

***Phanera ferruginea* var. *griffithiana* (Fabaceae, Cercidoideae): resolving the status of a lesser-known climbing legume in Singapore**

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ABSTRACT. *Phanera ferruginea* (Roxb.) Benth. is reported as a naturalised species for the *Flora of Singapore*. This species of climbing legume is represented by *Phanera ferruginea* var. *griffithiana* (Benth.) Bandyop., Ghoshal & M.K.Pathak in Singapore. The status of the species in Singapore, which is known only from Bukit Timah Nature Reserve, has hitherto not been fully investigated. We provide a description of the species from Bukit Timah, a comprehensive account of its origin through literature records and herbarium specimens, along with a taxonomic key and field characters for the *Phanera* species of Singapore.

Keywords. Bukit Timah Nature Reserve, Caesalpinioideae, introduced, Leguminosae, naturalised

Introduction

Phanera Lour. in the Fabaceae is a genus of 74 species of tendrilled climbers that are distributed from Asia to Australia (Mackinder & Clark, 2014; Clark et al., 2017; Sinou et al., 2020). Up to 2014, *Phanera* was broadly classified within the large pantropical genus *Bauhinia* L., which consisted of c. 300–350 species at that time (Larsen et al., 1980, 1984; Larsen & Larsen, 1996; Chen et al., 2010; Mackinder & Clark, 2014; Clark et al., 2017). Molecular phylogenetic studies have largely supported the delimitation of *Bauhinia* s.l. into several smaller genera (Hao et al., 2003; Sinou et al., 2009), which have at some point in their history been recognised at the generic or sectional level (De Wit, 1956; Wunderlin et al., 1976; Verdcourt, 1979; reviewed in Mackinder & Clark, 2014). *Bauhinia* s.l. has now been split into eleven genera based on plastid and nuclear gene sequences, namely *Bauhinia* s.s., *Brenierea* Humbert and *Piliostigma* Hochst., which are all trees or shrubs, and *Barklya* F.Muell., *Cheniella* R.Clark & Mackinder, *Gigasiphon* Drake, *Lysiphyllum* (Benth.) De Wit, *Phanera* s.s., *Schnella* Raddi, *Tournaya* A.Schmitz and *Tylosema* (Schweinf.) Torre & Hillc., which are all tendrilled climbers (Sinou et al., 2020). *Phanera* can be distinguished from the other ten segregate genera of *Bauhinia* by its habit as a liana or scandent shrub with entire or bilobate leaves, lobed calyces, presence of five petals and three stamens, and a distribution from South Asia to Malesia (Mackinder & Clark, 2014; Clark et al., 2017; Sinou et al., 2020).

The genus *Phanera* in Singapore is represented by only one native species, *Phanera semibifida* (Roxb.) Benth. which in Singapore is represented by the type variety (Loo & Tan, 1998; Chong et al., 2009). *Phanera semibifida* is a relatively common species, but it is confined to primary and mature secondary rainforests. It is floriferous and conspicuous along forest margins in the Central Catchment Nature Reserve.

In 1996, another species of *Phanera* was collected from Taban Loop in Bukit Timah Nature Reserve (BTNR) and was noted to be non-native (Loo & Tan, 1998). This plant was identified as *Phanera ferruginea* var. *griffithiana* (Benth.) Bandyop., Ghoshal & M.K.Pathak, a woody climber which is known to be distributed throughout the lowland forests and forest margins of Peninsular Malaysia and with a single record from eastern Sumatra (Larsen & Larsen, 1996). The first individual observed in Bukit Timah was a large mature climber with a diam. of more than 50 cm (Fig. 1A). Unfortunately, this magnificent climber fell due to rot in 2020. The flowers of this taxon were observed once again in the same location in May 2021. A visual survey of the area around Taban Loop revealed a growing population of juvenile, semi-mature climbers and several mature climbers around the area (Fig. 1, 2), similar to what was reported in Loo & Tan (1998). This species is currently only known from this locality (Fig. 3).

While the individuals of *Phanera ferruginea* var. *griffithiana* at the Taban Loop locality may have been present for a long time, there has not been a taxonomic description of the species from Singapore. The status of this taxon in Singapore, sometimes under names now treated as synonyms, has been stated by various authors since the late 1870s as either native (or implied as such) (Baker, 1878; De Wit, 1956), absent (Ridley, 1922), introduced (Keng, 1990; Turner et al., 1990), present (but without an assessment of the status) (Turner & Tan, 1994), or casual (Loo & Tan, 1998). It was omitted from the two recent checklists of the Singapore flora, which covered both native and naturalised species (Turner, 1993; Chong et al., 2009). The origin of this species in Singapore has not been fully investigated nor recently documented.

