Parkia timoriana (Leguminosae), its synonyms and their types, and the identity of Gleditsia javanica

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Parkia timoriana (Leguminosae), its synonyms and their types, and the identity of Gleditsia javanica

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Abstract

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Parkia timoriana (DC.) Merr. (*Leguminosae*, *Caesalpinioideae*, *Mimoseae*), a large forest tree distributed from north-east India to north-west New Guinea, has had two other names commonly applied to it at different times: *P. roxburghii* G. Don, based on a type from north-east India, and *P. javanica* (Lam.) Merr., with a type originating from Java. In addition, it has sometimes been referred to by names that belong to an African species in this genus, *P. biglobosa* (Jacq.) R. Br. ex G. Don (syn. *P. africana* R. Br.), which is clearly distinct. The history of name changes and confusion with the African and two other Asian species are outlined. We reiterate the doubts previously expressed by Nielsen and others about the identity of an illustration of seeds and a small, sterile plant in a pre-Linnaean work by Commelin, which is the lectotype of *Gleditsia javanica* Lam., the basionym of *Parkia javanica*. This drawing does not accurately represent the morphology of *P. timoriana* when compared with specimens of seedlings of verified identity, although the local name given by Commelin, "kaduwang", does refer to this species. Several additional taxonomic names that have not been widely used also apply to *P. timoriana*; among them, *Mimosa peregrina* sensu Blanco, non L., is a misapplied name. A sheet at L is identified here as the type of *Parkia grandis* Hassk., and *P. calcarata* Gagnep. is transferred to the synonymy of *P. speciosa* Hassk. and a lectotype is designated.

Keywords

FABACEAE – *Parkia javanica* – *Parkia roxburghii* – Commelin – Lectotype – Nomenclature –Seedling morphology – Synonymy

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Introduction

Over the last two centuries, the Asian tree currently known as *Parkia timoriana* (DC.) Merr. (*Leguminosae*, *Caesalpinioideae*, *Mimoseae*) has had various other names applied to it at different times, due to differences in the interpretation of types and the priority of epithets, leading to some confusion. During much of the 19th century, this species was commonly called *P. roxburghii* G. Don, based on a type from north-east India. Then in the early and middle part of the 20th century, the name *P. javanica* (Lam.) Merr. was widely used. This combination was based on *Gleditsia javanica* Lam., which itself was based on descriptions and illustrations of *Acacia javanica non spinosa* in pre-Linnaean works by Commelin (1697), Ray (1704) and Plukenet (1692). Merrill (1918: 169) stated that the name *Gleditsia javanica* was "typified by Commelin's figure and description", i.e., Commelin (1697: 207–208, tab. 106). However, when Nielsen (1980: 340) reviewed the taxonomy and nomenclature of the mimosoid legumes of Indochina, he considered that Commelin's drawing could not be satisfactorily identified as *Parkia* and he re-instated the name *P. timoriana*, which has a type from Timor: the epithet predated Don's and referred to the same species. Although he judged *P. javanica* to be a dubious name ("*Parkia javanica* auct. *vix* (Lam.) Merrill"), Nielsen did not propose its formal rejection, which was not a common practice at that time, nor did he propose an epitype to clarify the application of the name; this option was not introduced under the International Code of Botanical Nomenclature until Greuter et al. (1994). Due to confusion with an African species, the names *P. biglobosa* (Jacq.) R. Br. ex G. Don (commonly cited as *P. biglobosa* Benth. in Asian works), *P. africana* R. Br., or rarely *P. clappertoniana* Keay, which are all synonyms (Hopkins 1983), have sometimes been applied to *P. timoriana* in error.

The aim of this paper is to review the history of the names associated with *Parkia timoriana* and clarify their types where necessary. The three principal names dealt with here, *P. timoriana*, *P. roxburghii* and *P. javanica*, are discussed in the main text. To avoid obscuring this narrative, three further names that have never been widely applied, either in the literature or on specimens (*Mimosa peregrina* sensu Blanco, non L., *Parkia grandis* Hassk., *P. calcarata* Gagnep.), are treated separately in the section Taxonomy, with a discussion of types for two of them and a re-evaluation of the synonymy of *P. calcarata*. We also describe the leaf morphology of seedlings and saplings and compare these stages with Commelin's illustration, as the background to considering the status of the name *Gleditsia javanica*, and hence to determining what the accepted name should be for the tree discussed here as *Parkia timoriana*. Key events, names and their authors, and significant publications, are summarised in Table 1.

Parkia timoriana is a large, unarmed tree with bipinnate leaves and large, robust, pendent, pyriform to biglobose capitula that have a yellow apical ball of fertile flowers, a constricted zone of nectar-secreting flowers below, and a band of sterile flowers at the base, in which the white staminodia are often but not always elongated to form a relatively short fringe. The fruits are strap-shaped, indehiscent pods that contain several seeds, each of which is elliptic in outline and somewhat flattened with a pleurogram on either face. This species grows in wet tropical forests, both evergreen and deciduous, and sometimes in drier deciduous forest, usually at low elevations but occasionally up to 1300 m. It occurs in north-eastern India and Bangladesh, southern Myanmar (rare), southern Thailand and Peninsular Malaysia, and through many of the islands of Malesia as far east as north-west New Guinea (rare), and is sometimes cultivated in parts of its range. It is absent in the wild from Laos, Cambodia and Vietnam (Nielsen 1980, 1981; Hopkins 1992, 1994).

Although this species has a complicated taxonomic history, the conspecificity of the populations in south-east Asia (previously treated as *Parkia timoriana* or *P. javanica*) and north-east India (treated as *P. roxburghii*) has not been questioned since first half of the 19th century, when they were first place in synonymy. The disjunction between the two areas of distribution is quite short and the plants share a distinctive leaf morphology that is unique in Asian *Parkia*, and the capitula are the same size and colour in both areas, and appear to show the same range in shape, notwithstanding a small difference in the fruits (Hopkins, 1994). The genetic relationship of trees from the two areas has not been investigated.

Materials and methods

Unless indicated as n.v., all specimens referred to have been seen, either in the herbarium or as online images via Jstor Global Plants website [https://plants.jstor.org], JACQ Virtual Herbarium [https://www.jacq.org], Naturalis Bioportal [https://bioportal.naturalis.nl], through herbarium websites for B, BR, CAL, E, G, LINN, NY, P and PTBG, or supplied in response to specific requests. For specimens at L and U, the registration number associated with the QR code is cited in preference to both the barcode number or, for material at L, the accession number on the label for Herb. Lugd. Bat. [= Lugduno Batavorum = Leiden]. For specimens in other herbaria, barcode numbers are generally given where known, especially for types and probable type material. Literature references were seen either in the libraries at K and BM or via the online Biodiversity Heritage Library [https://www.biodiversitylibrary.org] and dates of publication were verified online via the Taxonomic Literature website [https://www.sil.si.edu/DigitalCollections/tl-2]. When discussing specimens: lv. = leaves; ped. = peduncle; recept. = receptacle (i.e. central part of a capitulum without flowers but usually attached to a peduncle); capit. = capitulum (with flowers in bud, at anthesis, or post anthesis, usually with the peduncle attached); fl. = flowers; fr. = fruit; cult. = cultivated.

Table 1. – Names and selected publications relating to *Parkia timoriana* (DC.) Merr., indicating significant changes in accepted name, taxonomic concept and known distribution. First column: author and publication date; second: taxonomic name (in bold) and its author used in publication in column 1, plus synonyms (not bold); third: geographical distribution of the species according to author in column 1. Where no author and species name are given in columns 1 and 2, herbarium specimens of *P. timoriana* are cited.

