

NOMENCLATURE

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Typification of Linnaean names relevant to algal nomenclature

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Lectotypes (61), neotypes (4) and epitypes (6) are designated here by 15 specialists for Linnaean algal names. These newly designated types support the current usage of the names concerned. All Linnaean names that have been linked with algal taxa are listed, and earlier but ineffective or supersedable type selections are discussed where appropriate.

KEYWORDS: Algae, Linnaean names, nomenclature, typification; *Alcyonium*, *Byssus*, *Chara*, *Conferva*, *Corallina*, *Eschara*, *Fucus*, *Madrepora*, *Millepora*, *Tremella*, *Ulva*, *Volvox*

INTRODUCTION

As part of continuing research by the Linnaean Plant Name Typification Project at the Natural History Museum, London, all Linnaean names relevant to algal nomenclature have been investigated. Type information for all Linnaean plant names (more than 9,100 in total) can be viewed via the Linnaean Plant Name Typification Project's website at <http://www.nhm.ac.uk/research-curation/projects/linnaean-typification/index.html>; see also Jarvis (2007) for additional information.

Linnaeus validly published, at the rank of genus (8 names), species (141 names) or variety (1 name), a total of 150 names considered relevant to algal nomenclature (excluding three new combinations, one orthographic variant and two typographical errors). Effective typifications exist for 64 of these. Each of the remaining 86 untypified names was examined closely, relevant literature searched for typifications, and details of all original elements compiled. Specialists were then approached in order to establish choices of lectotype (or neotype where original material is lacking) to fix the current application of each name. Of the 86 untypified names, 65 are newly typified here. Of the remaining 21 names, 9 (*Byssus antiquitatis* L., *B. saxatilis* L., *B. septica* L. [*septicus*], *Conferva amphibia* L., *C. polymorpha* L., *Fucus excisus* L., *F. lacerus* L., *F. siliculosus* L. and *F. spermophorus* L.) may be candidates for rejection (Art. 56.1 of the *ICBN*, McNeill & al., 2006), whereas *Ulva rugosa* L. may require a conserved type (Art. 14.9). It is outside the scope of this paper to discuss the complexities of these issues, and conservation or rejection proposals will be made separately. Unfortunately, for *Fucus acinarius* L. we have been unable to persuade a specialist to make a type choice. Two names (*Fucus spinosus* L., *Millepora coriacea*

L.) are illegitimate replacements for earlier, apparently untypified, non-Linnaean names.

Equating Linnaean algal nomenclature with modern concepts is, predictably, often highly complex. Various Linnaean algal names represent non-algal taxa, such as *Byssus botryoides* L. (= *Omphalina ericetorum* (Bull.) M. Lange, a lichen), *Byssus velutina* L. (= *Pogonatum aloides* (Hedw.) P. Beauv., a moss) or *Conferva cancellata* L. (= *Vesicularia spinosa* L., a bryozoan). Conversely, some taxa, originally treated by Linnaeus (1758, 1767a, b) as animals and placed within "Vermes", have subsequently been recognised as representing algal taxa; therefore we have also treated some names within *Alcyonium* L., *Corallina* L., *Eschara* L., *Madrepora* L., *Millepora* L., *Tubularia* L. and *Volvox* L. Unlike preceding Project papers dealing with typification we have cited the details of species names that have already been typified; in addition, we have also included details of the generitypes of Linnaean algal genera (*Byssus* L., *Chara* L., *Conferva* L., *Fucus* L., *Tremella* L., *Ulva* L.) as well the generitypes of *Corallina* and *Volvox* (both treated as "Vermes" by Linnaeus but now known to be algal).

Fifteen Linnaean names investigated here within the genera *Byssus* L., *Conferva* L., *Fucus* L., *Tremella* L. and *Ulva* L. prove not to be validly published (Arts. 13.1, 13.2 & 43.1), because they apply to groups with starting dates later than 1753 (Art. 13.1 & 13.2) or else pre-date the starting date of the *International Code of Zoological Nomenclature* (Ride & al., 1999: Art. 3). Article 13.2 states that "the group to which a name is assigned for the purposes of this Article is determined by the accepted taxonomic position of the type of the name"; therefore, inevitably a preliminary type must be designated prior to application of Arts. 13.1. and 43.1. If, as a result, the name is found not to be validly published, this preliminary type and its

selection cease to be effective, as only a validly published name can have a type; any later use of the Linnaean epithet in a validly published name is subject to separate typification, e.g., under Art. 7.7 second sentence. For a detailed discussion of Linnaean algal names currently considered to be lichens, see Jørgensen & al. (1994a, b).

METHODS

The methods used for the present work have been described in detail by Turland & Jarvis (1997: 458–461) and will not be repeated in full. However, the following points may be helpful.

Literature has been searched for existing effective typifications, and these have been found for 64 Linnaean names relevant to algal nomenclature. The 86 untypified names were carefully examined, and a list of the original material (specimens and illustrations) compiled for each. Specialists were then approached in order to establish choices of types (Art. 9, Note 2) from among these elements (or to designate neotypes where no original material could be traced). Great care has been taken to try to ensure that all newly proposed types support the current usage of the names.

In selecting types for the present paper, wherever a choice lay between specimens and illustrations, the most complete of the specimens has generally been chosen, except where such a choice would disrupt current usage, in which case an illustration supporting current usage has been chosen instead. All lectotype illustrations designated here have been carefully evaluated and if considered inadequate for the purpose of fixing the precise taxonomic application of the name, then an epitype specimen (Art. 9.7) has been selected to remove ambiguity. For some names the illustrations selected as lectotypes are supported by either a “typotype” or a “voucher” specimen. The term “typotype”, originally proposed by J.E. Dandy, is used here to describe a specimen upon which the type illustration was based (Stearn, 1957: 128–129); “voucher” refers to a specimen that supports the originating author’s concept of the taxon depicted in the illustration. “Vouchers” are not necessarily contemporaneous with the protologue and may not have been seen by the originating author. Application of the terms “typotype” and “voucher”, whilst taxonomically useful, are not governed by the rules of the *ICBN* (McNeill & al., 2006) and thus have no nomenclatural standing.

In situations where all potential sources of original material were checked but nothing pertinent was found, then (and only then) have neotypes been designated. Both neotypes and epitypes have, as far as possible, been chosen from among material originating from the geographical area given by Linnaeus in his statements of provenance (“Habitat in ...”) in the relevant protologue.

Some authors, particularly Van den Hoek (1963, 1969), have mistakenly cited specimens from Dillenius’s *Historia Muscorum* herbarium (Herb. Dillenius – OXF) as types for Linnaean names; these typifications are not tenable because Linnaeus did not base his descriptions on materials in the *Historia Muscorum* herbarium. Linnaeus, however, did rely heavily on the published *Historia Muscorum* (Dillenius, 1742; note—the title page is dated 1741 but the volume was published in March 1742; see Stafleu & Cowan, 1976: 656) accounts and many names have been typified using illustrations from this source. Specimens in the *Historia Muscorum* herbarium are here treated as vouchers rather than typotypes for those Linnaean names based, sometimes in part, on polynomials from the *Historia Muscorum*. Druce & Vines (1907: 185) observed that, on the cover of the herbarium, there is a note stating that the specimens were not mounted until 1744, three years after publication of the *Historia*; it is therefore possible that some specimens are not contemporary with the book. The determinations in Druce & Vines (1907) of material in the *Historia Muscorum* herbarium were based upon remarks made by Turner (1804) and the determinations of Mr. E. Batters. The Dillenian herbarium is of considerable historical and taxonomic value but the material therein is not normally made available for DNA sampling.

Although the Linnaean Herbarium in LINN is an important source of type material for Linnaean algal names, annotations within the folder containing Herb. Linn. Nos. 1274.122–180 should be treated with caution. Some of these sheets have annotations in the hand of Linnaeus that apparently relate to *Species Plantarum* numbers (see Stearn, 1957: 127; Turland & Jarvis, 1997: 458–461), but their significance can be ambiguous. For example, Herb. Linn. No. 1274.134 bears the annotation “9” that may support the conclusion that the specimen is original material for *Fucus nodosus* L. (\equiv *Ascophyllum nodosum* (L.) Le Jol.) but the specimen is of a species of *Hypnea* J.V. Lamour. It is extremely unlikely that Linnaeus would have confused a species of *Hypnea* with *Ascophyllum* Stackh. and it is reasonable to conclude that the annotation either does not relate to the specimen or it does not relate to *Species Plantarum*. Additionally, the folder containing Herb. Linn. Nos. 1274.122–180 is annotated “Fuci non Sys. Veg.” in the hand of J.E. Smith (Savage, 1945: 201). Unfortunately, there is no indication as to which edition of *Systema Vegetabilium* this refers; as Smith acquired the Linnaean Herbarium in 1788, it is reasonable to assume that he was referring to the 13th edition (Linnaeus, 1774). These anomalies suggest that Herb. Linn. Nos. 1274.122–180 may have been added to the collection after the publication of the first edition of *Species Plantarum* (Linnaeus, 1753). The Linnean Society of London archives are also an important source of unpublished annotations and determinations (here cited as: *in not.*) of Herb. Linn. specimens not attached to the herbarium sheets.

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TIPIFICATIONS

The type designations are presented alphabetically in the following format: Linnaean name with full bibliographic reference, any earlier homonym (placed in square brackets), any later homotypic Linnaean name

(recombination), the currently accepted name (when different), the scientific name of the major organism group to which the taxon is currently considered to belong, the lectotype, any typotype or voucher specimen that supports a lectotype illustration, any epitype, and any explanatory notes. In a number of cases, earlier typifications have been judged not to be effective, usually because, although original material had survived, the designated elements were not part of it, and these are noted and discussed. For each entry, the first name to be cited is the name being typified; any later recombinations are, of course, simultaneously typified. The currently accepted name in each entry is shown in **bold italic** typeface, and is placed in square brackets if not homotypic with the name being typified.

Alcyonium bursa L., Syst. Nat., ed. 10, 1: 803. 1758 [= **Webberella bursa** (L.): *Porifera*] – Type status unknown.

Note. – *Alcyonium bursa* is the basionym for a sponge (M. Spencer-Jones, pers. comm.). The sole known extant original material, an illustration in Ellis (1755: t. 17, f. B, C & D), represents a form of colonial polyp-forming animal. However, *Alcyonium bursa* has also, though erroneously, been treated by phycologists as the basionym for the green alga, *Codium bursa*; the correct authorship for the latter name is *C. bursa* (Olivi) C. Agardh (Brodie & al., 2007: 190).

Byssus L., Sp. Pl.: 1168. 1753, nom. rej. – Generitype (designated by Fries, 1825: 42): *Byssus jolithus* L.

Note. – Two other *Byssus* names have been designated as the generitype: *B. flos-aquae* (= *Aphanizomenon flos-aquae* Ralfs ex Bornet & Flahault) by Drouet & Daily (1956: 145), and *B. cryptarum* (= *Trentepohlia aurea* (L.) Mart.) by Ross & Irvine (1967: 186). *Trentepohlia* Mart. was successfully proposed for conservation against *Byssus* and the latter is now listed as a nomen rejiciendum with *B. jolithus* as generitype. A lectotype for the generitype is proposed in the present manuscript. *Byssus*, which is feminine, was erroneously treated as masculine by Jørgensen & al. (1994a, b) and also appears incorrectly in App. V of the *ICBN* (McNeill & al., 2006: 466).

Byssus antiquitatis L., Sp. Pl.: 1168. 1753 – Type not designated.

Note. – Laundon (1992: 340) suggested that *B. antiquitatis* may be of mineral origin whilst Ross & Irvine (1967: 185) stated that application of this name was uncertain. Laundon (1992: 340) excluded *Lepraria antiquitatis* (L.) Ach. from *Lepraria* Ach. (Lichenes); *Index Fungorum* (<http://www.indexfungorum.org/Index.htm>) treats *B. antiquitatis* as a member of *Trentepohliaceae*. We have been unable to locate extant original material and have been

not been able to persuade an expert to typify this name. Application of this name remains uncertain.

Byssus aurea L., Sp. Pl.: 1168. 1753 ≡ *Trentepohlia aurea* (L.) Mart.: *Chlorophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 1, f. 16. 1742. – Voucher: Herb. Dillenius (OXF) “*Byssus petraea crocea, glomerulis lanuginosis*”.

Note. – Ross & Irvine (1967: 184) discussed the typification of this name but did not make a selection. Druce & Vines (1907: 187) determined the Herb. Dillenius material as “*Chroolepus aureus* Kütz.,” a synonym of *T. aurea*. Because the lectotype is “demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name” (Art. 9.7), an epitype may need to be selected; this should await the results of ongoing taxonomic investigations (F. Rindi & J.M. Lopez-Bautista, pers. comm.).

Byssus botryoides L., Sp. Pl.: 1169. 1753 [= *Omphalina ericetorum* (Bull.) M. Lange: *Lichenes*] – Lectotype (designated by Redhead & Kuyper, 1987: 321): [illustration in] Dillenius, Hist. Musc.: 3, t. 1, f. 5. 1742. – Voucher: Herb. Dillenius (OXF) “*Byssus botryoides, saturate virens*”. – Epitype (designated by Jørgensen & al., 1994a: 270, 371): England. London Borough of Camden, Hampstead Heath, Herb. Sherard, sheet 1995 (OXF).

Byssus cancellata L., Syst. Nat., ed. 12, 2: 721. 1767 [= *Hydrodictyon reticulatum* (L.) Lagerh.: *Chlorophyceae*] – Lectotype (designated here by John): [illustration] “*Etwas Schlammmoß*” in Ledermüller, Mikroskopische Gemüths- und Augen-Ergötzung: t. 72. 1761.

