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Redescription of the genus *Selliporella* (Calcareous algae; Dasycladaceae)

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New finds of well preserved material of *Selliporella donzellii* Sartoni & Crescenti enabled a better understanding of that species and of the genus. This has revealed the identity of the genera *Selliporella* and *Likanella* and hence the genus *Likanella* should be considered a younger objective synonym of the genus *Selliporella*. Certain characteristics observed in *Clypeina pejovicae* Radoičić suggest the attribution of that species to the genus *Selliporella*. The same is also true for »*Dasycladacea*« *dalmatica* Radoičić.

INTRODUCTION

The genus *Selliporella* has been established by Sartoni & Crescenti (1962) on the basis of a rather poorly preserved material, represented by a few sections of the type species, *S. donzellii*. The paucity of the material available to the authors (Sartoni & Crescenti, 1962: Pl. 14; Pl. 43, figs. 1—5) caused an inadequately clear description of this stratigraphically very important species. The subsequent description by Nikler & Sokač (1967) was equally inadequate and illustrated by unsatisfactory sections (Nikler & Sokač, 1967: Pl. 1, figs. 1—9). Thus no better insight into the structural properties of the genus *Selliporella* was provided. The more so, since the latter authors described *S. donzellii* as having a non-segmented cylindrical thallus with dense alternating whorls of branches. A somewhat better insight into the morphological-structural properties of *S. donzellii* was made possible by the illustrations given by De Castro (1962: Pl. 13), Radoičić (1966: Pl. 94, figs. 1—2), Dondi & al. (1966: Pl. 6, figs. 1—4), and Devoto & Parotto (1967: p. 147, fig. 2). Admittedly, already in the first description Sartoni & Crescenti (1962) mentioned the segmented structure of the thallus, when they spoke about isolated and separatedly fossilized whorls, or in particular when they compared the new genus with the genus *Clypeina*, from which it was said to differ by having two or more consecutive series of branches in a whorl, as distinct from *Clypeina* with one-rowed whorls of branches. However, in the present authors' opinion, this assertion was not made completely clear.

The material used in the present study was collected in the region north of Neum, south Hercegovina. The samples derive from the fragments and blocks in Tertiary breccia exposed along the old road from Neum to Metković, and from the Doggerian limestones cropping out north of Duži village, along the road to Hutovo. I. Galović assisted in the field work.

Phylum Chlorophyta

Order Dasycladales

Family Dasycladaceae

Tribe Diploporeae Pia 1927

Genus *Selliporella* Sartoni & Crescenti 1962

The genus is characterized by a cylindrical main stem with alternating branch-bearing and branchless parts. The branchless parts of the thallus have thin cylindrical calcareous wall, a varying length and they form a loose connection between the branch-bearing parts of the thallus. The shape of the branches is generally pyriferous or phloiophorous, in some species also vesiculiferous. The branches are arranged in double, triple, or multiple whorls (verticills). The verticillate arrangement of the branches may be seemingly disturbed when numerous branches concentrate on a relatively small area. Each branche has its own calcareous envelope, projecting distally like a spine (when the branches are of approximately pyriferous shape) or giving the impression of a »bundle« (when the branches are of approximately vesiculiferous or phloiophorous shape), while in their basal parts the calcareous envelopes of the branches merge together into a calcareous mass. Thus the thallus acquires the appearance of being composed of more or less pronounced segments. This does not exclude the possibility of the existence of independent phloiophorus branches at the periphery, depending on their more or less dense arrangement, the degree of their widening in their distal parts, or on other factors, such as, for example, the angle between successive branches in the superimposed whorls. The position of the branches in relation to the central axis varies from their being directed steeply upward to the ones bending downward, which may be present in the same species and even in the same specimen.

Selliporella donzellii Sartoni & Crescenti

Plates 1—5

1962. Dasycladaceae. — De Castro, pl. 13.
1962. *Selliporella donzellii* n. gen., n. sp. — Sartoni & Crescenti, p. 263, pl. 14, pl. 43, figs. 1—5.
1964. *Selliporella donzellii.* — Farinacci & Radoičić, pl. 5, fig. 1.
1966. *Selliporella donzellii.* — Dondi, Papetti & Tedeschi, pl. 6, figs. 1—4.
1966. *Selliporella donzellii.* — Radoičić, pl. 29, fig. 1; pl. 97, figs. 1—2; pl. 99, figs. 1—2; pl. 115, figs. 1—2.
1967. *Selliporella donzellii.* — Devoto & Paroto, p. 147, fig. 2.
1967. *Selliporella donzellii.* — Nikler & Sokač, p. 109—110, pl. 1, figs. 1—9.
1968. *Selliporella donzellii.* — Nikler & Sokač, pl. 7, fig. 5.

The need for a revised description of that species is obvious for two reasons: (1) because the descriptions published so far were inadequate and insufficiently illustrated, and, (2) because this is the type species of the genus which makes necessary its full understanding in order to enable a thorough comparison with species attributed to other genera.

Description. *Selliporella donzellii* has a cylindrical calcareous skeleton built up of recrystallized calcite. The skeleton consists of alternating branch-bearing and branchless parts. The thickened parts from which the branches grow acquire a shape of segments formed by filling of interspaces between the proximal (basal) parts of the branches, i. e. between the calcareous envelopes of the branches. Such segments are connected by tubular branchless parts of the skeleton, in which the thickness of the calcareous wall varies depending upon whether the segments pass gradually or abruptly into the tubular part of the skeleton. The wall is thinnest immediately above the lower segment (Pl. 1, fig. 3; Pl. 3, figs. 1—2; Pl. 4, fig. 4). The thin tubular calcareous envelope of the branchless parts of the skeleton is easily broken and this is the main reason that *S. donzellii* is but seldom found in larger preserved fragments, showing two, three or more segments. Therefore the common picture of *S. donzellii* in thin sections is the one of branch-bearing fragments of skeleton. In the inner side of the skeleton, some more or less prominent thickenings of the calcareous wall, protruding inward into the main stem, can be seen at the levels of segments. Therefore the main stem displays an alternatingly varied diameter: it is broader in tubular branchless parts and becomes narrower in the segments (Pl. 1, fig. 3; Pl. 2, fig. 5; Pl. 3, figs. 1, 5). Because of this, the relation outer diameter: inner diameter is not constant but varies according to where the skeleton is cut. In the segments, i. e. where the main stem is narrowed, it amounts to 2.8:1, whereas in lower parts of the tubular parts, where the calcareous wall is thinnest, it is about 1.5:1. The latter value varies slightly if the tubular parts of the skeleton are gradually growing thicker as one goes upward (Pl. 4, fig. 4). In the calcareous wall of the tubular parts of the skeleton, fine channels and pores may be seen, which seem to be partly destroyed by recrystallization. The arrangement of these pores and channels (which is best seen in transversal sections: Pl. 1, fig. 6; Pl. 2, fig. 7) seems to be a random one, so that their function remains unclear. Certain indications suggest that they may possibly be derived from longitudinal furrows at the outer surface of the tubular parts of the skeleton. They seem to stretch downward from the lowest branches of a superimposed segment and gradually disappear going toward the lower segment. They may secondarily be filled with calcareous mass and thus the pores perhaps represent the relics of those furrows.

The main characteristics of the genus (and of the type species) concern the position, shape, and arrangement of the branches, which are concentrated at more or less regular intervals. The intervals between segments seem to be fairly constant in a specimen, but vary widely in different specimens (Pl. 1, figs. 1, 3; Pl. 3, fig. 3; Pl. 4, figs. 2, 4; Pl. 5, figs. 1—4). In *S. donzellii* the branches are concentrated into groups composed of two or three whorls (verticills) (Pl. 1, fig. 1; Pl. 2, fig. 1;

Pl. 5, figs. 1—2). The branches are undivided, generally of a pyriferous shape which is occasionally typical (Pl. 1, fig. 4; Pl. 3, fig. 1; Pl. 4, fig. 3a), but sometimes also widely deviating from this type (Pl. 3, figs. 4, 5). Each branch has its own calcareous envelope. Because the branches of two or three whorls are in their basal parts concentrated in a small area, their envelopes in proximal parts are compressed. The more so, because the branches are thicker in their basal (proximal) parts. The narrow interspaces left between the envelopes in the proximal region are filled up with calcareous mass, which indeed forms the thickened, segment-like shape. The branches are variously directed: those of the uppermost whorl grow upward, those of the middle whorl are directed more or less horizontally, and those of the lowest whorl bend downward. Thus the angle between the branches of a group of whorls (= of a segment) and the longitudinal axis of the thallus varies widely (Pl. 2, fig. 2; Pl. 3, figs. 1, 2, 5; Pl. 4, fig. 3a). Such an arrangement of the branches, in addition to their being thinner toward the periphery, results in their going apart from each other distally. This leads ultimately to complete individualization of each branch, coated in its own calcareous envelope which also becomes thinner distally, thus acquiring a dull spine-like shape (Pl. 1, figs. 4, 5; Pl. 3, figs. 1, 2, 4; Pl. 4, fig. 3a). In some specimens deviations in the direction of the distal divergency of the branches have been observed (D o n d i & al., 1966: Pl. 6, figs. 1—4; R a d o i č i ć, 1966: Pl. 99, figs. 1—2), resulting in a more one-sided bending of the branches and their less pronounced individualization. Few sections show that the branches are arranged in clearly differentiated whorls (Pl. 2, fig. 6; Pl. 5, fig. 1a), which, in turn, form a group of whorls consisting of two or three whorls, or, in other words, a double or triple whorl. The position of branches in successive whorls is probably alternating, which is visible when proximal (basal) parts of the branches are cut, while it becomes less pronounced going outward due to various directions of the bending of the branches. Each branch communicates with the main stem through a tiny pore.

The individualized spine-shaped parts of the branches are seldom preserved; they are mostly encountered as tubules in longitudinal, oblique or transversal sections among other biodetrital particles, and in which, though not frequently, a curving of some branches can be seen (Pl. 2, figs. 1, 5; Pl. 3, fig. 6a).

