

Two new heterococcoliths from the Albian–Cenomanian, Austral Basin, Patagonia, Argentina

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Abstract Two new heterococcoliths, *Zeughrabdotos angelozziae* sp. nov. and *Cribrosphaerella santacruzensis* sp. nov. are described and illustrated. The species were recovered from drill samples from two boreholes in Albian to Cenomanian sediments from the high southern latitude Austral Basin, Argentina.

Keywords Calcareous nannofossils, *Zeughrabdotos angelozziae*, *Cribrosphaerella santacruzensis*, Cretaceous, Austral Basin, Argentina.

1. Introduction

Calcareous nannofossil biostratigraphic investigations of Cretaceous sediments within the high southern latitude Austral Basin, Argentina (Pérez Panera, in press) have revealed at least two new heterococcoliths. These are described herein as *Zeughrabdotos angelozziae* and *Cribrosphaerella santacruzensis*. Although both species are represented in low numbers within the calcareous nannofossil assemblages, they may have some local biostratigraphic significance. High-latitude calcareous nannofossil associations such as those in this study are typically of lower diversity compared to those of low-latitudes, so the identification of new, local biostratigraphic events, may have potential for developing a local biozonation. This may impact stratigraphic understanding as it pertains to oil exploration in the area. These new species were recorded in Albian to Cenomanian drill samples provided by Petrobras-Energía S.A. from Sur Río Chico and Cañadón Salto boreholes. The exact names of the boreholes and their geographic coordinates are held in confidence by the petroleum company; however, Figure 1 illustrates their general locations within the Austral Basin.

2. Materials and Methods

Drill samples were prepared according to the gravity settling technique of Bramlette & Sullivan (1961). A petrographic microscope with polarized light at a magnification of 1200X was used for analysis. All slides were deposited in the Facultad de Ciencias Exactas y Naturales of the Universidad Nacional de Buenos Aires collection (BAFC-NP). The taxonomic scheme adopted in this study is based on the

systematic revision and taxonomic criteria proposed by Jordan & Kleijne (1994), Young & Bown (1997a; 1997b) and Bown & Young (1997).

3. Systematic Palaeontology

Order Eiffellithales Rood, Hay & Barnard, 1971

Family Chiastozygaceae Rood, Hay & Barnard, 1971

emend. Varol & Girgis, 1994

Genus *Zeughrabdotos* Reinhardt, 1965 emend.

Black, 1973



Figure 1. Location map of Sur Río Chico and Cañadón Salto boreholes in the Austral Basin, Argentina (map modified after Nullo *et al.*, 1999).