Byssus candelaris L., Sp. Pl.: 1169. 1753 ≡ *Chrysothrix candelaris* (L.) J.R. Laundon: *Lichenes* – Lectotype (designated by Ross & Irvine, 1967: 185): [illustration in] Dillenius, Hist. Musc.: 3, t. 1, f. 4. 1742. – Voucher: Herb. Dillenius (OXF) “*Byssus pulverulenta flava lignis adnascens*”. – Epitype (designated by Jørgensen & al., 1994a: 270, 371): England. London Borough of Lewisham, Blackheath, on timber, Herb. J.E. Smith (LINN-SM).

Byssus cryptarum L., Sp. Pl.: 1168. 1753 [= *Trentepohlia aurea* (L.) Mart.: *Chlorophyceae*] – Lectotype (designated by Ross & Irvine, 1967: 185): Herb. Linn. No. 1278.5 (LINN).

“*Byssus flos-aquae* L.,” Sp. Pl.: 1168. 1753, non rite publ. [= *Aphanizomenon flos-aquae* Ralfs ex Bornet & Flahault]: *Cyanophyceae* – Preliminary neotype of

A. flos-aquae (designated by Drouet & Daily, 1956: 145): Herb. Linn. No. 1278.1 (LINN).

Note. – Although there may be some difficulties associated with the type choice made by Drouet & Daily (see Ross & Irvine, 1967: 184), it is accepted here as a “preliminary” lectotype, a term kindly suggested by the Nomenclature Editor. The name *B. flos-aquae* consequently applies to a member of the heterocystous *Nostocaceae* and therefore pre-dates the starting date (Bornet & Flahault, 1886) for the nomenclature of that group. “*Byssus flos-aquae*” consequently has no nomenclatural standing (see Introduction). Although Bornet & Flahault (1886: 241) listed *B. flos-aquae* as a synonym of *A. flos-aquae*, the latter is nomenclaturally independent and its typification is beyond the scope of this paper

Byssus incana L., Sp. Pl.: 1169. 1753 ≡ *Lepraria incana* (L.) Ach.: *Lichenes* – Lectotype (designated by Laundon, 1992: 333): [illustration in] Dillenius, Hist. Musc.: 3, t. 1, f. 3. 1742. – Epitype (designated by Jørgensen & al., 1994a: 270, 371): Herb. Dillenius (OXF) “*Byssus pulverulenta incana, farinae instar strata*”.

Byssus jolithus L., Sp. Pl.: 1169. 1753 ≡ *Trentepohlia jolithus* (L.) Wallr.: *Chlorophyceae* – Lectotype (designated here by Irvine): [illustration] “*Byssus*” in Micheli, Nova Pl. Gen.: t. 89, f. 3. 1729.

Note. – Because the lectotype is “demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name” (Art. 9.7), an epitype may need to be selected; this should await ongoing taxonomic investigations (F. Rindi & J.M. Lopez-Bautista, pers. comm.). No corresponding material can be found in the Micheli Herbarium (FI).

Byssus lactea L., Sp. Pl.: 1169. 1753, nom. utique rej.: *Lichenes* – Lectotype (designated by Jørgensen & al., 1994b: 646): [illustration in] Dillenius, Hist. Musc.: 2, t. 1, f. 2. 1742. – Voucher: Herb. Dillenius (OXF) “*Byssus candidissima, calcis instar Muscos vestiens*”.

Byssus phosphorea L., Sp. Pl.: 1168. 1753 [= *Terana caerulea* (Lam.) Kuntze: *Fungi*] – Lectotype (designated by Ross & Irvine, 1967: 184): [illustration in] Dillenius, Hist. Musc.: 4, t. 1, f. 6. 1742. – Voucher: Herb. Dillenius (OXF) “*Byssus lanuginosa violacea lignis adnascens*”.

Byssus saxatilis L., Sp. Pl.: 1169. 1753 – Type not designated.

Note. – Necker (1771: 113) transferred *B. saxatilis* to *Lichen* L., legitimately changing the name to *L. segestria* Necker because of the existence of the earlier *L. saxatilis* L.

However, later authors, including Acharius (1803: 8), failed to reuse the epithet “*saxatilis*” when making new combinations based upon *L. segestria*. Laundon (1992: 344) suggested that *B. saxatilis* may be of mineral origin and excluded the superfluous name *Lepraria segestria* (Necker) Ach. nom. illeg. from *Lepraria*. *Index Fungorum* (<http://www.indexfungorum.org/Index.htm>) treats *B. saxatilis* as a member of *Trentepohliaceae* (*Chlorophyceae*) and *Lepraria segestria* as a member of *Stereocaulaceae* (*Fungi*). We have been unable to locate extant original material and have been not been able to persuade an expert to typify this name.

Byssus septica L., Syst. Nat., ed. 12, 3: 235. 1768 (‘*septicus*’) – Type not designated.

Note. – We have been unable to persuade an expert to typify this name. Application of this name is uncertain because the sole original material (Micheli, 1729: t. 89, f. 9) is taxonomically ambiguous.

“*Byssus velutina* L.”, Sp. Pl.: 1168. 1753, non rite publ. [= *Pogonatum aloides* (Hedw.) P. Beauv.: *Bryophyta*] – Lectotype (designated here by Newton): [illustration in] Dillenius, Hist. Musc.: t. 1, f. 14. 1742. – Voucher: Herb. Dillenius (OXF) “*Byssus tenerrima viridis, velutum referens*”.

Note. – According to Druce & Vines (1907: 187) the Herb. Dillenius material associated with the cited Dillenius figure is bryophytic; these specimens were determined as “Protonema of *Polytrichum* probably *P. aloides*” by A. Eddy (12/01/1966: *in sched.*). The same material has also been annotated as the typtotype by L. Irvine (1966: *in sched.*). Another original element cited by Linnaeus, a plate in Micheli (1729: t. 89, f. 5.), is not here selected as the type because it is taxonomically ambiguous and is not supported by material within the Micheli Herbarium (FI). The name *B. velutina* pre-dates the starting date for the nomenclature of *Musci* (Hedwig, 1801) and therefore has no nomenclatural standing (see Introduction). Hedwig (1801: 96) did not refer to this name in his entry for *Polytrichum aloides* Hedwig.

Chara L., Sp. Pl.: 1156. 1753: *Chlorophyceae* – Generitype (designated by Robinson, 1906: 254): *Chara vulgaris* L.

Note. – Horn af Rantzien & Olsen (1949: 99) designated *C. tomentosa* as the type, apparently unaware of Robinson’s earlier effective typification.

Chara flexilis L., Sp. Pl.: 1157. 1753 ≡ *Nitella flexilis* (L.) C. Agardh: *Chlorophyceae* – Neotype (designated by Wood, 1960: 224): Herb. Sloane 117: 10 (BM-SL).

Chara hispida L., Sp. Pl.: 1156. 1753: *Chlorophyceae* – Lectotype (designated by Wood, 1960: 220): Herb. Linn. No. 1088.4 (LINN).

Note. – It is likely that Herb. Linn. No. 1088.4 (LINN) is not the same as the plant currently known as *C. hispida*; it probably represents *C. aspera* Willd. Proposal of a conserved type may be desirable, pending ongoing taxonomic investigation (J.A. Bryant & N. Stewart, pers. comm.).

Chara tomentosa L., Sp. Pl.: 1156. 1753: *Chlorophyceae* – Lectotype (designated by Wood, 1960: 220): Herb. Linn. No. 1088.1 (LINN).

Chara vulgaris L., Sp. Pl.: 1156. 1753: *Chlorophyceae* – Lectotype (designated by Wood, 1960: 220, pl. I, II): Herb. Linn. No. 1088.3 (LINN).

Conferva L., Sp. Pl.: 1164. 1753, nom. rej. = *Cladophora* Kütz. – Generitype (designated by Chamisso, 1821: 178): *Conferva rupestris* L.

Note. – Although the ICBN lists Bonnemaison (1822) as the first to designate *C. rupestris* as the generitype, the same choice was, in fact, made by Chamisso a year earlier.

Conferva aegagropila L., Sp. Pl.: 1167. 1753 ≡ *Aegagropila linnaei* Kütz.: *Chlorophyceae* – Lectotype (designated by Van den Hoek, 1963: 51): Herb. Linn. No. 1277.49 (LINN).

Conferva aeruginosa L., Sp. Pl.: 1165. 1753 ≡ *Spongomorpha aeruginosa* (L.) C. Hoek: *Chlorophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 4, f. 20. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva marina capillacea brevis, viridissima mollis*”.

Note. – Turner (1804: 106) determined the Herb. Dillenius material as *C. aeruginosa*; however, Druce & Vines (1907: 189) determined the same material as “*Cladophora lanosa* Kütz.”, a synonym of *Acrosiphonia arcta* (Dillwyn) Gain. Van den Hoek (1963: 19, 225) mistakenly (see Methods) designated the Herb. Dillenius material as the type of *C. aeruginosa*, a selection later accepted by Burrows (1991: 71). Brodie & al. (2007: 48), referring to Jarvis (2007), stated that the illustration in Dillenius was the type but as they omitted the phrase “hic designatus” or an equivalent, their statement cannot be accepted as an effective typification (Art. 7.11).

Conferva amphibia L., Sp. Pl.: 1164. 1753 – Type not designated.

Note. – This name potentially threatens *Vaucheria dillwynii* (F. Weber & Mohr) C. Agardh and is, therefore, a candidate for rejection (Art. 56.1).

Conferva bullosa L., Sp. Pl.: 1164. 1753 [= *Cladophora glomerata* (L.) Kütz. var. *crassior* (C. Agardh)

C. Hoek: *Chlorophyceae*] – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 3, f. 11. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva palustris bombycina*”, the specimen annotated as “from our cistern in ye court”.

Note. – Linnaeus incorrectly cited “f. 2” instead of “f. 11” for the *Historia Muscorum* (Dillenius, 1742) polynomial and also cited a plate from Loeselius (1703: t. 55). In Herb. Dillenius there are two sheets, each with four specimens, bearing this name. Druce & Vines (1907: 188) cited Turner (1804: 104), who identified two of the eight Herb. Dillenius specimens as “*Conferva divaricata* var. β *elongata* Roth” (? = *Conferva elongata* C. Agardh, a synonym of *C. glomerata*) and “*C. jugalis*, Fl. Dan.” (? = *Spirogyra jugalis* (Dillwyn) Kütz.); the rest were considered unidentifiable by Turner. Van den Hoek (1963: 19, 179) mistakenly (see Methods) designated as the type the Herb. Dillenius specimen here treated as a voucher for the lectotype.

Conferva canalicularis L., Sp. Pl.: 1164. 1753 \equiv *Vaucheria canalicularis* (L.) T.A. Chr.: *Xanthophyceae* – Lectotype (designated by Christensen, 1968: 466): [illustration in] Dillenius, Hist. Musc.: t. 4, f. 15. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva rivulorum capillacea, densissime congestis ramulis*”.

“*Conferva cancellata* L.”, Sp. Pl.: 1165. 1753, non rite publ. [= *Vesicularia spinosa* L.: *Bryozoa* – Preliminary lectotype (designated here by Spencer-Jones): [illustration in] Dillenius, Hist. Musc.: t. 4, f. 22. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva marina cancellata*”.

Note. – The Dillenius illustration is the only known extant original material; Druce & Vines (1907: 189) cited Turner’s (1804: 106) determination of the associated voucher material as “*Sertularia spinosa*. *C. cancellata* of Linnaeus, Hudson and other authors” (= *V. spinosa* L.), a view also shared by Papenfuss (1951: 178). The typification made here by Spencer-Jones serves only to establish that *C. cancellata* (1753) is a name for a member of the *Bryozoa* and, as it pre-dates the starting date of the ICZN (Ride & al., 1999: Art. 3), has, therefore, no nomenclatural standing (see Introduction). *Conferva cancellata* appeared again six years later (Linnaeus, 1759: 1346), post-dating the starting date of the zoological code. However, Spencer-Jones’s typification here carries no implications for the typification of this later (1759) name, even though it may also prove to be a synonym of *Vesicularia spinosa* L. (1758: 812).

Conferva capillaris L., Sp. Pl.: 1166. 1753 [= *Cladophora glomerata* (L.) Kütz.: *Chlorophyceae*] – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 5, f. 25B. 1742. – Voucher: Herb.

Dillenius (OXF) “*Conferva filamentis longis geniculatis simplicibus*”, the specimen corresponding with *descriptio* B.

Note. – Turner (1804: 106) identified one of the three specimens on the Herb. Dillenius sheet as *C. capillaris* L. Druce & Vines (1907: 189) determined the Herb. Dillenius material as: A. “*Chaetomorpha litorea* Cooke”, B. “*C. linum* Kütz.” and C. “*C. aerea* Kütz.”. Van den Hoek (1963: 19, 179–180) determined the herbarium material supporting fig. 25A as *Chaetomorpha linum* (O.F. Müll.) Kütz. and that supporting fig. 25B as *Cladophora glomerata*; he also mistakenly designated all three Herb. Dillenius specimens as the type (see Methods). Selection of fig. 25A as lectotype is not suitable as Linnaeus’s “Habitat in ...” statement refers to fresh and brackish waters, whereas *Chaetomorpha linum* is a marine taxon; there is no figure in *Historia Muscorum* associated with the third Herb. Dillenius specimen. Blair (1983: 178–180) treated *Conferva capillaris* as a synonym of *Chaetomorpha linum* whereas Silva & al. (1996: 936) considered *C. capillaris* to be of uncertain application. The other extant original elements are illustrations in Morison (1699: s. 15, t. 4, f. 3) and Plukenet (1696: t. 84, f. 9). Neither of these was selected as lectotype as they are not supported by voucher material and are, in our opinion, taxonomically ambiguous.