In this paper, we describe the specimens of *Phanera ferruginea* var. *griffithiana* at Taban Loop. We also provide a diagnostic key to differentiate *Phanera ferruginea* var. *griffithiana* from *Phanera semibifida*, the native taxon in Singapore. To investigate the origin of *Phanera ferruginea* var. *griffithiana*, we examined the literature and herbarium records of *Phanera* in Singapore. Based on this and the observation of the thriving population at Taban Loop in BTNR, we establish that *Phanera ferruginea* var. *griffithiana* should be considered as naturalised in Singapore. We further provide a hypothesis to explain its introduction.

Taxonomic notes

Phanera ferruginea (Roxb.) Benth. in Miquel, Pl. Jungh. 2: 262, adnot. (1852); De Wit, Reinwardtia 3: 453 (1956). – *Bauhinia ferruginea* Roxb., Fl. Ind. 2: 331 (1832); Baker in Hooker, Fl. Brit. India 2(5): 283 (1878) (excluding var. 2: *excelsa*); Prain, J.

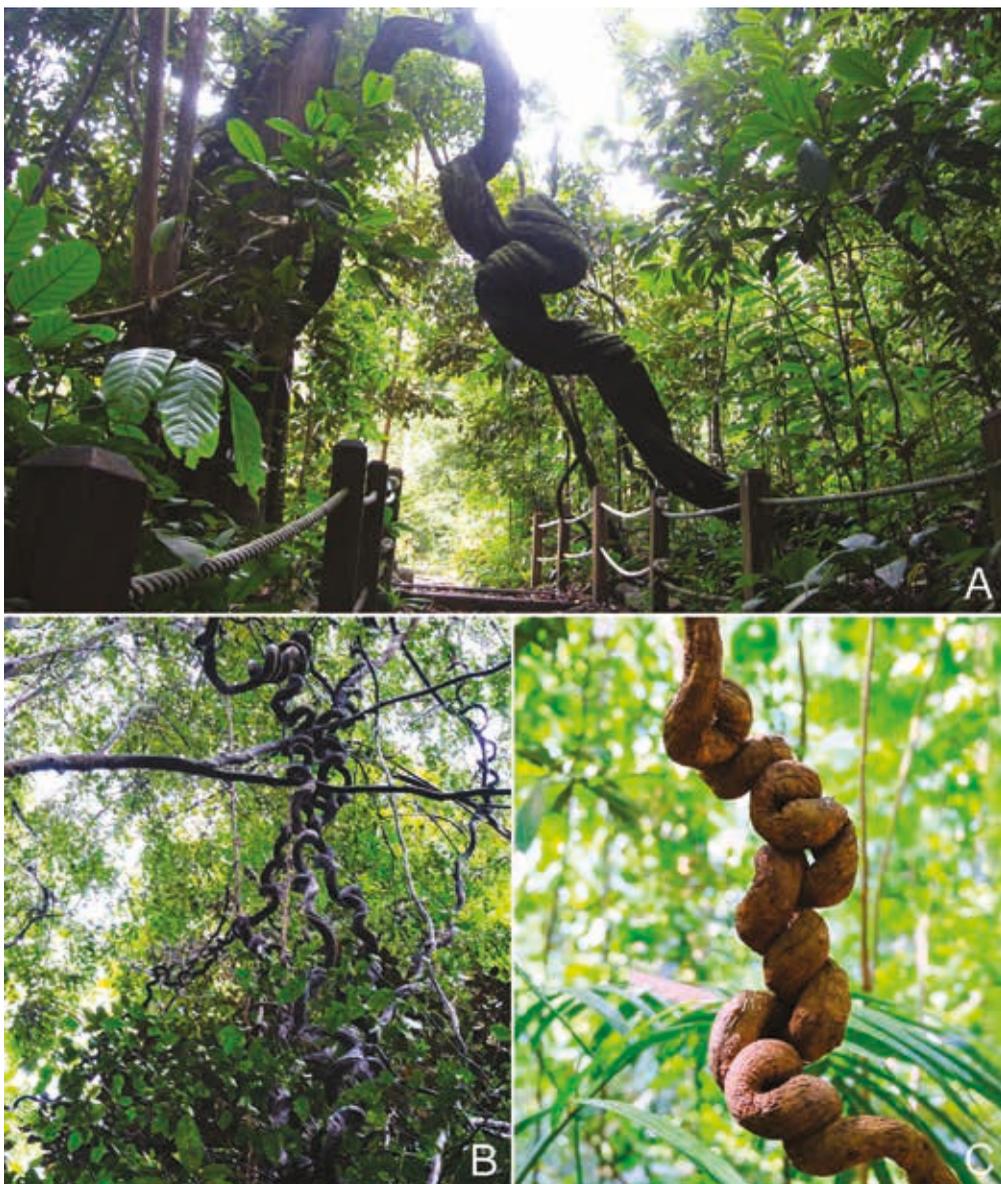


Fig. 1. *Phanera ferruginea* var. *griffithiana* (Benth.) Bandyop., Ghoshal & M.K.Pathak. **A.** Massive climbing stem at the foot of Bukit Timah Nature Reserve (start of Taban Loop), showing the absence of persistent stem bases and older stems which are not as flattened as in *Phanera semibifida* var. *semibifida*. This individual fell due to rot and was removed. **B.** Mature climbing stems at Taban Loop, showing a thriving population of the species. **C.** A mature but narrower climbing stem at the start of Taban Loop. The width of the stem is about 10 cm across. (Photos: A, A.H.B. Loo; B, C, K.B.H. Er)

Asiat. Soc. Bengal 66, 2: 184 (1897); Ridley, Fl. Malay Penins. 1: 628 (1922); Larsen & Larsen, Thai Forest Bull., Bot. 23: 45 (1995); Larsen & Larsen in Hou et al., Fl. Males., ser. 1, 12(2): 473 (1996). – TYPE: Roxburgh drawing no. 1137 (lectotype CAL, designated by Bandyopadhyay, Phytotaxa 297(1): 86 (2017); isolectotype K [as Roxburgh drawing no. 1138]).

