

Calcimicrobial oncoid coatings from the Pliensbachian Massone Member (Calcari Grigi Formation, Trento Platform, Italy). Preliminary communication.

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Abstract

Oncoids built by calcimicrobial laminae from the Pliensbachian Massone Member (Calcari Grigi Formation, Trento Platform) have been studied in detail for the first time. Two groups of microorganisms attributed to calcified cyanobacteria have been identified.

The first represents a new taxon of the family Thaumtoporellaceae De Castro; the second is provisionally assigned to *Pseudolithocodium carpaticum* Mišik.

Keywords: calcified cyanobacteria, oncoids, Pliensbachian, Trento Platform, Calcari Grigi Formation.

Material

The samples examined come from sections AA2 (sample n. 3) and AA3 (sample n. 10) of Col Santo-Rifugio Lancia (Pasubio Group), previously described by Avanzini and Broglio (1996). The material studied was kindly supplied in 1995 by Prof. Carmen Broglio Loriga, to whose memory this work is dedicated, with profound gratitude and everlasting esteem.

Description of calcimicrobial layers

The studied oncoids are contained in bioclastic packstone-grainstone. They display asymmetrical growth and have an average diameter of 1-2 cm. The nucleus, made up of fragments of chaetetids (Avanzini and Broglio Loriga 1996) or Porostromata,

is surrounded by a series of concentric microbialitic laminae (Fig. 1), appearing ribbon-like in cross section.

Two intergrowing structural types, apparently belonging to two different taxa of calcified cyanobacteria are distinguishable.

In each single lamina built up by the former structural type, three distinct zones may be differentiated: the upper alveolar and lower alveolar ones, between which there is a median zone (Fig. 2). The lower alveolar zone is thinner than the upper one; the alveoli in both zones are open towards the outside and display a constant diameter. These two zones are linked by perpendicularly directed, massive structural elements subdividing the median zone and showing an irregularly labyrinthic arrangement (Fig. 3). Sparitized spaces between consecutive laminae (asterisk in Fig. 3) were, in our opinion, originally