Dimensions in mm:

Outer diameter of the calcified part of the segments (including the preserved part of the branches)	1.75—2.95
Inner diameter of the thallus in the segments	0.55—1.11
Outer diameter of the tubular, brancheless part of the thallus	1.11—1.68
Outer diameter of the tubular parts of the thallus	0.70—1.11
Height of the segments	0.75—0.93
Distance between segments (= length of the tubular parts of the thallus)	0.93—1.85
Diameter of the branches (maximum)	0.18—0.21
Length of the branches	1.30—1.80
Distance between whorls in a segment	?0,18

Remarks:

1. Outer diameter of the calcified parts of the segments includes the basal parts of the branches, while the individualized spine-like parts of the branches are only partly, or not at all, preserved.

2. The length of the branches is the maximum observed one, but numerous fragments suggest the possibility that the length of the barnches could be even greater.

Discussion:

The description of *S. donzellii* as given above, on the basis of the available material, reveal certain previously unknown characteristics. These corroborate the justification of the establishing of the genus *Selliporella,* but they also necessitate the revision of the relationships with the later established genus *Likanella* Milanović (1966). For the description of *S. donzellii* as it has been given above has many points in common with the genus *Likanella,* i.e. with the type species *L. spinosa,* as it has been described by Milanović (1966). The direct comparison of *L. spinosa* (Milanović, 1966: p. 10—13, Pls. 1—6) and the present material of *S. donzellii* (Pls. 1—5) reveals the identical structure of the thallus, which is built up of segments where the branches are concentrated (into 3 whorls in *L. spinosa,* and into 2—3 whorls in *S. donzellii),* and, which, in turn, are connected with tubular brancheless parts of the thallus. That the segments in *L. spinosa* contain 3 whorls of branches is best seen in Milanović's (1966) Pl. 1, figs. 1, 9; Pl. 2, figs. 1, 4, 7; and Pl. 4, fig. 7, and the segments of *S. donzellii* having two or three whorls are shown in the present Pl. 2, fig. 1, and Pl. 3, fig. 3. The shape of the branches is also the same in both species: individualized spinose protrusions, each with its own calcareous envelope, issuing from a common calcified base in their proximal parts. This is visible both in Milanović's description and illustrations of *L. spinosa* (Milanović, 1966: Pl. 2, figs. 1, 5, 7; Pl. 3, figs. 2—5; Pl. 4, fig. 8) and in the present material of *S. donzellii* (Pl. 1, figs. 4—5; Pl. 3, figs. 1, 2, 4). A further point of similarity is the existence of fine pores and channels in both species, in the calcareous walls of the tubular parts of the thallus, which is deprived of branches and which was expressly mentioned by Milanović (1966) as a generic characteristic of *Likanella.* The above mentioned characteristics, common to both *S. donzellii* and *L. spinosa,* clearly show that the genus *Likanella* should be considered to be a younger objective synonym of the genus *Selliporella,* as amended herein.

The great similarity of *S. donzellii* and *L. spinosa,* though separated by an important stratigraphic interval (Middle-Upper Permian to Middle Jurassic), necessitates also the outlining of differences between the two species. At the same time, these differences support the validity of each species.

Selliporella spinosa (Milanović) is much smaller than *S. donzellii.* The outer diameter of the thallus in *S. spinosa,* including the length of the branches, is maximally 1.5 mm, whereas in *S. donzellii* it is up to 2.95 mm, not counting the individualized spinose parts of the branches.

In *S. spinosa* the segments are more high than broad, while in *S. donzellii* it is just the opposite, the width of the segment being, in addition, much larger. In *S. spinosa*, the maximum number of branches in a whorl is about 20, which is about the minimum number of branches in a whorl in *S. donzellii*. Further differences, though easily neglected superficially, concern the shape of the main stem (= inner contour of the calcareous envelope of the thallus, respectively), which is regularly cylindrical in *S. spinosa*, while displaying pronounced narrowings in the segments in *S. donzellii*.

Because subsequently a number of species has been attributed to the genus *Likanella* — *L.? danilovae* Radoičić (1968), *L. campanensis* Azema & Jaffrezo (1972), *L. bartheli* Bernier (1971), and *L. hammudai* Radoičić (1975) — these must now be included into the genus *Selliporella*, if the same criteria are applied as being used in their attribution to the genus *Likanella*, and thus implicitly certain characteristics of those species have now to be considered to be characteristic of the genus *Selliporella*.

Viewed in this context, *Clypeina pejovicae* Radoičić (1969) must also be considered. Originally (Radoičić, 1969) it was assigned to the genus *Clypeina* in spite of certain characteristics uncommon to that genus, which, however, have not been properly elucidated. First of all, this refers to the interpretation of the arrangement of branches, which were said to be arranged in whorls consisting of two rows of the branches; this is, however, difficult to accept for no figured sections of *C. pejovicae* show such an arrangement (Radoičić, 1969: figs. 1—3), while a transverse section may even be interpreted as denying this statement (Radoičić, 1969: fig. 1b). However, an almost identical description of the arrangement of the branches is given for *S. hammudai* (Radoičić, 1975), mentioning the uniformly distributed whorls as a generic characteristic, and a few lines further on, the arrangement of the branches in two rows. Hence it is not clear whether the single whorls or the group of whorls are uniformly distributed along the main stem of the thallus. Hence it cannot be concluded that there is a concentration of two or three whorls at regular intervals along the thallus, as it has been clearly stated by Milanović (1966) in the description of the genus *Likanella*. Neither does the illustration of *S. hammudai* (Radoičić, 1975: Pl. 1, fig. 10) show the arrangement of the branches in two rows (meaning the branches belonging to the same whorl); it probably represents a deeper tangential section of a segment, showing two rows of equally sized pores, which would suggest the existence of two whorls. This shows that species interpreted in the same way have been assigned to different genera. Let us remember that already Sartoni & Crescenti (1962), in their original description of the genus *Selliporella*, expressly stated that the genus differed from similar genera, in particular from *Clypeina*, in having the branches of the individual whorls (verticills) arranged in two or more »series«, while in *Clypeina* the whorls are formed of one row (»series«) of branches. Our own observations show the existence of two or three closely concentrated whorls with divergently directed branches, rather than being interpreted as single whorls with two or three rows of branches. If we accept Radoičić's

(1968) statement that tangential sections are most characteristic for such forms of the calcareous algae, then the section of *C. pejovicae* in the upper part of the picture (Radoičić, 1969: fig. 2h) and the sections of *S. donzellii* in the present paper (Pl. 2, fig. 4; Pl. 4, fig. 1a) appear almost identical, with the differences that do not exceed the specific level. Hence it follows that *C. pejovicae*, also, should be included into the genus *Selliporella*.

Selliporella dalmatica n. sp.

Plates 6—9

1968. »*Dasycladacea*« *dalmatica* spec. nov. — Radoičić, p. 183—185, pls. 12—14.
?1968. *Actinoporella podolica* (Alth) 1878. — Bouroullec & Deloffre, pl. 5, fig. 11.
non 1970. *Verticilloporella dalmatica*. — Raviv & Lorch, p. 234—235, pl. 1, figs. 1—6; pl. 2, figs. 1, 2.
1970. *Verticilloporella dalmatica* Raviv & Lorch. — Conrad, p. 69—70, pl. 5, figs. 1—3.
?1971. »*Dasycladacea*« *dalmatica* Radoičić. — Masse & Poignant, p. 261, pl. 2, fig. 2.
?1973. *Likanella? danilovae* Radoičić. — Jaffrezo, p. 81, pl. 2, fig. 13.
1974. *Actinoporella podolica* (Alth) 1878. — Conrad, Praturlon & Radoičić, p. 2, 4, 6, 12, fig. 11.

The new interpretation of this alga, here labelled as a new species of the genus *Selliporella*, necessitates a brief review of the foregoing period, during which it was variously named but, in the present authors' opinion, no valid establishment of that species has so far been made.

It was first described by Radoičić (1968: p. 183—185, pls. 12—16) as »*Dasycladacea*« *dalmatica* spec. nov. On that occasion Radoičić proposed that an informal genus with the family name »*Dasycladacea*« be established, into which all forms of inadequately understood structure should be lumped (due to poor state of preservation or insufficient material available), which, according to Radoičić, represent new forms for the science and have a stratigraphic value as index forms. However, already the first attempt proved unsatisfactory, showing serious shortcomings for various poorly preserved algal remains, deriving from different levels, have subsequently been attributed to this dubious alga. By doing so the very intention of the author, namely that of pinpointing stratigraphically useful forms, has failed. On the other hand, the proposal to establish an informal genus with a familiar name cannot be accepted from taxonomic criteria, and would probably lead to the description of several new forms with no clearly set delimitations, i.e. properly outlined diagnostic features, and thus turning out to be totally useless for stratigraphic purposes. This is already exemplified in »*Dasycladacea*« *dalmatica*, to which remains of various forms have been assigned, including such which are impossible to determine on the basis of whichever criteria. This caused the »*Dasycladacea*« *dalmatica* to lose both its stratigraphic and taxonomic validity, and its subsequent assigning to the synonymy of valid *Actinoporella podolica* (Conrad & al., 1974) casts

serious doubts as to whether all unclear forms represent new forms, though this will be shown from that example. However, the assignment of that form to *A. podolica* implies the broadening of the stratigraphic range of *A. podolica*, which forms an obvious discrepancy with the original intention.

Raviv & Lorch (1970) have noticed the invalidity of the generic name »*Dasycladacea*« and thus they correctly concluded that the taxon bearing this name was also invalid. Probably because of that, they (Raviv & Lorch, 1970: p. 234—235, pls. 1—2) have established the new genus, *Verticilloporella*, retaining at the same time the species name »*dalmatica*« proposed by Radoičić (1968). However, they failed to furnish the description of the species, probably regarding the description by Radoičić (1968) as valid on the specific level, and hence not even on that occasion was the species validly established. In addition, Raviv & Lorch (1970: pls. 1—2) depicted fragments of *Actinoporella podolica* under the name of *V. dalmatica*. Later, Conrad & al. (1974) identified the fragments depicted by Raviv & Lorch (1970) as belonging to *Actinoporella podolica*, proving at the same time that the characteristics ascribed by Raviv & Lorch (1970) to the genus *Verticilloporella* are in fact characteristic of the genus *Actinoporella*. On that occasion, also, all sections depicted by Radoičić (1968) as »*Dasycladacea*« *dalmatica* (Radoičić, 1968: pls. 12—16) were assigned to *A. podolica*, as well as sections depicted by Conrad (1970: pl. 5, figs. 1—3; pl. 9, fig. 1) labelled *Verticilloporella dalmatica*. In quoting the above mentioned papers, we deliberately omitted sections depicted also by some other authors, which are so poorly preserved that any determination is impossible. For the same reason, they have not been cited in the above synonymy list.

