

# The seaweeds of Kenya: Checklist, history of seaweed study, coastal environment, and analysis of seaweed diversity and biogeography

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## Abstract

The seaweeds of Kenya are relatively well documented in comparison with the marine floras of other countries in the Indian Ocean. A checklist is provided of the seaweeds recorded, which includes a total of 386 species (214 red algae, 116 green algae and 56 brown algae), plus an additional 19 infra-specific taxa. This is the first detailed list for almost 30 years, with a 29% increase in species compared to the previous listing. The history of seaweed study in Kenya and the Kenyan coastal environment as a habitat for seaweeds are discussed in detail. An ordination analysis of the global biogeographic relationships of the Kenyan seaweed flora shows clearly the internal consistency of the Indo-Pacific seaweed flora at this large scale. Data on Indian Ocean relationships show that the Kenyan flora produces a distinct grouping of seaweed floras from Tanzania, Madagascar, Mozambique and the Indian Ocean coast of South Africa, which is somewhat separated from the floras of the rest of the Indian Ocean. The data reveal that Mozambiquan seaweeds are seriously understudied, with only 26% of the Kenyan flora having been recorded in that country, compared with 68% in Tanzania, 41% in Madagascar, and 43% in South Africa.

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## 1. Introduction

The seaweeds of Kenya are fairly well-studied floristically, relative to other Indian Ocean countries (Coppejans et al., 2001; Bolton et al., 2003). Seaweeds are economically important, both currently and potentially in the western Indian Ocean (Bandeira, 1998; Mshigeni, 1998; Mollion, 1998; Oyieke, 1998), but there has not been a thorough listing of the species recorded in Kenya for almost 30 years. A comprehensive catalogue of species recorded in the literature for the entire Indian Ocean, with all relevant literature, was published a decade ago (Silva et al., 1996), although a number of species have been newly recorded for Kenya since then; see Coppejans et al. (2000, 2001). The biogeographic affinities of the Kenyan seaweed flora have not previously been analysed in detail. This contribution documents the history of seaweed study in Kenya, describes the coastal

environment as a habitat for seaweeds, lists the species which have been recorded, and analyses the biogeographic patterns of distribution of the seaweeds which have been recorded in Kenya, both in the Indian Ocean and worldwide. It comprises Phaeophyceae, Chlorophyta and Rhodophyta, omitting the Cyanophyta (=Cyanobacteria) which, despite the listings in Silva et al. (1996), are much less well studied than the other three groups, and have taxonomic and nomenclatural problems.

### 1.1. History of seaweed study in Kenya

The first published records on Kenyan seaweeds were made as a result of expeditions undertaken by early German explorers and botanists. An expedition by J.M. Hildebrandt in the late 19th century covered the Red Sea and the Indian Ocean, and taxonomic lists of algae based on his collections from the region were later published by Hauck (1886, 1887, 1888, 1889). The port of Mombasa was one of the stations visited during the expedition, and from Hauck's records, a total of 28 species of algae were recorded. Other floristic records by German botanists

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who called on the East African coastal stations, Mombasa included, were published by Engler (1895), Schmitz (1895), Reinbold (1907) and Schroeder (1912). Schmitz (1895) listed 68 taxa for Tanzania and Kenya, including 19 for Mombasa. There is a wide gap in records of Kenyan algae spanning the period between 1913 and 1956. Lind (1956) published an ecological note based on a collection trip she made to Malindi. She recorded the occurrence and distribution of the common algae of the littoral zone and commented on the paucity of brown algae. In the following year Schmidt (1957) described the flora on a reef platform at Kilindini. He observed that there were significant similarities between the flora of the eastern Africa region and those of Madagascar, India and Malaysia.

Interest in studies and subsequent publications on Kenyan seaweeds has had a significant increase from 1960 to date. Gerloff (1960) examined collections from the East African Herbarium, mostly collected by Greenway and Rawlins between 1952–1953 and 1955–1957. He documented a single species of cyanophyte (*Lyngbya majuscula*) and 35 species of chlorophytes, including ecological observations and the geographical distribution. Taylor (1966) studied Indo-Pacific *Turbinaria*, which included 7 species from Kenya. Of the Kenyan species, *T. crateriformis* and *T. kenyaensis* were described as new species. Ducker (1967) undertook a taxonomic study of the genus *Chlorodesmis* in the Indo-Pacific Region and reported the occurrence of *C. caespitosa* and *C. major* on the Kenya coast. Papenfuss (1967) and Papenfuss and Jensen (1967) reported on the history, morphology and taxonomy of *Hormophysa* and *Cystoseira* species, based on specimens collected in 1962 along the eastern coast of Africa (International Indian Ocean Expedition) which included Kenya.

The first marine botanists to collect, identify and publish their own extensive works on the marine flora of the whole of the Kenyan coast were W.E. Isaac and F.M. Isaac. During the 1960's they carried out the first extensive survey from Manda Island in the north to Gazi in the south, including information on ecology and distribution (Isaac and Isaac, 1968). W.E. Isaac (1967, 1968, 1971) published lists, including 136 species of Rhodophyta, 86 species of Chlorophyta and 40 species of Phaeophyceae. As part of the International Indian Ocean Expedition in 1962, Lawson conducted a brief ecological survey at Malindi, Mombasa and Diani on the Kenya Coast and at Tanga, Bagamoyo and Dar es Salaam on the Tanzanian coast (Lawson, 1969). He described the vertical distribution of the algae at each locality and distinguished three zones comprising of five belts: (1) an *Entophysalis* belt (littoral fringe zone); (2) a *Bostrychia* belt; (3) an animal belt; (4) an algal community belt without obvious dominants and (5) a belt of marine monocots and larger brown algae (sublittoral zone). He observed that the schemes of zonation that had been used in other countries of the world were not entirely satisfactory when applied to the shores of tropical East Africa.

Moorjani, the first Kenyan to conduct studies and publish findings on Kenyan seaweeds, made her first publication on the reproductive structures of *Udotea orientalis* (Moorjani, 1969). She also carried out a taxonomic study on the Kenyan species of *Acetabularia* (Moorjani, 1970) where she gave a description of Kenyan species including an identification key for the flora. The

first non-taxonomic study on the Kenyan algae was conducted by Imbamba (1972). He analyzed the mineral elements (N, P, K, Ca, Mg) of 6 chlorophytes, 4 phaeophytes, 4 rhodophytes and the marine angiosperm *Cymodocea ciliata* from the Diani, Tiwi and Gazi areas. The morphology and taxonomy of *Sarconema filiforme* and *S. scinaoides* specimens collected in Kenya, among other countries, were studied by Papenfuss and Edelstein (1974).

The most extensive ecological study on Kenyan seaweeds was that carried out by Moorjani (1977). She made an attempt to describe the ecology of over 300 species of marine algae, including 160 Rhodophyta. She observed that Caulerpales (=“Siphonales”) were dominant among the Chlorophyta, while Fucales dominated the Phaeophyceae. A total of 31 species were newly recorded for Kenya in her study. On a geographical basis, she observed that the majority of Kenyan algae had a wide north-south distribution on the coast. Malindi was marked as the transition zone with some species restricted to the north of it. She further observed that there was an abrupt change in the composition of the flora at Mamburi, where Rhodophyta predominated. Moorjani (1980) also noted seasonal changes in both quantity and composition of the flora and discussed shore zonation patterns. Oyieke and Ruwa (1987) described the zonation pattern of 33 species of rocky cliff macroalgae in Mombasa, including 10 new records for Kenya. “Seaweeds of the Kenya Coast” (Moorjani and Simpson, 1988) provides a simple key to the common genera found along the coastal waters of Kenya, with descriptions and illustrations of all included taxa (18 genera of Chlorophyceae, 13 genera of Phaeophyceae and 27 genera of Rhodophyceae). Other recent guides to the seaweeds of regions on the Indian Ocean coast of Africa, which are useful in the identification of Kenyan seaweeds, are Coppejans et al. (1997), Oliveira et al. (2005) and De Clerck et al. (2005).