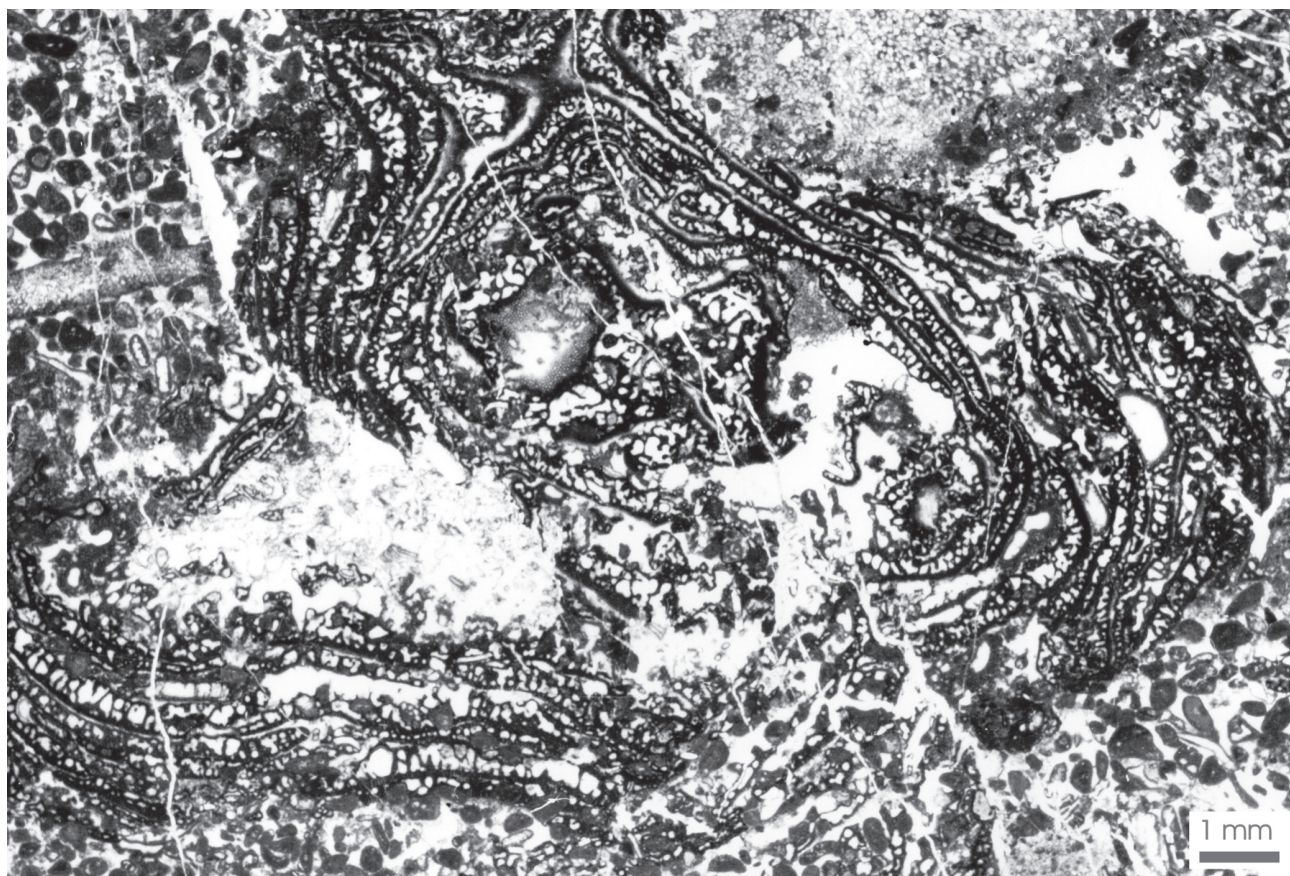


Fig. 1. New taxon of the family Thaumtoporellaceae. Very irregular microbialitic laminae are concentrically arranged around a nucleus (Porostromata).

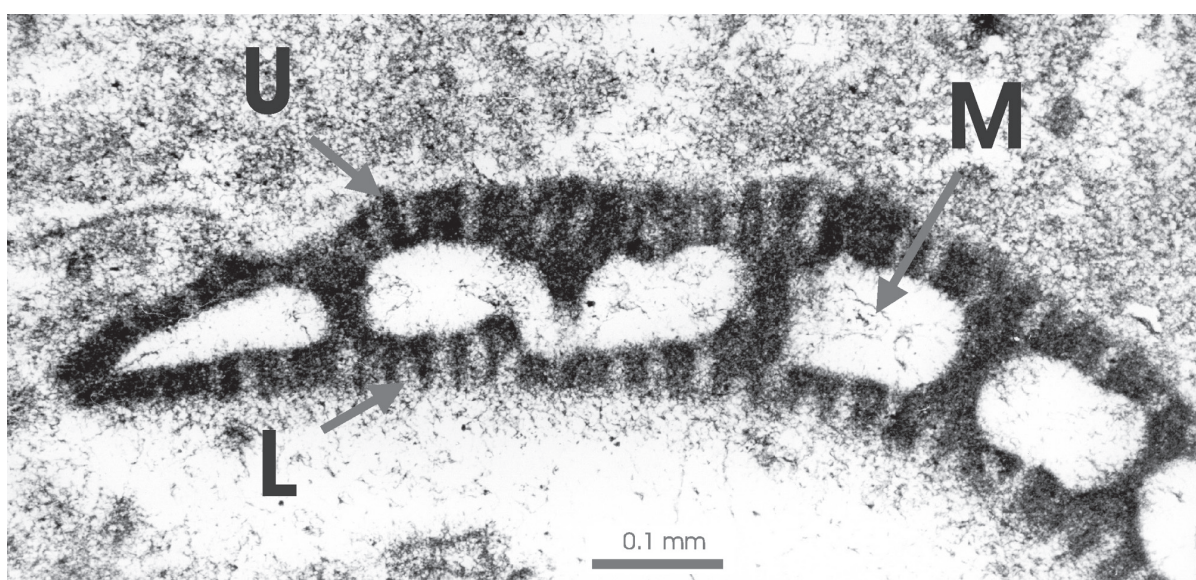


Fig. 2. New taxon of the family Thaumtoporellaceae. Marginal part of a single lamina showing the upper (U) and lower (L) zones, separated by a median zone (M).