Conferva capillaris has sometimes been treated as the basionym of *Oedogonium capillare* (L.) Kütz. (Huxley & Pentecost, 2002: 417; Guiry, 2007). However, since the nomenclatural starting date (Art. 13.1) for *Oedogonium* Link is 1 January 1900 (Hirn, 1900), the name should be cited as *Oedogonium capillare* Hirn. The typification of this latter name is beyond the scope of this paper.

Conferva catenata L., Sp. Pl.: 1166. 1753 \equiv *Cladophora catenata* (L.) Kütz.: *Chlorophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 5, f. 27. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva ramosa, geniculis longioribus cateniformibus*”.

Note. – Van den Hoek (1963: 19, 123) stated that the Herb. Dillenius material should be “indicated” as the type of *C. catenata*. Later, he (1969: 134) mistakenly (see Methods) designated this material as the type. Druce & Vines (1907: 189) stated that the material was unnamed by E. Batters (see Methods), but cited Turner’s (1804: 106) determination as “*Conferva prolifera* Roth”, the basionym of *Cladophora prolifera* (Roth) Kütz. Leliaert & Coppéjans (2003: 53) followed Van den Hoek.

Conferva corallina L., Syst. Veg., ed. 13: 818. 1774, nom. illeg. – see *Conferva corallinoides*.

Conferva corallinoides L., Sp. Pl.: 1166. 1753 \equiv *Griffithsia corallinoides* (L.) Trevisan: *Rhodophyceae*

– Lectotype (designated here by Irvine): [illustration in] Dillenius, *Hist. Musc.*: t. 6, f. 36. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva marina gelatinosa, Corallinae instar geniculata, crassior*”.

Note. – Turner (1804: 107) determined the Herb. Dillenius material as “*C. corallinoides*. Linn.”. Both Irvine (in Maggs & Hommersand, 1993: 184) and Athanasiadis (1996: 99) mistakenly (see Methods) cited the Herb. Dillenius material as the holotype. Druce & Vines (1907: 190) identified the voucher material as “*Griffithsia flosculosa* Batt.”, a synonym of *Halurus flosculosus* (J. Ellis) Maggs & Hommersand; however the Herb. Dillenius sheet is actually annotated “*Griffithsia corallinoides* Batt.”. It is probable that the determination in Druce & Vines (1907: 190) is a typographical error.

The entry for “*C. corallina*” in *Systema Vegetabilium* (Linnaeus, 1774: 818; see above) appears with the same diagnosis and in the same position within the genus as *C. corallinoides* and it was therefore treated by Silva (1980: 134–135) and Silva & al. (1996: 410) as an illegitimate replacement for *C. corallinoides*.

Conferva dichotoma L., *Sp. Pl.*: 1165. 1753 ≡ ***Vaucheria dichotoma*** (L.) Mart.: *Xanthophyceae* – Lectotype (designated by Christensen, 1987: 15): [illustration in] Dillenius, *Hist. Musc.*: 17, t. 3, f. 9. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva dichotoma, setis porcinis similis*”.

Conferva fluviatilis L., *Sp. Pl.*: 1165. 1753 ≡ ***Lemanea fluviatilis*** (L.) C. Agardh: *Rhodophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, *Hist. Musc.*: t. 7, f. 47. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva fluviatilis lubrica setosa, Equiseti facie*”.

Note. – Turner (1804: 108) and Druce & Vines (1907: 190) determined the Herb. Dillenius material as *C. fluviatilis* and *L. fluviatilis* respectively. Silva (1952: 262) discussed the *Historia Muscorum* figure without selecting it as the type; he further (p. 272) commented that there was an authentically named specimen in LINN. The only relevant specimen is Herb. Linn. No. 1277.38 (LINN), but this is annotated only by F. Ehrhart and it is therefore not original material.

Conferva fontinalis L., *Sp. Pl.*: 1165. 1753 ≡ ***Vaucheria fontinalis*** (L.) T.A. Chr.: *Xanthophyceae* – Lectotype (designated by Christensen, 1968: 465, f. 1–4): [illustration in] Dillenius, *Hist. Musc.*: 14, t. 2, f. 3. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva minima, Byssi facie*”.

Conferva gelatinosa L., *Sp. Pl.*: 1166. 1753 ≡ ***Batrachospermum gelatinosum*** (L.) DC.: *Rhodophyceae*

– Lectotype (designated here by Irvine): [illustration in] Dillenius, *Hist. Musc.*: t. 7, f. 42. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva fontana nodosa, spermatis ranarum instar lubrica, major et fusca*”.

Note. – Turner (1804: 108) determined the Herb. Dillenius material as *C. gelatinosa*. Druce & Vines (1907: 190) referred to Turner’s (1804: 108) determination but stated that the material was unnamed by E. Batters (see Methods). Compère (1991: 21) stated that the type “could be the specimen from Sweden described by the phrase ‘*Conferva filis ramosis moniliformibus, articulis globosis gelatinosis*’...since the same phrase was used...in *Flora Suecica*” (Linnaeus, 1755: 435). However, this phrase-name was not linked by Linnaeus in *Species Plantarum* to either a specimen or a figure. Compère (1991: 21) commented (citing F. Barrie, in litt.) that Herb. Linn. No. 1277.39 (LINN) is a post-1753 addition and therefore not tenable as a lectotype. Compère (1991: 22) further commented that the *Historia Muscorum* illustration “could” be considered the lectotype and determined the Herb. Dillenius material (see Compère, fig. 2) as *Batrachospermum moniliforme* Roth, a taxon usually considered synonymous with *B. gelatinosum* (Guiry, 2007). Vis & al. (1995: 37) mistakenly interpreted Compère’s comments as effective typification. Entwisle & Foard (1997: 352) mistakenly (see Methods) designated the Herb. Dillenius material as lectotype.

Other extant original elements are illustrations in Dillenius (1719: app. 60, t. 13, f. 3.) and Vaillant (1727: t. 7, f. 6.). Neither of these was selected as lectotype as they are not supported by voucher material and could be considered taxonomically ambiguous.

Conferva glomerata L., *Sp. Pl.*: 1167. 1753 ≡ ***Cladophora glomerata*** (L.) Kütz. var. ***glomerata***: *Chlorophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, *Hist. Musc.*: t. 5, f. 31. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva fontalis ramosissima, glomeratim congesta*”.

Note. – Turner (1804: 107) and Druce & Vines (1907: 189) determined the Herb. Dillenius material as *Conferva glomerata* and *Cladophora glomerata* respectively. Waern (1952: 76) noted that the Dillenian plate should be regarded as the “original” for *C. glomerata* and also commented that Linnaeus incorrectly cited “f. 34” in the protologue, instead of “f. 31”. Van den Hoek (1963: 19, 162) mistakenly (see Methods) cited the Herb. Dillenius material as the type of *C. glomerata* L.; this selection was later accepted by Brodie & al. (2007: 176). The other extant original element is an illustration in Morison (1699: s. 15, t. 4, f. 2). This was not selected as lectotype as it is not supported by voucher material and could be considered taxonomically ambiguous.

Conferva littoralis L., Sp. Pl.: 1165. 1753 ≡ *Pylaiella littoralis* (L.) Kjellm.: *Phaeophyceae* – Lectotype (designated here by Reviere): [illustration in] Dillenius, Hist. Musc.: t. 4, f. 19. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva marina capillacea longa, ramosissima mollis*”. – Epitype (designated here by Loiseaux de Goer & Reviere): France. Roscoff, Perharidy, mid intertidal, on *Fucus vesiculosus* L., 30 Sep 2002, A. Peters (CCAP strain no. 1330/2) (PC 0074126).

Note. – Athanasiadis (1996: 173) stated that the *Historia Muscorum* figure represented a species of *Cladophora* Kütz. although Druce & Vines (1907: 189) determined the Herb. Dillenius material as *P. littoralis*. Drouet (1968: 311) mistakenly (see Methods) designated the Herb. Dillenius material as the type of *P. littoralis*. Kjellman (1872: 100), Kylin (1942) and Setchell & Gardner (1925: 403) discussed the taxonomy and nomenclature of *P. littoralis* without selecting a type. Because the lectotype is “demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name” (Art. 9.7) an epitype has been selected.

Conferva polymorpha L., Sp. Pl.: 1167. 1753. ≡ *Ceramium polymorphum* (L.) DC. [= *Ceramium virgatum* Roth: *Rhodophyceae*] – Lectotype (designated here by Maggs): [illustration in] Dillenius, Hist. Musc.: t. 6, f. 35 A. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva marina geniculata nigra palmata*”. – Epitype (designated here by Maggs): Germany. Helgoland, German North Sea, South Harbour, 7 Jan 1999, I. Bartsch & A. Wagner (BM 000898199).

Note. – There is no extant original herbarium material associated with this name so a lectotype must be selected from one of the illustrations cited by Linnaeus. Of these, those cited from Barrelier (1714: t. 1301), Boccone (1697: t. 5, f. 11. & t. 7, n. 1) and Plukenet (1691: t. 47, f. 10) are “demonstrably ambiguous” (Art. 9.7) and are not associated with either typotype or voucher material that would aid identification. Cited illustrations from Dillenius’s *Historia Muscorum* (1742: t. 6, f. 35 A–C) are also ambiguous but they are supported by vouchers in Herb. Dillenius (Druce & Vines, 1907: 190).

Turner (1804: 107) determined the Herb. Dillenius material supporting fig. 35 as: A. = *Conferva rubra* Hudson (= *C. virgatum* Roth) and B. and C. as *Conferva polymorpha*. Druce & Vines (1907: 190) determined the Herb. Dillenius material as A. = *Ceramium tenue* J. Agardh (see Maggs & Hommersand, 1993: 43 for a discussion of this name) and B. and C. as *Polysiphonia fastigiata* (Roth) Grev. (= *P. lanosa* (L.) Tandy). Maggs, using digital images (courtesy of S. Marner, OXF), determined the Herb. Dillenius A. material as *C. virgatum*. See Silva (1952: 294) and Maggs & al. (2002) who discussed the nomenclature of *Ceramium rubrum* and associated names.

Some authors such as Lamarck (1805: 45), Duby (1830: 965) and Greville (1830: 17) have equated *C. polymorpha* with *P. lanosa*; others such as Athanasiadis (1996: 127), Silva & al. (1996: 392) and Tandy (1931: 225) have remained uncertain about the correct application of the name. Åsberg & Stearn (1973: 159) treated the name as synonymous with *Pylaiella littoralis* (L.) Kjell. and quoted, in translation from Linnaeus (1745: 261), “... No. 2 was a green conferva like wool with many hardly visible joints; at the lowest branches there was a covering of small slippery grains”. As *P. littoralis* is a brown alga it is uncertain why Åsberg & Stearn came to this conclusion.

Selection of a lectotype for *Conferva polymorpha* referable (via an associated voucher specimen) to *Polysiphonia lanosa* would reduce the latter to a junior synonym of *P. polymorpha* (L.) Duby. *Polysiphonia lanosa* is a widely accepted name (Guiry, 2007) and we have therefore selected, in the interests of nomenclatural stability (Preamble 1), fig. 35 A as lectotype. Because the lectotype is “demonstrably ambiguous [although it is supported by a voucher] and cannot be critically identified for purposes of the precise application of the name” (Art. 9.7) an epitype is designated here. The chosen epitype is the same as that designated by Maggs & al. (2002: 412) as the epitype of *Ceramium virgatum* Roth, and the same as that designated here as the epitype of *Ulva confervoides* (see below). Although the earliest name for the taxon in question is *Ceramium polymorphum* (L.) DC. (Lamarck, 1805: 45), past uncertainty over the application of this name, and the recent use of *C. virgatum* (Roth 1797: 146) by authors such as Maggs & al. (2002), leads us to conclude that the best course of action will be to propose *C. polymorpha* as a nomen rejiciendum.

Conferva reticulata L., Sp. Pl.: 1165. 1753 ≡ *Hydrodictyon reticulatum* (L.) Lagerh.: *Chlorophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 4, f. 14. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva reticulata*”.

Note. – Turner (1804: 105) and Druce & Vines (1907: 188) respectively determined the Herb. Dillenius material as *C. reticulata* and *H. utriculatum* Roth (a synonym of *H. reticulatum*). Silva (1952: 272) commented that there was an authentically named specimen in LINN. The only relevant specimen in the Linnaean herbarium annotated “*Conferva reticulata*” is Herb. Linn. No. 1277.37 (LINN), but this is annotated only by F. Ehrhart and is therefore not original material for *C. reticulata*. Other extant original elements are illustrations in Loeselius (1703: t. 54), Morison (1699: s. 15, t. 4, f. 4) and Plukenet (1691: t. 24, f. 2). None of these was selected as lectotype as they are not supported by voucher material and could be considered taxonomically ambiguous.

Conferva rivularis L., Sp. Pl.: 1164. 1753 ≡ *Cladophora rivularis* (L.) C. Hoek: *Chlorophyceae* – Lectotype (designated by Van den Hoek, 1963: 113): Herb. A. van Royen, sheet no. 910,185-1110 (L).

Conferva rupestris L., Sp. Pl.: 1167. 1753 ≡ *Cladophora rupestris* (L.) Kütz.: *Chlorophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 5, f. 29. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva marina trichodes ramosior*”, lower left hand specimen.

