

A Scientific Journey Through Borneo

**CROCKER
RANGE
NATIONAL PARK SABAH**

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GHAZALLY ISMAIL
LAMRI ALI



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Araceae of the Crocker Range National Park Sabah: A Preliminary Survey, Checklist and Generic Key

Peter C. Boyce¹, Baharuddin Sulaiman² and Jain Lintong³

Abstract

A preliminary survey, tabulated and referenced checklist and generic key to the Araceae of the Crocker Range Park is presented based on fieldwork undertaken during the Crocker XPDC'99 supplemented with surveys of specimens in major Asian and European herbaria. A total of 16 genera comprising 73 species of which 70 are indigenous to Sabah are recorded.

Introduction

The Crocker Range is a tropical highland dividing the west coast from the interior regions of Sabah. The Range has numerous peaks over 1500m, including G. Alab (1964m), G. Tambuyukon (2579m), G. Trusmadi (2642m) and G. Kinabalu (4218m). Two National Parks are included within the range. To the southwest is the Crocker Range Park (the location for the Crocker XCPD'99) while to the north is Kinabalu Park.

Results and Discussion

Vegetation in the Crocker Range Park consists of variously disturbed patches of lowland forest, large tracts of hill and upper hill forest and patches of montane and upper montane moss forest. Based on our studies, Araceae generic and species diversity in the Crocker Range Park is

¹ Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK.

² Universiti Sains Malaysia, School of Biological Sciences, Minden, Penang 11800, Malaysia.

³ Taman Pertanian Sabah, W.D.T. 28, Lagud Sebrang, 89909 Tenom, Sabah, Malaysia.

highest in hill forest (300-800m; 11 genera/27 species) and upper hill forest (800-1200m; 9 genera/30 species), with diversity falling as altitude increases (lower montane, 1200-1500m; 6 genera/11 species) and dropping appreciably over 1500m (upper montane, above 1500m; 1 genus/2 species.) A similar, though less marked decline in diversity occurs below 300m (lowland, sea level -300m; 7 genera/8 species).

While some aroid species seem to be widespread throughout a range of altitudes and corresponding vegetation types (e.g. *Pothos mirabilis* Merr., *Scindapsus curranii* Engl.) the majority of species are quite distinctly altitudinal in their distribution and in their habitat requirements. A particularly striking example of altitudinal delimitation is that of the two Bornean *Colocasia* species. *Colocasia esculenta* (L.) Schott is a widespread cultivated and naturalized species from sea level to c. 1100m but at altitudes exceeding 1400m is completely replaced by the indigenous, endemic mountain taro (*C. oresbia* A. Hay).

During fieldwork and subsequent searches of herbaria, 16 genera (29 recorded genera for Borneo) and 70 indigenous species (total for Borneo not known, but well in excess of 200) were recorded for the Crocker Range Park. Of these, 20 are new species records for the park, with at least two representing undescribed species. Important finds during our field work included substantial discrete stands of the horticulturally desirable and thus potentially threatened *Alocasia cuprea*, several populations of *Pothos ovatifolius* Engl., a Philippine species only recorded for Borneo (and there restricted to Sabah) in 1997, large numbers of the recently described endemic mountain taro, *Colocasia oresbia*, several stands of the yet to be described *Schismatoglottis corneri*, an extraordinary as yet undescribed unifoliate *Schismatoglottis*, and substantial discrete stands of *Rhaphidophora latevaginata* M. Hotta, a species widespread in Borneo but to date known from only 3 collections.

From the checklist below it can be seen that while most collections are named to species, four genera, *Amorphophallus*, *Amydrium*, *Homalomena* and *Schismatoglottis* are mostly designated as sp. A, B, etc. This is

a reflection of the current state of knowledge of these genera rather than an indication that the specimens are too incomplete to name to species.

KEY TO THE GENERA OF ARACEAE OF THE CROCKER RANGE PARK

1. Plants free floating 2
1. Plants terrestrial, either forest herbs, climbers, rheophytes (i.e. growing on rocks along streams) or swamp plants 3
2. Leaves each more than 2cm long, in a rosette, dull pale green, hairy **Pistia**
2. Leaves each less than 1cm long, solitary or a few jointed together to form small, flat, floating patches, bright green, hairless **Lemna**
3. Plants climbing. Flowers hermaphroditic 4
3. Plants forest herbs, swamp plants or rheophytes. Flowers unisexual 9
4. Flowers with conspicuous or papery tepals. Fruits a berry, red at maturity 5
4. Flowers without tepals. Fruits either not a berry or, if berry-like then white at maturity 6
5. Leaves with conspicuous veins arising from the base of the lamina and crossing over the primary lateral veins. Spathe persistent into fruiting. Flowers with conspicuous tepals **Pothos**
5. Leaves without conspicuous veins arising from the base of the lamina. Spathe shed at anthesis. Flowers without conspicuous tepals **Anadendrum**
6. Leaf lamina with all veins of leaf reticulate, lamina frequently pinnate and usually perforated. Fruits berry-like, white at maturity **Amydrium**
6. Leaf lamina with primary lateral veins parallel, higher order veins parallel or reticulate 7
7. Leaf blade entire or with holes and/or splitting (*R. beccarii* creeping on rocks by stream). Fruits with many straight seeds **Rhaphidophora**
7. Leaf lamina entire or divided. Fruits with one or only a few curved seeds 8
8. Leaf lamina entire. Stem apices without fibrous masses. Inflorescences occurring singly. Fruits with a single seed **Scindapsus**
8. Leaf lamina variously pinnately divided. Stem apices with fibrous masses. Inflorescences occurring in clusters. Fruits with a single seed **Epipremnum**
9. Leaf lamina venation parallel 10
9. Leaf lamina venation reticulate 13
10. Spathe entirely persistent and not withering 11
10. Upper part of spathe shedding at or soon after anthesis, lower part persistent into fruiting 12

