

THE DASYCLAD GENUS *PHYSOPORELLA* IN THE ANISIAN OF YUGOSLAVIA

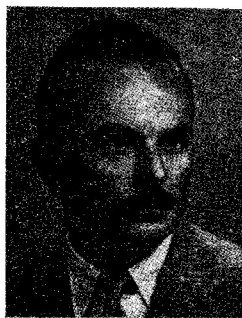
MILAN HERAK

University of Zagreb, Yugoslavia

ABSTRACT : This paper gives a short review of the localities of the Dasyclad genus *Physoporella* in the Anisian of Yugoslavia. Besides recording the already known species *Physoporella pauciforata* (Gümb.), *Ph. varicans* Pia, *Ph. aff. praealpina* Pia and *Ph. dissita* (Gümb.), a new species, *Physoporella croatica* is also described. This species is characterized by an elongated, mostly polygonal, stem and branches which are pressed together at their proximal part and therefore they are also polygonal. Their distal part is tapered and cone-like.

INTRODUCTION

THE Middle Trias of Yugoslavia is very rich in fossil specimens of different Dasyclads. Especially in the limestone, an abundant Dasyclad flora has been recorded at



many localities in Bosnia, Monte Negro, Croatia and Slovenia. The genus *Physoporella* is among the most frequent forms. The new fossil specimens of various species of this genus, collected in the surroundings of Knin and Gračac in Croatia and in the district of Jezersko and Kranjska Gora in Slovenia, are now included in the collection of the Geological and Paleontological Institute, University of Zagreb.

The possibility of recording new localities and new forms is evidently not yet exhausted. The distribution of *Physoporella* in Yugoslavia, according to our recent knowledge, is presented on text-fig. 1.

DESCRIPTION OF THE FOSSIL MATERIAL

Family DASYCLADACEAE

Genus *PHYSOPORELLA*

PHYSOPORELLA PAUCIFORATA (Gümb.)

Pl. 13, figs. 1-5

Ph. pauciforata : Pia, J., 1912, Neue Studien, p. 44, Pl. 8, figs. 9-19.

„ Pia, J., 1920, Die *Siphonaceae verticillatae*, pp. 51-52, Pl. 3, figs. 10-15.

Ph. pauciforata var. *undulata* : Pia, J., 1935, Die Diploporen der anisischen Stufe Bosniens, pp. 221-226, figs. 33-36.

This is the type species of the genus. The pores are principally closed and only exceptionally they pierce through the calcareous wall. The whorls are not always regular. Sometimes they are crowded. Many specimens of the new material give the impression of some irregularity in the position of the branches, making a whorl, because they are not always in the same plane. It seems in these cases, as if the whorls were not definitely formed. J. Pia (1912, 1920 and 1935) distinguishes several varieties, but they are not completely defined.



Localities of Physoporella in Yugoslavia:

1. Skubrov vrh, 2. Pišenca, 3. Between Rašica and Turjak, 4. Brižino, 5. Trebević, 6. Haliluci, 7. Miljevići, 8. Greda, 9. Ograda, 10. Rastovača

TEXT-FIG. 1

LOCALITIES IN YUGOSLAVIA: 1. *Skubrov Vrh, Jezerko, Slovenia* (Text-fig. 1.1) This locality is most probably identical with Pia's "Čuber vrh nordlich von Obersee-land, N-Seite der Steiner Alpen"

(J. Pia, 1920, p. 52). Obersee-land is the German name for Jezerko, and in its surroundings "Čuber vrh" does not exist. The mistake must be due to the registration of the name from hearing.

The Anisian limestone of Skubrov vrh is very rich in fossil specimens of *Physoporella pauciforata* (Pl. 13, figs. 1-5). In general the whorls have one row of branches. Only a few specimens are characterised by whorls consisting of two rows of branches. Besides there are some of them with crowded branches. The calcareous wall is very thick. All the pores are closed at their distal end, while their proximal parts are enlarged. Fissures in the calcareous wall are often to be found. The number of branches in a row differs, but generally it is rather large. On one cross section, I could register 17 (or 18).

MEASUREMENTS :—Outer diameter 2.25 mm.—3.14 mm.

Diameter of the central hollow 1.60 mm.—2.23 mm.

Accompanying dasyclads : *Macroporella* sp. and *Griphoporella* sp.

2. Pišenca, Kranjska Gorā, Slovenia (Text-fig. 1, 2). I possessed only one hand specimen rich in fossil remains. It was not *in situ*. It could not have been transported very far because the hand specimen was very well preserved.

