

***Heteroporella lepina*, new dasyclad species from Upper Cenomanian - Lower Turonian of Central Apennines**

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(manoscritto ricevuto il 18 Febbraio 1967)

ABSTRACT — Description of *Heteroporella lepina*, new calcareous alga recently found in Lepini Mountains (Central Apennines) from Upper Cenomanian-Lower Turonian beds. Genus *Heteroporella*, recently proposed by Cros & Lemoine for scarce remains of a new Liassic species to which no name given (resulting therefore the genus as formally non-valid), is reestablished on the Apenninic species. It includes dasyclad algae having fertile and sterile branches in alternating whorls, fertile ones being distally ramified.

RIASSUNTO — Descrizione di *Heteroporella lepina*, nuova specie di alga calcarea rinvenuta di recente nel Cenomaniano superiore - Turoniano inferiore dei Monti Lepini (Lazio). Il genere *Heteroporella*, proposto di recente da Cros & Lemoine per scarsi resti di una nuova specie liassica cui non fu dato peraltro alcun nome (il genere è da considerarsi quindi come formalmente non valido), viene nuovamente istituito sulla base delle forme dell'Appennino. Esso include le disicladacee con verticilli alternati di ramuli sterili e di ramuli fertili, questi ultimi con ramificazioni di secondo ordine.

In a recent work (Praturlon 1966, p. 181) is indicated in text, as *Neomeris* sp., a new species which revealed afterwards, on well preserved specimens very recently found in Lepini Mountains, peculiar and interesting features.

Type-species — *Heteroporella lepina* n. sp. (Upper Cenomanian - Lower Turonian). Other species: *Heteroporella* sp. ind. Cros & Lemoine 1966 (Rhaetic - Lias).

HETEROPORELLA LEPINA n. sp.
pls. 51-52, text-fig. 1

Fam. DASYCLADACEAE
Gen. HETEROPORELLA n. gen.
(= *Heteroporella* Cros & Lemoine, 1966)

Diagnosis — Dasycladaceae having fertile and sterile branches in alternating whorls; sterile branches simple and slender, fertile ones highly inflated and distally ramified, last feature differentiating the genus from *Cylindroporella* Johnson.