Note. – Turner (1804: 106) and Druce & Vines (1907: 189) respectively determined the Herb. Dillenius material as *Conferva rupestris* and *Cladophora rupestris*. Van den Hoek (1963: 19, 64) mistakenly (see Methods) cited the lower left hand specimen on the Herb. Dillenius sheet as the lectotype of *C. rupestris*, also accepted by Burrows (1991: 169) and Brodie & al. (2007: 171). The other extant original element is an illustration in Plukenet (1700: t. 182, f. 6). This was not selected as lectotype as it is not supported by voucher material and could be considered taxonomically ambiguous.

Conferva scoparia L., Sp. Pl.: 1165. 1753 ≡ *Stypocaulon scoparia* (L.) Kütz.: *Phaeophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 4, f. 23. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva marina pennata*”.

Note. – Turner (1804: 106) and Druce & Vines (1907: 189) respectively determined the Herb. Dillenius material as *Conferva scoparia* and *Stypocaulon scoparia*. Prud’homme van Reine (1982: 262) mistakenly (see Methods) designated the Herb. Dillenius material as the type of *C. scoparia*. Prud’homme van Reine (22/9/1969: *in not.*) identified Herb. Linn. Nos. 1277.3, .4 & .5 as *S. scoparia*; however, these have no Linnaean determinations associated with them and cannot be considered original material for the name. Athanasiadis’s (1996: 202) typification statement (“typ: I OXF”) is ineffective as a specific specimen was not selected.

Conferva vagabunda L., Sp. Pl.: 1167. 1753 ≡ *Cladophora vagabunda* (L.) C. Hoek: *Phaeophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 5, f. 32. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva marina trichodes, lanæ instar expansa*”, the specimen corresponding with *descriptio A*.

Note. – Turner (1804: 107) and Druce & Vines (1907: 189) respectively determined the Herb. Dillenius material as *C. vagabunda* and *Cladophora fracta* (O.F. Müll. ex Vahl) Kütz. Van den Hoek (1963: 19, 144) mistakenly (see Methods) cited the Herb. Dillenius material as the type of *C. vagabunda*; this selection was later accepted

by Burrows (1991: 174). There are two specimens in Herb. Dillenius determined by Van den Hoek (1963: 144). One, corresponding to *descriptio A*, is *Cladophora vagabunda* and the other, corresponding to *descriptio B*, is *Cladophora sericea* (Huds.) Kütz.

Corallina L., Syst. Nat., ed. 10, 1: 646, 805. 1758 – Generitype (designated by Schmitz, 1889: 455): *Corallina officinalis* L.

Corallina barbata L., Syst. Nat., ed. 10, 1: 806. 1758 ≡ *Cymopolia barbata* (L.) J.V. Lamour.: *Chlorophyceae* – Lectotype (designated here by Irvine): [illustration in] Ellis, Nat. Hist. Corallin.: t. 25, f. C. 1755.

Note. – In the list of synonyms for *C. barbata*, Linnaeus (1758: 806) cited and attributed to Ellis (1755: 53) the polynomial “*Corallina articulata jamaicensis*”. However, this name was not used by Ellis (1755: 54) who described his figure as being similar to the “*Corallina fistulosa Jamaicensis candida cum internodiis brevissimis, & quasi silo trajectis*”, of Plukenet (1696: 118).

Corallina corniculata L., Syst. Nat., ed. 10, 1: 806. 1758 ≡ *Jania rubens* (L.) J.V. Lamour. var. *corniculata* (L.) Yendo: *Rhodophyceae* – Lectotype (designated by Irvine & Johansen in Irvine & Chamberlain, 1994: 56): Herb. Linn. No. 1293.19 (LINN).

Corallina cristata L., Syst. Nat., ed. 10, 1: 806. 1758 [= *Jania rubens* (L.) J.V. Lamour.: *Rhodophyceae*] – Lectotype (designated here by Irvine): [illustration] “*Corallina dichotoma, capillis densis, cristatis, spermophoris, fucis minimis teretibus adnascens*” in Ellis, Nat. Hist. Corallin.: t. 24, f. F. 1755.

Note. – Irvine & Johansen (in Irvine & Chamberlain, 1994: 57) noted that the Ellis figure is of the distal part of a frond of *J. rubens* with one set of conceptacles subtending an immature set.

Corallina fragilissima L., Syst. Nat., ed. 10, 1: 806. 1758 ≡ *Amphiroa fragilissima* (L.) J.V. Lamour.: *Rhodophyceae* – Lectotype (designated here by Johansen): Herb. Linn. No. 1293.20 (LINN).

Note. – Manza (1940: 300) discussed material he considered to be the type without making an effective selection. The other extant original element is an illustration in Sloane (1707: t. 20, f. 5). Although there is possible voucher material for it in existence (in Herb. Sloane 1: 5, BM-SL), it is not linked to the published figure via an original drawing (as is normal in this collection) so its interpretative value is uncertain. Material in the Linnaean herbarium has therefore been designated as the lectotype.

Corallina officinalis L., Syst. Nat., ed. 10, 1: 805. 1758: *Rhodophyceae* – Lectotype (designated by Irvine in Jarvis & al., 1993: 37): Herb. Linn. No. 1293.9 (LINN).

Corallina opuntia L., Syst. Nat., ed. 10, 1: 805. 1758 ≡ *Halimeda opuntia* (L.) J.V. Lamour.: *Chlorophyceae* – Lectotype (designated here by Verbruggen): [illustration in] Ellis, Nat. Hist. Corallin.: t. 25, f. B. 1755.

Note. – Linnaeus cited figures “a” and “b” from Ellis as representing his *C. opuntia*; however figure A (a magnified portion of fig. a) most probably represents *H. incrassata* (J. Ellis) J.V. Lamour., so the lectotype is restricted to figure B (a magnified portion of fig. b). Linnaeus also cited several other polynomials for *C. opuntia*, depicting material currently ascribed to different taxa. There are also two extant herbarium sheets that can be considered original material for the name: Herb. Burser XX: 78 (UPS) is probably *H. tuna* (J. Ellis & Sol.) J.V. Lamour., and Herb. Linn. No. 1293.1 (LINN) is a mixed collection of either *H. opuntia*, *H. gracilis* Harvey ex J. Agardh or *H. distorta* (Yamada) Hillis-Col. (right hand specimen) or *H. incrassata* (left hand specimen); detailed anatomical analysis would be required to confirm these determinations. Hillis (1959: 359) and Hillis-Colinvaux (1980: 111) discussed the taxonomy of *H. opuntia* without selecting a type.

Corallina penicillus L., Syst. Nat., ed. 10, 1: 807. 1758 ≡ *Penicillus capitatus* (L.) Lam.: *Chlorophyceae* – Lectotype (designated here by Leliaert): Herb. Linn. No. 1293.21 (LINN).

Note. – Herb. Linn. No. 1293.21 (LINN) is, apparently, the only extant original material. Linnaeus gave its origin as “habitat in Asia”, but *P. capitatus* as currently understood occurs in the Caribbean (with range extensions reported from Brazil and Bermuda), Mediterranean and Madeira; *P. capitatus* has never been reported from the Indian or Pacific Oceans. It is probable that Herb. Linn. No. 1293.21 (LINN) does indeed represent *C. penicillus*, but this determination can only be confirmed by destructive sampling. Because the specimen cannot be critically identified, an epitype may need to be selected but this should await further taxonomic investigation (F. Leliaert, pers. comm.). Gepp & Gepp (1911: 68) discussed at length the complex history of the genus *Penicillus* and, for *P. capitatus*, provided a long list of synonyms.

Corallina rubens L., Syst. Nat., ed. 10, 1: 806. 1758 ≡ *Jania rubens* (L.) J.V. Lamour.: *Rhodophyceae* – Lectotype (designated by Irvine & Johansen in Irvine & Chamberlain, 1994: 56): Herb. Burser XX: 72 (UPS).

Corallina spermophoros L., Syst. Nat., ed. 10, 1: 807. 1758 [= *Jania rubens* (L.) J.V. Lamour.: *Rhodophyceae*]

– Lectotype (designated here by Irvine): [illustration] “*Corallina alba spermophoros, capillis tenuissimis*” in Ellis, Nat. Hist. Corallin.: t. 24, f. G. 1755.

Note. – Irvine & Johansen (in Irvine & Chamberlain, 1994: 57) noted that the Ellis figure is of the distal part of a frond of *J. rubens* with conceptacles showing a concatenate later stage. Other extant original elements are illustrations in Morison (1699: s. 11, t. 9, f. 9) and Plukenet (1691: t. 168, f. 3). Neither of these was selected as lectotype as they are not supported by voucher material and could be considered taxonomically ambiguous.

Corallina squamata L., Syst. Nat., ed. 10, 1: 806. 1758 ≡ *Haliptilon squamatum* (L.) Johansen & al.: *Rhodophyceae* – Lectotype (designated by Irvine & Johansen in Irvine & Chamberlain, 1994: 49): [illustration] “*Corallina Anglica erecta, ramulis dense pennatis, lanceolae forma terminantibus, segmentis ad utrumque latus paululum compressis*” in Ellis, Nat. Hist. Corallin., 49, t. 24, f. C. 1755.

Eschara divaricata L., Syst. Nat., ed. 10, 1: 805. 1758 ≡ *Galaxaura divaricata* (L.) Huisman & R.A. Towns.: *Rhodophyceae* – Lectotype (designated by Huisman & Townsend, 1993: 100, f. 2): Herb. Linn. No. 1297.4 (LINN).

Eschara fragilis L., Syst. Nat., ed. 10, 1: 805. 1758 ≡ *Tubularia fragilis* (L.) L. ≡ *Tricleocarpa fragilis* (L.) Huisman & R.A. Towns.: *Rhodophyceae* – Lectotype (designated by Huisman & Townsend, 1993: 100, f. 2): Herb. Linn. No. 1297.1, upper specimen (LINN).

Fucus L., Sp. Pl.: 1158. 1753 – Generitype (designated by De Toni, 1891: 173): *Fucus vesiculosus* L.

Note. – Chamisso (1821: 176) designated *Fucus crispus* L. (≡ *Chondrus crispus* (L.) Stackh.) as the generitype. However, this is not acceptable as *F. crispus* was not published by Linnaeus until 1767 (see below) and is therefore not eligible for selection as generitype (Art 10.2).

Fucus abrotanifolius L., Sp. Pl.: 1161. 1753 [= *Cystoseira foeniculacea* (L.) Grev.: *Phaeophyceae*] – Lectotype (designated by Roberts, 1968: 252): *Löfling*, Herb. Linn. No. 1274.95 (LINN).

Fucus acinarius L., Sp. Pl.: 1160. 1753 ≡ *Sargassum acinaria* (L.) Setch.: *Phaeophyceae* – Type not designated.

Note. – Herb. Linn. Nos. 1274.42 and 1274.103 (LINN) are annotated “acinarius” in the hand of Linnaeus; Herb. Linn. No. 1274.102 (LINN) is annotated “cartilagineus, gigartinus, acinarius” [deleted] in the hand of Linnaeus and “gigartinus” in the hand of Linnaeus filius. None of these

sheets bears a *Species Plantarum* number and therefore cannot be considered original material. Herb. Linn. No. 1274.172 (LINN) is identifiable as a species of *Laurencia* J.V. Lamour.; it bears the number “12” in Linnaeus’s hand, which might correspond to the species entry in *Species Plantarum*, but does not appear to be original material for the name (see Methods). Setchell (1933: 209–212) discussed the Herb. Linn. material, and Turner’s (1808: 110) opinion of it, without selecting a type. Papenfuss (1940: 9) quoted Setchell (pers. comm.), who stated the type was in Herb. Linn. Another extant original element is the illustration in Plantin (1581: 256) also reproduced in Donati (1750: t. 4, f. 1.); selection of either of these is undesirable as they do not agree with current usage (E. Ramon, pers. comm.). Silva & al. (1996: 929–931) summarised the problems arising from the early taxonomic and nomenclatural history of *F. acinarius* and concluded “It seems logical to lectotypify *F. acinarius* with the Adriatic plant described and illustrated by Donati” but without making an effective selection. Unfortunately, we have been unable to persuade an expert to typify this name.

Fucus aculeatus L., Sp. Pl., ed. 2, 2: 1632. 1763 ≡ *Desmarestia aculeata* (L.) J.V. Lamour.: *Phaeophyceae* – Lectotype (designated here by Irvine): Herb. Linn. No. 1274.15 (LINN).

Note. – The other extant original element is an illustration in Morison (1699: s. 15, t. 9, f. 4). This was not selected as lectotype as it is not supported by voucher material and could be considered taxonomically ambiguous.

Fucus barbatus L., Sp. Pl.: 1161. 1753 ≡ *Fucus foeniculaceus* L. var. *barbatus* (L.) L. [= *Cystoseira foeniculacea* (L.) Grev.: *Phaeophyceae*] – Lectotype (designated here by Irvine): Herb. Burser XX: 94 (UPS).

Note. – We are following R. Ross (in litt.) and Roberts (1968: 257, pl. 4) who suggested that Herb. Burser XX: 94 (UPS) might be considered the type.

Fucus buccinalis L., Mant. Pl. Alt.: 312. 1771 [= *Ecklonia maxima* (Osbeck) Papenf.: *Phaeophyceae*] – Neotype (designated here by Irvine): South Africa. Cap Agulhas, “*Lessonia nigrescens* Bory”, R.F. Hohenacker No. 162 (BM 000774387).

