

Species Composition of Mangrove Ecosystem in Ranong, Thailand

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ABSTRACT.- The purpose of this study is to examine the current composition of the fauna and flora of the mangrove ecosystem in Ranong, Thailand. Six (6) different sites located at three (3) districts were selected on the basis of the diversity of mangrove species. The Point Centered Quarter Method (PCQM) and direct observation were employed for floristic and animal inventory purposes respectively. With reference to the aquatic fauna structure, results indicated that there were twenty-seven (27) species present in the aforementioned areas. *Scylla olivacea* and *Sardinella* sp. were the most dominant species. On the other hand, the floristic composition totaled nineteen (19) identified species. Results point to the prevalence of *Xylocarpus granatum*, *Bruguiera parviflora*, *Rhizophora apiculata* and *R. mucronata* species. The dominance of these species in Ranong reveal several implications that describe the state of the ecosystem itself and ultimately, how it affects the human society of Ranong.

KEY WORDS.- biodiversity, aquatic fauna and flora, mangrove ecosystem, Ranong, Thailand

INTRODUCTION

Mangroves are tropical inshore communities dominated by several species of mangrove trees, shrubs and herbs capable of growth and reproduction in areas inundated daily by seawater (Aksornkoae, 1992; Smith and Smith, 2004). This shoreline ecosystem is a vital factor in the preservation and sustainance of human, fauna and flora alike. It serves as a link between marine and the inland communities.

Mangrove vegetation contributes to habitat complexity and the diversity of the associated fauna of the mangrove ecosystem (Hutchings and Saenger, 1987; Othman, 1994;

Tri *et al.*, 1998; Lee, 1998). Mangrove trees provide a source of food for many marine animals. Furthermore, it provides protection of habitats that are suitable as breeding and nursery areas for many shrimp, crabs and marine fish (Sasekumar *et al.*, 1992; Barbier and Strand, 1998; RBR, 2007).

As the mangrove fauna thrives, man's fishing industry is able to enjoy an abundant year round supply. Mangrove thus supports human well being in the coast since they provide a multitude of ecosystem services, including direct services like food provisioning and shelter. It is also providing important indirect services such as shoreline stability and water quality (Buot, 1994; Janssen and Padilla, 1999). In addition, healthy mangrove ecosystems mitigate the negative impact of tsunami that commonly ravage the coast. To ensure continuous benefits, man in turn must exert efforts in mangrove

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conservation and rehabilitation.

An important undertaking in mangrove conservation is defining its species composition, hence, the purpose of this study is to inventory the fauna and flora in the mangrove ecosystem of Ranong, Thailand to know the available resources that people can utilize and need to protect.

MATERIALS AND METHODS

Study area

The study was conducted in Ranong, Thailand (Fig 1) which was severely destroyed by the tsunami on December 26, 2004. It is a biosphere reserve located on the coast of the Andaman Sea, 568 kilometers south of Bangkok.

Ranong encompasses an area of 3,298 square kilometers. The study area was situated around $9^{\circ} 43' N$ to $9^{\circ} 57' N$ and $98^{\circ} 29' E$ to $98^{\circ} 39' E$. The province shares borders with Myanmar (Burma). Geographically, in addition to sixty-two islands Ranong has long expanses of sandy beaches, unspoiled forests, waterfalls, parks, and biodiversity sanctuary zone. Three (3) districts were selected based on the criteria such as accessibility, size of mangrove patches and associated elements such as canals, distance, and the availability of fish raft. The three (3) districts were Mueng (Ngaw and Rachakrud), Kapoe (Bangben and Banghin), and Suk Samran (Talaynog and Hadsaykaow) (Fig 1). Site selection was based on the result of image processing.

