

Typification and nomenclature of *Rhodophyllis bifida* and *R. divaricata* (Rhodophyta) in relation to *Fucus bifidus* Hudson, *F. bifidus* Turner, *Bifida divaricata* Stackhouse and *Delesseria bifida* J.V. Lamouroux

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This analysis of the typification and nomenclature of species names historically linked to *Rhodophyllis bifida* (Cystocloniaceae, Rhodophyta) was initiated in parallel with a nomenclatural analysis of the genus name *Rhodophyllis* (Woelkerling & al. 2020). The relevant species names (with current, corrected author citations) include *Fucus bifidus* Hudson *nom. illeg.* (Hudson 1778: 581), *Fucus bifidus* Turner *nom. illeg.* (Turner 1811: 43), *Delesseria bifida* J.V.Lamouroux *nom. nov.* [Lamouroux 1813a: 125; reprinted as 1813b: 37 (as ‘38’)], *Rhodymenia bifida* (J.V.Lamouroux) Greville [as *Rhodomenia bifida* in Greville 1830: 85], *Rhodophyllis bifida* (J.V.Lamouroux) Kützinger (1847: 23) [as ‘*Rh. bifida* Kg.’], *Bifida divaricata* Stackhouse *nom. nov.* (Stackhouse 1809:97), and *Rhodophyllis divaricata* (Stackhouse) Papenfuss (Papenfuss 1950: 190). To our knowledge, nomenclatural types (specimens/illustrations) have not been designated to date for these names or have become inadmissible due to changes in the *Code*. The nomenclatural type of *R. bifida* also typifies the genus name *Rhodophyllis* Kützinger, 1847, *nom. cons.*

Our analysis, including nomenclatural terminology, is based on the current ICN (*International Code of Nomenclature for algae, fungi and plants* (Shenzhen Code), Turland & al. 2018), here abbreviated to *Code* or ICN. Herbarium abbreviations are those in the online database *Index Herbariorum* (<http://sweetgum.nybg.org/science/ih/>). The triple-bar symbol (≡) denotes names that are based on the same nomenclatural type (Turland 2019: 167) and thus are homotypic; the double-bar symbol (=) denotes names that are based on the different nomenclatural types (Turland 2019: 167) and thus are heterotypic. References to both the journal and the independently paginated offprint versions of several publications are included because of citations of the latter by some authors. The use of double quotation marks to indicate binary designations (as defined in the ICN Glossary), which are not validly published as scientific names, follows Turland & al. (2018: 205). We follow Woelkerling & al. (2020) with respect to dates of effective publication, correct author citations, the interpretation of 18th- and 19th-century nomenclatural actions (which can be cryptic) in the context of 21st century nomenclatural ‘rules’, and relevant changes to the *Code*.

Nomenclatural types of species names are ‘elements’ (specimens or illustrations) to which the names are permanently attached (ICN Art. 7.2), but a nomenclatural type specimen/illustration is not necessarily a high quality one or the most representative element of a species (Art. 7.2). Turland (2019: 65-83) provides a detailed account of nomenclatural types and typification.

Rhodophyllis bifida was the only species that Kützinger (1847: 23) included in his newly established genus *Rhodophyllis*; it was proposed as a new combination based on *Rhodymenia bifida* ‘Greville’ (1830: xlviii, 85, as ‘*Rhodomenia*’). The spelling ‘*Rhodymenia*’ is conserved (Wiersema & al. 2015: 76 [in print]; Wiersema & al. 2018+ [online, continuously updated]). The application of scientific names to all taxa of family rank or lower is determined (ICN Principle II; Art. 7.1) by means of nomenclatural types (specimens or illustrations), but no nomenclatural type specimen/illustration has been designated for *Rhodophyllis bifida* (and thus the genus *Rhodophyllis*). Consequently, past nomenclatural interpretations involving *Rhodophyllis bifida* (including its homotypic synonyms and the genus name *Rhodophyllis*) are speculative because they have lacked underpinning evidence essential for nomenclatural stability.

Since 1950, however, *Rhodophyllis divaricata* (Stackhouse) Papenfuss (1950: 190) has been treated as the correct name of the species (*R. bifida*) whose nomenclatural type typifies *Rhodophyllis*. There is no firm evidence, however, that *R. bifida* is conspecific with (and thus a heterotypic synonym of) *R. divaricata* because an earlier typification of *R. divaricata* (Dixon & Irvine 1977a: 138) is no longer admissible due to changes in the *Code* and because nomenclatural types (specimens/illustrations) in accord with the current ICN have not been designated to date for either species. In the present study, nomenclatural types for *Rhodophyllis bifida* and *R. divaricata* are properly designated, and the consequent nomenclatural and taxonomic implications are considered.

Rhodophyllis bifida/ *Rhodymenia bifida*. — *Rhodophyllis bifida* and *Rhodymenia bifida* are homotypic; both are derived from the basionym (see ICN Glossary) involving the earliest legitimate name amongst the four binomials (Fig. 1) listed as synonyms of *Rhodymenia bifida* by Greville (1830: 85).