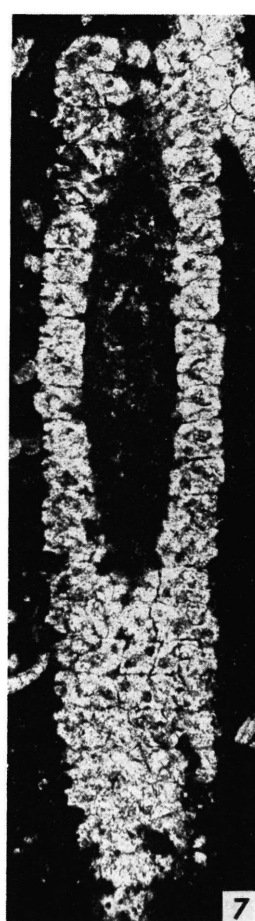
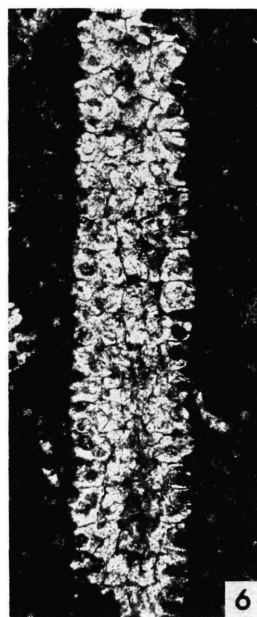
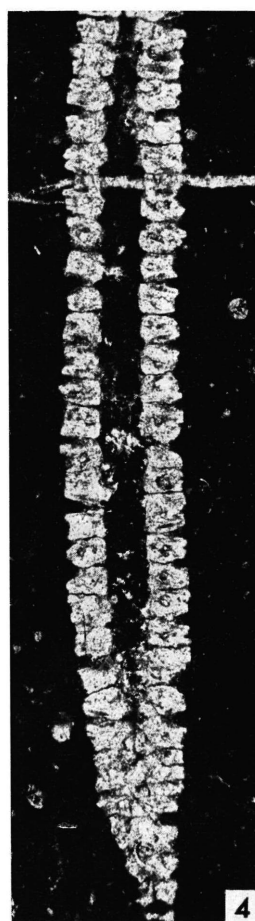
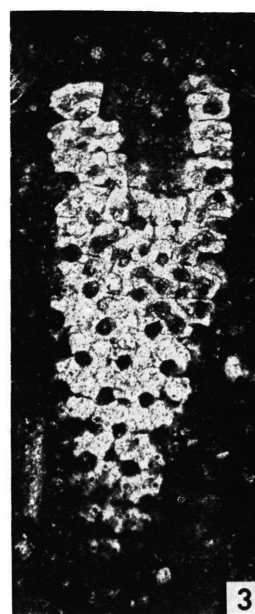
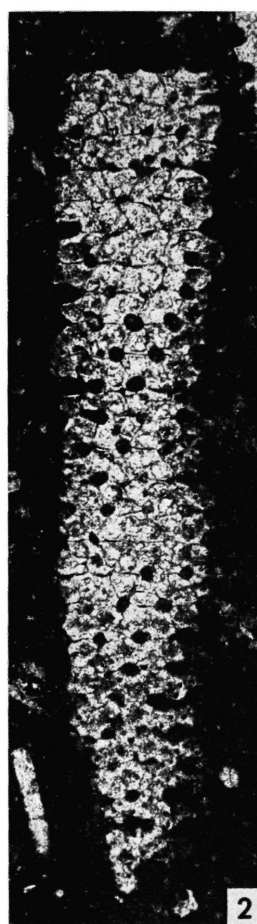
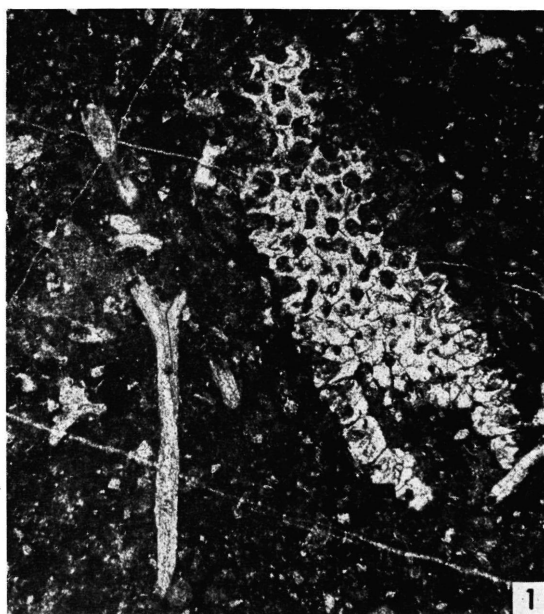
Diagnosis — *Heteroporella* having elongate, cylindrical, highly calcified thallus, with large axial hollow. Branches differentiated in fertile and sterile ones, arranged in regular, gathered whorls which alternate. Fertile branches often filled with transparent calcite and therefore difficult to be observed, owing to the high recrystallization which usually affects the remains. They are very fine in

EXPLANATION OF PLATE 51

Heteroporella lepina n. sp., x 40. «Occhio di Bue» near Carpineto Romano, Lepini Mountains.

- Fig. 1 - Microfacies with *H. lepina* and sponge spicules. D 39/2.
- 2 - Tangential, slightly oblique section; sterile branches black, in lower part fine secondary pores of the sporangia, which are difficult to recognize as calcite-filled. D 39/4.
- 3 - Holotype, oblique section. Black and round sterile branches; partly black and partly calcite-filled the oblique-narrowed sporangia. In lower part the fine secondary pores of the sporangia. D 39/1.
- 4 - Specimen laterally compressed, showing black sterile branches and calcite-filled sporangia. D 39/5.
- 5, 6 - Tangential sections. Fig. 5 D 39/4, fig. 6 D 39/1.
- 7 - Oblique section, showing sporangia and their ramifying. D 39/1.