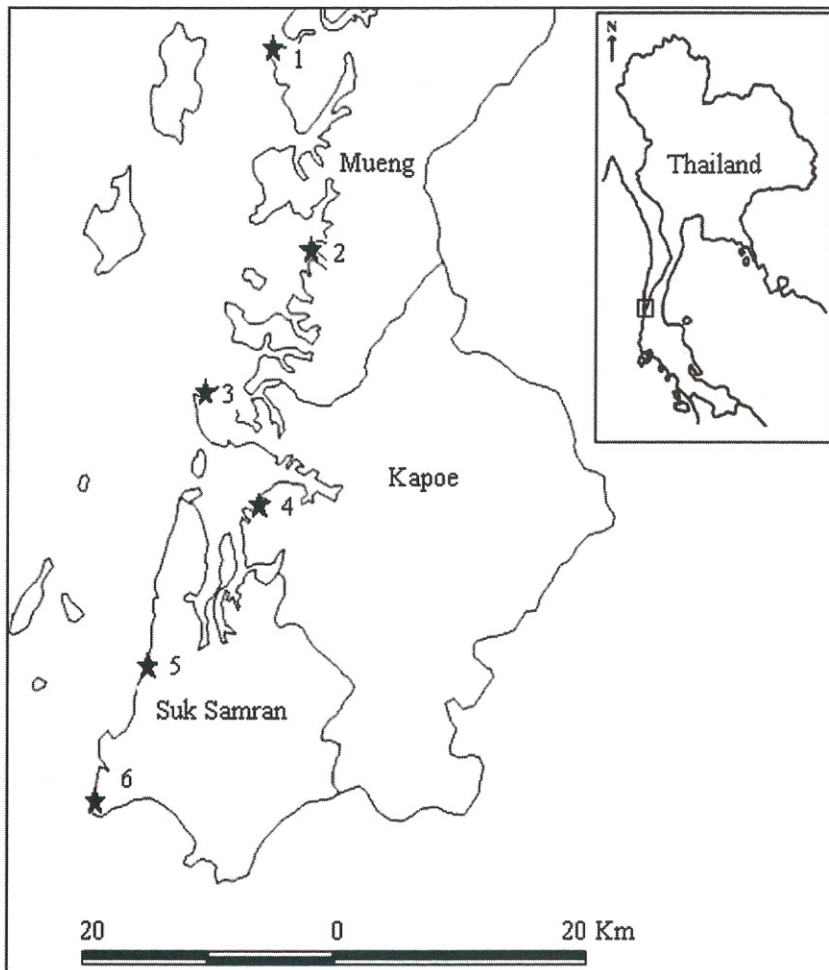


Figure 1. The study sites along the Andaman seacoast at Mueng (Ngaw [1] and Rachakrud [2]), Kapoe (Bangben [3] and Banghin [4]) and Suk Samran (Talaynog [5] and Hadsaykaow [6]).

Data collection

For each sampling site, the coordinates were determined using a Global Positioning System (GPS) receiver with estimated accuracy of 10 m or better. To validate the coordinates, georeferencing technique was applied to display the collecting localities on the map. The aquatic fauna was surveyed and enumerated through direct observation. The PCQ-Method (Point Centered Quarter Method) of Mueller-Dombois and Ellenberg (1974) was used to study the flora.

RESULTS

Figure 2 displays the general overview of the six (6) study sites. There were a total of twenty-seven (27) species of aquatic fauna (Table 1) and nine-teen (19) species of flora (Table 2) that were identified.

Among the fauna, the mud crabs (*Scylla olivacea*) and the sardine (*Sardinella* sp.) (Fig 3) were the most common species in Ranong mangrove ecosystem. The mud crabs