Of these, the earliest legitimate name is *Delesseria bifida* J.V.Lamouroux (1813a: 125; reprinted as 1813b: 37 [as ‘38’]). Earlier references (Fig. 1) to *Fucus bifidus* are linked directly or indirectly to *F. bifidus* Hudson (Hudson 1778: 581) or *F. bifidus* Turner (Turner 1811: 43-46), both of which are illegitimate later homonyms (Art.53.1) of *F. bifidus* S.G.Gmelin (Gmelin 1768: 201) [now treated as *Arthrothamnus bifidus* (S.G.Gmelin) J.Agardh (Agardh 1868: 28) (*Laminariales*, *Ochrophyta*)].

1. RHODOMENIA BIFIDA.

FronD thin transparent subdichotomously divided linear the apices obtuse, capsules minute spherical marginal.

Sphaerococcus bifidus, Ag. Sp. Alg. v. 1. p. 293. Syst. Alg. p. 231. Spreng. Sp. Pl. v. 4. p. 334.

Delesseria bifida, Lamour. Essai, p. 37.

Halymenia bifida, Gaill. Dict. Sc. Nat. v. 53. p. 360.

Fucus bifidus, Gooden. and Woodw. in Linn. Trans. v. 3. p. 159. t. 17. f. 1. Sm. Eng. Bot. t. 773. Turn. Syn. Fuc. p. 166. Hist. Fuc. t. 154.

Fig. 1. Brief description & synonymy for *Rhodymenia bifida*, reproduced here from Greville (1830: 85, as ‘*Rhodomenia*’). See references for publication details.

Although illegitimate, *F. bifidus* Hudson and *F. bifidus* Turner are validly published, taxonomically independent names with different nomenclatural types because Turner (1811: 43-44, 46) explicitly excluded the Hudson name from his *F. bifidus*, and also had previously (Turner 1809: 3, 4) treated

the Hudson species as a variety of *Fucus palmetta* S.G.Gmelin (ICN, Art. 48.1). As illegitimate names, however, *F. bifidus* Hudson and *F. bifidus* Turner cannot serve as basionyms, which, by definition (Art. 6.10; ICN Glossary), must be legitimate.

Greville's references (Fig. 1) to *Sphaerococcus bifidus* C.Agardh (1817: xvi; 1822: 299; 1824: 231) and *Halymenia bifida* (Lamouroux 1824: 387; Gaillon 1828: 360) involve names published after 1813 and thus are not of primary consideration. The earlier binary designation (ICN Glossary) "*Sphaerococcus bifidus* Stackhouse" *nom. nud.* (1797: xxiv in the Appendix), not listed by Greville (1830: 85) (Fig. 2), is not validly published and consequently has no status under the ICN (Art. 12.1). Stackhouse (1797: xxiv) did not provide a species description or diagnosis or a reference to a previously published name, description or diagnosis. Furthermore, C. Agardh (1817: xvi, 1822: 299; 1824: 231) did not mention the Stackhouse binary designation.

In the context of the current ICN, *Delesseria bifida* J.V.Lamouroux (Lamouroux 1813a: 125; 1813b: 37 [as '38']) is a replacement name (Art. 6.12; ICN Glossary) for *Fucus bifidus* Turner (Turner 1811: 43, pl. 154) (*non F. bifidus* Hudson 1778: 581, *nec F. bifidus* S.G.Gmelin 1768: 201) that Lamouroux (*op. cit.*) validated solely by a (cryptic) reference ("Turn. Hist.") to *F. bifidus* Turner in "*Historia fucorum*" (= Turner 1811; see footnote 1 in Lamouroux 1813a: 35, 1813b: 15). Accordingly, *Delesseria bifida* is typified (Art. 7.4) by the type of the replaced synonym (Art. 6.11), namely *F. bifidus* Turner (*non F. bifidus* Hudson), and as the earliest legitimate name listed by Greville (1830: 85), *D. bifida* J.V.Lamouroux becomes the basionym for the subsequent new combinations *Rhodymenia bifida* (J.V.Lamouroux) Greville (Greville 1830: xviii, 85) and *Rhodophyllis bifida* (J.V.Lamouroux) Kützinger (1847: 23). Nomenclaturally, *Fucus bifidus* Turner *nom. illeg.* is the replaced synonym for *Delesseria bifida* J.V.Lamouroux.

