

**TYPE COLLECTIONS OF NONGENICULATE CORALLINALES
(RHODOPHYTA) IN THE RIJKSHERBARIUM (L),
LEIDEN UNIVERSITY, THE NETHERLANDS**

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SUMMARY

An analysis of collections of nongeniculate Corallinales (Rhodophyta) in the Onderzoekinstituut Rijksherbarium/Hortus Botanicus, Rijksuniversiteit Te Leiden (abbreviated L) has revealed the presence of type material for 114 species and infraspecific taxa. These include 35 holotypes, 21 lectotypes, 1 neotype, 15 isotypes, 25 isolectotypes, 12 syntypes and 4 paratypes. Type material of 25 authors is represented and includes taxa described by F.T. Kützing, M.H. Foslie, F.R. Kjellman, R.A. Philippi, F. Hauck, and F. Heydrich. Lectotypes have been newly designated for *Lithophyllum crassum*, *L. crispatum*, *Lithothamnion macquariensis*, and *L. mamillosum*. For each taxon, information on the protologue, nature of the type material, type locality, references to typification and published illustrations and pertinent nomenclatural and other comments are provided.

INTRODUCTION

The Onderzoekinstituut Rijksherbarium/Hortus Botanicus, Leiden University (abbreviated L; see Holmgren et al. 1990), contains one of the more extensive and important collections of algae in the world and includes the herbaria of F. Hauck, F.T. Kützing, W.R.F. Suringar, and A.A. Weber-van Bosse. The earlier history of the algal collections has been recounted by Joséphine Thérèse Koster (1936, 1948), who was in charge of their curation for a number of years (Van den Hoek 1989).

During a visit to the Rijksherbarium in 1980, the senior author rediscovered the type collections of nongeniculate Corallinales (Rhodophyta) described by R.A. Philippi (1837), and it became apparent that type material of a number of other nongeniculate corallines also was represented. In 1980, however, many of the types were not explicitly flagged, the nature of the type material (holotype, isotype, lectotype, syntype, etc.) had not been identified and information on these types published between 1900–1980 was limited to brief mentions in several papers (Foslie 1904, Dawson 1960, Huvé 1962, Papenfuss 1968).

Since 1980, four papers dealing with type material of particular sets of nongeniculate corallines in the Rijksherbarium have appeared. Woelkerling (1983a, 1983b) provided detailed accounts of the types of species that Philippi (1937) originally referred to *Lithothamnium* Philippi (nom. rejic.) and *Lithophyllum* Philippi. Types

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of species referred to *Spongites* by Kützing (1841) were examined by Woelkerling (1985a), and a detailed account of the types involving Siboga Expedition collections was prepared by Verheij & Woelkerling (1992). In addition, information on the types of other species has been published by Chamberlain (1983, 1991, 1992, 1994), Chamberlain & Keats (1994), Chamberlain & Norris (1994), Penrose (1991), Penrose & Woelkerling (1991), Verheij (1993a, 1993b, 1993c, 1994) and Zaneveld & Sanford (1980). Collectively, however, these papers deal with less than half of the types of nongeniculate corallines present in L.

The aims of the present account are to provide a detailed summary of information on all type collections of nongeniculate Corallinales represented in the Rijksherbarium, to identify holotypes, isotypes, lectotypes, syntypes, etc. that have not been previously flagged, and to deal with other pertinent nomenclatural matters relating to these collections. A summary analysis of nongeniculate coralline types in L is included after the taxonomic accounts.

This study is also designed to complement the earlier studies of Siboga Expedition nongeniculate coralline types (Verheij & Woelkerling 1992) and of the type collections in the Foslie herbarium at TRH (Woelkerling 1993).

MATERIALS AND METHODS

The taxonomic accounts to follow are organized alphabetically by final epithet (species, variety, or form). All taxa are referred to by their basionyms because the generic disposition of many of these taxa requires new studies in a modern context, a task beyond the scope of the present paper. Each entry includes information on basionym and protologue, the nature and location of type material, published references containing typification information, type locality and collection data, published illustrations of type material, and comments that include explanations for newly selected lectotypes.

Labels indicating the nature of the type material have been affixed to all collections examined during the present study. All collections in the Leiden herbarium, including types, are assigned a three-part number that may contain up to nine digits (e.g. 991.239-234; 943.7-15) and is related to the date of official numbering of the collection. The first part of the number represents the last three digits of the year in which the number was assigned; the second part represents the number of the day within that year in which the number was assigned; and the third part represents the position of the collection amongst those numbered on that particular day. In the examples above, 991.239-234 refers to the 234th collection to be numbered on day 239 of the year 1991, while 943.7-15 refers to the 15th collection to be numbered on day 7 of the year 1943.

Amongst collections examined here, L 943.10-34 is distinctive in that it contains type material of seven species (*Lithophyllum incrustans*, *L. lichenoides*, *Lithothamnion crassum*, *L. gracilis*, *L. ramulosum*, *L. rubrum*, *Nullipora byssoides*) described by or dealt with by Philippi and four species (*Lithothamnion bamleri*, *L. orthoblastum*, *L. pygmaeum*, *Perispermon hermaphroditum*) described by Heydrich. Most of Philippi's types were wrapped in a single piece of paper annotated by Kützing (see

Woelkerling 1983a: figs. 1, 2), and all of the specimens in L 943.10-34 have been retained under a single number to preserve the historical information attending the collection and its rediscovery (Woelkerling 1983a, 1983b). It is not quite certain how the Heydrich type fragments came to be lodged in the same container with Philippi's types. However, all of Heydrich's fragments are labelled by Weber-van Bosse, and they apparently were sent to her by Heydrich after she requested them. Each of the other Rijksherbarium types dealt with has its own L number.

Within the Leiden herbarium, specimens are usually filed under the most recently accepted name for a taxon, but all taxa can be located by looking under the original name (basionym) of the taxon within the herbarium. Herbarium abbreviations follow Holmgren et al. (1990) and the abbreviation ICBN is used for the International Code of Botanical Nomenclature (see Greuter 1988). The genus *Lithothamnion* Heydrich (1897b) has been conserved against *Lithothamnium* Philippi (1837) (see Woelkerling 1985b; Greuter 1988: 116), and consequently the spelling *Lithothamnion* is used throughout except when referring to basionyms in Philippi (1837).

TAXONOMIC ACCOUNTS

affinis

Basionym & protologue: *Mastophora affinis* Foslie (1904: 71).

Lectotype: L 943.7-29 (Siboga Expedition collection 1262), designated by Verheij & Woelkerling (1992: 276); includes one slide.

Lectotype fragment: TRH; includes one unnumbered slide based on material from Siboga Expedition station 1262.

Paratype: L 941.98-171 (Siboga Expedition collection 1328).

Type locality and collection data: Tual Anchorage, Kei Islands, Indonesia; collected by A. Weber-van Bosse, 12–16 December 1899. (Siboga Expedition station 258).

Previous references to typification: Verheij & Woelkerling (1992: 276); Woelkerling (1993: 22).

Published illustrations of lectotype: Foslie (1904) text figs. 28b, 28c, 29; Printz (1929) pl. 74, figs. 8, 9.

Published illustrations of paratype: Foslie (1904) text fig. 28a; Printz (1929) pl. 74, fig. 7.

Comments – In the protologue, Foslie (1904: 73) explicitly indicated that the three known specimens all came from a single locality that he (Foslie 1904: 71) incorrectly listed as Sikka, Island of Flores. Verheij & Woelkerling (1992: 276; see also Woelkerling 1993: 22) found two of the three specimens in a box with the number L 943.7-29; these were depicted in protologue figures 28b and 28c, came from Siboga Expedition station 258 (Tual Anchorage, Kei Islands), and bore the collection number 1262. During the present study, the third specimen, depicted in protologue figure 28a, was located on an herbarium sheet numbered L 941.98-171. Contrary to statements in the protologue, this specimen comes from a second locality, namely Siboga Expedition station 58 (anchorage off Seba, Savu Island), and it bears a different collection number (1328). Consequently, the material from station 258 must be considered as lectotype rather than holotype (Verheij & Woelkerling 1992; Woelkerling 1993), while the material from station 58 must be treated as paratype because it was collected at a different place and time from the lectotype.

alcicorne

Basionym & protologue: *Lithothamnion alcicorne* Kjellman (1883: 121).

Syntype: L 943.008-143.

Type locality and collection data: Tromsø, Norway; collector and date not indicated for L syntype but given in protologue as collected by M. Foslie at the beginning of August.

Previous references to typification: ?

Published illustrations of syntype material: Kjellman (1883) pl. 5, figs. 1–8; Kjellman (1885) pl. 5, figs. 1–8.

Published illustrations of L syntype: ?

Comments – Kjellman (1883) based *Lithothamnion alcicorne* on specimens from Tromsø sent by Foslie, but did not explicitly designate a type. The collection included both carposporangial and tetrasporangial specimens obtained from a depth of 36.6 m (20 fathoms). The L syntype collection includes 12 unattached plants/fragments c. 20–50 mm in greatest dimension and a few smaller fragments together with a label of Weber-van Bosse indicating the name and origin of the material. According to Stafleu & Cowan (1979: 560), the English version of the protologue (Kjellman 1885: 91–93, pl. 5, figs. 1–8) appeared two years after the Swedish version even though the title page of the English publication also is dated 1883.

angulata

Basionym & protologue: *Lithophyllum incrustans* f. *angulata* Foslie (1899: 17).

Lectotype: TRH, Flahault no. 254, designated by Woelkerling (1993: 27); includes slide 52.

Isolectotype: L 951.165-023.

Type locality and collection data: Banyuls-sur-Mer, France; collected by C. Flahault, Sept. 1893.

Previous references to typification: Woelkerling (1993: 27).

Published illustrations of lectotype: Printz (1929) pl. 58, fig. 11.

Published illustrations of L isolectotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 27). The isolectotype L 951.165-023 contains two fragments c. 39 and 46 mm in greatest dimension. Isolectotype material of this taxon (including L 951.165-023) was distributed as part of *M. Foslie: Lithothamnium Selecta Exsiccata* (see Woelkerling 1993: 9, 10, 274–276).

arcticum

Basionym & protologue: *Lithophyllum arcticum* Kjellman (1877: 16).

Syntypes: TRH, unnumbered; includes slide 1559. — L 943.7-98.

Type locality and collection data: TRH collection: Uddebay, Novaya Zemlya; collected by *Kjellman*, 18 Aug. 1875. — L collection: Uddebay, Novaya Zemlya; collected by *Kjellman*, 30 Aug. 1875.

Previous references to typification: Woelkerling (1993: 30).

Published illustrations of syntype material: ?

Comments – Kjellman (1877, p. 16, pl. 1, figs. 1–13) based *Lithophyllum arcticum* on material from Novaya Zemlya but did not designate a type or indicate how many specimens were involved. Information on the TRH syntype is provided by Woelkerling (1993: 30). The L syntype consists of two fragments c. 23–30 mm in greatest dimension and includes a label from Kjellman with the species name and collecting data.

bamleri

Basionym & protologue: *Lithothamnion bamleri* Heydrich (1897a: 4, pl. 1, figs. 8–10).

Lectotype: PC, unnumbered, designated by Verheij (1993c: 39). Verheij 1993c contains a preprint of Verheij 1994.

Isolectotype: L 943.10-34 (part of).

Type locality and collection data: Tami Island, Huon Gulf, New Guinea, collected by *Bamler*, December 1894.

Previous references to typification: Verheij (1993c: 39); Verheij (1994: 99)

Published illustrations of lectotype: ?

Comments – Verheij (1993c) designated the lectotype in an account of the species from the Spermonde Archipelago, Indonesia. The L isolectotype contains three fragments, the largest measuring 14.9 mm in greatest dimension. All three fragments contain numerous uniporate conceptacles.

In addition to *Lithothamnion bamleri*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *L. lichenoides* Philippi, *Lithothamnium crassum* Philippi, *L. gracile* Philippi, *L. orthoblastum* Heydrich, *L. pygmaeum* Heydrich, *L. ramulosum* Philippi, *L. rubrum* Philippi, *Nullipora byssoides* Lamarck, and *Perispermion hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

bandanum

Basionym & protologue: *Lithothamnion bandanum* Foslie (1904: 12).

Holotype: L 943.7-27 (Siboga Expedition collection 224); includes one slide.

Holotype fragment: TRH; includes one slide.

Type locality and collection data: Banda Anchorage, Sumatra, Indonesia; collected by *A. Weber-van Bosse*, November 1899 (Siboga Expedition station 240).

Previous references to typification: Adey & Lebednik (1967: 64); Adey (1970: 19); Verheij & Woelkerling (1992: 276); Woelkerling (1993: 37).

Published illustrations of holotype: Foslie (1904) pl. 1, fig. 10, and text fig. 4, p. 12; Printz (1929) pl. 5, fig. 8.

Comments – Additional information is provided by Verheij & Woelkerling (1992: 276) and Woelkerling (1993: 37).

brachiata

Basionym & protologue: *Lithothamnion australe* f. *brachiata* Foslie (1904: 24).

Lectotype: L 991.239-221 (Siboga Expedition collection 868), designated by Verheij & Woelkerling (1992: 276); there are no associated slides.

Lectotype fragment: TRH (Siboga Expedition collection 868); there are no associated slides.

Type locality and collection data: Haingsisi, Samau Island, Timor; collected by *A. Weber-van Bosse*, 2–5 February 1900 (Siboga Expedition station 303).

Previous references to typification: Verheij & Woelkerling (1992: 276); Woelkerling (1993: 41).

Published illustrations of lectotype: Foslie (1904) pl. 2, fig. 25; Printz (1929) pl. 17, fig. 45.

Comments – Additional information, including data on the seven isolectotypes, is provided by Verheij & Woelkerling (1992: 276) and Woelkerling (1993: 41).

byssoides

Basionym & protologue: *Nullipora byssoides* Lamarck (1801: 374).

Neotype: L 943.10-34 (in part; see comments), designated by Woelkerling (1983a: 177).

Type locality and collection data: Sicily (Italy), Mediterranean Sea; collector and date not indicated.

Previous references to typification: Woelkerling (1983a: 173, 177).

Published illustrations of neotype: Kützing (1869) p. 35, fig. 99e; Woelkerling (1983a) figs. 2, 12–16.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1983a). In addition to *Nullipora byssoides*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *L. lichenoides* Philippi, *Lithothamnium bamleri* Heydrich, *L. crassum* Philippi, *L. gracile* Philippi, *L. orthoblastum* Heydrich, *L. pygmaeum* Heydrich, *L. ramulosum* Philippi, *L. rubrum* Philippi, and *Perispermon hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

canellata

Basionym & protologue: *Melobesia pustulata* B *canellata* Kützing (1849: 696).

Lectotype: L 940.317-503, designated by Chamberlain (1991: 61).

Type locality and collection data: Mediterranean Sea; collector and date not indicated.

Previous references to typification: Chamberlain (1991: 61).

Published illustrations of lectotype: ?

Comments – Chamberlain (1991: 61) treated this taxon as *Titanoderma pustulatum* var. *canellata* (Kützing) Chamberlain but did not provide an account of or illustrate the lectotype. *Titanoderma* is considered here to be a heterotypic synonym of *Lithophyllum*; see Campbell & Woelkerling (1990), Woelkerling & Campbell (1992) and Verheij (1993c, 1994).

capense

Basionym & protologue: *Lithophyllum capense* Rosanoff (1866: 86).

Lectotype: CN, Hohenacker specimen 236 in *Algae Marinae Siccatae*; specimen in the Lenormand herbarium, designated here by Y.M. Chamberlain.

Putative isolectotypes: L 939.6-150 (includes two labelled specimens). — L 910.168-189 (includes two labelled specimens).

Type locality and collection data: Cape Agulhas, South Africa; collector and date not indicated.

Previous references to typification: Unpublished annotation of Y.M. Chamberlain on specimen in CN.

Published illustrations of lectotype: ?

Published illustrations of putative L isolectotypes: ?

Comments – Rosanoff (1866, pl. 6, figs. 13, 15a, 15b) based *Lithophyllum capense* on specimens in the Lenormand herbarium under the unpublished names *Millepora fucorum* and *Melobesia capensis*. Specimens of the latter were distributed with printed labels as number 236 in Hohenacker's *Algae Marinae Siccatae* (Sayre 1969: 79), and the Hohenacker exsiccata specimen in the Lenormand herbarium in CN has been designated here as lectotype by Y.M. Chamberlain. Four putative isolectotypes with printed labels occur in L; however, these appear to contain more than one species and comparisons of all L material with the CN lectotype are needed to determine which L specimens contain material that is conspecific with the CN lectotype.

caulescens

Basionym & protologue: *Peyssonnelia caulescens* Kützing (1849: 694).

Holotype: L 939.6-143.

Type locality and collection data: Port Natal, South Africa; collected by Gueinzus, date not indicated.

Previous references to typification: Papenfuss (1968: 275); Woelkerling (1980: 232, 238).

Published illustrations of holotype: ?

Comments – The single collection (and thus the holotype) of *Peyssonnelia caulescens* in the Kützing herbarium is housed in a packet on which the name, collecting data and reference to the protologue appear in Kützing's script. The packet contains material that is concordant with the protologue account and consists of fragments of *Metamastophora flabellata* (Sonder) Setchell deformed with a bryozoan (see Woelkerling 1980 for an account of this species, including deformed specimens). Papenfuss (1968: 275) previously has noted that Kützing's species belongs to *Metamastophora*. The holotype of *Peyssonnelia caulescens* also is likely to be a syntype of *Mastophora stelligera* Endlicher & Diesing (1845: 290); see Woelkerling (1980: 238) for additional comments.

chamaedoris

Basionym & protologue: *Lithophyllum chamaedoris* Foslie et Howe (1906: 134).

Holotype: NY, Howe no. 4017.

Isotypes: L 941.155-257 (Howe no. 4017). — TRH, Howe no. 4017. — BM, unnumbered (see Tittley et al. 1984: 10).

Type locality and collection data: Cave Cays, Exuma Chain, Bahamas; collected by M.A. Howe, 19 February 1905.

Previous references to typification: Adey & Lebednik (1967: 36, as *Melobesia*); Adey (1970: 5); Woelkerling (1993: 50).

Published illustrations of holotype: Foslie & Howe (1906) pl. 90, fig. 1.

Published illustrations of L isotype: Fig. 1.

Comments – Additional information on the typification of this species is provided by Woelkerling (1993: 50). The L isotype contains four host fragments with coralline epiphytes (probably of several species).

