

## A REVISION OF *JASMINUM* (OLEACEAE) IN PENINSULAR MALAYSIA AND SINGAPORE, WITH CONSERVATION ASSESSMENTS

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The species of *Jasminum* Tourn. ex L. (Oleaceae) in Peninsular Malaysia are revised. Eighteen species are recognised, of which eight are endemic. Five of these species have been recorded from Singapore. A key to species is provided, all names are typified, and all species are described. Conservation assessments are given for all species in Peninsular Malaysia. One species is Extinct in Peninsular Malaysia, eleven are Endangered and one is Data Deficient. *Jasminum shahii* Kiew is described as a new species. In Singapore, two species are certainly Extinct.

*Keywords.* Conservation status, *Jasminum*, key, new species, Oleaceae, taxonomic revision.

### INTRODUCTION

*Jasminum* Tourn. ex L. is the largest genus of the Oleaceae, with about 450 species worldwide, mostly in tropical and subtropical regions. A few, notably the winter jasmine, *Jasminum nudiflorum* Lindl., are temperate and frost-resistant. South and Southeast Asia are the centre of diversity of the genus and 54 species have been recorded from Malesia (Kiew, 1994a), 18 of which are indigenous to Peninsular Malaysia.

*Jasminum* is well known for its ornamental species, and its sweet fragrance is much used in the perfume industry and for scenting tea. *Jasminum sambac* (L.) Aiton is one of the national flowers of Indonesia, where it is known as *melati putih*, and of the Philippines, where it is known as *sampaguita*. In Malaysia, it is known as *bunga melur* or *bunga melati*, and the wild jasmines are known as *melur hutan* (forest jasmines) except for species with wide-spreading star-like flowers, which are called *pokok pekan*. *Melur jawa*, *Clerodendrum chinense* (Osbeck) Mabb. (Labiatae), with fragrant white flowers, is sometimes mistaken for a jasmine.

*Jasminum* was divided into four sections by de Candolle (1844), based on leaf morphology and arrangement. Section *Pinnatifolia* DC. was characterised by its opposite, pinnate leaves; sect. *Alternifolia* DC. by its alternate, pinnate or trifoliate leaves and yellow flowers; sect. *Trifoliolata* DC. by its opposite, trifoliate leaves; and sect. *Unifoliolata* DC. by its opposite, unifoliate leaves (the leaf reduced to a single leaflet). As more species have been described, the sections have been refined to deal with anomalous species.

Although sect. *Jasminum* (formerly sect. *Pinnatifolia*) and *Chrysojasminum* (formerly sect. *Alternifolia*; Banfi, 2014) are natural groups, sect. *Trifoliolata* and sect. *Unifoliolata*, the last by far the largest section, are artificial. Green (2001) redefined sect. *Trifoliolata* to include a small group of small-flowered species with trifoliolate, opposite leaves and white flowers, and created a new section, sect. *Primulina* P.S.Green, to accommodate two trifoliolate species with opposite leaves and yellow flowers. The result is that “the remaining species with trifoliolate leaves are then left in a larger group, as yet unclassified intergenerically” (Green, 2001). *Jasminum lanceolaria* subsp. *scortechinii* belongs in this ‘unclassified’ group, whereas all the other Malaysian species fall within sect. *Unifoliolata*.

The most recent complete account of *Jasminum* in Peninsular Malaysia was by Ridley (1923), who described 14 species and provided a key to species. Kiew (1994a) provided a checklist for Malesian jasmines. Since Ridley (1923), several new species have been described (Ridley, 1926; Kiew, 1994b) and new records made (Kiew, 2018, and this account), and several other names have been reduced to synonymy. The total now stands at 18.

#### USES

##### *Perfume*

The Arabian jasmine, *Jasminum sambac*, has the strongest fragrance of any jasmine and has been cultivated since the earliest historical times. It is a commercial crop in India and Java, where flowers are harvested for the perfume industry. Its essential oils are used to perfume a wide range of products. In China, its flowers are added to tea leaves to produce jasmine tea. Arabian jasmine flowers are sacred to Lord Vishnu, and in Peninsular Malaysia buds are made into garlands or are strung on banana fibre in strings to wear in hair or for use during prayer, mostly by Hindus but also by Buddhists. Traditionally, the strings were priced per *hasta* (a measurement from elbow to fingertips). In 2018, a string of about 20 buds cost RM 1. From home gardens, buds are picked for family altars in the evening, when buds begin expanding and the petals are opening.

##### *Ornamental species*

In Peninsular Malaysia, three species, namely the Arabian jasmine, Spanish jasmine and star jasmine, are commonly grown in parks and gardens. All are introduced. They flower throughout the year.

The Spanish jasmine, *Jasminum grandiflorum* L., illustrated by Herklots (1976, fig. 202), probably originated in India but has long been cultivated in the region. It is an elegant, slender climber with pinnate leaves and broad leaflets. Its star-like flowers are white, tinged purplish red outside, and are very fragrant. The flowers are long-stalked with a corolla tube 15–23 mm long and five broad lobes, 15–20 mm long and 7–8 mm wide. In the south of France, it is cultivated as the source of oil of jasmine.

The star jasmine, *Jasminum multiflorum* (Burm.f.) Andrews (syn. *J. pubescens* (Retz.) Willd.), illustrated by Herklots (1976, fig. 206), has its origin in India and Nepal. It is a robust shrubby climber, usually pruned to bush size. Its unifoliolate leaves are very hairy. It

is popular because it constantly produces many pure white, slightly scented flowers. The corolla tube is 15–28 mm long, and the 6–9 lobes, 12–20 mm long. Its fruits are black. It has naturalised in Java (Backer & Bakhuizen f., 1965) and Thailand (Green, 2000), but not in Peninsular Malaysia, where it does not set fruit.

The Arabian jasmine, *Jasminum sambac*, illustrated by Herklots (1976, fig. 209), was brought to China, Malaysia and Java around the third century, probably from India, and has been widely cultivated ever since. The single-flowered form grows wild in India. It is not known when the semidouble and double flowers arose. The last of these do not produce fruits, and are propagated by layering or hardwood cuttings. In Malaysia, the semidouble cultivar is the usual one grown, more for its heavily scented buds, which are harvested for sale or home use, than for its ornamental value, because it is a rather scruffy-looking climber. It has unifoliolate leaves, flowers with stout stalks, with corolla tube 12–15 mm long and broadly oval lobes 14–15 × 9–10 mm. ‘Grand Duke of Tuscany’ is one cultivar that has double flowers, but it is rarely grown in Malaysia.

A few other species are sometimes cultivated in parks or botanical gardens, such as angel wing jasmine, *Jasminum laurifolium* Roxb. (syn. *J. nitidum* Skan), illustrated by Herklots (1976, fig. 207). It is a slender climber with unifoliolate leaves and pure white, faintly scented, star-like flowers. Rarely cultivated, even though it has the largest flower of any jasmine in the region, is the Thai native *Jasminum nobile* C.B. Clarke subsp. *rex* (Dunn) P.S. Green, with a corolla tube 25–35 mm long and 6–10 broad lobes, 20–22 × 8–18 mm. It is illustrated by Herklots (1976, fig. 208).

Very few minor medicinal uses have been recorded for Malaysian species. *Jasminum decussatum* and *J. maingayi* have been recorded as being used to cure ulcers, *J. maingayi* is taken after childbirth, and *J. wrayi* is used to eliminate tapeworm.

#### CONSERVATION STATUS

*Distribution.* Of the 18 species, eight are endemic to Peninsular Malaysia (*Jasminum cordatum*, *J. curtisii*, *J. kedahense*, *J. ledangense*, *J. shahii* and *J. wrayi*) or Peninsular Malaysia and Singapore (*J. griffithii* and *J. longipetalum*). The most widespread species is *Jasminum elongatum*, which ranges from India and Bhutan to South China, through Malesia, to Australia (Northern Territory). It is the only species that occurs both in Peninsular Malaysia and in Sabah and Sarawak in Borneo. The affinity with continental Asia is apparent in the distribution of *Jasminum nervosum* from South China, through Indochina and Thailand, to reach its southernmost locality on limestone in Perlis and Langkawi Island, Kedah. Five other species, *Jasminum carissoides*, *J. decussatum*, *J. insulare*, *J. lanceolaria* subsp. *scortechinii* and *J. maingayi*, also occur in Thailand. In contrast, only three species, *Jasminum decussatum*, *J. insigne* and *J. smilacifolium*, also occur in Sumatra. Three native species have been recorded from Singapore: *Jasminum elongatum*, *J. griffithii* and *J. longipetalum* (Keng, 1990).

*Habitats.* *Jasminum elongatum*, the most common and widespread species, grows on forest fringes in the lowlands or sometimes in hill forest or on limestone, and is found in secondary habitats such as in hedges in villages and orchards or remnants of forest.

*Jasminum decussatum* grows in open thickets and disturbed margins of secondary forest in the north, which experiences a monsoon climate. *Jasminum maingayi*, which also grows on forest margins, is widespread and quite common in the lowlands but is more usually found in hill forest. Forest species that flower below the tree canopy are rare, with *Jasminum insigne* and *J. longipetalum* confined to the lowlands and *J. griffithii* also occurring in hill forests. Species confined to lower montane forest include *Jasminum kedahense*, *J. lanceolaria* subsp. *scortechinii* and *J. ledangense*. Five species, *Jasminum carissoides*, *J. cordatum*, *J. curtisii*, *J. insularum* and *J. nervosum*, are restricted to limestone karst habitats or, like *J. elongatum* and *J. wrayi*, are sometimes found on limestone.

Rarity in Peninsular Malaysian jasmines takes two forms: *Jasminum kedahense* and *J. ledangense* are each known from a single peak where they are not uncommon, whereas forest species such as *J. insigne* and *J. longipetalum* have a wide area of occupancy (AOO) but are known from only a very few widely scattered individuals.

**Conservation status.** This follows the IUCN criteria and categories (IUCN, 2001). Geospatial Conservation Assessment Tool (GeoCAT) (Bachman *et al.*, 2011) was used to estimate extent of occurrence (EOO) and to prepare a distribution map for every species. The EOO for each species restricted to limestone habitats is assumed to be the same as its AOO, due to substrate restriction. For endemic species, it is the global conservation status; for the remainder, it is the regional conservation status that applies only to the Peninsular Malaysian population (Chua & Saw, 2006).

One species is Regionally Extinct, one is assessed as Data Deficient, 61% (11/18) are endangered (three species are Critically Endangered, six are Endangered, and two are Vulnerable), three are Near Threatened, and two are assessed of Least Concern (Table).

*Jasminum smilacifolium*, which is regionally Extinct (i.e. extinct in Peninsular Malaysia), is presumed to be still extant in Sumatra. It is a very conspicuous species that is unlikely to have been overlooked by collectors, but despite this was last collected in 1886. *Jasminum adenophyllum* is assessed as Data Deficient because its taxonomic circumscription is still not completely understood.

Of the Critically Endangered species (Fig. 1), *Jasminum shahii* is known only from the type site, which lies outside the network of Totally Protected Areas, and two, *J. kedahense* and *J. ledangense*, are each known from a single mountain peak and are both vulnerable to habitat disturbance from the construction of telecommunications stations and from tourist activities and associated developments. *Jasminum longipetalum* is an extremely rare lowland species known from only a few widely scattered individuals.

*Jasminum decussatum* is Endangered because in Peninsular Malaysia it is rare and known from only five localities, none of which falls within the network of Totally Protected Areas and all of which are adjacent to agricultural estates or urban areas.

Karst limestone is one of the most endangered habitats in Peninsular Malaysia (Kiew *et al.*, 2017), not only because the great majority of karsts lie outside the network of Totally Protected Areas but also because the limestone flora is vulnerable to elimination from quarrying and fire. Of the species that are restricted to limestone, *Jasminum carissoides*, *J. insularum* and *J. nervosum*, and also *J. curtisii*, which is usually associated with

TABLE. IUCN conservation status of *Jasminum* species in Peninsular Malaysia

| <i>Jasminum</i> species                      | Conservation status                   | Global or regional |
|--|---------------------------------------|--------------------|
| <i>smilacifolium</i>                         | EX                                    | Regional           |
| <i>adenophyllum</i>                          | DD                                    | Regional           |
| <i>kedahense</i>                             | CR B2ab(iii,iv)                       | Global             |
| <i>ledangense</i>                            | CR B2ab(iii,iv)                       | Global             |
| <i>shahii</i>                                | CR B2ab(iii,iv)                       | Global             |
| <i>carissoides</i>                           | EN B1ab(iii)+2ab(iii)                 | Regional           |
| <i>curtisii</i>                              | EN B1ab(iii)+2ab(iii)                 | Global             |
| <i>decussatum</i>                            | EN B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv) | Regional           |
| <i>insularum</i>                             | EN B2ab(iii)                          | Regional           |
| <i>longipetalum</i> <sup>a</sup>             | EN B2ab(iii)                          | Global             |
| <i>nervosum</i>                              | EN B1ab(iii)+2ab(iii)                 | Regional           |
| <i>cordatum</i>                              | VU B1ab(ii,iii,iv)+2ab(ii,iii,iv)     | Global             |
| <i>lanceolaria</i> subsp. <i>scortechini</i> | VU B1ab(iii)+2ab(iii)                 | Regional           |
| <i>griffithii</i> <sup>a</sup>               | NT                                    | Global             |
| <i>insigne</i>                               | NT                                    | Regional           |
| <i>wrayi</i>                                 | NT                                    | Global             |
| <i>elongatum</i>                             | LC                                    | Regional           |
| <i>maingayi</i>                              | LC                                    | Regional           |

CR, Critically Endangered; DD, Data Deficient; EN, Endangered; EX, Extinct in the Wild; LC, Least Concern; NT, Near Threatened; VU, Vulnerable.

