

## Mangrove ecosystems of the Indian Ocean region

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Covering about 47 % of world's mangrove area, containing 85 % of world's mangrove species, and occurring in a variety of habitats, the mangrove ecosystem plays a vital role in coastal biodiversity of 30 countries bordering the Indian Ocean. This ecosystem supports a rich species diversity of flora and fauna, but it is facing heavy human pressures and natural stresses, leading to a loss in biodiversity. This calls for urgent measures of conservation and management.

[Key words: Mangroves, Indian Ocean, East Africa, Arabian Peninsula, Indo-west Pacific, NW-Australia, associated flora, fauna, ecosystems]

### Introduction

Mangrove forests are among the world's most productive ecosystems<sup>1</sup>. They are the only forests situated at the confluence of land and sea in tropical and subtropical latitudes<sup>1</sup>. With continuing degradation and destruction of mangroves, there is a critical need to understand the biodiversity of the mangrove ecosystems, more so in the countries bordering the Indian Ocean, since this is the place of origin for mangroves and where losses of the mangrove habitats are the greatest<sup>1</sup>. Scattered information is available about the biodiversity of mangrove ecosystems from east Africa, Arabian Peninsula, Indo-west Pacific, and North-West Australia of the Indian Ocean region. This paper aims to review the available information and to assess the current status of biodiversity in mangrove ecosystems of the Indian Ocean region, in support of the international efforts of Census of Marine Life (CoML) with the theme of what is known, unknown and unknowable about marine populations and ecosystems.

### Mangrove habitat

The total area of mangroves<sup>2,3</sup> in the Indian Ocean region is 84,984.56 km<sup>2</sup> equivalent to about 47% of the total area of world mangroves (18 × 10<sup>6</sup> hectares)<sup>3</sup>. About 30 countries (Fig. 1) of the Indian Ocean region (lat. 30°N-45°S; long. 32°E-130°E) have mangrove habitats with areas ranging from 1.08 km<sup>2</sup> in Comoros<sup>9</sup> to 42,500 km<sup>2</sup> in Indonesia<sup>1</sup>. Indonesia alone accounts for 50% of the mangrove

area in the Indian Ocean region, followed by Myanmar (6,950 km<sup>2</sup>), Malaysia (6,410 km<sup>2</sup>), India (4,871 km<sup>2</sup>), NW Australia (4,513 km<sup>2</sup>), Bangladesh (4,500 km<sup>2</sup>), Madagascar (4,200 km<sup>2</sup>), Mozambique (4,000 km<sup>2</sup>), Pakistan (2,600 km<sup>2</sup>) and Thailand (1,900 km<sup>2</sup>) (Fig. 1). In few countries, especially in the arid regions of the Gulf, mangroves occur only in scattered patches.

In the Indian Ocean region, the mangroves are found in a variety of coastal settings, ranging from arid areas through estuaries, lagoons and deltas to coastal fringes. The functional types of mangroves in the Indian Ocean region are:

1. Over-wash mangrove forests – small mangrove islands, frequently over-washed by the tides.
2. Fringing mangrove forests – found along the waterways influenced by daily tides.
3. Basin mangrove forests – stunted mangroves, located in the interior of swamps.
4. Hammock mangrove forests – similar to basin type, but existing in more elevated sites.
5. Scrub mangrove forests – dwarf stands of mangroves, existing on flat coastal fringes.

The sheltered coasts support a luxuriant growth of mangroves and a higher biodiversity and this is because of the favourable conditions such as, muddy sediment, frequent water exchange, high rainfall and high humidity, prevailing in the areas. The best examples are mangroves of Sundarbans (India and Bangladesh), Malaysia and Indonesia. In contrast, the arid regions of Arabian Gulf countries, Pakistan and