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the proximal part, then highly inflated; due to the contact with the sterile branches, they seem to be gradually deformed during growth and riping, the deformation resulting distally in a strong narrowing, oblique to the stem (in the same direction for two-three whorls, often in the opposite direction in the contiguous ones); the narrowings seem to gradually divide the single branches in two parts, each having a tuft of three (sometimes more?) very fine and short secondary branches. Sterile branches apparently of the phloiophorous type, nearly normal to the stem; very slender at the basis, they gradually widen toward the exterior, appearing distally as dark, largely open pores, slightly leaning out of the surface of the alga, where the numerous, fine secondary branches of the fertile whorls spread out.

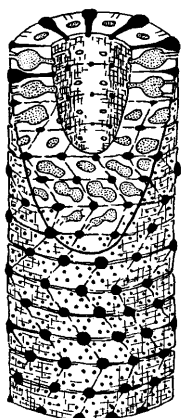


Fig. 1 - *Heteroporella lepina* n. sp., schematic reconstruction of the calcified thallus. Black big pores, sterile branches; black little pores, secondary branches of the sporangia; dotted, sporangia.

Measurements — Outer diameter 0.4-0.8 mm; inner diameter half about of the outer one; max. diameter of fertile primary branches, measured in vertical section and including calcified walls, 0.08-0.15 mm; diameter of fine, secondary branches 0.01-0.02 mm; diameter of sterile branches (near the surface) 0.04-0.06 mm; number of primary fertile branches per whorl 10-15; idem for sterile branches.

Remarks — In a very recent report on the algal flora of some Rhaetic-Liassic sections of the Dolomites (Northern Italy), Cros & Lemoine (1966) proposed, on the basis of scarce remains of a new but not established species, the genus *Heteroporella*, that surely shows the same generic features of the Cretaceous *H. lepina*. The main character of the new genus, as said above, is the presence of fertile and sterile branches arranged in regular whorls which alternate, as in *Cylindroporella* Johnson; fertile branches of *Heteroporella* divide however distally in secondary filaments, whereas in *Cylindroporella* they appear as big, subspherical, outwards closed sporangia.

Now, according to the rules of nomenclature, lacking the type-species it is not possible to consider as formally valid the genus *Heteroporella* proposed by Cros & Lemoine. Though retaining the name in homage to the real Authors of the genus, it seems necessary to indicate it as a new genus in the present work, *Heteroporella lepina* n. sp. being the type-species (1).

Owing to the very different shape of the two types of branches, fertile and sterile whorls are quite evident in the Liassic species; some doubt may persist on the contrary about the interpretation of the analogous structures in the Cretaceous species. It is not impossible in fact that fertile branches are represented by the big, black, outwards open pores, whereas the ones interpreted as fertile structures would serve, respectively, the primary branches as reserve-structures, the secondary ones as assimilatory filaments. Such an interpretation has been however considered as non-valid by the writer owing mainly to the following considerations: a) the general features of the branches inter-

(1) The same opinion on the subject was expressed to the writer by M. Lemoine & P. Cros. They point out nevertheless that a phenomenon of *convergence* in the ambit of distinct phyla in different geological moments (Lias and Cretaceous) is not to be excluded. What is difficult to be proved, but surely reasonable. (Note added during the press).

preted as fertile is quite identical to the ones of other reproductive structures in which calcified « spores » *in situ* have been found in several specimens: it will worth mentioning the primary branches of *Triploporella*, which are surely fertile and are followed, as in our species, by fine, secondary branches; b) owing to the high gathering of the whorls, the inflated branches interpreted as fertile structures are clearly and regularly deformed by the ones interpreted as sterile; this is a typical feature of the new species. It seems that such a deformation may happen only when we assume that the high inflation of the fertile branches is successive to the regular growth and calcification of the sterile ones, that is to say, it may happen only in the adult stage of the alga, when the sporangia mature; c) the branches interpreted as fertile often appear filled with transparent calcite, in spite of the presence of the secondary branches which clearly communicate with the outer surface. The simple sterile branches, on the other hand, widen in the distal part and are surely open all along the life of the alga; they never show inflations and are usually found filled with dark micrite. We may hypothesize that the secondary « branches » of the sporangia are not assimilatory filaments but a sort of simple « pipes » from where ripe spores spread out; it seems that when the sporangia are imperfectly mature, there is no true communication with the exterior, and this may explain the frequent cases of spathic filling after death.

