

***Silvanella coronata* Dragastan (Bryopsidophyceae, Family Pseudoudoteaceae) from late Jurassic of Carpathians carbonate platforms (Romania)**

***Silvanella coronata* Dragastan (Bryopsidophyceae, Family Pseudoudoteaceae) del Jurásico tardío en las plataformas carbonatadas de los Cárpatos (Rumania)**

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ABSTRACT

A new calcareous green alga *Silvanella coronata* Dragastan (Bryopsidophyceae, Pseudoudoteaceae) was discovered in the Late Jurassic deposits of Getic Carbonate Platform (Carpathians). The taxon and the name of genus are dedicated to Dr. Paul C. Silva, University of California at Berkeley, in occasion of his 80th anniversary.

Key words: Jurassic calcareous alga, Bryopsidophyceae, Family Pseudoudoteaceae.

RESUMEN

Una nueva alga verde calcárea, *Silvanella coronata* Dragastan (Bryopsidophyceae, Pseudoudoteaceae) fue descubierta en depósitos del Jurásico tardío provenientes de las Plataformas Carbonatadas de Getic (Cárpatos). El taxon y el nombre genérico están dedicados al Doctor Paul C. Silva de la Universidad de California en Berkeley en ocasión de su octogésimo aniversario.

Palabras clave: Algas calcáreas, Jurásico, Bryopsidophyceae, Family Pseudoudoteaceae.

INTRODUCTION

The reconstructed paleogeography of the territory embracing the Carpathians area and the Moesian Platform was drawn by Patruşius (1972) and Patruşius *et al.* (1976). In their opinion, this territory "looks like a mosaic of carbonate platforms", including shelf and through basins, but the original picture has been much distorted and blurred by subsequent orogenies resulting in overthrusts. Within the East Carpathians a large outlier is represented by the Hâghimas Nappe originating in the Central Transylvanian Carbonate Platform (Bicaz Valley, Ghilcos Massif) during a mid-Cretaceous event. On the other hand, the large olistolites

within Bucegi Mts., had a source area of limestone in the Getic Carbonate Platform (Fig. 1A).

GEOLOGICAL SETTING AND JURASSIC STRATIGRAPHY

The large Getic Carbonate Platform includes from west to east different outliers of the Getic Nappe, such as the Vânturari[la Massif, the limestone of Piatra Craiului Massif, the Dâmbovicioara Basin (including Dâmbovita Valley, Giuvăla) and Piatra Mare - Postăvaru Massif, as well as the olistolites from the eastern slope of the Bucegi Massif (Fig. 1B - C).

THE OLISTOLITE WITHIN EASTERN SLOPE OF THE BUCEGI SYNCLINE.

The limestone olistolite in this area have different ages (Triassic to Cretaceous) and originated from various limestone facies, which evolved in the eastern part of the Getic Carbonate Platform.

The olistolite are small to large mainly derived from the Dogger – Malm rocks. Few olistolite resulted from Berriasian, Valanginian or Barremian - Lower Aptian limestones.

The olistolite were incorporated in the Albian molasse deposits (Patrului, 1969), or in the Neocomian -Aptian flysch deposits on the eastern slope of the Bucegi Massif.

The Middle and Upper Jurassic stratigraphic section can be studied within olistolite A, the biggest outcropping in the Peles Valley near Sinaia (Fig. 1C).

The Middle Jurassic section begins with grey sandstone interbedded with marl containing *Bositra buchi* and *Macrocephalites macrocephalus* being of Late Bathonian - Early and Middle Callovian in age. The clastic sequence is

overlain after an unconformity by Oxfordian radiolarite. The Kimmeridgian corresponds to a condensed Ammonitico Rosso facies, nodular limestone with *Aspidoceras acanthicum*, followed by a micrite - pelmicrite limestone with *Saccocoma* debris and Microfilaments.

The transition from the Ammonitico Rosso slope - basinal facies to a shoal - shelf facies (oosparite – pelsparite) are Upper Kimmeridgian in age.

