

# On the findings of a new calcareous nannofossil (*Conusphaera zlambachensis*) and other calcareous organisms in the upper Triassic sediments of Austria

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On the findings of a new calcareous nannofossil  
(*Conusphaera zlambachensis*) and other calcareous organisms  
in the upper Triassic sediments of Austria

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ABSTRACT

A new species of *Conusphaera* TREJO, i.e. *Conusphaera zlambachensis*, from the upper Triassic sediments of Upper Austria is described. Representatives of this form are rather common in the Zlambach-Mergel layers of the Rhaetian. The species is accompanied by *Thoracosphaera* spp., presumed to have affinities to the calcareous dinoflagellates. Other small calcareous bodies not yet determined, are also present.

RÉSUMÉ

Une nouvelle espèce de *Conusphaera* TREJO, *Conusphaera zlambachensis* provenant du Trias Supérieur d'Autriche est décrite. Des formes de cette espèce sont fréquentes dans les couches Rhétiennes des marnes de Zlambach. Cette nouvelle espèce est accompagnée de *Thoracosphaera* spp. genre qui semble avoir des affinités avec les dinoflagellés calcaires. D'autres corpuscules calcaires sont également présents, mais pour l'instant n'ont pas encore été déterminés.

Introduction

Data concerning pre-Jurassic occurrences of calcareous nannofossils is scarce (GÜMBEL 1870; NOEL 1961; DEFLANDRE 1970; PIRINI RADRIZINI 1971; GARTNER & GENTILE 1972) and rather confusing (GARTNER 1977). Lately, however, new evidence on the presence of calcareous nannofossils in the Triassic period were published. DI NOCERA & SCANDONE (1977) noted and figured calcareous nannofossils from several middle and upper Triassic limestone outcrops in Central Mediterranean regions, which they attribute dubiously to the family Podorhabdaceae, as well as others which they relate to the genera *Zycolithus*, *Nannoconus* and *Schizosphaerella*. In another work, WIEDMANN et al. (1979) describe the presence of Calcisphaeridae(?) in the upper Triassic beds of Austria and note (WIEDMANN et al. 1979, p. 143) that according to JAFAR et al. (in press), the Kössener layers and the Zlambach-Mergel of the late Triassic, contain true coccoliths and other calcareous nannofossils related among others, to the genera *Crucirhabdus*, *Vekshinella* and *Paleopontosphaera*.

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In the present preliminary study, new information regarding the distribution of the calcareous nannofossils in several late Triassic outcrops of Upper Austria is presented.

### Provenance of studied material

a) Fischerwiese, north of Luppitsch. – An isolated sample (GSI N.2073), composed of gray marl, recovered from a section of the Zlambach-Mergel layers. The section is made up of marls, clays and thin intercalations of biogenic calcareous limestone. According to the literature, the section contains a rich faunal assemblage, among which, corals, bivalves, brachiopods, foraminiferids and ostracods are found. Among the ammonites, the presence of *Choristoceras marshi* HAUER indicates a late Triassic, Rhaetian age.

b) Kendelbachgraben, south of Wolfgangsee. – An isolated sample (GSI N.2072), composed of gray marl, recovered from the upper Norian-Rhaetian Kössener layers, containing the ammonite *Choristoceras marshi*.

Both samples (GSI N.2072-3) were collected by Dr. F. Hirsch of the Geological Survey of Israel, Jerusalem, during a field excursion in connection with the “Internationales Symposium über die Stratigraphie der Alpin-Mediterranen Trias” that took place in Vienna in May 1973, organized by Prof. H. Zapfe of the Paleontological Institute, University of Vienna.

c) Rossmoosgraben, east of Bad Goisern. – 31 samples (GSI N.5412-42), composed of light gray and dark marls of the Zlambach-Mergel of late Triassic age. The samples constitute part of a geological section prepared and described by HOHENEGGER & PILLER (1977) and cover the interval between their samples RM 2-148 (their Fig. 2). According to Hohenegger (personal communication, April 1981), the marly layers immediately above sample RM 133, contain the ammonite *Choristoceras marshi*.