Bauhinia hullettii Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66(1): 183 (1897). – *Phanera hullettii* (Prain) De Wit, Reinwardtia 3: 457 (1956). – TYPE: [Peninsular Malaysia], Penang, Waterfall, April 1886, *Curtis 784* (lectotype SING [SING0044711], designated by De Wit, Reinwardtia 3: 458 (1956)).

Distribution. The species as a whole is recorded from Southern Thailand to Peninsular Malaysia and with a single collection from eastern Sumatra (Larsen & Larsen, 1996).

Key to the varieties of *Phanera ferruginea*

(adapted from Larsen & Larsen, 1996)

- 1a. Stipules on flowering shoots early caducous; indumentum of inflorescence axis and buds usually ferrugineous; bracts pubescent, lanceolate, 5–10 mm long; bracteoles narrowly lanceolate, 5–6 mm long var. *ferruginea*
- 1b. Stipules on flowering shoots tardily caducous; indumentum of inflorescence axis and buds usually greyish to light brown; bracts sparsely pubescent, ovate-carinate, 10–15 mm long; bracteoles narrowly elliptic to lanceolate, 7–9 mm long var. *griffithiana*

var. *griffithiana* (Benth.) Bandyop., Ghoshal & M.K.Pathak, Bangladesh J. Pl. Taxon. 19(1): 57 (2012). – *Phanera griffithiana* Benth. in Miquel, Pl. Jungh. 2: 263, adnot. (1852); Miq., Fl. Ind. Bat. 1(1): 287 (1861); De Wit, Reinwardtia 3: 455 (1956). – *Bauhinia ferruginea* Roxb. var. *griffithiana* (Benth.) Baker in Hooker, Fl. Brit. India 2: 283 (1878); Larsen & Larsen in Hou et al., Fl. Males., ser. 1, 12(2): 475 (1996). – *Bauhinia griffithiana* (Benth.) Prain, J. Asiat. Soc. Bengal 66, 2: 183 (1897); Ridley, Fl. Malay Penins. 1: 628 (1922); Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. 32 (1990). – TYPE: [Peninsular Malaysia], Malacca, 1845, *Griffith s.n.* (lectotype K [K000760846], first step designated by De Wit, Reinwardtia 3: 455 (1956), second step designated by Larsen & Larsen in Hou et al., Fl. Males., ser. 1, 12(2): 475 (1996)).

