



## Triassic nannofossils from borehole R-1 Golitsa, East Balkan, Bulgaria

### Триаски нанофосили от сондаж Р-1 Голица, Източен Балкан, България

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Triassic calcareous nannofossils are rarely encountered due to their poor preservation and low diversity. Well preserved Late Triassic nannofossils have been described in limestone-marl alternations from alpine sections in Northern and Southern Alps, and from boreholes in NW Australian continental shelf. First biostratigraphic consideration of Late Triassic nannofossils belongs to Prins (1969), who described *Crucirhabdulus primulus* from nonspecified locality and defined a taxon range zone *Crucirhabdulus* (Rethian–Chetangian). Unfortunately his new taxa remained invalid because their description did not meet the requirements of the code of ISBN. Thus the new species *Crucirhabdulus primulus* was introduced by Rood et al. (1973) based on TEM microphotographs. Jafar (1983) confirmed the presence of this species in Upper Triassic carbonate rocks in NE Alps on the territory of Germany and Austria. He described new genera and new species calcareous nannofossils – *Euconosphaera tollmannia* and *Prinsiosphaera triassica* with several subspecies based on SEM investigation. Bralower et al. (1991, 1992) believed that difference between these subspecies is a result of etching and overgrowth of the outer wall and this gives rise to the diversity of forms described by Jafar (1983). They referred the hollow forms of *Prinsiosphaera geometrica* Jafar to the genus *Thoracosphaera* Kamptner (*T. geometrica*). The authors defined a taxon range zone *Prinsiosphaera triassica* (Carnian–Rhaetian) with two subzones based on the first appearance of *Euconosphaera zlabachensis* (Moshkovitz) in the Upper Norian: *Thoracosphaera geometrica* (Lower Carnian–Upper Norian) and *Euconosphaera zlabachensis* (Upper Norian–Rhaetian).

In the present study calcareous nannofossils from borehole R-1 Golitsa in East Balkan are described, recovered from the interval between 3488 and 3740 m composed of motley clayey and micritic limestones with marl intercalations, assigned to the Omurtag/Tvarditsa Formations (Carnian–Norian). They contain poor nannofossil assemblages with characteristic Late Triassic forms.

The nannofossil association in the investigated interval is of low diversity. It consists of several forms belonging to the genera *Prinsiosphaera* Jafar and *Obliquipithonella* Keupp. Similar to the previously described Upper Triassic nannofossil associations, *Prinsiosphaera triassica* Jafar is the dominating form in the investigated samples. Very rare are the representatives of the hemispherical calcareous dinocists, originally described by Bralower et al. (1991) as *Thoracosphaera wombatensis*. In the present study these forms are referred to the Triassic members of the genus *Obliquipithonella* Keupp. The other forms are considered to be new species, accompanied by brief diagnosis.

### Sistematic paleontology

Genus *Prinsiosphaera* Jafar, 1983

*Prinsiosphaera triassica* Jafar, 1983 (Pl. I, a, b)

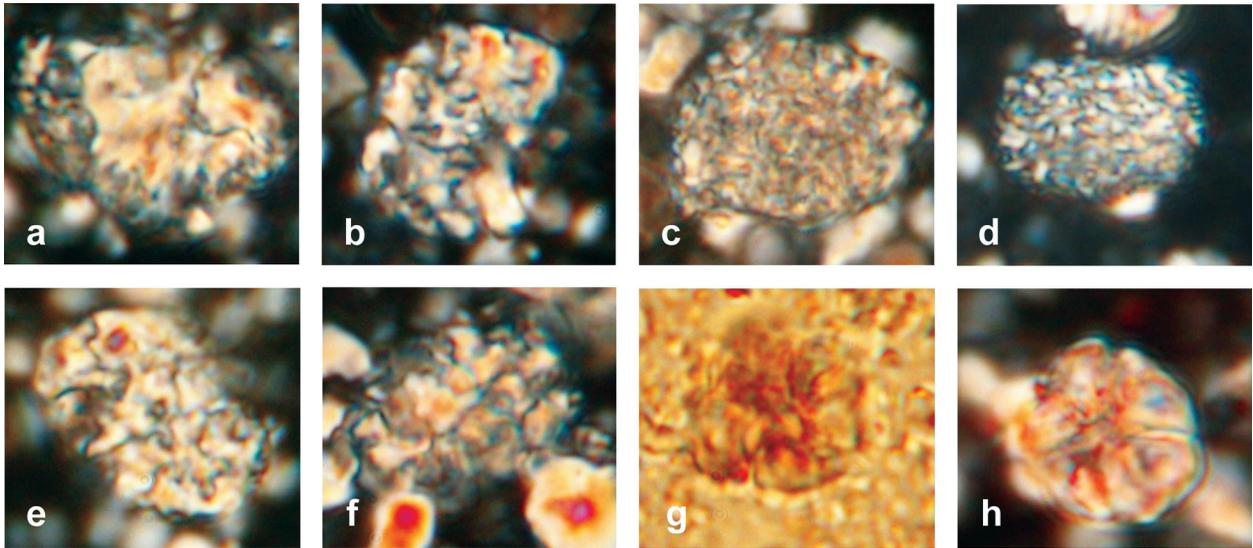
Remarks: These nannofossils indicate a large diversity of forms. According to Bralower et al. (1991, 1992) the species includes only specimens of solid structure while the hollow forms belong to the genus *Thoracosphaera* Kamptner. In the present study several broken specimens were observed with entirely destroyed outer cycle. This is the dominating form in the poorly preserved associations observed in the investigated stratigraphic interval.