### Systematic descriptions

Genus *Conusphaera* TREJO, 1969

*Type species: Conusphaera mexicana* TREJO, 1969

*Conusphaera zlambachensis* n. sp.

Pl. 1, Fig. 1-10

*Derivation of name.* – Species name is given after the Zlambach-Mergel, where the first specimens of the new species were found.

*Holotype.* – Plate 1, Figures 1-3 (negatives SEM F.398/32-4).

*Paratype.* – Plate 1, Figure 5 (negative SEM F.408/14).

*Type level.* – *Choristoceras marshi* zone, late Triassic, Rhaetian.

*Type locality.* – Fischerwiese, north of Luppitsch, Upper Austria.

*Depository.* – In the collection of the Paleontological Department, Geological Survey of Israel, Jerusalem (sample GSI N.2073).

*Description.* – Elongated cone, truncated at both ends, composed of some 35–40 calcitic lamellae, closely packed and radiating from the center of the cone. When viewed from the narrower base, the lamellae are seen to be inclined and arranged in a sinistrally turning spindle (Pl. 1, Fig. 3, 4, 6). The outer surface of the cone is covered by elongated, smooth plates, each one separated from the other. In LM, the form is too small to reveal the fine details of the lamellae and only the general conical shape and the cover plates, which in many specimens have fallen out (Pl. 1, Fig. 4, 5) could be discerned (Pl. 1, Fig. 7, 8).

*Dimensions of the holotype.* – Length: 8  $\mu\text{m}$ ; larger diameter: 5  $\mu\text{m}$ ; smaller diameter: 3.5  $\mu\text{m}$ .

*Remarks.* – *Conusphaera zlambachensis* n.sp. resembles *Conusphaera mexicana* TREJO (of latest Jurassic–early Cretaceous age) from which it differs by the lack of a central canal and by the opposite trend of the lamellar inclination (compare THIERSTEIN 1971, p. 482–3, Pl. III, Fig. 1, 2, *Cretaturbella rothii* THIERSTEIN, synonym of *C. mexicana* TREJO).

*Distribution.* – Widespread in the examined samples of the Zlambach-Mergel of the Fischerwiese and Rossmoosgraben samples; less frequent in the Kendelbachgraben sample.

*Age.* – Late Triassic, Rhaetian.

#### Genus *Thoracosphaera* KAMPTNER, 1927

*Type species: Thoracosphaera heimi* (LOHMANN) KAMPTNER, 1927

##### *Thoracosphaera* sp. 1

Pl. 2, Fig. 1

*Description.* – Spherical test with a diameter of 7.5  $\mu\text{m}$ . The surface which is blurred, seems to have lost its original ultrastructure. The small circular archaeopyle is about 1.5  $\mu\text{m}$  in diameter.

*Distribution.* – In the upper part of the Zlambach-Mergel section, Rossmoosgraben outcrop (sample GSI N.5438–RM 140).

*Age.* – Late Triassic, Rhaetian.

##### *Thoracosphaera* sp. 2

Pl. 2, Fig. 2

*Description.* – Spherical test with a diameter of about 8  $\mu\text{m}$ ; a circular depressed area (upper right hand side) with a diameter of about 4  $\mu\text{m}$ , might represent a possible presence of an archaeopyle. The outer surface is composed of numerous crystallites, each in a form of three-sided pointed pyramid, reminiscent of that found in *T. tuberosa* KAMPTNER as figured by FÜTTERER (1977, Pl. 6, Fig. 3, 7), however, dimensions of the new form are much smaller.

*Distribution.* – In the lower part of the Zlambach-Mergel section, Rossmoosgraben outcrop (sample GSI N.5416–RM 10).