<sup>a</sup> Extinct in Singapore.

limestone hills, are Endangered because of their extreme rarity, as well as being restricted to fewer than five limestone karsts. *Jasminum cordatum*, also restricted to limestone, is more widespread, being known from eight karst hills, and is assessed as Vulnerable.

*Jasminum lanceolaria* subsp. *scortechini*, assessed as Vulnerable, is the only species that grows in lower montane forest. However, although widespread, it is rare or scarce where it occurs, and reduction in habitat is the major threat. In Peninsular Malaysia, the area covered by lowland and hill forest has been drastically reduced, and by about 2000 was estimated to cover 40.7% of the land area (Anonymous, 2008). *Jasminum griffithii*, *J. insigne* and *J. wrayi*, all lowland forest species, are assessed as Near Threatened because they are not common (they are known from fewer than ten collections) and in most cases they lie outside the network of Totally Protected Areas.

Only the two widespread and common species are assessed as Least Concern. *Jasminum maingayi* is more common in hill forest. *Jasminum elongatum* used to be commonly found along the margins of forest and rubber estates and in hedges in towns and villages, but it has now become uncommon for the following reasons: rubber estates are being replaced by oil palm plantations, and forest margins have become unstable habitats subject to the rapid changes in land use made possible by modern earth-moving machinery (these woody vines are unable to grow sufficiently rapidly to keep abreast of such changes). It is also likely that

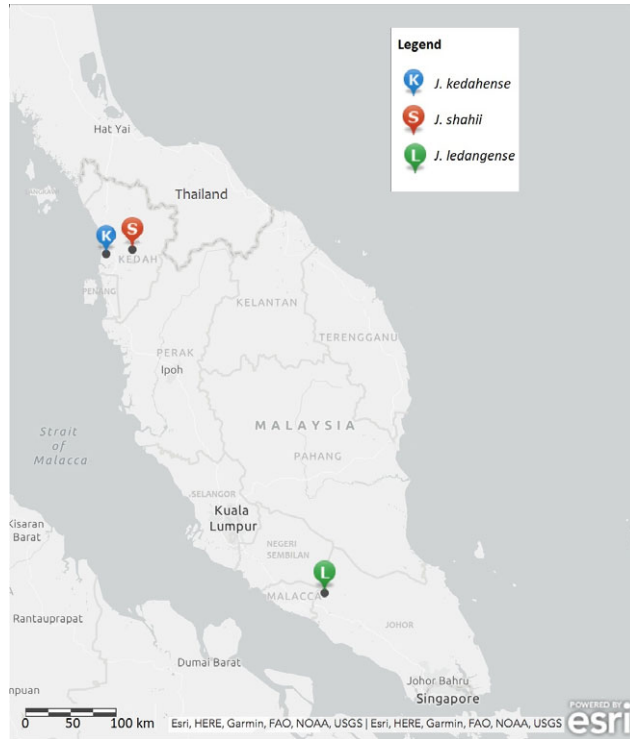


FIG. 1. Distribution of Critically Endangered *Jasminum* species in Peninsular Malaysia.

the seed source and bird dispersers have also become more scarce. Open-country species, such as *Jasminum decussatum* and *J. shahii*, are particularly vulnerable to the changes in land use described here.

In Singapore, *Jasminum griffithii* and *J. longipetalum* are certainly extinct. The conservation status of *Jasminum elongatum* needs to be assessed in the light of information from recent botanical surveys.

#### CHARACTERS

For Peninsular Malaysian species, the following characters are useful for identification and delimiting species.

##### *Habit*

Most species are small, slender climbers, although stem diameter is often underestimated because frequently only twigs are collected and the diameter of the main stem is not recorded. The exception is *Jasminum insigne*, which flowers on the stem. Flowers fallen to the forest floor indicate that *Jasminum lanceolaria* subsp. *scortechinii* and *J. maingayi* are likely to be lianas, but it is often impossible to collect them from the tree canopy. Some of the species that grow in open, exposed habitats are shrubby, for example *Jasminum cordatum* and *J. kedahense*.

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### *Indumentum*

The indumentum comprises uniseriate hairs. Density is useful in those species that are densely hairy, but in others the distinction between glabrous and sparsely hairy is variable, often with age. However, hair colour is useful and distinguishes species with ashy grey, tawny or ferruginous young stems, underside of veins, inflorescences and calyx. Domatia are present in some *Jasminum* species as tufts of hairs in the axil of the lateral veins and midrib on the underside of the leaf. Domatia are constant for a species, so their presence or absence is a reliable character in species identification.

### *Stems*

Stems are woody, usually terete, except in *Jasminum insigne*, in which the stem is square in cross-section and the angle on its twigs is slightly winged.

### *Leaves*

The leaves are always opposite and petiolate in Peninsular Malaysian species. Except in *Jasminum lanceolaria* subsp. *scortechinii*, which usually has trifoliolate leaves, the leaves are unifoliolate, as indicated by the articulate petiole. In this account, petiole length refers to the part above and below the articulation.

Laminas range from broadly or narrowly elliptic-lanceolate or ovate, base cuneate, to truncate or rarely cordate, margin entire, apex acute-acuminate, membranous (drying pale khaki and extremely thin, in *Jasminum adenophyllum*, *J. decussatum* and *J. curtisii* with prominent domatia), chartaceous to subcoriaceous to thickly coriaceous with a recurved margin.

### *Venation*

Both type and number of lateral veins are important characters in distinguishing species. There are two basic venation types: pinnate and tripliveined. In pinnately veined leaves, the lateral veins are either more or less perpendicular to the midrib, often with the lateral veins ascending strongly to the margin but not joining to form a conspicuous submarginal vein. In tripliveined leaves, either the basal pair of lateral veins ascends to the apex and other lateral veins, if present, are obscure, or the basal pair of lateral veins ascends about midway, where it joins other lateral veins to form a distinct submarginal vein. In *Jasminum cordatum*, the lamina appears to be tripliveined; however, the basal pair of lateral veins does not arise at the base of the midrib but a short way above, and so the venation is in fact pinnate with strongly ascending lateral veins. In species with thickly coriaceous leaves, for example *Jasminum insulare* and *J. ledangense*, the veins are obscure.

### *Inflorescence*

Inflorescence position, type and number of flowers (few versus many) are useful characters for identification. Inflorescences are terminal, often on short side branches, as well as

sometimes axillary (*Jasminum curtisii* and *J. shahii*). Cauliflory is rare (*Jasminum insigne*). Inflorescences are basically cymose. They range from many-flowered thyrses (more than seven flowers per inflorescence), which are sometimes compact and corymbose (*Jasminum kedahense*) or sessile (*J. curtisii* and *J. shahii*), to few-flowered umbels (*J. longipetalum*) or simple cymes with three flowers, and in a few species they are reduced to a single flower (*J. carissoides*). Peduncles range from long (*Jasminum griffithii*) to almost lacking. Bracts are usually small and linear, but in *Jasminum curtisii* they are large, conspicuous, white and leaf-like. Pedicels are short or long, exceptionally so in *Jasminum longipetalum*.

#### *Flowers*

Flowers are heterodistylous, and in both the long-styled and the short-styled flowers the stamens are included within the corolla tube, usually in the upper half, which is slightly expanded to accommodate them. In all species the filament is short and the anther is narrowly ellipsoid. The difference between the two flower forms is in the position of the stamens relative to the length of the styles. In long-styled flowers, the stamens are attached lower down so that the stigma on the long style is positioned above them, whereas in short-styled flowers the stamens are attached above the stigma. This arrangement promotes cross-pollination.

#### *Calyx*

Calyx characters are particularly useful, because corollas are often lacking on herbarium specimens and the calyx persists in the fruit. Calyx tooth (lobe) length is regularly used in keys to identify species. Although there is some variation in length in those flowers with long calyx teeth, the distinction between minute teeth to 3 mm long versus those over 5 mm long continues to be useful. In all species, the calyx tube is small, either campanulate or narrowly tubular, and has 5–9 teeth, which are usually filiform but sometimes stiff and subulate (awl-like).

#### *Corolla*

The corolla is white (sometimes with a purplish tinge outside) in Peninsular Malaysian species and narrowly tubular with 5–9 lobes. Generally, the corolla tube is much longer than the lobes, but in two species, *Jasminum decussatum* and *J. wrayi*, it is shorter. Whether the lobes are patent (the star-like flowers) or more or less erect, or are particularly long (e.g. *Jasminum longipetalum*) or wide (e.g. *J. insigne*), appear to be consistent characters.

#### *Stamens*

Stamens do not display much diversity and do not provide useful characters in keys.



### *Gynoecium*

The ovary is quite uniform (globose and small) and does not provide useful characters in species identification. Style length varies more with the flower form (long- or short-styled forms) than between species.

### *Fruit*

The fruit is a two-lobed berry, but sometimes only a single lobe develops. There is not much variation in size or shape in Peninsular Malaysian species (the degree to which it is subglobose to ellipsoid depends to a certain extent on age). However, colour is a consistent character that distinguishes the few species that ripen waxy white (*Jasminum decussatum*, *J. longipetalum*) from the majority, which ripen glossy dark purple or black. The fleshy fruits are presumably bird-dispersed, which may account for their scattered distribution. However, observations are lacking for Peninsular Malaysian or Singaporean species.

### POLLINATION

No pollinator or even flower visitor has been observed visiting Malaysian jasmines, although fruits can usually be found, indicating that pollination has been successful. (*Jasminum* species are not reported to be apomictic.) Indeed, worldwide, there are very few pollination studies of jasmines. The author of one such study carried out in southern France reported a wide range of flower visitors to the yellow-flowered species *Jasminum fruticans* L., which included 12 bee species, 9 butterflies, 2 hawk moths, 2 beetles and 1 bee fly, although which were the primary pollinators was not ascertained (Thompson, 2001).

Jasmines are famed for their sweetly scented flowers. Among the wild species, *Jasminum decussatum* is reported to be especially fragrant. However, field observations regarding whether or not a species is scented are often unreliable, because fragrance is not produced uniformly throughout the day. Scent is especially weak between 10 a.m. and 4 p.m, when temperatures are high, and generally strongest from late afternoon to dusk. In the commercially important *Jasminum sambac*, it has been shown that the content of essential oils increases considerably at the time of opening of the flowers, which is in the evening (Rahajoe *et al.*, 1999).

Generally, jasmine flowers display the classic characters of flowers pollinated by moths (Fægri & van der Pijl, 1979). The flowers are white and strongly fragrant towards dusk; the corolla has a long, narrow tube; and the lobes are deeply divided and form a regular star-like outline. Peninsular Malaysian jasmines have a corolla tube 4–40 mm long. Notable is the group of species with especially long corolla tubes, 14–30 mm long, namely *Jasminum insigne* (19–30 mm), *J. carissoides* (17–24 mm), *J. longipetalum* (18–23 mm) and *J. adenophyllum* (15–18 mm). These species also have unusually long pedicels, 5–30 mm long (*J. longipetalum*, 33–40 mm; *J. adenophyllum*, 20–30 mm; *J. insigne*, 5–15 mm; and *J. carissoides*, 10–13 mm), compared with most other species, which have pedicels 1–5 mm long. Just as Darwin predicted in 1892 that the pollinator of the orchid *Angraecum*

*sesquipedale* Thouars (corolla tube, 30 cm long) would be an exceptionally long-tongued insect, which was eventually proven by observations in 1992 (Ardeiti *et al.*, 2012), we can predict that the likely pollinators of jasmines, with their combination of long pedicels that bend to position the long corolla tube in a horizontal or pendent position, making them accessible to hovering insects, are hawk moths, the group of moths in Peninsular Malaysia that have the longest proboscis.

At the other end of the spectrum are the flowers of *Jasminum decussatum*, which are significantly different from those of the other species in having a very short corolla tube, 4–6 mm long, that is particularly narrow (0.5–1.5 mm in diameter) compared with the corolla tube of the other species (14–30 mm long and 1.5–6 mm in diameter), and have a strong honey scent conspicuous in the morning, which suggests that it is pollinated by day-flying insects such as bees or butterflies.

