

Resolving the status of *Chondria boryana* (Rhodomelaceae, Rhodophyta)

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The red alga *Chondria boryana* (Ceramiales, Rhodomelaceae) has been reported throughout the Mediterranean Sea usually with the authorship “(De Not[aris]) De Toni” (e.g., Feldmann 1943; Boudouresque & Perret 1977; Ribera & Gómez Garreta 1984; Perret-Boudouresque & Seridi 1989; Conde *et al.* 1996; Rindi *et al.* 2002; Tsiamis & Panayotidis 2016), or “(J. Agardh) De Toni” (e.g., Gómez-Garreta *et al.* 2001; Furnari *et al.* 2003; Taskin *et al.* 2008; Rodríguez-Prieto *et al.* 2013; Gallardo *et al.* 2016). Debray (1893) reported *Chondria boryana* Bornet, while Tsiamis & Panayotidis (2016) and Athanasiadis (2006) reported *C. boryana* (De Notaris ex J. Agardh) Bornet. Rodríguez y Femenías (1889) recorded *Chondriopsis boryana* J. Agardh. Godeh *et al.* (1992) and Said & Godeh (2008) reported this species under the name *Chondriopsis mediterranea* (Kützing) J. Agardh. These questions arise: What is the taxonomic and nomenclatural status of this taxon and what is its correct authorship? This note aims to answer these questions.

This nomenclatural maze starts with *Gigartina denudata* Bory (1832: 322), a species with a type locality of Cap Ténare [presently known as Cape Matapan], situated at the end of the Mani Peninsula, Greece. A decade later De Notaris (1842: 289) described *Laurencia boryi* De Notaris from the Ligurian coast of Italy, saying that his material corresponded with a specimen collected by Bory in Montagne’s herbarium; however, he cited *Gigartina denudata* Bory in synonymy. Thus, De Notaris’s unwarranted change of epithet rendered *L. boryi* nomenclaturally illegitimate. J. Agardh (1842: 113) described *Laurencia boryana* De Notaris ex J. Agardh from Nice and Toulon, France, but J. Agardh (1842: 114) also included *G. denudata* Bory and his name is thus also illegitimate. Likewise, *Chondriopsis boryana* J. Agardh (1863: 799) is also illegitimate as it also included *G. denudata* Bory in synonymy as well as *Carpocaulon mediterraneum* Kützing in synonymy. In their treatment of *Laurencia* from the Mediterranean Sea, Furnari *et al.* (2001) treated *L. boryi* De Notaris (1842) and *L. boryana* J. Agardh (1842) as illegitimate names and categorised them both taxonomically as “*taxa inquirenda*”.

The next significant step was the work by Bornet (1892: 303), who reported *Chondria boryana* from Marseille, France. He recognized that De Notaris (1842) was incorrect in treating *Gigartina denudata* Bory as a *Laurencia*. According to Bornet, Bory’s herbarium specimens of *G. denudata* were clearly *Alsidium corallinum* C. Agardh (1827: 639). Accordingly, Bornet explicitly excluded *Gigartina denudata* Bory when he used the name *Chondria boryana*. Therefore, in accordance with Art. 58.1 of the Melbourne ICN (McNeill *et al.*, 2012), *Chondria boryana* is to be treated as a new name based on Schousboe material from Marseille, France, and not on Bory’s material from Cap Ténare, Greece. The Bornet name thus dates from 1892 and is a valid and legitimate new name. Three collections in the Muséum national d’Histoire naturelle Paris, namely, PC0571187, PC0571188 and PC0571189 appear to be protologue material of *Chondria boryana* Bornet, all collected by P.K.A. Schousboe in June, 1820 from Marseille, France, and now in Herb. G. Thuret, PC. “*Chondria repanda* Schousboe” on the specimens is an unpublished and thus invalid name. The specimen PC0571188 is here designated the lectotype of *Chondria boryana* Bornet and is shown here as Fig. 1.