11. Plants without smell when cut. Fruits bright red or orange when ripe. Female flowers without an associated staminode **Aglaonema**
11. Plants usually smelling strongly when cut. Fruits inconspicuous and enclosed in spathe. Female flowers usually with an associated staminode **Homalomena**
12. Forest herbs. Spathe usually constricted (at least slightly in the middle), lower part ellipsoid or oblong at fruiting stage **Schismatoglottis**
12. Rheophytes. Spathe not constricted, lower part funnel-shaped at fruiting stage **Piptospatha**
13. Petiole with conspicuous blotches and snake-skin-like markings. Leaf lamina often very large, always divided into three main parts, these with further divisions, the whole structure resembling a tattered umbrella. Leaf and inflorescence usually produced at different times. Inflorescence often very large **Amorphophallus**
13. Leaf not as above. Leaf or leaves always together with inflorescence(s) **14**
14. Weedy seasonally-appearing small plants of disturbed habitats. Leaf lamina hastate with basal lobes spreading widely, all venation conspicuously reticulate. Inflorescence produced at ground level, brownish purple, very bad-smelling; spadix with dense filamentous sterile flowers between the distant male and female flower zones. **Typhonium**
14. Plants of various appearances, if weedy then evergreen and often gigantic. Leaf lamina variously shaped, if hastate then basal lobes not widely spreading, venation not reticulate or if reticulate then primary lateral veins not so. Inflorescence variously coloured, often greenish to whitish, smelling variously of fruit, pear drops, etc., occasionally bad-smelling; spadix without filamentous sterile flowers between the continuous male and female flower zones **15**
15. Inflorescences solitary to few together per leaf, arising parallel to leaf lamina. Fruits large, carried on an erect peduncle, berries red and odourless at maturity, each containing a few large seeds **Alocasia**
15. Inflorescences often several to many per leaf, arising at right angles to leaf lamina. Fruits small, carried on a pendent peduncle, berries yellowish to brownish and fruity smelling at maturity, each containing many small seeds **Colocasia**

Genus	Species	Generic Revision/ Reference	Habitat/ altitudinal range	Notes
<i>Aglaonema</i>	<i>nitidum</i>	Nicolson (1969)	Hill forest. 470m.	
	<i>simplex</i>	Nicolson (1969)	Hill forest. 470m.	
<i>Alocasia</i>	<i>cuprea</i>	Hay (1998)	Hill forest. 470m.	Endemic to Sabah
	<i>longiloba</i>	Hay (1998)	Hill forest. 470m.	
	<i>macrorrhizos</i>	Hay (1998); Hay & Wise (1991)	Lowland 0-80m.	introduced/ cultivated
	<i>peltata</i>	Hay (1998)	Lower montane forest. 1300-1340m.	Endemic to Borneo
	<i>princeps</i>	Hay (1998)	Upper hill forest. 1020m.	Endemic to Borneo
	<i>robusta</i>	Hay (1998)	Lower montane forest. 1340m	Endemic to Borneo
	<i>sarawakensis</i>	Hay (1998)	Hill forest. 670m	Endemic to Borneo
	<i>scabriuscula</i>	Hay (1998)	Hill to upper hill forest. 700-870m.	Endemic to Borneo
<i>Amorphophallus</i>	<i>hottae</i>	Hettescheld (1992)	Hill forest. 470m.	Endemic to Sabah
	<i>lambii</i>	Mayo, Widjaja & Gibbon (1982)	Hill forest. 700m.	Endemic to Sabah
	sp. A		Hill forest. 470m.	
	sp. B		Hill forest. 470m.	
<i>Amyclitum</i>	<i>medium</i>	Nicolson (1968); Nguyen & Boyce (1999)	Upper hill to lower montane forest. 870-1200m.	
<i>Anadendrum</i>	sp. A		Upper hill forest. 840m.	
	sp. B		Hill forest. 700m	
<i>Colocasia</i>	<i>esculenta</i>	Hay (1996a)	Lowland to upper hill forest. 0-1100m	introduced/ cultivated
	<i>orehia</i>	Hay (1996a)	Lower montane forest. 1420m.	Endemic to Sabah
<i>Epipremium</i>	<i>pinnatum</i>	Boyce (1998)	Hill forest. 700m.	
<i>Homalomena</i>	<i>coerulescens</i>	Hay (in prep. 2)	Hill forest. 700m	
	<i>pygmaea</i>	Hay (in prep. 2)	Upper hill forest. 840m.	
	<i>trapezifolia</i>	Hay (in prep. 2)	Hill forest. 700m.	
	sp. A		Upper hill forest. 840m.	
	sp. B		Upper hill forest. 840m.	
	sp. C		Hill forest. 700m.	
	sp. D		Hill forest. 470m.	
	sp. E		Hill forest. 470m.	
<i>Lemna</i>	<i>minutissima</i>	Landolt (1986)	Upper hill forest. 870m.	
	<i>Piptospatha</i>	<i>elongata</i>	Bogner & Hay (in prep.)	Hill forest. 470m.