3. Between Rasica and Turjak NNE Cerknica, Slovenia (Text-fig. 1, 3).

In a short communication F. Uršič (1937) refers on a dasyclad flora determined by J. Pia. Besides *Physoporella pauciforata* he also mentions the following species: *Ph. dissita* (Gumb.), *Oligoporella pilosa* Pia, *O. prisca* Pia, *Diplopora philosophi* Pia, *D. annulatissima* Pia, *D. subtilis* Pia and *Teutloporella hirsuta* Pia. Unfortunately he has given no information about the stratigraphical relations of the locality.

4. Brizino, near Sv. Rok, W Gračac in Lika, Croatia (Text-fig. 1, 4). In the surroundings of Sv. Rok the middle Triassic limestone with remains of various dasyclads covers a large area. I collected rich fossil material. *Physoporella pauciforata* is accompanied by some not yet determined specimens of the dasyclads.

5. Trebebic and N Haliluci, in the surroundings of Sarajevo in Bosnia (Text-figs. 1, 5 and 6). The fossil specimens, collected in the Anisian limestone, according to J. Pia

(1935), are characterized by a clear longitudinal undulation. In the cross section the external surface of the calcareous wall is also gently undulated. Therefore, he created a new variety : *Ph. pauciforata undulata*.

Accompanying dasyclads : *Macroporella alpina* Pia, *Oligoporella pilosa* Pia, *Physoporella varicans* Pia, *Diplopora proba* Pia; *D. hexaster* Pia and *D. subtilis* Pia.

PHYSOPORELLA CROATICA, sp. nov.

Text-fig. 2 and Pl. 14, figs. 1-5

Description : The stem is elongated; in the cross section predominantly polygonal and generally isodiametrical. The branches are closed at their distal end. The calcareous wall is very thin. The proximal part of each branch is large and lies with a broad base on the stem. The branches are pressed together and therefore polygonal in the cross section of the whorl. The width of the proximal part of the branch, in the section perpendicular to the main stem, is narrower than in the section parallel to the main stem. This concerns especially its base. The distal cone-like part of the branch is tapered and covered with a thin calcareous wall.

The branches are situated in whorls consisting only of one row. Some whorls become somewhat irregular. In most cases there are 7 branches in one whorl. One specimen of our material has only five branches (Text-fig. 2, 7). Most probably it is a section of an end portion of the stem. Two oblique, nearly cross sections show more than 7 branches, but not strictly in one plane (Text-fig. 2, 5 and 6).

MEASUREMENTS :—Diameter of the central hollow 0.27 mm. —0.61 mm.

Length of the branches to 1.3 mm.

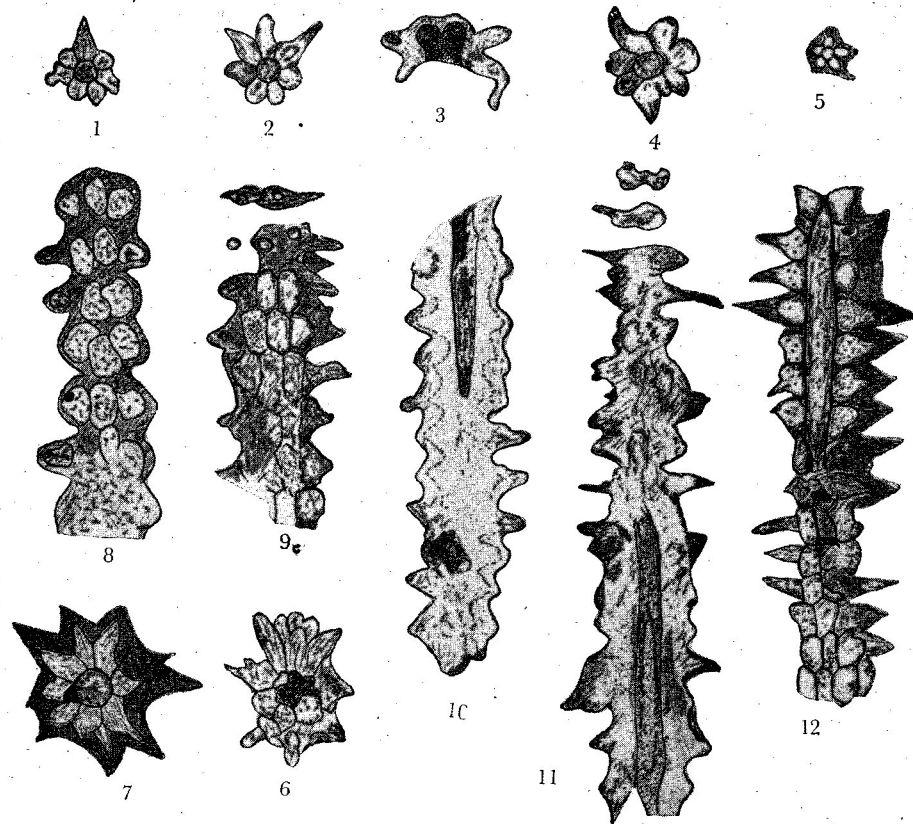
Width of the base of the branches :

perpendicular to the stem 0.14 mm—0.33 mm.

parallel to the stem 0.53 mm.—1 mm.

