HEART OF BORNEO SERIES 4

LONG BANGA

WHERE THE BEAT GOES ON



Forest Department Sarawak

The Heart of Borneo Series 4

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Forest Department Sarawak

Edited by
Meekiong, K., Ampeng, A., Sapuan, A., Jack, L., Hamden, M., Shahbudin, S., Arifin, A.Z., Wasli, M.E., Syukor, M.N., Mohamed, A.M., Yeo, F.K.S., Syafiani, O., & Nazari, A.





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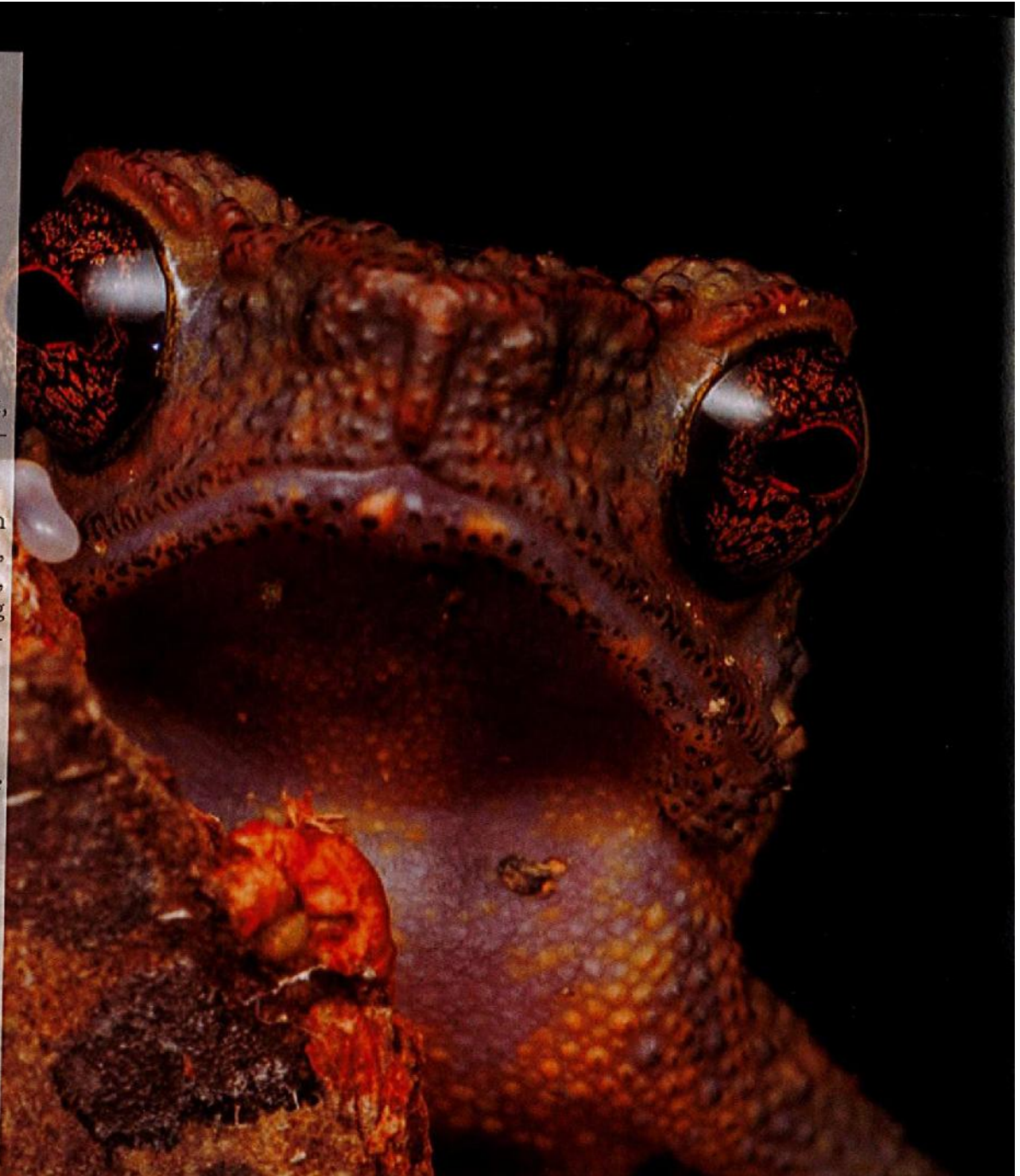
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The Heart of Borneo Series: Long Banga - Where The Beat Goes On

By
Forest Department Sarawak

Edited by:
Meekiong, K., Ampeng, A., Sapuan, A., Jack, L., Hamden, M., Shahbudin, S., Arifin, A.Z., Wasli, M.E., Syukor, M.N., Mohamed, A.M., Yeo, F.K.S., Syafiani, O., & Nazari, A.

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Foreword

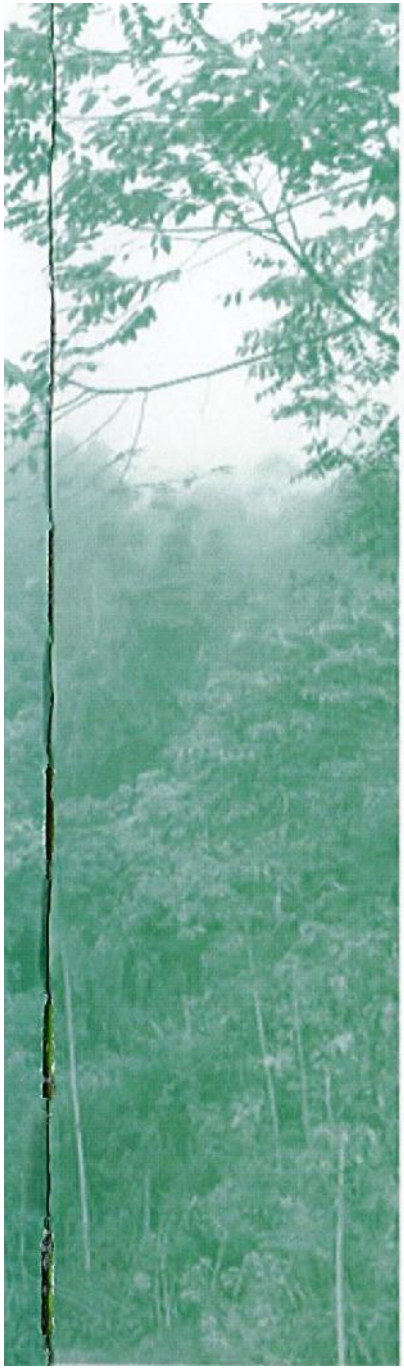
Long Banga Scientific Expedition: Where the Beat Goes On, was held from 20 October to 2 September 2016 with participants of over 120 scientists from various government institutions, universities and local NGOs from all over Malaysia and includes participants from Brunei Darussalam, Denmark and Japan. It was conceived as an activity to illustrate and provide invaluable insight on the richness of nature in Long Banga areas. The expedition was organized by the Forest Department Sarawak and mainly funded and supported by the Ministry of Natural Resources and Environment Malaysia (MNRE) and State Government of Sarawak as a continuation project under the Heart of Borneo (HoB) Initiative Project. Long Banga Scientific Expedition, in fact is a fifth scientific expedition conducted in the project that revealed the diverseness of floras and faunas in the State.

I am privileged and honored to write the foreword for this book of very important scientific observations and discoveries on Long Banga areas which I ranks as among the richest biodiversity in the State. The Book entitled "The Heart of Borneo Series 4: Long Banga - Where the Beat Goes On" is mainly a collection of provisional results that were presented by the participants during the expedition and as well as field observations by the authors.

The organizing committee deserves much credit for the time and effort put in for the success of the expedition. Special appreciation goes to all the esteemed writers and researchers who have been gracious to provide the data and photos which culminated into wonderful publication.

Thank you.

HAJI SAPUAN BIN AHMAD
(Director of Forests)
Sarawak





Zingiber pseudopungens



Black –Headed Bulbul (*Pycnonotus atriceps*)



Preface

This book gives us a glimpse on the findings of the Scientific Expedition to Long Banga made in 2016, which was organized by the Forest Department Sarawak.

This book is one of the series of publication under the Heart of Borneo (HoB) Initiative Project for Sarawak. It highlights the results of the 2016 expedition with photographs and information on activities, the physical environments, flora and fauna studies.

From the 14-days expedition, a tremendous amount of data were collected by researchers and scientists from various government institutions, research institutions, universities and NGOs from Malaysia, Brunei Darussalam, Japan and Denmark. The area covered in the expedition is relatively small, approximately 20 percent of the Long Banga areas. The Biodiversity recorded is exceptionally rich, many species of flora and fauna have been recorded and compiled. Orchids, Begonias, palms, ferns and mosses are diverse. Great number of mammals, birds and insects recorded is comparable to other places in the HoB areas, such as Lanjak Entimau Wildlife Sanctuary, Payeh Maga and Mentawai.

Apart from the flora and fauna, the atmosphere of Long Banga itself is also unique with beautiful sceneries. Many rocky river and streams and waterfalls with high esthetic values for ecotourism spots are also found in this area.



The Heart of Borneo (HoB) Intiative Project

Borneo, the world's third largest island, account for just 1% of the world's land yet hold approximately 6% of global biodiversity in its rich, tropical forests. Its specis range from the distinct Bornean Orang Utans and elephants to the giant pitcher plants and the largest single flower, *Rafflesia*. Yet, this diversity is under threat - Borneo has already lost over half of its forests, and a third of these dissapeared in just last three decades.

The Heart of Borneo (HoB) refers to the main part of the island where forests remain intact. Covering an area the size of Utah in the US, Victoria in Australia or the whole of England and Scotland put together and extending into the territory of the countries of Brunei Darussalam, Indonesia and Malaysia, it is one of the largest transboundary rainforests remaining in the world. The HoB is not just a treasure trove of biodiversity but also a source of life and livelihood for people, providing ecological services for at least 11 millions Borneans, including a million forest-dwelling indigenous Dayaks.

Text Source: wwf.panda.org

The Heart of Borneo (HoB) is a project by the tri-lateral nations that share the island of Borneo: Indonesia, Brunei Darussalam and Malaysia. The historic agreement was signed in 2005, agreed to share reponsibility for protecting this varnishing ecosystem, focusing on the remaining intact band of forest in the center of the island, straddling the mountains that run from Mount Kinabalu in the North East down to the Schwaner Range in the South west.

The primary focus of the Heart of Borneo Project is to protected *The Heart of Borneo Rainforests* - the single largest strecth of rainforest left standing in South East Asia, the third largest rainforest on earth and perhaps the most diverse with biogicals.



2016 Long Banga Scientific Expedition

The Heart of Borneo (HoB) Initiative Sarawak have organized a 2016 Scientific Expedition to Long Banga, Ulu Baram near the Kalimantan Border. Long Banga located at 437m above sea level and is a settlement of the Sabans people, one of the smallest ethnic in Sarawak but bearing many similarities to the Kelabit tribes. The other tribes found here are Penans and Kenyahs.

The 2016 Long Banga Scientific Expedition was aimed to study the fauna and floral diversity, geology, aquatic habitat, sociology and anthropology of local communities and tourist potential of the area, with a view in contributing to the well-being of the local communities and enhancing conservation, elusive and rare species such as the rhinoceros and Banteng (*Bos javanicus*) that were reported existed in these areas.

This scientific expedition also aims to raise awareness of local communities in the conservation of flora and fauna in Long Banga. Apart of documenting the rich fauna and flora in Long Banga, the results of this expedition will be used to assist conservation efforts such as the establishment of totally protected areas and the development of the eco-tourism spots.





Objectives

The main objectives of the 2016 Long Banga Scientific Expedition were;

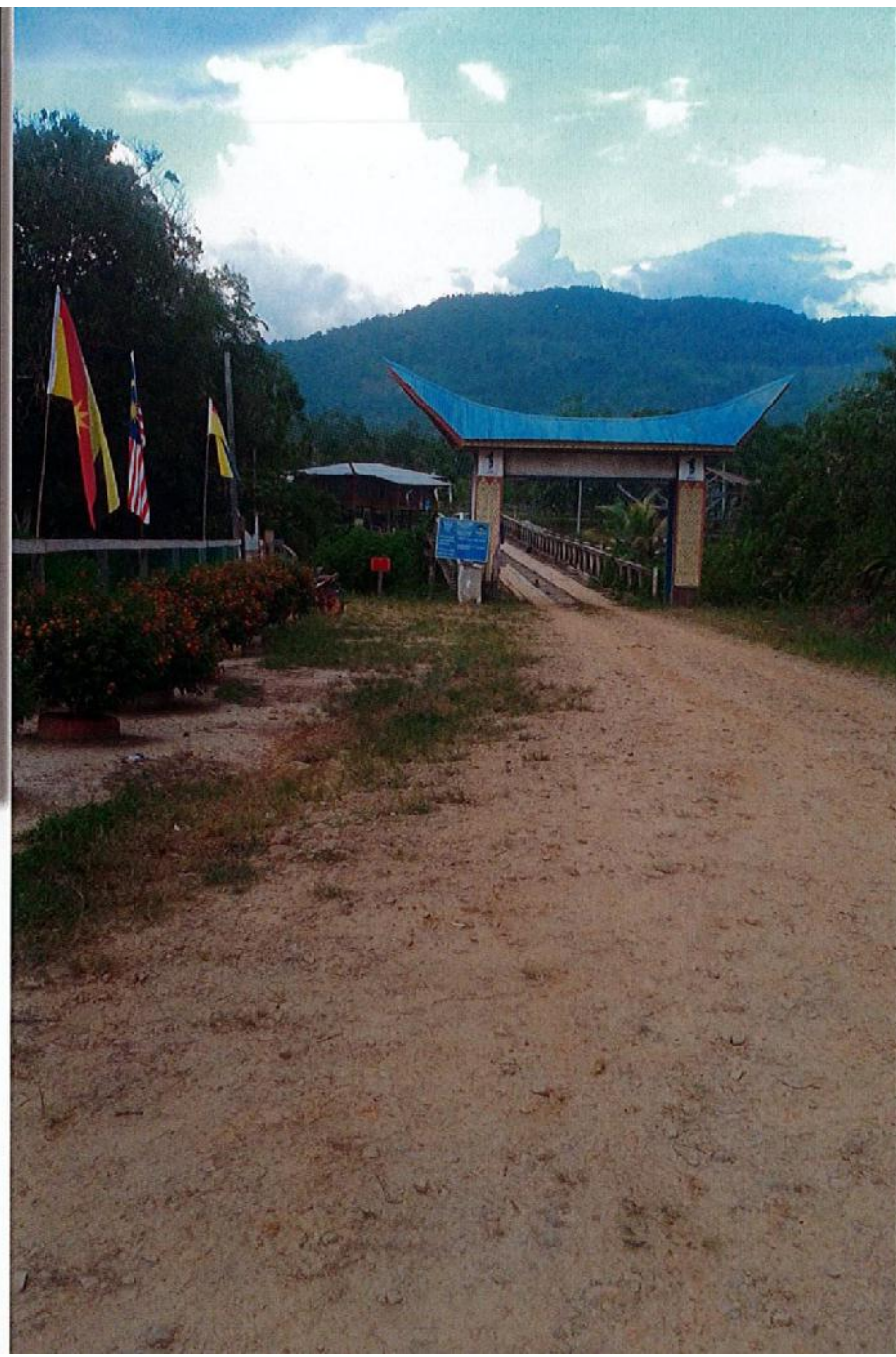
- To confirm the existences of the rhinoceros and Banteng (*Bos javanicus*) that reported roaming in Long Banga
- To document the varieties, range and diversity of wildlife in order to assess the future needs for conservation of HoB area,
- To collect, document and analyze scientific data on the flora and fauna
- To create awareness on the importance of conservation and organize outreach events that will inspire local participation in flora and fauna conservation.
- To studying the effects of tourism
- To increasing the conservation values of the area,
- Systematic study on the sociology and anthropology of local tribes

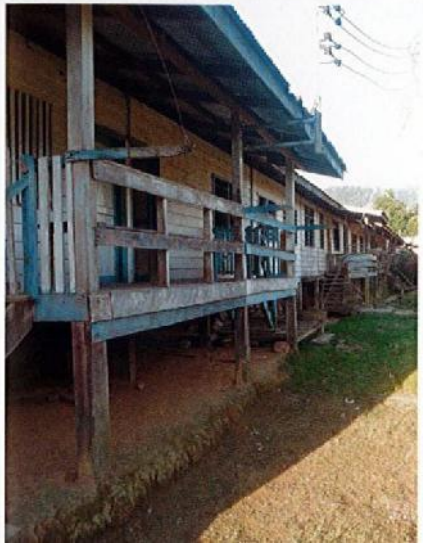
Expedition Site

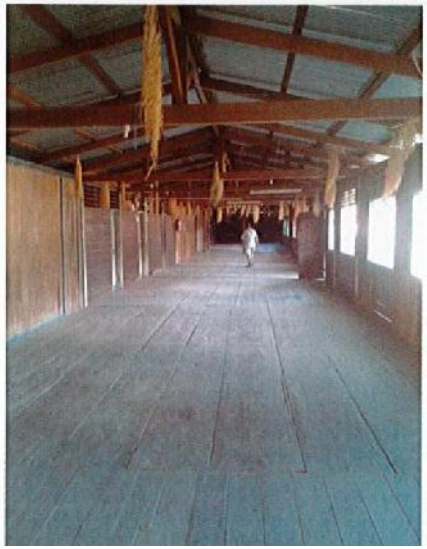
The 2016 Scientific Expedition site was held at Long Banga, Ulu Baram (2°N 115.38333°E) near Kalimantan Border (Indonesia). Majority of the Long Banga areas altitude is more than 430m above sea level. Long Banga can either be reached by logging roads from Miri or by air. MASWINGS is the only aircraft company which flies from Miri to Long Banga for every Tuesday and Saturday. The area is mountainous and several peaks reached 600 – 700 m.











Landscape and Geological Features - *Rivers and Streams*

The landscape of the Long Banga typified by ridges and rolling hills. The ridges are occupied by sandstone whilst the rolling topography is dominated by softer shale. Many beautiful scenic rapids and waterfalls can be found in the river systems in this area.













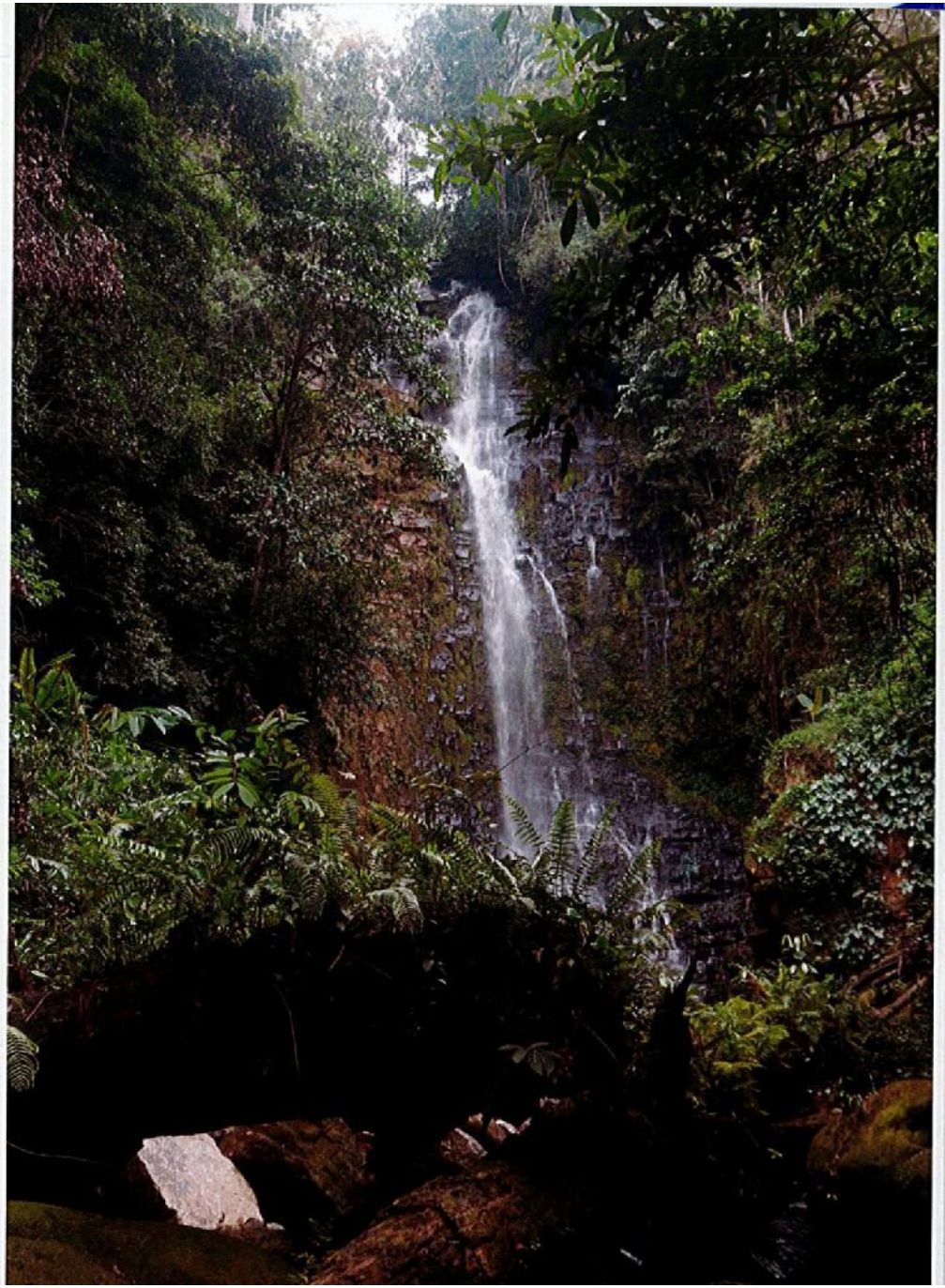


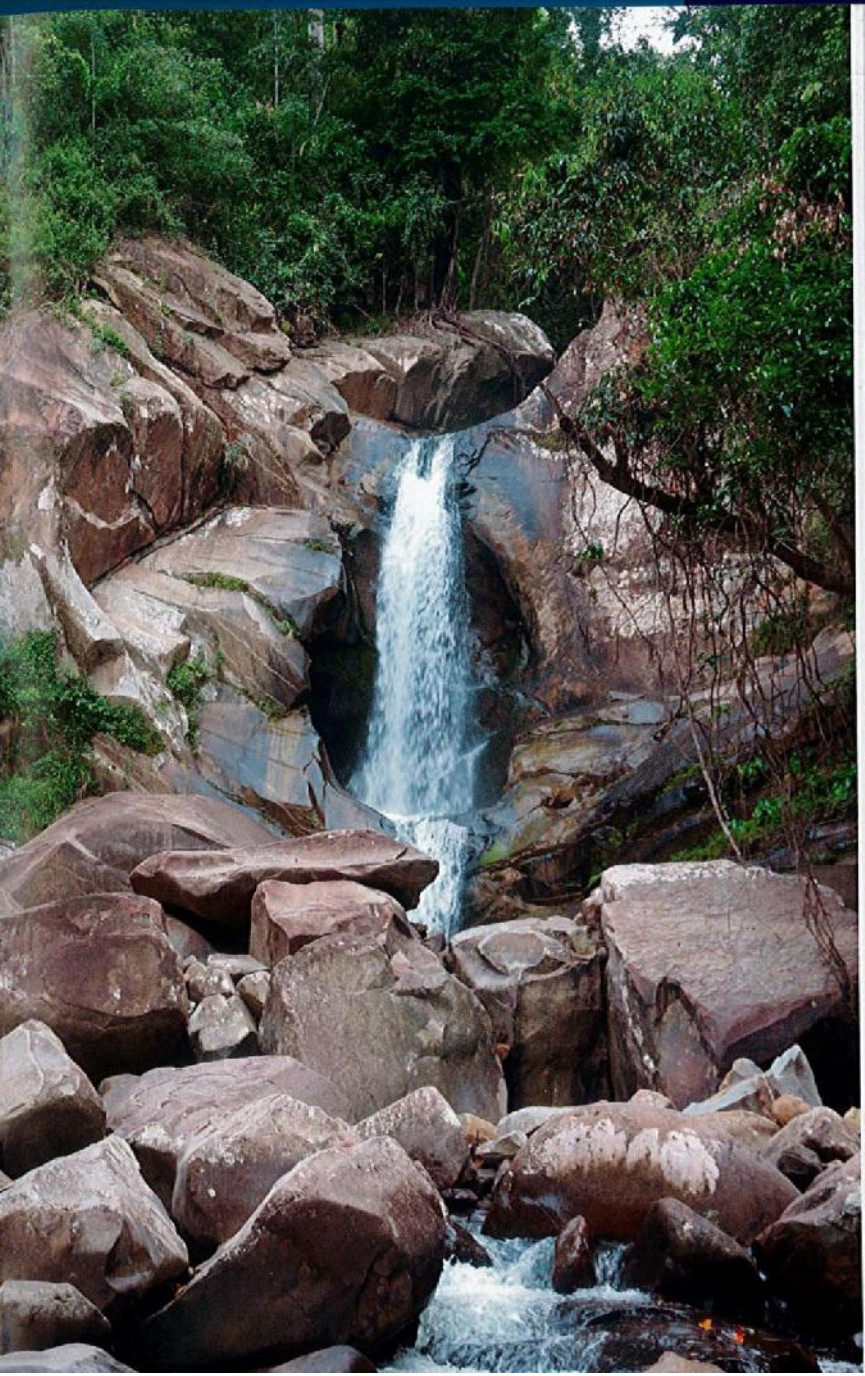


Landscape and Geological Features - *Waterfalls*

Waterfalls are commonly formed in the upper course of river and normally formed in a rocky area due to erosion. For fully formed waterfalls, after a long period of time, the water falling off the ledge will retreat, causing a horizontal pit parallel to the waterfall wall. Eventually, as the pit grows deeper, the waterfall collapses to be replaced by a steeply sloping stretch of river bed.

Many beautiful waterfall are found in the Long Banga areas which in the Long Banga areas which has the potential to be exploited for nature-based ecotourism. With more than 50 m tall, the Udau Waterfall is probably the tallest and most beautiful waterfall in the area. Other waterfalls are such as Sekuan Waterfall and Sungai Pesi Waterfall.