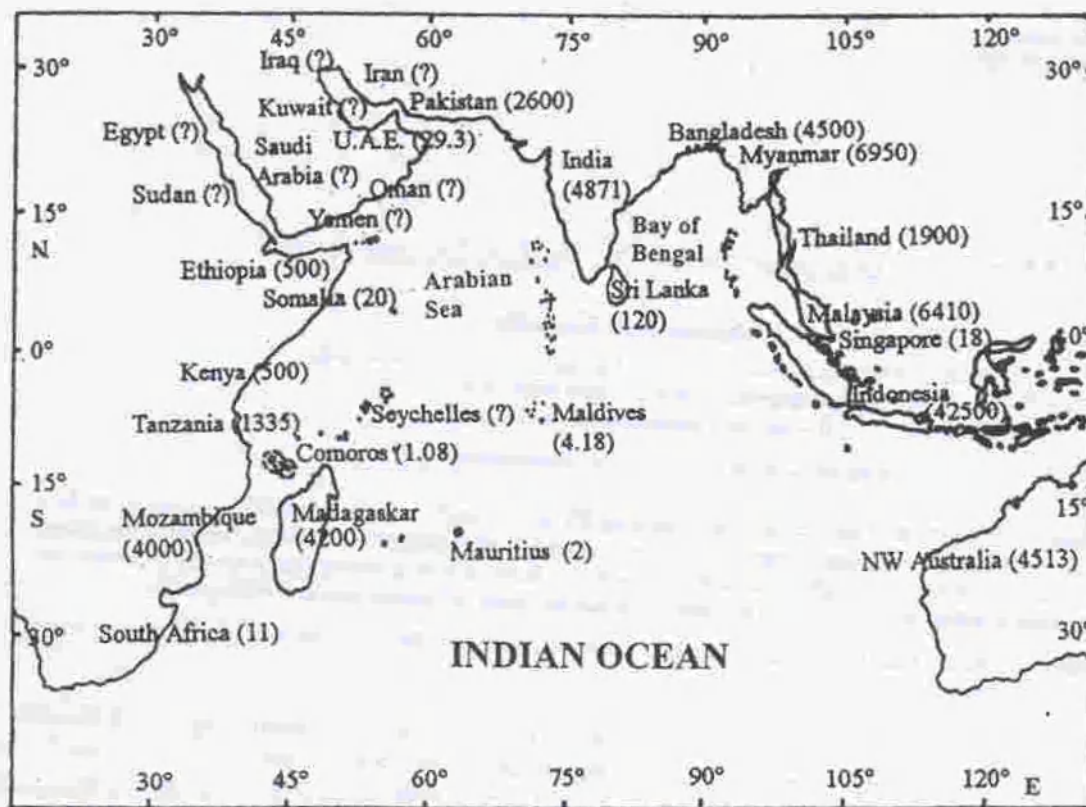


Fig. 1—Countries bordering the Indian ocean region indicating the area of mangroves in km<sup>2</sup> as given in parenthesis.

Gujarat (India), where the sediment is sandy, highly saline and poor in nutrients have only dwarf mangrove stands.

#### Diversity in mangroves

A total of 55 mangrove species (Table 1) belonging to 22 genera and 18 families are known from the Indian Ocean region. In other words, about 85 % of the total number of global mangrove species that is 65 species<sup>1</sup>, are present in the region. Country-wise diversity ranges from 1 to 45 species (Table 1). Countries such as Indonesia (45 spp.), Malaysia (40 spp.), India (39 spp.), Thailand (34 spp.) and Singapore (31 spp.) are rich in mangrove species. Some species such as *Avicennia marina*, *Rhizophora mucronata*, *Acrostichum aureum*, *Bruguiera gymnorrhiza*, *Ceriops tagal* and *Xylocarpus granatum* are cosmopolitan in distribution and were recorded from many countries. Species such as *Sonneratia caseolaris*, *Excoecaria agallocha*, *Bruguiera sexangula*, *Aegiceras corniculatum* and *Nypa fruticans* are known from at least 10 countries (Table 1).

