

Nomenclatural remarks on *Agarum* (Laminariaceae, Phaeophyceae)

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The generic name *Agarum* (Laminariaceae), based on *Fucus agarum* S.G. Gmelin, is traditionally accredited to Bory de Saint-Vincent 1826, who changed the epithet of the type species to *cribrosum* in order to avoid a tautonym. In fact, the name was first used by Dumortier in 1822, in exactly the same sense, with the epithet of the type species changed to *clathratum*. The correct name of this species is thus *Agarum clathratum* Dumortier, even though the generic name has been conserved with Bory as author. While it is not necessary to emend the entry for *Agarum* in the list of conserved names (Appendix IIIA of the International Code of Botanical Nomenclature), emendation would have the desirable result of eliminating an awkward situation in which the date of the generic name is later than the date of the name of the type species.

Key Index Words: Agarum—Costaria—Laminariaceae—nomenclature.

The word *agarum* was first used in valid nomenclature of algae by S. G. Gmelin (1768, p. 210, pl. XXXII), who described *Fucus agarum* from "Oceanus Indiae orientalis et mare Kamtschaticum." This species, together with *F. clathrus* S. G. Gmelin (1768, p. 211, pl. XXXIII: "Oceanus indicus et Mare Kamtschatkam alluens" and *F. bracteatus* S. G. Gmelin (1768, p. 212: "Mare indicum"), constituted the seventh order of Fuci in Gmelin's classification. Gmelin named this order *Agara*, the plural of the substantive *Agarum*, which had been used as a generic name for edible seaweeds by Rumphius (1750, pp. 181, 185-187). Rumphius, in turn, derived the name from agar-agar, a Malayan word applied to certain Rhodophyceae (usually species of *Eucheuma*) that produce an edible gelatin or to the gelatin itself. (The polysaccharide from *Eucheuma*, however, fits the chemical definition of carrageenan rather than agar.) Curiously, the characters given in the diagnosis of the order *Agara* do not include the presence of an edible gelatin. The only discernible unifying feature is the perforate blade.

Fucus agarum and *F. clathrus*, as judged from

Gmelin's illustrations, are clearly the algae currently known as *Agarum cribrosum* Bory and *Thalassiophyllum clathrus* (S. G. Gmelin) Postels and Ruprecht, respectively. Gmelin did not illustrate *Fucus bracteatus*, but he cited a description and figures published by Seba (1761, p. 192, pl. CIII, nos. 1-3), which are clearly representative of the alga currently known as *Gigartina bracteata* (S. G. Gmelin) Setchell and Gardner. The citation of the Indian Ocean as a provenance of all three species is puzzling since *Agarum cribrosum* is restricted to the North Pacific and North Atlantic, *Thalassiophyllum clathrus* to the North Pacific, and *Gigartina bracteata* to the Atlantic shores of South Africa. An explanation presents itself in the case of *Fucus bracteatus* by Gmelin's citation of *Agarum secundum*, sive *bracteatum* ["brachiatum"]... *Alga bracteolata* ["bracheolata"] of Rumphius (1750, p. 186) from Amboina, Indonesia, along with the Seba reference, but no clues are offered by the protologues of *F. agarum* and *F. clathrus*, which include no literature citations. The *Agarum secundum* sive *bracteatum* of Rumphius has been identified as *Sarcodia montagneana* (J. Hooker and Harvey) J. Agardh by Zaneveld

(1959, p. 280).