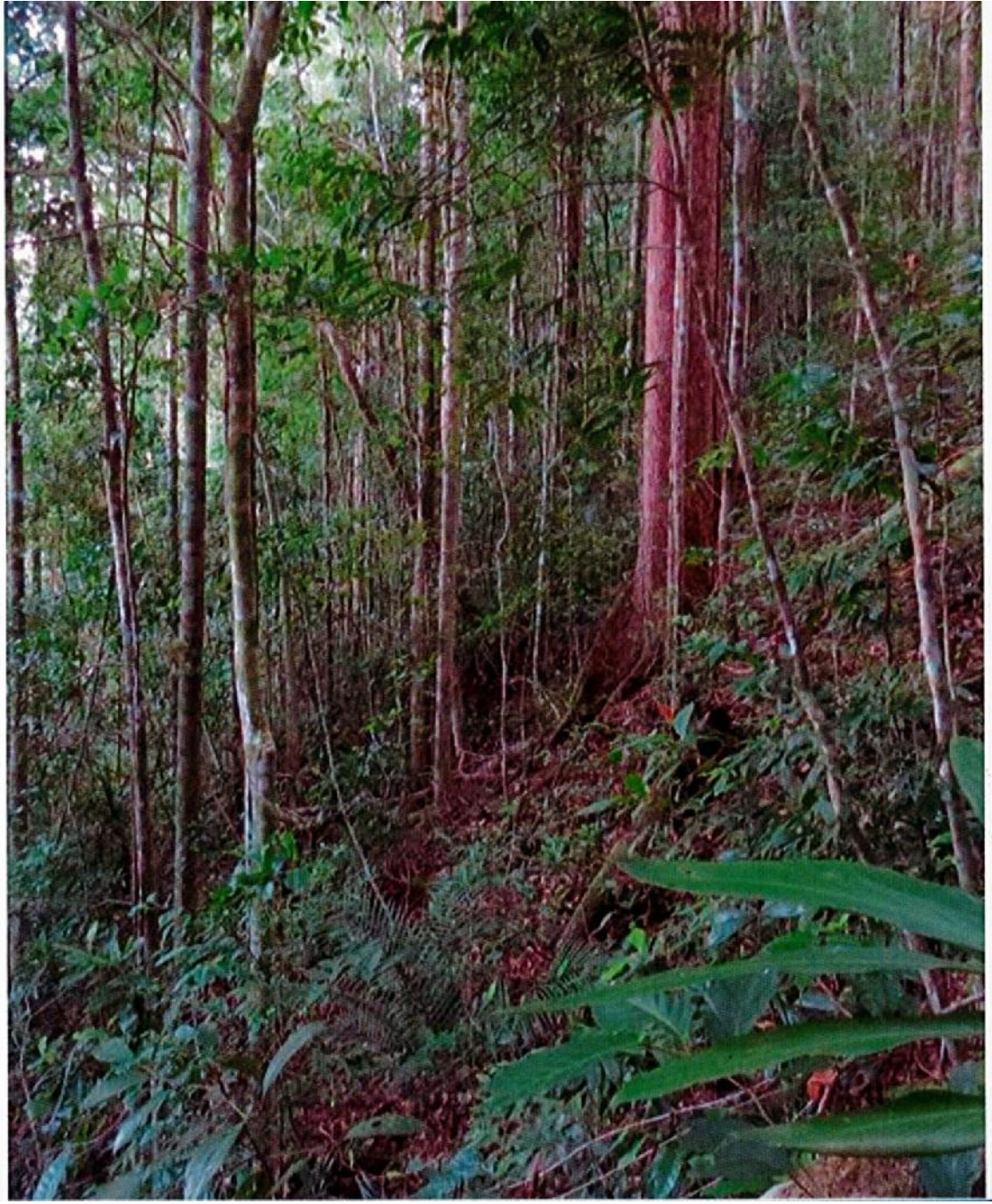




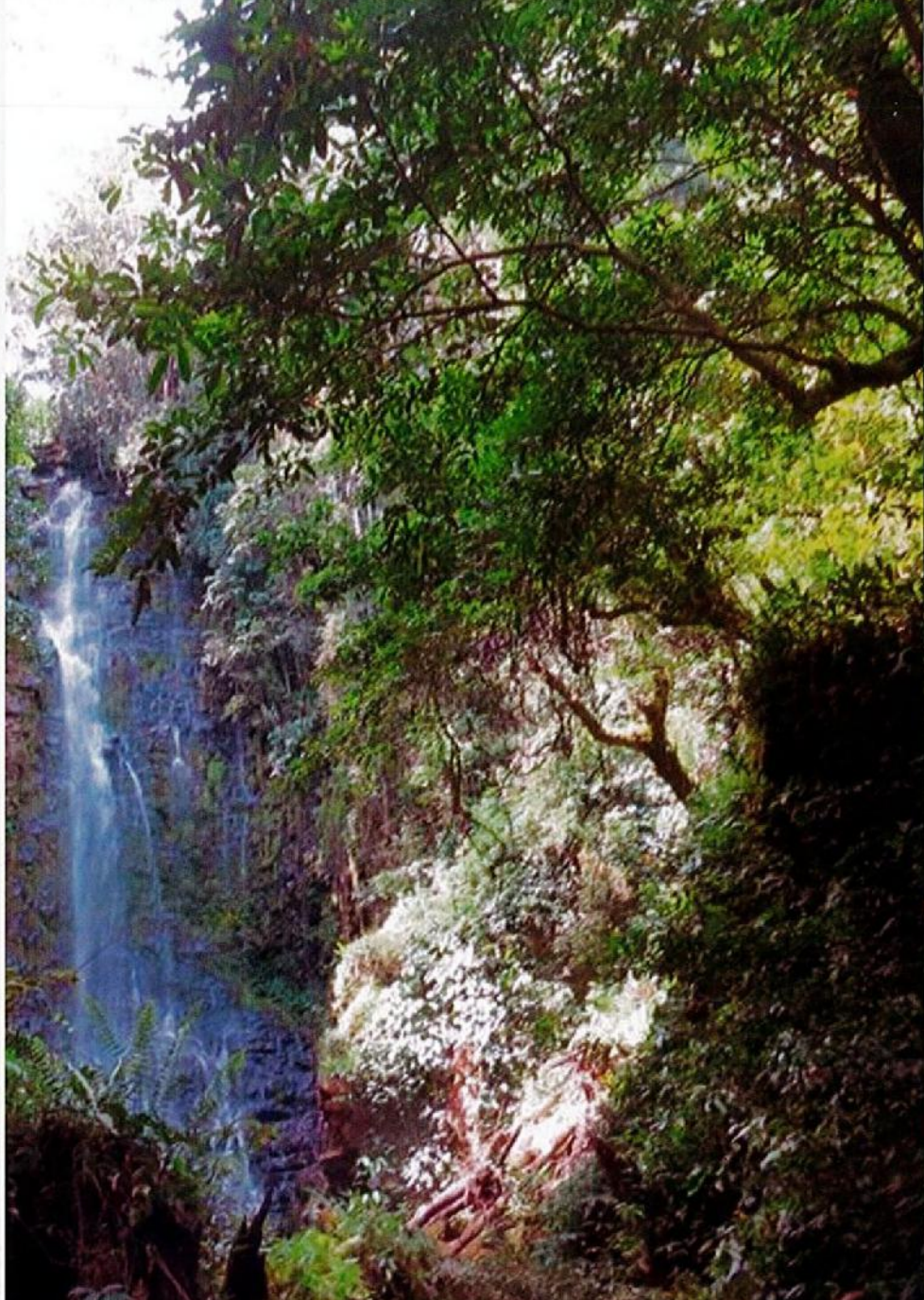


The Long Banga Forests

The Long Banga areas is located on northern east of Sarawak, in Ulu Baram area. Most of the areas are terrains or hilly with peaks between 320 - 480 m elevations. Four major vegetations observed, hill mixed dipterocarp forest, riparian forest, secondary forests and kerangas forest. Small patches of alluvial swampy forest also observed along the transect number 15. The hill mixed dipterocarp forest dominated by tall and medium sized dipterocarps and legumes trees (big trees are mostly been logged many years ago). Density of herbaceous plants exceptionally rich particularly the begonias, gingers and ferns. Many stages of secondary forests were observed in the Long Banga areas. The secondary forests are mostly formed on the abandoned agricultural land and open area caused by forest fire. Kerangas forest is the second predominant forest type in the area. The forest ground often with sandy soil and cover with many rocks.







Camping Site

The Base Camp was located on 3.2°N 115.38333°E at the altitude of about 400 m above sea level. The Camp was strategically located in the middle of the study site, between the two rivers, Sungai Puak and Sungai Sekuan. The average temperature during the expedition were between 22 - 28°C at day time and between 16 - 18°C at the night time. The average humidity was rather high between 70 - 80 %.









Long Banga 2016 Scientific Expedition - Base Camp

Sampling

Sampling, collecting and preserving samples are crucial in research activities. The methods varies depending on the type of specimens: i.e. flora or fauna as well as type of studies. The collected specimens need to be preserved well and taken care of as they are the evidence of the studies.



Collecting seeds for germplasms



Analyzing damaged on the tree by animal



Installing camera trapping



Recording habitat

Recording

Recording data is important for scientific studies. For flora, flowers and fruits are vital for species identification. All the changeable characters need to be recorded. Photograph is one of the best methods for recording the species evidence. For the fauna studies, trapping, netting, camera trapping and observations of the animal signs such as footprints, animal droppings and damages on the plants are among the important methods to record the existing of the type of animals.



Photographing flowers



Climbing for fertile specimens

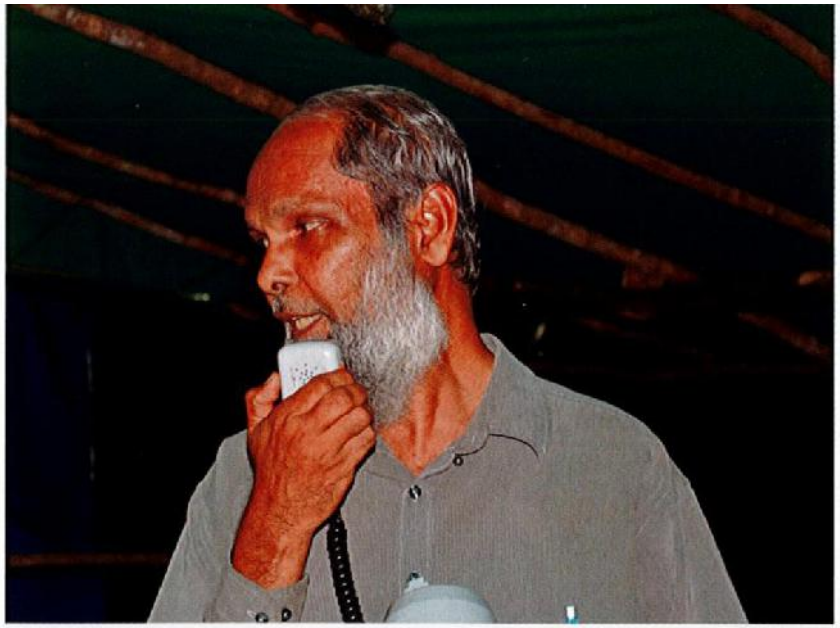

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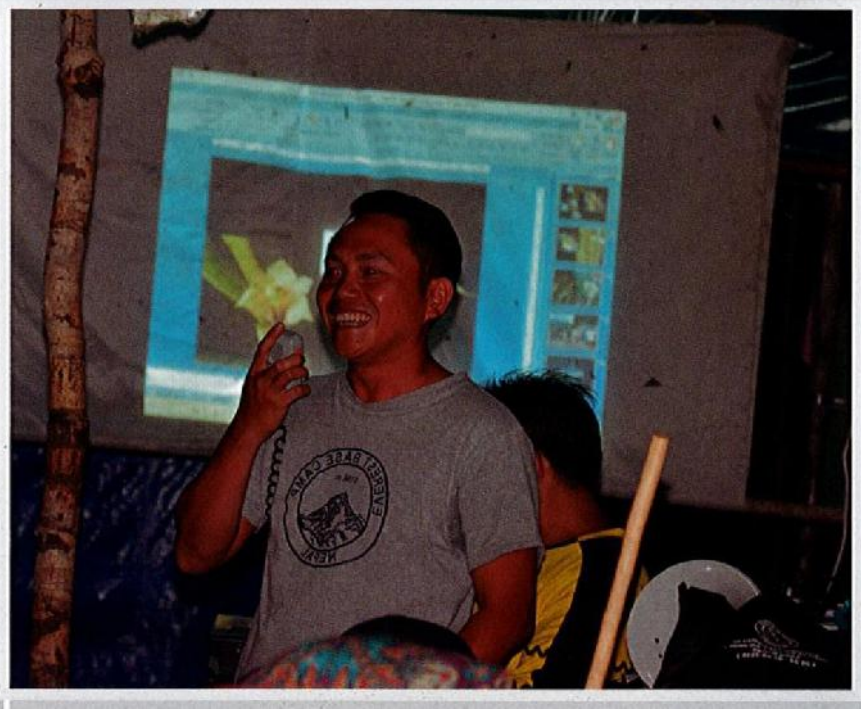




Night activities - knowledge sharing session. scientists presenting their findings of their survey and ending the night with program briefing for the next day program by the expedition leader.





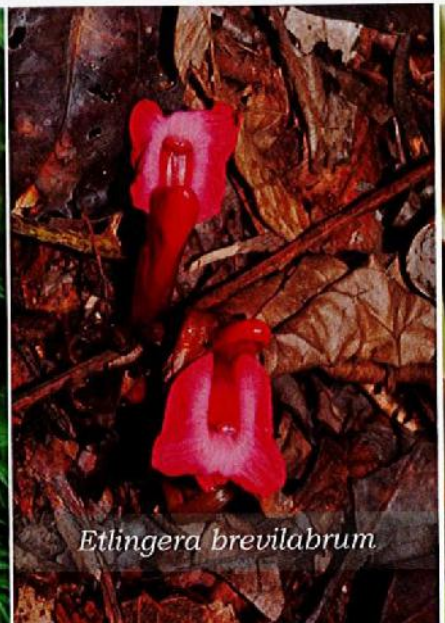


Biodiversity of Long Banga

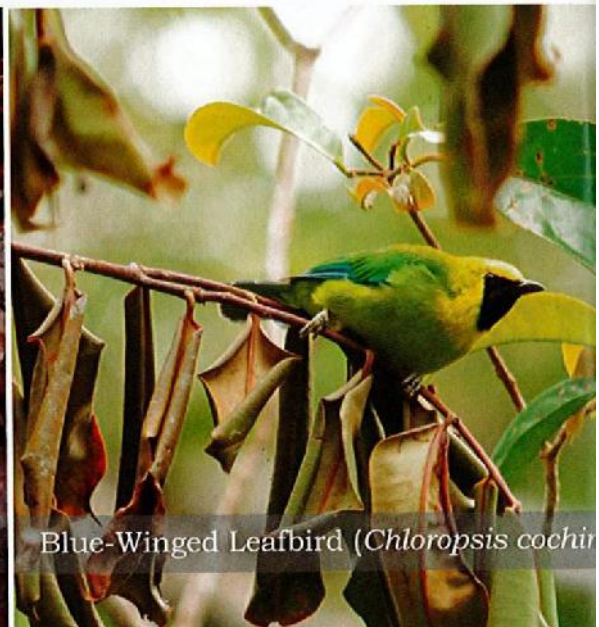
Borneo is conventionally predictale to contain 15,000 - 17,000 plant species, of which 6,000 - 6,500 are endemic, and may well have the highest plant diversity of any region of the world. Being the world's 12 mega biodiversity habitats, Malaysian Borneo has more then 1,300 species of orchids, 250 species of gingers and 230 palm species and still many unidentified plants species. The animal species are also very rich with exceptional numbers of mammals, ampibians, birds and new species are still being discovered.

Being in the same tropical region, the Long Banga area is expected to be rich in biodiversity. Therefore, the Heart of Borneo (HoB) Intiative Project has selected the Long Banga areas to document the richness of biodiversity. As a results of 14-days surveys, the Long Banga has projected exceptionally rich with flora and fauna. Great number of plants species such as orchids, gingers, palms, ferns and mosses recorded during the expedition. The population of animals such as barking deers, Malayan Porcupines, primates and birds are in healthy numbers.





Etlingera brevilabrum



Blue-Winged Leafbird (*Chloropsis cochi*





Shorea

Shorea is a genus in the family Dipterocarpaceae that mainly found in the tropical rainforests. They are native to Southeast Asia, distributed from northern India to Peninsular Malaysia, Indonesia, Borneo and the Philippines. There are about 196 known species throughout the world with Borneo as the hotspot of species diversity. A total of 138 species recorded in Borneo of which 91 are endemic.

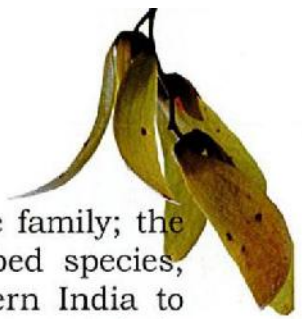
The genus is named after Sir John Shore, the government-General of the British East India Company (1793—1798). They are most dominant trees in the emergent canopy layer of the tropical rainforests. The tallest documented tropical angiosperm in an 88.3 meter tall *Shorea faguetiana* in the Tawau Hills National Park in Sabah and many more species in Borneo from the genus also have been measured to be over 80 m tall. Many of the *Shorea* species are important for timber and sold under various trade such as *Meranti, Seraya, Balau* or *Phiippine Mahagony.*





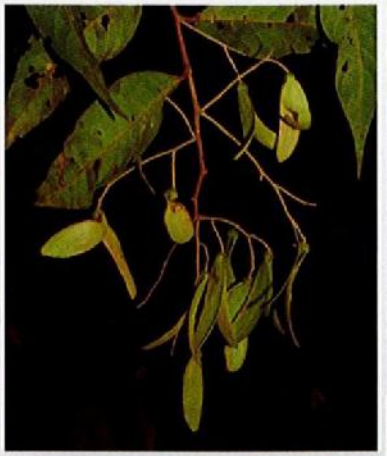






Hopea

Hopea is a member of Dipterocarpaceae family; the second largest genus with 104 described species, distributed from Sri Lanka and southern India to southern China and southward throughout Malesia to New Guinea. The genus is named after John Hope, the first Regius Keeper of the Royal Botanic Garden, Edinburgh. More than 45 species have been recorded from Borneo with about half of the number are endemic.







Agathis

Agathis or commonly known as *Damar Minyak* or *Bindang* in Malaysia is relatively a small genus with 22 species of evergreen tree. The genus is part of ancient plants that belong to the Araucariaceae family or connifer group that once widespread during the Jurassic period. Now, however the distribution largely restricted to the Southern Hemisphere, except few number extent toward the Malesia region. Five species have been recorded from Borneo, i.e. *A. borneensis, A. endertii, A. lenticula, A. orbicula* and *A. kinabaluensis*. Except *A. borneensis*, the other four are endemic to the island. The *Agathis* is a large tree with straight bole. The timbers are extracted for furnitures and light construction such as yacht or guitar.







Dialium

The Tamarind-Plum or locally known as Keranji is a fruit-bearing tree that belongs to the Fabaceae family. The scientific name is *Dialium indum*. Keranji trees are mostly tall and dominated the emergent layer of the forest canopy. The fruits are edible with sweet-sour taste similar to tamarind but too acidic to enjoy. In Sarawak, at least two varieties of Keranji occurs in the forests and can be differentiated by the size of the fruits.

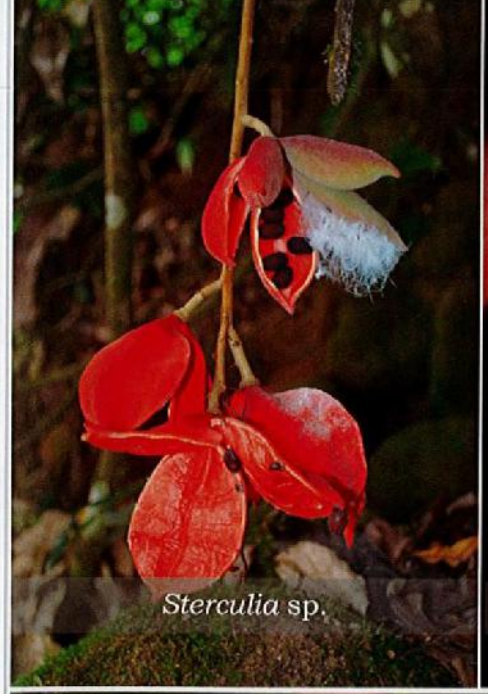
Ternstroemia

The genus *Ternstroemia* is a flowering plants in the family Pentaphyllacaceae that distributed mainly in the tropical and subtropical regions of Africa, Asia and the America. These evergreen plants are small shrub to medium size tree and occasionally climber. Normally found along the river bank or forest on ultramafic and clay sandy soil in many habitats such as kerangas forest, lower and upper montane forest at altitude from sea level up to 4,000 m. Locally known as *Pokok Hujan*, the stem of *Ternstroemia* can be recognized by the smooth to flaky or cracking bark, inner bark pinkish to dark red an fibrous. Leaves are simple, usually spirally arranged or clustered at the end of the twigs, green. Reddish young shoots. Inflorescences axillary or terminal, flowers solitary or rarely forming a pseudo-umbel. Fruits indehiscent, apex acute, obtuse or terminated by stigma.





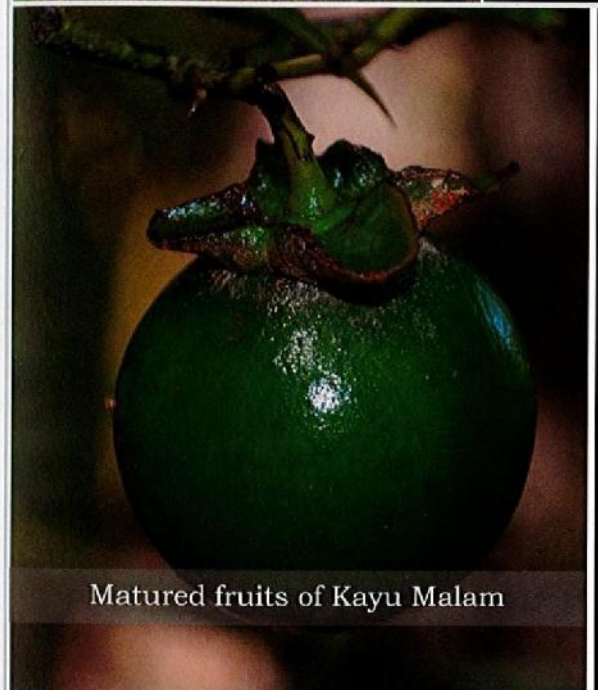




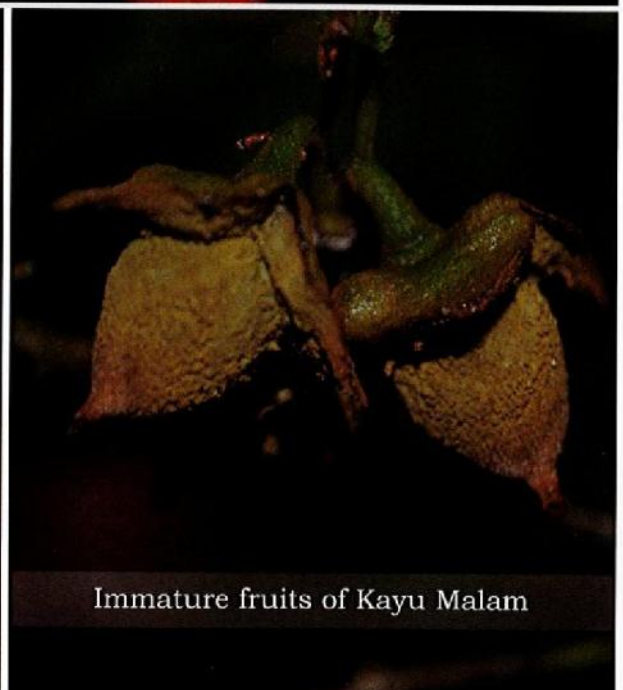
Sterculia sp.



Sterculia sp. Close-up seeds



Matured fruits of Kayu Malam



Immature fruits of Kayu Malam

Sterculia

Sterculia is a genus of flowering plants in the Mallow family, Malvaceae. Known as tropical chestnuts or *Kembang Semangkuk* by the local people, previously placed in the Sterculiaceae. The genus is named after Sterculius of Roman mythology, who is the God of manure; this is in reference to the unpleasant aroma of the flowers of this genus. In Long Banga, at least five to six species were observed and recorded during the expedition.

Diospyros

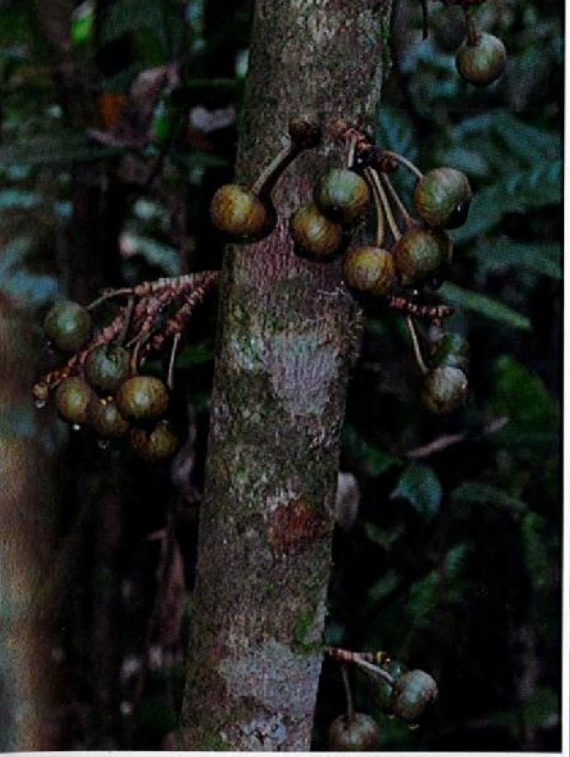
Commonly known as Ebony or Persimmon trees or popularly identified as *Kayu Malam* in Malaysia, the genus *Diospyros* is a large genus with more than 700 species recorded throughout the world. The species are vary from deciduous to evergreen, big trees, shrub or small bushes. Majority are native to tropics with only few extending into temperate regions. At least 10 species of *Kayu Malam were* recordeed in the Long Banga areas.

