

**THE DISTRIBUTION AND THE SPECIES COMPOSITION
OF THE EXISTING
MANGROVE VEGETATION AROUND CHILAW LAGOON**

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Abstract

The distribution pattern, species composition, zonation and the abundance of the mangrove communities around Chilaw lagoon were studied. 15 typical mangrove species and 13 mangrove associates were listed.

*Quadrat sampling analysis shows that most of the western part of the lagoon is dominated by *Excoecaria agallocha* and *Aegiceras corniculatum*. Line transect analysis shows a prominent border to *Rhizophora apiculata* near the shore around most parts of the lagoon. Some rare mangrove species such as *Xylocarpus granatum* is common in the islands of Chilaw lagoon.*

Mangrove area has been reduced due to the new developments and expansion due to aquaculture.

Key words: Distribution, species composition, mangrove vegetation, Chilaw lagoon.

1. Introduction

Mangroves are salt tolerant forest ecosystems which are limited only to the tropical and subtropical belts. Their distribution is mainly determined by the tide levels. In Sri Lanka where the tidal variation is about 0.8 m, the mangroves form only a thin belt around lagoons and river mouths. But in places where the tidal variation is greater it can go up to 15-20 kilometers inland. Extent of mangroves in Sri Lanka were estimated conservatively by Aruchelvam in 1968 to be around 8,000 acres to 10,000 acres (Aruchelvam, 1968).

Mangroves play several important roles which would enhance the development of estuarine and coastal fisheries. These plant communities are directly linked to the fisheries through energy flow pathways based on detritus and as well as providing shelter, protection and nutrients for juvenile fishes and crustaceans.

Several studies have been carried out on mangrove ecosystems in Negombo lagoon area (Pinto, 1982; Amarasinghe, 1966). Some recent studies on determining the mangrove coverage around Puttalam lagoon, Dutch Bay and Portugal Bay through remote sensing techniques were carried out by Kanakarathne *et al.*, in 1983. Twenty one true mangrove species and sixteen mangrove associated species have been recorded from Sri Lanka (Abeywickrama, 1960).

No particular studies have been done on mangrove vegetation in Chilaw lagoon. This paper describes the distribution pattern, species composition, zonation and the abundance of the mangrove communities around Chilaw lagoon.

2. Materials and Methods

The study commenced in January, 1987 and it was carried out for 4 months. Several visits were made in such a way to be able to locate almost all the species in the lagoon area. Fourteen of 100 sq. m. quadrat samples (plots) were taken randomly at different selected sites of the lagoon. Horizontal distribution (zonation) of the community formation was studied by line transects in all the selected sites.

Margalef diversity index was used to determine the species diversity in different plots. The extent of the mangrove cover was estimated using aerial photographs and satellite false colour imageries (LANDSAT series). The percentage of the destruction of the mangroves was also determined visually.

3. Results

True mangrove and mangrove associated species found in Chilaw lagoon are given in Table 1. The density and the Margalef diversity index of the species are given in Tables II and III. The distribution of mangrove areas and the sampling sites for the zonation studies are given in Fig. 1. Sampling sites selected for the fourteen plots are given in Fig. II. The horizontal distribution of mangrove formations at twelve sites around the lagoon are given in Fig III A and B.

Table 1.

The mangrove species found in Chilaw lagoon	Mangrove associated species
1. <i>Aegiceras corniculatum</i>	1. <i>Acanthus ilicifolius</i>
2. <i>Avicennia marina</i>	2. <i>Acrostichum aureum</i>
3. <i>Avicennia officinalis</i>	3. <i>Anona</i> sp.
4. <i>Bruguiera cylindrica</i>	4. <i>Barringtonia racemosa</i>
5. <i>Bruguiera gymnorhiza</i>	5. <i>Cerbera manghas</i>
6. <i>Ceriops tagal</i>	6. <i>Clerodendron inerme</i>
7. <i>Ecoecaria agallocha</i>	7. <i>Dolichandrone spathacea</i>
8. <i>Heritiera littoralis</i>	8. <i>Hibiscus tiliacea</i>
9. <i>Lumnitzera racemosa</i>	9. <i>Phoenix</i> sp.
10. <i>Rhizophora spiculata</i>	10. <i>Pandanus</i> sp.
11. <i>Rhizophora mucronata</i>	11. <i>Suriana maritima</i>
12. <i>Scyphiphora hydrophyllaceae</i>	12. <i>Salvadora persica</i>
13. <i>Sonneratia alba</i>	13. <i>Thespesia populnea</i>
14. <i>Sonneratia caeseolaris</i>	
15. <i>Xylocarpus granatum</i>	

