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Status and distribution of *Aglaia multinervis* Pannell in Singapore

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Abstract. *Aglaia multinervis* Pannell (Meliaceae) was assessed to be nationally extinct in The Singapore Red Data Book in 2009, after collected specimens deposited in the Singapore Botanic Gardens Herbarium were misidentified. The specimens were later redetermined on their sheets in 2012 by C. M. Pannell, but the conservation status of the species remained unchanged. A subsequent encounter of a mature, fruiting individual in MacRitchie is documented here and reconfirms the taxon's extant status in Singapore.

Key words. *Aglaia multinervis*, Meliaceae, Singapore

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INTRODUCTION

The genus *Aglaia* consists of small to large dioecious trees, sometimes with bark that exudes white latex when cut. *Aglaia* can be distinguished from other genera of Meliaceae in Southeast Asia by the combination of yellow subglobose or ovoid flowers and indumentum of stellate hairs or scales or peltate scales. Simple hairs are completely absent from all exposed surfaces of the plants. The leaves are in spirals, imparipinnate or simple, with leaflets glabrous or sparsely to densely covered with stellate or peltate hairs and scales. The inflorescences are paniculate or spicate, axillary or sometimes ramiflorous or cauliflorous. The flowers are usually very small, with male flowers terminal on short branchlets and female flowers either terminal on short branches or solitary along the rachis. The fruits have a fibrous outer pericarp and fleshy layer (aril) surrounding the seeds. The pericarp is an either indehiscent or dehiscent three-valved loculicidal capsule with 1–3 seeds. In Singapore, there are over 25 species recorded, with most species limited to nature reserves with primary to mature secondary forest vegetation such as Bukit Timah and Central Catchment.

Aglaia multinervis Pannell is a tree that can grow up to 35 m tall and is usually found in lowland and hill dipterocarp forests. It has pale brown to reddish-brown bark that flakes in large scales to expose the reddish-brown inner bark, exuding red-white latex. The leaves are imparipinnate, 40 by 20 cm, with petioles up to 10 cm long. The 11 to 25 leaflets are dark green, glossy (Fig. 1), coriaceous, 5–15 by 3–5 cm with peltate scales with a fimbriate margin scattered on the underside and midrib (Fig. 2). The lateral veins are 20–25 on each side of the midrib, alternating with less conspicuous veins that sometimes branch before reaching the margin. The inflorescences are about 20 cm long and 10 cm wide, and densely covered with peltate fimbriate scales which are also found on the twigs. The flowers are about 3 by 2.5 mm, consisting of three petals that are densely covered with stellate scales. The fruits are dehiscent subglobose capsules with three locules each containing a single seed. The outer pericarp is brown and densely covered with reddish-brown stellate scales (Fig. 3). The specific epithet refers to the numerous lateral veins on each side of the midrib, a character that distinguishes it from all other species of *Aglaia* found in Singapore. *Aglaia multinervis* has more than 20 pairs of lateral veins compared to other species, which usually have up to 19 pairs. In the region, *Aglaia multinervis* can be found in Peninsular Malaysia, Borneo and Sumatra (Pannell, 1995, 2013).

AGLAIA MULTINERVIS IN SINGAPORE

Aglaia multinervis was first published in 1992 by C. M. Pannell, with the type specimen collected by A. C. Maingay in 1866 from Malacca, Malaysia. Since 1995, Singapore has been listed in various publications as one of the localities where *Aglaia multinervis* can be found (e.g., Turner, 1995; Pannell, 2013). C. M. Pannell has also recorded *Aglaia multinervis* as extant in Singapore in her revisions of *Aglaia* for Tree Flora of Sabah and Sarawak, Volume 6, in 2007; and Flora of Peninsular Malaysia, Volume 4, in 2013 (Pannell, 2007, 2013).