Fourteen species are endemic to the south-east Asia and northern Australia of the Indian Ocean region

(Table 1). This reflects their origin in the Indo-Malaysian region and subsequent dispersal to other parts of the world. Two species—*Rhizophora annamalayana* and *Heritiera kanikensis* are restricted to the east coast of India<sup>10</sup>. *Aegiceras floridum* and *Camptostemon philippensis* are found only in Indonesia. *Avicennia integra* and *Ceriops australis* are confined to Australia (Table 1). Other species with restricted distribution to only two countries—Malaysia and Indonesia, are *Aegiceras annulata*, *Avicennia lanata*, *Bruguiera exaristata*, *Camptostemon schultzi*, *Cynometra iripa*, *Sonneratia lanceolata*, *S. gulngai* and *S. urama*.

Besides endemism, discontinuous distribution is also of interest. *Sonneratia alba* has populations located on East Africa, India, Sri Lanka and Australia. *Sonneratia ovata* occurs only between Thailand and Indonesia. *Ceriops tagal* and *Bruguiera gymnorrhiza* show major discontinuities between eastern Africa and southwest Asia. *Aegialites rotundifolia* is restricted to shorelines of the Bay of Bengal and the Andaman Sea<sup>11</sup>. Similarly, *Camptostemon schultzi* occurs in Indonesia and northern Australia<sup>12</sup>.

Table 1—Occurrence and distribution of mangrove species in different countries bordering the Indian Ocean (+ Recorded; - Not Recorded)

No.	Name of the species	South Africa	Mozambique	Madagascar	Mauritius	Tanzania	Comoros	Seychelles	Kenya	Somalia	Ethiopia	Sudan	Egypt	Saudi Arabia	Yemen	Oman	U.A.E.
1	<i>Acanthus ebraeatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	<i>A. ilicifolius</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	<i>Acrostichum aureum</i>	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-
4	<i>A. speciosum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	<i>Aegiceras corniculatum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	<i>Ae. floridum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	<i>Aegiatiris rotundifolia</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	<i>A. annulata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	<i>Aglaia cucullata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	<i>Avicennia alba</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	<i>A. marina</i>	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+
12	<i>A. integra</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	<i>A. lanata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	<i>A. officinalis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	<i>Braquiara cylindrica</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	<i>B. exaristata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	<i>B. gymnorhiza</i>	+	+	+	+	+	-	+	+	-	-	-	-	-	-	-	-
18	<i>B. hainesi</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	<i>B. parviflora</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	<i>B. sexangula</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
21	<i>Cerlops decandra</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	<i>C. tagal</i>	+	+	+	-	+	-	+	+	+	-	-	-	-	-	-	-
23	<i>C. australis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	<i>Campostemon schultzei</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	<i>C. philippensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	<i>Cynometra iripa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	<i>Dalichondrone spathulaceae</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	<i>Excoecaria agallocha</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	<i>E. indica</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	<i>Heritiera fomes</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	<i>H. globosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	<i>H. littoralis</i>	-	+	-	-	+	-	-	+	-	-	-	-	-	-	-	-
33	<i>H. konikensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	<i>Kandelia candel</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	<i>Lumnitzera racemosa</i>	+	+	+	-	+	-	+	+	-	-	-	-	-	-	-	-
36	<i>L. littorea</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	<i>Nypa fruticans</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	<i>Osbornia octodonta</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	<i>Pemphis acidula</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	<i>Rhizophora apiculata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	<i>R. mucronata</i>	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-
42	<i>R. stylosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	<i>R. x lamarekii</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	<i>R. x annamalyana</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	<i>Scyphiphora hydrophyllaceae</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	<i>Sonneratia alba</i>	-	+	+	-	+	-	+	+	-	-	-	-	-	-	-	-
47	<i>S. apetala</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	<i>S. caseolaris</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	<i>S. griffithii</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	<i>S. ovata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	<i>S. lanceolata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	<i>S. x galngai</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	<i>S. x urama</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	<i>Xylocarpus granatum</i>	-	+	-	-	+	-	+	+	-	-	-	-	-	-	-	-
55	<i>X. mekongensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	<b>Total number of species</b>	<b>6</b>	<b>9</b>	<b>9</b>	<b>3</b>	<b>9</b>	<b>3</b>	<b>8</b>	<b>9</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>