Ficus

The Ficus or Fig-tree or commonly known as Kayu Ara in Malaysia is a member of the Moraceae family with more than 850 species throughout the world. The *Ficus* are varies in habits, i.e. trees, shrubs, vines, epiphytes, lithophytes or hemiepiphytes. Most of the Moraceae members includes *Ficus* produce white exudate or latex. The fig fruit is an enclosed inflorescence, sometimes referred as a synconium. All the Fig-trees in Sarawak are protected under the Forest Department Sarawak, Wildlife Protection Ordincance due to their importantness as food sources for the wild animals.







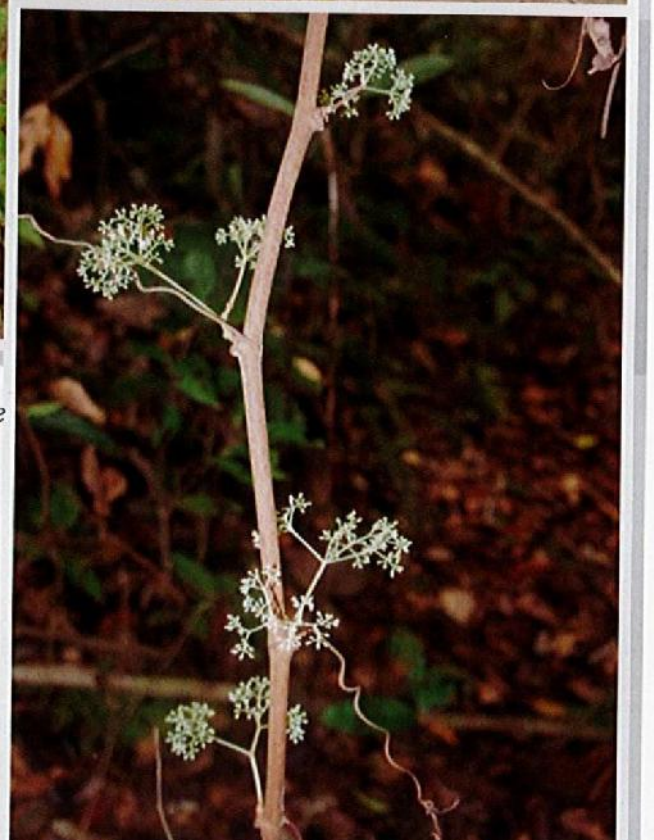












Tetrastigma pedunculare

Tetrastigma

Tetrastigma is a genus of plants in the grape family, Vitaceae and notably known as a sole hosts of parasitic plants in the family Rafflesiaceae. The plants are lianas that climb with tendrils and have palmately compound leaves or seldom creeping on the forest floor or open-spaced to forming a thicket-like bushes. The species are found in subtropical and tropical regions of Asia, Malesia and Australia, where they grow in primary rainforest. Four species have been recorded in the Long Banga areas during the expedition. The species are, *Tetrastigma diepenhorstii* (Miq.) Planch., *Tetrastigma megacarpum* Latiff, *Tetrastigma pedunculare* (Wall. ex Laws.) Planch. and *Tetrastigma rafflesiae* (Miq.) Planch.

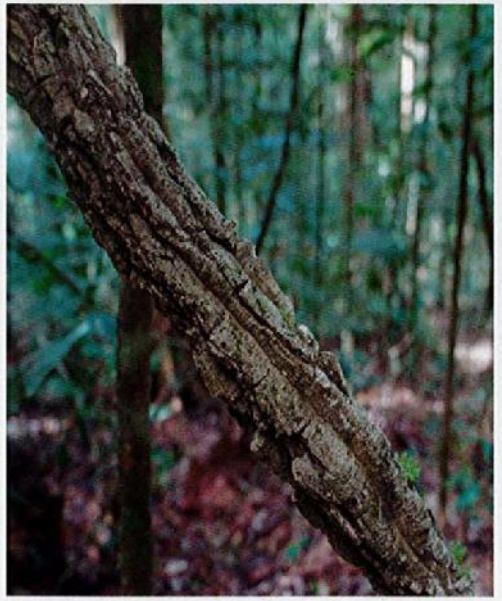


Tetrastigma rafflesiae





Tetrastigma diepenhorstii





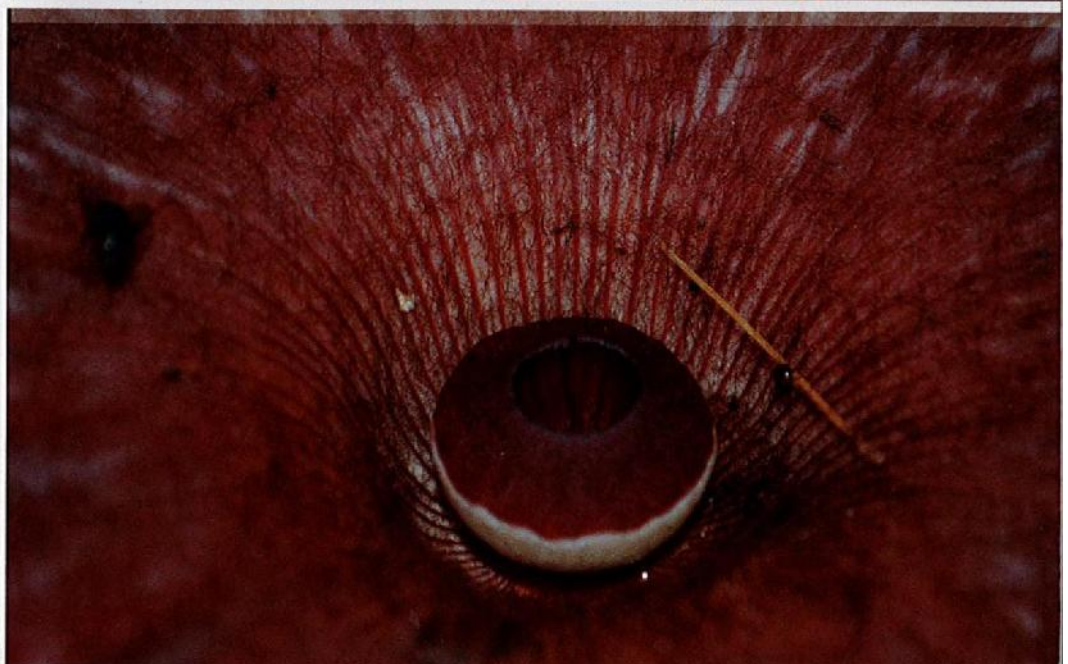
Tetrastigma megacarpum







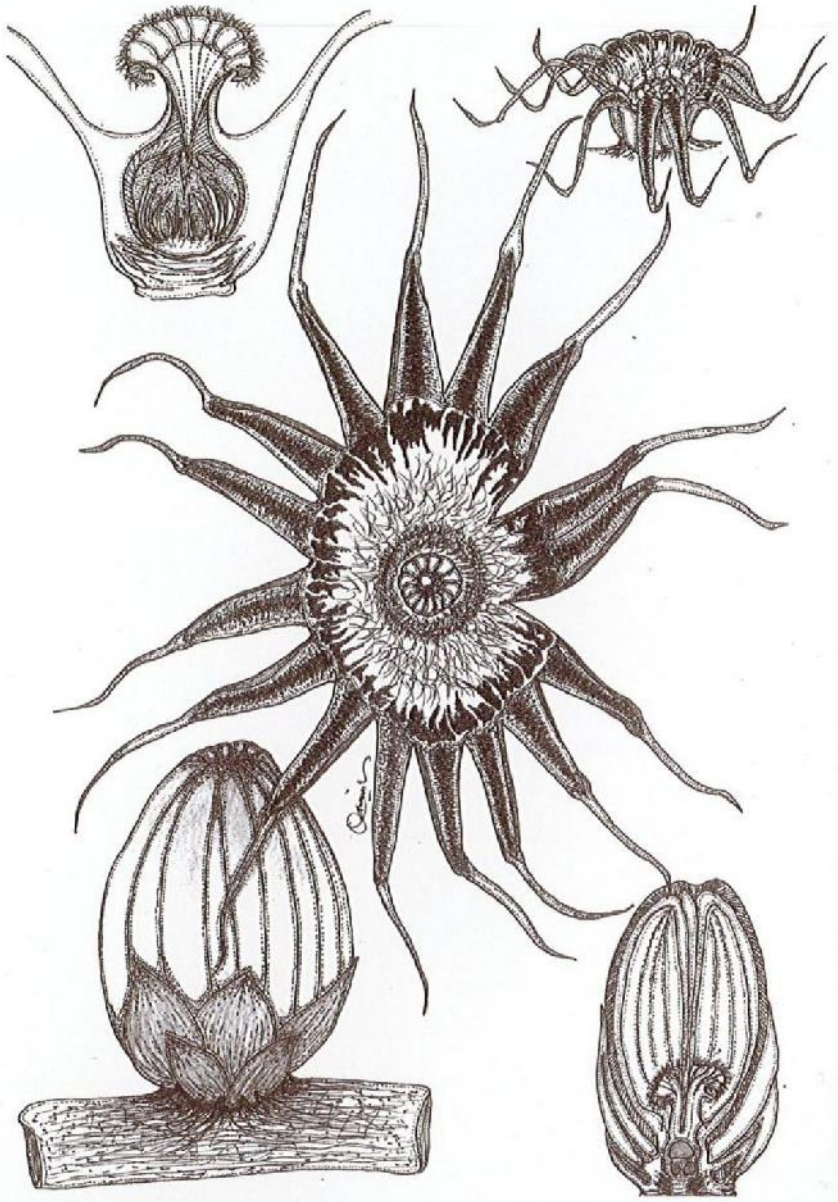






Rizanthes

The genus *Rizanthes* is one of the three members of Rafflesiaceae family. The *Rizanthes* is the lesser-known endoparasite plant compared to its sister, the biggest flower in the world, *Rafflesia*. They locally known as *Patma Tikus, Patma laba-laba* because of the long appendages of the lobes. Sometimes also known as *Jambulipa,* referring to the shaped of unopened flower buds that similar of the fruits of Jambu (*Syzygium*). Unlike the *Rafflesia,* the species of *Rizanthes* can be identified via the number of the lobes (between 17 - 20 lobes). Currently only four species of *Rizanthes* are known and they are distributed strictly in the Southeast Asia. Only one species recorded in the Long Banga area, *Rizanthes lowii,* which is endemic to Borneo. The beautiful *batek* patterns almost similar with undescribed species from Lanjak Entimau that was discovered in the year 2008 during the HoB Scientific Expedition.



Botanical drawing of *Rizanthes* sp. by Meekiong, K.

Begonia

The genus *Begonia* L. is one of the largest genera of flowering plants with approximately 1,600 species have been described around the world. Sands (2000) estimated that the number of *Begonia* in Borneo is about 160 species. The latest figures by Kiew *et al.* (2015) indicated that the number of *Begonia* in Borneo might be double from the earlier estimation. For example, before the year 2004, the number of *Begonia* in Sarawak was only 25 species recorded and within 12 years, the number has increased dramatically to 119 species. In Long Banga, about 15 - 20 species have been recorded during the expedition in which many of them are unidentified.







Begonia baramensis Merr. is endemic to Borneo and is one of the only two species that can be found in all four continents within the island (Brunei Darussalam, Kalimantan, Sabah and Sarawak). This species lives in wide range of habitats from lowland dipterocarp forest in valley bottoms often near water, hill slopes and ridges and up to the montane forest at altitude 1,600 m above sea level.





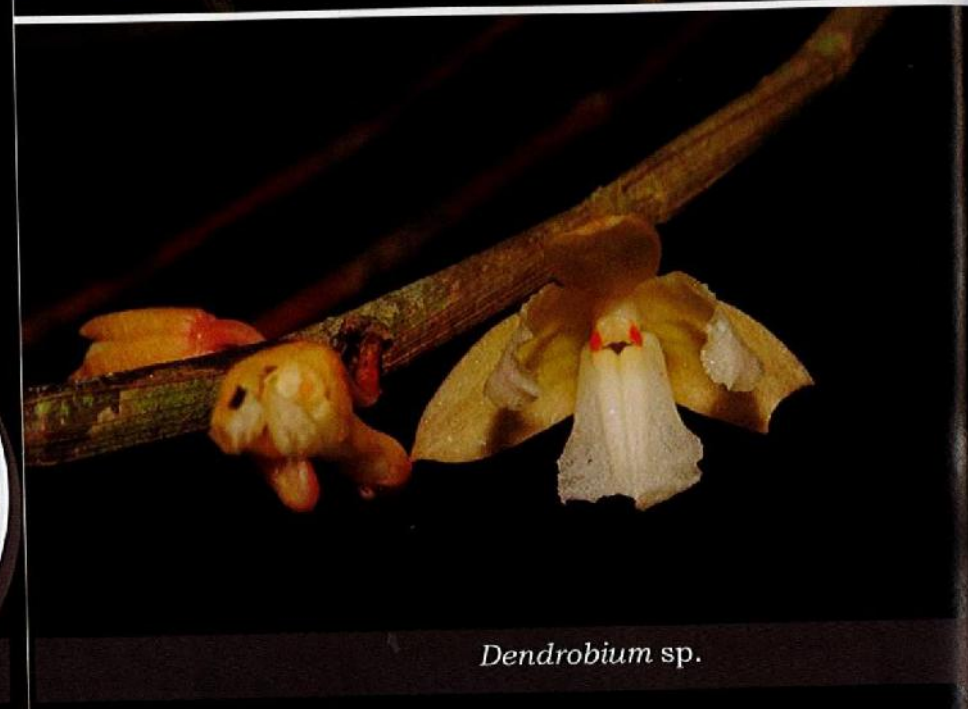
Begonia fuscisetosa Sands, is endemic to Borneo and is the one of the only two species that grow in Brunei Darussalam, Kalimantan, Sabah and Sarawak. The species grow in lowland mixed dipterocarp forest in river valleys, often near river banks or streams or in deep shaded of wet areas at foothill. This species also recorded from lower montane forest at altitude 1,400 m above sea level and also been reported from ultramafic soils.



Dendrobium kiauensis



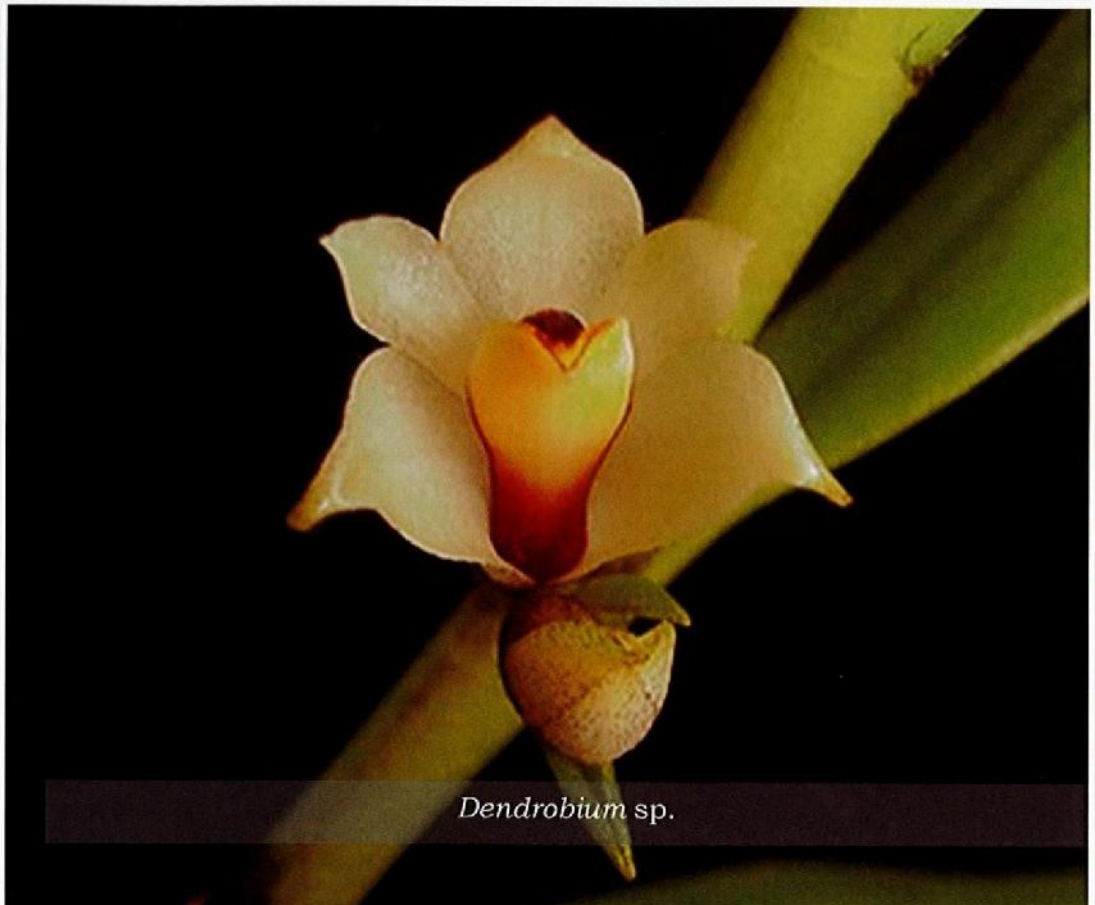
Dendrobium tetrachromum



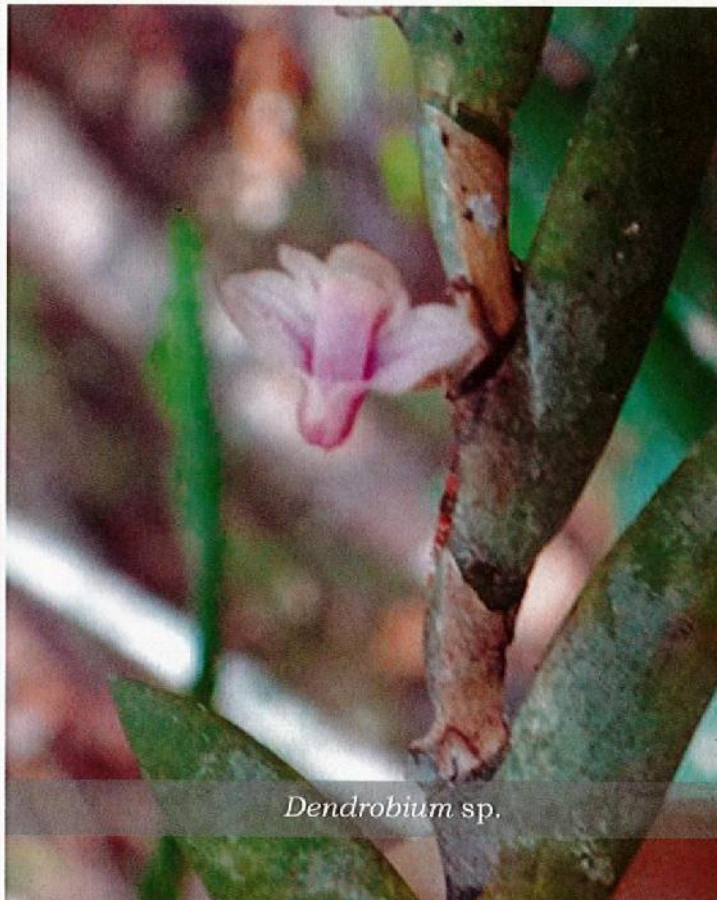
Dendrobium sp.

Dendrobium

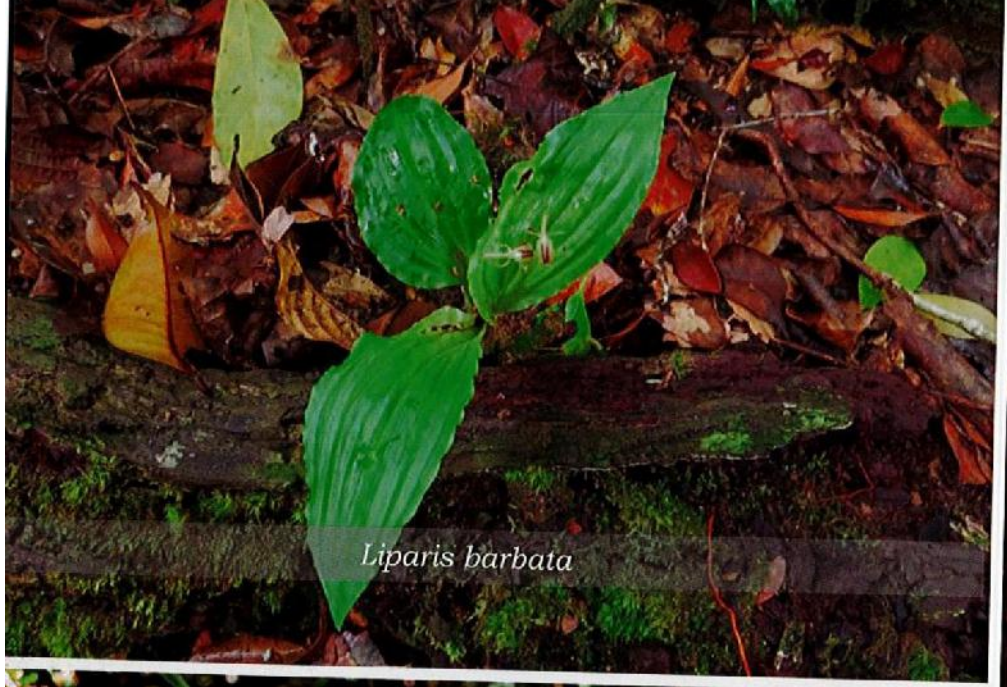
The genus *Dendrobium* is one of the largest genus in the Orchidaceae family with approximately 1,300 - 1,400 species distributed throughout the world and the second largest orchid genus in Southeast Asia and probably the most diverse in terms of different habits and flower shapes. The genus was established by Olof Swartz in 1799. The genus name is derived from the Greek words, *dendron* which means tree and *bios* means life, with combination menas "one who lives on trees". or essentially epiphytes. Preliminary result showed that this genus is among the most diverse orchids in the Long Banga areas.



Dendrobium sp.



Dendrobium sp.



Liparis barbata



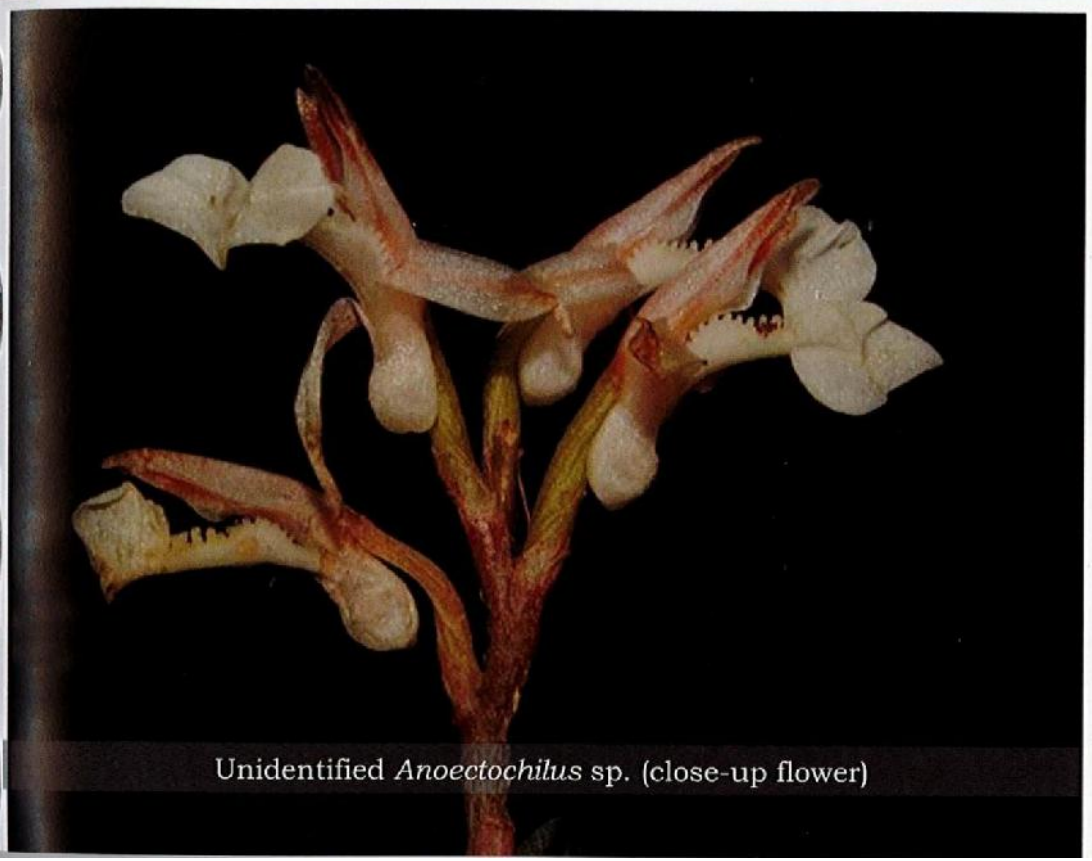
Collabium simplex



Unidentified *Anoectochilus* sp.

