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Autor(en): **Biolzi, Milena / Perch-Nielsen, Katharina**

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Helicosphaera truempyi, a new Early Miocene calcareous nannofossil

By MILENA BIOLZI and KATHARINA PERCH-NIELSEN[1])

ABSTRACT

A new calcareous nannofossil, *Helicosphaera truempyi*, is described from the Early Miocene of the equatorial Atlantic Ocean.

ZUSAMMENFASSUNG

Ein neues kalkiges Nannofossil, *Helicosphaera truempyi*, aus dem frühen Miozän des äquatorialen Atlantiks wird beschrieben.

Introduction

During the detailed biostratigraphic study of the Oligocene/Miocene boundary in samples collected on Deep Sea Drilling Project Leg 39 in the South Atlantic a new form of *Helicosphaera* was found. Several species of *Helicosphaera* are known to have short ranges and wide distributions and thus to be useful biostratigraphic markers. The new species has only been found at one site and in two closely spaced samples, but may prove a valuable marker near the Oligocene/Miocene boundary when searched for in the future. The species of *Helicosphaera* were reviewed by HAQ (1973) and the validity fo *Helicosphaera* or *Helicopontosphaera* was discussed by JAFAR & MARTINI (1975). A new review of the now over 30 species is under way (PERCH-NIELSEN, in preparation).

Systematic description

Helicosphaera KAMPTNER 1954

Type species: *Helicosphaera carteri* (WALLICH 1877) KAMPTNER 1954

Helicosphaera truempyi n.sp.

(Plate, Fig. 1-8)

Holotype: Plate, Fig. 2 (negative 6-3962/9, ETH SEM Archive, Hönggerberg, Zürich).

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[1]) Geologisches Institut, ETH-Zentrum, CH-8092 Zürich.

Derivation of the name: To honour Prof. R. Trümpy, Geologic Institute, Zürich, former President of the IUGS.
Type locality: DSDP Site 354, Ceara Rise, equatorial Atlantic Ocean (sample 9-5, 70–72 cm).
Type level: Early Miocene, NN1 or CN1a.
Diagnosis: Large form of *Helicosphaera* with a prominent asymmetrical flange and two large openings separated by a detached central bridge aligned with the short axis.

Description. – The proximal shield consists of radially oriented elements, as does the proximal side of the distal shield into which the proximal shield merges and which forms a prominent asymmetrical flange. The central bridge is separated from the area surrounding the central openings by a suture, making it a separated unit from the proximal shield. The bridge shows the parallel rows of elements separated by a suture in proximal view. In distal view, the bridge consists of elongate elements aligned parallel to the bridge itself. In distal view the proximal shield is covered partly by a layer of more or less tangentially oriented, thin elements forming a kind of distal shield completely attached to the proximal one. The outline is long-elliptical and more or less asymmetrical, depending on the size of the flange, which varies.

Under the light microscope, *H. truempyi* is conspicuous by its large size, wide central opening and the detached bridge parallel to the short axis well visible when viewed at 0° as well as at 45° to the crossed nicols.

Remarks. – There are only few species of *Helicosphaera* with which *H. truempyi* may be confounded, since only few have a detached bridge. Of these, *H. lophota*, *H. intermedia* and *H. euphratis* have an oblique bridge. The Eocene *H. seminulum* and *H. wilcoxonii* have a bridge parallel to the short axis, but the former has an elliptical outline with a less prominent flange and the latter has a very characteristic flange terminating abruptly and an egg-shaped outline. *H. truempyi* is thought to have evolved from *H. intermedia* around the Oligocene/Miocene boundary, by a rotation of the bridge from oblique to axial.

Occurrence. – *H. truempyi* was found only in two samples assigned to the Early Miocene NN1/CN1a of the MARTINI (1971)/OKADA & BUKRY (1980) zonations respectively. Other species found in these samples include *Cyclicargolithus floridanus*, *Discoaster deflandrei* (but not *D. druggii*), *Helicosphaera intermedia*, *H. perch-nielsenae*, *Sphenolithus moriformis* s.l. (but not *S. ciperoensis* or *S. belemnos*) and well developed *Triquetrorhabdulus carinatus* (PERCH-NIELSEN 1977; BIOLZI, in press). *H. truempyi* occurs rare to few in the samples were it was found.