Ecology — In the Carpineto Romano section (Lepini Mountains, Central Apennines) *Heteroporella lepina* was recognized in an unexpected facies: very numerous dasyclad remains are associated in fact to a lot of sponge spicules (pl. 51, fig. 1) and some rare *Solenopora*. In samples of outer Dinarides it is present somewhere in detrital-skeletal, sparitic limestones, associated to *Triploporella fraasi* Stein., somewhere in

biomicrites featured by the presence of some rare planktonic foraminifera. In assemblage, both in Lepini Mountains and in the Dinarides, there are however the usual microfossils typical of the lower part of the « *Dicyclina schlumbergeri* and *Cuneolina pavonia parva* - Cenozoone » (Sartoni & Crescenti, 1963), slightly reworked perhaps with the dasyclads. We have to assume that the species was typical of reefoid facies near to the outer shelf, where the remains were sometimes transported by water movements in deeper environments contiguous to the open sea.

Occurrences — The type-level is exactly located at « Occhio di Bue » near Carpineto Romano (Sheet 159 Frosinone, IV NE). The species was found also in other localities of Lepini Mountains and in some places of outer Dinarides (kind communication of Mrs. R. Radoicic).

Stratigraphic range — In the type-level the species occurs very abundantly half a score of meters beneath the « *Cisalveolina fallax*-zone » (Devoto, 1964), associated to *Dicyclina schlumbergeri* Mun. Chalmas. In outer Dinarides Radoicic found it in surely Lower Turonian levels. The range of the species may be indicated as Upper Cenomanian-Lower Turonian (beginning of the « *Dicyclina schlumbergeri* and *Cuneolina pavonia parva* - Cenozoone », Sartoni & Crescenti 1963, Crescenti 1966).

Derivatio nominis — *Lepina* from Lepini Mountains, Central Apennines. Derivatio nominis of the genus, not clearly indicated by Cros & Lemoine, has to be related to the differentiation of the branches in two types, the sterile and the fertile ones.

Depository — Holotype D 39/1 (figured in pl. 51, fig. 3), preserved with paratypes (D 39/2-7) in the micropaleontological collection of the Institute of Geology and Paleontology of the University of Rome.

EXPLANATION OF PLATE 52

Heteroporella lepina n. sp., x 65. Figs. 1-2 from « Occhio di Bue » near Carpineto, Lepini Mountains; figs. 3-6 from different localities of outer Dinarides.

Figs. 1, 2 - Oblique sections. D 39/1.

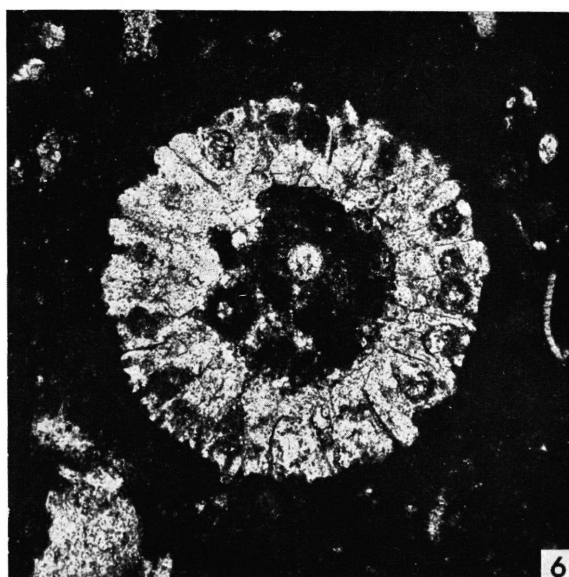
3 - Detail showing in oblique section the transition from the sporangia (black) to the fine secondary branches. D 39/7.

4 - Detail of axial section; open sterile branches and ramified sporangia. D 39/7.

5 - Compressed oblique section, showing the ramification of the sporangia. D 39/6.

6 - Transverse section, cutting mainly a whorl of sporangia; these appear more numerous than it is in reality, as some appear double owing to the strong oblique narrowings. D 39/6.

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