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The marine macroalgae of Cabo Verde archipelago: an updated checklist

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An updated list of the names of the marine macroalgae of Cabo Verde, an archipelago of ten volcanic islands in the central Atlantic Ocean, is presented based on existing reports, and includes the addition of 36 species. The checklist comprises a total of 372 species names, of which 68 are brown algae (Ochrophyta), 238 are red algae (Rhodophyta) and 66 green algae (Chlorophyta). New distribution records reveal the existence of 10 putative endemic species for Cabo Verde islands, nine species that are geographically restricted to the Macaronesia, five species that are restricted to Cabo Verde islands and the nearby Tropical Western African coast, and five species known to occur only in the Maraconesian Islands and Tropical West Africa. Two species, previously considered invalid names, are here validly published as *Colaconema naumannii* comb. nov. and *Sebdenia canariensis* sp. nov.

Key words: *Cabo Verde islands, Macaronesia, Marine flora, Seaweeds, Tropical West Africa.*

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INTRODUCTION

The Republic of Cabo Verde is an archipelago situated in a region in the Northeast Atlantic Ocean known as the Macaronesia, which also contains the Portuguese archipelagos of the Azores and Madeira (including the Selvagens) and the Spanish archipelago of the Canaries (Sangil et al. 2018). Cabo Verde archipelago is located 570 km west of Senegal (West Africa), and comprises 10 main islands and eight minor islets divided in two groups, the Windward and the Leeward islands, with a total coastline of 979 km and an Exclusive Economic Zone of 796.555 km2 (Menini et al. 2018).

The marine flora of Cabo Verde islands has been studied since 1896 (see revision in Otero-Schmitt 1995), with the most recent checklist for the archipelago published in 2005 by Prud'homme van Reine et al. Since then, few studies and reports have been published with the characterization of the Caboverdean marine biota (e.g. Silva 2012; Berecibar et al. 2013, Sangil et al. 2018), but an updated list of the names of the archiepelago's marine macroalgae is not available. The Distribution Tool available on the AlgaeBase Website delivers an incomplete species list for Cabo Verde, mostly lacking the species that went through taxonomic and nomenclatural changes since 2005.

The present work aims to fulfill this gap, by producing an updated list based on published records, with recent additions (Afonso-Carillo et al. 2006; Wilkes et al 2006; Almada et al. 2010;

Berecibar et al. 2013; Tronholm et al. 2013; Sangil et al. 2018), nomenclatural corrections (Guiry & Guiry 2019, present work), and the inclusion of previously reported taxa (e.g. John et al. 2004) which were not considered in Prud'homme van Reine et al. (2005).

The resulting list comprises a total of 372 species, of which 68 are brown algae, 238 are red algae and 66 are green algae, the removal of six synonyms, nomenclatural correction of 84 taxa, addition of 36 species and the valid publication of two red algal species as *Colaconema naumannii* comb. nov. and *Sebdenia canariensis* sp. nov.

New distribution records also resulted in the recognition of 10 endemic species for Cabo Verde, nine species geographically restricted to Macaronesia and five species restricted to Cabo Verde islands and the nearby Tropical Western African coast. This confirms the African imprint in the Caboverdean marine flora as reported by Prud'homme van Reine (2005), though now with less species restricted to only those two areas (a reduction from 11 to five species). An African imprint is also detected on the Macaronesian marine flora, with five species limited to Tropical West Africa and the Macaronesian islands. The number of Caboverdean endemics is also reduced from the 21 names reported by Haroun-Tabraue (1998), since they have also been found in other areas.

Future taxonomic work is necessary to assess possible misidentifications in previous reports (e.g. Prud'homme van Reine 1982; Price et al. 1986; Lawson et al. 1995; Leliaert & Coppejans 2004) as well as the clarification of general taxonomic groups (e.g. Otero-Schmitt 1995; Berecibar et al. 2013; Sangil et al. 2018). Consequently, many species and genus names in this checklist may not be accurate because the taxonomic concepts of previous reports were based nearly exclusively on superficial morphological similarities without reference to type collections or comparative molecular systematics (with a few exceptions such as Tronholm et al. 2013 and Belton et al. 2014). Moreover, many of the listed names may be outdated because many recent advances in phycology and traditional morphology-based species delimitation often yield inaccurate estimates of seaweed diversity (Leliaert et al. 2013).

In a changing world with mounting evidence of global climate change and its related effects, changes in ocean circulation, ocean acidification, and spread of invasive species, the need for precise biodiversity assessment has never been greater. Therefore, it is of prime importance that the algae from Cabo Verde archipelago, as well as worldwide, be well characterized taxonomically and the short- and long-term trends in the diversity of their assemblages thoroughly examined with regard to seasonality in ephemeral, annual and perennial species (Brodie et al. 2009; Zenetos et al. 2010).

The framework, taxonomy, nomenclature, and authorities in this checklist are predominantly built upon the current synthesis of taxa in AlgaeBase (Guiry & Guiry 2019). Taxa indicated with an asterisk (*) denotes those listed in Prud'homme van Reine et al. (2005). It is beyond the scope of this paper to provide a rigorous assessment about the misapplication of species and genus names reported for Cabo Verde islands without a critical examination of the seaweed vouchers from the region. Nevertheless, this checklist is the first step to start estimating the true diversity of the seaweeds from Cabo Verde in relation to global marine biogeography.

Kingdom **Chromista**
Phylum **Ochrophyta**
Class **Phaeophyceae**
Subclass **Dictyotophycidae**
Order **Dictyotales**
Family **Dictyotaceae**