As may be seen from all that has been mentioned above, the situation with that frequently cited species is by no means definitely clear. In stating that, we clearly exclude the forms described under one of the above mentioned names, but which may be reliably determined as belonging to any already existing taxa, and limit our interest only to those specimens which represent the new species, originally described by Radoičić (1968) as »*Dasycladacea*« *dalmatica*.

In this renewed description — in our opinion, the first formally valid description of that 10-year-old form — we choose to retain the specific name proposed by Radoičić (1968), both in order to avoid introducing new names and because we respect Mrs. Radoičić's contribution in having recognized that form.

Type locality: island Korčula, Dalmatia (south Croatia, Yugoslavia); on the road about 2 km SW of Pupnat village.

Age of the type locality: Upper Barremian (for more detailed information see under heading Stratigraphic position).

Holotype: Pl. 6, fig. 1; slide KP-7.

Diagnosis: A *Selliporella* with segments composed of three to four whorls of phloiophorous branches, and cylindrical main stem of a uniform diameter. The verticillate arrangement of the branches becomes more clearly pronounced distally, i.e. at the periphery.

Description: The calcareous skeleton is of a cylindrical shape, built up of recrystallized calcite, and characterized by alternation of parts with concentrated whorls (verticills) of the branches and of brancheless parts, connecting the former (Pl. 6, figs. 1—2; Pl. 7, figs. 1—3; Pl. 9, fig. 2). The branch-bearing parts of the skeleton look like segments, especially in more strongly recrystallized speciments (Pl. 9, fig. 2). These are connected with thin-walled, cylindrical parts of the skeleton. The central cavity (= main stem) is relatively broad and with an even inner contour. The ratio outer diameter/inner diameter depends on where the thallus is cut, so that in the branch-bearing parts of the thallus (= segments) it is 3.5—4 : 1, and in cylindrical branchless part it is about 1.2 : 1.

The branches are simple, undivided, and arranged in whorls (verticills), which, in turn, are concentrated into groups (or »bundles«, «tufs«) composed of 3—4 whorls (Pl. 1, figs. 1—2; Pl. 2, figs. 1—4) and distributed in rather regular intervals along the thallus (Pl. 1, figs. 1—2). Each branch has its own calcareous envelope, which widens distally, according to the shape of the branches. Each branch communicates with the main stem through a (probably) tiny pore, though this is not clearly visible in the available sections (Pl. 6, fig. 4; Pl. 9, fig. 5). Within a group, the whorls are densely arranged, compressed to each other, which may be seen in longitudinal and oblique sections. The branches widen going outward and become more clearly individualized distally, because a large number of branches grow up from a small surface (25—30 branches in a whorl, 80—100 branches in a segment), and they are variously directed, in relation to the longitudinal axis of the thallus. The branches of the uppermost whorl are, as a rule, directed upward, those of the middle whorl are directed slightly upward or approximately perpendicular to the longitudinal axis of the thallus, and those of the lowermost whorl are, at least in their distal parts, directed downward (Pl. 6, figs. 1—2; Pl. 7, figs. 1, 4; Pl. 8, fig. 1). In the basal (proximal) parts of the branches the calcareous envelopes are tightly compressed, and if there is occassionally a loose interspace, it is filled up with calcite. Going toward the periphery, each whorl also becomes more clearly individualized, which is best seen in tangential sections cutting through the tips of the branches, which appear as a row of calcite rings (Pl. 6, figs. 1, 2; Pl. 7, fig. 1). It remains unanswered whether in the extreme distal parts it comes to an individual separation of the branches, though some sections may possibly suggest this.

Dimensions in mm:

Outer diameter of the branch-bearing parts of the thallus (= calcified part, »segment«)	1.60—2.25
Inner diameter	0.40—0.74
Outer diameter of the cylindrical branchless parts of the thallus	0.55—0.84
Height of segments	0.75—0.80
Distance between the segments (= length of the tubular parts of the thallus)	0.37—0.43
Maximum diameter of the branches	0.18—0.25 (0.40?)
Length of the branches	0.69—0.82
Number of branches in a whorl	25—30
Distance between the whorls	0.14?

Similarities and differences: This spacies has been here assigned to the genus *Selliporella* on the basis of the above described characteristics. It differs clearly from *S. spinosa, S. donzellii* and *S. bartheli,* in all of which the terminal individualization of single branches is clearly pronounced. Compared to *S. danilovae,* this species is considerably larger and the branches are of a different shape: in *S. danilovae* the branches show a more pronounced outward divergent tendency. Moreover, the number of branches in a segment is smaller in *S. danilovae. S. dalmatica* differs from *S. hammudai* by its larger size and larger number of whorls (3—4) in a segment, as well as from *S. campanensis,* the latter species, having, moreover, the branches of a distinctly different shape. As regards the size, *S. dalmatica* is closest to *S. pejovicae,* from which it differs by the greater number of whorls in a segment (3—4 in *S. dalmatica* vs. 2 in *S. pejovicae)* and by the distally more widened branches. A feature common to all species of the genus *Selliporella* is the differentiation of the thallus into branch-bearing and branchless parts, as in the genera *Clypeina* and *Actinoporella.* However, in both *Clypeina* and *Actinoporella* single whorls (verticills), or in other words, whorls consisting of one row of branches, are distributed along the thallus, whereas in *Selliporella* two or more whorls are concentrated in groups (or »bundles«), which makes any confusion impossible.

Stratigraphic position: *S. dalmatica* has been found in a sample taken from a stratimetrically measured Lower Cretaceous sequence, so that its exact position may be precisely defined with relation to the under- and overlying deposits and their respective fossil contents. In a 60 m thick, underlying limestone complex, the following microfossils have been determined: *Salpingoporella melitae* Radoičić, *S. cerni* (Radoičić), *S. muehlbergii* (Lorenz), *Salpingoporella* sp., *Cylindroporella* sp., *Debarina hahounerensis* Fourcade & al., *Pseudotextulariella? scarsellai* (De Castro), *Cuneolina camposaurii* Sartoni & Crescenti, *Sabaudia minuta* (Hofker), and other, stratigraphically insignificant, forms. In the complex with *S. dalmatica,* which is about 10 m thick, the following forms have been found: *Cylindroporella* sp., *Nezzazata simplex* Omara, *Sabaudia minuta, Debarina hahounerensis,* and *Pseudotextulariella? scarsellai,* in addition to stratigraphically insignificant forms. In the overlying deposits, 10 m above the last occurrence of *S. dalmatica, Palorbitolina lenticularis* (Blumenbach) makes its first appearance, accompanied by other, less important, forms. On the basis of all that, the stratigraphic position of *S. dalmatica* at the type locality can be defined, quite reliably, as the Upper Barremian.

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REFERENCES

Bernier, P. (1971): Deux nouvelles algues Dasycladacees du Jurassique supérieur du Jura meridional. — *Géobios,* 4/3, 174—183, Lyon.

Bouroullec, J. & Deloffre, R. (1968): Les algues du Néocomien d'Aquitaine. — *Bull. Centre Rech. Pau, SNPA, 2,* (2), 213—261, Pau.

Conrad, M. A. (1970): Barremian and Lower Aptian Dasycladaceae in the area surrounding Geneva (Switzerland). — *Geol. Romana, 9,* 63—100, Roma.

Conrad, M. A., Praturlon, A. & Radoičić, R. (1974): The Genus *Actinoporella* Guembel in Alth 1882, Dasycladales, green Algae. A, revision. — *Geol. Romana, 13,* 1—15, Roma.

Crescenti, U., Crostella, A., Donzzelli, G. & Raffi, G. (1969): Stratigrafia della serie calcarea dal Lias al Miocene nella regione Marchigiano-Abruzzese. — *Mem. Soc. Geol. Ital., 8,* 343—420, Pisa.

De Castro, P. (1962): Il Giura-Lias dei Monti Lattari e dei rilievi ad ovest della Valle dell'Irno e della Piana di Montoro. — *Boll. Soc. Natur. Napoli, 71,* 3—34, Napoli.

Dondi, L., Papetti, I. & Tedeschi, D. (1966): Contributo alle conoscenze del Mesozoico del sottosuolo abruzzese. — *Geol. Romana, 5,* 69—81, Roma.

Devoto, G. & Parotto, M. (1967): Note geologiche sui rilievi tra Monte Crepacuore e Monte Ortara (Monti Ernici—Lazio nord-orientale). — *Geol. Romana, 6,* 145—163, Roma.

Jaffrezo, M. (1973): Les alques calcaries du Jurassique supérieur et du Crétacé inférieur des Corlières. — *Rev. Micropal., 16/2,* 75—88, Paris.

Masse, J. P. & Poignant, A. F. (1971): Contribution à l'étude des algues du Crétacé inférieur provencal. Intéret stratigraphique. — *Rev. Micropal., 13/4,* 258—266, Paris.

Nikler, L. & Sokač, B. (1967): Fosilne Dasycladaceae gornje jure Velebita i sjeverozapadne Velike Kapele. — *Rad Jugosl. akad. znan. umjetn., 345,* 101—134, Zagreb.

Nikler, L. & Sokač, B. (1968): Biostratigraphy of the Jurassic of Velebit (Croatia). — *Geol. vjesnik, 21,* 161—176, Zagreb.

Radoičić, R. (1966): Microfaciès du Jurassique des Dinarides Externes de la Yougoslavie. — *Geologija, 9,* Ljubljana.

Radoičić, R. (1968): *Likanella? danilovae* spec. nov. et quelques autres Dasycladacées crétacées inférieures des Dinarides externes. — *Vesnik Zav. geol. geof. istr.,* (A), *26,* 177—193, Beograd.

Radoičić, R. (1969): A new Lower Cretaceous Dasycladacea, *Clypeina pejovici,* and note on some Clypeinae. — *Geol. Romana, 8,* 71—84, Roma.

Radoičić, R. (1975): On *Likanella hammudai* sp. nov. from the Upper Cretaceous of the Tripoli Area (Lybia) and the age of strata containing *Dissocladella ondulata* Raineri. — *Geol. Anali Balk. Poluostrva, 39,* 147—152, Beograd.