Table 1—Occurrence and distribution of mangrove species in different countries bordering the Indian Ocean  
(+ Recorded; - Not Recorded)—Contd

No.	Name of the species	Kuwait	Iraq	Iran	Pakistan	India	Sri Lanka	Maldives	Bangladesh	Myanmar	Thailand	Malaysia	Singapore	Indonesia	NW Australia	Frequency of occurrence
1	<i>Acanthus ebracteatus</i>	-	-	-	-	+	-	-	-	+	+	+	+	+	-	5
2	<i>A. ilicifolius</i>	-	-	-	-	+	+	-	+	+	+	+	+	+	-	8
3	<i>Acrostichum aureum</i>	-	-	-	-	+	+	+	+	+	+	+	+	+	-	18
4	<i>A. speciosum</i>	-	-	-	-	+	-	-	-	+	+	+	+	+	+	6
5	<i>Aegiceras corniculatum</i>	-	-	-	+	+	+	-	+	+	+	+	+	+	+	10
6	<i>Ae. floridum</i>	-	-	-	-	-	-	-	-	-	-	-	-	+	-	1
7	<i>Aegialia rotundifolia</i>	-	-	-	-	+	-	-	+	+	+	-	-	-	-	4
8	<i>A. annulata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	2
9	<i>Aglala cucullata</i>	-	-	-	-	+	-	-	+	-	-	+	-	-	-	3
10	<i>Avicennia alba</i>	-	-	-	-	+	-	-	+	+	+	+	+	+	-	7
11	<i>A. marina</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	28
12	<i>A. integræ</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1
13	<i>A. lanata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
14	<i>A. officinalis</i>	-	-	-	-	+	+	-	+	+	+	+	+	+	-	6
15	<i>Bruguiera cylindrica</i>	-	-	-	-	+	+	+	-	+	+	+	+	+	-	8
16	<i>B. exaristata</i>	-	-	-	-	-	-	-	-	-	-	-	-	+	+	2
17	<i>B. gymnorrhiza</i>	-	-	-	+	+	+	+	+	+	+	+	+	+	+	18
18	<i>B. haincsl</i>	-	-	-	-	-	-	-	-	-	+	+	+	+	-	3
19	<i>B. parviflora</i>	-	-	-	+	+	-	-	-	+	+	+	+	+	+	7
20	<i>B. sexangula</i>	-	-	-	-	+	+	-	+	+	+	+	+	+	+	10
21	<i>Ceriops decandra</i>	-	-	-	+	+	+	-	+	+	+	+	-	+	+	9
22	<i>C. tagal</i>	-	-	-	+	+	+	+	+	+	+	-	+	+	+	18
23	<i>C. australis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1
24	<i>Conyostemon schultzei</i>	-	-	-	-	-	-	-	-	-	-	-	-	+	+	2
25	<i>C. philippensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	+	-	1
26	<i>Cynometra iripa</i>	-	-	-	-	+	-	-	-	-	+	-	-	-	-	2