Note. – The collection upon which the name was based (Cape of Good Hope, *König 43*) could not be found; we have been unable to trace any other extant original material and therefore we have selected a neotype. Turner (1811: 12) commented that *F. buccinalis* is the same as *F. maximus* Osbeck (1757: 283–284). Papenfuss (1940: 7), when making the combination *E. maxima*, did not select a type for *F. buccinalis*. As commented upon by Silva & al. (1996: 639), the Hohenacker specimen in BM (designated

here as the neotype) was determined as *E. maxima* by Papenfuss (April 1939: *in sched.*). The same specimen was also determined as *E. buccinalis* (L.) Hornem. by W.A. Setchell (Sep. 1935: *in sched.*).

Fucus canaliculatus L., Syst. Nat., ed. 12, 2: 716. 1767 ≡ *Pelvetia canaliculata* (L.) Decne. & Thur.: *Phaeophyceae* – Lectotype (designated here by Irvine): Herb. Linn. No. 1274.55 (LINN).

Fucus cartilagineus L., Sp. Pl.: 1161. 1753 ≡ *Plocamium cartilagineum* (L.) Dixon: *Rhodophyceae* – Lectotype (designated by Dixon, 1967: 56): Herb. A. van Royen, sheet no. 910.184-14 (L).

Fucus ceranoides L., Sp. Pl.: 1158. 1753: *Phaeophyceae* – Lectotype (designated here by Irvine): Herb. Linn. No. 1274.52 (LINN).

Fucus concatenatus L., Sp. Pl.: 1160. 1753 [= *Cystoseira foeniculacea* (L.) Grev.: *Phaeophyceae*] – Lectotype (designated by Roberts, 1968: 253, pl. 1, 2a): Herb. A. van Royen, sheet no. 910.153-1332 (L).

Fucus confervoides L., Sp. Pl., ed. 2, 2: 1629. 1763, nom. illeg., non Huds. 1762 [= *Gracilariopsis longissima* (S.G. Gmel.) Steentoft & al.: *Rhodophyceae*] – Lectotype (designated by Steentoft & al., 1991: 663): Herb. Linn. No. 1274.111, larger, right hand specimen (LINN).

Fucus crispatus L., Syst. Nat., ed. 12, 2: 718. 1767 ≡ *Cryptopleura ramosa* (Huds.) Kylin ex L. Newton: *Rhodophyceae* – Neotype (designated here by Irvine): United Kingdom. Scarborough, “*F. crispatus*”, ex Herb. Hudson (BM 000619664).

Note. – Linnaeus (1767b) did not refer to any herbarium specimens or plates in publishing *F. crispatus*. Hudson (1762: 476) described *Ulva ramosa* Huds. from the Lancashire coast, and later (Hudson, 1778: 580) placed this name in synonymy under *Fucus crispatus* Huds. (which was thus an illegitimate replacement), indicating only that this name might be synonymous with *F. crispatus* of Linnaeus. Withering (1796: 103) cited the earlier Hudson names but as synonyms of the (then invalid) name “*F. cristatus*”. Turner (1808: 153) placed *F. crispatus* L. in synonymy with *Fucus laceratus* S.G. Gmel. (1768) (= *Cryptopleura ramosa*). There has been much confusion between *Fucus crispatus* L. and *Fucus cristatus* L. ex Turner (see below). It therefore seems advisable to accept Turner’s (1808: 153) and Hudson’s (1778: 580) tentative synonymy and select, as the neotype of *F. crispatus*, the same material selected by Maggs & Hommersand (1993: 246–248) as the neotype of *Ulva ramosa* Huds.

Fucus crispus L., Syst. Nat., ed. 12, 2: 718. 1767; Mant. Pl.: 134. 1767, nom. illeg. [= *Chondrus crispus* Stackh.: *Rhodophyceae*] – Lectotype (designated here by Brodie): Herb. Linn. No. 1274.68, top specimen (LINN).

Note. – A later homonym of *F. crispus* Huds. (Hudson 1762: 472) ≡ *Phyllophora crispa* (Huds.) P.S. Dixon, and hence illegitimate. Linnaeus's and Hudson's phrase names bear some similarity, but not enough to be considered the same; neither are there any shared synonyms, nor does Linnaeus cite Hudson in his description.

Goodenough & Woodward (1797: 171) noted the material in LINN and identified it as *F. crispus* L. Dixon & Irvine (1977: 234) and Athanasiadis (1996: 61) cited Herb. Linn. No. 1274.68 (LINN) as the type of *Chondrus crispus*; these typifications are not tenable because Stackhouse (1797: 24) did not base his name on Linnaean material. See Papenfuss (1950: 191) for a discussion on the nomenclature of *Chondrus* Stackh.

Fucus cristatus L. ex Turner, Fuci, 1: 48. 1808 ≡ *Callophyllis cristata* (C. Agardh) Kütz.: *Rhodophyceae* – Lectotype (designated by Dixon & Parkes, 1968: 87; amended here by Irvine): Herb. Linn. No. 1274.69 (LINN) third from bottom, right-hand side.

Note. – *Fucus cristatus* L. in sched. (Herb. Linn. No. 1274.69) is a manuscript name (Athanasiadis, 1996: 66), eventually published by Turner (1808: 48) who based his description of *F. cristatus* on one of the nine specimens on Herb. Linn. No. 1274.69; this is evident when the sheet and Turner's figure in *Fuci* (1808: pl. 23, f. a–e) are compared. Dixon & Parkes (1968: 87) and Irvine (1983: 38) both cited Herb. Linn. No. 1274.69 as the type of *Fucus cristatus* L. ex Turner; however, this typification requires restricting (see above) because the sheet consists of a mixed taxon gathering of nine specimens as well as a painting by König (the whole reproduced in Jarvis, 2007: 62). *Fucus cristatus* L. ex Turner (1808) is an illegitimate name due to the prior publication of *F. cristatus* With. (Withering, 1796: 103). Dixon & Parkes (1968: 83–87) concluded that the earliest legitimate name for the taxon (Art. 58) is *Sphaerococcus cristatus* C. Agardh (1817: 29); this becomes the basionym of *Callophyllis cristata* (C. Agardh) Kütz., of which Herb. Linn. No. 1274.69 pro parte is also the type. Dixon & Parkes (1968) also discussed usage of the epithets “*crispatus*” and “*cristatus*” and concluded that “*cristatus*” is not an orthographic variant of “*crispatus*”.

Fucus dentatus L., Syst. Nat., ed. 12, 2: 718. 1767; Mant. Pl.: 135. 1767 ≡ *Odonthalia dentata* (L.) Lyngbye: *Rhodophyceae* – Lectotype (designated by Athanasiadis, 1996: 129): Herb. Linn. No. 1274.72 (LINN).

Fucus discors L., Syst. Nat., ed. 12, 2: 717. 1767 [= *Cystoseira foeniculacea* (L.) Grev.: *Rhodophyceae*]

– Neotype (designated by Roberts, 1968: 252): Herb. Linn. No. 1274.21, left hand specimen (LINN).

Fucus distichus L., Syst. Nat., ed. 12, 2: 716. 1767: *Phaeophyceae* – Lectotype (designated by Powell, 1957: 420, pl. I, fig. 2A): Herb. Linn. No. 1274.56, uppermost specimen (of five) (LINN).

Fucus divaricatus L., Sp. Pl.: 1159. 1753 [= *Fucus vesiculosus* L.: *Phaeophyceae*] – Lectotype (designated here by Fletcher): *Löfpling*, Herb. Linn. No. 1274.50 (LINN).

Note. – Turner (1809: 44) placed *F. divaricatus* in synonymy under *F. vesiculosus* L.

Fucus elongatus L., Sp. Pl.: 1159. 1753 ≡ *Himanthalia elongata* (L.) Gray: *Phaeophyceae* – Lectotype (designated by Setchell, 1931: 358): Herb. Linn. No. 1274.1 (LINN).

Fucus ericoides L., Sp. Pl., ed. 2, 2: 1631. 1763 [= *Cystoseira tamariscifolia* (Huds.) Papenf.: *Phaeophyceae*] – Lectotype (designated by Athanasiadis, 1996: 219): Herb. Linn. No. 1274.18 (LINN).

Fucus esculentus L., Syst. Nat., ed. 12, 2: 718. 1767; Mant. Pl.: 135. 1767 ≡ *Alaria esculenta* (L.) Grev.: *Phaeophyceae* – Lectotype (designated here by Irvine): Herb. Linn. No. 1274.63 (LINN).

Note. – Athanasiadis (1996: 208) suggested (with a question mark) the type was in Herb. Linn. without making a selection.

Fucus excisus L., Sp. Pl.: 1159. 1753 – Type not designated.

Note. – This name, with original material in Herb. Linn. No. 1274.143 (LINN) and a figure from Morison (1699: s. 15, t. 8, f. 11), potentially threatens *Pelvetia canaliculata* (L.) Decne. & Thur. and it may be a candidate for rejection (Art. 56.1).

Fucus fastigiatus L., Sp. Pl.: 1162. 1753 [= *Furcellaria lumbricalis* (Huds.) J.V. Lamour.: *Rhodophyceae*] – Lectotype (designated by Drew, 1958: 363): Herb. Linn. No. 1274.24, upper specimen (LINN).

Fucus filum L., Sp. Pl.: 1162. 1753 ≡ *Chorda filum* (L.) Stackh.: *Phaeophyceae* – Lectotype (designated here by Irvine): [illustration in] Boccone, Museo di Fisica [Piante] 1: t. 7, f. 9. 1697.

Note. – South & Burrows (1967: 379–380) determined Herb. Linn. No. 1274.22 as *C. filum* but as it was probably annotated in the hand of Dahl (Savage, 1945: 200) they considered it to be a post-1753 addition to the herbarium.

South & Burrows also noted that the Boccone illustration corresponded with current usage. See Papenfuss (1950) for a discussion of the nomenclature of *Chorda* Stackh.

Fucus foeniculaceus L., Sp. Pl.: 1161. 1753 ≡ *Cystoseira foeniculacea* (L.) Grev.: *Phaeophyceae* – Lectotype (designated by Roberts, 1968: 252); Herb. Burser XX: 93 (UPS).

Fucus foeniculaceus L. var. *barbatus* (L.) L., Syst. Nat., ed. 12, 2: 717. 1767 – see *Fucus barbatus*.

Fucus furcellatus L., Sp. Pl., ed. 2, 2: 1631. 1763 [= *Furcellaria lumbricalis* (Huds.) J.V. Lamour.: *Rhodophyceae*] – Lectotype (designated by Athanasiadis, 1996: 59); [illustration] “*Fucus parvus segmentis praelongis teretibus acutis*” in Morison, Pl. Hist. Univ. 3: 648, s. 15, t. 9, f. 4. 1699.

Fucus gigartinus L., Syst. Nat., ed. 10, 2: 1344. 1759 [= *Gigartina pistillata* (S.G. Gmel.) Stackh.: *Rhodophyceae*] – Neotype (designated here by Irvine); Herb. Linn. No. 1274.102 (LINN).

Note. – We have been unable to locate any original material and have therefore been obliged to select a neotype (Art. 9.6). The selected neotype is material annotated “*gigartinus*” by Linnaeus filius and conforms with current usage. Turner (1808: 60) considered *F. gigartinus* and *F. pistillatus* S.G. Gmel. (1768: 159. pl. 18. fig. 1) to be synonymous. When establishing the new genus *Gigartina*, Stackhouse (1809: 55) did not cite Linnaeus; the new combination *G. pistillata* was based exclusively on *Fucus pistillatus* S.G. Gmel. Dixon & Irvine (1977: 239) cited the plate in Gmelin as the lectotype of *G. pistillata* without making a selection for *F. gigartinus*. The specific epithet was spelt “*gigantinus*” in Syst. Nat. ed. 10 (1759) but this was later corrected in the 12th edition (1767b). See Papenfuss (1950) for a discussion on the nomenclature of *Gigartina* Stackh.

Fucus granulatus L., Sp. Pl., ed. 2, 2: 1629. 1763 ≡ *Cystoseira usneoides* (L.) M. Roberts: *Phaeophyceae* – Lectotype (designated by Roberts, 1968: 264, pl. 5); Herb. Linn. No. 1274.11 (LINN).

Fucus hirsutus L., Syst. Nat., ed. 12, 2: 717. 1767; Mant. Pl.: 134. 1767 [= *Cladostephus spongiosus* (Huds.) C. Agardh f. *verticillatus* (Lightf.) Prud’homme: *Phaeophyceae*] – Lectotype (designated here by Irvine); Herb. Linn. No. 1274.18 (LINN).

Note. – The Herb. Linn. material has profuse growth of epiphytic *Jania rubens* on it. In making this typification, we are following unpublished determinations, housed at the Linnean Society of London (LINN), by

Prud’homme van Reine (22/9/1969: *in not.*) and Gondswaard (11/9/1979: *in not.*) who indicated Herb. Linn. No. 1274.18 as the type.

Fucus inflatus L., Sp. Pl.: 1159. 1753 [= *Fucus vesiculosus* L.: *Phaeophyceae*] – Lectotype (designated by Powell, 1957: 432, pl. 1, fig. 1); Herb. Linn. No. 1274.51 (LINN).

Fucus lacerus L., Sp. Pl., ed. 2, 2: 1627. 1763 – Type not designated.

Note. – This name potentially threatens *Chondrus crispus*, *Mastocarpus stellatus* (Stackh.) Guiry or *Phyllophora pseudoceranioides* (S.G. Gmelin) Newroth & A.R.A. Taylor and may, therefore, be a candidate for rejection (Art. 56.1).