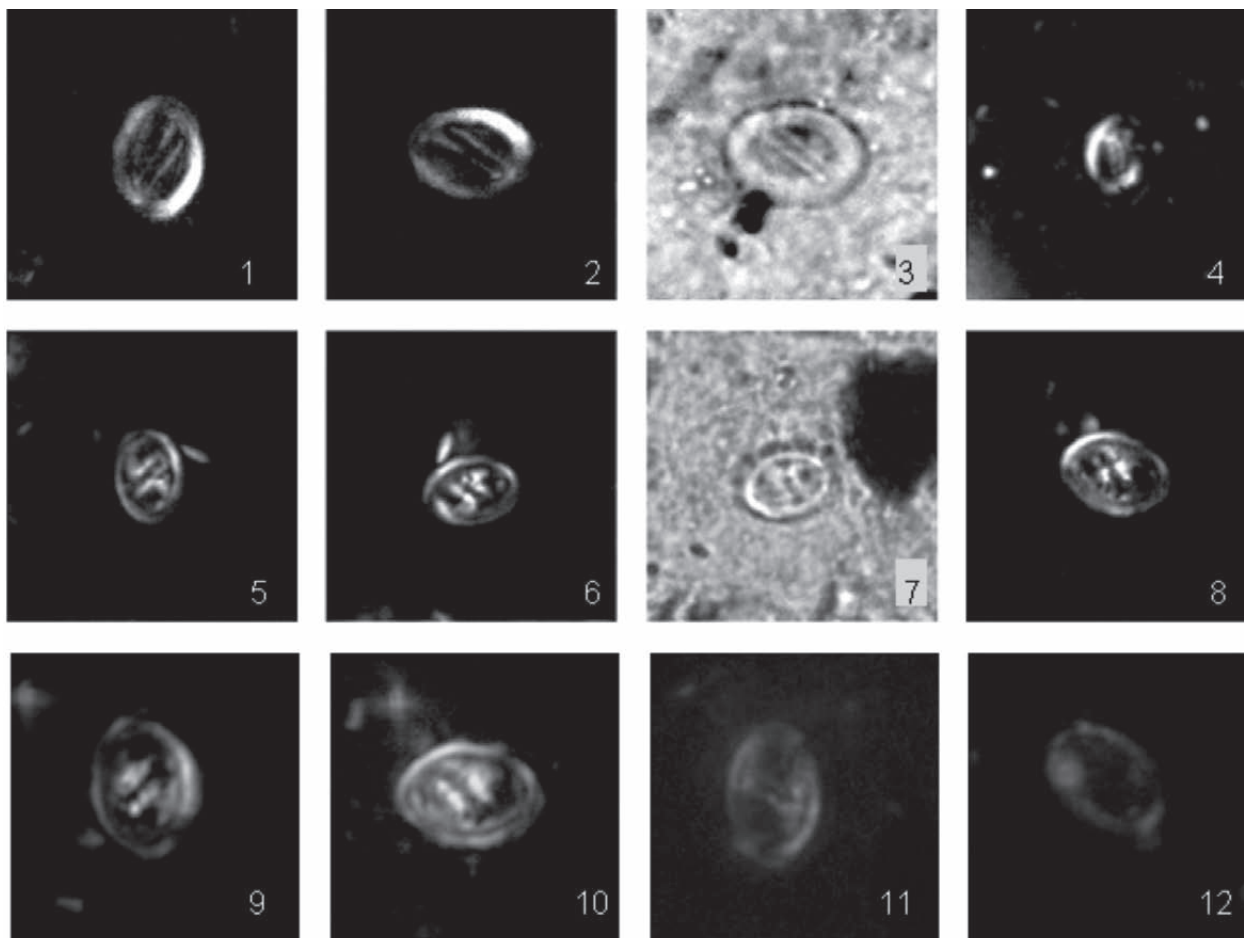


Plate 1. *Zeugrhabdotus angelozziae* sp. nov. 1-3. Holotype. Length: 10 μm . BAFC-NP 3690. 4. Paratype. Length: 7.2 μm . BAFC-NP 3523. 5-7. Paratype. Length: 8 μm . BAFC-NP 3690. 8. Paratype. Length: 8 μm . BAFC-NP 3690. 9-10. Paratype. Length: 10 μm . BAFC-NP 3690. 11-12. Paratype. Length: 10 μm . BAFC-NP 3690.

Type species *Zeugrhabdotus erectus*
Deflandre in Deflandre & Fert, 1954
Zeugrhabdotus angelozziae sp. nov.

Pl. 1, figs 1–12

Derivatio nominis: After biostratigrapher Gladys N. Angelozzi because of her pioneering labour in the study of calcareous nannofossils from Argentina.

Diagnosis: A medium to large species of *Zeugrhabdotus* that presents its central-area spanned by two parallel bars disposed obliquely to the main axes of the ellipse.

Description: A medium to large, elliptical loxolith with bicyclic, external rim, with good development of both cycles. The central-area is spanned by two parallel, narrow bars disposed diagonally, at an angle that varies between 45° and 55° with respect to the minor axis of the ellipse. Under crossed nicols the external rim and the bars are birefringent, but the bars go into extinction at 45 degrees.

Dimensions: Length: 7–10 μm ; width: 5–7 μm .

