

Original Article

Filling the gaps: new seaweed distribution records from the coast of Mozambique, Western Indian Ocean

Western Indian Ocean
JOURNAL OF
Marine Science

Maria J. Américo¹ , Manuela Amone-Mabuto^{1,3} , Rui Santos^{1,2} , Valera Dias¹ , Salomão O. Bandeira^{1*} 

Open access

Citation:

Américo MJ, Amone-Mabuto M, Santos R, Dias V, Bandeira SO (2025) Filling the gaps: new seaweed distribution records from the coast of Mozambique, Western Indian Ocean. Western Indian Ocean Journal of Marine Science 24(1): 43-61 [doi: 10.4314/wiojms.v24i1.6]

¹ Eduardo Mondlane University, Department of Biological Sciences, PO Box 257 Maputo 1100, Mozambique

² Centre of Marine Sciences of Algarve (CCMAR), University of Algarve, Gambelas Campus, Faro, 8005-139, Portugal

³ Department of Botany, Institute for Coastal and Marine Research, Nelson Mandela University, PO Box 77000, Gqeberha, South Africa

Received:

April 6, 2024

Accepted:

February 19, 2025

Published:

June 12, 2025

Copyright:

Owned by the journal. The articles are open access articles distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) licence.

* Corresponding author:

salomao.bandeira4@gmail.com

Abstract

This paper revises and updates information on the seaweed flora of Mozambique. Out of 367 recorded species, 194 species belong to Rhodophyta, 49 to Heterokontophyta and 124 to Chlorophyta. These species represent sampling at a handful of sites, mainly at sandstone areas in southern Mozambique. Forty-seven new species were added to the list, from field expeditions carried out after 2007, covering sandstone rocky pools, crevices between rock platforms in the midlittoral transition zone to the sublittoral fringe and the sublittoral zone. This update includes a record of the kelp *Ecklonia radiata* in Zavora, Inhambane. Seaweed specimens were deposited at the LMU Herbarium, Eduardo Mondlane University. A value of 6.49 of the Cheney Index indicates a rather tropical seaweed flora for Mozambique. This seaweed flora update is important from a biodiversity census perspective, as well as identifying species with economic potential.

Keywords: Macroalgae, new distribution records, Cheney Index, tropical seaweed

Introduction

The seaweed flora of Mozambique remains poorly studied, with the exceptions of Inhaca Island and surrounding regions of Maputo Bay, described by the pioneering work of Isaac (Chamberlain, 1958; Isaac, 1956, 1958, 1959; Isaac and Chamberlain, 1958; Silva, 1959; Saenger 1971, 1973), and the biogeographic analyses and updates that followed (Critchley *et al.*, 1994, 1997; Coppejans, 2002). Outside Maputo Bay, important documented accounts of Mozambican seaweed flora are those from the northern regions of Mozambique Island (Massingue and Bandeira, 2005), Mecúfi (Bandeira and António, 1996; Bandeira *et al.*, 2001), and the Quirimbas Archipelago (Carvalho and Bandeira, 2003). Guiry and Guiry (2022) Algaebase website listed only 321 seaweed species, until early 2023. These included the new additions from the recent discovery of deep-water kelp (*Ecklonia radiata*) (Phaeophyceae)

in Závora (southern Mozambique) (Wernberg *et al.*, 2019) and the deep-water brown algae *Lobophora bandeirae* and *L. novae* both collected in Inhambane, southern Mozambique (Vieira *et al.*, 2021).

This paper aims to present a check list of the seaweed flora of Mozambique, to update the geographical distribution of known species in the region, and to present new additions to the Mozambique seaweed flora following recent extensive field expeditions.

Materials and methods

Mozambique is located on the southeastern coast of Africa between latitudes 10° 20'S to 26° 50'S (Fig. 1). The coastline is about 2 770 km long; the shelf up to the depth of 200 m has an approximate area of 104 km² (Barbosa *et al.*, 2001, Hogueane 2007).

The coastline is characterized by a wide diversity of habitats including sandy and rocky beaches, coastal dunes, coral reefs, estuaries, bays, seagrass beds, mangrove forests and offshore islands (Barbosa *et al.*, 2001; Hogueane, 2007; Bandeira and Paula, 2014). Mozambique's coastline can be divided into three types: coralline in the north, swamp in central Mozambique and sandy in the south (Barbosa *et al.*, 2001). Seaweed inhabiting hard substrates abound both within coralline substrates and reefs. Mozambique's coastline supports diverse ecosystems, some

Field sampling expeditions to collect macroalgae were carried out during low tides during the period from 2007 to 2022. During the visits, novel species records were searched for, giving special attention to the sub-tidal fringe as well as to specific niches such as rock-pools and shaded rock crevices. Specimens were catalogued and vouchers of each species were stored at LMU Herbarium (Eduardo Mondlane University).

The taxonomical identification of specimens was based on the main publications for macroalgae in

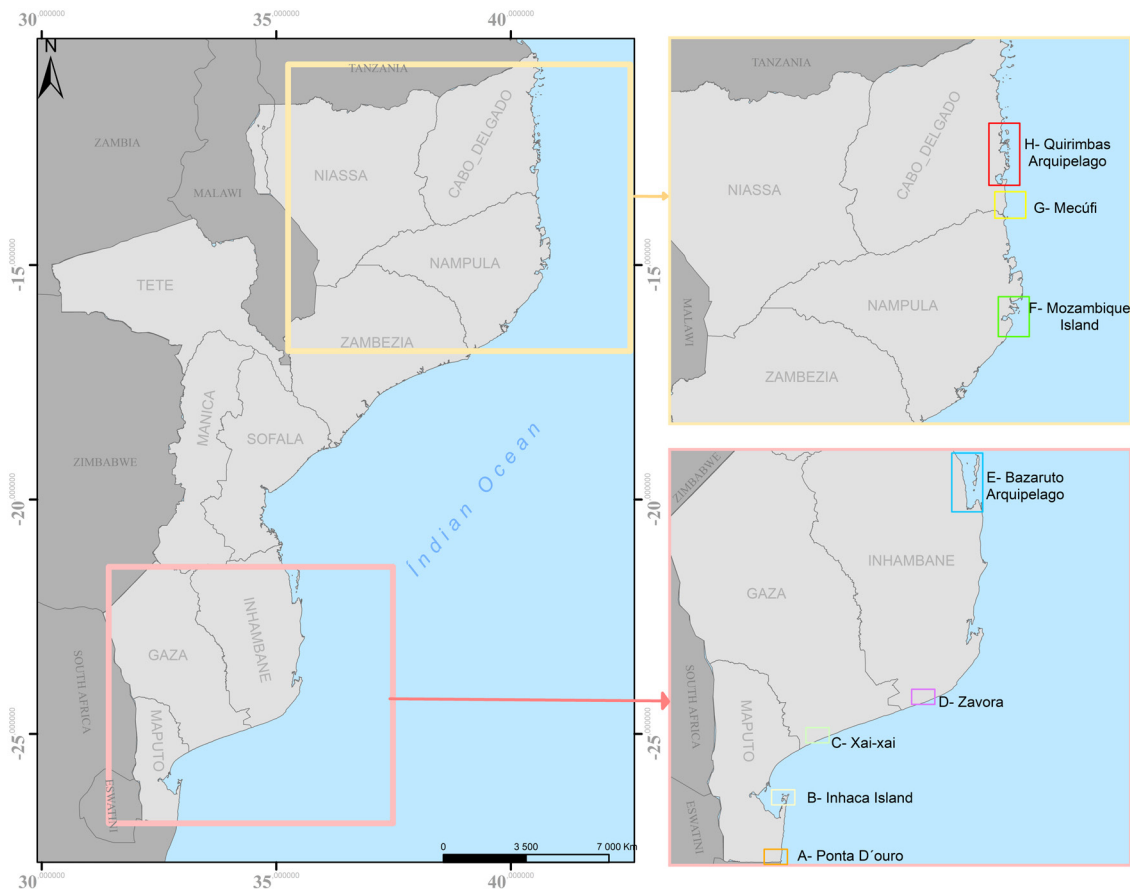


Figure 1. The geographical setting of Mozambique in the Western Indian Ocean. Dots indicate the main seaweed locations.

of them pristine, having high biological diversity and productivity as highlighted by the high number of Ecologically and Biologically Sensitive Areas (EBSAs) (IUCN, 2021).