Publication	Names, authors and synonyms	Geographical distribution	Notes
Commelin (1697)	***Acacia javanica non spinosa foliis maximus splendentibus***	grown in Amsterdam from seeds originating in Java	pre-Linnaean name. Illustration is the lectotype of *Gleditsia javanica* (see Merrill, 1918)
Lamarck (1788)	***Gleditsia javanica*** Lam.	Java	new species, based on the pre-Linnaean name
Candolle (1825)	***Acacia javanica*** (Lam.) DC. *Gleditsia javanica* Lam.	Java	new combination, based on Lamarck's name
Candolle (1825)	***Inga timoriana*** DC.	Timor	new species
Wallich (1831)	***Parkia brunonis*** Graham in Wall., nom. nud.	Hort. Bot. Calcutta & Silhet (NE India)	unpublished name for *Wallich 5288* A & B
Don (1832)	***Parkia roxburghii*** G. Don	Sillet [sic]	new species based on *Wallich 5288*.
Roxburgh (1832)	***Mimosa biglobosa*** sensu Roxb., non Jacq.	Silhet	plant from NE India thought to be the same as *M. biglobosa* Jacq. (≡ *P. biglobosa* s.s. (Jacq.) R. Br. ex G. Don, from Africa)
Decaisne (1834)	***Parkia roxburghii*** G. Don *Parkia brunonis* Graham, *Mimosa biglobosa* sensu Roxb., non Jacq., *Inga timoriana* DC., *Acacia pennata* (L.) Willd.	Timor & NE India	Decaisne was the first to equate plants from Timor and NE India. However, he included *Acacia pennata* (≡ *Senegalia pennata* (L.) Maslin) in synonymy, in error. He also cited the vernacular name "cadawan" based on a specimen in Burmans' herbarium, which is now at G
Blanco (1837)	***Mimosa peregrina*** sensu Blanco, non L.	Philippines	first record from the Philippines. Initially thought to be the same as Linnaeus' species from tropical America but in later editions of Blanco's flora, *M. peregrina* was equated with synonyms of *P. timoriana*
Bentham (1841)	***Parkia biglobosa*** sensu Benth. (1841), non (Jacq.) R. Br. ex G. Don *Parkia africana* R. Br., *Parkia biglandulosa* Wight & Arn., *Parkia brunonis* Graham, *Parkia roxburghii* G. Don, *Inga timoriana* DC., *Mimosa peregrina* sensu Blanco, non L.	Africa, India & SE Asia, incl. Philippines	three distinct species were confused under the name *P. biglobosa* by Bentham, one from Africa (*P. biglobosa* s.s.) and two from Asia (*P. timoriana, P. biglandulosa*)
Hasskarl (1842)	***Parkia grandis*** Hassk. *Parkia biglobosa* sensu Hrt. Bog.	Java	Hasskarl described a new species but he put it into synonymy in his subsequent publications
–	–	Borneo (1865–1868)	first collection from Borneo (*Beccari 3084*, K [2 sheets], P [2 sheets])
Bentham (1875)	***Parkia roxburghii*** G. Don *Mimosa biglobosa* sensu Roxb., non Jacq., *Parkia brunonis* Graham, *Parkia biglobosa* Benth., *Inga timoriana* DC., *Mimosa peregrina* sensu Blanco, non L., *Inga pyriformis* Jungh. ex Miq., *Parkia grandis* Hassk.	Tropical Asia: Silhet, Burma, Indian Archipelago [i.e. Malesia]	in contradiction to Bentham (1841), *P. roxburghii* was now recognised as distinct from *P. biglandulosa* (India) and *P. africana* R. Br. (syn. *P. biglobosa* s.s., Africa). *Inga pyriformis* is a synonym of *P. speciosa* Hassk. but the name is invalid
Baker (1879)	***Parkia roxburghii*** G. Don *Parkia brunonis* Graham, *Parkia biglobosa* Benth., *Mimosa biglobosa* sensu Roxb., non Jacq.	Assam, Silhet, Burma, Malay Peninsula, Malay Islands	distribution extended to Malay Peninsula

Publication	Names, authors and synonyms	Geographical distribution	Notes
Prain (1897)	***Parkia roxburghii*** G. Don *Parkia brunonis* Graham, *Parkia africana* sensu Miq., non R. Br., *Parkia biglobosa* Benth., *Parkia intermedia* Hassk., *Mimosa biglobosa* sensu Roxb., non Jacq.	wild in NE India: Malacca, Silhet, Cachar [Assam], Chittagong; cult. sparingly in Indo-China, Malaya, Singapore	*Parkia intermedia* said to be of likely hybrid origin, involving *P. timoriana* and *P. speciosa*
Merrill (1910)	***Parkia timoriana*** (DC.) Merr. *Inga timoriana* DC., *Mimosa biglobosa* sensu Roxb., non Jacq., *Parkia roxburghii* G. Don, *Acacia niopo* sensu Llanos, non Kunth, *Mimosa peregrina* sensu Blanco, non L.	NE India, Indo-China, Java (cult. form), Timor, Philippines	epithet *timoriana* said to have precedence over *roxburghii*
Merrill (1918)	***Parkia javanica*** (Lam.) Merr. *Gleditsia javanica* Lam, *Acacia javanica* (Lam.) DC., *Mimosa biglobosa* sensu Roxb., non Jacq., *Inga timoriana* DC., *Parkia roxburghii* G. Don, *Acacia niopo* sensu Llanos, non Kunth, *Mimosa peregrina* sensu Blanco, non L., *Parkia biglobosa* Benth. p.p.	NE India and SE Asia, as far the Philippines	said Lamarck's name *Gleditsia javanica* had been overlooked and the epithet *javanica* had precedence over *timoriana*
–	–	Sulawesi (1938)	first collection from Sulawesi (*Reppie 344 bb. 25001*, BO, L)
–	–	Numfur Isl., West New Guinea (1954)	first collection from New Guinea (*Jarisetouw BW 605*, L)
Nielsen (1980)	***Parkia timoriana*** (DC.) Merr. *Inga timoriana* DC., *Parkia roxburghii* G. Don, *Mimosa biglobosa* sensu Roxb., non Jacq., *Parkia javanica* (Lam.) Merr. sensu Merr.	NE India to New Guinea, also cult.	*Gleditsia javanica* is considered a dubious name because the type is poor
Hopkins (1992, 1994)	***Parkia timoriana*** (DC.) Merr. *P. roxburghii* G. Don & others	NE India to New Guinea	agreed with Nielsen (1980) regarding the status of *G. javanica*

Discussion

Leaf morphology in adults, seedlings and saplings

The combination of leaflet shape and venation in adult foliage is usually distinctive for *Parkia* as a whole in Asia, and the precise details are often diagnostic for individual species (Hopkins, 1994: fig. 3; Silva, 2015). In mature trees of *P. timoriana*, the leaves have 14–31 pairs of pinnae, each with 52–72 pairs of opposite, contiguous leaflets (Table 2), and each leaflet is sessile, narrowly oblong and slightly sigmoid with a calcar or auricle (a small, obtuse to acute lobe) on the proximal side at the base; the apex is pointed and curves acropetally (Fig. 1A). The mid-vein is almost centrally placed, parallel to the lateral margins and thus also slightly sigmoid, and no other species of *Parkia* in Asia have leaflets of this size, number and shape. The venation pattern is palmate-pinnate with one or more veins additional to the mid-vein arising at or near the leaflet's basal attachment point. Secondary veins arise along the length of the mid-vein at an acute angle, and they loop, forming an intramarginal vein (Silva, 2015: fig. 9.27). The petiole typically bears a single elliptical extra-floral nectary and smaller glands are found on the rachis between the distal pairs of pinnae. The petiole is attached to the stem by an enlarged pulvinus.