*Age.* – Late Triassic, Rhaetian.

#### Undetermined globular calcitic bodies

Pl. 2, Fig. 3–4

*Description.* – Globular calcitic bodies with a diameter of 8–10  $\mu\text{m}$ , built of numerous, closely packed lamellae, arranged in groups. Each group is bounded by suture lines and the calcitic lamellae within an area are superposed in a parallel way. In certain areas, the orientation of the lamellae is not constant and seems to be inclined and sometimes perpendicular. Bad preservation prevents more accurate description of the outer surface.

*Distribution.* – Common in the Zlambach-Mergel of the Fischerwiese sample and in the Rossmoosgraben outcrop; less frequent in the Kendelbachgraben sample.

*Age.* – Late Triassic, Rhaetian.

#### Comments

The newly described *Conusphaera zlambachensis* might prove to be significant for stratigraphic correlation purposes of the upper Triassic layers. Its findings move the origin of the genus *Conusphaera* TREJO back from the latest Jurassic, to the late Triassic period. Surprisingly, no traces of representatives of this genus during most of the Jurassic period (nearly 50 m.y.) were reported. It is worth mentioning that its reappearance in the latest Jurassic (i.e. *Conusphaera mexicana*), is characterized by the presence of dextrally inclined calcitic lamellae, a direction which is reversed in comparison to that found in the Rhaetian species.

The systematic position of the genus *Thoracosphaera* KAMPTNER was discussed lately by FÜTTERER (1976, 1977), who regards it as part of the calcareous dinoflagellates. The possibility of the existence of calcareous dinoflagellates in upper Triassic sediments is supported by recent reports regarding the presence of marine dinoflagellate cysts during the late Triassic times in various parts of the world (SARJEANT 1963, 1966; WIGGINS 1973; BUJAK & FISHER 1976) and especially MORBEY (1975) who described dinoflagellates from the Kendelbachgraben section of Austria.

#### Acknowledgments

This preliminary study started as a result of sporadic investigation of samples from the Fischerwiese and the Kendelbachgraben outcrop, supplied by Dr. F. Hirsch of the Geological Survey of Israel, Jerusalem, to whom the author is greatly obliged. Thanks are also due to Dr. J. Hohenegger of the Paleontological Institute, University of Vienna, for the samples supplied by him from his Rossmoosgraben section and for permission to use the material for this publication. The author is thankful to Mr. D. Soudry for translating the summary into French, to Mrs. T. Beer, for her helpful assistance in laboratory work, to Messrs. M. Dvoracek and R. Knafo for SEM photography, to Mr. J. Levy for development of the pictures and to Mrs. B. Katz for reading and correcting the English text.

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**Plate 1**

All specimens are from the Zlambach-Mergel layers of late Triassic, Rhaetian age.

Fig. 1-10

*Conusphaera zlambachensis* n. sp.

1: Holotype. Side view. Fischerwiese (sample GSI N.2073, stub 491); SEM  $\times$  8500.

2-3: Same specimen as in Figure 1 (2: apical view, SEM  $\times$  10,000; 3: oblique view, SEM  $\times$  8500).

4: Another specimen, same sample as in Figure 1, showing inclined lamellae; cover plates detached; stub 474; SEM  $\times$  8000.