Bauhinia suffruticosa Ridl., Trans. Linn. Soc. London, Bot. 3(9): 295 (1893). – TYPE: [Peninsular Malaysia], Pahang, Kwala Tembeling, 1891, *Ridley 2606* (lectotype BM [BM000016566], designated by Larsen & Larsen in Hou et al., Fl. Males., ser. 1, 12(2): 475 (1996)).

A large woody liana. **Young branches** black with longitudinal brown stripes where lenticels are more numerous, glabrescent, with tendrils. **Leaves:** stipules somewhat persistent, orbicular, membranaceous, glabrous on the abaxial surface and sparsely pubescent towards the base of the adaxial surface, 1–1.9 × 1.1–1.9 cm; petiole 1–1.8 cm long, densely greyish pubescent when young, glabrous soon after; lamina orbicular, 4.5–7 × 4.5–8.5 cm, 9-nerved, bifid for 1/3 to 1/2 of its length, tips of lobes rounded to obtuse, base cordate; upper surface glabrous and slightly glossy; lower surface minutely pubescent when young but later glabrescent, base of leaf and nerves remain minutely pubescent. **Inflorescence** axis with large, late caducous stipules (Fig. 2C). **Flowers:** pedicel 1.3–1.5 cm long, greyish pubescent with thin adpressed hairs; receptacle 1.3–1.7 cm long, strongly striate with a widened base, similarly greyish pubescent as in pedicel. **Sepals** 5, equal, narrowly lanceolate, 2.2–2.4 × 0.3–0.4 mm, outer surface finely greyish pubescent with tightly adpressed hairs, inner surface glabrous. **Petals** 5, strongly reflexed, standard slightly smaller than the rest, yellow blending into greenish yellow at the tip; densely covered with silky reddish brown tightly adpressed hairs on the outer surface which are densest down the middle of the petal, inner surface completely glabrous, narrowly spatulate with inrolled edges, 4.2–4.5 × 1.4–1.9 cm, of which claw 4–6 mm long. **Stamens:** filaments reddish pink and greenish yellow at both ends, 4.2–4.5 cm long, anthers not seen, staminodes dark pink, much reduced, 8–11 mm long. **Pistil** dark pink to orange, densely adpressed pubescent with silky reddish brown hairs, increasing in length during anthesis, stipe (0.6–)1.5–1.8 cm long, ovary 0.9–2 × 0.3–0.5 cm long, up to 6 ovules, style 2.1–4 cm long, stigma large, peltate, 3–4 mm in diam. **Pods** dehiscent, woody, 11.5–18.5 × 4.7–4.8 cm, surface slightly fissured and puberulous but becoming glabrous over time. **Seeds** 2–5, black and flattened, c. 1 × 0.7 cm when immature.

Distribution. *Phanera ferruginea* var. *griffithiana* is distributed throughout Peninsular Malaysia, and also from a single location in Sumatra, but not from Southern Thailand (Larsen & Larsen, 1996) (Fig. 4B). In Singapore only known from a single locality, Taban Loop and up to 100 m along the Summit Path from the Visitor Centre in BTNR (Fig. 3).

Habitat. Lowland rainforests and along forest margins. In Singapore the species is found in old growth secondary rainforest with remnant primary forest trees.

Specimens examined. SINGAPORE: **Bukit Timah Nature Reserve:** Taban Loop, 19 Sep 1996, A.H.B. Loo 64 (SINU [SINU2007004761]); *ibidem*, 2 Jun 2020, Mhd Khairi SING2020-1613 (SING); *ibidem*, 1 May 2021, A.H.B. Loo & K.B.H. Er 01 (SING); Main Road Path, 5 Sep 2018, Lim SING2018-799 (SING [SING0274181]); *ibidem*, 24 Apr 2021, Ng SING2021-314 (SING); *ibidem*, 4 May 2021, Choo *et al.* SING2021-264 (SING); *ibidem*, 9 Jun 2021, Yeoh SING2021-418 (SING).