Terrestrial Orchids

The orchids are easily distinguished from other plants, as they share some very evident, shared derived characteristics. The terrestrial orchids may be rhizomatous or form corms or tubers. The root caps of terrestrial orchids are smooth and white. Some with leafy shoots or leafless saprophytic. Among the terrestrial genus recorded in Long Banga area are *Liparis, Collabium, Plocoglottis, Anoectochilus, Goodyera, Nervilia, Macodes, Nephelaphyllum, Vrydagzynea* and *Zeuxine.*

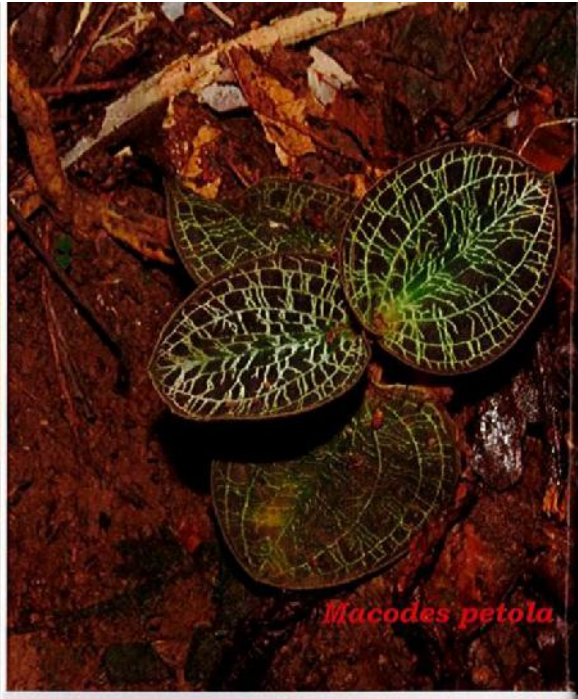


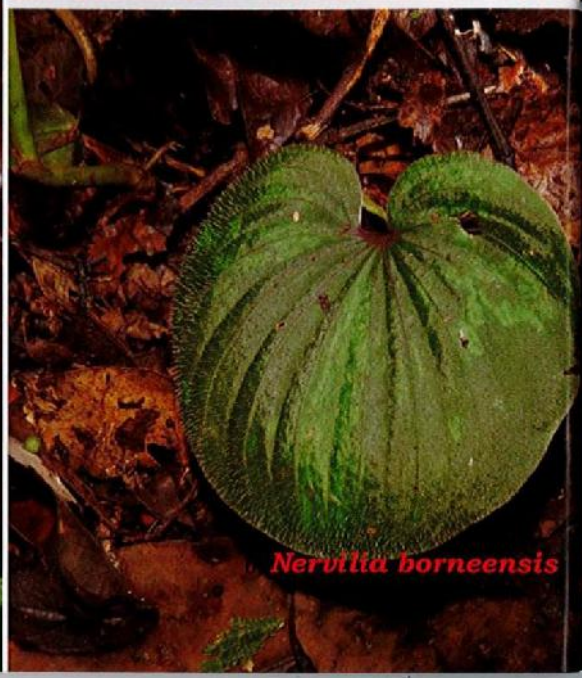
Unidentified *Anoectochilus* sp. (close-up flower)



Plocoglottis acuminata


Goodyera sp.


Macodes petola


Nervilia borneensis


Vrydagzynea sp.


Nervilia sp.


Nephelaphyllum aureum

Cystorchis variegata

Known as the 'Variegated Cystorchis', this species is found in Peninsular Malaysia, Borneo, Java, Sumatra, the Philippines and Vanuatu in lowland and hill mixed dipterocarp forests, montane forests on sandstone at elevations 200 to 1,500 m above sea level. This species often with decumbent, terete stem rooting all along and then ascending. The leaves are ovate with undulate margins, velvety red brown or green with paler veins. Inflorescence with 2 tubular sheaths and ovate, pubescent, concave, reddish floral bracts and all the flowers held toward the apex.

The genus *Cystorchis* is a terrestrial herb, stem with few leaves or saprophytic, replaced by brown scales-leaves. There are about 20 species distributed in China, India, Southeast Asia, New Guinea and Vanuatu. Six species in Borneo and four of them are recorded in Sarawak.





Zeuxine

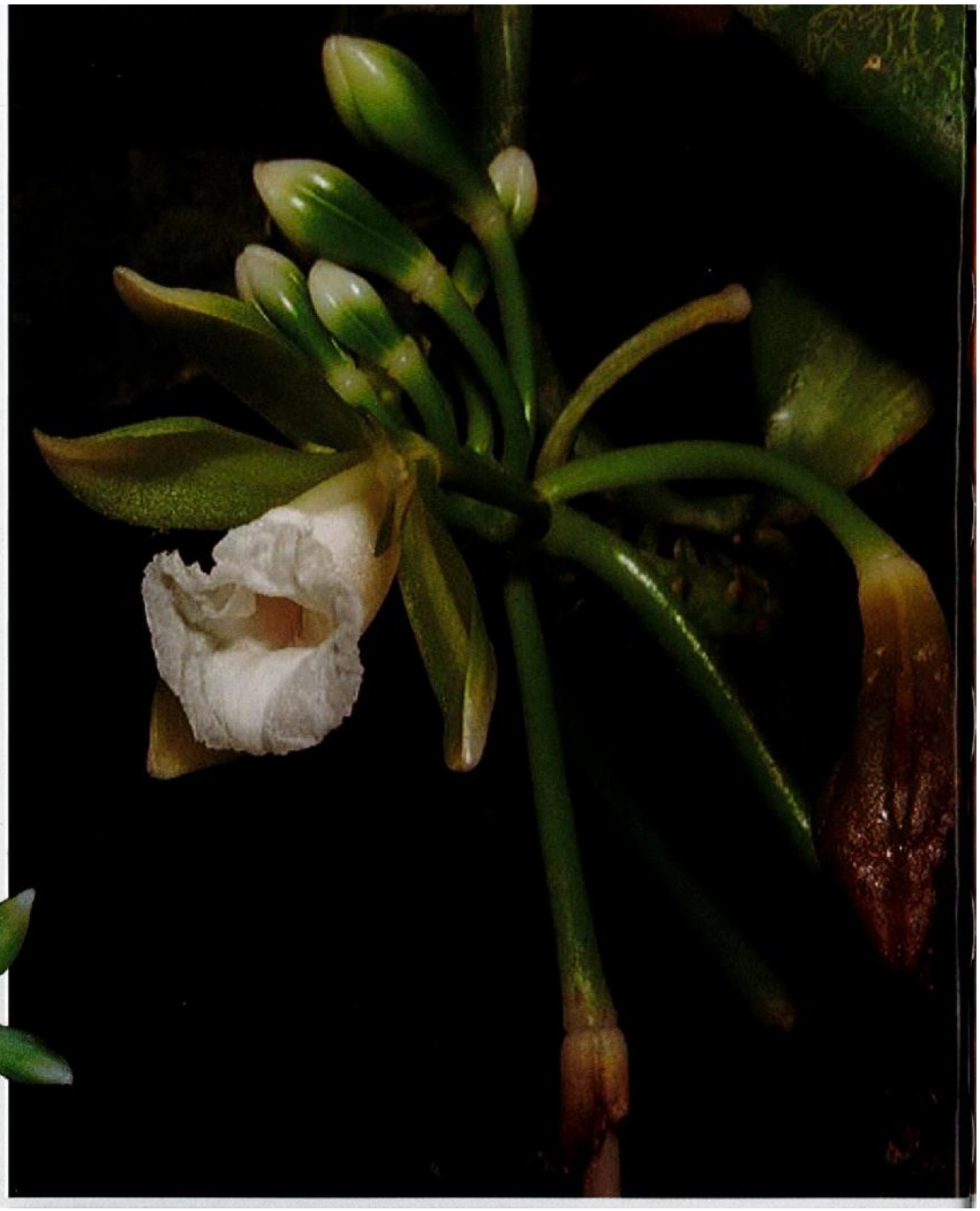
Zeuxine is a large genus terrestrial orchid with about 80 species that distributed widespread across tropical Africa, Asia, New Guinea, Australia, Pacific Islands, Brazil, Hawaii and main United States. This mycoheterotrophic orchids are mostly found to grow in wet grassland or humid tropical forest floor. Many species in this genus usually go through a period of dormancy after flowering. The plants generally have thick fleshy roots with smooth succulent stems. The leaves may be cauline, or spiral along the stem, and often marked with pale or pink spots or lines. The inflorescence is terminal with few to numerous spirally arranged flowers. The flowers are usually white.



Vanilla

The genus *Vanilla* is a moderately large orchid genus with 110 species worldwide. This evergreen orchid occur in the tropical and subtropical regions, from tropical America to tropical Asia, New Guinea and West Africa. The genus was established by Plumier in 1754 based on J. Miller. The word vanilla, derived from diminutive of Spanish word, *vaina* mean pod, referred to the fruit. The most widely known species is Flat-Leaved Vanilla (*Vanilla planifolia*), a species native to Mexico and being planted widely for commercial purposes.

The *Vanilla* is a vine-like plants, has monopodial climbing habitat. The can form long thin stems with a length of more than 35 m. The inflorescence with short-lived flowers arise successively on short peduncles. The flowers are opens up in the morning and close late in the evening on the same day. Flowers are sweet scented and mostly are





Aphyllorchis pallida

Found throughout the Southeast Asia at elevations around 200 - 1,600 m above sea level, *Aphyllorchis pallida* is a group of mycoheterotrophic terrestrial orchids. The genus *Aphyllorchis* also known as Pauper Orchids are leafless orchid with sturdy, often purplish stem with few to several stalked flowers on unbranched inflorescence. The flowers are cup-shaped, creamy with purplish stripes on the inner part of lip. This species grow in humid forest floor, loam rich in decaying litter and humus, and often near streams.



The Palms

Arecaceae or Palmae or sometimes invalidly known as Palmaceae is widely distributed from tropical, sub-tropical and temperate climates. There are about 202 genera consisting of approximately 2,600 species throughout the world. Borneo is particularly very rich with the palms species, for example, Kubah National Park is the richest spot in the world with half of all species recorded in Sarawak are found here. More than 12 genera with about 20 species of palms recorded in Long Banga during the expedition.



Rattan fruits (*Calamus* sp.)



Rattan fruits (*Plectocomia* sp.)



Salak palm (*Salacca* sp.)



Areca sp. (insert: close-up fruit)



Palas/Biris palm (*Licuala* sp.)



Pinanga arundinacea (insert: close-up fruits)

Mapania

Locally known as *Rumput Serapat* or *Pandan Tikus*, this sedge group is one of the member of Cyperaceae family. Found in tropical and sub-tropical areas with Southeast Asia as centre of distribution. There are 115 species throughout the world and about 50 species occurs in Borneo. Sarawak with 41 species is considered as the richest spot for the plant group. At least five to six species are found in the Long Banga areas.



Mapania caudata



Mapania sp. nov.



Mapania palustris



Mapania latifolia







Sonerila sp.



Sonerila sp.

Melastomataceae

Melastomataceae is a flowering plant family found mostly in the tropical and sub-tropical regions, comprising about 165 genera and about 5,115 known species. Most of the members are annual or perennial herbs, shrubs or small trees. In Sarawak, altough they common plants seen dwelling on the forest floor or at the edges of forests, but no scientific records on the number of species occurs.



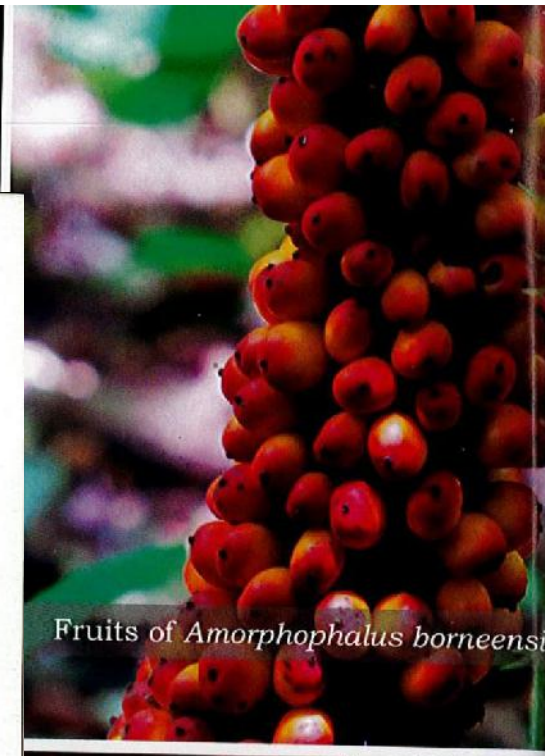
Sonerila sp.



Melastoma cf. malabathricum

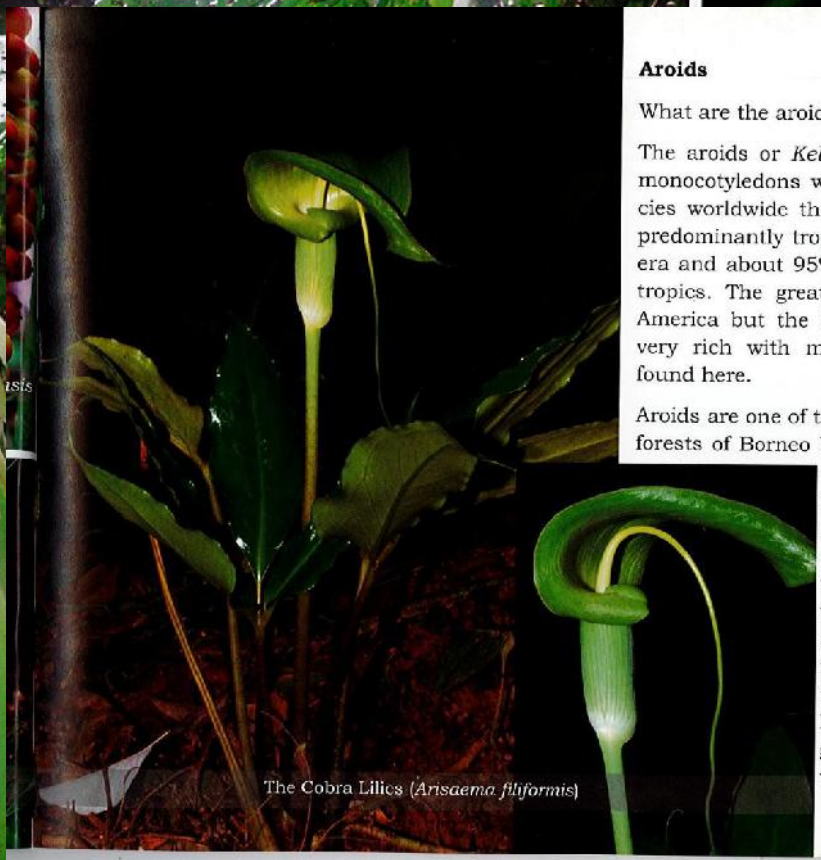






Fruits of *Amorphophalus borneensi*





The Cobra Lilies (*Arisaema filiformis*)

Aroids

What are the aroids?

The aroids or *Keladi Hutan* is a family of herbaceous monocotyledons with 110 genera and over 4,000 species worldwide that called as Araceae. The aroids are predominantly tropical in distribution with 90% of genera and about 95% of the species are restricted to the tropics. The greatest number of species is in South America but the Southeast Asia also considered also very rich with many important horticultural genera found here.

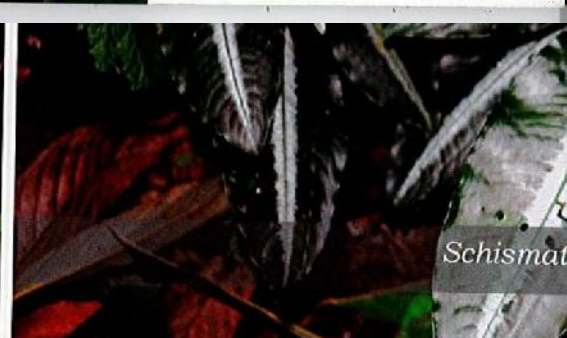
Aroids are one of the most abundant herb groups in the forests of Borneo but among the least well known and studied. As currently understood, the number of aroids species in Borneo comprises over 370 described species making it the richest and most diverse region in tropical Asia. Sarawak, particularly the northern west and central are very rich but the number certainly well below the actual figure. The number of aroids in Long Banga is not known as this group of plant is not covered during the expedition.







Alocasia sp.

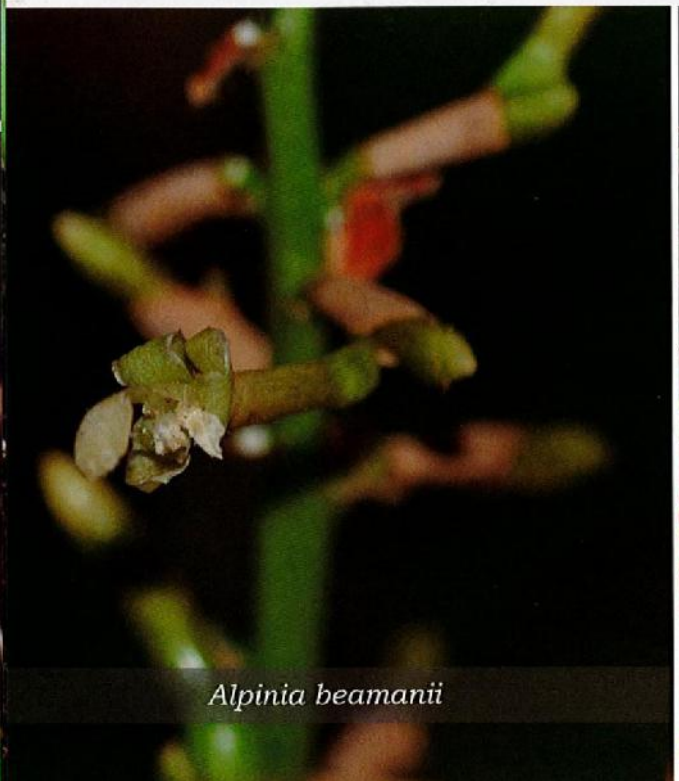


Schismatoglottis sp.

Alpinia

The genus named after a 17th-century Italian botanist, Prospero Alpino who specialized in exotic plant. This genus is the largest genus in the Zingiberaceae family with about 230 known species. The genus *Alpinia* have terminal inflorescence at the top of the leafy shoot. Most of the species are with shell-shaped lip, that why this genus also so-called Shell gingers. About six to seven species of *Alpinia* recorded in Long Banga. The occurrence of *Alpinia aquatica* at altitude more than 600 m above sea level is a new altitudinal record for the species.





Alpinia beamanii



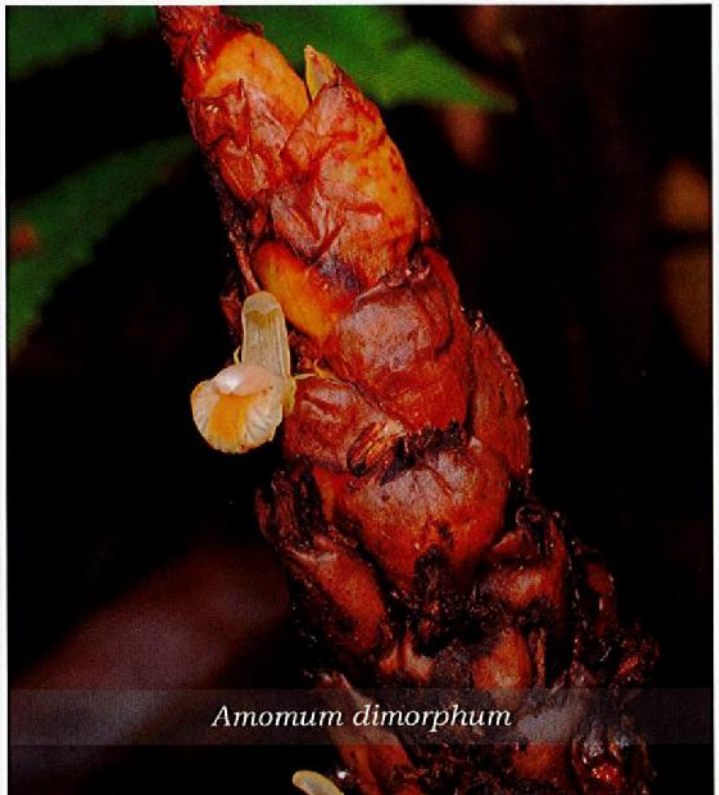
Alpinia nieuwenhuizii (in-circle: a close-up flower)

Amomum

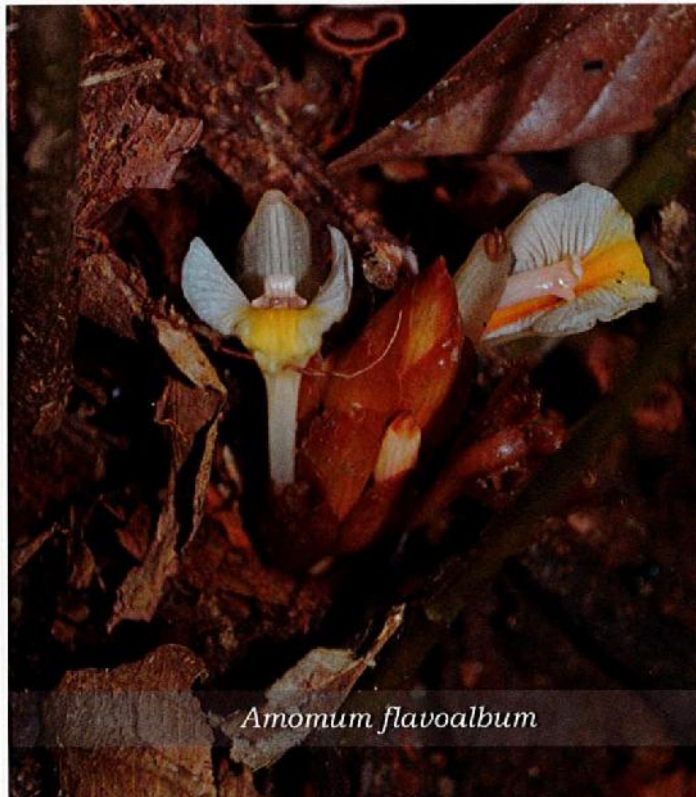
The genus name derived from Greek words, *a* - without and *momos* mean harm, "*without harm*", referring to the Indian spice plant. The genus *Amomum* is the second largest genus in the Zingiberaceae with more than 400 names but only 200 valid names. This genus distributed very well in the Southeast Asia with Borneo is recognized as the main diversity centre for the genus. In Sarawak, this genus is poorly studied with only 28 species have been recorded. Long Banga areas is considered rich with *Amomum* species with 17 taxa were collected and recorded during the expedition. Among the species recorded are includes *Amomum borealiborneense, Amomum calyptratum, Amomum dimorphum, Amomum flavoalbum, Amomum hansenii, Amomum longipenduculatum* and includes five unidentified taxa.



Amomum calyptratum



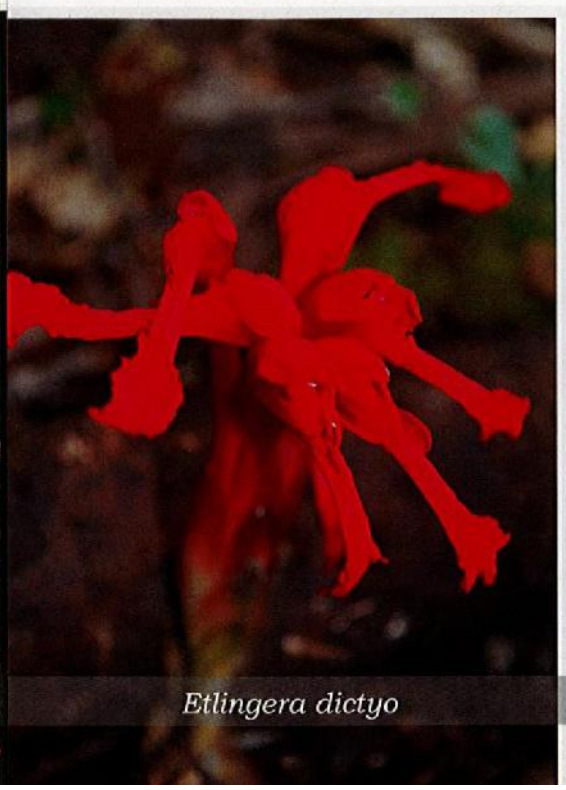
Amomum dimorphum



Amomum flavoalbum

Etlingera

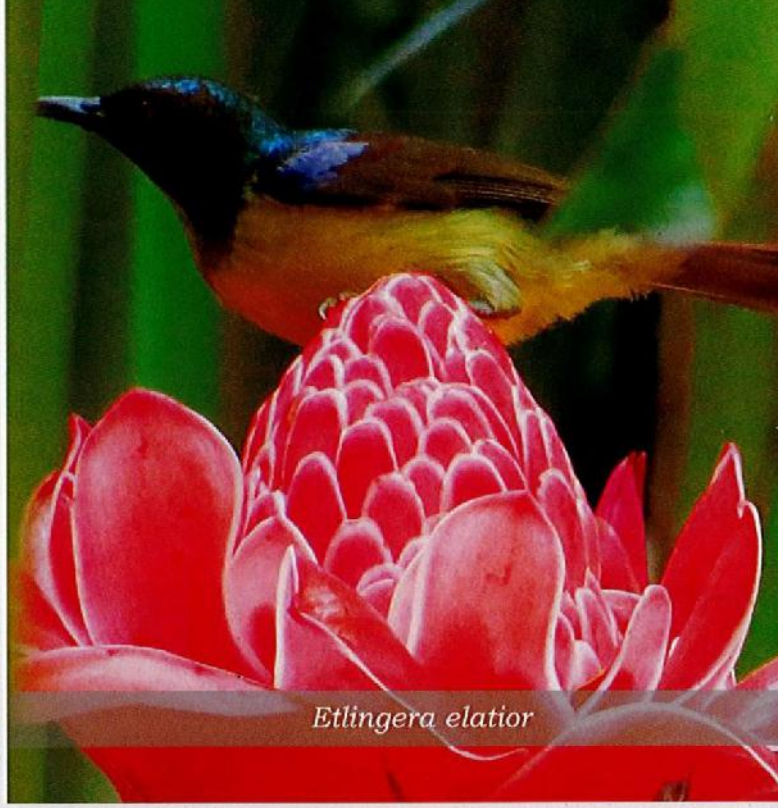
The genus *Etlingera* was established by B.L. Burtt and R.M. Smith in 1986 to integrate species that previously treated under the three genera, *Achasma, Nicolaia* and *Geanthus*. Poulsen (2006) in his revision reported 40 species encountered in Borneo and about 30 species occur in Sarawak. During the Long Banga Scientific Expedition, about 10 species of *Etlingera* were identified and recorded.



