C15

by Abdul Syukur

Submission date: 26-Aug-2020 09:36AM (UTC+0700)
Submission ID: 1374169492
File name: 8._Proseding_terindeks_Scopus_dan_SJR,_IOP_Publishing.pdf (891.16K)
Word count: 2316
Character count: 12745

The diversity of fauna in mangrove community: Success replanting of mangroves species in South Coastal East Lombok, Indonesia

The diversity of fauna in mangrove community: Success replanting of mangroves species in South Coastal East Lombok, Indonesia

A A Idrus[1,2], A Syukur[1,2,*] and L Zulkifli[1,2]

[1] Postgraduate Program of Science Education, Mataram University, Lombok, Indonesia
[2] Department of Sciences Education, Faculty of Teacher Training and Education, Mataram University, Lombok, Indonesia

*syukurbiologi@.unram.ac.id

Abstract. Mangrove is a plant species that grow in a unique environment and serve as breeding, spawning, hatching, and nursery grounds for many marine species. However, the damage of mangrove has a negative impact on the diversity of fauna associated. This study aims to prove and evaluate mangrove replanting of fauna diversity on the South Coast of East Lombok and the geographical position of 116 ° 27 "0 "´ 116 ° 30´´´ LU and - 8 ° 48´0´´-8 ° 51´0´. Data collection were done through observation, surveys and quadrant methods. The data were further analyzed to detemine Diversity Index (H`) and Dominance Index (D). The results of the analysis show that in the first cluster with the highest index of fauna diversity of 1.726, the highest value of the index of distribution is in the second cluster of 3.207 and the highest value for the dominance index is in the second cluster of 0.356.The conclusion of this study is that mangrove planting has been successful in increasing the diversity of fauna associated with mangroves on the south coast of East Lombok. Therefore, efforts to maintain the results of mangrove revegetation are a very important part of mangrove conservation.

1. Introduction

Mangrove forests have a biodiversity richness which includes special plant and animal species and they have adapted well to the unique conditions of mangrove ecosystems [1]. The main role of mangrove ecosystems are as mud traps, coastline stabilization, enrichment of coastal waters, nursery areas and feeding many organisms that are associated with mangroves. Therefore, the loss of mangrove species has the potential to significantly reduce the loss of biodiversity and ecosystem functions and subsequently will have a negative impact on human life, especially those who have livelihoods from the mangrove ecosystem [2]. Meanwhile, in the management of mangroves is managed traditionally on a local scale or subsystem [3].

Regardless of its value, mangrove forests have suffered substantial losses and degradation. Because of this, the mangrove restoration program has value not only for mangrove recovery but for the existence of mangrove ecological functions. However, the lack of recovery in the area of revegetation is caused by many mangrove species that cannot grow due to inundation which continuously decreases the sediment height, thus preventing propagul formation, as in Rhizopora species [4], even though the percentage of mangrove seedling survival is often used as an indicator of mangrove environment recovery [5]. The important concept of mangrove recovery is increasing productivity of ecosystems and

their biodiversity, and from the value of productivity can be the basis for more effective management, especially for the conservation of mangrove ecosystems [6]. And the value of biodiversity conservation can be formulated as a generic Code of Conduct for sustainable management of mangrove ecosystems [7].

The other indicators to assessment recovery of the function of mangrove vegetation are the presence of benthic macrofauna communities such as Gastropods which can be found at various levels of mangrove vegetation [8]. This is a proof that mangrove ecosystems are a variety of community-associated flora, fauna, and its associated microbiota and the mangrove species were distributed to follow the zoning patten and re-planted locations support more fauna recolonisation, and indicate similar to natural mangrove locations in terms of functional indicators investigated [9,10]. In connection with the planting of mangroves in the study area, the purpose of this paper is to assess the diversity of fauna as indikaor success srategi reboesasi and conservation for sustainable ecological functions of mangroves in the South Coastal East Lombok.