Fig. 2. *Phanera ferruginea* var. *griffithiana* (Benth.) Bandyop., Ghoshal & M.K.Pathak. **A.** A young seedling. **B.** A young seedling, with the purple undersides of the leaves shown. Stipules are conspicuous at the base of the petioles. **C.** Inflorescences showing the large orbicular stipules that are persistent on the flowering axis. (Photos: K.B.H. Er)

Notes. The vegetative characters of seedlings are different from that of the mature plant thus: young stem thin, dark brown, finely striate and densely hairy with short tomentose hairs. Leaves: stipules broadly elliptic, membranaceous, pubescent on both surfaces and the margins with long straight adpressed hairs, 3.5–4 × 2.7–3.3 mm; petiole (1.5–)3.7–5 cm long, covered with brown tomentose hairs; lamina half to fully bifid, 5.9–10.6 × 6–9.4 cm, 9-nerved, base cordate; individual lobes elliptic to ovate, lobe apex acute to obtuse; both upper and lower surface pubescent with very fine golden adpressed hairs, including on the nerves, more densely so on the lower surface; young leaves green above and deep purple below.

Key to the *Phanera* taxa in Singapore

- 1a. Stipules on mature stems large and orbicular, 1–2 cm in diam.; receptacle strongly striate and greyish pubescent with thin adpressed hairs; petals reflexed at anthesis, white becoming yellow to greenish yellow with age
 *Phanera ferruginea* var. *griffithiana*
- 1b. Stipules on mature stems smaller and lanceolate, usually less than 1 cm in diam.; receptacle not strongly striate, densely pubescent with reddish brown hairs; petals not reflexed at anthesis, white becoming light yellow with age
 *Phanera semibifida* var. *semibifida*

There are several distinctive field characters to differentiate the two Singapore *Phanera* climbers even at the juvenile stage. Table 1 presents additional distinctive features of the two taxa from various life stages.



Fig. 3. Map showing the localities of *Phanera ferruginea* var. *griffithiana* in Bukit Timah Nature Reserve.

Literature and specimen records of *Phanera ferruginea* from Singapore

The oldest record stating the presence of *Phanera ferruginea* (then *Bauhinia ferruginea* Roxb.) in Singapore was by Baker (1878) where Penang, Malacca and Singapore were listed as the distribution for the type variety of the species, *P. ferruginea* var. *ferruginea*. In the same work, Malacca was also listed as the locality for *Phanera ferruginea* var. *griffithiana*, while Malacca and the Malay Isles were listed as the distribution of the third variety, *P. ferruginea* var. *excelsa* (Blume ex Miq.) Baker, which is now a separate species, *Phanera excelsa* Blume ex Miq. It is unclear which specimens could have contributed to Singapore being listed in the distribution for *Phanera ferruginea* var. *ferruginea*, as there are no *Phanera ferruginea* specimens from Singapore at K (I.M. Turner, pers. comm.), nor any specimens in SING of this species dating back to 1878 or earlier. Without further evidence, Baker's listing of *Phanera ferruginea* var. *ferruginea* from Singapore was likely a mistake, or was intended to apply to the species as a whole rather than only to the type variety.

Later collections labelled as *Phanera ferruginea* from Singapore do exist, although they have subsequently been re-identified as *Phanera semibifida*, or they could not be conclusively confirmed as having been collected in Singapore despite being labelled so. They are as follows:

Table 1. Comparison of *Phanera ferruginea* var. *griffithiana* with *Phanera semibifida* var. *semibifida*.

Character	<i>Phanera ferruginea</i> var. <i>griffithiana</i>	<i>Phanera semibifida</i> var. <i>semibifida</i>
Mature climbing stems	Absence of persistent remnant base of woody tendrils	Presence of remnant base of woody tendrils
Abaxial surface of the leaves of the saplings and juvenile climbers	Distinctively purplish and pubescent (Fig. 2B)	Green and brownish pubescent
Androecium	Filaments are reddish pink at the lower half and greenish yellow at the very base (Fig. 5)	Filaments white
Gynoecium	Pistil orange at the top half and dark pink at the lower half (Fig. 5)	Pistil brown-green along entire length
Petals	Petals white turning yellow to greenish yellow as it matures, reddish brown indumentum along the main axis at the lower half of the outer surface; petals first erect, then with recurved margins and finally becoming reflexed with time	Petals are completely white, turning a light yellow at maturity, outer surface glabrous, except for the pubescent claw; petals not reflexed
Fragrance of flowers	Strongly fragrant, resembling the scent of <i>Gardenia tubifera</i> but not as pungent	Slightly fragrant

- (a) Two separate collections by R.W. Hullett assigned to the same number, but with different details (*Hullett 287*, Oct 1883, Behind waterworks, SING [SING0046348]; *Hullett 287*, 12 May 1885, Road to Jurong, SING [SING0046343]). They were both initially identified as *Phanera ferruginea*, but later this was corrected to *Phanera semibifida* on both sheets.
- (b) Another specimen, *Cantley s.n.*, SING [SING0046346] with a “Flora of Singapore” label, was found to be indeed a specimen of *Phanera ferruginea*. This is presumed to have been collected sometime between 1880 and 1888 when Nathaniel Cantley was Superintendent of the Singapore Botanic Gardens (SBG), and the specimen was annotated by Cantley himself with only the Malay name “Tapah Kuda Antan”. The sheet was erroneously identified by I.H. Burkill, the director of SBG from 1912 to 1925, as *Phanera semibifida*.