Raviv, V. & Lorch, J. (1970): *Verticilloporella,* a new Mesozoic genus of Dasycladaceae, with discussion on *Munieria* and *Actinoporella.* — *Israel Journ. Bot., 19,* 225—235.

Sartoni, S. & Crescenti, U. (1962): Ricerche biostratigraphiche nel Mesozoico dell'Appennino Meridionale. — *Giorn. Geol.,* (2a), *39* (1960—1961), 161—302, Bologna.

Ponovni opis roda *Selliporella* (vapnenačke alge; Dasycladaceae)

B. Sokač i *I. Velić*

UVOD

Rod *Selliporella* uspostavljen od Sartoni & Crescenti (1962) prikazan je prilikom prvog opisa oskudnim materijalom s nekoliko fragmentarnih presjeka genotipske vrste *Selliporella donzellii* Sartoni & Crescenti. Ovako oskudan materijal (Sartoni & Crescenti, 1962, tab. XIV, tab. XLIII, sl. 1—5) za kojega se danas može utvrditi da predstavlja isključivo presjeke pojedinih seg-

menata vrste *S. donzellii* uvjetovao je, što je i razumljivo, nedovoljno jasan prikaz ove stratigrafski izuzetno značajne vapnenačke alge. Ponovljeni opis ove vrste kojega su dali Nikler & Sokač (1967), ilustriran također nepovoljnim materijalom (Nikler & Sokač, 1967, tab. I, sl. 1—9), nije ni tom prilikom omogućio da se sagledaju stvarne karakteristike ove vrste, a kroz nju i roda *Selliporella*. Ovo tim više što zadnje navedeni autori vrsti *S. donzellii* pridaju cjeloviti cilindrični talus s alternirajućim ograncima susjednih gusto poredanih pršljenova. Nešto jasniju sliku u pogledu morfoloških odlika *S. donzellii* bilo je moguće dobiti iz presjeka koje su u svojim radovima dali De Castro (1962, tab. XIII), Radoičić (1966, tab. XCIX, sl. 1—2), Dondi & al. (1966, tab. VI, sl. 1—4) te Devoto & Parotto (1967, str. 147, sl. 2). Međutim potrebno je napomenuti da je segmentirana građa talusa uočljiva već iz originalnog opisa (Sartoni & Crescenti, 1962) kada se govori o izoliranim i pojedinačno fosiliziranim pršljenima ili nešto dalje usporedbom s rodom *Clypeina* od kojega se ovaj razlikuje pršljenima kod kojih su ogranci svakog pršljena smješteni u dvije ili više serija razmještenih jedna iznad druge, kao što je već u prvom momentu bilo nejasno.

Materijal dogerskih vapnenaca prikupljen je u suradnji s I. Galovićem i potječe od ulomaka i blokova nađenih u tercijarnim brečama na staroj cesti od Neuma za Metković te iz vapnenaca dogera sjeverno od naselja Duži na cesti za Hutovo.

Tribus Diploporeae Pia 1927

Genus *Selliporella* Sartoni & Crescenti 1962

Ovaj rod odlikuje se cilindričnom stabljikom na kojoj su u izmjeni diferencirani dijelovi s i bez ogranaka. Dijelovi talusa bez ogranaka s tankim vapnenačkim stijenkama valjkastog oblika i varijabilne dužine rahlo međusobno povezuju dijelove talusa s kojih izrastaju ogranci. Ogranci su približno pirifornog ili floiofornog, a kod pojedinih vrsta približuju se vezikulifernom tipu. Smješteni su u dva, tri ili više pršljena. Pršljenasti raspored ogranaka zbog njihovog većeg broja koncentriranog na maloj površini prividno može biti narušen. Ogranci su obavijeni vlastitom vapnenačkom ovojnicom, kojih je međuprostor u proksimalnom dijelu ispunjen vapnenačkom masom, dok distalno strše pojedinačno slobodno u obliku bodlja (kod ogranaka približno pirifornog tipa), ili daju dojam nakupine (kod ogranaka približno floiofornog i vezikulifernog tipa), čime se na talusu formiraju više ili manje izraženi »segmenti«. Ovime ne treba isključiti i mogućnost perifernog samostalnog prisustva floiofornih ogranaka što može biti ovisno o njihovoj gustoći, intenzitetu njihovog proširenja prema distalnom kraju, ili drugom faktoru, kao primjerice kutu što ga čine susjedni ogranci superponirajućih pršljena. Položaj ogranaka u odnosu na uzdužnu os stabljike varira od ustrmljenih naviše do onih koji su usmjereni naniže, što je moguće kod iste vrste i na istom primjerku.

Selliporella donzellii Sartoni & Crescenti

Table I—V

1962. Dasycladaceae. — De Castro, tab. 13.
1962. *Selliporella donzellii* n. sp. — Sartoni & Crescenti, str. 263, tab. XIV, tab. XLIII, sl. 1—5.
1964. *Selliporella donzellii* Sartoni & Crescenti. — Farinacci & Radoičić, tab. 5, sl. 1.
1966. *Selliporella donzellii* Sartoni & Crescenti. — Dondi, Papetti & Tedeschi, tab. 6, sl. 1—4.
1966. *Selliporella donzellii* Sartoni & Crescenti. — Radoičić, tab. XXIX, sl. 1, tab. XCVII, sl. 1—2, tab. XCIX, sl. 1—2, tab. CXV, sl. 1—2.
1967. *Selliporella donzellii* Sartoni & Crescenti. — Devoto & Paroto, str. 147, sl. 2.
1967. *Selliporella donzellii* Sartoni & Crescenti. — Nikler & Sokač, str. 109—110, tab. I, sl. 1—9.
1968. *Selliporella donzellii* Sartoni & Crescenti. — Nikler & Sokač, tab. VII, sl. 5.

Potreba da se ponovi opis vrste *S. donzellii* proizlazi iz njezinog dosada nepotpunog ili netočnog prikaza kao posljedice pomanjkanja ilustrativnog materijala s jedne strane i s druge, kao genotipskog predstavnika na osnovi kojega se omogućuje potpunija usporedba s vrstama pribrojenim drugim rodovima.

Opis. *Selliporella donzellii* predstavljena je cilindričnim vapnenačkim skeletom izgrađenim od rekristaliziranog kalcita. Duž skeleta diferencirani su dijelovi s i bez ogranaka. Ojačani dijelovi s kojih izrastaju ogranci poprimaju oblik segmenata za koje se čini da su nastali ispunjavanjem međuprostora u proksimalnom dijelu ogranaka između njihovih vapnenačkih ovojnica. Ovi segmenti međusobno su spojeni valjkastim dijelovima skeleta bez ogranaka, kod kojih debljina vapnenačkog zida varira ovisno da li segment oštro ili postupno prelazi u valjkasti dio skeleta redovito najtanjih stijenka neposredno iznad nižeg segmenta (tab. I, sl. 3, tab. III, sl. 1, 2, tab. IV, sl. 4). Tanka vapnenačka stijenka valjkastog dijela skeleta jedan je od primarnih razloga da se ova alga nađe veoma rijetko očuvana u većim fragmentima na kojima su vidljiva dva, tri ili više segmenata, pa je predodžba o njezinoj građi uglavnom bila bazirana na pojedinačnim dijelovima skeleta s kojih su izrastali ogranci. Na unutrašnjoj površini skeleta, u šupljini matične stanice zapažaju se više ili manje izražena ojačanja u visini segmenata nastala odebljavanjem vapnenačke stijenke prema unutra, što uvjetuje sužavanje matične stanice, odnosno njezino proširenje u valjkastom dijelu skeleta (tab. I, sl. 3, tab. II, sl. 5, tab. III, sl. 1, 5). S obzirom na ove odlike vanjske i unutrašnje površine skeleta odnos vanjskog i unutrašnjeg dijametra varira ovisno o mjestu ravnine presjeka. U ravnini sa segmentom gdje je matična stanica sužena iznosi 2,8:1 dok u presjeku kroz donji valjkasti dio skeleta koji ima i najtanje vapnenačke stijenke ta se vrijednost kreće u omjeru 1,5:1. U slučaju postupnog odebljavanja valjkastog dijela skeleta (tab. IV, sl. 4) ovisno o mjestu presjeka spomenuti omjer se mijenja. U vapnenačkim zidovima valjkastog dijela skeleta često se zapažaju fini kanalići i pore za koje izgleda da su dijelom uništeni rekristalizacijom. Raspored ovih kanalića i pora, lakše uočljivih u poprečnim presjecima (tab. I, sl. 6, tab. II, sl. 7), ne izgleda pravilan već više slučajan pa njihova funkcija ostaje nejasna. Neke indikacije u pogledu ovih kanalića i pora sugeriraju mogućnost da oni potječu od vanjskih uzdužnih brazda duž dijela skeleta bez ogranaka. Čini se da se protežu od najnižih ogranaka superponirajućeg segmenta i da se postupno prema nižem gube, odnosno sekundarno mogu biti ispunjeni vapnenačkom masom, pa bi pore dijelom predstavljale relikte tih brazda.

