to the specimen figured by Thunell (1978 in pl. 2, fig. 3), *G. laeta* may be

present in recent sediments from the Eastern Mediterranean.

Both new species belong to a planktonic foraminiferal assemblage, substantially characterized by the following species:

Globigerina calabra COLALONGO and SARTONI
Globigerina cariacoensis RÖGL and BOLLI
Globigerinoides ruber (D'ORBIGNY)
Globigerinoides sacculifer (BRADY)
Globigerinoides tenellus PARKER
Globigerinoides trilobus (REUSS)
Globorotalia anfracta PARKER
Globorotalia bermudezi RÖGL and BOLLI
Globorotalia crassaformis crassaformis (GALLOWAY and WISSLER)
Globorotalia ex gr. crassaformis
Globorotalia crassaformis hessi BOLLI and PREMOLI SILVA
Globorotalia incompta (CIFELLI)
Globorotalia inflata (D'ORBIGNY)
Globorotalia oscitans TODD
Globorotalia scitula scitula (BRADY)
Globorotalia truncatulinoides excelsa SPROVIERI, RUGGIERI and UNTI
Hastigerina pelagica (D'ORBIGNY)
Hastigerina precalida (BLOW)
Hastigerina siphonifera (D'ORBIGNY)
Hastigerinella riedeli RÖGL and BOLLI
Neocarinina atlantis (BERMUDEZ)
Neogloboquadrina dutertrei subcretacea (LOMNICKI)
Neogloboquadrina pachyderma (EHRENBERG)
Pulleniatina sp.
Turborotalita clarkei (RÖGL and BOLLI)
Turborotalita humilis (PARKER)
Turborotalita iota (PARKER)
Turborotalita quinqeloba (NATLAND)

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REFERENCES

BERGER W. H., 1971 - *Sedimentation of planktonic Foraminifera.* Mar. Geol., 11, 5, pp. 325-358, 18 ff., 6 pls., Amsterdam.

CIARANFI N. and CITA M. B., 1973 - *Paleontological evidence of changes in the Pliocene climates.* In: RYAN W. B. F., HSÜ K. J. *et al.*, Initial Reports of the Deep Sea Drilling Project, 13, U. S. Govt. Printing Office, pp. 1387-1399, 5 ff., Washington.

CITA M. B., 1973 - *The Pliocene record in deep sea Mediterranean sediments. 1, Pliocene biostratigraphy and chronostratigraphy.* In: RYAN W. B. F., HSÜ K. J. *et al.*, Initial Reports of the Deep Sea Drilling Project, 13, U. S. Govt. Printing Office, pp. 1343-1379, 7 pls., Washington.

CITA M. B., 1976 - *Planktonic foraminiferal biostratigraphy of the Mediterranean Neogene.* In: TAKAYANAGI Y. and SAITO T. (Eds.), Progress in Micropaleontology, pp. 47-68, 9 ff., 3 pls., New York.

CITA M. B., CHIERICI M. A., CIAMPO G., MONCHARMONT ZEI M., D'ONOFRIO S., RYAN W. B. F. and SCORZIELLO R., 1973 - *The Quaternary record in the Tyrrhenian and Ionian basins of the Mediterranean Sea.* In: RYAN W. B. F., HSÜ K. J. *et al.*, Initial Reports of the Deep Sea Drilling Project, 13, U. S. Govt. Printing Office, pp. 1263-1339, 14 ff., 20 pls., Washington.

CITA M. B., CIAMPO G., FERONE E., MONCHARMONT ZEI M., SCORZIELLO R. and TADDEI RUGGIERO E., 1974 - *Il Quaternario del Tirreno abissale. Interpretazione stratigrafica e paleoclimatica del pozzo DSDP 132.* Rev. Esp. Micropaleont., 6, 2, pp. 257-326, 10 ff., 2 tab., 20 pls. Madrid.

COLLEN J. D. and VELLA P., 1973 - *Pliocene planktonic Foraminifera, Southern North Island, New Zealand.* Jour. Foram. Res., 3, 1, pp. 13-29, 2 ff., 7 pls., Washington.

OLSSON R. K., 1973 - *What is a kummerform planktonic foraminifer?* Jour. Paleont., 47, 2, pp. 327-329, 2 ff., Tulsa.

RAFFI I. and RIO D., 1979 - *Calcareous nannofossil biostratigraphy of DSDP Site 132, Leg 13 (Tyrrhenian Sea - Western Mediterranean).* Riv. Ital. Paleont. Strat., 84, 2, pp. 383-402, Milano.

SPROVIERI R., RUGGIERI G. and UNTI M., 1980 - *Globorotalia truncatulinoides excelsa n. subsp., foraminifero planctonico guida per il Pleistocene inferiore.* Boll. Soc. Geol. It. (in press).