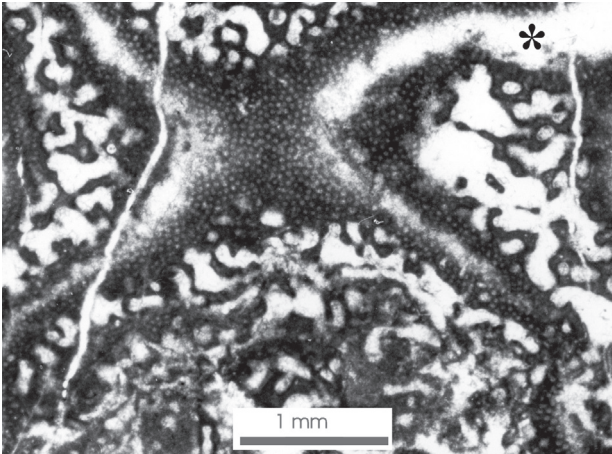


Fig. 3. New taxon of the family Thaumtoporellaceae showing the median zone of different laminae subdivided by labyrinthically arranged partitions and sparitized spaces (asterisk) between two consecutive laminae.

filled with organic mucilage, particularly abundant in this type of organism.

This first structural type that we have been describing is provisionally attributed to a new taxon belonging to the family Thaumtoporellaceae De Castro, 1988. The Thaumtoporellaceae described by De Castro (1988, 1990) are characterised by an alveolar layer completely surrounding a vast cavity. Smaller forms, often found within the large cavity, are interpreted by De Castro as offspring.

In the Trento specimens preliminarily described in this paper, however, a median zone, located between two alveolar layers, is subdivided by walls

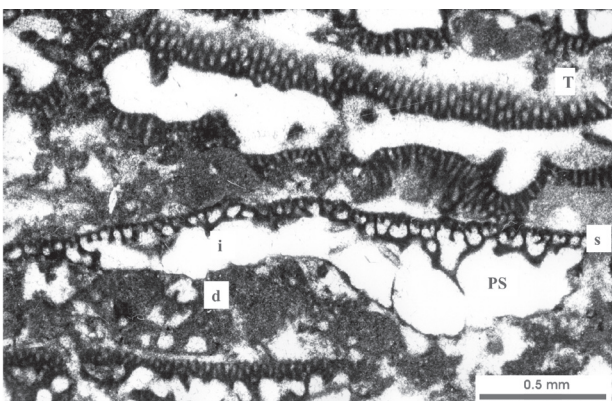


Fig. 4. Intergrowth of Thaumtoporellaceae (T) and cf. *Pseudolithocodium carpaticum* Mišik (PS), the latter showing a lower zone (i) made up of large irregular cavities and an upper zone (s) subdivided by small partitions. d: detrital material.

arranged in a labyrinthic manner (Fig. 3). This structural characteristic permits attribution of the forms coming from the Massone Member to a new taxon.

The second microorganism, characterised by two different structural zones, is sometimes inserted among the thaumtoporellacean laminae (Fig. 4). Its lower zone (i) is made up of relatively large cavities of unequal shape and diameter, and the upper one (s) of a network of small chamberlets generally divided by short vertical partitions. This second organism is preliminarily attributed to *Pseudolithocodium*