Bitna karakteristika roda i tipske vrste proizlazi iz položaja, oblika i rasporeda ogranaka koncentriranih na talusu u više manje izraženim razmacima, koji su ako promatramo pojedinačno individue dosta pravilni. Međutim udaljenost od jednog do drugog segmenta promatrano kod više primjeraka znatno varira (tab. I, sl. 1, 3, tab. III, sl. 3, tab. IV, sl. 2, 4, tab. V, sl. 1—4). Kod vrste *S. donzellii* koncentrirani su ogranci dva do tri pršljena (tab. I, sl. 1, tab. II, sl. 1, tab. V, sl. 1, 2). Ogranci su nepodjeljeni približno pirifornog tipa, neki više tipični (tab. I, sl. 4, tab. III, sl. 1, tab. IV, sl. 3a), pa do takvih koji znatno odstupaju od ovog oblika (tab. III, sl. 4, 5). Svaki ogranak posjeduje vlastitu vapnenačku ovojnicu. Kako su ogranci dva ili tri pršljena koncentrirani na maloj površini to su ovojnice ogranaka u proksimalnom dijelu, gdje su ovi i deblji, međusobno stisnute. Mali preostali međuprostor između ovojnica u proksimalnoj regiji ispunjava vapnenačka masa, pa se na tim dijelovima skeleta formira odebljanje u obliku segmenta. Prema vani ogranci su različito usmjereni od onih koji rastu prema gore (ogranci najvišeg pršljena), preko približno horizontalnih i horizontalnih (ogranci srednjeg pršljena), do ogranaka koji rastu prema dolje (ogranci najnižeg pršljena), što uvjetuje veliku varijabilnost kuta kojega zatvaraju ogranci grupe pršljena s uzdužnom osi talusa (tab. II, sl. 2, tab. III, sl. 1, 2, 5, tab. IV, sl. 3a). Ovakvim načinom rasta ogranaka uz njihovo sužavanje uvjetovano je i njihovo međusobno udaljavanje distalno. Ovo dovodi do potpune individualizacije svakog ogranka zaštićenog vlastitom ovojnicom koja također stanjuje prema vrhu, pa ova postaje nalik relativno tupoj bodlji (tab. I, sl. 4, 5, tab. III, sl. 1, 2, 4, tab. IV, sl. 3a). Na nekim primjercima ove vrste zapažaju se odstupanja u pogledu distalne divergencije ogranaka (Dondi & al., 1966, tab. VI, sl. 1—4, Radoičić, 1966, tab. XCIX, sl. 1—2) i njihovog usmjeravanja prema gore čime je povijanjem ogranaka u jednu stranu došlo i do ograničene mogućnosti njihove individualizacije. Na malobrojnim povoljno orijentiranim presjecima vidljiv je položaj ogranaka u jasno diferenciranim pršljenima (tab. II, sl. 6, tab. V,

sl. 1a), kojih dva do tri čine grupu pršljena. Međusobni odnos ogranaka susjednih pršljena izgleda najvjerojatnije naizmjeničan što se uočava na presjecima uz bazu ogranaka, a prema vani se zbog različitog usmjeravanja ogranaka ubrzo gubi. Svaki ogranak porom malih dimenzija komunicira s matičnom stanicom.

Individualizirani dio ogranka u obliku bodlje rijetko je očuvan i najčešće ga nalazimo kao biodetritus u obliku cjevčica poprečnog ili uzdužnog presjeka kod kojih se, premda u našem materijalu rjeđe, zapaža i zakrivljenost jednog broja individualiziranog dijela ogranka (tab. II, sl. 1, 5, tab. III, sl. 6a).

Dimenzije u mm:

Vanjski dijametar dijela talusa s ograncima (kalcificirani dio — segment)	1,75—2,95
Unutrašnji dijametar talusa u ravnini segmenta	0,55—1,11
Vanjski dijametar valjkastog dijela talusa bez ogranka	1,11—1,68
Unutrašnji dijametar valjkastog dijela talusa	0,70—1,11
Visina segmenta	0,75—0,93
Udaljenost segmenata (dužina valjkastog dijela talusa)	0,93—1,85
Dijametar ogranaka u najširem dijelu	0,18—0,21
Dužina ogranaka	1,30—1,80
Broj ogranaka jednog pršljena	20—30
Udaljenost pršljena u segmentu	?0,18

Opaske:

1. Vrijednost vanjskog dijametra dijela talusa s ograncima odnosi se na širinu segmenta bez individualiziranog dijela ogranaka, koji su vrlo rijetko očuvani, a i za one koje nalazimo nije sigurno da su očuvani cijelom dužinom.

2. Vrijednosti dužine ogranaka odnose se na maksimalno promatrane, a niz prisutnih fragmenata bodlja i njihovi samostalni nalazi sugeriraju mogućnost da im je dužina mogla biti veća od mjerene.

Diskusija. Na osnovi iznešenog materijala kroz dopunjeni opis roda i njegove genotipske vrste *S. donzellii* moguće je potpunije sagledati više dosada nepoznatih karakteristika roda *Selliporella*, koje ga u ovom momentu prezentiraju u novom obliku. Navedene dopune danas samo pokazuju opravdanost svojevremenog uspostavljanja roda *Selliporella*, ali istovremeno nameću i nužnost nove usporedbe s kasnije uspostavljenim rodom *Likanella* Milanović (1966). U prethodno dopunjenom opisu roda *Selliporella*, a naročito kroz prikaz vrste *S. donzellii*, uočljiv je niz identičnosti s rodom *Likanella* te s njegovom genotipskom vrstom *Likanella spinosa* Milanović. Usporedbom vrsta *L. spinosa* (Milanović, 1966, str. 10—13, tab. I—VI) i *S. donzellii*, koja je prikazana na našim tablama (tab. I—V), zapaža se istovjetna građa talusa na kojem se smjenjuju intervali s koncentracijom ogranaka raspoređenih u tri pršljena kod *L. spinosa* (Milanović, 1966, tab. I, sl. 1, 9, tab. II, sl. 1, 4, 7, tab. IV, sl. 7) i u dva do tri pršljena kod *S. donzellii* (tab. II, sl. 1, tab. III, sl. 3), međusobno povezanih dijelovima talusa bez ogranaka. Nepodjeljeni ogranci jedne i druge vrste zaštićeni su vlastitim vapnenačkim ovojnicama između kojih međuprostor u proksimalnom dijelu ispunjava vapnenačka masa, dok distalno strše slobodno u formi tupih bodlja što je vidljivo u prikazu *L. spinosa* (Milanović, 1966, tab. II, sl. 1, 5, 7, tab. III, sl. 2—5, tab. IV, sl. 8), kao i kod vrste *S. donzellii* (tab. I, sl. 4—5, tab. III, sl. 1, 2, 4). Podudarnost vrsta *L. spinosa* i *S. donzellii* postoji i u prisutnosti finih pora i kanalića kod obih vrsta u vapnenačkim stijenkama dijela talusa koji je bio bez ogranaka, a što Milanović (1966) uz njihovo postojanje i u stijenkama ovojnice ogranaka navodi kao karakteristiku roda. Ovime su iscrpljene osnovne karakteristike roda *Likanella* koje su neosporno utvrđene i na vrsti *S. donzellii*, pa bi dalja egzistencija roda *Likanella* bila neopravdana, te ga treba smatrati mlađim sinonimom roda *Selliporella*.

Neobično velika sličnost vrsta *Selliporella spinosa* (Milanović) i *S. donzellii* Sartoni & Crescenti, unatoč velikog stratigrafskog intervala između pojave prve u srednjem i gornjem permu i druge u gornjem dogeru, zahtijeva i iznošenje njihovih međusobnih razlika, čime se i dalje zadržava validnost obih vrsta.

S. spinosa u odnosu na *S. donzellii* znatno je manja. Kod prve širina segmenta uključujući dužinu ogranaka iznosi maksimalno 1,5 mm, dok je kod druge ta vrijednost bez dužine individualiziranog dijela ogranka do 2,95 mm. Kod *S. spinosa* visina segmenta je veća od širine, a u *S. donzellii* to je obrnuto, uz znatno veću širinu segmenta. Broj ogranaka u pršljenu prve vrste maksimalno iznosi 20, što je približno minimalni broj ogranaka u jednom pršljenu druge vrste. Unatoč vizuelno velike sličnosti znatna razlika očituje se u obliku matične stanice, gotovo pravilno cilindrične u *S. spinosa*, uz izrazito sužavanje u visini segmenta kod *S. donzellii*.

S obzirom da je kasnije više novih vrsta pribrojeno rodu *Likanella* — *L. ? danilovae* Radoičić (1968), *L. campanensis* Azema & Jaffrezo (1972), *L. bartheli* Bernier (1971), *L. hammudai* Radoičić (1975), a da ove, ako primijenimo iste kriterije po kojima smo ih uvrstili u rod *Likanella*, danas treba smatrati vrstama roda *Selliporella*, to neke od karakteristika spomenutih vrsta treba uključiti u karakteristike roda *Selliporella*.

Prilikom razmatranja roda *Selliporella* potrebno je osvrnuti se i na vrstu *Clypeina pejovicae* Radoičić. U izvornom opisu (Radoičić, 1969) ova je vrsta pribrojena rodu *Clypeina* unatoč prisutnosti nekih karakteristika koje su ostale nedovoljno razjašnjene, a do tada nisu zapažene kod spomenutog roda. Kod ovoga prvenstveno treba analizirati interpretaciju rasporeda ogranaka jednog pršljena u dva niza, što se općenito čini teško prihvatljivim, jer nije vidljivo kod *C. pejovicae* ni u jednom od ilustriranih presjeka (Radoičić, 1969, sl. 1—3), a donekle bi se moglo demantirati poprečnim presjekom (Radoičić, 1969, sl. 1b), premda bazalni dio ogranka ni ovdje nije vidljiv. Međutim, gotovo identičan opis rasporeda ogranaka nalazimo kod vrste *S. hammudai* (Radoičić), gdje se govori o ravnomjerno raspoređenim pršljenima kao karakteristici roda, a nešto dalje o rasporedu ogranaka u dva reda. Iz ovoga ostaje nejasno da li su ravnomjerno raspoređeni pojedinačni pršljeni ili su ravnomjerno raspoređene grupe pršljena, odnosno da li je na talusu u određenim intervalima izvršena koncentracija dva do tri pršljena, kao što je to naglasio Milanović (1966) prilikom opisa roda *Likanella*. Raspored ogranaka u dva reda, ukoliko se misli na ogranke jednog pršljena, ni ovdje nije moguće potvrditi prikazanom fotografijom (Radoičić, 1975, tab. I, sl. 10), koja vjerojatno odgovara dubljem tangencijalnom presjeku jednog segmenta, a što bi u tom slučaju, s obzirom na dva reda pora podjednakih dimenzija, ukazivalo na dva pršljena. S ovim je naglašena istovrsna interpretacija za vrste pribrojene različitim rodovima. Originalnim opisom roda *Selliporella*, autori su istakli (Sartoni & Crescenti, 1962) da se ovaj rod razlikuje od drugih po tome, što su mu ogranci jednog pršljena raspoređeni u dvije ili više serija čime se diferencira i od vrlo sličnog roda *Clypeina* kod kojega je pršljen formiran od samo jedne serije ogranaka. Naša razmatranja negiraju interpretaciju rasporeda ogranaka istog pršljena u dva ili tri reda, već pokazuju koncentraciju dva ili tri pršljena kod kojih su ogranci u odnosu jednog prema drugom divergentni. Ako prihvatimo konstataciju (Radoičić, 1968), da su kosi i tangencijalni presjeci karakteristični za ovako građene vapnenačke alge (Radoičić, 1968, tab. II, sl. 6; Milanović, 1966, tab. IV, sl. 4) koje su dane u usporedbi, onda nesumnjivo ovdje možemo uvrstiti presjek *C. pejovicae* u gornjem dijelu slike (Radoičić, 1969, sl. 2h) ili naš presjek (tab. II, sl. 4, tab. IV, sl. 1a) kao gotovo identične, s razlikama koje su uvjetovane pripadnošću različitim vrstama. Iz ove analize smatramo da jasno proizlazi naše uvjerenje da i vrstu *C. pejovicae* treba pribrojiti rodu *Selliporella*.