Recent taxonomic research on the seaweeds of Kenya has been carried out by Coppejans and colleagues, working on *Caulerpa* (Coppejans and Beeckman, 1989, 1990), Codiales (Van den Heede and Coppejans, 1996; Coppejans and Van den Heede, 1996) and *Dictyota* (Coppejans, 1990; De Clerck, 2003). Coppejans et al. (2000) provided an annotated list including 40 species newly recorded in Kenya. In addition, this group carried out ecological studies on the seaweeds associated with mangrove vegetation (Coppejans and Gallin, 1989; De Schryver, 1990) as well as the ecology of epiphytes on seagrasses (Coppejans et al., 1992).

A survey of the marine flora in Mida Creek along the northern coast of Kenya was carried out by Uku et al. (1998) and Mwayuli (2003) studied spatial and temporal changes in species diversity and zonation of macroalgae in the intertidal zones at Kanamai and Vasco da Gama Point along the Kenyan north coast. The latter study recorded a total of 87 species of macroalgae, with the highest species richness observed on the reef platforms. Macroalgal abundance was positively correlated with nutrients and faecal coliforms, while high levels of total suspended solids and oil in water resulted in low macroalgal diversity.

The first studies of potential economic importance of seaweeds in Kenya were a brief contribution by Coppejans

(1989) and a more detailed survey by Yarish and Wamukoya (1990). Both studies found populations of species of economic potential, and Coppejans (1989) was of the opinion that harvesting of *Gracilaria* “might be economically interesting”. Yarish and Wamukoya (1990) conducted a survey of 15 sites along the Kenyan coast to evaluate the potential for harvesting seaweeds and for establishing seaweed farms. They observed that *Gracilaria*, whose agar content had been reported to be of low quality, was widely distributed along the Kenya coast, whereas *Gelidium* could be a potential source of high quality bacteriological grade agar. They further suggested that *Eucheuma* could be farmed locally to support the increasing demand for carrageenan. Oyieke (1993a, 1994) quantified and characterised agar from Kenyan *Gracilaria* species collected from different stations along the Kenya Coast. Besides the studies on commercial potential, Oyieke (1993b) and Oyieke and Kokwaro (1993, 1995) studied the taxonomy, ecology and seasonality of Kenyan *Gracilaria*. Oyieke (1994) studied the relationship between phenotypic variation and agar quality in *Gracilaria salicornia*. The Kenyan green alga *Halimeda macroloba* has been reported to contain the triterpenoid Clionasterol, in bioprospecting studies for novel pharmaceuticals (Dzaha et al., 2003). Oyieke (1998) gives an overview of seaweeds of potential economic importance in Kenya. Wakibia (2005) and Wakibia et al. (2006, in press) have recently studied growth rates of three commercial eucheimoid isolates (originally from the Philippines); *Eucheuma denticulatum*, and green and brown *Kappaphycus alvarezii* at three sites i.e. Gazi Bay, Kibuyuni and Mkwiro, all from the southern coast of Kenya. These authors also characterized and compared carrageenan extracts from the three morphotypes by studying yields, gel strength, viscosity and sulphate contents. An economic feasibility and socio-economic study for growing *E. denticulatum* and *K. alvarezii* at Kenyan village sites was also undertaken. Wakibia (2005) reiterated the need for the development of a national mariculture programme in Kenya to guide and promote farming of marine resources, including seaweeds.

### 1.2. The Kenyan coastal environment

The Kenyan coastline (Fig. 1) is ca. 600 km long, stretching from 1°40'S to 4°41'S, and bordering Somalia in the north and Tanzania in the south. While most areas of the world oceans have relatively wide shelf areas, the Kenyan continental shelf is virtually non-existent (Newell, 1957, 1959; Johnson et al., 1982; Nguli, 2005). Most of what may be referred to as the inner shelf consists of a narrow strip area shallower than 50 m. From the shelf edge, the bottom deepens sharply offshore reaching 500 m within a distance of less than 5 km in most cases. Most of the coastline, except where two major rivers (Tana and Sabaki) discharge into the Indian Ocean, is protected by a fairly continuous fringing coral reef platform lying between 0.5–1.5 km offshore, parallel to the coastline (Hartnoll, 1976; IUCN/UNEP, 1988). This fringing reef platform line is known to break strong waves from the open sea, thereby calming waters in the back reef lagoons and adjoining inner coastal waters near the beach (Johnson et al., 1982; Kirugara et al., 1998).

Off-shore patchy reef systems are well developed around the Mida-Lamu-Kiwayu archipelago in the north and Shimoni in the south (Fig. 1). Other features of the continental shelf worth pointing out are the semi-continuous lagoon systems found immediately behind fringing reef platform; the numerous tidal creeks and bays, usually dominated by mangrove swamps (usually following drowned river mouths); the large Ungwana Bay area into which two major rivers drain; and two main banks — the Malindi Bank lying just north of Mida Creek and the North Kenyan Bank located off Kipini (Morgan, 1969) (Fig. 1). The back-reef lagoon waters have physical and chemical parameters that more closely resemble those of oceanic water (Johnson et al., 1982; Kirugara et al., 1998; Nguli, 2005), while the physical parameters of the creek and bay waters fluctuate considerably (Newell, 1957, 1959; Brakel, 1984; Kitheka, 1997). In the bay and creek systems the major environmental drivers include evaporation, precipitation, river inputs, ground-water input, heat budget, incoming and outgoing tidal water, and creek volume (Johnson et al., 1982; Kitheka, 1997; Kirugara et al., 1998; Nguli, 2005).

The leeward side of central and southern Kenya's fringing reefs is frequently dominated by hard substratum areas often colonized by corals, algae, and associated coral reef community (Moorjani, 1977). The northern reefs, on the other hand, are mostly platform reefs (Hamilton and Brakel, 1984), but have a lagoon and edge similar to a fringing reef. The north reef platform is 0.8 m above extreme low water and the lagoon is 0.9 m deep. The central (Kanamai reef) is 1.4 m high at extreme low water and its lagoon 0.3 m deep, while the south (Diani reef) is 0.8 m above extreme low water and 0.6 m deep (McClanahan and Muthiga, 1984). The total area of coral reef in Kenya is estimated at about 50,000 ha (IUCN/UNEP, 1988; McClanahan and Obura, 1984; UNEP, 1998). The biotic components contributing to reef development comprise soft corals, coralline red algae, and calcareous algae. Generally, reef communities here are dominated by *Porites* spp. assemblages in calm waters and *Acropora* spp. assemblages in high energy environments (McClanahan and Obura, 1984; UNEP, 1998). However, the 1997/98 El-Nino event caused extensive bleaching which resulted in local mortalities of up to 70% (Linden and Sporong, 1999).