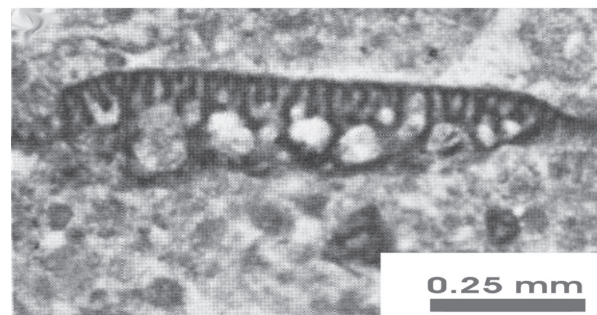


Fig. 5. *Pseudolithocodium carpaticum* Mišik. Holotype. Malm of Carpathian Mountains. From Mišik (1979, pl. 2, fig. 7).

carpaticum Mišik, 1979 (Fig. 5).

Taxonomic attribution is still to be considered uncertain, as in the material studied, we observed that the roof of the upper zone is perforated (Fig. 6), while this characteristic was not described by Mišik in the holotype of *P. carpaticum* and has not been previously observed. *P. carpaticum* has thus far been found in Carpathian Malm, where it was instituted (Mišik 1979), and in the Tithonian from the Madonie Mountains (Senowbari-Daryan et al. 1994). The presence of this morphotype in the Liassic is being documented for the first time.

Detrital grains, trapped during bacterial growth and incorporated into organogenic structures, are often present between overlying laminae. In fact, some peculiar situations may be observed (Fig. 7):

- the alveolar layer, following deposition of grains, adapts perfectly to the morphology of the grains themselves (arrow 1);
- the grains compressed the immediately underlying alveolar layer, deforming it, evidently when the organic sheath was still plastic (arrow 2).

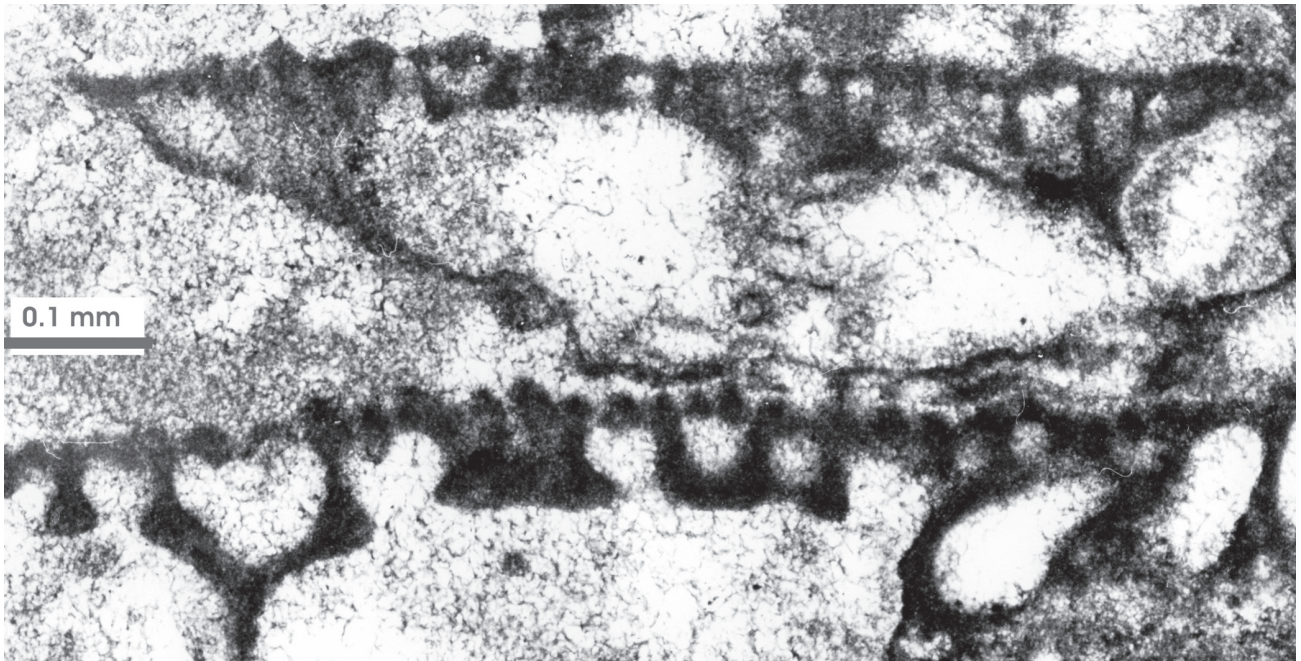


Fig. 6. cf. *Pseudolithocodium carpaticum* Mišik showing perforations in the outer wall of the upper zone.