1. *Canistrocarpus crispatus* (J.V. Lamouroux) De Paula & De Clerck (as *Dictyota crispata* J.V. Lamouroux)*
2. *Dictyopteris delicatula* J.V. Lamouroux*
3. *Dictyopteris divaricata* (Okamura) Okamura (in Price et al. 1978)
4. *Dictyopteris prolifera* (Okamura) Okamura (in Price et al. 1978)
5. *Dictyota bartayresiana* J.V. Lamouroux*
6. *Dictyota canariensis* (Grunow) Tronholm (in Tronholm et al. 2013)
7. *Dictyota crenulata* J. Agardh*
8. *Dictyota dichotoma* (Hudson) J.V. Lamouroux*
9. *Dictyota fasciola* (Roth) J.V. Lamouroux*
10. *Dictyota friabilis* Setchell (as *Dictyota pfaffii* Schnetter; in Sangil et al. 2018)
11. *Dictyota humifusa* Hörnig, Schnetter & Coppejans*
12. *Dictyota implexa* (Desfontaines) J.V. Lamouroux (as *Dictyota divaricata* J.V. Lamouroux)*
13. *Dictyota jamaicensis* W.R. Taylor (in Tronholm et al. 2013)
14. *Dictyota liturata* J. Agardh*
15. *Dictyota menstrualis* (Hoyt) Schnetter, Hörning & Weber-Peukert (in John et al. 2004)
16. *Dictyota mertensii* (C. Martius) Kützing*
17. *Dictyota pinnatifida* Kützing (as *Dictyota alternans* (J. Agardh) Hörnig, Schnetter & Prud'homme van Reine)*
18. *Lobophora variegata* (J.V. Lamouroux) Womersley ex E.C. Oliveira*
    Note: The genus *Lobophora* is the subject of recent revisions (e.g. Camacho et al. 2019) and material from Cabo Verde needs to be critically examined in order to designate the correct species name.
19. *Padina gymnospora* (Kützing) Sonder*
20. *Padina pavonica* (Linnaeus) Thivy*
21. *Rugulopteryx suhrii* (Kützing) De Clerck & Coppejans (as *Dictyota suhrii* (Kützing) I. Hörnig, R. Schnetter & W.F. Prud'homme van Reine)*
22. *Stypopodium zonale* (J.V. Lamouroux) Papenfuss*
23. *Zonaria tournefortii* (J.V. Lamouroux) Montagne*

Subclass **Fucophycidae**

Order **Ectocarpales**

Family **Acinetosporaceae**

24. *Acinetospora crinita* (Carmichael) Sauvageau*
25. *Feldmannia irregularis* (Kützing) Hamel*
26. *Feldmannia mitchelliae* (Harvey) H.-S. Kim (as *Hincksia mitchelliae* (Harvey) P.C. Silva)*

Family **Chordariaceae**

27. *Levringia brasiliensis* (Montagne) A.B. Joly*
28. *Levringia natalensis* (Kützing) Kylin*

Family **Ectocarpaceae**

29. *Ectocarpus hamulosus* Harvey & Bailey*
    Note: Endemic.
30. *Ectocarpus simpliciusculus* C. Agardh (as *Feldmannia irregularis* (Kützing) Hamel; in John et al. 2004)
31. *Spongonema tomentosum* (Hudson) Kützing*

Family **Scytosiphonaceae**

32. *Chnoospora minima* (Hering) Papenfuss*
33. *Colpomenia sinuosa* (Mertens ex Roth) Derbès & Solier*
34. *Hydroclathrus clathratus* (C. Agardh) M. Howe*
35. *Rosenvingea intricata* (J. Agardh) Børgesen (in Sangil et al. 2018)
36. *Stragularia clavata* (Harvey) Hamel*

Order **Fucales**

Family **Sargassaceae**

37. *Cystoseira abies-marina* (S.G. Gmelin) C. Agardh*
38. *Cystoseira compressa* (Esper) Gerloff & Nizamuddin*

39. *Cystoseira foeniculacea* (Linnaeus) Greville*
40. *Cystoseira humilis* Schousboe ex Kützing*
41. *Cystoseira nodicaulis* (Withering) M. Roberts*
42. *Cystoseira sauvageauana* Hamel*
43. *Cystoseira selaginoides* Naccari (as *Cystoseira sauvageauana* Hamel)*
44. *Cystoseira sonderi* (Kützing) Piccone*
    Note: Endemic.
45. *Cystoseira tamariscifolia* (Hudson) Papenfuss*
46. *Cystoseira usneoides* (Linnaeus) M. Roberts*
47. *Sargassum acinarium* (Linnaeus) Setchell*
48. *Sargassum cymosum* C. Agardh*
49. *Sargassum natans* (Linnaeus) Gaillon*
50. *Sargassum platycarpum* Montagne*
51. *Sargassum rigidulum* Kützing (as *Sargassum cymosum* C. Agardh)*
52. *Sargassum subrepandum* var. *[rueppellii]* f. *turneri* (Kützing) Grunow (as *Sargassum turneri* (Kützing) Montagne)*
53. *Sargassum vulgare* C. Agardh*
    Note: John et al. (2003:57, 164) did not distinguish between *S. vulgare* and *S. vulgare* var. *foliosissimum*.

Order **Laminariales**
Family **Lessoniaceae**

54. *Ecklonia biruncinata* (Bory) Papenfuss (as *Ecklonia muratii* Feldmann)*
55. *Ecklonia muratii* Feldmann*
    Note: Restricted to Tropical West Africa and Macaronesia.
56. *Ecklonia radiata* (C. Agardh) J. Agardh (as *Ecklonia muratii* Feldmann)*

Order **Ralfsiales**
Family **Neoralfsiaceae**

57. *Neoralfsia expansa* (J. Agardh) P.-E. Lim & H. Kawai ex Cormaci & G. Furnari (as *Ralfsia expansa* (J. Agardh) J. Agardh)*

Family **Ralfsiaceae**

58. *Ralfsia verrucosa* (Areschoug) Areschoug*

Order **Scytothamnales**
Family **Asteronemataceae**

59. *Asteronema breviarticulatum* (J. Agardh) Ouriques & Bouzon (as *Hincksia breviarticulata* (J. Agardh) P.C. Silva)*

Family **Bachelotiaceae**

60. *Bachelotia antillarum* (Grunow) Gerloff*

Order **Sphacelariales**
Family **Sphacelariaceae**

61. *Sphacelaria brachygonia* Montagne*
62. *Sphacelaria cirrosa* (Roth) C. Agardh*
63. *Sphacelaria fusca* (Hudson) S.F. Gray (in Prud'homme van Reine 1982)
64. *Sphacelaria novae-hollandiae* Sonder (in John et al. 2004)
65. *Sphacelaria rigidula* Kützing*
66. *Sphacelaria solitaria* (Pringsheim) Kylin (misspelled as *Sphacelaria soliaria* (Pringsheim) Kylin; in John et al. 2004)
67. *Sphacelaria tribuloides* Meneghini*