Agarum Bory de Saint-Vincent (1826, pp. 192, 193) entails the deliberate reuse of a name that had previously been applied to another alga by another author. Bory described *Agarum* in the ninth volume of the *Dictionnaire Classique d'Histoire Naturelle* as a new genus of the new family Laminariées, but he had already given, in the first volume (Bory, 1822, p. 145), a brief account of *Agarum* Link (1809, p. 7), which he referred to the genus *Delesseria* Lamouroux. *Agarum* Bory was intended to segregate those species of *Laminaria* that have one or more longitudinally percurrent ribs. The name-bringing species, and logical type, is *Fucus agarum* S. G. Gmelin, constituting an unnamed section of the genus, which was characterized as having a midrib and a cribose blade. Bory gave a fallacious derivation of the generic name, stating that it had been borrowed by phycologists from some northern language, in which it designates edible marine algae. To avoid creating a tautonym, Bory proposed a new epithet, *cribosum*. To *Fucus costatus* Turner (1816, p. 72, pl. 226), which has five ribs and constituted a second unnamed section, Bory applied the name *Agarum quinquecostatum*, the epithet being changed unnecessarily. Three additional species, constituting a third unnamed section, shared the feature of having "pinnules" (sporophylls) on the stipe below a blade with a midrib: *Agarum esculentum*, based on *Fucus esculentus* Linnaeus (1767, p. 135), and two new species from Newfoundland, *A. delisei* and *A. pylaii*. Gaillon (1828, pp. 357-358) accepted Bory's *Agarum*, but illegitimately changed *A. cribosum* Bory to *A. cribrum* Gaillon.

In a worldwide synopsis of marine algae that prefaces his *Algae Britannicae*, Greville (1830, p. xxxix) recognized the three sections of Bory's *Agarum* as distinct genera. *Agarum* was restricted to species with a midrib and a cribose blade and was assigned *Fucus clathrus* S. G. Gmelin (as *Agarum clathrus*) in addition to *A. cribosum*. The new genus *Costaria* was established to receive *Fucus costatus* Turner, the epithet again being changed unnecessari-

ly, to *turneri*. The three species of *Agarum* with "pinnules" constituted the new genus *Alaria*.

Postels and Ruprecht (1840, p. 11) adopted Greville's classification, but further segregated *Fucus clathrus* into its own genus, *Thalassiophyllum*. Moreover, *Thalassiophyllum*, *Agarum*, and *Costaria* were removed from the Laminariaeae to their own group, Agaroidae, for which Agara S. G. Gmelin was cited as a synonym. (Although Postels and Ruprecht did not designate the rank of Agaroidae, its position is coordinate with groups currently interpreted as families). Postels and Ruprecht distinguished three species and two additional forms of *Agarum* on the basis of the width and thickness of the midrib and the pattern of the holes in the blade. Confusingly, *A. cribosum* Bory was renamed *A. gmelinii* ("gmelini"), a name attributed by Postels and Ruprecht to a manuscript by the elder Mertens. The alga illustrated by Turner (1809, p. 10, pl. 75) as *Fucus agarum* was described as a new species, *A. turneri*. A third species, *A. pertusum*, based on *Fucus pertusus* Mertens fil. (1829, p. 53) from Kamchatka, comprised f. *brassicaeforme* and f. *platyneurum* in addition to the typical form.

Endlicher (1843, p. 27-28) adopted the classification proposed by Postels and Ruprecht, but reunited *Thalassiophyllum* and *Agarum* with the Laminariaeae. He incorrectly attributed *Agarum* to Greville, obviously following the circumscription method rather than the type method in designating this name. The authorship was further changed to Postels and Ruprecht by J. Agardh (1848, p. 140) and to (Bory) Postels and Ruprecht by Setchell (1912, p. 154).

The various species of *Agarum* that were recognized by Postels and Ruprecht were merged into one by Setchell (1912, p. 154) and Setchell and Gardner (1925, p. 615), who restored for it what was thought to be the earliest legitimate name, *A. cribosum*. Setchell (1912, p. 154), however, incorrectly cited its authorship as "(Mert.) Bory", confusing *Fucus cribosus* Mertens fil. (1829, p. 52), which was a new species based on Turner's concept of *F.*

agarum and thus an earlier nomenclatural synonym of *Agarum turneri* Postels and Ruprecht, with *Agarum cribrosum* Bory. Although this error was corrected by Setchell and Gardner (1925, p. 615), it has persisted to the present (Taylor, 1937, p. 197; 1957, p. 185; South and Hooper 1980, p. 42; South and Tittley, 1986, p. 30).