27	<i>Dolichandrone spathaceae</i>	-	-	-	-	+	+	-	-	-	-	+	+	+	-	5
28	<i>Excoecaria agallocha</i>	-	-	-	-	+	+	+	+	+	+	+	+	+	+	10
29	<i>E. indica</i>	-	-	-	-	-	-	-	+	+	-	+	+	+	-	5
30	<i>Heritiera fomes</i>	-	-	-	-	+	-	+	-	+	+	-	-	-	-	4
31	<i>H. globosa</i>	-	-	-	-	-	-	-	+	-	-	+	-	+	-	3
32	<i>H. littoralis</i>	-	-	-	-	+	+	-	-	-	+	+	+	+	-	9
33	<i>H. kanikensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
34	<i>Kandelia candel</i>	-	-	-	-	-	-	-	+	+	+	+	+	+	-	7
35	<i>Lumnitzera racemosa</i>	-	-	-	-	+	+	+	+	+	+	+	+	+	+	16
36	<i>L. linearis</i>	-	-	-	-	+	-	-	-	+	+	+	+	+	+	7
37	<i>Nypa fruticans</i>	-	-	-	-	+	+	+	+	+	+	+	+	+	+	10
38	<i>Osbornia octodonata</i>	-	-	-	-	-	-	-	-	-	-	+	-	+	+	3
39	<i>Penphis acidula</i>	-	-	-	-	+	+	+	-	-	+	+	+	+	+	9
40	<i>Rhizophora apiculata</i>	-	-	-	+	+	+	+	+	+	+	+	+	+	+	11
41	<i>R. mucronata</i>	-	-	-	+	+	+	+	+	+	+	+	+	+	+	19
42	<i>R. stylasa</i>	-	-	-	-	+	-	-	-	-	-	+	+	+	+	6
43	<i>R. x lamarckii</i>	-	-	-	-	+	-	-	-	-	-	+	+	+	+	4
44	<i>R. x annamolayana</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	1
45	<i>Scyphiphara hydrophyllacene</i>	-	-	-	-	-	+	-	-	-	+	+	+	+	+	7
46	<i>Sonneratia alba</i>	-	-	-	-	+	+	-	-	+	+	+	+	+	+	13
47	<i>S. apetala</i>	-	-	-	-	+	+	-	+	-	-	-	-	-	-	4
48	<i>S. caseolaris</i>	-	-	-	+	+	+	+	+	+	+	-	-	+	-	10
49	<i>S. griffithii</i>	-	-	-	-	+	-	-	-	+	+	+	-	-	-	4
50	<i>S. ovata</i>	-	-	-	-	-	-	-	-	-	+	+	+	+	-	4
51	<i>S. lanceolata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	2
52	<i>S. x gulfal</i>	-	-	-	-	-	-	-	-	-	-	+	+	+	-	2
53	<i>S. x urama</i>	-	-	-	-	-	-	-	-	-	-	+	-	+	-	2
54	<i>Xylocarpus granatum</i>	-	-	-	-	+	+	-	+	+	+	+	+	+	+	13
55	<i>X. mekongensis</i>	-	-	-	-	+	-	-	+	+	+	-	+	+	+	7
	<b>Total number of species</b>	-	<b>1</b>	<b>1</b>	<b>8</b>	<b>39</b>	<b>23</b>	<b>13</b>	<b>24</b>	<b>28</b>	<b>34</b>	<b>40</b>	<b>31</b>	<b>45</b>	<b>28</b>	