The oceanographic conditions experienced in Kenya are driven by four oceanic currents: the South Equatorial Current (SEC), the East African Coastal Current (EACC), the Equatorial Counter Current (ECC), and the Somali Current (SC) (Newell, 1957; Wyrki, 1971; Swallow et al., 1992). Superimposed on these currents is the broader influence of a seasonal and variable monsoon climate (Newell, 1957). The monsoon variability is driven by annual north–south migration of the Inter-Tropical Convergence Zone (ITCZ), recently being redefined under the Indian Ocean Dipole (IOD) phenomenon (Anderson, 1999; Behera et al., 1999; Saji et al., 1999; Webster et al., 1999). As a result of this IOD variability with seasonally varying pressure, wind, humidity, cloud cover, rainfall, radiation, and evaporation, two monsoon events occur, the southeast monsoons (SEM) and the northeast monsoons (NEM). These drive local differences in the physical, chemical and biological oceanographic conditions

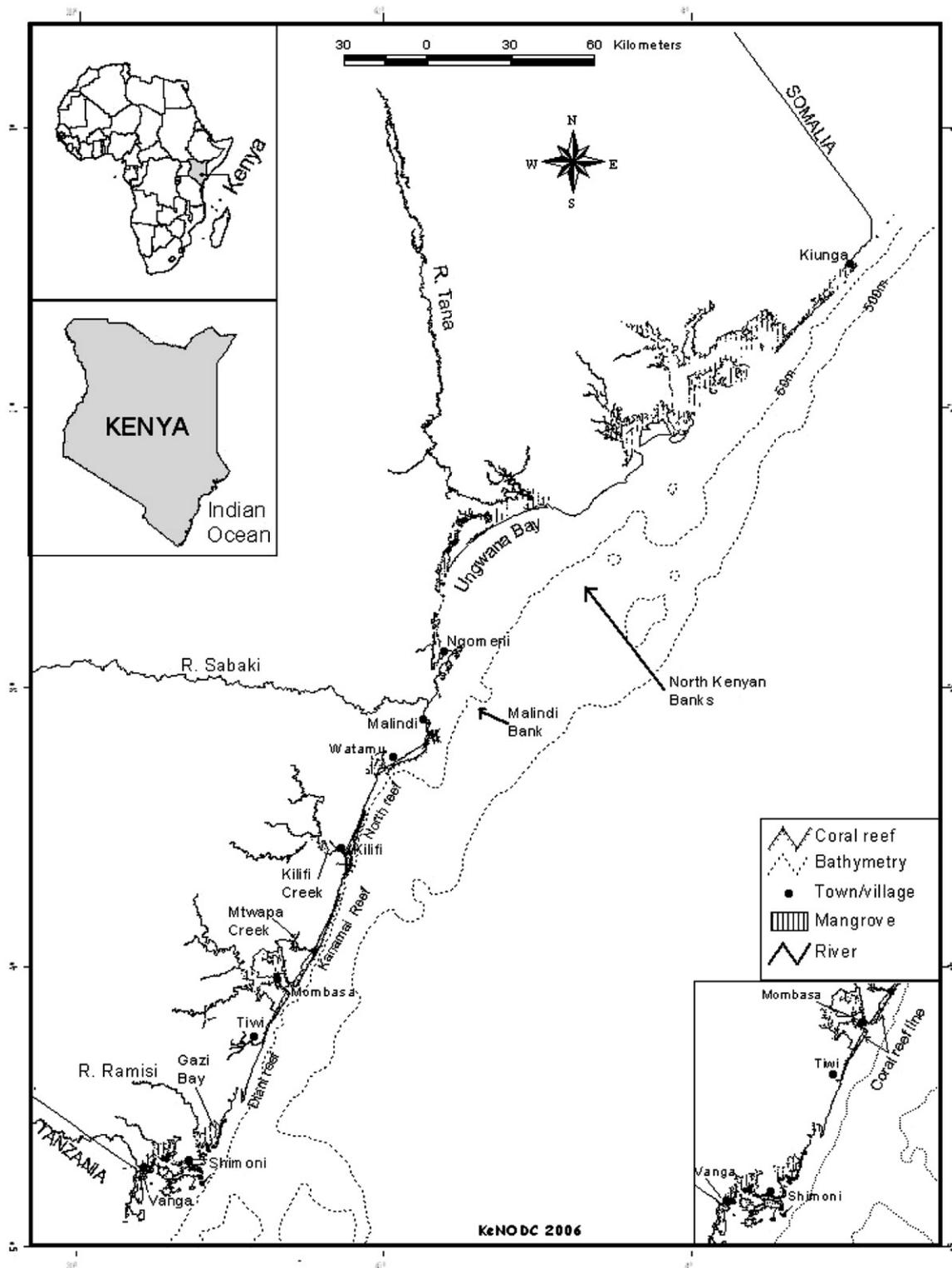


Fig. 1. The Kenyan coastline, showing reef and mangrove habitats and major depth contours.

of coastal waters (Smith and Codispoti, 1990). The alternation between SEM and NEM conditions have been shown to affect the seasonal growth patterns of the carrageenophytes *Eucheuma* and *Kappaphycus* in pilot commercial aquaculture systems (Wakibia, 2005; Wakibia et al., in press).

Of the four coastal currents experienced in the East African region, the Somali Current is the only one that reverses its direction of flow under the influence of the monsoons (Leetmaa, 1972, 1973; Leetmaa and Truesdale, 1972; Johnson et al., 1982). It flows in a south-westerly direction (at about 1.5–2 knots)

Table 1  
Percentage of total Kenyan seaweed flora found to occur in other regions of the world (codes are used for the world regions in Fig. 2)

South-east Asia (SEA)	66.4%
Australia and New Zealand (ANZ)	61.6%
Pacific Islands (PAC)	59.7%
East Asia (EAS)	52.4%
West Africa (WAF)	39.1%
Caribbean Basin (CAR)	38.6%
Europe (EUR)	30.9%
Mediterranean Basin (MED)	25.4%
Eastern South America (ESA)	24.6%
Western, North and Central America (WNA)	17.4%
Red Sea (RED)	16.2%
Western South America (WSA)	13.8%
Antarctic and sub-Antarctic Islands (ANT)	3.8%
Eastern North America (ENA)	2.9%

during NEM, and reverses its flow and increases its velocity (to around 2–2.5 knots) in SEM (Duing and Schott, 1978; Tomczak and Godfrey, 1994). During SEM, the EACC move northwards beyond Malindi and joins with the Somali Current and continues right to the Horn of Africa. It also causes upwelling off the Somali coast in June (Duing and Schott, 1978; Tomczak and Godfrey, 1994). EACC drives the waters onshore, under conditions associated with high wind energy, high cloud cover, high rain (and therefore high sedimentation from increased river discharge or surface run-offs), and low water temperatures (Swallow et al., 1992). As a consequence of SEM conditions, reduced phytoplankton productivity and a relatively higher abundance of benthic algae are generally experienced in coastal waters (Bryceson, 1982).

During NEM, the northward extent of the EACC is more restricted. At this time, it meets and joins the southwards flowing SC (with the convergence taking place anywhere between Malindi and Lamu depending on the strength of the monsoon in that particular year). The two streams then turn eastwards and flow offshore as the ECC, driving waters offshore, under conditions associated with high radiation and evaporation, low wind energy, low cloud cover. The net onshore currents result in the sinking of surface waters along most of the coast, except at the northern frontiers (e.g., near Kiunga, Fig. 1)

where some mild upwelling is thought to occur during NEM (Bruce and Volkmann, 1969; Findlater, 1971, 1977).

Discharges from major rivers have local effects on salinity, especially during the heavy rainy season in SEM periods. Oceanic salinity increases towards the west from relatively low salinity areas in the east and, off the East African coast, surface salinity gradually increases to a maximum off the Red Sea and the Arabian Sea (Nguli, 2005). Within the smaller river systems draining into the estuaries, a similar trend is observed throughout the region, e.g., in Gazi Bay (Kitheka, 1997), Tudor Creek, Kilindini Harbour (Norconsult, 1975).

