

Some Triassic Calcareous Algae from Plackles (Hohe Wand, Lower Austria)

By UTARIT BILGÜTAY *)

With 6 fig. and 3 plates

Zusammenfassung

In der vorliegenden Arbeit werden aus rhätischen Kalken und Mergeln des Plackles (Hohe Wand, N.-Ö.) eine Anzahl von Kalkalgen abgebildet und beschrieben. Es konnten zwei Familien nachgewiesen werden, und zwar *Solenoporaceae* (*Solenopora*, *Parachaetetes*) und *Dasycladaceae* (*Physoporella*, *Placklesia multipora* n. gen. n. sp.). *Placklesia* n. gen. scheint hinsichtlich ihrer phylogenetischen Stellung besonders interessant, da der Tribus *Thyrsoporelleae* bisher nur mit zwei Gattungen (*Thyrsoporella* und *Belzungia*) und nur aus tertiären Ablagerungen bekannt war; es dürfte sich somit bei *Placklesia* n. gen. um die triadische Ahnenform der *Thyrsoporelleae* handeln.

Summary

Calcareous algae which were observed in the samples from Plackles locality A/6, Hohe Wand, Lower Austria, are described. The material comprises brown marly limestone and dark shales. According to mega- and microfossils, previously determined by several paleontologists, this samples were assigned Upper Triassic (Rhaetian) age. The geological situation of the area has been described by E. KRISTAN (1960).

The present calcareous algae in these samples belong to two families of *Thallophyta*; i. e. *Solenoporaceae* (*Rhodophyta*) and *Dasycladaceae* (*Chlorophyta*). The family *Solenoporaceae* is represented by *Solenopora* and *Parachaetetes*, *Dasycladaceae* by *Physoporella* and *Placklesia multipora* n. gen. n. sp. The later species seems to be very interesting in its phylogeny as other members of the tribe *Thyrsoporelleae*, *Thyrsoporella* and *Belzungia*, were found only in Tertiary beds and they may have been derived from this Triassic ancestor *Placklesia* n. gen.

Introduction

The material studied was partly provided by Dr. R. OBERHAUSER from Plackles, Hohe Wand (KÜPPER 1963, Locality A/6) in form of brown marly limestone and dark shales, partly it was collected by the author during October 1966 from the same locality. The washed samples of the shales contain small Ammonites, Crinoids, Bryozoa, Foraminifera and Ostracoda besides some of the members of calcareous algae. In thin sections the limestone reveals the same faunae associated with *Solenoporaceae* and *Dasycladaceae*.

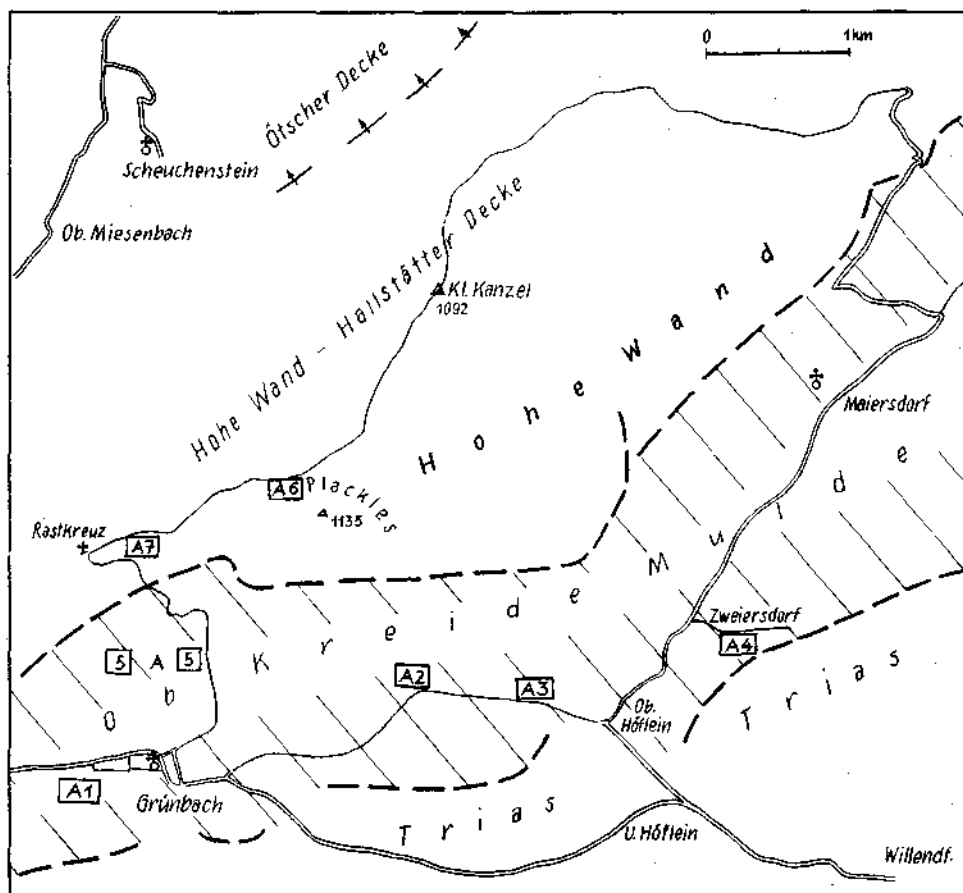
The geological knowledge of the area in question has been provided in detail by E. KRISTAN 1958. The foraminifera have been studied by E. KRISTAN and R. OBERHAUSER, the Ostracoda by K. KOLLMANN and the Crinoids by H. DORECK-SIEVERS. This present paper describes the calcareous algae contents of the Plackles A/6 locality. Text fig. 1 shows a sketch map of the sample area.

Acknowledgements

The author wishes to express her gratitude to UNESCO, Government of Austria and to Professor Dr. H. KÜPPER for providing the opportunity to attend the post Graduate Course in Geology.

*) Address of the author: Midd. East. Tec. Univ. Mining Eng. Dep. Ankara, Turkey.

Thanks to Dr. R. OBERHAUSER for supplying the material and encouragement, to Dr. H. STRADNER, Dr. M. E. SCHMID, Dr. H. PLACHY and other members of Geological Survey of Vienna for their kindly help during the preparation of this paper.



Text fig. 1. The sketchmap of the sample area, after H. KÜPPER, 1963, p. 10, fig. 1.

Systematic Description

Phylum: RHODOPHYCOPHYTA PAPENFUSS, 1946

The Rhodophycophyta represent the structurally highest group of algae and they are distinguished from the other major groups of algae by the following characters:

1. They contain a red pigment (phycoerythrin) and sometimes a blue pigment (phycocyanin) in addition to the green chlorophyll. In most of them the phycoerythrin is of a high amount and covers the colour of other pigments and therefore gives the plants a distinctive red colour.
2. They differ from the other algae by their sexual reproduction, in which non-flagellated male gametes are transported to the female carpogonium.
3. They differ also by lacking flagellated asexual spores.