It seems unlikely that this large species has not been observed previously. We therefore think it possible that it was confounded with the Eocene form *H. seminulum* and assumed to be reworked.

Comments

The new species seems to have a very short range at the site from which it is described. It was not found in the samples just above and below 354-9-5, 70 cm and

354-9-5, 75 cm respectively. The accumulation rate for the Late Oligocene/Early Miocene at this site was calculated to be in the order of 1.5 cm/1000 years (PERCH-NIELSEN, SUPKO et al. 1977). This means that the time that this species lived in this area in high enough numbers to be found in the sediments of that time was in the order of at least 3000 to 5000 years, or a time span much below the one represented by the usual sample spacing of one core section (150 cm = 100,000 years in this case with a relatively high accumulation rate). From the above it can be expected that, as the Oligocene/Miocene boundary interval gets studied in more closely spaced samples, *H. truempyi* will be found in other low latitude sections too.

Acknowledgments

We would like to thank the Deep Sea Drilling Project to furnish the samples for the investigation of the Oligocene/Miocene boundary, H. Franz, Zürich, for the technical assistance at the scanning electron microscope and U. Gerber, Zürich, for the photographic work.

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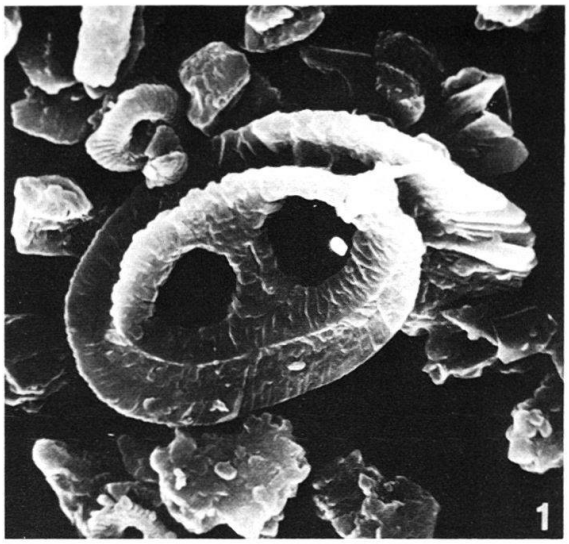
Plate

Fig. 1-8 *Helicosphaera truempyi* n.sp. from the Early Miocene of DSDP Site 354, Ceara Rise, equatorial Atlantic, sample 9-5, 70 cm (Fig. 1-4) and sample 9-5, 75 cm (Fig. 5-8).
Figures 1-4 are scanning eelctron micrographs, Figures 5-8 are light micrographs.
Fig. 2: Holotype. Figures 1 and 2 are proximal views, Figures 3 and 4 are distal views.
In Figures 5 and 6 the long axis of *H. truempyi* is parallel, in Figures 7 and 8 at 45° to the crossed nicols.
Magnification: ×2700 (Fig. 1 and 2), ×4250 (Fig. 3), ×3300 (Fig. 4), ×2000 (Fig. 5-8).