Selliporella dalmatica n. sp.
Tab. VI—IX

1968. »*Dasycladacea*« *dalmatica* spec. nov. — Radoičić, str. 183—185, tab. XII—XVI.

?1968. *Actinoporella podolica* Alth, 1878. — Bouroullec & Deloffre, tab. 5, sl. 11.

non 1970. *Verticilloporella dalmatica*. — Raviv & Lorch, str. 234—235, tab. I, sl. 1—6, tab. II, sl. 1, 2.

1970. *Verticilloporella dalmatica* Raviv & Lorch. — Conrad, str. 69—70, tab. V, sl. 1—3.

?1971. *»Dasycladacea« dalmatica* Radoičić. — Masse & Poignant, str. 261, tab. 2, sl. 2.

?1973. *Likanella? danilovae* Radoičić. — Jaffrezo, str. 81, tab. 2, sl. 13.

1974. *Actinoporella podolica* (Alth) 1878. — Conrad, Praturlon & Radoičić, str. 2, 4, 6, 12, sl. 11.

Novi prikaz ove vapnenačke alge, uz njezino označavanje kao n. sp. roda *Selliporella*, zahtijeva da se barem ukratko radi objašnjenja osvrnemo na prethodni period u kojem je ona bila različito označavana, a ni u jednom slučaju prema našem mišljenju kao vrsta validno uspostavljena.

Njezin prvi prikaz dala je Radoičić (1968, str. 183—185, tab. XII—XVI) pod nazivom *»Dasycladacea« dalmatica* spec. nov. Tom prilikom spomenuta autorica predložila je da se uspostavi neformalan rod s imenom fomilije *»Dasycladaceae«*, u kojem bi bili opisani oblici kojih zbog slabe očuvanosti i nedovoljno materijala građa nije dovoljno jasna, a koji prema njezinom mišljenju za nauku predstavljaju nove forme, značajne i u stratigrafskoj interpretaciji. Međutim, već ovaj prvi pokušaj, slijedeći interpretaciju i prikaz ove forme kroz desetgodišnji period, pokazao je niz nedostataka koji su rezultirali da se ovoj nejasnoj algi pribroji različit slabo očuvan materijal iz različitih nivoa, čime je i prvobitna namjera o njezinom stratigrafskom značenju bila u osnovi narušena. S druge strane usvajanje prijedloga (Radoičić, 1968) o uspostavljanju neformalnog roda s imenom familije, nije prihvatljivo s taksonomskog kriterija, a najvjerojatnije bi dovelo do opisa većeg broja novih taksona na materijalu koji se ni u stratigrafskoj interpretaciji ne bi mogao objektivno primjeniti, što pokazuje i primjer vrste *»Dasycladacea« dalmatica* kojoj su pribrojeni ostaci različitih vrsta, pa i takvih koje ni po kojem kriteriju nije moguće determinirati. Već samim tim tako opisani oblik izgubio je svoju stratigrafsku i taksonomsku vrijednost, a njegovo kasnije (Conrad & al., 1974) uvrštavanje u sinonimiku validne vrste *Actinoporella podolica* (Alth) doveo u pitanje postavku da li svi nejasni oblici stvarno predstavljaju i nove, premda će se to na ovom primjeru pokazati. Međutim, pripajanjem ove forme vrsti *Actinoporella podolica* doveo je i do proširenja stratigrafskog raspona ove vrste, čime je postignut upravo suprotan efekt od prvobitne namjere.

Raviv & Lorch (1970), uočivši neispravnost prvobitnog opisa *»Dasycladacea« dalmatica*, ispravno zaključuju da ovaj takson nije validno uspostavljen. Najvjerojatnije iz ovog razloga Raviv & Lorch (1970, str. 234—235; tab. I—II) uspostavljaju rod *Verticilloporella* gen. nov. kojom su prilikom akceptirali ime vrste predloženo od Radoičić (1968), a da nisu označili n. sp., i uz nedostatak opisa vrste, pa ova nažalost ni ovom prilikom nije validno uspostavljena, tim više, što su na svojim tablama (Raviv & Lorch, 1970, tab. I—II) prikazali fragmente vrste *Actinoporella podolica*. Identifikaciju primjeraka koje su dali Raviv & Lorch (1970) s pripadnošću vrsti *A. podolica* kao i karakteristika roda *Verticilloporella* značajnih za rod *Actinoporella*, izvršili su Conrad & al. (1974), kojom prilikom su i svi presjeci prikazani od Radoičić (1968, tab. XII—XVI) također pribrojeni vrsti *A. podolica*, kao i primjerci koje pod nazivom *Verticilloporella dalmatica* daje Conrad (1970, tab. V, sl. 1—3, tab. IX, sl. 1). Kod ovog navoda s naše strane nisu uzeti u obzir primjerci prikazani i od nekih drugih autora, za koje je zbog vrlo slabe očuvanosti teško bilo što određenije reći, pa ih nismo citirali u prethodno navedenoj sinonimici.

Iz izloženog očita je prilično nejasna situacija oko vrste koju pod različitim nazivom već deset godina susrećemo u literaturi, a da kroz cijelo to vrijeme nije stekla status validnog taksona. Ovime treba jasno odvojiti forme objavljene pod jednim od spomenutih naziva, a za koje se objektivno može utvrditi pripadnost nekom od poznatih taksona, i ograničiti se na one primjerke koji odgovaraju novoj formi.

Prilikom opisa n. sp. u okviru roda *Selliporella*, koji dalje slijedi, usvojili smo naziv vrste *dalmatica* predložen od Rajke Radoičić (1968) radi lakšeg snalaženja, izbjegavajući time uvođenje novih naziva uz već postojeći, koji je, bez obzira na neispravnost prethodnih opisa, prihvaćen.

Tipičan lokalitet: oko 2 km na cesti jugozapadno od Pupnata na otoku Korčuli.
Stratigrafska pripadnost: gornji barem.

Holotip. *Selliporella dalmatica* n. sp. prikazana uzdužno-kosim presjekom na tabli VI, sl. 1, sadržana je u preparatu KP-7.

Opis. Vapnenački skelet cilindričnog oblika izgrađen od reklistaliziranog kalcita karakteriziran je smjenjivanjem dijelova talusa s kojih su izrastale grupe ogranaka i dijelova bez ogranaka (tab. VI, sl. 1—2, tab. VII, sl. 1—3, tab. IX, sl. 2). Dijelovi skeleta s nakupinom ogranaka kod jače rekristariziranih primjeraka daju izgled segmenta (tab. IX, sl. 2). Ovi su međusobno povezani cilindrima tankih vapnenačkih zidova. Centralna šupljina relativno je prostrana i ravnih je površina. Odnos vanjskog i unutarnjeg dijametra ovisan je o položaju presjeka i u dijelovima gdje su razvijeni ogranci iznosi 3,5—4:1, dok u dijelu bez ogranaka dobiva drugu vrijednost, cca 1,2:1.

Nepodjeljeni ogranci floiofornog tipa raspoređeni su u pršljene kojih 3—4 čine grupu pršljena (tab. I, sl. 1—2, tab. II, sl. 1—4, i dr.), raspoređenih u relativno pravilnim razmacima duž talusa (tab. I, fig. 1—2). Svaki od ogranaka obavijen je vlastitom vapnenačkom ovojnicom koja se u skladu s oblikom ogranka distalno proširuje. Ogranci samostalno komuniciraju s matičnom stanicom (tab. VI, sl. 4, tab. IX, sl. 5) i premda to u našim presjecima nije jasno vidljivo, najvjerojatnije porom malih dimenzija. Unutar jedne grupe ogranaka pršljeni su gusto stisnuti jedan uz drugog, što je uočljivo uzdužnim i kosim presjecima. Ogranci se prema vani proširuju, a kako ih je veći broj (jedan pršljen 25—30, grupa pršljena 80—100 ogranaka) koncentriran na mali prostor, to se oni distalno razilaze pa su u odnosu na uzdužnu os različito usmjereni. Redovito su ogranci najvišeg pršljena usmjereni prema gore, onog srednjeg prema gore ili približno okomiti, a najnižeg više ili manje barem distalnim krajem usmjereni prema dolje (tab. VI, sl. 1, 2, tab. VII, sl. 1, 4, tab. VIII, sl. 1). U proksimalnom dijelu ovojnice ogranaka međusobno su u uskom kontaktu, a mogući međuprostor ispunjava kalcit. Prema vani dolazi do individualizacije svakog pršljena, što se očituje u presjecima vrhova ogranaka međusobno spojenim kružnicama (tab. VI, sl. 1, 2, tab. VII, sl. 1). Da li u krajnjem distalnom dijelu ogranaka jednog pršljena dolazi i do njihovog pojedinačnog osamostaljenja, što sugeriraju neki presjeci, za sada ostaje još nedovoljno jasno.

