

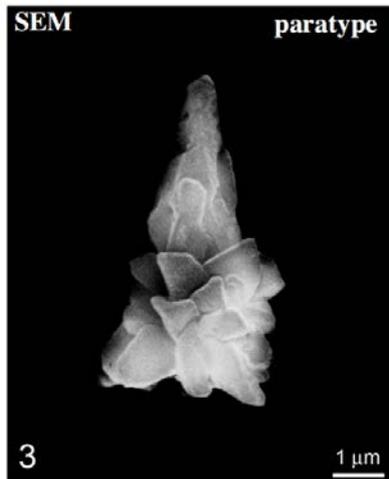
86. *Sphenolithus pseudoheteromorphus* Fornaciari & Agnini (2009)



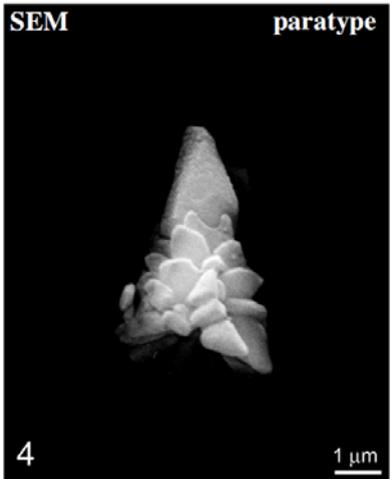
Side view
Sample 115-714A-19X-5, 75cm



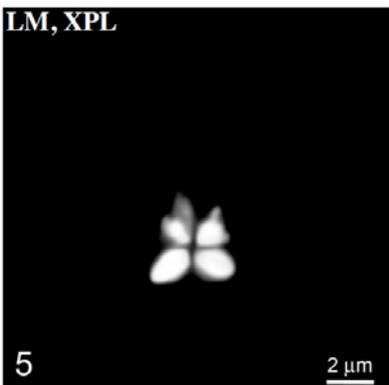
Side view
Sample 115-714A-19X-5, 75cm



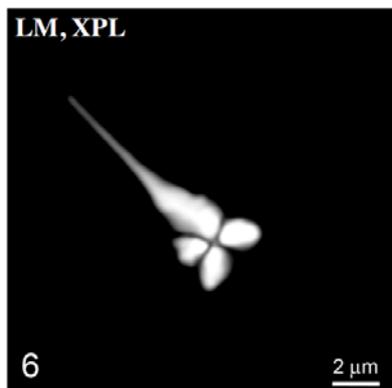
Side view
Sample 115-714A-19X-5, 75cm

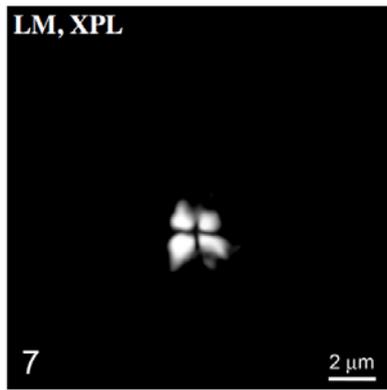


Side view
Sample 115-714A-19X-5, 75cm

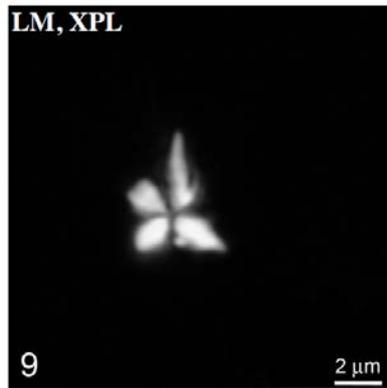
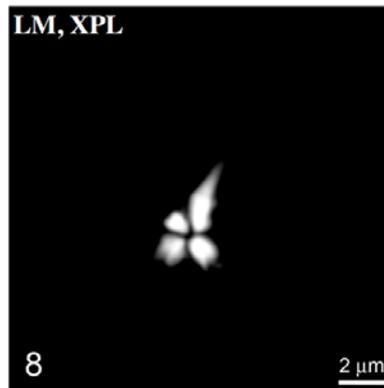