This checklist is based on bibliographical research and the species were recorded in the database Algaebase (Guiry and Guiry, 2022). All taxon names were revised to employ currently accepted species names following Algaebase (Guiry and Guiry, 2022).

the region with a focus on those from Mozambique (Bandeira *et al.*, 2001; Critchley *et al.*, 1997; Coppejans *et al.*, 2002), including an assessment conducted more than 60 years ago (Isaac, 1957). important seaweed assessments carried out for similar aeolianite rocky outcrop formations in KwaZulu/Natal in South Africa (Branch *et al.*, 2010; De Clerck *et al.*, 2005; Seagrif, 1980, 1984) were also used as well as existing literature from Tanzania (Guiry and Guiry, 2022; Oliveira *et al.*, 2005) and other regional (Richmond, 2011) and global databases (Guiry and Guiry, 2022) and references.

The biogeographical nature of the seaweed flora of Xai-Xai Beach was assessed using the floristic ratio of Cheney, $(n^{\circ} \text{Rhodophyta} + n^{\circ} \text{Chlorophyta}) / n^{\circ} \text{Heterokontophyta}$ (Cheney, 1997) which indicates that a value of 3.0 signals a cold-water flora, whilst values of > 6.0 are indicative of a tropical flora (Cheney, 1997). New distribution records still signals an under-studied seaweed flora diversity.

The Sørensen similarity index $= (2 Na+b)/(Na+Nb)$ (Nguyen *et al.*, 2013; Kokabi and Yousefzadi, 2015) was also used to calculate the similarity of Mozambican species with the neighboring countries of South Africa, Madagascar, Tanzania and Kenya.

Results and discussion

Forty-seven new species are added to the previously known checklist as depicted within Algaebase (Guiry and Guiry, 2022). These were made possible through extensive field visits carried out from 2007 especially in areas within southern Mozambique (dominated by sandstone) namely Inhaca Island, Xai-Xai Beach, Chidenguele and Bazaruto Island. Table 1 presents the new species added to the Mozambique collection from this extensive search carried out within the intertidal areas and subtidal fringe. Out of the 47 species, 34 were Rhodophyta, 9 Chlorophyta and 4 Heterokontophyta (Table 1), mostly from Xai-Xai beach, where extensive searches were carried out. The sublittoral fringe produced most of the new species due to concerted collection effort in this zone.

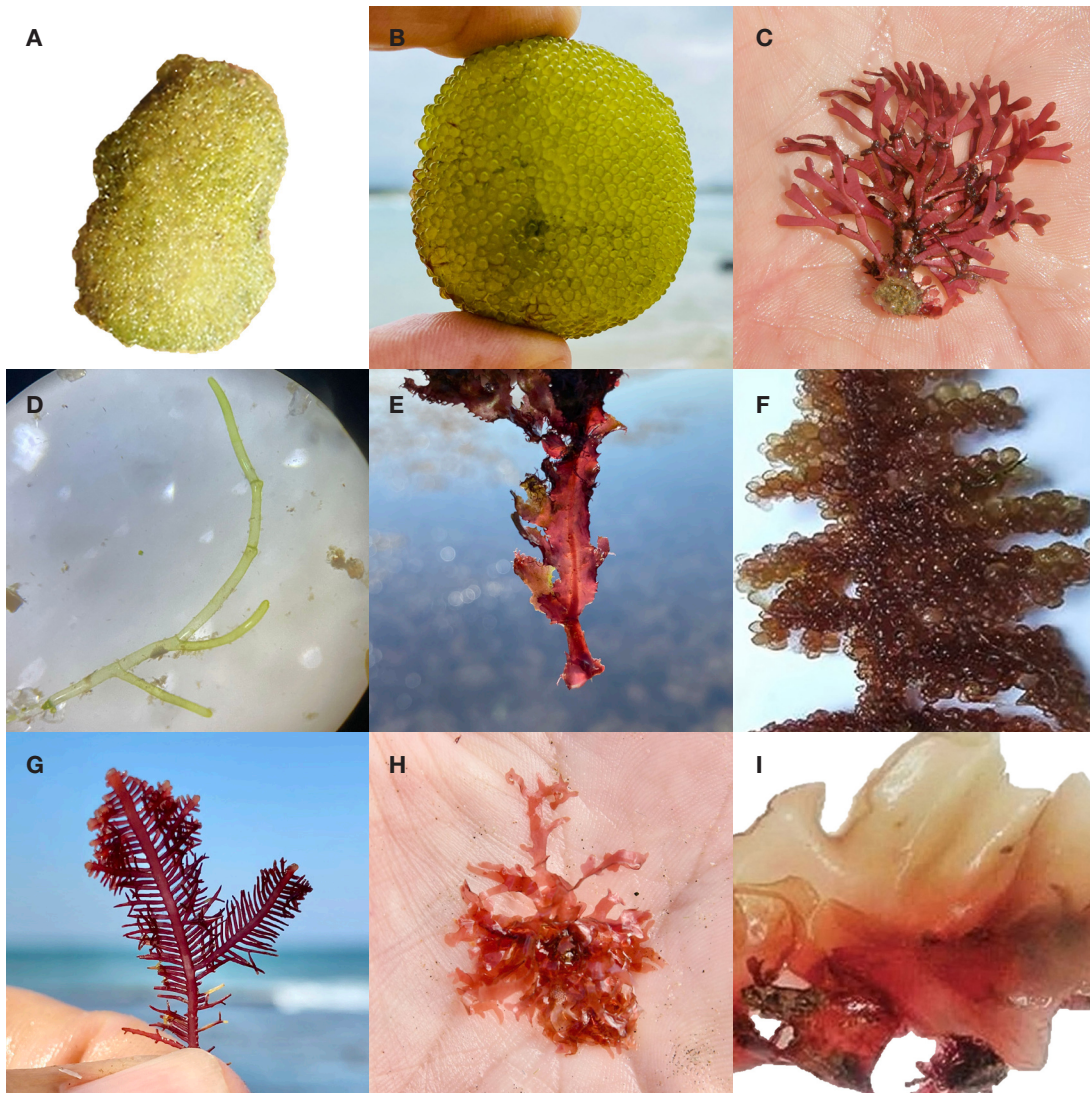


Figure 2. (A) *Cladophoropsis sundanensis* Reinbold; (B) *Codium megalophysum* P.C.Silva; (C) *Dichotomaria tenera* (Kjellman) Huisman, J.T.Harper & G.W.Saunders; (D) *Cladophoropsis sundanensis* Reinbold (braching), same species as (A) *Cladophoropsis sundanensis*; (E) *Nienburgia serrata* (Suhr) Papenfuss; (F) *Botryocladia leptopoda* (J.Agardh) Kylin; (G) *Pterocladia nana* (Okamura) Shimada, Horiguchi & Masuda; (H) *Cryptopleura ramosa* (Hudson) L.Newton and (I) *Acrosorium acrospermum* (J.Agardh) Kylin.

Table 1. New species recorded for Mozambique (SPZ= supra littoral zone, MDZ= mide littoral zone and SBZ=subtidal zone)