Family **Stypocaulaceae**

68. *Halopteris scoparia* (Linnaeus) Sauvageau (as *Stypocaulon scoparium* (Linnaeus) Kützing)*

Kingdom **Plantae**
Phylum **Rhodophyta**
Subphylum **Eurhodophytina**
Class **Bangiophyceae**
Subclass **Bangiophycidae**
Order **Bangiales**
Family **Bangiaceae**

1. *Porphyra umbilicalis* Kützing*

Class **Florideophyceae**
Subclass **Ahnfeltiophycidae**
Order **Ahnfeltiales**
Family **Ahnfeltiaceae**

2. *Ahnfeltia elongata* Montagne (as *Chondrus elongatus* Montagne)*

Subclass **Corallinophycidae**

Note: The systematics of the Corallinophycidae is in a constant flux and has undergone major recent taxonomic changes at the family, subfamily, genus and species level (e.g. Nelson et al. 2015, Rösler et al. 2016, Caragnano et al. 2018, Liu et al. 2018, Peña et al. 2018). For this reason, the classification of this group did not follow Guiry & Guiry (2019). Members of the subfamilies of the family Corallinaceae (previously viewed as families in the Corallinales) are here listed alphabetically. Likewise, members of the previously known Lithothamniaceae and Mesophyllaceae are here listed under the Hapalidiaceae (Hapalidiales).

Order **Corallinales**

Family **Corallinaceae**

3. *Amphiroa fragilissima* (Linnaeus) J.V. Lamouroux*
4. *Amphiroa rigida* J.V. Lamouroux*
5. *Corallina officinalis* Linnaeus*
6. *Ellisolandia elongata* (J. Ellis & Solander) K.R. Hind & G.W. Saunders (as *Corallina elongata* J. Ellis & Solander; in Berecibar et al. 2013)
7. *Floiophycus africanus* (Foslie) R.A. Townsend & Huisman (as *Spongites africanus* (Foslie) J. Afonso-Carrillo, M. Chacana & M. Sanson)*
8. *Goniolithon orotavicum* Foslie (as *Neogoniolithon orotavicum* (Foslie) Me. Lemoine ex Afonso-Carrillo)*
   Note: Restricted to Tropical West Africa and Macaronesia.
9. *Harveylithon samoënse* (Foslie) A. Rösler, Perfectti, V. Peña & J.C. Braga (as *Hydrolithon samoense* (Foslie) Keats & Y.M. Chamberlain and *Neogoniolithon illitus* (Me. Lemoine) Afonso-Carrillo)*
10. *Hydrolithon farinosum* (J.V. Lamouroux) Penrose & Y.M. Chamberlain*
11. *Jania adhaerens* J.V. Lamouroux*
12. *Jania capillacea* Harvey*
13. *Jania crassa* J.V. Lamouroux*
14. *Jania cubensis* Montagne ex Kützing (as *Haliptilon cubense* (Montagne ex Kützing) Garbary & H.W. Johansen)*
15. *Jania cultrata* (Harvey) J.H. Kim, Guiry & H.-G. Choi (as *Cheilosporum elegans* (J. Hooker & Harvey) Areschoug)*
16. *Jania longifurca* Zanardini (in Berecibar et al. 2013)
17. *Jania rubens* (Linnaeus) J.V. Lamouroux*
18. *Jania tenella* (Kützing) Grunow*
19. *Jania verrucosa* J.V. Lamouroux*
20. *Jania virgata* (Zanardini) Montagne (as *Haliptilon virgatum* (Zanardini) Garbary & H.W. Johansen)*
21. *Lithophyllum aninae* Foslie*
    Note: Endemic.
22. *Lithophyllum byssoides* (Lamarck) Foslie (in John et al. 2004)
23. *Lithophyllum esperi* (Me. Lemoine) South & Tittley*
    Note: Restricted to Macaronesia.
24. *Lithophyllum geometricum* Me. Lemoine*
25. *Lithophyllum gracile* Foslie*
    Note: Endemic.
26. *Lithophyllum incrustans* Philippi*
27. *Lithophyllum lobatum* Me. Lemoine*
28. *Lithophyllum polycephalum* Foslie*
29. *Lithophyllum simile* Foslie*
30. *Lithophyllum vickersiae* Me. Lemoine*
31. *Lithoporella melobesioides* (Foslie) Foslie*
32. *Lithoporella sauvageaui* (Foslie) Adey*
    Note: Restricted to Macaronesia.
33. *Neogoniolithon caribaeum* (Foslie) Adey*
34. *Neogoniolithon hauckii* (Rothpletz) R.A. Townsend & Huisman (as *Neogoniolithon mamillosum* (Hauck) Setchell & L.R. Mason)*
35. *Neogoniolithon mamillare* (Harvey) Setchell & L.R. Mason*
36. *Pneophyllum amplexifrons* (Harvey) Y.M. Chamberlain & R.E. Norris*
37. *Porolithon oligocarpum* (Foslie) W.H. Adey*

Note: Restricted to Macaronesia.

38. *Porolithon onkodes* (Heydrich) Foslie (as *Hydrolithon onkodes* (Heydrich) Penrose & Woelkerling)*
39. *Pseudolithophyllum mildbraedii* (Pilger) De Toni (as *Lithophyllum retusum* (Foslie) Foslie)*
    Note: Restricted to Tropical West Africa and Cabo Verde islands.
40. *Spongites absimilis* (Foslie & M. Howe) Afonso-Carrillo*
41. *Spongites fruticulosus* Kützing (in John et al. 2004)
42. *Titanoderma mediterraneum* (Foslie) Woelkerling*
43. *Titanoderma pustulatum* (J.V. Lamouroux) Nägeli (as *Lithophyllum pustulatum* (J.V. Lamouroux) Foslie)*

