

DIVERSITY OF LIMESTONE ORCHIDS IN PADAWAN, SARAWAK

By

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**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirements for the Degree of Master of Science**

September 2004

DEDICATION

This thesis is dedicated to my supervisors, Assoc. Prof. Dr. Rusea Go, Dr. Faridah Qamaruz Zaman and Assoc. Prof. Dr. Saleh Kadzimin. Much of the results and discussions in this thesis would be but uncut diamonds without their expertise.

I also dedicated this thesis to my beloved family. There is no way to overstate the importance of their love and support.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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Padawan Formation is the largest outcrop in Sarawak. However, little botanical work has been done. Many of the collections are unpublished. Therefore, the orchid flora in Padawan is poorly known. Nine limestone hills and two rivers in the northern part of Padawan Formation have been botanized in this study. A total of 148 taxa in 47 genera from 3 subfamilies were recorded. A total of 43 taxa and 10 genera are new records for Padawan. *Bulbophyllum reticulatum*, *Cleisostoma discolor*, *Dendrobium truncatum*, *Dossinia marmorata*, and *Paphiopedilum stonei* are recognised as endemic species of limestone area; whilst, *Bulbophyllum reticulatum*, and *Paphiopedilum stonei* are recognised as endemic species in Sarawak. There are three outstanding features of the Orchidaceae of Padawan: (i) consists of Asian and Papuasias elements at the generic level and Bornean element at the species level; (ii) morphological diversity, a prima fascia indication of the rich floristic composition of the limestone area; and (iii) small size of genus, species in small populations. Gunung Bekap, Gunung Mangan and Gunung Timurang, stand out for *in-situ* conservation because they comprise the most diverse

orchid species. They are also home to endangered and rare species like *Dossinia marmorata*, *Paphiopedilum lowii* and *Paphiopedilum stonei*.

Abstrak tesis dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

DIVERSITI ORKID BATU KAPUR DI PADAWAN, SARAWAK

Oleh

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Pengerusi: Professor Madya Rusea Go, Ph.D.

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Formasi Padawan merupakan kawasan batu kapur yang paling besar di Sarawak. Walau bagaimanapun, kerja-kerja botani tidak dilakukan dengan meluasnya. Kebanyakan koleksi tidak diterbitkan. Oleh itu, flora orkid di Padawan tidak banyak diketahui. Kerja-kerja botani telah dijalankan terhadap sembilan gunung batu kapur dan dua Sungai di bahagian Utara Formasi Padawan. Sebanyak 148 taxa dalam 47 genera daripada 3 subfamili telah direkodkan. Sebanyak 43 taxa dan 10 genera adalah rekod baru bagi Padawan. *Bulbophyllum reticulatum*, *Cleisostoma discolor*, *Dendrobium truncatum*, *Dossinia marmorata*, dan *Paphiopedilum stonei* merupakan spesies endemik di kawasan batu kapur; manakala, *Bulbophyllum reticulatum*, *Paphiopedilum lowii* dan *Paphiopedilum stonei* adalah spesies endemik di Sarawak. Terdapat tiga fakta yang ketara terhadap Orchidaceae di Padawan: (i) mempunyai elemen Asian dan Papuasial di tahap generik dan elemen Bornean di tahap spesies; (ii) diversiti morfologi yang merupakan satu indikasi yang paling utama dalam penentuan kekayaan komposisi flora di kawasan batu kapur; dan (iii) saiz genus adalah kecil, spesies juga adalah kecil dalam suatu populasi. Gunung Bekap, Gunung Mangan dan Gunung Timurang merupakan tiga

gunung yang paling sesuai untuk pemuliharaan *in situ* sebab ketiga-tiga gunung ini mempunyai kepelbagaian spesies orkid yang paling luas. Ketiga-tiga gunung ini juga mempunyai spesies yang dalam bahaya kepupusan seperti *Dossinia marmorata*, *Paphiopedilum lowii* and *Paphiopedilum stonei*.

ACKNOWLEDGEMENT

I would like to express my deep appreciation to:

My supervisor, Assoc. Prof. Dr. Rusea Go:
Thank you so much for your understanding and wise counsels.

My co-supervisors, Assoc. Prof. Dr. Saleh Kadzimin and Dr. Faridah Qamaruz Zaman:
Thank you for careful corrections and I really appreciate your input and comments.

The Malaysian Government departments
Malaysian Agriculture Department Kuala Lumpur, Sarawak Forestry Research Centre,
Mineral and Geoscience Department Kuala Lumpur, Mineral and Geoscience Department
Kuching, Statistics Department Sarawak, Malaysian Meteorological Department Kuala
Lumpur and Library of Sultan Abdul Samad, UPM:
Thank you so much for your helping hand.

The Herbaria
Herbarium of Sarawak Research Centre (SAR), Herbarium of Universiti Kebangsaan
Malaysia (UKMB), Herbarium of Universiti Malaya (KLU), Herbarium of FRIM (KEP)
and Herbarium of Singapore (SING):
Thanks for giving me so much guidance in checking the herbaria specimens.

Mr André Schuiteman:
Thank you so much for the excellent discussion guide.

Dr. Jaap J. Vermeulen, Dr. Edward de Vogel, Dr. Philip Cribb, Dr. John Beaman, Mr.
Tony Lamb, Dr. Finn N Rasmussen and Dr. Hanne N. Rasmussen:
Thanks for invaluable opinions and suggestions.

Kak Pak and Abang Man:
Thank you for being such a wonderful assistant in the Biology herbarium.

My fellow buddies in Biology Herbarium, UPM
Joe, Q-tub, Clay, Yet Han, Wendy, Lea Yen, Tang, Mike, Christina:
Thank you for the fun times in herbarium.

Drina and Choon Kit:
A special salute to both of you. Thanks for your prayer and love. Cheer for faithful
friendship.

My family:
Next to God's grace, all of you are the best gifts to me. Thanks for loving me as who I
am.

I certify that an Examination Committee met on 17th September 2004 to conduct the final examination of Phoon Sook Ngoh on her Master of Science thesis entitled “Diversity of Limestone Orchid in Padawan, Sarawak” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Putra Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

PHOON SOOK NGOH

Date:

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