



RESEARCH IN SHARK BAY
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The marine algae of Shark Bay, Western Australia

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Abstract

One hundred and fifty-three species of marine algae are reported from Shark Bay, Western Australia, comprising 102 species of Rhodophyta, 27 species of Chlorophyta and 24 species of Phaeophyta.

Résumé

Cent cinquante-trois espèces d'algues marines vivant dans la Baie des Chiens Marins, Australie-Occidentale sont répertoriées, comprenant 102 espèces de Rhodophycées, 27 espèces de Chlorophycées et 24 espèces de Phéophycées.

Introduction

The early French exploration of Shark Bay saw a number of algae collected, many of which were new species and were subsequently described in various publications (e.g. *Acetabularia calyculus* Lamouroux in Quoy & Gaimard, 1824). Unfortunately a complete flora of the area was never published, and it is only recently that there has been an upsurge of interest in the marine plants of the area. Recent publications have been concerned with the seagrasses (Walker 1985; Walker *et al.* 1988; Walker & McComb 1985, 1988), the seagrass epiphytes (Harlin *et al.* 1985; Kendrick *et al.* 1988; Walker & Woelkerling 1988) and the benthic algae (Kendrick *et al.* 1990). This paper collates all of the species recorded in those works and gives a reference to a recent description and illustration to aid in identification.

Materials and methods

Surveys of Shark Bay were made using SCUBA and snorkel during March, June, August, October and December 1982, September 1984, August 1985, July 1986, July and August 1988. All samples of algae were preserved in 6% formalin in seawater. Voucher specimens of all species collected were deposited in the herbaria at Murdoch University and The University of Western Australia.

Results and discussion

Although seagrasses dominate the sedimentary environments of Shark Bay, macroalgae are found on the rare subtidal rock platforms, on extensive sandflats

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that dominate the shallows of the bay, or as epiphytes on seagrasses, other algae and mangroves. In addition many species survive as drift algae amongst the seagrass beds. Tropical species predominate. The Rhodophyta are represented by the greatest number of species, but these tend to be largely inconspicuous epiphytes. Members of the Chlorophyta are most abundant with *Penicillus nodulosus* (Lamouroux) Blainville and *Polyphysa peniculus* (R. Brown ex Turner) C. Agardh the most common species. *Polyphysa peniculus* dominates the high salinity area south of the Faure Sill. The brown algae *Hormophysa cuneiformis* (Gmelin) Silva and *Dictyota furcellata* (C. Agardh) J. Agardh were also common in high salinity areas (Allender and Smith 1978). Species richness was lower in high salinity regions for both benthic (Kendrick *et al.* 1990) and epiphytic algae (Kendrick *et al.* 1988).

Species list of algae found in Shark Bay, W.A.

(E epiphytic; B benthic)

CHLOROPHYTA

CAULERPALES

Caulerpaceae

- B *Caulerpa cupressoides* (Vahl) C. Agardh. Taylor 1960: 147, pl. 14, figures 3, 4, 6, pl. 15, figures 1-4, pl. 18, figures 11-13.
- B *C. lentillifera* J. Agardh. Cribb 1958: 213, pl. 4, figures 1-4, pl. 3, figures 1-17.
- B *C. papillosa* J. Agardh. Womersley 1984: 270, figures 91C, 92E.
- B *C. racemosa* var. *clavifera* (Turner) Weber-van Bosse. Taylor 1960: 151, pl. 18, figure 3.
- B *C. racemosa* var. *uvifera* (Turner) Weber-van Bosse. Taylor 1960: 151, pl. 18, figure 4.
- B *C. sertularioides* (Gmelin) Howe. Taylor 1960: 144, pl. 13, figures 1-7.

Udoteaceae

- B *Halimeda incrassata* (Ellis) Lamouroux. Hillis-Colinvaux 1980: 93, figure 22.
- B *H. simulans* Howe. Hillis-Colinvaux 1980: 103, figure 26.
- B *H. tuna* (Ellis & Solander) Lamouroux. Hillis-Colinvaux 1980: 122, figure 35.
- B *Penicillus nodulosus* (Lamouroux) Blainville. Gepp & Gepp 1911: 86, pl. XX, figures 172-175.
- B *Udotea argentea* Zanardini. Gepp & Gepp 1911: 125, figures 21, 22C, 22D, 57-60.

