

NEW SPECIES OR FORMS OF MELOBESIEAE

BY

M. FOSLIE

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Lithothamnion phymatodeum Fosl. mscr.

Thallus crustlike, 1—2 mm. thick, with wart-like or irregular excrescences; conceptacles of sporangia subprominent, 300—350 μ in diameter.

The species forms crusts on rocks in the upper sublittoral zone. It shows a striking resemblance in habit to *Phymatolithon polymorphum*. I do not know the extent of the crust, as I have seen but fragmentary pieces. It does not exceed 2 mm. in thickness, and the excrescences are frequently rather irregular, in part however raised in consequence on covering up extraneous objects.

The lower part of the thallus is destroyed by worms or other animals and, therefore, also the greater part of the primary hypothallic layer. New hypothallic formations are here and there met with; the cells of these are elongated, up to about 18 μ long, forming ascending bows. The perithallic layer is composed of cells which partly are square or almost square, 7—8 μ in diameter, partly and more frequently vertically elongated, 9—11 or up to 14 μ long and 6—9 μ broad. On a cross section is occasionally to be seen alternating long and short cells.

Of reproductive organs only sporangia are known. The conceptacles are convex or almost disc-shaped, subprominent, 300—350 or up to 400 μ in diameter seen from above, here and there crowded or almost confluent. The roof is intersected with 30—40 muciferous canals which are crowded in the central part, the latter often slightly depressed. This part most often gets dissolved at maturity, sometimes the whole roof and, therefore, emptied conceptacles appear seldom or only in part to be overgrown by new-formed tissue. The sporangia are four-parted, about 100 μ long and 55 μ thick with enduring interwalls.

As remarked above the present species resembles *Phymatolithon polymorphum* in habit except with regard to the mentioned reproductive organs. It stands nearest to *Lithothamnion Sonderi* and rather approaches certain forms of this species. On the other hand it somewhat approaches forms of *L. californicum* which stick to an uneven substrat.

Occurrence. Pacific coast of North America: Puget Sound, Whidbey Island, Wash., Setchell and Gardner, No. 653.

Lithothamnion Sonderi Hauck.

Meeresalg. p. 273.

f. *pacifica* Fosl. mscr.

Excrescences more decidedly branchlike, cells sometimes larger and conceptacles of sporangia less prominent than in the typical form.

Along the Pacific coast of North America an alga has been found, which at first sight seems to be fully identic with the European *L. Sonderi*. A closer comparison shows however, that in the American form the crust frequently develops excrescences which are more decidedly branchlike than in the other, although there appear specimens in both tracts which in this respect fully resemble each other. Besides the said form differs a little in structure, the cells on a cross section of the crust here and there being slightly larger than in the typical form of the species. The conceptacles of sporangia lie a little deeper and therefore often being less prominent than in European specimens, with most often thicker roof. Therefore I consider this form a separate one and propose to name it f. *pacifica*. It may however be remarked, that cystocarps are not yet known in the latter. In the typical form these organs appear in other specimens than the sporangia, but it is unknown whether so also being the case in f. *pacifica*, or whether the conceptacles are of the same shape.

The present form on the one side rather approaches *L. rugosum* f. *crassiuscula* in habit. I have seen but a fragmentary specimen of the latter form which perhaps represents a separate species, however at any rate more nearly connected with *L. rugosum* than *L. Sonderi*. The form in question on the other hand sometimes

reminds one in habit of young specimens of a form of *L. glaciale* appearing in shallow water. Besides it now and then approaches *L. phymatodeum* in habit and even in regard to the conceptacles of sporangia.

Occurrence. California: Pacific Grove, in low pools, *Setchell*, No. 1595 and 1596; Duxbury Reef, Marin County, in small pools in the rocks, *Setchell*, No. 1074 in part; and Puget Sound: Channel Rocks near Seattle, Wash., *Setchell* and *Gardner*, No. 654 in part.

Lithothamnion californicum Fosl.

Five new calc. Alg. p. 3.

f. *microspora* Fosl. mscr.

Conceptacles of sporangia 200—300 μ in diameter seen from above, occasionally not raised above the surface of the frond.

