The Liagoraceae (Rhodophyta) of New Caledonia collected by Vieillard, including *Ganonema filicoides* (Kützing) comb. nov.

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Abstract – Historical specimens of Liagoraceae (Rhodophyta) collected by Eugène Vieillard from New Caledonia in the 1850s and housed in the Leiden herbarium have been examined and their identities clarified. Included are: *Liagora ceranoides*, *L. maderensis* (a new record for New Caledonia), *Ganonema farinosum*, *Ganonema filicoides* (Kützing) comb. nov., and *Yamadaella caenomyce*. Type material of two species, *Liagora tomentosa* Kützing and *Nemalion filicoides* Kützing, is present. The former is shown to be a heterotypic synonym of *Ganonema farinosum* (Lamoureux) Fan et Wang. The latter is incorrectly placed in *Nemalion* and displays the cortical structure and reproductive development of *Ganonema*. Thus, the combination *Ganonema filicoides* (Kützing) Huisman et Millar is proposed. *Ganonema filicoides* is similar, if not identical, to the later named *Ganonema samaense* (Tseng) Huisman.

*Liagora ceranoides* / *Liagora tomentosa* / *Nemalion filicoides* / *Yamadaella caenomyce* / *Liagora maderensis* / *Nemaliales* / red algae


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INTRODUCTION

The collections of marine algae from New Caledonia made by Eugène Vieillard (1819-1896) and described by Friedrich Kützing during the mid 1800s (1863a, 1863b-1869) include many of historical importance. Until recently, most of the Kützing names had not re-appeared in the literature since their description, nor have they been critically re-examined taking into account updated taxonomy and nomenclature. Millar & Prud’homme van Reine (2005) have recently clarified the identities of many of these species. Arising from that study was the need for a detailed examination of the Vieillard collection of Liagoraceae, the results of which are presented here. All specimens collected from New Caledonia by Vieillard and housed in the Rijksherbarium at Leiden (L) were examined. Type specimens of two species (Nemalion filicoides Kützing and Liagora tomentosa Kützing) were examined, plus several specimens that possibly formed the basis of later records. The identities of several other Liagoraceae listed in the catalogue of New Caledonian algae by Garrigue & Tsuda (1988) are also considered, but unfortunately no specimens are available to support those records.

MATERIALS AND METHODS

Specimens were loaned from Leiden and examined at Murdoch University. Small portions of plants were rehydrated for several minutes, decalcified with dilute HCl, stained with aniline blue, and then mounted on slides in a solution of 50% Karo (ACH Food Companies, Inc.) and water. The coverslips were pressed lightly to spread the filaments. Photographs of dried plants were taken with a Nikon Coolpix 4200 digital camera and arranged for publication in Adobe Photoshop v. 7.

RESULTS

Ganonema filicoides (Kützing) Huisman et Millar, comb. nov. (Fig. 1)


The sole specimen is 53 mm in height, lightly calcified, and light pink in colour. Branching is probably radial, but appears pinnate in the pressed specimen, with each order of branching progressively shorter. From the general aspect of the pressed specimen and its adherence to paper, it would also appear that the plant might have been mucilaginous when living. Cortical fascicles are 350-450 μm long, dichotomously divided except near the tips, where the terminal branches are often 4-5 cells long. Distal cells of cortical filaments are ellipsoid to barrel-shaped and 15-18 μm in diameter. Medullary filaments are 15-25 μm in diameter. Carpogonial branches are 4 celled, the cells 15 μm in diameter. Other reproductive structures were not observed.
Remarks: The morphology and observed reproductive structures of *N. filicoides* are incompatible with *Nemalion*, a genus with elongate carpogonial branches with the carpogonium terminating an elongate branch comparable to a vegetative filament (Womersley, 1994; Huisman & Womersley, 2006). The shorter, 4-celled carpogonial branches of *N. filicoides* are similar to those found in the genus *Ganonema* Fan et Wang (Huisman et al., 2004). In fact, the holotype of *N. filicoides* (Fig. 1) is very similar in habit to the more recently described *Ganonema samaense* (Tseng) Huisman (2002: 829) (Basionym: *Liagora samaensis* Tseng 1941: 276), particularly a specimen from the Hawaiian Islands depicted by Huisman et al. (2004, fig. 35). Unfortunately the type specimen of *N. filicoides* did not rehydrate well, but vegetative dimensions are comparable to those described by Huisman et al. (2004). We also observed 4-celled carpogonial branches that are relatively straight and have large cells. They are borne from the mid to proximal end of the bearing cell. Other details are unclear and further study on more recently collected specimens is needed to ascertain the conspecificity of *G. filicoides* and *G. samaense*. If this can be demonstrated, the species should be known as *G. filicoides*, the name based on the earlier of the two basionyms.