Species	Phyllum	Voucher number	Site	SPZ	MDZ	SBZ
<i>Chaetomorpha indica</i> (Kützting) Kützting	Chlorophyta	122	Xai-Xai	+	-	-
<i>Cladophoropsis fasciculata</i> (Kjellman) Wille	Chlorophyta	73	Xai-Xai	+	-	-
<i>Codium extricatum</i> P. C. Silva	Chlorophyta	118	Xai-Xai	-	+	-
<i>Codium papenfussii</i> P. C. Silva	Chlorophyta	63	Xai-Xai	+	+	-
<i>Codium megalophysum</i> P.C. Silva	Chlorophyta	143	Xai-Xai	-	+	-
<i>Halimeda gracilis</i> Harvey ex J. Agardh	Chlorophyta	15	Xai-Xai	-	+	+
<i>Lychaete herpestica</i> (Montagne) M.J. Wynne	Chlorophyta	71	Xai-Xai	-	+	-
<i>Pseudocodium floridanum</i> Dawes & A.C. Mathieson	Chlorophyta	141	Xai-Xai	-	+	+
<i>Valonia fastigiata</i> Harvey ex J. Agardh	Chlorophyta	119	Xai-Xai	-	+	+
<i>Ahnfeltiopsis polyclada</i> (Kützting) P.C. Silva & DeCew	Rhodophyta	136	Xai-Xai	-	-	+
<i>Amphiroa bowerbankii</i> Harvey	Rhodophyta	139	Xai-Xai	-	-	+
<i>Amphiroa capensis</i> Areschoug	Rhodophyta	127	Xai-Xai	-	+	-
<i>Amphiroa ephedraea</i> (Lamarck) Decaisne	Rhodophyta	128	Xai-Xai	-	-	+
<i>Acrosorium acrospermum</i> (J. Agardh) Kylin (**)	Rhodophyta	104	Xai-Xai	-	-	+
<i>Botryocladia leptopoda</i> (J. Agardh) Kylin	Rhodophyta	155	Bazaruto (Dom Carlos)	-	+	+
<i>Caulacanthus ustulatus</i> (Mertens ex Turner) Kützting	Rhodophyta	126	Xai-Xai, Inhaca	+	+	-
<i>Carpopeltis phyllophora</i> (J.D. Hooker & Harvey)	Rhodophyta	6	Xai-Xai, Inhaca	-	+	+
<i>Cryptopleura ramosa</i> (Hudson) L. Newton	Rhodophyta	2	Xai-Xai	-	+	+
<i>Corallina officinalis</i> Linnaeus	Rhodophyta	149	Xai-Xai	-	-	+
<i>Dasya elongata</i> Sonder	Rhodophyta	84	Xai-Xai	-	-	+
<i>Dictyomenia stephensonii</i> Papenfuss	Rhodophyta	75	Xai-Xai	-	-	+
<i>Dichotomaria tenera</i> (Kjellman) Huisman	Rhodophyta	26	Xai-Xai	-	+	+
<i>Gelidium foliaceum</i> (Okamura) E.M. Tronchin	Rhodophyta	29	Xai-Xai	-	+	+
<i>Gelidium pristoides</i> (Turner) Kützting	Rhodophyta	42	Xai-Xai	-	-	+
<i>Gymnogongrus tetrasporifer</i> Papenfuss	Rhodophyta	135	Xai-Xai	-	+	+
<i>Gracilaria vieillardii</i> P.C. Silva	Rhodophyta	134	Xai-Xai	-	+	+
<i>Halymenia durvillei</i> Bory	Rhodophyta	124	Xai-Xai	-	-	+
<i>Jania pumila</i> J.V. Lamouroux	Rhodophyta	121	Xai-Xai	-	+	+
<i>Jania verrucosa</i> J.V. Lamouroux	Rhodophyta	7	Xai-Xai	-	+	-
<i>Laurencia filiformis</i> (C. Agardh) Montagne	Rhodophyta	132	Xai-Xai	-	+	+
<i>Laurencia glomerata</i> (Kützting) Kützting	Rhodophyta	14	Xai-Xai	-	-	+
<i>Neoizziella divaricata</i> (C.K. Tseng) S.-M. Lin, S.-Y. Yang & Huisman	Rhodophyta	101	Xai-Xai	-	+	+
<i>Nienburgia serrata</i> (Suhr) Papenfuss	Rhodophyta	130	Xai-Xai	-	-	+
<i>Polyopes constrictus</i> (Turner) J. Agardh	Rhodophyta	138	Xai-Xai	-	+	+
<i>Pterocladia nana</i> (Okamura) Shimada, Horiguchi & Masuda	Rhodophyta	67	Xai-Xai	-	+	+
<i>Ptilophora helenae</i> (Dickinson) R.E. Norris	Rhodophyta	89	Xai-Xai	-	+	+
<i>Pterosiphonia cloiophylla</i> (C. Agardh) Falkenberg	Rhodophyta	109	Xai-Xai	-	+	+
<i>Portieria tripinnata</i> (Hering) De Clerck	Rhodophyta	120	Xai-Xai	-	+	+
<i>Rhodymenia capensis</i> J. Agardh	Rhodophyta	106	Xai-Xai	-	+	+
<i>Sarconema scinaoides</i> Børgesen	Rhodophyta	22	Xai-Xai	-	+	+
<i>Scinaia bengalica</i> Børgesen	Rhodophyta	59	Xai-Xai	-	+	+
<i>Trematocarpus flabellatus</i> (J. Agardh) De Toni	Rhodophyta	60	Xai-Xai	-	+	+
<i>Tricleocarpa cylindrica</i> (J. Ellis & Solander) Huisman	Rhodophyta	24	Xai-Xai	-	+	+
<i>Dictyota ceylanica</i> Kützting	Phaeophyceae	69	Xai-Xai	+	+	-
<i>Dictyopteria ligulata</i> Papenfuss	Phaeophyceae	107	Xai-Xai	-	+	+
<i>Exallosorus harveyanus</i> (Pappe ex Kützting) J.A. Phillips	Phaeophyceae	18	Xai-Xai	-	-	+
<i>Iyengaria stellata</i> (Børgesen)	Phaeophyceae	95	Xai-Xai	-	+	-

Table 1 (above highlights the main morphological features used to determine new species, following the taxonomic literature (e.g., Branch *et al.*, 2010; De Clerk *et al.*, 2005; Seagrief, 1980, 1984). Furthermore, the identification of Xai-Xai seaweed flora benefited from existing literature from Tanzania (Oliveira *et al.*, 2005) and other regional (e.g., Richmond, 2011) and global databases (Guiry and Guiry, 2022). Voucher numbers are included in Table 1 above. Figure 2 depicts photographs of some of newly recorded species of Mozambique.

Distinctive features and LMU (Eduardo Mondlane University Herbarium) voucher numbers of the new macroalgae are as follows:

Lychaete herpestica (Montagne) M.J. Wynne (Chlorophyta) (Voucher: M71)

Description: Green, firm, cylindrical thallus, forming tangled tufts.

Chaetomorpha indica (Kützinger) Kützinger (Chlorophyta)

Description: Thallus forming a small, long tuft. Slightly tangled long-standing filaments, Unbranched, very narrow filaments.

Cladophoropsis fasciculata (Kjellman) Wille (Chlorophyta)

Description: Light green *in situ*, small soft cushion, up to 6 cm across and 1.5 cm thick very short thallus, dense filament cylindrical.

Pseudocodium floridanum Dawes & A.C. Mathieson (Chlorophyta)

Description: Erect flattened thallus, green *in situ*, main axis with dichotomous branches from which small branches with arc-shaped ends appear.

Codium extricatum P.C. Silva (Chlorophyta)

Description: Singular dark green, just few cm, main thallus with several branches, and end branches often dichotomous.

Codium papenfussii P.C. Silva (Chlorophyta)

Description: Sub-globous, hemispherical body with dark green colour.

Halimeda gracilis Harvey ex J. Agardh (Chlorophyta)

Description: Erect thalli, solitary, composed of flat, calcified segments.

Valonia fastigiata Harvey ex J. Agardh (Chlorophyta)

Description: Hemispherical thallus with cells placed radially.

Excallosorus harveyanus (Pappe ex Kützinger) J.A. Phillips (Phaeophyceae)

Description: Flattened fan-shaped blades, light to dark golden brown, iridescent, blade margins prostrate or semi-upright.

Dictyota ceylanica Kützinger (Phaeophyceae)

Description: Light brown, compact, bifurcation in the apices.

Iyengaria stellata (Børgesen) Børgesen (Phaeophyceae)

Description: Forming firm cartilaginous cushions covered with branched knobby protrusions.

Dictyopteris ligulata (Suhr) O.C. Schmidt (Phaeophyceae)

Description: Greenish brown colour *in situ*, compact, with white central rib, thin cylindrical from which dichotomous branches regularly appear, smooth margin.

Acrosorium acrospermum (J. Agardh) Kylin (Rhodophyta)

Description: Pink in colour, forms a ribbon, slippery cartilaginous texture.

Amphiroa ephedraea (Lamarck) Decaisne (Rhodophyta)

Description: Calcareous, cylindrical slightly flattened, whitish apices.

Amphiroa bowerbankii Harvey (Rhodophyta)

Description: Thick and composed of flattened thallus, dichotomously to sometimes tri- or tetrachotomously-branched, with constrictions along the calcified thallus arc-shaped apex, bleached apexes, attached by a main holdfast.

Amphiroa capensis (Lamarck) Decaisne (Rhodophyta)

Description: Erect with constrictions along the thallus, compact, main holdfast, from where thallus with dichotomous branching appears, arc-shaped apexes, and whitish, lobed.

Ahnfeltiopsis polyclada (Kützinger) P.C. Silva & DeCew (Rhodophyta)

Description: Rigid thallus, dark red, pointed apices, dichotomously branched.

Carpopeltis phyllophora (J.D. Hooker f. & Harvey) F. Schmitz (Rhodophyta)

Description: Dark red, firm, flattened, dichotomously branched and contorted ends.

Caulacanthus ustulatus (Mertens ex Turner) Kützing (Rhodophyta)

Description: Light brown and thallus in short cylinders, forming small upright and forked sections, pointed apices in the form of bristles.

Corallina officinalis Linnaeus

Description: Limestone, pink-purple, erect, compact, pyramidal branches, forms small tuft.

Dasya elongata Sonder (Rhodophyta)

Description: Thallus brown, filamentous, ciliate, attached to a calcareous alga.

Dichotomaria tenera (Kjellman) Huisman, J.T. Harper & G.W. Saunders (Rhodophyta)

Description: Red purple, flattened stalk, the main body dichotomously branched surges.