Etlingera dictyo



Etlingera velutina



Etlingera elatior



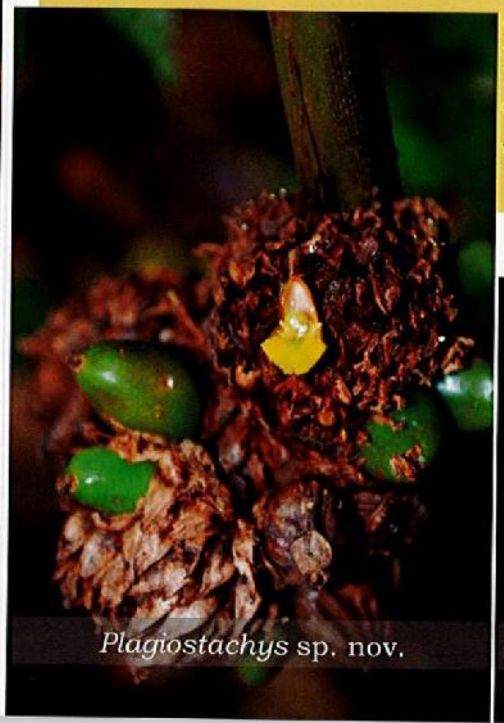
Etlingera brevilabrum



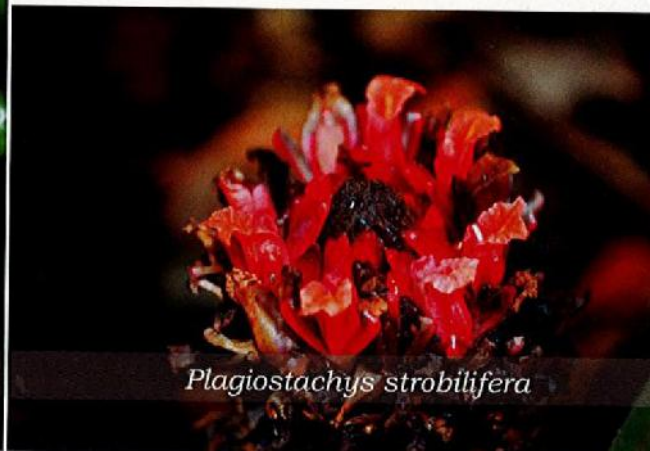
Plagiostachys crocydocalyx

Plagiostachys

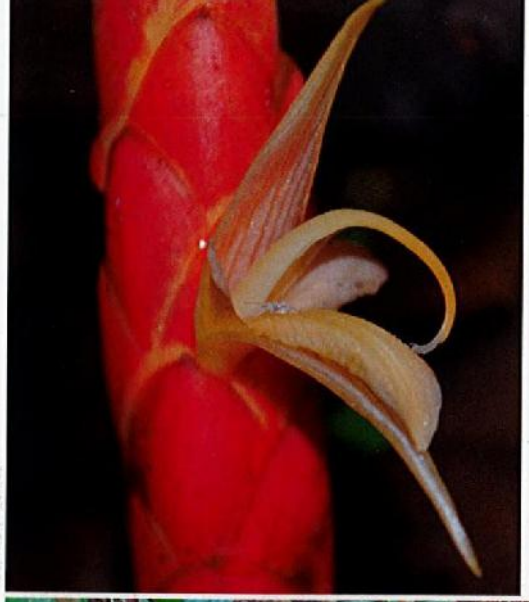
The genus name from Latin words, *plagio* mean lateral and *stachys* mean inflorescence that referred to the characteristic appearance of inflorescence that slanting on the pseudostem. This genus has peculiar distribution ranging from Southern China toward the Southeast Asia, with centre of distribution in Borneo. Out of 17 total number recorded in the world, about 10 - 12 species occur in Borneo and eight of them in Sarawak. Informally, the member in this genus are divided into two groups viz. group with inflorescence that covered with mucilage and group with inflorescence without mucilage cover the inflorescence. About five species recorded in Long Banga during the expedition. One of the species with yellow flowers was identified as a new to science.



Plagiostachys sp. nov.



Plagiostachys strobilifera

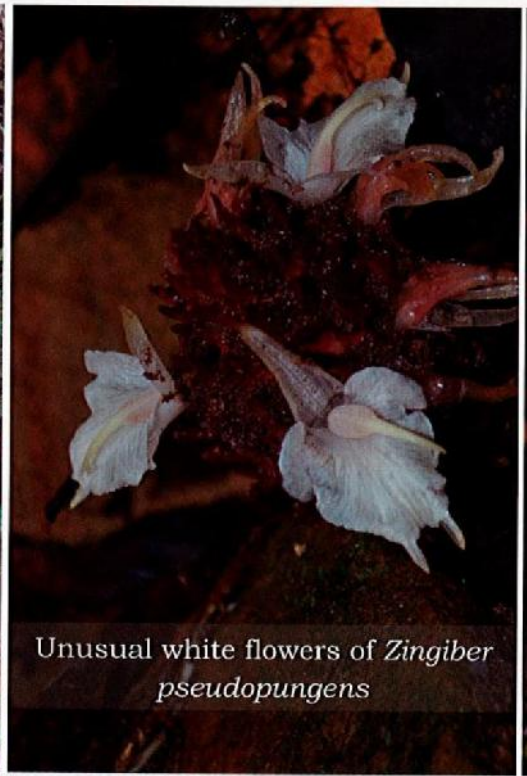


Zingiber

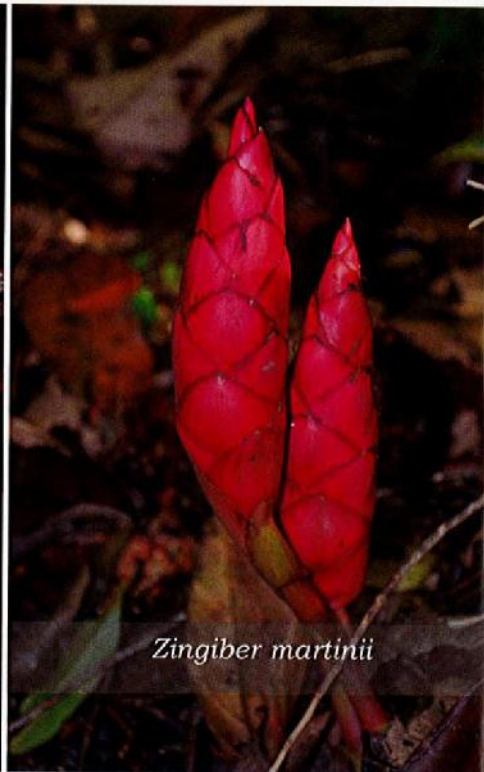
The genus name was derived from the Sanskrit word, "*Sringavera*" which means 'horns-shaped root' or bulls horn. This probably refers to the rhizomes, but some think this also might be refered to the unique structure of the anther crest. This genus distributed throughout South and Southeast Asia to China and Japan and to tropical Australia. There are 16 species Zingiber recorded in Sarawak, including two newly described from Kuching. In Long Banga, about 8 - 9 *Zingiber* species collected and recorded during the expedition. Among the species recorded are *Zingiber martinii, Zingiber pseudopungens, Zingiber coloratum, Zingiber pachysiphon* and includes two unidentified taxa.



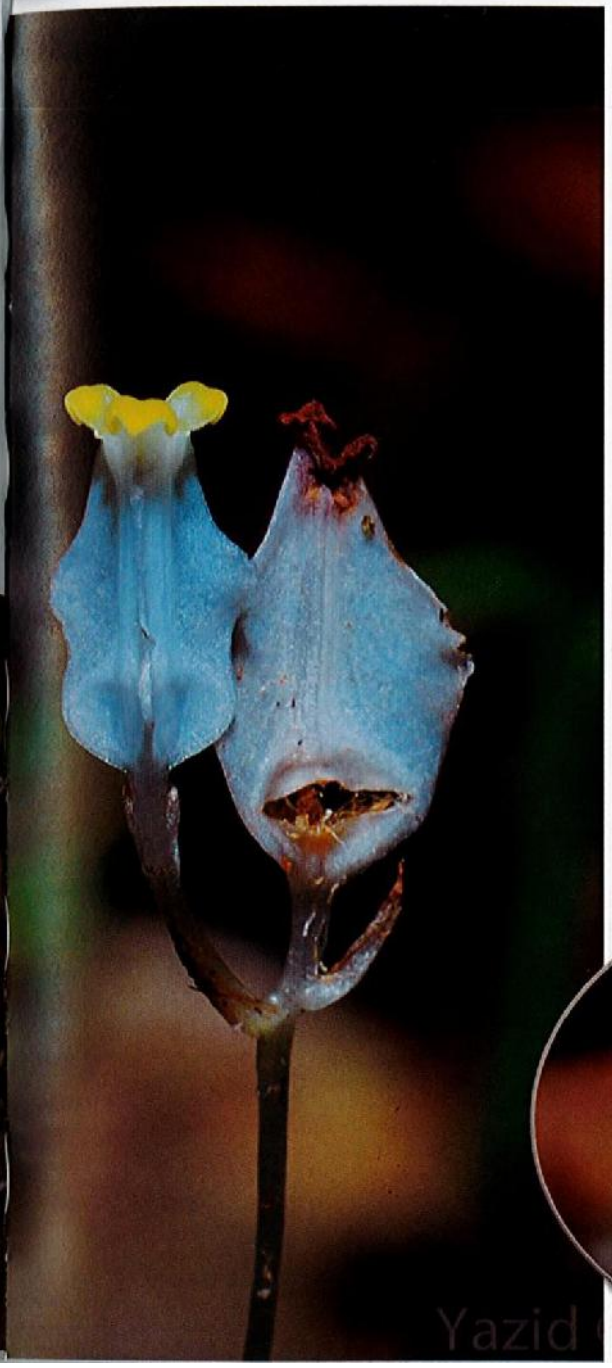
Unidentified *Zingiber* species [above: close-up flower]



Unusual white flowers of *Zingiber pseudopungens*



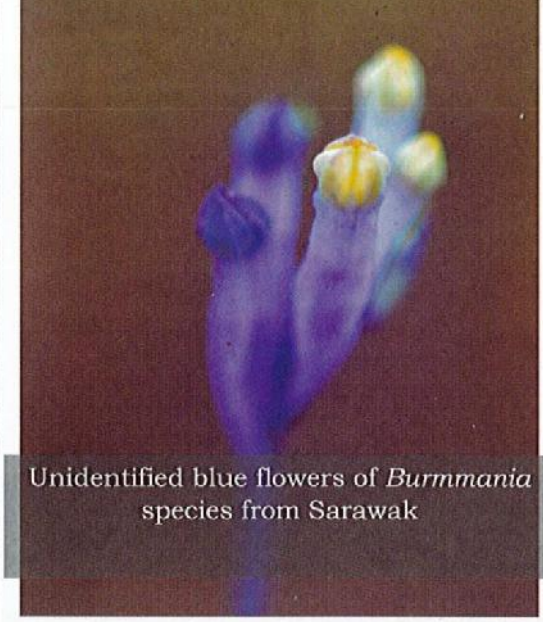
Zingiber martinii



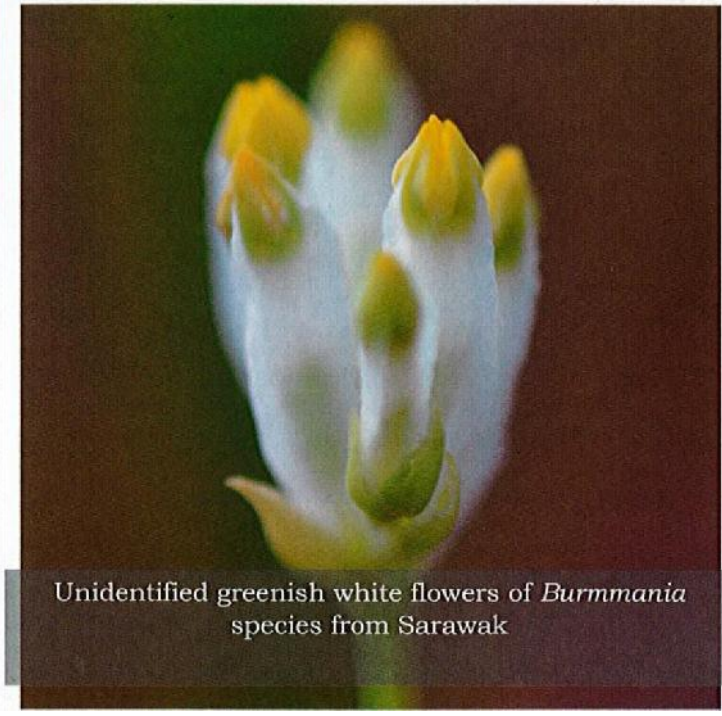
Burmannia

Burmannia is a flowering plant, member of Burmanniaceae family. They are quite remarkable plants, more often red, purple or yellow than green, without much leaf area and in small size. The reason for this appearance is that the member of this family are all myco-heterotrophic species. They grow in shady or open-spaced under tropical environments. There are about 99 species





Unidentified blue flowers of *Burmmania* species from Sarawak



Unidentified greenish white flowers of *Burmmania* species from Sarawak

Lycophytes

The Lycophytes (fern-allies group) or sometimes called Lycopodiophyta is a tracheophyte subgroup of the Kingdom Plantae. It is one of the oldest lineages of living vascular plants. They differ from all other vascular plants in having single vascular vein. They are around 1,290 species of Lycophytes around the world that classified into three groups; Lycopodiales, Isotales and Selaginellales. *Lycopodiella, Huperzia* and *Selaginella* are among the genera recorded in the Long Banga during the expedition.



Selaginella sp.



Lycopodiella cernua

Monilophytes

A Monilophtye is a vascular plant that reproduces via spores or better known as a true-ferns group. There are about 10,560 known ferns species around the world. They are divided into four classes; Psilopsida, Equisetopsida, Marattiopsida and Polypodiopsida. The latter group is the most predominant group with more than 9,000 species recorded. The number of ferns recorded in Sarawak is estimated about 1,100 species.

The tree-fern, *Cyathea* sp.

Lindsaea sp.

Bryophytes

The Bryophytes is traditional name used to refer all the Embryophytes or non-vascular plants that includes mosses, hornworts and liverworts. There are about 25,000 species of Bryophytes around the world. The Bryophytes are small, herbaceous plant that grow closely packed together in mats or cushions on rocks, soil or as epiphytes on the trunks and leaves of forest trees. They flourish particularly well in moist, humid forests or montane rain forest. Though they are small, ecologically they play very important roles for the ecological system.





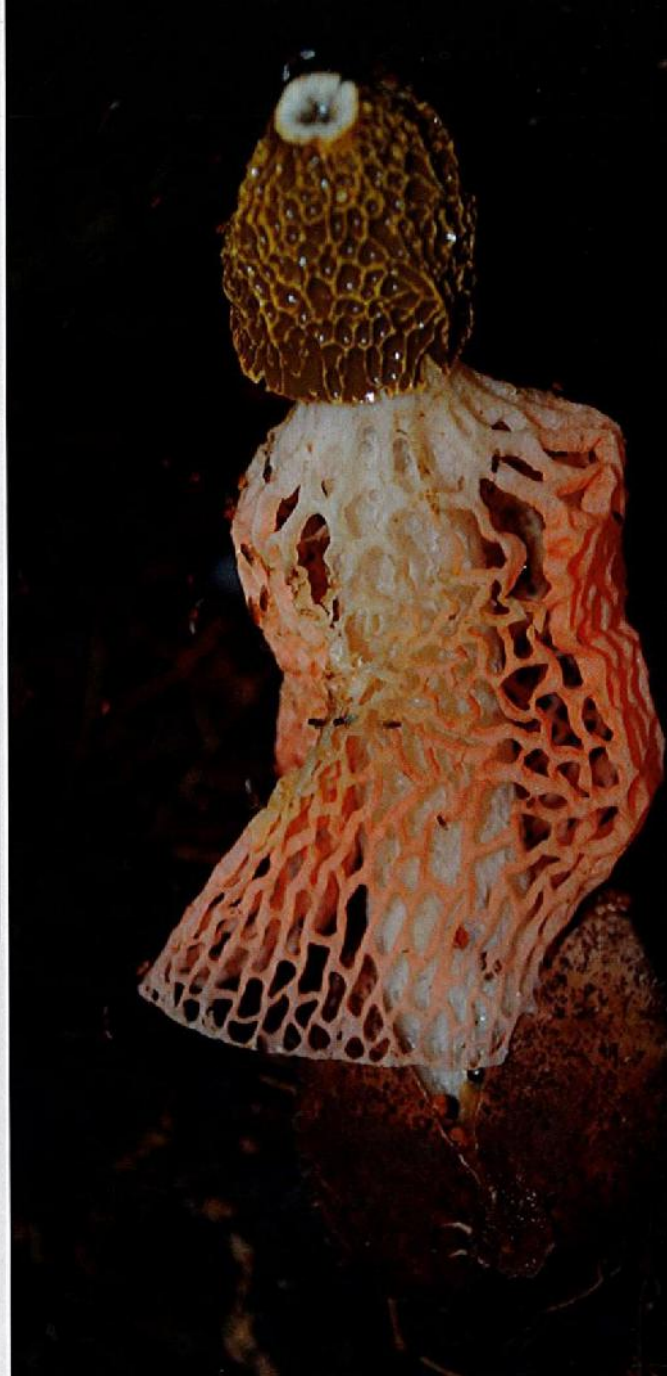
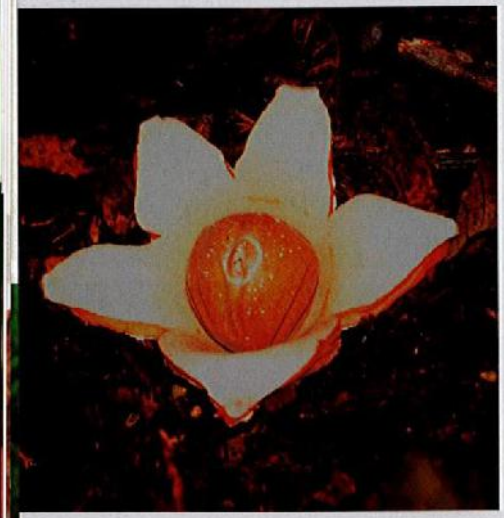
















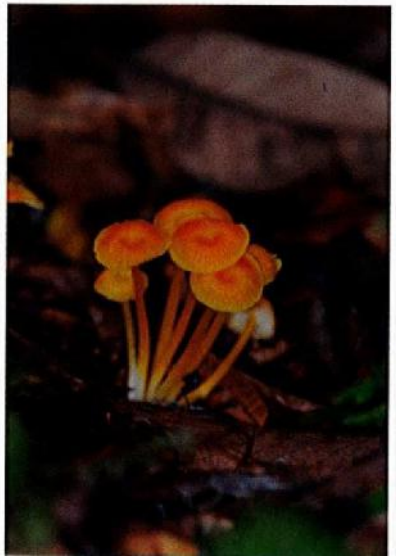


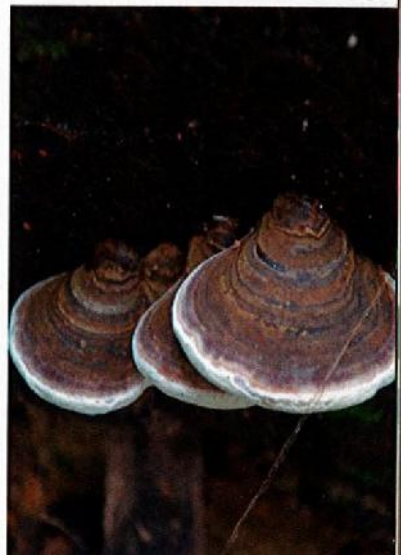

The Mushrooms

The collection of macro-fungi (mushrooms) from the Long Banga has never been done before, therefore all the collection from here are fresh input for the mushrooms data in Sarawak. The most common and abundant fruiting bodies of macro-fungi seen in the forests of Longa Banga areas were *Ganoderma,* coral fungi and soft-fleshy macro-fungi.











Xerospermum cf. noronhianum

Edible wild fruits

Malaysia is very rich with plants species with many of them has potential economically values. It has been reported that a total of 520 species of plants that produce edible fruits or seeds in the Malaysian forests. These plants are broadly grouped into trees (355 species) and non-trees (165 species). The non-trees are including herbs, shrubs, woody climbers and palms. This wild edible fruits are important as food sources for the wildlife and as well as for the people in the areas. Example of edible wild fruits recorded in Long Banga are includes, *Tundun Biawak* (*Xerospermum cf. noronhianum*), wild rambutan (*Nephelium* sp.), *Terap* (*Artocarpus sericeus*) etc.



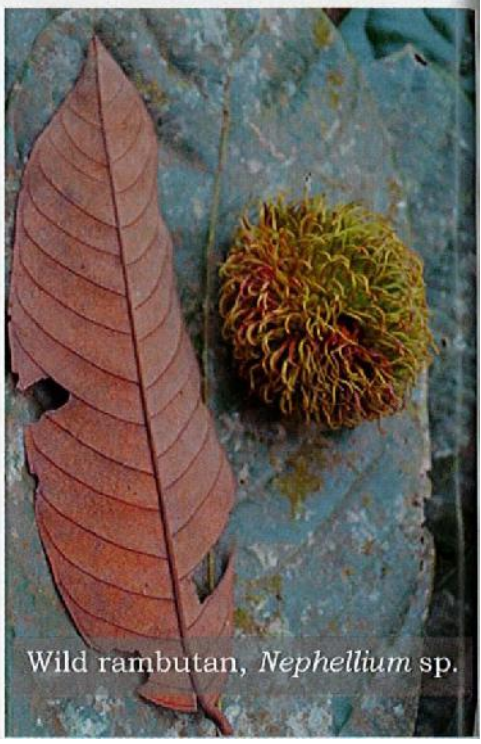
Salacca affinis



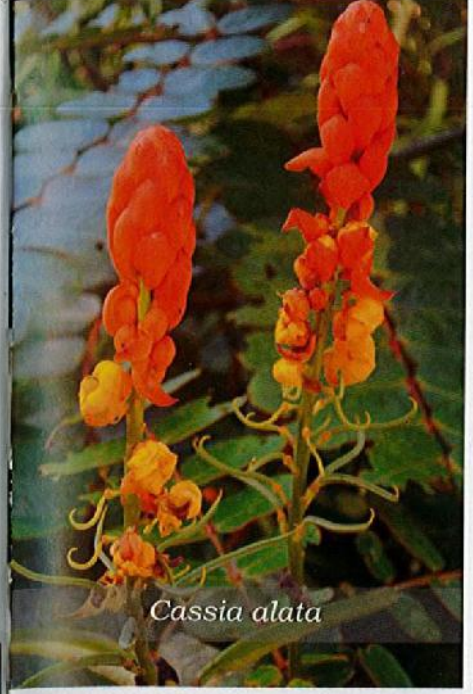
Artocarpus sericeus



Artocarpus sp.



Wild rambutan, *Nephellium* sp.



Cassia alata



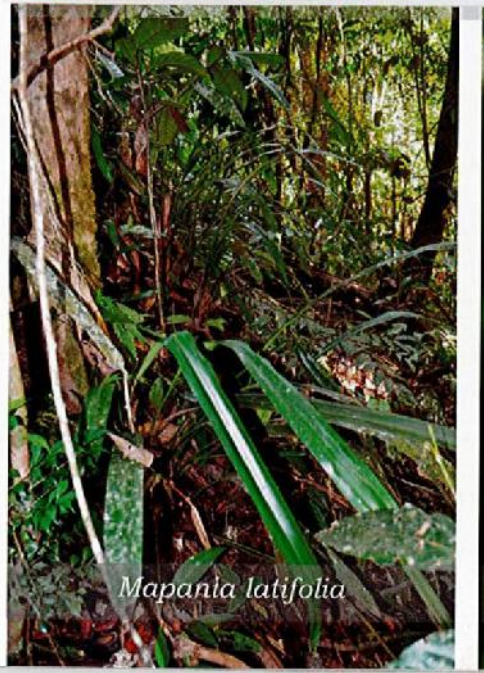
Kacip Fatimah (*Labisia pumila*)

Medicinal Plants

The jungle remedies are mostly from plants or simply herbaceous plants that have been identified and used since long times ago. Medicinal plants are widely used to treat diseases in non-industrial or rural communities, not least because they are far cheaper than modern medicines. Many of popular commercial plants such as Tongkat Ali (*Eurycoma longifolia*), Kacip Fatimah (*Labisia pumila*), Rumput serapat (*Mapania latifolia*), Gelenggan Besar (*Senna alata*) are found in the Long Banga areas.



Tongkat Ali
(*Eurycoma longifolia*)



Mapania latifolia



Clerodendron sp.

The Fauna Study

Besides documenting the richness of flora, the main objective of the Long Banga Scientific Expedition 2016 is to confirm the existences of the Sumatran Rhinos (*Dicerorhinus sumatrensis*) and the *Banteng* or the wild buffalo (*Bos javanicus*) that reported roam in these areas as well as other fauna life.

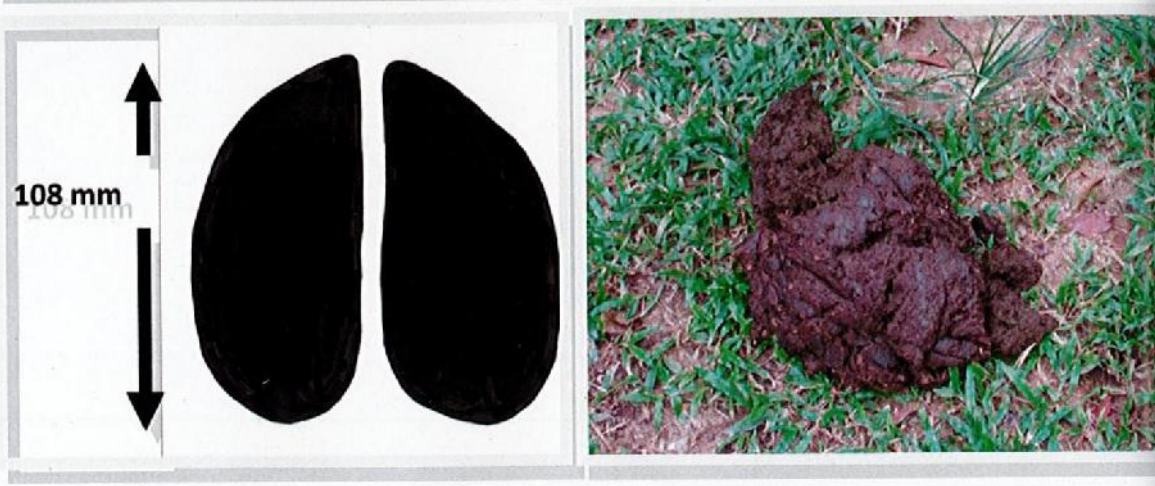
Banteng (*Tembadau*)

Banteng is a species of wild cattle found in Southeast Asia. The *Banteng* live in sparse forest where they feed on grasses, bamboo, fruit, leaves and young branches. The wild *Banteng* is considered as endangered by the IUCN. Yet, no evidence on the existence of this animal in Long Banga.