The need to conserve *Agarum* Bory against the earlier homonym *Agarum* Link was recognized by Tandy, who published a formal proposal (in Sprague 1935, p. 82), which was approved by the Eighth International Botanical Congress at Paris in 1954. Although the typification and taxonomic placement of rejected earlier homonyms is purely academic, an explanation of the changes in the entry for *Agarum* in successive editions of the ICBN will be useful to those who have been puzzled. In the Paris edition (1956), the type was correctly cited as *A. rubens* (L.) Link (*Fucus rubens* L.), while its taxonomic placement was not given. In the Montreal edition (1961), it was assigned to the Phyllophoraceae and indicated as a nomenclatural synonym of *Phyllophora*. Shortly afterward, Dixon (1964), having tracked down the unequivocal type specimen of *Fucus rubens* Linnaeus (1753, p. 1162), found that it was representative of *Phycodrys* in the Delesseriaceae rather than *Phyllophora*, as previously supposed by many authors. In the Leningrad edition (1978), therefore, the type of *Agarum* Link was changed to *A. rubens* sensu Link (syn. tax. *Phyllophora crispa* (Hudson) Dixon) since it is clear from Link's description and figures that he had *Phyllophora* rather than *Phycodrys* in hand. Because two views prevailed with regard to the typification of generic names, one of which assigned overriding importance to the material in the hands of the describer, the other to species cited in the protologue, proposals were made to the Nomenclature Section of the Thirteenth International Botanical Congress at Sydney in 1981 to clarify the situation. The resulting decision favored typification by cited species rather than by material in hand, so that in the Sydney edition of the ICBN (1983) the type of *Agarum*

Link was once again listed as *A. rubens* (L.) Link, but this time it was assigned to the Delesseriaceae.

One would hope that the entry for *Agarum* Bory vs. *Agarum* Link was finally stabilized, but that is not the case. Dumortier, a Belgian botanist whose work on the classification of algae is generally unknown to phycologists, foreshadowed Bory by four years in segregating the species of *Laminaria* with ribbed blades into a separate genus, which he also called, not surprisingly, *Agarum* (Dumortier, 1822, p. 102). Although Dumortier's account lacks precise literature citations, it is clear that he based his *Agarum* on *Laminaria* [sect.] *Costatae* C. Agardh (1817, p. XIII; 1820, p. 109), which included the same three species. *Laminaria agarum* (S. G. Gmelin) C. Agardh became *Agarum clathratum* Dumortier, *L. costata* C. Agardh (*Fucus costatus* Turner 1816, non Stackhouse 1801) became *A. costatum* (C. Agardh) Dumortier, and *L. esculenta* (L.) C. Agardh became *A. esculentum* (L.) Dumortier. Thus, *Agarum* Dumortier 1822 has the same circumscription as *Agarum* Bory 1826. While the disclosure of *Agarum* Dumortier does not affect the conservation of *Agarum* Bory, which is conserved against all earlier homonyms and nomenclatural synonyms, whether or not they are listed as *nomina rejicienda* (Art. 14.4 of the ICBN), it necessitates a change in the correct name of the type species. *Agarum cribrosum* Bory is an unintentionally superfluous name for *A. clathratum* Dumortier. Although *A. clathratum* antedates *Agarum* Bory, it is to be cited without change of authorship or date in accordance with Art. 68.3 of the ICBN. It is possible, however, to bring the specific name into agreement with the generic name with regard to date and authorship. To accomplish this goal it is necessary to emend the entry for *Agarum* in the list of conserved generic names. A formal proposal to make such an emendation will be published in the journal *Taxon*.

The nomenclatural synonyms of the various species discussed above that occur in northern Japan and nearby waters are summarized as follows:

- Agarum clathratum* Dumortier
Fucus agarum S. G. Gmelin 1768
Laminaria agarum (S. G. Gmelin) C. Agardh 1817
Agarum clathratum Dumortier 1822
Agarum cribrosum Bory 1826
Agarum cribrum Gaillon 1828
Agarum gmelinii Postels and Ruprecht 1840
(In addition, both *Fucus cribrosus* Mertens fil. 1829 and *Agarum turneri* Postels and Ruprecht 1840 are based on *Fucus agarum* sensu Turner 1809 and thus are nomenclatural synonyms of one another. They are currently considered taxonomic synonyms of *Agarum clathratum*.)
Thalassiophyllum clathrus (S. G. Gmelin) Postels and Ruprecht
Fucus clathrus S. G. Gmelin 1768
Laminaria clathrus (S. G. Gmelin) C. Agardh 1824
Agarum clathrus (S. G. Gmelin) Greville 1830
Thalassiophyllum clathrus (S. G. Gmelin) Postels and Ruprecht 1840
Costaria costata (C. Agardh) Saunders
Fucus costatus Turner 1816 (not *F. costatus* Stackhouse 1801)
Laminaria costata C. Agardh 1817 (treated as a new name in accordance with Art. 72, Note 1, Ex. 2 of the ICBN)
Agarum costatum (C. Agardh) Dumortier 1822
Agarum quinquecostatum Bory 1826
Costaria turneri Greville 1830
Costaria costata (C. Agardh) Saunders 1895