Dictyomenia stephensonii Papenfuss (Rhodophyta)

Description: Thallus dark red, erect toothed margins.

Gelidium foliaceum (Okamura) E.M. Tronchin (Rhodophyta)

Description: Delicate leafy texture, flattened, short, contorted stalk forms a tuft resembling lettuce.

Gelidium pristoides (Turner) Kützing (Rhodophyta)

Description: Red-purple stalk, tangled with small, flat, narrow ribbons, forming tufts.

Gracilaria vieillardii P.C. Silva (Rhodophyta)

Description: Cartilaginous, dark purple, branched into several planes, sometimes with lobed margins.

Gymnogongrus tetrasporifer Papenfuss (Rhodophyta)

Description: Dark red, erect, attached by a main holdfast, from where several branched stems appear in several planes, forming a tuft.

Halymenia durvillei Bory (Rhodophyta)

Description: Bright, slippery red thallus, held by a main holdfast from which several thalli emerge, frond.

Jania pumila J.V. Lamouroux.

Description: pinkish-red to whitish-pink; sub-cylindrical segments, small size bush appearance forming turfs.

Jania verrucosa J.V. Lamouroux (Rhodophyta)

Description: Red to pink, calcareous, cylindrical, dichotomous branches, whitish round forked terminations.

Laurencia filiformis (C. Agardh) Montagne (Rhodophyta)

Description: Rounded holdfast, fleshy greenish-purple cylindrical stalk, forming small tufts of red round ends.

Laurencia glomerata (Kützing) Kützing (Rhodophyta)

Description: Dark red, erect thallus that emerges from the holdfast, with pyramidal branches that reduce towards the apex.

Neoizziella divaricata (C.K. Tseng) S.-M. Lin, S.-Y. Yang & Huisman (Rhodophyta)

Description: Stem, cylindrical erect, of the main body has several branches, ends with dichotomous branches usually rounded.

Nienburgia serrata (Suhr) Papenfuss (Rhodophyta)

Description: Flattened thalli, sawn edges slightly contorted.

Polyopes constrictus (Turner) J. Agardh (Rhodophyta)

Description: Erect, cylindrical, fleshy stem with pointed ends.

Portieria tripinnata (Hering) De Clerck (Rhodophyta)

Description: Red orange colour, compact thallus, from the main stem with small branches, from small stems with short branches resembling a dentition.

Pterocladia nana (Okamura) Shimada, Horiguchi & Masuda (Rhodophyta)

Description: Erect, red to purple, solitary thallus, thallus that emerges from the holdfast with branches arranged in the opposite way resembling a comb with two, functional parts that reduce the length towards the apex.

Pterosiphonia cloiophylla (C. Agardh) Falkenberg (Rhodophyta)

Description: Red, the main body has opposite branches near the end with higher density.

Ptilophora helenae (Dickinson) R.E. Norris (Rhodophyta)

Description: Red orange colour, pinnate branches, compact stems appear from the main body.

Rhodymenia capensis J. Agardh (Rhodophyta)

Description: Light red to purple, compact stem, dichotomously branched, rounded lighter apexes tapered.

Sarconema scinaoides Børgesen (Rhodophyta)

Description: red to brownish, upright, short thallus, bifurcated branching, dichotomous distal branches, pointed apex.

Scinaia bengalica Børgesen (Rhodophyta)

Description: Hold fast discoid, main body from which several branches emerge, with constrictions along the stem, transparent pink colour, delicate.

Trematocarpus flabellatus (J. Agardh) De Toni (Rhodophyta)

Description: Erect, flattened, red, green colour, from the main body dichotomous branches appear, terminations in the shape of an arch.

Tricleocarpa cylindrica (J. Ellis & Solander) Huisman & Borowitzka (Rhodophyta)

Description: Erect, cylindrical thallus, dichotomous branching, with openings at the end of each thallus.

Codium megalophysum P.C. Silva (Chlorophyta)

Description: Hemispherical to globose, light green; ungrouped (individual) utricles visible to the naked eye, loosely grouped; very relaxed fixation.

Botryocladia leptopoda (J. Agardh) Kylin (Rhodophyta)

Description: with main axis, branched, from which purple to red spherical vesicles appear.

Cryptopleura ramosa (Hudson) L. Newton (Rhodophyta)

Thallus thin, membranous, red, dichotomously branched, irregular on upper parts, with iridescent spots.

With these new additions, a total of 367 species (124 Chlorophyta, 49 Phaeophyceae, 194 Rhodophyta) are documented (Table 2). Chlorophyta contained 12

families, with the most diverse families being Halimedaaceae containing nearly half of the Chlorophyta species; Heterokontophyta; Phaeophyceae (brown algae), with 7 families with the most diverse being Sargassaceae with 21 taxa; Rhodophyta, the largest group with 194 taxa, comprised 34 families, Rhodomelaceae with 48 taxa. The general Index of Cheney for Mozambique of 6.49 indicated a rather tropical flora.

The relatively low number of brown algae in Mozambique agrees with Santelices *et al.* (2009), who demonstrated that brown algae species are low in tropical regions. This pattern has also been demonstrated to occur in the Indian Ocean (Price *et al.*, 2006). The relatively high proportion of green and red algae is similar to many tropical floras (Santelices *et al.*, 2009).

Comparing the macroalgae diversity of Mozambique with that of the neighboring countries and considering the vast coastline of Mozambique, 367 species might still be an underestimate. While Rhodophyta and the subtidal fringe provided more new records, the search in the subtidal areas may yield further species diversity. Kenya, Tanzania and Madagascar flora surpass 400 species (Fig. 3).

The reported macroalgae species richness of Mozambique is much lower than the around 1029 macroalgae species reported for South Africa, including its sub-tropical and temperate phyto-geographical zones, and the around 531 species in both Tanzania and Kenya tropical floras (Guiry and Guiry, 2022). The number of seaweed species is related to the length of

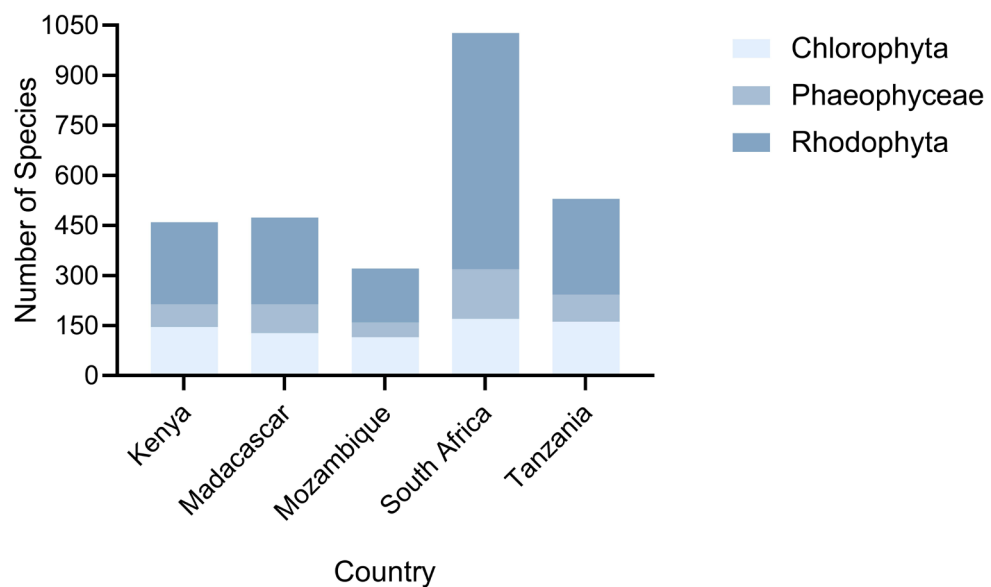


Figure 3. Numbers of species of seaweeds in Mozambique and neighboring countries.

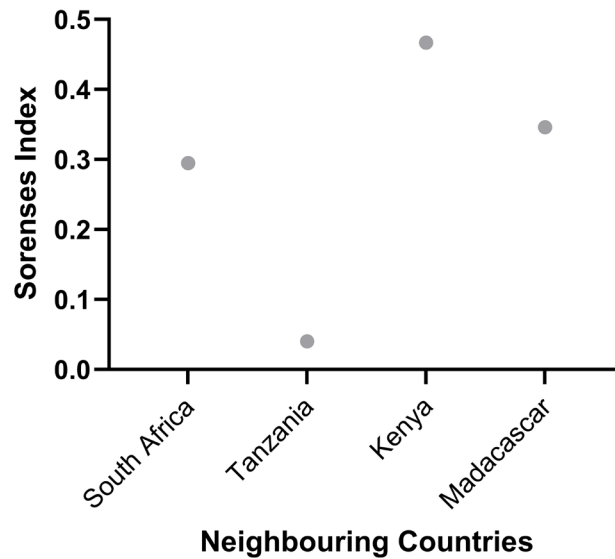


Figure 4. Similarity index between Mozambique and neighboring countries.

the coastline (Santelices *et al.*, 2009). Mozambique has a long coastline of about 2700 km, which is close to the South African coastline of 3000 km and much longer than the coastline of Kenya and Tanzania. The relatively low number of species found so far in Mozambique is probably indicative of less research effort than in Kenya, Tanzania and South Africa.