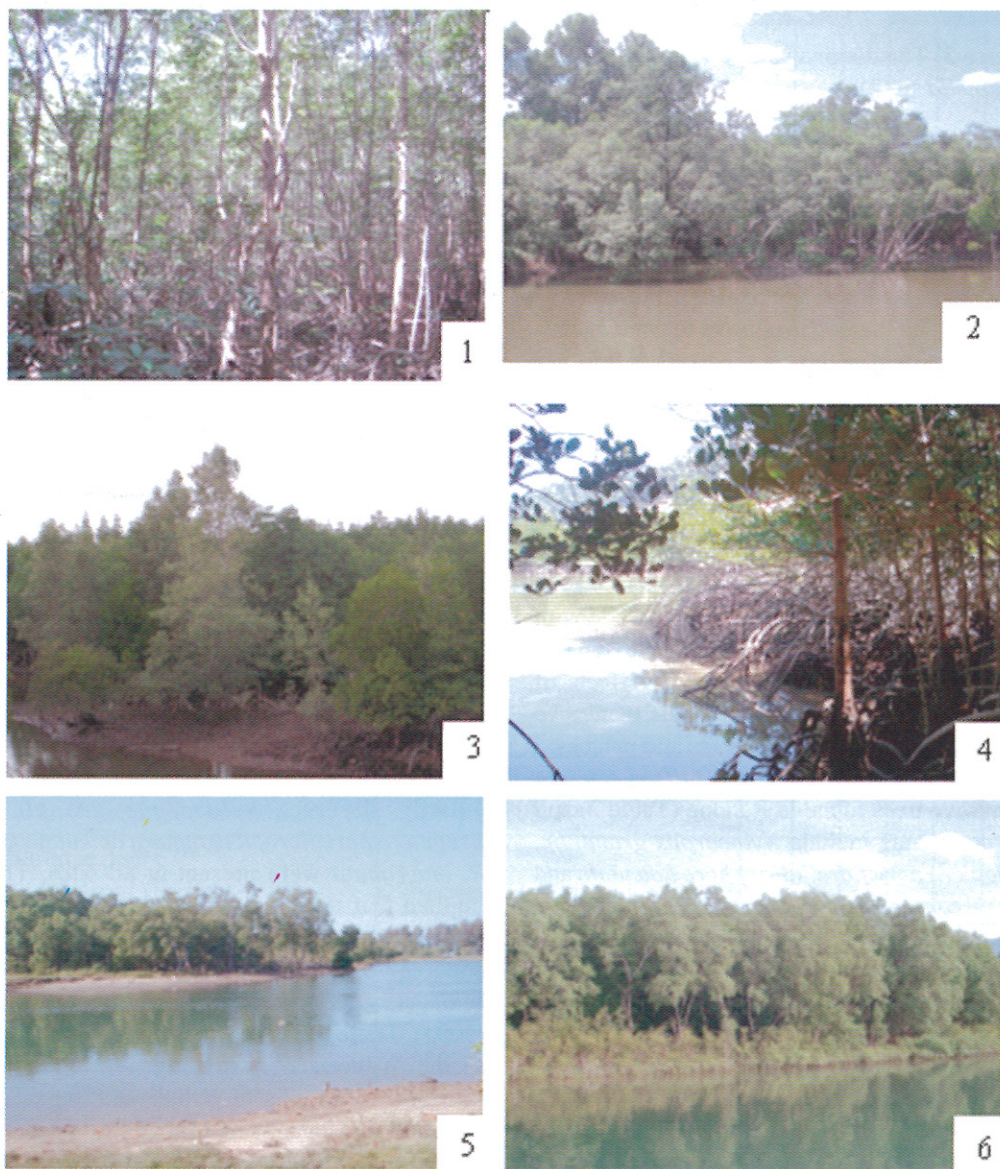


Figure 2. Overview of mangrove stands in the six study sites in Ranong, Thailand: Ngaw [1]; Rachakrud [2]; Bangben [3]; Banghin [4]; Talaynog [5] and Hadsyakaow [6].