Long axis at 0° (5) & 45° (6)
Sample 115-714A-19X-5, 75cm

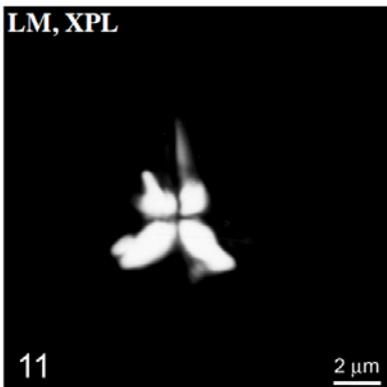
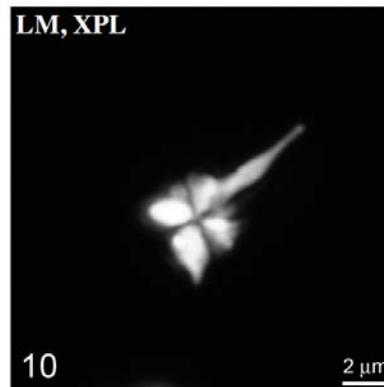




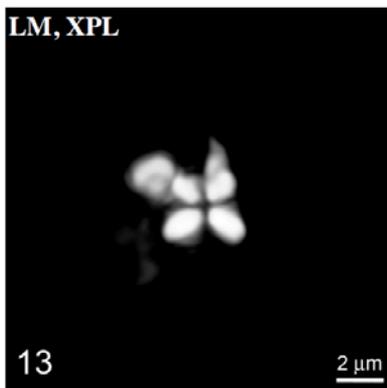
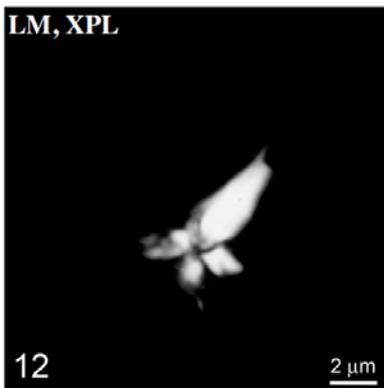
Long axis at 0° (7) & 45° (8)
Sample 115-714A-19X-5, 75cm



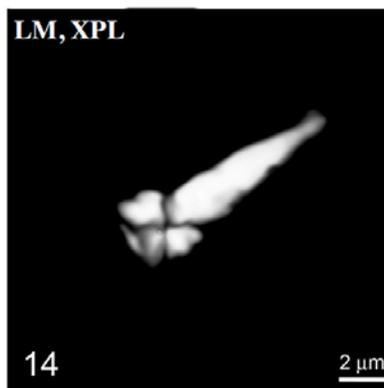
Long axis at 0° (9) & 45° (10)
Sample 115-714A-19X-5, 75cm