Fucus lanosus L., Syst. Nat., ed. 12, 2: 718. 1767 ≡ *Polysiphonia lanosa* (L.) Tandy: *Rhodophyceae* – Lectotype (designated by Tandy, 1931: 227); König, Herb. Linn. No. 1274.23 (LINN).

Fucus lendigerus L., Sp. Pl.: 1160. 1753 ≡ *Sargassum lendigerum* (L.) C. Agardh: *Phaeophyceae* – Lectotype (designated here by Irvine); “*Insula adscensionis. Osbeck*” Herb. Linn. No. 1274.44 (LINN); fragmentary isotype of 1274.44 received from K ex Herb. Turner (BM 000563637).

Note. – As Linnaeus specified “Habitat ad insulam adscensionis. Osbeck”, the appropriately labelled Osbeck collection, Herb. Linn. No. 1274.44, is selected over other material. This specimen was illustrated by Turner (1808: 108, t. 48).

Fucus loreus L., Syst. Nat., ed. 12, 2: 716. 1767 [= *Himantalia elongata* (L.) Gray: *Phaeophyceae*] – Lectotype (designated here by Irvine); Herb. Linn. No. 1274.3 (LINN).

Note. – Turner (1811: 147) commented that *F. loreus* and *F. elongatus* were synonymous (based upon his comparison of specimens in Herb. Linn.). Setchell (1933: 250–253), when typifying *F. elongatus* L., discussed priority and the correct name for this taxon but without selecting a type for *F. loreus*.

Fucus lycopodioides L., Syst. Nat., ed. 12, 2: 717. 1767 ≡ *Rhodomela lycopodioides* (L.) C. Agardh: *Rhodophyceae* – Lectotype (designated by Athanasiadis, 1996: 131); Herb. Linn. No. 1274.20 (LINN).

Fucus muscoides L., Sp. Pl.: 1161. 1753 ≡ *Acanthophora muscoides* (L.) Bory: *Rhodophyceae* – Neotype (designated by de Jong, 1998: 133); Brazil. Desfontaines, LD 94/068.9765 (no. 38011) (LD).

Fucus natans L., Sp. Pl.: 1160. 1753 ≡ *Sargassum natans* (L.) Gaillon: *Phaeophyceae* – Lectotype (designated by Børgesen, 1914: 7): Herb. Linn. No. 1274.35 (LINN).

Fucus nodosus L., Sp. Pl.: 1159. 1753 ≡ *Ascophyllum nodosum* (L.) Le Jol.: *Phaeophyceae* – Lectotype (designated here by Irvine): Herb. Linn. No. 1274.58 (LINN).

Note. – Woelkerling (1975: 16) indicated “Type: LINN” but did not distinguish between the two specimens in Herb. Linn. (Nos. 1274.58 & 1274.134, LINN) annotated with the number “9”. As they are not part of a single gathering, Art. 9.15 does not apply. Selection of Herb. Linn. No. 1274.134 (LINN) is undesirable because the material may not be original material (see Methods) and represents a species of *Hypnea*.

Fucus ornatus L., Mant. Pl. Alt.: 312. 1771 [= *Suhria vittata* (L.) Endl.: *Rhodophyceae*] – Lectotype (designated by Papenfuss, 1951: 173): *König*, Herb. Linn. No. 1274.80 (LINN).

“*Fucus ovariatus*” L., Syst. Nat., ed. 12, 2: 714. 1767, typogr. error – see *F. uvariatus*.

Fucus palmatus L., Sp. Pl.: 1162. 1753 ≡ *Palmaria palmata* (L.) Kuntze: *Rhodophyceae* – Lectotype (designated by Irvine, 1983: 68.): Herb. A. van Royen, sheet no. 910,184-2889 (L).

Note. – See Guiry (1974) for a discussion on nomenclature.

Fucus pavonicus L., Sp. Pl.: 1162. 1753 ≡ *Fucus pavonius* L. (1763), nom. illeg. ≡ *Ulva pavonica* (L.) L. ≡ *Padina pavonica* (L.) J.V. Lamour.: *Phaeophyceae* – Lectotype (designated here by De Clerck): Herb. Burser XX: 106 (UPS).

Note. – The protologues for both *F. pavonicus* and *F. pavonius* included the same diagnosis and synonymy, and are placed in the same position, after *F. rubens* L., in the lists of *Fucus* species; therefore most authors, including De Clerck (2003: 185), Silva (in Schmid, 2004: 618) and Guiry (2007) followed Silva & al. (1996: 605–606) who considered *F. pavonius* L. (1763: 1630) to be an illegitimate replacement for *F. pavonicus*. However, Price & al. (1979: 3) considered “*pavonius*” to be an orthographic variant of “*pavonicus*”. Taylor (1960: 234) gave the authority for the combination in *Padina* as *P. pavonica* (L.) Thivy.

Herb. Linn. Nos. 1274.120 & 121 (LINN) are not accepted as original material for this name; both are annotated “*pavonius* 22” in the hand of Linnaeus, suggesting the annotation is post-1767, the year *F. pavonius* was published.

The typification statement, “typ: I LINN”, of Athanasiadis (1996: 206) and the tentative statement, “Holotype presumably in LINN”, of Wynne (1998: 287) are not accepted as there is no known extant original material in Herb. Linn.

Fucus pavonius L., Sp. Pl., ed. 2, 2: 1630. 1763, nom. illeg. – see *Fucus pavonicus*.

Fucus pyriferus L., Mant. Pl. Alt.: 311. 1771 ≡ *Macrocystis pyrifera* (L.) C. Agardh: *Phaeophyceae* – Neotype (designated here by Irvine): W. Falkland Islands. King George’s Sound, Oct 1910, *Mrs Elinor Vallentin* (BM 000840161 ex K).

Note. – Womersley (1954: 113; 1987: 382) referred to material in Herb. Linn. as possible type material. The only specimen associated with this name, Herb. Linn. No. 1274.59, is annotated by Linnaeus filius and cannot be considered original material for the name. We have been unable to trace any extant original material and therefore a neotype has been selected from the South Atlantic, the probable origin of Linnaeus’s material (see Papenfuss, 1940: 7–8; Womersley, 1954: 111–115; North, 1971: 9; Price & al., 1978: 136).

Fucus ramentaceus L., Syst. Nat., ed. 12, 2: 718. 1767b ≡ *Devaleraea ramentacea* (L.) Guiry: *Rhodophyceae* – Lectotype (designated here by Irvine): Herb. Linn. No. 1274.82 (LINN), top left specimen.

Fucus rubens L., Sp. Pl.: 1162. 1753 ≡ *Phycodrys rubens* (L.) Batters: *Rhodophyceae* – Lectotype (designated by Dixon, 1964: 57): Herb. A. van Royen, sheet no. 910.128-1044 (L).

Note. – When Batters (1902: 76) made the combination “*P. rubens*”, he was uncertain of the identity of *F. rubens* L. and so he based it upon “*F. rubens* Huds.” (1762: 475), no doubt having seen the specimen from Hudson’s herbarium, now in the Natural History Museum, London (BM 000840141). Dixon (1964: 56), however, showed that Hudson’s treatment was based entirely upon that of Linnaeus.

Fucus saccharinus L., Sp. Pl.: 1161. 1753 [= *Saccharina latissima* (L.) C.E. Lane & al.: *Phaeophyceae*] – Lectotype (designated here by Lane): Herb. Linn. No. 1274.64 (LINN). – Epitype (designated here by Lane): England. Cornwall, Looe, Hannafore Point, 24 Jul 2005, *J. Brodie* (BM 000893631).

Note. – Setchell & Gardner (1925: 595) noted that the “type has been assumed to be the plant with mucilage ducts in the blade, but lacking them in the stipe” but without discussing what material was the type. Because the lectotype is “demonstrably ambiguous [due to its fragmentary nature] and cannot be critically identified

for purposes of the precise application of the name” (Art. 9.7) an epitype has been selected. See Lane & al. (2006) for a discussion on the taxonomy and nomenclature of kelps, particularly *Saccharina latissima* (= *Laminaria saccharina* (L.) J.V. Lamour.).

Fucus selaginoides L., Syst. Nat., ed. 12, 2: 717. 1767; Mant. Pl.: 134. 1767 [= *Cystoseira tamariscifolia* (Huds.) Papenf.: *Phaeophyceae*] – Lectotype (designated by Roberts, 1968: 256); Herb. Linn. No. 1274.12 (LINN).

Fucus serratus L., Sp. Pl.: 1158. 1753: *Phaeophyceae* – Lectotype (designated here by Fletcher); Herb. Linn. No. 1274.46 (LINN).

Fucus siliculosus L., Syst. Nat., ed. 12, 2: 716. 1767 – Type not designated.

Note. – This name potentially threatens *Hizikia fusiformis* (Harvey) Okamura, an economically important seaweed, and it may be a candidate for rejection (Art. 56.1).

Fucus siliquosus L., Sp. Pl.: 1160. 1753 ≡ *Halidrys siliquosa* (L.) Lyngb.: *Phaeophyceae* – Lectotype (designated here by Irvine); Herb. Linn. No. 1274.60 (LINN).

Fucus spermophorus L., Syst. Nat., ed. 12, 2: 719. 1767 – Type not designated.

Note. – This name potentially threatens names in *Gracilaria* Grev. and *Gelidium* J.V. Lamour. and it may be a candidate for rejection (Art. 56.1).

Fucus spinosus L., Mant. Pl. Alt.: 313. 1771, nom. illeg. ≡ *Eucheuma denticulatum* (Burm. f.) Collins & Herv.: *Rhodophyceae* – Type not designated.

Note. – *Fucus spinosus* L. is an illegitimate replacement name for *Fucus denticulatus* Burm. f. (Burman, 1768: 28, 32; Silva & al., 1987: 46). *Fucus spinosus* is therefore automatically typified (Art. 7.5) by the type of *F. denticulatus* (≡ *Eucheuma denticulatum* (Burm. f.) Collins & Herv.). A type for *F. denticulatus* has not been designated. The designations, by Collins & Hervey (1917: 108) and Doty in Abbott (1988: 179), of Herb. Linn. No. 1274.104 (LINN) as the type of *F. spinosus* are not acceptable because the type of the Linnaean name is the type of *Fucus denticulatus* (Art. 9.2). Type material should be sought and selected from the N.L. Burman Herbarium (G). Further investigation is required but is beyond the scope of this paper.

Fucus spiralis L., Sp. Pl.: 1159. 1753: *Phaeophyceae* – Lectotype (designated by Børgesen, 1909: 119, pl. 9); Herb. Linn. No. 1274.53 (LINN).

“Fucus tendo L.”, Sp. Pl.: 1162. 1753, non rite publ. [= Animal, of uncertain application] – Preliminary lectotype (designated here by Irvine): [illustration] *“Fucus Indicus, teres etam piscatoriam referens longissimus”* in Plukenet, *Phytographia*: t. 184, f. 3. 1692.

Note. – Silva & al. (1996: 902) cited Turner (1802: 342) as stating that this name refers to what “is in reality an animal substance, commonly used in this country for fishing lines, and known by the name of Indian grass”. The typification of *F. tendo* (1753) here serves only to confirm that this name pre-dates the starting date of zoological nomenclature under the *ICZN* (Ride & al., 1999: Art. 3) and therefore has no nomenclatural standing under the *ICBN* (see Introduction). *Fucus tendo* L. appeared again in 1759 (Syst. Nat., ed. 10, 2: 1345). Although the Plukenet synonym is absent there, this is probably merely a consequence of the concise format of this work, for the diagnostic phrase-name (*F. filiformis simplex tenuissimus subdiphanus*) is identical in both the 1753 and 1759 accounts. Although it therefore seems likely that *F. tendo* L. (1759) is an available name for an animal taxon under the *ICZN*, further investigation is beyond the role of this study.

Fucus triqueter L., Mant. Pl. Alt.: 312. 1771, nom. illeg. [= *Hormophysa cuneiformis* (J.F. Gmel.) P.C. Silva: *Phaeophyceae*] – Lectotype (designated here by Irvine); Herb. Linn. No. 1274.8 (LINN).

Note. – A later homonym of *Fucus triqueter* S.G. Gmel. (1768: 122), and hence illegitimate. Turner (1808: 72, t. 34) illustrated Herb. Linn. No. 1274.8 which is annotated “triquetratus” and “capensis [delet.] König” by Linnaeus. Papenfuss (1943: 84) commented upon an unspecified type specimen, possibly Herb. Linn. No. 1274.8 (LINN), without making an effective selection.

Fucus turbinatus L., Sp. Pl.: 1160. 1753 ≡ *Turbinaria turbinata* (L.) Kuntze: *Phaeophyceae* – Lectotype (designated here by Irvine): [illustration] *“Fucus marinus vesiculas habens membranis extantibus alatus”* in Sloane, *Voy. Jamaica* 1: t. 20, f. 6. 1707. – Voucher: Herb. Sloane 1: 6, 1044 (BM 000589212).

Note. – Howe (1920: 591) commented that material originating from Sumatra in Herb. Linn. (No. 1274.43) is “presumably spurious”. Tandy (27/11/1933: *in not.*) stated that the name is based upon the Sloane illustration; he further pointed out that Herb. Linn. No. 1274.43 is not original material and represents another species, *T. conoides* (J. Agardh) Kütz.

“Fucus uranus” L., Syst. Nat., ed. 10, 2: 1345. 1759, typogr. error – see *F. uvarius*.

Fucus usneoides L., Syst. Nat., ed. 10, 2: 1344. 1759 ≡ *Cystoseira usneoides* (L.) Roberts: *Phaeophyceae*

– Lectotype (designated by Roberts, 1968: 264, pl. 5): Herb. Linn. No. 1274.11 (LINN).