Many species in *Parkia* sect. *Parkia*, including *P. timoriana*, have phaneroepigeal germination as defined by Duke & Polhill (1981). The first structure produced above the raised cotyledons is usually a small, bract-like cataphyll, which is then followed by spirally arranged, bipinnate eophylls (developed leaves) (Burger, 1972; Ng, 2014). Leaflet shape in eophylls is usually less species-specific than in adults in *Parkia* and the first ones typically have a small number of opposite pinnae and fewer opposite leaflets than in adult leaves, the precise numbers of pinnae and leaflets varying somewhat according to the position of the leaf. Seedlings of *P. timoriana* grown to 3rd eophyll stage in a glasshouse in Oxford had 10–33 pairs of leaflets per pinna (Hopkins, 1981), in *Lorence 10197* [PTBG1000021294] the 5th leaf has up to 32 pairs of leaflets, and in *Bakhuizen van den Brink 1832* [U.1316754] the 6th (?) leaf has up to 49 pairs (Table 2). In the first few seedling leaves, the leaflets have a basal calcar but their overall shape is oblong and straight, i.e., comparatively broader than in adult leaves and not sigmoidly curved, with the apex acute to broadly acute and sometimes mucronulate (Fig. 1C, D). In the herbarium specimens seen, the junction of the petiole with the stem is not or only slightly enlarged,

Fig. 1. – Leaflet shapes in *Parkia timoriana* (DC.) Merr. **A**. Adult leaf; **B**. Sapling leaf; **C**. c. 5th seedling leaf; **D**. 1st seedling leaf. [**A:** *Poopath et al. 1492* (K), Thailand; **B:** *Herendeen & Pooma 24-IV-1999-4* (K), Thailand; **C, D:** *Lorence 11005* (K), Hawaii, cult.]

although by the 9th leaf stage in a drawing of a seedling in a glasshouse (HCFH, unpubl. data), the stem had become woody and the pulvini were enlarged with prominent axillary buds and each had a minute stipule on either side. This suggests that the size of the pulvini may depend on the conditions of growth as well as the age of the seedling.

Leaflets in saplings of *Parkia timoriana* are larger than in adults and intermediate in shape between those of the seedling and adult (Fig. 1B). The apex is acute and somewhat deflected acropetally but the leaflets as a whole are less sigmoid than in the adult. The number of pairs of leaflets in the longest pinnae in the specimens available from mainland south-east Asia and Malesia is c. 70–100, which is similar to or exceeds the number reported for the leaves of adult trees (Table 2). The transition from seedling to sapling leaflet characters, and from sapling to adult, is gradual.

Pre-Linnaean publications and Gleditsia javanica

A species described as "*Acacia javanica non spinosa, foliis maximis splendentibus*" was published posthumously by Jan Commelijn (Commelin, 1697). The polynomial used by Commelin was copied from an earlier account of the same species grown in the garden of Simon van Beaumont (1641–1726) at The Hague (Kiggelaer, 1690: 2). According to Wijnands (1983), seeds of this plant were sent from Java by a German explorer, Andreas Cleyer (1634–1697/98) in 1688 and grown in the Hortus Medicus in Amsterdam, possibly from the same stock as those in Beaumont's garden. Commelin's illustration, reproduced here as figure 2, shows a few seeds, each with a pleurogram, described by Commelin as "*plana, oblongo-rotunda*" (i.e. flat, oblong to round), and a small plant without spines or prickles that most likely represents a large seedling rather than a mature specimen. This has four spirally arranged leaves plus the petiole of another arising from a stem that bears cotyledon scars towards its base. Each leaf is bipinnate with 3–5 pairs of opposite pinnae and c. 10–70 pairs of opposite leaflets per pinna; each petiole is attached to the stem by a large pulvinus with a bud in its axil. No flowers or fruits are illustrated.

The leaflets have been drawn schematically, mostly with a simple elliptic outline, rounded to broadly acute at the apex and acute at the base but lacking details of exact shape and

Table 2. – Characteristics of the leaves of seedlings, saplings and adults of *Parkia timoriana* (DC.) Merr.
[* = Developed-leaf number, ignoring any scale-like cataphylls, which are not always easily visible on the stem between the cotyledons and the 1st eophyll]

Herbarium specimen or published source of data	Herbarium with barcode or QR code	Locality	Stage of growth and eophyll* number	Number of pairs of pinnae	Number of pairs of leaflets in the longest pinna	Dimensions of largest leaflets [mm]
Commelin (1697: tab. 106)	–	seed from Java	seedling, 4th	3	c. 70	–
Ng (2014: 348, plate 109B)	–	Peninsular Malaysia	seedling, 2nd	2	18	–
Burger (1972: 192)	–	SE Asia	seedling, 3rd	3–4	c. 32	–
Hopkins (1981: 41)	–	unknown	seedling, 3rd	3	33	–
Lorence 10197	PTBG1000021294	cult. in Hawaii, seed from Java	seedling, 5th	3?	32	9 × 2
Ng FRI 6162	SING0228710	cult. at FRIM, Peninsular Malaysia	seedling, c. 5th	3	c. 40	11 × 3
Bakhuizen van den Brink 1832	L.2042904 U.1316754 K000564040	Java	seedling, 6th (?)	3	49	7 × 2
Herendeen & Pooma 24-IV-1999-4	K000564690	Thailand	sapling	4	70+	13 × 2.5
Koop 69	L.2031701 L.2031702	Sumatra	sapling	c. 9	c. 87	8 × 2.5
Merrill 1530	K000295975	Philippines	sapling	c. 18	80	9 × 2
Elmer 6888	K000295970	Philippines	probably a sapling or regrowth shoot	–	97	13 × 2
Hopkins (1994: 199)	–	NE India to NW New Guinea	adult	14–31	52–72	6–10.5 × 1–2

venation. Some leaflets have the apex curving slightly acropetally but none are clearly truncate at the base with an acute proximal calcar. The first developed leaf in figure 2 resembles a seedling leaf of *Parkia* in terms of numbers of pinnae and leaflets. The maximum number of pairs of leaflets per pinna shown in the 4th developed leaf, c. 70, is considerably more than in the equivalent leaves of *Lorence 10197* or *Bakhuizen van den Brink 1832* but similar to the number in some sapling leaves (Table 2). The seeds illustrated are consistent with *Parkia* but not diagnostic for the genus nor for any particular species within it. If the plant shown in Commelin (1697: tab. 106) is *P. timoriana*, the drawing must be a composite of seedling and sapling characters with the leaflet shape not depicted accurately for either.

One reason for linking Commelin's *Acacia javanica non spinosa* with *Parkia timoriana* is the Javanese name he gave for the plant, "kaduwang". Numerous similar words with slightly different orthographies were given by Backer (1911), Burkill (1935), Corner (1940), Heyne (1950) and others as vernacular names in Java and other parts of south-east Asia for a plant referred to as either *P. roxburghii*, *P. javanica*, "*P. biglobosa* Benth." or *P. timoriana* (Table 3), and we have found no evidence that this name is applied to any other species.

Nearly a century after Commelin, Lamarck (1788: 466) published *Gleditsia javanica*, citing Commelin's name and illustration as given above, plus references to "Raj. 477. nº 29" and "Pluk. t. 123" in synonymy. In the descriptive notes, Lamarck also added that the name *Gleditsia inermis* L. partially applied to this species, but he noted that Linnaeus based his name on a mixture of at least three different taxa and that only Plukenet's element correctly referred to what he called *G. javanica*. Ray (1704: 477) repeated Commelin's name and description exactly, as well as the reference to Plukenet. In his book of illustrations of rare and exotic plants, Plukenet (1692: tab. 123, fig. 3) had depicted a single detached bipinnate leaf with four pairs of pinnae, to which he gave the vernacular name "cadawang", and he referred to the plant again in his annotated list of plants (Plukenet, 1696: 6). Plukenet's plate is the only extant element of original material for *Gleditsia inermis* and its taxonomic identity will be discussed separately (Wajer & Hopkins, in prep.). When publishing the combination *Acacia javanica* (Lam.) DC., Candolle (1825) referred to Lamarck's name but he did not provide any supplementary information and no relevant material is present in Lamarck's herbarium at P (Nielsen, 1980).