2. Material and methods

The study was carried out at the geographical position of 116 ° 27 "0 "´ 116 ° 30´´´ LU and - 8 ° 48´0´´- 8 ° 51´0´´(Figure.1). Furthermore, the research location was grouped into 3 clusters, namely: cluster 1 with the location of Keruak District covering Kedome, Tanjung Luar, and Lungkak, cluster 2 in Jerowaru District, including Poton Bako and Teluk Jor, and cluster 3 at the Ekas Bay.

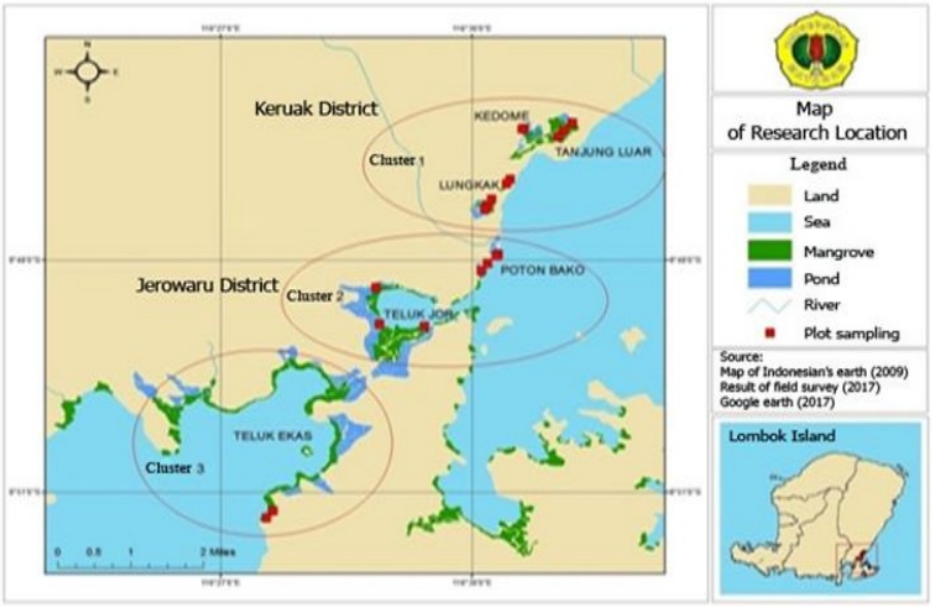

Figure 1. Research location [11].

Observations on the types of fauna associated with mangroves were carried out on permanent transects for each sampling unit, namely in the quadrant measuring 10 mx 10 m. The parameters measured were mangrove stands in the tree category and species of fauna species. Data analysis was carried out descriptively and the value of the Diversity Index (H '), Domination index (ID) and Distribution Index (ID) were calculated based on the formula of Shannon & Wiener [12].

3. Results and discussion

3.1. Profile of mangroves in the study area

Rhizophora stylosa is the most dominant in cluster one (Figure 2). Rhizophora stylosa can grow optimally with characteristics of muddy and sandy mud habitat and even after 50 years of cultivation, which stand structure and spatial arrangement and associated species karakerisik not unlike the natural mangrove forests [13,14]. Sonneratia alba is the most dominant in the second cluster (Figure 3). Species of mangrove such as *Sonneratia alba* are often found growing optimally on muddy substrates and high salinity [15]. The profile of the mangrove species at the tree level in cluster three (Figure 4) are *Sonneratia alba, Rhizophora apiculata* and *Avicennia marina*.

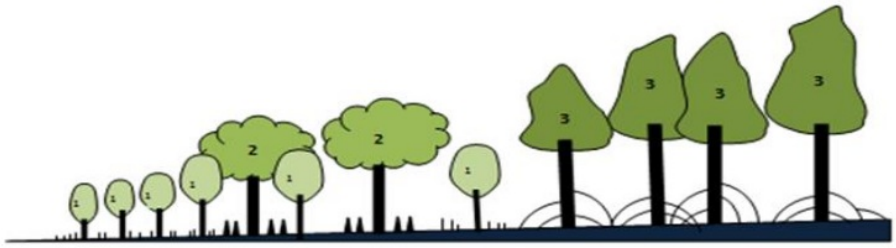

Figure 2. The vertical profile of mangroves stands (m) for the tree-level on a cluster one: 1 = *Avicennia marina*, 2 = *Sonneratia alba*, 3 = *Rhizophora stylosa*.

