

NEW LITHOTHAMNIA

AND SYSTEMATICAL REMARKS

BY

M. FOSLIE

DET KGL. NORSKE VIDENSKABERS SELSKABS SKRIFTER, 1905. NO. 5

AKTIETRYKKERIEET I TRONDHJEM

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Lithothamnion Gabrieli Fosl. mscr.

Fronde crustlike, 1—3 mm. thick, sometimes with small wart-like or irregular excrescences, rather shining; conceptacles of sporangia immersed or slightly prominent, circular or sometimes oblong, 600—800 μ in diameter; sporangia four-parted, 180—200 μ long and 70—90 μ broad.

In this characteristic species new crusts may be developed upon others, closely clinging to the subjacent, and the small excrescences sometimes are formed by growing over and covering up extraneous objects, or feebly elevated ridges are formed when two crusts anastomose.

A vertical section shows a feebly developed hypothallium, the cells of which are 14—25 or up to 30 μ long and 7—12 μ broad. In the perithallium is no real stratification to be seen. The cells of this layer are squarish or elongated vertically and up to about $1\frac{1}{2}$ times the breadth, 9—14 μ long and 7—12 μ broad.

The conceptacles of sporangia are at first almost disc-shaped, but slightly raised above the surface of the frond, afterwards the roof becomes distinctly but shallowly concave, intersected with 60—80 muciferous canals. After maturity the roof gets dissolved and, therefore, overgrown conceptacles do not occur.

The species sometimes shares substratum with *Lithoth. repandum*. It seems to stand nearest to *Lithoth. obtectulum*, but in a sterile stage it much approaches particularly worn specimens of *Lithophyllum verrucosum* in habit. It occurs in the lowest part of the litoral region and bears ripe sporangia in the month of April.

This alga was collected at Ocean Beach, Philips Island, Victoria by Mr. C. J. Gabriel. It seems to have been scarce.

Goniolithon misakiense Fosl. mscr.

Frond attached to rocks, lamellate, suborbiculate, squamulose-imbriate, often proliferating, edge crenulate-lobate.

Although this alga is sterile, I venture to consider it an undescribed species. It much resembles partly *Lithoth. Lenormandi*, partly *Lithoth. squamuliforme* in habit, but differs particularly thereby that the lamels often are a little larger than in the said species, 100—300 μ thick, now closely, now loosely squamulose-imbriate, and frequently proliferating. The proliferations are in a young stage often more or less concave. Old fronds are up to about 5 mm. thick, generally, however, less.

In a vertical section the hypothallium shows to be vigorously developed, occupying the greatest part of the crust, the cells 15—36 μ long and 10—15 μ broad, sending forth upwards very short perithallic rows. The cells of the latter are squarish or elongated vertically, 10—18 μ long and 8—11 μ broad. Besides occur rather numerous heterocysts, which are proportionally large, 25—40 μ long and 15—18 μ broad.

I refer this species to the genus *Goniolithon* on account of the said heterocysts, which, as far as I know, only occur in species of the said genus and in *Melobesia farinosa*. They have till now not been found in the genera *Lithothamnion* and *Lithophyllum*.

The species grows in the litoral region in rather exposed places. It seems often to grow over other algæ. Among such ones is a form probably belonging to the subgenus *Lithoporella* of *Mastophora*. Cp. Siboga Exp. LXI, p. 73. It forms small crust-layers under parts of the species in question and seems to be identical with *Mastophora melobesioides* or *M. pacifica*, perhaps the latter owing to the size and shape of the cells.

G. misakiense is only known from Misaki on the Pacific coast of Japan, where it has been collected by Mr. K. Yendo.

Melobesia farinosa Lamour.

f. *mauritiana* Fosl. mscr.

Frond orbicular, becoming confluent and irregular in outline,

more adherent and less brittle than in the typical form; conceptacles of sporangia densely crowded, 140—180 μ in diameter.

