

## A PRELIMINARY STUDY ON THE DIVERSITY OF MAGNOLIACEAE FROM MT. KINABALU AREA IN SABAH, MALAYSIA

Adam J.H. and Abdul Manap M.

*School of Environmental Science & Natural Resources,  
Faculty of Science & Technology, Universiti Kebangsaan Malaysia,  
43600 Bangi, Selangor D.E., Malaysia  
E-mail: [adamj@pkriscc.uk.my](mailto:adamj@pkriscc.uk.my)*

### ABSTRACT

This study recorded a total of 15 taxa of family Magnoliaceae from Mt. Kinabalu area in Ranau, Sabah. Of these, 7 taxa were endemic in Borneo, namely, *Magnolia carsonii* Dandy ex Nootboom var. *carsonii*, *Magnolia carsonii* var. *drymifolia* Nootboom, *Magnolia persuaveolans* ssp. *persuaveolans* Nootboom, *M. persuaveolans* ssp. *rigida* var. *rigida* Nootboom, *M. persuaveolans* ssp. *rigida* var. *pubescens* Nootboom, *Magnolia uvariifolia* Dandy ex Nootboom, and *Manglietia sabahensis* Dandy ex Nootboom. Eight widespread taxa, which are recorded from outside Borneo includes *Elmerrillia tsiampacca* (Linne) Dandy, *Magnolia candolii* var. *candolii* (Blume) H. Keng (Sikkin, Assam in India, Thailand Andaman Island and Cambodia), *Magnolia candolii* var. *obovata* (Korthals) Nootboom (Borneo and Peninsular Malaysia), *M. candolii* var. *singaporensis* (Ridley) Nootboom (Borneo, Peninsular Malaysia and Sumatra), *Magnolia macklotii* (Korthals) Dandy (Borneo, Peninsular Malaysia, Sumatra and Java), *Magnolia maingayi* King (Borneo and Peninsular Malaysia), *Michelia montana* Blume and *Manglietia dolichogyna* Dandy ex Nootboom (Peninsular Malaysia and Borneo).

### INTRODUCTION

The family of Magnoliaceae is commonly known in Malaysia as bunga cempaka. According to Meijer (1968), the family comprises of 12 genera and 220 species. It is fairly widespread group occurring in Pacific areas of the world, Tropical Asia, Central America, Brazil and with the center of distribution in South East Asia. The general characteristic of the family includes having the simple leaves, flowers and barks produce nice odor, fruits made up of group of carpel, very distinct scars on leaf twigs. Fossils of this family have been found various part of the world, which includes the Artic, Greenland, North America and Europe (Meijer 1968). Previous study on the taxonomy of this family was carried out by various researches (Dandy 1927; Nootboom 1985 & 1987; Meijer 1968; Abdul Manap bin Mahmud 1992).

### MATERIALS AND METHODS

The study to determine the species diversity, their morphological characteristic and their distribution in Mt. Kinabalu area, Ranau District is based on the examination of dried herbarium voucher specimens from Herbarium School of Environmental and Natural

Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia in Bangi (UKMB), Herbarium Forestry Department Sabah in Sandakan (SAN), Sabah National Parks Herbarium in Kundasang.

## **SPECIES ENDEMIC TO BORNEO**

### ***Magnolia carsonii* Dandy ex Nootboom, var. *carsonii*, *Blumea* 32 (1987) 348**

This species is a tree up to 50m tall. Leaves are glabrous; lamina shapes are elliptic; base cuneate; it has 8-12 pairs primary nerves, the nerves are distinct; leaf petioles are 6-13 mm long. Flowers are without pedicel with 3 tepal on the outer series and 6 on the inner series. Fruits are carpel and they are glabrous and covered with lenticels. This species is commonly found in Sosopodon Forest Reserve in Ranau District at 1500m to 1700m altitude. It has also been recorded from forest underlying ultrabasic rock on Mt. Tambuyukon in Ranau District. This species is known to occur in Sabah only.

### ***Magnolia carsonii* var. *drymifolia* Nootboom, *Blumea* 32 (1987) 351**

This species is either shrubs or trees, which may reach up to 25m tall. Twigs are pubescent on the apex of the bud; stipules are also pubescent towards the apex of the bud. Leaves are glabrous, shapes are elliptic or obovate, 4-9cm long and 2.5-4.5cm wide; leaf bases are cuneate and their apex are acuminate; leaves have 6-12 pairs of primary nerves; leaf petioles are from 1 to 2cm long. Flowers of this species are pubescent, which covered with pilose hairs; flowers possess 3 tepal on the outer series and 6 tepal on the inner series. Fruits are capellate and covered with lenticels. It is recorded from various localities in Ranau District, which includes Bundu Tuhan Trail, Layang-Layang, Kamborango, Sosopodon Forest Reserve, Tohubang, Tenompok Forest Reserve, Ulu Liwago and Mamut Copper Mine. This species is found endemic in Borneo (Sabah, Sarawak and Kalimantan) from 1000 to 2900m altitude.