The specimen was later re-determined by C.X. Furtado, a botanist at SBG, as *Bauhinia hullettii* Prain in 1928, and later by De Wit as the combination *Phanera hullettii* (Prain) De Wit (De Wit, 1956). This is now treated as a synonym of *Phanera ferruginea* var. *ferruginea*, but as the specimen is sterile, we cannot conclusively confirm if the specimen indeed belongs to the type variety, or to *Phanera ferruginea* var. *griffithiana*. However, the locality of many Cantley specimens labelled as originating from Singapore are known to be inaccurate, with some being “either cultivated plants or from some other part of the [Malay] Peninsula”, as pointed out by Ridley (1900), Burkill (1927), Van Steenis-Kruseman & Van Steenis (1950) and Middleton & Turner (2019).

Publications from 1879 to 1955 did not record *Phanera ferruginea* as being present in Singapore. These included Prain (1897) which listed *Bauhinia ferruginea* and *Bauhinia griffithiana* (Benth.) Prain to only be present in what is now Peninsular Malaysia; Ridley (1900) which listed *Bauhinia semibifida* Roxb. as the only native *Bauhinia* or *Phanera* in Singapore; Ridley (1922) in the *Flora of the Malay Peninsula* where he also stated that *Bauhinia semibifida* was the “only wild *Bauhinia*” in Singapore. Furthermore, Ridley (1922) listed the native name of *Bauhinia hullettii*, “Akar tapah kudah antan”, but did not cite Cantley’s Singapore specimen, even though the Malay name on Cantley’s specimen matched this. This, coupled with Ridley (1900) in which it is stated that specimen labels on Cantley’s specimens were inaccurate, showed that he did not regard Cantley’s sheet as being collected from Singapore. Interestingly, the collector Hullett was the Headmaster of the Raffles Institution in Singapore from 1871 to 1906, and was a good friend of Ridley (Middleton & Turner, 2019). Hullett had a good knowledge of *Bauhinia* species, having collected several species in Peninsular Malaysia and Singapore. He would have known if *Bauhinia ferruginea* had been collected in Singapore, and would have alerted Ridley.

In De Wit (1956), Singapore was once again listed in the distribution of *Phanera hullettii* (Prain) De Wit. He listed the following localities “Penang (type), Malacca and Singapore (19th century)”. It is likely that he was referring to the Cantley specimen, which was collected in the 1880s. The specimen had been seen and annotated by De Wit.

In the *Concise Flora of Singapore*, Keng (1990) listed *Phanera ferruginea* var. *griffithiana* as *Bauhinia griffithiana* (Benth.) Prain, and indicated that it was an introduced species. Turner et al. (1990) also listed *Bauhinia griffithiana* as an alien species in the checklist of native and naturalised vascular plants of Singapore. Turner (1993) subsequently excluded the species altogether. This could be because he considered it as an introduced species, with only one known mature specimen at the base of BTNR (i.e., not in sufficient numbers to be considered naturalised). Turner & Tan (1994) listed the species as present in Singapore, but did not give any further assessments of the status of the species.

Further work by Larsen & Larsen (1995, 1996) led to *Phanera griffithiana* being reduced to *Bauhinia ferruginea* var. *griffithiana*, and *Phanera hullettii* being reduced to a synonym of the type variety *Bauhinia ferruginea* var. *ferruginea*. Larsen & Larsen

