MANGROVE – – FLORA & FAUNA

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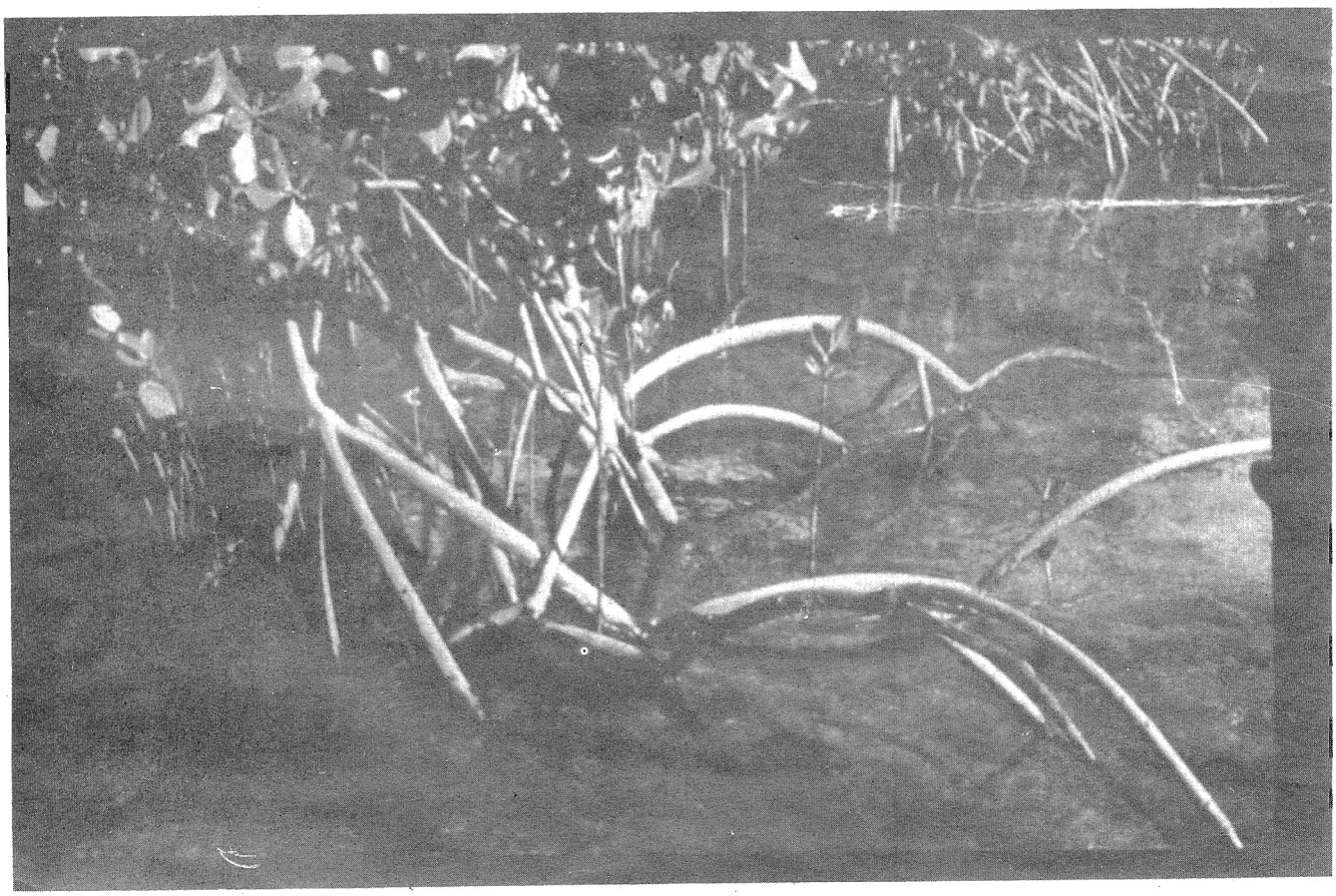


Mangroves improve the coastal micro climate, protects the land from erosion and cyclonic conditions, prevents sand dune formation and sedimentation. Because of their prop roots, Mangroves accelerate the process of sedimentation. Solid particles coming down the streams tend to flocculate at river mouths and get deposited due to the differences in salinities and densities.