DERBESIALES

Bryopsidaceae

- B *Bryopsis plumosa* (Hudson) C. Agardh. Womersley 1984: 282, figures 96C, 97A.

CODIALES

Codiaceae

- E B *Codium spongiosum* Harvey. Womersley 1984: 228, figures 75E, 76F.
B *C. duthieae* Silva in Silva & Womersley. Womersley 1984: 235, figures 77F, 78G.
B *C. harveyi* Silva in Silva & Womersley. Womersley 1984: 236, figures 79A, 80A.

DASYCLADALES

Polyphysaceae

- B *Acetabularia calyculus* Lamouroux in Quoy & Gaimard, Womersley 1984: 295, figures 101B, 102B-D.
B *Polyphysa peniculus* (R. Brown ex Turner) C. Agardh. Womersley 1984: 296, figures 101C-E, 102E-G.

CLADOPHORALES

Cladophoraceae

- E B *Chaetomorpha valida* (Hooker & Harvey) Kuetzing. Womersley 1984: 178, figures 56B, 57D.
B *Cladophora feredayi* Harvey. Van den Hoek & Womersley 1984: 196, figures 62C, D, 63D, E.
E *C. valonioides* Sonder. Van den Hoek & Womersley 1984: 196, figures 64A, 65A, B.
B *Cladophora* sp.
B *C. vagabunda* (Linnaeus) van den Hoek. Van den Hoek & Womersley 1984: 202, figures 64E, 65G.
B *Rhizoclonium* sp.

Anadyomenaceae

- E B *Microdictyon umbilicatum* (Velley) Zanardini. Womersley 1984: 217, figure 72.

ULVALES

Ulvaceae

- B *Enteromorpha clathrata* (Roth) Greville. Womersley 1984: 157, figures 50A, 51B, C.
E B *Enteromorpha intestinalis* (Linnaeus) Nees. Womersley 1984: 161, figures 50D, 51G, H.

- B *Ulva australis* Areschoug. Womersley 1984: 141, figures 44B, 45D-F.
 E B *Ulva lactuca* Linnaeus. Womersley 1984: 141, figures 44A, 45A-C.

PHAEOPHYTA
SPHACELARIALES
 Sphacelariaceae

- E B *Sphacelaria rigidula* Kuetzing. Womersley 1987: 166, figures 51D, 54A-G.
 E B *S. tribuloides* Meneghini. Womersley 1987: 160, figures 45G, 52A-C.

ECTOCARPALES
 Ectocarpaceae

- E B *Ectocarpus siliculosus* (Dillwyn) Lyngbye. Womersley 1987: 33, figures 2D, 5A-E.
 B *Hincksia* sp.

SCYTOSIPHONALES
 Scytosiphonaceae

- E B *Colpomenia sinuosa* (Mertens ex Roth) Derbes & Solier. Womersley 1987: 297, figures 107A, 108E, F.
 E B *Hydroclathrus clathratus* (C. Agardh) Howe. Womersley 1987: 300, figures 109A, 110A, B.

DICTYOTALES
 Dictyotaceae

- E B *Dictyota furcellata* (C. Agardh) J. Agardh. Womersley 1987: 196, figures 65C, 66A-C.
 E B *D. dichotoma* (Hudson) Lamouroux. Womersley 1987: 194, figures 64H-M, 65A, B.
 B *D. ciliolata* Kuetzing. Taylor 1960: 223, pl. 32, figure 3.
 B *Dictyopteris plagiogramma* (Montagne) Vickers. Allender & Kraft 1983: 103, figures 17A, B, 18A, B.
 B *Dictyopteris* sp.
 B *Lobophora variegata* (Lamouroux) Womersley. Womersley 1987: 253, figures 91F, G, 92A.
 B *Padina sanctae-crucis* Boergesen. Womersley 1987: 219, figures 74A, 75H-J.
 E B *Padina* sp.
 B *Stypopodium flabelliforme* Weber-van Bosse. Allender & Kraft 1983: 96, figures 11D, F, 12.