Athanasiadis (2016: 480, including footnote 9 and associated notes) listed *Delesseria bifida* J.V.Lamouroux as an illegitimate new combination [*'Delesseria bifida* (De Candolle) Lamouroux'] stating that the name was "...illegitimate as the epithet from *Bifida divaricata* Stackhouse (1809) should have been adopted". This treatment is incorrect. Lamouroux (1813a, 1813b) never mentioned the Stackhouse taxon or publication and did not publish a putative new combination [*'Delesseria bifida* (De Candolle) Lamouroux'] for the synonym that De Candolle (in Lamarck & De Candolle 1805: 28) listed under *Fucus laceratus* as "*ε Fucus bifidus*. Trans Linn. 3. P. 159. T. 17. F.1". The 'Trans. Linn. 3' citation refers to Goodenough & Woodward 1797, who in turn cited Hudson (1778: 581) (as '*F. Ang. p. 581*') as the basis for their use of the species name *Fucus bifidus*. "*Fucus laceratus* var. *bifidus*" (Athanasiadis 2016: 480, incl. footnote 6) and "*Delesseria bifida* (De Candolle) Lamouroux" (Athanasiadis 2016: 480, incl. footnote 9) are thus designations (ICN Glossary); they are not validly published and have no status under the *Code* (Art. 12.1).

According to Turner (1811: 43-46), specimens of *F. bifidus* Turner occurred at various localities in England, Ireland, France, Spain and Italy. Turner, however, did not designate/indicate a nomenclatural type specimen or illustration for *F. bifidus* Turner. Similarly, Lamouroux (1813a, 1813b) did not designate/indicate a nomenclatural type for *Delesseria bifida*, and to our knowledge, the name has yet to be typified, if possible with any original material (Art. 9.4, ICN Glossary) associated with the protologue of the replaced synonym, *Fucus bifidus* Turner (Turner 1811: 43-46, pl. 154).

After searching for and examining various Turner specimens, we **designate here** specimen 'A' on **BM** herbarium sheet 000044298 as lectotype (Fig. 2A) of *Fucus bifidus* Turner, and thus of the replacement name *Delesseria bifida* J.V. Lamouroux and the subsequent combinations



Fig. 2. *Fucus bifidus* Turner *nom. illeg.* ($\equiv$ *Delesseria bifida* J.V.Lamouroux; $\equiv$ *Rhodophyllis bifida* (J.V.Lamouroux) Kützing). **A.** Lectotype (BM 000044298 specimen A), designated here. Annotations written by Dawson Turner. Scale = 10 mm. **B.** Illustration accompanying protologue of *F. bifidus* Turner, reproduced from Turner (1811, pl. 154: fig. a; see references for publication details). Scale = c. 10 mm.

Rhodymenia bifida (J.V. Lamouroux) Greville and *Rhodophyllis bifida* (J.V. Lamouroux) Kützinger. The designated lectotype closely resembles an individual depicted in the protologue (Turner 1811, pl. 154: fig. a), reproduced here as Fig. 2B. The lectotype specimen is annotated by Turner with the name *F. bifidus* and a reference to an earlier publication (Turner 1802: 165) in which the material was described as *Fucus bifidus* Hudson (*nom. illeg.*). No precise locality details were provided on the specimen sheet for the designated lectotype.

As noted above, the correct author citation (as defined in the ICN Glossary) for *Rhodophyllis bifida* is *R. bifida* (J.V.Lamouroux) Kützinger. Various incorrect author citations [most commonly ‘*Rhodophyllis bifida* (Goodenough & Woodward) Kützinger’, ‘*Rhodophyllis bifida* Kützinger’, and ‘*Rhodophyllis bifida* Kützinger, *nom. illeg.*’] that occur in the literature require correction to *Rhodophyllis bifida* (J.V.Lamouroux) Kützinger. Citations involving Goodenough & Woodward as the authors of a putative basionym, for example, are incorrect. Goodenough & Woodward (1797: 159), although applying the name *Fucus bifidus* in the sense of Turner (1811), also definitely included reference (“Fl. Ang. p. 581”) to the earlier name *F. bifidus* Hudson (1778: 581). As noted above, both the Turner and Hudson names are illegitimate, and illegitimate names cannot serve as basionyms, which, by definition (ICN Art. 6.10, ICN Glossary), must be legitimate. Papenfuss (1950: 190) and Silva (1952: 266) suggested that Goodenough & Woodward (1797) misapplied the name *Fucus bifidus* to specimens now known as *Rhodophyllis bifida* (J.V.Lamouroux) Kützinger, but such misapplications do not make the binomials *Fucus bifidus* Hudson and *Fucus bifidus* Turner legitimate.

Rhodophyllis divaricata. — Papenfuss (1950: 190) and Silva (1952: 264) treated *Rhodophyllis divaricata* (Stackhouse) Papenfuss as the earliest correct name (Art. 11.4; ICN Glossary) for *R. bifida*, the type of which typifies the monotypic genus (ICN Art. 38.6) *Rhodophyllis* Kützinger. Subsequently, *R. divaricata* was widely adopted (e.g., Feldmann 1954: 84; Dixon 1961: 76; Min-Thien & Womersley 1976: 88; Dixon & Irvine 1977b: 199; Ballesteros 1981: 60; Coppejans & Kling 1995: 398; Woelkerling & al. 1998: 117; John & al. 2004: 119; Furnari & al., 2010: 815; Gallardo & al. 2016: 28) as the putatively correct name of the species to which the type of *Rhodophyllis* belongs. However, the identity of the ultimate type of *Rhodophyllis* has remained equivocal (Cormaci & al. 2020: 168, Note), especially after species descriptions could no longer serve as nomenclatural types (see below).

