
Notes on New Zealand Marine Algae

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One rather striking accompaniment to the denudation of these evergreen trees and shrubs was the uplifting of the branches after they had been relieved of their normal weight of foliage. Many of them which ordinarily rest on the ground rose one or two feet from it, and the ends became incurved like the eaves of a Chinese temple, giving the trees a curiously unfamiliar pose.

XXXI.—NOTES ON NEW ZEALAND MARINE ALGAE.

A. D. COTTON.

A number of New Zealand algae have been from time to time examined and identified in the Herbarium, and in the course of their determination several points of interest have come to light. The publication of these will doubtless be of value to students in that country, and in the following notes the results of some recent investigations are given.

Myrionema strangulans, Grev., Scotch Crypt. Flora, vol. v. Pl. 300 (1827). On *Ulva latissima*, D.C., Otago, Lyall, March 1850. On *U. rigida*, Ag., West Coast, Algae Muellerianae.

Not previously known from New Zealand. The specimens agree precisely with those found in Europe on the same host.

Leathesia difformis, Aresch., and *Petrospongium Berkeleyi*, Naeg.

In the Flora of New Zealand, Harvey does not include *Leathesia difformis*, Aresch., though he refers to *L. Berkeleyi*, Harv. (= *Petrospongium Berkeleyi*, Naeg.) and *Asperococcus sinuosus*, Bory (= *Colpomenia sinuosa*, Derbes & Sol.). The Lyall gathering of the latter at Kew is found, however, to consist of *Leathesia difformis*. As far as can be seen, the specimens differ in no way from the European examples.

The record of *P. Berkeleyi*, Naeg., is founded upon specimens sent by Colenso. The plant has not since been collected in New Zealand, and Laing suggests that Colenso's plant may possibly be referable to *Leathesia difformis*. An examination of the original gathering shows that this is not the case. The type of structure is the same as that of *P. Berkeleyi* of Europe, but the filaments are more slender than in that species. It is probable that the New Zealand plant is specifically distinct from that of Europe, but further material is necessary before a definite statement can be made. Colenso notes that the plant occurred "on tidal rocks near Cape Kidnapper."

Dictyota ocellata, J. Ag., Anal. Algol. cont. 1, p. 68 (1894); Laing, Revised List, Addendum to Part 1, in Trans. & Proc. N.Z. Instit. vol. xxxiv., p. 358 (1901); see also vol. xxxii., p. 65 (1899).

It is well known that whilst some 10 or 12 species of *Dictyota* occur in South Australia, only two species have been recorded from New Zealand. Some of the New Zealand records have since been referred to other genera, others again have been questioned, so that Laing in his "Revised List of New Zealand Seaweeds," 1899, p. 65, remarked: "Indeed I am by no means certain that we have in New Zealand any species of *Dictyota*, as it is quite possible

that immature specimens of *Glossophora Harveyi* have been confused with *D. dichotoma*." In 1901 he recorded, however, *D. ocellata* on the authority of J. Agardh.

The presence of a fragment of a true *Dictyota* in a collection of Algae from the Chatham Islands, and also of several New Zealand specimens referred to that genus in the Kew Herbarium, suggested the desirability of an examination of the material available. The result of this examination is given below, from which it will be seen that two, if not three, species are found to be represented in the Kew Herbarium, though at the same time Laing's opinion with regard to *Glossophora* was found to be correct.

Dictyota dichotoma is mentioned by Harvey in the Flora New Zealand as collected by Lyall and Colenso. Lyall's specimens (dredged in 8 fathoms, Queen Charlotte Sound, Nov., 1850) represent a fine large plant with broad segments which branch in a sub-regular dichotomous manner. The structure is that of a typical *Dictyota*, but the fronds are unfortunately sterile. The plant does not appear to agree with any of the known broad-fronded Australian species, and it probably represents an undescribed species. Colenso's gathering (Hawke's Bay) consist of two species, one is *Dictyota ocellata*, J. Ag., and the other possesses the three-layered frond of a *Glossophora*, and doubtless represents young plants of *G. Harveyi*, J. Ag.

In the Hooker collections in the Herbarium there are specimens collected by Sinclair (Bay of Islands, Sept., 1841). The plants are too fragmentary for a definite opinion to be expressed, but from the disposition of the tetraspores the species is evidently closely allied to the European *D. dichotoma*, if indeed it is not identical with it.

Callophyllis Hombroniana, Kütz., Spec. Alg., p. 746, pro parte (1849). *Rhodymenia Hombroniana*, Mont., Prod., p. 3 (1842); Voy. Pol. Sud., p. 157, tab. 1, fig. 2 (1842-5); non *Callophyllis Hombroniana*, Kütz. in Harv. et Hook. Crypt. Antaret., nec in Flora New Zealand. *Callophyllis erosa*, Harv. Fl. New Zeal., vol. ii., p. 250 pro parte, Pl. 118, fig. 1, 3, 4 (1855).

