

Life from Headwaters to the Coast
GUNUNG SANTUBONG

Where Nature Meets Culture

Edited by

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UNIMAS
UNIVERSITI NEGERI
PUBLISHER



**Natural History
Publications (Borneo)**



GUNUNG SANTUBONG

The Santubong Peninsula is steeped in history and antiquity, and is easily accessible throughout the year. The Peninsula harbours mudflats, mangroves forest, mixed dipterocarp and cloud forests that show a vast vegetational diversity- from stunted to towering trees, with a matching variety of flowers, fruits, creeping epiphytes and ferns. Its diverse habitats are home to many endemic plants and animals, including numerous species of conservation importance. The many ecotourism elements put in one place, make Santubong unique.

The history of biodiversity research in Santubong is a long one, and preceding that, legends and archaeological interests, have been the subject of scholarly attention. Such information has been integrated into this work through specially commissioned chapters by leading specialists.

This book aims to enlighten and educate nature enthusiasts about this region and draws material from researches and experiences of various specialists- scientists, sociologists, ethnographers and historians, and a review of literature. It is splendidly illustrated throughout to document a magnificent site for naturalists, ecotourists as well as researchers.

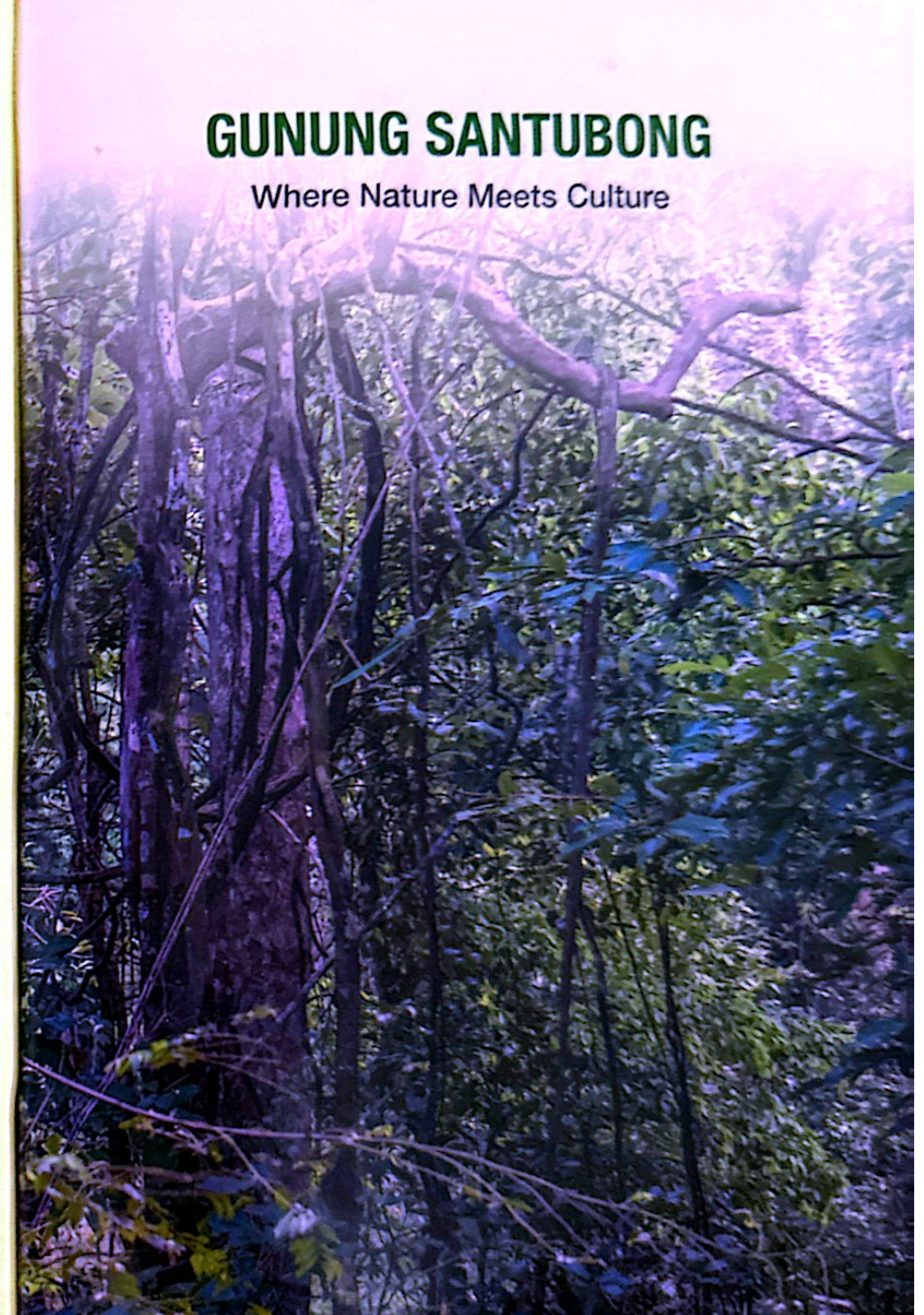
The introductory chapters gives us insights into myths and legends of the Santubong region. The fascinating history of the Peninsula is recounted next, which includes pioneering studies of its biological diversity. The geology of Santubong is brought to life through the images of landscapes and rock formation, specially commissioned for the work. The plant chapters showcase the uniqueness of the flora diversity of the Santubong area, from the unusual insectivorous pitcher plants to the towering dipterocarp trees. The animal biodiversity covers an array of taxa that includes both invertebrates (butterflies, dragonflies and stream macrofauna) and the vertebrates (fishes, frogs, reptiles, birds and mammals). The sociological elements that hinges on the biodiversity of Santubong are covered under the human use of natural resources and ecotourism. The final chapter on e-biodiversity binds all this information together.