### 1.3. Methods of checklist production and biogeographical analysis

The checklist of the seaweed species of Kenya was extracted from the website [www.Algaebase.org](http://www.Algaebase.org) (Guiry and Nic Dhonncha, 2005) in March 2005, which is thus the cut-off date for the species noted here. This website includes all the data in Silva et al. (1996) and more recent taxonomic and floristic publications and is updated continually from taxonomic and nomenclatural standpoints. It is thus a comprehensive list of our current knowledge of seaweeds present in Kenya. A few species are commonly listed for the region which have not been validly described, most of them illustrated in Jaasund's (1976) guide to Tanzanian seaweeds (e.g. *Ulva pulchra*, *Acrosorium amphiroae*, *Ceramium multijugum* and *Hypnea esperi*). These have been omitted from the list and analysis, as have a small number of doubtful records. From late 2004, the Algaebase website has also included distribution records for all species by country and provided a summary of the country data in larger biogeographical world regions. The checklist is presented in alphabetical order of genera within phyla, as family concepts in the algae are fluid. The data for Kenyan species were extracted, and two biogeographical analyses were carried out. Firstly, the number and percentage of Kenyan seaweeds in major world regions were calculated and the number and percentage of species of Kenyan seaweeds which have been recorded in various major Indian Ocean countries were analysed. These two datasets were then analysed by ordination (Detrended Correspondence

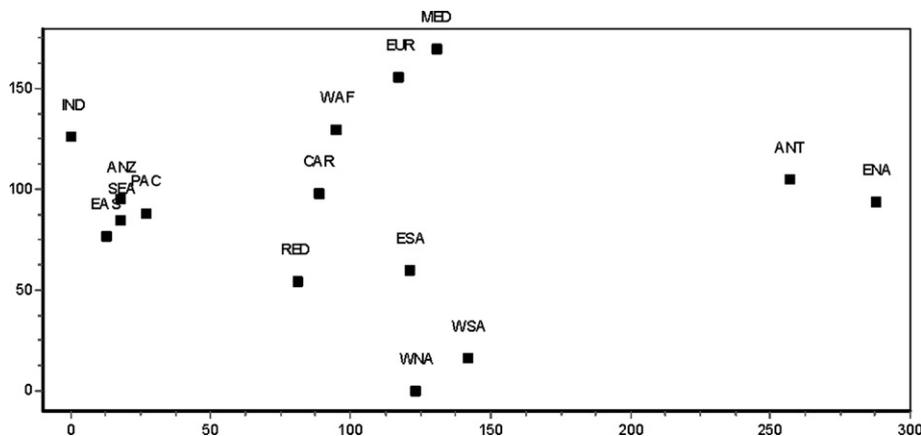


Fig. 2. DECORANA ordination of different world marine regions, based on the seaweeds which occur in Kenya (see Table 1 for codes: Kenya is in the Indian Ocean=IND). Eigenvalues — Axis 1: 0.234, Axis 2: 0.088.

Table 2  
Percentage of total Kenyan seaweed flora found to occur in other regions of the Indian Ocean (codes are used for the Indian Ocean regions in Fig. 3)

Tanzania (TAN)	67.6%
India (INDI)	58.7%
Sri Lanka (SRI)	42.8%
South Africa (SAF)	43.0%
Madagascar (MAD)	40.8%
Indonesia (INDO)	40.8%
Arabian Peninsula (ARA)	40.1%
Somalia (SOM)	28.5%
Pakistan (PAK)	26.8%
Mozambique (MOZ)	25.8%
Bangladesh (BAN)	16.9%
Thailand (THA)	9.7%
Burma (BUR)	6.5%

Analysis: DECORANA) techniques using the Community Analysis Package (CAP: Version 2.1: Pisces Conservation Ltd., 2003), to give an idea of the Indian Ocean and global distributions of those species recorded for Kenya.

## 2. Results of biogeographic analysis

The global distribution of seaweeds occurring in Kenya is shown in Table 1 and Fig. 2. Only a very few cosmopolitan species (<4% of the Kenyan flora) occur both in Kenya and the Antarctic/sub-Antarctic or Eastern North American waters. The analysis reveals that the Indo-Pacific region forms a very distinct cluster, including East Asia, Australia/New Zealand, Southeast Asia, and the Pacific Islands. Over 50% of the Kenyan seaweed flora occurs in each of these regions (Table 1). The Red Sea is separated from this cluster on Axis 2, due to its low species numbers, and hence lower percentage similarity. The rest of the world's floras form a looser cluster, widely separated from that of the Indo-Pacific.

The distribution of Kenyan seaweeds in the Indian Ocean is shown in Table 2 and Fig. 3. 68% of Kenyan seaweeds occur in Tanzania, the most similar flora. The seaweed floras of the Indian Ocean coastline of southeastern Africa (Tanzania, Kenya, Madagascar, South Africa, Mozambique) form a tight cluster.

All these regions, except Mozambique (26% similarity), share more than 40% of their species with Kenya. Most of the remaining Indian Ocean floras (Somalia, Arabian Peninsula, India, Sri Lanka, Indonesia) form a distinct tight cluster. Outliers on the left of Fig. 3 are regions with relatively poorly-studied floras, with consequent low similarities to Kenya (<27% of Kenyan species occur in Thailand, Pakistan, Bangladesh, Burma).

## 3. Discussion

The Kenyan seaweed flora thus far recorded comprises 386 species (214 Rhodophyta, 116 Chlorophyta and 56 Phaeophyceae: Appendix 1), and also includes 19 additional infraspecific taxa. This is a high figure, in keeping with the biogeographical position of Kenya, forming part of the Indo-West Pacific — the most speciose world marine coastal region (Lüning, 1990; Van den Hoek, 1984). Kenya also has a coastline with a proliferation of habitats for different seaweed communities, in contrast to regions of tropical West Africa (John and Lawson, 1997; Bolton et al., 2003). However, in general, the number of seaweed species in a region is related to coastal length in a log/log relationship (Santelices et al., in press), and thus Kenya does not necessarily have an especially rich flora in an Indian Ocean context. Price et al. (2006), however, applying a complex measure combining species richness, rarity and average taxonomic distinctness to the data of the Silva et al. (1996), suggest that Kenya counts 11th in seaweed biodiversity out of 66 countries or island groups in the Indian Ocean.

The relatively low number of brown algae in the Kenyan flora is in agreement with findings of Santelices et al. (in press), who demonstrated that the proportion of species of brown algae in a seaweed flora is low in tropical regions on a global scale. This pattern has also been demonstrated to occur in the Indian Ocean (Price et al., 2006). The relatively high proportion of green algae (30% of the flora) is similar to many tropical floras (Santelices et al., in press). The seaweeds of Kenya have been relatively well collected, with indigenous phycologists being active earlier than in most other African countries, and with substantial subtidal collections being performed at the end of the 20th century by

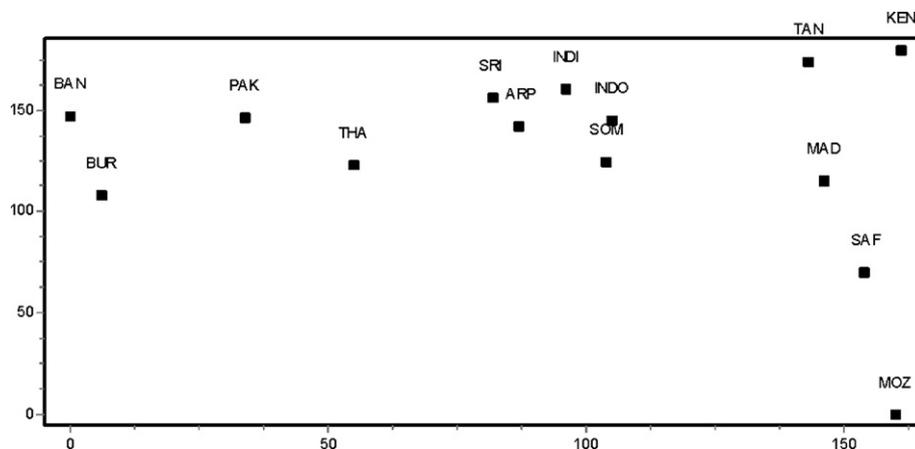


Fig. 3. DECORANA ordination of marine regions in the Indian Ocean, based on seaweeds which occur in Kenya (see Table 2 for codes: Kenya=KEN). Eigenvalues — Axis 1: 0.164, Axis 2: 0.141.

seaweed taxonomists from Belgium (see Coppejans et al., 2000, 2001). The latter added significantly to the recorded floras of both Kenya and Tanzania. The seaweed floras of Somalia and Mozambique are much less well known (Bolton et al., 2003), as is reflected by the low number of species thus far reported to co-occur in Kenya and Mozambique, despite these countries being within the same biogeographical region.