Fucus uvarius L., Syst. Nat., ed. 10, 2: 1345. 1759 ('*uranus*') ("Fucus ovarius" L. see above) ≡ ***Botryocladia uvaria*** (L.) Kylin: *Rhodophyceae* – Lectotype (designated here by Brodie): Herb. Linn. No. 1274.32 (LINN).

Note. – Unfortunately, due to a typographical error (Art. 60.1) the entry in *Systema Naturae*, ed. 10 (Linnaeus, 1759: 1345) appeared as "*F. uranus*" as was pointed out by Silva (pers. comm.). *Fucus uranus* was not taken up in *Species Plantarum*, ed. 2. (1763), nor does it appear in any subsequent publication. *Fucus uranus* has a similar diagnosis "F. teretiusculus ramosus, frond. obovatis fornicatis integerrimis" to the diagnosis "F. caule filiformi ramoso, fol. confertis ovatis fornicatis" of *F. uvarius* (Linnaeus, 1774: 811). There are three sheets in Herb. Linn. annotated "*uvarius*" in the hand of Linnaeus: Herb. Linn. Nos. 1274.32–34. Of these, Herb. Linn. No. 1274.32 most closely agrees with current usage. Tandy (27/11/1933: *in not.*) noted that, on the verso of Herb. Linn. No. 1274.32, Linnaeus had written "Fucus caule ramoso teretiuscula [?], foliis racemosis obovatis cochleatis [super convesis resi—three words erased] supra convexis subtus concavis"; this description is similar to that accompanying *F. uranus*. Tandy (13/2/1934: *in not.*) considered Herb. Linn. 1274.32 to be the type of *F. uvarius*.

A second typographical error, *F. ovarius*, appeared in *Systema Naturae*, ed. 12 (1767b: 714) and the spelling was amended in *Systema Vegetabilium*, ed. 13 (1774: 811) to *uvarius*, keeping the same phrase name "F. caule filiformi ramoso, fol. confertis ovatis fornicatis". Furthermore, Linnaeus corrected the epithet to "*uvarius*" from "*ovarius*" in his personal copy of *Systema Naturae*, ed. 12 (1767b: 714: Linnean Society of London Library). Although the evidence is not conclusive, it is not unreasonable to treat all three names as variants and, consequently, the date of publication of *F. uvarius* is 1759.

Fucus botryoides Wulfen (in Jacquin, 1791: 146) is an illegitimate replacement (Silva 1980: 124–125) based upon Linnaeus's *F. uvarius*; he repeated Linnaeus's description originally cited for both *F. uvarius* and *F. ovarius*, and indicated uncertainty concerning the typography ("An Fucus Ovarius sive Uvarius?").

Turner (1802: 34) studied "authentic" specimens and concluded that Linnaeus had examined a zoophyte. Silva (1980: 125) was uncertain, having examined microfiche illustrations, that any material in the Linnaean Herbarium was referable to *Botryocladia*. Recent examination of Herb. Linn. 1274.32 (D. John & J. Brodie, pers. comm.) confirms that the material represents a *Botryocladia* species. Tandy (13/2/1934: *in not.*) considered Herb. Linn. 1274.33 to represent *Caulerpa racemosa* (Forssk.) J. Agardh and Herb. Linn. 1274.34 to be a species of *Sargassum*.

Selection of a lectotype for *F. uvarius* referable to either *Caulerpa racemosa* or *Sargassum* would result in considerable nomenclatural instability (Preamble 1), therefore a lectotype referable to *B. uvaria* has been selected. Because the lectotype is "demonstrably ambiguous and cannot be critically identified [without destructive sampling] for purposes of the precise application of the name" (Art. 9.7) an epitype may need to be selected; this should await the completion of ongoing taxonomic investigation of *Botryocladia*.

Fucus venosus L., Mant. Pl. Alt.: 312. 1771 ≡ ***Hymenena venosa*** (L.) C. Krauss: *Rhodophyceae* – Lectotype (designated here by Irvine): Herb. Linn. No. 1274.78 (LINN).

Note. – Turner (1811: 10) noted the presence of material in Herb. Linn. Neither Papenfuss (1940: 14) nor Kylin (1924: 85) discussed the typification of this name.

Fucus vesiculosus L., Sp. Pl.: 1158. 1753: *Phaeophyceae* – Lectotype (designated here by Fletcher): Herb. Linn. No. 1274.48 (LINN).

Note. – Woelkerling (1975: 16) indicated "Type: LINN" but did not distinguish between the three specimens in Herb. Linn. The three sheets are evidently not part of a single gathering, therefore Art. 9.15 does not apply.

Fucus vittatus L., Syst. Nat., ed. 12, 2: 718. 1767 ≡ ***Suhria vittata*** (L.) J. Endl.: *Rhodophyceae* – Lectotype (designated by Papenfuss, 1951: 173): Herb. Linn. No. 1274.79 (LINN).

Fucus volubilis L., Syst. Nat., ed. 10, 2: 1344. 1759 ≡ ***Osmundaria volubilis*** (L.) R.E. Norris: *Rhodophyceae* – Lectotype (designated here by Irvine): Herb. Linn. No. 1274.47 (LINN).

Note. – Norris (1991: 15) stated that the holotype was held at "L" (Nationaal Herbarium Nederland, Leiden, but it is probable that he meant LINN) and that he had seen a microfiche of the specimen; he also described and illustrated a sheet of specimens at BM (formerly at K) labelled as the type but none of these is eligible for selection as lectotype because they are not original material.

Madrepora acetabulum L., Syst. Nat., ed. 10, 1: 793. 1758 ≡ *Tubularia acetabulum* (L.) L. ≡ ***Acetabularia acetabulum*** (L.) P.C. Silva: *Chlorophyceae* – Lectotype (designated here by John): [illustration] "*Acetabulum*" in Tournefort, Instit. Herb.: t. 338. 1703.

Note. – Silva (1952: 255), when making the new combination *A. acetabulum*, did not select a type.

Millepora coriacea L., Syst. Nat., ed. 12, 1(2): 1285. 1767, nom. illeg. ≡ ***Millepora agariciformis*** Pall.: *Rhodophyceae* – Type not designated.

Note. – An illegitimate renaming of *M. agariciformis* Pall. (Pallas 1766: 263). *Millepora coriacea* is automatically typified by the type of *Millepora agariciformis* (Art. 7.5), a name for which we have been unable to trace an acceptable lectotypification. Athanasiadis (1999: 243) suggested that an illustration in Shaw (1738: fig. 1, plate opposite p. 48) of “*Alcyonidium candidum* ...” quoted by Pallas could serve as lectotype but did not formally designate it as such. No original Pallas material has been found. Algaebase (Guiry, 2007) lists *Millepora agariciformis* as a synonym of *Mesophyllum lichenoides* (J. Ellis) Lemoine, but see discussion in Woelkerling & Irvine (1986a: 394). The illustration in Shaw (1738) is of a rhodolith and is too substantial to represent *M. lichenoides*. Further investigation is required but is beyond the scope of this paper.

Millepora polymorpha L., Syst. Nat., ed. 12, 1(2): 1285. 1767, nom. illeg. ≡ *Millepora calcarea* Pall. ≡ ***Phymatolithon calcareum*** (Pall.) W.H. Adey & D.L. McKibbin: *Rhodophyceae* – Lectotype (designated here by Irvine): [illustration in] Ellis, Nat. Hist. Corallin.: t. 27, fig. C. 1755). – Epitype (designated here by Woelkerling & Irvine): England, Cornwall, St. Mawes Bank, 11 Dec 1983, BM box 1626 (BM 000562555).

Note. – An illegitimate renaming of *M. calcarea* Pall. (Pallas 1766: 265). Woelkerling & Irvine (1986b: 58) designated a specimen from Falmouth, Cornwall as the neotype for the Pallas (and hence the Linnaean) name. However, as Pallas cited numerous illustrations (1766: 265), this choice has to be superseded because the rules of the ICBN governing the selection of types (Voss & al., 1983: Art. 9.3) have changed and the new rules are retroactive (Art. 9.10). Therefore, we have designated the Ellis illustration as lectotype and amended Woelkerling & Irvine’s neotype selection to an epitype.

“*Tremella* L.” Sp. Pl.: 1157. 1753 [non *Tremella* Pers., nom. cons.], non rite publ. – Generitype (designated by Donk, 1958: 245): “*Tremella nostoc* L.”

Note. – *Tremella* was first published by Linnaeus (1753: 1157) who described seven species; he later published a further two names in *Flora Suecica*, ed. 2 (Linnaeus, 1755). The name *Tremella* originated in Dillenius’s *Historia Muscorum* (1742) where he published 17 polynomial names under that genus. Donk (1958: 245) objected to the previous choice by Arthur (1901: 134) of *T. juniperina* L. as generitype because *T. juniperina* (and the taxon it represents) was not derived from one of the *Historia Muscorum* polynomials; he then selected *T. nostoc* L. as the type. Arthur’s (1901: 134) choice of *T. juniperina* as the type of *Tremella* “may be superseded” on the basis that it was “based on a largely mechanical method of selection” (Art. 10.5), and Donk’s action has been taken as such a supersession. With the type of *T. nostoc* accepted as the

type of *Tremella*, the latter applies to a group with a post-1753 starting date and is therefore not validly published. As a consequence, none of the species names assigned by Linnaeus to *Tremella* is validly published either.

“*Tremella adnata* L.”, *Flora Suecica*, ed. 2: 430. 1755, non rite publ. – Type not relevant.

Note. – We have been unable to locate extant original material associated with this name.

“*Tremella auricula* L.”, Sp. Pl.: 1157. 1753, non rite publ. – Type not relevant.

“*Tremella difformis* L.”, *Flora Suecica*, ed. 2: 429. 1755, non rite publ. – Type not relevant.

Note. – This name has been treated as the basionym of *Leathesia difformis* (L.) Aresch. (*Phaeophyceae*), a name that is in current use. The correct name and authorship for the taxon currently known under this name is unclear but resolution of this question is beyond the scope of this paper.

“*Tremella hemisphaerica* L.”, Sp. Pl.: 1158. 1753, non rite publ. – Type not relevant.

“*Tremella juniperina* L.”, Sp. Pl.: 1157. 1753, non rite publ. – Type not relevant.

“*Tremella lichenoides* L.”, Sp. Pl.: 1157. 1753, non rite publ. – Type not relevant.

Note. – Believing the binomial to be validly published, Jørgensen & al. (1994a: 371, f. 67) designated Herb. Linn. No. 1276.9, lower specimen (LINN) as the lectotype of *T. lichenoides*, the basionym of the widely used name “*Leptogium lichenoides* (L.) Zahlbr.” (*Lichenes*). It would appear that the correct name for the taxon in question is *Leptogium lichenoides* (Wulfen) Zahlbr.

“*Tremella nostoc* L.”, Sp. Pl.: 1157. 1753, non rite publ. [= ***Nostoc commune*** Vaucher ex Bornet & Flahault: *Cyanophyceae*] – Preliminary lectotype (designated here by Irvine & Pentecost): [illustration in] Dillenius, Hist. Musc.: t. 10, f. 14. 1742. – Voucher: Herb. Dillenius (OXF) “*Tremella terrestris sinuosa, pinguis & fugax*”.

Note. – The name *T. nostoc* pre-dates the starting date for heterocystous *Nostocaceae* (Bornet & Flahault, 1886), to which the designated type belongs, and therefore has no nomenclatural standing (see Introduction). Bornet & Flahault (1886: 204) listed *T. nostoc* as a synonym of *N. commune* and Druce & Vines (1907: 191) determined the Herb. Dillenius material as belonging to the same species. The designation of the Herb. Dillenius material as neotype of *T. nostoc* by Drouet (1978: 25) was contrary

to Art. 9.11 as there is original material in existence, the *Historia Muscorum* illustration.

“*Tremella purpurea* L.”, Sp. Pl.: 1158. 1753, non rite publ.
– Type not relevant.

“*Tremella verrucosa* L.”, Sp. Pl.: 1158. 1753, non rite publ.
– Type not relevant.

Tubularia acetabulum (L.) L., Syst. Nat., ed. 12, 1(2): 1303.
1767 – see *Madrepora acetabulum*.

Tubularia fragilis (L.) L., Syst. Nat., ed. 12, 1(2): 1302.
1767 – see *Eschara fragilis*.

Ulva L., Sp. Pl.: 1163. 1753 – Generitype: *Ulva lactuca* L., typ. cons.

Note. – Linnaeus (1754: 492) described the genus *Ulva* as a vesicular alga, leading Papenfuss (1960: 303) to conclude that the type could not be *Ulva lactuca* L. (see C. Agardh, 1822: 402) as it is not vesicular. In order to preserve current usage, Papenfuss (1960: 304, 314) proposed the conservation of *Ulva* Thuret (1854: 28) over *Ulva* L. (1753: 1163), with *Ulva rigida* (C. Agardh) Thuret as the type. The form of this conservation proposal was subsequently altered by the General Committee (Ross, 1960: 286) who recommended conservation of *Ulva* L. with the conserved type *Ulva lactuca* L.; this was accepted and appeared first in the *Edinburgh Code* (Lanjouw & al., 1966: 240).

Ulva compressa L., Sp. Pl.: 1163. 1753: *Chlorophyceae* – Lectotype (designated by Blomster & al., 1998: 332, f. 50, 55–57): [illustration in] Dillenius, Hist. Musc.: 48, t. 9, f. 8, 1742. – Voucher: Herb. Dillenius (OXF) “*Tremella marina tenuissima et compressa*”.