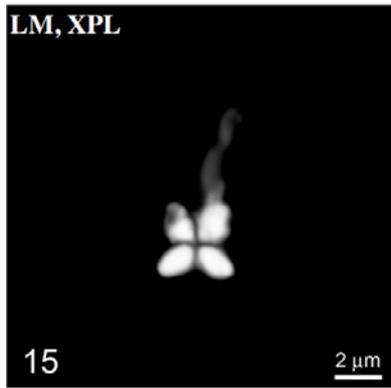


Long axis at 0° (11) & 45° (12)
Sample 115-714A-19X-5, 116cm

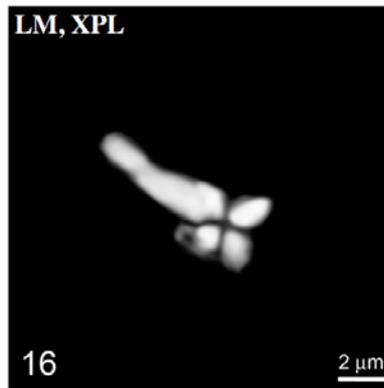


Long axis at 0° (13) & 45° (14)
Sample 130-806B-66X-3, 69cm

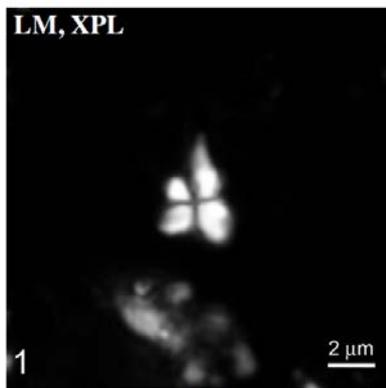




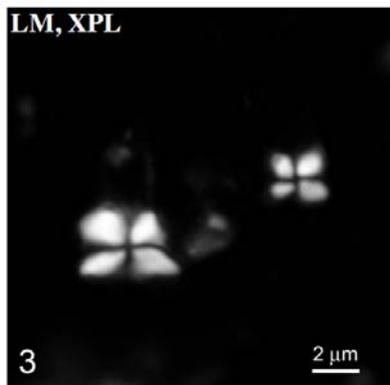
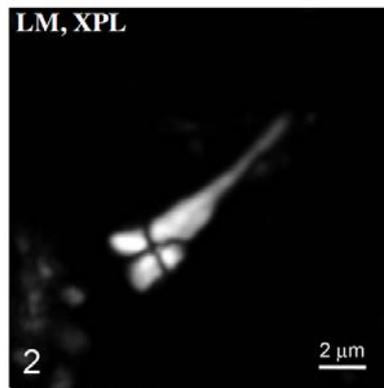
Long axis at 0° (15) & 45° (16)
Sample 130-806B-66X-3, 69cm



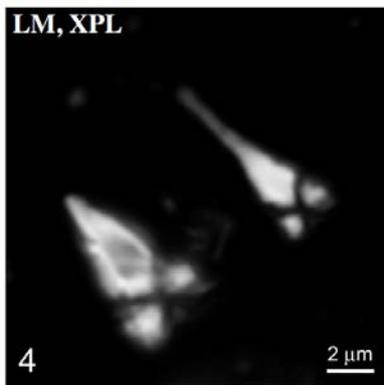
Pl.1, figs 1-16

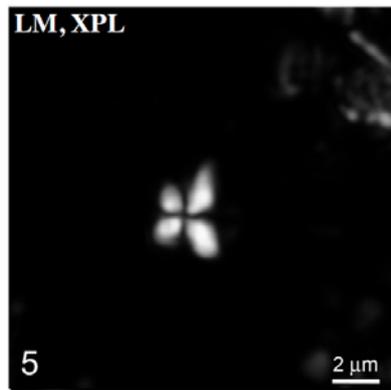


S. pseudoheteromorphus, long axis at 0° (1) & 45° (2)
Sample 154-926B-39X-6, 43cm

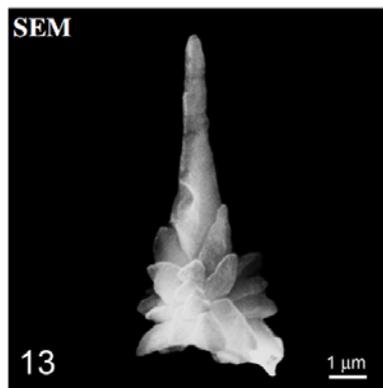
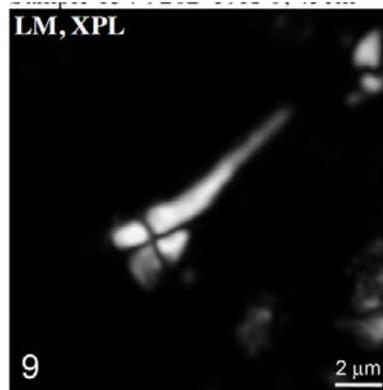


S. heteromorphus, long axis at 0° (3) & 45° (4)
Sample 154-926B-33X-CC





S. pseudoheteromorphus
long axis at 0° (5) & 45° (9)
Sample 154-926B-39X-6, 43cm



S. pseudoheteromorphus side view
Sample 115-714A-19X-5, 75cm

Pl.2, figs 1-5, 9, 13

1990 *Sphenolithus pseudoheteromorphus* Fornaciari *et al.*: pl. 3, figs 4a, b.