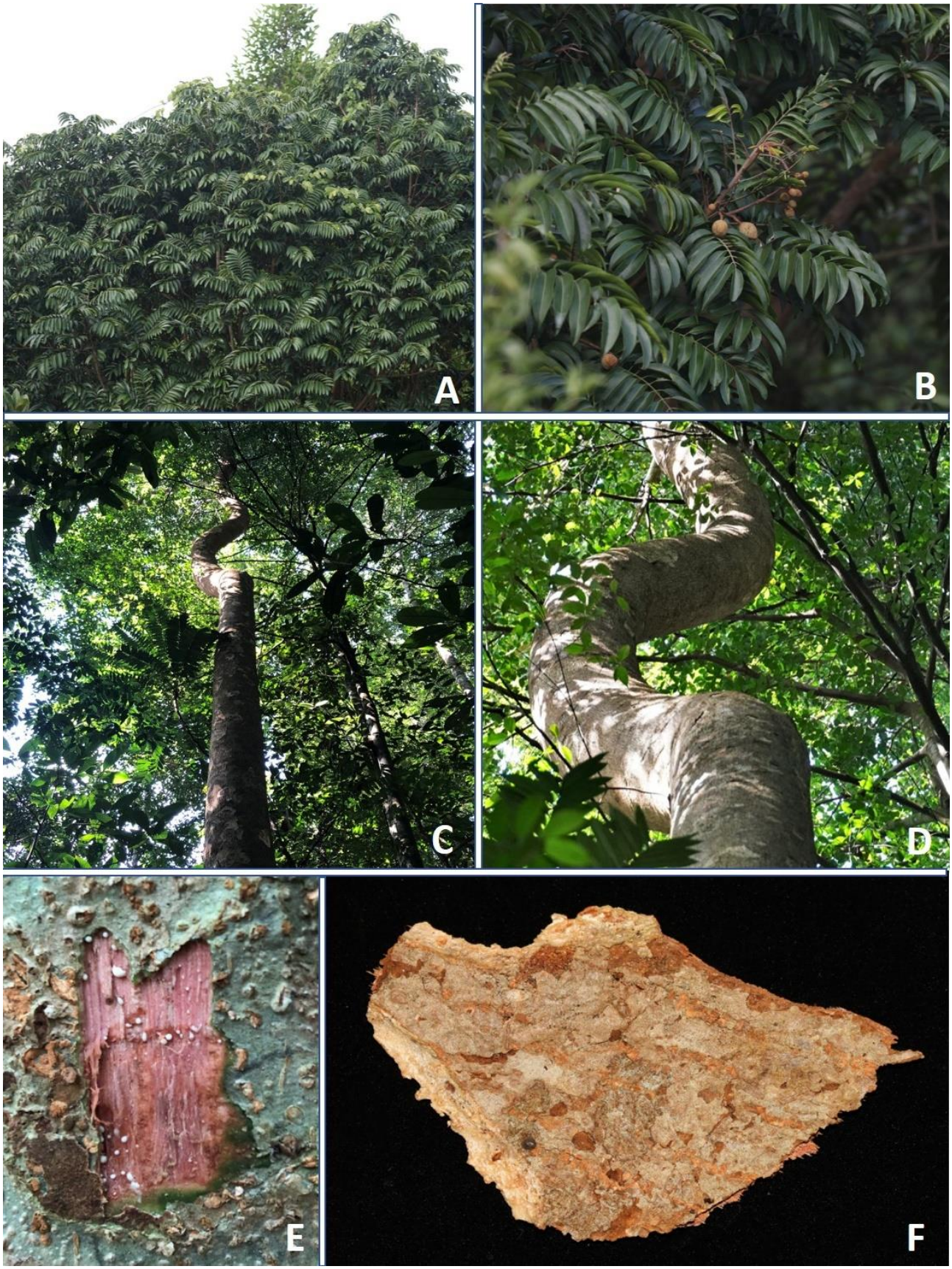

Fig. 1. *Aglaia multinervis* found at MacRitchie, Singapore, in September 2020. A, canopy of *Aglaia multinervis*; B, fruiting branch; C, trunk; D, interesting kink in the trunk; E, white sap secreted after bark scrape; F, a piece of the outer bark removed from the trunk. (Photographs A–C, E, F by: X. Y. Ng; D by: R. C. J. Lim).

Fig. 2. *Aglaia multinervis*. A, underside of the leaflet; B, characteristic scales of *Aglaia multinervis*, scale bar = 0.1 mm. (Photographs by: P. K. F. Leong).

Fig. 3. Fallen fruits of *Aglaia multinervis*, scale bar = 1 cm. (Photograph by: X. Y. Ng).