The basionym of *Rhodophyllis divaricata* (Stackhouse) Papenfuss is *Bifida divaricata* Stackhouse (1809: 97). Stackhouse provided a five-word description (see Fig. 3), cited ‘Fl. Angl. 581’ (i.e. Hudson 1778: 581), which includes descriptions of *Fucus bifidus* Hudson and two other species, and cited “Turn 165” (i.e. Turner 1802: 165), which also includes a reference (“Fl. Ang. p. 581”) to *Fucus bifidus* Hudson (1778: 581). Under ICN Art. 41.3, these citations constitute an indirect reference [“a clear (if cryptic) indication, by an author citation or in some other way, that a previously and effectively published description or diagnosis applies” – ICN Art. 38.14] to Hudson’s name.

Importantly, unlike Turner (1811: 45, 46; see above), Stackhouse (1809) did not exclude (ICN Art. 48.1) the type of *Fucus bifidus* Hudson from his protologue account of *Bifida divaricata*. Consequently, it seems manifest in the context of the current ICN (Turland & al. 2018) that Stackhouse (1809) effectively published *Bifida divaricata* as a replacement name (ICN Glossary) for *Fucus bifidus* Hudson (1778), possibly because Stackhouse saw no need to adopt the epithet ‘*bifidus*’ (or ‘*bifida*’) and intended to avoid creating a tautonym (‘*Bifida bifida*’; see ICN Art. 23.4 and the ICN Glossary). As a replacement name, *Bifida divaricata* is typified (ICN Art. 7.4) by the

type of the replaced synonym, namely the type of *Fucus bifidus* Hudson. Dixon & Irvine (1977a: 138) also treated the Stackhouse and Hudson names as homotypic.

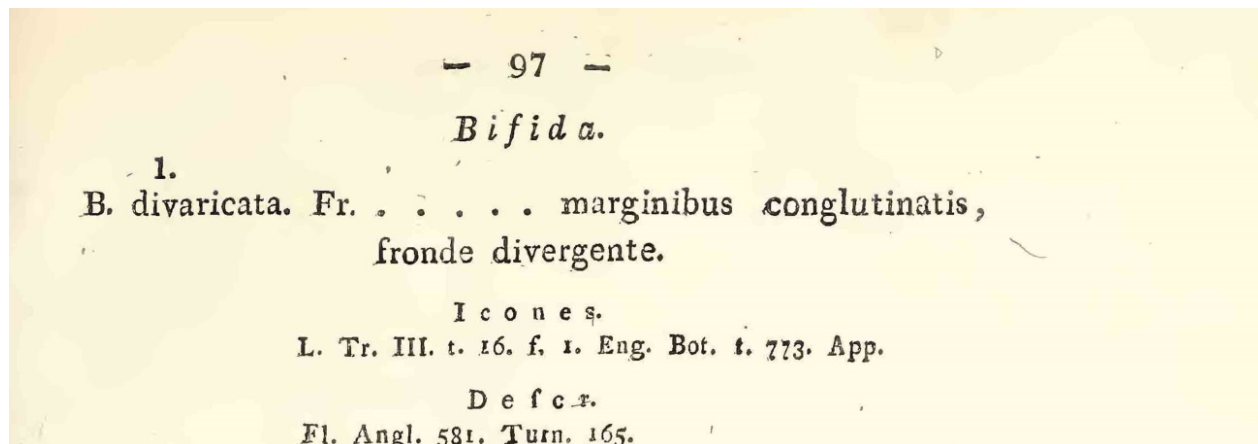


Fig. 3. Original account of *Bifida divaricata* Stackhouse (1809: 97). Publication details in references. “L. Tr. III. t. 16 f. 1” refers to Goodenough & Woodward (1797, p. 159, pl. 17: fig.1), erroneously cited by Stackhouse (1809: 97) as pl. 16; “Eng. Bot. t. 773 App.” refers to Smith (1800, pl. 773). See references for publication details.

The protologue of *Fucus bifidus* Hudson (1778: 581) (reproduced here as Fig. 4) consists of a description without citation of specimens or illustrations and lacking references to previously published illustrations or specimens. Hudson did not designate a nomenclatural type. Moreover, no original material (ICN Art. 9.4) is known with certainty, and after a detailed analysis, Dixon (1959: 38-39) concluded that “...it would seem best to assume the total loss of the original herbarium” of William Hudson (presumably in a house-fire in 1783, perhaps started by a disgruntled servant). Guiry (1977: 386) subsequently noted that “genuine material of *Fucus bifidus* Hudson has not as yet been located”.