Class: RHODOPHYCEAE RUPRECHT, 1901

Order: CRYPTONEMIALES SCHMITZ, in ENGLER, 1892

Family: SOLENOPORACEAE PIA, 1927

The description for the family has been given by all details in JOHNSON, 1961, p. 72—74. For all publications and discussions about Triassic members of this family vide E. FLÜGEL, 1960, p. 340—347. Solenoporaceae was represented with two genera in the studied material.

Genus: *Solenopora* DYBOWSKI, 1877

This genus is described as below: in the vertical sections the threads of cells are vertical or slightly radiating. Cross partitions are irregularly spaced and less conspicuous. The slight differentiation of tissue is present. Growth habit: commonly rounded nodular masses.

Solenopora cf. *styriaca* FLÜGEL, 1960

Pl. I, fig. 2, Pl. II, figs. 1, 2

Description

Few broken pieces of thallus have been observed with dimensions of $2.8 \times 3 \times 7.2$ and $2 \times 2.4 \times 3.6$ mm. in dark shales. The thin sections of brown marly limestone contain many short thick branches or pieces of thallus, which are built of parallel cell threads with distinctive longitudinal cell walls, weaker and generally incompleting transversal partitions. In some samples the cell threads show inclination to the outside. The longitudinal cell walls are very thick at the former place of transversal partitions, where these are not complete or not existing. With a low magnification, this thickness gives a net-work view to the tissue. The outlines of cells generally are circular or oval and seldom angular in the transversal sections. The maximum diameter of the thallus is 4.06 to 4.41 mm.

Two different forms can be distinguished, regarding their measurements:

a) Large forms: The cell dimensions in longitudinal sections 0.029—0.044, 0.032—0.040 mm. width and 0.044—0.088, 0.048—0.060 mm. (if measuring is possible) in length. The cell wall is 0.012—0.020 mm. thick. In transversal sections the diameter of cells are 0.028—0.048 mm. and cell walls are 0.012 to 0.024 mm.

b) Small forms: The cell measurements in longitudinal sections are 0.016 to 0.022 mm. in diameter and 0.059 mm. in length. The thickness of the cell wall is 0.012—0.020 mm.

Remarks

The specimens from Plackles are similar to *Solenopora styriaca* from the Zlambach shales by the oval or circular shapes of the cell threads in transversal section; also the cell measurements correspond. But they differ from the present species by thin longitudinal cell walls, which are 0.05—0.10 mm. in *S. styriaca*, and also by the distinctive perl string-like structures of cell threads of *S. styriaca*,

which are not so clear in our form. It also differs from other known species of *Solenopora* with oval or round outlines by its cell threads in transversal sections and in some cases by different cell dimensions.

Occurrence

Lower Austria, Hohe Wand (Plackles, sample A/6), brown marly limestone and dark shales of Rhaetian age. Associated with *Placklesia multipora*, n. gen. n. sp., *Physoporella minutula*, *Parachaetetes* sp. Problematicum 2 and 3 E. FLÜGEL, and below mentioned Foraminifera, Ostracoda and Megafossils.

Other Localities

Rhaetien Zlambach-Schichten, Langmoos near Alt-Aussee, Styria.

Genus: *Parachaetetes* DENINGER, 1906

Description of genus after JOHNSON (1961, p. 74):

"Solenoporaceae with very regular tissue. In vertical sections, the cells appear to be in regular horizontal layers and vertical (or slightly radiating) threads. The cross partitions separating the cells in the threads are thick and regularly spaced and at the same levels in adjoining threads. As result, the tissue in vertical or radial sections commonly has a grid-like appearance."

Parachaetetes sp. indet.

In examined thin sections of brown marly limestone were found some fragments of thallus with very distinctive transversal and longitudinal cell walls. These cells measure 0.029×0.029 mm. They possibly belong to the genus *Parachaetetes*.

Problematicum 2 E. FLÜGEL, 1960

Problematicum 3 E. FLÜGEL, 1964

Pl. II, figs. 3, 4

Some problematica are distinguished in thin sections of the brown marly limestone, which can be compared with Problematicum 2 and Problematicum 3 E. FLÜGEL. These forms are represented as crust-like thalli with fine structure and contain many big pores of irregular shape and dimensions. The pores may be compared with the conceptacles of *Corallinaceae*.

Phylum: CHLOROPHYCOPHYTA PAPENFUSS, 1946

This phylum is one of the largest and most important of algae. Its distinctive characters are:

1. The plants contain Chlorophyll a and b, beside carotin and xanthophyll.
2. The reproduction may be sexual or asexual where by mobile reproductive cells are flagellated.

Class: CHLOROPHYCEAE KÜTZING, 1843

Order: DASYCLADALES PASCHER, 1931

Family: DASYCLADACEAE KÜTZING, orth. mut. STIZENBERGER, 1860

For general description of the family vide JOHNSON, 1961, p. 117—121.

This family is represented by two genera in the examined samples.

Tribe: DIPLOPOREAE

This tribe was described by JOHNSON (1961, p. 121) as below.

"Stem and branches not ramified. Branches usually in clusters of 3 or 6 and often, but not always, in regular whorls (verticille). Generally the thallus is cylindrical or club-shaped. Sporangia in the central stem or in the branches. Sometimes the branches are differentiated into sterile and fertile."

Genus: *Physoporella* STEINMANN, 1903

This genus was described by PIA (1912, p. 43—44) as below.

„Maßgebend für die Zugehörigkeit zu dieser Gattung ist jene Form der Wirteläste, die ich als die pirifere bezeichnet habe, d. h. die Poren endigen blind, aber zum Unterschiede vom vesikuliferen Typus, ohne distale Erweiterung in der Kalkschale. In der Regel ist der Basalteil der Äste am dicksten. Alle bisher bekannten Arten haben Porenreihen und es ist aus phylogenetischen Gründen wahrscheinlich, daß dieses Verhalten für die ganze Gattung typisch ist, da sie sich schon von euvertizillaten Oligoporellen ableiten dürfte. Häufig ist in unserer Gattung (anscheinend bei spezialisierten Formen) das Auftreten gedrängter, zweizeiliger Wirtel. Die Art der Gliederung des Skelettes, welche wir als Wulstung kennengelernt haben, findet bei einigen hieher gehörigen Formen eine extreme Ausbildung.