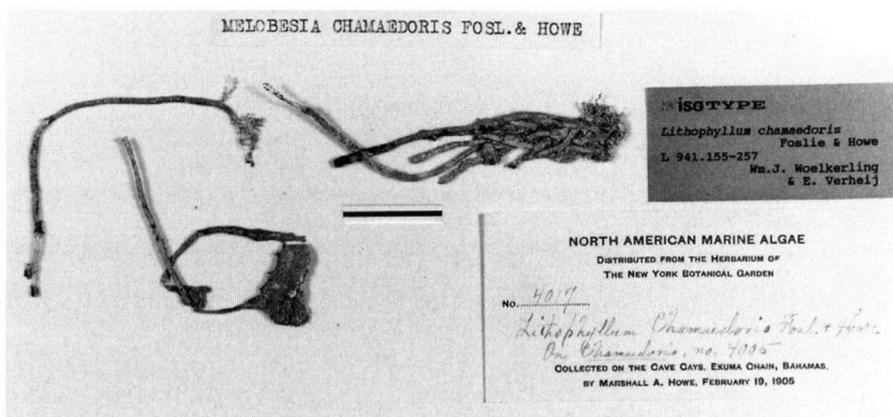


Fig. 1. Isotype *Lithophyllum chamaedoris* Foslie et Howe (L 941.155-257); scale bar = 1 cm.

coalescens

Basionym & protologue: *Lithothamnion coalescens* Foslie (1895: 162; p. 134 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 52); includes slide 215 (missing) and five unnumbered slides.

Isolectotype: L 942.350-64.

Type locality and collection data: Inderøen, Strømmen, Trondheimsfjord, Norway; collected by *M.H. Foslie*, 12 August 1893.

Previous reference to typification: Woelkerling (1993: 52).

Published illustrations of lectotype: Foslie (1895) pl. 19, figs. 15–20; Printz (1929) pl. 41, figs. 11, 12 (as *Clathromorphum compactum* f. *coalescens*).

Published illustrations of L isolectotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 52). The isolectotype collection in L contains a label with name, locality and date in Foslie's script and consists of a single stone c. 25 mm in greatest dimension mostly covered with coralline material.

colliculosum

Basionym & protologue: *Lithothamnion colliculosum* Foslie (1891: 43; p. 8 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 53); includes slides 137 and 138.

Isolectotype: L 943.7-92.

Previous references to typification: Adey & Lebednik (1967: 71); Adey (1970: 19); Woelkerling (1993: 53).

Type locality and collection data: Skorpen, Kvænangen, Norway, collected by *M.H. Foslie*, 8 September 1890.

Published illustrations of lectotype: Foslie (1891) pl. 3, fig. 1; Foslie (1895) pl. 17, fig. 9.

Published illustrations of L isolectotype: ?

Comments – The history of typification of this species is dealt with in detail by Woelkerling (1993: 53). The isolectotype collection in L contains a small label with name, locality and date in Foslie's script and consists of plants covering three stones, none of which were depicted in the protologue.

compactum

Basionym & protologue: *Lithothamnion compactum* Kjellman (1883: 132).

Lectotype: TRH, unnumbered, designated by Woelkerling (1988: 161); includes slide 217.

Paratype: L 992.173-203.

Type locality and collection data: Karmakul Bay, Novaya Zemlya; collected by *F. Kjellman*, 26 June 1875.

Previous references to typification: Woelkerling (1988: 161, as *Clathromorphum compactum*); Woelkerling (1993: 54).

Published illustrations of lectotype: Kjellman (1883) pl. 6, figs. 8–12; Kjellman (1885), pl. 6, figs. 8–12; Woelkerling (1988) figs. 167–170 (as *Clathromorphum compactum*).

Published illustrations of L paratype: ?

Comments – Lectotypification of *Lithothamnion compactum* Kjellman with a specimen in TRH was effected by Woelkerling (1988: 161) who provides further details. The collection in L consists of six fragments and includes an identification

label from Kjellman with collecting details. Because the date of collection on the L label is 29 June 1875 and not 26 June 1875 as per the lectotype, the L collection is regarded to be a paratype rather than an isolectotype. According to Stafleu & Cowan (1979: 560), the English version of the protologue (Kjellman 1885: 101–102, pl. 6, figs. 8–12) appeared two years after the Swedish version even though the title page of the English publication also is dated 1883.

condensata

Basionym & protologue: *Mastophora macrocarpa* f. *condensata* Foslie (1907: 30).

Holotype: L 943.10-60 (Siboga Expedition collection 1334); there are no associated slides.

Holotype fragment: TRH (Siboga Expedition collection 1334); there are no associated slides.

Type locality and collection data: Sanana Bay, E coast of Sula Besi Island, Indonesia; collected by A. Weber-van Bosse, 13–14 November 1899 (Siboga Expedition station 193).

Previous references to typification: Verheij & Woelkerling (1992: 277); Woelkerling (1993: 57).

Published illustrations of holotype: Foslie (1904) p. 71, text fig. 27; Printz (1929) pl. 74, fig. 6; Woelkerling (1988) p. 11, fig. 16.

Comments – Additional data are provided by Verheij & Woelkerling (1992: 277) and Woelkerling (1993: 57).

confervicola

Basionym & protologue: *Phyllactidium confervicola* Kützing (1843: 295).

Holotype: L 941.156-120.

Type locality and collection data: Trieste, Italy; collector and date not indicated.

Previous references to typification: Chamberlain (1983: 385); Irvine & Chamberlain (1994: 137).

Published illustrations of holotype: Kützing (1869) figs. 92c, 92d (as *Hapalidium phyllactidium*); Chamberlain (1983) figs. 43a, 45a (as *Pneophyllum conferviculum*).

Comments – Additional information on this species is provided by Chamberlain (1983: 385–387, as *Pneophyllum*). As noted by Chamberlain (1983: 300), Kützing (1849: 695) subsequently transferred *Phyllactidium confervicola* to his genus *Hapalidium* and needlessly changed the specific epithet *conferviculum* to *phyllactidium*. Thus the epithet *phyllactidium* is a superfluous substitute for *confervicola* (ICBN Art 63.1; see Greuter 1988).

confluens

Basionym & protologue: *Spongites confluens* Kützing (1841: 32).

Holotype: L 943.7-78.

Holotype fragment: L 941.149-401.

Type locality and collection data: Spalato (Adriatic Sea), Italy; collector and date not indicated.

Previous references to typification: Woelkerling (1985a: 129).

Published illustrations of holotype: Kützing (1843) pl. 78, fig. 2; Kützing (1869) pl. 97, figs. a–d; Woelkerling (1985a) figs. 9–13.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1985a). During the present study, a fragment of the holotype of *Spongites confluens* was found among the sheet collections of *Lithophyllum incrustans*. This fragment, which easily can be matched with the main part of the holotype, is in a

packet on which reference is made in Kützing's script to the figures on plate 97 of Kützing (1869). In the text portion of Kützing (1869: 34), reference also is made to pl. 78, fig. 2 in Kützing (1843). Although not explicitly indicated, the 1843 figure also must be based on the holotype collection because it is the only collection in Kützing's herbarium with the name *Spongites confluens*.

congregatum

Basionym & protologue: *Lithothamnion congregatum* Foslie (1895: 142; p. 114 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 60); includes slides 172–174.

Isolectotype: L 951.165-045.

Type locality and collection data: Skjørn, Trondheimsfjord, Norway; collected by *M.H. Foslie*, 20 July 1894.

Previous references to typification: Woelkerling (1993: 60).

Published illustrations of lectotype: Foslie (1895) pl. 20, figs. 1–6.

Published illustrations of L isolectotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 60). The isolectotype L 951.165-045 contains one largely intact plant about 75 mm in greatest dimension and a number of smaller fragments. Isolectotype material of this taxon (including L 951.165-045) was distributed as part of *M. Foslie: Lithothamnion Selecta Exsiccata* (see Woelkerling 1993: 9, 10, 274–276) under the name *Lithothamnion nodulosum* f. *congregata*.

corticiformis

Basionym & protologue: *Melobesia corticiformis* Kützing (1847: 33).

Holotype: L 943.68-281.

Type locality and collection data: Atlantic Ocean (precise locality not indicated); collector and date not indicated.

Previous references to typification: Foslie 1905: 73.

Published illustrations of holotype: Kützing (1869) pl. 94, figs. c–d.

Comments – Kützing (1847) established *Melobesia corticiformis* for plants growing on *Gelidium corneum* in the Atlantic Ocean. The Kützing herbarium contains two specimens identified by Kützing as *Melobesia corticiformis*. L 943.68-281, considered here to be the holotype, is labelled 'mari atlantico' while the second specimen (L 941.149-412) is labelled Canary Islands, a locality not explicitly mentioned in the protologue. Subsequently, Kützing (1869: 34, pl. 94, figs. c–d) illustrated part of the holotype but incorrectly gave the locality as the Mediterranean. Later, Foslie (1905: 73) concluded from a comparative examination of type material that *Melobesia corticiformis* was a heterotypic synonym of *M. membranacea* Lamouroux. The conspecificity of the two taxa was reaffirmed by Chamberlain (1983: 304, 306) and accepted by Wilks & Woelkerling (1991). The holotype collection consists of a number of specimens and fragments of *Gelidium* with epiphytic plants of *Melobesia corticiformis*.

crassiuscula

Basionym & protologue: *Melobesia crassiuscula* Kützing (1843: 386).

Holotype: L 939.6-146.

Type locality and collection data: Cape of Good Hope, South Africa; collector and date not indicated.

Previous references to typification: ?

Published illustrations of holotype: Kützing (1858) pl. 99, figs. c–e.

Comments – Kützing (1843) established *Melobesia crassiuscula* for plants growing on *Gelidium*. Subsequently Kützing (1849: 696) placed the species in *Mastophora* and later (Kützing 1858: pl. 99, figs. c–e) depicted several individuals. L contains a single collection labelled *Mastophora crassiuscula* by Kützing, which therefore is considered the holotype. The collection is annotated by Kützing to indicate that this material was used to prepare his 1858 illustrations. The holotype contains only one intact plant and a few fragmentary individuals.

crassum

Basionym & protologue: *Lithophyllum crassum* Rosanoff (1866: 93).

Lectotype: CHE, Lloyd specimen 318 in *Algues de l'Ouest de la France*, designated here by Y.M Chamberlain

Paratype: L 943.10-43.

Type locality and collection data: Île d'Yeu (Vendée), France, collected by Lloyd, September 1852.

Previous references to typification: ?

Published illustrations of lectotype: Rosanoff (1866) pl. 7, figs. 5, 7.

Published illustrations of L paratype: ?

Comments – Rosanoff (1866) based *Lithophyllum crassum* on material from Ile d'Yeu distributed by Lloyd as specimen no. 318 in *Algues de l'Ouest de la France* (Sayre 1969: 86) under the unpublished name *Melobesia crassa* and on Thuret & Decaisne material from Biarritz. Y.M. Chamberlain has examined the Lloyd material in CHE studied by Rosanoff and has designated it as lectotype here.

The paratype in L was collected on 28 August 1854 at Biarritz (one of two localities cited by Rosanoff 1866: 95 in the protologue); it contains five pieces of coralline material 20–30 mm in greatest dimension and a label from the Thuret herbarium with the name *Melobesia crassa* Lloyd and collection date written by hand.

crassum

Basionym & protologue: *Lithothamnium crassum* Philippi (1837: 388).

Holotype: L 943.10-34 (in part; see comments).

Type locality and collection data: Sicily (Italy), Mediterranean Sea; collector and date not indicated.

Previous references to typification: Woelkerling (1983a: 173, 180); Irvine & Chamberlain (1994: 70, as *L. duckeri*).

Published illustrations of holotype: Kützing (1869) p. 35, figs. 99a–b; Woelkerling (1983a) figs. 2, 17–22.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1983a), who transferred the species to *Lithophyllum* and established the new specific epithet *duckerae* (as *duckeri*) to avoid creation of a later homonym for

Lithophyllum crassum Rosanoff (1866: 93). Because only a single specimen is involved, the type must be considered a holotype rather than a lectotype as suggested by Woelkerling (1983a: 173, 180). The genus *Stichospora* Heydrich (1900: 316) is typified by the type of *Lithothamnium crassum* (Table 1). Woelkerling (1983a: 184; 1988: 102) concluded that the type of *Lithothamnium crassum* belonged to *Lithophyllum*, thus making *Stichospora* a heterotypic synonym of *Lithophyllum*.

In addition to *Lithothamnium crassum*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *L. lichenoides* Philippi, *Lithothamnium bamleri* Heydrich, *L. gracile* Philippi, *L. orthoblastum* Heydrich, *L. pygmaeum* Heydrich, *L. ramulosum* Philippi, *L. rubrum* Philippi, *Nullipora byssoides* Lamarck, and *Perispermum hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

The generic name *Lithothamnium* Heydrich (1897b: 412) has been conserved against *Lithothamnium* Philippi (1837: 387) (ICBN, Appendix IIIA: 116; see Greuter 1988); however, in the context of dealing with Philippi's types, *Lithothamnium* is used here because Philippi established both the genus and the species in the same paper.

crispatum

Basionym & protologue: *Lithothamnium crispatum* Hauck (1878: 289).

Lectotype: L 943.7-75 (designated here).

Type locality and collection data: Rovigno, Adriatic Sea.

Previous references to typification: ?

Published illustrations of lectotype: ?

Comments – Hauck (1878: 289, pl. 3, figs. 1–4) based *Lithothamnium crispatum* on a number of specimens from Rovigno without specifying a type. However, the Hauck herbarium in L contains one Rovigno collection identified as *Lithothamnium crispatum*. Because Hauck material from Rovigno also occurs in PC and TRH, the L collection is considered here to be the lectotype. Hauck (1878: pl. 3, figs. 1–4) illustrated two individuals and indicated in the protologue that he could not find any reproductive structures on his material. Hauck material of *Lithothamnium crispatum* in L, PC (Lemoine 1912: liv), and TRH (Adey & Lebednik 1967: 66) also has been examined, but none of these specimens have conceptacles either. One specimen from TRH, however, shows flared epithallial cells and other vegetative features considered characteristic of *Lithothamnium* (Woelkerling 1988), but in the absence of reproductive material, the status and disposition of this taxon must be considered uncertain. The TRH collection inadvertently was overlooked by Woelkerling (1993).

crispescens

Basionym & protologue: *Lithothamnium simulans* f. *crispescens* Foslie (1904: 16).

Lectotype: L 943.7-36 (Siboga Expedition collection 409), designated by Verheij & Woelkerling (1992: 278); there are no associated slides. The Leiden box numbered L 943.7-36 contains all

Siboga Expedition specimens identified by Foslie as *Lithothamnium simulans*.

Lectotype fragment: TRH (Siboga Expedition collection 409); includes one slide.

Type locality and collection data: Between Nusa Besi and the NE point of Timor, Indonesia; collected by A. Weber-van Bosse, 15–17 January 1900 (Siboga Expedition station 282).

Previous references to typification: Adey & Lebednik (1967: 70, as *Mesophyllum crispescens*); Adey (1970: 23, as *Mesophyllum crispescens*); Verheij & Woelkerling (1992: 278); Woelkerling (1993: 68).

Published illustrations of lectotype: Foslie (1904) pl. 1, fig. 23; Printz (1929) pl. 8, fig. 18. The figure legend in Printz (1929) is missing but the specimen matches that shown in Foslie (1904).

Comments – Additional information is provided by Verheij & Woelkerling (1992: 278) and Woelkerling (1993: 68).

crustacea

Basionym & protologue: *Spongites crustacea* Kützing (1843: 386).

Holotype: L 943.7-70.

Type locality and collection data: Helgoland, Germany; collector and date not indicated.

Previous references to typification: ?

Published illustrations of holotype: Kützing (1869) pl. 97, figs. e–g.

Comments – Kützing (1843) established *Spongites crustacea* for plants growing on stones at Helgoland, Germany but did not designate a type. The Kützing herbarium contains a single collection (thus regarded as the holotype) with a note labelled *Lithophyllum crustaceum* in Kützing's script and a reference to the illustrations in Kützing 1869. The collection consists of a single rock fragment with attached coralline material and is c. 21 mm in greatest dimension.

cystoseirae

Basionym & protologue: *Melobesia cystoseirae* Hauck (1883: 266).

Lectotype: L 943.10-32, designated by H. Huvé (1962: 232).

Type locality and collection data: Trieste, Italy (Adriatic Sea); collector and date not indicated.

Previous references to typification: H. Huvé (1962: 232); Athanasiadis (1989: 436, 437).

Published illustrations of lectotype: H. Huvé (1962) pl. 3, figs. B, D; Athanasiadis (1989) figs. 1, 2, 4.

Comments – Hauck (1883: 266, pl. 3, figs. 1, 2, 6) based *Melobesia cystoseirae* on a series of specimens from the Adriatic Sea without explicitly designating a type. Subsequently, Huvé (1962: 232) designated L 943.10-32 as [lecto]type. The lectotype includes a number of individuals (most badly fragmented) and five prepared slides, two of which (according to Huvé 1962: 232) were labelled by Setchell as type. Most individuals are badly fragmented, and consequently, none can be matched with the three specimens depicted in the protologue. Several pieces of the lectotype are depicted by Athanasiadis (1989: 436, figs. 1, 2), who provides additional information about the species.

daedaleum

Basionym & protologue: *Lithophyllum daedaleum* Foslie et Howe (1906: 133).

Holotype: NY, Howe no. 2676.

Isotypes: TRH, Howe no. 2676; includes one slide also numbered 2676. — L 942.360-60.

Type locality and collection data: Salinas Bay, near Guánica, Puerto Rico; collected by *M.A. Howe*, 29 June 1903.

Previous references to typification: Foslie & Howe (1906: 133); Adey & Lebednik (1967: 43); Adey (1970: 5); Woelkerling (1993: 70).

Published illustrations of holotype: Foslie & Howe (1906) pl. 83.

Published illustrations of TRH isotype: Printz (1929) pl. 66, fig. 2.

Published illustrations of L isotype: ?

Comments – Information on the typification of this species and the TRH isotype are provided by Woelkerling (1993: 70). The isotype collection in L contains a partially printed label with name, Howe collection number, locality and date and consists of two fragments, both c. 60 mm in greatest dimension, and two slides prepared in 1955 as ground thin sections.

decaisnei

Basionym & protologue: *Mastophora decaisnei* Kützing (1849: 697).