The Sorensen Similarity Index between Mozambique and neighboring countries is presented in Figure 4.

The similarities of floras between Mozambique and neighboring countries are low ($C_s < 0.5$, Fig. 4, Table 2). The flora similarity with Kenya is highest ($C_s = 0.467$), while it is lowest with South Africa ($C_s = 0.295$).

The observed similarity between the floras of Mozambique and of Kenya and Tanzania is due to the tropical nature of the northeastern section in Mozambique (Bolton *et al.*, 2006). The Madagascar channel represents an important biogeographical barrier that may decrease the flora dispersal between southern Mozambique and Tanzania (Obura *et al.*, 2019), resulting in these two areas having moderate similarity. The lowest similarity with South Africa flora results from

the diverse climatic regions of South Africa, from sub-tropical to temperate phyto-geographical zones.

Mozambique remains poorly known in terms of its seaweed flora, however studies like this with significant field work in southern Mozambique may help fill the gap in species diversity counts.

Acknowledgments

This study was enriched with data from the bachelor's theses of MJA and MAM from Eduardo Mondlane University and Pedagogic University of Maputo respectively. We thank Dr. Alan Critchley (Verschuren Centre for Sustainability in Energy and Environment, Canada) for commenting on an earlier version of the manuscript. Our acknowledgements are extended to Joaquim Campira and Torres Taimo. This study was mainly funded by the AKDN – Fundação Aga Khan and FCT – Fundação para a Ciência e a Tecnologia IP, in the context of the COBIO-NET project. WIOMSA MASMA grant (Seagrass protect) and WIO-RISE projects provided additional support. RS acknowledges the funding from FCT - Foundation for Science and Technology through projects UIDB/04326/2020, UIDP/04326/2020 and LA/P/0101/2020.

Table 2. Number of species in Mozambique; Nb, number of species in each neighbouring country; Na+b, number of species in common with Iran; Cs, Sørensen similarity index = $(2 Na+b)/(Na+Nb)$ (Nguyen *et al.*, 2013; Kokabi and Yousefzadi, 2015).

Neighbouring countries	Na = 367		Sorensen Index
	N	Na+Nb	
South Africa	1029	206	0.295
Tanzania	531	180	0.400
Kenya	461	177	0.467
Madagascar	475	146	0.346

Table 3. Updated checklist of marine macroalgae of Mozambique (* is a new record).

RHODOPHYTA
BONNEMAISONIACEAE
<i>Asparagopsis taxiformis</i> (Delile) Trevisan
CALLITHAMNIACEAE
<i>Spyridia filamentosa</i> (Wulfen) Harvey
<i>Spyridia fusiformis</i> Børgesen
<i>Spyridia hypnoides</i> (Bory) Papenfuss
<i>Crouania attenuata</i> (C. Agardh) J. Agardh
<i>Euptilota fergusonii</i> Cotton
CAULACANTHACEAE
<i>Catenella caespitosa</i> (Withering) L.M. Irvine
<i>Catenella nipae</i> Zanardini
<i>Catenella subumbellata</i> C.K. Tseng
<i>Caulacanthus ustulatus</i> (Turner) Kützing*
CHAMPIACEAE
<i>Champia compressa</i> Harvey
<i>Champia indica</i> Børgesen
CERAMIACEAE
<i>Balliella subcorticata</i> Itono & Tak. Tanaka
<i>Centroceras clavulatum</i> (C. Agardh) Montagne
<i>Ceramium brevizonatum</i> H.E. Petersen
<i>Ceramium deslongchampsii</i> Chauvin ex Duby
<i>Ceramium diaphanum</i> (Lightfoot) Roth
<i>Ceramium planum</i> Kützing
<i>Antithamnion antillanum</i> Børgesen, nom. cons.
CORALLINACEAE
<i>Arthrocardia carinata</i> (Kützing) H.W. Johansen
<i>Arthrocardia flabellata</i> (Kützing) Manza
<i>Jania cultrata</i> (Harvey) J.H. Kim, Guiry & H.-G. Choi
<i>Jania prolifera</i> (J.V. Lamouroux) J.H. Kim, Guiry & H.-G. Choi, nom. illeg.
<i>Jania cubensis</i> Montagne ex Kützing
<i>Jania rosea</i> (Lamarck) Decaisne
<i>Jania subulata</i> (Ellis & Solander) Sonder
<i>Jania pedunculata</i> var. <i>adhaerens</i> (J.V. Lamouroux) A.S. Harvey, Woelkerling & Reviere
<i>Jania intermedia</i> (Kützing) P.C. Silva
<i>Jania rubens</i> (Linnaeus) J.V. Lamouroux
<i>Corallina officinalis</i> Linnaeus *
<i>Pneophyllum amplexifrons</i> (Harvey) Y.M. Chamberlain & R.E. Norris
<i>Jania pumila</i> J.V. Lamouroux*
<i>Jania verrucosa</i> J.V. Lamouroux, nom. rejic. *
CYSTOCLONIACEAE
<i>Hypnea cornuta</i> (Kützing) J. Agardh
<i>Hypnea hamulosa</i> (Esper) J.V. Lamouroux
<i>Hypnea musciformis</i> (Wulfen) J.V. Lamouroux
<i>Hypnea nidifica</i> J. Agardh
<i>Hypnea pannosa</i> J. Agardh
<i>Hypnea rosea</i> Papenfuss
<i>Hypnea tenuis</i> Kylin
<i>Hypnea viridis</i> Papenfuss

DELESSERIACEAE

Caloglossa vieillardii (Kützing) Setchell
Cryptopleura ramosa (Hudson) L. Newton *
Acrosorium acrospermum (J. Agardh) Kylin *
Dasya scoparia Harvey
Dasya elongata Sonder*
Dictyurus purpurascens Bory
Heterosiphonia capensis Falkenberg
Herposiphonia secunda (C. Agardh) Ambronn
Herposiphonia secunda f. *tenella* (C. Agardh) M.J. Wynne
Martensia elegans Hering
Nienburgia serrata (Suhr) Papenfuss*
Platysiphonia delicata (Clemente) Cremades
Taenioma nanum (Kützing) Papenfuss
Vanvoorstia spectabilis Harvey

DICRANEMATACEAE

Tenaciphyllum lobatum Børgesen
Tylotus obtusatus (Sonder) J. Agardh

GALAXAURACEAE

Actinotrichia fragilis (Forsskål) Børgesen
Dichotomaria diesingiana (Zanardini) Huisman, J.T. Harper & G.W. Saunders
Galaxaura divaricata (Linnaeus) Huisman & R.A. Townsend
Dichotomaria lenta (Kjellman) Huisman, J.T. Harper & G.W. Saunders
Dichotomaria marginata (J. Ellis & Solander) Lamarck
Dichotomaria obtusata (J. Ellis & Solander) Lamarck
Dichotomaria tenera (Kjellman) Huisman, J.T. Harper & G.W. Saunders*
Galaxaura rugosa (J. Ellis & Solander) J.V. Lamouroux
Tricleocarpa fragilis (Linnaeus) Huisman & R.A. Townsend
Tricleocarpa cylindrica (J. Ellis & Solander) Huisman & Borowitzka*

GRACILARIACEAE

Gracilaria arcuata Zanardini
Gracilaria canaliculata Sonder
Gracilaria corticata (J. Agardh) J. Agardh
Gracilaria cornea J. Agardh
Gracilaria crassa f. *conglomerata* Børgesen
Gracilaria debilis (Forsskål) Børgesen
Gracilaria millardetii (Montagne) J. Agardh
Gracilaria protea J. Agardh
Gracilaria salicornia (C. Agardh) E.Y. Dawson
Gracilariopsis longissima (S.G. Gmelin) Steentoft, L.M. Irvine & Farnham
Gracilaria denticulata F. Schmitz ex Mazza
Gracilaria edulis (S.G. Gmelin) P.C. Silva
Gracilaria vieillardii P.C. Silva*

GRATELOUPIACEAE

Yonagunia maillardii (Montagne & Maillardet) Showe M. Lin, Y.-C. Chuang & De Clerck