Stratigraphic range: Albian–Cenomanian (Zones CC8–CC10 of Sissingh, 1977).

Remarks: The elliptical outline, wide central-area and the loxolithid-rim suggest the inclusion of this species in the genus *Zeugrhabdotus*. The most conspicuous feature that differentiates this species from others of the same ge-

nus is the diagonal central-area bars. One specimen shows extra sigmoidal struts supporting the bars under crossed nicols (Plate 1, figs. 5–7), but it could be due to overgrowth. It has been recorded throughout Albian–Cenomanian assemblages with an abundance of 1 specimen in 11 to 100 fields of view at 1200X magnification.

Provenance: Sur Río Chico, Cañadón Salto.

Holotype: BAFC-NP 3690 (Pl. 1, figs 1–3).

Paratypes: BAFC-NP 3523 (Pl. 1, fig 4); BAFC-NP 3690 (Pl. 1, figs 5–7); BAFC-NP 3690 (Pl. 1, fig 8); BAFC-NP 3690 (Pl. 1, figs 9–10); BAFC-NP 3690 (Pl. 1, figs 11–12).

Type locality: Sur Río Chico 1300–1305 mbbp.

Order Podorhabdales Rood, Hay & Barnard, 1971
emend. Bown, 1987

Family Axopodorhabdaceae Bown & Young, 1997
Genus *Cribrosphaerella* Deflandre in Piveteau, 1952
emend Reinhardt, 1964

Type species *Cribrosphaerella ehrenbergii* (Arkhangelsky, 1912) Deflandre, in Piveteau, 1952

Cribrosphaerella santacruzensis sp. nov.