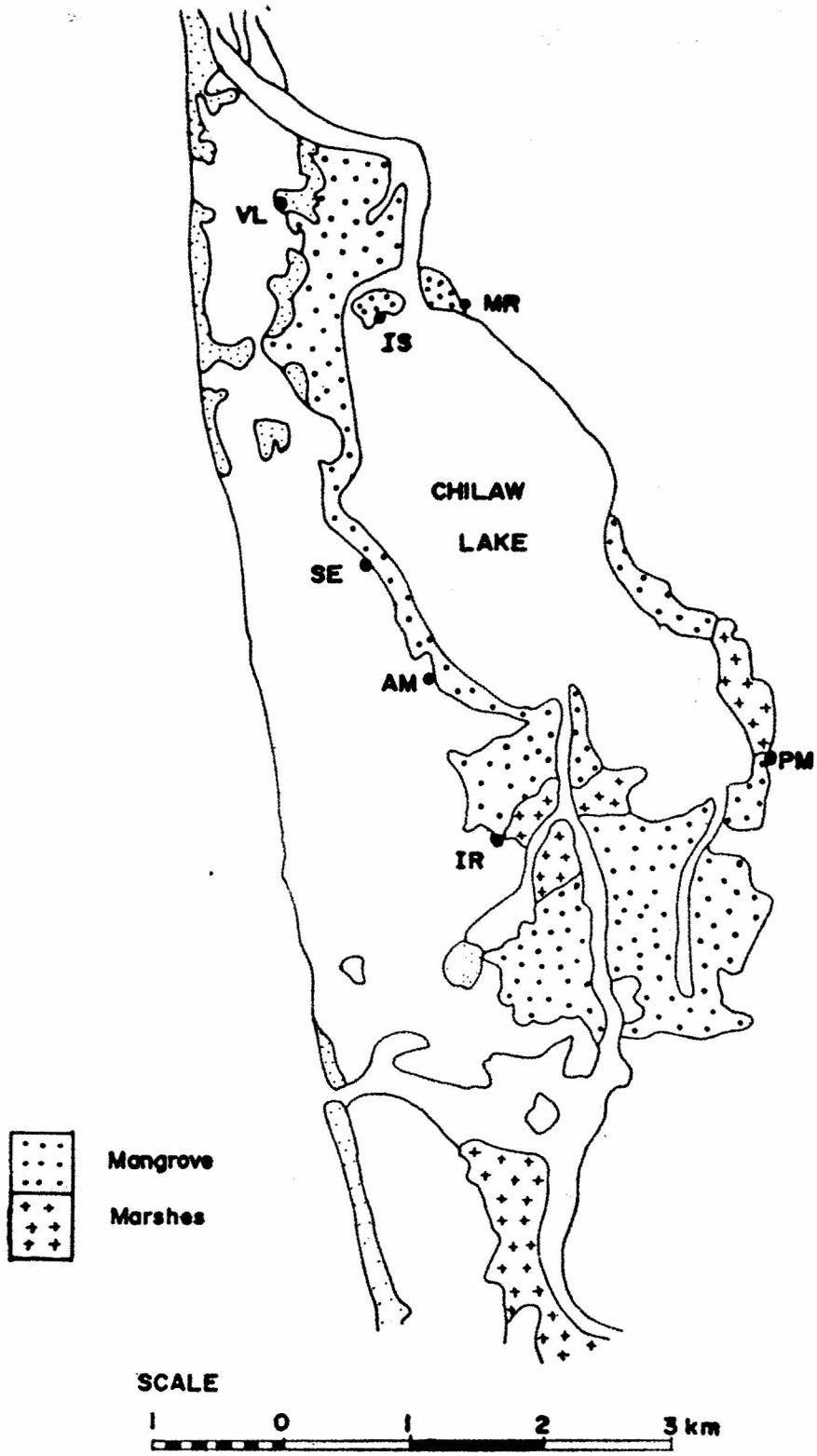


Fig. I