A name exists that has been treated as a heterotypic taxonomic synonym of *Chondria boryana*, namely, *Carpocaulon mediterraneum* Kützing (1843: 436, pl. 57 II: fig. 1 [α majus], fig. 2 [β minus]). *Carpocaulon mediterraneum* is the generitype of *Carpocaulon* and has syntype localities of the Golf von Neapel, Gaëta, and Genua [all in Italy]. Various authors (e.g., J. Agardh 1863; Ardissonne 1883; De Toni 1903; Feldmann 1943) have treated *Carpocaulon mediterraneum* Kützing (Kützing 1843, 1865: 16, pl. 42: figs a-d) as conspecific with *Chondria boryana*. This proposal was first made by Kützing (1849: 852), who treated *Gigartina denudata* Bory and *Laurencia boryi* De Notaris as taxonomic synonyms of his *C. mediterraneum*. De Toni (1903), Kylin (1956), and

Schneider & Wynne (2007) have regarded *Carpocaulon* as congeneric with *Chondria*. At the time of its original description, Kützing (1843) recognized two infraspecific taxa: “ α majus” and “ β minus”. Earlier, Kützing (1836: 15) had given the name *Chondria mediterranea* in a list without a description or illustrations. The binomial *Chondriopsis mediterranea* was used by Gómez-Garreta et al. (2001), who credited J. Agardh, but that combination was not made by J. Agardh (1863). The basionym was not cited by Gómez-Garreta *et al.* (2001), and so that binomial is invalid.

Ms Nicolien Sol and Dr Willem Prud’homme van Reine kindly conducted a search for protologue material of *Carpocaulon mediterraneum* in Kützing’s herbarium at Leiden. Three collections, now filed as “*Chondria boryana* (Denot.) De Toni”, bear the name *Carpocaulon mediterraneum* Kützing. At least two of these appear to be protologue material, each with a name of one of the syntype localities. L 4043023 is from “Genua”. L 4043016 is from “Neapel” and has a packet with a total of 14 cards with algal mounts (Fig. 2) all apparently collected at the same time. Arts 8.2 and 8.3 of the ICN Melbourne Code (McNeill *et al.* 2012) permit such a “gathering” to serve as a collection, and therefore this gathering is here designated the lectotype of *Carpocaulon mediterraneum*.

As pointed out above, there is a general consensus that *Carpocaulon mediterraneum* Kützing (1843) and *Chondria boryana* Bornet (1892) are conspecific; as the former name has priority, the following binomial is proposed:

Chondria mediterranea (Kützing) M.J.Wynne, *comb. nov.*

Basionym: *Carpocaulon mediterraneum* Kützing, *Phycologia generalis*, p. 436, pl. 57 II: figs 1-7. 1843.

Heterotypic synonyms

Chondria boryana Bornet 1892: 143 [303].

Chondria boryana De Toni 1903: 833. *nom. illeg.* [a later homonym of *Chondria boryana* Bornet (1892)]

An unrelated species is:

Alsidium corallinum C.Agardh 1827: 639.

Heterotypic synonym (*fide* Bornet 1892): *Gigartina denudata* Bory 1832: 322.

Homotypic synonyms of *Gigartina denudata* [and thus of *Alsidium corallinum*]:

Laurencia boryi De Notaris 1842: 489, *nom. illeg.*

Laurencia boryana De Notaris ex J.Agardh 1842: 113, *nom. illeg.*

Chondriopsis boryana J.Agardh 1863: 799, *nom. illeg.*

Carpocaulon denudatum (Bory) Kuntze, 1898: 398

Finally, a collection of *Gigartina denudata* Bory in Herbarium Montagne in PC (PC0059394) is here designated the lectotype (Fig. 3). Another six collections (PC0059395 – PC0059397, PC0059399 – PC0059401) from Nice, France, and from Algeria, all collected by De Notaris, are on the same sheet in PC and were identified by De Notaris with a miscellany of names such as *Gigartina denudata* Bory, *Laurencia boryana* De Notaris, *Carpocaulon mediterraneum* var. *minus* Kützing, and “*Alsidium corallinum?* Ag.”