THUNELL R. C., 1978 - *Distribution of recent Planktonic Foraminifera in surface sediments of the Mediterranean Sea.* Mar. Micropaleont., 3, 2, pp. 147-173, 24 ff., 1 tab., 2 pls., Amsterdam.

THUNELL R. C., 1979a - *Climatic evolution of the Mediterranean Sea during the last 5.0 million years.* Sedim. Geol., 23, 1, pp. 67-79, 7 ff., Amsterdam.

THUNELL R. C., 1979b - *Pliocene-Pleistocene paleotemperature and paleosalinity history of the Mediterranean Sea: results from DSDP Sites 125 and 132.* Mar. Micropaleont., 4, 2, pp. 173-187, 4 ff., Amsterdam.

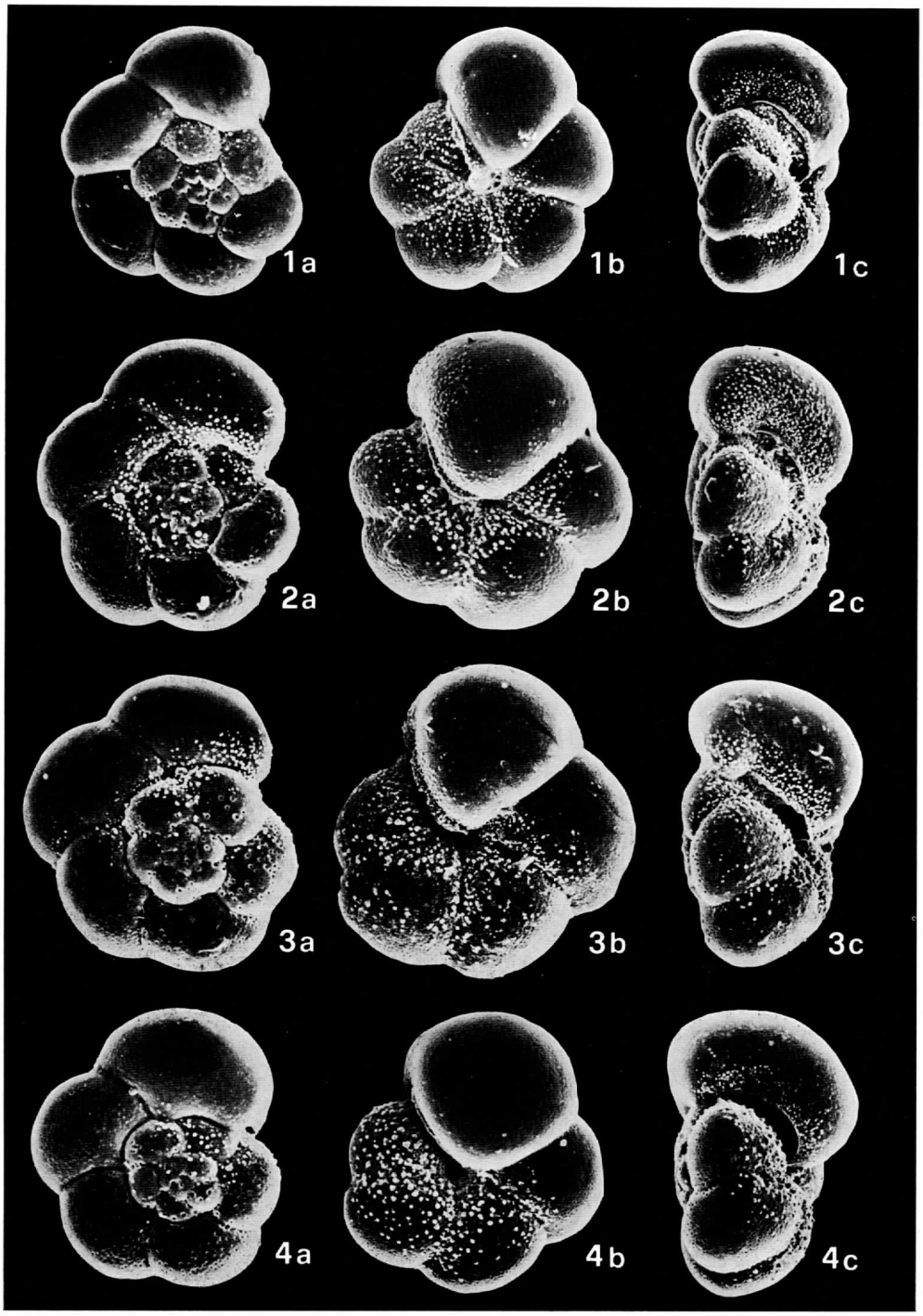
THUNELL R. C., 1979c - *Quantitative biostratigraphy and paleoclimatology of Late Neogene deep sea drilled sequences from the Mediterranean.* Ann. Géol. Pays Héllen., Hors Série, fasc. III, pp. 1215-1223, 3 ff., Atene.