FUCALES
Cystoseiraceae

- E B *Caulocystis uvifera* (C. Agardh) Areschoug. Womersley 1987: 359, figure 129A.
E B *Cystoseira trinodis* (Forsskål) C. Agardh. Womersley 1987: 357, figures 128B, 131E, F.
E B *Hormophysa cuneiformis* (Gmelin) Silva. Womersley 1987: 356, figures 128A, 131C, D. (as *H. triquetra*).
B *Platythalia angustifolia* Sonder. Womersley 1987: 404, figures 150A, 155B.

Sargassaceae

- E B *Sargassum decurrens* (R. Brown ex Turner) C. Agardh. Womersley 1987: 421, figures 157A, 160A.
E B *S. flavicans* (Mertens) C. Agardh. J. Agardh 1889: 82, t.25, figure 3
B *S. spinigulerum* Sonder. Womersley 1987: 442, figures 166A, 168D.
E B *S. varians* Sonder. Womersley 1987: 426, figures 159A, 160E.
B *S. verruculosum* (Mertens) C. Agardh. Womersley 1987: 426, figures 159B, 160F.

RHODOPHYTA
ACROCHAETIALES
Acrochaetiaceae

- B *Audouinella daviesii* (Dillwyn) Woelkerling 1971: 28, figures 67, 22.
E *A. microscopica* (Naegeli) Woelkerling 1971: 33, figure 10.

NEMALIONALES
Liagoraceae

- E B *Liagora* sp.

Galaxauraceae

- B *Galaxaura collabens* J. Agardh. Kjellman 1900: 46, pl. 2 figures 19-24, pl. 3, figure 1, pl. 20, figure 15.
B *G. obtusata* (Ellis & Solander) Lamouroux. Papenfuss *et al.* 1982: 418, figures 14-16, 27, 39.
B *G. rugosa* (Ellis & Solander) Lamouroux. Papenfuss *et al.* 1982: 421, figures 17-19, 29, 40, 41, 45.

BONNEMAISONIALES
Bonnemaisoniaceae

- B *Asparagopsis taxiformis* (Delile) Trevisan. Cribb 1983: 28, pl. 4, figures 1-2.

GELIDIALES

Gelidiaceae

- B *Gelidiella acerosa* (Forsskål) Feldmann & Hamel. Cribb 1983: 29, pl. 6, figure 1.
- B *Gelidium pusillum* (Stackhouse) Le Jolis. Fuhrer *et al.* 1981: 14, pls 55, 56.
- B *Pterocladia capillacea* (Gmelin) Bornet in Bornet & Thuret. Fuhrer *et al.* 1981: 42, pl. 57 (as *P. pinnata*).

CORALLINALES

Corallinaceae

- B *Amphiroa anceps* (Lamarck) Decaisne. Jaasund 1976: 79, figure 160.
- B *Amphiroa* sp.
- E *Haliphtilon roseum* (Lamarck) Garbary & Johansen. Johansen & Womersley 1986: 551, figures 1-6.
- E B *Jania micrarthrodia* Lamouroux 1816: 271, t.9, figure 5.
- E *Jania* sp.
- E *Fosliella cruciata* Jones & Woelkerling 1984: figures 1,2,4,20. Harlin *et al.* 1985: figures 4, 11.
- E *F. cymodoceae* (Foslie) Jones & Woelkerling 1984: figures 3,6-13. Harlin *et al.* 1985: figures 7, 13.
- E *Pneophyllum caulerpae* (Foslie) Jones & Woelkerling 1984: figure 18. Harlin *et al.* 1985: figures 3, 8-10.
- E *Melobesia membranacea* (Esper) Lamouroux, Chamberlain 1984: figures 17, 19.
- E B *Metagoniolithon stelliferum* (Lamarck) Weber-van Bosse. Ducker 1979: 83, figures 1-3.
- B *Neogoniolithon* sp.

GIGARTINALES

Dicranemaceae

- E *Dicranema revolutum* (C. Agardh) J. Agardh. Kraft 1977: 223, figures 1-3, 12,13.

Gracilariaceae

- B *Ceratodictyon spongiosum* Zanardini. Cribb 1983: 55, pl. 12, figures 3, 4.
- E B *Gracilaria harveyana* J. Agardh. May 1948: 56, pl. 15, figure 1
- B *Gracilaria* sp.