Physoporella bildet gleichsam ein Gegenstück zu *Gyroporella*. In der erwachsenen Pflanze tritt die assimilatorische Tätigkeit der Wirteläste offenbar ganz zurück. Wir müssen auch hier Jugendstadien voraussetzen, die sich vermutlich im Bau an *Oligoporella* anschlossen. Ich halte es übrigens für wahrscheinlich, daß wenigstens bei den primitiveren Arten, wie *Physoporella pauciforata*, auch der letzte Trieb ursprünglich an allen Ästen assimilatorische Haare trug. Bevor jedoch noch der Verkalkungsprozeß abgeschlossen war, fielen diese Haare ab. Der Basalteil der Äste verwandelte sich in ein Sporangium, das zum besseren Schutze vollständig mit Kalk überzogen wurde. Bei den spezialisiertesten Formen, wie *Physoporella minutula*, mag die Ausbildung von Haaren am fertilen Triebe vielleicht schon ganz unterdrückt gewesen sein.“

Stratigraphic range: Muschelkalk.

Physoporella minutula (GÜMBEL, 1872), PIA, 1912

Pl. III, figs. 3—4

Gyroporella minutula GÜMBEL, 1872: Die sogenannten Nulliporen. II. Teil. Die Nulliporen des Tierreiches. Abhandl. d. math.-phys. Kl. d. königl. bayr. Akademie d. Wiss., 11, 1. Abt., pl. D III, fig. 4 a.

Physoporella minutula (GÜMBEL) — PIA, 1912: Neue Studien über die Triadischen Siphoneae Verticillatae. Beitr. Paläont. Geol. Band XXV, p. 45, pl. VI, figs. 5—12.

Physoporella minutula (GÜMBEL) — PIA, 1920: Siphoneae Verticillatae vom Karbon bis zur Kreide. Abh. Zool. Botan. Ges. Wien, p. 56, pl. II, figs. 19—22.

Physoporella minutula (GÜMBEL) — HERAK, 1965: Comparative study of some Triassic Dasycladaceae in Yugoslavia. Geol. Vjesnik Svezak 18, Broj 1, p. 17—18, pl. XII, fig. 6.

Physoporella minutula (GÜMBEL) — HERAK, 1965, *ibid.*, p. 18, pl. XII, fig. 3.

In the thin sections of brown marly limestones have observed some longitudinal and transversal sections of thallus which belong to this species.

Description

The thallus is cylindrical, branches are of "sausage-like" shape and arranged in two sets per whorl. There are 29—30 branches in one whorl and oblique to the central stem. The annulation of the thallus is not clearly observed. In the central stem some globular shaped forms are contained can be compared with reproductive organs.

Dimensions

- D = 1,568 mm.
d. = 0.784 mm.
St = 0.444 mm.
P = 0.088—0.148 mm.

Remarks

With the above mentioned characters and dimensions this form is closely similar to the *Physoporella minutula* as described by HERAK, 1965, p. 17—18. According to PIA, 1912, p. 45, the calcareous wall of this species shows all transitional stages from smooth surface to deep segmentation, like *Physoporella dissita*. Branches arranged in two sets per whorl, but the outline of branches is different from *Physoporella dissita*. The distal parts are not pointed but more or less well rounded. This description also is fitting to our samples; therefore it is determined as *Physoporella minutula* (GÜMBEL), PIA.

Occurrence

Lower Austria, Hohe Wand (Plackles, sample A/6), brown marly limestone of Rhaetian age. Associated with *Placklesia multipora* n. gen. n. sp., *Solenopora styriaca*, *Parachaetetes*, Problematicum 2 and 3 E. FLÜGEL, and below mentioned Foraminifera, Ostracoda and Megafossils.

Other localities

Wettersteinkalk of Zweekenalpe near Mythem, Kanton Schwyz; Riprecht-lifluh; Dimlital, Southeast Schweden; in the Freiburger Alps Tour d'Al; Lika of Klanac pucalovica, Bosnia; Deralo-Bosausko Grahovo Trias (Anisian) limestone.

Tribe: THYRSOPORELLEAE

This tribe can be distinguished by the following character:

Numerous branches are in regular whorls and characterized by a great number of bifurcations at all degrees of branches. Primary, even those second, third and fourth order of branches are thickened and probably contain sporangia.

Placklesia, new genus

Type species: *Placklesia multipora*, n. sp.

Derivatio nominis: After the type locality Plackles, Hohe Wand, Lower Austria.

Description

The thallus is segmented and bifurcated like modern *Cymopolia*. The segments of thallus are cylindrical and relatively thick towards the proximal end, slender and pointed at the base. Central stem is cylindric and rather large. Branches are ramified and arranged in regular whorls. Each segment has several whorls which are in alternating order. The primary branches start with a large pore from the axial cavity and continue along the calcareous wall by ramification in many times and open out with many small pores, which are arranged in groups of 4 together at the surface, the ramification takes place about 5 times in each primary branch.

This genus is similar to some species of *Diplopore* in respect of these characters (cylindrical, annulated thallus; arrangement of branches in whorls and several whorls in one segment), but differs from them by the bifurcation of branches, which are in bundles at *Diplopore*. But the new species resembles with all above mentioned characters to the members of the tribe *Thyrsoporellae*, such as *Thyrsoporella* and *Belzungia*.

The main differences between *Belzungia* and *Thyrsoporella* are given by M. MASSIEUX, 1966, p. 138, as below.

«Le genre *Belzungia* se distingue nettement de *Thyrsoporella* par des traits caractéristiques qui permettent de les différencier à coup sûr, même en lames minces. Chez *Thyrsoporella*, la calcification est faible, et semble constituée de calcifications élémentaires groupées en plaquettes, alors que *Belzungia* présente une paroi calcaire continue, épaisse et compacte.

Dans les deux cas, à un rameau primaire, correspondent bien 32 pores terminaux. Mais, caractères importants à considérer en lames minces, la ramification chez *Belzungia*, se fait par dichotomies successives, alors que chez *Thyrsoporella* elle a lieu par tetradichotomie, à partir des rameaux de 2^e ordre, et surtout le premier genre se distingue nettement du second par la disposition irrégulière de ses rameaux, principalement à partir du cinquième ordre.»

According to this explanation the building of calcareous wall and the manner of ramification of branches are important characters for generic description. In this respect *Placklesia* differs from the genus *Thyrsoporella* by the structure of calcareous wall, by having a 5th order of branches and from the genus *Belzungia* by the ramification of branches. Because of these reasons a new genus *Placklesia* is erected, which is considered to be the Triassic ancestral form of those two Tertiary genera.

The system of ramification of *Placklesia* is seen at the text-fig. 2. It is similar to *Thyrsoporella*, but having a 5th order of branches, the number of outside pores becomes 128.

Sporangia probably are developed at the thickened parts of primary and secondary branches.

Placklesia multipora n. gen. n. sp.

Pl. III, figs. 1—9, text-fig. 4

Derivatio nominis: multi (lat.) = many, porus (lat.) = pore (containing many pores).

