

# Ecosystem functions and the use of mangrove forests as a fish-breeding areas: *Uotsukirin*

Based on research at mangrove forests in Kota Kinabalu Wetlands, Sabah, Malaysia

Year: 2013

Place of fieldwork: Malaysia, Singapore, Australia

Seigo Murakami

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## Background

People enjoy the benefits of mangroves as an ecosystem service Provision of seafood is one of these services; many edible aquatic animals live in mangrove forests. However, the relationships among life forms in a mangrove forest are not yet clearly understood.

## Purposes

The main purposes of the research conducted from November 5, 2013, to February 4, 2014, were to:

- conduct preliminary research on mangroves at Kota Kianablu Wetlands (KKW), Sabah, Malaysia
- perform reconnaissance of mangrove forests as potential research sites to be compared with KKW

## Results of fieldwork

### 1. Preliminary research on mangroves at KKW

After surveying the mangrove distribution and the geographic features of the mangrove forest in KKW, nine quadrats (10m X 10m) were observed. In each quadrat, the species, the number, height, and breast-height diameters of mangroves were researched. Table 1 below shows the 10 species of mangrove found in the survey. The fauna in each quadrat was also recorded. Table 2 below shows the species of fish found in the survey. Furthermore, the changes of flora and research conducted since 1980s were surveyed.

Table 1. Species of mangrove at KKW

Family	Scientific Name
Avicenniaceae	<i>Avicennia alba</i>
Avicenniaceae	<i>Avicennia marina</i>
Avicenniaceae	<i>Avicennia officinalis</i>
Combretaceae	<i>Lumnitzera littorea</i>
Combretaceae	<i>Lumnitzera racemosa</i>
Rhizophoraceae	<i>Rhizophora apiculata</i>
Rhizophoraceae	<i>Rhizophora mucronata</i>
Rhizophoraceae	<i>Bruguiera cylindrica</i>
Rhizophoraceae	<i>Ceriops tagal</i>
Sonneratiaceae	<i>Sonneratia alba</i>

Table 2. Species of fish found at KKW

Common Name	Scientific Name	Family
Cardinalfish; local name: Seriding Putih	<i>Ambassis</i> sp.	Ambassidae
Cardinalfish; local name: Seriding	<i>Apogon</i> sp.	Apogonidae
Marine catfish; local name: Badukang, Utik	<i>Arius</i> sp.	Ariidae
Flat Needlefish; local name: Jolong-jolong	<i>Ablennes hians</i>	Belontiidae
Layang scad, slender mackerel scad; local name: Basung	<i>Decapterus macrosoma</i>	Carangidae
Tilapia	<i>Oreochromis mossambicus</i>	Cichlidae
Pearlspot	<i>Etropus suratensis</i>	Cichlidae
Snakehead Gudgeon	<i>Ophiocara porocephala</i>	Eleotridae
Papilose Flat-head Goby	<i>Glossogobius sparsipapilus</i>	Gobiidae
Halfbeak; local name: Jolong-jolong	<i>Hemiramphus</i> sp.	Hemiramphidae
Sea bass, Sea perch; local name: Sakap, Sulungung	<i>Lates calcarifer</i>	Latidae
Tarpon; local name: Bulan-bulan	<i>Megalops cyprinoides</i>	Megalopidae
Mullet; local name: Belanak	<i>Liza subviridis</i>	Mugilidae
Greenback Mullet		
Burrowing snake eel	<i>Pisodonophis</i> sp.	Ophichthidae
Mudskipper; local name: Tembaku	<i>Periophthalmus</i> sp.	Periophthalmidae
Catfish eel; local name: Sembilang, Ikan duri	<i>Pletosus</i> sp.	Pletosidae
Striped eelcat catfish	<i>Pletosus lineatus</i>	Pletosidae
Rabbitfish; local names: Blais, Dengkis	<i>Siganus guttatus</i>	Siganidae
Pufferfish; local name: Ikan Buntal	<i>Arotiron manillensis</i>	Tetraodontidae
Archer fish; local name: Sumpit-sumpit	<i>Toxotes jaculator</i>	Toxotidae
Crescent perch, Jarbusa, Banded perch; local name: Gelama, kerong-kerong	<i>Terapon jarbusa</i> / <i>Terapon theraps</i>	Terapontidae



replanted site



gap site



forest floor



near the nursery



mangrove replantation site

## 2. Reconnaissance of potential mangrove research sites

### 2.1. Mangrove forests in Sabah

#### 2.1.1. Sulaman Wetland Sanctuary (SWS)

There are some fish species that do not exist in KKW, such as *Xylocarpus moluccensis*, *Bruguiera sexangula*. Fish aquaculture is carried out around SWS.



natural mangrove forest



abandoned forest



vegetation research on boat



fish aquaculture site

### 2.1.2. Alamesra area

Alamesra is located in Kota Kinabalu City. Some of the mangrove forests there were converted into residential areas (see photo below). The flora is similar to that in KKW.





mangroves near the development site

### 2.1.3. Labuk Bay

Located in the eastern coast of Sabah, the mangrove forest has been remained by the oil palm plantations. Although the composition of the forest is similar to that of KKW, many *Bruguiera* species are found there.



Proboscis monkey in the Labuk Bay mangrove forest

### 2.1.4. Tamau Village

Located in Kota Belud District, the mangrove forest inland has been converted to cow grazing lands and palm agricultural fields. Mostly, the *Avicennia* family is found near the seaside.



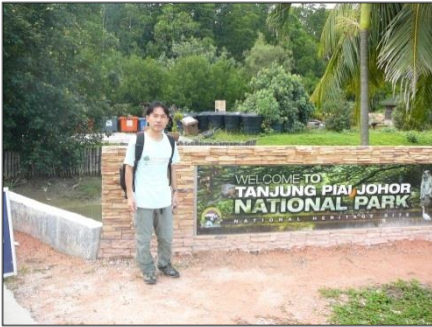
the mangrove cover is decreasing

## 2.2. Mangrove forests of Sabah

### 2.2.1. Malay Peninsula: Johor State

Three wetlands registered as Ramsar Sites were visited to study the mangrove cover: (1) Sungai

Pulai, (2) Tanjung Piai National Park, and (3) Kukup Island. More mangrove species were found here than in KKW, including *R.stylosa*, which is rarely found in Malaysia.



The entrance of Tanjung Piai National Park



Mussel aquaculture site in front of Kukup Island



Mangrove timber workshop at the Sungai Pulai Ramsar site

### 2.2.2. Singapore

Three mangrove forests were visited: (1) Pasir Ris Park, (2) Sungei Buloh, and (3) Ubin Island. The vegetation was found to be similar to that in Johor. The wetlands appeared to be carefully maintained with respect to the artificial regulation of the water level, salinity, and PH level.



Mangroves in the water at high tide at Ubin Island



Information board on the walking track in Pasir Ris Park



Xylocarpus granatum in Sungei Buloh

### 2.2.3. Australia

The mangroves in the Brisbane River basin, Boondall Wetlands Reserve, and Nudgee Beach were studied. *A.marina* were dominant in the fringing zone and *B.gymnorrhiza* were dominant in the landward zone. *Ceriops australis*, which is only seen in Australia, was found in the intermediate zone.



*A. Corniculatum* with salt excreted from salt gland on the leaves

### Implications for and Directions for Future Research

First, based on the information acquired during this research, a solid research method plan and research sites comparable to KKW will be determined. Then, the preparation for research approval in Malaysia will begin.