

# A NEW OCCURRENCE OF *CYMOPOLIA LONGISTILA* SOKAČ & NIKLER IN THE LOWER CRETACEOUS LIMESTONES OF THE DÂMBOVICIOARA ZONE (SOUTHERN CARPATHIANS, ROMANIA)

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**Abstract.** Specimens of the dasycladalean alga *Cymopolia longistila* Sokač & Nikler were found in the Lower Cretaceous limestones of the Dâmbovicioara area (Southern Carpathians). These findings allowed the clarification of certain aspects regarding the thallus morphology and the proposal of an emended diagnosis of the species.

*Key-words:* Calcareous algae, Lower Cretaceous, Southern Carpathians.

**Résumé.** Des spécimens de l'algue dasycladale *Cymopolia longistila* Sokač & Nikler ont été découverts dans les calcaires du Crétacé inférieur de la région de Dâmbovicioara (Carpates méridionales). Ces découvertes ont permis de préciser certains aspects de la morphologie du thalle et de proposer une diagnose amendée de l'espèce.

*Mots-clés:* Algues calcaires, Crétacé inférieur, Carpates méridionales.

## 1. INTRODUCTION

Dasycladalean algae are important components of Mesozoic carbonate platform deposits. In the Early Cretaceous, particularly in the Barremian-early Aptian, they reached their maximum development (e.g., Bucur, 1999; Masse et al., in preparation). The Dinarides represent one of the regions with extensive carbonate platform development during the Early Cretaceous and, at the same time, one of the richest areas in calcareous algae (e.g., Sokač and Nikler, 1973; Sokač, 2004). *Cymopolia longistila* was initially described (Sokač and Nikler, 1971) from the Lower Cretaceous carbonates of the Dinaric Mountains (Niksić Zupa, Montenegro). To the best of our knowledge, it has subsequently been illustrated only from the Apulia region (Pl. 3, figs. 6, 7, in Luperto Sinni and Masse, 1993), as *Cymopolia velici* Sokač & Nikler.

In the Lower Cretaceous limestones of the Dâmbovicioara area, we have recently identified several specimens attributable to *Cymopolia longistila*, which form the subject of this paper.

## 2. GEOLOGICAL SETTING

The Dâmbovicioara area, located in the eastern part of the Getic Nappe (Southern Carpathians), comprises Jurassic and Lower Cretaceous sedimentary deposits (Figs. 1, 2). The Upper Jurassic is represented by Stramberk-type carbonate deposits of the Giuvala Formation (Patrulius, 1969), which are conformably overlain by limestones of the Cheile Dâmbovicioarei Formation (Berriasian–? earliest Valanginian). An intra-Valanginian unconformity (Grădinaru et al., 2016) separates these limestones from the Dâmbovicioara Formation (late Valanginian–early Aptian), composed mainly of marls with

ammonites and subdivided into three members: the Cetatea Neamțului Member (late Valanginian), the Dealul Sasului Member (latest Valanginian–Hauterivian), and the Valea Muierii Member (latest Hauterivian–Barremian–early Aptian) (Patrulius and Avram, 1976). The latter, consisting predominantly of marls and marly limestones with ammonites, also contains, at various stratigraphic levels, calcareous buildups (patch reefs) with corals, rudists, foraminifera (including orbitolinids), and calcareous algae.