Mangrove ecosystem is considered to be one of the most ancient ecosystems of the world. The extent of mangroves in Sri Lanka has been estimated to be between 8,000 to 10,000 acres. They are confined mainly around lagoons and in the entrediant shores near the river mouths.

The most extensive mangroves occur in Puttalam - Kalpitiya area in association with estuaries. Dense localized stands also occur in the Southern, South western and North eastern coasts. Eg: Koggala lagoon, Kalpitiya lagoon and Kokilai lagoon.

Benefits of the Mangrove Resource*

Mangrove plant species and mangrove associate plant species form a unique forest ecosystem. Mangroves improve the coastal micro climate, protects the land from erosion and cyclonic conditions, prevents sand dune formation and sedimentation. Because of their prop roots, Mangroves accelerate the process of sedimentation. Solid particles coming down the streams tend to flocculate at river mouths and get deposited due to the differences in salinities and densities.

Mangroves provide optimum conditions for breeding of fish, prawns, crabs, molluses, etc., nesting places of aquatic birds and a habitat for a varied fauna.

Mangroves plants are used for Brush - pile fishery ("Mas athu") in Sri Lanka. The fishermen leave the branches of mangrove plants in the lagoon. After a few weeks when fish have gathered in this "artificial mangrove", the brush pile is encircled with a net, the branches are removed and the fish caught. *Avicennia* branches are preferred for brush piles. The fish and crustaceans caught in the brush pile are sold as sea food. In addition, ornamental fish are also caught and they are sold to exporters.

The shells of mangroves molluscs are collected and sent to kilns to produce lime. Lorry loads of *Telescopium telescopium* are collected from Kalpitiya weekly. Annually about 150 m·tons of cockle and clams and 10 m tons of *T. telescopium* are extracted from the mangroves for lime.

Polychaetes especially the large *Marphysa boradellei* (S. Kalandanpanuwa) are dug out of the soil for fish baits. Since they are rich in proteins, there is a demand for polychaetes as fish food. The flesh of *T. telescopium* is also used as fish baits.

The leaves of mangrove plants especially those of *Avicennia* are used in agriculture as a manure.

Mangrove areas are good for

* This article was written at the request of G.C.E. (Advanced Level) science students.

aquaculture, especially for prawns. Acid sulphate of the mangrove soils, sometimes adversely affect the prawns or fish.

Cattle and goats feed on mangrove leaves. Perhaps the salt in the leaves make it more palatable to them. Even the thorny *Acanthus ilicifolius* is liked by goats.

The pneumatophores of *Sonneratia* are porous. Hence they are used as bottle stoppers and floats.

Mangrove plants are used as indigenous medicines. *Rhizophora* bark is used to cure fractures. Barks of *Bruguiera* is crushed and used as a poultice on minor cuts. Juice from Sonneratia fruit is used for bleeding piles and *Excoecaria* latex for skin rashes.

Mangroves provide fuel wood, poles, and domestic timber to the coastal poor. Mangrove timber is highly priced for telegraph posts because of its strength. It is naturally protected from insects due to the high percentage of tannins. These tannins are used by the fishermen to dye their nets and sails to give additional durability. Mangrove timeber is also used for the production of good quality charcoal and ornamental goods. The leaves of *Nypa fruticans* are used for tatting mats and making baskets.

Nypa fruticans (Ginpol) flower is tapped to obtain a type of wine. The fruits of *Sonneratia caseolaris* (Kirila) can be used to prepare a delicious *Sonnaratia caseolaris* fruit drink. *Avicennia spp.* is called as "honey mangroves" in which beekeeping is practised.