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- Agardh, C.A. (1827). Aufzählung einiger in den österreichischen Ländern gefundenen neuen Gattungen und Arten von Algen, nebst ihrer Diagnostik und beigefügten Bemerkungen. *Flora* 10: 625-646.
- Agardh, J.G. (1842). *Algae maris Mediterranei et Adriatici*, observationes in diagnosis specierum et dispositionem generum. pp. [i]-x, 1-164. Parisiis [Paris]: Apud Fortin, Masson et Cie.
- Agardh, J.G. (1863). *Species genera et ordines algarum*. Volumen secundum, part 3, pp. 787-1291. C.W.K. Gleerup, Lunda [Lund].
- Ardissone, F. (1883). *Phycologia Mediterranea. Parte Prima. Floridee*. pp. i-x, 1-516 pp. Antica Tipografia Ferri di Maj e Malnati, Varese.
- Athanasiadis, A. (2016). *Phycologia Europaea Rhodophyta Vol. I*. pp. [i]-xxxxviii, 1-762. Thessaloniki: Published and distributed by the author.
- Bornet, E. (1892). Les algues de P.-K.-A. Schousboe. *Mémoires de la Société des Sciences Naturelles et Mathématiques de Cherbourg* 28: 165-376, pls I-III.
- Bory de Saint-Vincent, J.B.G.M. (1832). Hydrophytes. In: *Expédition scientifique de Morée. Section des sciences physiques. Tome III. 2e partie. Botanique, pp. 1-367 [368]*. (Bory de Saint-Vincent, J.B.G.M., Ed.), pp. 316-337. Paris & Strasbourg: Chez F. G. Levrault, imprimeur-libraire, rue de la Harpe, n.º 81; même maison, rue des Juifs, n.º 33 (Strasbourg, imprimerie de Levrault).
- Boudouresque, C.-F. & Perret, M. (1977). Inventaire de la flora marine de Corse (Méditerranée): Rhodophyceae, Phaeophyceae, Chlorophyceae et Bryopsidophyceae. *Bibliotheca Phycologica* 25: 1-171.
- Conde, F., Flores-Moya, A., Soto, J., Altamirano, M. & Sánchez, A. (1996). Check-list of Andalusia (S. Spain) seaweeds. III. Rhodophyceae. *Acta Botanica Malacitana* 21: 7-33.
- Debray, F. (1893). Liste des algues marines et d'eau douce récoltées jusqu'à ce jour en Algérie. *Bulletin scientifique de la France et de la Belgique* 25: 174-192.
- De Notaris, G. (1842). Algologiae maris ligustici specimen. *Memorie dell'Accademia delle Scienze di Torino, ser. 2*, 4: 273-315, 7 pls.
- De Toni, G.B. (1903). *Sylloge algarum omnium hucusque cognitarum. Vol. IV. Florideae. Sectio III*. pp. [i], frontispiece, [iii-v], 775, 775 bis, 776, 777 bis, 777-1521 + 1523-1525. Patavii [Padua]: Sumptibus auctoris.
- Feldmann, J. (1943). [“1942”]. Les algues marines de la côte des Albères, IV. Cérámiales. *Travaux Algologiques* 1: 29-113.
- Furnari, G., Cormaci, M. & Serio, D. (2001). The *Laurencia* complex (Rhodophyta, Rhodomelaceae) in the Mediterranean Sea: an overview. *Cryptogamie Algologie* 22: 331-373.
- Furnari, G., Giaccone, G., Cormaci, M., Alongi, G. & Serio, D. (2003). Biodiversità marina delle coste italiane: catalogo del macrofitobenthos. *Biologia Marina Mediterranea* 10(1): 1-482.
- Gallardo, T., Bárbara, I., Afonso-Carrillo, J., Bermejo, R., Altamirano, M., Gómez Garreta, A., Barceló Martí, M.C., Rull Lluch, J., Ballesteros, E. & De la Rosa, J. (2016). Nueva lista