### ***Magnolia persuaveolans* ssp. *persuaveolans* Nootboom, *Blumea* 32 (1987) 379**

They are shrubs, up to 2.5 m tall. Twigs are pubescent towards the apex, apical buds are pubescent too. Leaves are pubescent when juvenile, elliptic to obovate in shape, 9-22cm long and 4-8cm wide; the leaves have 10-14 pairs of primary nerves. Fruits are glabrous. This species is endemic to Sabah. It has been collected from Mt. Kinabalu, Mesilau (2700-3300m) and on the top of Mt. Tambuyukon at 2500m altitude. It is found growing in exposed area of secondary vegetation.

### ***Magnolia persuaveolans* ssp. *rigida* var. *rigida* Nootboom, *Blumea* 32 (1987) 379**

This variety is shrubs or trees, up to 25m tall. The twigs and leaves are glabrous. Leaves are elliptic in shape, 11-18cm long and 6-14cm wide, leaf apex are cuneate and base attenuate; the leaves also have 15-16 pairs of primary nerves. This species is endemic to Sabah and confines in its distribution along the slope of Mt. Kinabalu from 2400 to 3400m altitude.

***Magnolia persuaveolans* ssp. *rigida* var. *pubescens* Nootboom, *Blumea* 32 (1987) 379**

This variety differs from the typical variety by its leaves, twigs and carpel, which are pubescent, and the leaves have 10-12 pairs of primary nerves. It is a very rare variety, and confined in its distribution in Sabah and Mt. Kinabalu.

***Magnolia uvariifolia* Dandy ex Nootboom, *Blumea* 32 (1987) 358**

They are trees, which are 6-25m tall. Twigs with apical buds are pubescent; stipules are 3cm long. Leaves are pubescent, leaf shapes are obovate which are 10-28cm long and 4-9cm wide; leaf apices are acuminate, and the bases are cuneate to rounded; the leaves have 13-19 pairs of primary nerves. Flowers have 3 teal on the outer series and 6 tepal on the inner series. Fruits are cylindrical in shape and the carpels are glabrous. This species is endemic Borneo. It is recorded from several localities in Kinabalu area that includes Mt. Kinabalu, Sosopodon Forest Reserve, Liwagu and Bembangan River. This species is found growing in lowland primary forest and secondary forest of lower montane species from 180 to 1800m altitude.

***Manglietia sabahensis* Dandy ex Nootboom, *Blumea* 31 (1985) 95**

It is a tree species. The twigs are glabrous. Leaves are glabrous or pubescent; elliptic to obovate in shape, 12-22cm long and 6-9cm wide; leaf bases cuneate and apex acute; 12-14 pairs of primary nerves; leaf petiole 2-3cm long; stipule glabrous, scars very distinct. Fruits are ellipsoid. This species is very rare since it has been collected once from Mt. Kinabalu at 1300m altitude.

**SPECIES DISTRIBUTED OUTSIDE BORNEO**

***Elmerrillia tsiampacca* (Linne) Dandy, *Blumea* 32 (1987) 102**

This species is a tree up to 60m tall. Twigs are pubescence or tomentose when juvenile. Leaves are elliptic in shape, 10 - 46cm long and 4-15cm wide; leaves primary nerves 11-28 pairs. Fruits are cylindrical in shape, each carpel contained 1-2 seeds. This species is widely distributed. It is recorded from outside Borneo from Sumatra and New Guinea. This species was recorded from three different localities that include Poring Hotspring, Gunung Kulimpisau both from Ranau District and Kundasang on the foot of Mt. Kinabalu.

***Magnolia candollii* var. *candollii* (Blume) H. Keng, *Gardens' Bulletin Singapore* 31 (1978) 129.**

This typical variety is shrubs or trees, up to 25m tall. The twigs are covered with pilose hairs. Leaves are glabrous or pubescent, elliptic to ovate in shape; the bases are cuneate to attenuate. Fruit carpel contained 1-2 seeds each. It is very widespread variety in Sabah and have been collected from various localities from Kinabalu area which includes Mt.

Kinabalu (1600m), Mamut Copper Mine (1040m), Talutan Village (750m) and Pinawantai Village (1350m) in Ranau, Tenompok (1350m), Kundasang, Hot Spring (550m) and Mesilau (1600m). This variety is widespread and found in Sikkin and Assam in India, Thailand, Andaman Island and Cambodia.

***Magnolia candolii* var. *obovata* Nootboom, *Blumea* 32 (1987) 374**

They are trees, from 3 to 20m tall. The twigs and leaves are glabrous. The leaves are obovate to elliptic in shape, 17-50cm long and 6-22cm wide; the leaf apex are acuminate and bases are cuneate; the leaves have 9-25 pair of primary nerves. Fruits are ellipsoidal in shape. This variety is recorded from several places in Kinabalu, which includes Hulu Sungai Nabutan, Mamut Copper Mine (1040 - 1480m), Pinosuk Plateau (1680m), Kundasang (1260m). This species is recorded from Borneo (Sabah and Sarawak) and Peninsular Malaysia.