In New Zealand some uncertainty exists as to the identity of *Callophyllis Hombroniana*. Montague's beautiful figure (Voy. Pol. Sud. l.c.) gives an excellent idea of the plant, and the large number of specimens that exist in British herbaria indicate that the species is of common occurrence. Harvey's conception of the plant was incorrect, he having confused it with another species, *C. calliblepharoides*, J. Ag., an error pointed out by J. Agardh (Epic, p. 231). Harvey, however, as explained below, figures it well in the Flora of New Zealand.

It has been already pointed out in the Kew Bulletin (1908, p. 162) that the original gathering of *Callophyllis erosa* consisted of more than one species, a fact which explains the character of the published figure and description. Figure 2 of Pl. 118 in the Flora of New Zealand has long been known to represent *Craspedocarpus erosus*, Schmitz (= *Rhodophyllis erosus*, J. Ag.), whilst the remaining figures have been either left as depicting *Callophyllis erosa*, Harv., or referred to *C. Hombroniana*. Considerable uncertainty, however, exists, and De Toni omits all reference to the figures. From an

examination of the specimens it is perfectly clear that *Callophyllis erosa* cannot exist as a species, part of the original gathering being composed of *Craspedocarpus erosus*, Schmitz, and the remainder (with the exception of an indeterminable fragment) of *C. Hombroniana*. The specimen depicted in figure 1 is in the Kew Herbarium, and is a typical, though somewhat worn, example of the last named plant, and figures 3 and 4 refer also to the same species.

The following is a revised description of *C. Hombroniana* :— Fronds narrow, much branched, rather large, deep crimson. Root small, discoid. Main branches 5–8 mm. wide, erect or spreading 20–25 cm. long, irregularly dichotomous, and pinnately beset with branched laciniae, or lateral branches. Lateral branches short, repeatedly and irregularly dichotomous; margins lacinate. Laciniae short, almost simple or much branched. Cystocarps single in the segments of simple or slightly branched laciniae. Tetrasporangia in terminal segments of lateral branches and in densely branched laciniae, cruciately divided, $40 \times 20\mu$.

Distinguished from *C. calliblepharoides* by the longer narrower fronds and much branched laciniae. The Tasmanian *C. Lambertii*, Harv. which *C. Hombroniana* most closely resembles differs in the ancipate frond, coarser and thicker lateral branches and absence of fimbriae; whilst *C. coccinea* may be known by the much narrower branches, absence of fimbriae and by the long dichotomously branched lateral branches.

***Chrysomenia asperata*, Cotton, comb. nov.**

Callophyllis asperata, Harv. in Hook., Flora New Zealand, vol. ii., p. 250 (1855). *Chrysomenia? apiculifera*, J. Ag., Epic. p. 320 excl. syn. (1876).

Callophyllis asperata, Harv., is little known and has not been lately recorded. An examination of the type specimens in the Herbarium shows that the plant is not a *Callophyllis*, but possesses the texture and structure of *Chrysomenia*; a striking resemblance was also noted to J. Agardh's New Zealand *Chrysomenia apiculifera*. On comparing it with the original gathering of the latter (part of which is in the Herbarium) the two plants were found to be identical. An alteration of name is therefore necessary.

The tetraspores of the present species are cruciately divided, and there is little doubt that the generic position accorded to it by Agardh is correct, though his ideas were somewhat confused owing to his uniting it with *Nitophyllum variolosum*, Harv. The latter, as stated below, is a true *Nitophyllum*.

***Nitophyllum variolosum*, Harv. in Flora New Zealand, vol. ii., p. 241 (1855).**

Clearly described by Harvey in the Flora of New Zealand, this alga was linked by J. Agardh (Epic. p. 320) with his *Chrysomenia apiculifera*. Agardh had not seen authentic specimens, but stated that such a common alga as *C. apiculifera* could not have been unknown to Harvey, and that the plant named *N. variolosum*, with peculiar root-like processes, was probably the same as his *C. apiculifera*. Consequently *N. variolosum* has disappeared from the list of *Nitophylla* and now figures only as a synonym of *C. apiculifera*.

Two of the original specimens collected by Lyall are preserved at Kew, and they clearly show that on this occasion Agardh was in error and that the plant is a *Nitophyllum*.

Though nearly allied to *N. palmata*, the present plant appears to be distinct from any of the species described in that difficult section. The root-like processes, with which both the surface and margin of the frond are beset, give the plant a peculiar appearance, but as these bodies are not always present this character must be used with care. In Britain similar outgrowths are met with upon certain forms of *N. laceratum*, especially those in which procumbent fronds are present, or those in which the fronds are in contact with other algae. The stimulus of contact appears in this species to be capable of bringing about the production of these peculiar attachment organs. From the appearance of the Kew specimens of *N. variolosum* it seems very probable that the same cause might occasion the formation of root-like processes in that species. Harvey's diagnosis precisely describes the Kew specimens and nothing of material importance can be added to it.