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- crítica de las algas bentónicas marinas de España. A new checklist of benthic marine algae of Spain. *Algas. Boletín Informativo de la Sociedad Española de Ficología* 51: 7-52.
- Godeh, M.M., Nizamuddin, M. & El-Menifi, F.A. (1992). Marine algae from eastern coast of Libya (Cyrenaica). *Pakistan Journal of Botany* 24: 11-21.
- Gómez Garreta, A., Gallardo, T., Ribera, M.A., Cormaci, M., Furnari, G., Giaccone, G. & Boudouresque, C.-F. (2001). Checklist of the Mediterranean seaweeds. III. Rhodophyceae Rabenh. 1. Ceramiales Oltm. *Botanica Marina* 44: 425-460.
- Kuntze, O. (1898). *Revisio generum plantarum. Pars III (3)*. pp. 1-576. Leipzig, London, Milano, New York, Paris: Arthur Felix, Dulau & Co., U. Hoepli, Gust. A. Schechert, Charles Klincksierck.
- Kützing, F.T. (1836). Pflanzenverkauf. *Flora oder Botanische Zeitung* 19(2). *Intelligenzblatt*. Zweiter Band. Pp. 13-16.
- Kützing, F.T. (1843). *Phycologia generalis* oder Anatomie, Physiologie und Systemkunde der Tange. Mit 80 farbig gedruckten Tafeln, gezeichnet und gravirt vom Verfasser. pp. [part 1]: [i]-xxxii, [1]-142, [part 2:] 143-458, 1, err.], pls 1-80. Leipzig: F.A. Brockhaus.
- Kützing, F.T. (1849). *Species algarum*. pp. [i]-vi, [1]-922. Lipsiae [Leipzig]: F.A. Brockhaus.
- Kützing, F.T. (1865). *Tabulae phycologicae*; oder, Abbildungen der Tange. Vol. XV pp. [i-iii], 1-36, 100 pls. Nordhausen: Gedruckt auf kosten des Verfassers (in commission bei W. Köhne).
- Kylin, H. (1956). *Die Gattungen der Rhodophyceen*. . pp. xv + 673. Lund: C.W.K. Gleerup
- McNeill, J., Barrie, F.R., Buck, W.R., Demoulin, V., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Prado, J., Prud'homme van Reine, W.F., Smith, G.F., Wiersema, J.H. & Turland, N.J. (2012). *International Code of Nomenclature for algae, fungi and plants (Melbourne Code)* adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011 Regnum Vegetabile, Vol. 154. pp. [i]-xxx, 1-208. Königstein: Koeltz Scientific Books.
- Perret-Boudouresque, M. & Seridi, H. (1989). *Inventaire des algues marines benthiques d'Algerie*. pp. [i-v], 1-117. Marseille: GIS Posidonie Publ.
- Preda, A. (1909). *Flora Italica cryptogama. Pars II: Algae*. Vol. 1. Fasc. 1. pp. i-iii, 1-462, Errata. Società Botanica Italiana. Rocca S. Casciano, Stabilimento Tipografico Cappelli.
- Ribera Siguán, M.A. & Gómez Garreta, A. (1984). Catálogo de la flora bentónica marina de las Islas Baleares, I (Rhodophyceae). *Collectanea Botanica* (Barcelona) 15: 377-406.
- Rindi, F. Sartoni, G. & Cinelli, F. (2002). A floristic account of the benthic marine algae of Tuscany (Western Mediterranean Sea). *Nova Hedwigia* 74: 201-250.
- Rodríguez y Femenías, J.J. (1889). Algas de las Baleares. *Anales de la Sociedad Española de Historia Natural* 18: 199-274, pls III, IV.
- Rodríguez-Prieto, C., Ballesteros, E., Boisset, F. & Afonso-Carrillo, J. (2013). *Guía de las macroalgas y fanerógamas marinas del Mediterráneo occidental*. pp. [1]-656. Barcelona: Ediciones Omega, S.A.
- Said, A.A. & Godeh, M.M. (2008). Marine algae of Tukra and Tolmeta coasts, Libya. *Egyptian Journal of Phycology* 9: 167-179.
- Schneider, C.W. & Wynne, M.J. (2007). A synoptic review of the classification of red algal genera a half century after Kylin's "Die Gattungen der Rhodophyceen". *Botanica Marina* 50: 197-249.
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Taskin, E., Öztürk, M., Kurt, O. & Öztürk, M. (2008). *The check-list of the marine algae of Turkey*. pp. [i-ii]-[1]-87. Manisa, Turkey: Ecem Kirtasiye.

