THE SARAWAK MUSEUM JOURNAL

https://museum.sarawak.my

Crossref

The Sarawak Museum Journal
Vol. LIX No. 80
December 2004

ISSN: 0375-3050
E-ISSN: 3036-0188

Citation: Ruth Kiew. (2004). The Limestone Flora of Sarawak. The Sarawak Museum Journal, LIX (80): 79-90

THE LIMESTONE FLORA OF SARAWAK

Ruth Kiew

The Herbarium, Singapore Botanic Gardens, 1 Cluny Road, Singapore 259569

ABSTRACT

Compared with Peninsular Malaysia and Sabah, until recently the limestone flora of Sarawak was poorly known. Although recent inventories have been conducted on Gunung Api in the Gunung Mulu National Park and the Subis limestone in the Niah National Park, the results are still unpublished. The recent survey of the limestone hills around Bau has added greatly to knowledge of the Sarawak limestone flora and confirms the earlier impression that (a) there are four phytogeographically distinct areas (Mulu, Niah, Bau, and the Padawan-Serian limestone), (b) each of these limestone areas has high biodiversity and harbours endemic as well as undescribed species, and that (c) the limestone flora of Sarawak, while showing some similarities to that of Sabah, e.g. in the Dipterocarpaceae, Begoniaceae and the Urticaceae being well represented, is distinct in the presence of the calcifuge element, the larger number of epiphytes particularly orchids, and in the submontane vegetation on Gunung Api, at 1,700m the tallest limestone mountain in Malaysia. Some areas still remain botanically unexplored, e.g. the Padawan-Serian area, the Gunung Sarang and Ulu Kukus area, and the limestone hills in the Baram and Limbang areas.

Keywords: limestone flora, Sarawak, phytogeography, endemism, conservation

© Sarawak Museum Department 2024

All rights reserved. No part of this journal may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Director, Sarawak Museum Department

Jabatan Muzium Sarawak

THE LIMESTONE FLORA OF SARAWAK

Ruth Kiew

The Herbarium, Singapore Botanic Gardens, 1 Cluny Road, Singapore 259569

Abstract. Compared with Peninsular Malaysia and Sabah, until recently the limestone flora of Sarawak was poorly known. Although recent inventories have been conducted on Gunung Api in the Gunung Mulu National Park and the Subis limestone in the Niah National Park, the results are still unpublished. The recent survey of the limestone hills around Bau has added greatly to knowledge of the Sarawak limestone flora and confirms the earlier impression that (a) there are four phytogeographically distinct areas (Mulu, Niah, Bau, and the Padawan-Serian limestone), (b) each of these limestone areas has high biodiversity and harbours endemic as well as undescribed species, and that (c) the limestone flora of Sarawak, while showing some similarities to that of Sabah, e.g. in the Dipterocarpaceae, Begoniaceae and the Urticaceae being well represented, is distinct in the presence of the calcifuge element, the larger number of epiphytes particularly orchids, and in the submontane vegetation on Gunung Api, at 1,700 m the tallest limestone mountain in Malaysia. Some areas still remain botanically unexplored, e.g. the Padawan-Serian area, the Gunung Sarang and Ulu Kukus area, and the limestone hills in the Baram and Limbang areas.

Key Words: limestone flora, Sarawak, phytogeography, endemism, conservation

Kiew, R. (2004) The limestone flora of Sarawak. *In*: *Sarawak Bau Limestone Biodiversity* (eds H.S. Yong, F.S.P. Ng and E.E.L. Yen). *The Sarawak Museum Journal* Vol. LIX, No. 80 (New Series); Special Issue No. 6: 79-89.

INTRODUCTION

Limestone in South East Asia is characteristically of the tower karst type, where relatively small hills rise abruptly above the surrounding landscape frequently with spectacular sheer vertical, white cliffs. This poses a challenging habitat for plants as the soil layer is thin and the limestone free draining so that limestone vegetation is prone to drought.

This intense selection has resulted in its having a distinct suite of species compared with the surrounding lowland forest. Proctor *et al*. (1982) showed on Gunung Api that the limestone forest was distinct in having fewer species

in common with the other lowland forest types than the other forest types had between each other.

Limestone vegetation is also characterised by high species diversity compared with the area it occupies. For example, in Peninsular Malaysia about 14% of the Peninsula's flowering plant flora is found on limestone, which occupies only 0.3% of the total land area (Chin, 1977). The reason for the high biodiversity of the flora is the many microhabitats found on limestone each of which harbours characteristic species (Anderson, 1965; Kiew, 1991). These include the forest on soil associated with the limestone. The steep slope up to the base of the tower karst, while supporting fewer tree species than other lowland forest types, has a characteristic suite of shrubs and herbs. The base of the cliff and the fallen boulders are deeply shaded and humid and support a rich herbaceous flora including many endemic species. Streams that issue from caves have limestone bedrock and rare aquatics may be found there. Around the cave, the conditions are drier although still partially shaded and support relatively few but again a characteristic group of species. The cliff provides several habitats, besides the humid, deeply shaded base and the cave mouth areas. The sheer cliff faces support different species that grow in crevices below the tree canopy in light shade from those that grow above the canopy in full sunlight.

Many of the hills are deeply divided vertically and here screes are met with. Gullies frequently have deep soils where large trees are established. The summits of tower karst hills in Peninsular Malaysia and Sabah are usually devoid of peat and only a sparse straggly tree layer can find root among the craggy rocks. In contrast, in Sarawak, many hills are covered in a peat layer, which is derived from decomposing leaf litter that varies from a few centimetres to half a metre deep on Gunung Api. This is highly acidic (pH as low as 4.5 has been recorded) and supports a completely different flora from that which grows on the limestone or limestone-derived soils. This distinct calcifuge element includes casuarinas, such as *Gymnostoma sumatrana*; conifers, such as *Phyllocladus hypophyllus*, *Dacrydium beccarii* and species of *Podocarpus*; members of the Ericaceae (rhododendrons and vacciniums); *Medinilla* (Melastomataceae); and pitcher plants (Nepenthaceae).

In addition, Gunung Api and Gunung Benarat in the Gunung Mulu National Park, the highest limestone hills in Malaysia at 1,700 m altitude, are the only limestone hills that support submontane vegetation, which has more in common with the submontane forest on nearby Gunung Mulu than the summit vegetation of exposed limestone hills.

Chin (1977) found that about 10% of the species on limestone hills in Peninsular Malaysia are confined to limestone but, as yet, no species has been shown to be an obligate caliciphile, i.e. requiring a limestone substrate