*Ganonema farinosum* (Lamouroux) Fan et Wang, 1974: 492. *(Fig. 2)*

*Liagora tomentosa* Kützing, 1863a: 13. Type is L 941,149-236 (barcode L 0056005) from New Caledonia by Vieillard. Isotype on sheet L 940,284-299 (barcode L 0055801) with the holotype of *Gongroceras subtile* Kützing (= *Ceramium flaccidum*).

Remarks: The holotype of *Liagora tomentosa* is presently mislaid, but an image of the specimen exists on the NHN website database. However, an isotype (which also happens to have the epiphytic holotype of *Gongroceras subtile* Kützing) has the distinctive cylindrical cortical filaments and carpogonial branches of *Ganonema farinosum*. The specimen also has mature cystocarps. *Liagora tomentosa* is therefore placed in the synonymy of *Ganonema farinosum*.

*Liagora ceranoides* Lamouroux, 1816: 239. *(Fig. 3)*

Specimen: Wagap, New Caledonia, 1863, Vieillard 2092 (L 941,149-218; barcode 0193975).

Remarks: This small size and vegetative structure of this specimen are entirely compatible with *L. ceranoides*, a species with a wide distribution in tropical seas (Huisman, 2002).

*Liagora maderensis* Kützing, 1858: 43, tab. 91, figs 1a-e. *(Fig. 4)*

Specimen: Noirmontiers, New Caledonia (L 941,149-234; barcode 0193977).

Remarks: This specimen is filed under *Liagora versicolor* Lamouroux, a superfluous name for *L. distenta* (Mertens) Lamouroux (Abbott 1990a: 114). *Liagora distenta* does not apparently occur in the Pacific Ocean (Abbott 1990a: 116) and this specimen is clearly misidentified. The thallus is moderately calcified, dichotomously divided without proliferous branches, and structurally has much-divided cortical filaments, strongly curved, four-celled carpogonial branches, compact gonimoblasts, no fusion cell, and branched involucral filaments with cylindrical cells. These features indicate conspecificity with *Liagora maderensis* Kützing, as described by Kvaternik & Afonso-Carillo (1995), who examined the type specimen. Similar specimens from Australia were also attributed to this species by Huisman (2002).

(Figs 5, 6)

As Liagora rugosa var. vieillardii Grunow (Garrigue & Tsuda, 1988: 66).

Remarks: These specimens are filed in Leiden as _Liagora valida_ and are also annotated as _L. rugosa_, a synonym of _Yamadaella caenomyce_ (Abbott, 1970). They have the distinctive inflated outer cortical cells of _Y. caenomyce_ (see Abbott, 1970; Yoshizaki, 1979; Wynne & Huisman, 1998; Huisman, 2006) and are clearly that species. Some specimens also have the large, three-celled carpogonial branches of this species. Another specimen (L. 941,149-215) of this species is filed in Leiden as _Liagora viscosa_. It is a male specimen, with spermatangia arising at the apices of stalk cells borne on cells subtending the inflated outer cortical cells, again typical of this species.

**DISCUSSION**

The specimens examined here represent the majority of Liagoraceae thus far recorded from New Caledonia. In addition to the species mentioned above, Garrigue & Tsuda (1988) also recorded _Liagora annulata_ and _L. boergeseni_, but the whereabouts of specimens to support these records is unknown. _Liagora annulata_ is regarded as a synonym of _Titanophycus validus_ (Harvey) Huisman, G.W. Saunders et A.R. Sherwood (Huisman et al., 2006) by Abbott (1990b, as _Liagora valida_ Harvey), but it is not known what taxon the specimens from New Caledonia actually represent. Some of the specimens in Leiden are misidentified as _L. valida_, but are in fact _Yamadaella caenomyce_. However, _Titanophycus validus_ is common in tropical seas generally, and it is entirely possible that it occurs at New Caledonia. Specimens of _L. boergeseni_ were not seen, but again this species is easily misidentified. Neither _Titanophycus validus_ or _Liagora boergeseni_ were present in the Leiden collection.

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**REFERENCES**


Liagoraceae of New Caledonia