Parkia roxburghii and confusion with P. biglobosa

The earliest name validly published in *Parkia* for the tree discussed here is *P. roxburghii*, for which Don (1832: 397) described the leaves and capitula, saying the plant was a native of Silhet in the East Indies. Subsequently, the name *P. roxburghii* became generally established in regional works for India, which at that time included Bangladesh (e.g. Baker, 1879), and for south-east Asia (e.g. Prain, 1897; Ridley, 1922; Backer, 1963), in vegetation studies (e.g. Gibbs, 1914) and in generic overviews (e.g. Bentham, 1875).

However, in the middle of the 19th century, the Indian *Parkia roxburghii* was often confused with the African *P. biglobosa*

Table 3. – Vernacular names applied to *Parkia timoriana* (DC.) Merr. or one of its synonyms in south-east Asia.

		Hasskarl (1844)	Backer (1911)	Burkill (1935)	Corner (1940)	Heyne (1950)	Yusuf & Zuhud (2001)
Indonesia	Java	"puntoi"	"kadawoeng" "kadhaboeng" "kedahoeng" "kedaoeng"	"kědahung" "kědawung"	–	"kědawoeng"	"kedawung" [Javanese] "peundeuy" [Sundanese]
	Sumatra	–	–	–	–	–	"alai"
Malaysia	Peninsular	–	–	"kědaung" "kědawang" "kadaong" "gědayong" "gedayang" "kěrayong"	–	"kědahoeng"	"petai kerayong"
	Sabah	–	–	–	–	–	"kupang"
	Sarawak	–	–	–	–	–	"kedaung"
Philippines	–	–	–	–	–	–	"kupang" [Filipino] "amarang" [Palawano]
Singapore	–	–	–	–	"kerayong"	–	–
Thailand	–	–	–	–	–	–	"kariang" "riang" [Peninsular]

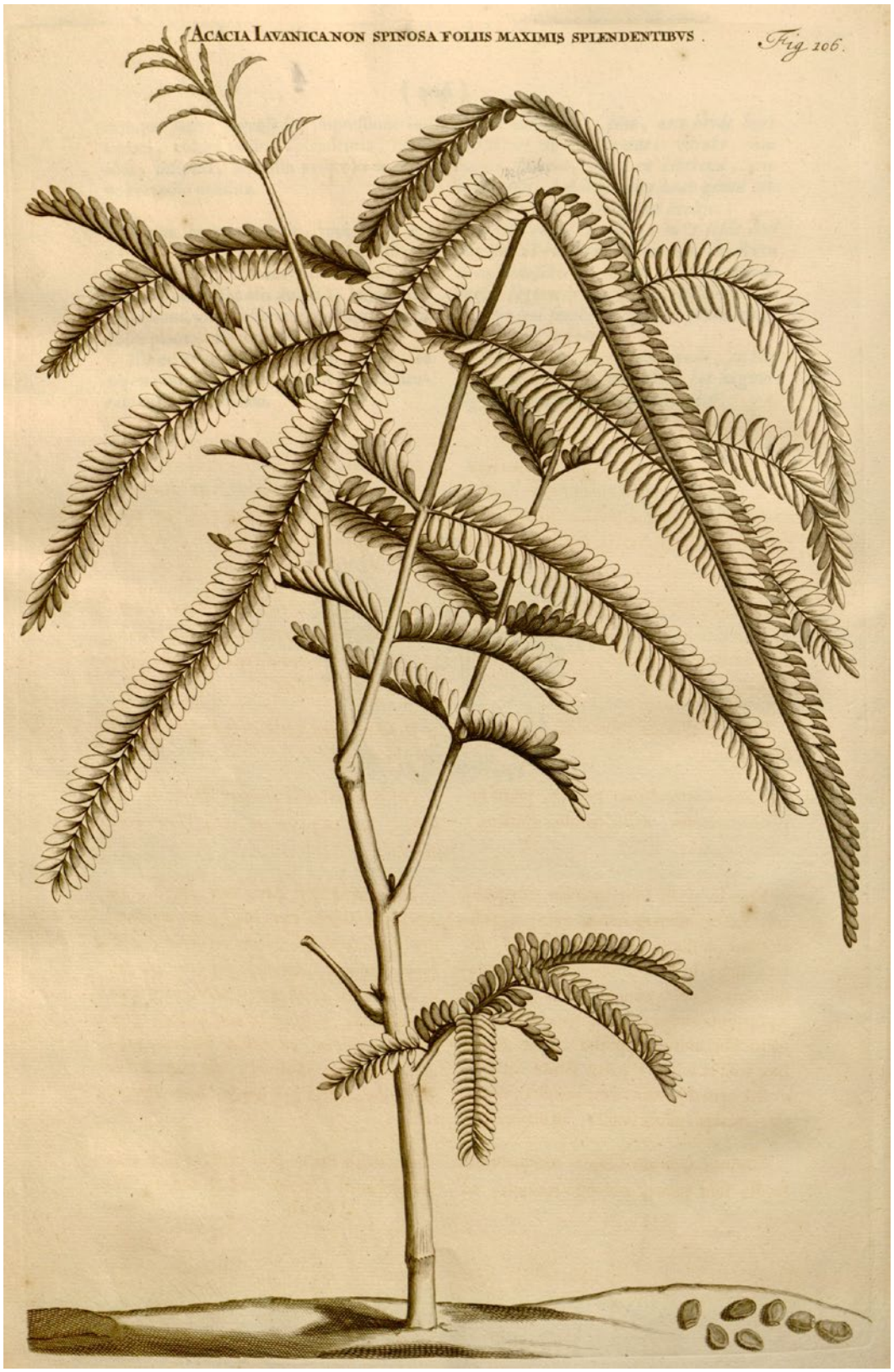

Fig. 2. – Engraving of "*Acacia javanica non spinosa, foliis maximis splendentibus*".
[Commelin, *Horti medici amstelodamensis*, tab. 106, 1697; © Missouri Botanical Garden / BHL (www.biodiversitylibrary.org/item/15229#page/324)]

(*P. biglobosa* sensu stricto) despite clear differences in their leaves, capitula and fruits. Don cited "*Inga biglobosa* Roxb." as a synonym of the Indian tree although Roxburgh (1832: 551) himself had referred to his plant as *Mimosa biglobosa* Jacq., which is the basionym of the African species. The illustration from his *Icones* (Fig. 3) repeated this together with the name *Parkia africana*, and this is also how the plant was referred to in the catalogue of Roxburgh's paintings at Kew (Sealy, 1956). Roxburgh's name has subsequently been cited as *Mimosa biglobosa* Roxb. to distinguish his concept from the African species but the name is misapplied. Don (1832) indicated that the flowers of *Parkia roxburghii* were vermillion rather than yellow, further muddling the African tree with the Indian one.

The confusion was continued by Bentham (1841), who included under the name *Parkia biglobosa* what he later treated as three separate species, two from Asia (*P. roxburghii*, *P. biglandulosa* Wight & Arn.) and one from Africa (*P. africana*, with *P. biglobosa* cited as a synonym) (Bentham, 1875). Taxonomic works for Malesia that have used one of these African names for *P. timoriana* include Hasskarl (1844), Miquel (1855), who also included *P. speciosa* Hassk. under the name *P. africana*, and Koorders & Valeton (1894). To further complicate matters, the African *P. biglobosa* sensu stricto is cultivated in the botanical garden (Hortus Botanicus, now Kebun Raya) in Bogor, Indonesia (e.g. *Wiriadinata 2425* [K000564038], *De Wit* [L.2031692], *Durand 1979* [L.2031689]). This species is also reported as cultivated in Tamil Nadu state in India (Sanjappa, 1992, as *P. clappertoniana*; repeated by Kumar & Sane, 2003 under the name *P. biglobosa*) but this requires confirmation because no specimens were cited. The confusion of names has also meant that in publications on economic botany, uses of the African *P. biglobosa* sensu stricto are sometimes reported in error for *P. timoriana* in Malesia (e.g. Quisumbing, 1978).