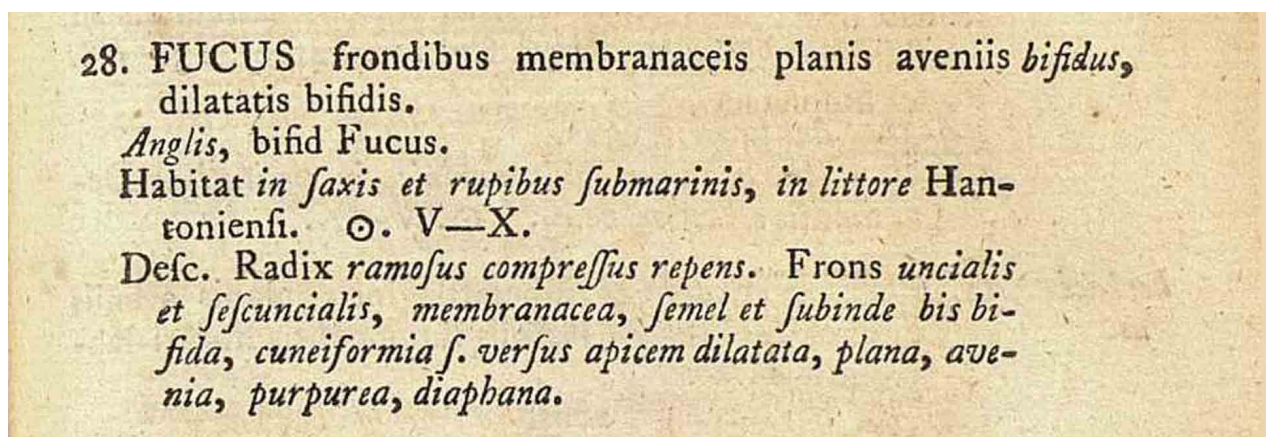


Fig. 4. Protologue account of *Fucus bifidus* Hudson (1778: 581). See references for publication details.

Dixon & Irvine (1977a: 138) lectotypified *Fucus bidifus* Hudson with Hudson’s (1778: 581) original description (Fig. 4). In a separate publication, Dixon & Irvine (1977b: 199) also listed the lectotype of *Rhodophyllis divaricata* as “the original description [of *Fucus bifidus*] (Hudson 1778) in the absence of material”, with a cross-reference to Dixon & Irvine 1977a: 138. They also presumed that *Rhodophyllis divaricata* was the correct name (Art. 6.6, ICN Glossary) for *Fucus bifidus* Hudson.

Under Art. 9 in the then current *Seattle Code* (Stafleu & al. 1972), it was still possible to designate a description as lectotype in cases where there was no known original material. This option, however, was subsequently deleted from the *Berlin Code* (Greuter & al. 1988) (Art. 9.3), and this meant that only specimens or illustrations are eligible for designation as nomenclatural types (Art. 8.1). This change rendered the Dixon & Irvine designation of a description as lectotype inadmissible, and to date, no specimen/illustration appears to have been designated as the nomenclatural type of *Fucus bifidus* Hudson (and thus of the replacement name *Bifida divaricata* Stackhouse).

In addition to assuming that Hudson's original herbarium was totally lost, Dixon (1959: 38-39) also reported that there were still "...about 200 algal specimens which once belonged to Hudson, or which at some time passed through his hands in existence at the present time" and stated that "It should be possible to select neotypes from the specimens located, but this selection must be undertaken only after careful and prolonged investigation, not only of the available material, but also of the historical background of the species in question." Dixon (1959: 38) also noted that "Sir Thomas Frankland, a pupil of Hudson, received a large number of specimens from him, but these are now scattered" and that "Those specimens received by Dawson Turner are in the general herbarium at Kew." Subsequently, all algal specimens in **K** (Kew) were transferred to **BM** (Ross & Brenan 1970).

During the present investigation, we became aware of an illustration published by Turner (1809: pl. 73, fig. g) (reproduced here as Fig. 5A) of a specimen that Turner (1809: 5) stated was amongst "...original specimens sent by Hudson to Sir Thomas Frankland" and which was "...the real *F. bifidus* of that author" (i.e. of Hudson). Thus, Hudson had identified the specimen as *Fucus bifidus*