Seaweed species occurring in Kenya are widely distributed within the Indo-Pacific marine region. The world regions with closest links to the Indo-Pacific, as measured by the presence of seaweeds found in Kenya, are Tropical West Africa and the Caribbean. A link between the seaweeds of Mozambique and those of the Caribbean has previously been proposed by Critchley et al. (1994). Interestingly, despite relatively high similarity between the Kenyan flora and that of the Pacific Islands, few Kenyan species occur on the west coasts of the Americas, suggesting the presence of a biogeographical barrier (see Santelices, 1980; Santelices and Meneses, 2000).

The occurrence of very similar floras in southeastern African countries (Kenya, Tanzania, Madagascar, South Africa), separated considerably from other Indian Ocean countries, is evidence of a slightly different flora in these southern regions. The surprisingly low number of seaweeds in Kenya which also grow in Mozambique is very probably an artifact, indicative of the lack of knowledge of Mozambiquan seaweeds in comparison to the seaweeds of Kenya, Tanzania and South Africa. The observed similarity between the seaweeds of Kenya and those of South Africa is due to the tropical nature of the short northeastern section in South Africa (Bolton et al., 2004; Anderson and Bolton, 2005). More distant, well-studied countries in the Indian Ocean (e.g. India, Indonesia) have high numbers of seaweeds also occurring in Kenya.

The narrow continental shelf on much of the Kenyan coast has implications both for seaweed ecology and commercial utilization. It limits the available habitat for seaweed growth and consequently limits natural populations with commercial potential. In addition, it also limits the area available for commercial seaweed aquaculture operations and this is exacerbated by the common occurrence of estuaries, with the concomitant lowered salinities that prevent successful cultivation. Bearing in mind the potential conflict with other coastal uses (e.g. fishing, nature conservation, tourism), it is imperative that studies be carried out to assess the existing habitat which could be used for seaweed cultivation systems (Wakibia, 2005, 2006, in press).

In conclusion, it is clear that detailed documentation of available literature, such as the catalogue of Silva et al. (1996), combined with reliable, web-based data handling (Guiry and Nic Dhonncha, 2005) can produce useful regional information, which can add significantly to our knowledge of biodiversity, biogeography and, ultimately, our ability to conserve marine biotas.

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#### Appendix 1

Checklist of the seaweeds of Kenya, extracted from [www. Algaebase.org](http://www.Algaebase.org) in March 2005, and edited by JJ Bolton.

#### PHAEOPHYCEAE (brown algae)

- 1 *Asteronema rhodochortonoides* (Børgesen) D.G. Müller and E.R. Parodi
- 2 *Chnoospora implexa* J. Agardh
- 3 *Colpomenia sinuosa* (Mertens ex Roth) Derbès and Solier
- 4 *Cystoseira myrica* (S.G. Gmelin) C. Agardh
- 5 *Cystoseira trinodis* (Forsskål) C. Agardh
- 6 *Dictyopteris delicatula* J.V. Lamouroux
- 7 *Dictyopteris hoytii* W.R. Taylor
- 8 *Dictyopteris polypodioides* (A.P. de Candolle) J.V. Lamouroux
- 9 *Dictyopteris repens* (Okamura) Børgesen
- 10 *Dictyota adnata* Zanardini
- 11 *Dictyota bartayresiana* J.V. Lamouroux
- 12 *Dictyota cervicornis* Kützing
- 13 *Dictyota ceylanica* Kützing
- 14 *Dictyota ciliolata* Sonder ex Kützing
- 15 *Dictyota dichotoma* var. *intricata* (C. Agardh) Greville
- 16 *Dictyota friabilis* Setchell
- 17 *Dictyota humifusa* Hörnig, Schnetter and Coppejans
- 18 *Dictyota pardalis* f. *pseudohamata* A.B.Cribb
- 19 *Feldmannia indica* (Sonder) Womersley and A. Bailey
- 20 *Hincksia mitchelliae* (Harvey) P.C. Silva
- 21 *Hormophysa cuneiformis* (J.F. Gmelin) P.C. Silva
- 22 *Hydroclathrus clathratus* (C. Agardh) M. Howe
- 23 *Lobophora variegata* (Lamouroux) Womersley ex Oliveira
- 24 *Padina boryana* Thivy
- 25 *Padina gymnospora* (Kützing) Sonder
- 26 *Padina pavonica* (Linnaeus) Thivy
- 27 *Padina antillarum* (Kützing) Piccone
- 28 *Rosenvingea intricata* (J. Agardh) Børgesen
- 29 *Rosenvingea orientalis* (J. Agardh) Børgesen
- 30 *Sargassum aquifolium* (Turner) C. Agardh
- 31 *Sargassum asperifolium* Hering and G. Martens ex J. Agardh
- 32 *Sargassum cristaefolium* C. Agardh
- 33 *Sargassum densifolium* Zanardini
- 34 *Sargassum echinocarpum* var. *ambiguum* (Grunow) Grunow
- 35 *Sargassum ilicifolium* (Turner) C. Agardh
- 36 *Sargassum ilicifolium* f. *erythraeum* Grunow
- 37 *Sargassum ilicifolium* var. *venustum* Grunow
- 38 *Sargassum latifolium* (Turner) C. Agardh

- 39 *Sargassum lendigerum* var. *mombassaense* Grunow  
 40 *Sargassum oligocystum* Montagne  
 41 *Sargassum polycystum* C. Agardh  
 42 *Sargassum portieranum* var. *mombassiense* Grunow  
 43 *Sargassum swartzii* C. Agardh  
 44 *Sargassum wightii* Greville  
 45 *Spatoglossum asperum* J. Agardh  
 46 *Sphacelaria novae-hollandiae* Sonder  
 47 *Sphacelaria rigidula* Kützing  
 48 *Sphacelaria tribuloides* Meneghini  
 49 *Stoechospermum polypodioides* (J.V. Lamouroux) J. Agardh  
 50 *Stypopodium zonale* (J.V. Lamouroux) Papenfuss  
 51 *Turbinaria condensata* Sonder  
 52 *Turbinaria conoides* (J. Agardh) Kützing  
 53 *Turbinaria crateriformis* W.R. Taylor  
 54 *Turbinaria decurrens* Bory de Saint-Vincent  
 55 *Turbinaria kenyaensis* W.R. Taylor  
 56 *Turbinaria murrayana* Barton  
 57 *Turbinaria ornata* (Turner) J. Agardh  
 58 *Turbinaria ornata* f. *ecoronata* W.R. Taylor  
 59 *Turbinaria ornata* f. *evesiculosa* (Barton) W.R. Taylor  
 60 *Turbinaria ornata* f. *hainanensis* W.R. Taylor  
 61 *Turbinaria tanzaniensis* Jaasund