GELIDIELLACEAE

Gelidiella acerosa (Forsskål) Feldmann & Hamel
Gelidium reptans (Suhr) Kylin
Gelidium foliaceum (Okamura) E.M. Tronchin*
Gelidium pristoides (Turner) Kützing*
Ptilophora helenae (Dickinson) R.E. Norris*

HAPALIDIACEAE

Choreonema thuretii (Bornet) F. Schmitz

HALYMENIACEAE

Halymenia venusta Børgesen

Prionitis linearis Kylin

Carpopeltis phyllophora (Hooker f. & Harvey) F. Schmitz*

Halymenia durvillei Bory*

Polyopes constrictus (Turner) J. Agardh*

LITHOPHYLLACEAE

Amphiroa anceps (Lamarck) Decaisne

Amphiroa fragilissima (Linnaeus) J.V. Lamouroux

Amphiroa rigida J.V. Lamouroux

Amphiroa tribulus (J.Ellis & Solander) J.V. Lamouroux

Amphiroa bowerbankii Harvey*

Amphiroa capensis Areschoug*

Amphiroa ephedraea (Lamarck) Decaisne*

Lithophyllum subplicatum (Foslie) Basso, Caragnano, Le Gall & Rodondi

LIAGORACEAE

Liagora ceranoides J.V. Lamouroux

Liagora ceranoides f. *leprosa* (J. Agardh) Yamada

Liagora mauritiana Børgesen

Neozizella divaricata (C.K. Tseng) S.-M. Lin, S.-Y. Yang & Huisman *

Titanophycus validus (Harvey) Huisman, G.W. Saunders & A.R. Sherwood

LOMENTARIACEAE

Ceratodictyon repens (Kützing) R.E. Norris

MASTOPHORACEAE

Metamastophora flabellata (Sonder) Setchell

MESOPHYLLUMACEAE

Leptophytum ferox (Foslie) Y.M. Chamberlain & Keats

ORTHOGONACLADIACEAE

Aphanta pachyrrhiza Tronchin & Freshwater

PEYSSONNELIACEAE

Sonderophycus capensis (Montagne) M.J. Wynne

PHACELOCARPACEAE

Phacelocarpus tristichus J. Agardh

PLACENTOPHORACEAE

Callophycus condominiumus R.E. Norris

PTEROCLADIACEAE

Pterocладиella caespitosa (Kylin) Santelices

Pterocладиella australafricanensis E.M. Tronchin & D.W. Freshwater

Pterocладиella caeruleascens (Kützing) Santelices & Hommersand

Pterocладиella psammophila Tronchin & Freshwater

Pterocладиella nana (Okamura) Shimada, Horiguchi & Masuda*

PLOCAMIACEAE

Plocamium beckeri F.Schmitz ex Simons

Plocamium corallorhiza (Turner) Hooker f. & Harvey

Plocamium glomeratum J. Agardh

Plocamium maxillosum (Poiret) J.V. Lamouroux

Plocamium telfairiae (W.J. Hooker & Harvey) Harvey ex Kützing

 PHYLLOPHORACEAE

Ahnfeltiopsis polyclada (Kützing) P.C.Silva & DeCew*
Gymnogongrus tetrasporifer Papenfuss*

 SOLIERIACEAE

Eucheuma denticulatum (N.L. Burman) Collins & Hervey
Eucheuma odontophorum Børgesen
Kappaphycus striatus (F.Schmitz) L.M. Liao
Wurdemannia miniata (Sprengel) Feldmann & Hamel
Sarconema scinaoides Børgesen*
Sarconema filiforme (Sonder) Kylin
Solieria jaasundii Mshigeni & Papenfuss
Solieria robusta (Greville) Kylin

 SARCODIACEAE

Sarcodia montagneana (Hooker f. & Harvey) J. Agardh
Trematocarpus flabellatus (J. Agardh) De Toni *

 SCINAIACEAE

Scinaia bengalica Børgesen*

 SPONGITIDACEAE

Neogoniolithon oblimans (Heydrich) P.C. Silva

 STYLONEMATACEAE

Stylonema alsidii (Zanardini) K.M. Drew

 RHODOMELACEAE

Acanthophora dendroides Harvey
Acanthophora muscoides (Linnaeus) Bory
Acanthophora spicifera (M. Vahl) Børgesen
Acrocystis nana Zanardini
Amansia rhodantha (Harvey) J. Agardh
Balliella subcorticata Itono & Tak. Tanaka
Bostrychia moritziana (Sonder ex Kützing) J. Agardh
Bostrychia radicans (Montagne) Montagne
Bostrychia tenella (J.V. Lamouroux) J. Agardh
Bryocladia densa Saenger
Chondria armata (Kützing) Okamura
Chondria collinsiana M. Howe
Chondria dasyphylla (Woodward) C. Agardh
Dictyomenia stephensonii Papenfuss*
Digenea simplex (Wulfen) C. Agardh
Halopithys subopaca (Simons) L.E. Phillips & De Clerck
Endosiphonia horrida (C. Agardh) P.C. Silva
Halopithys subopaca (Simons) L.E. Phillips & De Clerck
Herposiphonia tenella (C. Agardh) Ambronn
Kentrophora natalensis (J.Agardh) S.M.Wilson & Kraft
Chondrophyucus columellaris (Børgesen) E. Coppejans & A.J.K. Millar
Laurencia complanata (Suhr) Kützing
Chondrophyucus intermedius (Yamada) Garbary & J.T. Harper
Laurencia filiformis (C. Agardh) Montagne*
Laurencia glomerata (Kützing) Kützing*
Laurencia natalensis Kylin
Laurencia obtusa var. *rigidula* Grunow
Palisada perforata (Bory) K.W. Nam
Laurencia pumila (Grunow) Papenfuss

Laurencia tenera C.K. Tseng
Amansia dietrichiana Grunow
Murrayella pericladus (C. Agardh) F. Schmitz
Newrymenia fraginifolia (Mertens ex Turner) J. Agardh
Ophidocladus simpliciusculus (P. Crouan & H. Crouan) Falkenberg
Vidalia melvillii (J. Agardh) F. Schmitz
Placophora binderi (J. Agardh) J. Agardh
Polyzonia elegans Suhr
Pterosiphonia stangeri (J. Agardh) Falkenberg
Rhodmelopsis africana Pocock
Bostrychia tangatensis Post
Streblacladia corymbifera (C. Agardh) Kylin
Leveillea jungermannioides (Hering & G. Martens) Harvey
Polysiphonia caespitosa (Pocock) Hollenberg
Rhodymenia capensis J. Agardh*
Polysiphonia incompta Harvey
Pterosiphonia cloiophylla (C. Agardh) Falkenberg*
Botryocladia leptopoda (J. Agardh) Kylin*
Rhodymenia natalensis Kylin

RHIZOPHYLLIDACEAE

Portieria harveyi (J. Agardh) P.C. Silva
Portieria hornemanni (Lyngbye) P.C. Silva
Portieria tripinnata (Hering) De Clerck*

WRANGELIACEAE

Tiffaniella codicola (Yamada & T. Tanaka) Doty & Meñez
Tiffaniella cymodoceae (Børgesen) E.M. Gordon
Ptilothamnion polysporum Gordon-Mills & Wollaston
Spongoconium caribaeum (Børgesen) M.J. Wynne
Pleonosporium harveyanum (J. Agardh) De Toni
Griffithsia confervoides Suhr
Griffithsia rhizophora Grunow ex Weber Bosse
Anotrichium tenue (C. Agardh) Nägeli

CHLOROPHYTA

ANADYOMENACEAE

Anadyomene stellata (Wulfen) C. Agardh
Anadyomene wrightii Harvey ex J.E. Gray
Microdictyon kraussii J.E. Gray

BRYOPSISIDACEAE

Bryopsis hypnoides J.V. Lamouroux
Bryopsis pusilla Levring

BOODLEACEAE

Boodlea composita (Harvey) F. Brand
Boodlea montagnei (Harvey ex J.E. Gray) Egerod
Cladophoropsis fasciculata (Kjellman) Wille*
Cladophoropsis vaucheriiformis (Areschoug) Papenfuss
Phyllodictyon anastomosans (Harvey) Kraft & M.J. Wynne

CLADOPHORACEAE

Chaetomorpha antennina (Bory) Kützing
Chaetomorpha indica (Kützing) Kützing*

Chaetomorpha aerea (Dillwyn) Kützing
Chaetomorpha linum (O.F.Müller) Kützing
Cladophora catenata Kützing
Cladophora coelothrix Kützing
Cladophora patentiramea (Montagne) Kützing
Cladophora prolifera (Roth) Kützing
Cladophora vagabunda (Linnaeus) Hoek
Lychaete herpestica (Montagne) M.J. Wynne*
Rhizoclonium africanum Kützing