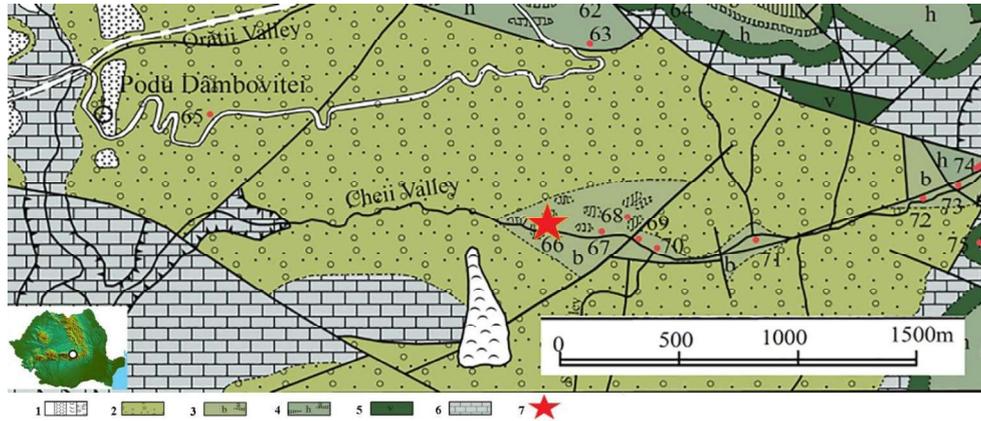


Figure 1. Excerpt from the geological map of Dâmbovicioara zone (from Patrulius and Avram, in Avram 2015) with location of the algae-bearing outcrop. 1. Quaternary. 2. Podu Dâmbovitei Formation (Upper Albain). 3-5. Dâmbovicioara Foramtion [3, Valea Muierii Member (uppermost Hautrivian-lower Aptian); 4, Dealul Sasului Member (uppermost Valanginian-Hauterivian); 5, Cetatea Neamțului Member (upper Valanginian)]. 6. Giuvala and Cheile Dâmbovicioarei formations (Upper Tithonian-Berriasian-?lowermost Valanginian); 7. Location of the algae-bearing outcrop.

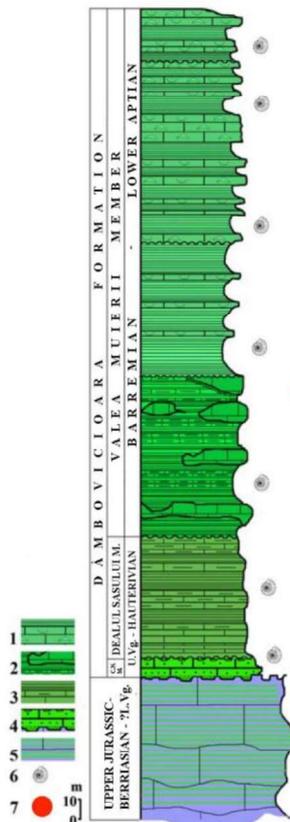


Figure 2. Succession of the Lower Cretaceous deposits from the Dâmbovicioara zone, with the approximate location of the algae-bearing limestones (from Bucur *et al.*, 2011).  
 1. Marl and bioclastic limestone. 2. Marly-limestone, marl and reef limestone intercalations. 3. Limestone, marly-limestone and marl. 4. Glauconite-bearing limestone. 5. Massive limestone. 6. Ammonites. 7. Approximate stratigraphic position of the algae-bearing limestones.

The calcareous algae described in this paper were collected from such a patch reef situated on Valea Cheii, near Podu Dâmboviței village (Fig. 1).

### 3. PALEONTOLOGICAL DESCRIPTION

Order Dasycladales Pascher 1931

Family Dasycladaceae Kützing 1843

Trybe Neomereae Pia 1920

Subtrybe Cymopoliinae Pia 1927

Genus *Cymopolia* Lamouroux 1816

*Cymopolia longistila* Sokač & Nikler in Granier and Deloffre 1993 non 1971

(Pl. 1, figs. 1-10)

#### Remarks

Sokač and Nikler (1971) gave the following diagnosis for *Cymopolia longistila*: “Fragments of cylindrically shaped calcareous thallus built up of fine-grained cryptocrystalline calcite. From their very base the thin primary branches gradually thicken towards their distal parts and enlarge at once to form a thickening with four secondary branches. These secondary branches being half as long as the primary branches are either vertical to the thallus or slightly bent to each other and have thickened terminations. Pear-shaped sporangia come out of the distal parts of the primary branches, inbetween the secondary branches.”

Because Sokač and Nikler (1971) did not designate a holotype but syntypes, the species was a *nomen nudum* until it was typified by the authors in Granier and Deloffre (1993), designating a lectotype (Pl. 1, fig. 1, in Sokač and Nikler, 1971).

The specimens found in the Dâmbovicioara area come from limestones assignable to the late Barremian of Valea Cheii. These consist of coarse grainstones to rudstones with rudist fragments or coral rudstones with fragments of bivalves, gastropods, bryozoans, brachiopods and echinoderms. *Lithocodium* crusts, foraminifera and calcareous algae are also present. Sponge spicules appear in the matrix of the coral rudstones, and the bivalve fragments are partially silicified.