Don based the name *Parkia roxburghii* on material from the herbarium amassed by Nathaniel Wallich (1786–1854) at the Botanical Garden of the British East India Company (EIC) in Calcutta. This garden was founded in 1787 by Colonel Robert Kyd at Shibpur, in the city of Howrah, which lies on the opposite bank of the River Hooghly from Calcutta (now Kolkata), and on Kyd's death, William Roxburgh (1751–1815) became its first paid superintendent in 1793 (Robinson, 2008). Roxburgh's specimens are known from various herbaria, including BM, E, G, K and LINN-HS (Forman, 1997) but no material of *Parkia* has been located by us. Roxburgh was succeeded as superintendent of the garden by Wallich, from 1815 until 1846, and with the EIC's permission, Wallich brought his large herbarium from Calcutta to London when he was on furlough there, arriving in 1828 (Krieger, 2023). Wallich's material was in sets of numerous duplicates which were then distributed widely and worked on by various botanists, including Robert Graham for the legumes.

Wallich's personal set of material is in the EIC or Wallich herbarium at Kew (K-W) (Stafleu & Cowan, 1988). In the lithographed catalogue for this collection (Wallich, 1831), the only entry for *Parkia* is "*P. brunonis* Grah. no. 5288, *Mimosa biglobosa* Roxb., A Sillet FD, B HBC" but Graham's name for this species is invalid because no description was ever published. *Wallich 5288* is indicated as being composed of two elements: A, from Sillet (or Silhet), collected by FD, i.e., Francis De Silva, who was a plant collector for Wallich and an assistant at the botanical garden in Calcutta (Wallich Catalogue online [https://wallich.rbge.org.uk]), and B, from HBC, i.e., Hortus Botanicus Calcuttensis.

In the protologue of *Parkia roxburghii*, Don (1832) did not indicate a particular collection but gave the locality Silhet. However, it seems unlikely that his description was based only on *Wallich 5288A*, and it is more probable that he mentioned Silhet because this is where he knew the plant grew wild. According to the online version of Wallich's catalogue, collections marked "Silhet" may have come from the Khasi Hills, now in the Indian state of Meghalaya, or from Bengal/Bangladesh, because at that time, this name referred to a much wider area than the current city and administrative division of Sylhet in eastern Bangladesh.

Nielsen (1980) gave the type of *Parkia roxburghii* as "*Smith in Wallich 5288B*, Calcutta (holo-, K)". Because more than one sheet of *Wallich 5288B* is present at K, a second step lectotypification was made by Turner (2022). The material he designated as the lectotype [K000791057] is in the general herbarium at K and has the name "Sir J. E. Smith" written on it, as well as "*Parkia roxburghii* Don" and "*Inga*", probably all in the same hand, plus a label stating "*Mimosa biglobosa*" and "Bot. Gard. Calc.", with some illegible initials. On the same sheet, a single bipinnate leaf [K000791058] has a label for Wallich's herbarium which gives the same information that is in Wallich's Catalogue for number *5288*, plus a relatively recent label stating *5288A*; this leaf was excluded from being part of Turner's lectotype. The bare receptacle and peduncle of the lectotype are not adequate to determine the application of the name, but happily, the isolectotype in the herbarium of Sir James Edward Smith [LINN-HS1578,37] consists of a capitulum with flowers and its peduncle, plus three leaves attached to a short twig. The shape of the leaflets is diagnostic for this species. The sheet is labelled "*Mimosa biglobosa* Roxb., Bot. Gard. Calcutta, Wallich 1819". Another Smith is also connected to these collections from Calcutta: Roxburgh (1814) mentioned that Mr. M. R. Smith [Mathew Richard Smith (c. 1749–1819)] had donated material of this species to the East India Company's Botanic Garden in 1812.

Not all herbarium material distributed under the Wallich Catalogue number *5288* indicates whether it is collection A or B, and furthermore, we cannot be certain that A and B each represents only a single gathering (Turner, 2022).

Fig. 3. – Watercolour on paper of *Parkia timoriana* (DC.) Merr., painted under the name *Mimosa biglobosa* Jacq. Note that in vivo, the capitula and their peduncles are pendent, not erect.
[*Icones Roxburghianae* no. 2510 / 2515; © Board of Trustees, Royal Botanic Gardens, Kew]

Sheets of *Wallich 5288* (A, B or neither, some *Wallich s.n.*) are known at BR [BR00000520305, BR00000520338, BR00000517454, all ster.], CAL [CAL0000067945, capit., *5288A*; CAL0000067947, ster., *5288B*], G [G00370509, G00370524, both lv. & capit.], K [K003713041, lv. & capit.; K001120392, col. *F. de Silva*, lv., ped. & recept. (K-W); K001120393, lv. & capit. (K-W)], OXF [OXF0073062, lv. & capit.] and W [W0026898, lv.], as well as at C, CGE, GH and SING, and further duplicates are likely to exist elsewhere.

Parkia timoriana

Nearly 80 years after Don's account of *Parkia roxburghii*, Merrill (1910: 33) published the combination *P. timoriana*, based on *Inga timoriana* DC., with *P. roxburghii* given as a synonym. In the protologue of *I. timoriana*, Candolle (1825: 442) had stated that the plant grew in Timor and he gave a brief description of the leaves and pods, saying the flowers were unknown. His description of the leaflets, "*basi et apice obliquè truncatis*", accords with *P. timoriana* and he indicated that he had seen dried material in his own herbarium. Nielsen (1980) cited the type of *I. timoriana* as "*s.coll. s.n.*, Timor (holo-, G-DC)" and the relevant specimen in G-DC is comprised of two sheets: G00652142 (lv. & fr.) has labels that state "*Inga timoriana* DC." and "*Mimosa*, Timor, Muséum de Paris 1821", whereas G00652169 (lv.) has a blank label. This material would have been amongst 220 specimens mentioned in the Catalogue of Candolle's herbarium (Candolle et al., 1794–1921: 30) that had been collected in Timor and was said to be from the Baudin voyage to Australia (1800–1804). They were received by Augustin-Pyramus de Candolle (1778–1841) in 1821 from what is now the Muséum national d'Histoire naturelle in Paris.

Decaisne (1834: 459) appears to have been the first to synonymize the tree from the Malay Archipelago with that from north-east India, which he did under the name *Parkia roxburghii* by including *Inga timoriana* amongst its synonyms. In this first ever account of the flora of Timor, Decaisne (1834) described the leaves and fruits of *P. timoriana* and mentioned clavate spikes, but he gave no description of the flowers. In his introduction, he said his work on Timor was largely based on material collected by Riedlé and Guichenot, two gardeners who were part of the expedition to Australia on the corvettes *Naturaliste* and *Géographe* (1800–1804) that was led by Nicolas Baudin until his death in 1803 (Brosse, 1983; Fornasiero et al., 2016). Leschenault de la Tour, the official botanist and ornithologist on the voyage, was scarcely mentioned by Decaisne and then only in connection with Java.

Baudin's Expedition visited Timor from August to November 1801, and Riedlé died during this period on 21 October 1801 (Brosse, 1983; Fornasiero et al., 2016). During this time, Guichenot, Leschenault de la Tour and Riedlé collected on the island. The *Géographe* visited Timor again in 1803, when Leschenault left the corvette due to ill health and he spent the following three years in Java. On both visits to Timor, the corvettes anchored in the Dutch port of Coupang, now Kupang, capital of the Indonesian Province of East Nusa Tenggara, near the south-western tip of the island. Decaisne (1834) also mentioned that plant specimens collected by the French botanist Gaudichaud were included in his flora of Timor. Gaudichaud-Beaupré was part of the circum-global voyage led by Louis de Freycinet on the *Uranie* from 1817 to 1820 which visited Kupang and later the Portuguese port of Diely or Dilli, now Dili, capital of East Timor, on the north side of the island in 1818 (Steenis-Kruseman, 1950; Brosse, 1983).

