



RESEARCH PAPER

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A preliminary checklist of mangrove plants and associate species in Sungai Kong Kong, Selat Medana, Johor, Malaysia

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Abstract

This paper attempts to provide a preliminary checklist of mangrove species in Sungai Kong Kong, Selat Medana, Johor. The results presented were taken from the sampling at Sungai Kong Kong. After being pressed, dried and mounted on herbarium sheet, the specimens were made into herbarium voucher. Of the 26 species, *Rhizophora apiculata* and *R. mucronata* are the dominant species in the mangrove forest of Sungai Kong Kong. This indicates that the mangrove forest of Sungai Kong Kong can potentially become an ecotourism site and should be conserved.

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Introduction

Mangrove is a term used to refer to types of woody vegetation occurring in the brackish and marine environment and restricted to the coastal area (Shin Shin *et al.*, 2015). Mangroves are found mainly in Perak, Kedah and Johor, while smaller mangrove areas are found in Pahang, Terengganu and Kelantan (Faridah-Hanum *et al.*, 2014). Mangroves are known to be a unique species. They have many adaptations to survive in the saline environment, such as having pneumatophores and viviparous seeds that will germinate early while still on the tree. Srikanth *et al.* (2016) stated that mangrove species, when waterlogged, have roots with a higher portion of gas space and are capable of excluding salt or can tolerate high concentrations of salt in tissues.

Mangrove is very important and plays a key role in many aspects. Some of the role of mangroves is to protect the shoreline from waves and storm surges (Koh *et al.*, 2018). It also helps trap sediment and stabilise the soil. In addition, mangroves act as nurseries for marine life, thus supporting the ecosystem's food web by protecting young from predators (Hutchison *et al.*, 2014). This, in turn, will also help to sustain the economic activities of communities living in coastal areas, mainly dependent on fisheries. In addition, it is also able to supply the communities with wood and non-timber products. More importantly, mangroves are helping to sequester carbon from the atmosphere. This indicates that mangroves play a crucial role in climate regulation (Denise, 2015).

Mangroves can be found mainly in Perak, Kedah and Johor, while smaller mangrove areas can be found in Pahang, Terengganu and Kelantan (Faridah-Hanum *et al.*, 2014). According to Japar Sidik, Malaysia has 38 true mangroves, 57 non-exclusive and nine associated mangrove species (cited in Faridah-Hanum *et al.*, 2014). Giesen *et al.* (2006) reported that there were 42 true mangroves. Most of the mangrove cover is located in East Malaysia with

132,000 hectares in Sarawak and 341,377 hectares in Sabah, accounting for about 82% of the total cover in Malaysia. The remaining 18% of the mangrove cover is located on the peninsula, which is approximately 104,181 hectares, most of which are located on its western coast (Chong, 2006).

Unfortunately, Malaysia's mangrove cover has been reduced from nearly 670,000 hectares in 1980 to about 570,000 hectares by the year 2000 (Denise, 2015), indicating that our current mangrove cover is at an alarming rate in 2018. The main reason for this decrease was due to human factors such as over-exploitation of resources that cause habitat destruction (Given, 1994). If this uncontrolled activity does not stop, it will cause future disasters such as soil erosion, floods, loss of habitat, loss of economic resources that will sustain local communities livelihoods.

An active conservation effort must therefore be made to prevent such disasters from occurring. Mangrove forest has the potential to become an ecotourism site. There are many recreational activities that can be carried out in mangroves, including nature photography, bird watching, wildlife observation, nature education, recreational fishing and boating (Chong, 2006). Ecotourism and leisure activities have been stated to have attracted entrepreneurs in places such as Langkawi Island, Kuala Selangor, Matang, Lumut and Kuantan (Faridah-Hanum *et al.*, 2014). This can help provide additional income for the local community and, at the same time, educate local people and tourists about the importance of mangrove protection.