#### MATERIAL STUDIED

Herbarium material from the following herbaria was studied: A, BK, BKF, BM, CAL, E, K, KEP, KLU, L, SAN, SAR, SING and UKMB (herbarium codes follow *Index Herbariorum*; Thiers, [continuously updated](#)). All specimens cited have been seen, unless otherwise indicated. Only specimens from Peninsular Malaysia and Singapore are cited in this account. The dimensions given in the descriptions are from dried material.

#### TAXONOMIC TREATMENT

**Jasminum** L., Sp. Pl. 1: 7 (1753); A.DC, Prodr. 8: 301 (1844); Clarke in Hooker, Fl. Brit. India 3: 591 (1882); King & Gamble, J. Asiat. Soc. Bengal 74: 255 (1905); Ridley, Fl. Malay Penin. 2: 310 (1923); Green, Fl. Thailand 7: 306 (2000).

Evergreen climbers (elsewhere deciduous), sometimes lianas, or shrubby. Indumentum of uniseriate hairs or lacking. *Stems* woody, usually terete, sometimes square in cross-section (*Jasminum insigne*). *Leaves* opposite (elsewhere alternate), usually unifoliolate, or trifoliolate (*Jasminum lanceolaria* subsp. *scortechinii*) (elsewhere imparipinnate or lacking); petiole articulate; lamina broadly or narrowly lanceolate, ovate or obovate, base decurrent, cuneate, truncate or cordate, margin entire, apex obtuse, acute to acuminate or caudate, glabrous to densely pubescent, membranous or chartaceous to coriaceous; venation pinnate, or the basal pair of lateral veins ascending more or less halfway before joining the lateral veins in the upper half, or tripliveined; domatia present or absent. *Inflorescences* terminal, sometimes axillary, rarely cauliflorous (*Jasminum insigne*), many- to few-flowered, thyrses, corymbose thyrses, dichasial cymes, sometimes umbellate, to a simple cyme of 3 flowers or reduced to a single flower, peduncle long to almost lacking; bracts usually small and linear, sometimes large and leaf-like (*J. curtisii*). *Flowers* bisexual, actinomorphic, heterodistylous, scented, pedicels short or long (*Jasminum longipetalum*) or flowers rarely sessile (*J. curtisii* and *J. shahii*); *calyx* small, campanulate or tubular, with teeth 5–9, filiform, linear, sometimes stiff and subulate (elsewhere narrowly lanceolate or leaf-like)

or minute, persistent; *corolla* white, sometimes tinged purplish or rosy in bud (elsewhere yellow or red), glabrous, narrowly tubular, usually the tube is much longer than the lobes, rarely with the lobes longer than the tube (*J. decussatum* and *J. wrayi*), lobes 5–9 (elsewhere 4–16), ligulate, narrowly or broadly elliptic, spreading, imbricate in bud; *stamens* 2, included in the corolla tube, filaments short; anthers dorsifixed, narrowly elliptic, connective broad, usually extended into an appendage, introrse, dehiscing longitudinally; *ovary* superior, small, subglobose, locules 2, ovules 2 per locule, style long in long-styled flowers or short in short-styled flowers, stigma bilobed or capitate. *Fruit* a 2-lobed berry, sometimes with a single lobe developing, lobes usually ellipsoid, sometimes globose, ripening dark purple or black or in a few species waxy white (*Jasminum decussatum* and *J. longipetalum*). *Seed*: one per locule (elsewhere 2), cotyledons massive, lacking endosperm (elsewhere endosperm present, cotyledons thin).

*Distribution*. About 450 species, the majority tropical and subtropical, with a few frost-resistant species in temperate regions. In Peninsular Malaysia, represented by 18 species.

*Etymology*. *Yasameen*, from the Persian name for the plant, or *ysmym*, from Arabic.

*Key to Jasminum species in Peninsular Malaysia and Singapore*

- 1a. Leaf trifoliolate \_\_\_\_\_ **11. *J. lanceolaria*** subsp. ***scortechinii*** (in part)
- 1b. Leaves unifoliolate \_\_\_\_\_ 2
- 2a. Stem and twigs quadrangular; bark white and corky; twigs winged. Inflorescences cauliflorous, sometimes with a few axillary on the upper stems \_\_\_\_ **8. *J. insigne***
- 2b. Stem and twigs terete, bark not corky. Inflorescences terminal on the stem apex or on side branches and/or from the upper leaf axils but never cauliflorous \_\_\_\_\_ 3
- 3a. Lamina with pinnate venation, lateral veins not forming a submarginal vein \_\_\_\_ 4
- 3b. Lamina tripliveined (the basal vein pair ascends to apex) or the basal pair of veins arises shortly above the base and ascending steeply, forming a submarginal vein that in the upper half of the leaf joins the lateral veins \_\_\_\_\_ 15
- 4a. Corolla tube 4–15 mm long \_\_\_\_\_ 5
- 4b. Corolla tube 15–28 mm long \_\_\_\_\_ 6
- 5a. Lamina coriaceous. Calyx teeth minute, c.0.1 mm long. Corolla tube (10–15 mm long) longer than lobes (5–6 mm long) **11. *J. lanceolaria*** subsp. ***scortechinii*** (in part)
- 5b. Lamina membranous. Calyx teeth 0.5–1.5 mm long. Corolla tube (4–6 mm long) shorter than the lobes (6–9 mm long) \_\_\_\_\_ **5. *J. decussatum***
- 6a. Lamina membranous or chartaceous \_\_\_\_\_ 7
- 6b. Lamina subcoriaceous to coriaceous \_\_\_\_\_ 13
- 7a. Inflorescence a few-flowered umbel (2–6 flowers); pedicels 33–40 mm long. Corolla lobes 20–30(–45) mm \_\_\_\_\_ **13. *J. longipetalum***

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- 7b. Inflorescence a cyme (sometimes reduced to a single flower) or thyrses or sometimes on a long peduncle; pedicels 1–20 mm long. Corolla lobes 5–15(–22) mm long \_\_\_\_\_ 8
- 8a. Inflorescence sessile, a compact dichasium \_\_\_\_\_ 9
- 8b. Inflorescence pedunculate, a cyme (sometimes reduced to a single flower) or a thyrses \_\_\_\_\_ 10
- 9a. Lamina with conspicuous domatia. Flowers more or less enclosed by a pair of large (1–3 × 0.5–1.2 cm long), papery, leaf-like white bracts. Corolla lobes 8–10 mm long, less than half the length of the corolla tube (18–27 mm long) \_\_\_\_\_ **4. J. curtisii**
- 9b. Lamina without domatia. Flowers not enclosed by large leaf-like bracts. Corolla lobes 13–15 mm, more or less the same length as the tube (15–16 mm long) \_\_\_\_\_ **16. J. shahii**
- 10a. Twigs and leaves with tawny tomentum. Lamina with 7–12 veins on either side of midrib. Inflorescence a corymbose thyrses on a long peduncle 3–5.5 cm long. Fruits ripening waxy white \_\_\_\_\_ **7. J. griffithii**
- 10b. Twigs and leaves minutely pubescent, hairs not tawny, or glabrous. Lamina with 4–9 veins on either side of midrib. Inflorescence not a corymbose thyrses, peduncle short. Fruits ripening purple–black \_\_\_\_\_ 11
- 11a. Inflorescence a 3- to 4-flowered cyme, sometimes reduced to a single flower. Calyx teeth 12–13 mm long. Corolla lobes (17–22 mm long) more or less as long as tube (15–22 mm long) \_\_\_\_\_ **1. J. adenophyllum**
- 11b. Inflorescence a dichasium or thyrses. Calyx teeth 4–8 mm long. Corolla lobes (6–10 mm long), much shorter than the tube (15–27 mm long) \_\_\_\_\_ 12
- 12a. Lamina narrow, 3–11 × 1.5–4 cm, veins 4–6 on either side of midrib, without domatia. Inflorescence a dichasium with (1–)6–9(–14) flowers. Fruit lobes c.6 mm in diameter \_\_\_\_\_ **6. J. elongatum**
- 12b. Lamina broader, 8–19 × 4–6.5 cm, veins 6–10 on either side of midrib, domatia conspicuous. Inflorescence a many-flowered thyrses with 15–20 flowers. Fruit lobes 8–12 mm in diameter \_\_\_\_\_ **18. J. wrayi**
- 13a. Inflorescence a cyme with 1–4 flowers. Lamina more than twice as long as wide, 2.7–9.5 × 1.3–4.5 cm \_\_\_\_\_ **3. J. cordatum**
- 13b. Inflorescence a compound dichasium with 10 or more flowers. Lamina less than twice as long as wide, 5.5–14 × 3–7.5 cm \_\_\_\_\_ 14
- 14a. Leaves coriaceous, young leaves densely hairy beneath. Corollas large, tube 27–35 mm long, lobes 11–20 mm long \_\_\_\_\_ **10. J. kedahense**
- 14b. Leaves subcoriaceous, young leaves glabrous. Corollas smaller, tube 12–30 mm long, lobes 8–15 mm long \_\_\_\_\_ **14. J. maingayi**
- 15a. Robust climber. Lamina broadly ovate, 8–18 × 7–10 cm. Inflorescence a 3- to 5-flowered cyme or a thyrses with 7–20 flowers. Calyx teeth minute to 1.5 mm long \_\_\_\_\_ **17. J. smilacifolium**

- 15b. Slender or bushy climber. Lamina narrowly lanceolate, to  $9.5 \times 3$  cm. Inflorescence a simple cyme with 2–4 flowers or flowers solitary. Calyx teeth more than 1.5 mm long \_\_\_\_\_ 16
- 16a. Bushy climber. Lamina small, ovate, up to twice as long as wide,  $2.5\text{--}5 \times 1.3\text{--}2.4$  cm \_\_\_\_\_ **2. *J. carissoides***
- 16b. Slender climber, lamina narrowly lanceolate, more than twice as long as wide,  $3.7\text{--}9.5 \times 1.5\text{--}3$  cm \_\_\_\_\_ 17
- 17a. Petiole 5–10 mm long. Corolla tube 17–22 mm long, more or less same length as lobes (15–21 mm long) \_\_\_\_\_ **12. *J. ledangense***
- 17b. Petiole 2–6 mm long. Corolla tube 21–28 mm long, longer than lobes (10–22 mm long) \_\_\_\_\_ 18
- 18a. Lamina thickly coriaceous, veins obscure above and beneath, veins drying concolorous with lamina. Calyx teeth 2–5 mm. Corolla tube c.27 mm long, at least 1.5 times longer than lobes (10–18 mm long) \_\_\_\_\_ **9. *J. insularum***
- 18b. Lamina chartaceous, veins drying conspicuously darker than lamina. Calyx teeth 5–9 mm long. Corolla tube 21–28 mm long, to 1.5 times longer than lobes (14–22 mm) \_\_\_\_\_ **15. *J. nervosum***

*Species descriptions*

**1. *Jasminum adenophyllum*** Wall. ex C.B. Clarke, Wall. Cat. 2876, nomen; A.DC., Prodr. 8: 314 (1844), nomen; Clarke in Hooker, Fl. Brit. India 3: 597 (1882); King & Gamble, J. Asiat. Soc. Bengal 74: 261 (1905); Ridley, Fl. Malay Penin. 2: 314 (1923); Henderson, J. Malayan Branch Roy. Asiat. Soc. 17: 55 (1939); Chin, Gard. Bull. Singapore 32: 194 (1979); Green, Fl. Thailand 7: 315, fig. 24 (2000). – Type: Bangladesh, Mt Silhet. Wall. Cat. 2876, 1830 (K-W).

*Jasminum malayanum* Kiew, Sandakania 4: 77 (1994), ibid. 5: 8 (1994). – Type: Peninsular Malaysia, Penang, 1881, *King's Coll.* 1736 (holo SING, iso CAL).

Slender twining, glabrous, wiry climber, 2–10 m long, stems and branches terete. *Leaves* unifoliolate; petioles 0.5–1 cm long; lamina narrowly elliptic to lanceolate,  $7.5\text{--}15 \times 2.5\text{--}5.5$  cm (elsewhere to  $15 \times 8.5$  cm), membranous, drying pale khaki, base cuneate, margin not thickened, apex obtuse to acuminate, acumen to 1 cm long; venation pinnate, midrib and veins prominent beneath, lateral veins 4–8 on either side of the midrib, arching and joining to form a fine submarginal vein; intercostal venation obscure; domatia present. *Inflorescences* axillary, cymes with 3 or 4 flowers or flowers solitary; peduncles 0.7–1.5 cm long; bracts linear, 1–3 mm long. *Flowers* fragrant; pedicels to 20 mm long; *calyx* tube urceolate, c.2 mm long, teeth 5, 12–13 mm long, filiform, thick and twisted; *corolla* white, tube 15–22 mm long, 1.5–2 mm wide, lobes 8 or 9, spreading widely and recurving, ligulate,  $17\text{--}22 \times 2\text{--}4.5$  mm, apex apiculate; *stamens* short; anthers oblong, c.3 mm long, connective broad, apex mucronate; *ovary* cylindrical. *Fruit* lobes globose, c.5–7 mm in diameter, stalk slender, c.20 mm long.