CODIACEAE

Codium acuminatum O.C. Schmidt
Codium arabicum Kützing
Codium capitatum P.C. Silva
Codium cicatrix P.C.Silva
Codium duthieae P.C. Silva
Codium dwarkense Børgesen
Codium extricatum P.C. Silva*
Codium flabellatum P.C. Silva ex M. Nizamuddin
Codium lucasii subsp. *capense* P.C. Silva
Codium megalophysum P.C. Silva*
Codium mozambiquense P.C. Silva
Codium ovale Zanardini
Codium papenfussii P.C. Silva*
Codium pocockiae P.C. Silva
Codium prostratum Levring
Codium spongiosum Harvey

HALIMEDACEAE

Halimeda cuneata Hering
Halimeda cylindracea Decaisne
Halimeda discoidea Decaisne
Halimeda gigas W.R. Taylor
Halimeda gracilis Harvey ex J. Agardh*
Halimeda lacunalis f. *lata* (W.R. Taylor) L.W. Hillis
Halimeda macroloba Decaisne
Halimeda melanesica Valet
Halimeda opuntia (Linnaeus) J.V. Lamouroux
Halimeda renschii Hauck
Halimeda tuna (J.Ellis & Solander) J.V. Lamouroux
Halimeda velasquezii W.R.Taylor
Pseudocodium floridanum Dawes & A.C. Mathieson*
Pseudocodium devriesii Weber Bosse
Rhipidosiphon javensis Montagne
Udotea flabellum (J.Ellis & Solander) M. Howe
Udotea glaucescens Harvey ex J. Agardh
Udotea indica A. Gepp & E.S. Gepp
Udotea orientalis A. Gepp & E.S. Gepp
Udotea palmetta Decaisne
Udotea wilsonii A. Gepp, E.S. Gepp & M. Howe

CHLOROSARCINACEAE

Chlorosphaera schweickerdtii Cholnoky

DASYCLADACEAE

Bornetella oligospora Solms-Laubach

Dasycladus ramosus Y.M. Chamberlain

Neomeris dumetosa J.V. Lamouroux

Neomeris vanbosseae M. Howe

DICHOTOMOSIPHONACEAE

Avrainvillea erecta (Berkeley) A. Gepp & E.S. Gepp

Avrainvillea nigricans Decaisne

Avrainvillea obscura (C. Agardh) J. Agardh

CAULERPACEAE

Boodleopsis pusilla (Collins) W.R. Taylor, A.B. Joly & Bernatowicz

Caulerpa ambigua Okamura

Caulerpa antoensis Yamada

Caulerpa brachypus Harvey

Caulerpa cupressoides (Vahl) C. Agardh

Caulerpa cupressoides f. *amicorum* (Harvey) Weber Bosse

Caulerpa cupressoides var. *flabellata* Børgesen

Caulerpa elongata Weber Bosse

Caulerpa fastigiata Montagne

Caulerpa filiformis (Suhr) Hering

Caulerpa lanuginosa J. Agardh

Caulerpa lentillifera J. Agardh

Caulerpa mexicana Sonder ex Kützing

Caulerpa microphysa (Weber Bosse) Feldmann

Caulerpa racemosa (Forsskål) J. Agardh

Caulerpa racemosa var. *lamourouxii* (Turner) Weber Bosse

Caulerpa racemosa var. *occidentalis* (J. Agardh) Børgesen

Caulerpa racemosa var. *turbinata* (J. Agardh) Eubank

Caulerpa racemosa var. *macrophysa* (Sonder ex Kützing) W.R. Taylor

Caulerpa racemosa f. *simplicissima* Børgesen

Caulerpa chemnitzia (Esper) J.V. Lamouroux

Caulerpa chemnitzia var. *turbinata* (J. Agardh) Fernández-García & Riosmena-Rodríguez

Caulerpa scalpelliformis (R. Brown ex Turner) C. Agardh

Caulerpa denticulata Decaisne

Caulerpa denticulata var. *intermedia* (Weber Bosse) M.J. Wynne

Caulerpa selago (Turner) C. Agardh

Caulerpa serrulata (Forsskål) J. Agardh

Caulerpa sertularioides (S.G. Gmelin) M. Howe

Caulerpa sertularioides f. *brevipes* (J. Agardh) Svedelius

Caulerpa taxifolia (M. Vahl) C. Agardh

Caulerpa urvilleana Montagne

Caulerpa webbiana Montagne

Caulerpa webbiana var. *pickeringii* (Harvey & Bailey) Eubank

Chlorodesmis fastigiata (C. Agardh) S.C. Ducker

Chlorodesmis major Zanardini

POLYPHYSAEAE

Acetabularia calyculus J.V. Lamouroux

Parvocaulis parvulus (Solms-Laubach) S. Berger, Fettweiss, Gleissberg, Liddle, U. Richter, Sawitzky & Zuccarello

SIPHONOCLADACEAE

Boergesenia forbesii (Harvey) Feldmann
Chamaedoris auriculata Børgesen
Chamaedoris delphinii (Hariot) Feldmann & Børgesen
Dictyosphaeria cavernosa (Forsskål) Børgesen
Dictyosphaeria versluisii Weber Bosse
Siphonocladus tropicus (P. Crouan & H. Crouan) J. Agardh

VALONIACEAE

Valonia aegagropila C. Agardh
Valonia macrophysa Kützinger
Valonia fastigiata Harvey ex J. Agardh*
Valoniopsis pachynema (G. Martens) Børgesen
Valonia ventricosa J. Agardh

ULVACEAE

Ulva compressa (Linnaeus) Nees
Ulva intestinalis Linnaeus
Ulva kyllinii (Bliding) H.S. Hayden, Blomster, Maggs, P.C. Silva, Stanhope & Waaland
Ulva clathrata (Roth) C. Agardh
Ulva prolifera O.F. Müller
Ulva latuca Delile
Ulva pertusa Kjellman
Ulva pulchra Jaasund, nom. inval.
Ulva reticulata Forsskål
Ulva rigida C. Agardh
Ulva uncialis (Kützinger) Montagne

Heterokontophyta (PHAEOPHYCEAE)

ACINETOSPORACEAE

Feldmannia irregularis (Kützinger) Hamel

DICTYOTACEAE

Dictyopteris delicatula J.V. Lamouroux
Dictyopteris longifolia Papenfuss
Dictyopteris macrocarpa (Areschoug) O.C. Schmidt
Dictyopteris serrata (Areschoug) Hoyt
Dictyota adnata Zanardini
Canistrocarpus cervicornis (Kützinger) De Paula & De Clerck
Dictyota ceylanica Kützinger
Dictyota dichotoma (Hudson) J.V. Lamouroux
Dictyota implexa (Desfontaines) J.V. Lamouroux
Dictyota humifusa Hörnig, Schnetter & Coppejans
Exallosorus harveyanus (Pappe ex Kützinger) J.A. Phillips*
Dictyopteris ligulata (Suhr) O.C. Schmidt*
Lobophora variegata (J.V. Lamouroux) Womersley ex E.C. Oliveira
Padina boergesenii Allender & Kraft
Padina boryana Thivy
Padina gymnospora (Kützinger) Sonder
Spatoglossum asperum J. Agardh
Rugulopteryx suhrii (Kützinger) De Clerck & Coppejans*
Stoehospermum polypodioides (J.V. Lamouroux) J. Agardh
Stypopodium multipartitum (Suhr) P.C. Silva
Zonaria subarticulata (J.V. Lamouroux) Papenfuss

SCYTOSIPHONACEAE

Chnoospora minima (Hering) Papenfuss
Colpomenia sinuosa (Mertens ex Roth) Derbès & Solier
Rosenvingea endiviifolia (Martius) M.J. Wynne
Rosenvingea orientalis (J. Agardh) Børgesen
Hydroclathrus clathratus (C. Agardh) M. Howe
Iyengaria stellata (Børgesen) Børgesen*

SARGASSACEAE

Anthophycus longifolius (Turner) Kützing
Hormophysa cuneiformis (J.F. Gmelin) P.C. Silva
Polycladia myrica (S.G. Gmelin) Draisma, Ballesteros, F. Rousseau & T. Thibaut
Sirophysalis trinodis (Forsskal) Kützing
Sargassum aquifolium (Turner) C. Agardh
Sargassum elegans Suhr
Sargassum ilicifolium (Turner) C. Agardh
Sargassum ilicifolium (Turner) C. Agardh
Sargassum incisifolium (Turner) C. Agardh
Sargassum latifolium (Turner) C. Agardh
Sargassum lendigerum (Linnaeus) C. Agardh
Sargassum oligocystum Montagne
Sargassum polycystum C. Agardh
Turbinaria conoides (J. Agardh) Kützing
Turbinaria decurrens Bory
Turbinaria kenyaensis W.R. Taylor
Turbinaria ornata (Turner) J. Agardh
Turbinaria ornata var. *serrata* Jaasund, nom. inval.