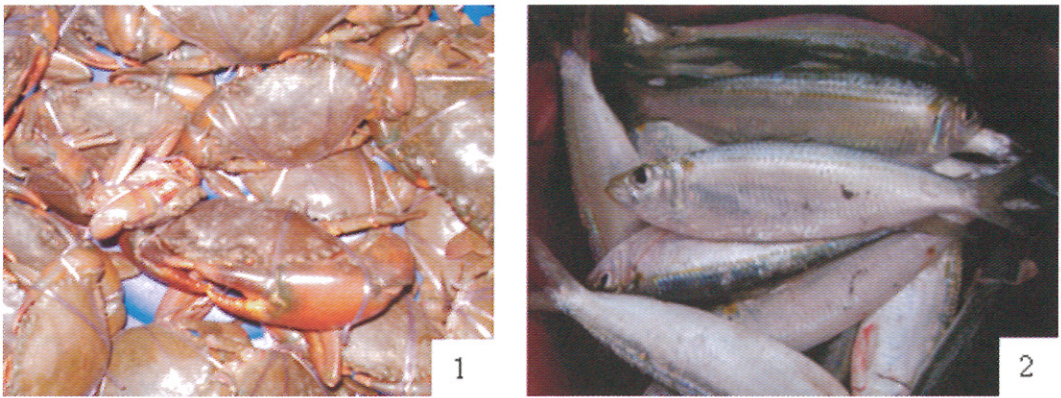


Figure 3. The dominants of the aquatic fauna in Ranong mangrove forest: *Scylla olivacea* (1) and *Sardinella* sp.(2)

were presented in all sites except at Hadsaykaow. They are the economic aquatic fauna generating income for fishermen who relies on small-scale fisheries in the Ranong mangrove forest.

The Ranong mangrove forest is a complex ecosystem with rich biodiversity and has an important role in enriching the coastal waters and serving as the habitat for various aquatic organisms. The study revealed that the highest species-richness of aquatic fauna was in Ngaw site with thirteen (13) species. The declaration of the site as a biosphere reserve indeed helped in species conservation. The lowest species-richness of aquatic fauna was in Bangben site with only four (4) species. This implied that the site has not yet recovered from the ill effects of tsunami in 2004 which reduced the mangrove forests in Ranong into fragments and patches.

There were nineteen (19) species of mangrove trees found in Ranong (Table 2) and the dominants include *Xylocarpus granatum*, *Bruguiera parviflora*, *Rhizophora apiculata* and *R. mucronata*. The distribution of mangrove is concentrated in the south of Ranong. The highest species-richness of the flora was in Rachakrud site with fourteen (14) species and the lowest was in Banghin and Talaynog sites with only seven (7) species.

DISCUSSION

The Ranong mangrove ecosystem displayed a diverse composition of its aquatic

fauna. Dominants among these were *Scylla olivacea* and *Sardinella* sp. (Fig 3). The presence of these organisms implied that their food sources were readily available. It also meant that they were adapted to the biological and physico-chemical environment. The abundance of this species served as source of livelihood of small-scale fishermen thus bringing about socio-economic upliftment in the area.

The aquatic fauna species in Ranong mangroves were composed of molluscs, crustaceans and finfish (Table 1). There were twenty-seven (27) species observed. The species-richness was lesser compared with the studies of Macintosh *et al.* (2002) where they listed more than seventy (70) species. This implies that the fisheries resources are declining probably because of the diminishing mangrove forest cover.

The flora of Ranong mangroves were equally diverse. *Xylocarpus granatum*, *Bruguiera parviflora*, *Rhizophora apiculata* and *R. mucronata* were present at all sites. This implied that these were the type of flora that thrived the most on mangrove ecosystem conditions similar to the reports of Sasekumar *et al.* (1992), Buot (1994) and Ashton *et al.* (2003). These were the species that contributed to the lushness of the mangrove, which in turn can be shields to reduce the impact of forthcoming tsunamis in Ranong Province.

The Ranong mangroves exhibited a high species-richness in terms of flora. Nine (9) families were present in all sites. Buot (1994)

Table1. List of aquatic fauna in the six study sites in Ranong, Thailand: Ngaw [1]; Rachakrud [2]; Bangben [3]; Banghin [4]; Talaynog [5]; and Hadsaykaow [6].