Comments – *Mastophora decaisnei*, as noted by Silva et al. (1987: 37), is a superfluous substitute name (ICBN Art. 63.1; see Greuter 1988) for *Mastophora licheniformis* Decaisne (1842a: 359, pl. 17 fig. 11) because Kützing (1849: 697) explicitly listed syntype material of *M. licheniformis* (Cumming [sic] exsiccata specimen 2232) in the protologue of *M. decaisnei*. Kützing (1849: 697) also indicates that he had not seen the Cumming exsiccata material, and the only specimen in L labelled *Mastophora decaisnei* (L 941.98-196) found during this study comes from 'Détroit de la Sonde' and contains plants referable to *M. rosea* (C. Agardh) Setchell. *M. licheniformis* is a heterotypic synonym of *M. rosea* (Woelkerling 1988: 131).

dehiscens

Basionym & protologue: *Lithothamnion dehiscens* f. *dehiscens* Foslie (1895: 72; p. 44 in independently paginated offprint) (as f. *typica*).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 71); includes slide 144 and two unnumbered slides.

Isolectotype: L 943.8-121.

Type locality and collection data: Skjøm, Trondheimsfjord, Norway, collector not indicated, 20 July 1894.

Previous references to typification: Woelkerling (1993: 71).

Published illustrations of lectotype: Foslie (1895) pl. 12, fig. 2 (as *Lithothamnion dehiscens* f. *typica*).

Published illustrations of L isolectotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 71). The isolectotype collection in L contains a label with name, locality and date in Foslie's script and consists of a single unattached plant c. 200 mm in greatest dimension.

dentatus

Basionym & protologue: *Spongites dentatus* Kützing (1841: 33).

Holotype: L 943.7-69.

Type locality and collection data: Gulf of Naples, Italy; collector and date not indicated on specimen but said to be June 1835 in Kützing (1843: 387).

Previous references to typification: Woelkerling (1985a: 125); Irvine & Chamberlain (1994: 67).
Published illustrations of holotype: Kützing (1843) pl. 78, fig. 4; Woelkerling (1985a) figs. 1–8.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1985a). During the present study, a second specimen (L 941.149-402) labelled *Spongites dentata* in Kützing's script was discovered. Because Kützing (1841: 33) explicitly based his protologue on a single collection from the Gulf of Naples, this second specimen (from Spalato) is neither an isotype or a paratype. Because the generic name *Spongites* is masculine [Penrose (1991: 439); ICBN Art. 76.4 (see Greuter 1988)], the specific epithet is correctly spelled *dentatus* rather than *dentata* as done by Kützing (1841) and Woelkerling (1985a).

dimorphum

Basionym & protologue: *Lithothamnion dimorphum* Foslie (1895: 68; p. 40 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 74); includes slides 154, 157 and five unnumbered slides.

Isotype: L 943.8-138.

Type locality and collection data: Rottingsund, Frøyen, Trondheimsfjord, Norway; collected by M.H. Foslie, 10 July 1894.

Previous references to typification: Woelkerling (1993: 74).

Published illustrations of lectotype: Foslie (1895) pl. 10, figs. 1, 3, 5, 6.

Published illustrations of L isotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 74). The isotype collection in L contains a label with name, locality and date in Foslie's script and consists of three unattached, spherical plants c. 30–100 mm in greatest dimension.

divaricata

Basionym & protologue: *Lithophyllum fasciculatum* f. *divaricata* Foslie (1900a: 30)

Holotype: TRH, unnumbered.

Isotype: L 951.165-026.

Type locality and collection data: Roundstone Bay, Republic of Ireland; collected by M.H. Foslie, 15 April 1899.

Previous references to typification: Woelkerling (1993: 78).

Published illustrations of holotype: Printz (1929) pl. 63, figs. 7, 8 (as *Lithophyllum fasciculatum* f. *divergens*).

Published illustrations of L isotype: ?

Comments – Information on the typification of this taxon and the TRH holotype are provided by Woelkerling (1993: 78). The isotype L 951.165-026 contains five unattached plants or fragments c. 20–47 mm in greatest dimension and three slides with ground thin sections. Isotype material of this taxon (including L 951.165-026) was distributed as part of M. Foslie: *Lithothamnion Selecta Exsiccata* (see Woelkerling 1993: 9, 10, 274–276) under the superfluous substitute name *Lithophyllum fasciculatum* f. *divergens* Foslie (see Woelkerling 1993: 79).

Table 1. Generic names of nongeniculate Corallinaceae represented by or associated with type material in L.

Clathromorphum Foslie (1898: 4)

Lectotype species: *C. compactum* (Kjellman) Foslie (1898: 4); for further details, see Woelkerling (1988: 161).

Basionym: *Lithothamnion compactum* Kjellman (1883: 132). Additional data on the type material in L are provided in the entry for *compactum* in the main text.

Crodelia Heydrich (1911: 12)

Comment – *Crodelia* is a superfluous substitute name for *Lithophyllum* Philippi (see Woelkerling 1988: 102). The type of *Lithophyllum* is *L. incrustans*, additional data on the type material in L are provided in the entry for *incrustans* in the main text.

Goniolithon Foslie (1898: 5; non Foslie 1900b).

Lectotype species: *G. papillosum* (Zanardini ex Hauck) Foslie (1898: 5); for further details see Woelkerling (1988: 216).

Basionym: *Lithothamnion papillosum* Zanardini ex Hauck (1883: 272). Additional data on the type material in L are provided in the entry for *papillosum* in the main text.

Hapalidium Kützing (1843: 385)

Type species: *H. roseolum* Kützing (1843: 385); for further details see Chamberlain (1983: 300) and Woelkerling (1988: 189). Additional data on the type material in L are provided in the entry for *roseolum* in the main text.

Heteroderma (Foslie) Foslie (1909: 56)

Lectotype species: *H. subtilissima* (Foslie) Foslie (1909: 56); for further details, see Chamberlain (1983: 312) and Woelkerling (1988: 147).

Basionym: *Melobesia subtilissima* Foslie (1904: 55). Additional data on the type material in L are provided in the entry for *subtilissima* in the main text.

Heydrichia Townsend et al. (1994: 177)

Type species: *H. woelkerlingii* Townsend et al. (1994: 178). Additional data on the type material in L are provided in the entry for *woelkerlingii* in the main text.

Hydrolithon Foslie (1909: 55)

Lectotype species: *H. reinboldii* (Weber van Bosse et Foslie in Foslie) Foslie (1909: 55); for further details, see Penrose and Woelkerling (1992: 83) and Woelkerling (1988: 155).

Basionym: *Lithophyllum reinboldii* Weber van Bosse et Foslie in Foslie (1901: 5). Additional data on the type material in L are provided in the entry for *reinboldii* in the main text.

Hyperantherella Heydrich (1900: 316)

Comment – *Hyperantherella* is a superfluous substitute name for *Lithophyllum* Philippi (see Woelkerling 1988: 99). The type of *Lithophyllum* is *L. incrustans*. Additional data on the type material in L are provided in the entry for *incrustans* in the main text.

Lithophyllum Philippi (1837: 387)

Lectotype species: *L. incrustans* Philippi (1837: 388); for further details, see Woelkerling (1983b) and Woelkerling (1988: 99), and the account of *incrustans* in the main text.

(Table 1 continued)

Lithothamnion Heydrich (1897b: 412), *nom. cons.*

Lectotype species: *L. muelleri* Lenormand ex Rosanoff (1866: 101); for further details, see Woelkerling (1983a: 193) and Woelkerling (1988: 171). Additional data on the type material in L are provided in the entry for *muelleri* in the main text.

Lithothamnium Philippi (1837: 387), *nom. rejic.*

Lectotype species: *L. ramulosum* Philippi (1837: 387); for further details, see Woelkerling (1983a) and Woelkerling (1988: 173). The proposal (Woelkerling 1985b) to reject *Lithothamnium* Philippi in favour of *Lithothamnion* Heydrich (see above) was accepted by the International Committee on Botanical Nomenclature (see Greuter 1988). Additional data on the type material in L are provided in the entry for *ramulosum* in the main text.

Paraspora Heydrich (1900: 315)

Type species: *P. fruticulosa* (Kützing) Heydrich (1900: 315); for further details, see Woelkerling (1988: 155).

Basionym: *Spongites fruticosus* Kützing (1841: 33). *S. fruticosus* is the lectotype species of *Spongites* (see Woelkerling (1985a; 1988: 153), thus making *Paraspora* Heydrich a homotypic synonym. Additional data on the type material in L are provided in the entry for *fruticosus* in the main text.

Perispermon Heydrich (1900: 316)

Type species: *P. hermaphroditum* Heydrich (1901b: 410). Additional data on the type material in L are provided in the entry for *hermaphroditum* in the main text and by Woelkerling (1991), who concluded that *Perispermon* was a heterotypic synonym of *Lithophyllum*.

Pneophyllum Kützing (1843: 385)

Type species: *P. fragile* Kützing (1843: 385); for further details, see Chamberlain (1983: 352–359) and Penrose and Woelkerling (1991). Additional data on the type material in L are provided in the entry for *fragile* in the main text.

Spongites Kützing (1841: 30)

Lectotype species: *S. fruticosus* Kützing (1841: 33); for further details, see Woelkerling (1985a) and Woelkerling and Penrose in Woelkerling (1988: 153). Additional data on the type material in L are provided in the entry for *fruticosus* in the main text.

Stereophyllum Heydrich (1904: 198)

Type species: *S. expansum* (Philippi) Heydrich (1904: 198); for further details, see Woelkerling (1988: 193).

Basionym: *Lithophyllum expansum* Philippi (1837: 389). Additional data on the type material in L are provided by Woelkerling (1983b) and in the entry for *expansum* in the main text.

Stichospora Heydrich (1900: 316)

Type species: *S. crassum* (Philippi) Heydrich (1900: 316); see Woelkerling (1988: 102).

Basionym: *Lithothamnion crassum* Philippi. Additional data on the type material in L are provided by Woelkerling (1983a) and in the entry for *Lithothamnion crassum* in the main text.

divergens

Basionym & protologue: *Lithothamnion divergens* Foslie (1895: 96; p. 68 in independently paginated offprint).

Holotype: TRH, unnumbered; includes slides 92 and 93 and one unnumbered slide.

Isotype: L 951.165-030.

Type locality and collection data: Skorpen, Norway; collected by *M.H. Foslie*, 8 September 1890.

Previous references to typification: Woelkerling (1993: 79).

Published illustrations of holotype: Foslie (1895) pl. 16, figs. 43–50; Printz (1929) pl. 20, figs. 7, 8 (as *Lithothamnion tophiforme* f. *divergens*).

Published illustrations of L isotype: ?

Comments – Information on the holotype is provided by Woelkerling (1993: 79). The isotype collection in L contains two unattached plants c. 45–55 mm in greatest dimension and several smaller fragments. This material was distributed as part of *Lithothamnium Selecta Exsiccata* (see Woelkerling 1993: 9, 10, 274–276) under the name *Lithothamnion tophiforme* f. *divergens*.

divergens

Basionym & protologue: *Lithophyllum fasciculatum* f. *divergens* Foslie (1909: 28).

Comments – *Lithophyllum fasciculatum* f. *divergens* is a superfluous substitute name for *Lithophyllum fasciculatum* f. *divaricata* (q. v.).

duckerae

Basionym & protologue: *Lithophyllum duckerae* Woelkerling (1983a: 173, as *duckeri*).

Comments – *Lithophyllum duckerae* Woelkerling (1983a: 173) is a nom. nov. for *Lithothamnium crassum* Philippi (1837: 387); further data are provided under the entry for *L. crassum*.

echini

Basionym & protologue: *Lithophyllum dentatum* f. *echini* Chalon (1900: 27).

Syntype: L 942.365-029.

Type locality and collection data: Port Vendres, France; collected by *J. Chalon*, date not indicated.

Previous references to typification: ?

Published illustrations of type material: ?

Comments – Chalon (1900: 27) established *Lithophyllum dentatum* f. *echini* for plants from Port Vendres but he did not explicitly designate a type. He indicated, however, that he had sent his material to the Botanical Gardens in Bruxelles. The syntype material in L consists of four unattached specimens c. 24–35 mm in greatest dimension, and the collection includes a label written in an unidentified script with the name of the taxon, listing the collector as Chalon and giving the locality as Port Vendres. There also are three slides with ground thin sections prepared in 1955 by C.G. Rümke.

eckloniae

Basionym & protologue: *Lithothamnion capense* f. *eckloniae* Foslie (1902: 19).

Holotype: TRH, unnumbered; includes slides 701, 731 and 1555.

Isotype: L 942.360-109.

Type locality and collection data: Houtbaai, Cape of Good Hope, South Africa; collected by A. Weber-van Bosse, 1893.

Previous references to typification: Woelkerling (1993: 81).

Published illustrations of holotype: ?

Published illustrations of L isotype: ?

Comments – Information on the typification of this species and the TRH holotype are provided by Woelkerling (1993: 81). The isotype collection in L contains a label with name, locality and date in Weber-van Bosse's script and consists of two pieces of host c. 25–30 mm long with attached coralline epiphytes.

ectocarpon

Basionym & protologue: *Lithothamnion ectocarpon* Foslie (1907: 11).

Lectotype: TRH, unnumbered, designated by Adey in Adey & Lebednik (1967: 83); includes slides 869, 1557 (missing) and 1564.

Isolectotype: L 942.361-24.

Type locality and collection data: Cape Blanco, Africa; collected by A. Weber-van Bosse, 29 December 1895.

Previous references to typification: Adey & Lebednik (1967: 83); Adey 1970, p. 23 (as *Mesophyllum*); Woelkerling (1993: 82).

Published illustrations of lectotype: Printz (1929) pl. 8, fig. 1.

Published illustrations of L isolectotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Adey (1970: 23) and Woelkerling (1993: 82). The isolectotype collection in L consists of four specimens c. 22–45 mm in greatest dimension. One of the two labels in the isolectotype box is written in Foslie's script and contains the name of the species, the locality and the date of collection. A second label, written by Weber-van Bosse, also has the name of the plant but lists the collector as Versluys (not mentioned in protologue) and suggests the material was obtained on the Chazalie Expedition (also not mentioned in the protologue).

expansum

Basionym & protologue: *Lithophyllum expansum* Philippi (1837: 389).

Holotype: L 943.7-84.

Type locality and collection data: Sicily (Italy), Mediterranean Sea; collector and date not indicated.

Previous references to typification: Woelkerling (1983b: 307).

Published illustrations of holotype: Woelkerling (1983b) figs. 4–14.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1983b). Because only a single specimen is involved, the type must be considered a holotype rather than a lectotype as suggested by Woelkerling (1983b: 307). Woelkerling (1983b) considered *Lithophyllum expansum* to be conspecific with *Mesophyllum lichenoides* (Ellis) Lemoine. In addition, the genus *Stereophyllum* Heydrich (1904: 198) is typified by the type of *Lithophyllum expansum* (Table 1).

fastigiata

Basionym & protologue: *Lithothamnion fruticosum* f. *fastigiata* Foslie (1895: 46; p. 18 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 91); includes slides 158 and 159 and four unnumbered slides.

Isolectotype: L 943.7-86.

Type locality and collection data: Bejan, Beiskjaret, Norway; collected by *M. H. Foslie*, 6 July 1894.

Previous references to typification: Woelkerling (1993: 91).

Published illustrations of lectotype: Foslie (1895) pl. 5, figs. 5, 7.

Published illustrations of L isolectotype: ?

Comments – Additional information on *Lithothamnion fruticosum* f. *fastigiata* is provided by Woelkerling (1993: 91). The isolectotype in L contains three unattached plants 40–50 mm in greatest dimension and an annotation slip written by Foslie.

foliacea

Basionym & protologue: *Melobesia foliacea* Kützting (1843: 385).

Holotype: L 941.149-53.

Type locality and collection data: Mariana Islands; collected by *Gaudichaud*, date not indicated.

Previous references to typification: ?

Published illustrations of holotype: Kützting (1858) pl. 100, figs. e–h.

Comments – Kützting (1843) based *Melobesia foliacea* on material in the Kunth herbarium growing on algae collected by *Gaudichaud* in the Mariana Islands. The Kützting herbarium contains a single collection of this description, which must therefore be considered the holotype. The holotype collection consists of two fragments of *Gelidiella* epiphytized by small, apparently sterile plants of what appears to be *Mastophora rosea* (C. Agardh) Setchell. Setchell (1943: 129) previously considered *M. foliacea* to be a heterotypic synonym of *M. rosea*, apparently without examining Kützting's collection. De Toni (1905: 1775), in contrast, considered *M. foliacea* to be a heterotypic synonym of *Mastophora plana* (Sonder) Harvey. *Mastophora plana* is now considered to be a heterotypic synonym of *Metamastophora flabellata* (Sonder) Setchell (Woelkerling 1980).

fornicatum

Basionym & protologue: *Lithothamnion fornicatum* Foslie (1891: 38; p. 3 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Adey in Adey & Lebednik (1967: 71); includes slides 150 and 151.

Isolectotypes: L 951.165-043. — L 992.173-260.

Type locality and collection data: Mestervik, Malangen, Norway; collector not indicated, 20 September 1890.

Previous references to typification: Adey & Lebednik (1967: 71); Adey (1970: 20); Woelkerling (1993: 97).

Published illustrations of lectotype: Foslie (1891) pl. 2, fig. 2.

Published illustrations of L isolectotypes: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 97). The isolectotype L 951.165-043 contains two fragments 90–110 mm in greatest dimension and forms part of *M. Foslie: Lithothamnia Selecta Exsiccata*, an exsiccata issued from TRH (see Woelkerling 1993: 9, 10, 274–276). The isolectotype L 992.173-260 contains a small label with name, locality and date in Foslie's script and consists of a single plant c. 170 mm in greatest dimension.

foveatum

Basionym & protologue: *Leptophyllum foveatum* Y.M. Chamberlain et Keats (1994: 115).

Holotype: L 993.052-539 (Y.M. Chamberlain 91/249).

Type locality and collection data: Yzerfontein, Western Cape Province, South Africa, collected by Y.M. Chamberlain & D.W. Keats, 24 November 1991.

Previous references to typification: Chamberlain & Keats (1994: 115).

Published illustrations of holotype: Chamberlain & Keats (1994) fig. 32.