Dimenzije u mm:

Vanjski dijametar dijela talusa s ograncima (kalcificirani dio — segment)	1,60—2,25
Unutarnji dijametar	0,40—0,74
Vanjski dijametar valjkastog dijela skeleta bez ogranaka	0,55—0,84
Visina segmenta	0,75—0,80
Udaljenost segmenta (dužina valjkastog dijela skeleta)	0,37—0,43
Maksimalni dijametar ogranaka	0,18—0,25 ?0,40
Dužina ogranaka	0,69—0,82
Broj ogranaka u pršljenu	25—30
Udaljenost pršljena	?0,14

Sličnosti i razlike. Vrsta *Selliporella dalmatica* pribrojena je ovom rodu na osnovi prethodno iznešenih karakteristika. Prema vrstama *S. spinosa, S. donzellii* i *S. bartheli,* za koje je karakteristična distalna individualizacija ogranaka, ova vrsta jasno je diferencirana. U odnosu na vrstu *S. danilovae* naša vrsta znatno je veća i različitog oblika ogranaka, s njihovom jače izraženom divergencijom prema vani kod *S. danilovae,* koja u jednom segmentu ima i manji broj ogranaka. Većim dimenzijama, s tri do četiri pršljena u segmentu kao i finom građom kod *S. dalmatica,* ističe se razlika i prema *S. hammudai,* slično kao i prema vrsti *S. campanensis* kod koje su ogranci izrazitije različitog oblika. Nešto više sličnosti barem u pogledu općih dimenzija nalazimo s vrstom *S. pejovicae,* od koje se *S. dalmatica* razlikuje većim brojem pršljena u jednom segmentu i izrazitijim distalnim širenjem segmenta. Zajednička osobina svih vrsta pribrojenih rodu *Selliporella* izražena je diferencijacijom talusa na dijelove sa i bez ogranaka, slično rodovima *Clypeina* i *Actinoporella* kod kojih se smjenjuju intervali talusa bez ogranaka s onima koji nose samo jedan pršljen, za razliku od roda *Selliporella* kod kojega su koncentrirana dva ili više pršljena, pa je mogućnost međusobne zamjene ovih rodova isključena.

Stratigrafski položaj. *Sellipora dalmatica* n. sp. nađena je u stratimetrijski uzorkovanom stupu donje krede otoka Korčule s točno definiranim položajem, koji je određen fosilnim nalazima u njezinoj podini i krovini. Ispod prvih nalaza ove vrste u kompleksu vapnenaca debljine 60 m nađeni su slijedeći fosilni ostaci: *Salpingoporella melitae* Radoičić, *S. cemi* (Radoičić), *S. mühlbergii* (Lorenz), *Salpingoporella* sp., *Cylindroporella* sp., *Debarina hahounerensis* Fourcade & al., *Pseudotextulariella? scarsellai* (De Castro), *Cuneolina camposaurii* Sartoni & Crescenti, *Sabaudia minuta* (Hofker). U nivou debljine oko 10 m, gdje je prisutna opisana vrsta, nađene su *Cylindroporella* sp., *Nezzazata simplex* Omara, *Sabaudia minuta* (Hofker), *Debarina hahounerensis*, *Pseudotextulariella? scarsellai*. U krovini vapnenaca s ovom vrstom, svega 10 m iznad njezinog zadnjeg nalaza, nađeni su već prvi primjerci vrste *Palorbitolina lenticularis* (Blumenbach) uz koju su prisutni i drugi manje značajni oblici. Na osnovi položaja u stupu i navedenih fosilnih oblika u podini i krovini, vrsta *S. dalmatica* na ovom lokalitetu pripada gornjem baremu.

Primljeno 19. 02. 1977.

PLATE — TABLA I

1—6 *Sellipora donzellii* Sartoni & Crescenti

1 Tangential section (tangencijalni presjek); x 18,1

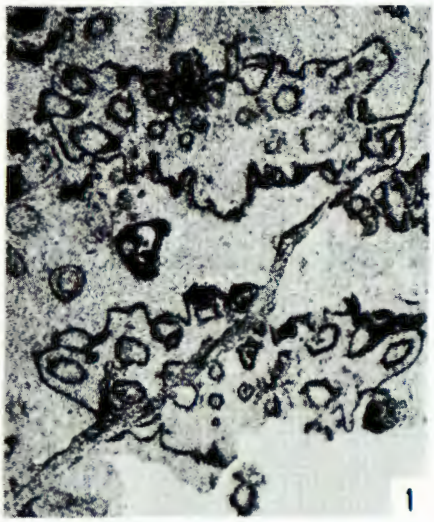
2 Slightly oblique cross section (malo kosi poprečni presjek); x 16,2

3 Longitudinal section (uzdužni presjek); x 15

4 Cross-oblique section (poprečni-kosi presjek); x 16,2

5 Slightly oblique cross section (malo kosi poprečni presjek); x 13,5

6 Cross section trough a part of the thallus without branches (poprečni presjek kroz dio talusa bez ogranaka); x 18,6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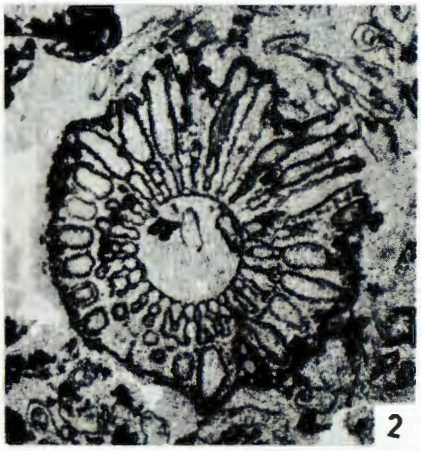
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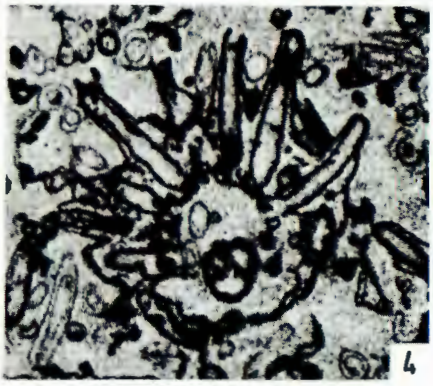
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3


5

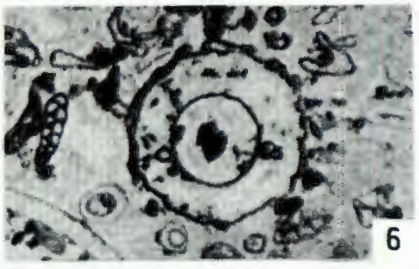

6

PLATE — TABLA II

1—7 *Selliporella donzelli* Sartoni & Crescenti

1 Oblique section (kosi presjek); x 20,7

2 Oblique section (kosi presjek); x 16,3

3 Oblique section (kosi presjek); x 13,5

4 Tangential section trough one segment (tangencijalni presjek kroz jedan segment); x 17,2

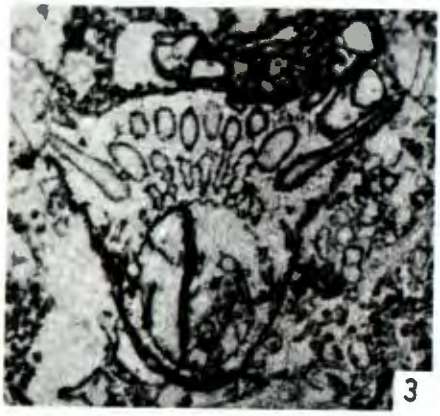
5 Oblique section (kosi presjek); x 20

6 Cross section (poprečni presjek); x 19

7 Cross section trough the lower part of the thallus without branches(poprečni presjek kroz donji dio talusa bez ogranaka); x 19


1


2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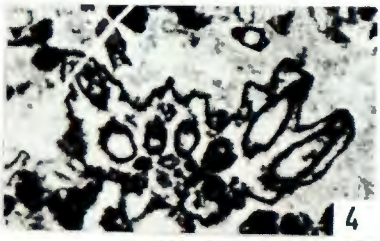
5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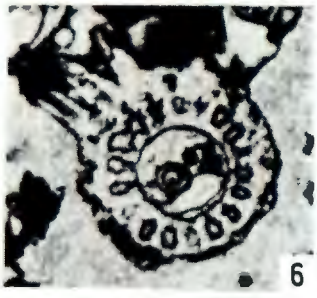
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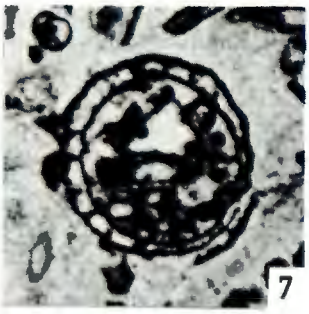
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PLATE — TABLA III

1—6 *Selliporella donzellii* Sartoni & Crescenti

1 Oblique section (kosi presjek); x 21,1

2 Oblique section (kosi presjek); x 27,6

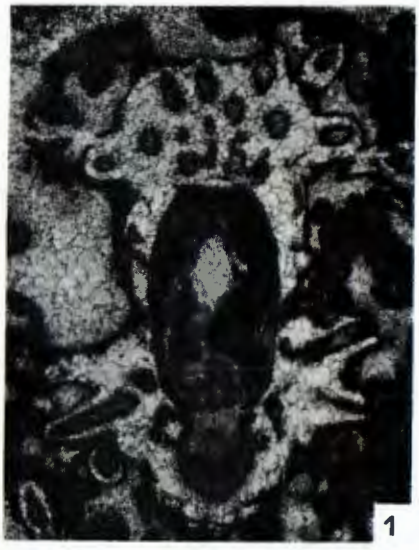
3 Oblique section (kosi presjek); x 20

4 Cross section (poprečni presjek); x 18,4

5 Longitudinal section trough a segment (uzdužni presjek kroz jedan segment) x 20

6a Longitudinal section trough a branch (uzdužni presjek kroz ogranak); x 19,3

6b Longitudinal section trough a part of the thallus without branches (uzdužni presjek kroz dio talusa bez ogranaka); x 19,3


1


2


3


4


5

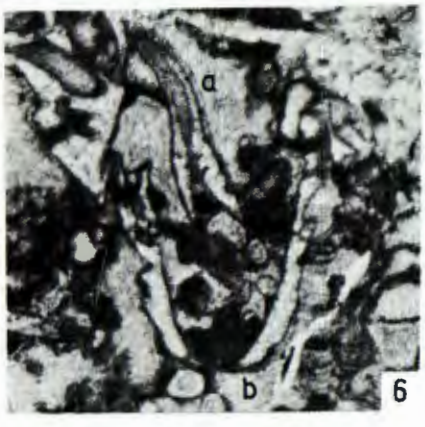

a
b
6

PLATE — TABLA IV

1—4 *Selliporella donzèllii* Sartoni & Crescenti

1a Tangential section trough one segment (tangencijalni presjek kroz jedan segment); x 16,6

