



*Life from Headwaters to the Coast*

# **SAMUNSAM**

**Wilderness Rediscovered**

*Edited by*

**Jayasilan Mohd-Azlan,  
Abang Arabi Abang Aimran and Indraneil Das**



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# FOREWORD

Malaysia's largest State, Sarawak, on the island of Borneo, is home to some of the world's richest biodiversity, including endemics, economically valuable species, as well as species of conservation importance. Some of the best examples of such plants and animals can be found in Sarawak's extensive network of protected areas. Many of us here in Universiti Malaysia Sarawak continue to explore Sarawak's biodiversity, with the hopes of generating critical knowledge at these sites. This book represents but a subset of work done by our academics in the realm of biodiversity research. I would like to commend the efforts by Sarawak Forestry Corporation Sdn. Bhd. who supported us in this task, by providing a research grant. The work is expected to be important for local communities, to aid them better understand, appreciate and perhaps use their resources sustainably, such as an interpretation tool to guide ecotourists and naturalists in Samunsam.



As will be evident to the readership, a variety of approaches have been taken by the authors of this volume. J. Mohd-Azlan, Lisa Lok and Indraneil Das provide the backdrop to the project, including introductory information on Samunsam. Siali and Tisen from SFC provides a brief account of the development of the site as a Wildlife Sanctuary. Subsequent chapters deal with the zoological components of the Sanctuary's biodiversity, including crabs (Jongkar Grinang), termites (Wan Nurainie Wan Ismail and colleagues), dragonflies and damselflies (Rory Dow), fishes (Fazimah Aziz and colleagues), amphibians and reptiles (Indraneil Das and his team), a separate chapter on the Painted Terrapin (James Bali), investigations on the bird diversity (Mohamad Fizl Sidq Ramji and colleagues); small mammal community (Faisal Ali and colleagues); a separate chapter focussed on the Proboscis Monkey (Ahmad Fitri Aziz and colleagues) and the larger mammals (Mohd-Azlan Jayasilan and his team). The book wraps up with chapters on related social elements, such as use of natural resources (Mohamad Suhaidi and his team), and finally, the ecotourism and entrepreneurial potential of Samunsam (Dayang Affizah).

It is my hope that this book will contribute in at least a small way of encouraging more people to work in the field, publish more articles of this

## FOREWORD

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kind and new sponsors would emerge to provide support. I anticipate that this volume will be useful to stakeholders to whom we remain connected through our common views on biodiversity conservation for future generations.

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



# MESSAGE

The State of Sarawak boasts one of the most extensive networks of protected areas in Malaysia. The western tip of Sarawak is an important area for biodiversity conservation where iconic protected areas, such as Tanjung Datu National Park and Samunsam Wildlife Sanctuary are located.

Biodiversity is one of the top State agendas, whereby the State of Sarawak, with the establishment of Sarawak Forestry Corporation (Park and Wildlife) is determined to conserve and protect its wildlife and natural landscapes. This project sits in line with the University's niche area of biodiversity and environmental conservation and sustainable community transformation. This book, based on research collections by the staff of our two institutes, brings together information on species, their habitats and other aspects of natural history, and the perceptions of the human community on conservation and sustainable use.

Identifying the distribution, densities and habitat use of animals in tropical rainforest are essential for understanding their ecology, and in facilitating management of our biodiversity-rich protected areas. This book attempts to enumerate these species, many of which remain undetected in the dense tropical rainforest. The faunal studies include inventories of crabs, termites, dragonflies and damselflies, fishes, frogs, reptiles, birds and mammals of the area, a critical first step towards understanding our natural heritage. The work also highlights how the local communities interact with biodiversity, and their deep dependence with such natural resources in Samunsam.

This book is written for local stakeholders, management authorities, naturalists, researchers and for the general public. An understanding of our biodiversity may influence the support of the complex needs of conservation in this ever-challenging environment. It is hoped that nature enthusiasts and those who are interested in tropical biodiversity will find this book beneficial.



## MESSAGE

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Acknowledgement is here made to the authors who have gathered these data, substantially increasing our knowledge and awareness of an important part of our national heritage.