This form is attached to eelgrass and somewhat differing in habit from the typical form of the species, particularly as to the conceptacles. These are of about the same diameter as in the said form, but densely crowded over the whole frond except a narrow peripheral portion, frequently so densely that the roofs become more or less angular and then looking lower than in the typical form, sometimes even slightly depressed. In this respect f. *mauritiana* stands in the same relation to f. *typica* as *M. Lejolisii* f. *typica* stands to *M. Lejolisii* f. *limitata*, i. e. in the latter form the conceptacles are not crowded, whereas in *M. Lejolisii* f. *typica* they are frequently densely crowded. The cells and the heterocyst in f. *mauritiana* are often a little smaller than in f. *typica*. The alga is richly provided with sporangia in June.

This species hitherto is only known from Mauritius, here collected by Prof. Jadin (no. 496).

Gen. *Litholepis* Fosl. mscr.

Frond forming minute delicate crusts more or less irregular, often becoming confluent, monostromatic except around the conceptacles, rather incrustated with carbonate of lime, superposing up to about 150 μ thick, cells thick-walled; conceptacles of sporangia resembling those in *Melobesia*.

As regards the vegetative part, this genus corresponds with the subgenus *Lithoporella* of *Mastophora*. Cp. Siboga Exp. LXI, p. 73, fig. 30—32. The crust in *Litholepis* is, however, considerably smaller, more delicate and seems to be destitute of rhizoids. It is formed partly by a solitary layer of thick-walled cells with marginal growth, partly and most frequently more layers are formed, the one upon the other, loosely or closely clinging to the subjacent such as in *Mastophora* (*Lithoporella*) *melobesioides*. Cp. Siboga Exp. I. c. In *Litholepis*, however, the superposing crusts seldom exceed 3—5 in number, and the crustlayers attain a thick-

ness of 150 μ , frequently, however, less. The alga is closely and rather firmly adherent to the substratum.

Of reproductive organs I have only seen sporangia. In this respect the genus *Litholepis* seems to be very nearly related to *Melobesia* and in the main apparently corresponds with this genus. It must, however, be remarked that the scanty and very sparingly fructiferous material in hand, attached to a hard substratum, makes a closer examination difficult at present.

This genus is in as much interesting as it seems to represent and intermediate link between *Melobesia* and *Mastophora*.

In Öfvers. Vet. Ak. Handl. (1900), p. 131. I described a species under the name of *Melobesia caspica* with monostromatic frond, but „attached to small shells are frequently to be found two or three crusts one above the other, and sometimes even stretched over conceptacles of the primary crust“. Besides, in New Melob. (1900), p. 22 I described a similar alga under the name of *Melobesia bermudensis*, „superposing at length up to 150 μ thick“. Both these species belong to the same serie of forms and represent the said genus. They are, therefore, to be denominated:

Litholepis caspica Fosl.

„ *bermudensis* Fosl.

I shall here describe a third species of this genus:

Litholepis Sawageaui Fosl. mscr.

Frond 2—3 mm. in diameter, very irregularly shaped, becoming more or less confluent; conceptacles of sporangia superficial, sub-hemispheric-conical, 160—225 μ in diameter. Sporangia four-parted, 60—80 μ long by 40—60 μ .

The alga is attached to stones and forms numerous minute crusts on one and the same substratum, of indefinite shape, crenulate or lacerate, more crusts often becoming confluent, leaving however lacunæ here and there. In a section the cells are verti-

cally elongated, $1\frac{1}{2}$ —3 times longer than broad, 15—25 μ long and 8—12 μ broad, without cortical cells.¹⁾ The conceptacles appear scattered in confluent fronds.

This species is intermediate the two other ones, standing however nearest to *Lithol. bermudensis*. I have been in doubt whether it should be considered specifically distinct from the latter, although all three species are feebly differentiated. It is difficult to decide from a scanty material. However, in the species in question the crusts are much more irregular than in *L. bermudensis*, and the cells frequently longer. Besides, the conceptacles are of larger diameter, but proportionally lower, and they are scattered, whereas in *L. bermudensis* they are frequently densely crowded. The alga has been found in the litoral region and was provided with ripe sporangia in December—January.

L. Sauvageaui is only known from Puerto Orotava (Teneriffe) on the Canary Islands, here collected by Prof. Camille Sauvageau. It seems to have been very scarce.

In Siboga Exp. LXI, p. 49 I mentioned that in *Goniolithon Reinboldi* Web. et Fosl. the hypothallium forms a solitary layer of cells, which are vertically elongated, often more or less oblique. This is also the case in the near *G. Börgesenii* Fosl. Therefore, I propose to establish a new subgenus for these two species:

Subgen. *Hydrolithon* Fosl. mscr.