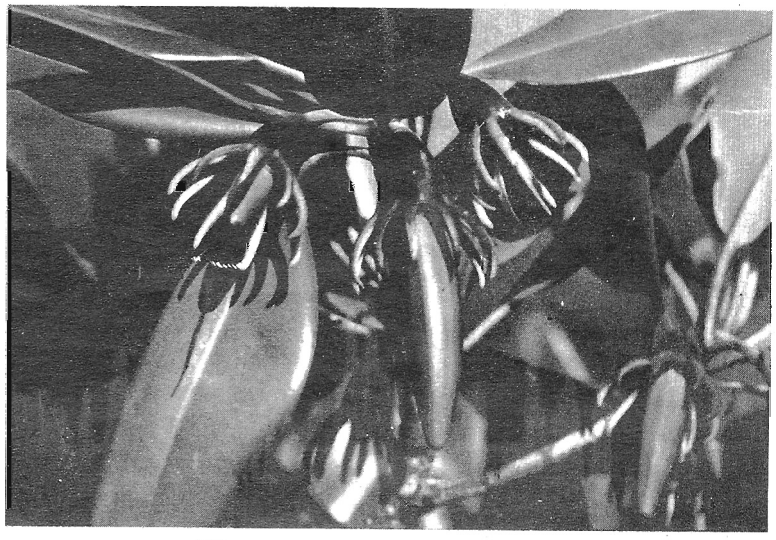
Adaptations of Mangrove Flora

Two major problems that mangrove plants are faced within the environment are difficulties in obtaining water and air. Although there is plenty of water, the salt conditions of the environment makes it difficult for the plants to absorb it. Some mangrove plants (eg. *Avicennia* spp.) have salt secreting glands to secrete salt from the water. Most of the mangrove plants have a thick cuticle and fleshy small leaves to conserve water.

Soil oxygen is necessary for the respiration of roots. But mangroves live in a soil, poor in oxygen. The special roots known as pneumatophores are developed in some mangrove plants (*Avicennia* Spp., *Bruguiera* Spp.) to obtain air from the atmosphere. These roots originate from the underground root system and protrude above the level of tide water, providing a continuous air passage to the submerged root system.

Since mangroves live on a loose substrate, they have developed extra roots other than the underground root system. They are prop roots arising from the branches and stilt roots arising from the main stem to anchor the plant to the substrate.

To meet the hostile conditions of the mangrove environment, an adaptation known as viviparity has developed. (eg.:- *Rhizophora* Spp., *Bruguiera* Spp. and *Ceriops* Spp.) The seeds grow to juvenilhood on the mother plant. When the grown embryo is released, it adheres to the mud with it's spit like hypocotyl.



Fruit and Flower of *Bruguiera gymnorhiza*

Mangrove Flora

Mangrove plants do not belong to the same family. There are 55 mangrove species in the world and 28 have been reported in Sri Lanka, both true mangroves and mangrove associates.

1. Family - Rhizophoraceae

1.1 Genus : *Rhizophora*

Mangrove trees with prop roots and stilt roots, growing along the muddy shores. The flower has 4 sepals and 4 white petals. The leaves are thick.

Rhizophora apiculata has sessile flowers while *R. mucronata* has long stalks. Thus the viviperous fruits of *R. mucronata* hang gracefully where as the viviperous fruits of *R. apiculata* found are clumsy and often curved. common name - Kadol.

1.2 Genus : *Bruguiera*

Bruguiera plants do not have prop roots but knee roots. They also have viviperous fruits but the hypocotyl of the fruit is not so long as in *Rhizophora spp.*

B. gymnorhiza can be identified by the red coloured calyx with 12-16 sepals. In *B. sexangula* there are 10-12 sepals which are yellow or orange. *B. cylindrica* which has 7-8 green sepals looks different from the above two species. Its hypocotyl is small and slender.
Common names - Malkadol, Sirikanda

1.3 Gunus - *Ceriops*

Ceriops occur as short bushes with stilt roots in Sri Lanka. The flowers are small and greenish yellow in colour. There are 5-6 petals and sepals. Although the flowers of *C. roxburghiana* are sessile, *C. tagal* have short stalks. The petals of *C. tagal* have 3-4 club shaped append ages while the petal apex of *C. roxburghiana* is Lacerate.
Common names - Punkanda, Rathugas.

2. Family - Sonneratiaceae

Sonneratia are small trees with stumpy pneumatophores. The fruit is a spherical berry, with a persistent calyx and style.

In *S. caseolaris*, 2-3 flower buds are found together but in *S. alba*, the flowers occur singly. There are 6-9 green sepals and 6 petals in the flower. *S. caseolaris* flowers are red and *S. alba* flowers are white.
Common name - Kirilla.

3. Family - Avicenniaceae (Verbenaceae)

3.1 *Avicennia: Avicennia* can be identified by the large number of pencil like pneumatophores. The underside of the leaves have a shade of white. In *A. marina*, the leaf apex is pointed and in *A. officinalis*, it is rounded.