#### CHLOROPHYTA (green algae)

- 1 *Acetabularia calyculus* J.V. Lamouroux  
 2 *Acetabularia clavata* Yamada  
 3 *Acetabularia exigua* Solms-Laubach  
 4 *Anadyomene stellata* (Wulfen) C. Agardh  
 5 *Anadyomene wrightii* Harvey ex J.E. Gray  
 6 *Avrainvillea amadelpha* (Montagne) A. Gepp and E.S. Gepp  
 7 *Avrainvillea amadelpha* f. *submersa* A. Gepp and E. Gepp  
 8 *Avrainvillea erecta* (Berkeley) A. Gepp and E.S. Gepp  
 9 *Avrainvillea lacerata* Harvey ex J. Agardh  
 10 *Avrainvillea nigricans* Decaisne  
 11 *Avrainvillea obscura* (C. Agardh) J. Agardh  
 12 *Avrainvillea ridleyi* A. Gepp and E.S. Gepp  
 13 *Boergesenia forbesii* (Harvey) Feldmann  
 14 *Boodlea composita* (Harvey) F. Brand  
 15 *Boodlea montagnei* (Harvey ex J.E. Gray) Egerod  
 16 *Boodleopsis pusilla* (F.S. Collins) W.R. Taylor, A.B. Joly and Bernatowicz  
 17 *Bryopsis hypnoides* J.V. Lamouroux  
 18 *Bryopsis indica* A. Gepp and E.S. Gepp  
 19 *Bryopsis pennata* J.V. Lamouroux  
 20 *Bryopsis pennata* var. *leprieurii* (Kützing) Collins and Hervey  
 21 *Bryopsis plumosa* (Hudson) C. Agardh  
 22 *Caulerpa brachypus* f. *parvifolia* A.B. Cribb  
 23 *Caulerpa cupressoides* (Vahl) C. Agardh  
 24 *Caulerpa cupressoides* f. *amicorum* (Harvey) Weber-van Bosse  
 25 *Caulerpa elongata* Weber-van Bosse  
 26 *Caulerpa fastigiata* Montagne  
 27 *Caulerpa lentillifera* J. Agardh  
 28 *Caulerpa macrophysa* (Sonder ex Kützing) G. Murray  
 29 *Caulerpa mexicana* Sonder ex Kützing  
 30 *Caulerpa peltata* J.V. Lamouroux  
 31 *Caulerpa racemosa* (Forsskål) J. Agardh  
 32 *Caulerpa racemosa* var. *gracilis* (Zanardini) Weber-van Bosse  
 33 *Caulerpa racemosa* var. *lamourouxii* (Turner) Weber-van Bosse  
 34 *Caulerpa racemosa* var. *occidentalis* (J. Agardh) Børgesen  
 35 *Caulerpa racemosa* var. *turbinata* (J. Agardh) Eubank  
 36 *Caulerpa scalpelliformis* (R. Brown ex Turner) C. Agardh  
 37 *Caulerpa scalpelliformis* var. *denticulata* (Decaisne) Weber-van Bosse  
 38 *Caulerpa serrulata* (Forsskål) J. Agardh  
 39 *Caulerpa sertularioides* (S.G. Gmelin) M. Howe  
 40 *Caulerpa taxifolia* (M. Vahl) C. Agardh  
 41 *Caulerpa verticillata* J. Agardh  
 42 *Caulerpa webbiana* f. *tomentella* (Harvey ex J. Agardh) Weber-van Bosse  
 43 *Chaetomorpha aerea* (Dillwyn) Kützing  
 44 *Chaetomorpha antennina* (Bory de Saint-Vincent) Kützing  
 45 *Chaetomorpha brachygona* Harvey  
 46 *Chaetomorpha crassa* (C. Agardh) Kützing  
 47 *Chaetomorpha gracilis* Kützing  
 48 *Chaetomorpha linum* (O.F. Müller) Kützing  
 49 *Chaetomorpha minima* F.S. Collins and Hervey  
 50 *Chaetomorpha spiralis* Okamura  
 51 *Chamaedoris auriculata* Børgesen  
 52 *Chamaedoris delphinii* (Hariot) Feldmann and Børgesen  
 53 *Chlorodesmis caespitosa* J. Agardh  
 54 *Chlorodesmis fastigiata* (C. Agardh) Ducker  
 55 *Chlorodesmis hildebrandtii* A. Gepp and E.S. Gepp  
 56 *Chlorodesmis major* Zanardini  
 57 *Cladophora patentiramea* (Montagne) Kützing  
 58 *Cladophora prolifera* (Roth) Kützing  
 59 *Cladophora saviniana* Børgesen  
 60 *Cladophora socialis* Kützing  
 61 *Cladophora vagabunda* (Linnaeus) Hoek  
 62 *Cladophoropsis javanica* (Kützing) P.C. Silva  
 63 *Cladophoropsis membranacea* (Hofman Bang ex C. Agardh) Børgesen  
 64 *Cladophoropsis sundanensis* Reinbold  
 65 *Codium arabicum* Kützing  
 66 *Codium capitatum* P.C. Silva  
 67 *Codium decorticatedum* (Woodward) M. Howe  
 68 *Codium duthieae* P.C. Silva  
 69 *Codium dwarkense* Børgesen  
 70 *Codium extricatum* P.C. Silva  
 71 *Codium geppiorum* O.C. Schmidt  
 72 *Codium lucasii* subsp. *capense* P.C. Silva  
 73 *Codium pocockiae* P.C. Silva  
 74 *Codium prostratum* Levring  
 75 *Codium tomentosum* Stackhouse  
 76 *Dictyosphaeria cavernosa* (Forsskål) Børgesen  
 77 *Dictyosphaeria intermedia* Weber-van Bosse  
 78 *Dictyosphaeria versluisii* Weber-van Bosse