***Magnolia candolii* var. *singaporensis* (Ridley) Nootboom, *Blumea* 32 (1987) 376**

This variety is a tree from 6-40m tall. The twigs are tomentose to pubescent. The leaves are elliptic to obovate in shape, 30-70cm long and 8-25 cm wide, 17-29 pairs of primary nerves. This variety is found from Nalumad Trail in Poring (750m). It is also found in Sumatra, Peninsular Malaysia and Borneo (Sabah, Sarawak and Kalimantan).

***Magnolia macklotii* (Korthals) Dandy, *Kew Bulletin* (1927) 263**

Shrub or tree. Leaves pubescence, particularly on the midribs and secondary nerves; lamina elliptic and obovate; base acute; apex acuminate. Petiole pubescence when young and glabrous when matured. Flower buds ellipsoid, glabrous or pubescence. This species is very rare, and it is occurring in Sabah only in Borneo. This species is also very rarely collected and once collected from SFR at an altitude of 1260m. However, it is also found from Peninsular Malaysia, Sumatra and Java.

***Magnolia maingayi* King**

This species are shrubs or trees, which is 8m tall. Leaves are glabrous, obovate to elliptic in shape, the sizes are 9-26cm long and 3-9cm wide; leaf bases are cuneate to rounded and apex are acuminate; the leaves have 14-18 pairs; petioles are 3-5cm long. Flower buds are covered with villose hairs, flowers have 3 tepal on the outer series and 6 on the inner series. Fruits are covered with villose hairs. This species is found growing in lowland primary forest to lower montane forest from sea level to 2000m altitude. It has been collected from Kinabalu area from Sungai Mesilau and Lohan Forest Reserve. This species is found in Peninsular Malaysia and Borneo (Sarawak and Sabah).

***Manglietia dolichogyna* Dandy ex Nootboom, *Blumea* 31 (1985) 95**

It is a tree to 21m tall. The twigs are glabrous. The leaves are elliptic in shape, with minute secondary nerves on both surfaces; stipule scars distinct on the leaf petiole. Fruits are cylindrical. This species is found in Peninsular Malaysia and Sabah in Borneo. They

grow in dipterocarp forest, hill forest from 450 to 1500m altitude. This species was recorded from Hot Spring Trail in Ranau, Sosopodon Forest Reserve, Mamut Copper Mine, Padang Tentulung (Ranau), and Power Station Mt. Kinabalu.

***Michelia montana* Blume, *Verh. Bat. Gen.* 9 (1823) 153**

This species is a tree up to 40m tall. The twigs are glabrous (not covered by hairs). Leaves are glabrous too, elliptic in shape, the base is attenuate and the apex is cuneate; the leaves sizes ranging from 9-30cm long. The leaves have 9-25 pairs of primary nerves; leaf stipules are hairy. Fruits have free carpel; each carpel contained 1-4 seeds. Matured carpel is covered with sparsely distributed lenticels. It is recorded from Sumatra, Malay Peninsular and Java and Borneo. This species is found from two different localities around Mt. Kinabalu. They are from Ranau and Bukit Hampuan from Ranau District.

**ACKNOWLEDGEMENTS**

We wish to thank Universiti Kebangsaan Malaysia, R & D grant 4-07-03-042 & 56 and Tabung Biodiversiti Fakulti Sains & Sumber Alam for financial sponsoring this project. We wish to thank Sabah Parks and Sabah Forestry Herbarium for providing the accommodation during our visits and the helpful hands of their staff. We were also very grateful to Sabah Forestry Herbarium in Sandakan, Sabah National Parks in Kinabalu Park, Kundasang and not forgetting Herbarium of School of Environmental and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia for their permission to examine the herbarium specimens for this study. Lastly, we wish to thank Pn Aspah Hashim for typing this manuscript.

**REFERENCES**

- Abdul Manap bin Mahmud 1992. *Kajian Taksonomi ke atas famili Magnoliaceae di Sabah*. SmSn Thesis, Biology Department, Fakulti Sains & Sumber Alam, Universiti Kebangsaan Malaysia.
- Dandy, J.E. 1927. Magnoliaceae. The Miscellaneous family. *Kew Bulletin* 13: 115-138
- Keng, H. 1978. The Delimitation of the Genus *Magnolia* (Magnoliaceae). *The Gardens' Bulletin Singapore* 3: 127-131.
- Nooteboom, H.P. 1985. Notes on the Magnoliaceae with a revision of *Pachylarnax* and *Elmerrillia* and the Malesian species of *Manglietia* and *Michelia*. *Blumea* 31: 65-121.
- Nooteboom, H.P. 1987. Notes on the Magnoliaceae II. Revision of *Magnolia* section *Maingola* (Malesian species) *Aromadendron* and *Blumiana*. *Blumea* 32: 343-382.
- Meijer, W. 1968. *Botanical Bulletin Herbarium, Forest Department, Sandakan, Sabah, East Malaysia* No. 11: 2-19.