The specimens of *Cymopolia longistila* have the morphological characteristics described by Sokač and Nikler (1971) in terms of the shape of the primary laterals (elongated, thin in the proximal part, slightly widening towards the distal part and ending with a thickening from which the secondary laterals start) (Pl. 1, figs. 1–7). I have not identified tangential sections of the external part of the thallus, which would allow me to estimate the number of secondaries, but the estimate of 4 made by Sokač and Nikler (1971) is very probable. Also, the pear shape of the fertile ampullae (sporangia in Sokač and Nikler, 1971) is not very clear due to an advanced recrystallization and a marginal abrasion of the skeleton.

Radoičić (2002, p. 9) reassigned the species *longistila* to the genus *Neomeris* in the new combination *Neomeris (Drimella) longistilla* (Sokač and Nikler, 1971 (sic!)), without providing any arguments in this regard. The specimen identified (Pl. 1, fig. 4) clearly shows that we are dealing with segments, delimited both at the upper and lower part by a narrowing, and which were indisputably part of an articulated alga of the *Cymopolia* type. The confusion could also come from the original diagnosis, where Sokač and Nikler mentioned that the alga represents “fragments of a cylindrical thallus”. I therefore consider that the diagnosis of the species requires an emendation to correctly present the shape of the thallus.

**Emended diagnosis:** Articulated thallus (moniliform), formed by elongated barrel-shaped segments, with a round outline in cross-section; the internal cavity follows the external shape of the segments. Primary laterals thin and long, which widen slightly outwards; distally these form a thickening from which 4 secondary laterals arise. The secondary laterals are approximately perpendicular to the axis of the thallus and slightly divergent from each other and widen terminally. The reproductive organs (fertile ampullae) are located between the secondary laterals, at the distal end of the primary laterals and are pear-shaped. The primary aragonitic skeleton has been diagenetically transformed into sparitic-microsparitic calcite.

The dimensions of the specimens from the Dâmbovicioara area are presented in comparison with those from Montenegro in Table 1. The specimens from Dâmbovicioara fall within the dimensional range given by Sokač and Nikler (1971), especially in its lower dimensional domain.

Table 1

The dimensions of the specimens from the Dâmbovicioara area presented in comparison with those from Montenegro (Sokač and Nikler, 1971)

	<i>Sokač and Nikler (1971)</i>	<i>This paper</i>
D	1.56–2.37	1.45–2.2 (median = 1.74)
d	0.56–0.82	0.50–0.65 (0.56)
d/D	–	27–37%
l <sub>1</sub>	0.29–0.63	0.42–0.55 (0.49)
l <sub>2</sub>	0.18–0.33	0.15–0.25 (0.18)
p <sub>1</sub> (prox)	0.01	0.03–0.04 (0.035)
p <sub>1</sub> (dist)	0.03–0.05	0.08–0.20 (0.12)*
h	0.07–0.10	0.08
w		~ 35
Ø cysts	0.15	0.08–0.10/0.12–0.17

#### 4. ASSOCIATED MICROFOSSILS AND AGE

In the thin sections containing *Cymopolia longistilla* we also identified an association of calcareous algae and foraminifera composed of: *Neomeris* cf. *cretacea* Steinmann, *Salpingoporella pygmaea* (Gümbel) (forma *exilis* Dragastan), *Salpingoporella muehlbergii* Lorenz, *Triploporella* sp., *Sporolithon rude* Lemoine, *Charentia cuvillieri* Neumann, *Montseciella arabica* (Henson) and *Neotrocholina* sp. The orbitolinid *Montseciella arabica* is characteristic of the late Barremian-basal Aptian (e.g., Schroeder et al., 2010). In fact, the ammonites identified by Patručius and Avram (2015) in sites 69 and 70 (see Fig. 1) in the marls near the limestones with *Cymopolia longistilla* indicate the Forbesi zone of the lower part of the lower Aptian.