An unequivocally distinct species of *Agarum* with a flattened fringed stipe, *A. fimbriatum*, was described by Harvey (1862, p. 166) on the basis of collections dredged from Esquimalt Harbour, Vancouver Island, British Columbia, Canada by David Lyall and C. Wood. This species has a range with a remarkable disjunction, occurring from southeastern Alaska southward through Puget Sound and from the southern Channel Islands of California through Isla Todos Santos, Baja California, Mexico, but apparently

it is absent from the vast intervening stretch of coast.

Agarum oharaense, a species with characteristics intermediate between *A. clathratum* and *A. fimbriatum* was described from Chiba Prefecture, Japan, by Y. Yamada (1958, 1961). Yet another species, *A. yakishiriense*, was proposed by Y. Yamada (1962), but not validly published, on the basis of material from Yakishiri Island, Hokkaido. In a study of local variation in *A. clathratum* (as *A. cribrosum*) in Hokkaido and adjacent regions, I. Yamada (1974) recognized four forms, one of which was *f. yakishiriense* (*A. yakishiriense* Y. Yamada). Nakahara and I. Yamada (1974) conducted crossing experiments among these forms and found a high rate of interfertility. In deciding which of the four forms was nomenclaturally typical of the species, I. Yamada (1974) was able to make comparisons with two authentic specimens of *Fucus agarum* S. G. Gmelin housed at Leningrad (LE).

References

- Agardh, C. A. 1817. Synopsis algarum scandinavicae... Lundae [Lund].
 Agardh, C. A. 1820. Species algarum... Vol. 1, part 1. Lundae [Lund].
 Agardh, C. A. 1824. Systema algarum. Lundae [Lund].
 Agardh, J. G. 1848. Species genera et ordines algarum. Vol. 1. Lundae [Lund].
 Bory de Saint-Vincent, J. B. G. 1822. *Agarum*. Dict. Class. Hist. Nat. 1: 145.
 Bory de Saint-Vincent, J. B. G. 1826. Laminariées. Dict. Class. Hist. Nat. 9: 191-194.
 Dixon, P. S. 1964. Taxonomic and nomenclatural notes on the Florideae, IV. Bot. Not. 117: 56-78.
 Dumortier, B. C. 1822. Commentationes botanicae. Tournay.
 Endlicher, S. L. 1843. Mantissa botanica altera. Sistens generum plantarum supplementum tertium. Vindobonae [Wien].
 Gaillon, B. 1828. Thalassiophytes. Dict. Sci. Nat. [Levrault] 53: 350-406.
 Gmelin, S. G. 1768. Historia fucorum. Petropoli [Leningrad].
 Greville, R. K. 1830. Algae britannicae... Edinburgh.
 Harvey, W. H. 1862. Notice of a collection of algae made on the north-west coast of North America, chiefly at Vancouver's Island, by David Lyall, Esq., M. D., R. N., in the years 1859-61. J. Linn. Soc.,