Explanation of Plate XIX

Fig. 1 - *Globorotalia laeta* n. sp. - Holotype
Lower Pleistocene

Figs. 2-4 - *Globorotalia laeta* n. sp. - Paratypes
Lower Pleistocene

All figures × 100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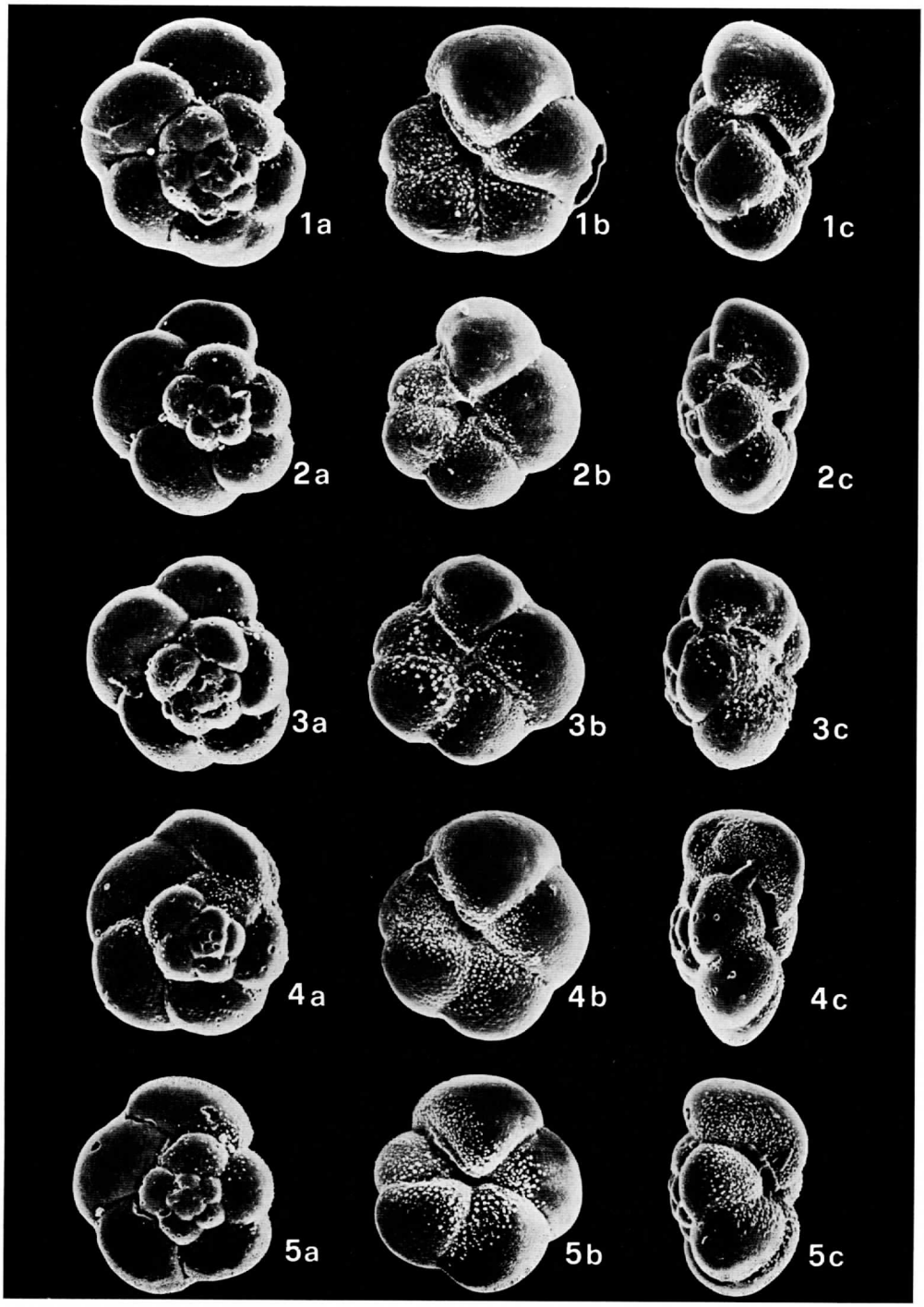
Explanation of Plate XX

Fig. 1 - *Globorotalia tyrrhenica* n. sp. - Holotype
Lower Pleistocene

Figs. 2-5 - *Globorotalia tyrrhenica* n. sp. - Paratypes
Lower Pleistocene

All figures × 100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