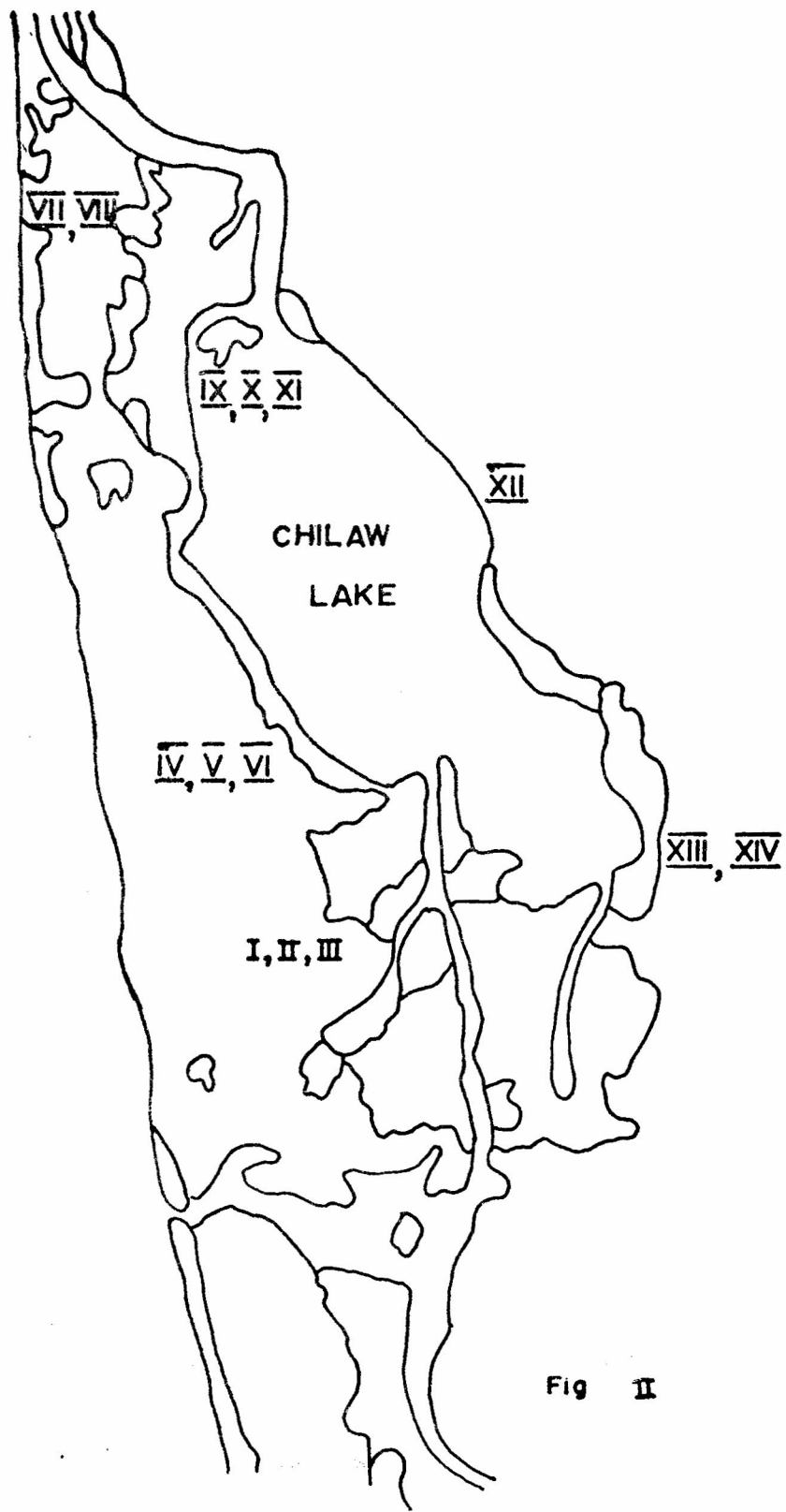
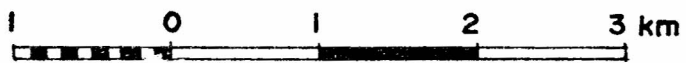