1b Longitudinal section trough one segment (uzdužni presjek kroz jedan segment); x 16,6

2 Tangential section (tangencijalni presjek); x 21,8

3a Longitudinal section trough one segment (uzdužni presjek kroz jedan segment); x 14,3

3b Tangential section trough one segment (tangencijalni presjek kroz jedan segment); x 14,3

3c Tangential section (tangencijalni presjek); x 14,3

4 Longitudinal-tangential section (uzdužno-tangencijalni presjek); x 20


a
b
1


2


a
b
c
3

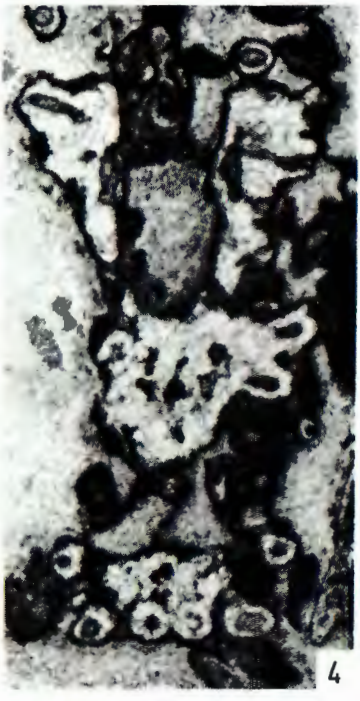

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PLATE — TABLA V

1—4 *Selliporella donzellii* Sartoni & Crescenti

1a Tangential section (tangencijalni presjek); x 12

1b Slightly oblique cross section (malo koso poprečni presjek); x 12

2 Tangential section (tangencijalni presjek); x 15,4

3 Oblique section (kosi presjek); x 16,2

4 Longitudinal section (uzdužni presjek); x 28,5


a
b
1


2


3


4

PLATE — TABLA VI

1–4 *Selliporella dalmatica* n. sp.

1 Oblique section-Holotype (kosi presjek-holotip); x 17,8

2 Longitudinal-tangential section (uzdužno tangencijalni presjek); x 18,3

3 Slightly oblique cross section (malo kosi poprečni presjek); x 16,2

4 Oblique section (kosi presjek); x 20

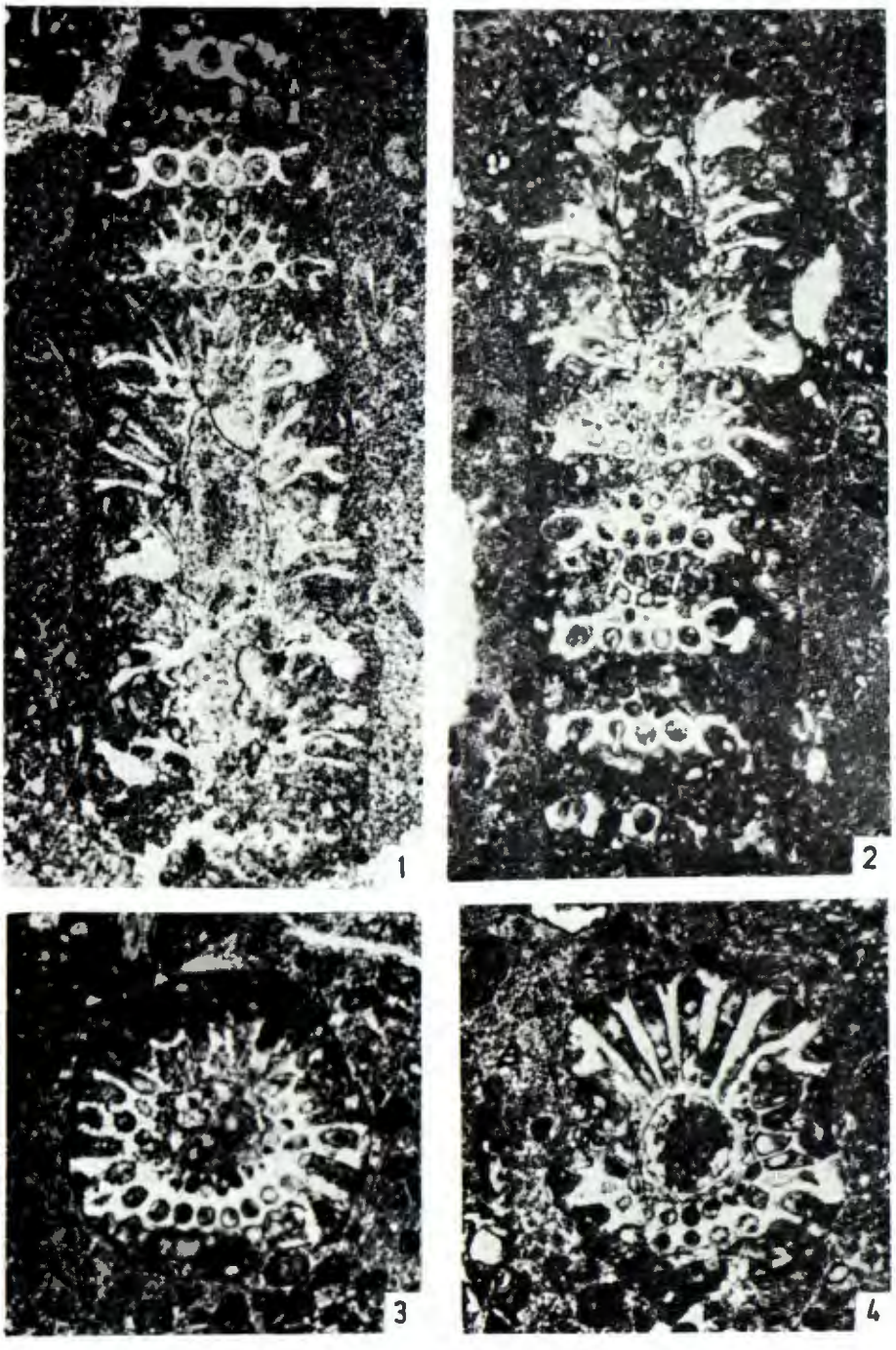

1
2
3
4

PLATE — TABLA VII

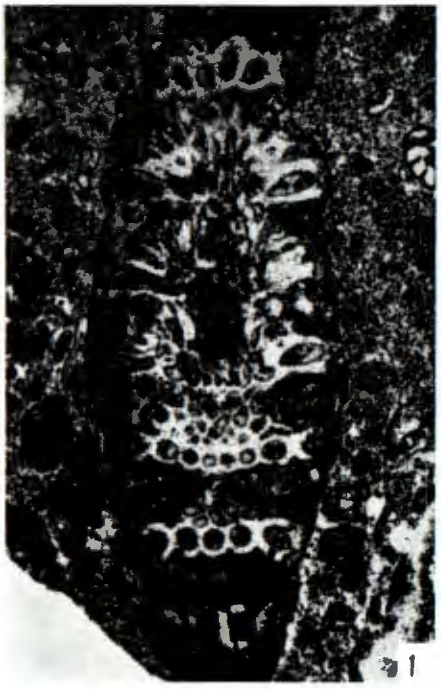
1—4 *Selliporella dalmatica* n. sp.

1 Oblique section (kosi presjek); x 18

2 Oblique section (kosi presjek); x 18,2

3 Oblique section (kosi presjek); x 21,6

4 Longitudinal-tangential section (uzdužni tangencijalni presjek); x 20,9


1


2


3


4

PLATE — TABLA VIII

1—4 *Selliporella dalmatica* n. sp.

1 Oblique section (kosi presjek); x 17,2

2 Longitudinal section (uzdužni presjek); x 20

3 Oblique section (kosi presjek); x 21

4 Oblique section (kosi presjek); x 20


1


2


3


4

PLATE — TABLA IX

1—5 *Selliporella dalmatica* n. sp.

1 Tangential section (tangencijalni presjek); x 16,2

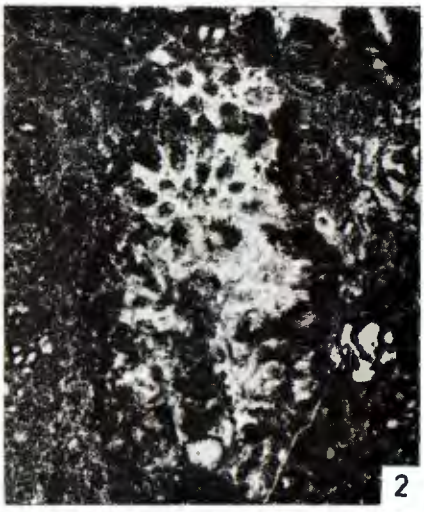
2 Longitudinal-tangential section (uzdužno tangencijalni presjek); x 20,7

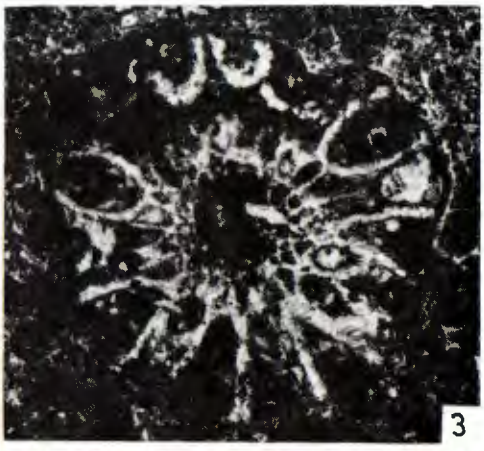
3 Cross section (poprečni presjek); x 21,6

4 Oblique section (kosi presjek); x 20,2

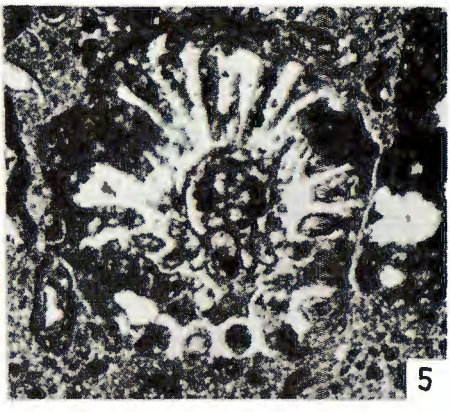
5 Oblique section (kosi presjek); x 20,9


1


2


3


4


5