Holotypus: pl. III, fig. 8.

Locus typicus: Hohe Wand, Plackles, Lower Austria.

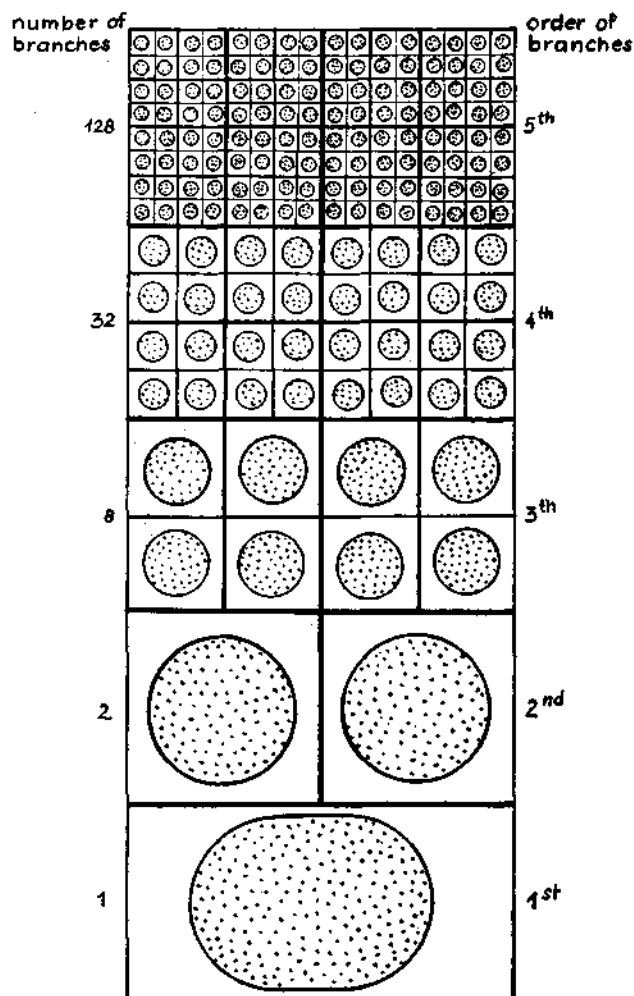


Fig. 2. The system of ramification of *Placklesia*.

Stratum typicum: Upper-Trias (Rhaetian), Plackles, marly limestone and shales.

Depository: Geologische Bundesanstalt, nr. 0321 (Holotype), nrs. 0322 to 0329 (figured paratypes), nr. 0330 (not figured paratypes).

Description

Thallus composed of segments which measure 1—2.2 mm. in length and 0.8 to 1.6 mm. in thickness. Text fig. 3 shows all measurements which were made from selected segments. Each segment contains a cylindrical central stem (about $\frac{1}{2}$ — $\frac{1}{3}$ diameter of thallus), from which 6 primary branches emerge. Primary branches are perpendicular to the central stem at the center and proximal side,

L	2,20	2,12	1,80	1,80	1,80	1,76	1,76	1,68	1,68	1,68	1,60	1,60	1,52	1,52	1,48	1,44	1,32	1,28	1,24	1,20	1,00	1,00
D	1,32 1,08	1,44 1,16	1,16	0,92	1,00	1,20	1,00	1,16	1,52	1,28	1,32	1,20	1,20 1,04	1,60 1,00	0,80 0,80	0,96	0,96	1,28	1,36	1,20	1,16 1,00	1,16

Text fig. 3: Measurements from the segments of *Placklesia multipora* n. gen. n. sp. in mm.

Explanations of the symbols which are used in tables

- L: length of thallus
 D: Outer diameter of thallus
 d: Inner diameter of thallus
 St: Wall thickness
 P (I—V): Diameter of pores or branches in different order
 Sp: Distance between first branches in one whorl
 Sl: Distance between first branches in superimposed whorls
 l: Length from middle of one whorl to the another superimposed whorl
 W: Number of whorls of a segment
 w: Number of branches of a whorl

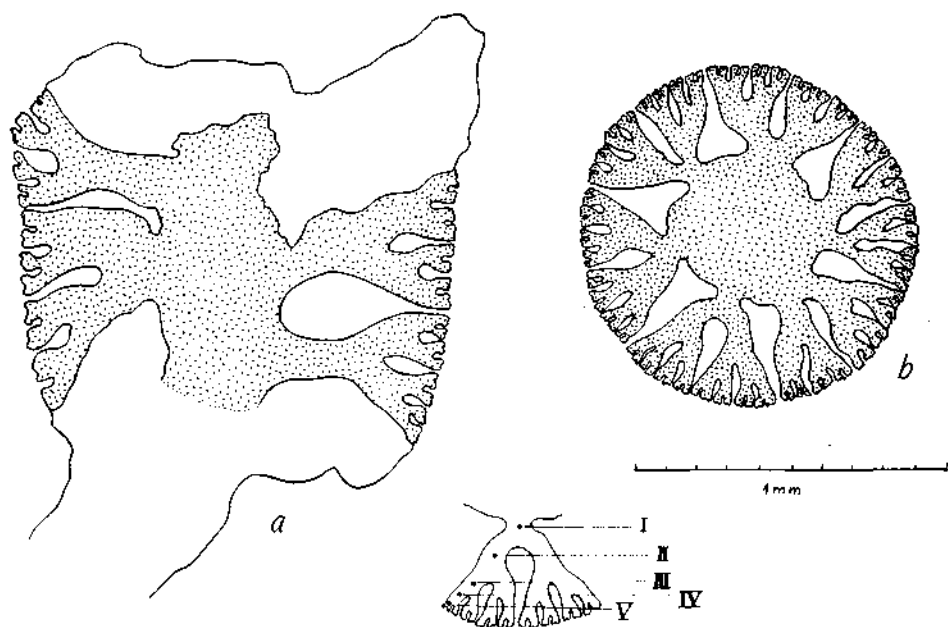


Fig. 4. *Placklesia multipora* n. gen. n. sp. a, longitudinal, b, transversal section.

but oblique at the distal sides of the segments, and arranged in regular whorls which are alternating at different levels. Each segment contains 3—5 whorls which are spaced (from one 1st order pore to the next) 0.144—0.176 mm. The distance from the center of one primary pore to the center of the superimposed next one measures 0.304—0.176 mm. Primary branches are short and start with large pores at the central cavity. The diameter of these pores are 0.144 to 0.160 mm. and each whorl consists of 6 primary pores which are spaced 0.096 to 0.112 mm.

The bifurcations of the branches take place in the above mentioned manner and with 5 times branching they build a canal system through the rather strong calcareous wall and open with 128 small, fifth pores, which are about 0.016 to 0.029 mm. in diameter. Text fig. 44 shows the branching system in longitudinal and transversal sections. The measurements of *Placklesia multipora* are seen in text fig. 5. The text fig. 6 shows the comparison of *Placklesia multipora* with the other known genera of the tribe.