*Distribution.* Widespread. Found in Bangladesh, Vietnam, Thailand and Peninsular Malaysia, where it is rare and known from three (or perhaps four) localities, one each in Kedah, Pahang, Penang (?cultivated) and Selangor.

*Habitat.* Hill or swampy forest and once from karst limestone. It flowers below the tree canopy.

*Altitude.* From c.40 to 1000 m.

*Regional IUCN conservation status.* Data Deficient. DD.

*Jasminum adenophyllum* is still poorly known in Peninsular Malaysia. The Penang specimen is dubiously native. Henderson (1939) recorded that it “was collected in 1881, but it may then have been in cultivation in Penang as it is now”. The specimen collected from Gunung Keriang in 1938 is not in good condition. Although this limestone hill has been botanised since, this species has not been recollected and now the flora of Gunung Keriang is much disturbed by the total removal of the buffer zone of forest that originally surrounded the karst. More recent collections from Gunung Menuang Gasing and Jebak Puyuh Forest Reserve differ in a few characters from the species description, namely in having more lateral veins (6–8, not 4 or 5 on either side of the midrib) and in the flowers always being single (not 3(–5) flowers per inflorescence). Therefore, number of locations, existing threats and how the threats affect populations cannot be determined.

*Etymology.* Greek, *adeno* = indicating the presence of glands; *-phyllum* = leaf.

*Specimens examined.* PENINSULAR MALAYSIA. **Kedah:** Gunung Keriang, 20 v 1938, *Kiah SFN* 35424 (L, SING). **Pahang:** Jebak Puyuh, 10 ii 2011, *Ezzawanis* et al. *FRI* 74129 (KEP); *ibid.*, 11 ii 2011, *Kamarul FRI* 67242 (KEP, SAN). **Penang:** 1881, *Kings Coll./Kunstler* 1736 (CAL, SING). **Selangor:** G. Menuang Gasing, ii 1912, *Kloss s.n.* (K).

*Jasminum adenophyllum* is a widespread species in Asia, reaching its southern limit in Peninsular Malaysia. Under the names ‘blue grape jasmine’ or ‘princess jasmine’, it is widely cultivated for its long-petalled, star-like flowers. It is distinct by the combination of its leaves that dry pale khaki and papery, its pinnate venation, its few-flowered cymes sometimes reduced to a single flower, and its long-stalked flowers with a calyx with long, twisted, stiff teeth. In its papery leaves that dry pale khaki, short petioles and domatia and its long stiff calyx teeth, it resembles *Jasminum wrayi*, but that species differs in its larger leaves with more veins, many-flowered terminal inflorescences and smaller flowers with short pedicels.

**2. *Jasminum carissoides*** Kerr, Bull. Misc. Inform. Kew 27 (1938); Kerr, Fl. Siam. Enum. 2: 396 (1939); Kiew, Gard. Bull. Singapore 70: 113, fig. 3 (2018). – Type: Thailand, Surat, Ban Kawp Kep, climbing on bushes on a rocky limestone hill, flowers white, 100–200 m, 16 viii 1927, *Kerr* 13353 (lecto K, isolecto BK).

*Jasminum cordatum* auct. non Ridl.: Green, Fl. Thailand 7: 339 (2000).

Scrambling shrub or bushy climber with many side branches 3–12.5 cm long. Young twigs terete, greyish, glabrous. *Leaves* unifoliolate; petiole 0.1–0.4(–0.7) cm long; lamina broadly

ovate to broadly or occasionally narrowly lanceolate, 2.5–3.7(–5) × 1.3–1.5(–2.4) cm, slightly coriaceous, glabrous, base rounded to slightly cordate, margin slightly thickened, apex rounded, blunt and mucronate or sometimes acute; venation with the basal pair ascending and forming a submarginal vein with an additional pair of minor veins from the base, in the upper half of lamina 2 lateral veins on either side of the midrib, midrib and veins slightly prominent on both surfaces; without domatia. *Inflorescences* 3-flowered cymes often reduced to a single flower, terminal on side branches; peduncle to 10–13 mm long, glabrous; bracts narrowly lanceolate, c.1 mm long, bracteoles linear, c.1 mm long. *Flowers* fragrant, pedicel to 10–13 mm long; *calyx* glabrous, cream to light greenish, tube 1.5–3 mm long, teeth 5 or 6, filiform 3–4(–6) mm long; *corolla* white, tube 17–24 mm long, slender to 2 mm wide, lobes 6–8, narrowly oblong, 9–15 × 2–3 mm, apex acute; *stamens*: filaments c.1 mm long; anthers c.4.5 mm long, apex mucronate; *ovary* small c.1 mm long, style c.4 mm long (short-styled flower), stigma bilobed, c.2 mm long. *Fruits* not known.

*Distribution.* Peninsular Thailand (Songkla and Surat Provinces) and Peninsular Malaysia (Langkawi, Kedah, and Bukit Chuping, Perlis).

*Habitat.* In Peninsular Malaysia, it is restricted to limestone substrates in the north that experience a monsoon climate with a distinct dry season. It grows on exposed summits of rugged limestone hills or in Langkawi on limestone islands.

*Altitude.* At sea level.

*Regional IUCN conservation status.* Endangered. EN B1ab(iii)+2ab(iii).

*Jasminum carissoides* is restricted to limestone on four islands in Langkawi, Kedah, and from one karst hill, Bukit Chuping, in Perlis. Its EOO and AOO are the same (8.83 km<sup>2</sup>) and are declining due to the presence of an active quarry on Bukit Chuping and tourist activities on Pulau Dayang Bunting.

*Etymology.* Latin, *-oides* = similar to *Carissa*, Apocynaceae.

*Specimens examined.* PENINSULAR MALAYSIA. **Kedah:** Langkawi – SE of Kuah, 3 v 1962, *Burt & Woods* B1812 (E); Pulau Dayang Bunting, 29 iv 1962, *Burt & Woods* B1767 (E), *ibid.*, 10 v 1967, *Stone* 6927 (KLU); *ibid.*, 26 ii 1970, *Stone* 9144 (KLU); Pulau Jerom Kechil 13 v 1967 *Stone* 6986 (KLU), *ibid.*, 9 v 2008, *Julius* et al. *FRI* 56092 (KEP, SAN); Pulau Kedrah 17 xi 1941, *Corner SFN* 37812 (SING). **Perlis:** Bukit Chuping, 23 iv 1962, *Burt & Woods* B1710 (E).

Chin (1979) drew attention to several small-leaved specimens from Langkawi that were different from the other limestone jasmines. He named them *Jasminum* sp. A (*Stone* 9144) and *Jasminum* sp. B (*Stone* 6927 and 6986). These all belong to *Jasminum carissoides*, a Thai species restricted to limestone hills and that characteristically has small, broadly ovate leaves with a blunt apex. *Jasminum carissoides* is confined to Peninsular Thailand and northwestern Peninsular Malaysia. One aberrant specimen, *Julius* et al. *FRI* 56092, had flowers with three stamens (Kiew, 2018, Fig. 3).

**3. *Jasminum cordatum*** Ridl., Bull. Misc. Inform. Kew : 473 (1926); Chin, Gard. Bull. Singapore 32: 194 (1979); Kiew, Sandakania 5: 4 (1994). – Type: Peninsular Malaysia,

Perak, Gunung Lanno [Lenoh], 16 iv 1925 *Mills & Henderson SFN* 15064 (lecto SING [SING0194735], isolecto K).

Scandant shrub or shrubby climber to 1.5–5 m long, minutely pubescent, sometimes dense on young stems, petioles and lower surface of midrib and veins. Young twigs terete, light brown. *Leaves* unifoliolate; petiole 0.7–1 cm long; lamina ovate, (2.7–)3–7(–9.5) × (1.3–)2–3.5(–4.5) cm, subcoriaceous, glabrous, base cordate, margin recurved, apex attenuate, tip acute, sometimes mucronate; venation pinnate, 2–3(–5) veins on either side of the midrib, ascending but not forming a submarginal vein, impressed above, prominent below; intercostal veins obscure; without domatia. *Inflorescences* terminal on short branches, cymes with (1–)3–4 flowers, glabrous; peduncle short, glabrous to minutely puberulous; bracts linear, c.1 mm long. *Flowers* fragrant; pedicels to 3–4 mm long; *calyx* tube c.2 mm long, teeth 6, filiform, 2–5 mm long, puberulous; *corolla* white, tube 16–28 mm long, c.2 mm wide, lobes 6–8, (9–)12–20 × (2.5–)3–5 mm, oblong with apiculate apex; *stamens*: anthers 2.5–3 mm long; *ovary* c.1.25 × 1 mm. *Fruits* ripening purple to almost black, lobes c.8 × 7 mm (immature).

*Distribution.* Endemic to Peninsular Malaysia: Perak, Pahang, Selangor and Terengganu.

*Habitat.* Restricted to karst limestone hills, fully exposed to full sun on the summit. Rarely collected in fruit.

*Altitude.* From 100 to 450 m.

*Global IUCN conservation status.* Vulnerable. VU B1ab(ii,iii,iv)+2ab(ii,iii,iv).

*Jasminum cordatum* is restricted to seven karst limestone hills that, apart from Bukit Takun (which lies within the Serendah Forest Reserve), do not fall within the network of Totally Protected Areas. Additionally, all have experienced disturbance either from tourism and recreational activities or from quarry activity (Gunung Kanthan, Gunung Lanno and Gunung Rapat).

*Etymology.* Latin, *cordatum* = cordate, referring to the leaf base.

*Specimens examined.* PENINSULAR MALAYSIA. **Pahang:** Bkt. Bekong, Merapoh, Gua Ulu Rakit, 21 ii 2013, *Mohd Hairul & Kiew FRI* 54080 (KEP, SAN, SING); *ibid.*, 1 x 2013, *Ummul Nazrah et al. FRI* 78413 (KEP). **Perak:** Gunung Kanthan, 19 xii 2013, *Tan et al. FRI* 81762 (KEP); Gunung Rapat, 20 v 1959, *Molesworth-Allen* 4289 (SING), *ibid.*, 17 ii 1967, *Ng FRI* 1919 (KEP); *ibid.*, 15 iii 2011, *Rafidah et al. FRI* 64601 (KEP). **Selangor:** Batu Caves [Gua Batu], 29 viii 1971, *Chin* 1662 (KLU); *ibid.*, 12 iii 2010, *Syahida et al. FRI* 66737 (KEP); Bukit Takun [Kanching Rock], 30 x 1940, *Durant* 56258 (KEP); *ibid.*, 17 ix 1940, *Tachun & Sow* 50696 (KEP); *ibid.*, 27 ix 1970, *Chin* 366 (KEP, KLU); *ibid.*, 11 vi 1965, *Stone* 5893 (KLU), *ibid.*, 7 xii 1969, *Stone* 8932 (K). **Terengganu:** Sungai Puah, Tembat FR, 4 iv 2009, *Ummul Nazrah et al. FRI* 66192 (KEP).

Green (2000) mistakenly recorded *Jasminum cordatum* from Thailand, based on a mixture of *J. carissoides* and *J. nervosum* specimens (Kiew, 2018). Recent collections from Pahang and Terengganu show that it is distributed on both sides of the Main Range. Specimens from Pahang have slightly larger leaves (9.5 × 4–4.5 cm) but are otherwise typical in texture, the cordate base and veins impressed on the upper surface.



**4. *Jasminum curtisii*** King & Gamble, J. Asiat. Soc. Bengal 74: 259 (1905); Ridley, Fl. Malay Penin. 2: 312 (1923); Henderson, J. Malayan Branch Roy. Asiat. Soc. 17: 55 (1939); Chin, Gard. Bull. Singapore 32: 194 (1979); Kiew, Sandakania 5: 4 (1994). – Type: *Curtis s.n.*, xii 1895 Peninsular Malaysia, Perak, Ipoh (lecto SING [SING0194733]).

A slender, glabrous climber, to 7 m long or shrubby. *Stems* whitish, terete, branchlets c.5 mm thick, rusty brown minutely pubescent, soon glabrescent. *Leaves* unifoliolate; petioles 0.5–1 cm long, minutely pubescent; lamina lanceolate, elliptic to obovate, 7.5–14 × 2.5–6 cm, membranous, glabrous, base cuneate to rounded, margin not thickened nor recurved, apex acuminate to attenuate, acumen to 1 cm long; venation pinnate, lateral veins fine, 5 or 6 on either side of the midrib, distant, looping and joining c.2–4 mm from margin, slightly impressed above, prominent beneath; intercostal venation obscure; domatia present. *Inflorescences* terminal, flowers crowded in a compact sessile cyme less than 0.5 cm long, 5- to 20-flowered; peduncles 2–3 cm long; bracts and bracteoles leaf-like, whitish green, drying white; bracts ovate-lanceolate, 1–3 × 0.5–1.2 cm long, more or less surrounding the inflorescence, persistent, bracteoles narrowly lanceolate, decreasing in size towards the apex, 13.5–18 × 2.5–4.5 mm. *Flowers*: pedicels c.1.5 mm; *calyx* whitish green, minutely pubescent, tube narrowly campanulate, 2–3 mm long, teeth 5 or 6, longer than the tube, filiform 8–10 mm long; *corolla* white tinged green, tube slender, 18–27 mm long, 1–2.5 mm wide, lobes 8 or 9, oblong-lanceolate, 8–10 × 1.5–3 mm, tip acute to acuminate, spreading; *stamens*: filaments less than 1 mm in short-styled flowers; anthers narrowly oblong, 3 mm long, apex mucronate; *ovary* c.1 mm in diameter, style less than half length of corolla tube, stigma bilobed. *Fruits* ripening blackish, lobes ellipsoid, c.10 × 7 mm, apex blunt.