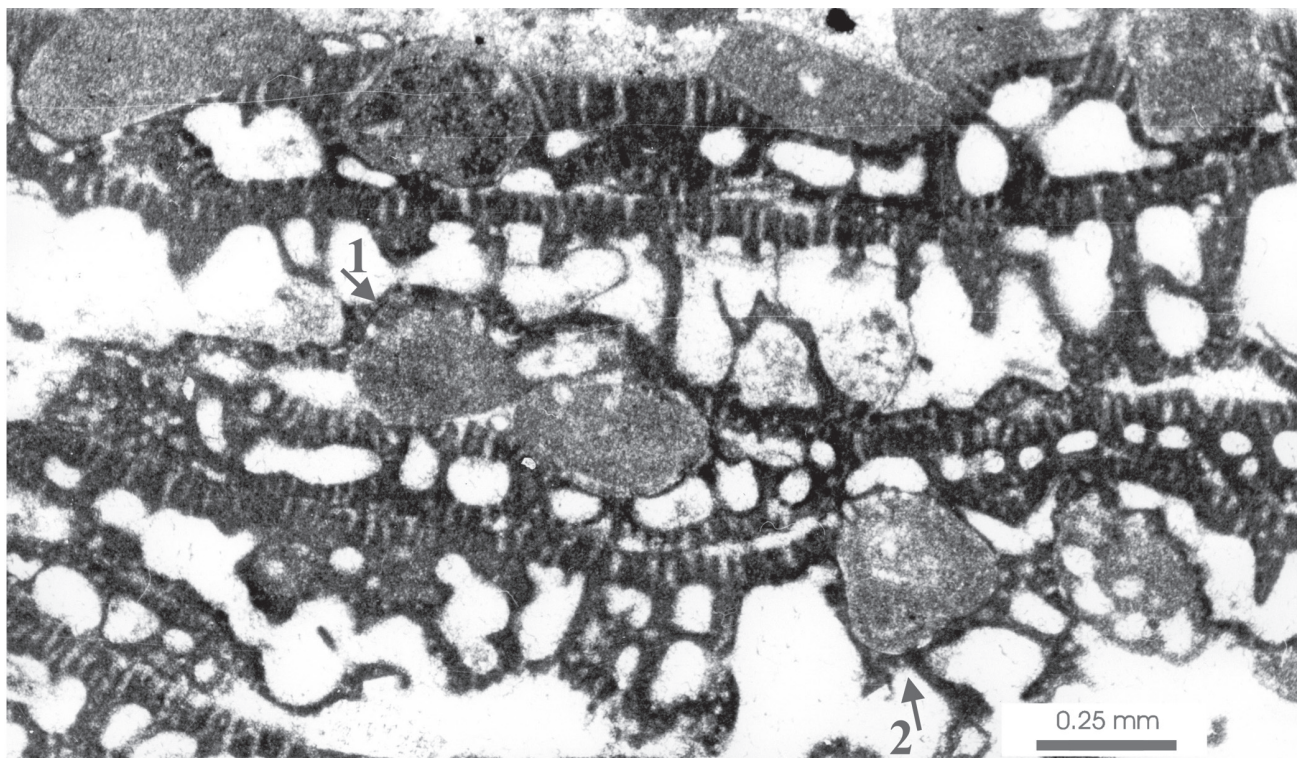


Fig. 7. Thaumtoporellaceae trapping detrital grains. For explanation of the arrows (1, 2) see text.