The algal assemblage and microfossils recorded in this interval, in olistolite A is similar to the one found in olistolite C, which includes *Rivularia pumili* Dragastan (Cyanophyceae), *Garwoodia fissa* Dragastan, *Silvanella coronata* Dragastan (Bryopsidophyceae), *Valvulina alpina* Dragastan (Foraminiferida), *Tubiphytes morronensis* Crescenti and *Aeolisaccus tintinniformis* Misik (Microproblematicae).

The Tithonian deposits of olistolite A include an assemblage comparable to the one in olistolite D. The limestone contains pelmicrosparite and oncosparite interlayer with limestone, abundant in small *Nerinea* and *Pileolus*.

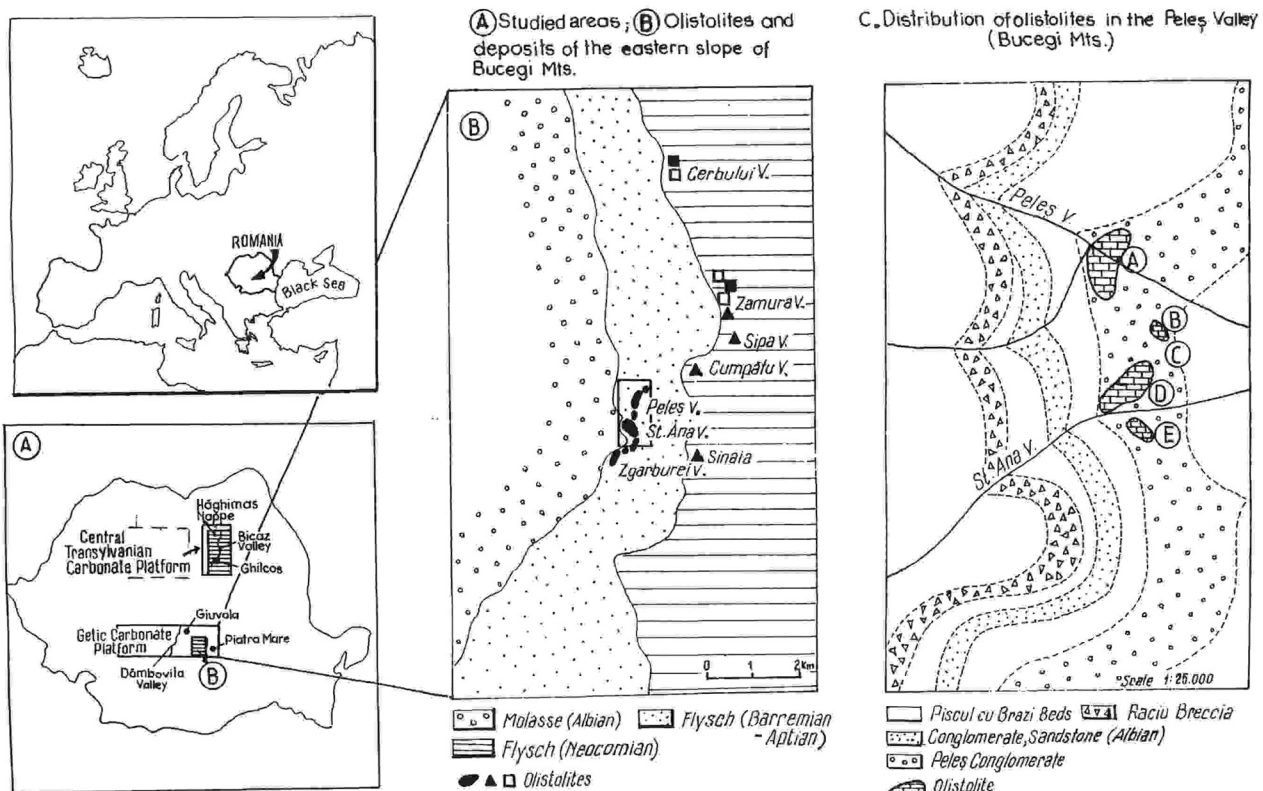


Figure 1. Studied areas (Hâghimas, Bicz Valley, Bucegi, Piatra Mare, Giuvăla, Dâmbovită Valley) and distribution of the olistolite in the eastern slope of Bucegi Mts.
 A. Studied areas; B. Olistolite of the eastern slope of Bucegi Mts. (from Patrului, 1969)
 C. Olistolite from Peleş Valley, scale 1: 25000.