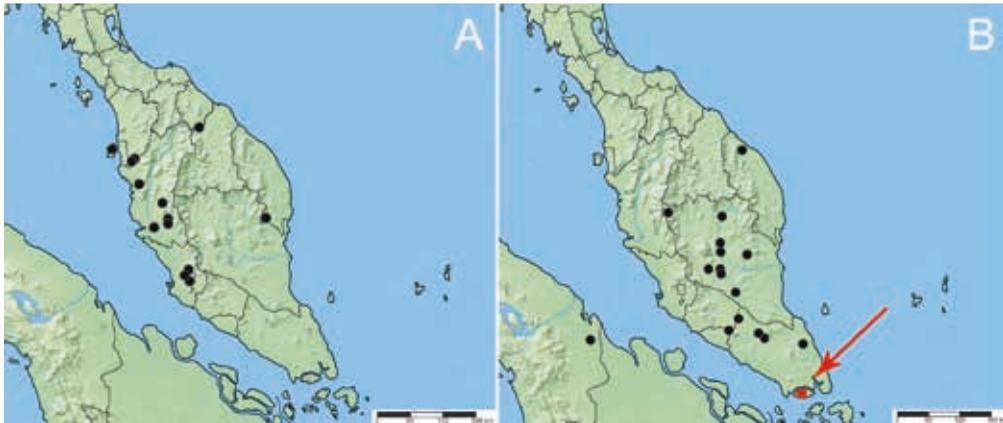


Fig. 4. **A.** Distribution of *Phanera ferruginea* var. *ferruginea*. **B.** Distribution of *Phanera ferruginea* var. *griffithiana*. The black dots indicate the native distribution of the two varieties, whereas the red arrow pointing to the red square shows the introduced locality of *Phanera ferruginea* var. *griffithiana*.

(1995, 1996) considered the distinction of the varieties based on floral characters to be unsatisfactory, but they chose to maintain them because of their distribution. Using the current nomenclature these authors suggested that *Phanera ferruginea* var. *ferruginea* is limited to the northern part of Peninsular Malaysia including Penang (type locality of *Phanera hullettii*) and southern Thailand, whereas *Phanera ferruginea* var. *griffithiana* is found all over the Malay Peninsula and one locality in Sumatra (Fig. 4). The specimens previously labelled *Phanera hullettii* in SING are heterogenous and have been re-assigned to both varieties, but Singapore was not mentioned in their treatment, most likely because no specimen had been verified by them at that time.

The latest available published checklist of all native, naturalised and cultivated species in Singapore, Chong et al. (2009), followed Turner (1993) and did not include *Phanera ferruginea* in the checklist.

Based on a review of the literature and specimen records, we conclude that *Phanera ferruginea* does not occur naturally in Singapore, in agreement with Loo & Tan (1998).

Current record of *Phanera ferruginea* var. *griffithiana* in Bukit Timah Nature Reserve

Our current record of *Phanera ferruginea* var. *griffithiana* dates back to 1996, when the first specimen of the species was collected from Taban Loop in BTNR (A.H.B. Loo 64, 19 Sep 1996, SINU [SINU2007004761]), despite the earlier literature records of the species in Singapore. The Caesalpiniaceae account for the angiosperm flora of Singapore by Loo & Tan (1998) also reported the presence of *Bauhinia ferruginea* var. *griffithiana* based on the abovementioned specimen and stated that it “regenerates within the vicinity of adult plants”.