Sumatran Rhinoceros

The Sumatran Rhinoceros or Asian Two-Horned Rhinoceros is a rare member of the family Rhinocerotiidae. They are critically endangered with only five substantial populations in the wild left. A small populations recorded in Sabah and Kalimantan and yet no record from Sarawak.



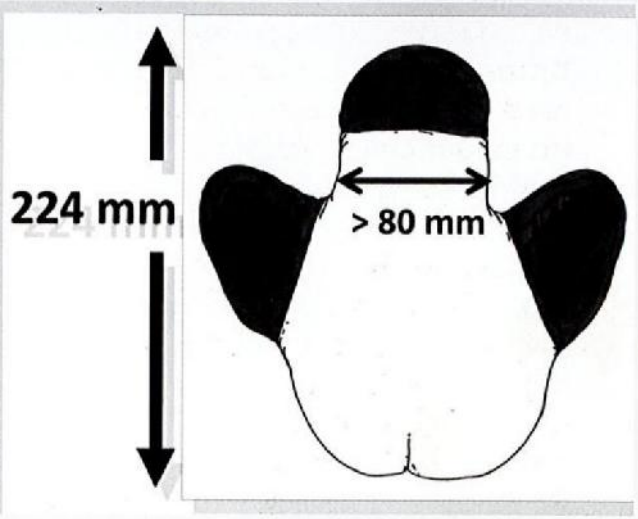


Banteng (*Bos javanicus*)

Photos and illustrations credited: PERHILITAN







Sumatran Rhino (*Dicerorhinus sumatrensis*)

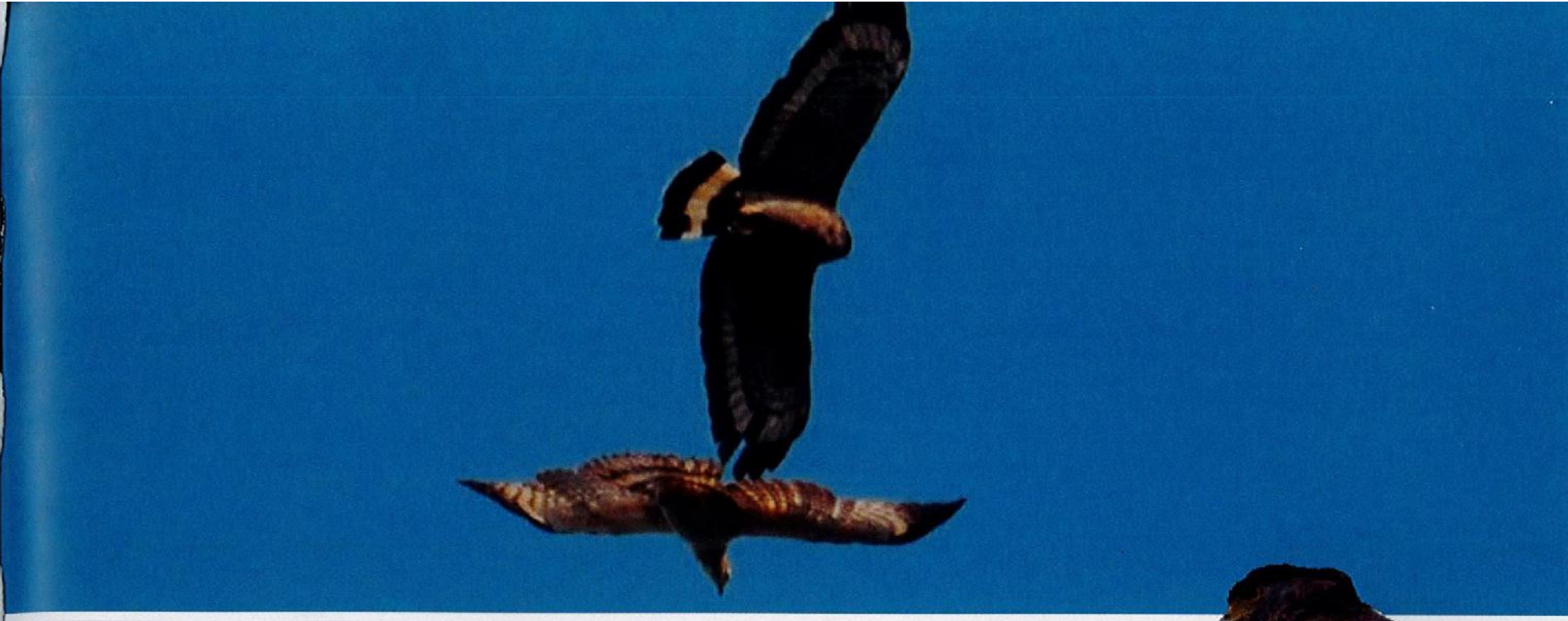
The Rhinoceros Hornbills

Known by local with many names, *Kenyalang, Enggang, Mayau* or *Burung Torak,* the Rhinoceros Hornbills is the Sarawak's State icon. Found in the primary forest throughout Borneo. The only hornbill with a black band on the white tail. Bill and white plumage is often stained orange with oil from gland at base of tail (Phillipps & Phillipps, 2011). The call often with a series of loud honks, breaking into raucous cackles as the bird flies off. This species are heavily hunted for feathers that are used in the traditional costumes and for ceremonies. All the Hornbills in Sarawak are protected under the Forest Department Sarawak Wildlife Protection Ordinance, 1998.



Family: Bucerotidae
Genus: *Buceros*
Species: *Buceros rhinoceros*



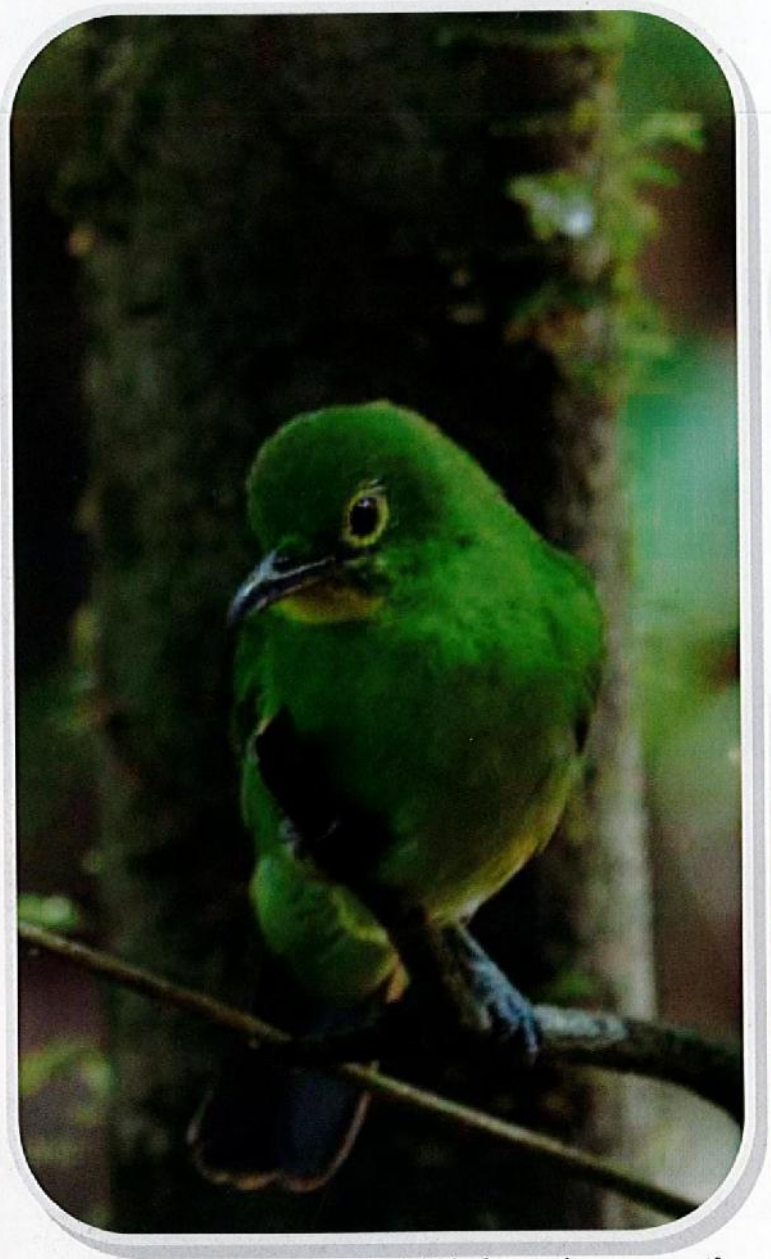


Crested Serpent Eagle

Medium-sized bird of prey that is found in forested habitat across tropical Asia. They fly over the forest canopy on broad wings and tail have wide white and black bars. Their call is often with loud, piercing and familiar three or two note calls. They often feed on snakes, small mammals or smaller birds.

Family: Accipitridae
Genus: *Spilornis*
Species: *Spilornis cheela* Latham





Greater Green Leafbird (*Choloropsis sonnerati*)

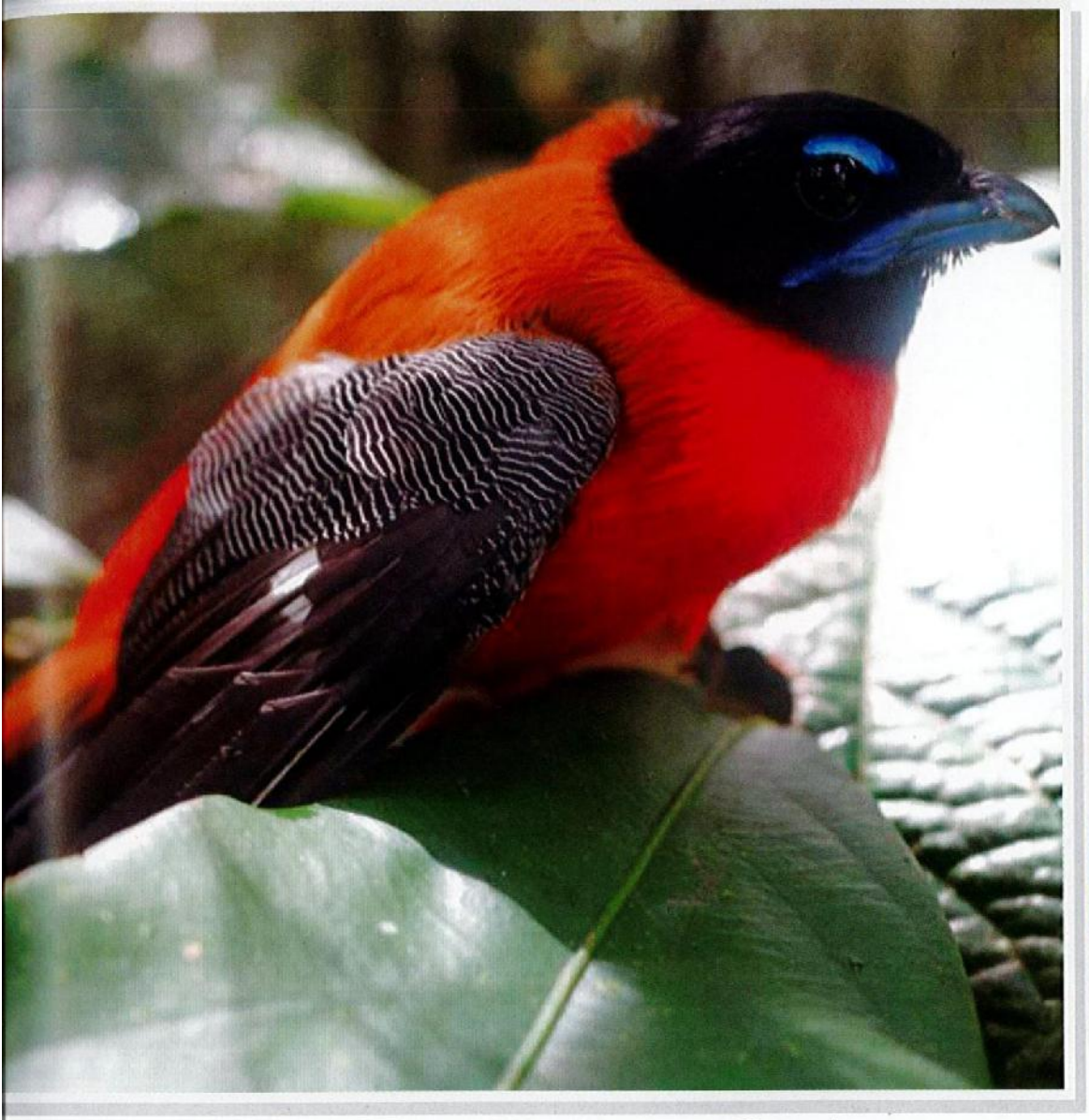


Dark Blue Flycatcher (*Cyornis concretus*)

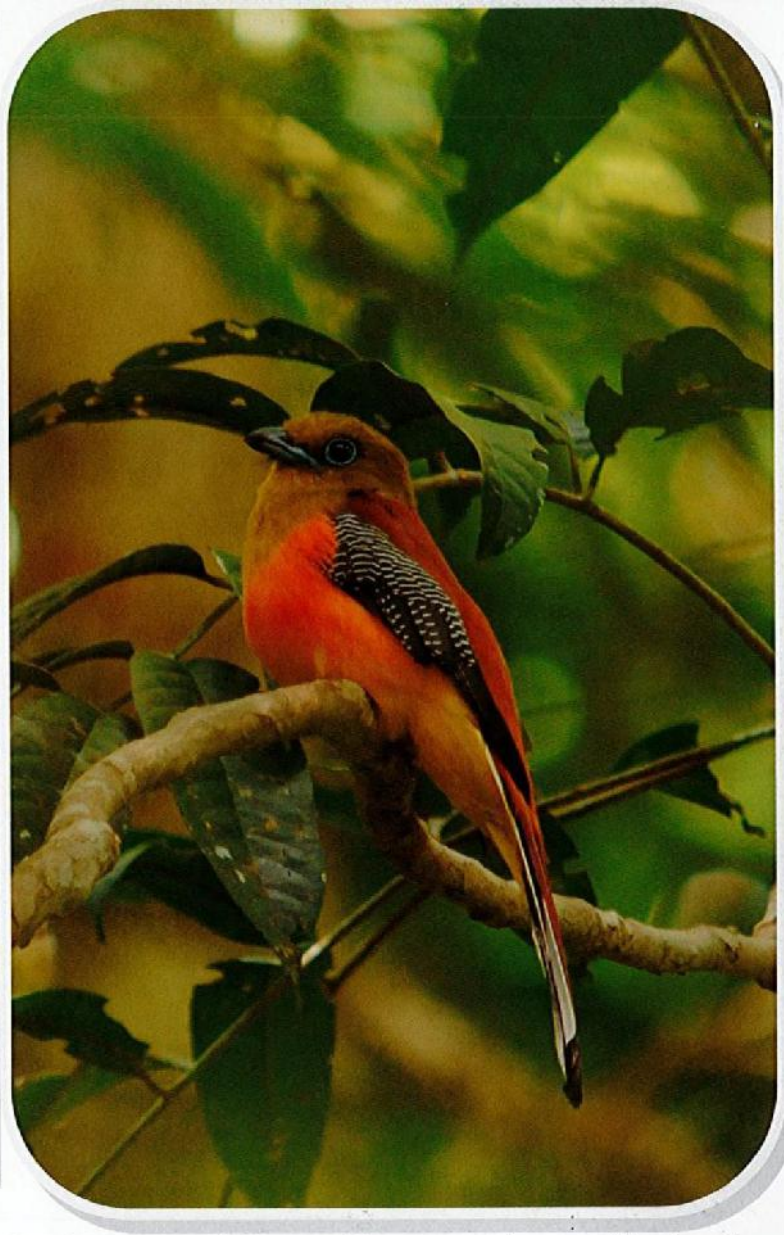


Green Broadbill (*Calyptomena viridis*)





Scarlet-Rumped Trogon (*Harpactes duvaucelii*) - male



Scarlet-Rumped Trogon (*Harpactes duvaucelii*) - female



Sacred Kingfisher (*Todiramphus sanctus*)

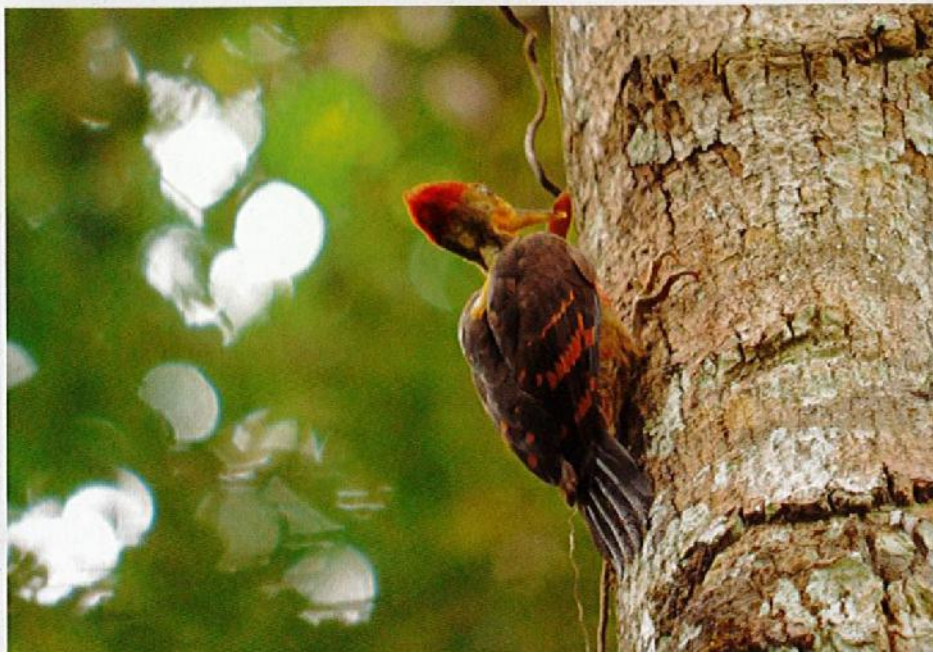


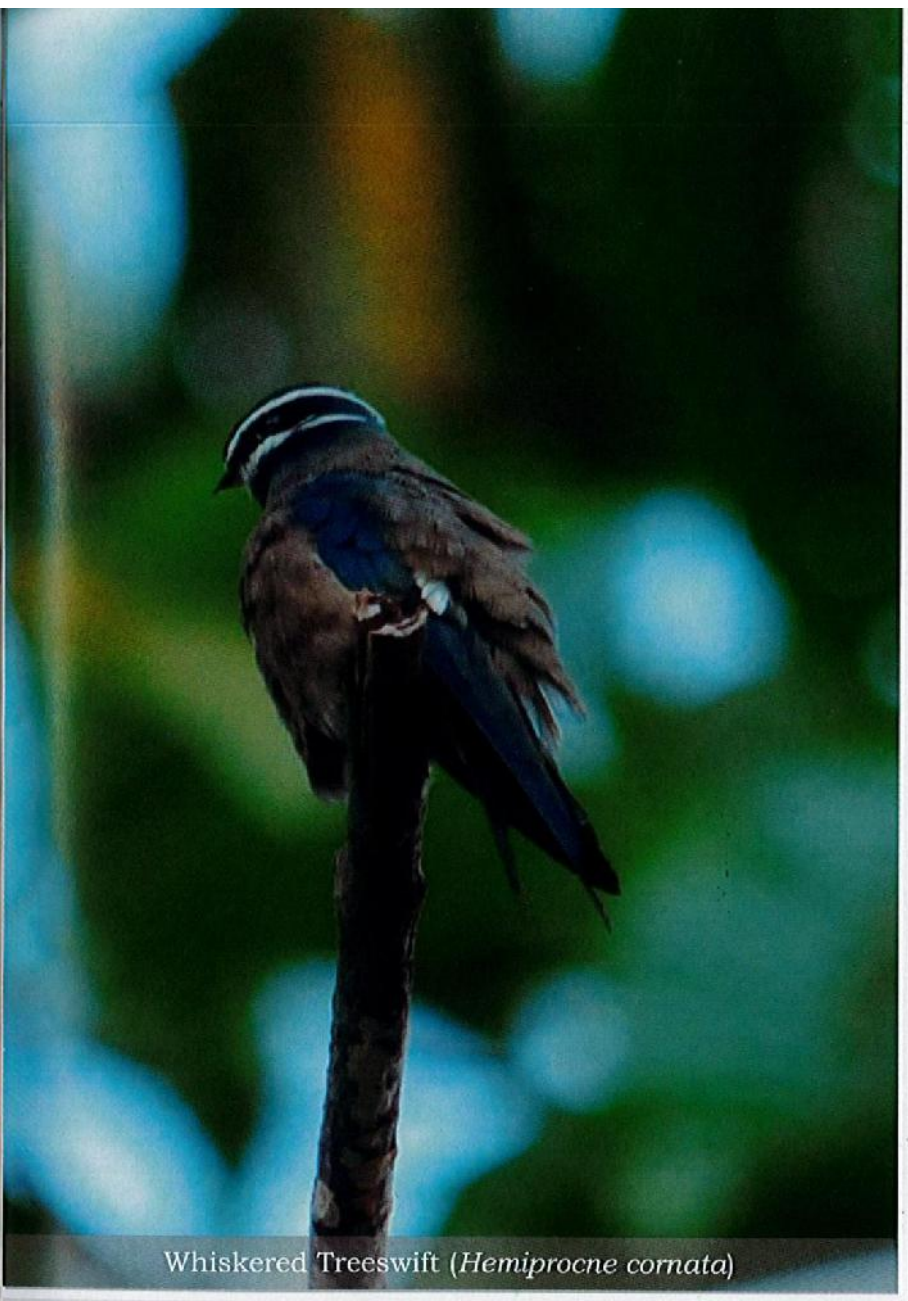
Buff-Necked Woodpecker (*Meiglyptes tukki*)

Rufous Backed Kingfisher (*Ceyx rufidorsa rufidorsa*)

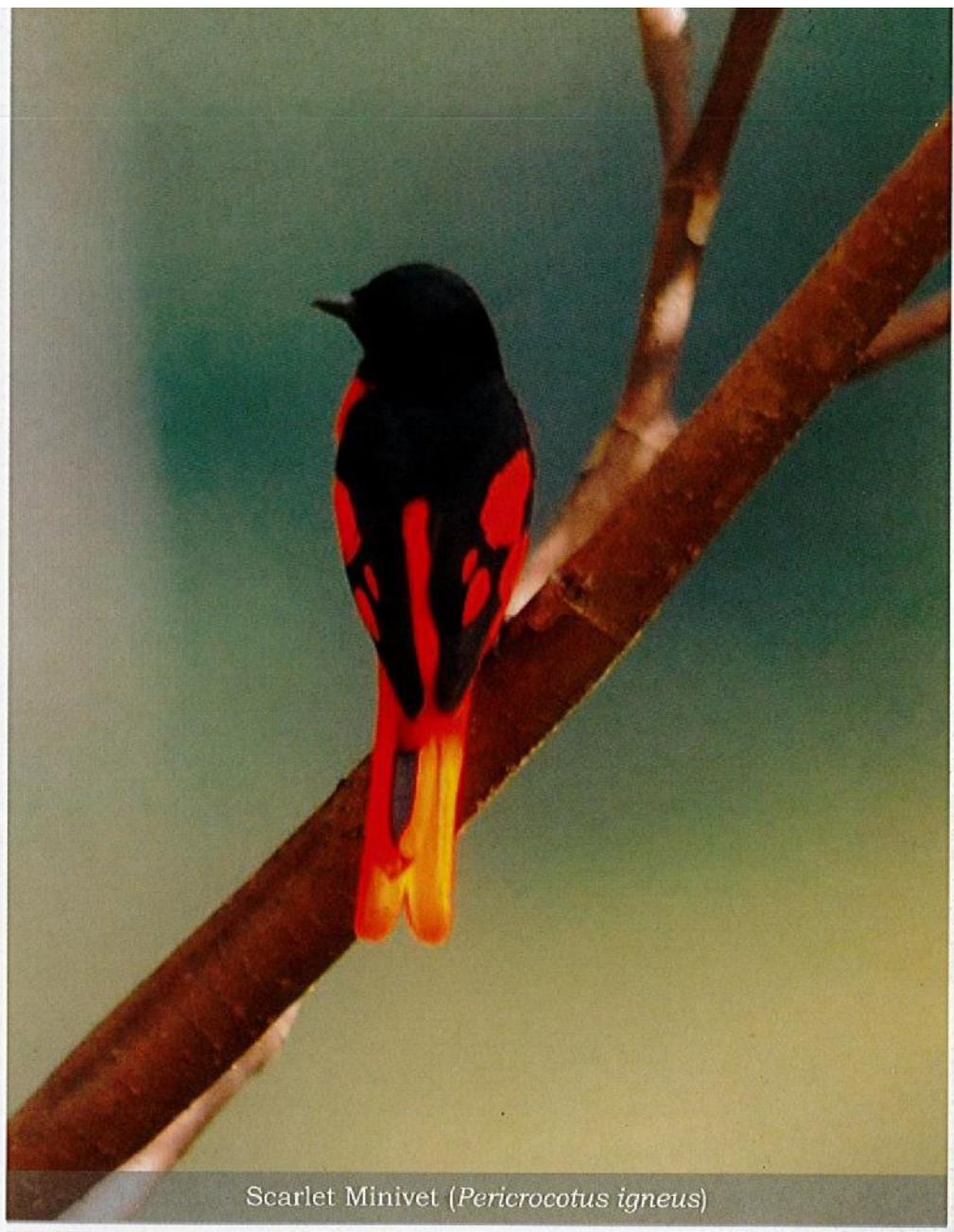


Orange-Backed Woodpecker (*Reinwardtipicus validus*)





Whiskered Treeswift (*Hemiprocne cornata*)



Scarlet Minivet (*Pericrocotus igneus*)

Babblers

The Babblers or Timaliids are a large family of passerine birds that rather diverse in size and coloration but are characterized by soft fluffy plumage. Morphological diversity is rather high; most species resemble "warblers", jays and thrushes. This group is among those old world bird families with highest number of species still being discovered.