Bryopsidophyceae (*Pseudoudotea silvanensis* Dragastan, *P. bortzii* Dragastan, *Garwoodia bardosi* Dragastan) and miliolids dominate the algal assemblage.

Towards the middle part of olistolite A, the section includes micrite limestone, intrasparitic breccia interbedded with very thin beds of oncomicrite (1 - 2 cm). The assemblage found for this interval can be compared with the one in olistolite E, which is poor in taxa, but has numerous specimens of *Clypeina jurassica* Favre, *Valvulina alpina* Dragastan, *Protopenneroplis striata* Weynschenk, macrofauna (*Nerinea silesiaca*) and small oncoids.

Due to the outcrop exposure, the last part of the section in olistolite A is not clear, being interrupted.

To the terminal part the algal assemblage of olistolite A is comparable with the one in olistolite B and contains: *Garwoodia maxima* Dragastan (Pseudoudoteaceae), *Pseudopenicillus jurassicum* (Dragastan) - (Udoteaceae), *Paraortonella richteri* Dragastan (Cyanophyceae), *Textularia jurassica* Gumbel, *Aeolisaccus tintiniformis* Misik and *Tubiphytes morronensis* Crescenti, many of taxa being found in the Late Tithonian limestone of the alpine realm.

Garwoodia fissa, considered a stenotipic species found in Apuseni Mts., in the subtidal, semi - restricted distal lagoon and accompanied by *Rivularia pumili* Dragastan (Rivulariaceae), confirmed the distribution of these taxa on the lagoon - shelf carbonate platform (Dragastan *et al.*, 1998).

The calcareous alga *Silvanella coronata* Dragastan as well as the assemblages and *Garwoodia bardosi* Dragastan, are indicative for subtidal, proximal lagoon facies, together with miliolids and "cluster" of biostromite built by *Nerinea* and *Pileolus*.

SYSTEMATIC DESCRIPTION

Division CHLOROPHYTA Pascher, 1914

Class BRYOPSIDOPHYCEAE Round, 1963

Order BRYOPSIDALES Schaffner, 1922

Family PSEUDOUDOTEACEAE Dragastan *et al.*, 1997

Ecorticatae Group

Tribe Silvanelleae Dragastan, 2002

Genus *Silvanella* Dragastan, 2002

Derivatio nominis: Genus dedicated to Prof. Dr. Paul C. SILVA, from University Herbarium, University of California, Berkeley (USA) for his fundamental contributions to the knowledge of

algae and for the implementation of taxonomical stability in phylogenical nomenclature.

Diagnosis: Thallus fan shaped crossed by dichotomic branched siphons very narrow in the proximal part and strong widened distally having a "trumpet - like" shape. In the vertical section of the small axis, the thallus appeared flattened laterally, being composed by one or two small bushes.

The sheath - walls of the siphons were built by calcite and the interspaces between siphons filled with micrite. In the sheath, no pores were observed.

Type species: *Silvanella coronata* Dragastan

Remarks: *Silvanella* Dragastan has a fan - shaped thallus, flattened laterally being different from the genus *Halimedooides* Mamet and Roux, 1987 (Sakmarian in age) composed by "pseudo - segments", conical in shape, distally large, possibly flattened. The "pseudo - segments" probably were crossed by very fine "tubes" filled with micrite.

In our opinion, another interpretation is possible, the "pseudo - segments" could be siphons, very widened distally and comparable to the shape of siphons found in the genus *Silvanella*, but also clearly different.

The genus *Brandneria* Senowbari - Daryan *et al.*, 1993 (Late Anisian in age) has a hemispherical multibranching thallus and in our opinion is a pseudoudoteacean alga of completely corticatae inner structure. The large siphons, which become club shaped distally widened correspond in our interpretation to the medullary siphons surrounded by fine, cortical, simple or dichotomic - branched siphons, which formed together, a "disk" - in the distal part of club - shaped area.