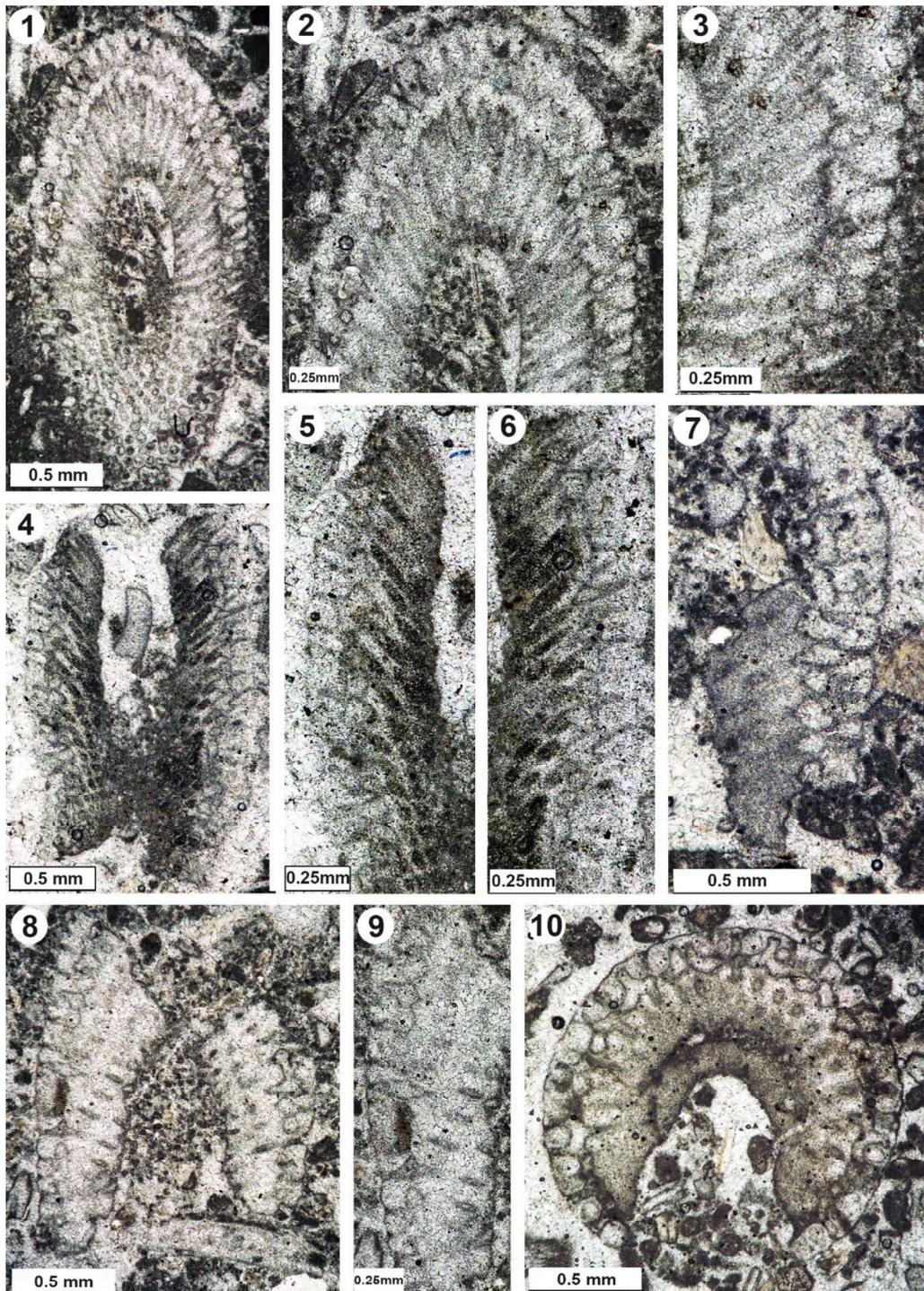
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**Plate I.** Figs. 1–10. *Cymopolia longistila* Sokač & Nikler in Granier and Deloffre (1993). Fig. 1, oblique section through a segment; thin section 14605A-2. Figs. 2, 3, close up views of fig. 1 showing the shape of the laterals and fertile ampullae. Fig. 4, segment in longitudinal section; thin section 14605A-3; note its barrel-shaped outline. Figs. 5, 6, close up views of fig. 4, showing the shape of the laterals, the inclined arrangement of the primary laterals with respect to the axis of the segment and the appearance of the fertile ampullae. Fig. 7, fragment of longitudinal section; thin section 14605A-5. Fig. 8, segment in longitudinal-oblique section; thin section 14605-5. Fig. 9, close up view of Fig. 8. Fig. 10, transverse section; thin section 14610-3.