Timaliids are small to medium size birds. They have strong legs and quite terrestrial. They are not strong migratory and most species have short rounded wings and a weaker flight.

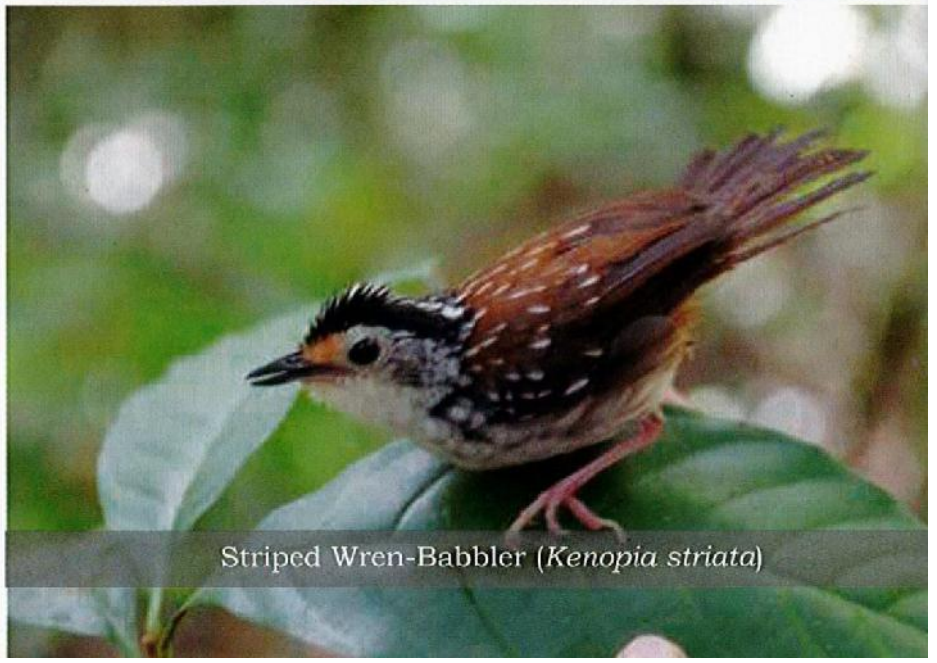


Scaly-Crowned Babbler (*Malacopteron cinereum*)



Horsfield's Babbler (*Trichastoma sepiarium*)

Short-Tailed Babbler (*Trichastoma malaccense*)



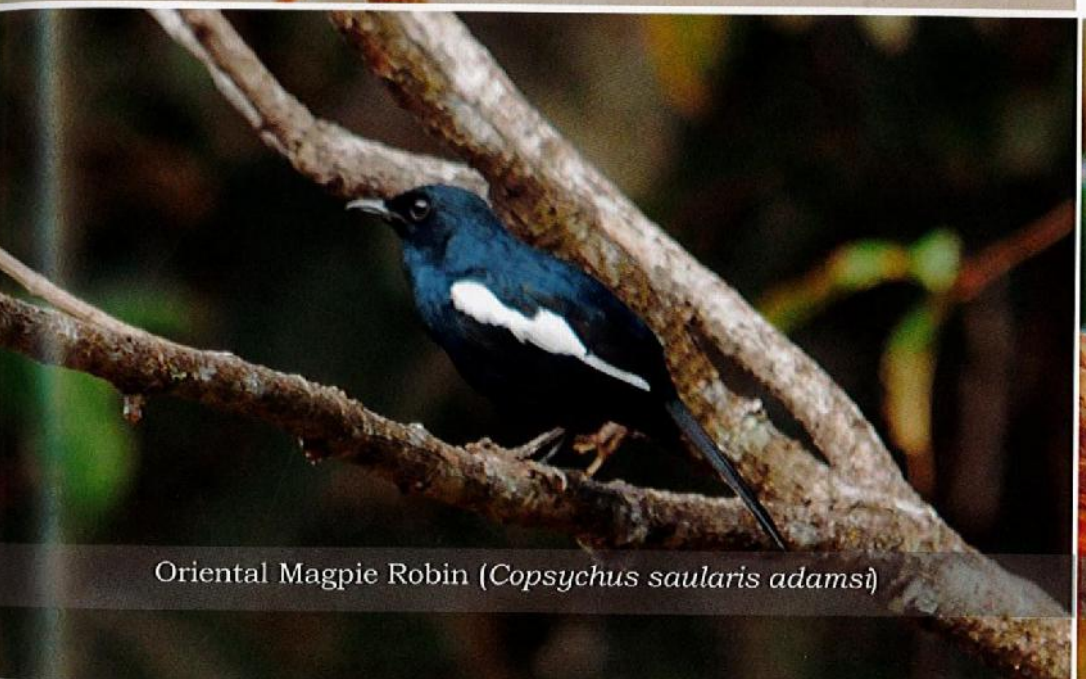
Striped Wren-Babbler (*Kenopia striata*)



White-Rumped Shama (*Copsychus malabaricus*)

Magpie-Robins

The Magpie-Robin or Shamas are medium-sized insectivorous birds. They are group in the genus *Copsychus* of the family Muscicapidae. The White-Rumped Shama (*Copsychus malabaricus*) is the most popular cage-bird because their voice is rich and melodious and their ability to mimic other birds sound. They also make a 'TcK' call in alarm or when foraging. The Oriental Magpie-Robin (*Copsychus saularis*) is the most common birds in the forest and urban gardens.



Oriental Magpie Robin (*Copsychus saularis adamsi*)



Oriental Magpie Robin (*Copsychus saularis musicus*)

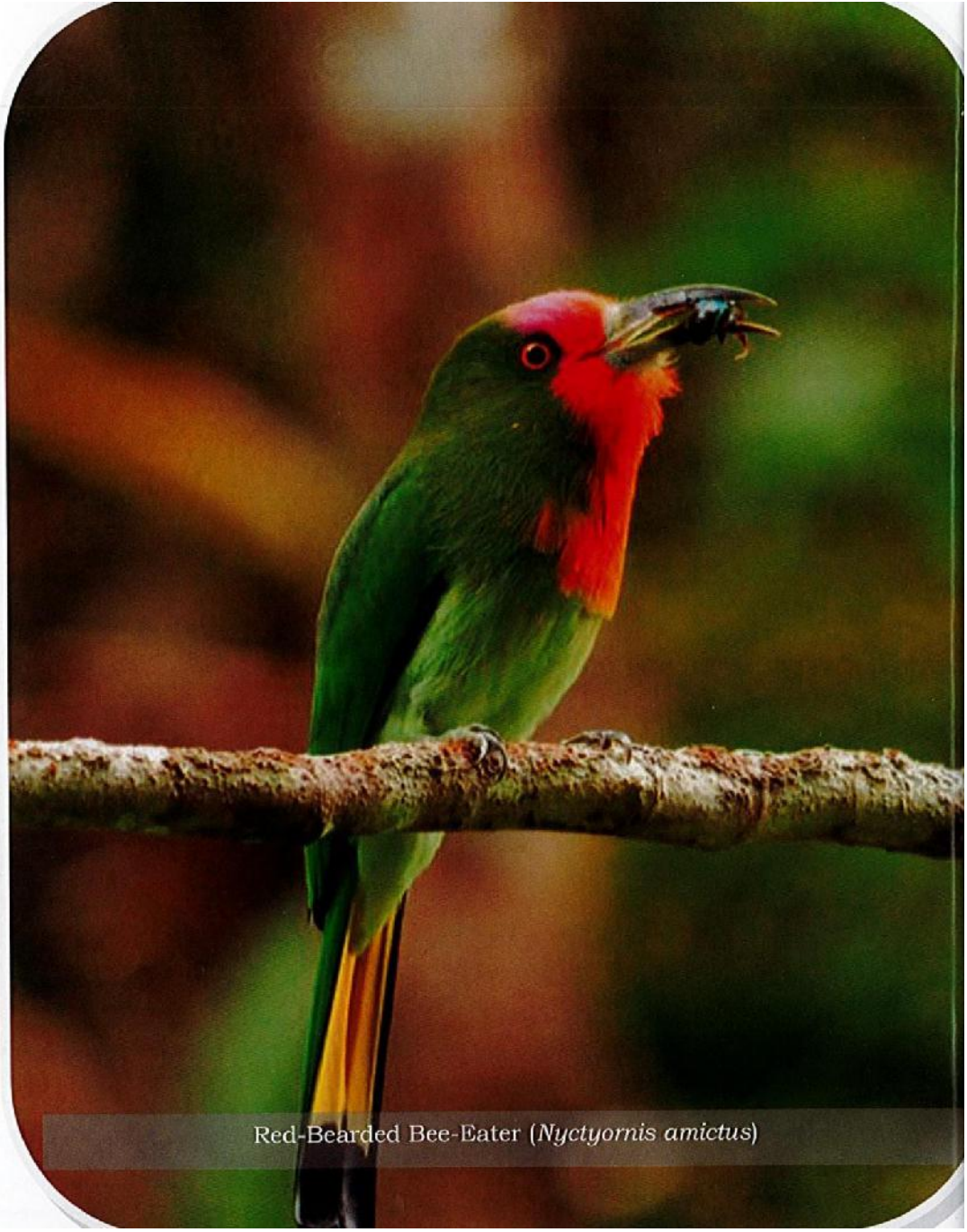
List of endemic birds in Long Banga

- Mountain Serpent Eagle
- Borneo Frogmouth
- Bornean Banded Kigfisher
- Mountain Barbet
- Bornean Barbet
- Bornean Banded Pitta
- Blue-banded Pitta
- Bornean Treepie
- Yellow-rumped Flowerpecker
- Bornean Leafbird
- Dusky Munia
- Bornean Bulbul
- Chestnut-crested Yuhina
- Pygmy Ibon

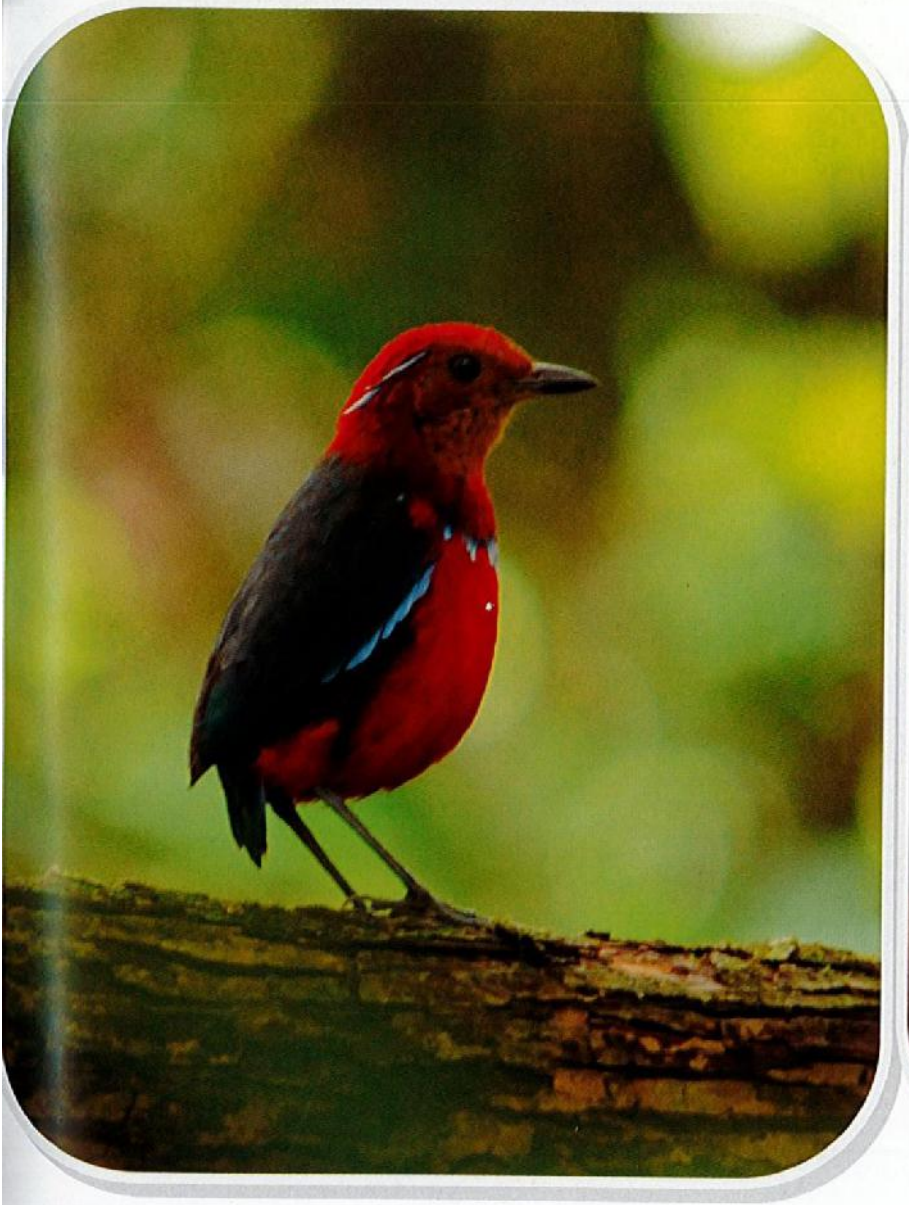
Recorded during the 2016 Long Banga scientific Expedition.



Orange-Backed Woodpecker (*Reinwardtipicus validus*)



Red-Bearded Bee-Eater (*Nyctyornis amictus*)



Blue-Banded Pitta (*Pitta arquata*)



Sundan Frogmouth (*Batrachostomus cornutus*)

Snakes

Snakes are elongated, legless, carnivorous reptiles of the Order Squamata (Sub-order: Serpents) that can be distinguished from the legless lizard by their lack of eyelids and external ears. All the snakes are ectothermic, amniote and vertebrates that covered in overlapping scales.

The Southeast Asia's snakes exhibit remarkable diversity of colour, patterning, shape and size and as well as their habits and behavior. Some species spend virtually their entire lives burrowing in tropical soil, others are master climbers which can easily ascend vertical tree trunk or navigate their way amongst the most slender of branches. The most amazing of tree dwellers are the genus *Chrysopelea,* such as the Paradise Tree Snake, the flying snakes



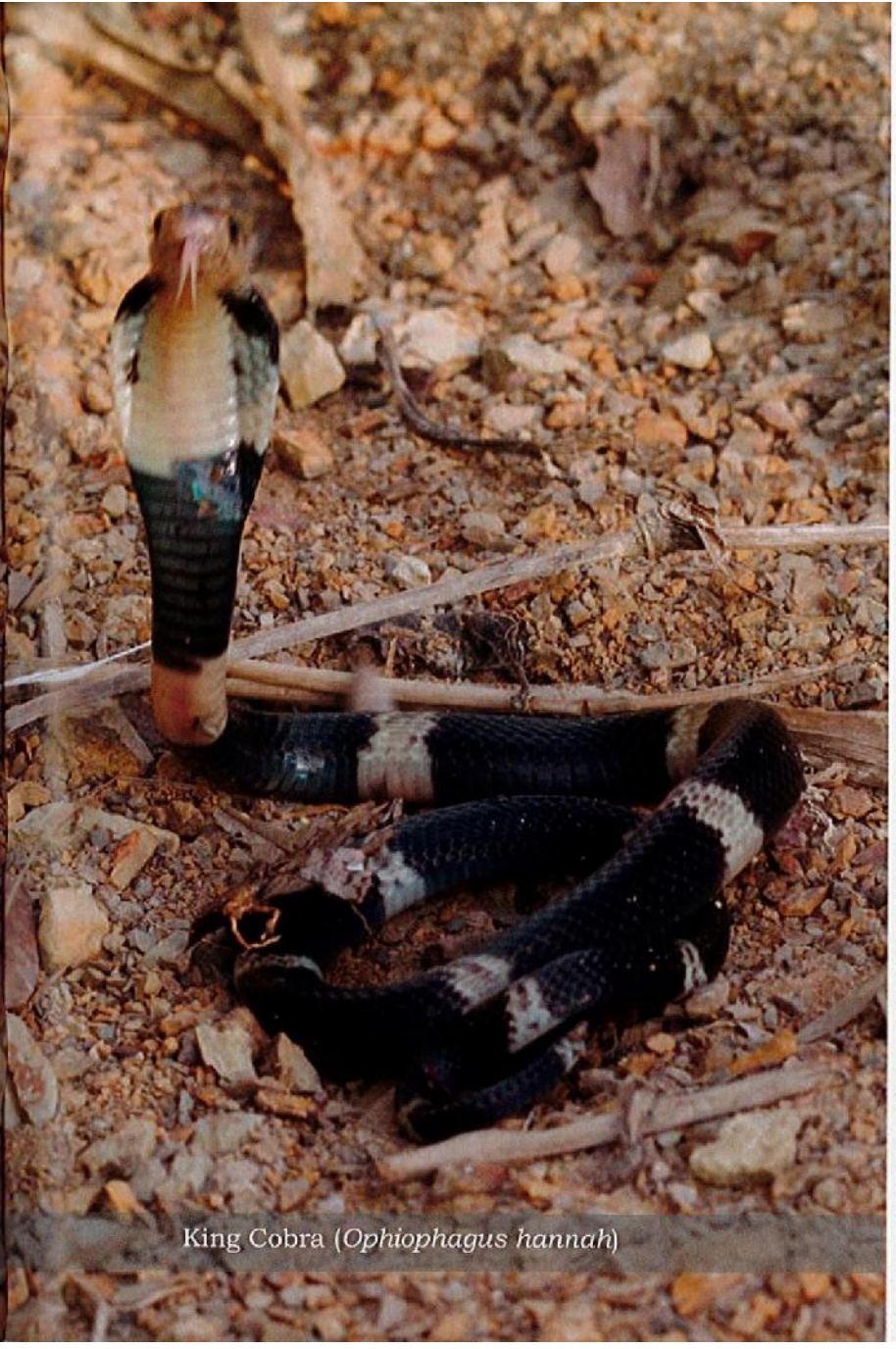


Oriental whip snake (*Ahaetulla prasina*)



Pink-Headed Reed Snake (*Calamaria schlegeli*)





King Cobra (*Ophiophagus hannah*)

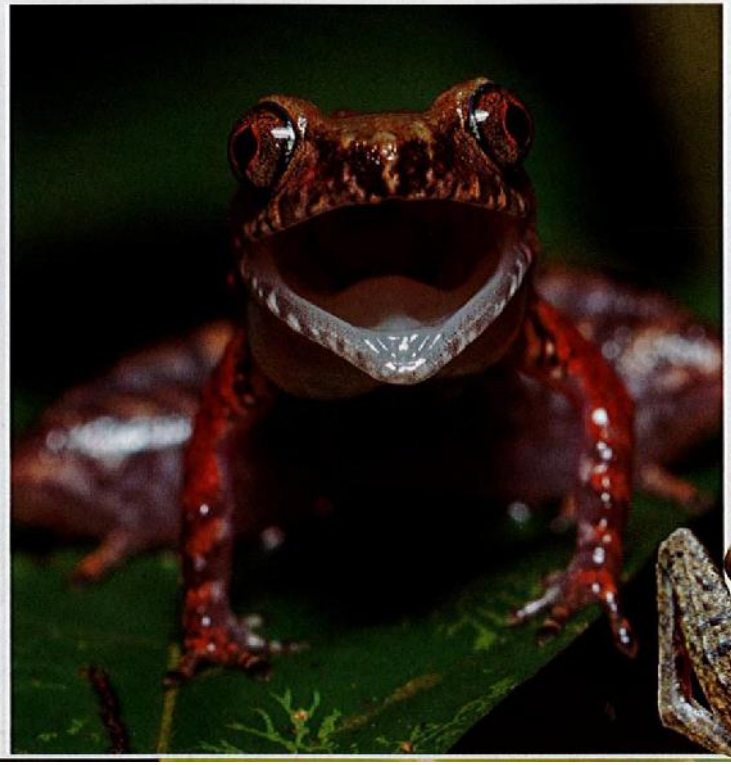


Wragler's Pit Viper (*Tropidolaemus wagleri*)

Amphibians

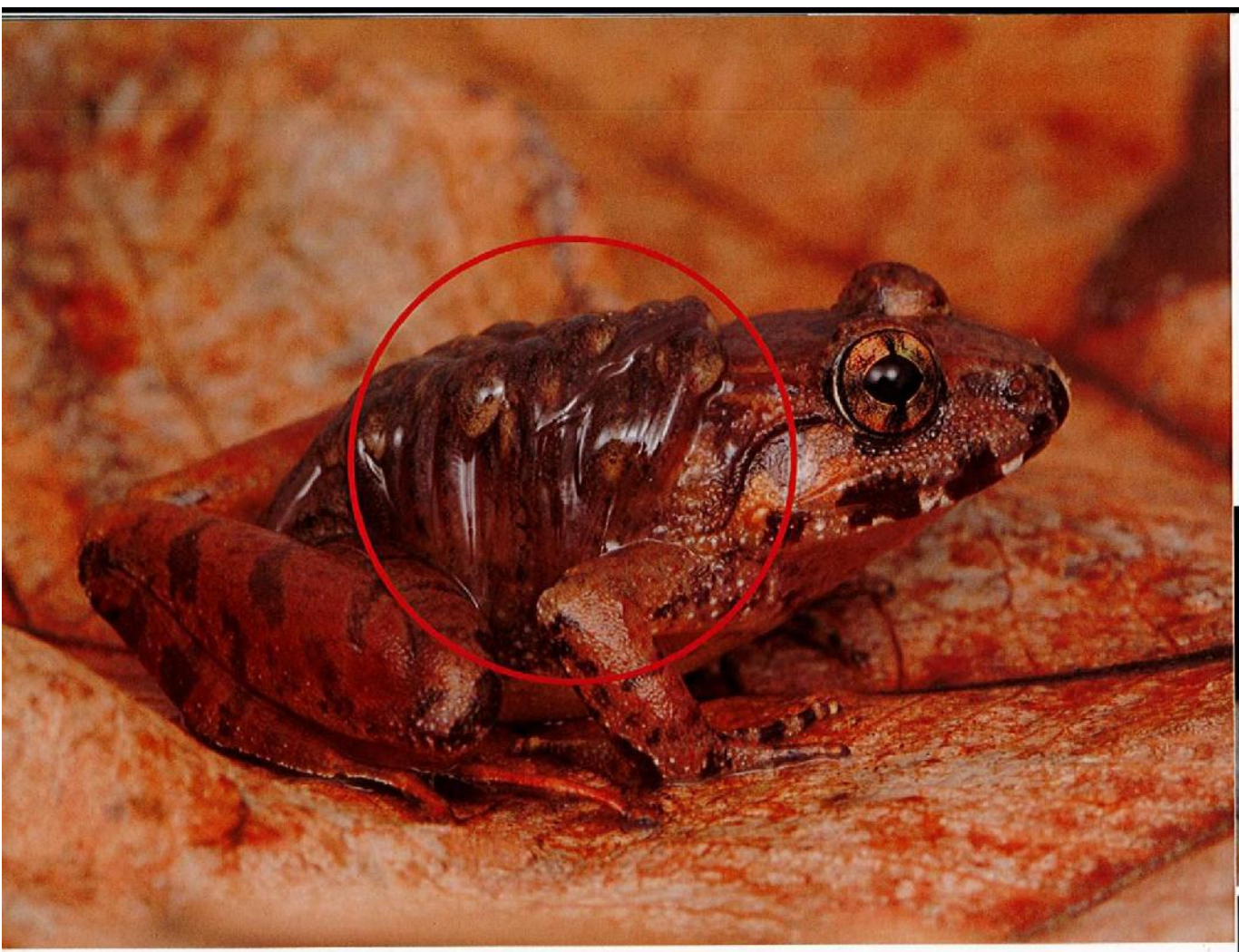
Amphibians grasp their utmost diversity in the tropics, mainly in the moist and hot environment of tropical rainforest and freshwater swamp forest. Southeast Asia is one of the world's biodiversity hotspots for amphibians, where amazing evolutionary detonation has resulted in unbelievable diversity of form, colour and lifestyle. There are more than 700 species has been reported occurs in the region. They are found in many habitats such as the shallowest puddles, hidding under leaf litter, making their foam nests in streamside vegetation, or calling relentlessly from treeholes. Amphibians are found all over Borneo. About $^{2}/_{3}$ of all known Borneo amphibian species are found in Mulu National Park. Many new discoveries of amphibians recorded in the Heart of Borneo areas such as, a new species of frog from Kelabit Hghlands (*Kalophrynus eok*), *Philautus erythrophthalmus* and *Ansonia anotis* from Sabah and new record of Bornean flat-headed frog from Kapuas River basin.








hosii
Rana luctuosa
Malayan Horned Frog (Megophrys nasuta)
Polypedates macrotis
Bufo asper









Most of the frogs lay their eggs in water and when the tadpoles hatch they are on their own with no parent intervention. But some of the frog species do things a little differently, they carry their tadpoles about on their backs.