Four sheets of *Parkia timoriana* from Timor would have been available to Decaisne in Paris. P02775741 consists of two pods and has Decaisne's name written on the label but no collector is given. P02775743 is sterile and has the collector's name Riedlé. P02775744 has leaves and pods and was collected by Leschenault. The fourth sheet, P03090159, does not indicate a collector but has "*Roxburghii* G. Don?" in ink on the printed label for Herb. Mus. Paris, with initials underneath (illegible but apparently not those of Decaisne, cf. handwriting in *Flora Malesiana* ser. I, vol. 1: cxlix), with *Parkia* added by a different hand in pencil. A small label in the lower left corner of this sheet states "No. 291 graines", and Steenis-Kruseman (1950: 603) recorded that Gaudichaud-Beaupré's collections included seeds, so it is likely that he was the collector of P03090159. No seeds linked to this sheet were located in the carpological collection at P in April 2024.

Among the four sheets at P, *Leschenault s.n.* [P02775744] and *Riedlé s.n.* [P02775743] resemble one another and the lectotype in G-DC quite closely, as does *Leschenault s.n.* at K [K000564114]. The sheets E01153934, G00370517 and L.2042871 are also similar but lack collectors' names. P02775741 was labelled as a possible type of *Inga timoriana* by Nielsen. P03090159 (probably collected by Gaudichaud) bears a marked resemblance to G00370530 (no collector's name, label for herb. Moricand), because both have one of their pods attached to the receptacle of an old capitulum. The Catalogue of Candolle's herbarium (Candolle et al., 1794–1921) shows that material was received from Gaudichaud at various times, but his collection is not part of the original material for *Inga timoriana*. Amongst the other sheets, it is not possible to be certain which are part of the same collection as the material in G-DC and none of those at P has Candolle's writing on the label (M. Callmander, pers. comm.); however, all the material looks sufficiently similar to have come from the same tree. None of the sheets mentioned in this paragraph has flowers. A sheet at W (*s.coll., s.n.*, île du Timor, W0026620 n.v.) may be a duplicate of one of the collections at P.

The status of *Parkia timoriana* in Timor is uncertain and unfortunately, Leschenault did not mention *Parkia* in the account in his diary of the plants he found on Timor (Gibbard, 2023). After the expeditions led by Baudin and

Freycinet, *P. timoriana* was collected in Timor again in 1828 by the horticulturalist and plant collector Zippelius (Herb. Zippel *s.n*. [L.2042870, ster.]), who worked at the botanical garden in Bogor; his collections from Timor also came from around Kupang (Steenis-Kruseman, 1950). However, there appear to be few if any subsequent collections from the island. Spanoghe (1841) mentioned *P. roxburghii* in his *Prodromus florae timorensis* (as a synonym of *P. biglandulosa*), but *Parkia* was not included in the checklist that forms an appendix in Forbes et al. (1885). Neither were any names in this genus included in the lists of species in Kalkman (1955) or Sidiyasi et al. (1989), the latter being the most recent floristic work mentioned for the island by Frodin (2001). A survey for a proposed national park at the eastern tip of East Timor (Cowie, 2006), which includes areas of evergreen forest, did not mention *Parkia* either.

The apparent lack of collections after 1828 could be due to any of several factors, such as natural rarity caused by growing at the limit of its climatic tolerance, destruction of suitable habitat reducing the population or resulting in local extinction, or lack of collecting effort, or it might be because the tree was cultivated rather than native at Kupang in the early 19th century. However, a number of Timorian endemics have also not been re-collected since this period (Laura Jennings, pers. comm.) so until an effort is made to re-find *P. timoriana*, we cannot say which of these possibilities is the most likely. Timor lies south of the main area of wet evergreen forest in Malesia and although some is present on the island, the vegetation around Kupang was classified as dry deciduous forest by Monk et al. (1997: fig. 4.4). We do not know the extent to which *P. timoriana* is tolerant of strongly seasonal climates with marked dry periods, although it grows wild in Sumbawa (*Indir Alam 36*, BO; *Kuswata 198,* A, BO, G, K, L, P, SING), which is in the monsoonal zone, with a mixture of moist and dry deciduous forest (Monk et al., 1997: fig. 4.4).

Parkia javanica and the return to P. timoriana

After Merrill (1910), the name *Parkia timoriana* did not have much time to become established in the literature before the next change, which was again due to Merrill. When reviewing the plants published by Blanco (1837, 1845) and Blanco et al. (1879, 1880) from the Philippines, Merrill (1918: 169) made the combination *P. javanica*, stating that Lamarck's basionym had been overlooked. He listed a number of synonyms including *Inga timoriana* and *P. roxburghii* in addition to Blanco's misapplied name, *Mimosa peregrina* sensu Blanco, non L. In his discussion of Commelin's account, Merrill wrote that "the local name *cadawang* […] leaves no doubt as to the form intended" but he considered the foliage was poorly drawn as to the number of pinnae.

Following its publication in 1918, the combination *Parkia javanica* was widely adopted on specimens and in the literature for this species, especially in Malesia (e.g. Merrill, 1923; Burkill, 1935; Corner, 1940; Steenis, 1949; Whitmore, 1972) although the confusion caused by Commelin's illustration was noted by Corner (1940) and led Backer (1963) to reject the name *P. javanica* in favour of retaining *P. roxburghii* for the plant in Java. When Nielsen revised the taxonomy of the mimosoid legumes of eastern and south-eastern Asia for several flora treatments (including Nielsen, 1981, 1985, 1992), as mentioned above, he expressed doubts about the identity of *Gleditsia javanica* (Nielsen, 1980). Subsequent to his work, *P. timoriana* has generally replaced both *P. javanica* and *P. roxburghii* in the literature on taxonomy, phylogeny, ecology and economic botany (e.g. Hopkins, 1992, 1994; Lock & Heald, 1994; Setyowati, 1998; Yusuf & Zuhud, 2001; Kumar & Sane, 2003; Lock & Ford, 2004; Fernando et al., 2004; Hidayati et al., 2020; Oliveira et al., 2021; Singh, 2022), although the latter names still appear occasionally on specimens, and in publications and online databases.

Other bipinnate Mimoseae in Java

In addition to the evidence of the vernacular name, Wijnands (1983) thought Commelin's "*Acacia javanica non spinosa*" must correspond to *Parkia timoriana*, which he called *P. javanica*, because he knew of no other bipinnate mimosoid legumes in Java with so many leaflets. However, other possibilities do exist, each having leaves with several pairs of pinnae and numerous small leaflets, although the numbers of leaflets in seedlings and saplings is not often reported.

Within the genus *Parkia*, *P. speciosa* Hassk. is a well-known food plant, often known as "sator", "petai" or "peté" (Wiriadinata & Bamroongrugsa, 1993) that is commonly cultivated in southern Thailand and western Malesia, including Java. Its adult leaves have 11–20 pairs of pinnae, each with 29–42 pairs of oblong leaflets with rounded apices and are thus quite distinct from those of *P. timoriana*, although the seedlings of the two species are very similar (see Ng, 2014: 348). *Parkia intermedia* Hassk. is given as an accepted species in POWO [https://powo.science.kew.org] and by Lock & Ford (2004), but was treated as of uncertain status by Hopkins (1994). It is thought to be an ancient hybrid, probably involving *P. speciosa* and *P. timoriana*, which perhaps arose in Java through cultivation (Backer, 1911; Steenis, 1949). As its name implies, its morphology said to be intermediate between that of its putative parents but because no type material has yet been located, this cannot be confirmed. Hasskarl (1844) gave the common name "putier" for *P. intermedia,* "putoi" or "peteh" for *P. speciosa*, but "puntoi", not "kaduwang", for *P. timoriana*, which he referred to by the name *P. africana*.