Type locality.

Lower Austria, Hohe Wand (Plackles, Sample A/6), brown-marly limestone and dark shales of Rhaetian age. Associated with *Solenopora* cf. *styriaca* FLÜGEL, *Parachætetes*, Problematicum 2 and 3 FLÜGEL, *Physoporella minutula* (GÜMBEL) PIA and below mentioned Foraminifera, Ostracoda and megafossils.

The fossils found in the Plackles A/6 samples (after KÜPPER 1963, p. 16—17)

1. Dark shales:

Foraminifera (by Dr. R. OBERHAUSER).

Involutina liassica (JONES), *Trocholina* div. sp., *Semiinvoluta clari* KRISTAN, *Austrocolomia* sp., *Nodosaria*, *Dentalina*, *Pseudoglandulina*, *Lenticulina*, *Marginulina*, *Fronicularia* and *Lingulina* div. sp.

Crinoids by Dr. H. DORECK-SIEVERS.

Seirocrinus, *Pentacrinus*, *Encrinus*, *Entrochus*, *Holocrinus*?, *Cyclocrinus*?

Ostracoda by Dr. KOLLMANN.

Bairdia div. sp., *Cryptobairdia* sp., *Bairdiacypris* sp., *Triebelina* sp. 498
KOLLMANN, *Triebelina* sp., *Dicerobairdia bicornuta* KOLLMANN, *Neobairdiolites placklesensis* KOLLMANN, *Crinobairdia triassica* KOLLMANN, *Crinobairdia umbonata* KOLLMANN, *Crinobairdia alpina* KOLLMANN, *Medwenitschia* aff. *ornata* KOLLMANN, *Healdia* sp., *Ogmoconcha* or *Hungarella* sp., *Polycopa* sp. *Kirkbyidarum* gen. indet.

2. Brown marly limestone:

Foraminifera by Dr. OBERHAUSER.

Involutina liassica (JONES), *Involutina turgida* KRISTAN, *Trocholina granosa* FRENTZEN, *Semiinvoluta clari* KRISTAN, *Variostoma coniforme* KRISTAN, *Galeanella tollmanni* (KRISTAN), *Ladinosphaera geometrica* OB., *Diplostromina subangulata* KRISTAN, *Lenticulina*, *Marginulina*, *Lingulina*, *Fronicularia*, *Pseudoglandulina* div. sp.

References

- CROS, P., & LEMOINE, M. (1966): Dasycladaceae Nouvelles ou peu Connues du Lias Inferieur des Dolomites et de Quelques Autres Regions Mediterraneennes. *Revue de Micropaléontologie*. Vol. 9, No. 3, p. 156—168, pl. I—II, 1966.
- DENINGER, K. (1906): Einige neue Tabulaten und Hydrozoen aus mesozoischen Ablagerungen. *Neues Jahrb. Min. Geol. Paläont.* Band I, p. 61—70, pl. V—VII, 1906.
- ELLIOTT, G. (1955): Fossil Calcareous Algae from the Middle East. *Micropaleontology*, vol. 1, No. 2, p. 125—131, pl. I, 1955.
- ELLIOTT, G. (1956): Further Records of Fossil Calcareous Algae from the Middle East. *Micropaleontology*, vol. 2, No. 4, p. 327—334, pl. I—II, 1956.
- ELLIOTT, G. (1957): New calcareous Algae from the Arabian Peninsula. *Micropaleontology*, vol. 3, No. 3, p. 227—230, pl. I, 1957.
- ELLIOTT, G. (1958): Fossil Microproblematica from the Middle East. *Micropaleontology*, vol. 4, No. 4, p. 419—428, pl. I—III, 1958.
- ELLIOTT, G. (1959): Fossil Calcareous Algae Floras of the Middle East. With a note on a Cretaceous Problematicum, *Hensonella cylindrica* Gen. et Sp. Nov. *Quart. Jour. Geol. Soc. of London* vol. CXV, p. 217—232, pl. VIII, 1959.
- FLÜGEL, E. (1960): Solenoporaceae (Algae) aus den Zlambach-Schichten (Rhät) der Fischerwiese bei Altaussee, Steiermark. *Neues Jahrb. Geol. Paläont., Mh.* p. 339—354, Text fig. 1—3. Stuttgart 1960.
- FLÜGEL, E. (1961): Algen (Solenoporaceen) aus den Cassianer-Schichten (Ober-Ladin) der Südalpen. *Neues Jahrb. Geol. Paläont. Mh.* p. 339—345, Text fig. 1—4. Stuttgart 1961.
- FLÜGEL, E. (1962): Beiträge zur Paläontologie der Nordalpinen Riffe. Neue Spongien und Algen aus den Zlambach-Schichten (Rhät) des Westlichen Gosaukammes, Oberösterreich. *Ann. Naturhist. Mus. Wien*, 65, p. 51—56, pl. I—II, 1962.