*Distribution*. Endemic to the northern states of Peninsular Malaysia: Kedah, Kelantan and Perlis.

*Habitat*. The type specimen does not provide a precise locality nor habitat data, but all other collections are from limestone localities. It is a rare, lowland species probably restricted to limestone, where it grows on exposed boulders at the base of limestone hills.

*Global IUCN conservation status*. Endangered. EN B1ab(iii)+2ab(iii).

*Jasminum curtisii* is a rare species known from five localities with restricted EOO and AOO (20.63 km<sup>2</sup>). It falls within this category because it is nowhere protected; it lies outside the network of Totally Protected Areas. Additionally, all the limestone sites lack a buffer zone of trees so are particularly vulnerable to deterioration in habitat quality from agricultural or ecotourism activities.

*Etymology*. C. Curtis, 1853–1928, Curator of the Waterfall Gardens, Penang, 1884–1902.

*Specimens examined*. PENINSULAR MALAYSIA. **Kedah**: Langkawi, Pulau Bumbon *Van Balgooy* 2209 (L). **Kelantan**: Gua Panjang, 16 v 1990, *Kiew & Anthonysamy* RK 2972 (KEP). **Perak**: Ipoh, *Curtis s.n.*, xii 1895. **Perlis**: Bukit Wang Tangga, *Henderson* 23010 (K, SING); Kaki Bukit, *Haniff & Salleh* 10463 (SING).

A distinct species in its whitish stems; thin, papery leaves that dry wrinkled, with conspicuous domatia; big, leaf-like, often white bracts; and long calyx teeth.

**5. *Jasminum decussatum*** Wall. ex G. Don, Gen. Hist. 4: 62 (1827); Clarke in Hooker, Fl. Brit. India. 3: 596 (1882); King & Gamble, J. Asiat. Soc. Bengal 74: 260 (1905); Ridley, Fl. Malay Penin. 2: 313 (1923); Kiew, Sandakania 5: 4 (1994); Green, Fl. Thailand 7: 325 (2000) fig. 26. – Type: Myanmar, Amherst, caves at Kegum, 11 iii 1827 *Wallich 2860 Sheet II* (lecto K).

*Jasminum puberulum auct. non* Baker: Ridley, J. Fed. Malay States Mus. 10: 100 (1929).

Bushy climber, to 3 m long. *Twigs* terete, c.3 mm thick. Young stems, petioles, lamina, inflorescences and calyx densely tomentose, hairs tawny, persistent. *Leaves* unifoliolate; petioles 1–1.3 cm long; lamina broadly lanceolate to ovate, 6.5–8.5(–11) × 3–4(–5) cm, membranous, densely velutinous above and especially beneath, base rounded to slightly cuneate, margin not recurved, minutely ciliate, apex attenuate to acuminate, tip sometimes mucronate; venation pinnate, lateral veins 3–5 on either side of midrib, ascending, midrib and veins villous beneath, slightly sunken above, slightly prominent beneath; intercostal veins obscure; without domatia. *Inflorescences* terminal on short side shoots to c.10 cm long with one or two pairs of leaves or from the axils of the upper leaf pair, many-flowered (more than 30), lax thyrse (trichotomous), (3.5–)5–6 cm long; peduncles 1.5–3 cm long; bracts ovate, c.3 mm long, bracteoles linear, 2–3 mm long, persistent. *Flowers* small, fragrant; pedicels 3–5 mm long; *calyx* greyish green, minutely tomentose, hairs white, tube 1–3 mm long, teeth 5 or 6, short, filiform, recurved, 0.5–1.5 mm long; *corolla* cream-coloured to yellow–green in bud, white at anthesis, glabrous, tube 4(–6) mm long, c.1 mm wide, lobes 5 or 6, ligulate, 6–7(–9) × 0.5–1.5 mm, tip acute to apiculate, often reflexed; *stamens* with filaments c.0.75 mm in short-styled flowers; anthers yellow, ellipsoid, c.2 × 1.5 mm, connective apiculate; *ovary* globose, c.0.75 mm in diameter, glabrous, style c.3–4 mm long, stigma bilobed, 1.5 mm long. *Fruits* ripening blackish, lobes ellipsoid, c.8 × 4 mm (immature?, elsewhere 13 × 8.5 mm); stalk 5–6 mm long.

*Distribution.* Myanmar, Thailand, Peninsular Malaysia and North Sumatra. In Peninsular Malaysia, known only from the northern states of Perlis and Kedah.

*Habitat.* Lowlands, in open thickets and disturbed margins of secondary forest.

*Altitude.* Sea level to c.250 m.

*Uses.* In Kedah, it is recorded for *Haniff & Salleh* 10463 (SING) that this species was used to cure ‘*sakit pekang/pekong*’ (large foul ulcers) by chewing the leaf with betel nut and spitting it onto the ulcer.

*Regional IUCN conservation status.* Endangered. EN B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv).

In Peninsular Malaysia, *Jasminum decussatum* is rare and known from only five localities, none of which falls within the network of Totally Protected Areas. Its EOO and AOO are projected to decline, because all recorded localities are adjacent to agricultural estates or urban areas.

*Etymology.* Latin, *decussatum* = leaves in opposite and alternate pairs.

*Specimens examined.* PENINSULAR MALAYSIA. **Kedah:** Bukit Renang, Alor Setar, ii 1910, *Ridley* 14931 (BM, K, SING); Jitra, *Burkill* 13345 (SING); Gunung Bongu, *Haniff & Salleh* 10463 (SING); Langgar, 17 ii 1988, *Kiew RK* 2624 (KEP); Kuala Nerang, *Stein W* 15 open country, rather often (SING).

This distinct jasmine has small flowers, a corolla tube shorter than the narrow lobes, minutely velutinous stems and lower leaf surface, leaf with ascending pinnate veins, and lax densely pubescent thyrses.

**6. *Jasminum elongatum*** (Bergius) Willd., Sp. Pl. ed. 4, 37 (1797); Green, Kew Bull. 42: 437 (1987), Fl. Thailand 7: 322 (2000); Kiew in Henderson's Malaysian Wild Flowers, Dicotyledons 250, fig. (2014). Basionym: *Nyctanthes elongata* Bergius, Philos. Trans. 61: 289, t. 11 (1772); Abrev. (Hutton) 13: 147, t. 4, fig. 6 (1809). – Type: China, Canton, *Ekeberg s.n.* (holo SBT n.v., photo K).

*Jasminum aemulum* R.Br., Prodr. 521 (1810); Kiew, Malay. Nat. J. 47: 312 (1994), Sandakania 5: 3 (1994). – Type: Australia, Northern Territory [Groote Eylandt], 1803 *R. Brown* 2842 (lecto BM, isolecto K).

*Jasminum bifarium* Wall. ex G.Don, Gen. Syst. 4: 60 (1837), Clarke in Hooker, Fl. Brit. India 3: 595 (1882); King & Gamble, J. Asiat. Soc. Bengal 74: 260 (1905); Ridley, Fl. Malay Penin. 2: 313 (1923); Chin, Gard. Bull. Singapore 32: 194 (1979). – Type: Peninsular Malaysia, Penang *Wallich* 2866a Penang (lecto K).

*Jasminum bifarium* var. *glabra* C.B. Clarke in Hooker Fl. Brit. India 3: 595 (1882); King & Gamble, J. Asiat. Soc. Bengal 74: 261 (1905); Ridley, Fl. Malay Penin. 2: 313 (1923). – Type: Singapore or Penang, *Walker* 206 (lecto K).

*Jasminum lessertianum* A.DC., Prodr. 8: 304 (1884). – Type: Singapore *Delessert s.n.* (holo P n.v., iso BM).

*Jasminum evansii* Ridl., J. Fed. Malay States Mus. 10: 148 (1920), Fl. Malay Penin. 2: 313 (1923). – Type: Peninsular Malaysia, Pahang, G. Senyum, vi 1917 *Evans s.n.* (lecto K; isolecto BM, SING).

*Jasminum arenarium* Ridl., J. Fed. Malay States Mus. 10: 147 (1920), Fl. Malay Penin. 2: 313 (1923). – Type: Peninsular Malaysia, Kelantan, Kota Baharu, ii 1917 *Ridley s.n.* (type lost).

Slender, scrambling, woody climber, 3–5 m long, old stems to 2 cm thick. Indumentum on young twigs, petioles, lower surface of the midrib and lateral veins, inflorescence and calyx variable, from sparsely to densely pubescent or pilose or glabrous. *Twigs* terete, brown, nodes distinctly annular. *Leaves* unifoliolate; petioles twisted, 0.3–0.7(–1) cm long; lamina narrowly ovate to lanceolate, 3–8.5(–11) × 1.5–2.5(–4) cm, chartaceous, glabrous above, base rounded or sometimes rhomboid or almost subcordate, margin not recurved, apex attenuate to acuminate; venation pinnate, lateral veins 4–6 on either side of the midrib, curving upwards to join the submarginal vein, midrib and veins glabrous and impressed above, prominent beneath; intercostal venation obscure; without domatia. *Inflorescences* short dichasia, (3.5–)5–10 cm long with (1–)6–9(–14) flowers, terminal on short opposite

side branches; bract pair often large, c.11–15 × 8–11 mm or leaf-like and grading into the leaves, bracteoles linear, 1–10 mm long. *Flowers*: pedicels 1–6 mm long; *calyx* tube campanulate, 1.5–2 mm long, teeth (5–)7, filiform, 1–4(–6) mm long; *corolla* white, tube 15–27 mm long, lobes 6–9, narrowly elliptic, 6–10 × 2–4 mm, tip acute to apiculate; *stamens*: filaments short, c.0.75 mm; anthers narrowly ellipsoid, c.4 mm long, connective broad, tip apiculate; *ovary* globose, c.1.75 mm in diameter, glabrous, style to 20 mm long (long-styled flowers), stigma bilobed, 1.5 mm long. *Fruits* ripening dark purple, lobes ellipsoid, 8–10 × 5–6 mm; stalk slender, 1.5–6 mm long.

*Distribution*. Among Malaysian jasmines, it is the most widespread, being distributed from Bhutan, India, Myanmar, South China, Indochina, Thailand, throughout Malesia, to North Australia. In Peninsular Malaysia, it is recorded from all states except Melaka (where it has probably been overlooked). Also in Singapore.

*Habitat*. Widespread in open areas, such as forest margins, hedges, rubber plantations, riverbanks and secondary vegetation, sometimes on karst limestone or swamp forest or mangrove.

*Altitude*. Sea level to 1700 m.

*Vernacular name*. *Akar pekan hutan* (Malay).

*Regional IUCN conservation status*. Least Concern. LC.

*Jasminum elongatum* is the most widely distributed species in Peninsular Malaysia and grows in a wide variety of habitats. It also grows in hedges and rubber estates. It is becoming less common because hedges and forest margins have become less stable habitats, being vulnerable to removal for road widening and other rapid changes in land use facilitated by the use of modern heavy machinery.

In Singapore, it is widespread and recently collected.

*Etymology*. Latin, *elongatum* = elongated.