Tsiamis, K. & Panayotidis, P. (2016). Seaweeds of the Greek coasts: Rhodophyta: Ceramiales. *Acta Adriatica* 57(2): 227-249.

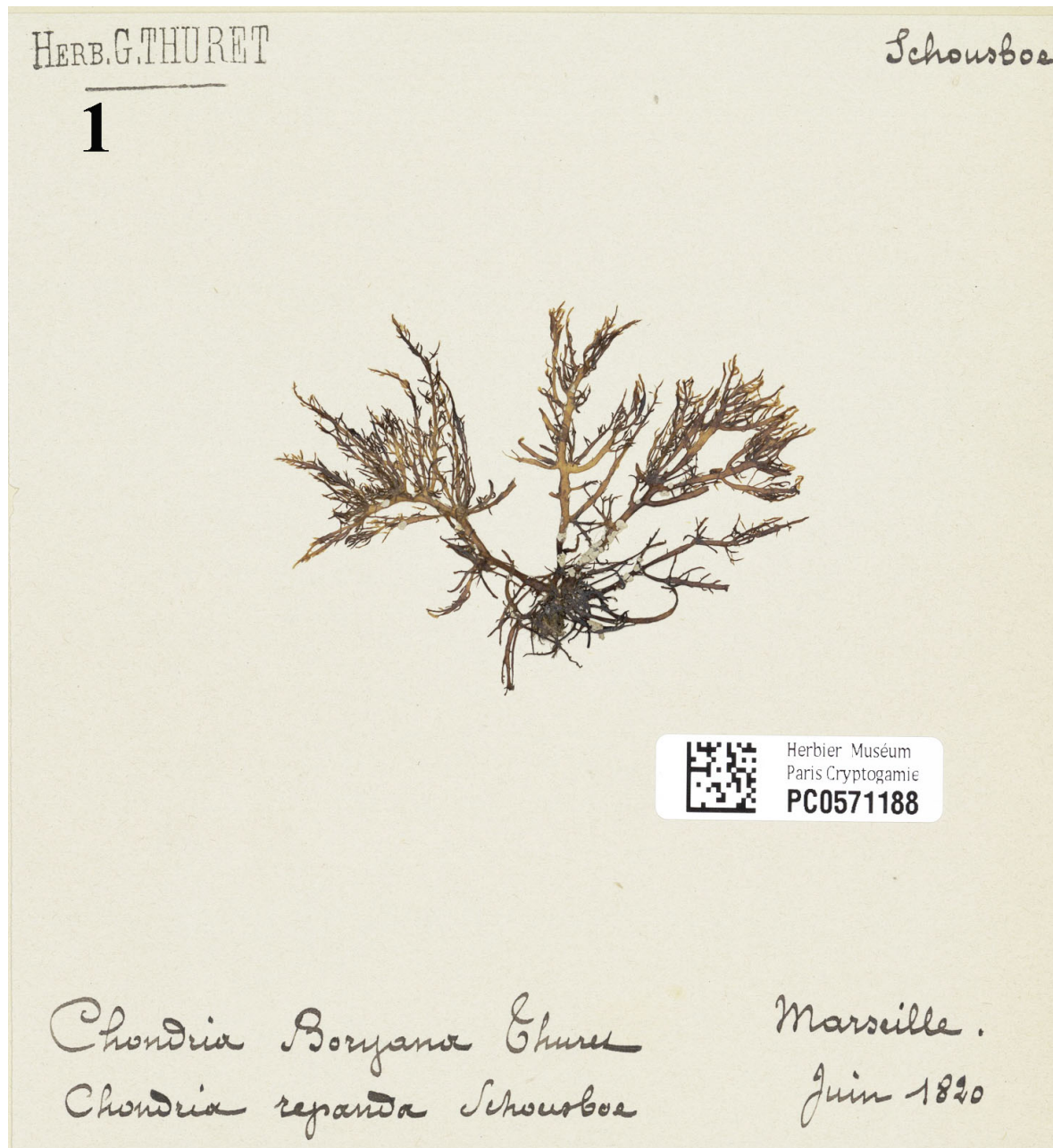


Fig. 1. *Chondria boryana* Bornet. Lectotype (here designated) in Muséum national d'Histoire naturelle Paris. PC0571188.