Comments – In addition to the designated holotype, the protologue (Chamberlain & Keats 1994) is based on a number of collections from Namibia and South Africa.

fragile

Basionym & protologue: *Pneophyllum fragile* Kützing (1843: 385).

Holotype: L 941.241-152.

Type locality and collection data: Mediterranean Sea; collector and date not indicated.

Previous references to typification: Chamberlain (1983: 352, 356); Penrose & Woelkerling (1991: 496); Irvine & Chamberlain (1994: 141).

Published illustrations of holotype: Kützing (1869) pl. 93, figs. a–c; Chamberlain (1983) figs. 24–27; Penrose & Woelkerling (1991) figs. 1–8.

Comments – Detailed accounts of the holotype collection are provided by Chamberlain (1983) and Penrose & Woelkerling (1991). Woelkerling (1988: 147) incorrectly refers to the holotype as the lectotype. The genus *Pneophyllum* Kützing (1843) is typified by the type of *P. fragile* (Table 1).

fragilissimum

Basionym & protologue: *Lithothamnion fragilissimum* Foslie (1904: 13).

Lectotype: L 943.7-21 (Siboga Expedition collection 971-b-I), designated by Verheij & Woelkerling (1992: 278); there are no associated slides. The Leiden box numbered L 943.7-21 also contains the isolectotypes.

Type locality and collection data: Pulu Sebangkatan (Island), Borneo Bank, Indonesia; collected by A. Weber-van Bosse, 14 June 1899 (Siboga Expedition station 81).

Previous references to typification: Adey & Lebednik (1967: 69); Adey (1970: 24, as *Mesophyllum*); Verheij & Woelkerling (1992: 278); Woelkerling (1993: 98).

Published illustrations of lectotype: Foslie (1904) pl. 1, figs. 14–16; Printz (1929) pl. 8, figs. 9–11.

Comments – Additional information, including data on the six isolectotypes, is provided by Verheij & Woelkerling (1992: 278) and Woelkerling (1993: 98).

fruticulosus

Basionym & protologue: *Spongites fruticulosus* Kützing (1841: 33).

Holotype: L 943.8-134.

Type locality and collection data: Mediterranean Sea; collector and date not indicated.

Previous references to typification: Woelkerling (1985a: 136); Penrose & Woelkerling (1988: 173); Woelkerling & Penrose (1988: 153); Penrose (1991: 442); Penrose & Woelkerling (1992: 83).

Published illustrations of holotype: Woelkerling (1985a) figs. 23–32; Penrose (1991) figs. 1–3.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1985a), and further data are provided by Penrose (1991). Woelkerling (1985a: 146) lectotypified the genus *Spongites* with *S. fruticulosus*. Because the generic name *Spongites* is masculine [Penrose (1991: 439); ICBN Art. 76.4 (see Greuter 1988)], the specific epithet is correctly spelled *fruticulosus* rather than *fruticulosa* as was done by Kützing (1841) and Woelkerling (1985a). The genus *Paraspora* Heydrich (1900) also is typified by the type of *Spongites fruticulosus* (Table 1).

genuinea

Basionym & protologue: *Lithophyllum cristatum* f. *genuinea* Hauck (1883: 271).

Comments – In the protologue of *Lithophyllum cristatum* f. *genuinea*, Hauck (1883: 271) cited *Lithophyllum cristatum* Meneghini as a synonym. Consequently, in accordance with ICBN Arts. 24.3 and 26.1 (see Greuter 1988), *Lithophyllum cristatum* f. *genuinea* Hauck (1883: 271) must be considered an invalid name for *Lithophyllum cristatum* f. *cristatum*, the type form of the species. Type material of this taxon is not in L.

glaciale

Basionym & protologue: *Lithothamnion glaciale* Kjellman (1883: 123).

Syntypes: L 943.8-103. — TRH (see Woelkerling 1993: 106).

Type locality and collection data: see below.

Previous references to typification: Woelkerling (1993: 106).

Published illustrations of L syntype: ?

Published illustrations of TRH syntype: Kjellman (1883) pl 2, figs. 1–2, pl. 3, figs. 1–14; Kjellman (1885) pl. 2, figs. 1–2, pl. 3, figs. 1–14; Printz (1929) pl. 24, fig. 2.

Comments – Kjellman (1883) based *Lithothamnion glaciale* on specimens (including a number misidentified by other authors) from various localities but did not designate a type. Syntype material in TRH has been commented upon by Woelkerling (1993: 106–107). The L syntype consists of two unattached specimens collected in 1872 by Kjellman at Mosselbay, Spitzbergen (a locality cited in the protologue), and it includes a label from Kjellman with the species name and the locality and date of collection. According to Stafleu & Cowan (1979: 560), the English version of the protologue (Kjellman 1885: 93–96) appeared two years after the Swedish version even though the title page of the English publication also is dated 1883.

gracile

Basionym & protologue: *Lithothamnium gracile* Philippi (1837: 388).

Holotype: L 943.10-34 (in part; see comments).

Type locality and collection data: Sicily (Italy), Mediterranean Sea; collector and date are not indicated.

Previous references to typification: Woelkerling (1983a: 170, 173).

Published illustrations of holotype: Woelkerling (1983a) figs. 2–5.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1983a), who transferred the species to *Amphiroa* (subfamily Amphiroideae) and established the new specific epithet *johansenii* to avoid creation of a later homonym for *Amphiroa gracilis* Harvey (1855: 547). Because only a single specimen is involved, the type must be considered a holotype rather than a lectotype as suggested by Woelkerling (1983a: 170, 173).

In addition to *Lithothamnium gracile*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *L. lichenoides* Philippi, *Lithothamnium bamleri* Heydrich, *L. crassum* Philippi, *L. orthoblastum* Heydrich, *L. pygmaeum* Heydrich, *L. ramulosum* Philippi, *L. rubrum* Philippi, *Nullipora byssoides* Lamarck, and *Perispermum hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

The generic name *Lithothamnion* Heydrich (1897b: 412) has been conserved against *Lithothamnium* Philippi (1837: 387) (ICBN, Appendix IIIA: 116; see Greuter 1988); however, in the context of dealing with Philippi's types, *Lithothamnium* is used here because Philippi established both the genus and the species in the same paper.

gracilescens

Basionym & protologue: *Lithothamnion gracilescens* Foslie (1895: 87; p. 59 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 109); includes slides 97–99.

Isolectotypes: L 951.165-047. — L 943.8-146.

Type locality and collection data: Rotvold, Trondheimsfjord, Norway; collected by *M.H. Foslie*, 6 June 1894.

Previous references to typification: Woelkerling (1993: 109).

Published illustrations of lectotype: Foslie (1895) pl. 15, figs. 20–25; Printz (1929) pl. 26, figs. 3–5 (as *Lithothamnion nodulosum* f. *gracilescens*).

Published illustrations of L isolectotypes: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 109). The isolectotype L 951.165-047 contains 10 unattached plants c. 15–32 mm in greatest dimension and a number of smaller fragments. The isolectotype L 943.8-146 contains a label with name, locality and date in Foslie's script and consists of two unattached plants c. 20–35 mm in greatest dimension. Isolectotype material of this taxon (including L 951.165-047) was distributed as part of *M. Foslie: Lithothamnion Selecta Exsiccata* (see Woelkerling 1993: 9, 10, 274–276) under the name *Lithothamnion nodulosum* f. *gracilescens* Foslie.

grandifrons

Basionym & protologue: *Lithothamnion dehiscens* f. *grandifrons* Foslie (1895: 73; p. 45 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 110); includes slide 145 and two unnumbered slides.

Isolectotype: L 951.165-046.

Type locality and collection data: Herø, Norway; collector not indicated on herbarium material but listed as Kr. Schreiner in protologue (Foslie 1895: 78), 28 August 1894.

Previous references to typification: Woelkerling (1993: 110).

Published illustrations of lectotype: Foslie (1895) pl. 13, fig. 3.

Published illustrations of L isolectotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 110). The isolectotype L 951.165-046 contains two pieces 70–115 mm in greatest dimension and a number of smaller fragments. Isolectotype material of this taxon (including L 951.165-046) was distributed as part of *M. Foslie: Lithothamnia Selecta Exsiccata* (see Woelkerling 1993: 9, 10, 274–276) under the superfluous substitute name *Lithothamnion fornicatum* f. *tuberculata* Foslie (see Woelkerling 1993: 227).

granii

Basionym & protologue: *Lithothamnion flabellatum* f. *granii* Foslie (1895: 98; p. 70 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Adey in Adey & Lebednik (1967: 78); includes slide 177. Isolectotype: L 943.8-147.

Type locality and collection data: Drøbak, Norway; collected by *H.H. Gran*, 12 July 1893.

Previous references to typification: Adey & Lebednik (1967: 78, as *Lithothamnion granii*); Adey (1970: 20, as *Lithothamnion granii*); Woelkerling (1993: 111).

Published illustrations of lectotype: Foslie (1895) pl. 17, fig. 3, pl. 22, fig. 1; Printz (1929) pl. 18, fig. 15 (as *Lithothamnion granii* f. *typica*).

Published illustrations of L isolectotype: ?

Comments – Information on the lectotypification of this taxon and the TRH lectotype are provided by Woelkerling (1993: 111). The isolectotype collection in L contains a label with name, locality and date in Foslie's script and consists of one stone c. 55 mm in greatest dimension with attached plants and a number of fragments probably originating from an unattached plant.

granulata

Basionym & protologue: *Melobesia granulata* Meneghini ex Kützing 1849: 696.

Holotype: L 941.156-73.

Type locality and collection data: Mediterranean Sea; collector and date not indicated.

Previous references to typification: ?

Published illustrations of holotype: ?

Comments – The name *Melobesia granulata* first appeared in Zanardini (1843: 44) as a *nomen nudum*. Subsequently, Kützing (1849: 696) provided a formal description based on material sent to him by Meneghini, and in the protologue, Kützing listed Meneghini as the author. The holotype is the only specimen in the Kützing her-

barium labelled *Melobesia granulata* that appears to have come from Meneghini. The specimen used in later illustrations (Kützing 1869, pl. 95, figs. a–b) is most likely L 941.156-76, presently filed under the name *Fosliella farinosa*. Penrose & Chamberlain (1993) have transferred *F. farinosa* into *Hydrolithon*.

haingsisiana

Basionym & protologue: *Lithothamnion erubescens* f. *haingsisiana* Weber-van Bosse et Foslie in Foslie (1901: 4).

Lectotype: L 991.239-229 (Siboga Expedition collection 17), designated by Verheij & Woelkerling (1992: 279); there are no associated slides.

Type locality and collection data: Haingsisi, Samau Island, Timor; collected by A. Weber-van Bosse, 2–5 February 1900 (Siboga Expedition station 60/303).

Previous references to typification: Verheij & Woelkerling (1992: 279); Woelkerling (1993: 113).

Published illustrations of lectotype: Foslie (1904) pl. 3, fig. 13; Printz (1929) pl. 15, fig. 13.

Comments – Additional information, including data on the 25+ isolectotypes, is provided by Verheij & Woelkerling (1992: 279) and Woelkerling (1993: 113).

hauckii

Basionym & protologue: *Lithothamnion hauckii* Rothpletz (1891: 304).

Comments – As noted by Woelkerling (1993: 115), *Lithothamnion hauckii* is an avowed substitute name for *Lithothamnion mamillosum* Hauck (1883), a later homonym of *Lithothamnion mamillosum* Gumbel (1871). Further information on Hauck's species is provided below in the entry for *Lithothamnion mamillosum* Hauck.

hermaphroditum

Basionym & protologue: *Perispermon hermaphroditum* Heydrich (1901b: 410, figs. 1–3).

Lectotype: TRH, unnumbered, includes slides 857 and 858, designated by Woelkerling (1991: 136).

Isolectotype: L 943.10-34 (part of).

Isolectotype: C, unnumbered.

Type locality and collection data: Tami Island, Huon Gulf, New Guinea, collected by Bamler, December 1894.

Previous references to typification: Woelkerling (1991: 136); Woelkerling (1993: 115).

Published illustrations of lectotype: Woelkerling (1991) figs. 1–13.

Published illustrations of L isolectotype: ?

Comments – The basis of selection of the designated lectotype is explained by Woelkerling (1991: 136) who provides a detailed account of the material. Woelkerling (1991) transferred the species to *Lithophyllum* and concluded that *Perispermon*, which is typified by *P. hermaphroditum*, is a heterotypic synonym of *Lithophyllum*.

The isolectotype in L consists of six fragments; the largest is 9.7 mm in greatest dimension. Five of the six fragments have numerous uniporate conceptacles. In addition to *Perispermon hermaphroditum*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *L. lichenoides* Philippi, *Lithothamnium bamleri* Heydrich, *L. crassum* Philippi, *L. gracile* Philippi, *L. orthoblastum* Heydrich, *L. pygmaeum* Heydrich, *L. ramulosum* Philippi, *L. rubrum* Philippi, and *Nullipora byssoides* Lamarck; reasons for this are provided in Materials and Methods.

impar

Basionym & protologue: *Lithophyllum impar* Foslie (1909: 13).

Holotype: TRH, unnumbered; includes slides 649–651.

Isotype: L 942.361-18.

Type locality and collection data: Natal, South Africa; collected by A. Weber-van Bosse, 1893.

Previous references to typification: Adey & Lebednik (1967: 18); Adey (1970: 13, as *Pseudolithophyllum impar*); Woelkerling (1993: 121).

Published illustrations of holotype: Printz (1929) pl. 54, figs. 18–21.

Published illustrations of L isotype: Chamberlain (1994) fig. 54 [as *Spongites impar* (Foslie) Chamberlain].

Comments – Information on the typification of this taxon and the TRH holotype are provided by Woelkerling (1993: 121). The isotype L 942.361-18 contains 12 pieces c. 25–135 mm in greatest dimension and a few small fragments. *Lithophyllum impar* was first described as *Lithophyllum marlothii* f. *subplicata* (Foslie 1902: 19) (q.v.); both taxa are based on the same type material.

incrustans

Basionym & protologue: *Lithophyllum incrustans* Philippi (1837: 388).

Holotype: L 943.10-34 (in part; see comments).

Type locality and collection data: Sicily (Italy), Mediterranean Sea; collector and date not indicated.

Previous references to typification: Woelkerling (1983b: 315); Irvine & Chamberlain (1994: 75).

Published illustrations of holotype: Woelkerling (1983b) figs. 15–23.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1983b). Because only a single specimen is involved, the type must be considered a holotype rather than a lectotype as suggested by Woelkerling (1983b: 315). *Lithophyllum incrustans* also has been designated (Foslie 1898: 6) as lectotype species of *Lithophyllum*. Information on other genera also based ultimately on *Lithophyllum incrustans* is provided by Woelkerling (1988: 97–105, 109–115) and by Woelkerling (1991).

In addition to *Lithophyllum incrustans*, L 943.10-34 contains material of ten other types: *Lithophyllum lichenoides* Philippi, *Lithothamnium bamleri* Heydrich, *L. crasum* Philippi, *L. gracile* Philippi, *L. orthoblastum* Heydrich, *L. pygmaeum* Heydrich, *L. ramulosum* Philippi, *L. rubrum* Philippi, *Nullipora byssoides* Lamarck, and *Perispermion hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

johansenii

Basionym & protologue: *Amphiroa johansenii* Woelkerling (1983a: 173).

Comments – *Amphiroa johansenii* Woelkerling (1983a: 173) is a nom. nov. for *Lithothamnium gracile* Philippi (1837: 388); further data are provided under the entry for *L. gracile*.

keatsii

Basionym & protologue: *Pneophyllum keatsii* Y.M. Chamberlain (1994: 144).

Holotype: L 993.052-321 (Y.M. Chamberlain 89/284).

Type locality and collection data: Oudekraal, W coast of Cape Peninsula, South Africa, collected by *R. Anderson & D.W. Keats*, 24 November 1989.

Previous references to typification: Chamberlain 1994: 144.

Published illustrations of holotype: Chamberlain (1994) figs. 9–25. — Fig. 2a, 2b.



Fig. 2a. Holotype *Pneophyllum keatsii* Y.M. Chamberlain (alcohol collection); scale bar = 1 cm.

Comments – The holotype consists of an alcohol preserved piece of stipe of *Ecklonia maxima* with attached plants of *Pneophyllum keatsii* and *Lithothamnion eckloniae*.

Pneophyllum keatsii Y.M. Chamberlain HOLOTYPE
 overgrown by: *Lithothamnion eckloniae* Fensholt

Coll.: R. Anderson & D. Keats No.: YMC 89/284

Det.: Y. M. Chamberlain Date: 24 November 1989

Country: South Africa County: western Cape Province

Locality: Oudekraal, west coast of Cape Peninsula

Habitat: Subtidal on *Ecklonia maxima* stipe

P. keatsii comprises thin crusts from which samples have been removed by scalpel. The *L. eckloniae* forms thicker crusts on top.

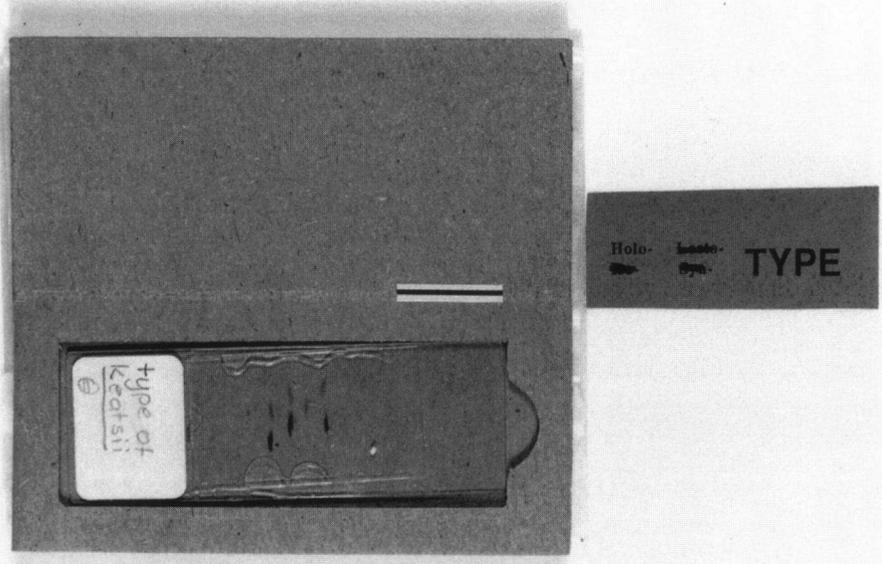


Fig. 2b. Holotype *Pneophyllum keatsii* Y.M. Chamberlain (dry collection including reference to alcohol collection and microscope slide; L 993.052-321); scale bar = 1 cm.

keiensis

Basionym & protologue: *Porolithon reinboldii* f. *keiensis* A. Weber-van Bosse (1926: 116, fig. 25).