The mangrove forest of Sungai Kong Kong is located along Selat Medana, near Kampung Kong Kong, about 30 km from Johor Bahru. However, the current ecotourism activity in Sungai Kongkong related to the mangrove forest has not been so developed. This can be due to a lack of information on the distribution of mangrove plants in Sungai Kong Kong. There is by far no known investigation into mangrove plants in Sungai Kong Kong. The aim of this study is to provide

a preliminary checklist of mangrove species found in Sungai Kong Kong.

Materials and methods

Study area

The study was conducted in the mangrove area near Sungai Kong Kong. Sampling was conducted from July 2017 to May 2018. The mangrove forest of Sungai Kong Kong covers an area of approximately 38.9 hectares.

Sampling method

The sampling was done using random sampling method along the mangrove forest. A total of 3 samples per species of plant were collected. The samples were pressed, dried and mounted on herbarium sheet to be prepared into herbarium voucher.

Data analysis

The data collected included location as well as visual observation with several parameters. This includes the vegetative and reproductive structures which was observed and recorded for species identification.

Results and discussion

A total of 26 species from 20 genera and 14 families have been identified. The families of true mangroves and associated mangroves that were found to be Acanthaceae, Rhizophoraceae, Combretaceae, Lythraceae, Meliaceae, Pteridaceae, Rubiaceae, Areaceae, Asteraceae, Celasteraceae, Malvaceae, Lamiaceae, Flagellariaceae and Sapindaceae. The most dominant family, depending on the number of species collected in Sungai Kong Kong mangrove forest belongs to the Rhizophoraceae family (3 genera, 6 species), Acanthaceae (2 genera, 4 species), Rubiaceae (3 genera, 3 species), Asteraceae (2 genera, 2 species), and Pteridaceae (1 genus, 2 species). From the list of species, 13 species of true mangroves and 13 species of related mangroves have been recorded. Sungai Kong Kong mangrove were generally dominated by the *Rhizophora* and *Bruguiera* species. According to Che Hashim *et. al*, there are four types of mangrove vegetation, *Rhizophora-Bruguiera* forest, *Avicennia* forest, *Lumnitzera-Scyphiphora*, and dry land mangroves (as cited in Tan *et. al*, 2012). This was placed by Sg. Kong Kong forest type to be

most likely to be the *Rhizophora-Bruguiera* dominated coastal forest.

This is followed by other true mangrove species i.e. *Ceriops tagal*, *Avicennia officinalis*, *A. alba*, *Lumnitzera littorea*, *Sonneratia alba*, *Xylocarpus granatum* and *Scyphiphora hydrophyllaceae* found scattered in the mangrove forest. Apart from that, mangrove associates species that consists of herbs, shrubs and small trees i.e. *Acanthus ebracteatus*, *A. ilicifolius*, *Pluchea indica*, *Cassine viburnifolia*, *Hibiscus tiliaceus*, *Melanthera biflora*, *Oxyceros longiflorus*, *Premna serratifolia*, *Flagellaria indica*, and *Allophylus cobbe* were found along the side of the mangrove forest, including the fern species, *Acrostichum aureum* and *A. speciosum* that can also be found inside the forest. The total number of species recorded at Sg. Kong Kong is slightly lower with 13 true mangroves and 13 mangrove associates compared to other studies conducted by Wan Juliana *et al.* (2010) in Mersing Mangrove Forest, Johor, which recorded 32 true mangrove taxa and 14 mangrove associates. However, with the small sampling area of Sg. Kong Kong Mangrove Forest, which covers much less than approximately 38.9 hectares of total area, Sungai Kong Kong has a relatively high number of species.

Conclusion

Twenty-six species of true mangrove and mangrove associates from 14 families and 20 genera have been found in the mangrove forest of Sungai Kong Kong. This diversity of mangrove species in Sungai Kong Kong shows how important it is to be protected and thus shows its potential to develop into an ecotourism site.

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