Genus	Species	Generic Revision/ Reference	Habitat/ altitudinal range	Notes
<i>Pistia</i>	<i>stratiotes</i>	Mayo, Bogner & Boyce 1997	Lowland. 0-100m.	
<i>Pothos</i>	<i>barberianus</i>	Boyce (in prep. 2)	Hill forest. 470m.	Endemic to Borneo
	<i>mirabilis</i>	Boyce (in prep. 2)	Lowland to lower montane forest. 270-1340m.	Endemic to Sabah
	<i>ovatifolius</i>	Boyce (in prep. 2)	Hill to upper hill forest. 700-870m.	Second recorded occurrence in Sabah
	<i>scandens</i>	Boyce (in press 1, in prep. 2)	Hill forest. 470m.	
<i>Rhaphidophora</i>	<i>beckarii</i>	Boyce (1999, in press 2, in prep. 1)	Hill forest. 470m.	
	<i>ellipticifolia</i>	Boyce (in prep. 1)	Upper hill forest. 900m.	Endemic to Borneo
	<i>foraminifera</i>	Boyce (1999, in press 2, in prep. 1)	Hill to upper hill forest. 700-840m.	
	<i>korthalsii</i>	Boyce (1999, in press 2, in prep. 1)	Upper hill forest. 870m.	
	<i>latevaiginata</i>	Boyce (in prep. 1)	Upper hill forest. 840m.	Endemic to Borneo
	<i>puberula</i>	Boyce (1999, in press 2, in prep. 1)	Upper hill to lower montane forest. 840-1420m	
	<i>silvestris</i>	Boyce (1999, in press 2, in prep. 1)	Upper hill forest. 840m.	
	sp. A		Upper hill forest. 840m.	
	sp. B		Hill forest. 470m.	
	sp. C		Hill forest. 470m.	
	sp. D		Lowland forest. 270m.	
sp. E		Lower montane forest. 1340m.		
<i>Schismatoglottis</i>	<i>calyptrata</i>	Hay (1996b, in prep. 1)	Upper hill forest. 840m.	
	<i>comeri</i>	Hay (in prep. 1)	Lowland forest. 180m.	Undescribed species. Endemic to Sabah
	<i>mutata</i>	Hay (1996b, in prep. 1)	Upper hill forest. 840m.	
	<i>unifolia</i>	Hay (in prep. 1)	Hill forest. 470m.	Undescribed species. Endemic to Sabah
	sp. A		Upper hill forest. 840m.	
	sp. B		Upper hill forest. 840m.	
	sp. C		Upper hill forest. 1020m.	
	sp. D		Upper hill forest. 1020m.	
	sp. E		Hill forest. 700m	
sp. F		Upper hill forest. 870m.		

Genus	Species	Generic Revision/ Reference	Habitat/ altitudinal range	Notes
<i>Schismatoglottis</i>	sp. G		Hill forest. 750m.	
	sp. H		Upper hill forest. 840m.	
	sp. I		Upper hill forest. 840m.	
	sp. J		Upper hill forest. 840m.	
	sp. K		Upper hill forest. 840m.	
	sp. L		Upper hill forest. 840m.	
<i>Scindapsus</i>	<i>beccarii</i>	Boyce (in prep. 3)	Hill forest. 450m.	
	<i>coriaceus</i>	Boyce (in prep. 3)	Hill to upper montane forest. 750-1550m.	Endemic to Borneo
	<i>curranii</i>	Boyce (in prep. 3)	Lowland to upper montane forest. 270-1550m.	Philippines species. In Borneo known only from Sabah
	<i>longistiptatus</i>	Boyce (in prep. 3)	Upper hill to lower montane forest. 840-1320m.	Endemic to Borneo
	<i>perakensis</i>	Boyce (in prep. 3)	Upper hill forest. 840m.	
	<i>pictus</i>	Boyce (in prep. 3)	Lower montane forest. 1300m.	
<i>Typhonium</i>	<i>roxburghii</i>	Nicolson & Sivadasan (1981)	Lowland. 0-50m.	introduced/ cultivated

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