Based on Nielsen (1992), other taxa of the *Mimoseae* tribe that occur in Java and have bipinnate leaves and relatively small, numerous, opposite leaflets include: *Vachellia leucophloea* (Roxb.) Maslin et al. (6–13 pairs of pinnae, 6–25 pairs of leaflets per

pinna in adult foliage, referred to as *Acacia leucophloea* Roxb. by Nielsen) but this species commonly has spinescent stipules, at least in adults; *Paraserianthes lophantha* subsp. *montana* (Jungh.) I.C. Nielsen (9–13 pairs of pinnae, 15–34 pairs of leaflets/pinna), from montane forest; and several members of the genera *Albizia* Durazz. and *Senegalia* Raf. (referred to as *Acacia* subg. *Aculeiferum* Vassal by Nielsen), although Javan species in the last genus generally have narrowly oblong to linear leaflets. The remaining *Mimoseae* from Java have fewer, larger leaflets.

Taxonomy

1. ***Parkia timoriana*** (DC.) Merr. in Philipp. J. Sci., C. 5: 33. 1910.

≡ *Inga timoriana* DC., Prodr. 2: 442. 1825.

Holotypus: Indonesia. Timor: s.l., VII.XI.1801, *Leschenault* or *Riedlé s.n.* (2-part specimen: G-DC [G00652142 lv. & fr., G00652169 lv.] images!).

= *Parkia roxburghii* G. Don, Gen. Hist. 2: 397. 1832. **Lectotypus** (first step designated by Nielsen, 1980: 340; second step designated by Turner, 2022: 74)**: India:** Bot. Gard. Calcutta, *Anon. s.n.* (K [K000791057 ped. & recept.]!; isolecto-: LINN [LINN-HS1598.37 capit. & lv.] image!).

= *Parkia grandis* Hassk. in Flora 25, Beibl. 2: 55. 1842. **Lectotypus** (designated here): **[Indonesia. Java]:** Hort. Bogor, "Pundoi" [vernacular name], s.d., *Hasskarl s.n.* (L [L.2042913 lv. & fr.]!).

– *Mimosa biglobosa* sensu Roxburg (1814: 40) [non Jacq.].

– *Parkia brunonis* Graham in Wall. Numer. List, no. 5288. 1831 [nom. inval., nom. nud.].

– *Mimosa biglobosa* sensu Roxburg (1832: 551) [non Jacq.].

– *Mimosa peregrina* sensu Blanco (1837: 737) [non L.].

– *Parkia biglobosa* sensu Bentham (1841: 328) [quoad plantam Indicam pro parte, non G. Don].

– *Acacia niopo* sensu Llanos (1858: 508) [non Kunth].

Notes. – Candolle (1825: 442) in the protologue of *Inga timoriana* DC. wrote: "in ins. Timor […] (v. s.)" but did not specify any individual specimen on which he based his description. In the introduction to the *Prodromus* Candolle (1824: vi), however, clearly mentioned that any descriptions marked as "(v. s.)", i.e., *vidi siccam* [I saw dried material], were prepared from the corresponding specimens in his own collection. The two sheets kept in one folder in his personal herbarium at G-DC are part of the same gathering. In this case, Nielsen's holotype citation applies equally to both of them. There are likely to be isotypes in other herbaria, especially P, but at present, we are uncertain as to which they are (see main text). The two sheets of the holotype are shown in figure 4.

Previously two other sheets from the general herbarium at G, i.e. G00370517 and G00370530, were labelled by the first author as types of *Inga timoriana*, because she did not realise that these were not the specimens seen by Candolle. G00370530, for example, was accessioned in 1827, two years after the name *I. timoriana* was published.

Blanco was an Augustinian friar who spent some 40 years in the Philippines and published the first flora of the archipelago (Steenis-Kruseman, 1950). When he published the name and a description for *Mimosa peregrina*, although he did not use the term "mihi", neither did he explicitly refer it to the Linnaean name (Blanco, 1837: 737). However, in both the 2nd and 3rd editions of Flora de Filipinas (Blanco, 1845: 509; Blanco et al., 1879: 139), he did refer to Linnaeus's name although with a question mark, and it would be a remarkable coincidence if he had selected the epithet *peregrina* independently. Meanwhile, Llanos, another Augustinian priest and missionary in the Philippines, gave "*Acacia niopo* D. C." as a synonym of *M. peregrina* Blanco in an appendix to the Flora (Llanos, 1858: 508). In the Gran Edición (Blanco et al., 1880: 74), both "*Mimosa peregrina*, Blanco (non Linn.)" and "*Acacia niopo*, Llanos, (non Humb.)" were given as synonyms of *Parkia roxburghii*, and Merrill (1918: 169) listed these names as synonyms of *P. javanica*. It appears that in the mid 1840s, Blanco and Llanos considered their tree might be the same as Linnaeus's plant from the Americas but subsequently decided that it matched Don's from India. It is clear that Llanos never intend to publish a new name, and although Blanco (1837) provided his own description, it is unlikely that he intended to publish a new name either, making his name misapplied rather than a later homonym.

Apparently nothing is known about Blanco's original specimens and if they were preserved at the time, they are no longer extant (Merrill, 1918: 5). After interpreting his names, Merrill re-collected material from Luzon that he considered represented Blanco's species, and distributed it widely. *Mimosa peregrina* was represented by the collections *Merrill Sp. Blancoanae 604* (fr.: BO, F, GH, K, L, NSW, NY, P, US) and *689* (fl.: A, BO, F, GH, K, L, MO, NSW, NY, P, US), both also labelled as *Parkia javanica*.

Although Blanco's original material from 1837 is unknown, Steenis-Kruseman (1950) said that Llanos collected plants on behalf of the second edition of Blanco's Flora, and a set of 400 specimens at MA was said by Colmeiro (n.v.) to have been collected by Blanco and Llanos (Stafleu & Cowan, 1976; Steenis-Kruseman, 1950). Two of these sheets [MA240762, MA240762-2] belong to *Parkia timoriana* (det. Nielsen, 1985) and each has leaf material and a single fruit. Both have modern printed labels for "P. Fr. Manuel Blanco, Flora de Filipinas" with the names *Parkia javanica*, *Acacia niopo* and *Mimosa peregrina*,

Fig. 4. – Holotype of *Parkia timoriana* (DC.) Merr. in G-DC. **A.** First sheet; **B.** Second sheet. [*Leschenault* or *Riedlé s.n.*, G00652142; Conservatoire et Jardin botaniques, Genève]

with "lectotype" below and "leg. *Llanos 140*, det. Quisumbing, Sept. 1958". The first sheet also has an older label with "140" and the names "*Acacia niopo* (Humb.) DC., *Mimosa peregrina* (Blanco)". While these sheets probably represent the plant described by Blanco (1837), they are not part of his original material of *M. peregrina* sensu Blanco non L. because Blanco did not publish a new species name. Instead, he misapplied the name of a South American species (i.e. *Mimosa peregrina* L.) to a south-east Asia taxon (i.e. *Parkia timoriana* (DC.) Merr.).

The names used by Blanco and Llanos refer to the South American tree *Anadenanthera peregrina* (L.) Speg. Its basionym is *Mimosa peregrina*, and Altshul (1964) cited *Acacia niopo* (Humb. & Bonpl. ex Willd.) Kunth as a heterotypic synonym. The epithet *peregrina*, means foreign, outlandish, strange, imported from abroad or travelling abroad, as on a pilgrimage (Simpson & Weiner, 1989) or simply foreign (Stearn, 1992), although it is not clear in what exact sense it was intended here. *Niopo* is one of the Amerindian names for this tree and refers to the psychoactive snuff made from the roasted seeds (Torres & Repke 2006).