- FLÜGEL, E. (1962): Untersuchungen im Obertriadischen Riff des Gosaukammes (Dachsteingebiet, Oberösterreich). Verh. Geol. B.-A., p. 138—144, pl. V, 1962.
- FLÜGEL, E. (1961): Fossilinhalt und Mikrofazies des Dachsteinkalkes (Ober-Trias) im Begunjscica-Gebirge, S-Karawanken, (NW-Slovenien, Jugoslawien). Neues Jahrb. Geol. Paläont. Mh., p. 287—294. Stuttgart 1961.
- FLÜGEL, E. (1964): Microproblematica aus den Rhätischen Riffkalken der Nordalpen. Paläont. Z. 38, 1/2, p. 74—87, pl. 8—9. Stuttgart 1964.
- FLÜGEL, E. (1964): Ein neues Vorkommen von Plassenkalk (Ober-Jura) im Steirischen Salzkammergut, Österreich. Neues Jahrb. Geol. Paläont. Abh. 120, 2, p. 213—232, pl. 11—13. Stuttgart 1964.
- HERAK, M. (1962): Trias de la Yougoslavie. Geol. Vjesnik Sve. 15, B. 1, Zagreb 1962.
- HERAK, M. (1965 a): Comparative Study of some Triassic Dasycladaceae in Yugoslavia. Geol. Vjesnik Ins. Geol. Istra. Vol. 18, No. 1, p. 3—34, pl. I—XV. Zagreb 1965.
- HERAK, M. (1965 b): Triasablagerungen in der Umgebung von sv Rok in der Lika. Acta Geologica V, p. 96—100. Zagreb 1965.
- HERAK, M. (1965 c): Die Kalkalgen in der Stratigraphie der Dinariden (Jungpaläozoikum und Mesozoikum). Mitt. Geol. Ges. Band 58, p. 209—217. Wien 1965.
- HERAK, M. (1951): Ladinic Dasycladaceae of Yugoslavia and their Stratigraphical Significance. Extrait de "Rad de l'Academie Yougoslave", Tome 280, p. 115—141 (p. 51—56, pl. I—IV).
- HERITSCH, F. (1919): Über Solenopora DYB. Centralbl. Miner., p. 350—352. Stuttgart 1919.
- JOHNSON, J. H. (1961): Limestone-Building Algae and Algal Limestones. Denver Colorado 1961.
- KAMPTNER, E. (1958): Über das System und die Stammesgeschichte der Dasycladaceen (Siphonaeae Verticillatae). Ann. Natur-Hist. Museums in Wien, Band 62, p. 95—122, 1958.
- KAMPTNER, E. (1965): Über ein Vorkommen der Dasycladaceen-Spezies *Griphoporella curvata* (GÜMBEL) PIA in der Ober-Trias der Nördlichen Kalkalpen. Verh. Geol. B.-A., p. 143—146, 1965.
- KOCHANSKY, V. (1964): Velebitella, eine neue Jungpaläozoische Diploporengattung und ihre Phylogenetischen Verhältnisse. Geol. Vjesnik sve. 17, p. 135—142, pl. I—IV. Zagreb 1964.
- KRISTAN, E. (1958): Geologie der Hohen Wand und des Miesenbachtals (N.-Ö.). Jb. Geol. B.-A., p. 47, 1958.
- KÜPPER, H. (1963): Exkursion zur Hohen Wand in den Kalkalpen südlich von Wien. Verh. Geol. B.-A., Sonderh. F, p. 9—19. Wien 1963.
- LEVY, J. (1966): Neomizzia (Dasycladaceae) Nouveau Genre Du Lias Du Maroc. Revue de Micropaléontologie vol. 9, No. 1, p. 37—39, pl. I, fig. 1—2, 1966.
- MAHEL, M. (1958): Geologie des Gebirges Stratska Hornatina, 2. Versteinerungen der Mitteltriadischen *Chlorophyta*, p. 118—119, pl. IX. Bratislava 1958.
- MASSIEUX, M. (1966): Les Algues du Nummulitique Egyptien et des Terrains Cretaces-Eocenes de Quelques Regions Mesogenes. Revue de Micropaléontologie vol. 9, No. 3, p. 135—146, pl. I—III, 1966.
- MORELLET, L. (1908): Deux Algues Siphonées Verticillées du Thanetien de Boncourt (Oise). Bull. Soc. Géol. France T. VIII, p. 96—99, 1908.
- MORELLET & MORELLET (1913): Les Dasycladacees du Tertiaire Parisien. Mém. Soc. Geol. Fr. Pal. Mém. No. 47, p. 5—43, pl. I—III, 1913.
- OTT, E. (1963): Untersuchungen an Ladinischen Dasycladaceen aus den Nördlichen Kalkalpen. Mathem.-naturwiss. Fak. Eber. Karls Univ. Tübingen, p. 1—43, pl. I—V, 1963.
- OTT, E. (1965): Dissocladdella cretica, eine neue Kalkalge (Dasycladaceae) aus dem Mesozoikum der griechischen Inselwelt und ihre phylogenetischen Beziehungen. Neues Jahrb. Geol. Paläont. Mh., p. 683—693. Stuttgart 1965.
- OTT, E. (1966): Zwei neue Kalkalgen aus den Cassianer Schichten Südtirols (Oberladin, mittlere Trias). Mitt. Bayer Staatssamml. Paläont. Hist. Geol. Heft 6, p. 155—166, pl. XIII—XIV. München 1966.
- OTT, E. (1966): Die gesteinsbildenden Kalkalgen im Schlauchkar (Karwendelgebirge). Jahrb. Ver. z. Schutze d. Alpenfl. u. -Tiere, Band 31, p. 1—8. München 1966.
- PANTIC, S. (1959): Macroporella alpina PIA sa planina Bjelasice (Crna Gora). Bull. Geol. Livre III, p. 49—52, pl. VI, Inst. Geol. Titograd 1959.

Explanation of Plates ^{**)}

PLATE I

- Fig. 1. Algal limestone 3,5 ×.
Fig. 2. *Solenopora* cf. *styriaca* FLÜGEL. Transversal and longitudinal sections. 17 ×.

PLATE II

- Fig. 1. *Solenopora* cf. *styriaca* FLÜGEL. Transversal section 17 ×.
Fig. 2. *Solenopora* cf. *styriaca* FLÜGEL. Longitudinal section 58 ×.
Fig. 3. Problematicum 2 FLÜGEL. 30 ×.
Fig. 4. Problematicum 3 FLÜGEL. 30 ×.

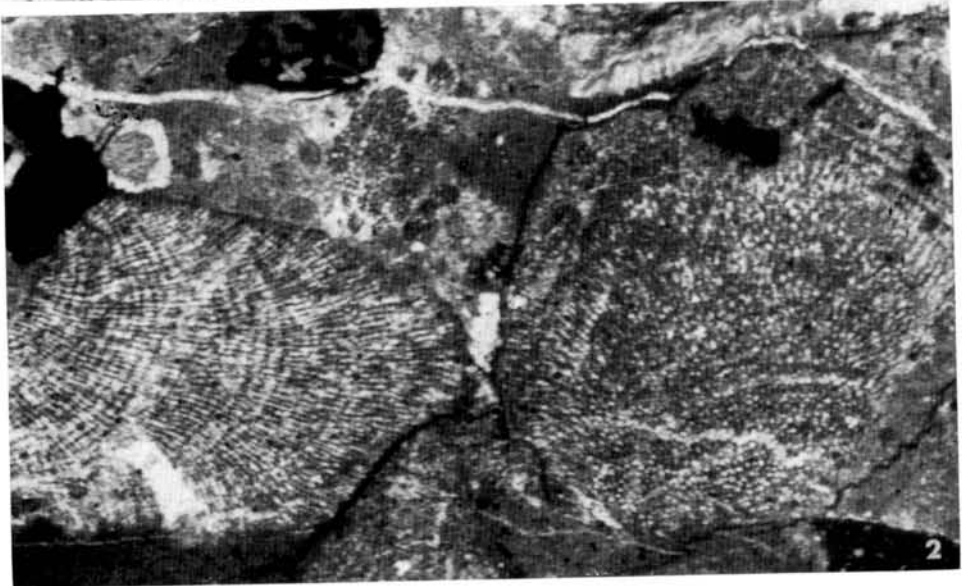
PLATE III

- Fig. 1. *Placklesia multipora* n. gen. n. sp., a segment 30 ×.
Fig. 2. *Placklesia multipora* n. gen. n. sp., a branched segment 30 ×.
Fig. 3. *Placklesia multipora* n. gen. n. sp., a segment 30 ×.
Fig. 4. *Placklesia multipora* n. gen. n. sp., longitudinal section 30 ×.
Fig. 5. *Placklesia multipora* n. gen. n. sp., tangential section 30 ×.
Fig. 6. *Placklesia multipora* n. gen. n. sp., tangential section 30 ×.
Fig. 7. *Placklesia multipora* n. gen. n. sp., longitudinal section 30 ×.
Fig. 8. *Placklesia multipora* n. gen. n. sp., transversal section 30 ×.
Fig. 9. *Placklesia multipora* n. gen. n. sp., transversal section 30 ×.
Fig. 10. *Physoporella minutula* (GÜMBEL) PIA, longitudinal section 30 ×.
Fig. 11. *Physoporella minutula* (GÜMBEL) PIA, transversal section 30 ×.