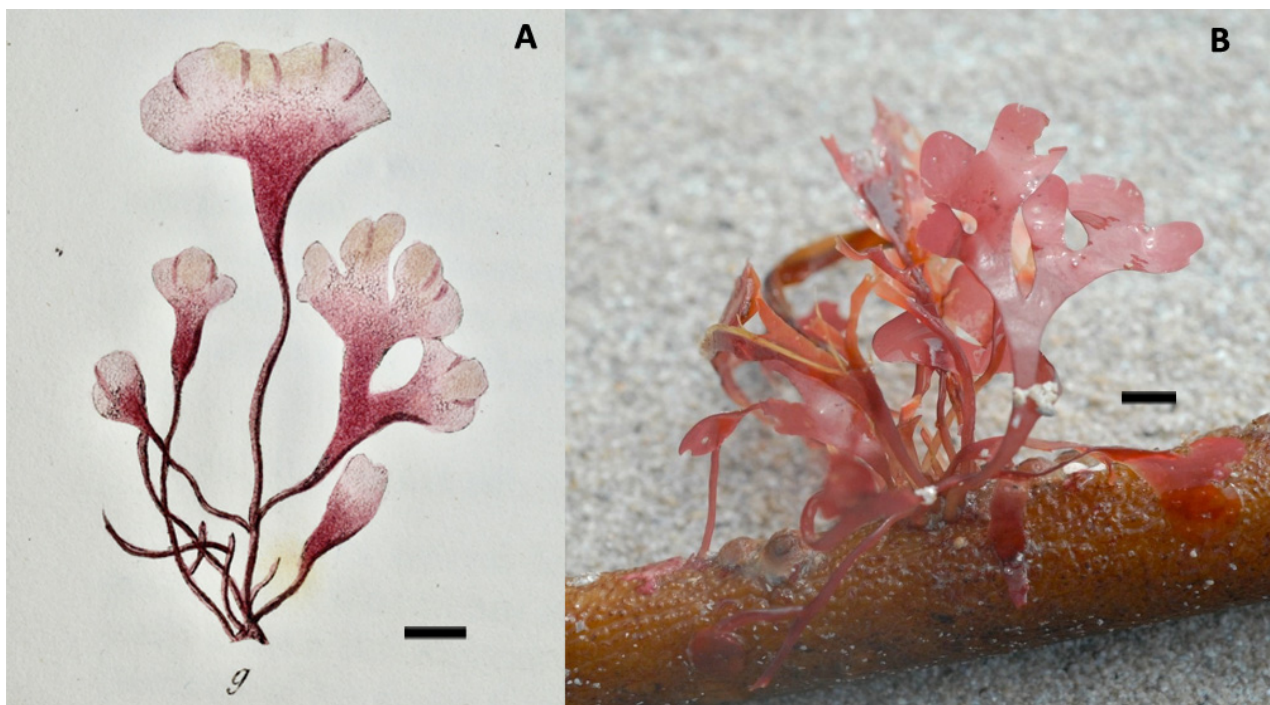


Fig. 5. A. Designated neotype of *Fucus bifidus* Hudson *nom. illeg.* ($\equiv$ *Bifida divaricata* Stackhouse; $\equiv$ *Rhodophyllis divaricata* (Stackhouse) Papenfuss) (illustration from Turner 1809, pl. 73, fig. g) (publication details in references). Scale = 10 mm. **B.** Image of living specimen referable to the same species as the designated neotype and identified by one of us (MDG) as *Rhodymenia pseudopalmata*. Specimen collected by M.D. Guiry at *Trá na Reilige, Muigh Inis* [Graveyard Strand, Mweenish], Co. Galway, Ireland; 13.iv.2006; drift on *Laminaria hyperborea* stipe. Scale = 10 mm.

Hudson before sending it to Frankland (probably in the 1780s; see comment in Dixon & Irvine (1977b: 138)), some years before Hudson died (1793) and two decades before Turner (1809: 5) treated the specimen as *Fucus palmetta*. Unfortunately, using the **BM** [specimen data portal](#), we have been unable to find (in June 2020) any specimens labelled *Fucus bifidus*, *F. palmetta*, *Rhodymenia palmetta* or *Rhodymenia pseudopalmata* (the currently ‘correct’ name for *F. palmetta*; see Silva 1952: 265; Guiry 1977: 386, 390; 2012: 69) in **BM** that were from Frankland and that matched the illustration in Turner (1809: pl. 73, fig. g).

There is no firm evidence that the specimen represented by Turner’s (1809, pl. 73: fig. g) illustration constitutes original material (ICN Art. 9.4), namely material available to Hudson prior to or at the time he described *Fucus bifidus* Hudson (Hudson 1778: 581). Nevertheless, based on the text comments in Turner (1809: 5), that the illustration (Turner 1809, pl. 73, fig. g) (reproduced here as Fig. 5A) clearly is of a specimen identified by Hudson as *F. bifidus*. Therefore, we **designate here** the illustration in Turner (1809: pl. 73: fig. g) as neotype of *Fucus bifidus* Hudson, and thus of the replacement name *Fucus divaricata* Stackhouse and of the subsequent combination *Rhodophyllis divaricata* (Stackhouse) Papenfuss. The designated neotype consists of a slightly branched, more or less cylindrical stipe giving rise to flattened, expanded, simple or divided blades without evident reproductive structures.