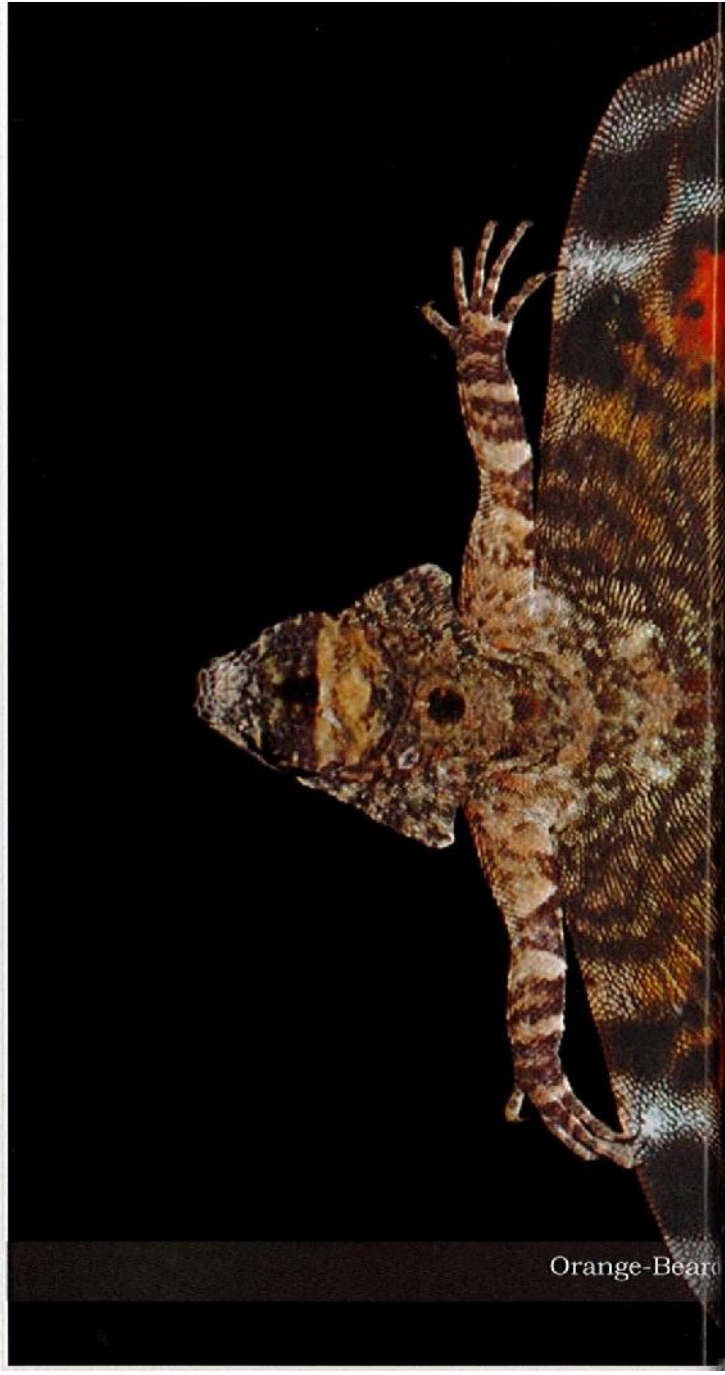
Harlequin Flying Frog (*Rhacophorus pardalis*)

Lizards

The lizards are widespread group of squamate reptiles with over 6,000 species throughout the world. In Southeast Asia, the lizards have evolved to fill an amazing range of ecological niches, from the tiniest of geckos inhabiting people's houses to a huge monitor lizards of up to 3 meters. The most remarkable lizards are the gliding lizards or probably better known as flying dragon. They have winged structure (patagium) which allows them to glide long distances from tree to tree. The most diverse group of lizards are the smooth-bodies skinks.



Brown Tree Skink (*Dasia grisea*)



Orange-Beard



Gliding Lizard (*Draco abbreviates*)



Motane Gecko (*Cyrtodactylus matsui*)



Common Lowland Gecko (*Cyrtodactylus pubisuleus*)

Dragonfly

The Dragonflies are among the most beautiful insects that belong to the Order Odonata which are called Odonates. The are five families of Dragonflies, viz. Aeshnidae, Gomphidae, Chlorogomphidae Corduliidae and Libellulidae. They are often found near the freshwater as their breeding sites. However, they are also adapted to many habitats; suburban, drains, garden ponds, open lakes, dams, marshy wayside places, swamp forests and mixed dipterocarp forests (Orr, 2005).



Orthetrum pruinosum



Indaeschna grubaueri



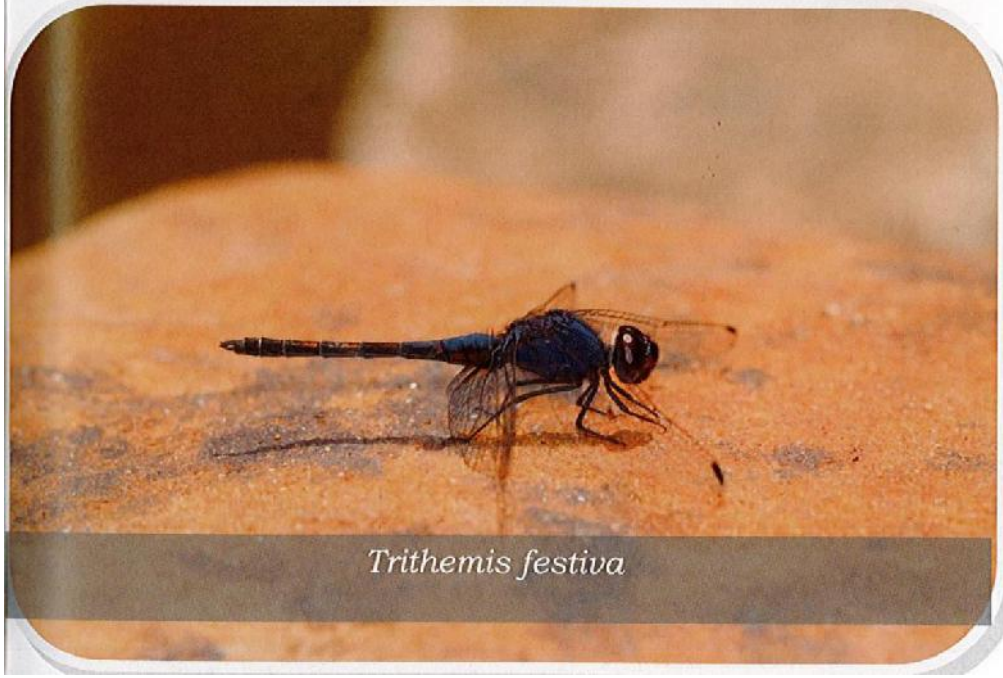
Orthetrum testaceum



Orthetrum glaucum



Neurothemis terminata



Trithemis festiva



Cratilla lineata



Neurothemis fluctuans



Neurothemis ramburii



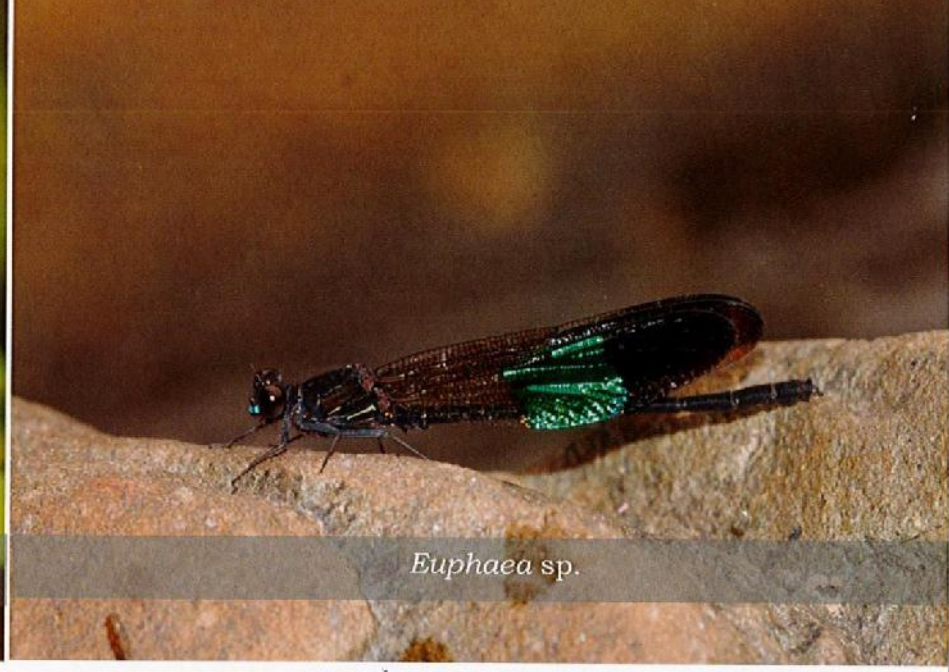
Macromia corycia



Agrionoptera insignis



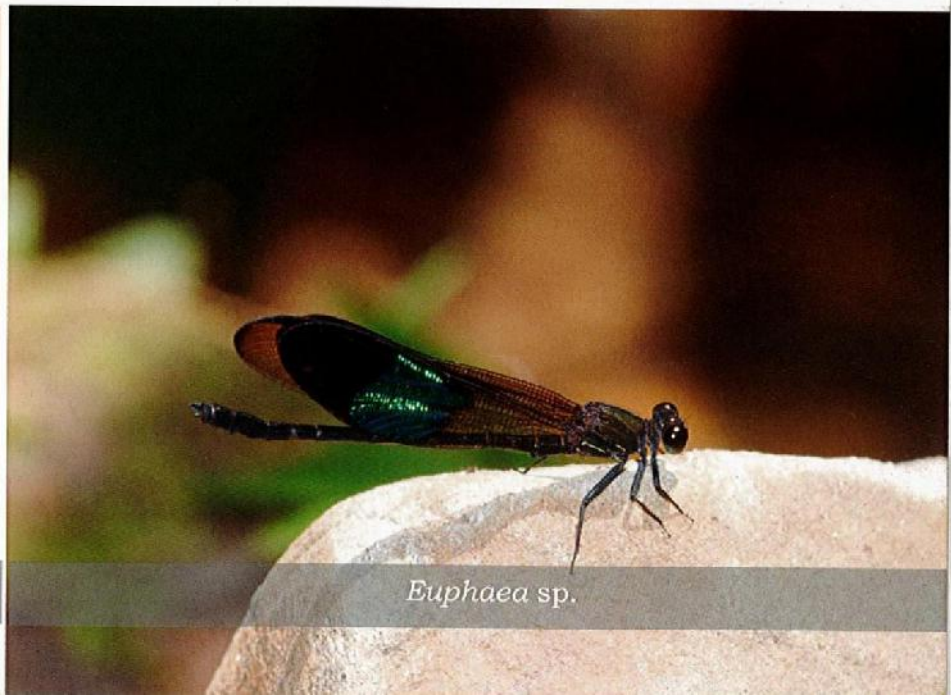
Agriocnemis femina



Euphaea sp.



Xiphiagrion cyanomeles



Euphaea sp.



Coeliccia arcuata



Coeliccia nigrohamata



Ceriagrion bellano



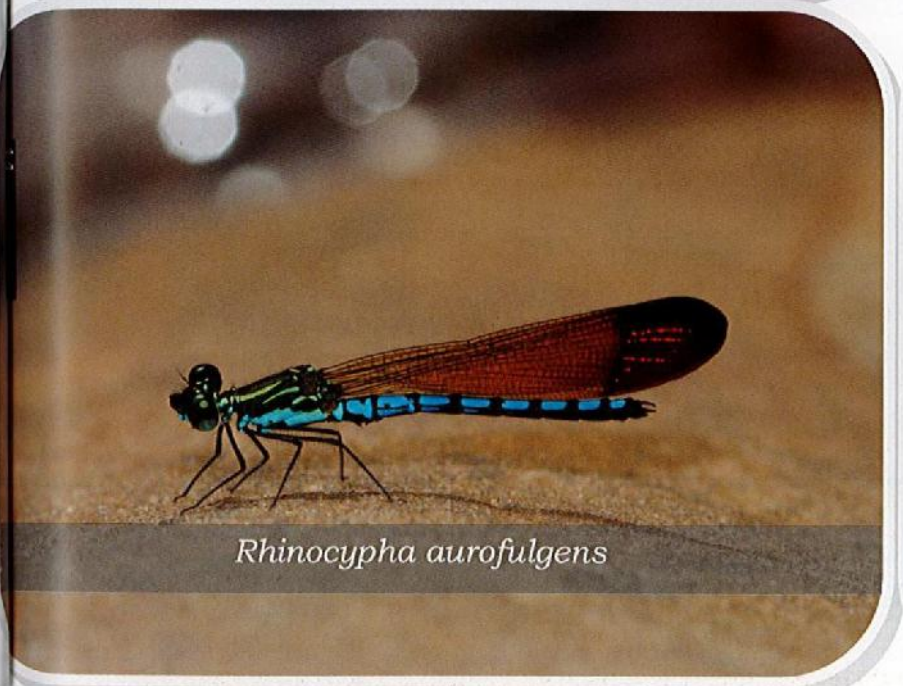
Stenagrion dubium



Drepanosticta rufostigma

Damselfly

The Damselflies are grouped together with the Dragonflies in the Order Odonata because they share similar morphological characteristics. The Damselflies can be differentiated by the fact that the wings are held together and parallel to body when they are resting. In addition, the sizes of Damselflies are usually smaller, more delicate and they are weaker flier and also their eyes are separated. The Damselflies are inhibit slow moving waters, margin of streams, ponds and lakes. There are about 2,900 species of Damselflies around the world ranging from 18 mm to about 19 cm length of the body.



Rhinocypha aurofulgens



Orolestes wallacei



Other Insects

The insects fauna in the Long Banga areas are tremendous. Cicadas, bees, wasps, stick insects, cockroaches, butterflies, moths, grasshoppers, mantis and many more can be observed during the day or night times. Yet, the data on this component are still far from sufficient as they are not covered during the expedition. The number of insects from this areas might be exceeding thousands as they are the biggest fauna group in the world.















Camera Trapping Records

In natural, it is difficult to record or photograph the wild animals due to their sensitiveness to movements or human's odor. So, camera trapping is among the best method or strategy to record the occurrence of the animals in particular areas. The cameras were installed at the selected animal's pathways to capture images and record videos. Dates and times of animals passed by at the camera area were also recorded on the images.

Among the animals recorded by the camera trapping method in the Long Banga areas were includes Great Argus (*Argusianus argus*), Crested Fireback (*Lophura ignita*), Hose's Leaf-Monkey (*Presbytis hosei*), Pig-Tailed Macaque (*Macaca nemestrina*), Long-Tailed Macaque (*Macaca fascicularis*), Barking Deer (*Munticus muntjak*), Sambar Deer (*Rusa unicolor*), Bearded Pig (*Sus barbatus*), Whitehead's Rat (*Maxomys whiteheadi*), Malayan Porcupine (*Hystrix brachyura*), Banded Palm Civet (*Hemigalus derbyanus*), Yellow-Throated Marten (*Martens flavigula*), Pangolin (*Manis javanica*), Emerald Dove (*Chalcophaps indica*), Thick-Billed Green Pigeon (*Treron curvirostra*).

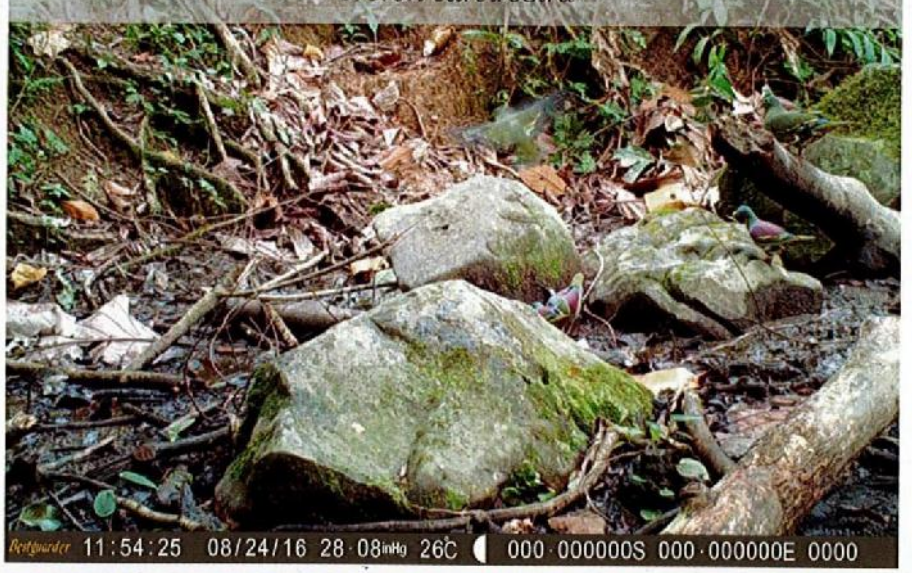


Argusianus argus

Lophura ignita (female)



Treron curvirostra



Lophura ignita (male)



Chalcophaps indica



Hose's Leaf-Monkey

The Hose's Leaf-Monkey is a primate group that endemic to Borneo, scientifically known as *Presbytis hosei*. This species occur in primary and secondary forest at altitude range 1000 - 1300 m and primarily a folivorous, but will also consume flowers, fruits and seeds.







Pig-Tailed Monkey

The second largest monkeys group in Borneo after Long-Tailed Macaque. Pig-Tailed Monkeys usually spending most of their times on the ground feeding on any kinds of foods such as leaves, grasses, fruits, flowers, insects, small mammals, fishes, crabs, shrimps etc. They only climbs up trees for sleeping or when they felt unsecured or threatened. Male Pig-Tailed Macaques are normally larger than female and more aggressive and dangerous when they tried to protect their areas or group members.







Long-Tailed Macaque

The Long-Tailed Macaques are the most common primate found the forested areas in Southeast Asia. Normally in large groups of 5 to 20 (or more) with female are dominance. They feed on plants (leaves, flowers, fruits), crabs, shrimps or smaller animals.

Family: Cercopithecidae
Genus: *Macaca*
Species: *Macaca fascularis*







Bornean Bearded Pig

The Bornean Bearded Pig also known ambiguously as the bearded pig is a Southeast Asia mammal. It recognized by its prominent beard. They inhabits from the mangrove to the montane forest and feeding on almost everything. The populations in Borneo is declining due to over hunting.

Family: Suidae
Genus: *Sus*
Species: *Sus barbatus*





Red Muntjac

Known as Indian Muntjac or also called Red muntjac and Barking Deer, is a common and most widespread deer species in the Southeast Asia. It inhabits a wide variety of forest types including primary and secondary rainforest, hill forest and montane habitats up to 3,000 m elevations. Its typic diet includes young leaves, shoots, tree bark, grass and fallen fruits. Small ground-dwelling vertebrates may also be consumed. The species is generally nocturnal or sometimes in certain areas, where they are not persecuted, they may be active by day. Based on the evidences of camera trapping records, the population of this species in Long Banga is considered healthy.

Family: Cervidae
Genus: *Muntiacus*
Species: *Muntiacus muntjak*




℃ 000·000000S 000·000000E 0000


Redguarder 11:58:57 10/12/16 26·45inHg 24℃ 000·000000S 000·000000E 0000


Redguarder 22:58:24 09/25/16 28·37inHg 23℃ 000·000000S 000·000000E 0000

Banded Palm Civet

Also called the Banded Civet, this species found in the Sundaic region and occurs in Peninsular Myanmar, Peninsular Thailand, Peninsular Malaysia, Indonesia and Borneo. They inhabit in lowland primary rainforest and old secondary forest, at elevation from 100 to 1,200 m above sea level. It is nocturnal and mainly terrestrial in habits, but also recognized as a good climber.

Family: Viverridae
Genus: *Hemigalus*
Species: *Hemigalus derbyanus*



Short-Tailed Mongoose

The Short-Tailed Mongoose or Water Mongoose is a species of mongoose that lives in the rainforests of Southeast Asia. They inhabit primary and old secondary forests and often near to the rivers or streams.

Family: Herpestidae
Genus: *Herpestes*
Species: *Herpestes brachyurus*





Porcupine

Known as Malayan Porcupine or Himalayan Porcupine is a species in the rodents group. This species widely distributed from Nepal through north-east India, to cental and southern China and Southeast Asia. They medium to large stout-bodied odent that covered with quills which are sharp and rigid stratures.

Family: Hystricidae
Genus: *Hystrix*
Species: *Hystrix brachyura*



Pangolin

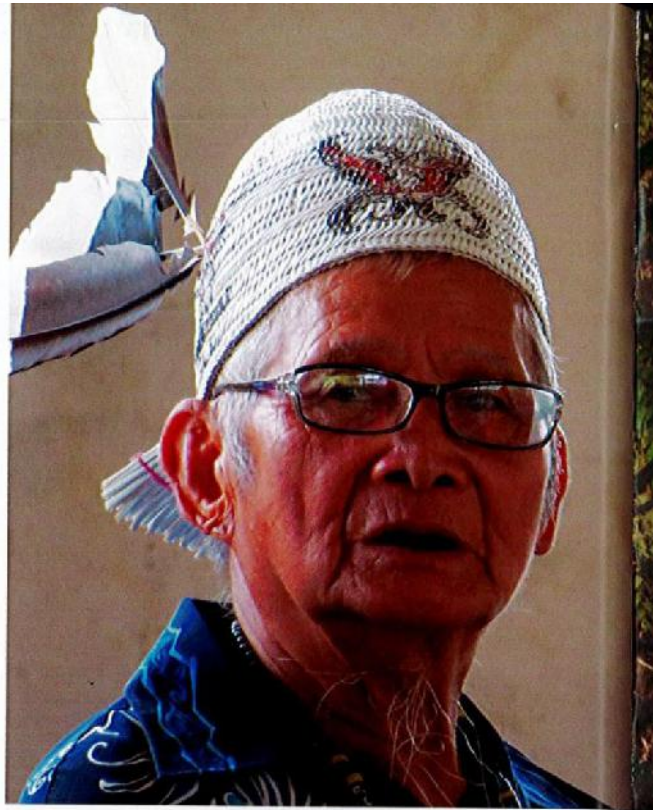
Known with many names, such as *Tenggiling,* The Sunda Pangolin, Malayan Pangolin, Java Pangolin or Scaly Anteater inhabitant of Southeast Asia's forested habitats and plantations. Pangolins are among the most heavily poached and exploited protected animals for its skins, scales and meats.

Family: Manidae
Genus: *Manis*
Species: *Manis javanica*

Long Banga - The Way Forward

The Long Banga area is very rich in biodiversity and considered as one of the richest forest in the Heart of Borneo (HoB) Initiative Project Areas. The State Government of Sarawak has taken the right step to initiate a comprehensive documentation of the area for further consideration. However, a further study and research in the area could unveil much more biodiversity treasure of Long Banga for future generation to savour and the future planning.

Sitting here starring through the silent night, gazing stars and we found a peaceful moment..and hope it will last forever as it be.








SELAMAT JALAN

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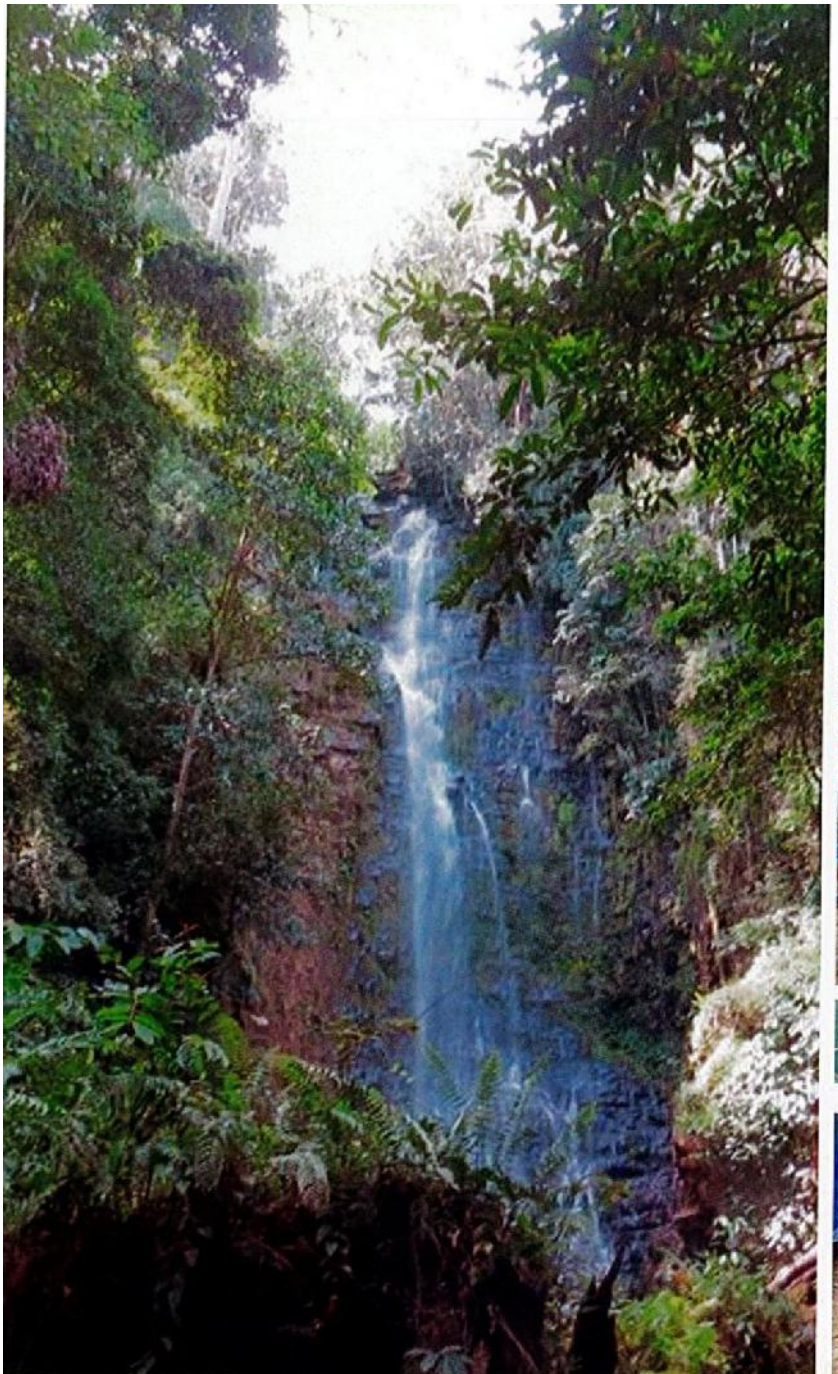
Hedychium borneensis

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