Order **Hapalidiales**

Family **Hapalidiaceae**

44. *Capensia fucorum* (Esper) A. Athanasiadis (as *Lithophyllum capense* Rozanov)*
45. *Leptophytum bisporum* (Foslie) W.H. Adey (as *Phymatolithon bisporum* (Foslie) Afonso-Carrillo)*
46. *Lithothamnion corallioides* (P. Crouan & H. Crouan) P. Crouan & H. Crouan (as *Lithothamnion solutum* (Foslie) Me. Lemoine)*
47. *Melobesia membranacea* (Esper) J.V. Lamouroux*
48. *Melyvonnea erubescens* (Foslie) Athanasiadis & D.L. Ballantine (as *Mesophyllum erubescens* (Foslie) Me. Lemoine)*
49. *Mesophyllum ectocarpon* (Foslie) W.H. Adey*
    Note: Restricted to Tropical West Africa and Macaronesia.
50. *Mesophyllum lichenoides* (J. Ellis) Me. Lemoine*
51. *Phymatolithon lenormandii* (Areschoug) W.H. Adey*
52. *Phymatolithon purpureum* (P. Crouan & H. Crouan) Woelkerling & L.M. Irvine*

Order **Sporolithales**

Family **Sporolithaceae**

53. *Sporolithon africanum* (Foslie) Afonso-Carillo*

Subclass **Nemaliophycidae**

Order **Colaconematales**

Family **Colaconemataceae**

54. *Colaconema naumannii* (Askenasy) Prud'homme van Reine, R.J. Haroun & L.B.T. Kosterman ex D. Gabriel & Fredericq comb. nov. Basionym: *Chantransia naumannii* Askenasy (naumani), published in *Forschungsreise S.M.S. "Gazelle". Theil 4: Botanik*, p.31, 1888.
    Note: John et al. (2004:54) indicated that Stegenga (pers. comm.) suggested that *Acrochaetium naumannii* (Askenasy) Askenasy should be referable to the genus *Colaconema*. The new combination *Colaconema naumannii* (Askenasy) Prud'homme van Reine, R.J. Haroun & L.B.T. Kostermans* was proposed by Prud'homme van Reine et al. (2005: 21, nom. inval.), who failed to cite the place of publication of the basionym. The complete citation is here refered to validate the new combination, according to Article 46 of the Shenzhen Code (Turland et al. 2018).
55. *Colaconema nemalii* (De Notaris ex L. Dufour) Stegenga*
56. *Colaconema savianum* (Meneghini) R. Nielsen (as *Colaconema byssaceum* (Kützing) J.H. Price)*

Order **Nemaliales**

Family **Galaxauraceae**

57. *Dichotomaria obtusata* (J. Ellis & Solander) Lamarck (as *Galaxaura obtusata* (J. Ellis & Solander) J.V. Lamouroux)*
58. *Galaxaura rugosa* (J. Ellis & Solander) J.V. Lamouroux*
59. *Tricleocarpa cylindrica* (J. Ellis & Solander) Huisman & Borowitzka*

60. *Tricleocarpa fragilis* (Linnaeus) Huisman & R.A. Townsend*

Family **Liagoraceae**

61. *Ganonema farinosum* (J.V. Lamouroux) K.C. Fan & Yung C. Wang*
62. *Helminthocladia calvadosii* (J.V. Lamouroux ex Duby) Setchell*
63. *Liagora albicans* J.V. Lamouroux*
64. *Liagora ceranoides* J.V. Lamouroux*
65. *Liagora distenta* (Mertens ex Roth) J.V. Lamouroux*
66. *Liagora viscida* (Forsskål) C. Agardh*
67. *Titanophycus validus* (Harvey) Huisman, G.W. Saunders & A.R. Sherwood (as *Liagora valida* Harvey)*
68. *Trichogloea requienii* (Montagne) Kützing*

Family **Liagoropsidaceae**

69. *Liagoropsis schrammii* (P. Crouan & H. Crouan) Doty & I.A. Abbott*

Family **Scinaiaceae**

70. *Scinaia furcellata* (Turner) J. Agardh*

Subclass **Rhodymeniophycidae**

Order **Acrosymphytales**

Family **Acrosymphytaceae**

71. *Acrosymphyton purpuriferum* (J. Agardh) Sjöstedt (as *Helminthiopsis purpuriferum* (J. Agardh) Pappenfuss)*

Family **Schimmelmanniaceae**

72. *Schimmelmannia bollei* Montagne*
Note: Restricted to Macaronesia.

Order **Bonnemaisoniales**

Family **Bonnemaisoniaceae**

73. *Asparagopsis taxiformis* (Delile) Trevisan*

Order **Ceramiales**

Family **Callithamniaceae**

74. *Aglaothamnion boergesenii* (Aponte & D.L. Ballantine) L'Hardy-Halos & Rueness*
75. *Aglaothamnion tenuissimum* (Bonnemaison) Feldmann-Mazoyer (as *Ceramium tenuissimum* (Roth) J. Agardh)*
76. *Callithamnion corymbosum* (Smith) Lyngbye*
77. *Callithamnion ellipticum* Montagne*
Note: Restricted to Macaronesia.
78. *Callithamnion granulatum* (Ducluzeau) C. Agardh*
79. *Callithamnion tetragonum* (Withering) S.F. Gray*
80. *Crouania attenuata* (C. Agardh) J. Agardh*
81. *Gaillona hookeri* (Dillwyn) Athanasiadis (as *Aglaothamnion hookeri* (Dillwyn) Maggs & Hommersand)*
82. *Gaillona rosea* (Roth) Athanasiadis (as *Aglaothamnion roseum* (Roth) Maggs & L'Hardy-Halos)*
83. *Gulsonia ecorticata* Lawson & John*
Note: Restricted to Tropical West Africa and Cabo Verde islands.

Family **Ceramiaceae**

84. *Antithamnion cruciatum* (C. Agardh) Nägeli*
85. *Antithamnionella boergesenii* (Cormaci & G. Furnari) Athanasiadis*
86. *Antithamnionella elegans* (Berthold) J.H. Price & D.M. John (as *Antithamnionella boergesenii* (Cormaci & G. Furnari) Athanasiadis)*
87. *Centroceras clavulatum* (C. Agardh) Montagne*
88. *Centroceras hyalacanthum* Kützing (as *Centroceras clavulatum* (C. Agardh) Montagne)*
89. *Ceramium ciliatum* (J. Ellis) Ducluzeau*
90. *Ceramium codii* (H. Richards) Mazoyer*
91. *Ceramium cornutum* P.J.L. Dangeard*
Note: Restricted to Tropical West Africa and Cabo Verde islands.