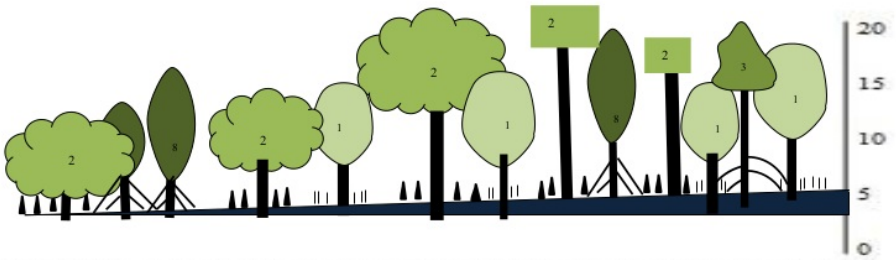

Figure 3. The vertical profile of mangroves stands (m) for tree-level at the second cluster: 1 = *Avicennia marina*, 2 = *Sonneratia alba*, 3 = *Rhizophora stylosa*.

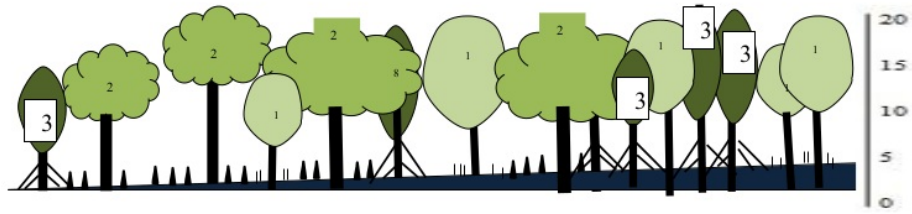

Figure 4. The vertical profile of mangroves stands (m) for tree-level at cluster three: 1 = *Avicennia marina*, 2 = *Sonneratia alba*, 3 = Rhizophora apiculate.

3.2. The fauna associated with mangroves in the study area

The fauna group found in association with the mangrove planted on the three clusters in the area of study (Table 1). The presence of fauna in the mangrove ecosystem is a form of mangrove ecological service. The fauna diversity associated with mangroves in Gili Sulat includes crustaceans, insects, fish, vertebrates (Varanus sp, Chrysopelea sp, Cerberus sp.), Mammals (Lutrogale sp and Callosciurus sp.), and primates and birds [15].

Table 1. The composition of fauna in each of the mangrove clusters in the study site.

Class	Family	Species	Cluster I	Cluster II	Cluster III
Gastropoda					
1	Ellobiidae	*Cassidula aurisfelis*	+	-	-
2	Potamididae	*Cerithideopsilla alata*	-	+	-
3	Potamididae	*Telescopium telescopium*	+	-	+
4	Potamididae	*Terebralia sulcata*	+	+	+
5	Potamididae	*Cerithidea cingulata*	+	+	+
6	Potamididae	*Cerithidea quadrata*	+	+	+
7	Potamididae	*Cerithidea obtuse*	-	+	-
8	Littorinidae	*Litoraria scabra*	-	-	-
9	Littorinidae	*Littoraria melanostoma*	+	-	-
10	Potamididae	*Terebralia palustris*	+	-	-
11	Muricidae	*Chicoreus capucinus*	-	+	+
Mollusca					
1	Lucinidae	*Cerithidiopsis malagensis*	-	+	-
2	Cerithiidae	*Clypeomorus curalium*	+	-	-
3	Cymatiidae	*Gyrineum natator*	+	-	-
4	Neritidae	*Nerita undata*	+	+	-
5	Neritidae	*Nerita articulata*	+	+	-
6	Neritidae	*Nerita balteta*	-	+	-
7	Cymatiidae	*Cymatium* sp	+	-	-
8	Strombidae	*Strombus* sp	-	+	+
9	Pachychilidae	*Sulcospiras* sp	-	-	+
10	Cerithiidae	*Rhinocalvus aspera*	+	-	-
11	Ellobiidae	*Melampus castaneus*	+	-	-
12	Neritidae	*Clithon faba*	+	-	-
13	Ellobiidae	*Ellobium scheepmakeri*	+	-	-
14	Ellobiidae	*Cassidula nucleus*	+	-	-
15	Ellobiidae	*Melampus monile*	+	-	-
16	Assimineidae	*Assiminea brevicula*	+	-	-
Bivalvia					
1	Arcidae	*Anadara granosa*	+	+	-
2	Pteriidae	*Isognomon ephippium*	+	-	-
3	Corbiculidae	*Polymesoda erosa*	+	+	+
4	Ostreidae	*Saccostrea cucculata*	-	-	-
Malacostraca					
1	Ocypodidae	*Uca sp.*	+	+	+
2	Portunidae	*Scylla serrata*	+	+	+
Reptilia					
1	Varandiae	*Varanus salvator*	+	-	-
2	Elapidae	*Cryptophis boschmai*	+	-	-