*Specimens examined*. PENINSULAR MALAYSIA. **Kedah**: Gunung Inas Forest Reserve, 7 ii 1968, Whitmore FRI 4665 (KEP); Langkawi Is., 1977, *Anthonyssamy SA* 135 (KEP); Timun Is., 17 iii 2007, *Syahida Emiza FRI* 54992 (KEP, SAN, SAR, SING); Bukit Malut, 2 iii 2010, *Imin FRI* 70031 (KEP, SING). **Kelantan**: Kuala Betis, 21 iv 2009, *Rafidah FRI* 64303 (K, KEP, L, SAN, SING); Bukit Mangga, 19 ii 2003, *Kiew RK* 5273 (KEP); Gunung Reng, 13 i 2010, *Imin FRI* 66459 (KEP); Sekolah Menengah Rahmat, 26 i 2011, *Imin FRI* 71988 (KEP, SING). **Pahang**: Boh Valley, 5 vii 1999, *Kiew RK* 4732 (KEP); Gunung Brinchang, 11 ii 2009, *Mohd Hairul FRI* 60888 (KEP, SAN); Gunung Siku Forest Reserve, 27 ix 2012, *Imin FRI* 77543 (KEP, SING); Sg. Tahan, Taman Negara, 20 iv 1980, *Kiew RK* 956 (KEP); Sg. Tembeling, Taman Negara, 14 vii 1970, *Everett FRI* 14468 (KEP); Sg. Keniyam, Taman Negara, 24 ii 1973, *Ng FRI* 20887 (KEP); Jeram Panjang, Kuala Tahan, Taman Negara, 22 vii 1970, *Mohd Shah MS* 2047; Jeram Katak, Taman Negara, 13 viii 1972, *Mohd Shah MS* 2656 (KEP); Bukit Belar, Ulu Sg. Tembeling, Taman Negara, 7 iii 1968, *Mohd Shah MS* 1627 (KEP); Merapoh, 21 ii 2013, *Mohd Hairul FRI* 54080 (KEP, SAN, SING); Raub, 24 vi 1959, *Mat Akhir KEP* 69622 (KEP); Fraser's Hill – Kuala Kubu Baru Road, 5 v 2007, *Chew FRI* 53684 (K, KEP, L, SAN, SAR, SING); Lesong Forest Reserve, 5 v 1982, *Vethevelu FRI* 29685 (KEP). **Penang**: Penang Hill, 31 v 1938, *Henderson SFN* 21436 (KEP); Penang Hill, 12 iii 1996, *Balgooy*

7216 (KEP). **Selangor:** Klang Gates, 7 iv 1982, *Kiew RK 1154* (KEP); Forest Research Institute Malaysia, 20 xii 1946, *Wyatt-Smith 60611* (KEP); Kajang, 10 xi 1983, *Kiew RK 1256* (KEP); Kuala Pansom, 6 xi 1960, *Gadoh KL 2193* (KEP); Sg. Buloh, 23 iii 1958, *Abdullah KL 255* (KEP); University Putra Malaysia, viii 1979, *Anthonyamy SA 259* (KEP); Bukit Tinggi, 18 vii 1984, *Mohd Shah MS 4937* (KEP).

*Jasminum elongatum* is not only the most common jasmine in the Peninsula, it is also the most variable in its indumentum, leaf size and shape (Kiew, 1994a), which has led to the proliferation of species names throughout its geographical range. Only synonyms that have been applied to Peninsular Malaysian specimens are listed here. For synonyms for the Malesian region see Kiew (1994a, 1994c as *Jasminum aemulum*), and for Thai taxa see Green (2000). Notable is a montane form that grows at 1000–1634 m altitude that has larger leaves (8.5–11 × 4–4.5 cm) than the lowland form (3–6 × 1.5–2.5 cm) but does not differ in any other characters apart from size.

The type specimen of *Jasminum arenarium* is apparently lost. The specimen on the type sheet at Kew that has the label in Ridley's hand, recording it from Kota Baharu, is in fact the type specimen of *Jasminum evansii*, and a handwritten note on this sheet records 'specimen presumably lost'. Furthermore, there are no duplicates of it in BM or SING. From Ridley's description, it is conspecific with *Jasminum elongatum*.

**7. *Jasminum griffithii*** C.B. Clarke, in Hooker, Fl. Brit. India. 3: 593 (1882); King & Gamble, J. Asiat. Soc. Bengal 74: 257 (1905); Ridley, Fl. Malay Penin. 2: 311 (1923); Kiew, Sandakania 5: 6 (1994). – Type: Peninsular Malaysia, Melaka *Griffith Kew Distrib. No. 3704* (holo K [K000901416]).

*Jasminum griffithii* var. *cuspidata* King & Gamble, J. Asiat. Soc. Bengal 74: 257 (1905). – Type: Peninsular Malaysia, Penang, Government Hill Road to Penara Bukit *Curtis 2787*, iii 1892, flowers yellowish green, 1800 ft (lecto SING [SING0194747], isolecto SING [SING0194746]).

Shrubby or slender climber, to 5 m long, old stems 0.5–2.5 cm thick, bark smooth, reddish brown. *Twigs* slender, terete. Indumentum on twigs, petiole, lower surface of lamina, inflorescences and calyx densely and minutely hispid, hairs tawny. *Leaves* unifoliolate; petioles 0.5–1 cm long, densely tomentose; lamina broadly or narrowly lanceolate to elliptic, 10–17(–21) × 4–7.5(–9) cm, membranous, sparsely pilose above, base rounded, margin shortly ciliate, not thickened, apex acuminate to caudate, acumen 1–2.3 cm long; venation pinnate, lateral veins (7–)10–12 on either side of the midrib, looping and joining to form a faint submarginal vein; midrib raised above, midrib and lateral veins prominent beneath; intercostal venation finely reticulate; domatia a tuft of tawny hairs. *Inflorescences* terminal or terminal on short side shoots or sometimes axillary, (3–)5–7 cm long, many-flowered, branched, a corymbose thyrse; peduncles 3–5.5 cm long; bracts linear, c.6 mm long, persistent, bracteoles linear, to 9 mm long, similar to calyx lobes. *Flowers*: pedicels 2–4 mm long; *calyx* tube slender, 1.5–3 mm long, teeth 5, stiff, filiform, (4–)6–7 mm long; *corolla* lemon yellow or creamy white, sparsely hairy outside, tube 14–20 mm long, slender, c.1 mm wide, slightly enlarged above, lobes 5, elliptic, (5–)6.5–8 × 1–2(–3) mm,

apex acute, spreading; *stamens* almost sessile; anthers oblong-lanceolate, 4–5 mm long, connective broad, apex mucronate; *ovary* subglobose, c.1 mm in diameter, glabrous, style slender, c.20 mm long and projecting beyond the corolla tube (long-styled flower), stigma clavate, 1–1.5 mm long. *Fruits* ripening waxy white, lobes more or less globose, 7–9 mm in diameter; fruit stalk stout, 3–4 mm long.

*Distribution.* Endemic to Malaya (Peninsular Malaysia and Singapore). In Peninsular Malaysia, widespread (Penang, Perak, Selangor, Melaka, Pahang, Terengganu, Johor) but absent from the northern states.

*Habitat.* In primary lowland dipterocarp forest, sometimes in seasonally swampy areas, or in hill dipterocarp forest. Ridley (1923) noted that it was never common.

*Altitude.* To 600 m.

*Vernacular names.* *Akar kum-kuma hutan* (Malay), *lang* (Temuan).

*Global IUCN conservation status.* Near Threatened. NT.

*Jasminum griffithii*, although widespread, except for the Krau Game Reserve, falls outside the network of Totally Protected Areas. It is a lowland species and there are few recent collections and none from the west coast, indicating that its habitat has suffered decline due to disturbance and fragmentation.

In Singapore, it was collected by H. N. Ridley from Bidadari in 1897 and the Singapore Botanic Gardens Jungle in 1894, and by Goodenough from Chan Chu Kang in 1893, but it has not been collected in the past 120 years. Most of its original habitats have declined in area and quality, indicating that it is now extinct in Singapore.

*Etymology.* W. Griffith, 1810–1845, doctor and botanist with the East India Company.

*Specimens examined.* PENINSULAR MALAYSIA. **Johor:** G. Pulau, *King s.n.* (CAL, n.v., SING); *ibid.*, xii 1904 *Ridley s.n.* fruit white (SING); Mt Austin, 1904, *Ridley s.n.* (SING). **Melaka:** [no locality] iv 1867/8, *Maingay KD* 99810 (K); [no locality] *Alvins* 947 (SING). **Pahang:** Kota Gelanggi, *Henderson SFN* 22490 (SING); Cameron Highlands, Lubok Tamang, *Henderson* 10925 ‘flowers lemon yellow’ (SING); P. Tioman, Sedagong, *Md Nur* 18850 flowers white (SING); Fraser’s Hill, *Burkill & Holtum* 7817 berry white (SING); Krau Wildlife Reserve, 5 vi 2000, *Chua et al. FRI* 45636 (KEP). **Penang:** Government Hill, iii 1892, *Curtis* 2787 (SING). **Selangor:** [Perak] Ulu Bubong, vi 1886, *King’s Coll./Kunstler* 10229 flower rich cream colour, fruit pale waxy white (K); Batu Caves, *Curtis* (SING); Kuala Pansom, 13 vii 1958, *Gadoh KL* 519 (KEP). **Terengganu:** Jerangau Forest Reserve, 22 vii 2008, *Lim et al. FRI* 65065 (K, KEP, SAN), *ibid.*, 23 vii 2008, *Lim et al. FRI* 65078 (K, KEP); Ulu Berang, *Moysey & Kiah* 33649 (SING).

*Jasminum griffithii* is a very distinctive species in the large number of lateral veins, the tawny tomentose indumentum, many-flowered, branched, a corymbose thyrse with a long peduncle, its yellowish flowers, and most striking fruits that ripen waxy white.

King & Gamble (1905) described var. *cuspidata* as having “leaves thinner, oblong, abruptly and sharply cuspidate-acuminate, attenuate and abruptly rounded at base, 5–5.5 × 1.5–2 in. [12.5–14 × 4–5 cm], much less pilose, veins 8–10 pairs”. Now that

a wider range of specimens is available for comparison, it is not distinct from the typical variety. Both Ridley (1923) and Kiew (1994a) treated it as a synonym.

**8. *Jasminum insigne*** Blume, Ann. Mus. Bot. Lugduno-Batavi 1: 278 (1850); Miquel, Fl. Ind. Bat. 2: 541 (1856) 541; King & Gamble, J. Asiat. Soc. Bengal 74: 263 (1905); Ridley, Fl. Malay Penin. 2: 314 (1923); Kiew, Sandakania 5: 7 (1994). – Type: Sumatra, Doetoe. Unknown collector *s.n.* (probably Korthals) *s.n.* (lecto L [L2683845]).

*Jasminum insigne* var. *teysmannii* Miq., Fl. Ind. Bat. 2: 541 (1856) [as *teysmanni*]. – Type: West Sumatra, *Teysmann HB* 960 (lecto L [L2683767]).

*Jasminum insigne* var. *sublanceolata* Miq., Fl. Ind. Bat. 2: 541 (1856) – Type: West Sumatra, Priaman *Diepenhorst HB* 961 (lecto L [L2683854]; isolecto BO, CAL), **syn. nov.**

Woody, glabrous, robust climber, to 15 m long, old stems stout, obscurely quadrangular, 0.5–1.75 cm thick; bark pale grey to white, corky, c.1 mm thick. *Twigs* acutely quadrangular, angles winged, wings pale green, corky. *Leaves* unifoliolate; petioles twisted, thickened, 1–3 cm long; lamina elliptic, sometimes narrowly or broadly elliptic, 13–18(–25) × 6–7(–11) cm, thinly to thickly coriaceous, glabrous above and beneath, base cuneate, margin slightly recurved, apex cuspidate or acuminate, acumen to 0.5–1.5 cm; venation pinnate, basal pair faint, opposite, ascending steeply in the lower third and forming in a submarginal vein 2.5–5 mm from the margin, upper lateral veins 5–7 widely spaced on either side of the midrib, looping and joining the submarginal vein, prominent beneath; intercostal venation obscure; without domatia. *Inflorescences* cauliflorous from the leafless old stem, a few also from the upper leaf axils, compact 5–9 flowers together or many-flowered dichasial cymes 0.5–2 cm long, glabrous; peduncles short, 0.5–1 cm long; bracts linear, c.2.5 mm, persistent. *Flowers* fragrant; pedicels 5–15 mm long, somewhat angular; *calyx* campanulate, 3–4.5 × 3–4 mm long, glabrous, teeth 4 or 5, filiform, unequal, (1–)3–4(–6) mm long, tip hooked; *corolla* white, yellow or orange in the throat, glabrous, tube slender, 19–30 mm long, 2–4 mm wide, mouth slightly thickened, lobes (4 or) 5, thick with conspicuous veins, broadly elliptic, 12–16(–22) × 5–7 mm, tip apiculate, spreading; *stamens* with anthers sessile, oblong, c.5 mm long, connective minutely mucronate; *ovary* rounded, c.2 mm in diameter, glabrous, style c.12 mm long (in short-styled flower), stigma clavate, shortly bilobed. *Fruits* pale magenta ripening glossy white, lobes ellipsoid, c.15 mm long, 7 mm in diameter.

*Distribution.* Sumatra and Peninsular Malaysia. In Peninsular Malaysia known from Perak, Negeri Sembilan, Kelantan, Terengganu and Pahang.

*Habitat.* Not common, in primary lowland mixed dipterocarp forests, sometimes in riverine forest or at the base of limestone hills or in deep valleys in shade. Although a robust climber, it flowers below the canopy. In Sumatra, it is reported from montane forest at 1450 m. Sometimes reported as fragrant; others report no scent detected, but on *Burkill* 3173 it was noted that it produces ‘abundant honey’.

*Altitude.* From sea level to 170 m, occasionally to 400 m (Gunung Tampin).

*Regional IUCN conservation status.* Near Threatened. NT.