- Bot. 6: 157-177.
- Link, H. F. 1809. Nova plantarum genera e classe Lichenum, Algarum, Fungorum. Neues J. Bot. 3(1/2): 1-19.
- Linnaeus, C. 1753. Species plantarum... Holmiae [Stockholm].
- Linnaeus, C. 1767. Mantissa plantarum... Holmiae [Stockholm].
- Mertens, [K.] H. 1829. Zwei botanisch-wissenschaftliche Berichte vom Dr. Heinrich Mertens... Erster Bericht über verschiedene *Fucus*-Arten, an den Vater, Prof. Mertens in Bremen. Linnæa 4: 43-58.
- Nakahara, H. and I. Yamada. 1974. Crossing experiments between four local forms of *Agarum cribrosum* Bory (Phaeophyta) from Hokkaido, northern Japan. J. Fac. Sc. Hokkaido Univ., Ser V (Bot.) 10: 49-54.
- Postels, A. and F. Ruprecht. 1840. Illustrationes algarum... Petropoli [Leningrad].
- Rumphius, G. E. 1750. Herbarium amboinense... Vol. 6. Amstelaedami [Amsterdam].
- Saunders, De A. 1895. A preliminary paper on *Costaria* with description of a new species. Bot. Gaz. 20: 54-58.
- Seba, A. 1761. Locupletissimi rerum naturalium thesauri... Vol. 3. Amstelaedami [Amsterdam].
- Setchell, W. A. 1912. The kelps of the United States and Alaska. In: F. K. Cameron, A preliminary report on the fertilizer resources of the United States. 62nd Congress, 2nd Session, Senate Doc. 190: 130-178.
- Setchell, W. A. and N. L. Gardner. 1925. The marine algae of the Pacific coast of North America. Part III. Melanophyceae. Univ. Calif. Publ. Bot. 8: 383-898.
- South, G. R. and R. G. Hooper. 1980. A catalogue and atlas of the benthic marine algae of the island of Newfoundland. Memorial Univ. Newfoundland Occas. Pap. Biol. 3.
- South, G. R. and I. Tittley. 1986. A checklist and distributional index of the benthic marine algae of the North Atlantic Ocean. Huntsman Marine Laboratory, St. Andrews [New Brunswick, Canada].
- Sprague, T. A. (ed.). 1935. Additions and amendments to the International Rules of Botanical Nomenclature, ed. 3. Kew Bull. 1935: 65-92.
- Taylor, W. R. 1937. Marine algae of the northeastern coast of North America. Ann Arbor, Michigan.
- Taylor, W. R. 1957. Marine algae of the northeastern coast of North America. Revised edition. Ann Arbor, Michigan.
- Turner, D. 1809. Fuci... Vol. 2. London.
- Turner, D. 1816 ("1819"). Fuci... Vol. 4. London.
- Yamada, I. 1974. Local variation in *Agarum cribrosum* Bory (Phaeophyta) on the coasts of Hokkaido and adjacent regions. J. Fac. Sc. Hokkaido Univ., Ser. V (Bot.) 10: 32-47.
- Yamada, Y. 1950. [An interesting alga, *Agarum oharaense* Yam. sp. n., from Ohara, Chiba Prefecture.] Bull. Jap. Soc. Phycol. 6: 37-39. (Japanese only.)
- Yamada, Y. 1961. Two new species of marine algae from Japan. Bull. Res. Council Israel, Sect. D, Bot. 10: 121-125.
- Yamada, Y. 1962. [On the species of *Agarum*.] Acta Phytotax. Geobot. 20: 275-279. (Japanese only.)
- Zaneveld, J. S. 1960. An identification of the algae mentioned by Rumphius. In: H. C. D. de Wit (ed.), Rumphius memorial volume. Amsterdam. pp. 277-280.

Paul C. Silva: *Agarum* (褐藻綱コンブ科) に関する命名上の所見

属名 *Agarum* (コンブ科) は, Bory de Saint-Vincent によって, *Fucus agarum* S. G. Gmelin にもとづき命名されたものとされている。彼は, 反復名を避けるため, タイプ種の呼び名を *cribrosum* に変更している。しかしながら, 属名 *Agarum* を使ったのは, Dumortier (1822) が最初であって, 属名が *Laminaria agarum* (S. G. Gmelin) Agardh にもとづいていたことから, 彼もタイプ種の呼び名を *clathratum* に変えている。したがって, たとえ属名のオーサー名として Bory を保留したとしても, タイプ種の名称は *Agarum clathratum* とするほうが正しいといえる。保留名のリスト (国際植物命名規約付録 IIIA) に *Agarum* の登録を修正する必要はないとはいえ, もし修正すれば属名の命名年がタイプ種の命名年より遅いという不格好な状態からのがれることができるであろう。(Herbarium, University of California, Berkeley, California 94720, U.S.A.)