92. *Ceramium diaphanum* (Lightfoot) Roth (as *Ceramium nodosum* (Kützing) Harvey)*
93. *Ceramium nitens* (C. Agardh) J. Agardh*
94. *Ceramium poeppigianum* Grunow (as *Reinboldiella poeppigianum* (Grunov) Feldmann & Mazoyer)*
95. *Ceramium strobiliforme* G.W. Lawson & D.M. John*
96. *Ceramium tenerrimum* (G. Martens) Okamura (in Almada et al. 2010)
97. *Compsothamnion thuioides* (Smith) Nägeli*
98. *Gayliella flaccida* (Harvey ex Kützing) T.O. Cho & L.J. McIvor (as *Ceramium flaccidum* (Kützing) Ardissone)*

Family **Dasyaceae**

99. *Dasya baillouviana* (S.G. Gmelin) Montagne (in Sangil et al. 2018)
100. *Dasya schmidtiana* Sonder*
    Note: Endemic.
101. *Halydictyon mirabile* Zanardini*
102. *Heterosiphonia crispella* (C. Agardh) M.J. Wynne*
    Note: Lipkin & Silva (2002:32) indicates that *H. crispella* var. *laxa* appears to be a shaded habitat ecophene.

Family **Delesseriaceae**

103. *Acrosorium ciliolatum* (Harvey) Kylin (as *Acrosorium venulosum* (Zanardini) Kylin)*
104. *Apoglossum ruscifolium* (Turner) J. Agardh*
105. *Haraldia lenormandii* (Derbès & Solier) Feldmann*
106. *Hypoglossum hypoglossoides* (Stackhouse) Collins & Hervey*
107. *Phrix spatulata* (E.Y. Dawson) M.J. Wynne, M. Kamiya & J.A. West (as *Apoglossum gregarium* E.Y. Dawson) M.J. Wynne; in Almada et al. 2010)
108. *Taenioma nanum* (Kützing) Papenfuss*
109. *Taenioma perpusillum* (J. Agardh) J. Agardh*

Family **Rhodomelaceae**

110. *Alsidium triquetrum* (S.G. Gmelin) Trevisan *(*as *Bryothamnion triquetrum* (S.G. Gmelin) M. Howe)*
111. *Bryocladia cuspidata* (J. Agardh) De Toni*
112. *Bryocladia thyrsigera* (J. Agardh) F. Schmitz*
113. *Carradoriella denudata* (Dillwyn) A.M. Savoie & G.W. Saunders (as *Polysiphonia denudata* (Dillwyn) Greville ex Harvey)*
114. *Chondria densa* P. [J.L.] Dangeard*
115. *Chondrophycus glandulifer* (Kützing) Lipkin & P.C. Silva (in John et al. 2004)
116. *Digenea simplex* (Wulfen) C. Agardh*
117. *Herposiphonia secunda* (C. Agardh) Ambronn*
118. *Herposiphonia secunda* f. *tenella* (C. Agardh) M.J. Wynne*
119. *Janczewskia verruciformis* Solms-Laubach*
120. *Laurencia dendroidea* J. Agardh (as *Laurencia majuscula* (Harvey) Lucas)*
121. *Laurencia galtsoffii* M. Howe*
122. *Laurencia intricata* J.V. Lamouroux (as *Laurencia implicata* J. Agardh)*
123. *Laurencia microcladia* Kützing*
124. *Laurencia nidifica* J. Agardh*
125. *Laurencia obtusa* (Hudson) J.V. Lamouroux*
126. *Laurencia tenera* C.K. Tseng*
127. *Laurencia viridis* Gil-Rodríguez & Haroun*
    Note: Restricted to Macaronesia.
128. *Leptosiphonia brodiei* (Dillwyn) A.M. Savoie & G.W. Saunders (as *Polysiphonia brodiaei* (Dillwyn) Sprengel)*
129. *Leptosiphonia schousboei* (Thuret) Kylin (in John et al. 2004)
130. *Lophocladia trichoclados* (C. Agardh) F. Schmitz*
131. *Lophosiphonia obscura* (C. Agardh) Falkenberg*
132. *Melanothamnus collabens* (C. Agardh) Díaz-Tapia & Maggs (as *Strebloclad*ia *collabens* (C. Agardh) Falkenberg)*

133. *Melanothamnus ferulaceus* (Suhr ex J. Agardh) Díaz-Tapia & Maggs (as *Polysiphonia ferulacea* Suhr ex C. Agardh)*
134. *Melanothamnus gorgoniae* (Harvey) Díaz-Tapia & Maggs (as *Polysiphonia gorgoniae* Harvey)*
135. *Osmundea hybrida* (A.P. de Candolle) K.W. Nam*
136. *Osmundea pinnatifida* (Hudson) Stackhouse*
137. *Palisada corallopsis* (Montagne) Sentíes, Fujii & Díaz-Larrea (as *Chondrophycus corallopsis* (Montagne) K.W. Nam)*
138. *Palisada intermedia* (Yamada) K.W. Nam (as *Chondrophycus intermedia* (Yamada) Garbary & J.T. Harper)*
139. *Palisada patentiramea* (Montagne) Cassano, Sentíes, Gil-Rodríguez & M.T. Fujii (as *Chondrophycus patentiramea* (Montagne) K.W. Nam)*
140. *Palisada perforata* (Bory) K.W. Nam (as *Chondrophycus papillosa* (C. Agardh) Garbary & J.T. Harper and *Chondrophycus perforata* (Bory) K.W. Nam)*
141. *Palisada thuyoides* (Kützing) Cassano, Sentíes, Gil-Rodríguez & M.T. Fujii (as *Laurencia paniculata* (C. Agardh) J. Agardh)*
142. *Polysiphonia pulvinata* (Roth) Sprengel*
143. *Polysiphonia scopulorum* Harvey*
144. *Polysiphonia stricta* (Mertens ex Dillwyn) Greville*
145. *Polysiphonia subtilissima* Montagne*
146. *Vertebrata foetidissima* (Cocks ex Bornet) Díaz-Tapia & Maggs (as *Polysiphonia tepida* Hollenberg)*
147. *Vertebrata fruticulosa* (Wulfen) Kuntze (as *Boergeseniella fruticulosa* (Wulfen) Kylin)*
148. *Vertebrata reptabunda* (Suhr) Díaz-Tapia & Maggs (as *Lophosiphonia reptabunda* (Suhr) Kylin)*
149. *Yuzurua poiteaui* (J.V. Lamouroux) Martin-Lescanne (as *Laurencia poiteaui* (J.V. Lamouroux) M. Howe)*