The present species is shown to be rather varying and appears in two different forms rather analogous to *Lithothamnion laeve* f. *macrospora* and f. *tenuis*, partly with large partly with small conceptacles of sporangia. The above f. *microspora* characterizes itself especially thereby, that the conceptacles of sporangia seen from above are 200—300 μ in diameter, thus smaller than in the typical form. They are partly subprominent partly not raised above the surface of the frond, in the latter case at least often caused thereby, that the sporangia for some reason are proportionally more slowly developed than the vegetative part of the plant, such as now and then to be seen also in other species.

The species stands between *L. magellanicum* and *L. tenuissimum*, being very nearly related especially to the latter. It seems even to be a question whether this species ought to be considered specifically distinct from the last named one, which till now is known only from the west coast of Africa. In habit it sometimes much reminds one of *L. laeve*.

Occurrence. The form *microspora* known from Pacific Beach near San Diego, California, collected by Mrs. E. Snyder, comm. Mr. F. S. Collins; the typical form is met with in different places along the Pacific coast of America and northward to Puget Sound,

Channel Rocks near Seattle, Wash., here anastomosed with *L. Sonderi* f. *pacifica* (Setchell and Gardner, No. 654 in part).

Lithothamnion conchatum Setch. et Fosl. mscr.

Thallus forming plane or arching discs 0.5—1.5 cm. in diameter on *Cheilosporum*; conceptacles of sporangia subprominent, 0.7—1 mm., conceptacles of cystocarps subhemispheric-conical, 0.6—0.9 mm. in diameter.

If the hostplant, *Cheilosporum*, do not grow in too dense and irregular tufts and the species thereby being allowed to develop itself freely, it forms more or less plane and orbicular, about 0.5 mm. thick discs, partly shallowly undulating, partly not, and now and then feebly crenate. The plant is attached to the host in the lower central part, and in the free lower part most often being concentric zonate. The margin is sometimes and most frequently bent a little downwards, sometimes however upwards. This is what may be considered the typical form of the species. Often, however, more crusts are founded close to each other, become at length confluent and form clustered, more or less imbricate crustcomplexes over some branches of the host, partly attached with the whole lower part, partly here and there free, or, not seldom, more or less arching crusts form almost similar crustcomplexes nearly surrounding certain parts of the hostplant. Now and then a crust becomes proportionally thick and lumpy, up to 1.5 mm. in thickness, or almost square or angular, occasionally even with a short stalk.

A median section of a typically developed crust shows, that it is attached to the host with a rather feebly developed, coxillate hypothallic layer, the latter sending forth perithallic rows of cells which are square, 9—15 μ in diameter, or more frequently vertically elongated, 12—24 μ long and 9—18 μ broad. In the freely developed part of the crust the hypothallic layer is frequently more vigorously developed, composed of cells which are most often 20—40 μ long, and sends forth upwards perithallic rows corresponding with the mentioned ones, but in somewhat thick crusts even downwards too.

The conceptacles of sporangia are crowded over the whole

thallus except a narrow peripheral portion. They are frequently subprominent, flattened subhemispheric, 0.7—1 mm. in diameter seen from above, and the roof is intersected with about 80 muciferous canals. The sporangia are four-parted and very large, 250—350 μ long and 100—150 μ broad. The conceptacles of cystocarps also are crowded, often so densely that they become angular, subhemispheric-conical, 0.6—0.9 mm. in diameter seen from above. In thick and lumpy specimens they are exceptionally even developed in the lower part of the frond.

The roof of the conceptacles of sporangia appears frequently to get dissolved at maturity and the scars filled by new formed tissue especially in thin crusts. Sometimes however the conceptacles become in part overgrown even before the sporangia are mature, and at length fully overgrown, but the sporangia are then as a rule escaped. The conceptacles of cystocarps seem to be overgrown in the same proportion as the former, sometimes also these in part before the spores are mature, become however frequently emptied before fully overgrown. Such emptied and nearly overgrown conceptacles sometimes look, as if they had not or scarcely been raised above the surface of the frond, as the orifices now and then do not become covered before several layers of tissue are formed over the conceptacles, and therefore on a section appearing rather elongated. This however occasionally takes place also in other species.