The association of fauna with mangroves in cluster one consisted of 4 classes, namely Gastropods with 13 species, Bivalves 5 species, Crustaceans with 2 species, and Reptiles with 2 species. Furthermore, the species diversity index at clusters two and three is lower than cluster one. However, the distribution index and dominance index in cluster one are lower than clusters two and three (Figure 5). In addition,

the *Chicoreus capucinus* species is a type of fauna found only in Poton Bako (cluster two). The species richness in cluster one is indicated by the presence of 4 species not found in clusters two and three, namely the reptilian group which includes 2 species (*Varanus salvator* and *Cryptophis boschmai*) and Gastropoda class which includes 2 species of *Strombus sp*. and *Telescopium telescopium*).

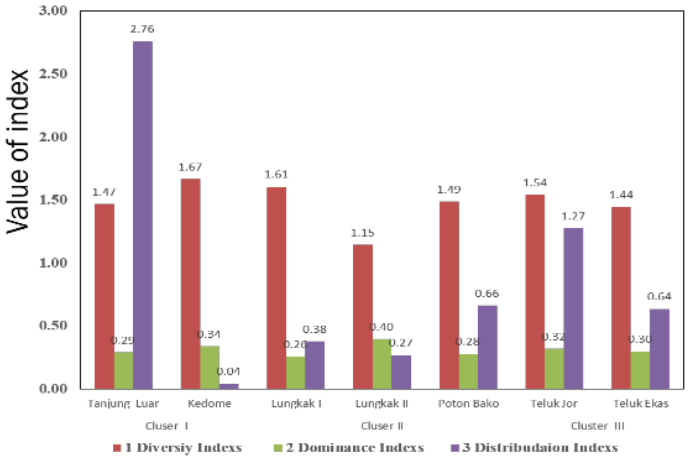

Figure 5. Fauna dominance index value, distribution index value and diversity index in the study location

3.3. Implications

The planting of mangroves at the study site has had a positive impact on the restoration of environmental conditions. This can be seen from the diversity of fauna associated with mangroves, such as in the first cluster, where 80% of the existing mangroves are the result of planting between 1990-1995. From all planting locations, information is obtained that the Mollusca have the highest number of species which is equal to 46% and the lowest is Reptilia and Malacostraca on average by 6% (Figure 6). This is an important indicator of the positive impact of mangrove planting activities as a conservation strategy for sustainable ecological functions of mangroves

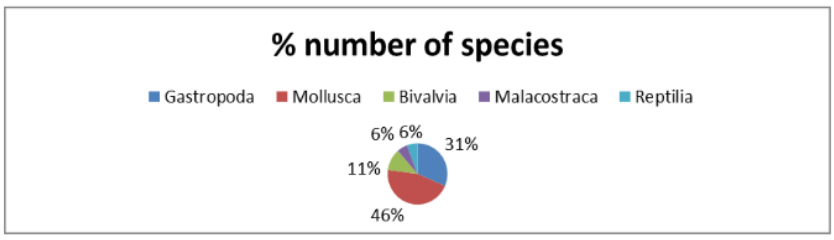

Figure 6. Percentage of fauna species based on class

4. Conclusion

The indicator of the success of mangrove planting at the study site, first can be seen from the mangrove vegetation strata that can be classified in tree categories, and secondly fauna diversity associated with mangroves in all clusters. Species of *Strombus sp* are species found only in cluster one and three species found in clusters two and three namely *Chicoreus capucinus Littoraria*, *Murex sp*., and *Oliva sp*.