LESSONIACEAE

Ecklonia radiata (C. Agardh) J. Agardh

NEORALFSIACEAE

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

References

- Bandeira SO, António CM (1996) The intertidal distribution of seagrasses and seaweeds at Mecúfi Bay, northern Mozambique. In: Kuo J, Phillips RC, Walker DI, Kirkman H (eds) *Seagrass biology. Proceedings of an international workshop. Rottneest Island, Western Australia.* pp 15-20
- Bandeira SO, António CM, Critchley AT (2001) A taxonomic listing, including new distribution records, for benthic intertidal seaweeds from Mecúfi, Northern Mozambique. *South African Journal of Botany* 67: 492-496 [https://doi.org/10.1016/S0254-6299(15)31169-8]
- Bandeira S, Paula J (2014) (eds) *The Maputo Bay ecosystem. WIOMSA, Zanzibar Town.* 427 pp
- Barbosa FMA, Cuambe CC, Bandeira SO (2001) Status and distribution of mangroves in Mozambique, *South African Journal of Botany* 67 (3): 393-398 [https://doi.org/10.1016/S0254-6299(15)31155-8]
- Bolton, JJ, Oyieke H, Gwada P (2006) The seaweeds of Kenya: checklist, history of seaweeds study, coastal environment and analysis of seaweed diversity and biogeography. *South African Journal of Botany* 81: 73-76 [https://doi.org/10.1016/j.sajb.2006.08.006]
- Branch GM, Griffiths CL, Branch ML, Beckley LE (2010) *Two oceans - A guide to the marine life of southern Africa.* Struik Nature, Cape Town. 456 pp
- Carvalho MA, Bandeira SO (2003) Seaweed flora of Quirimbas Archipelago, northern Mozambique. In: Chapman ARO, Anderson RJ, Vreeland VJ, Davison IR (eds) *Proceedings of the 17th International Seaweed Symposium.* Oxford University Press, Cape Town. pp 319-324
- Chamberlain YM (1958) *Dascladus ramosus*, a new species from Inhaca Island and Peninsula, Portuguese East Africa. *Journal of South African Botany* 24: 119-121

- Cheney DP (1977) R + C / P – a new and improved ratio for comparing seaweed floras. *Journal of Phycology* 13 (suppl.): 1-12
- Coppejans E, Leliaert F, Schils T (2002) New records of marine benthic algae for the Mozambican coast, collected at Inhaca Island. *South African Journal of Botany* 68 (3): 342-348 [https://doi.org/10.1016/S0254-6299(15)30396-3]
- Critchley AT, Farrell EG, Aken ME, Pienaar RN (1994) A multivariate approach to the phycogeographical aspects of the seaweed flora of Inhaca Island, Mozambique. *Botanica Marina* 37: 261-265 [https://doi.org/10.1515/botm.1994.37.3.261]
- Critchley AT, Aken ME, Bandeira SO, Kalk M (1997) A list of seaweeds from Inhaca Island, Mozambique. *South African Journal of Botany* 63 (6): 426-435 [https://doi.org/10.1016/S0254-6299(15)30796-1]
- De Clerck O, Bolton JJ, Anderson RJ, Coppejans E (2005) Guide to the seaweeds of Kwazulu- Natal. *Scripta Botanica Belgica* 33, Flanders Marine Institute (VLIZ)/Flemish Community/National Botanic Garden of Belgium, Meise. 294 pp
- Guiry MD, Guiry GM (2022) *AlgaeBase*. Worldwide electronic publication, National University of Ireland, Galway [https://www.algaebase.org]
- Isaac WE (1956) Marine algae of Inhaca Island and of the Inhaca Peninsula. I. *Journal of South African Botany* 22: 161-193
- Isaac WE (1957) Some marine algae from Xai-Xai. *Journal of South African Botany* 23: 75-102
- Isaac WE (1958) Ecology of algae. In: Macnae W, Kalk M (eds) *A natural history of Inhaca Island*. Mozambique. University of the Witwatersrand Press, Johannesburg. pp18-22
- Isaac WE, Chamberlain YM (1958) Marine algae of Inhaca Island and of the Inhaca Peninsula. II. *Journal of South African Botany* 24: 123-158
- Isaac WE (1959) Comments on the seaweed flora and vegetation of Inhaca. *South African Journal of Science* 55: 181-183
- IUCN (2021) *Avaliação do Estado, Tendências e Ameaças à Biodiversidade em Moçambique BIODIV2030*. Maputo. 190 pp
- Kokabi M, Yousefzadi M (2015) Checklist of the marine macroalgae of Iran. *Botanica Marina* 58 (4): 307-320 [https://doi.org/10.1515/bot-2015-0001]
- Massingue AO, Bandeira SO (2005) Distribution of seagrasses and common Seaweeds around Nampula Province (Northern Mozambique) with emphasis on Mozambique Island. *Western Indian Ocean Journal of Marine Science* 4 (2): 175-183 [https://www.ajol.info/index.php/wiojms/article/view/28486]
- Hoguane AM (2007) Perfil diagnóstico da zona costeira de Moçambique. *Journal of Integrated Coastal Zone Management, Revista de Gestão Costeira Integrada* 7 (1): 69-82
- Nguyen VT, Le NH, Lin M, Steen F, De Clerck O (2013) Checklist of the marine macroalgae of Vietnam. *Botanica Marina* 56 (3): 207-227 [https://doi.org/10.1515/bot-2013-0010]
- Obura DO, Bandeira SO, Bodin N, Burgener V, Braulik G, Chassot E, Gullström M, Kochzius M, Nicoll M, Osuka K (2019) The Northern Mozambique Channel. In: Sheppard C (ed) *World Seas: An Environmental Evaluation (Second Edition)*. Academic Press. pp 75-99 [https://doi.org/10.1016/B978-0-08-100853-9.00003-8]
- Oliveira EC, Österlund K, Mtolera MSP (2005) Marine plants of Tanzania. A field guide to the seaweeds and seagrasses of Tanzania. Sida/Department for Research Cooperation, SAREC, Stockholm. 267 pp
- Price ARG, Vincent LPA, Venkatachalam AJ, Bolton JJ, Basson PW (2006) Concordance between different measures of biodiversity in Indian Ocean macroalgae. *Marine Ecology Progress Series* 319: 85-91
- Richmond MD (2011) A field guide to the seashores of Eastern Africa and the Western Indian Ocean islands. Sida/WIOMSA, Tanzania. 464 pp
- Saenger P (1971) On the occurrence of *Ophidocladus* (Rhodomelaceae) in Southern Africa. *Journal of South African Botany* 34: 291-304
- Saenger P (1973) Additions and comments on the Rhodomelaceae of Inhaca Island, Mozambique. *Nova Hedvigia* 12 (1): 19-37
- Santelices B, Bolton JJ, Meneses I (2009) Marine algal communities. In: JD Whitman, Roy K (eds) *Marine Macroecology*. Chicago University Press. pp 153-192
- Seagrief SC (1980) Seaweeds of Maputaland. In: Bruton MN, Cooper KH (eds) *Studies on the ecology of Maputaland*. Rhodes University and the Natal Branch of the Wildlife Society of southern Africa. 1841 pp
- Seagrief SC (1984) A catalogue of South African green, brown and red marine algae. *Memoirs of the Botanical Survey of South Africa* 47: 1-72
- Silva PC (1959) The genus *Codium* (Chlorophyta). *South African Journal of Botany* 25: 103-165
- Vieira C, Rasoamanendrika FA, Zubia M, Bolton JJ, Anderson RJ, Engelen AH, D'hondt S, Leliaert F, Payri C, Kawai H, De Clerck O (2021) *Lobophora* (Dictyotales, Phaeophyceae) from the western Indian Ocean:

diversity and biogeography. *South African Journal of Botany* 142: 230-246 [<https://doi.org/10.1016/j.sajb.2021.06.015>]

Wernberg T, Coleman MA, Russell C, Babcock RC, Bell SY, Bolton JJ, Connell SD, Hurd, CL, Johnson CR, Marzinelli EM, Shears NT, Steinberg PD, Thomsen

MS, Vanderklift MA, Vergés A, Wright JT (2019) Biology and ecology of the globally significant kelp *Ecklonia Radiata*. *Oceanography and Marine Biology: An Annual Review* 57: 265-324 [<https://www.taylorfrancis.com/reader/read-online/d36b3b32-3608-4033-a8b4-b924419256ed/chapter/pdf?context=ubx>]