*Jasminum insigne* is a lowland forest species and although relatively widespread, apart from Sungai Tahan in the National Park (Taman Negara), it does not grow within the network of Totally Protected Areas. The quality and area of its lowland habitat has also drastically declined, and there are few recent collections since the 1940s.

*Etymology.* Latin, *insignis* = remarkable; presumably referring to the cauliflorous habit.

*Specimens examined.* PENINSULAR MALAYSIA. **Kelantan:** Chiku, *Nor Neknazrul* et al. *FRI* 81733 (KEP). **Negeri Sembilan:** Gunung Tampin, *Burkill* 3173 no scent, abundant honey, flower white with a yellow eye, fruit white (K, SING); *ibid.*, *Holtum* 9579 (SING); Pasoh Forest Reserve, *no collector FRI* 32963 (KEP). **Pahang:** Tembeling, *Henderson* 21880 (SING); Tahan River, 1893, *Ridley s.n.* (SING). **Perak:** Taiping, 23 i 1885, *Cantley* (K, SING); Larut, Tupai, *Wray* 2840, fruit pale magenta (CAL, K, SING); *King's Coll./Kunstler* 3398, fruit glossy white when ripe (K); Telok Anson, *Mohd. Haniff* 14188 flower white with orange yellow eye (SING). **Terengganu:** Ulu Telomong, 28 vii 2006, *Kiew* et al. *RK* 5345 (K, KEP, L).

*Jasminum insigne* is a very distinct species in its square stems (both young and old), bunches of flowers on old wood, corollas often with a yellow or orange 'eye', and fruits that ripen waxy white. *King & Gamble (1905)* reported that it occasionally had whorled leaves, but this has not been observed in any specimen.

It is more common in Sumatra. *Kiew (1994a)* recognised two varieties: var. *insigne* from Peninsular Malaysia and Sumatra, and var. *sublanceolata* Miq., endemic to Sumatra. They were distinguished by differences in leaf characters: var. *insigne* had broader laminas, 13–22 × 6–8 cm, with a cuneate base, cuspidate apex with an acumen to c.1 cm long, and shorter petioles, 1–2.5 cm long, whereas var. *sublanceolata* Miq. had narrowly elliptic laminas, 16.5–20 × 4–7 cm, with a narrowly attenuate base, acute apex, and petioles 2–3 cm. There were no differences between them in habit, inflorescences, floral or fruit characters, and among recent collections, there are many specimens that have character states intermediate between the two varieties, so var. *sublanceolata* can no longer be maintained as distinct and is here reduced to synonymy.

*Jasminum insigne* does not occur in Thailand. The specimen *Haniff & Nur SFN* 3863, listed by *Kerr (1939)* as this species, is *Gynochthodes* sp., Rubiaceae (*Green, 2000*).

**9. *Jasminum insularum* Kerr, Bull. Misc. Inform. Kew 28 (1938), in Craib, Fl. Siam. Enum. 2: 401 (1939); Chin, Gard. Bull. Singapore 32: 194 (1979); Kiew, Gard. Bull. Singapore 70: 114 (2018).** – Type: Thailand, Phangnga, Pulau Tebun, 29 xi 1918, *Haniff & Nur SFN* 3605 (lecto K, isolecto SING [SING0194634]).

Slender climber or scandent shrub. Young twigs terete, c.3 mm thick, minutely pubescent, soon glabrescent. *Leaves* unifoliolate, petiole 2–4 mm long, minutely pubescent; lamina narrowly lanceolate to narrowly ovate, 4–6.5 × 1.5–2 cm, thickly coriaceous, glossy above, beneath minutely verrucose, glabrous, base rounded, margin thickened, recurved, apex obtuse to rounded, tip mucronate; venation obscure, basal vein pair faint, ascending about halfway, midrib slightly prominent above, prominent beneath; without domatia. *Flowers* solitary or two together, usually terminal on main shoot or on short side branches c.4 cm long, or sometimes axillary; peduncle c.7 mm; pedicel c.4–5 mm long; bracts linear,



to 2 mm long, minutely pubescent; *calyx* glabrous, tube 1.5–2 mm, teeth subulate (2–)4–5 mm long; *corolla* glabrous, tube to 27 mm long, lobes 5–8, oblong, to (10–)12–15(–18) × (2–)3–4(–6) mm, apex acute; *stamens* with filaments c.11 mm long; anthers narrowly ellipsoid, c.5.5 mm long, apex mucronate; *ovary* not seen, style slender, 21 mm long (long-styled flower), stigma shortly bilobed. *Fruits* ripening shining black, lobes ellipsoid, 9–10 mm long, 8 mm in diameter.

*Distribution.* Peninsular Thailand (known only from the type specimen) and Peninsular Malaysia, where it is rare and known from only two records, one from Pahang (Bukit Chintamanis) and the other from Kelantan (Gua Panjang), both east of the Main Range.

*Habitat.* In Peninsular Malaysia, rare and restricted to karst limestone hills, on cliffs or summits. In Thailand, its habitat is not recorded.

*Regional IUCN conservation status.* Endangered. EN B2ab(iii).

*Jasminum insularum* is an extremely rare species, presently known from just two localities in Peninsular Malaysia, both from karst limestone that is an endangered habitat. Both lie outside the network of Totally Protected Areas. Furthermore, it has not been collected elsewhere, despite extensive collecting on limestone.

*Etymology.* Latin, *insularum* = pertaining to islands, in reference to its first being recorded from an island.

*Specimens examined.* PENINSULAR MALAYSIA. **Kelantan:** Gua Panjang, 13 viii 1962, *UNESCO Limestone Expedition* 661 (K, L, SING). **Pahang:** Bukit Chintamanis, 16 x 1970, *Chin* 454 (KLU) Flowers white, sweet fragrance.

Chin (1979) first recognised this species, originally described from Thailand, from Peninsular Malaysia. It is a distinct jasmine outstanding for its small, narrow, thickly coriaceous leaves with a thickened, strongly recurved margin and obscure lateral veins. The specimen from Bukit Chintamanis (*Chin* 454) has small flowers (the calyx teeth are c.2 mm long and the corolla lobes measure c. 10 × 2 mm), but otherwise it is typical for the species.

**10. *Jasminum kedahense*** (King & Gamble) Ridl., *J. Fed. Malay States Mus.* 7: 46 (1916); Ridley, *Fl. Malay Penin.* 2: 311 (1923); Kiew, *Sandakania* 5: 7 (1994). Basionym: *Jasminum maingayi* C.B. Clarke var. *kedahense* King & Gamble, *J. Asiat. Soc. Bengal* 74: 258 (1905). – Type: Peninsular Malaysia, Gunung Jerai [Kedah Peak] Ridley 5535, vi 1893 (holo SING [SING0194741]).

Scrambling shrub or low climber, 1(–3) m tall, old stems to 5 mm thick. *Twigs* terete, densely tawny tomentose. *Leaves* unifoliolate; petioles slightly thickened, 0.8–1.5 cm long, pubescent; lamina broadly ovate, (5.5–)8.5(–14) × (3–)5(–7.5) cm, glossy above, coriaceous, sometimes subcoriaceous, base broadly rounded, sometimes cordate, margin thickened and recurved, apex abruptly acuminate or acute, acumen 1–1.5(–2) cm long, tip sometimes mucronate, glabrous above, finely and densely pubescent beneath; venation pinnate, lateral veins 3 or 4 on either side of the midrib, strongly ascending and forming a submarginal vein 4–5 mm from margin, veins impressed above and prominent beneath;

densely or sparsely tomentose on midrib and veins beneath; intercostal venation faint; without domatia. *Inflorescences* terminal or axillary from upper pairs of leaves, in compact many-flowered corymbose dichasia, minutely and densely pubescent, 1.5–3 cm long; peduncles 1.5–3.5(–6) cm long; bracts leaf-like, 10–30 × 3–23 mm, caducous. *Flowers*: pedicel stout, 2–4 mm long; *calyx* finely pubescent, tube campanulate, 2–3 × 2.5 mm, teeth 6, filiform, 3–8 mm long; *corolla* white, glabrous, tube 27–35 mm long, 2–3 mm wide, lobes 7–10, oblong, (11–)13–20 × (3–)4–7 mm, narrowed to apex, tip apiculate; *stamens*: filaments c.1 mm; anthers ellipsoid, c.7 mm long, connective broad, apex mucronate; *ovary* globose, c.1 mm in diameter, style c.4 mm long in short-styled flower, stigma spear-shaped, c.5 mm long. *Fruits* ripening black, lobes ellipsoid, 12–15 × 9–10 mm; stalk not enlarging, 2–3 mm long.

*Distribution*. Endemic to Peninsular Malaysia, known only from Gunung Jerai, Kedah.

*Habitat*. Mountain heath or lower montane forest. It flowers throughout the year.

*Altitude*. 900–1320 m.

*Global IUCN conservation status*. Critically Endangered. CR B2ab(iii,iv).

*Jasminum kedahense* is known from a single locality, Kedah Peak, which is continuously experiencing habitat disturbance from tourists and from resort activities.

*Etymology*. Latin, *-ensis*, indicating its only known locality, Kedah Peak, known as Gunung Jerai in Malay.

*Specimens examined*. PENINSULAR MALAYSIA. **Kedah**: G. Jerai, 23 ii 1973, *Ahmad Shukor AS 55* [3200'] (SING); *ibid.*, iii 1911, *Bell & Mohd Haniff s.n.* (K); *ibid.*, 15 i 1964, *Burkill HMB 3319* (K, SING); *ibid.*, iv 1925, *Holtum s.n.* (SING); *ibid.*, 27 xi 2014, *Imin & Staples FRI 70072* (KEP, L, SING); *ibid.*, 12 xi 1915, *Mohd. Haniff 1096* (SING); *ibid.*, *Mohd Haniff & Mohd Nur SFN5168* (SING); *ibid.*, 16 ii 1940, *Nauen 35819* (SING); *ibid.*, 9 iii 1967, *Price 40* (K); *ibid.*, vii 1915, *Robinson & Kloss 5981* (K, SING), *ibid.*, 4 xii 1915, *Robinson & Kloss 6077* (K, SING); *ibid.*, 8 xi 1962, *Samsuri Ahmad SA 287* (K, SING); *ibid.*, 8 xi 1962, *Samsuri Ahmad SA 313* (K, SING); *ibid.*, 30 iii 2011, *Saw FRI 48300* (KEP); *ibid.*, 27 xi 2014, *Tan 81809* (KEP); *ibid.*, *Yong KEP 99324* (KEP).

An endemic jasmine with large bunches of large white flowers produced in profusion throughout the year, rivalling *Jasminum multiflorum* as an ornamental shrub. Despite the existence of many collections, its flowers have not been recorded as scented. Green (2000) was mistaken in recording *Jasminum kedahense* from Thailand (Kiew, 2018).

**11. *Jasminum lanceolaria*** Roxb., *Fl. Indica* 1: 97, 111 (1820); Green, *Kew Bull.* 50: 575 (1995), *Fl. Thailand* 7: 312 (2000). – Type: Cultivated in Calcutta Botanic Gardens (not traced); India, Khasia, Moosmai, in sylvis, *Griffith in Herb. East Ind. Co.* 3715 (neo K, selected by Green, 1995).

Subsp. ***scortechinii*** (King & Gamble) P.S.Green, *Kew Bull.* 50: 576 (1995), *Fl. Thailand* 7: 312 (2000). Basionym: *Jasminum scortechinii* King & Gamble, *J. Asiat. Soc. Bengal* 74, 2: 264 (1905); Ridley, *Fl. Malay Penin.* 2: 315 (1923); Kerr, *Fl. Siam. Enum.* 2, 5: 405 (1939); Herklots, *Flowering Tropical Climbers* 139, fig. 200 (1976); Kiew,

Sandakania 5: 10 (1994). – Type: Peninsular Malaysia, Perak, *Scortechini* 479 (holo CAL 479 n.v., iso SING).

Woody, glabrous, liana, 10–17 m long, old stems rather stout 0.5–1.75 cm thick. *Twigs* terete or quadrangular, annular ridge at nodes, dark brown, c.6 mm in diameter. *Leaves* trifoliolate, below inflorescences on side branches occasionally unifoliolate, glabrous; petioles (1.5–)2.5–3 cm long, terminal petiolule 1.5–2.5 cm long, laterals c.0.8–1.6 cm long, leaflets more or less isomorphic, ovate or lanceolate, drying chestnut brown, terminal leaflet (5.5–)6–8(–11) × 2.5–3.5(–5.5) cm, laterals 8.5–11.5 × 5–5.7 cm, coriaceous, base broadly rounded, margin thickened, slightly recurved, apex acute to acuminate, acumen c.0.75 cm long; venation pinnate, lateral veins 5 or 6 on either side of the midrib, lowermost ascending and forming a submarginal vein c.1–2 mm from the margin, midrib impressed above, lateral veins plane above and beneath; intercostal venation obscure; without domatia. *Inflorescences* 1 or 2 axillary or terminal on side branches, thyrses lax, branches widely spaced, 1–4 cm long, many-flowered, 3–9 cm long; peduncles 2.5–6 cm long; bracts linear, minute, 1 mm long, caducous. *Flowers* fragrant; pedicels 2–4 mm long; *calyx* glabrous, tube campanulate, 1.5–3 mm long, scarcely toothed, teeth (5 or) 6, c.0.1 mm long; *corolla* white, tube dull reddish brown outside, 10–15 mm long, 2–3 mm wide, lobes 5, lanceolate, spreading, 5–6 × 3–4 mm, tip blunt; *stamens*: filaments c.0.75 mm long; anthers narrowly oblong, c.5 mm long, connective broad, tip acute 0.5 mm long; *ovary* globose, c.1.5 mm in diameter, style c.15 mm long (long-styled flowers) or 4 mm (short-styled flowers), stigma bilobed, c.3 mm long. *Fruits* ripening blackish brown or reddish and slightly rough, lobes ellipsoid, 10–22 × 5–14 mm; stalk conspicuously swollen, to 5 mm long.