Family **Sarcomeniaceae**

150. *Cottoniella filamentosa* (M. Howe) Børgesen*
151. *Platysiphonia caribaea* D.L. Ballantine & M.J. Wynne (in Lawson et al. 1995)
152. *Platysiphonia delicata* (Clemente) Cremades*
153. *Platysiphonia intermedia* (Grunow) M.J. Wynne*

Family **Spyridiaceae**

154. *Spyridia clavata* Kützing (in John et al. 2004)
155. *Spyridia filamentosa* (Wulfen) Harvey*
156. *Spyridia hypnoides* (Bory) Papenfuss*

Family **Wrangeliaceae**

157. *Anotrichium barbatum* (C. Agardh) Nägeli*
158. *Anotrichium furcellatum* (J. Agardh) Baldock*
159. *Anotrichium tenue* (C. Agardh) Nägeli*
160. *Halurus flosculosus* (J. Ellis) Maggs & Hommersand (in John et al. 2004)
161. *Tiffaniella gorgonea* (Montagne) Doty & Meñez*
162. *Vickersia baccata* (J. Agardh) Karsakoff*
163. *Wrangelia argus* (Montagne) Montagne*
164. *Wrangelia penicillata* (C. Agardh) C. Agardh*

Order **Gelidiales**

Family **Gelidiaceae**

165. *Gelidium corneum* (Hudson) J.V. Lamouroux (as *Gelidium sesquipedale* (Clemente) Thuret)*
166. *Gelidium pusillum* (Stackhouse) Le Jolis*
167. *Gelidium spinosum* (S.G. Gmelin) P.C. Silva*

Family **Gelidiellaceae**

168. *Gelidiella acerosa* (Forsskål) Feldmann & Hamel*
169. *Millerella pannosa* (Feldmann) G.H. Boo & Le Gall (as *Gelidiella pannosa* (Bornet ex Feldmann) Feldmann & Hamel)*

Family **Pterocladiaceae**

170. *Pterocladiella capillacea* (S.G. Gmelin) Santelices & Hommersand*

Order **Gigartinales**

Family **Areschougiaceae**

171. *Anatheca montagnei* F. Schmitz*
Note: Restricted to Tropical West Africa and Cabo Verde islands.

Family **Caulacanthaceae**

172. *Caulacanthus ustulatus* (Mertens ex Turner) Kützing*

Family **Cystocloniaceae**

173. *Hypnea arbuscula* P.J.L. Dangeard*
Note: Restricted to Tropical West Africa and Macaronesia.
174. *Hypnea cenomyce* J. Agardh*
175. *Hypnea cervicornis* J. Agardh (as *Hypnea spinella* (C. Agardh) Kützing)*
176. *Hypnea divaricata* (C. Agardh) Greville*
177. *Hypnea flagelliformis* Greville ex J. Agardh*
178. *Hypnea musciformis* (Wulfen) J.V. Lamouroux*
179. *Hypnea pannosa* J. Agardh*
180. *Hypnea spinella* (C. Agardh) Kützing*
181. *Hypnea valentiae* (Turner) Montagne*
182. *Hypneocolax stellaris* Børgesen*

Family **Dumontiaceae**

183. *Dudresnaya verticillata* (Withering) Le Jolis*

Family **Gigartinaceae**

184. *Chondracanthus teedei* (Mertens ex Roth) Kützing*
185. *Chondrus crispus* Stackhouse*
186. *Chondrus crispus* var. *lonchophorus* Montagne*
Note: Endemic.
187. *Chondrus uncialis* Harvey & Bailey*
Note: Endemic.

Family **Kallymeniaceae**

188. *Austrokallymenia schizophylla* (J. Agardh) G.W. Saunders (as *Kallymenia schizophylla* (Harvey) J. Agardh)*
189. *Kallymenia reniformis* (Turner) J. Agardh*
190. *Meredithia microphylla* (J. Agardh) J. Agardh*

Family **Phyllophoraceae**

191. *Ahnfeltiopsis concinna* (J. Agardh) P.C. Silva & DeCew*
192. *Ahnfeltiopsis devoniensis* (Greville) P.C. Silva & DeCew (as *Gymnogongrus devoniensis* (Greville) Schotter)*
193. *Ahnfeltiopsis gigartinoides* (J. Agardh) P.C. Silva & DeCew*
194. *Gymnogongrus crenulatus* (Turner) J. Agardh*
195. *Stenogramma interruptum* (C. Agardh) Montagne*

Family **Solieriaceae**

196. *Meristotheca decumbens* Grunow*
Note: Restricted to Macaronesia.
197. *Meristotheca gelidium* (J. Agardh) E.J. Faye & M. Masuda (as *Meristiella echinocarpum* (Areschoug) D.P. Cheney & P.W. Gabrielson)*
198. *Solieria filiformis* (Kützing) P.W. Gabrielson*
199. *Wurdemannia miniata* (Sprengel) Feldmann & Hamel*

Order **Gracilariales**
Family **Gracilariaceae**

200. *Gracilaria bursa-pastoris* (S.G. Gmelin) P.C. Silva*
201. *Gracilaria isabellana* Gurgel, Fredericq & J.N. Norris (as *Gracilaria lacinulata* (H. West) M. Howe)*
202. *Gracilaria multipartita* (Clemente) Harvey*
203. *Hydropuntia rangiferina* (Kützing) Gurgel & Fredericq (as *Gracilaria rangiferina* (Kützing) Piccone)*

Order **Halymeniales**
Family **Halymeniaceae**

204. *Cryptonemia seminervis* (C. Agardh) J. Agardh*
205. *Grateloupia filicina* (J.V. Lamouroux) C. Agardh*
206. *Grateloupia scutellata* Kützing*
Note: Endemic.
207. *Halymenia duchassaingii* (J. Agardh) Kylin*
208. *Halymenia elongata* C. Agardh*

Order **Nemastomatales**
Family **Nemastomataceae**

209. *Predaea feldmannii* Børgesen*

Family **Schizymeniaceae**

210. *Platoma confusum* (Kraft & D.M. John) Gabriel & Fredericq (as *Nemastoma confusum* Kraft & D.M. John)*
Note: Restricted to Tropical West Africa and Macaronesia.