The research in Santubong Peninsula would not been possible if not for the grant by the Ministry of Higher Education, Government of Malaysia, under the Niche Grant Scheme (NRGS) that was awarded to Universiti Malaysia Sarawak. This project is aimed to meeting the following targets:

- i. to assess the biotic diversity of basins of rivers arising in the mountains of western Sarawak, and traversing the plains to the coast by employing selected plant, invertebrate and vertebrate groups as surrogates of biodiversity, in order to estimate species turnover with stream order, gradients and elevation and local habitat diversity;
- ii. to study life histories of selected species of conservation importance, including both plant and animal taxa.
- iii. to analyse effects of landscape change, chiefly habitat fragmentation through anthropogenic activities, on biodiversity, at both community and population levels.
- iv. to examine human use of natural resources, and develop an applicable environmental model on ecotourism from a holistic perspective.
- v. to synthesize the data from the above activities into an online and/or digital platform, available to decision-makers.

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UNIVERSITI MALAYSIA SARAWAK
PUBLISHER


Natural History
Publications (Borneo)

SARAWAK

FORESTRY

Kota Kinabalu

2019

Published by

UNIMAS Publisher
Universiti Malaysia Sarawak
94300 Kota Samarahan,
Sarawak, Malaysia.
Website: www.unimas.my

Sarawak Forestry Corporation Sdn. Bhd.
Lot 218 KCLD, Jalan Tapang
Kota Sentosa, 93250 Kuching
Sarawak, Malaysia.
Website: www.sarawakforestry.com

and

Natural History Publications (Borneo) Sdn. Bhd. (216807-X)
A913, 9th Floor, Wisma Merdeka Phase 1,
P.O. Box 15566, 88864 Kota Kinabalu, Sabah, Malaysia.
Tel: 088-233098 Fax: 088-240768
e-mail: info@nhpborneo.com
Website: www.nhpborneo.com

Life from Headwaters to the Coast:
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ISBN 978-967-2008-94-1

First published 2019.

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Front cover: A partially cloud-covered summit region of Gunung Santubong. Photo: Hans Hazebroek.