^{**)} Die Abbildungsoriginale befinden sich in der Sammlung der Geologischen Bundesanstalt (Schliffe 62-356 und 62-550; Aquis. Nr. 0321—0335). Die Identifizierung der Abbildungen mit den Originalen mußte redaktionell erfolgen, doch konnten leider die Originale zu Taf. II, Fig. 3 und 4 nicht aufgefunden werden.

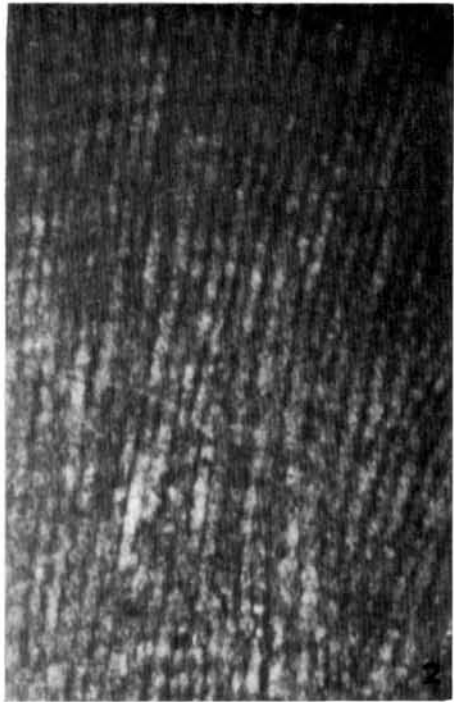
U. BILGÜTAY

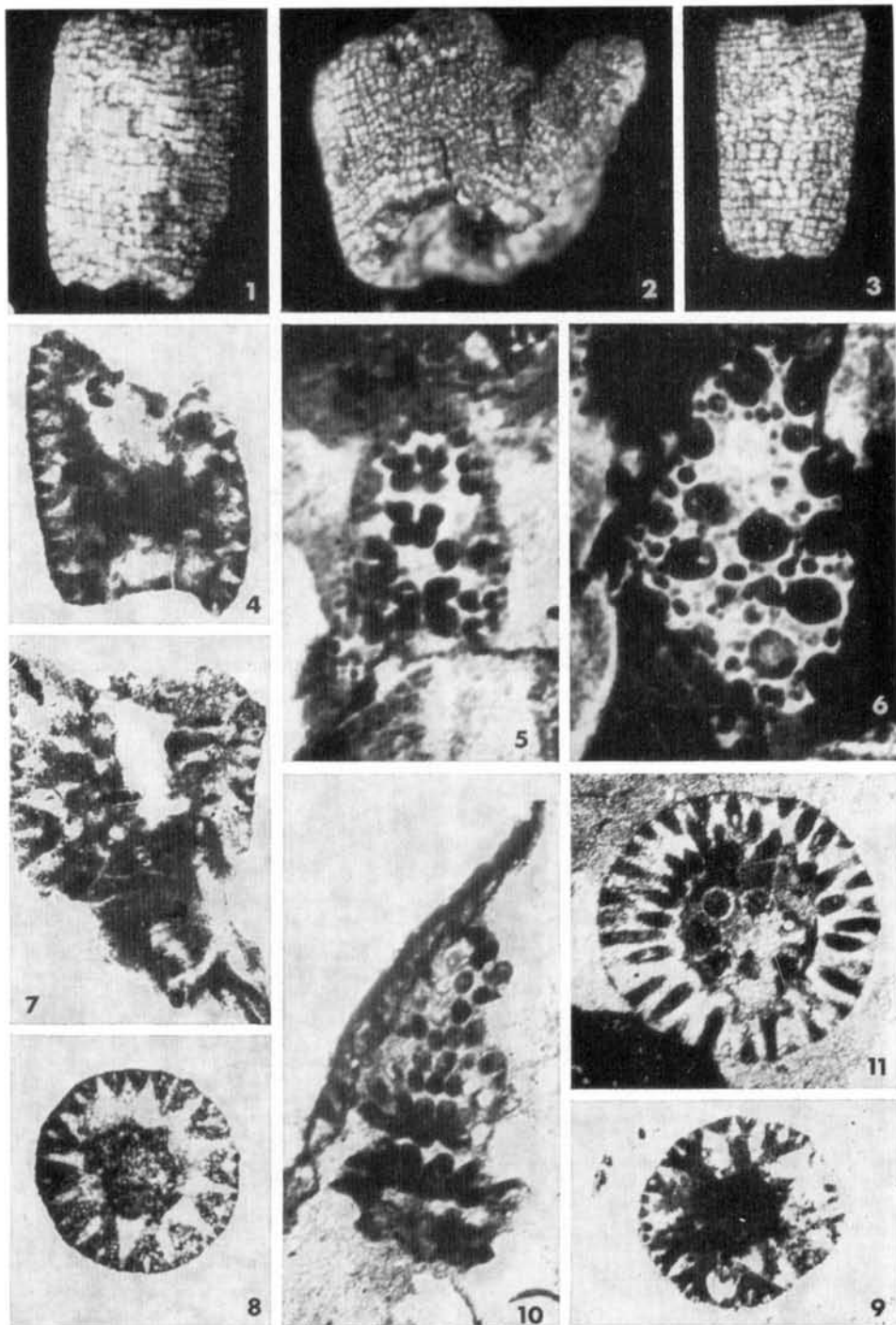
Plate I



U. BILGÜTAY

Plate II





- PIA, J. (1912): Neue Studien über die Triadischen Siphoneae Verticillatae. Beitr. Paläont. Geol. Österr.-Ung. Oriens, Band XXV, p. 4—81, pl. II—VIII, 1912.
- PIA, J. (1919): Katalog der Diploporen Sammlung des Naturhistorischen Museums in Wien. Ann. Naturhist. Mus., Band XXXIII, p. 1—16, 1919.
- PIA, J. (1920): Die Siphoneae Verticillatae vom Karbon bis zur Kreide. Abh. Zool. Botan. Gesellschaft in Wien, Band XI, Heft 2, 1920.
- PIA, J. (1923): Geologische Skizze der Südweststrecke des Steinernen Meeres bei Saalfelden mit besonderer Rücksicht auf die Diploporen Gesteine. Sitzber. Akad. Wiss. Wien, mathem.-naturwiss. Abteilung I, Heft 7—8, p. 329—346, 1924.
- PIA, J. (1925): Die Diploporen der Trias von Süddalmatien. Sitzber. Akad. Wiss. Wien, mathem.-naturwiss. Abteilung I, Band 13, Heft 7—8, p. 329—346, pl. I, 1924.
- PIA, J. (1925): Die Gliederung der Alpenen Mitteltrias auf Grund der Diploporen. Anzg. Akad. Wiss. Wien, p. 1—4, 1925.
- PIA, J. (1926): Die Diploporen der Deutschen Trias und die Frage der Gleichsetzung der Deutschen und Alpenen Triasstufen. Zeit. Deut. Geol. Gesell., Band 78, p. 192—201, 1926.
- PIA, J. (1930): Upper Triassic Fossils from the Burma-Siamese Frontier "A new Dasycladaceae, *Holosporella siamensis* nov. gen. nov. sp. with a description of the Allied Genus *Aciculella* PIA". Geol. Survey of India vol. LXIII, part. 1, p. 177—181, pl. 4, 1930.
- PIA, J. (1930): Neue Arbeiten über fossile Solenoporaceae und Corallinaceae. Neues Jahrb. f. Min. Geol. Paläont. Referate, Stuttgart, III, p. 122—147, 1930.
- PIA, J. (1931): Die Dasycladaceen der Germanischen Trias. Ann. Naturhist. Museum Wien, p. 265—279, pl. XXI, 1931.
- PIA, J. (1935): Die stratigrafische Verbreitung der Diploporen in der Trias von Bosnien. Vesnika Geol. Inst. Kral. Jugoslavije. KN. IV/I, p. 3—29, pl. X—XI. Beograd 1935.
- PIA, J. (1935): Algen und Pseudoalgen aus der Spanischen Trias. Abhand. Heidl. Akad. Wiss., mathem.-naturw. Kl. 22, p. 5—17, pl. I—II, 1935.
- PIA, J. (1939): Sammelbericht über fossile Solenoporaceae 1930 bis 1938. Neues Jahrb. f. Min. Geol. Paläont. Referate 1939, Nr. 3, p. 731—760, 1939.