- 79 *Ernodesmis verticillata* (Kützing) Børgesen  
 80 *Gayralia oxysperma* (Kützing) K.L. Vinogradova ex Scagel et al.  
 81 *Halimeda cuneata* K. Hering  
 82 *Halimeda discoidea* Decaisne  
 83 *Halimeda distorta* (Yamada) Hillis-Colinvaux  
 84 *Halimeda gracilis* Harvey ex J. Agardh  
 85 *Halimeda incrassata* (J. Ellis) J.V. Lamouroux  
 86 *Halimeda macroloba* Decaisne  
 87 *Halimeda macrophysa* Askenasy  
 88 *Halimeda melanesica* Valet  
 89 *Halimeda micronesica* Yamada  
 90 *Halimeda opuntia* (Linnaeus) J.V. Lamouroux  
 91 *Halimeda renschii* Hauck  
 92 *Halimeda stuposa* W.R. Taylor  
 93 *Halimeda tuna* (J. Ellis and Solander) J.V. Lamouroux  
 94 *Halimeda velasquezii* W.R. Taylor  
 95 *Neomeris annulata* Dickie  
 96 *Neomeris dumetosa* J.V. Lamouroux  
 97 *Neomeris van-bosseae* M. Howe  
 98 *Nereodictyon imitans* Gerloff  
 99 *Parvocaulis parvula* (Solms-Laubach) S. Berger, U. Fettweiss, S. Gleissberg, L. B. Liddle, U. Richter, H. Sawitsky, H. and G.C. Zuccarello  
 100 *Rhipidosiphon javensis* Montagne  
 101 *Rhizoclonium africanum* Kützing  
 102 *Rhizoclonium ambiguum* (J.D. Hooker and Harvey) Kützing  
 103 *Spongocladia vaucheriaeformis* Areschoug  
 104 *Phyllocladion anastomosans* (Harvey) Kraft and M.J. Wynne  
 105 *Phyllocladion pulcherrimum* J.E. Gray  
 106 *Udotea flabellum* (J. Ellis and Solander) M. Howe  
 107 *Udotea indica* A. Gepp and E.S. Gepp  
 108 *Udotea orientalis* A. Gepp and E.S. Gepp  
 109 *Ulva bulbosa* (Suhr) Hariot  
 110 *Ulva clathrata* (Roth) C. Agardh  
 111 *Ulva compressa* L.  
 112 *Ulva fasciata* Delile  
 113 *Ulva kyllini* i (Bliding) Hayden, Blomster, Maggs, P.C. Silva, M.J. Stanhope and J.R. Waaland  
 114 *Ulva lactuca* Linnaeus  
 115 *Ulva lingulata* A.P. De Candolle  
 116 *Ulva muscoides* Clemente y Rubio  
 117 *Ulva pertusa* Kjellman  
 118 *Ulva reticulata* Forsskål  
 119 *Ulva rigida* C. Agardh  
 120 *Valonia aegagropila* C. Agardh  
 121 *Valonia macrophysa* Kützing  
 122 *Valonia utricularis* (Roth) C. Agardh  
 123 *Valoniopsis pachynema* (G. Martens) Børgesen  
 124 *Ventricaria ventricosa* (J. Agardh) J.L. Olsen and J.A. West
- 3 *Acanthophora nayadiformis* (Delile) Papenfuss  
 4 *Acanthophora spicifera* (M. Vahl) Børgesen  
 5 *Acrocystis nana* Zanardini  
 6 *Acrosorium ciliolatum* (Harvey) Kylin  
 7 *Actinotrichia fragilis* (Forsskål) Børgesen  
 8 *Amansia rhodantha* (Harvey) J. Agardh  
 9 *Amphiroa anceps* (Lamarck) Decaisne  
 10 *Amphiroa foliacea* J.V. Lamouroux  
 11 *Amphiroa fragilissima* (Linnaeus) J.V. Lamouroux  
 12 *Amphiroa rigida* J.V. Lamouroux  
 13 *Amphiroa tribulus* (J. Ellis and Solander) J.V. Lamouroux  
 14 *Amphisbetema indica* (J. Agardh) Weber-van Bosse  
 15 *Anotrichium tenue* (C. Agardh) Nägeli  
 16 *Asparagopsis taxiformis* (Delile) Trevisan de Saint-Léon  
 17 *Balliella crouanioides* (Itono) Itono and Tanaka  
 18 *Bartoniella crenata* (J. Agardh ex Mazza) Kylin  
 19 *Beckerella hildebrandtii* (Hauck) Kylin  
 20 *Beckerella rumpii* (Dickinson) Papenfuss and Fan  
 21 *Bostrychia radicans* (Montagne) Montagne  
 22 *Bostrychia tenella* (J.V. Lamouroux) J. Agardh  
 23 *Botryocladia botryoidea* (Wulfen) Feldmann  
 24 *Botryocladia chiajeana* (Meneghini) Kylin  
 25 *Botryocladia leptopoda* (J. Agardh) Kylin  
 26 *Botryocladia skottsbergii* (Børgesen) Levring  
 27 *Callophycus serratus* (Harvey ex Kützing) P.C. Silva  
 28 *Caloglossa leprieurii* (Montagne) G. Martens  
 29 *Carpopeltis maillardii* (Montagne and Millardet) Chiang  
 30 *Catenella caespitosa* (Withering) L.M. Irvine  
 31 *Caulacanthus ustulatus* (Mertens ex Turner) Kützing  
 32 *Centroceras clavulatum* (C. Agardh) Montagne  
 33 *Ceramium brevizonatum* H.E. Petersen  
 34 *Ceramium camouii* E.Y. Dawson  
 35 *Ceramium deslongchampsii* Chauvin ex Duby  
 36 *Ceramium flaccidum* (Kützing) Ardissonne  
 37 *Ceramium macilentum* J. Agardh  
 38 *Ceramium truncatum* H. Petersen  
 39 *Ceratodictyon spongiosum* Zanardini  
 40 *Chamaebotrys boergesenii* (Weber-van Bosse) Huisman  
 41 *Champia compressa* Harvey  
 42 *Champia globulifera* Børgesen  
 43 *Champia irregularis* (Zanardini) Piccone  
 44 *Champia parvula* (C. Agardh) Harvey  
 45 *Champia vieillardii* Kützing  
 46 *Cheilosporum acutilobum* (Decaisne) Piccone  
 47 *Cheilosporum sagittatum* (J.V. Lamouroux) Areschoug  
 48 *Chondria armata* (Kützing) Okamura  
 49 *Chondria collinsiana* M. Howe  
 50 *Chondria dangeardii* E.Y. Dawson  
 51 *Chondria dasyphylla* (Woodward) C. Agardh  
 52 *Chondria repens* Børgesen  
 53 *Chondrophycus ceylanicus* (J. Agardh) M.J. Wynne, Serio, Cormaci and G. Furnari  
 54 *Chondrophycus intermedius* (Yamada) Garbary and Harper  
 55 *Chondrophycus papillosus* (C. Agardh) Garbary and Harper  
 56 *Chondrophycus parvipapillatus* (C.K. Tseng) Garbary and Harper
- RHODOPHYTA (red algae)**
- 1 *Acanthophora dendroides* Harvey  
 2 *Acanthophora muscoides* (Linnaeus) Bory de Saint-Vincent

- 57 *Chondrophyucus perforatus* (Bory de Saint-Vincent) K.W. Nam  
 58 *Chondrophyucus poiteaui* (J.V. Lamouroux) K.W. Nam  
 59 *Choreonema thuretii* (Bornet) F. Schmitz  
 60 *Coelarthrum boergesenii* Weber-van Bosse  
 61 *Coelarthrum opuntia* (Endlicher) Børgesen  
 62 *Corynomorpha prismatica* (J. Agardh) J. Agardh  
 63 *Crouania attenuata* (C. Agardh) J. Agardh  
 64 *Cryptonemia undulata* Sonder  
 65 *Dasya elongata* Sonder  
 66 *Dasya scoparia* Harvey  
 67 *Dichotomaria marginata* (Ellis and Solander) Lamarck  
 68 *Dichotomaria obtusata* (J. Ellis and Solander) Lamarck  
 69 *Dictyurus purpurascens* Bory de Saint-Vincent  
 70 *Digenea simplex* (Wulfen) C. Agardh  
 71 *Duckerella ferlusii* (Hariot) M.J. Wynne  
 72 *Enantiocladia prolifera* Falkenberg  
 73 *Endosiphonia horrida* (C. Agardh) P.C. Silva  
 74 *Eucheuma arnoldii* Weber-van Bosse  
 75 *Eucheuma chondriforme* J. Agardh  
 76 *Eucheuma denticulatum* (N.L. Burman) F.S. Collins and Hervey  
 77 *Eucheuma horridum* J. Agardh  
 78 *Eucheuma odontophorum* Børgesen  
 79 *Eucheuma platycladum* F. Schmitz  
 80 *Eucheuma serra* (J. Agardh) J. Agardh  
 81 *Euptilota fergusonii* A.D. Cotton  
 82 *Galaxaura filamentosa* R. Chou  
 83 *Galaxaura rugosa* (J. Ellis and Solander) J.V. Lamouroux  
 84 *Gelidiella acerosa* (Forsskål) Feldmann and G. Hamel  
 85 *Gelidiella myrioclada* (Børgesen) Feldmann and G. Hamel  
 86 *Gelidiella pannosa* Feldmann and G. Hamel  
 87 *Gelidiopsis intricata* (C. Agardh) Vickers  
 88 *Gelidiopsis repens* (Kützing) Weber-van Bosse  
 89 *Gelidiopsis scoparia* (Montagne and Millardet) De Toni  
 90 *Gelidiopsis variabilis* (J. Agardh) Schmitz  
 91 *Gelidium arenarium* Kylin  
 92 *Gelidium crinale* (Hare ex Turner) Gaillon  
 93 *Gelidium pusillum* (Stackhouse) Le Jolis  
 94 *Gracilaria arcuata* Zanardini  
 95 *Gracilaria arcuata* var. *snackeyi* Weber-van Bosse  
 96 *Gracilaria bursa-pastoris* (S.G. Gmelin) P.C. Silva  
 97 *Gracilaria canaliculata* Sonder  
 98 *Gracilaria cervicornis* (Turner) J. Agardh  
 99 *Gracilaria corticata* (J. Agardh) J. Agardh  
 100 *Gracilaria corticata* var. *ramalinooides* J. Agardh  
 101 *Gracilaria debilis* (Forsskål) Børgesen  
 102 *Gracilaria dura* (C. Agardh) J. Agardh  
 103 *Gracilaria edulis* (S.G. Gmelin) P.C. Silva  
 104 *Gracilaria foliifera* (Forsskål) Børgesen  
 105 *Gracilaria hauckii* P.C. Silva  
 106 *Gracilaria millardetii* (Montagne) J. Agardh  
 107 *Gracilaria salicornia* (C. Agardh) E.Y. Dawson  
 108 *Gracilaria spinulosa* (Okamura) Chang and B.M.Xia  
 109 *Gracilaria srilankia* (Chang and B. Xia) Withell, A.J.K. Millar and Kraft  
 110 *Gracilaria vieillardii* P.C. Silva  
 111 *Griffithsia ovalis* Harvey  
 112 *Griffithsia rhizophora* Grunow ex Weber-van Bosse  
 113 *Haliptilon mauritianum* (Børgesen) Garbary and Johansen  
 114 *Haliptilon roseum* (Lamarck) Garbary and Johansen  
 115 *Haliptilon subulatum* (J. Ellis and Solander) Johansen  
 116 *Haloplegma duperreyi* Montagne  
 117 *Halymenia durvillei* Bory  
 118 *Halymenia porphyraeformis* Parkinson  
 119 *Halymenia venusta* Børgesen  
 120 *Herposiphonia parca* Setchell  
 121 *Herposiphonia secunda* (C. Agardh) Ambronn  
 122 *Herposiphonia secunda* f. *tenella* (C. Agardh) M.J. Wynne  
 123 *Hydrolithon farinosum* (J.V. Lamouroux) D. Penrose and Y.M. Chamberlain  
 124 *Hydrolithon onkodes* (Heydrich) Penrose and Woelkerling  
 125 *Hydrolithon reinboldii* (Weber-van Bosse and Foslie) Foslie  
 126 *Hypnea boergesenii* T.Tanaka  
 127 *Hypnea cornuta* (Kützing) J. Agardh  
 128 *Hypnea hamulosa* (Esper) J.V. Lamouroux  
 129 *Hypnea musciformis* (Wulfen) J.V. Lamouroux  
 130 *Hypnea nidifica* J. Agardh  
 131 *Hypnea nidulans* Setchell  
 132 *Hypnea pannosa* J. Agardh  
 133 *Hypnea rosea* Papenfuss  
 134 *Hypnea spicifera* (Suhr) Harvey  
 135 *Hypnea spinella* (C. Agardh) Kützing  
 136 *Hypnea valentiae* (Turner) Montagne  
 137 *Jania adhaerens* J.V. Lamouroux  
 138 *Jania capillacea* Harvey  
 139 *Jania pumila* J.V. Lamouroux  
 140 *Jania rubens* (Linnaeus) J.V. Lamouroux  
 141 *Jania unguolata* f. *brevior* (Yendo) Yendo  
 142 *Kappaphycus cottonii* (Weber-van Bosse) Doty ex P.C. Silva  
 143 *Kappaphycus striatum* (F. Schmitz) Doty ex P.C. Silva  
 144 *Laurencia distichophylla* J. Agardh  
 145 *Laurencia flexilis* Setchell  
 146 *Laurencia indica* Hauck  
 147 *Laurencia indica* var. *nidifica* Hauck  
 148 *Laurencia majuscula* (Harvey) A.H.S. Lucas  
 149 *Laurencia natalensis* Kylin  
 150 *Laurencia obtusa* (Hudson) J.V. Lamouroux  
 151 *Leveillea jungermannioides* (K. Hering and G. Martens) Harvey  
 152 *Liagora ceranoides* J.V. Lamouroux  
 153 *Liagora ceranoides* f. *leprosa* (J. Agardh) Yamada  
 154 *Liagora mauritiana* Børgesen  
 155 *Liagora valida* Harvey  
 156 *Lithophyllum acrocampum* Heydrich  
 157 *Lithophyllum kotschyanum* Unger  
 158 *Lithophyllum pygmaeum* (Heydrich) Heydrich  
 159 *Lomentaria baileyana* (Harvey) Farlow  
 160 *Lophocladia lallemandii* (Montagne) F. Schmitz  
 161 *Lophosiphonia reptabunda* (Suhr) Kylin