Holotype: C, unnumbered.

Isotype: L 943.10-29.

Type locality and collection data: Kei Islands, Indonesia; collected by *Dr. Jensen*, date not indicated.

Previous references to typification: ?

Published illustrations of holotype: Weber-van Bosse (1926) fig. 25. The original drawings of the plants in fig. 25 are preserved on sheet L 950.49-201 in the icones collection at L.

Published illustrations of L isotype: ?

Comments – Weber-van Bosse (1926: 116) based *Porolithon reinboldii* f. *keiensis* on a collection very small coralline ‘nodules’ from the Kei Islands. The holotype element in C contains 70 rounded to spherical unattached individuals c. 10–27 mm in greatest dimension. The isotype in L, which formed part of the same collection, contains a label in Weber-van Bosse’s script with the name of the taxon and includes two unattached plants c. 25 mm in greatest dimension. Another collection in L (986.106-632) contains a specimen identified as *Hydrolithon schmidtii* that originally formed part of the isotype collection of *Porolithon reinboldii* f. *keiensis*.

laeve

Basionym & protologue: *Lithophyllum laeve* Kützing (1847: 33).

Holotype: L 943.21-121.

Type locality and collection data: Mediterranean Sea [precise locality not stated in protologue but indicated as Naples, Italy on the specimen packet and by Kützing (1849: 696), as *Mastophora laevis*]; collector and date not indicated.

Previous references to typification: ?

Published illustrations of holotype: ?

Comments – Kützing (1847) established *Lithophyllum laeve* for plants growing on *Cystoseira* in the Mediterranean Sea. Subsequently, Kützing (1849: 696) transferred the species to *Mastophora*. The Kützing herbarium contains a single specimen labelled *Mastophora laevis*, which therefore must be considered the holotype of *Lithophyllum laeve*, the basionym of *Mastophora laevis*. In 1905, Foslie annotated the holotype sheet to indicate that *Mastophora laevis* = *Lithophyllum expansum* Phil. forma. The holotype, however, has not been examined in a modern context and thus its status and distribution are uncertain. *Lithophyllum laeve* Kützing (1847) is not to be confused with *Lithophyllum laeve* Strömfelt (1886: 21), a later homonym (see Woelkerling 1988: 217 for details).

lemoinei

Basionym & protologue: *Archaeolithothamnion lemoinei* Weber-van Bosse (1926: 114).

Holotype: C, unnumbered.

Holotype drawing: L 950.49-293.

Type locality and collection data: Kei Islands, Indonesia; collected by *Dr. Jensen*, date not indicated.

Previous references to typification: Verheij (1993a: 192, as *Sporolithon*).

Published illustrations of holotype: Weber-van Bosse (1926) fig. 24; Verheij (1993a) fig. 23.

Comments – Information on the holotype in C is provided by Verheij (1993a: 192). The original drawing of the protologue illustration is preserved as L 950.49-293 in the icones collection at L.

lichenoides

Basionym & protologue: *Lithophyllum lichenoides* Philippi (1837: 389).

Holotype: L 943.10-34 (in part; see comments).

Type locality and collection data: Sicily (Italy), Mediterranean Sea; collector and date are not indicated.

Previous references to typification: Woelkerling (1983b: 318).

Published illustrations of holotype: Woelkerling (1983b) figs. 24–32.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1983b). Because only a single specimen is involved here, the type must be considered a holotype rather than a lectotype as suggested by Woelkerling (1983b: 318).

In addition to *Lithothamnium lichenoides*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *Lithothamnium bamleri* Heydrich, *L. crassum* Philippi, *L. gracile* Philippi, *L. orthoblastum* Heydrich, *L. pygmaeum* Heydrich, *L. ramulosum* Philippi, *L. rubrum* Philippi, *Nullipora byssoides* Lamarck, and *Perispermon hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

macquariensis

Basionym & protologue: *Lithothamnium macquariensis* Sanford in Zaneveld et Sanford (1980: 216)

Lectotype: L 993.340-001 (Zaneveld 65-02-0439) (designated here).

Paratype: L 993.340-002 (Zaneveld 65-02-0428b).

Type locality and collection data: Macquarie Island (off NE side), Tasmania, Australia; collected by Zaneveld, Curtis and Fletcher, 27 February 1965.

Previous references to typification: Zaneveld & Sanford (1980: 216, 218).

Published illustrations of lectotype: ?

Comments – In the protologue Sanford (in Zaneveld & Sanford 1980: 216, 218) cite two specimens as holotypes. However, only one of these can serve as the type because the two collections come from different localities. The specimen with tetrasporangial conceptacles is designated here to serve as lectotype while the gametangial plant is treated as a paratype.

macquariensis

Basionym & protologue: *Phymatolithon lenormandii* f. *macquariensis* Zaneveld et Sanford (1980: 221), nom. invalid.

Putative holotype: L 993.340-003 (Zaneveld collection number 65-02-0436).

Putative isotype: L 993.340-004 (Zaneveld collection number 65-02-0437).

Type locality and collection data: Macquarie Island (off NE side), Tasmania, Australia; collected by Zaneveld, Curtis & Fletcher, 27 February 1965.

Previous references to typification: Zaneveld & Sanford (1980: 221).

Published illustrations of holotype: ?

Comments – Zaneveld & Sanford (1980) did not provide an illustration or figure or refer to a previously and effectively published illustration or figure of *Phymatolithon lenormandii* f. *macquariensis*. Consequently, the name is not validly published in accordance with ICBN Art 39.1 and the taxon has no status under the ICBN. In the protologue, a putative holotype and isotype were identified by the authors; these have been assigned numbers in L during the present study.

macrocarpa

Basionym & protologue: *Mastophora macrocarpa* Montagne (1845: 149).

Syntype: L 941.098-425.

Type locality and collection data: Guam; collected by *Hombron*; date not indicated

Previous references to typification: ?

Published illustrations of L syntype: Kützing (1858) pl. 100, figs. a–d.

Comments – Montagne (1845) established *Mastophora macrocarpa* for specimens collected in Guam by Hombron but did not explicitly designate a type. The nature and extent of material of this species in the Montagne herbarium in PC is uncertain, but L 941.098-425 represents syntype material from Montagne's herbarium that was used by Kützing (1858) in preparing illustrations for Volume 8 of *Tabulae Phycologicae*. The L syntype contains an apparently sterile fragment 21 mm in length.

macrocarpa

Basionym & protologue: *Melobesia macrocarpa* Rosanoff (1866: 74).

Lectotype: CHE, Le Jolis Alg. Mar. Cherbourg no. 276, designated by Chamberlain (1986: 205).

Isolectotype: L 941.156-125.

Type locality and collection data: Cherbourg, France; collected by Le Jolis, 19 March 1863.

Previous references to typification: Chamberlain (1986: 205); Chamberlain (1991: 34).

Published illustrations of lectotype: Rosanoff (1866) pl. 4, figs. 4–8, 11–20; Chamberlain (1986) figs. 12–22.

Published illustrations of L isolectotype: ?

Comments – Chamberlain (1986) has provided a detailed account of the lectotype in CHE. The L isolectotype consists of a single sheet with a printed exsiccata label and three pieces of the host, *Phyllophora rubens*, with epiphytic plants of *Melobesia macrocarpa*.

malaysica

Basionym & protologue: *Lithophyllum yendoi* f. *malaysica* Foslie (1906: 19).

Lectotype: L 943.7-7 (Siboga Expedition collection 930), designated by Verheij & Woelkerling (1992: 280); includes three slides.

Lectotype fragment: TRH (Siboga Expedition collection 930); includes one slide. An additional fragment was sent to BO.

Type locality and collection data: Piapis Bay (Telok Sapira), NW coast of Waigeu Island, Indonesia; collected by A. *Weber-van Bosse*, 14 August 1899 (Siboga Expedition station 155).

Previous references to typification: Verheij & Woelkerling (1992: 280); Woelkerling (1993: 143).

Published illustrations of lectotype: Foslie (1904) pl. 11, fig. 2; Verheij & Woelkerling (1992) fig. 1.

Comments – Additional information is provided by Verheij & Woelkerling (1992: 280) and Woelkerling (1993: 143).

mamillosum

Basionym & protologue: *Lithothamnion mamillosum* Hauck (1883: 272).

Lectotype: L 943.8-115 (designated here).

Isolectotype: L 943.8-109.

Type locality and collection data: Rovigno, Adriatic Sea.

Previous references to typification: Woelkerling (1993: 144).

Published illustrations of lectotype: ?

Comments – Hauck (1883: 272, pl. 3 fig. 3; pl. 5 fig. 1) established *Lithothamnion mamillosum* for warty to fruticose plants from the Adriatic Sea that formed thick 'crusts' on stones or unattached, rounded rhodoliths. The Hauck herbarium contains 2 collections labelled *Lithothamnion mamillosum*, but none of the specimens within the boxes corresponds to either of the two plants illustrated in the protologue. L 943.8-115 contains 4 individuals which *collectively* are designated here as lectotype element of *L. mamillosum* Hauck. It also includes annotations and optical microscope slides prepared by J. Cabioch, who suggested that one of the four individuals be considered as lectotype. The Hauck fragments in TRH (Woelkerling 1993: 144–145) now need to be examined to determine whether they represent isolectotype or paratype material.

The name *Lithothamnion mamillosum* Hauck (1883) is a later homonym of *Lithothamnion mamillosum* Gumbel (1871). This led both Rothpletz (1891: 304) and then Foslie (1895: 58) to coin the avowed substitute name *Lithothamnion hauckii* for Hauck's taxon (see Woelkerling 1993: 115).

marshallense

Basionym & protologue: *Porolithon marshallense* Taylor (1950: 128).

Holotype: MICH, Taylor no. 46-627.

Isotypes: L 948.175-58. — BM, algal box collection 1015 (Tittley et al. 1984: 13).

Type locality and collection data: Kabella Island, Rongelap Atoll, Marshall Islands; collected by W.R. Taylor, 28 July 1946.

Previous references to typification: Taylor (1950: 129).

Published illustrations of holotype: Taylor (1950) pl. 67, fig. 2.

Published illustrations of L isotype: Fig. 3.



Fig. 3. Isotype *Porolithon marshallense* Taylor (L 948.175-58); scale bar = 1 cm.

Comments – Taylor (1950) established *Porolithon marshallense* for plants collected from a number of islands of the Rongelap and Bikini Atolls in the Marshall Islands and explicitly designated a collection from Kabella Island as the (holo)type. The individual illustrated by Taylor in pl. 67, fig. 2 probably constitutes part of the holotype, although this is not explicitly stated in the figure legend. The isotype in L consists of two larger pieces and a number of smaller fragments of *P. marshallense*.

megalocystum

Basionym & protologue: *Goniolithon megalocystum* Foslie (1904: 48).

Holotype: L 991.239-234 (Siboga Expedition collection 965).

Holotype fragment: TRH (Siboga Expedition collection 965); includes one slide.

Type locality and collection data: Kawio and Karuboling Islands, Indonesia; collected by A. *Weber-van Bosse*, 22–23 July 1899 (Siboga Expedition station 129).

Previous references to typification: Foslie (1904: pl. 9, legend to fig. 8); Printz (1929: pl. 46, legend to fig. 9); Adey & Lebednik (1967: 25); Adey (1970: 9, as *Neogoniolithon*); Verheij & Woelkerling (1992: 281); Woelkerling (1993: 147).

Published illustrations of holotype: Foslie (1904) text fig. 20A & pl. 9, fig. 8; Printz (1929) pl. 46, fig. 9.

Comments – Additional information is provided by Verheij & Woelkerling (1992: 281) and Woelkerling (1993: 147).

minutula

Basionym & protologue: *Lithothamnion australe f. minutula* Foslie (1904: 24).

Lectotype: L 991.239-231 (Siboga Expedition collection 673, portion in L; the portion in TRH is an isolectotype), designated by Verheij & Woelkerling (1992: 281); includes one slide.

Type locality and collection data: Tual, Kei Islands, Indonesia; collected by A. *Weber-van Bosse*, 12–16 December 1899 (Siboga Expedition station 258).

Previous references to typification: Verheij & Woelkerling (1992: 281); Woelkerling (1993: 150).

Published illustrations of lectotype: Foslie (1904) pl. 2, figs. 51–63; Printz (1929) pl. 17, figs. 71–83.

Comments – Additional information, including data on the two L isolectotypes, is provided by Verheij & Woelkerling (1992: 281) and Woelkerling (1993: 150).

mirabile

Basionym & protologue: *Archaeolithothamnion mirabile* Foslie (1899: 3).

Holotype: TRH, unnumbered; includes slides 63, 64 and 515 and four unnumbered slides.

Isotype: L 952.88-332.

Type locality and collection data: Corner Inlet, Victoria, Australia; collected by J. *Gabriel*, January–February 1897.

Previous references to typification: Adey & Lebednik (1967: 52, as *Lithothamnion*); Adey (1970, as *Lithothamnion*); Woelkerling (1993: 151).

Published illustrations of holotype: ?

Published illustrations of L isotype: ?

Comments – Information on the typification of this species and the TRH holotype are provided by Woelkerling (1993: 151). The isotype collection in L was sent from TRH, contains a typed label with name, locality and date, and consists of three specimens c. 25–30 mm in greatest dimension.

muelleri

Basionym & protologue: *Lithothamnion muelleri* Lenormand ex Rosanoff (1866: 101, pl. 6, figs. 8–11).

Lectotype: CN, unnumbered, designated by Woelkerling (1983a: 191, 193).

Isolectotypes: L 941.149-249. — MEL 588439.

Type locality and collection data: Western Port (Bay), Victoria, Australia; collector and date not indicated; apparently sent by F. von Mueller to W. H. Harvey who in turn sent material to Lenormand in 1861.

Previous references to typification: Woelkerling (1983a: 191, 193); Woelkerling (1985b: 302).

Published illustrations of lectotype: Woelkerling (1983a) fig. 29.

Published illustrations of L isotype: ?

Comments – Rosanoff (1866) established *Lithothamnion muelleri* for material in the Lenormand herbarium (CN) that originally was collected in Western Port, Victoria, Australia. Woelkerling (1983a: 191, 193, figs. 29–33) lectotypified the species and provided information on plants in the lectotype collection. The isotype in L was sent by Lenormand and consists of several fragments 8 mm or less in greatest dimension with uniporate conceptacles. *Lithothamnion muelleri* is the lectotype species of *Lithothamnion* Heydrich, *nom. cons.* (see Woelkerling 1985b, Greuter 1988: 116).

munitum

Basionym & protologue: *Lithophyllum munitum* Foslie et Howe (1906: (132)).

Holotype: NY, Howe no. 4023.

Isotypes: TRH, Howe no. 4023; includes three slides also numbered 4023. — L 942.360-31. — BM.

Type locality and collection data: Cave Cays, Exuma Chain, Bahamas; collected by M. A. Howe, 19 February 1905.

Previous references to typification: Adey & Lebednik (1967: 20); Adey (1970: 9, as *Neogoniolithon*); Woelkerling (1993: 153).

Published illustrations of holotype: Foslie & Howe (1906) pls. 86, 88, and 89.

Published illustrations of TRH isotype: Printz (1929) pl. 56, figs. 16–17.

Published illustrations of L isotype: ?

Comments – Information on the typification of this species and the TRH isotype are provided by Woelkerling (1993: 153). The isotype collection in L contains a partially printed label with name, Howe collection number, locality and date and consists of one piece of coral rubble c. 55 mm in greatest dimension mostly covered with coralline material.

nodosus

Basionym & protologue: *Spongites nodosus* Kützing (1841: 32).

Lectotype: L 943.7-79, designated by Woelkerling (1985a: 129).

Isolectotypes: L 943.7-77. — L 943.7-102.

Type locality and collection data: Mediterranean Sea; collector and date not indicated.

Previous references to typification: Woelkerling (1985a: 129).

Published illustrations of lectotype: Woelkerling (1985a) figs. 14–22.

Comments – A detailed account of the lectotype collection is provided by Woelkerling (1985a), who, however, did not explicitly list the two isotype collections. Because the generic name *Spongites* is masculine [Penrose (1991: 439); ICBN

Art. 76.4 (see Greuter 1988)], the specific epithet is correctly spelled *nodosus* rather than *nodosa* as done by Kützing (1841) and Woelkerling (1985a).

nodulosum

Basionym & protologue: *Lithothamnion nodulosum* [f. *nodulosum*] Foslie (1895: 144; p. 116 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 158); includes slides 169, 170.

Isolectotype: L 943.8-145.

Type locality and collection data: Brakstad (Ørlandet), Norway; collected by *M. Foslie*, 18 July 1894.

Previous references to typification: Adey & Lebednik (1967: 76); Adey (1970: 21); Woelkerling (1993: 158).

Published illustrations of lectotype: Foslie (1895) pl. 21, figs. 1, 2, 4; Printz (1929) pl. 25, fig. 3 (as *Lithothamnion nodulosum* f. *typica*).

Published illustrations of L isoelectotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 158). The isoelectotype collection in L contains a label with name, locality and date in Foslie's script and consists of seven unattached plants or plant fragments c. 23–60 mm in greatest dimension as well as a number of smaller fragments.

norvegica

Basionym & protologue: *Lithothamnion calcareum* var. *norvegica* Areschoug (1875: 4).

Syntype: L 943.8-100.

Type locality and collection data: Haugesund, Norway; collected by Wittrock; date not indicated.

Previous references to typification: ?

Published illustrations of type material: ?

Comments – Areschoug (1875) based *Lithothamnion calcareum* var. *norvegica* on Wittrock specimens from Haugesund, Norway but did not designate a type. The syntype collection in L contains two unattached plants and several small fragments as well as a label from Kjellman with collecting information corresponding to that in the protologue. This collection forms part of the Hauck herbarium.

ornatum

Basionym & protologue: *Lithothamnion mesomorphum* var. *ornatum* Foslie et Howe [1906: (129)].

Holotype: NY, Howe no. 4021.

Isotypes: L 942.360-29 (Howe no. 4021). — TRH (Howe no. 4021); includes slide 1579 and two slides numbered Howe 4021. — BM (Howe no. 4021).