Order **Peyssonneliales**
Family **Peyssonneliaceae**

211. *Peyssonnelia dubyi* P. Crouan & H. Crouan*
212. *Peyssonnelia harveyana* P. Crouan & H. Crouan ex J. Agardh*
213. *Peyssonnelia heteromorpha* (Zanardini) Athanasiadis (as *Peyssonnelia polymorpha* (Zanardini) F. Schmitz)*
214. *Peyssonnelia inamoena* Pilger*
215. *Peyssonnelia magna* Ercegovic*
216. *Peyssonnelia rosa-marina* Boudouresque & Denizot*
217. *Peyssonnelia rubra* (Greville) J. Agardh*
218. *Peyssonnelia squamaria* (S.G. Gmelin) Decaisne ex J. Agardh (in Berecibar et al. 2013)
219. *Polystrata fosliei* (Weber Bosse) Denizot*

Order **Plocamiales**
Family **Plocamiaceae**

220. *Plocamium cartilagineum* (Linnaeus) P.S. Dixon*
221. *Plocamium concinnum* Areschoug*
Note: Endemic.
222. *Plocamium corallorhiza* (Turner) J.D. Hooker & Harvey*
223. *Plocamium telfairiae* (W.J. Hooker & Harvey) Harvey ex Kützing*

Order **Rhodymeniales**
Family **Champiaceae**

224. *Champia parvula* (C. Agardh) Harvey*
225. *Champia vieillardii* Kützing (in Almada et al. 2010)
226. *Coelothrix irregularis* (Harvey) Børgesen (in Sangil et al. 2018)

Family **Faucheaceae**

227. *Leptofauchea rhodymenioides* W.R. Taylor*

Family **Lomentariaceae**

228. *Ceratodictyon intricatum* (C. Agardh) R.E. Norris*

Family **Rhodymeniaceae**

229. *Botryocladia botryoides* (Wulfen) Feldmann*
230. *Botryocladia macaronesica* Afonso-Carillo, Sobrino, Tittley & Neto (in Afonso-Carillo et al. 2006)
Note: Restricted to Macaronesia.
231. *Botryocladia papenfussiana* Ganesan & Lemus (in Wilkes et al. 2006)

232.*Rhodymenia pseudopalmata* (J.V. Lamouroux) P.C. Silva*

Order **Sebdeniales**
Family **Sebdeniaceae**

233.*Sebdenia canariensis* Soler-Onis, Haroun, Viera-Rodríguez & Prud'homme van Reine ex D. Gabriel & Fredericq sp. nov. First published in *XI Simposio Nacional de Botánica Criptogámica: resúmenes de comunicaciones*, pp. 15-16, 1995, nom. inval. Holotype: BCM 2206 (tetrasporophyte), collected by R. Haroun, on 19-June-1993, at 23 m depth. Deposited in the Herbarium of University of Las Palmas de Gran Canaria (BCM).

Type locality: Las Lanzas (28º 49' 54" N, 13º 51' 32" W), in the Strait of Bocaina, between Lanzarote and Fuerteventura, Canary Islands.

Etymology: The species name refers to its type locality, from the Canary Islands.

We here present an English translation of the original description and formally instate the species as S*ebdenia canariensis.*

Original description (sensu Soler-Onis et al. 2015: 15-16): Foliose, gelatinous thallus, 380-400 μm thick, at least 35 cm tall and 25-30 cm wide, brownish-pink in colour, attached to the substratum by a small basal disc (up to 5 mm of diameter), from which a cylindrical stipe about 2 cm long develops, becoming flattened at the basis of the blade. Blade has a swollen basis, with pseudo-dichotomous lobes, ending in round apices, with smooth edges. Cortex composed of one layer of very pigmented isodiametric cells that are 7-11 μm in diameter. Subcortex with two layers of cells 14-16 μm and 40-50 μm in diameter, respectively. Medulla formed by star-like cells 50-55 μm in diameter and filaments 12-17 μm long, connecting neighbouring star-like cells in the subcortex. Usually, adjacent filaments become linked with one another, but also bifurcated filaments are merged again. Gland cells, 10-12 μm in diameter, develop from star-like cells and filaments, and frequently observed throughout the thallus. Subspherical, cruciate tetrasporangia, 20-25 μm in diameter, are spread among cortical cells on both blade surfaces.

Note: Woelkerling et al. (1998: 121, nom. inval.) suggests *S. canariensis* Soler-Onis, Haroun & Prud'homme van Reine is a synonym of *S. macaronesica* Soler-Onis*, without giving any diagnosis or justification for the new species, combination or replacement, therefore constituting an invalid name according to Article 38 of the Shenzhen Code (Turland et al. 2018). *S. canariensis* was described by Soler-Onis et al. (1995: 15-16, nom. inval.) based on a description in Spanish, also constituting an invalid name according to Article 39 of the Shenzhen Code. Since neither of the two species was validly published, the species epithet '*canariensis*' does not have priority over '*macaronesica*' (Article 11 of the Shenzhen Code), nevertheless it is here maintained in honor of its first authors. The new species seems restricted to Macaronesia with all records (except that of Soler-Onís et al. 1995) previously reported as *S. macaronesica*.

234.*Sebdenia rodrigueziana* (Feldmann) Codomier ex Parkinson*

Subphylum **Proteorhodophytina**
Class **Compsopogonophyceae**
Order **Erythropeltales**
Family **Erythrotrichiaceae**

235.*Erythrocladia irregularis* Rosenvinge*
236.*Erythrotrichia carnea* (Dillwyn) J. Agardh*

Class **Stylonematophyceae**
Order **Stylonematales**

Family **Stylonemataceae**

237. *Chroodactylon ornatum* (C. Agardh) Basson*
238. *Stylonema alsidii* (Zanardini) K.M. Drew*

Phylum **Chlorophyta**

Class **Ulvophyceae**

Order **Bryopsidales**

Family **Bryopsidaceae**

1. *Bryopsis duplex* De Notaris*
2. *Bryopsis myosuroides* Kützing (as *Bryopsis setacea* Hering)**
3. *Bryopsis pennata* J.V. Lamouroux (in Berecibar et al. 2013)
   Note: Ballesteros (1990: 42) considers this species as conspecific with *B. plumosa*.
4. *Bryopsis plumosa* (Hudson) C. Agardh*
5. *Bryopsis stenoptera* Pilger*
   Note: Restricted to Tropical West Africa and Cabo Verde islands.

