

DISTRIBUTION AND DIVERSITY OF TRUE MANGROVE SPECIES IN SOME SELECTED LAGOONS AND ESTUARIES IN AMPARA DISTRICT IN THE EAST COAST OF SRI LANKA

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Introduction

Mangroves are a specialized vegetation type which is confined to the intertidal zone of the tropical and few subtropical areas in the world (Jaysingam, 2013). Mangrove vegetation possesses physiological and structural adaptation to grow in unfavorable soil such as anaerobic and high salinity. Being highly productive ecosystem, mangroves provides many ecological and socio economic benefits (Aksornkoae, 1993). Mangroves in Sri Lanka shows a scattered distribution around the country in areas bordering lagoons and estuaries (Bambaradeniya, et al., 2002). The extent of mangroves in Sri Lanka is about 15,000 ha which is about less than 0.01% of the total land area (Amarasinghe, 2003).

Coastline of Sri Lanka is approximately 1600 km long and the total extent of brackish water areas, including estuaries and lagoons, is about 158,016 ha (Perera, et al., 2013). The eastern province consists of three administrative districts and it covers about 16% of the country's land mass.

The Eastern province shares many natural resources such as approximately 25% of the beach (420km), 25% of the lagoons, 28% of the mangroves, 31% of freshwater marshes, 5% of sand dunes of the country (Jayasingam, 2008).

Pottuvil, Panama and Helawa are some of the major lagoon in the Ampara district. Pottuvil and Panama lagoons support a well-grown mangrove while Helawa lagoon has very little mangrove cover. Hadaoya Estuary at Sahastrawela too supports a luxuriant mangrove cover. Ragamwela creek at Peanut Farm and Okanda creek at Okanda village also support some mangrove cover. In Sri Lanka mangroves are distributed discontinuously along the shoreline.

Objective of the study is to study the distribution, abundance and diversity of true mangrove species in the lagoons and estuaries in the study area.

Methodology

Mangrove vegetation was sampled using belt transect method. Transects are 5 m in width and continued to the landward margin of the mangrove from the water's edge. Within each transect true mangrove species were identified and counted. Tree height and the DBH (Diameter at Breast Height) of the true mangrove species were also recorded. Quantitative data collected was used to calculate the relative density, relative frequency, relative dominance and the IVI (Importance

value index) of the species in each and every lagoon/estuarine system. Furthermore, Shannon diversity index (H') and the Shannon Evenness (E') was computed for comparative purposes.

Results

During the survey 11 true mangrove species were recorded in study area and the distribution of species within different mangroves studied is given in Table 1.

Table 1. Species composition of mangroves in study sites.

Family	Species	Pottu vil Lagoon	Panama Lagoon	Halawa Lagoon	Hada Oya Estuary	Ragamwela Creek	Okan da Creek
Myrsinaceae	<i>Aegiceras corniculatum</i>	+	-	-	-	-	-
Avicenniaceae	<i>Avicennia marina</i>	-	+	-	-	+	+
	<i>Avicennia officinalis</i>	-	+	-	-	-	-
Rhizophoreceae	<i>Bruguiera gymnorhiza</i>	+	+	-	+	-	+
	<i>Bruguiera sexangula</i>	-	+	-	-	-	-
	<i>Raizophora apiculata</i>	-	+	-	+	-	-
	<i>Raizophora mucronata</i>	+	+	+	-	-	+
Sterculiaceae	<i>Heritiria littoralis</i>	+	-	-	+	-	-
Combretaceae	<i>Lumnitzera racemosa</i>	+	+	+	+	+	+
Lythreaceae	<i>Pemphis acidula</i>	-	+	-	-	-	-
Euphorbiaceae	<i>Excoecaria agallocha</i>	+	+	+	+	+	+

Only two mangrove species namely *Lumnitzera racemosa* and *Excoecaria agallocha* were common to all six sites while some other species such as *Aegiceras corniculatum*, *Avicennia officinalis*, and *Pemphis acidula* each were restricted to a single site (Table 1). Nine true mangrove species were recorded in Panama lagoon and the

least number of species (3) were recorded from both Ragamwela creek and Halawa lagoon. *Lumnitzera racemosa* was most abundant mangrove species in Ragamwela creek while *Avicennia marina* was the least dominant mangrove species in the same site. *Excoecaria agallocha* recorded the highest relative density

values in Pottuvil lagoon, Panama lagoon and Hadaoya estuary while *Lumnitzera racemosa* recorded highest relative density values in Halawa lagoon, Ragamwela creek, and Okanda creek mangrove. *Pempis acidula* and *Avicinnia officinalis* were recorded only at Panama lagoon (Table 1).

Highest Shannon diversity value ($H' = 1.7$) was obtained for the Panama mangrove which was followed by the Heda Oya Estuary mangrove ($H' = 1.1$). Evenness values obtained for these two mangroves also show comparatively higher values (Table 2).

Table 2. Shannon Diversity and Shannon Evenness values obtained for study sites

Site	No. of Species	Shannon Diversity (H')	Shannon Evenness (E')
Pottuvil lagoon	6	0.88	0.49
Panama lagoon	9	1.7	0.76
Halawa lagoon	3	0.76	0.69
HadaOya estuary	4	1.1	0.67
Ragamwela Creek	3	0.41	0.45
Ragamwelacreek	5	0.91	0.57

Among all species the highest IVI was obtained for *Lumnitzera racemosa* in Ragamwela creek (274.08) while the lowest IVI was recorded for the *Hereteria litoralis* (0.59) in Pottuvil lagoon. *Excocecaria agallocha* shows the highest IVI values in Hada Oya estuary, Panama lagoon and Pottuvil mangroves. *Lumnitze aracemosa* recorded highest IVI in Hadaoya estuary, Okanda creek and Ragamwela creek.

Discussion

Nearly half of the true mangrove species (11) that have been recorded from Sri Lanka occurs in the six study sites. They belong to seven families and eight genera. All sites are situated in same geographic area. Although all six sites share same climate and other ecological factors and chemical parameters, they are subjected to different disturbance regimes. Panama

lagoon mangrove to be more diverse implies that the particular community is at a higher successional stage and less disturbed state than the other sites (Jayasundara, 1999).

The study has shown the species richness and diversity in six selected sites vary from one another. According to the survey *Lumnitzera racemosa* and *Excocecaria agallocha* were recorded in all six sites while *Pempis acidula* was recorded only from Panama lagoon. The distribution of *Excocecaria agallocha* in Panama and Pottuvil lagoons is much higher than the Halawa lagoon mangrove. The importance value index is very important to compare the ecological significance of species (Lamprecht, 1989). It indicates the extent of dominance of a species in the structures of a forest stand (Curtis and McIntosh, 1951). It is specified that

species with the greatest importance value are the leading dominants of the forest. Accordingly *Lumnitzera racemosa* and *Excoecaria agallocha* are the most important mangrove species in all mangals studied.

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