Type locality and collection data: Cave Cays, Exuma Chain, Bahamas; collected by *M.A. Howe*, 19 February 1905.

Previous references to typification: Woelkerling (1993: 165).

Published illustrations of holotype: Foslie & Howe (1906) pl. 80, fig. 2, pl. 90, fig. 2.

Published illustrations of TRH isotype: Printz (1929) pl. 9, fig. 9.

Published illustrations of L isotype: ?

Comments – Woelkerling (1993: 165) provides comments on the holotype and the TRH isotype. The isotype in L consists of three pieces c. 30–50 mm in greatest dimension and a number of very small fragments, and it includes a printed label with the name and collection details.

orthoblastum

Basionym & protologue: *Lithothamnion orthoblastum* Heydrich (1901a: 403).

Syntypes: L 943.5-3. — L 943.10-34.

Type locality and collection data: Tami Island, Huon Gulf, New Guinea; collected by *Bamler*, August 1898.

Previous references to typification: ?

Published illustrations of L syntypes: ?

Comments – Heydrich (1901a) based *Lithothamnion orthoblastum* on specimens from Tami Island but did not designate a type or indicate how many specimens were involved. Heydrich's main herbarium is presumed to be destroyed (Stafleu & Cowan 1979: 187) and thus the total number of specimens can no longer be determined. The syntype L 943.5-3 consists only of a single ground thin section on a slide labelled in Heydrich's script. The syntype L 943.10-34 contains two fragments; the largest measures 8.4 mm in greatest dimension and has one intact uniporate conceptacle and several damaged ones.

In addition to *Lithothamnion orthoblastum*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *L. lichenoides* Philippi, *Lithothamnium bamleri* Heydrich, *L. crassum* Philippi, *L. gracile* Philippi, *L. pygmaeum* Heydrich, *L. ramulosum* Philippi, *L. rubrum* Philippi, *Nullipora byssoides* Lamarck, and *Perispermion hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

papillosum

Basionym & protologue: *Lithothamnion papillosum* Zanardini ex Hauck (1883: 272).

Lectotype: L 942.365-1, designated by Huvé (1962: 224).

Type locality and collection data: Susak Island (formerly Sansego Island), SW of Losin Island, Gulf of Quarnero, Adriatic Sea.

Previous references to typification: Huvé (1962: 224, as *Goniolithon*); Woelkerling (1988: 216, as *Goniolithon*).

Published illustrations of lectotype: Hauck (1883) pl. 2, fig. 4; Huvé (1962) pl. 3, fig. A.

Comments – The lectotype collection in L consists of a number of fragments that can no longer be matched with the specimen depicted by Hauck (1883, pl. 2, fig. 4). The plant material is accompanied by a prepared slide and letter from Huvé stating that the material is the lectotype, and by a printed label for specimen 2308 in the exsiccata *Rabenhorst, Algen Europa's*. Further information on this exsiccata is provided by Sayre (1969: 92–95), who also lists the location of some sets.

Lithothamnion papillosum has been referred successively to *Lithothamnion* (Hauck 1883: 272), *Goniolithon* (Foslie 1898: 5), *Lithophyllum* (Foslie 1900b: 20), *Dermatolithon* Foslie (1909: 57), and *Titanoderma* Price et al. (1986: 86). The species also lectotypifies the genus *Goniolithon* Foslie 1898 (non *Goniolithon* Foslie 1900b), a genus requiring further evaluation (Woelkerling 1988: 216–217).

pellire

Basionym & protologue: *Hydrolithon pellire* Y.M. Chamberlain et R.E. Norris (1994: 291).

Holotype: L 993.052-34 (Y.M. Chamberlain 89/125).

Type locality and collection data: Umdloti, Natal, South Africa; collected by *Y.M. Chamberlain & R.E. Norris*, 16 October 1989.

Previous references to typification: Chamberlain & Norris (1994: 291)

Published illustrations of holotype: Chamberlain & Norris (1994) figs. 1–7, 9–19, 22–27.

Comments – The holotype consists of an alcohol preserved piece of *Gelidium abbotiorum* with epiphytic *Hydrolithon pellire*.

philippii

Basionym & protologue: *Lithothamnion philippii* Foslie (1897: 7).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 171).

Paratype: L 943.8-149.

Type locality and collection data: Gulf of Naples, Italy, collector and date not indicated, comm. Zoological Station Neapel, 1895.

Previous references to typification: Adey & Lebednik (1967: 67); Adey (1970: 25 as *Mesophyllum*); Woelkerling (1993: 171).

Published illustrations of lectotype: ?

Published illustrations of L paratype: see comments below.

Comments – Matters relating to the lectotypification and the lectotype collection of *Lithothamnion philippii* are dealt with by Woelkerling (1993: 171–172). The paratype in L contains a number of specimens/fragments (the largest measures 120 mm in greatest dimension), including one partially intact individual that appears to match the specimen depicted in Hauck (1883: pl. 1, fig. 7) and cited by Foslie (1897: 7) in the protologue. This collection also contains a label of Hauck giving the collection locality as Rovigno, a label of Weber-van Bosse indicating that Foslie had identified the material, and a letter from Foslie dated 12 May 1897 in which he explicitly identifies the species and indicates that he has a paper in press about it.

Another L collection, 943.8-128, also contains a label from Weber-van Bosse stating that Foslie had seen the material and identified it as *Lithothamnion philippii*. A second label in this box indicates that the material was collected by Solms-Laubach at Naples in 1879. This collection, however, cannot be regarded as paratype because Foslie (1897: 7) explicitly states in the protologue that he has not seen material of Solms-Laubach.

phyllactidium

Basionym & protologue: *Hapalidium phyllactidium* Kützing (1849: 695).

Comments – In the protologue of *Hapalidium phyllactidium*, Kützing (1849: 695) cited his earlier described *Phyllactidium confervicolum* (Kützing 1843: 295) as a synonym. In accordance with ICBN Art 63.1 (see Greuter 1988), therefore, the specific epithet *phyllactidium* must be considered a superfluous substitute name for the specific epithet *confervicolum*. Both *Hapalidium phyllactidium* and *Phyllactidium confervicolum* are based on the same type; further information is provided in the entry above for *Phyllactidium confervicolum*.

plana

Basionym & protologue: *Melobesia plana* Sonder (1845: 55).

Lectotype: MEL 516775, designated by Woelkerling (1980: 238).

Isolectotype: L 941.149-51.

Type locality and collection data: Western Australia (precise locality not indicated); collected by L. Preiss (no. 2602), date not indicated.

Previous references to typification: Woelkerling (1980: 238).

Published illustrations of lectotype: Woelkerling (1980) fig. 2.

Published illustrations of L isolectotype: ?

Comments – Sonder (1845) based *Melobesia plana* on Preiss' specimens numbered 2602 from Western Australia but did not designate a type. The species was lectotypified by Woelkerling (1980: 238) who concluded that *M. plana* was a heterotypic synonym of *Metamastophora flabellata* (Sonder) Setchell. The isolectotype in L also has the Preiss collection number 2602 and consists of two fragments (18 and 41 mm long), the larger of which has four intact conceptacles.

prolifer

Basionym & protologue: *Lithothamnion prolifer* Foslie (1904: 18).

Lectotype: L 943.7-40 (Siboga Expedition collection 146), designated by Verheij & Woelkerling (1992: 282); includes two slides. The Leiden box L 943.7-40 also contains the L isolectotype.

Lectotype fragment: TRH (Siboga Expedition collection 146; includes one slide).

Type locality and collection data: Lumu-Lumu shoal, Borneo Bank, Indonesia; collected by A. Weber-van Bosse, 10–11 June 1899 (Siboga Expedition station 78).

Previous references to typification: Verheij & Woelkerling (1992: 282); Woelkerling (1993: 176).

Published illustrations of lectotype: Foslie (1904) pl. 1, fig. 17; Printz (1929) pl. 8, fig. 12.

Comments – Additional information, including data on isolectotypes in L and TRH, is provided by Verheij & Woelkerling (1992: 282) and Woelkerling (1993: 176).

propontidis

Basionym & protologue: *Lithothamnion propontidis* Foslie (1899: 4).

Lectotype: TRH, unnumbered, designated by Adey in Adey & Lebednik (1967: 81); includes slides 1625 and 1626.

Paratypes: L 952.88-328 (box). — L 910.181-560 (sheet).

Type locality and collection data: Sea of Marmara, Turkey; collected by *Andrussow*, date not indicated.

Previous references to typification: Adey & Lebednik (1967: 81); Adey (1970: 21); Woelkerling (1993: 178).

Published illustrations of lectotype: Printz (1929) pl. 13, fig. 19.

Published illustrations of L paratypes: ?

Comments – Information on the lectotype in TRH is provided by Woelkerling (1993: 178). Both L paratypes were collected by J. Nemetz at San Stefano on 20 August 1896. L 952.88-328 consists of two pieces of rock c. 45–60 mm in greatest dimension with attached coralline algae. L 910.181-560 contains a single specimen 27 mm in greatest dimension and was distributed as number 548 in *Kryptogamae Exsiccatae editae a Museo Palatino Vindobonensi*. This exsiccata (see Sayre 1969: 31–32 for details) was issued with printed labels. In the protologue, Foslie (1899: 6) explicitly mentions the Nemetz material from San Stefano.

pruinosa

Basionym & protologue: *Melobesia pruinosa* Kützing (1845: 296).

Holotype: ?

Type locality and collection data: Trieste, Italy.

Previous references to typification: ?

Published illustrations of holotype: ?

Comments – Kützing (1845) based *Melobesia pruinosa* on thin, grey, confluent plants with closely crowded conceptacles that were collected at Trieste and were epiphytic on the seagrass *Zostera*. As noted by Chamberlain (1983: 359), the only known collection in the Kützing herbarium labelled by him as *Melobesia pruinosa* is contained in a small packet that forms part of a collection (L 941.241-153) labelled *Pneophyllum fragile*. Kützing had crossed out the name *pruinosa* on the packet and relabelled it *fragile*. The host is given on the packet as *Sphaerat. nervosus* [? = *Phyllospora nervosa* (DeCandolle) Greville] and the locality as Ragusa. Chamberlain (1983: 356, 359) also lists *Melobesia pruinosa* with a question mark as a heterotypic synonym of *Pneophyllum fragile* and provides reasons. Chamberlain, however, did not neotypify *Melobesia pruinosa* with the material in the packet in L 941.241-153, and until the species is typified, uncertainty will surround its status and disposition.

pseudoramosa

Basionym & protologue: *Lithothamnion siamense* f. *pseudoramosa* Foslie (1904: 10, pl. 1, figs. 3–9).

Lectotype: L 943.7-15 (Siboga Expedition collection 673b), designated by Verheij & Woelkerling (1992: 282); there are no associated slides.

Type locality and collection data: Tual, Kei Islands, Indonesia; collected by A. *Weber-van Bosse*, 12–16 December 1899 (Siboga Expedition station 258).

Previous references to typification: Verheij & Woelkerling (1992: 282); Woelkerling (1993: 181).

Published illustrations of lectotype: ?

Comments – Additional information, including data on the three L isolectotypes, is provided by Verheij & Woelkerling (1992: 282) and Woelkerling (1993: 181).

pteridoides

Basionym & protologue: *Lithothamnion fruticosum* f. *pteridoides* Foslie (1904: 19).

Lectotype: L 991.239-236 (Siboga Expedition collection 178), designated by Verheij & Woelkerling (1992: 283).

Lectotype fragment: TRH (Siboga Expedition collection 178); there are no associated slides.

Type locality and collection data: Banda Island, Indonesia; collected by A. *Weber-van Bosse*, November–December 1899 (Siboga Expedition station 240).

Previous references to typification: Verheij & Woelkerling (1992: 283); Woelkerling (1993: 181).

Published illustration of lectotype: Foslie (1904) pl. 2, fig. 2.

Comments – Additional information, including data on isolectotypes in L and TRH, is provided by Verheij & Woelkerling (1992: 283) and Woelkerling (1993: 181).

pulchrum

Basionym & protologue: *Lithothamnion pulchrum* Weber-van Bosse et Foslie in Foslie (1901a: 3).
Lectotype: TRH (Siboga Expedition collection 470), designated by Verheij & Woelkerling (1992: 284); includes one slide of specimen 470.

Isolectotype: L 943.7-17.

Type locality and collection data: Sailus Besar, Celebes, Indonesia; collected by A. *Weber-van Bosse*, 17–18 February 1900 (Siboga Expedition station 315).

Previous references to typification: Adey & Lebednik (1967: 75); Verheij & Woelkerling (1992: 284); Woelkerling (1993: 183).

Published illustrations of lectotype: ?

Comments – The L isolectotype includes 12 individuals with separate Siboga Expedition numbers and a group of unnumbered fragments. Additional information on type material is provided by Verheij & Woelkerling (1992: 284) and Woelkerling (1993: 183).

pygmaeum

Basionym & protologue: *Lithothamnion pygmaeum* Heydrich (1897a: 3, pl. 1, figs. 8–10).

Syntype: L 943.10-34 (part of).

Type locality and collection data: Tami Island, Huon Gulf, New Guinea; collected by *Bamler*, December 1894.

Previous references to typification: ?

Published illustrations of L syntype: ?

Comments – Heydrich (1897a) based *Lithothamnion pygmaeum* on specimens from Tami Island but did not designate a type or indicate how many specimens were involved. Heydrich's main herbarium is presumed to be destroyed (Stafleu & Cowan 1979: 187) and thus the total number of specimens can no longer be determined. The L syntype consists of three fragments. The largest is 5.3 mm in greatest dimension, and all three fragments have a number of uniporate conceptacles.

In addition to *Lithothamnion pygmaeum*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *L. lichenoides* Philippi, *Lithothamnium bamleri* Heydrich, *L. crassum* Philippi, *L. gracile* Philippi, *L. orthoblastum* Heydrich, *L. ramulosum* Philippi, *L. rubrum* Philippi, *Nullipora byssoides* Lamarck, and *Perispermum hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

racemosus

Basionym & protologue: *Spongites racemosus* Kützting (1841: 32).

Holotype: L 943.7-78.

Type locality and collection data: Spalato (Adriatic Sea), Italy; collector and date not indicated.

Previous references to typification: Woelkerling (1985a: 140).

Published illustrations of holotype: Kützting (1843) pl. 78, fig. 3; Woelkerling (1985a) figs. 33–40.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1985a), who incorrectly refers to it as the lectotype. Because the generic name *Spongites* is masculine [Penrose (1991: 439); ICBN Art. 76.4 (see Greuter

1988)], the specific epithet is correctly spelled *racemosus* rather than *racemosa* as done by Kützing (1841) and Woelkerling (1985a).

ramulosum

Basionym & protologue: *Lithothamnium ramulosum* Philippi (1837: 388).

Holotype: L 943.10-34 (in part; see comments).

Type locality and collection data: Sicily (Italy), Mediterranean Sea; collector and date not indicated.

Previous references to typification: Woelkerling (1983a: 173, 184).

Published illustrations of holotype: Kützing (1869) p. 35, fig. 99c [?]; Woelkerling (1983a) figs. 2, 23–28.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1983a). Because only a single specimen is involved, the type must be considered a holotype rather than a lectotype as suggested by Woelkerling (1983a: 173). Kützing (1869: 35) suggested that his illustration (fig. 99c) is based on Philippi's material and this is indicated in Kützing's script on the piece of paper in which the holotype is wrapped, but Kützing's drawing does not closely match the actual appearance of the type (Woelkerling 1983a: fig. 23).

In addition to *Lithothamnium ramulosum*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *L. lichenoides* Philippi, *Lithothamnium bamleri* Heydrich, *L. crassum* Philippi, *L. gracile* Philippi, *L. orthoblastum* Heydrich, *L. pygmaeum* Heydrich, *L. rubrum* Philippi, *Nullipora byssoides* Lamarck, and *Perispermon hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

Mason (1953: 322) designated *Lithothamnium ramulosum* as lectotype species of the genus *Lithothamnium* Philippi. Subsequently, the generic name *Lithothamnion* Heydrich (1897b: 412) has been conserved against *Lithothamnium* Philippi (1837: 387) (ICBN, Appendix IIIA: 116; see Greuter 1988). However, in the context of dealing with Philippi's types, *Lithothamnium* is used here because Philippi established both the genus and the species in the same paper.

reinboldii

Basionym & protologue: *Lithophyllum reinboldii* Weber-van Bosse et Foslie in Foslie (1901a: 5).

Lectotype: TRH (Siboga Expedition collection 38), designated by Adey in Adey & Lebednik (1967: 32); there are no associated slides.

Isolectotypes: L 991.239-240; L 991.239-241.

Type locality and collection data: Moearas Reef, E coast of Borneo, Indonesia; collected by A Weber-van Bosse, 22 June 1899 (Siboga Expedition station 91).

Previous references to typification: Dawson (1960: 29, as *Hydrolithon*); Adey & Lebednik (1967: 32, as *Goniolithon*); Adey (1970: 11, as *Hydrolithon*); Verheij & Woelkerling (1992: 284); Woelkerling (1993: 188).

Published illustrations of lectotype: Penrose & Woelkerling (1988) figs. 1–9; Penrose & Woelkerling (1992) fig. 3.

Published illustrations of L isolectotypes: ?

Comments – Additional information is provided by Verheij & Woelkerling (1992: 284) and Woelkerling (1993: 188). The genus *Hydrolithon* Foslie (1909) is typified by the type of *Lithophyllum reinboldii* (Table 1).