Derivatio nominis: From the Greek '*pseudos*', meaning 'false' *S. heteromorphus*.

Diagnosis: Medium-sized, conical or pyramidal sphenolith with a prominent apical spine.

The base of the sphenolith is constructed of about 10 wedge-shaped elements, oriented obliquely to the length of the axis, which support three cycles of laterally-projecting elements. These are wedge-shaped and encase an apical spine up to 2/3 the length of the entire nannolith.

Description: Under cross-polarised light (XPL), *S. pseudoheteromorphus* presents a long, weakly birefringent element in the third cycle when the long axis is at 0° (*e.g.* Pl. 1, figs 5, 9, 11, 13). With the long axis at 45° (*e.g.* Pl. 1, figs 6, 10, 12, 14), it shows a long, moderately-birefringent spine that is slightly asymmetrical (*i.e.* not parallel to the long axis), because of the presence of this well-developed element in the upper lateral cycle, overlapping onto the apical spine.

Differentiation: In the LM, this species is very similar to *S. heteromorphus*, from which is distinguished by the presence of the long, bright element in the upper lateral cycle at 0°.

In addition, figured specimens of *S. heteromorphus* (e.g. Aubry, 1989; this study: Pl. 2, fig. 16) have two cycles of lateral elements, while *S. pseudoheteromorphus* has three cycles.

Holotype: Pl. 1, fig. 1 (SEM).

Dimensions: height (H) - 4.5-12 μ m. Holotype: H - 10 μ m, base width (W) - 4 μ m, base height - 3.5 μ m.

Paratypes: Pl. 1, figs 2-4, Pl. 2, fig.13 (SEM); Pl. 1, figs 5-10 (LM). Sample ODP 115-714A-19X-5, 75cm.

Type locality: ODP Leg 115, Site714, Mascarene Plateau, western equatorial Indian Ocean.

Type level: Sample ODP 115-714A-19X-5, 75cm.

Geographical occurrence: Western equatorial Indian Ocean (ODP Leg 115, Holes 709C and 714A: Rio *et al.*, 1990; Fornaciari *et al.*, 1990), western equatorial Pacific Ocean (ODP Leg 130, Holes 806B and 807A: Fornaciari *et al.*, 1993) and western equatorial Atlantic Ocean (ODP Leg154, Hole 926B: Fornaciari, 1996).

Stratigraphical occurrence: Upper part of CN1c or NN2 (of, respectively, Okada & Bukry, 1980, Martini, 1971). Very rare specimens have been observed stratigraphically higher, in CN2, in Holes 709C, 714A and 806B, whereas it is missing from the equivalent stratigraphic interval in Holes 807A and 926B. This inconsistency in the last occurrence may be explained by the reworking commonly recorded in the Mascarene Plateau material during this interval; reworking may also affect Hole 806B sediments. The stratigraphic distributions available for *S. pseudoheteromorphus* suggest that the stratigraphic range of this species is actually restricted to a very short interval in the uppermost part of CN1c, thus indicating that it has a distinct stratigraphic distribution (Figure 1).

Biochronology: Age-depth plots from Holes 714A, 806B, 807A and 926B, based on the Astronomical Tuned Neogene Time Scale (ATNTS: Lourens *et al.*, 2004), and age estimates derived from magnetostratigraphic data, available for Hole 709C (Schneider & Kent, 1990), provide multiple calibrations for the first occurrence of *S. pseudoheteromorphus*. This biohorizon lies in Chron C6n in all the considered sites, suggesting that the evolutionary first appearance and stratigraphical range of this taxon could be used for interregional correlations.

Repository: Holotype and paratypes deposited in the permanent collection of the Museo di Geologia e Paleontologia dell'Università di Padova (MGPD), Padova, Italy (protocol# MGPD30096).

Fornaciari, E. & Agnini, C., 2009. Taxonomic note: *Sphenolithus pseudoheteromorphus*, a new Miocene calcareous nannofossil species from the equatorial Indian Ocean. *Journal of Nannoplankton Research*, **30(2)**: 97-101.