Conclusions

This preliminary study of Pliensbachian oncoids from the Massone Member (Trento Platform) led to recognition of cortical coverings made up of two groups of microorganisms in intergrowth: a new taxon of the family Thaumtoporellaceae De Castro 1988, and probably a new form preliminarily assigned to *Pseudolithocodium carpaticum* Mišik 1979.

Three distinct zones have been identified in the structures of organisms attributed to the Thaumtoporellaceae. Unlike the forms described by De Castro (1988, 1990), the presence of a labyrinthine subdivision of the median zone has been observed. This characteristic makes it possible to attribute the forms described in this work to a new taxon which is still being studied. For the first time, perforations in the roof of the upper zone of a morphological form comparable to *Pseudolithocodium carpaticum* have been pointed out. In addition, the presence of this morphological form has been documented in the Pliensbachian, while *Pseudolithocodium carpaticum* had only been identified in Malm.

Although the two organisms described in this preliminary communication have not yet received definite generic and specific names, structural analysis leads one to attribute them to colonial calcified cyanobacteria.

Acknowledgments

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References

- Avanzini M., Broglio Loriga C. (1996): Chaetetid facies from the uppermost Calcarei Grigi of the Southern Alps (Gruppo del Pasubio, Lower Jurassic; Trento, Italy). *Mem. Sc. Geol.* 48: 55-64.
- De Castro P. (1988): Observation on Thaumtoporellaceans. *Atti 74° Congr. Soc. Geol. Ital.*, vol. A: 245-250.
- De Castro P. (1990): Thaumtoporelle: Conoscenze attuali e approccio all'interpretazione. *Boll. Soc. Paleont. Ital.* 29: 179-206.
- Mišik M. (1979): Jurassic and Cretaceous algae (Dasycladales excepted) from the West

Carpathians. *Bull. Cent. Rech. Explor.-Prod., Elf-Aquitaine*, 3: 705-712.

Senowbari-Daryan B., Bucur I.I., Abate B. (1994): Upper Jurassic calcareous algae from the Madonie Mountains, Sicily. *Beitr. Paläont.* 19: 227-259.

Riassunto

[Involucri microbialitici degli oncoidi del Membro di Massone (Pliensbachiano), Formazione dei Calcarei Grigi, Piattaforma di Trento (Italia). Nota preliminare]

Sono stati studiati per la prima volta in dettaglio alcuni campioni di oncoidi pliensbachiani provenienti dal Membro di Massone (formazione dei Calcarei Grigi, Piattaforma di Trento) costituiti da strati concentrici di comunità microbialitiche. Sulla base dell'analisi delle microstrutture degli involucri corticali sono stati riconosciuti due differenti morfotipi di micro-organismi coloniali, in alternanza di crescita (*intergrowth*), attribuiti a cianobatteri. Il primo rappresenta un nuovo taxon, ancora da precisare, appartenente alla famiglia Thaumtoporellaceae De Castro 1988; il secondo viene provvisoriamente, e con riserva, attribuito a *Pseudolithocodium carpaticum* Mišik, 1979.

I campioni esaminati provengono dalle sezioni AA2 (camp. n. 3) e AA3 (camp. n. 10) di Col Santo-Rifugio Lancia (Gruppo del Pasubio), già descritte da Avanzini e Broglio (1996).

Gli oncoidi sono contenuti in *packstone-grainstones* a bioclasti. Mostrano una crescita asimmetrica e hanno mediamente un diametro di 1-2 cm. Il nucleo, costituito da frammenti di Chaetetidi o di Porostromata, è rivestito da involucri corticali microbialitici, fra loro sovrapposti.

Sovente tra gli strati microbialitici si incontrano granuli detritici, depositatisi durante la crescita batterica e incorporati nelle strutture organogene. Si possono osservare alcune peculiari situazioni: a) lo strato alveolare, successivo alla deposizione dei granuli, si adatta perfettamente alla morfologia dei granuli stessi; b) i granuli comprimono lo strato alveolare, deformandolo, quando evidentemente la guaina organogena era ancora plastica.

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