Family **Caulerpaceae**

6. *Caulerpa ambigua* Okamura (as *Caulerpella ambigua* (Okamura) Prud'homme van Reine & Lokhorst)*
7. *Caulerpa cupressoides* (Vahl) C. Agardh*
8. *Caulerpa mexicana* Sonder ex Kützing*
9. *Caulerpa prolifera* (Forsskål) J.V. Lamouroux*
10. *Caulerpa racemosa* (Forsskål) J. Agardh*
11. *Caulerpa chemnitzia* (Esper) J.V. Lamouroux (as *Caulerpa racemosa* var. *peltata* (J.V. Lamouroux) Eubank; in Berecibar et al. 2013)
    Note: Belton et al. (2014:48) reinstated *C. chemnitzia*, including *C. racemosa* var. *peltata* as an environmentally induced form.
12. *Caulerpa sertularioides* (S.G. Gmelin) M. Howe*
13. *Caulerpa taxifolia* (M. Vahl) C. Agardh*
14. *Caulerpa verticillata* J. Agardh*
15. *Caulerpa webbiana* Montagne*

Family **Codiaceae**

16. *Codium adhaerens* C. Agardh*
17. *Codium decorticatum* (Woodward) M. Howe*
18. *Codium guineënse* P.C. Silva ex G.W. Lawson & D.M. John (in John et al. 2004)
19. *Codium intertextum* Collins & Hervey*
20. *Codium repens* P. Crouan & H. Crouan*
21. *Codium taylorii* P.C. Silva*
22. *Codium tomentosum* Stackhouse*

Family **Derbesiaceae**

23. *Derbesia tenuissima* (Moris & De Notaris) P. Crouan & H. Crouan*

Family **Halimedaceae**

24. *Halimeda discoidea* Decaisne*
25. *Halimeda tuna* (J. Ellis & Solander) J.V. Lamouroux*

Family **Ostreobiaceae**

26. *Ostreobium quekettii* Bornet & Flahault*

Family **Udoteaceae**

27. *Boodleopsis pusilla* (Collins) W.R. Taylor, A.B. Joly & Bernatowicz*
28. *Flabellia petiolata* (Turra) Nizamuddin*
29. *Pseudochlorodesmis furcellata* (Zanardini) Børgesen (in Sangil et al. 2018)
30. *Udotea flabellum* (J.Ellis & Solander) M. Howe*

Order **Cladophorales**

Family **Anadyomenaceae**

31. *Anadyomene stellata* (Wulfen) C. Agardh*
32. *Anadyomene saldanhae* A.B. Joly & E.C. Oliveira (in Almada et al. 2010)
33. *Microdictyon umbilicatum* (Velley) Zanardini (as *Microdictyon calodictyon* (Montagne) Kützing)*

Family **Boodleaceae**

34. *Boodlea composita* (Harvey) F. Brand*
35. *Cladophoropsis membranacea* (Hofman Bang ex C. Agardh) Børgesen*
36. *Phyllodictyon anastomosans* (Harvey) Kraft & M.J. Wynne*
37. *Phyllodictyon pulcherrimum* J.E. Gray (in Leliaert & Coppejans 2004)

Family **Cladophoraceae**

38. *Chaetomorpha antennina* (Bory) Kützing*
39. *Chaetomorpha clavata* Kützing*
40. *Chaetomorpha nodosa* Kützing*
41. *Chaetomorpha pachynema* (Montagne) Kützing*
42. *Cladophora laetevirens* (Dillwyn) Kützing*
43. *Cladophora lehmanniana* (Lindenberg) Kützing*
44. *Cladophora prolifera* (Roth) Kützing*
45. *Cladophora ruchingeri* (C. Agardh) Kützing*
46. *Cladophor*a *vagabunda* (Linnaeus) van den Hoek*
47. *Lychaete pellucida* (Hudson) M.J. Wynne (as *Cladophora pellucida* (Hudson) Kützing)*
48. *Rhizoclonium riparium* (Roth) Harvey (as *Rhizoclonium tortuosum* (Dillwyn) Kützing)*
49. *Rhizoclonium tortuosum* (Dillwyn) Kützing*

Family **Siphonocladaceae**

50. *Dictyosphaeria cavernosa* (Forsskål) Børgesen*
51. *Dictyosphaeria ocellata* (M. Howe) Olsen-Stojkovich (in John et al. 2004)
52. *Ernodesmis verticillata* (Kützing) Børgesen*

Family **Valoniaceae**

53. *Valonia utricularis* (Roth) C. Agardh*
54. *Valonia ventricosa* J. Agardh (in Sangil et al. 2018)

Order **Dasycladales**

Family **Dasycladaceae**

55. *Neomeris annulata* Dickie*
56. *Neomeris mucosa* M. Howe*

Family **Polyphysaceae**

57. *Parvocaulis polyphysoides* (P. Crouan & H. Crouan) S. Berger, U. Fettweiss, S. Gleissberg, L.B. Liddle, U. Richter, H. Sawitzky & G.C. Zuccarello (as *Acetabularia polyphysoides* P. Crouan & H. Crouan)*

Order **Ulvales**

Family **Ulvaceae**

58. *Kallonema caespitosum* Dickie*
    Note: Endemic.
59. *Ulva clathrata* (Roth) C. Agardh (as *Enteromorpha clathrata* (Roth) Greville)*
60. *Ulva compressa* Linnaeus (as *Enteromorpha compressa* (Linnaeus) Nees)*
61. *Ulva fasciata* Delile*
62. *Ulva flexuosa* Wulfen (as *Enteromorpha flexuosa* (Wulfen ex Roth) J. Agardh)*
63. *Ulva intestinalis* Linnaeus (as *Enteromorpha intestinalis* (Linnaeus) Nees)*
64. *Ulva lactuca* Linnaeus*
65. *Ulva rigida* C. Agardh*

Family **Ulvellaceae**

66. *Ulvella viridis* (Reinke) R. Nielsen, C.J. O'Kelly & B. Wysor (as *Acrochaete viridis* (Reinke) R. Nielsen)*

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APPENDIX

Taxonomic index – Families and genera