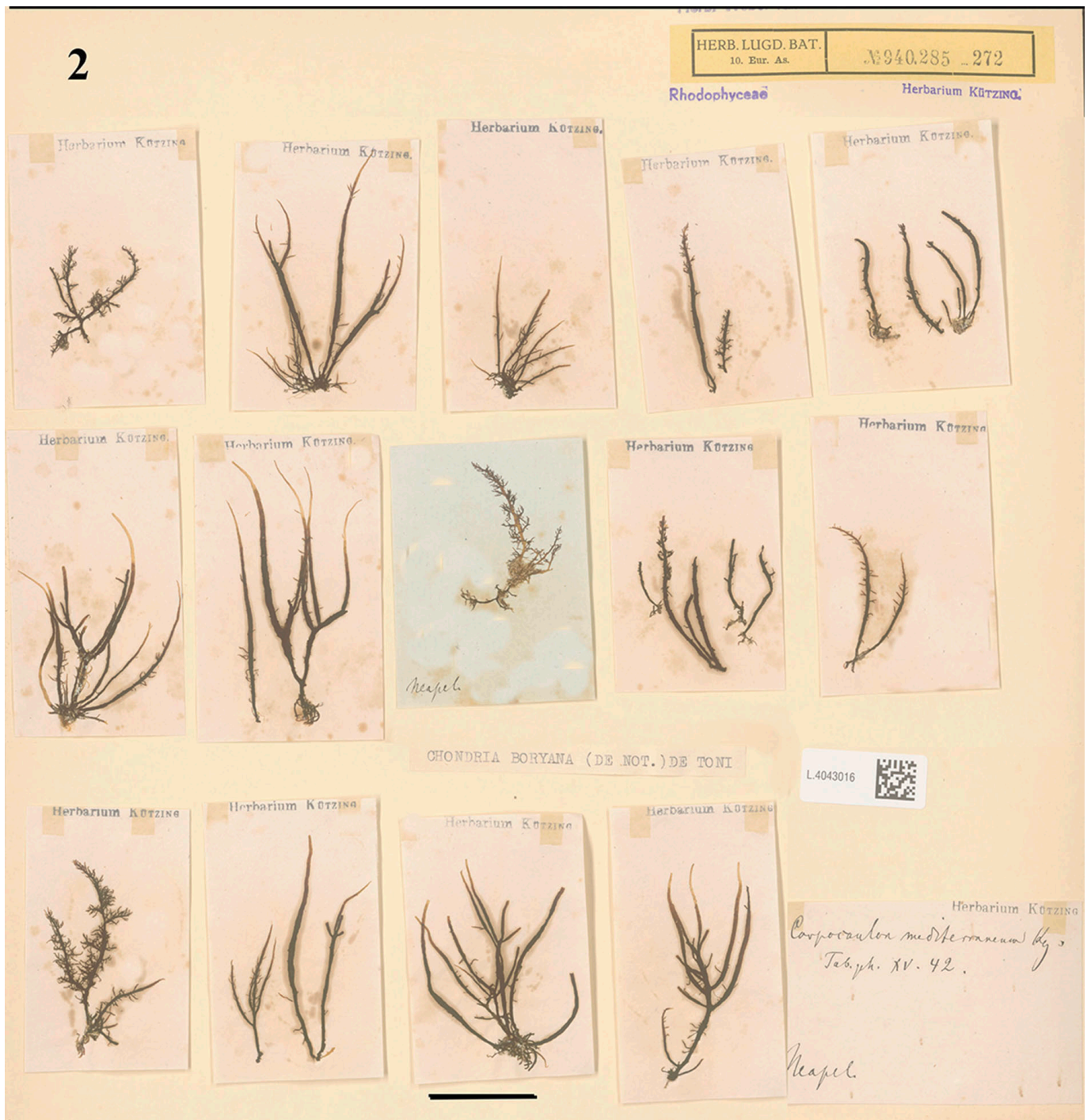


Fig. 2. *Carposcaulon mediterraneum* Kützinger. Lectotype sheet (here designated) in Naturalis Biodiversity Center. L 4043016. Scale bar: 3 cm.