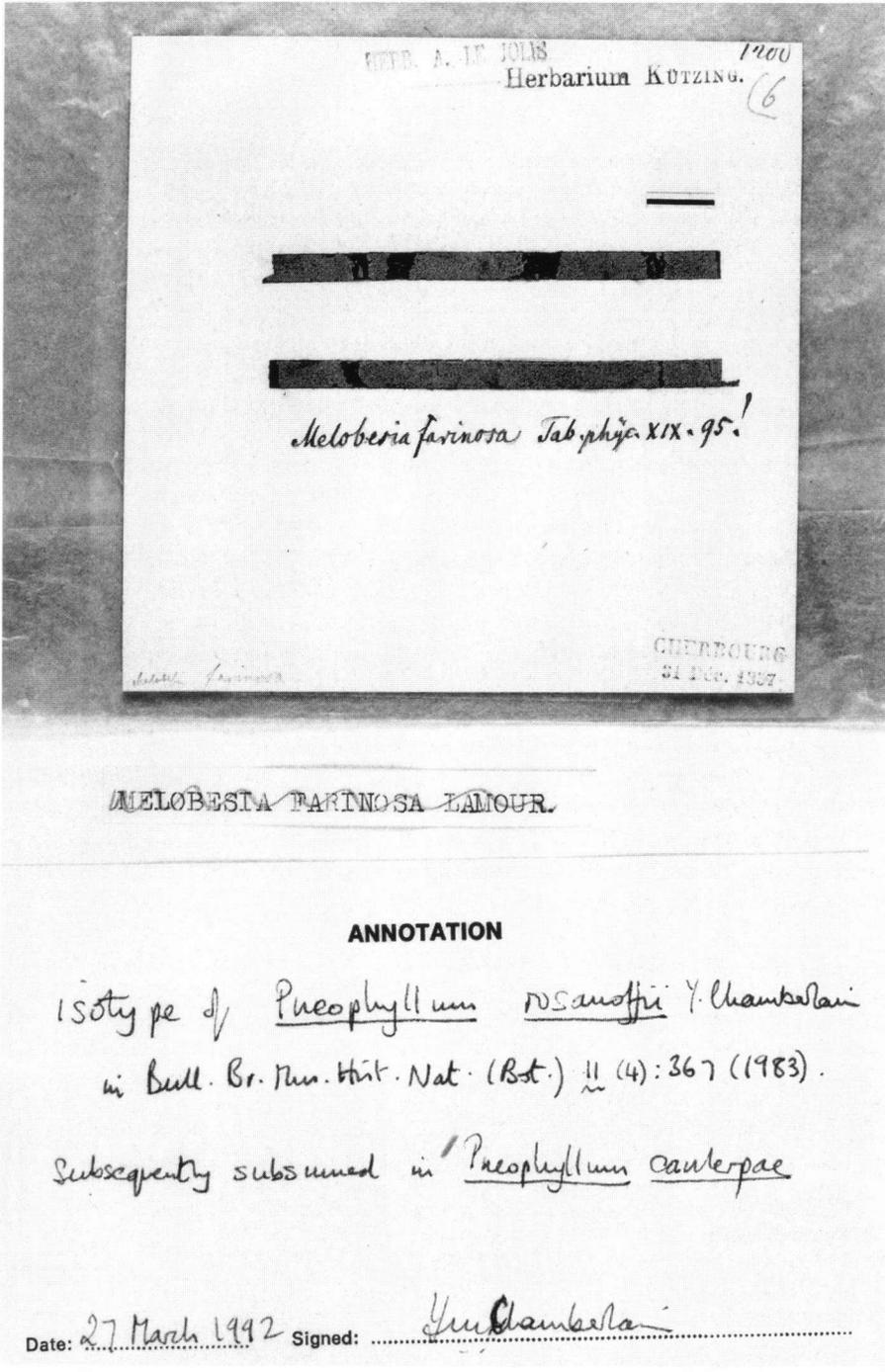


Fig. 4. Isotype *Pneophyllum rosanoffii* Y.M. Chamberlain (L 941.156-75); scale bar = 1 cm.

rosanoffii

Basionym & protologue: *Pneophyllum rosanoffii* Y.M. Chamberlain (1983: 367, figs. 33–37).

Holotype: CHE, Le Jolis no. 1200.

Isotype: L 941.156-75 (Le Jolis 1200).

Type locality and collection data: Cherbourg, France; collector not indicated, 31 December 1857.

Previous references to typification: Chamberlain (1983: 367).

Published illustrations of holotype: Chamberlain (1983) fig. 33.

Published illustrations of L isotype: Kützing (1869) pl. 95, figs. c–d (as *Melobesia farinosa*). —

Fig. 4.

Comments – The isotype in L has been annotated by Le Jolis (with collecting information and the number 1200), by Kützing (who indicated that this specimen is depicted in Kützing (1969: pl. 95) and by Chamberlain (who indicated that the L specimen is an isotype). Additional information on this species is provided by Chamberlain (1983: 367–76); Irvine & Chamberlain (1994: 133) subsumed this species in *Pneophyllum caulerpae*.

roseolum

Basionym & protologue: *Hapalidium roseolum* Kützing (1843: 385).

Holotype: L 941.149-413.

Isotype: CHE, unnumbered; see Chamberlain (1983: 306).

Type locality and collection data: Gulf of Spalato, Adriatic Sea; collector not indicated, March 1835.

Previous references to typification: Chamberlain (1983: 300, 306).

Published illustrations of holotype: Kützing (1869) pl. 92, figs. a, b.

Published illustration of CHE isotype: Chamberlain (1983) fig. 55B.

Comments – The holotype in L consists of a packet with seven pieces of host material on which *H. roseolum* is present. The outside of the packet is annotated in Kützing's script with the name, collecting information and a reference to the illustrations in Kützing 1869. *Hapalidium roseolum* is the type species of *Hapalidium* (Kützing 1843: 385). According to Chamberlain (1983: 300, 308), however, *Hapalidium roseolum* is a heterotypic synonym of *Melobesia membranacea* (Esper) Lamouroux (the type species of *Melobesia*), and thus *Hapalidium* is a heterotypic synonym of *Melobesia* [see also Woelkerling (1988: 189)].

rubrum

Basionym & protologue: *Lithothamnium rubrum* Philippi (1837: 388).

Holotype: L 943.10-34 (in part; see comments).

Type locality and collection data: Sicily (Italy), Mediterranean Sea; collector and date are not indicated.

Previous references to typification: Woelkerling (1983a: 172, 173).

Published illustrations of holotype: Philippi (1837) fig. 5; Woelkerling (1983a) figs. 2, 6–11.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1983a), who transferred the species to *Amphiroa* (subfamily Amphiroideae). Because only a single specimen is involved, the type must be considered a holotype rather than a lectotype as suggested by Woelkerling (1983a: 173).

In addition to *Lithothamnium rubrum*, L 943.10-34 contains material of ten other types: *Lithophyllum incrustans* Philippi, *L. lichenoides* Philippi, *Lithothamnium bamleri* Heydrich, *L. crassum* Philippi, *L. gracile* Philippi, *L. orthoblastum* Heydrich, *L. pygmaeum* Heydrich, *L. ramulosum* Philippi, *Nullipora byssoides* Lamarck, and *Perispermum hermaphroditum* Heydrich; reasons for this are provided in Materials and Methods.

The generic name *Lithothamnion* Heydrich (1897b: 412) has been conserved against *Lithothamnium* Philippi (1837: 387) (ICBN, Appendix IIIA: 116; see Greuter 1988); however, in the context of dealing with Philippi's types, *Lithothamnium* is used here because Philippi established both the genus and the species in the same paper:

saxatilis

Basionym & protologue: *Lithothamnion nodulosum* f. *saxatilis* Foslie (1905: 62).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 196).

Isolectotype: L 951.165-037.

Type locality and collection data: Tautra (Gargrunden), Trondheimsfjord, Norway, collected by *M. H. Foslie*, 15 June 1894.

Previous references to typification: Woelkerling (1993: 196).

Published illustrations of lectotype: Printz (1929) pl. 26, figs. 7–9.

Published illustrations of L isolectotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 196). The isolectotype L 951.165-037 contains seven individuals c. 10–20 mm in greatest dimension and several minute fragments. Isolectotype material of this taxon (including L 951.165-037) was distributed as part of *M. Foslie: Lithothamnia Selecta Exsiccata* (see Woelkerling 1993: 9, 10, 274–276).

sibogae

Basionym & protologue: *Archaeolithothamnion sibogae* Weber-van Bosse et Foslie in Foslie (1901a: 3).

Lectotype: TRH (Siboga Expedition collection 297), designated by Verheij & Woelkerling (1992: 286); there are no associated slides.

Isolectotype: L 942.361-69.

Type locality and collection data: Pearlbank, N coast of Borneo; collected by *A. Weber-van Bosse*, 9 May 1899 (Siboga Expedition station 96).

Previous references to typification: Adey & Lebednik (1967: 85); Adey (1970: 18); Verheij & Woelkerling (1992: 286); Verheij (1993a: 193); Woelkerling (1993: 200).

Published illustrations of lectotype: Verheij (1993a) fig. 27.

Published illustrations of L isolectotype: Foslie (1904) pl. 7; details are provided by Verheij & Woelkerling (1992: 286). The original print from which plate 7 of Foslie 1904 was produced is preserved as L 950.45-61 in the icones collection at L.

Comments – The L isolectotype contains 12 individuals with separate Siboga Expedition numbers and a group of unnumbered fragments. Additional information on type material is provided by Verheij & Woelkerling (1992: 286) and Woelkerling (1993: 200).

sonderi

Basionym & protologue: *Lithothamnion sonderi* Hauck (1883: 273).

Lectotype: L 943.008-148.

Isolectotype: L 941.149-403.

Type locality and collection data: Helgoland, Germany; collector and date not indicated.

Previous references to typification: Chamberlain (1992: 191); Irvine & Chamberlain (1994: 190).

Published illustrations of lectotype: Hauck (1883) pl. 3, fig. 5; Chamberlain (1992) figs. 13–15, 41.

Comments – The Hauck herbarium contains two collections labelled *Lithothamnion sonderi* from Helgoland, the type locality cited in the protologue (Hauck 1883). Apparently unaware that two collections existed, Y.M. Chamberlain annotated one as holotype and provided (Chamberlain 1992) an account of the material in the collection. Because there are two collections, however, Chamberlain's choice (L 943.008-148) must be considered the lectotype and the second collection (L 941.149-403) an isolectotype. The lectotype element includes a number of fragments on small stones in 10 packets. None of the fragments now present in the lectotype or the isolectotype, however, can be matched unequivocally with the specimen depicted in Hauck (1883: pl. 3, fig. 5). Additional information on material in the lectotype collection is provided by Chamberlain (1992: 191), who, however, does not cite the L number.

soriferum

Basionym & protologue: *Lithothamnion soriferum* Kjellman (1883: 117).

Syntype: L 943.8-141.

Type locality and collection data: See comments below.

Previous references to typification: ?

Published illustrations of syntype material: Kjellman (1883) pl. 1, figs. 1–19; Kjellman (1885) pl. 1, figs. 1–19.

Published illustrations of L syntype: ?

Comments – Kjellman (1883) based *Lithothamnion soriferum* on specimens from various localities in northern Norway but did not designate a type, and apparently the species has not been lectotypified. L 943.8-141 constitutes syntype material collected on 18 August 1876 from Maasø, Norway, one of the localities explicitly cited in the protologue (Kjellman 1883: 120). The collection contains a single unattached specimen c. 70 mm in greatest dimension along with a notation label with the hand-written name *Lithothamnion soriferum* (in Kjellman's script?) and printed information indicating that Kjellman collected and identified the material. L 943.8-141 originally formed part of the herbarium of F. Hauck. According to Stafleu & Cowan (1979: 560), the English version of the protologue (Kjellman 1885: 88–91, pl. 1, figs. 1–19) appeared two years after the Swedish version even though the title page of the English publication also is dated 1883.

stalatiticus

Basionym & protologue: *Spongites stalatiticus* Kützing (1841: 33).

Holotype: L 943.7-76.

Type locality and collection data: Mediterranean Sea; collector and date not indicated.

Previous references to typification: Woelkerling (1985a: 143, 144).

Published illustrations of holotype: Woelkerling (1985a) figs. 41–48.

Comments – A detailed account of the holotype collection is provided by Woelkerling (1985a). Because the generic name *Spongites* is masculine [Penrose (1991: 439); ICBN Art. 76.4 (see Greuter 1988)], the specific epithet is correctly spelled here *stalatiticus* rather than *stalatitica* as done by Kützing (1841) and Woelkerling (1985a).

stelligera

Basionym & protologue: *Melobesia stelligera* Endlicher & Diesing (1845: 290).

Syntypes: L 939.006-143. — MEL 516786 (Woelkerling 1980: 236, 238, fig. 4).

Type locality and collection data: Port Natal, South Africa; collected by *Dr Gueinzus*; date not indicated.

Previous references to typification: Woelkerling (1980: 238).

Published illustrations of L syntype: ?

Comments – Endlicher & Diesing (1845) based *Melobesia stelligera* on specimens from South Africa collected by Diesing and sent by Pöppig but did not designate a type. Woelkerling (1980) examined syntype material in MEL and concluded that *Melobesia stelligera* is a heterotypic synonym of *Metamastophora flabellata* (Sonder) Setchell. L 939.6-143 is probable syntype material of *Melobesia stelligera*; it also is the holotype of *Peyssonnelia caulescens* Kützing (see entry above).

subflabellata

Basionym & protologue: *Lithothamnion erubescens* f. *subflabellata* Foslie (1904: 31).

Lectotype: L 991.239-235 (Siboga Expedition collection 187), designated by Verheij & Woelkerling (1992: 286); there are no associated slides.

Lectotype fragment: TRH (Siboga Expedition collection 187); includes one slide.

Type locality and collection data: Banda Anchorage; collected by *A. Weber-van Bosse*, November 1899 (Siboga Expedition station 240).

Previous references to typification: Verheij & Woelkerling (1992: 286); Woelkerling (1993: 210).

Published illustrations of lectotype: Foslie (1904) pl. 3, fig. 24; Printz (1929) pl. 15, fig. 24.

Comments – Additional information, including data on isolectotypes, is provided by Verheij & Woelkerling (1992: 286) and Woelkerling (1993: 210).

subplicata

Basionym & protologue: *Lithophyllum marlothii* f. *subplicata* Foslie (1902: 19).

Holotype: TRH, unnumbered; includes slides 649–651.

Isotype: L 942.361-18.

Type locality and collection data: Natal, South Africa; collected by *A. Weber-van Bosse*, 1893.

Previous references to typification: Adey & Lebednik (1967: 18, as *Lithophyllum impar*); Adey (1970: 13, as *Pseudolithophyllum impar*); Woelkerling (1993: 211).

Published illustrations of holotype: Printz (1929) pl. 54, figs. 18–21 (as *Lithophyllum impar*); Chamberlain (1994) fig. 54 (as *Lithophyllum impar*).

Published illustrations of L isotype: ?

Comments – Information on the typification of this taxon and of the TRH holotype are provided by Woelkerling (1993: 211). The isotype L 942.361-18 contains 12 pieces c. 25–135 mm in greatest dimension and a few small fragments. Foslie

(1909: 13) subsequently redescribed *Lithophyllum marlothii* f. *subplicata* (Foslie 1902: 19) as a distinct species, *Lithophyllum impar* (q. v.); both taxa are based on the same type material.

subtilis

Basionym & protologue: *Goniolithon frutescens* f. *subtilis* Foslie (1904: 53, pl. 10, figs. 12, 13).
Lectotype: L 991.239-232 (Siboga Expedition collection 554), designated by Verheij & Woelkerling (1992: 287); there are no associated slides.

Type locality and collection data: S of the Lucipara Islands, Indonesia; collected by A. *Weber-van Bosse*, 8–10 November 1899 (Siboga Expedition station 225).

Previous references to typification: Verheij & Woelkerling (1992: 287); Woelkerling (1993: 216).
Published illustrations of lectotype: ?

Comments – Additional information, including data on the two isolectotype collections, is provided by Verheij & Woelkerling (1992: 287) and Woelkerling (1993: 216).

subtilissima

Basionym & protologue: *Melobesia subtilissima* Foslie (1904: 55).

Holotype: L 941.98-194 (no Siboga Expedition collection number); there are no associated slides.
Holotype fragment: TRH (Siboga Expedition collection, unnumbered); includes two unnumbered slides.

Type locality and collection data: Off Atjatuning, W coast of New Guinea; collected by A. *Weber-van Bosse*, 23–25 August 1899 (Siboga Expedition station 169).

Previous references to typification: Adey & Lebednik (1967: 37); Adey (1970: 17, as *Heteroderma*);
Verheij & Woelkerling (1992: 287); Woelkerling (1993: 218).

Published illustrations of holotype: ?

Comments – Additional information is provided by Verheij & Woelkerling (1992: 287) and Woelkerling (1993: 218). The genus *Heteroderma* (Foslie) Foslie (1909: 56) is typified by the type of *Melobesia subtilissima*. *Heteroderma* is considered to be a heterotypic synonym of *Pneophyllum* (Chamberlain 1983: 353; Woelkerling 1988: 147).

sulawesiensis

Basionym & protologue: *Spongites sulawesiensis* Verheij (1994: 116).

Holotype: L 992.185-200 (Verheij 1184).

Type locality and collection data: Kudingareng Keke Island, SW Sulawesi, Indonesia, *Verheij*, 16 July 1990.

Previous references to typification: Verheij (1993b: 237); Verheij (1993c: 56); Verheij (1994: 116).
Published illustrations of holotype: Verheij (1993c) fig. 66.

Comments – The name *Spongites sulawesiensis* was first validly published by Verheij (1994). There are two previous accounts of the species (Verheij 1993b, 1993c), but the name is not validly published in either. One (Verheij 1993b) lacks a figure or illustration or reference to a previously published illustration (thus contravening ICBN Art. 39.1), while the other (Verheij 1993c) lacks a Latin description or diagnosis (thus contravening ICBN Art. 36.2).

superficiale

Basionym & protologue: *Hydrolithon superficiale* Keats and Y.M. Chamberlain (1994: 12).

Holotype: L 991.239-019 (UWC: COR/302).

Type locality and collection data: Mbibi, Natal, South Africa; collected by *D.W. Keats*, 1.vii.1991.

Previous references to typification: Keats and Chamberlain (1994: 12).

Published illustrations of holotype: Keats and Chamberlain (1994) figs. 20–24.

Comments – The holotype occurs on rock and is one of several collections cited in the protologue account.

tamiense

Basionym & protologue: *Peyssonnelia tamiense* Heydrich (1897a: 9).

Syntype: L 943.11-6.

Type locality and collection data: Tami Island, Huon Gulf, New Guinea; collected by *M. Bamler*, December 1894 (see Heydrich 1897a: 1).

Previous references to typification: ?

Published illustrations of type material: Heydrich (1897a) pl. 1, fig. 12.