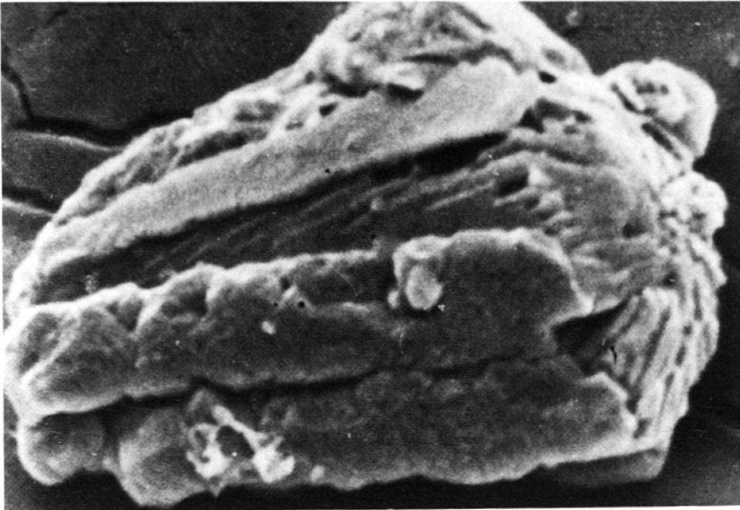
5: Paratype. Sample GSI N.2073, stub 474; SEM  $\times$  7500.

6: Another specimen, showing inclined lamellae and some of the cover plates. Rossmoosgraben (sample GSI 5438-RM 140, stub 205); SEM  $\times$  8000.

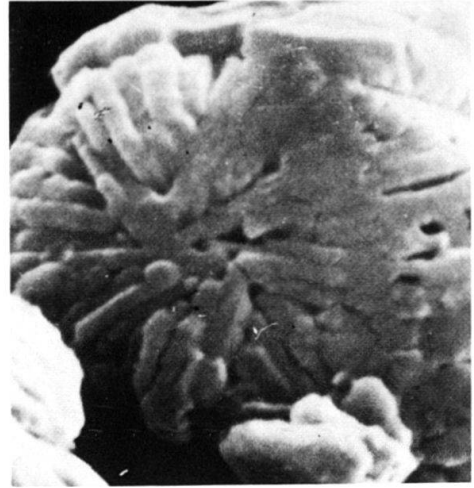
7-8: Another specimen. Rossmoosgraben (sample GSI N.5439-RM 145); LM  $\times$  3500 (7: transmitted light; 8: dark field).

9: Another specimen. Rossmoosgraben (sample GSI N.5415-RM 9, stub 2055); SEM  $\times$  6000.

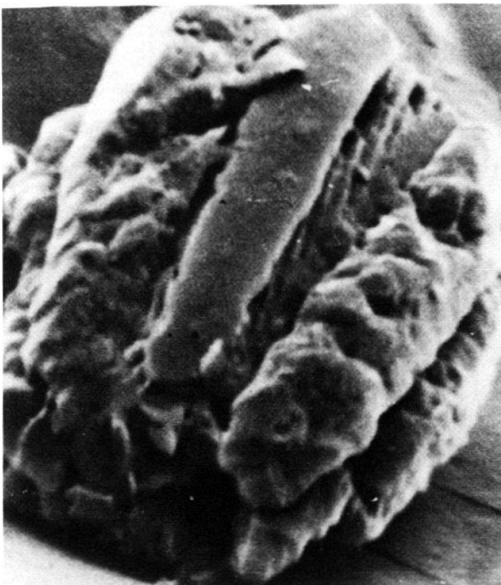
10: Another specimen, same sample as in Figure 9; SEM  $\times$  6000.