***Prof. Dr. Wan Hashim Wan Ibrahim***  
*Deputy Vice Chancellor (Research & Innovation)*  
*Universiti Malaysia Sarawak*

***Mr. Oswald Braken Tisen***  
*Deputy CEO*  
*Sarawak Forestry Corporation (Park and Wildlife)*



# PREFACE

The Expedition to Samunsam Wildlife Sanctuary, located near the western tip of Sarawak State, approximately 100 km from Kuching city, was held over the years 2019–2020. It was undertaken by the staff and students of Universiti Malaysia Sarawak, in collaboration with the Sarawak Forestry Corporation, the latter agency providing funding and on-the-ground support, besides joining forces in some of the field data collection.

The diversity of forest types (necessitating different sampling protocols) and eventually, the arrival of the Covid-19 pandemic, were major challenges on the ground, leading to reduced resources available for sampling. Despite these shortcomings, the multidisciplinary team from our two agencies could satisfactorily conduct what is essentially a rapid biodiversity survey, and bring the results out for our stakeholders in time.

Promotion of protected areas as tourist attraction and for research activities has been high on the State's agenda, being seen as an important driver of socioeconomic growth. It can also help governmental agencies such as ours remain engaged with the public for conservation, network with researchers locally and globally and incorporate new knowledge into conservation management plans.

The project was funded by Sarawak Forestry Corporation (GL/F07/SAMUNSAM/2019). We are especially thankful to Paschal Dagang and Taha Wahap for their assistance in the project. We also extend our gratitude to the staff of Samunsam Wildlife Sanctuary, namely, Mohamad Khalid B. Mohamad Zakeria, Mr. Japri and Mr. Shukur for their help. We would also like to thank Research, Innovation and Enterprise Centre, the Faculty of Social Sciences, the Faculty of Economics and Business, the Institute of Biodiversity and Environmental Conservation and the Faculty of Resource Science and Technology, UNIMAS for logistical and administrative support.

The following colleagues helped with reviews of manuscripts: Aaron M. Bauer, Henry Bernard, Kelvin Egay, Melvin Gumal, Jason Hon, David T. Jones, Kelvin K.P. Lim, Lo May Chiun, Suhaili bin Mokhtar, Peter K.L. Ng, Andrew Alek Tuen, Chan Kin Onn, Albert Orr, Pang Sing Tyan, Mustapha Abdul Rahman, Tan Heok Hui and Darren Yeo. We owe a special debt of gratitude to our friends and colleagues, Chien C. Lee, Research Associates of the Institute of Biodiversity and Environmental Conservation, UNIMAS, for providing images of species that we have used in this work.

## PREFACE

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Finally, we thank Chan Hin Ching for designing the page layout and Datuk Chan Chew Lun, Natural History Publications (Borneo) Sdn Bhd, and Sarawak Forestry Corporation and UNIMAS Publisher for arranging its publication.

If this guide contributes to the enhancement of knowledge and compel readers to think anew about conservation of this important protected area, and inspire local stakeholders to take pride in their biodiversity, we would consider the project a success.

*Jayasilan Mohd-Azlan  
Abang Arabi Abang Aimran  
Indraneil Das*





# TERMITES

*Wan Nurainie Wan Ismail, Ratnawati Hazali,  
Norsyarizan Jamil and Siti Shamimi Abidin*

Termites are social insects with a well-developed caste system, their community acting as ecosystem engineers and decomposers. Termites are also environmental bioindicators in tropical rainforests, being responsive to biotic or abiotic change, and are thus suitable models to evaluate disturbance (Davies, 2002) and are potential indicators of climate change (Gathorne-Hardy, 2004).

The present survey was conducted over seven consecutive days (7–13 February 2015). Termites were surveyed daily from 0900 h to 1200 h, and 1400 h to 1700 h, focussing on nests, forest floor and in dead wood.

Standardized transect methods, adopted from Jones and Eggleton (2000) and Norsyarizan *et al.* (2017) were used. Belt transects of 50 m × 2 m were divided into five contiguous sections, each 10 m × 2 m, randomly located throughout the sampling site. Samples were preserved in absolute ethanol and brought to the laboratory for identification, and stored in the UNIMAS Insect Reference Collection (UIRC), Universiti Malaysia Sarawak. Identification was done using taxonomic keys by Ahmad (1965), Thapa (1981) and Tho (1992).

A total of 17 species were identified, belonging to two families, eight subfamilies and 12 genera (see Checklist). Representatives of the subfamily Termitinae were the most speciose, with six species (23.5%), followed by Nasutermitinae (3 species, 17.6%), Macrotermitinae, Amitermitinae, Rhinotermitinae, Coptotermitinae, (2 species, 11.7% respectively), and Heterotermitinae and Termitogetoninae (1 species, 5.8% respectively).