Pl. 2, figs 1–24

Derivatio nominis: After the Argentinean province of

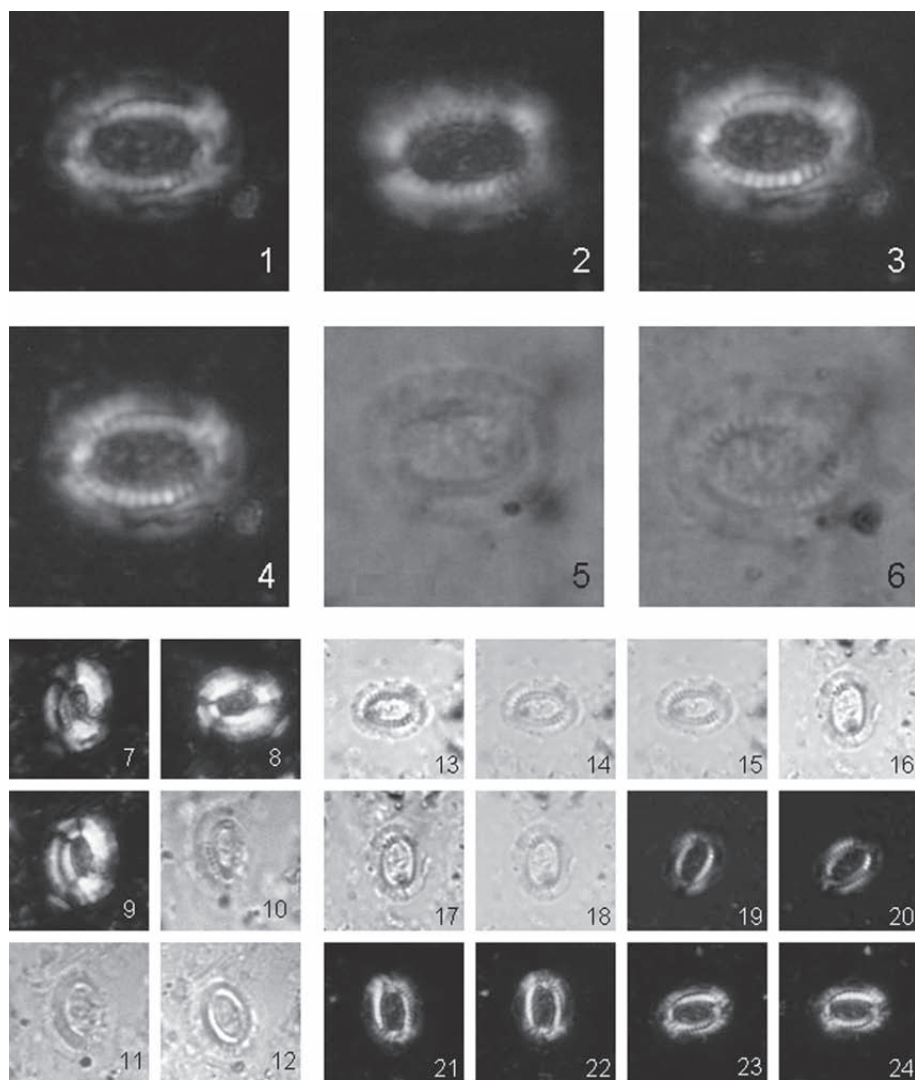


Plate 2. *Cribrosphaerella santacruzensis* sp. nov. 1-6. Holotype. Distal view. Length: 14 μm , width: 9.5 μm . BAFC-NP 3491. 7-12. Proximal view. Paratype. Length: 12 μm . BAFC-NP 3486. 13-24. Paratype. Distal view. Length: 12 μm BAFC-NP 3491.

Santa Cruz, where the species has been found.

Diagnosis: A large, elliptical to oblong placolith. Wide central-area spanned by a granular multi-perforated plate. The distal shield is wide and broad, expanded outwards. The distal inner tube cycle is markedly high and develops a crown.

Description: Large and bulky species of *Cribrosphaerella*, with an elliptical to oblong outline. The axial ratio varies from 1.3 to 1.45. Wide central-area is spanned by a granular multi-perforated plate that shows poor and heterogeneous birefringence under crossed nicols. The distal inner tube cycle is high and constructed by numerous radial elements producing a crown that shows high birefringence under crossed nicols. The outer cycle of the distal shield is constructed by numerous radial elements expanded outwards and with a lineal correspondence between these elements and those of the inner tube. The outer cycle shows good to poor birefringence, almost continuous within the outline. The proximal shield is approximately half as wide as the distal shield and shows good birefringence.

Dimensions: Length: 8–14 μm ; width: 6–9.5 μm .

Stratigraphic range: Albian–Cenomanian (Zones CC8–CC10 of Sissingh, 1977).

Remarks: Under crossed nicols, size and general aspect of *Cribrosphaerella santacruzensis* are similar to that of *Gaarderella granulifera*. It differs from the latter because *C. santacruzensis* has the central-area granulate-plate perforated, the inner tube cycle of the distal shield develops a high crown, and it presents a more elliptical axial ratio (1.25 to 1.45 in *C. santacruzensis* against the 1.15 to 1.34 of *G. granulifera*, measured over type material SEM photographs of Black, 1973). Because of the perforated central-area granulate-plate, the upper inner tube cycle that forms the crown and the radial disposition of its elements; this species is included within the genus *Cribrosphaerella*. This species differs from *Cribrosphaerella ehrenbergii* by the broader development of the outer cycle of the distal shield, its larger size, the almost oblong outline, and the more elliptical axial ratio. It has been recorded throughout

Albian to Cenomanian assemblages with an abundance of 1 specimen in 11 to 100 fields of view at 1200X magnification.

Provenance: Sur Río Chico, Cañadón Salto.

Holotype: BAFC-NP 3491 (Pl. 2, figs 1–6).

Paratypes: BAFC-NP 3486 (Pl. 2, figs 7–12); BAFC-NP 3491 (Pl. 2, figs 13–24); BAFC-NP 3493; BAFC-NP 3495; BAFC-NP 3517; BAFC-NP 3690.

Type locality: Cañadón Salto 1200–1209 mbbp.

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