- 162 *Martensia elegans* Hering  
 163 *Melanamansia dietrichiana* (Grunow) R.E. Norris  
 164 *Melanamansia glomerata* (C. Agardh) R.E. Norris  
 165 *Mesophyllum crispescens* (Foslie) M. Lemoine  
 166 *Mesophyllum erubescens* (Foslie) M. Lemoine  
 167 *Microcladia gloria-spei* Stegenga  
 168 *Microdictyon japonicum* Setchell  
 169 *Murrayella pericladus* (C. Agardh) F. Schmitz  
 170 *Neogoniolithon accretum* (Foslie and M. Howe) Setchell and Mason  
 171 *Neogoniolithon trichotomum* (Heydrich) Setchell and Mason  
 172 *Neurymenia fraxinifolia* (Mertens ex Turner) J. Agardh  
 173 *Osmundaria melvillii* (J. Agardh) R.E. Norris  
 174 *Parviphycus tenuissimus* (Feldmann and Hamel) B. Santelices  
 175 *Peyssonnelia involvens* Zanardini  
 176 *Peyssonnelia rubra* (Greville) J. Agardh  
 177 *Phacelocarpus tristichus* J. Agardh  
 178 *Platysiphonia delicata* (Clemente y Rubio) Cremades  
 179 *Spongoclonium caribaeum* (Børgesen) M.J. Wynne  
 180 *Polyopes intricatus* F. Schmitz  
 181 *Polyopes ligulatus* (Harvey ex Kützing) De Toni  
 182 *Polysiphonia crassicolis* Børgesen  
 183 *Polysiphonia denudata* (Dillwyn) Greville ex Harvey  
 184 *Polysiphonia howei* Hollenberg  
 185 *Polysiphonia scopulorum* Harvey  
 186 *Polysiphonia scopulorum* var. *villum* (J. Agardh) Hollenberg  
 187 *Polysiphonia subtilissima* Montagne  
 188 *Portieria dichotoma* (Hauck) P.C. Silva  
 189 *Portieria harveyi* (J. Agardh) P.C. Silva  
 190 *Portieria hornemannii* (Lyngbye) P.C. Silva  
 191 *Pterocladia heteroplatos* (Børgesen) Umamaheswara Rao and Kaliaperumal  
 192 *Pterocладиella caespitosa* (Kylin) Santelices  
 193 *Pterocладиella capillacea* (S.G. Gmelin) Santelices and Hommersand  
 194 *Pterocладиella nana* (Okamura) Shimada, Horiguchi and Masuda in Shimada and Masuda  
 195 *Ptilothamnion subsimplex* E. Gordon  
 196 *Sarcodia montagneana* (J. Hooker and Harvey) J. Agardh  
 197 *Sarconema filiforme* (Sonder) Kylin  
 198 *Sarconema scinaioides* Børgesen  
 199 *Scinaia furcellata* (Turner) J. Agardh  
 200 *Scinaia moniliformis* J. Agardh  
 201 *Sebdenia flabellata* (J. Agardh) P.G. Parkinson  
 202 *Solieria jaasundii* Mshigeni and Papenfuss  
 203 *Solieria robusta* (Greville) Kylin  
 204 *Sporolithon erythraeum* (Rothpletz) Kylin  
 205 *Spyridia cupressina* Kützing  
 206 *Spyridia filamentosa* (Wulfen) Harvey  
 207 *Spyridia hypnoides* (Bory de Saint-Vincent) Papenfuss  
 208 *Taenioma perpusillum* (J. Agardh) J. Agardh  
 209 *Tenaciphyllum lobatum* Børgesen  
 210 *Tenaciphyllum rotundilobum* Børgesen  
 211 *Titanophora weberae* Børgesen

- 212 *Tolypiocladia calodictyon* (Harvey ex Kützing) P.C. Silva  
 213 *Tolypiocladia condensata* (Weber-van Bosse) P.C. Silva  
 214 *Tolypiocladia glomerulata* (C. Agardh) F. Schmitz  
 215 *Trichogloea requienii* (Montagne) Kützing  
 216 *Tricleocarpa cylindrica* (J. Ellis and Solander) Huisman and Borowitzka  
 217 *Tricleocarpa fragilis* (Linnaeus) Huisman and Townsend  
 218 *Vanvoorstia spectabilis* Harvey  
 219 *Yamadaella caenomyce* (Decaisne) I.A. Abbott

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