Eleven were wood-feeding (W) species and were, by far, the most common in all transects, represented by the genera *Nasutitermes*, *Havilanditermes*, *Prohamitermes*, *Microcerotermes*, *Schedorhinotermes*, *Coptotermes*, *Heterotermes* and *Termitogen*. Four species of soil humus-feeders (S/H) were dominated by *Discuspiditermes*, *Procapritermes* and *Pericapritermes*. Wood-litter-feeders (WL) were found to be the least speciose feeding group in the area, and represented by *Odontotermes mathuri* and *O. denticulatus*.

### Checklist of Termites

List of termites recorded in the Samansam Wildlife Sanctuary and their feeding groups. Abbreviations: Feeding group: W= wood feeders; WL = wood-litters feeders; S/H = soil/humus feeders. \*Only representatives of soldier collected for identification.

Family/Subfamily	Species	Microhabitat	Feeding Group	No. of Encounters
<b>Termitidae</b>				
Macrotermitinae	<i>Odontotermes mathuri</i> Thapa, 1982	Mound	WL	1
	<i>Odontotermes denticulatus</i> Holmgren, 1913	Mound	WL	1
Termitinae	<i>Dicuspitermes paramkhamensis</i> Thapa, 1982	Forest litter	S/H	1
	<i>Dicuspitermes nemorosus</i> Haviland, 1898	Forest litter	S/H	1
	<i>Procapritermes neosetiger</i> Thapa, 1982	In soil	S/H	1
	<i>Pericapritermes latignathus</i> Holmgren, 1914	In soil	S/H	1
Nasutitermitinae	<i>Nasutitermes matangensisiformis</i> Holmgren, 1913	Dead wood	W	2
	<i>Nasutitermes longinasoides</i> Thapa, 1982	Tree trunk	W	1
	<i>Havilanditermes atripennis</i> Haviland, 1898	Dead wood	W	1
Amitermitinae	<i>Prohamitermes hosei</i> Desneux, 1906	Forest litter	W	1
	<i>Microcerotermes serrula</i> Desneux, 1904	Dead wood	W	1
<b>Rhinotermitidae</b>				
Rhinotermitinae	<i>Schedorhinotermes brevisulatus</i> Haviland, 1898	Dead wood	W	4
	<i>Schedorhinotermes javanicus</i> Kemmer, 1934	Tree trunk	W	2
Coptotermitinae	<i>Coptotermes curvignathus</i> Holmgren, 1913	Tree trunk	W	2
	<i>Coptotermes sepangensis</i> Krishna, 1956	Dead wood	W	3
Heterotermitinae	<i>Heterotermes tenuior</i> Haviland, 1898	Forest litter	W	1
Termitogetoninae	<i>Termitogen planus</i> Desneux, 1906	Mound	W	1



**Fig. 1.** Nasute termites. Photo: Chien C. Lee.

Wood-feeding species dominate the area (Table 1), with 11 species recorded (64.7%) and explain the characteristics of Samunsam Wildlife Sanctuary, the sampled area showing an abundance of trees, offering humic conditions. Most wood-feeder termites ingest dead tree trunks and have less contact with the soil, while certain species infest living trees.

Two species of the genus *Coptotermes* were found—*C. curvignathus* and *C. sepangensis*. It is an important genus of structural pest in Malaysia (Lee, 2002; Norsyarizan *et al.* 2018).

These preliminary studies encountered 17 species of termites. Extensive inventories are suggested in order to get a better representation of the fauna, which will further relate to these species to landscape change in western Sarawak.

The authors wish to thank Sarawak Forestry Department for permits NCCD 907.4.4(JLD.11)–11 and Park Permit No: 12/2015 and Sarawak Forestry Corporation for access of facilities and study sites. The authors would like to thank Universiti Malaysia Sarawak for support and a RAGS grant (RAGS/1180/2014–03) provided financial support. Special thanks are due to the Forest Rangers at Samunsam Wildlife Sanctuary for their generosity by providing us accommodation and guiding us during the sampling period. Images reproduced here were provided by Chien C. Lee and Badiozaman bin Sulaiman. Finally, our appreciation goes to Trevor Allen, Naron Ahmad and Badiozaman bin Sulaiman for their companionship and help in collecting, identifying and preparing specimens.

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