Fig. 9-10 *Helicosphaera intermedia* MARTINI.
Figure 9: proximal view, Figure 10: distal view; scanning electron micrographs, ×3500. Sample 354-9-5, 70 cm.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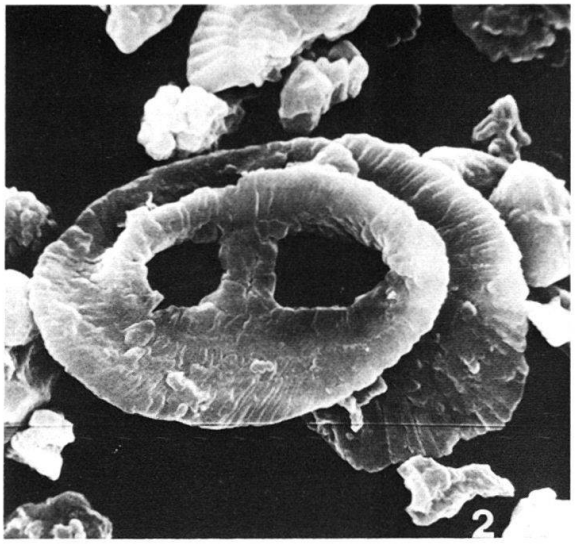
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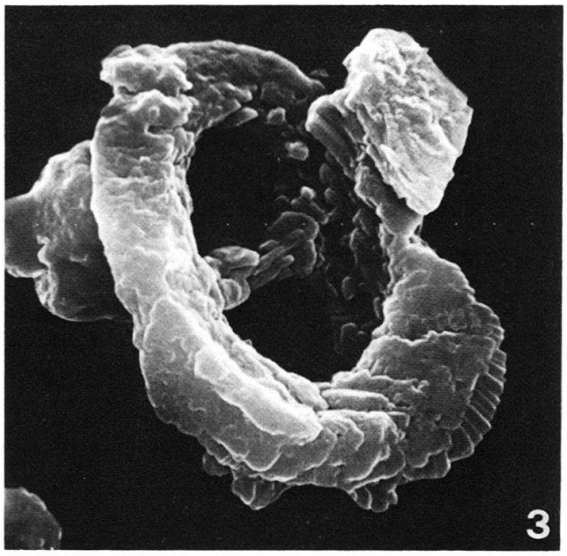
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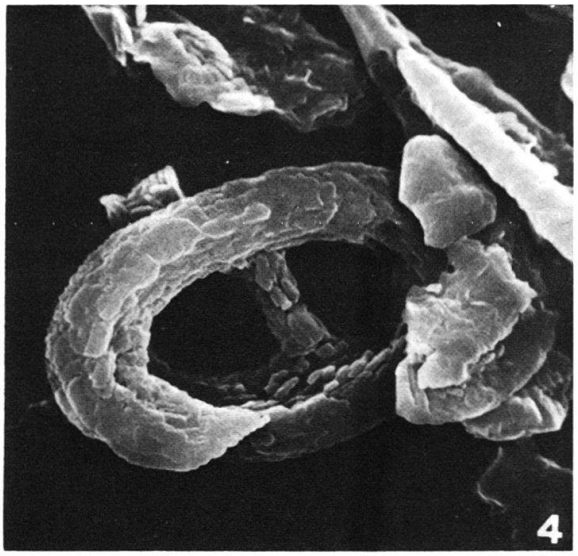
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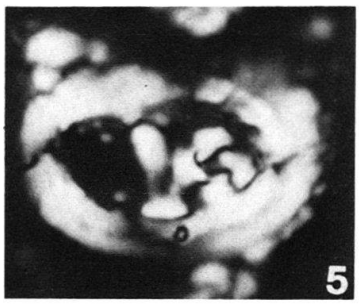
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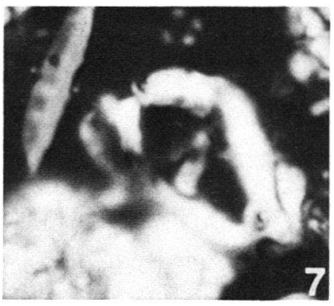
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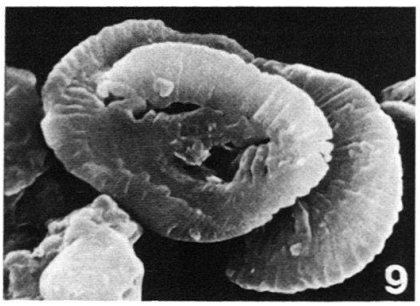
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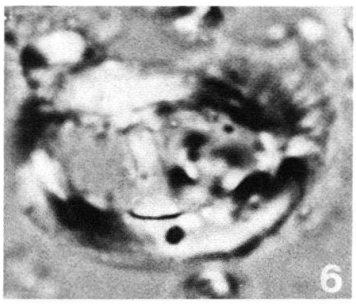
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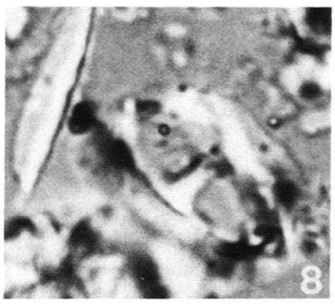
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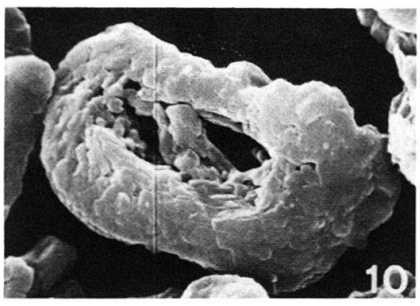
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