Half-title page: Much of the lower flanks of Gunung Santubong is covered in tall, mixed dipterocarp forest. In places, this forest is rich in lianas, that can form tangles connecting several trees together, as seen in this image. Photo: Hans Hazebroek.

Frontispiece: A bird's eye view of Gunung Santubong. Photo: Chien Lee.

Printed in Taiwan

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FOREWORD

The Santubong Peninsula is strategically situated in close proximity to the State Capital of Kuching. Oldtimers and long-term residents are aware of this hidden gem of a nature reserve, that offers to weary city-dwellers, peace and tranquility. Apart from a curious mix of warm sea breeze with crisp mountain air, Santubong offers field naturalists and trekkers outstanding views of rainforest, that is home to many unique species of Bornean lowland flora and fauna.



Recognizing the important role of biodiversity, the State government has initiated measures to mitigate impacts and facilitate its protection and conservation. The forested interior of Santubong Peninsula, where diverse habitats are found, support numerous species of plants and animals, some of which are Bornean endemics, or one of conservation importance. In the current socio-politic climate, it is important to highlight economic value of biodiversity and ecosystem services. Raising awareness on our natural heritage is an important step in achieving both national and international biodiversity conservation targets and reducing biodiversity loss, through safeguarding of our ecosystems.

UNIMAS has put biodiversity and environmental conservation at the forefront of its research agenda, and is one of the three research pillars of the young university's niche area. Recognizing its strength, both in resources and expertise, the Ministry of Higher Education, Government of Malaysia, has awarded UNIMAS a generous grant from the Niche Research Grant Scheme (NRGS) to facilitate research and conservation awareness of the biodiversity of western Sarawak.

UNIMAS being located in Sarawak, with its vast wealth of biodiversity and a multi-ethnic population, its academics collaborate with local communities, governmental and non-governmental agencies, as well as national and international researchers to study and conserve tropical biodiversity, in its efforts to raise awareness on conservation and management.

Fungi

Mohamad Hasnul Bolhassan

Mushrooms are a diverse group, widespread in distribution and contribute to species richness and to ecological processes. They are classified into three major groups: saprophytes, parasites and symbionts. Symbiotic relationships are noticeable, particularly amongst the mycorrhizal species. Mushrooms can be collected throughout the year, but most grow during the rainy season, especially the gills mushrooms. A few species can be encountered year-round, producing tough fruiting bodies. Examples include the genera *Ganoderma* and *Microporus*.

The mushroom diversity of Santubong has not been inadequately documented. At this site, mushrooms were recorded by collecting fruiting bodies from trunks, branches, leaves, exposed roots, and in the soil along trails. Eight families were identified. Most species were collected from decaying trunks and were classified as wood-inhabiting fungi. The Polyporaceae was dominant, represented by five species- *Earliella scabrosa*, *Microporus affinis*,



Fig. 1. *Amanoderma rade*.

Fig. 2. *Amauroderma subrugosum*.



Fig. 3. *Earliella scabrosa*.