Silvanella coronata Dragastan, 2002. Fig. 2

Specimen: Kimmeridgian, Olistolite C, Sample C, Bucegi Mts., Coll. L. P. B. V, No. 0806.

Diagnosis: Thallus fan shaped composed of one or rarely two bushes with a tendency to be flattened laterally. The thallus is crossed by dichotomic branched siphons, tubular strongly widened to the distal part and very narrow in the proximal part. To the distal end the siphon become very large, like a "trumpet", or a funnel.

Description: Thallus fan shaped simple or with 2 bushes, slightly flattened laterally. In transversal vertical section presents a subconical shape. The thallus-bushes are crossed by dichotomic branched siphons. The siphons have a long proximal part, tubular cylindrical with a small diameter. The siphons grow to the distal part first slightly, becoming conical

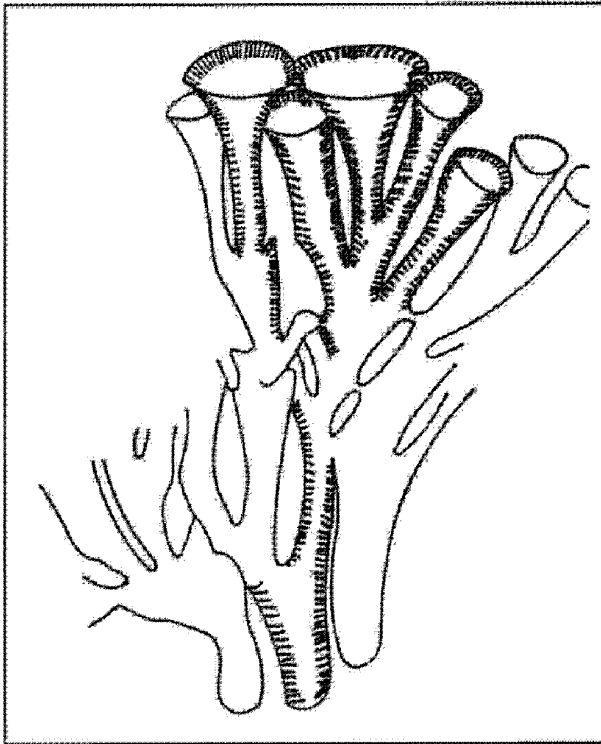


Figure 2. *Silvanella coronata* Dragastan, reconstruction of thallus.

and then extremely large, like a "trumpet" or a "funnel" . Sometimes the siphons in the distal part use to form a "corona".

The siphons in the vertical section (small axis) present the same shape having a long proximal, tubular, small in diameter, growing and becoming very large, extremely wide, like a funnel in the distal part. The sheath - wall built by calcite, sometime presents interspaces filled with micrite. Pores of sheath - wall not observed.

Dimensions in mm: Height of thallus (h) = 1.80 - 2.10; Width of thallus (w) = 2.80 - 3.0; Thickness of thallus (th) = 0.72 - 1.50; diameter of siphons in basal part (db) = 0.025 - 0.030; distal diameter below "trumpet" = 0.060 - 0.070; diameter of siphons in distal part (dd) (funnel or trumpet) = 0.090 - 0.120; thickness of the sheath-wall (thw) = 0.014 - 0.020.

Remarks: *Silvanella coronata* Dragastan can be compared with *Halimedoides arctica* Mamet and Roux, 1987, as it has a thallus crossed by siphons very large in the distal part, dichotomic or trichotomic branched. It is different, because however the siphons are flattened laterally and the thallus blade is built by "pseudosegments".

Brandneria dolomitica Senowbari - Daryan *et al.*, 1993 presents according to our interpretation, the thallus crossed by large medullary siphons, cylindro - conical in shape strongly inflated distally, club shaped, surrounded by fine, cortical simple or dichotomic branched siphons, which pierced the distal part. Due to the partial cortical structure of thallus, this taxon belongs to the pseudoudoteacean partially corticatae group, being different from the taxon *Silvanella coronata* Dragastan, 2002.

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