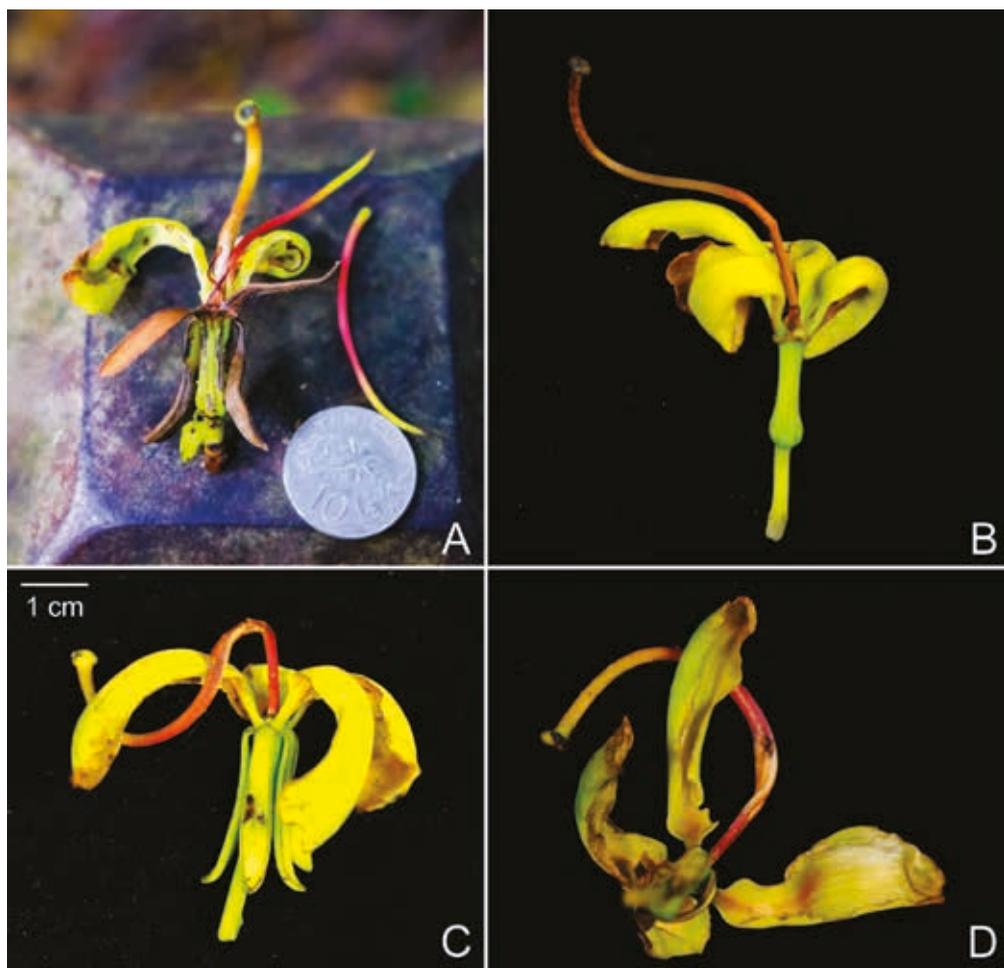


Fig. 5. Flowers of *Phanera ferruginea* var. *griffithiana* (Benth.) Bandyop., Ghoshal & M.K.Pathak, showing the following characters. **A.** Reddish pink filaments with greenish yellow tips at both ends. **B.** Strongly striate hypanthium. **C.** Reflexed yellow to greenish yellow petals. **D.** Reddish brown indumentum on the abaxial surface of the petals. A from A.H.B. Loo & K.B.H. Er 01, B–D from Choo *et al.* SING2021-264. (Photos: K.B.H. Er)

However, the presence of the species only in Taban Loop and up to 100 m along the Summit Path from the Visitor Centre of BTNR, and as yet nowhere else in Singapore, supports the conclusion of Keng (1990) and Turner *et al.* (1990) that the species is introduced. Several non-native species have been introduced to BTNR from plants collected by E.J.H. Corner from Peninsular Malaysia (Leong-Škorničková & Boyce, 2015; Niissalo *et al.*, 2016; Niissalo & Choo, 2021). While it is still unclear by whom and when these plants were introduced to Bukit Timah, the general consensus is that living plant material was brought back from Corner's field trips by his field assistants (Leong-Škorničková & Boyce, 2015). There is a Corner specimen of *Phanera ferruginea* var. *griffithiana* in SING (Corner *s.n.*, 27 Aug 1935, Pahang, Jerantut, SING [SING0203437]). The specimen label on the sheet states "Bauhinia, Jerantut,

seed taken". As the specimen was not identified to species in the field, it is likely that seeds were collected for the purposes of growing the plants for further study, and this could have been the means through which the species ended up in BTNR.

The presence of several mature, semi-mature and young plants of *Phanera ferruginea* var. *griffithiana* at the start of Taban Loop, along South View Path and on both sides of the main road (Fig. 3) leading from the Visitor Centre suggest that the population has grown from what was the large mature specimen discussed by Loo & Tan (1998). Given that the plants are reproducing and able to sustain a population through several decades without human intervention or re-introduction (c. 85 years, if the seeds were indeed planted in 1935) (Richardson et al., 2000), it is time to update the status of *Phanera ferruginea* var. *griffithiana* from casual (Loo & Tan, 1998) to naturalised, albeit in a single locality, in the forthcoming new checklist. As with other species thought to have been introduced to the Taban Loop area, further genetic analysis could be undertaken to determine its true origin. This may provide interesting insights into the genotype of geographically-isolated metapopulations of alien species. This can also be scoped to cover a comparative genetic study between *Phanera ferruginea* var. *griffithiana* and *P. ferruginea* var. *ferruginea*, so as to resolve the taxonomic difference between them given their overlap in geographic range.

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