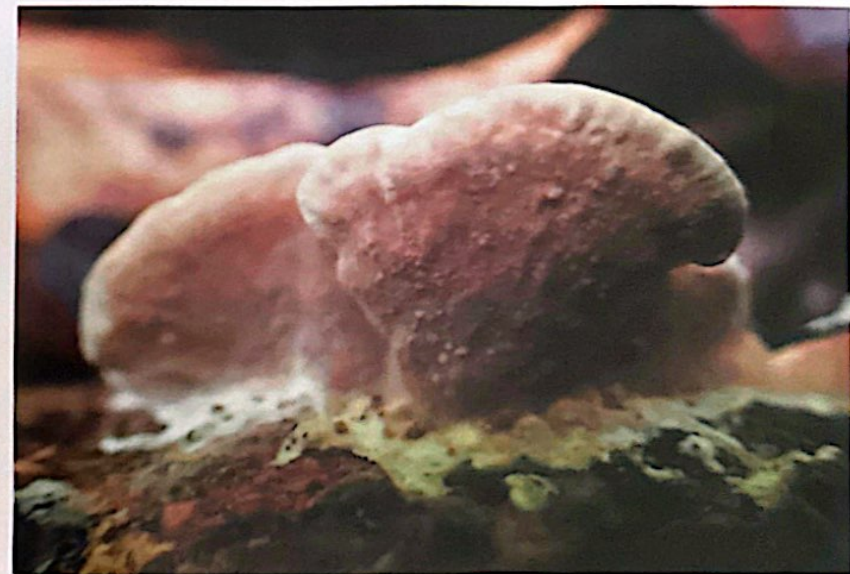


Fig. 4. *Fomitopsis feei*.

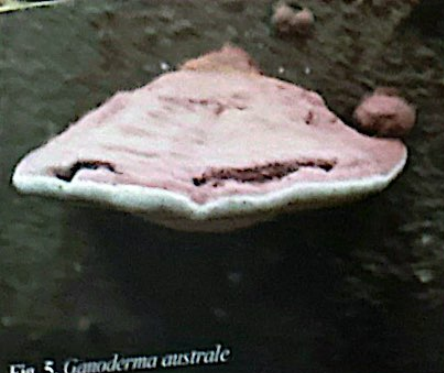


Fig. 5. *Ganoderma australe*



Fig. 6. *Hygrocybe miniata*



Fig. 7. *Marasmius* sp.



Fig. 8. *Microporus affinis*



Fig. 9. *Microporus xanthopus*



Fig. 10. *Polyporus gramocephalus*



Fig. 11. *Polyporus gramocephalus*

M. xanthopus, *Polyporus grammacephalus* and *Trametes menziesii*. Another seven families were Auriculariales, Fomitopsidaceae, Ganodermataceae, Hygrophoraceae, Marasmiaceae, Meripilaceae, and Stereaceae. Polyporaceae was commonly encountered along the trails. All produce sturdy fruiting bodies that can grow for a long time. *Marasmius* is an example that colonizes leaf litter. Additional species were encountered along the trails, but remain unidentifiable, due to degraded fruiting bodies.

Further research needs to be undertaken to improve our knowledge of the Park's macrofungal diversity.

The list of mushrooms below provides baseline data needed for assessments of mushroom diversity in Gunung Santubong National Park, and is the first step towards a checklist of macrofungi of the Park.



Fig. 12. *Protohydnum sclerodontium*.



Fig. 13. *Stereum ostrea*.



Fig. 14. *Trametes menziesii*.



Fig. 15. *Trametes* sp.

Checklist of Mushrooms

Family	Scientific name
Auriculariales	<i>Protohydnum sclerodontium</i> (Mont. & Berk.) Hjortstam & Spooner (1990)
Fomitopsidaceae	<i>Fomitopsis feei</i> (Fr.) Kreisel (1971)
Ganodermataceae	<i>Amauroderma rude</i> (Berk.) Torrend (1920)
	<i>Amauroderma subrugosum</i> (Bres. & Pat.) Torrend (1920)
Hygrophoraceae	<i>Ganoderma australe</i> (Fr.) Pat. (1890)
	<i>Hygrocybe miniata</i> (Fr.) P. Kumm. (1871)
Polyporaceae	<i>Earliella scabrosa</i> (Pers.) Gilb. & Ryvarden (1985)
	<i>Microporus affinis</i> (Blume & T. Nees) Kuntze (1898)
	<i>Microporus xanthopus</i> (Fr.) Kuntze (1898)
	<i>Polyporus grammacephalus</i> Berk. (1842)
	<i>Trametes menziesii</i> (Berk.) Ryvarden (1972)
	<i>Trametes</i> sp.
Marasmiaceae	<i>Marasmius</i> sp.
Meripilaceae	<i>Rigidoporus lineatus</i> (Pers.) Ryvarden (197)
Stereaceae	<i>Stereum ostrea</i> (Blume & T. Nees) Fr. (1838)