











Edited by Mohd-Azlan, Tuen, Tisen & Das

GUNUNG SANTUBONG

Where Nature Meets Culture

Life from Headwaters to the Coast GUNUNG SANTUBONG Where Nature Meets Culture

Edited by

Jayasilan Mohd-Azlan Andrew Alek Tuen **Oswald Braken Tisen** Indraneil Das







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.

The Editors

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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.

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Contents

Foreword vii by Prof. Datuk Dr. Mohamad Kadim Haji Suaidi

Prefaceix by Prof. Dr. Wan Hashim bin Wan Ibrahim and Haji Zolkipli Mohamad Aton

Introduction 1 by Jayasilan Mohd-Azlan, Andrew Alek Tuen and Indraneil Das

HISTORY

Of Sultans and Datu: Bringing Santubong's History and Myth to Life......3 by Kelvin Egay

- Santubong: An Environmental History13 by Dato Sri Gathorne, Earl of Cranbrook
- Geology and Geomorphology 25 by Hans Hazebroek

BOTANY

Fungi
Haniffa santubongensis (A Ginger)55 by Wong Sin Yeng
Heteroaridarum nicolsonii (An Aroid)57 by Wong Sin Yeng
Pitcher Plants61 by Chien C. Lee

General Account of the Flora......67 by Qammil Meekiong Kalu, Cheksum Tawan, Isa Ipor, Gabriel Tonga Noweg, Mohd Effendi Wasli, Siti Rubiah Zainudin and Zinnirah Shabdin

ZOOLOGY

- Dragonflies 81 by Rory Dow

- Bats 125 by Faisal Ali Anwarali Khan, Norfarhana Mazlan, Julius William Dee, Muhd Amsyari Morni, Qhairil Shyamri Rosli, Shafri Semawi, Mohd Ridwan Abd Rahman, Roberta Chaya Tawie Tingga and Jayasilan Mohd-Azlan

- Cetaceans 137 by Cindy Peter

HUMAN DIMENSIONS

FOREWORD

he 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.



The publication is the result of such collaborative work with State agencies of Sarawak, such as the Sarawak Forestry Corporation, Forest Department Sarawak, and other national bodies, such as Universiti Malaysia Sabah. Our researchers are passionate about their work and tireless in communicating. With this in mind, this richly-illustrated book was brought together to capture the uniqueness and beauty of Santubong Peninsula, targetting the general public, especially students, researchers, natural resource managers and ecotourists to the State.

It thus gives me great pleasure to write the Foreword to this informative book, containing 22 chapters on various aspects of biodiversity of Santubong Peninsula. I congratulate the authors for writing a lucid account of their often-technical work for a lay audience. In the beauty of the flora and fauna depicted through the photographs here, I hope city-dwellers can appreciate an important part of our Sarawak heritage. I hope this volume will be useful to all stakeholders, be it the business sector or the wider public, to all of whom we remain connected through our reliance on biodiversity.

> Prof. Datuk Dr. Mohamad Kadim Suaidi Vice Chancellor Universiti Malaysia Sarawak



PREFACE

Sundaland, and is home to a vast variety of forests, from mangrove forests in the lowlands to the cloud forests on mountaintops, where unique habitats harboured are home to some of the world's rarest and most threatened species.

Biodiversity is one of the top National agenda, whereby the National Policy on Biodiversity 2016–2025 was formulated to conserve the country's biodiversity and to ensure that its components are safeguarded without hindering the progress and socio-economic development of the nation and its people. Recognizing a paramount need for biodiversity conservation, the Ministry of Higher Education, Government of Malaysia, under its inaugural Niche Research Grant Scheme (NRGS), awarded Universiti Malaysia Sarawak a grant, entitled "Biodiversity of western Sarawak: Life from headwaters to the coast". This project sits within the University's niche area in biodiversity and environmental conservation, and aims to investigate the patterns of species and regional habitat diversity, from western tip of Borneo to the south-west of Sarawak. Within the auspices of this project, a series of scientific expeditions were carried out in 2014–2018, complementing the ongoing long-term research in the Santubong Peninsular.

Many of the charismatic species are known to occur only in totally protected areas, which includes Santubong National Park, located in the Santubong Peninsula. Knowing the distribution of species in a dense tropical rainforest has always been a challenging undertaking. These information, however, are essential in understanding the ecology of tropical rainforests, which is important in the design and implementation of management plans for protected areas. Santubong National Park, endowed with a lush forest cover, naturally is home to a diverse flora and fauna, and a backdrop of mountains overlooking the sea, offers ecotourism potential. Tourists can trek the forest trails, do birdwatching and encounter rainforest mammals, and visit the waterfalls, and can get a chance to watch whales and dolphins on the seafacing side of the mountain.

This third exploration marks the progress of a five-year project that started in 2014 in Tanjung Datu National Park, Gunung Penrissen in 2016 and will continue eastwards in the following year. This well-illustrated volume is thus part of series of publications on the targeted study areas within western Sarawak.

The geology and geomorphology chapter reveals interesting facts on the origin and evolution of the geological features of the Santubong area. The chapter sets the scene for the archeology, history and legends of Santubong Peninsula. The floral components demonstrate the richness of the herbaceous flora and tree species.

The fauna studied include the macroinvertebrates, insects, molluscs, fishes, frogs, lizards, snakes, birds, bats, rodents, shrews and larger mammals. Information on how anthropomorphic activities relate to biodiversity is also a part of the research, where the dependence of humans on natural resources is highlighted, demonstrating how we fit into the mosaic of a natural landscape.

The human and social component describes the use of natural resources by local communities, and a chapter on ecotourism enumerates how biodiversity, geological and cultural features of the site can benefit the State's effort to promote tourism.

An e-biodiversity platform would ultimately be made available for all the sites covered under the project, synthesizing the data and technologies developed during the project.

We intend to present the significant results of the research for local stakeholders, management authorities and for the general public. It is hoped that nature enthusiast and those who are interested in tropical biodiversity will find this book informative. Finally, we hope that this work will help enhance knowledge and awareness on a national heritage site.

Wan Hashim bin Wan Ibrahim Vice Chancellor (Research and Innovation),

Universiti Malaysia Sarawak

Haji Zolkipli Mohamad Aton

Chief Executive Officer, Sarawak Forestry Corporation Sdn Bhd

Bats

Faisal Ali Anwarali Khan, Norfarhana Mazlan, Julius William Dee, Muhd Amsyari Morni, Qhairil Shyamri Rosli, Shafri Semawi, Mohd Ridwan Abd Rahman, Roberta Chaya Tawie Tingga and Jayasilan Mohd-Azlan

The forests of Santubong National Park include mangroves, mixeddipterocarp, heath (Kerangas), and hill forests. This complex environment supports a rich bat diversity, as also observed at the nearby Bako National Park and Tanjung Datu National Park. Observing this diversity is sometimes not an easy affair, as the upland areas are challenging for the deployment of traps. The biodiversity enumerated in this chapter is based on trapping effort that focused on the lower parts of the Park, along established trails.

Bat trapping was conducted during two separate field expeditions, in the months of November 2015 and October 2016, with eight and six trapping nights duration, respectively. Harp traps and mist-nets were set along trails and small creeks. Traps were set on trails leading to the summit, which is



Fig. 1. Frugivorous bats from the family Pteropodidae: Lesser Short-nosed Fruit Bat (left) and Lucas's Short-nosed Fruit Bat (right). Only two species of frugivorous bats were caught. Besides the steep landscape limiting the setting of traps, it may be that the trees around the sampling areas were not fruiting or flowering.