Fig II



SCALE

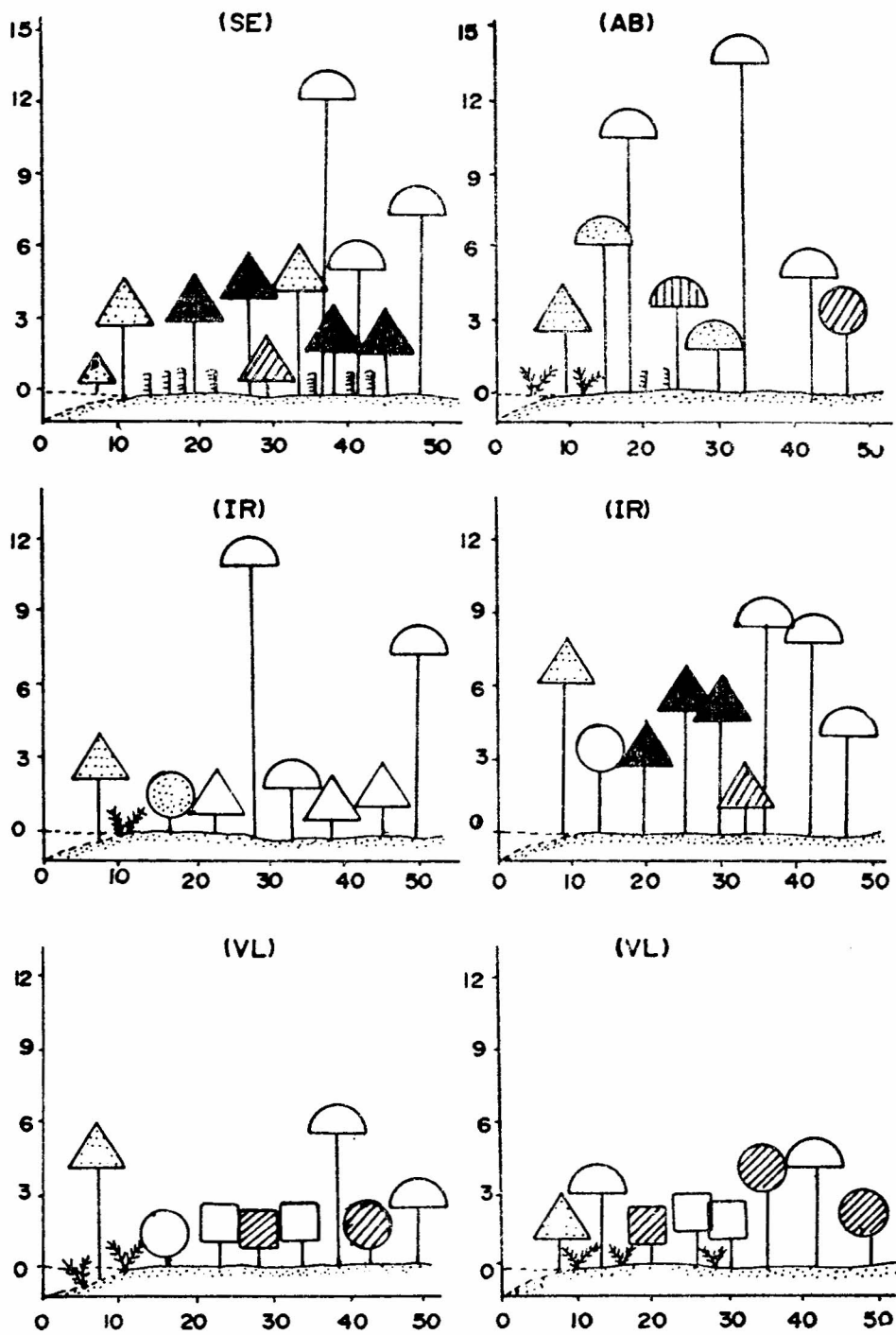


Fig. III A

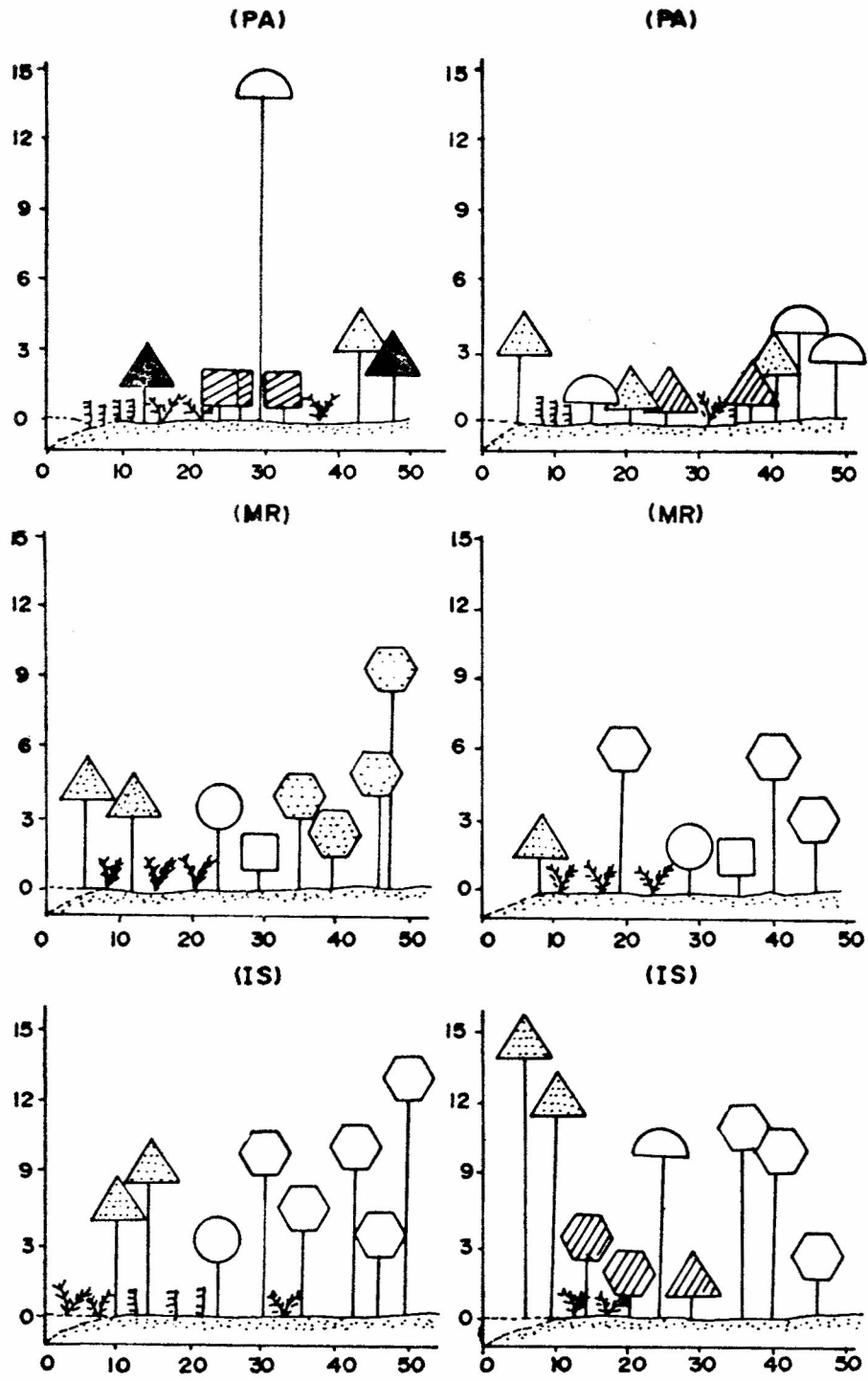


Fig. II B

LEGEND


















	Acanthus ilicifolius
	Acrostichum aureum
	Aegiceras corniculatum
	Avicennia marina
	Avicennia officinalis
	Bruguiera gymnorhiza
	Ceriops tagal
	Excoecaria agallocha
	Heritiera littoralis
	Lumnizera racemosa
	Rhizophora apiculata
	Rhizophora mucronata
	Scyphiphora hydrophyllaceae
	Sonneratia alba
	Sonneratia caeseolaris
	Xylocarpus granatum
	Clerodendron inerme

FIGURE CAPTIONS:

Figure I.

Distribution of mangroves in Chilaw lagoon, profiles are based on representative locations, indicated as IS -islands of the northern part of the lagoon; MA-Marawala; Pm -pambala; IR - Iranawilla; AM-Ambakandawilla; SE - Sereppuwaththa; VL-Valihena.

Figure II.

The sites selected for the quadrat sampling (plots)

Figure III A & B

Profiles of mangrove vegetation in Chilaw lagoon; Scale-1 Division = 3m (vertical axis) and 1 Division = 10m (horizontal axis)