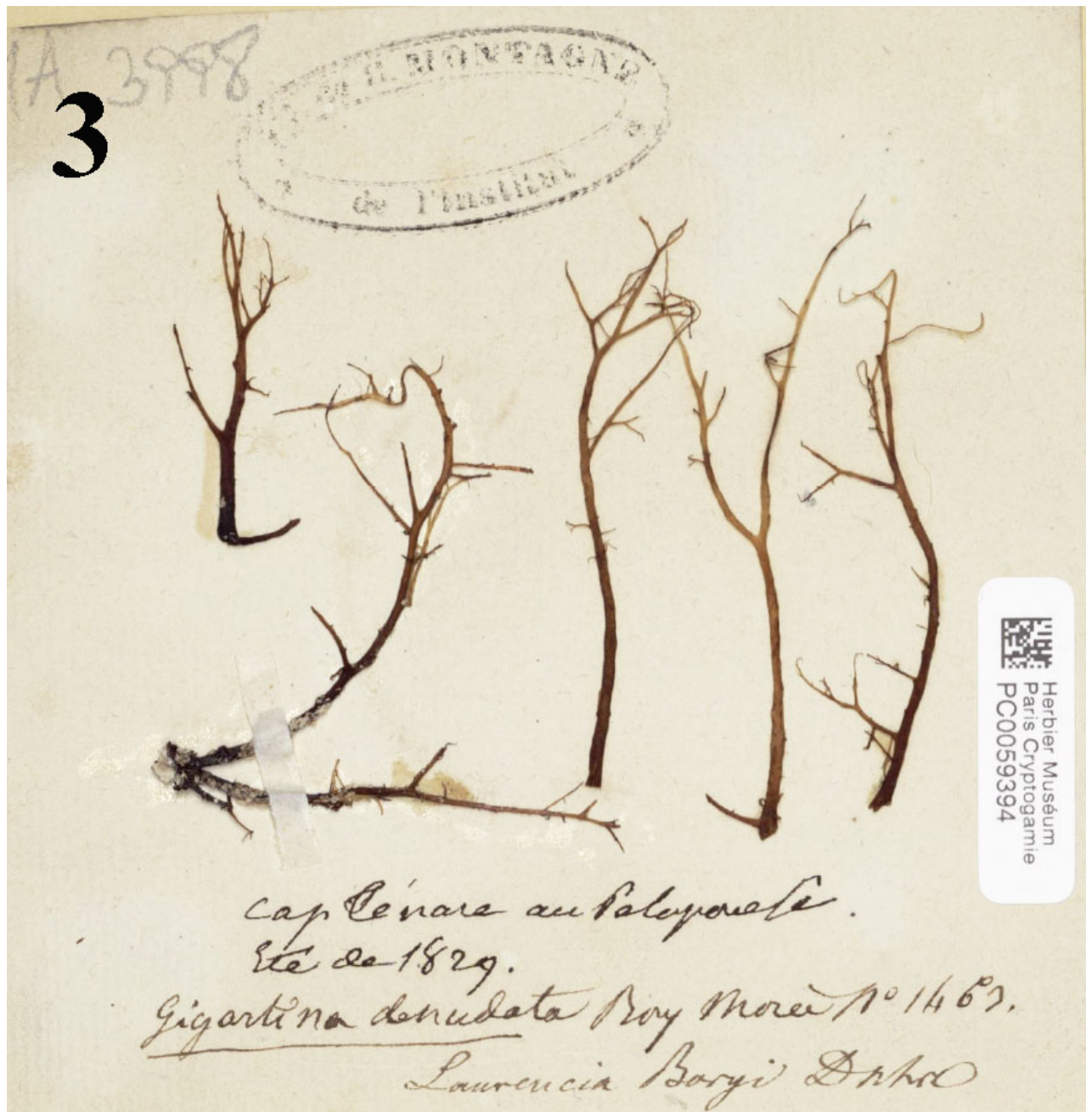


Fig. 3. *Gigartina denudata* Bory. Lectotype (here designated) in Muséum national d'Histoire naturelle Paris. PC0059394.