As remarked, this subgenus characterizes itself by its hypothallium being one-layered as contrasted with the following:

¹⁾ The cortical cells mentioned as occurring here and there in *Lithol. caspica* and *L. bermudensis* are not certain, being difficult to decide in sections not quite felicitous.

Subgen. *Eugoniolithon* Fosl. mscr.

In the latter the hypothallium is composed of more layers of cells and comprehends the other species of the genus *Goniolithon*.

In Rem. on north. Lithoth. I have taken the subgenus *Heteroderma* of *Melobesia* in another sense than formerly, including species with the frond monostromatic except around the conceptacles, but destitute of heterocysts as contrasted with *Eumelobesia*, in which heterocysts are present (*M. farinosa*). Besides the species recorded l. c., the following ones are to be classed under the said subgenus:

<i>Melobesia (Heteroderma)</i>	<i>Cymodoceæ</i>	Fosl.
"	"	<i>triplex</i> Heydr. (= <i>M. Cymodoceæ</i> ?)
"	"	<i>coronata</i> Rosan.
"	"	<i>rugulosa</i> Setch et Fosl.
"	"	<i>subtilissima</i> Fosl.
"	"	<i>Novæ Zelandiæ</i> Heydr.?

In Alg. Not. (1904), p. 3 I mentioned that the genus *Dermatolithon* must be considered a subgenus of *Lithophyllum*. The species of the former consequently were to be transferred to the latter genus. I referred to Rev. Syst. Surv. Melob. and did not, therefore, enumerate the species. Besides those admitted in Rem. on north. Lithoth., the following ones belong to this subgenus in the sense taken l. c.:

<i>Lithoph. (Dermatol.)</i>	<i>canescens</i>	Fosl.
"	"	<i>prototypum</i> Fosl.
"	"	<i>tumidulum</i> Setch. et Fosl.
"	"	<i>polycephalum</i> Fosl.

In the pamphlet quoted I further mentioned that specimens classed under the subgenus *Heteroderma* of *Mesobesia*, in the sense then taken, should also partly be transferred to *Lithophyllum*. I class them under the subgenus *Carpolithon* of the said genus. This subgenus is to be taken in a somewhat altered sense, including species with a solitary layer of hypothallic cells as contrasted with the subgenus *Lepidomorphum*, with a hypothallium composed of more layers of cells, but otherwise nearly allied. There are some species referable to the said subgenus, but I will here only enumerate those formerly classed under *Heteroderma*:

Lithoph. (Carpolithon) zonale (Crn.) Fosl.

” ” *marginatum* Setch. et Fosl.

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AKTIETRAKKEBET

In the paragraph quoted I further mentioned that specimens classed under the subgenus *Heterodermis* of *Heterodermis* in the sense then taken should also partly be transferred to *Lithomanius*. This subgenus is to be taken in a somewhat altered sense including species with a solitary layer of hypodermal cells as contrasted with the subgenus *Lithomanius* with a hypodermium composed of more layers of cells, but otherwise nearly alike. There are some species referable to the said subgenus, but I will here only enumerate those formerly classed under *Heterodermis*. Through *Heterodermis* (Curt.) Foot, I have had access to the type material of the same genera, the *Lithomanius* and *Heterodermis*.

Heterodermis (*Heterodermis*) *Cyrtodermis* Foot.

- cyrtodermis* Heydt. (= *M. Cyrtodermis*)
cyrtodermis Rosen.
cyrtodermis Setch. et Foot.
cyrtodermis Foot.
cyrtodermis Heydt.

In *Ann. Bot. (Foot)* p. 31 I mentioned that the genus *Dermis* should be considered a subgenus of *Lithomanius*. The species of the former consequently were to be transferred to the latter genus. I referred to Rev. Syst. Surv. Malac. and did not, therefore, enumerate the species. Besides those mentioned in *Richt. et Richt.* *Lithom.*, the following ones belong to this subgenus in the sense taken here.

Lithomanius (*Dermis*) *Lithomanius* Foot.

- protuberans* Foot.
protuberans Setch. et Foot.
protuberans Foot.