The plant stands between *L. Patena* and *L. lichenoides*, in some respects forming an almost intermediate link between both, sometimes much resembling the former in habit, sometimes however rather differing.

Occurrence. Pacific coast of North America: Monterey, California, W. A. Setchell; and Port Renfrew (Port San Juan), Vancouver Island, B. C. on *Cheilosporum frondescens* between tide marks, collected by Mr. K. Yendo of Tokyo.

Goniolithon mamillare (Harv.) Fosl.

Melobesia mamillaris Harv. Ner. Austr. p. 111.

f. *litoralis* Fosl. mscr.

Thallus 0.5—1 cm. thick, forming crusts on rocks, with irregularly wartlike or short branchlike, knotty, more or less crowded excrescences.

As remarked in a pamphlet in press¹) I have considered a calcareous alga from the Pacific coast of North America to be a stunted form of *G. Brassica-florida* (Harv.), being on the other hand uncertain whether the latter and *G. mamillare* are anything more than forms of one and the same species. I am still uncertain whether these species in fact are specifically distinct, as only rather young specimens of *G. mamillare* are known, a species which at any rate is closely connected with *G. Brassica-florida*. I am certainly most inclined to consider both identic, but at present I do not venture to unite them. So also in regard to the above f. *litoralis*. I have seen but fragmentary and rather small pieces of this form, which seems to be rather varying. Besides the conceptacles are emptied in the fertile pieces seen and, therefore, I am not quite sure of the nature of the reproductive organs and want to call attention to this form, although I am scarcely of any doubt at all in regard to its relation to the one or other of the said species. I refer it here to *G. mamillare* on account of the fact, that the latter with certainty is known only from America, where on the other hand any typical specimen of *G. Brassica-florida* has not yet been met with.

The branchlike excrescences in f. *litoralis* are a little thinner than in the typical form, partly rather densely crowded or almost confluent, partly somewhat scattered and then more irregular in shape and thickness. The conceptacles are often smaller than in *G. Brassica-florida*, but otherwise agreeing in shape.

Occurrence. California: Point Fermin, San Pedro in hollows near highwater mark, Prof. Setchell, No. 1147; and Pacific Beach near San Diego, Mrs. E. Snyder, comm. Mr. F. S. Collins.

1) Die Lithothamnien des Adriatischen Meeres und Marokkos. — Wissensch. Meeresuntersuchungen, Abt. Helgoland.

Melobesia (Heteroderma) *coronata* Rosan.

Melob. p. 64.

f. *zonata* Fosl. mscr.

Thallus forming orbicular or suborbicular, concentric zonated crusts on *Lenormandia*. Conceptacles subconical or conical, partly 150—200 μ , partly 250—300 μ in diameter seen from above.

According to a young authentic specimen of *M. coronata* in my collection, the above plant appears to be so nearly related to the said species that it scarcely may be considered more than a form of it. The species is as yet but little known, especially with regard to tendency of variation, and I do not yet exactly know its structure. The form *zonata* differs in the surface being more or less distinctly concentric zonate, and the crust somewhat thicker. Besides, according to Rosanoff's description l. c. the basal cells seem to be a little shorter in the said form than in the typical one, and often with thicker walls. On a cross section of f. *zonata* the cells are frequently square or rounded, about 6—12 μ in diameter, now however with the longest diameter in horizontal now in vertical direction. The crust consists in the peripheral portions of a single layer of cells with rather small cortical ones. It becomes thicker towards the centre, where it is composed of at least up to four layers of cells, perhaps even more in older crusts than that examined by me.

There are to be found two kinds of conceptacles. A few ones examined were empty. The one kind, the largest conceptacles, are conical or nearly so, 250—300 μ in diameter seen from above and probably identic with the cystocarpic ones described by Rosanoff l. c. The other and smaller conceptacles are subconical, 150—200 μ in diameter seen from above, being however uncertain whether those of sporangia or perhaps antheridia.

The form in question is attached to *Lenormandia spectabilis*, here forming solitary crusts up to nearly 1 cm. in diameter, or frequently smaller ones which partly anastomose.