Acknowledgement

The authors are thankful to the Directorate Generalof Strengthening Research and Development, Directorate of Research and Community Service, Ministry of Research, Technology and Higher Education of Indonesia for providing the funding for carrying out this study

References

[1] Aksornkoae S 1995 Ecology and Biodiversity of Mangroves. *Proceedings of the Ecotone January 1995*, Wang Tai Hotel Surat Thani, Thailand

[2] Jusoff K 2013 Malaysian mangrove forests and their significance to the coastal marine environment. *Polish journal of environmental studies*, **22**(4) 979-1005

[3] Lee S Y Primavera J H. Dahdouh-Guebas F McKee K Bosir J O Cannicci S. & Mendelssohn, I. 2014. Ecological role and services of tropical mangrove cosystems: a reassessment. *Global Ecology and Biogeography*, **23**(7) 726-743

[4] Asbridge E Lucas R Rogers K. & Accad A 2018 The extent of mangrove change and potential for recovery following severe Tropical Cyclone Yasi, Hinchinbrook Island, Queensland, *Australia*. *Ecology and evolution*, **8**(21) 10416-10434

[5] Mitra A Pal N Saha A Chaudhuri T R. Fazli P. & Zaman S 2017 Survival rate of mangroves: A proxy to assess ecosystem health. *Indian Journal of Geo Marine S cience*s, **46**(10) 2046-2053

[6] Reis-Neto A S D, Meireles A J D A and Cunha-Lignon M 2019 Natural Regeneration of the Mangrove Vegetation on Abandoned Salt Ponds in Ceará, in the Semi-Arid Region of Northeastern Brazil. *Diversity*, **11**(2)

[7] Macintosh D J & Ashton E C 2002 A review of mangrove biodiversity conservation and management. *Centre for tropical ecosystems research* (University of Aarhus, Denmark)

[8] Perry D M 1988 Effects of associated fauna on growth and productivity in the red mangrove. *Ecology*, **6** 1064–1075

[9] Cuenca G C, Macusi E D, Abreo N A S, Ranara C T B, Andam M B, Cardona L T and Guanzon G C 2015 Mangrove ecosystems and associated fauna with special reference to mangrove crabs in the Philippines: A Review. IAMURE *International Journal of Ecology and Conservation*, **15**(1) 60-110

[10] Bosire J O, Dahdouh-Guebas F, Kairo J G, Cannicci S, and Koedam N 2004 Spatial variations in macrobenthic fauna recolonisation in a tropical mangrove bay. *Biodiversity & Conservation*, **13**(6) 1059-1074

[11] Al Idrus A, Syukur A, and Zulkifli L 2018 The Perspective of Local Community's on Mangrove Resilience and Needs Conservation at Along the Southern Coast of Lombok Island, Indonesia. *The 2nd International Conference Postgraduate School Universitas Airlangga Surabaya Place/Date: Surabaya*, Indonesia/10th - 11st July 2018. SCITEPRESS

[12] Odum E P 1983 *Basic Ecology*. *3rd Edn* (Saunders College Publishing, New York) pp 613

[13] Tomlinson P B 2016 *The botany of mangroves*. *Second Edition*, (Cambridge University Press) pp 414

[14] Luo Z, Sun O J, and Xu 2010 A comparison of species composition and stand structure between planted and natural mangrove forests in Shenzhen Bay, South China. *Journal of Plant Ecology*, **3**(3) 165-174

[15] Al Idrus A 2014 *Mangrove Gili Sulat Lombok Timur*. Arga Puji Press. (Mataram, Lombok Indonesia) pp 216

C15

ORIGINALITY REPORT

15%	%	%	15%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Universitas Negeri Jakarta Student Paper	9%
2	Submitted to Universitas Negeri Surabaya The State University of Surabaya Student Paper	3%
3	Submitted to CSU, San Jose State University Student Paper	2%
4	Submitted to iGroup Student Paper	1%

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	On		