Comments – Heydrich (1897a) based *Peyssonnelia tamiense* on specimens from Tami Island but did not designate a type or indicate how many specimens were involved. Heydrich's main herbarium is presumed to be destroyed (Stafleu & Cowan 1979: 187) and thus the total number of specimens can no longer be determined. The L syntype consists of a single piece of thallus c. 25 mm in greatest dimension and is accompanied by a label stating that the material has come from the 'Museo botanico Berolinensi' (B), where Heydrich's main herbarium had been lodged. Although the L syntype appears sterile, sections of the vegetative thallus clearly show that this species belongs to the Corallinaceae and not to *Peyssonnelia*. Placement within the Corallinaceae, however, cannot be effected from the L syntype because it lacks conceptacles. The vegetative thallus shows a monomerous construction, has fusions between cells of adjacent filaments, and has epithallial cells that are rounded to flattened but not flared. Corallines with these characters are found in a number of genera of the Mastophoroideae and Melobesioideae, but a more precise placement of Heydrich's taxon is not possible from a study of the L syntype.

testaceum

Basionym & protologue: *Lithothamnion testaceum* Foslie (1895: 135; p. 107 in independently paginated offprint).

Holotype: TRH, unnumbered; includes slide 219 and one unnumbered slide.

Isotype: L 942.350-63.

Type locality and collection data: Bergsjord, Finnmark, Norway, collector not indicated, 2 Aug. 1891.

Previous references to typification: Woelkerling (1993: 222).

Published illustrations of holotype material: Foslie (1895) pl. 19, figs. 5–9; Printz (1929) pl. 41, fig. 14 (as *Clathromorphum*).

Published illustrations of L isotype: ?

Comments – Information on the typification of this species and the TRH holotype are provided by Woelkerling (1993: 222). The isotype collection in L contains a label with name, locality and date (given as 21 August 1891 rather than 2 August 1891) in Foslie's script and consists of a single fragment c. 15 mm in greatest dimension.

timorense

Basionym & protologue: *Archaeolithothamnion timorense* Foslie (1904: 42).

Lectotype: L 935, 207-13 (Siboga Expedition collection 443), designated by Verheij & Woelkerling (1992: 288); includes two slides. The box numbered L 935.207-13 also contains 17 isolectotype specimens and four slides.

Type locality and collection data: E of Sailus Besar, Paternoster Islands, Indonesia; collected by A. Weber-van Bosse, 17–18 February 1900 (Siboga Expedition station 315).

Previous references to typification: Verheij & Woelkerling (1992: 288); Woelkerling (1993: 223).
Published illustrations of lectotype: ?

Comments – Additional information, including data on the 19 L isolectotypes, is provided by Verheij & Woelkerling (1992: 288) and Woelkerling (1993: 223).

tualensis

Basionym & protologue: *Lithothamnion australe* f. *tualensis* Foslie (1904: 24).

Lectotype: TRH (Siboga Expedition collection 675a, portion in TRH; the portion in L is an isolectotype), designated by Verheij & Woelkerling (1992: 289); there are no associated slides.

Isolectotype: L 943.5-145.

Type locality and collection data: Tual, Kei Islands, Indonesia; collected by A. Weber-van Bosse, 11 December 1899 (Siboga Expedition station 258).

Previous references to typification: Verheij & Woelkerling (1992: 289); Woelkerling (1993: 226).
Published illustrations of lectotype: ?

Published illustrations of L isolectotype: ?

Comments – The L isolectotype includes six individuals with separate Siboga Expedition numbers. Additional information on type material is provided by Verheij & Woelkerling (1992: 289) and Woelkerling (1993: 226).

tuberculata

Basionym & protologue: *Lithothamnion fornicatum* f. *tuberculata* Foslie (1900b: 12).

Comments – *Lithothamnion fornicatum* f. *tuberculata* is a superfluous substitute name for *Lithothamnion dehiscens* f. *grandifrons* (q.v.).

tusterense

Basionym & protologue: *Lithothamnion tusterense* Foslie (1905: 65).

Holotype: TRH, unnumbered; includes slides 309, 310, 1644.

Isotype: L952.88-324.

Type locality and collection data: Tusteren (N of Kristiansund), Norway; collected by M.H. Foslie, 10 August 1898.

Previous references to typification: Woelkerling (1993: 229).

Published illustrations of holotype: Printz (1929) pl. 22, figs. 6–13.

Published illustrations of L isotype: ?

Comments – Information on the typification of this species and the TRH holotype are provided by Woelkerling (1993: 229). The isotype in L contains one intact, unattached plant c. 30 mm in greatest dimension and some small fragments.

ubiana

Basionym & protologue: *Lithothamnion australe* f. *ubiana* Foslie (1904: 24).

Lectotype: L 991.239-242 (Siboga Expedition collection 1046), designated by Verheij & Woelkerling (1992: 289); there are no associated slides.

Type locality and collection data: Pulu Sanguisiapo, Tawi-Tawi Islands, Sulu Archipelago, Indonesia; collected by A. *Weber-van Bosse*, 24–25 June 1899 (Siboga Expedition station 93).

Previous references to typification: Verheij & Woelkerling (1992: 289); Woelkerling (1993: 229).
Published illustrations of lectotype: ?

Comments – Additional information, including data on the isolectotype collection, is provided by Verheij & Woelkerling (1992: 289) and Woelkerling (1993: 229).

ungeri

Basionym & protologue: *Lithothamnion ungeri* Kjellman (1883: 120).

Syntype: L 943.008-123.

Type locality and collection data: see comments below.

Previous references to typification: ?

Published illustrations of type material: ?

Published illustrations of L syntype material: ?

Comments – Kjellman (1883) based *Lithothamnion ungeri* on specimens from Tromsø sent by Foslie and on material in the Museum of Bergen that had been misidentified by Unger (1858: 19–20, pl. 5, figs. 1–8) as *L. byssoides* (Lamarck) Philippi, but Kjellman did not designate a type. Kjellman (1883: 120) commented, however, that all the specimens at his disposal appeared sterile. L 943.8-123 constitutes syntype material collected in September 1880 from Tromsø, Norway, the locality explicitly cited in the protologue (Kjellman 1883a: 120). The collection contains a single unattached specimen c. 50 mm in greatest dimension along with a notation label with the hand-written name *Lithothamnion ungeri* (in Kjellman's script?) and information indicating that Foslie collected the material and that Kjellman distributed it. L 943.8-123 originally formed part of the herbarium of F. Hauck. According to Stafleu & Cowan (1979: 560), the English version of the protologue (Kjellman 1885: 91) appeared two years after the Swedish version even though the title page of the English publication also is dated 1883.

varians

Basionym & protologue: *Lithothamnion varians* Foslie (1895: 109; p. 81 in independently paginated offprint).

Lectotype: TRH, unnumbered, designated by Woelkerling (1993: 234); includes slide 134.

Isolectotype: L 943.10-41.

Type locality and collection data: Ballstad, Lofoten, Norway, collected by *M.H. Foslie*, 21 September 1881.

TRH drawer: C-23; listed under *Phymatolithon polymorphum* in Adey & Lebednik (1967: 89).

Previous references to typification: Woelkerling (1993: 234).

Published illustrations of lectotype: Foslie (1895) pl. 18, figs. 3, 4.

Previous illustrations of L isolectotype: ?

Comments – Information on the lectotypification of this species and the TRH lectotype are provided by Woelkerling (1993: 234). The isolectotype collection in L

contains a label with name, locality and date in Foslie's script and consists of a two fragments c. 24–30 mm in greatest dimension.

woelkerlingii

Basionym & protologue: *Heydrichia woelkerlingii* Townsend et al. 1994: 178.

Holotype: L 991.239-046 (YMC 88/60).

Isotype: LTB 17294.

Type locality and collection data: Oudekrall, Cape Peninsula, Western Cape, South Africa, collected by R. Anderson, 6 June 1986.

Previous references to typification: Townsend et al. (1994: 178).

Published illustrations of holotype: Townsend et al. (1994) figs. 1, 23, 25–28.

Comments – The holotype includes one dried piece of material and two prepared slides. In the protologue, L is given as the repository of the type, but the L number was not provided. *Heydrichia woelkerlingii* is the type species of the genus *Heydrichia* (Table 1).

zaneveldii

Basionym & protologue: *Lithothamnion zaneveldii* Sanford in Zaneveld et Sanford (1980: 220).

Holotype: L 993.340-005 (Zaneveld collection number 65-02-0428a; but see comments below).

Type locality and collection data: Macquarie Island (NE side); collected by Zaneveld, Curtis & Fletcher, February 1965.

Previous references to typification: Zaneveld & Sanford (1980: 220).

Published illustrations of holotype: Zaneveld & Sanford (1980) figs. 18, 19.

Comments – Sanford (in Zaneveld & Sanford 1980: 220, 221) based this species on several specimens found on a single rock. Three Zaneveld collection numbers are involved, however: 65-02-0428a refers to the holotype; 65-2-0439 refers to the material depicted in fig. 18 of the protologue; and 65-02-0428b2 refers to the material depicted in fig. 19 of the protologue. As all of these are based on specimens attached to a single rock, they are grouped together under a single L number to serve as the holotype element.

SUMMARY ANALYSIS

Type material of 114 species, varieties and forms of nongeniculate coralline red algae has been found in L during the present study. These include type material associated with 17 generic names (Table 1). The 114 type collections include 35 holotypes, 22 lectotypes, 1 neotype, 15 isotypes, 24 isolectotypes, 12 syntypes and 2 paratypes, 1 putative holotype, 1 putative isolectotype, and 1 drawing of a type specimen. In addition, two taxa are represented by isotypes as well as holotypes, 11 taxa are represented by isolectotypes as well as lectotypes, and one taxon is represented by a paratype as well as a lectotype. These additional isotypes, isolectotypes and paratypes are not included in the above tallies. Type material of *Melobesia pruinosa* Kützinger has not been located, and *Archaeolithothamnion lemoinei* Weber-van Bosse is represented in L only by the original protologue habit drawing. A summary of information relating to type material of taxa of nongeniculate Corallinales represented in L appears in Table 2.

Table 2. Summary list of authors and taxa of nongeniculate Corallinales for which type material is located in L. Authors (and first authors in the case of joint authorship) are listed alphabetically; names of taxa are listed alphabetically by basionym; information on the nature of the type material is given after each taxon. Further details on taxa are provided in the main text.

- Areschoug, J.E.
Lithothamnion calcareum var. *norvegica*;
 syntype
- Chalon, J.
Lithophyllum dentatum f. *echini*; syntype
- Chamberlain, Y.M.
Pneophyllum keatsii; holotype
P. rosanoffii; isotype
- Chamberlain, Y.M. & D.W. Keats
Leptophyllum foveatum; holotype
- Chamberlain, Y.M. & R.E. Norris
Hydrolithon pellire; holotype
- Endlicher, S.L. & C.M. Diesing
Melobesia stelligera; syntype
- Foslie, M.H.
Archaeolithothamnion mirabile; isotype
A. timorensis; lectotype; isolectotypes (× 19)
Goniolithon frutescens f. *subtilis*;
 lectotype; isolectotypes (× 2)
G. megalocystum; holotype
Lithophyllum fasciculatum f. *divaricata*;
 isotype
L. fasciculatum f. *divergens*; superfluous
L. impar; isotype
L. incrustans f. *angulata*; isolectotype
L. marlothii f. *subplicata*; isotype
L. yendoi f. *malaysica*; lectotype
Lithothamnion australe f. *brachiata*;
 lectotype; isolectotypes (× 7)
L. australe f. *minutula*; lectotype;
 isolectotypes (× 2)
L. australe f. *tualensis*; isolectotype
L. australe f. *ubiana*; lectotype; isolectotype
L. bandanum; holotype
L. capense f. *eckloniae*; isotype
L. coalescens; isolectotype
L. colliculosum; isolectotype
L. congregatum; isolectotype
L. dehiscens f. *dehiscens*; isolectotype
L. dehiscens f. *grandifrons*; isolectotype
L. dimorphum; isolectotype
L. divergens; isotype
L. ectocarpon; isolectotype
- L. erubescens* f. *subflabellata*; lectotype
L. flabellatum f. *granii*; isolectotype
L. fornicatum; isolectotype (× 2)
L. fragilissimum; lectotype; isolectotypes
 (× 6)
L. fruticosum f. *fastigiata*; isolectotype
L. fruticosum f. *pteridoides*; lectotype;
 isolectotype
L. gracilescens; isolectotypes (× 2)
L. nodulosum f. *nodulosum*; isolectotype
L. nodulosum f. *saxatilis*; isolectotype
L. philippi; paratype
L. prolifer; lectotype; isolectotype
L. propontidis; lectotype
L. siamense f. *pseudoramosa*; lectotype;
 isolectotypes (× 3)
L. simulans f. *crispescens*; lectotype
L. testaceum; isotype
L. tusterense; isotype
L. varians; isolectotype
Mastophora affinis; lectotype; paratype
M. macrocarpa f. *condensata*; holotype
Melobesia subtilissima; holotype
- Foslie, M.H. & M.A. Howe
Lithophyllum chamaedoris; isotype
L. daedaleum; isotype
L. munitum; isotype
Lithothamnion mesomorphum
 var. *ornatum*; isotype
- Hauck, F.
Lithothamnion crispatum; lectotype
L. mamillosum; lectotype, isolectotype
L. papillosum; lectotype
L. sonderi; holotype
Melobesia cystoseirae; lectotype
- Heydrich, F.
Lithothamnion bamleri; isolectotype
L. orthoblastum; syntype
L. pygmaeum; syntype
Perispermion hermaphroditum; isolectotype
Peyssonnelia tamiense; syntype
- Keats, D.W. & Y.M. Chamberlain
Hydrolithon superficiale; holotype

- Kjellman, F.R.
Lithothamnion alaicorne; syntype
L. articum; syntype
L. compactum; paratype
L. glaciale; syntype
L. soriferum; syntype
L. ungeri; syntype
- Kützing, F.T.
Hapalidium phyllactidium; superfluous
H. roseolum; holotype
Lithophyllum laeve; holotype
Mastophora decaisnei; superfluous
Melobesia corticiformis; holotype
M. crassiuscula; holotype
M. foliacea; holotype
M. granulata; holotype
M. pruinosa; not found
M. pustulata β *canellata*; lectotype
Peyssonnelia caulescens; holotype
Phyllactidium confervicolum; holotype
Pneophyllum fragile; holotype
Spongites confluens; holotype
S. crustacea; holotype
S. dentatus; holotype; isotype
S. fruticulosus; holotype
S. nodosus; lectotype; isolectotypes ($\times 2$)
S. racemosus; holotype
S. stalaticus; holotype
- Lamarck, J.B.
Nullipora byssoides; neotype
- Montagne, C.
Mastophora macrocarpa; syntype
- Philippi, R.A.
Lithophyllum expansum; holotype
L. incrustans; holotype
L. lichenoides; holotype
Lithothamnium crassum; holotype
L. gracile; holotype
L. ramulosum; holotype
L. rubrum; holotype
- Rosanoff, S.
Lithophyllum capense; putative isolecto-
types
L. crassum; paratype
Lithothamnion muelleri; isolectotype
Melobesia macrocarpa; isolectotype
- Sanford, R.B.
Lithothamnion macquariensis; lectotype;
paratype
L. zaneveldii; holotype
- Sonder, W.
Melobesia plana; isolectotype
- Taylor, W.R.
Porolithon marshallense; isotype
- Townsend, R.A., Y. M. Chamberlain &
D.W. Keats
Heydrichia woelkerlingii; holotype
- Verheij, E.
Spongites sulawesiensis; holotype
- Weber-van Bosse, A.A.
Archaeolithothamnion lemoinei; original
protologue drawing
Porolithon reinboldii f. *keiensis*; isotype
- Weber-van Bosse, A.A. & M.H. Foslie
Archaeolithothamnion sibogae; isolectotype
Lithophyllum reinboldii; isolectotypes ($\times 2$)
Lithothamnion erubescens f. *haingsisiana*;
lectotype; isolectotypes ($\times 25+$)
L. pulchrum; isolectotype
- Woelkerling, Wm J.
Amphiroa johansenii; nom. nov.;
see *Lithothamnion gracile* Philippi
Lithophyllum duckerae; nom. nov.;
see *Lithothamnium crassum* Philippi
- Zaneveld, J.S. & R.B. Sanford
Phymatolithon lenormandii
f. *macquariensis*; putative holotype;
putative isotype

Lectotypes have been newly designated for *Lithophyllum crassum*, *L. crispatum*, *Lithothamnion macquariensis*, and *L. mamillosum*. Putative isolectotype material of *Lithophyllum capense* needs to be compared with the lectotype in CN to determine whether they are conspecific; these specimens were distributed part of Hohenacker's Algae Marinae Siccatae. For *Phymatolithon lenormandii* f. *macquariensis*, Zaneveld & Sanford (1980) identified holotype and isotype specimens, but the taxon was not validly published and thus has no status under the ICBN. Zaneveld & Sanford's suggestions are regarded as putative in the present account.

Fifty-one of the 428 taxa validly published by M.H. Foslie (Woelkerling 1993) are represented by type material in L (Table 2). This includes four taxa described jointly by Foslie & Howe and four taxa described jointly by Weber-van Bosse & Foslie. Of the 51, four are holotypes, 14 are lectotypes, and 33 are isotypes, isolectotypes, or paratypes. Except for *Lithothamnion australe* f. *ubiana*, type material of all these taxa also occurs in TRH (see Woelkerling 1993 for details). Twenty-three of the 51 taxa involve Siboga Expedition collections (Verheij & Woelkerling 1992).

F.T. Kützing (1841, 1843, 1845, 1847, 1849) published 20 names involving nongeniculate corallines. Holotype or lectotype material for 17 are in L; type material for *Melobesia pruinoso* was not found during the present study, and *Hapalidium phyllactidium* and *Mastophora decaisnei* are superfluous substitute names. As noted by Papenfuss (1968: 275), the type of *Peyssonnelia caulescens* belongs to *Metamastophora*.

Other authors represented by type material in L include R.A. Philippi, F. Hauck, F. Heydrich, and F.R. Kjellman (Table 2). The holotypes of all seven nongeniculate corallines described by Philippi are present as are the holotypes/lectotypes of the five species described by Hauck. Three syntypes and two isolectotypes of Heydrich are present, and five syntypes and one paratype of species described by Kjellman occur. Overall, type material of 26 authors has been found in L (Table 2).

Detailed anatomical comparisons of isotypes and isolectotypes with their respective holotypes and lectotypes have not been undertaken during the present study but are now required to confirm that in each case only one taxon is represented. For many nongeniculate corallines, duplicates of types were identified solely from characters relating to external appearance, and most such characters are now known to be too variable (Woelkerling et al. 1993: 279 and references cited therein) to be reliable for use in taxon delimitation and recognition.

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