The aquatic fauna species arranged alphabetically in families	Vernacular name	Sites of Survey and Collection					
		1	2	3	4	5	6
Buccinidae 1. <i>Babylonia areolata</i>	หอยหวาน (Hoy wan)	X			X		
Carangidae 2. <i>Decapterus maruadsi</i>	ปลาทุแขก (Pla tu kag)						X
3. <i>Selaroides leptolepis</i>	ปลาสีกุน (Pla si kun)						X
Carcharhinidae 4. <i>Carcharhinus</i> sp.	ปลาฉลาม (Pla cha lam)	X					
Clupeidae 5. <i>Sardinella</i> sp.	ปลาหลังเขียว (Pla lung kew)	X	X			X	X
Cyaneidae 6. <i>Rhopilema</i> sp.	แมงกะพรุน (Mang ka pun)	X			X		
Cynoglossidae 7. <i>Cynoglossus</i> sp.	ปลาลิ้นหมา (Pla lin mar)	X					
Dasyatidae 8. <i>Dasyatis</i> spp.	ปลากะเบน (Pla kaben)	X					
Haliotidae 9. <i>Haliotis asinine</i>	หอยโข่งทะเล (Hoy kong tale)						X
Latidae 10. <i>Lates calarifer</i>	ปลากะพงขาว (Pla kapong khao)			X			
Loliginidae 11. <i>Loligo duvauceli</i>	หมึกกล้วย (Muk kuay)						X
Lutjanidae 12. <i>Lutjanus bohar</i>	ปลากะพงแดง (Pla kapong daeng)	X		X			
Mugilidae 13. <i>Valamugil cunnesius</i>	ปลากะบอก (Pla Kabok)	X	X				
Mytilidae 14. <i>Perna viridis</i>	หอยแมลงภู่ (Hoy marang poo)		X				
Ostreidae. 15. <i>Saccostrea cucullata</i>	หอยนางรมเล็ก (Hoy nang rom lek)	X			X		
Penaeidae 16. <i>Metapenaeus brevicornis</i>	กุ้งหัวมัน (Krung hua man)						X
17. <i>Penaeus merguensis</i>	กุ้งเขมร (Krung chair bouy)				X	X	X
Plotosidae 18. <i>Plotosus canius</i>	ปลาดุกทะเล (Pla duk tale)		X				

The aquatic fauna species arranged alphabetically in families	Vernacular name	Sites of Survey and Collection					
		1	2	3	4	5	6
Portunidae							
19. <i>Charybdis cruciata</i>	ปูลาย (Poo lai)					X	
20. <i>Portunus pelagicus</i>	ปูม้า (Poo mah)				X	X	
21. <i>Scylla olivacea</i>	ปูทะเล (Poo dam)	X	X	X	X	X	
Scombridae							
22. <i>Rastrelliger brachysoma</i>	ปลาทูสั้น (Pla tu san)						X
23. <i>Rastrelliger faughni</i>	ปลาทูดัง (Pla tu lang)						X
Sepiidae							
24. <i>Sepia pharaonis</i>	หมึกกระดอง (Muk ka dong)						X
Sergestidae							
25. <i>Acetes sibogace</i>	กุ้งเคย (Kung kouy)	X			X	X	
Serranidae							
26. <i>Epinephelus</i> sp.	ปลาเก๋า (Pla kaow)	X	X				
Sillaginidae							
27. <i>Sillago</i> sp.	ปลาทูทราย (Pla sai)	X	X	X			
Total species in each site		13	7	4	7	6	10

reported seven (7) families only in Cebu Island (Philippines) mangroves dominated by Rhizophoraceae. The Cebu Island mangrove ecosystem was quite intact and provided quality ecosystem services. This should be true in Ranong mangroves as well.