Between 1837 and 1845, when working as an assistant curator at the Hortus Botanicus in Bogor (Steenis-Kruseman, 1950), Hasskarl published three new species in *Parkia*: *P. speciosa*, *P. intermedia* and *P. grandis*. However, in his publications after 1842, he gave the last of these names as a synonym of *P. biglobosa* (Hasskarl, 1843, 1848) or *P. africana* (Hasskarl, 1844), and later Bentham (1875) listed *P. grandis* as a synonym of *P. roxburghii*. The name *P. grandis* does not appear to have been used on specimens nor in publications subsequent to Hasskarl (1842), other than in synonymy. The protologue mentioned no collections but "*P. biglobosa* Hrt. Bog." after the name suggests the plant was growing in Bogor Botanical Garden under this name in the mid 19th century.

Hasskarl (1842) mentioned characters of the tree and its leaves, capitula, flowers (in bud?) and fruits in his protologue. His herbarium and types were donated to L in 1892 with some material elsewhere (B, BO, H, K, NY) (Stafleu & Cowan, 1979). A sheet at L [L.2042913] is designated here as the lectotype, rather than as a holotype, as Hasskarl did not cite any specimen in the protologue, not even indirectly as Candolle did (see Turland et al., 2018: ICN Art. 9.3, 9.4). It has a small handwritten label that states "*Parkia grandis* Hkarl [?] (biglobosa Hrt. Bog) Pundoi" and consists of leaves and a single fruit. Three other sheets of *P. timoriana* at L bear stamps for Hasskarl's herbarium [L.2042911, L.2042912, L.2042914] but have labels stating "ex Hort. Bog. Java, Teysmann 1867". Teysmann (or Teijsmann) was curator of the botanical garden in Bogor between 1831 and 1869 and donated specimens from there to Hasskarl in 1867 (Steenis-Kruseman, 1950). These three sheets also consist of leaves and fruits but there is nothing to suggest they were part of Hasskarl's original material of *P. grandis*.

Casimir de Candolle is quoted in Merrill (1910) as saying that the type of another of Hasskarl's species, *Parkia intermedia*, could be considered as being a specimen distributed by Zollinger, who visited Java several times between 1841 and 1859 (Stafleu & Cowan, 1988) and thus initially coincided there with Hasskarl. Zollinger's collections were widely distributed, with the largest series at P, but no material relating to *P. grandis* was found there in April 2024.

Name excluded from the synonymy of P. timoriana

Parkia javanica (Lam.) Merr., Sp. Blancoan.: 169. 1918.

≡ *Gleditsia javanica* Lam., Encycl. 2(2): 466. 1788. ≡ *Acacia javanica* (Lam.) DC., Prodr. 2: 471. 1825. **Lectotypus** (designated by Merrill, 1918: 169): [icon] (Commelin, Horti Med. Amstelod. 1697: tab. 106) (Fig. 2).

Notes. – We can neither definitively confirm the identity of Commelin's plant nor can we rule out that it belonged to *Parkia timoriana*. The original description and illustration are insufficiently detailed, there is no indication of an extant herbarium specimen, and the best evidence for its identity is its Javanese name, which we do not consider a sufficiently strong reason for accepting Lamarck's basionym. We therefore concur with Nielsen (1980) that *Gleditsia javanica* is a dubious name, which is currently categorised by POWO as unplaced. Although we have the option of assigning an epitype to support the application of *G. javanica*, doing so would overturn, yet again, a name in common use for a plant of some economic value (e.g. Burkill, 1935; Heyne, 1950; Setyowati, 1998; Yusuf & Zuhud, 2001; Angami et al., 2018; Singh et al., 2020, 2021; Singh, 2022). For this reason, we intend to propose the formal rejection of *G. javanica* in due course (Wajer & Hopkins, in prep.), which would also apply to the combinations *Acacia javanica* and *Parkia javanica* that are based on it. This option is the most sensible way of ensuring nomenclatural stability within the rules of the International Code of Nomenclature (Turland et al., 2018).

2. ***Parkia speciosa*** Hassk. in Flora 25, Beibl. 2: 55. 1842.

Typus: not found.

= *Parkia calcarata* Gagnep. in Notul. Syst. (Paris) 1: 56. 1911, **syn. nov. Lectotypus** (designated here): **Indonesia. Java:** s.l., s.d., *Leschenault s.n.* (P [P02775713 lv., capit. & fr.]!; isolecto-: P [P02775714 lv. & capit.]!).

– *Inga pyriformis* Jungh., Reis. Java: 419. 1845 [nom. inval., nom. nud.].

– *Inga pyriformis* Jungh. ex. Miq., Fl. Neth. Ind. 1(1): 52. 1855 [nom. inval., pro. syn.].

Notes. – The type of *Parkia speciosa* was cited in the protologue as "Hrt. Bog. […] Nom. mal. Peteh, Nom. sund. Püdoi, nom. belg. faba foetida". No original material has been located so far either for this name or for Hasskarl's *P. intermedia*, which is morphologically close to it. Neotypes cannot be ascribed to either name until material originating from Hort. Bogor in the mid 19th century has been studied in greater detail. The synonymy of *P. calcarata* and *Inga pyriformis* are interpreted here according to the current usage of the name *Parkia speciosa*.

Junghuhn (1845) mentioned some features of *Inga pyriformis* but this is not sufficiently diagnostic to constitute a valid description. He gave the name "peté" and said that the seeds smelled of garlic and were a favourite food of the Javanese, which accords with *Parkia speciosa*. In his treatment of the *Leguminosae* in Miquel's *Plantae Junghuhnianae*, Bentham (1852: 266) did not mention *I. pyriformis* although he gave "Peté (Jungh.)" under the name *Parkia biglobosa*, with *P. speciosa* as a synonym. Subsequently Miquel (1855) listed *Inga pyriformis* and *Parkia speciosa* as synonyms of *P. africana*, continuing the confusion of *P. speciosa* and *P. timoriana* with each other and with the African *P. biglobosa*.

The type of *Parkia calcarata* was cited by Gagnepain (1911) as "Java [*Leschenault*] […] Deux échantillons en feuilles, capitules et jeune fruits existent dans l'herbier du Muséum […]", and according to him, these two sheets had been labelled "*Juga* [i.e. *Inga*] *biglobosa?*" by Leschenault, and after him, by Spach. The one designated here as the lectotype has leaves, two capitula in late bud stage and immature fruits, with a series of floral drawings attached; the isolectotype has leaves and a capitulum in bud. As mentioned above, the collector, Leschenault, spent some time in Java after leaving Baudin's expedition in Timor in 1803.

Gagnepain (1911) did not consider his new species to be the same as *Parkia roxburghii* nor any of the other species from south-east Asia, including *P. speciosa*. He described the capitula, flowers and fruits, and mentioned that the leaves have 7–8 pairs of pinnae and c. 18 pairs of leaflets per pinna, the leaflets having rounded apices. This last character in particular distinguishes *P. calcarata* from *P. timoriana*. The epithet *calcarata* is derived from calcar, the Latin for a spur or heel and presumably refers to the obtuse to acute projection at the base of each leaflet. The same term is used for the spur of a flower (Stearn, 1992).

Parkia calcarata was put into the synonymy of *P. timoriana* by Hopkins (1992, 1994) and the latter publication stated that the type at P had not been seen but a sheet at K was presumed to be an isotype. However, reviewing the material at P and the protologue shows this was an error, which we now correct. It is clear that the sheet at K [K000564114], *Leschenault s.n.*, is not conspecific with those at P and in addition, it is from Timor, not Java.

The type of *Parkia calcarata* is somewhat unusual for *P. speciosa*. Its narrow fruits match those of wild-collected specimens of *P. speciosa*, especially from Borneo and Palawan, from where the type of the synonym *P. harbesonii* Elm. was described, whereas pods from regions where the trees are often cultivated, including Java, Peninsular Malaysia and southern Thailand, are usually slightly broader. In addition, the leaves of *Leschenault s.n.*, if assumed to be from an adult tree, have fewer pinnae than is typical for *P. speciosa*, and in the isolectotype [P02775714], the leaflets are somewhat larger than usual (up to 13 × 3 mm vs. usual range 5–10 × 1.5–2 mm). However, this material is not sufficiently distinct to merit recognition as a separate taxon.

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