Dixon & Irvine (1977a: 138) seemingly cast some doubt on Hudson’s identification of the specimen illustrated by Turner (1809: pl. 73, fig. g) in stating “It is known, however, that Hudson’s interpretations of his own ‘species’ changed a great deal over the years”. Dixon & Irvine (1977a), however, did not provide evidence that this had occurred in relation to the designated neotype of *Fucus bifidus* Hudson. Nevertheless, the Turner illustration is of a specimen identified by Hudson as *F. bifidus* Hudson; there is no other known specimen or illustration identified by Hudson as *Fucus bifidus* and consequently it is clearly a suitable illustration to designate as neotype. According to Turner (1809: 4) the neotype (i.e., Turner, 1809: plate 73, specimen g) is “*var. β* and was collected by Miss Hutchins [Ellen Hutchins, (17 March 1785- 9 February 1815)] on the stones and rocks of the Hampshire coast, England.”

Nomenclatural and taxonomic implications. — The question of whether or not the nomenclatural types (Figs 2A, 5A) designated during this study are conspecific and the question of whether *Rhodophyllis divaricata* (Stackhouse) Papenfuss or *Rhodophyllis bifida* (J.V. Lamouroux) Kützinger is the earliest correct name of the species whose nomenclatural type typifies the genus name *Rhodophyllis* can now be assessed with greater certainty.

If the nomenclatural types are conspecific, then, as reasoned by Papenfuss (1950) and Silva (1952) and followed by various subsequent authors, *Rhodophyllis divaricata*, based on type of *Bifida divaricata* Stackhouse (1809: 97), a replacement name for *Fucus bifidus* Hudson *nom illeg.* (Hudson 1778: 581), would be the earliest correct name for the species whose nomenclatural type typifies the genus name *Rhodophyllis*. If, however, the types are not conspecific, then *Rhodophyllis bifida* (J.V.Lamouroux) Kützinger, based on *Delesseria bifida* J.V.Lamouroux (Lamouroux 1813a: 125), a replacement name for *Fucus bifidus* Turner *nom illeg.* (1811: 43) would be the earliest correct name for the species whose nomenclatural type typifies the genus name *Rhodophyllis*.

Our analysis of the designated lectotype of *Rhodophyllis bifida* and the designated neotype of *R. divaricata* have led to the conclusion that based on available morphological evidence, the two types are not referable to the same species. The lectotype of *Rhodophyllis bifida* (Fig. 2A) consists of a cluster of thin more or less dichotomously forked blade-like branches bearing cystocarps along the margins. Near the base, some blade-like branches become narrower but no distinct stipe is evident.

By contrast, the neotype (Fig. 5A) of *Rhodophyllis divaricata* has a distinct basal stipe which may or may not be branched and gives rise to compressed to flattened, expanded distal blade-like portions that may be unbranched or irregularly or somewhat dichotomously forked. No reproductive structures are evident.

One of us (MDG), who has spent nearly 50 years studying such plants, confirmed that the neotype of *Rhodophyllis divaricata* clearly does not belong to either species of *Rhodophyllis* from the NE Atlantic (Guiry 2012: 54, 183, pl. 1), but without doubt belongs to the species complex currently known as *Rhodymenia pseudopalmata* (J.V.Lamouroux) Silva; see Guiry (1977: 391, fig. 14; 2012: 69). He also indicated that as far as he knew, the neotype did not belong to any other genus known from the English Channel and adjacent coasts. An image of a living specimen currently referable to *Rhodymenia pseudopalmata* (or a name based on *Bifida divaricata*, a replacement name for *Fucus bifidus* Hudson) is provided in Fig. 5B for comparison.

Thus, our conclusion that the nomenclatural types of *Rhodophyllis bifida* and *R. divaricata* belong to different species means that the correct name of the species whose type typifies the genus name *Rhodophyllis* Kützinger is *R. bifida* (J.V. Lamouroux) Kützinger and not *R. divaricata* (Stackhouse) Papenfuss, as indicated by Papenfuss (1950: 190) and Silva (1952: 264). Consequently, the entry for *Rhodophyllis* in Appendix III of the *Code* (Wiersema & al. 2018+) requires updating. This and other nomenclatural matters relating to the genus name *Rhodophyllis* Kützinger are dealt with separately (Woelkerling & al. 2020).