Genus *Obliquipithonella* Keupp, 1984

*Obliquipithonella wombatensis* (Bralower et al., 1991) new comb. (Pl. I, c)

Remarks: According to Bralower et al. (1991) this species has a very different shape and texture from *Thoracosphaera geometrica* (Jafar, 1983) Bralower et al., 1991. It consists of bowl- or hat-shaped hemispherical specimens with coarser texture than typical *Thoracosphaera*, between 5 and 13  $\mu\text{m}$  in diameter, open at the wide end. Bralower et al. (1991, 1992) noted that they may be valves of a bivalved structure as is the case in *Schizosphaerella* (Moshkovitz, Erlich, 1976).

Age: Late Triassic.



**PLATE I (x 1250)**

a, b, *Prinsiosphaera triassica* Jafar, 1983, Late Triassic, Omurtag/Tvarditsa Fms, X-nicols; depth: a – 3645 m, b – 3495 m.  
 c, *Obliquipithonella wombatensis* (Brallower et al., 1991) new comb., Late Triassic, Omurtag/Tvarditsa Fms, X-nicols, depth 3580 m.  
 d, *Obliquipithonella balcanica* new species, Late Triassic, Omurtag/Tvarditsa Fms, Holotype EBG-1-3520-1, X-nicols, depth 3520 m.  
 e, f, *Obliquipithonella oviformis* new species, Late Triassic, Omurtag/Tvarditsa Fms: e – holotype EBG-1-3495-2, X-nicols, depth 3495 m; f – paratype EBG-1-3655-1, X-nicols, depth 3655 m.  
 g, h, *Polycostella triassica* new species, Late Triassic, Omurtag/Tvarditsa Fms, Holotype EBG-1-3495-3, plan view; g, normal light; h, X-nicols, depth 3495 m.

*Obliquipithonella balcanica* new species (Pl. I, d)

Derivation of name: from Balkan Mountain.

Holotype: EBG-1-3520-1, depth 3520 m.

Diagnosis: Relatively small hollow calcispheres with a shell in the shape of a flattened from the poles (oblate) spheroid with a broadly elliptical side view. This is a thin-walled species with a gentle shell composed of a mosaic of small irregular interlocking elements, with oblique calcite crystals “at various angles and directions” typical for the genus *Obliquipithonella*. The eccentricity of the shell is 0.67.

Size: long diameter – 9 µm, short diameter – 6 µm.

Age: Late Triassic.

*Obliquipithonella oviformis* new species (Pl. I, e, f)

Derivation of name: from its ovoid form.

Holotype: EBG-1-3495-3, depth 3495 m.

Diagnosis: Oviform representative of the genus *Obliquipithonella* with a prolate form and a thick wall of coarse irregular interlocking calcite elements. The holotype demonstrates repetition of complex configuration of calcite elements along the long axis of the spheroidal body. The eccentricity of the specimens observed is 0.62–0.63.

Size: long axis 9–12 µm, short axis 6–7 µm.

Age: Late Triassic.

Genus *Polycostella* Thierstein, 1971

*Polycostella triassica* new species (Pl. I, g, h)

Derivation of name: from Triassic.

Holotype: EBG-1-3495-3, depth 3495 m.

Diagnosis: Circular shaped nannolith with heliolithic structure composed of six rough, irregular elements, radially arranged around the center. The plan view of the figured specimen shows the structure typical for the representatives of the genus *Polycostella* Thierstein.

Size: 9 µm in diameter.

Age: Late Triassic.

**References**

- Brallower, T. J., P. R. Bown, W. Sieser. 1991. Significance of Upper Triassic nannofossils from the Southern Hemisphere (ODP Leg 122, Wombat Plateau, NW Australia). – *Marine Micropaleontol.*, 17, 119–154.
- Brallower, T. J., P. R. Bown, W. Sieser. 1992. Upper Triassic calcareous nannoplankton biostratigraphy, Wombat Plateau, Northwest Australia. – In: *Proceedings of the Ocean Drilling Program, Scientific Results*, 122, 437–451.
- Jafar, A. S. 1983. Significance of Late Triassic calcareous nannoplankton from Austria and South Germany. – *N. Jahrb. Geol. Paläontol. Abh.*, 166, 2, 218–259.
- Prins, J. 1969. Evolution and stratigraphy of coccolithinids from the Lower and Middle Lias. – In: *Proceedings of the First Intern. Conf. on Planktonic Microfossils*. Geneva, 1968, 2, 547–558.
- Rood, A. P., W. W. Hay, T. Barnard. 1973. Electron microscope studies of Lower and Middle Jurassic coccoliths. – *Eclogae Geol. Helv.*, 66, 365–382.