Ulva confervoides L., Sp. Pl.: 1163. 1753 [= *Ceramium virgatum* Roth: *Rhodophyceae*] – Lectotype (designated here by Maggs): [illustration in] Dillenius, Hist. Musc.: t. 6, f. 39 B. 1742. – Voucher: Herb. Dillenius (OXF) “*Conferva marina fistulosa*”. – Epitype (designated here by Maggs): Germany, Helgoland, German North Sea, South Harbour, 7 Jan 1999, I. Bartsch & A. Wagner (BM 000898199).

Note. – Extant original material consists of Herb. Linn. No. 1275.11 (*Stictyosiphon* Kütz. sp. with epiphytic *Ceramium tenuicorne* (Kütz.) Waern), Herb. Linn. No. 1275.12 (a branched *Ulva* sp.) and two illustrations from Dillenius’s *Historia Muscorum* (1742: t. 6, f. 39 A & B) that are “demonstrably ambiguous” (Art. 9.7), although supported by vouchers in Herb. Dillenius. Turner (1804: 107) determined the Herb. Dillenius material supporting fig. 39 as “*C.[onferva] tubulosa*, Fl. Ang.”, also commenting

that it “appears to be only an unusually thick variety of *C.[onferva] rubra*” (= *Ceramium virgatum* Roth). Druce & Vines (1907: 190) determined the Herb. Dillenius material supporting fig. 39 as: A. “*Ceramium rubrum* Ag. on *Cladostephus verticillatus*, Lyngb.” and B. as “*C. rubrum* Ag.”. Using digital images, C. Maggs (courtesy of S. Marner: OXF) regarded the Herb. Dillenius B. material as probably identifiable as *C. virgatum*. See Silva (1952: 294), Maggs & Hommersand (1992: 43) and Maggs & al. (2002) who discussed the nomenclature of *Ceramium rubrum* and associated names.

Selection of a lectotype for *U. confervoides* referable to either *Stictyosiphon*, *Ceramium tenuicorne*, *Ulva* or *Cladostephus spongiosus* would result in considerable nomenclatural instability (Preamble 1), therefore a lectotype referable (via the voucher specimen) to *Ceramium virgatum* has been selected. Because the lectotype itself is “demonstrably ambiguous [although it is supported by a voucher] and cannot be critically identified for purposes of the precise application of the name” (Art. 9.7), an epitype has been selected here.

The epithet “*confervoides*” in *Ceramium* is already occupied (*Ceramium confervoides* Wiggers = *Gracilaria gracilis* (Stackh.) Steentoft & al.: Guiry, 2007); therefore *C. virgatum* (Roth 1797: 146) is the earliest available name. Maggs & al. (2002: 409–420) selected BM 000898199 as the epitype for *Ceramium virgatum*; selection of this material as epitype for *Conferva polymorpha* (see above) and *Ulva confervoides* results in these names being placed in synonymy under *C. virgatum* (subject to a rejection proposal being made and approved for *C. polymorpha*).

Ulva granulata L., Sp. Pl.: 1164. 1753 ≡ *Botrydium granulatum* (L.) Grev.: *Xanthophyceae* – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 10, f. 17. 1742. – Voucher: Herb. Dillenius (OXF) “*Tremella palustris, vesiculis sphaericis fungiformibus*”.

Note. – Druce & Vines (1907: 191) determined the Herb. Dillenius material as *B. granulatum*. Drouet & Daily (1956: 167) and Drouet (1978: 219) stated the type specimen was in Herb. Linn. (LINN); unfortunately, there is no material there that can be linked to this name.

Ulva intestinalis L., Sp. Pl.: 1163. 1753: *Chlorophyceae* – Lectotype (designated by Blomster & al., 1998: 332, f. 49, 52–54): [illustration in] Dillenius, Hist. Musc.: 47, t. 9, f. 7, 1742. – Voucher: Herb. Dillenius (OXF) “*Tremella marina tubulosa, intestinorum figura*”.

“*Ulva labyrinthiformis* L.”, Sp. Pl., ed. 2, 2: 1633. 1763, non rite publ. ≡ *Spirulina labyrinthiformis* Gomont: *Cyanophyceae* – Preliminary lectotype (designated here by Pentecost): [illustration] “*Ulva thermalis*

valvulosa erecta simplex, capitulo subrotundo” in Vandelli, Tract. Therm. Agri Patav.: t. 2. 1761.

Note. – The name “*U. labyrinthiformis*” pre-dates the starting date for filamentous Nostocales (Bornet & Flahault, 1886) and therefore has no nomenclatural standing (see Introduction). In the protologue Linnaeus cited a reference to an undated publication by Vandelli. The name was later cited in *Systema Naturae*, ed. 12 (1767b: 720) and *Systema Vegetabilium*, ed. 13 (1774: 817) and a fuller reference provided (Vandelli, 1758); however, this citation is incorrect and the illustration was actually published in Vandelli’s *Tractatus de thermis agri Patavini* (1761). In *Species Plantarum*, ed. 2 (1763: 1632) the epithet “*labyrinthiformis*” was used in error for *U. lactuca*.

Ulva lactuca L., Sp. Pl.: 1163. 1753: *Chlorophyceae* – Lectotype (designated by Papenfuss, 1960: 304, pl. 1, f. 10); Herb. Linn. No. 1275.24 (LINN).

Ulva lanceolata L., Syst. Nat., ed. 12, 2: 719. 1767b [= *Ulva linza* L.: *Chlorophyceae*] – Lectotype (designated here by Irvine): [illustration in] Dillenius, Hist. Musc.: t. 9, f. 5. 1742. – Voucher: Herb. Dillenius (OXF) “*Tremella marina, Porri folio*”.

Note. – Turner (1804: 108) determined the Herb. Dillenius material as *U. linza*; however, Druce & Vines (1907: 191) determined the same material as “*Enteromorpha luiza* [sic] J. Ag.”, a synonym of *U. linza*; see Hayden & al. (2003) for discussion on *Enteromorpha* and *Ulva*.

Ulva latissima L., Sp. Pl.: 1163. 1753 ≡ *Saccharina latissima* (L.) C.E. Lane & al.: *Phaeophyceae* – Lectotype (designated by Papenfuss, 1960: 303); Herb. Linn. No. 1275.14 (LINN). – Epitype (designated here by Lane): England. Cornwall, Looe, Hannafore Point, 24 Jul 2005, J. Brodie (BM 000893632).

Note. – Turner (1811: 72) commented that *U. latissima* was a later synonym of *Fucus saccharinus*, based upon his observations of material in Herb. Linn. The lectotype is a small, complete specimen of a *Saccharina*, in good condition, with an undivided, bullate blade. However, an epitype is selected here by Lane in order to provide molecular data (see Lane & al., 2007: 637). Lane & al. (2006) provide a discussion on the taxonomy and nomenclature of kelps, particularly *Saccharina latissima* (= *Laminaria saccharina* (L.) J.V. Lamour).

Athanasiadis (pers. comm.) has recently questioned the validity of Papenfuss’s choice of type, arguing that Linnaeus’s 1753 concept was based on a large form of *Ulva lactuca* described from Marstrand on the Atlantic coast of Sweden (Linnaeus, 1747: 169). Indeed, the use of the name for a form of *Ulva* was accepted, particularly in Scandinavia (e.g., Levring, 1937: 18) until Papenfuss’s typification was published. However, no material of *Ulva*

linked with this name is extant, and the grounds for now rejecting Papenfuss’s choice of type appear to be weak. *Ulva latissima* is increasingly in use as the basionym of *Saccharina latissima* and any attempt to change this would probably require a conservation proposal. We are not convinced that this would be either worthwhile, or likely to be successful, and therefore accept both Papenfuss’s typification and its nomenclatural consequences.

Ulva linza L., Sp. Pl.: 1163. 1753. *Chlorophyceae* – Lectotype (designated here by Brodie & Irvine): [illustration in] Dillenius, Hist. Musc.: t. 9, f. 6. 1742. – Voucher: Herb. Dillenius (OXF) “*Tremella marina fasciata*”.

Note. – Setchell & Gardner (1920: 263) stated that the plate in Dillenius “seems sufficiently characteristic to distinguish this species” but did not designate it as a type. See Silva (1952: 295) for commentary on the application of this name. Although Hayden & al. (2003: 289) cited the *Historia Muscorum* illustration as lectotype, this choice was not effective because the phrase “hic designatus” or an equivalent was not used (Art. 7.11).

Ulva lumbricalis L., Mant. Pl. Alt.: 311. 1771 ≡ *Champia lumbricalis* (L.) Desv.: *Rhodophyceae* – Lectotype (designated here by Irvine): König s.n., Herb. Linn. No. 1275.2 (LINN).

Ulva papillosa L., Mant. Pl. Alt.: 311. 1771, nom. illeg. ≡ *Fucus muricatus* S.G. Gmel. (1768) [= *Euclima denticulatum* (Burm. f.) Collins & Herv.: *Rhodophyceae*] – Lectotype of *Fucus muricatus* S.G. Gmelin (designated here by Irvine): [illustration] “*Fucus muricatus*” in Gmelin, Hist. Fucorum: t. 6, f. 4. 1768.

Note. – *Ulva papillosa* L. is an illegitimate replacement name for *Fucus muricatus* S.G. Gmel. (1768: 111). *Ulva papillosa* is therefore automatically typified (Art. 7.5) by the type of *Fucus muricatus*.

Turner (1808: 32) believed that the description of *U. papillosa* L. agreed well with *Fucus stirriatus* Turner, and that Linnaeus made a “strange error” in taking *F. muricatus* Gmel. as a synonym, which Turner believed to belong to Linnaeus’s *F. spinosus*. The collection cited by Linnaeus in the protologue, Herb. Linn. No. 1274.179 “Koenig 41” (LINN) is missing from that sheet.

Ulva pavonia L., Syst. Nat., ed. 12, 2: 719. 1767b, nom. illeg.: *Fucus pavonius* L., nom. illeg. – see *Fucus pavonicus*.

“*Ulva pruniformis* L.”, Sp. Pl.: 1164. 1753, non rite publ. [= *Nostoc commune* Vaucher ex Bornet & Flahault: *Cyanophyceae*] – Neotype (designated by Drouet, 1978: 26): Germany. “In lacu qui Hollandermeer

appellatur prope Jeveeram, *G.H.B. Jürgens*” in Jürgens, *Alg. Aquat.* 15: 8 (1822), annotated by E. Bornet (PC).

Note. – The name *U. pruniformis* pre-dates the starting date for heterocystous *Nostocaceae* (Bornet & Flahault, 1886), to which the designated type belongs, and therefore has no nomenclatural standing (see Introduction).

Ulva rugosa L., *Mant. Pl. Alt.*: 311. 1771 – Type not designated.

Note. – Linnaeus (1771: 311) cited a specimen annotated “*Koenig no. 39*” (Herb. Linn. No. 1275.31, lower right hand specimen) in the protologue for *U. rugosa*; this specimen is therefore a syntype and selection of this as lectotype is obligatory (Art. 9.10). “*Koenig no. 39*” represents an *Ulva*, although its specific identity remains unknown. Two other specimens (Herb Linn. Nos. 1275.8 & 9) can also be considered original material (Savage, 1945: 202). Turner (1811: 118), when describing *F. rugosus* (L.) Turner from material provided to him from Herb. Linn. by J. E. Smith, figured Herb. Linn. No. 1275.8, a specimen of the species currently known as *Splachnidium rugosum* (L.) Grev. (Greville, 1830: 36). Subsequently, various authors (e.g., Womersley, 1987; Guiry, 2007) have followed Turner’s and Greville’s interpretation of *U. rugosa*. Typification of this name using “*Koenig no. 39*” would threaten the current application of *Splachnidium rugosum* (L.) Grev.; the proposal of a conserved type for *Ulva rugosa* is desirable.

Ulva umbilicalis L., *Sp. Pl.*: 1163. 1753 [= *Porphyra umbilicalis* Kütz.: *Rhodophyceae*] – Lectotype (designated by Conway, 1964: 349, pl. I, fig. 1): [illustration in] Dillenius, *Hist. Musc.*: 45, t. 8, f. 3, 1742. – Voucher: Herb. Dillenius (OXF) “*Tremella marina umbilicata*”. – Epitype (designated by Brodie & al., 2008: 1330): Scotland. Argyll, Easdale, 23 Jul 1998, J. Brodie & P.K. Hayes (BM 000769632).

Note. – See Brodie & al. (2008) for a discussion concerning an epitype for *Ulva umbilicalis* (and a neotype for *Porphyra umbilicalis* Kütz.).

Volvox L., *Syst. Nat.*, ed. 10, 1: 820. 1758 – Generitype (designated here by John): *Volvox globator* L.

Note. – Guiry (2007) cited *V. aureus* Ehrenb. as the generitype; this is unacceptable as *V. aureus* was not cited in the original listing of *Volvox* species. Stein in Farr & Zijlstra (2007) incorrectly stated that Ehrenberg (1838: 72) selected *V. globator* as generitype.

Volvox globator L., *Syst. Nat.*, ed. 10, 1: 820. 1758: *Chlorophyceae* – Lectotype (designated here by John): [illustration in] Baker, *Employ. Microscope*: pl. XII, f. 27. 1753.

Note. – Colonies of *V. globator* are the largest of the genus and contain 1,500–17,000 cells. Another illustration cited by Linnaeus in the protologue (Rösel von Rosenhof, 1755: 617), probably does not depict *Volvox globator* as currently applied; that illustration is of a mature *Volvox* colony, with daughter colonies, consisting of approximately 500 cells and is comparable to *V. tertius* Meyer.

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