1



2



3



4



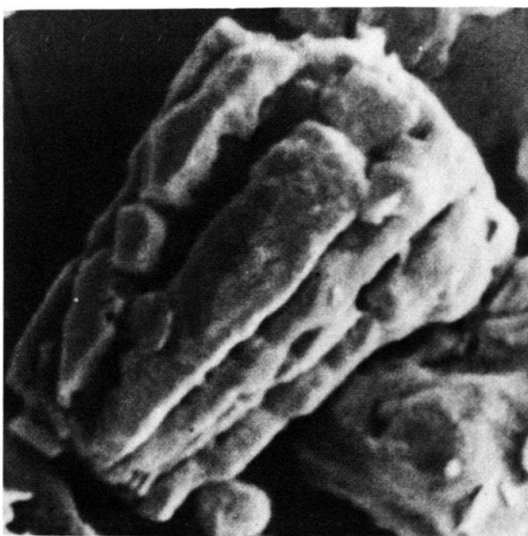
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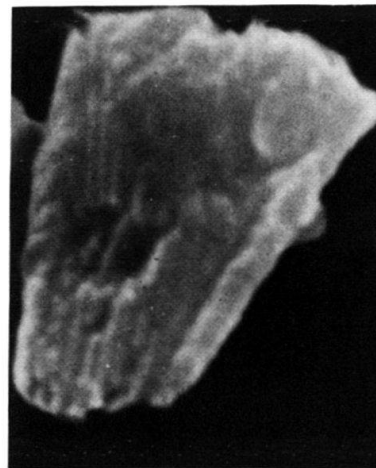
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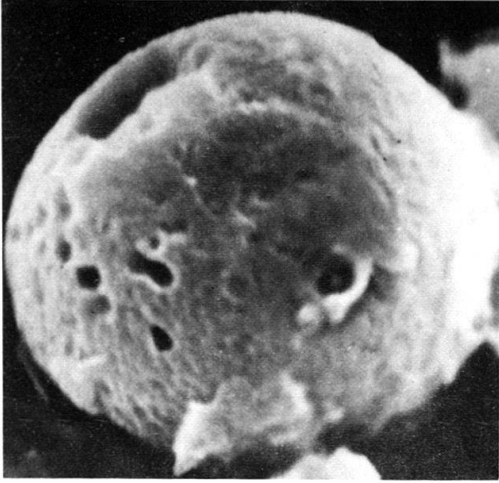
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**Plate 2**

All specimens are from the Zlambach-Mergel layers of late Triassic, Rhaetian age.

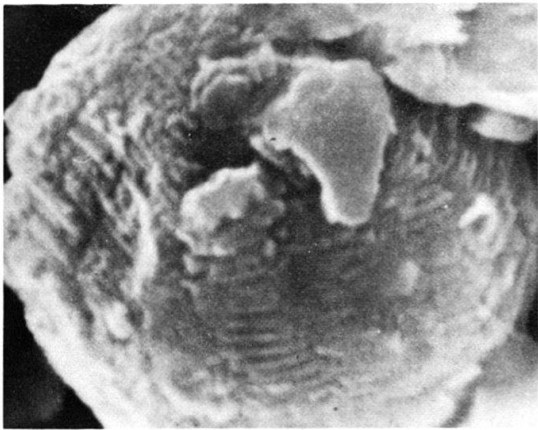
- Fig. 1            *Thoracosphaera* sp.1, Rossmoosgraben (sample GSI N.5438-RM 140, stub 205); SEM  $\times$  6500.
- Fig. 2            *Thoracosphaera* sp.2, Rossmoosgraben (sample GSI N.5416-RM 10, stub 158); SEM  $\times$  6500.
- Fig. 3            Undetermined globular calcitic body. Rossmoosgraben (sample GSI N.5438-RM 140, stub 205); SEM  $\times$  7000.
- Fig. 4            Undetermined globular calcitic body. Fischerwiese (sample GSI N.2073, stub. 491); SEM  $\times$  5500.



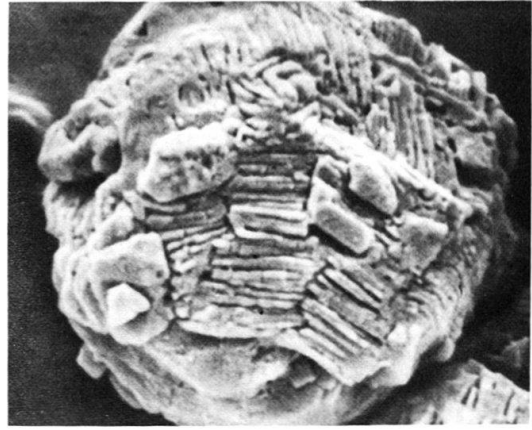
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