- RADOICIC, R. (1959): *Salpingoporella dinarica* nov. sp. u. *Donjokrednim sedimentima Dinarida*. Bull. Geol. livre III, p. 33—42, pl. III—V, Inst. Geol. Titograd 1959.
- RAMO RAO, & PIA, J. (1865): Fossil Algae from the Upper most Cretaceous beds (The Niniyur Group) of the Trichinopoly District, S. India. Mem. Geol. Surv. Ind. IV, pt. I, p. 1—44, pl. I—VI, 1865.
- YABE, H. (1912): Über einige gesteinsbildende Kalkalgen von Japan und China: Science Report Tohoku Imp. Univ., Sendai, ser. 2, Tokyo, v. 1, p. 1—8, pl. 1—2, 1912.

mm	Longitudinal sections						Transversal sections		Tangential section
L	1,509	1,435	0,705	0,902	1,332	1,480	Counted 6 pores		—
D	1,036	1,184	1,036	1,036	1,332	1,110	1,036	1,050	—
d	0,444	0,325	0,370	—	0,444	0,399	0,444	0,444	—
St	0,222	0,370	0,325	—	0,444	0,355	0,296	0,296	—
PI	0,236	0,133	0,148	0,118	0,152	0,133	0,148—0,222	0,133	0,251—0,281
pII	—	—	—	—	—	—	0,103—0,088	0,074—0,088	0,133—0,148
pIII	0,088	0,088	0,088	0,059	0,103	0,074	0,059—0,074	0,059	0,103
pIV	0,059	0,059	0,059	0,044	0,074	0,059	0,044—0,059	0,044	0,059—0,074
PV	0,029	0,029	0,029	0,029	0,029	0,029	0,029	0,014	0,029—0,044

Text fig. 5. Dimensions of *Placklesia multipora* n. gen. n. sp.

mm	Placklesia multipora n. Gen., n. sp.	Thyrsoporella cancellata Güm.	Thyrsoporella silvestrii (PFENDER)		Belzungia terquemi MUNIER-CHALMAS	Belzungia borneti MORELLET
			a-Belzungia sp. MASSIEUX	b-Belzungia silvestrii MASSIEUX		
L	0,705—1,590	0,100—4,000	2,400	6,400	Cylindric	4,000—6,000
D	1,036—1,332	0,225—0,460	0,625—0,725	0,475—0,780	0,775—1,250	1,000—1,500
d	0,325—0,444	0,125—0,300	0,375—0,475	0,200—0,340	0,325—0,375	—
St	0,222—0,444	0,100	0,125	0,125—0,260	0,225—0,375	—
PI	0,118—0,236	0,075—0,125	0,075—0,100	0,060—0,078	0,075—0,125	—
PII	0,074—0,103	0,062	0,050	0,060—0,075	0,075	—
PIII	0,059—0,103	0,025	—	0,040—0,050	0,050—0,062	—
PIV	0,044—0,074	0,012	—	0,030—0,040	0,025	—
PV	0,014—0,029	—	—	0,025	0,016	—
Sp	0,096—0,112	—	—	0,050—0,066	0,050—0,075	—
Sl	0,144—0,176	—	0,050	0,050—0,066	0,050—0,075	—
l	0,304—0,336	length of placks 0,125	—	0,090—0,125	0,137—0,175	—
W	3—5	—	—	—	—	—
w	6	7	9	7 (8)	9	—
Age	Trias (Rhaet.)	Tert. (Luterien)	Tert. Midd. Eocene	Tert. Midd. Eocene	Tert. Midd. Eocene	Tert. Thanecien
Locality	Plackles As	Parnas-Grignon	Egypt-Assiout	Somaly, Anatolia Egypt-Beni-Hassan	Paris-basen	Boncourt

Text fig. 6. Comparative table the dimentions of the known genera and species tribe of Thyrsoporelleae

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Verhandlungen der Geologischen Bundesanstalt](#)

Jahr/Year: 1968

Band/Volume: [1968](#)

Autor(en)/Author(s): Bilgütay Utarit

Artikel/Article: [Some Triassic Calcareous Algae from Plackles \(Hohe Wand, Lower Austria\) 65-79](#)