Occurrence. Hitherto only known from Port Elliot, South Australia, collected by Miss Brumsert and kindly communicated to me by Mr. Reinbold.

Melobesia (*Heteroderma*) *marginata* Setch. et Fosl. mscr.

Thallus forming orbicular crusts, at length extended patches on other algae, 50—100 μ thick; conceptacles of sporangia crowded, convex or subconical, 150—200 μ in diameter.

The plant at first forms small orbicular or sometimes rather irregular, purplish crusts on other algae. These crusts by and by anastomose and at length form extended patches almost covering certain parts of the frond of *Gymnogongrus linearis* or *Laurencia pinnatifida*. Steril specimens probably belonging to the same species have also been met with on *Odonthalia dentata*. The crust is 50—100 μ thick and composed of at least up to 9 layer of cells. The basal cells are almost square or, more frequently, vertically elongated, up to 12 μ long and 5—8 μ broad. The upper cells on a section are square or somewhat rounded, 6—8 μ in diameter, or vertically elongated, up to 10 μ long, occasionally forming short rows with the longest diameter in horizontal direction. The cortical cells are smaller. The cellwalls are frequently rather thick.

The conceptacles of sporangia are densely crowded almost over the whole frond, often so densely that the roofs partly anastomose, sometimes however forming small groups as in *Melobesia Cymodoceae*. They are convex but little prominent, or subconical, 150—200 μ in diameter seen from above. The sporangia are four-parted, 50—60 μ long and 25—30 μ broad.

Dried specimens of this species with emptied conceptacles somewhat resemble *Lithothamnion corticiforme* in habit. On the other hand the species approaches *Melob. zostericola* and *M. Cymodoceae*.

Occurrence. Pacific coast of North America: Bodega Bay, California, on *Gymnogongrus* and *Laurencia*; and Whidbey Island, Wash., on *Laurencia pinnatifida*, and in the same locality on *Odonthalia* (steril), Setchell and Gardner, Algae of Puget Sound No. 269, 270.

Melobesia (*Eumelobesia*) *rugulosa* Setch. et Fosl. mscr.

Thallus monostromatic exsept in the neighbourhood of the conceptacles, without cortical cells. Conceptacles of sporangia subconical, 120—150 μ in diameter.

This species forms minute crusts of indefinite shape which by and by anastomose, at length forming irregular rose-coloured or purplish patches on *Stenogramme*. The margin is frequently crenulate. The plant consists of a single layer of cells except in the neighbourhood of the conceptacles, and do not possess cortical cells. Seen from above the cells are 7—12 μ long and 5—7 μ broad. On a section they are shown to be square with rounded corners, 5—8 μ in diameter.

The conceptacles of sporangia are subconical, 120—150 μ in diameter seen from above, partly scattered partly rather crowded. The sporangia are four-parted, about 40 μ long and 25 μ broad.

The present species somewhat reminds one in habit of *Melobesia zonalis*, being however more delicate. Otherwise it seems to stand nearest to *M. Novae Zelandiae*, the latter however only known from a rather incomplete description.

Occurrence. Santa Monica, California, collected by Sarah P. Monks.

This species forms chains of indistinctly shaped which
 by and by tapering at lengthening further, now and then
 of conical shape or cylindrical. The margin is regularly
 crenulate. The plant consists of a single layer of cells except in
 the neighbourhood of the conical part, and does not possess central
 cells present from about the 10-12th joint and 2-3rd
 joint. One section they are shown to be square with rounded
 corners, 5-6 μ in diameter, and to have 10-12 in length.
 The conical part of the margin is cylindrical, 1.5-2.0 μ in
 diameter, and is shown to be cylindrical, and is cylindrical
 in shape. The margin is cylindrical, about 10 μ long and 2.5 μ broad.
 The present species somewhat resembles one in form of *Meliosira*
longicauda being however much smaller. Otherwise it agrees
 to stand nearest to *M. Neesii* (Kütz.) the latter however being
 known from a rather incomplete description, and is also
 known from *Meliosira* (Latham) collected by S. P. Huxley
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Meliosira (*Meliosira*) *rugulosa* Sacc. n. sp. descr.
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