Table II. Species density of mangrove trees in 14 plots

Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
<i>Aegiceras corniculatum</i>	—	3	18	—	—	—	—	—	—	—	2	—	—	—
<i>Avicennia marina</i>	—	—	1	4	—	—	—	—	1	5	—	—	—	6
<i>Avicennia officinalis</i>	—	—	—	—	—	2	—	—	—	—	—	—	—	—
<i>Bruguiera gymnorhiza</i>	—	3	2	1	2	2	—	—	3	—	4	—	3	2
<i>Ceriops tagal</i>	—	—	—	2	4	7	—	—	—	1	3	—	—	—
<i>Excoecaria agallocha</i>	1	15	9	4	6	10	21	32	6	9	12	7	8	5
<i>Heritiera littoralis</i>	—	—	—	—	—	1	4	6	—	—	—	1	2	1
<i>Lumnitzera racemosa</i>	3	2	1	—	—	—	—	—	1	—	1	—	—	—
<i>Rhizophora apiculata</i>	4	—	—	10	2	—	3	—	2	—	2	1	4	—
<i>Rhizophora mucronata</i>	1	3	—	2	6	4	—	—	5	—	1	2	1	—
<i>Scyphiphora hydrophyllaceae</i>	—	—	—	—	—	—	—	—	—	1	—	—	—	—
<i>Sonneratia alba</i>	—	—	—	—	1	—	—	—	—	—	—	—	—	—
<i>Sonneratia caesularis</i>	1	—	2	1	—	—	2	—	—	—	—	1	—	2
<i>Xylocarpus granatus</i>	—	—	—	—	—	—	—	—	6	4	3	—	—	—

4.0 Discussion

4.1 Species composition

Out of twenty two mangrove species recorded from Sri Lanka fifteen were found in Chilaw lagoon. Only 10 mangrove species were recorded from Negombo lagoon by Amarasinghe (1986). Thirteen mangrove associated species were also recorded in Chilaw lagoon.

It was found that *Excoecaria agallocha* is common in all mangrove patches. *Acicennia officinalis* is found in the north eastern part of the lagoon. Some rare species such as *Xylocarpus grantum* is common in the islands of the northern part of the lagoon. *Aegiceras corniculatum* and *Excoecaria agallocha* are dominating in the South western part.

4.2 Extent of mangrove area

Extent of mangrove area in Chilaw lagoon was found to be 667 hectares. This mangrove coverage is larger than the extent of mangroves in Negombo lagoon where the coverage is only 579 hectares. (Anon, 1988).

4.3 Zonation

Line transect analysis show a prominent border of *Rhizophora apiculata* near the shore around most part of the lagoon (Fig. III). *Excoecaria agallocha* and *Avicennia marina* were dominant in the island side of the transects. *Rhizophora mucronata* border is found in the Pambala area. At Serappuwattha, Pambala and Iranawilla areas *Rhizophora mucronata* were found in the middle of the profiles. Mangrove associated species such as *Acrostichum aureum* and *Acanthus ilicifolius* were found in almost all the profiles around Chilaw lagoon.

4.4 Density and the species diversity

Average density of the mangroves in 10 x 10m plot is 23 plants. *Excoecaria agallocha* is found in all the plots. The diversity indices presented in the Table III are relatively low.

The highest species diversity is found in the islands near Marawala area (d—2.000) where the lowest diversity is found at Iranawila site (d—0.274). The low values of the diversity indices were mainly due to the destruction of the mangrove vegetation at various parts of the area.

4.5 Human impact on the Mangrove resources

Many mangrove patches in all parts of Chilaw lagoon are totally destroyed for fire wood and for small timber. A significant amount of fire wood is being used for a large lime factory at Marawala area. *Avicennia* sp and *Ceriops tagal* are mainly used as firewood in this industry, Mangroves are used traditionally in this area for several purposes such as building houses, poles and posts for fish

traps, and brush piles for fishery. The new developments and the expansion of large scale prawn farms specially in Chilaw area might be a serious threat to the perpetuation of the mangrove resource. It was found that several mangroves were being destroyed at Iranawilla area for building up new prawn farms. This can also be proved by the lowest diversity index (0.274) estimated in this area (Table III).

Table III

Diversity index of the species found in 14 plots (each 10x10 m) in the lagoon.

<i>Plot number</i>	<i>Total number of individuals</i>	<i>Margalef diversity index (d)</i>
I	10	1.737
II	26	0.306
III	33	1.430
IV	24	1.887
V	21	1.642
VI	26	1.534
VII	30	0.882
VIII	38	0.274
IX	24	1.887
X	20	1.335
XI	28	2.100
XII	12	1.610
XIII	18	1.384
XIV	16	1.443

5. Conclusion :

Sixteen typical mangrove species and twelve mangrove associates were listed in the Chilaw area. The extent of the mangrove coverage was 667 hectares. Some rare mangrove species such as *Xylocarpus granatum* is common in the islands of Chilaw lagoon. Mangrove resource has been reduced due to the new developments and expansion of aquaculture.

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