Grateloupiaceae

- B *Grateloupia filicina* J. Agardh var. *luxurians* A. & E.S. Gepp 1906: 259.

Halymeniaceae

- B *Cryptonemia kallymenioides* (Harvey) Kraft in Scott *et al.* 1982: 246, figures 2-25.

Hypneaceae

- E B *Hypnea musciformis* (Wulfen) Lamouroux. Lucas & Perrin 1947: 90, figure 57.
B *H. pannosa* J. Agardh. Cribb 1983: 59, pl. 15, figures 2, 3.
E *H. valentiae* (Turner) Montagne. Dawson 1954: 436, figures 46L, 47.

Mychodeaceae

- E *Mychodea pusilla* (Harvey) J. Agardh. Kraft 1978: 533, figures 7-9, 33, 34.

Plocamiaceae

- B *Plocamium* sp.

Rhizophyllidaceae

- B *Portieria hornemannioides* (Lyngbye) Silva. Cribb 1983: 35, pl. 8, figure 2 (as *Chondrococcus hornemanni*).

Solieriaceae

- E B *Eucheuma speciosum* J. Agardh. Harvey 1859: pl. 64.
B *Solieria robusta* (Greville) Kylin. Min-Thein & Womersley 1976: 7, figures 1, 2, 49.

RHODYMENIALES

Rhodymeniaceae

- B *Coelarthrum* sp.
E B *Rhodymenia australis* (Sonder) Harvey. Fuhrer *et al.* 1981: 27, pl. 27.
B *Botryocladia leptopoda* (J. Agardh) Kylin. Jaasund 1976: 103, figure 209.

Champiaceae

- E *Champia affinis* (Hooker & Harvey) J. Agardh. Reedman & Womersley 1976: 82, figures 3, 4, 11B, 12.
B *Champia compressa* Harvey.
B *Champia* sp.

CERAMIALES

Delesseriaceae

- E B *Hypoglossum heterocystideum* (J. Agardh) J. Agardh. Womersley & Shepley 1982: 326, figures 1B, C, 4 (as *H. hypoglossoides*).

Marine algae

- B *Martensia elegans* Hering. Harvey 1847: 73, t. 43.
- E *Platysiphonia intermedia* (Grunow) Wynne.
- E *P. miniata* (C. Agardh) Borgesen. Ballantine & Wynne 1985: 461, figures 7-8.
- E *Platysiphonia* sp.

Dasyaccae

- E B *Dasya* sp.
- E B *Heterosiphonia callithamnion* (Sonder) Falkenberg 1901: 647.
- B *H. crassipes* (Harvey) Falkenberg. Kuetzing 1864: pl. 72.
- B *H. wurdemannii* (Bailey ex Harvey) Falkenberg. Taylor 1960: 565, pl. 72, figure 9.
- E *Heterosiphonia* sp.

Ceramiales

- E *Acrothamnion preissii* (Sonder) Wollaston 1967: 323, figure 24.
- B *Aglaothamnion cordatum* (Boergesen) Feldman-Mazoyer. Cribb 1983: 72, pl. 56, figure 4.
- E B *Anotrichium tenue* (C. Agardh) Naegeli. Cribb 1983: 72, pl. 32, figures 1-5
- E *Antithamnion armatum* (J. Agardh) De Toni. Wollaston 1967: 290, figure 18A-J.
- E *A. divergens* (J. Agardh) J. Agardh. Wollaston 1967: 281, figure 15.
- B *Antithamnionella* sp.
- E B *Centroceras clavulatum* (C. Agardh) Montagne. Cribb 1983: 75, pl. 25, figures 2, 3.
- E B *Ceramium australe* Sonder. Womersley 1978: 230, figures 3B, C, 13A-D.
- B *C. codii* (Richards) G. Mazoyer. Cribb 1983: 80, pl. 27, figures 1-4.
- E *C. flaccidum* (Kuetzing) Ardissonne. Cribb 1983: 82, pl. 31, figure 2, pl. 59, figures 1-4.
- E *C. puberulum* Sonder. Womersley 1978: 216, figures 1E, F, 6.
- E *C. shepherdii* Womersley 1978: 212, figures 1A, B, 5A-C.
- E *Crouania capricornica* Saenger & Wollaston 1982: 79, pl. 6
- E *Griffithsia ovalis* Harvey. Baldock 1976: 527, figures 19-21, 78.
- B *Griffithsia* sp.
- E *Haloplegma preissii* Sonder. Fuhrer *et al.* 1981: 51, pl. 75.
- E *Ptilocladia australis* (Harvey) Wollaston 1967: 265, figures 5E-J, 12.
- B *P. vestita* (Harvey) Wollaston 1967: 263, figure 11.
- E B *Spyridia filamentosa* (Wulfen) Harvey. Womersley & Cartledge 1975: 222, figures 1, 3, A, B.