The yellow sessile flowers are borne on a penicle. They give an odour like that of bee's honey. Fruit is a capsule. In mature fruits two large cotyledons are present. The fruits of *A. marina* are comparatively smaller than those of *A. officinalis*.
Common name - Mada gas.

3.2 *Clerodendron*: *Clerodendron inerme* is a small shrub with small leaves. White flowers occur on a cyme. Stamen and style are exerted.
Common name - Wal gurenda, Gowinda

4. Family - Myrsinaceae

Aegiceras corniculatum is the only species belongs to Myrsinaceae, found in Sri Lanka. It is a highly branched shrub.

The white flowers are fragrant and borne on slender stalks. There are 5 petals and 5 stamens inserted in the corolla tube. The viviparous fruit is curved.
Common name - Heen kadol.

5. Family - Acanthaceae

Acanthus ilicifolius is the only mangrove species belongs to the family Acanthaceae present in Sri Lanka. It is a creeper or a shrub with small prop roots and thorny leaves which have very short petioles.

The sessile flowers are purple in colour. They are borne on spikes and are surrounded by 2 bracts and a bracteole. Calyx has 4 sepals and the fruit is a capsule.
Common name - Ikili, Katu-ikili, Mulll

6. Family - Combretaceae

Lumnitzera are shrubs or small trees, evergreen with smooth purplish bark, and spirally arranged leaves. Flowers are white with 5 petals. Calyx is green with 5 sepals. There are 5-10 white stamens. The fruit is woody, green, oblong, and narrow at both ends, with a single seed.
Common name - Bariya

7. Family - Euphorbiaceae

Excoecaria are diocelous trees with latex, which is believed to be very poisonous. The mature leaves are red in colour. Flowers are very small. Female flowers occur on branches as spikes, and are few in number. The male flowers are found on spikes which grow singly in the axils of leaves. There are 3 sepals, 3 stamens and no petals in flowers.
Common name - Thela

8. Family- Meliaceae

Xylocarpus are small trees with a dark brown bark. Flowers are borne on long branches. They have 4 sepals and 4 petals. The fruit is large and round with corky, leathery

covering which splits into 4 pieces as it dries.

The fruit of *X. molluccensis* is about the size of a small orange whereas the fruit of *X. granatum* is 17-25 cm. in diameter. The fruit of *X. granatum* is light coloured, globose and smooth while that of *X. molluccensis* is dark brown, compressed and wrinkled.
Common name - Mutti Kadol

9. Family - Palmae

Nypa fruticans is the only palm growing naturally in the mangroves. The inflorescence is very characteristic with large globose fruiting heads. The fruit is a fibrous drupe and it takes about 4 months to ripen.
Common name - Gin pol

10. Family - Pteridaceae (Polypodiaceae)

Acrostichum aureum is the only mangrove fern with erect and stout rhizome. Leaves are pinnate and leathery. Sori are found along the veins.
Common name - Karen Koku

11. Family Sterculiaceae

Heretiera littoralis is a tree with leaves, green upper surface and silvery below. The unisexual flowers are yellowish green and bell shaped. The flower has 5 sepals but no petals. The fruit has a keel.
Common name - Etuna

12. Family - Bignoniaceae

Dolichandrone spathacea is a tree with glossy leaves. Three or four flowers occur in clusters. Flowers are white with a long corolla tube. The fruit is a follicle, about a foot long.
Common name - Diya danga.

Mangrove Flora

1. Family : Rhizophoraceae

1.1 *Rhizophora apiculata*
1.2 *Rhizophora mucronata*
1.3 *Bruguiera cylindrica (Bruguiera caryophylloides)*
1.4 *Bruguiera gymnorhiza (Bruguiera conjugata)*
1.5 *Bruguiera sexangula (Bruguiera eriopetala)*
1.6 *Ceriops tagal (Ceriops candolleana)*
1.7 *Ceriops roxburghiana (Ceriops decandra)*

2. Family Sonneratiaceae

2.1 *Sonneratia apetala*
2.2 *Sonneratia alba*
2.3 *Sonneratia caseolaris (Sonneratia acida)*