However, in 2008, *Aglaia multinervis* was recorded in The Singapore Red Data Book as nationally extinct (Tan et al., 2008). This was most likely because early specimens of this species, collected since 1941 and deposited in the Singapore Botanic Gardens Herbarium (SING), had been misidentified as *Aglaia malaccensis*. Following the Red Data Book assessment, *Aglaia multinervis* was listed in a checklist of the total vascular plant flora of Singapore as extinct (Chong et al., 2009). *Aglaia multinervis* has 15–25 leaflets with at least 20–25 pairs of lateral veins on each side of its midrib and indumentum of peltate scales with a fimbriate margin, whereas *Aglaia malaccensis* has 11–15 leaflets with only 10–16 pairs of lateral veins and indumentum of stellate hairs or scales. The misidentified specimens had been collected from Bukit Timah Nature Reserve as well as Central Catchment Nature Reserve (Table 1). These specimens were later redetermined by C. M. Pannell in 2012 as *Aglaia multinervis*. Therefore, *Aglaia multinervis* had been mistakenly considered as extinct in Singapore by Tan et al. (2008) and Chong et al. (2009).

Table 1. Collections of *Aglaia multinervis* Pannell in SING.

S/No.	Date collected	Collectors	Collector's no.	Locality
1	4 July 1941	Liew	SFN 37278	Bkt Timah NR
2	4 July 1941	Liew	SFN 37278	Bkt Timah NR
3	4 July 1941	Liew	SFN 37278	Bkt Timah NR
4	17 April 1943	Corner, E.J.H.	s.n.	Bkt Timah
5	October 1992	Wong; Ali, I.; Chew, W.L.	17	MacRitchie Wong plot 21
6	29 October 1996	Lai, J.	LJ 94	Bkt Kalang, CCNR
7	20 May 2008	Gwee, A.T.; Chew, P.T.; Ali, I. et al.	SING 2008-189	Chestnut Avenue, CCNR
8	21 November 2017	Leong, P.; Ali, I.; Athen, P.; Thomas, D.C.; Koh, S.L.; Lim, W.H.; Lua, H.K. & Chew, P.T.	SING 2017-642	Chestnut Peninsula, CCNR
9	13 September 2019	Leong, P.; Chew, P.T.; Lua, H.K.; Athen, P.; Lim, W.H.; Niissalo, M.A. & Choo, L.M.	SING 2019-879	Chestnut Peninsula, CCNR (Fig. 4)
10	18 September 2020	Ng, X.Y.; Lim, R.C.J. & Yong, J.K.L.	SING 2020-926	MacRitchie, CCNR (Figs. 1–3)

Fig. 4. Another *Aglaia multinervis* individual at Chestnut Peninsula, Butterfly Trail, Central Catchment Nature Reserve, Singapore. A, trunk; B, leaf and bark (SING 2019-879). (Photographs by: H. K. Lua).

In September 2020, a tree was observed by the authors to be fruiting in close proximity to the HSBC TreeTop Walk in MacRitchie (Fig. 1). The tree was estimated to be about 20 m tall with a girth of 1.5 m in a forest patch consisting of a mixture of primary and mature secondary species. Fallen leaves and dried fruits were collected and identified as *Aglaia multinervis* by P. K. F. Leong. It was subsequently confirmed to be *Aglaia multinervis* by C. M. Pannell based on the characteristic peltate scales and venation. However, no young saplings or seedlings were observed in the vicinity of the tree, other than some fallen dried fruits. It should be noted that this particular individual has a unique kink in its trunk, which could be due to a breakage in its main stem resulting in a secondary side shoot taking over the main leading stem (Fig. 1D).

CONCLUSIONS

This paper underscores the importance of plant taxonomic work, not only in Singapore but also in the region and around the world. The accurate identification of plant species and their collected specimens would help key decision making in the conservation of species as well as habitats. Here, the authors would like to propose that the conservation status of *Aglaia multinervis* in Singapore be revised to 'Critically Endangered' as there are currently less than 10 known mature individuals in the wild in Singapore. *Aglaia multinervis* was not recorded in the recent biodiversity surveys of Bukit Timah (Ho et al., 2019) despite having been collected there in the 1940s, and the current distribution of this species seems to be limited to the Central Catchment Nature Reserve. With its limited distribution and few known individuals, attempts should be taken to survey the forests of both nature reserves to see if more individuals can be found for conservation efforts.

With its beautiful, dark green foliage and spreading canopy, this species has great potential to be introduced into urban plantings as an ornamental tree. More efforts will be undertaken by the Native Plant Centre of the National Parks Board to monitor the known individuals for propagation material.

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