It is recommended that the study on recruitment, carrying capacity and responsible fisheries of aquatic fauna in Ranong be urgently done in order to address the fisheries resource decline issue. For the flora, a participatory approach is needed where the local people take active role in mangrove forest management to enhance its ecological and economic benefits. Furthermore, it is recommended that Information Technology such as Remote Sensing, Geographic Information System (GIS), Modeling and Database be used as well in studying the biodiversity of aquatic fauna and flora in mangrove ecosystem.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the support from the Faculty of Fisheries, Kasetsart University, Bangkok, Thailand headed by Dean, Dr. Suriyan Tunkijjanukij and Department of Fishery Management Chairman, Prof. Passara Rattanapisit. The Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) in Los Banos, Laguna, Philippines extended a graduate scholarship to the senior author and funded the field survey. Mr. Weeyawat Jaitrong and Mr. Piga Topim of the Natural History Museum of Thailand gave us full encouragement and support to write this article. The kind permission from Dr. Sakhan Teejuntuk, head of Ranong Coastal Resource Research Station (RCRRS) and the valuable assistance of Mr. Decha Dounnamol of Andaman Coastal Research

Table 2 List of the true mangroves in the six study sites in Ranong, Thailand: Ngaw [1]; Rachakrud [2]; Bangben [3]; Banghin [4]; Talaynog [5]; and Hadsaykaow [6].

The aquatic fauna species arranged alphabetically in families	Vernacular name	Sites of Survey and Collection					
		1	2	3	4	5	6
<u>Avicenniaceae</u>							
1. <i>Avicennia alba</i>	แสมขาว (Sa mae khao)	X	X				
2. <i>Avicennia marina</i>	แสมทะเล (Sa mae tale)		X	X			
3. <i>Avicennia officinalis</i>	แสมดำ (Sa mae dam)	X	X			X	X
<u>Combretaceae</u>							
4. <i>Lumnitzera littorea</i>	ฝาดดอกแดง (Fad dok daeng)		X	X			
5. <i>Lumnitzera racemosa</i>	ฝาดดอกขาว (Fad dok khao)			X			
<u>Euphorbiaceae</u>							
6. <i>Excoecaria agallocha</i>	ตาคุ่มทะเล (Ta tum tale)		X	X			
<u>Meliaceae</u>							
7. <i>Xylocarpus granatum</i>	ตะบูนขาว (Ta bun khao)	X	X	X	X	X	X
8. <i>Xylocarpus moluccensis</i>	ตะบูนดำ (Ta bun dam)	X	X			X	X
<u>Myrsinaceae</u>							
9. <i>Aegiceras corniculatum</i>	เล็บมือนาง (Lep meo nang)	X	X				
<u>Rhizophoraceae</u>							
10. <i>Bruguiera cylindrica</i>	ถั่วขาว (Tou khao)	X	X	X	X		X
11. <i>Bruguiera gymnorrhiza</i>	พังกาหัวส้มดอกแดง (Pang ga hou sum dok daeng)	X					
12. <i>Bruguiera parviflora</i>	ถั่วดำ (Tou dam)	X	X	X	X	X	X
13. <i>Ceriops decandra</i>	โปรงขาว (Pong khao)	X		X			X
14. <i>Ceriops tagal</i>	โปรงแดง (Pong daeng)	X			X	X	X
15. <i>Rhizophora apiculata</i>	โกงกางใบเล็ก (Kong kang pai lek)	X	X	X	X	X	X
16. <i>Rhizophora mucronata</i>	โกงกางใบใหญ่ (Kong kang pai yai)	X	X	X	X	X	X
<u>Rubiaceae</u>							
17. <i>Scyphiphora hydrophyllacea</i>	สีง้ำ (Si ngum)			X			
<u>Sonneratiaceae</u>							
18. <i>Sonneratia alba</i>	ลำพูทะเล (Lam phu tale)		X		X		
<u>Sterculiaceae</u>							
19. <i>Heritiera littoralis</i>	หอนไก่ทะเล (Ngon kai tale)			X			
Total species in each site		11	14	12	7	7	9

Center for Development in identifying the mangrove species are gratefully acknowledged. Ms. Marie Toni A. Salangsang of the Department of Human Kinetics, University of the Philippines Los Banos kindly edited the manuscript.

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Received : 28 October 2007

Accepted : 4 November 2007