Our analysis has resulted in the following outcomes:

1. Past judgements concerning the nomenclatural legitimacy, priority and application of the names *Rhodophyllis bifida* (J.V.Lamouroux) Kützinger, *Rhodophyllis divaricata* (Stackhouse) Papenfuss, and their associated homotypic synonyms, homonyms, replacement names, and replaced synonyms were made without appropriate knowledge of relevant nomenclatural types and thus were not properly based on ICN Principle II and Art. 7.1. which state that “the application of names is determined by nomenclatural types”.
2. In the context of the current ICN, the basionym of *Rhodophyllis bifida* (J.V.Lamouroux) Kützinger (1847:23) is *Delesseria bifida* J.V.Lamouroux (Lamouroux 1813a: 125), a replacement name for *Fucus bifidus* Turner (Turner 1811: 43), in turn an illegitimate later homonym of the legitimate binomial *Fucus bifidus* S.G.Gmelin (Gmelin 1768: 201) [currently known as *Arthrothamnus bifidus* (S.G.Gmelin) J Agardh (1868: 28)]. In accord with Art. 6.11, *Fucus bifidus* Turner (Turner 1811: 43) is the replaced synonym of the replacement name *Delesseria bifida* J.V.Lamouroux (Lamouroux 1813a: 125), and in accord with Art. 7.4, *D. bifida* and all combinations based on *D. bifida* are typified by the nomenclatural type of *F. bifidus* Turner.
3. *Fucus bifidus* Turner has been lectotypified here with specimen ‘A’ on **BM** herbarium sheet 000044298. The lectotype is original material as defined in Art. 9.4; it was annotated by Turner with the name *F. bifidus* and a reference to an earlier publication (Turner 1802: 165) in which the material was incorrectly described as *Fucus bifidus* Hudson (*nom. illeg.*). In accord with Art. 7.4, the nomenclatural type of *F. bifidus* Turner is also the nomenclatural type of the replacement name *Delesseria bifida* and its subsequent combinations *Rhodymenia bifida* (J.V.Lamouroux) Greville (Greville 1830: 85) and *Rhodophyllis bifidus* (J.V. Lamouroux) Kützinger (Kützinger 1847: 23).
4. In the context of the current ICN, the basionym of *Rhodophyllis divaricata* (Stackhouse) Papenfuss (Papenfuss 1950: 190) is *Bifida divaricata* Stackhouse (Stackhouse 1809: 97), a replacement name for *Fucus bifidus* Hudson (Hudson 1788: 581), another illegitimate later

- homonym of the legitimate *Fucus bifidus* S.G.Gmelin (Gmelin 1768: 201). In accord with Art. 6.11, *Fucus bifidus* Hudson (Hudson 1788: 581) is the replaced synonym of the replacement name *Bifida divaricata* Stackhouse (Stackhouse 1809: 97), and in accord with Art. 7.4, *B. divaricata* is typified by the nomenclatural type of *F. bifidus* Hudson (Hudson 1778: 581).
5. In the absence of any known original material (defined in ICN Art. 9.4), Dixon & Irvine (1977a: 138) designated Hudson's (1778: 581) original description as lectotype of *Fucus bifidus* Hudson. Although such a designation was permitted under the then current Seattle Code (Stafleu & al. 1972), that option was deleted from the Berlin Code (Greuter & al. 1988), thereby limiting type designations to specimens or illustrations (see Art. 8.1 of the current ICN) and rendering inadmissible Dixon & Irvine's designation of a description as the type. *Fucus bifidus* Hudson has since remained without a nomenclatural type until the present study.
 6. *Fucus bifidus* Hudson has been neotypified here with an illustration (Turner 1809: pl. 73, fig. g) of the only known specimen identified by Hudson (probably in the 1780s) as *Fucus bifidus* Hudson. We have been unable to determine whether the actual specimen still exists; Turner (1809:5) indicated that it was amongst original specimens sent by Hudson to Sir Thomas Frankland (which later were seen by Turner), but it is not currently included in the online **BM** specimen data portal.
 7. In accord with ICN Art. 7.4, the nomenclatural type of *F. bifidus* Hudson is also the nomenclatural type of the replacement name *Bifida divaricata* Stackhouse (Stackhouse 1809: 97) and its subsequent combination *Rhodophyllis divaricata* (Stackhouse) Papenfuss (Papenfuss 1950: 190).
 8. Our comparative analysis of the designated lectotype of *Rhodophyllis bifida* (J.V.Lamouroux) Kützinger (1847: 23) and the designated neotype of *R. divaricata* (Stackhouse) Papenfuss (Papenfuss 1950: 190) led to the conclusion that the two nomenclatural types are not referable to the same species based on available morphological evidence. Consequently, *Rhodophyllis divaricata* cannot, as indicated by Papenfuss (1950: 190) and Silva (1962: 264), be treated as the correct name of the species (*Rhodophyllis bifida*), whose nomenclatural type typifies *Rhodophyllis*.
 9. The lectotype of *Rhodophyllis bifida* (J.V. Lamouroux) Kützinger (1847: 23) is referable to *Rhodophyllis* as a distinct species whereas the neotype of *R. divaricata* (Stackhouse) Papenfuss (Papenfuss 1950: 190) is currently referable to *Rhodymenia pseudopalmata* (J.V.Lamouroux) Silva (or a name based on *Bifida divaricata*, a replacement name for *Fucus bifidus* Hudson).
 10. Nomenclatural matters relating to the genus name *Rhodophyllis* are dealt with separately (Woelkerling & al. 2020).

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