Distance between the middle of two adjacent whorls 0.61 mm.—0.75 mm.

Syntypes : The specimens figured in plate 14, figs. 1-5, from Anisian limestone, Miljevići, NW Knin, Croatia; coll. alg. nos. 61, 66, 70, 73 and 74 (slides); Geological and Paleontological Institute, University of Zagreb.



Text-Fig. 2

Physoporella croatica, new species, Miljevici; different sections drawn after photos of slides; 1—2 and 4—7 a little oblique, nearly cross sections; 3 and 8—12 nearly longitudinal (partly tangential) sections. Magnifications: 1—11 cca $\times 7.6$; 12 cca $\times 8.5$. Drawing: Z. Babic.

GEOLOGICAL RELATIONS AT THE LOCALITIES

1. *Miljevici*, NW *Knin*, *Croatia* (Text-fig. 1, 7). The fossiliferous limestone together with dolomite makes a broad Anisian zone—Schubert's (1920) "Muschelkalk". This zone follows the typical lower Triassic and is followed by the Ladinian sediments—Schubert's (1920) "Hornsteir-kalke der ladinischen Stufe".

2. *Greda*, above *Golubic*, N *Knin*, *Croatia* (Text-fig. 1, 8). The fossiliferous limestone follows the lower Trias and forms a plateau in the central part of which the

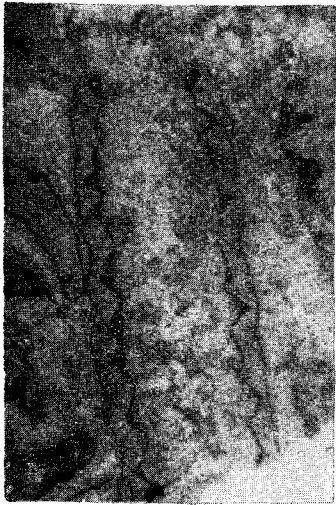
hand specimens were found. *Ph. croatica* is accompanied by many not yet determined specimens of calcareous algae.

REMARKS

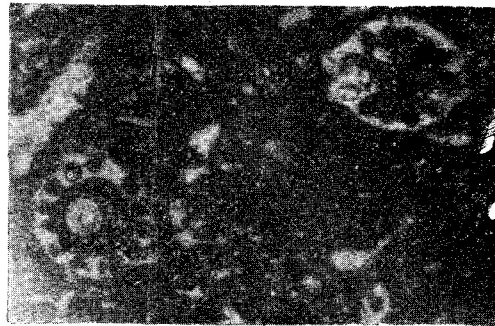
Physoporella croatica is mostly similar to *Ph. pauciforata undulata* Pia. But there are many differences. The whorls of *Ph. pauciforata undulata* are not pressed together and therefore the calcareous wall between them is thick. Consequently, the proximal part of the branches is not polygonal.

EXPLANATION OF PLATE 13

1—5 *Physoporella pauciforata* (Gümb.), Skubrov vrh; longitudinal, tangential and cross sections; cca $\times 8.5$ } 6. *Physoporella varicans* Pia, Rastovaca; longitudinal section, cca $\times 7.6$ } 7. ? *Physoporella varicans* Rastovaca (in the same slide as 6), cross sections; cca $\times 7.6$; Photo: M. Malez.