As surmised by Agardh, *C. apiculifera* was not unknown to Harvey, but he regarded it as a *Callophyllis*, having named it, as shown above, *C. asperata*. The ciliate processes on that plant bear no resemblance to those on the *Nitophyllum*, but are densely scattered over both surfaces of the fronds and have not the slightest appearance of being organs of attachment.

Nitophyllum uncinatum, J. Ag., Species Alg., vol. ii., p. 654 (1852).

Nitophyllum uncinatum is a very distinct species, but it is one which has become obscured owing to the fact that uncinatate branches may be also produced by other species of the genus.

The plant was first described by J. Agardh in 1852. He states that it is not uncommon in the Mediterranean, and was characterised by the possession of acuminate fronds and of occasional uncinatate branches; the sori moreover were produced immediately behind the apex of special short branches. Unfortunately, Agardh quoted as a synonym *N. laceratum* var. *uncinatum*, Grev. The latter is a perfectly distinct plant, but the error has been perpetuated. *N. laceratum*, Grev. assumes a large number of forms and the variety *uncinatum*, Grev., is not at all uncommon in the south of England. In the tetrasporic condition there is no difficulty in separating it from Agardh's species, and even when sterile, the straggling habit, the dingy colour, the blunt apices of the frond and well-marked veins are usually sufficient to distinguish it. In Britain *N. uncinatum*, J. Ag., is very rare and *N. laceratum* var. *uncinatum*, Grev., is not uncommon, whilst in the Mediterranean the reverse is the case.

When an examination is made of the Australian and New Zealand specimens of *Nitophylla* a similar state of affairs is found to exist, two distinct species having been referred to *N. uncinatum*, J. Ag. One is a plant which with little doubt is Agardh's species, and the other is an uncinatate form of *N. multipartitum* H. and H. The former agrees in form and structure with the European specimens, but up till the present it has only been examined in a sterile state.

With regard to New Zealand, the uncinata form of *N. multipartitum* has not been observed, but *N. uncinatum*, J. Ag., is represented by several specimens.

It may also be mentioned that several seasons' study of the genus *Nitophyllum* on the English coasts has clearly demonstrated that remarkable diversity in form can be exhibited by certain species, e.g., *N. punctatum* and *N. Gmelini*, though the structural characters remain unchanged. The precise conditions that bring about a given form have not yet been satisfactorily determined, but the depth of water and the amount of light are doubtless two very important factors. It is interesting to note that the variations which occur in the European species referred to, are closely paralleled by the Australian species *N. crispum* and *N. affine*. Such observations strengthen the view that not a few of the so-called species from Australia are in reality only forms.

Aphanocladia delicatula, Falkenb., in Engl. and Prantl. Pflanzenfam., p. 444 (1897); *Rhodomelaceen*, p. 288, tab. 2, figs. 15-17 (1901). *Rytiphloea delicatula*, Harv. in Hook. Flora New Zealand, p. 224, pl. 112 D (1855); Laing Rev. List, p. 355 (1901).

A fine tuft of this rare species was forwarded to Kew by Mr. R. H. A. Shakespear from Little Barrier Island. The gathering is interesting, not only as coming from a northern locality, but also that, according to Laing, the plant has not been collected since Lyall's time. The Little Barrier Island plants agree in every way with Lyall's original specimens.

Falkenberg removed the present species from *Rytiphloea* to a special genus *Aphanocladia*. The latter he placed amongst the *Pterosiphoniae*, a sub-family distinguished from the *Polysiphoniae* mainly by the distichous branching. The new position is decidedly more natural. *Aphanocladia* differs from *Pterosiphonia* in possessing only four pericentral cells, and by the spiral arrangement of the tetrasporangia.

With the exception of a record by Reinbold from New South Wales, *A. delicatula*, Falkenb., is only known from New Zealand.

XXXII.—ADDITIONS TO THE WILD FAUNA AND FLORA OF THE ROYAL BOTANIC GARDENS, KEW : IX.

NEMATODA.

Aphelenchus olesistus, Ritzema Bos ; an eelworm in fern fronds.

Quite recently, conspicuous, well-defined, brown stripes or irregularly shaped blotches, were observed on the fronds of various species of ferns growing under glass. Microscopic examination revealed the presence of eelworms in the diseased patches, which Dr. J. G. De Man, Terseke, Holland, kindly examined and identified as *Aphelenchus olesistus*, Ritzema Bos. This species also causes brown patches on the leaves of species of *Begonia*, *Chrysanthemum*, *Gloxinia*, *Coleus*, *Saintpaulia*, etc.