- E B *Spyridia dasyoides* Sonder. Womersley & Cartledge 1975: 231, figures. 3J, K, 5.
- E *Spyridia velasquezii* Trono 1971: 53, pl. 9, figures 1, 2, pl. 10, figure 3.
- E *Tiffaniella cymodoceae* (Boergesen) Gordon 1972: 121, figures 39D-F, 40.
- E *Wrangelia plumosa* Harvey. Gordon 1972: 21, figures 4, 5, 10G, H, J, 51.
- B *W. argus* (Montagne) Montagne. Cribb 1983: 94, pl. 66, figure 1.
- E *Wrangelia* sp.

Rhodomelaceae

- B *Acanthophora dendroides* Harvey. Kraft 1979: figure 7.
- B *Acanthophora spicifera* (Vahl). Boergesen. Cribb 1983: 105, pl. 32, figure 2.
- E B *Chondria minutula* Weber-van Bosse. Cribb 1983: 108, pl. 34, figures 4-5.
- E *Chondria* sp. 1
- B *Chondria* sp. 2
- E *Coeloclonium umbellulum* (Harvey) Falkenberg. Harvey 1860: pl. 47 (as *Chondria umbellula*).
- B *Dasyclonium flaccidum* (Harvey) Kylin. Scagel 1962: 1024, figures 4, 32-34.
- B *Digenia simplex* (Wulfen) C. Agardh. Cribb 1983: 109, pl. 32, figure 3.
- E *Herposiphonia secunda* (C. Agardh) Ambronn f. *tenella* (C. Agardh) Wynne. Cribb 1983: 111, pl. 67, figures 1-4 (as *H. tenella*).
- E *Herposiphonia* sp.
- B *Laurencia brongniartii* J. Agardh. Saito & Womersley 1974: 839, figures 4 C, D, 20, 21.
- E B *L. filiformis* (C. Agardh) Montagne. Saito and Womersley 1974: 832, figures 3 C, D.
- E B *L. majuscula* (Harvey) Lucas. Saito and Womersley 1974: 819, figures 1A, 6, 14-16.
- B *L. papillosa* (Forsskål) Greville. Jaasund 1976: 139, figure 281.
- E B *L. shepherdii* Saito and Womersley 1974: 826, figures 2C, D, 10.
- E B *Leveillea jungermannioides* (Hering & Martens) Harvey. Cribb 1983: 127, pl. 32, figure 4.
- B *Lophocladia harveyi* (Kuetzing) Schmitz. Kuetzing 1864: pl. 71E, F, (as *Dasya harveyi*).
- B *Neurymenia fraxinifolia* (Mertens ex Turner) J. Agardh. Jaasund 1976: 133, figure 271.
- E *Polysiphonia amphibolis* Womersley 1979: 474, figure 3F, G, 4A-C.
- E B *P. abscisoides* Womersley 1979: 492, figure 9E-H.
- E *P. decipiens* Montagne. Womersley 1979: 499, figure 12.
- B *P. ferulacea* Suhr ex J. Agardh. Cribb 1983: 129, pl. 71, figures 2-4.

- E *P. infestans* Harvey. Womersley 1979: 481, figure 6A-E.
 E B *P. scopulorum* Harvey. Womersley 1979: 467, figure 2A-E.
 E *P. sertularioides* (Grateloup) J. Agardh. Womersley 1979: 478, figure 5A-D.
 E B *Tolypiocladia glomerulata* (Agardh) Schmitz. Cribb 1983: 135, pl. 68, figure 4.
 E B *Vidalia spiralis* Lamouroux. Harvey 1847: 25, t. 9, figures 1-6 (as *Epineuron spirale*).

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