1



7



2



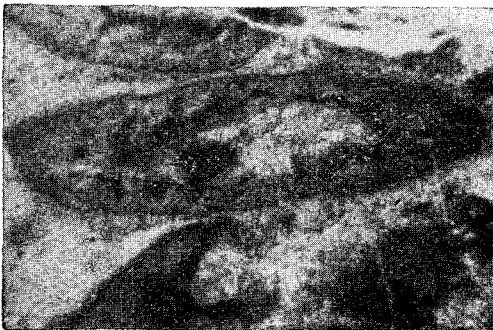
6



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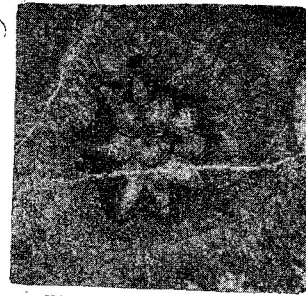


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HERAK : PHYSOPORELLA FROM THE ANISIAN OF YUGOSLAVIA



2



1



5



3



4

HERAK : PHYSPORELLA FROM THE ANISIAN OF YUGOSLAVIA

Further, one whorl of *Ph. pauciforata undulata*, according to Pia (1935, fig. 36), consists of 16 branches or so, while in *Ph. croatica* there are most frequently 7 branches in a whorl, etc.

The name of the species is given after Croatia, where so far the only localities have been registered.

PHYSOPORELLA VARICANS, Pia

Pl. 13, fig. 6

Ph. varicans:—Pia, J. 1935, Die Diploporen der Anisichen Stufe Bosniens, pp. 229-232, figs. 43-46.

The whorls consist of two rows of branches which are inclined on opposite sides and are a little curved against the surface of the calcareous wall of the specimen. Fissures are often to be found in the middle of the whorls. Calcareous wall is very thin. The pores are closed at their distal end.

LOCALITIES. 1.—*Trebevic*, near *Sarajevo* in *Bosnia* (Text-fig. 1, 6); Anisian limestone (J. Pia, 1935).

2. *Ograda*, near *Grahovo* in *W Bosnia* (Text-fig. 1, 9); Anisian limestone (J. Pia, 1935).

3. *Rastovaca*, near *Gracac* in *Lika, Croatia* (Text-fig. 1, 10). The hand specimen was not *in situ*, but because of its good preservation it must have come from *Rastovaca* where middle Triassic limestone and dolomite are exposed. Recording of this Anisian species is very important for the stratigraphical subdivision of the mentioned middle Triassic complex because it is for the first time that the Anisian horizon within it has been proven.

PHYSOPORELLA aff. PRAEALPINA Pia

Ph. aff. praealpina: Pia, J., 1935, Die Diploporen der Anisichen Stufe Bosniens, pp. 226-229, figs. 37-39, 42.

In the Anisian of Bosnia, J. Pia (1935) registered several specimens of the genus *Physoporella* which are characterized by whorls consisting of two rows of branches and fissures in their calcareous wall. The branches at the distal end are a little narrow.

LOCALITIES. 1.—*Ograda*, near *Grahovo, W Bosnia* (Text-fig. 1, 9).

2. *Trabevic*, near *Sarajevo, Bosnia* (Text-fig. 1, 8).

PHYSOPORELLA DISSITA (Gümb.).

Physoporella dissita: Pia, J. 1912, Neue Studien, p. 45, Pl. 6, figs. 1-4.

„ Pia, J., 1920, *Siphoneae verticillatae*, p. 55.

As already stated this species was recorded by F. Ursic (1937) together with other Anisian dasyclads between *Turjak* and *Rasica*, NNE *Cerknica*, *Slovenia* (Text-fig. 1, 8).

REFERENCES

- HERAK, M., 1956, Stratigraphische Interpretation triadischer Sedimente mit Dasycladaceen in der Umgebung von *Gracac* in Kroatien; *Yugosl. Acad. Zagreb, Acta geologica* 1, pp. 149-154.
- PIA, J., 1912, Neue Studien über die triadischen *Siphoneae verticillatae*; *Beitr. Paläont. u. Geol. Oest.-Ung.*, Vienna, 25, pp. 25-81, Pl. 2-8.
- , 1920, Die *Siphoneae verticillatae* von Karbon bis zur Kreide; *Abb. Zool.-Botan. Ges.*, Vienna 11, pp. 1-263, Pl. 1-8.
- , 1935, Die Diploporen der anisichen Stufe Bosniens; *Ann. géol. de la Péninsule Balkanique, Beograd*, 12, pp. 190-246, Pl. 1-5.
- SCHUBERT, R., 1920, Geol. Karte Knin-Ervenik, Vienna, Zone 29, Col. 14.
- URSIC, F., 1937, Diploporenkalk am Wege zwischen *Turjak* und *Rasica*; *Ann. géol. de la Péninsule Balkanique, Beograd*, 14, pp. 213-214.

EXPLANATION OF PLATE 14

1—5 *Physoporella croatica*, new species, Miljevic; different sections: a little oblique, nearly longitudinal, tangential and cross sections; 1—4 cca \times 7.6; 5 cca \times 8.5; Photo: M. Malez.