Mangrove taxonomy needs much attention<sup>12</sup>. For example, *Acrostichum* species are still poorly identified. *Sonneratia lanceolata* and *S. caseolaris* in Australia lack clear distinction in descriptions from Indonesia and Southeast Asia<sup>13</sup>. *Rhizophora apiculata* has under-leaf spots from Indo-Malaysia, but not in northern Australia<sup>14</sup>. *Rhizophora mucronata* from east Africa and Southeast Asia is not distinct from *R. stylosa*. *Acanthus ilicifolius* is not clearly identified from *A. ebracteatus*. For some species like *Avicennia marina* and *Ceriops tagal*, ecological varieties need to be recognized<sup>15</sup>. In addition, there are several natural hybrids, but their parental species are not clearly understood, especially for species of *Rhizophora*. Another problem in the taxonomy of mangroves is the confusion between the species of true mangroves and mangrove associates. Besides, often the same species is named differently at different sites, as in the case of *Avicennia rumphiana* and *A. lanata* and hence the total number of species is not constant<sup>16</sup>.

#### Lowest biodiversity areas

##### Arabian Peninsula

The mangrove species diversity is extremely low under arid climates as in the Arabian Peninsular region. The mangroves of the countries of this region—Saudi Arabia, Yemen, Oman, U.A.E., and Iran—are mostly mono-specific with *Avicennia marina*, but *Rhizophora stylosa* is also present sporadically in Saudi Arabia<sup>17</sup>. The Arabian Peninsula has high water salinity (>50 ‰) and high

sedimentation with pore-water salinity of 100 ‰. However, mangroves grow relatively well in the Persian Gulf (east of the Peninsula) but not in the Red Sea (west of the Peninsula). One reason is that the Red Sea has very low input of river water through very short perennial rivers, whereas the Arabian Gulf receives nutrient-rich waters from river discharge, especially from two rivers—Tigris and Euphrates<sup>17</sup>. In UAE, the bulk of *Avicennia marina* trees are present in few thousand acres from Kalba in the east, Rasal Khaimah in the North and Abu Dhabi and other islands in the west<sup>18</sup>.

##### African coasts

There are 11 species<sup>19</sup> of mangroves in the east Africa coasts, along western Indian Ocean. Some of the best mangroves (trees >25 m tall) in east Africa are found on the Zambezi delta (Mozambique) and the Rufiji deltas (Tanzania)<sup>19</sup>.

Along east Africa, three species—*Avicennia marina*, *Rhizophora mucronata*, and *Ceriops tagal* are

predominant. The species rank next in abundance are *Lumnitzera racemosa*, *Xylocarpus granatum*, *Bruguiera gymnorrhiza*, *Sonneratia alba* and *Heritiera littoralis*. The rare species are *Bruguiera cylindrica*, *Avicennia officinalis*, *Ceriops boviniana* and *Xylocarpus moluccensis*. Interestingly, the mangrove biodiversity decreases towards the region of southeast Africa. South Africa has 11 km<sup>2</sup> of mangroves, represented with 6 species along the Kosi system near Mozambique. This number decreases to 3—*Avicennia marina*, *Bruguiera gymnorrhiza* and *Rhizophora mucronata*—towards the south along the Richards Bay<sup>19</sup>.

In Mozambique, mangroves (4000 km<sup>2</sup>) are largely found along estuaries and large river mouths in Zambezi, Pungui, Buzi and Save flow<sup>7</sup>. A total of 9 species are known from Mozambique. The Zambezi delta has 8 species with large trees of *Rhizophora mucronata*, *Bruguiera gymnorrhiza* and *Heritiera littoralis*<sup>7,19</sup>.

Madagascar<sup>8</sup> has 9 species in 4200 km<sup>2</sup> area. Mauritius has only 2 km<sup>2</sup> area of mangroves with 3 species—*Acrostichum aureum*, *Bruguiera gymnorrhiza* and *Rhizophora mucronata*—occurring in very narrow strips<sup>5</sup>.

Tanzania<sup>6</sup> has 9 species of mangroves in an area of 1335 km<sup>2</sup> found mostly along perennial and seasonal rivers. Some of the best mangroves are found in the Rafiji river delta. The mangroves grow there exhibit a distinct pattern of zonation. For example, *Avicennia marina* is associated with sandy sediment; *Rhizophora mucronata* with muddy sediment along rivers and creeks; *Ceriops tagal* with dry areas; *Bruguiera gymnorrhiza* with wet area; *Lumnitzera racemosa* and *Xylocarpus granatum* with landward fringe; *Sonneratia alba* on open coasts; and *Heritiera* and *Bruguiera* away from the open coast<sup>19</sup>.

Kenya<sup>4</sup> has 9 species, existing in a total area of 500 km<sup>2</sup> with 50% of this lying in Lamu. In the Mida creek<sup>20</sup> of Kenya, 58% of the mangrove area is occupied by *Rhizophora mucronata* and *Ceriops tagal*.

Seychelles has 8 species of mangroves occurring largely in three areas—Aldabra, Cosmoled and Astove Islands<sup>19,21</sup>. Comoros has 3 mangrove species in three areas—Moheli Island, Grande Comose, Anjouna<sup>9</sup>. Somalia also has less mangrove swamps, with only 3 species—*Acrostichum aureum*, *Avicennia marina* and *Ceriops tagal* occurring sporadically<sup>19</sup>. Mangrove stands in Egypt, Sudan and Ethiopia bordering the Red Sea, are mostly monospecific with *Avicennia*