3. Family - Avicenniaceae (Verbenaceae)

3.1 *Avicennia officinalis*
3.2 *Avicennia marina*
3.3 *Clerodendron inerme*

4. Family - Myrsinaceae

4.1 *Aegiceras corniculatum*

5. Family - Acanthaceae

5.1 *Acanthus ilicifolius*
5.2 *Acanthus ebracteatus*

6. Family - Combretaceae

6.1 *Lumnitzera recemosa*
6.2 *Lumnitzera littorea*

7. Family -Euphorbiaceae

7.1 *Excoecaria aggalocha*

8. Family -Meliaceae

8.1 *Xylocarpus granatum*
8.2 *Xylocarpus molluccensis*

9. Family - Palmae

9.1 *Nypa fruticans*

10 Family - Pteridaceae (Polypodiaceae)

10.1 Acrostichum aureum

11. Family - Stercubiaceae

11.1 *Heretiera littoralis*

12. Family - Bignoniaceae

12.1 *Dolichandrone spathacea*

13. Family - Apocynaceae

13.1 *Cerbera manghas*

14. Family - Leguminoseae

14.1 *Derris scandens*
Derris uliginosa

13. Family - Apocynaceae

Cerbera manghas is a tree with alternatively arranged leaves. Flowers are large and white in colour, with 5 petals & 5 sepals. Fruit is smooth and rounded.
Common name - Gon Kaduru

14. Family - Leguminoseae

Derris scandens is a creeper common in the mangrove vegetation. White flowers are borne on a slende peduncle. *D. uliginosa* has pink flowers.
Common name - Kala wel.

Mangrove Fauna

There are lot of species of animals live in the mangrove enviorenment. Annelids, arthropods, molluses and chordales are the most common visible phyla living in the mangroves. These animals show diversity and adaptation to the environment. Oysters are attached to the roofs of the mangrove plants. Most of the crabs live in association with oysters. Prawns are normally found in the mangroves close to the sea. The mud-lobster lives in a complex burrow, building mounds in the mangroves. They are active only at night and never leave the

burrow. The mud skipper can be easily identified by its protruding eyes and the modified fins.

No account is given on the birds and the fishes of the Mangroves. Birds that occasionally found are Rajaliya, Sili watuwa, Waturan-duwa, Pilihuduwa, Kadol koka, Hota kalu koka, Diya kawa are frequently found in Mangroves.

The mangrove fish community is euryhaline, since the salinity of the mangrove water is subjected to high fluctuations.

Reference

Pinto, Leonard; *Mangroves of Sri Lanka*. (NARESA Publication).

Mangrove Fauna

1. Phylum -Arthropoda
Class - Crustacea
Order - Decapoda

(1) Suborder - Brachyura (Crabs)

(a) Family - Portunidae (Swim-mung crabs)
Thalamita crenata (Sinhala - Kaberiya)
Portunus pelagicus
(S - Sinnakkali)
Scylla serrala
(S. Kalapu Kakuluwa)

(b) Family - Ocypodiadae (Fiddler Crabs)
Macrophthalmus depressus
Uca lactea
Uca dussumieri

(c) Family - Grapsidae
Neosermatium malbaricum
Metapograpsus messor
Chiromantes indiarum
Chiromantes bidens
Chiromantes darwinensis

(11) Sub order -Macrura (Lobsters)
Burrowing macruran
Swimming macruran
Thalassina anomala

Tribe - Penaeida

Family - Penaeidae (Prawns)
Penaeus indicus (Kirissa)
Penaeus mondon (Kalissa)
Penaeus semisulcatus (Kurutiissa)
Metapenaeus dobsoni (Malissa)
Metapenaeus monoceros

Tribe - Caridea
Macrobrachium rosenbergii dissa)

2. Phylum - Mollusca

(1) Class - Gastropoda (Gastrodes)
Pleuroploca trapezium
Faunus ater
Telescopium telescopium
Nerita polita
Ceithidea cingulate
Cerithidea quadrata
Littorina scabra
Cassidula musterina

(11) Class - Lamellibranchiata (Biralvia)
Graffrarium tumidum
Perna spp.
Pinna bicolor
Marria sp.
Geloina coaxans (Matti)
Meretrix casta (Matti)
Saccostrea spp. (Kawati)
Crassostrea madrasensis
Crassostrea cucullata

3. Phylum - Chordata

Class - Actinopterygii
Order - Perciformes
Family - Gobiidae
Genus - Periophthalmus
(Mud Skipper)

Periophthalmus Koelreuteri
Periophthalmus Sobrinus