*Distribution.* China (Hainan); Hong Kong; Vietnam; North, Southwest and Southeast Thailand; Sumatra; and Peninsular Malaysia. In Peninsular Malaysia from mountains on the west coast from Kedah and Penang to Perak, Pahang and Johor.

*Habitat.* Lower montane forest. Based on herbarium collections, it appears to flower more frequently from July to December, with only one or two collections from April.

*Altitude.* (400–)500–1600 m.

*Regional IUCN conservation status.* Vulnerable. VU B1ab(iii)+2ab(iii).

*Jasminum lanceolarium* subsp. *scortechinii* is relatively common in lower montane forest, where it is known from six localities with EOO less than 20,000 km<sup>2</sup> and AOO of less than 2000 km<sup>2</sup>. Most of its known localities are accessible and threatened by habitat disturbance from agriculture, ecotourism and development activities.

*Etymology.* Latin, *lanceolaria* = with lance-shaped leaves. B. Scortechini, 1845–1886, Italian missionary and botanist, made extensive collections from Perak in 1884–1886.

*Taxonomy.* *Jasminum lanceolaria* is a distinctive species in the combination of trifoliolate leaves, many-flowered thyrses, calyx with minute teeth just 0.1–0.3 mm long and the thickened fruit stalk. Two subspecies are recognised: subsp. *lanceolaria* from evergreen forest, 800–1600 m altitude, in India (Khasia, Assam), China, Indochina and Thailand (Northeastern, Eastern, Southeastern and Peninsular floristic regions); and subsp.

*scortechinii* from dry evergreen forest, 25–1600 m altitude, in Indochina, Thailand (Northern, Southwestern, Southeastern and Peninsular floristic regions), and from lower montane forest, 400–1600 m, in Peninsular Malaysia and Sumatra. This is a first record for *Jasminum lanceolaria* subsp. *scortechinii* for Sumatra, for example *Alston* 14922 from Lae Pondon, East Sidikalang (L) and *Laumonier TFB* 3502 from Gunung Singgalang, West Sumatra (L). Both were collected from montane forest.

Subspecies *scortechinii* is different from the typical subspecies in its smaller flowers with calyx teeth 0.1 mm long (not 0.2–0.3 mm), corolla tube 10–15 mm long (not 12–25 mm) with lobes 5–6 × 3–4 mm (not 12–15 × 4–5 mm), and larger ellipsoid fruits 10–22 × 5–14 mm (not globose, 8–12 × 8–11 mm).

*Jasminum lanceolaria* is the only Peninsular Malaysian species with trifoliolate leaves. However, on shoots with a terminal inflorescence, the leaves diminish in size towards the apex and the upper ones may be unifoliolate, meaning that specimens that include the inflorescence and a few leaves are likely to have only unifoliolate leaves, for example *Haniff & Nur* 2458 and *FRI* 66779. For this reason, this taxon can be keyed out as having either unifoliolate or trifoliolate leaves.

*Specimens examined.* PENINSULAR MALAYSIA. **Johor:** G. Ledang, 8 v 1985, *Kiew RK* 1681 (SING). **Kedah:** G. Jerai, *Syahida FRI* 66779 (KEP) [unifoliolate]. **Pahang:** Fraser's Hill, *Md Nur* 11152 (K); *ibid.*, 19 xii 1970, *Whitmore FRI* 15714 (KEP); *ibid.*, 22 viii 1992, *Kiew RK* 3567 (KEP), *ibid.*, 5 ii 2010, *Kiew RK* 65539 (KEP). **Penang:** Government Hill, ix 1887, *Curtis* 1227 (K), *ibid.*, vi 1888, *Curtis* 1229 (K). **Perak:** G. Hijau, xii 1884, *King's Coll.* 7006 (K, SING); *ibid.*, 14 ii 1917, *Haniff & Nur* 2458 (BM); *King's Coll.* 7009 (SING); *Scortechini* 383 (BM, SING); *Ridley* 10679 (SING); *Curtis* 169 (SING).

Green (2000) notes that *Jasminum lanceolaria* is Roxburgh's original spelling and was intentional and should be retained.

**12. *Jasminum ledangense*** Kiew, *Gard. Bull. Singapore* 70: 110, figs 1 and 2 (2018).

– Type: Peninsular Malaysia, Johor, G. Ledang, Ampong Jatuh, 16 ii 2012 *Ong et al. FRI* 75292 (holo KEP; iso BKF, K).

*Jasminum laurifolium auct. non* Roxb.: *Ridley, J. Straits Branch Roy. Asiat. Soc.* 35: 18 (1901).

Slender, glabrous climber, 5–8 m long, bark dark brown; twigs terete. *Leaves* unifoliolate, glabrous; petioles twisted, 0.5–1 cm long; lamina elliptic to narrowly lanceolate, 5–9.5 × 1.7–2.5 cm, coriaceous, dark green above, base rounded, margin recurved, apex acute; midrib impressed above, prominent beneath; venation obscure above, scarcely visible beneath, basal pair arising c.2 mm above the base of lamina and forming a submarginal vein c.2 mm from the margin, lateral veins in the upper half of the lamina pinnate, 3 or 4 on either side of the midrib, looping to join the submarginal vein; without domatia. *Inflorescences* terminal on short side branches, 3-flowered cymes, usually reduced to a single flower; peduncles 1.5–2.7 cm long; bracts linear c.1 mm long, persistent. *Flowers* star-like, pedicels 6–20 mm long; *calyx* glabrous, tube campanulate, 2–3 mm long, teeth 5, stiffly filiform, 2.5–6 mm long; *corolla* white, lobes spreading,

flushed purple–pink outside, tube 17–22 mm, c.2 mm wide, lobes 8 or 9, narrowly oblong, 15–21 × 1.5–2 mm, narrowed to an acute tip; *stamens* almost sessile (short-styled flower); anthers narrowly ellipsoid, c.6 mm long, connective broad, tip mucronate; *ovary* globose, c.1 mm in diameter, glabrous, style c.5 mm long (short-styled flower), stigma narrowly ellipsoid, c.4 mm long. *Fruits* bilobed, lobes 11–12 × 7–8 mm; stalk slender, 10–20 mm long.

*Distribution.* Endemic to Peninsular Malaysia, known only from Gunung Ledang, Johor (formerly known as Mount Ophir, Malacca).

*Habitat.* Primary hill or montane forest.

*Altitude.* From 375 m to the summit at 1140 m.

*Global IUCN conservation status.* Critically Endangered. CR B2ab(iii,iv).

*Jasminum ledangense* is known from a single peak that is vulnerable to ongoing disturbance despite Gunung Ledang being a state park. It is extremely rare and has been collected only four times in the past 130 years.

*Etymology.* Latin, *-ensis*, indicating its only known locality, Gunung Ledang.

*Specimens examined.* PENINSULAR MALAYSIA. **Johor:** G. Ledang, iv 1880, *Hullett* 824 (K, SING); *ibid.*, 10 vi 1892, *Ridley s.n.* (K, SING); *ibid.*, 20 iv 1993, *Saw FRI* 37715 (K, L).

Ridley (1901, p. 18) identified his and Hullett's specimen as *Jasminum laurifolium* Roxb., which they resemble in their coriaceous, narrowly ellipsoid leaves with 4 or 5 lateral veins, but the leaves of *J. laurifolium* are much longer, 5–8 times longer than wide (5–14 × 1–3 cm), the lateral veins are more numerous (5–12 on either side of the midrib), and it is usually 3- to 5-flowered. Ridley (1923) did not include this taxon nor cite any specimens from Gunung Ledang in his *Flora* account.

**13. *Jasminum longipetalum*** King & Gamble, *J. Asiat. Soc. Bengal* 74: 262 (1905); Ridley, *Fl. Malay Penin.* 2: 314 (1923); Kiew, *Sandakania* 5: 7 (1994). – Type: Peninsular Malaysia, Perak, Gopeng, iv 1884, *King's Collector* 6005 (lecto BM; isolecto BO, CAL n.v., K, SING [SING 0194752]).

Slender, glabrous climber, 3–13 m long. *Twigs* terete, 3–4 mm thick, pale brown. *Leaves* unifoliolate; petioles twisted, (0.5–)1 cm long; lamina elliptic, (7–)8(–15) × (2.7–)4(–6.5) cm, membranous, base slightly rounded to cuneate, margin not thickened nor recurved, apex acuminate, acumen 0.7–1.3 cm long; venation pinnate, lateral veins 6 or 7 on either side of the midrib, basal pair ascending steeply and joining the lateral veins in the upper half, forming a strong submarginal vein 3–8 mm from the margin, midrib slightly impressed above, lateral veins slightly raised above, midrib and veins prominent beneath; intercostal venation faint; without domatia. *Inflorescences* terminal, or sometimes axillary from the upper leaves, (2–)3–6 flowers in umbellate cymes; subsessile (peduncle 3–5 mm long) or peduncle to 4 cm long; bracts and bracteoles minute, ovate, scarious, 1–1.5 mm long, persistent. *Flowers:* pedicel very long, slender, 33–40 mm long; *calyx* glabrous, tube campanulate, 2–3 mm long, teeth 6, linear, 1.5–2 mm long; *corolla* white with a reddish

tinge outside, tube 18–23 mm long, 1–2 mm wide, lobes 9 or 10, spreading and curling, linear-oblong, 20–30(–45) × (1–)2 mm, tip acute; *stamens*: filaments short, slender; anthers oblong, c.4 mm long, apex obtuse; *ovary* glabrous or minutely pubescent, style slender, stigma flattened, minutely pubescent. *Fruits* ripening glossy black; lobes ellipsoid 10–17 × c.11 mm; stalk 33–45 mm long, enlarged at base, c.1.5 mm thick.

*Distribution*. Endemic to Malaya (Peninsular Malaysia and Singapore). In Peninsular Malaysia occasional, in Kedah, Perak and Negeri Sembilan.

*Habitat*. Lowland forest, on rich soil.

*Altitude*. 100–270 m.

*Global IUCN conservation status*. Endangered. EN B2ab(iii).

Although *Jasminum longipetalum* has a wide EOO (8845 km<sup>2</sup>), its AOO is only 20 km<sup>2</sup>. It is an extremely rare forest species, known from very few, widely scattered individuals in five localities. Its lowland habitat is under threat from fragmentation due to agriculture, ecotourism and mining. Since it was first collected, very few recent collections have been made.

In Singapore, it was collected once from ‘Mandai Woods’ (Ridley 10937 21 x 1900 (K, SING [SING 0194751]), which no longer exists. Furthermore, it has not been collected since from anywhere else in Singapore, leading to the conclusion that it is now extinct in Singapore.

*Etymology*. Latin, *longi* = long; *petalum* = petals, from the exceptionally long corolla lobes.

*Specimens examined*. PENINSULAR MALAYSIA. **Kedah**: Jeniang, 11 iv 1968, *Sidek* S343 (SING). **Negeri Sembilan**: Pasoh Forest Reserve, 1989, *Lafrankie* 6052 (KEP), 6082 (KEP). **Perak**: Larut, ii 1882, *King’s Coll.* 2765 (K); Gopeng, iv 1884, *King’s Coll.* 6005 (BO, CAL, K, SING); Bubu Forest Reserve, 23 iii 1933, *Tachun* 29854 (SING).

King & Gamble (1905) noted *Jasminum longipetalum* to be “a particularly handsome and well-defined species, which is well worthy of garden cultivation”. It is a very distinctive jasmine in its umbellate inflorescences and flowers with exceptionally long, slender pedicels and long, narrow corolla lobes, the longest by far of any Peninsular Malaysian species. As noted above, these characters are adaptations to hawk-moth pollination. Several other jasmines, namely *Jasminum cinnamomifolium* Kobuski from China and Vietnam, *J. dolichopetalum* Merr. & Rolfe from the Philippines, and *J. pseudanastomosans* Lingelsh. and *J. turneri* C.T.White from New Guinea, share these characters, and this has led to them being considered as synonyms of *J. longipetalum*, for example by Green (1984). However, apart from *Jasminum pseudoanastomosans*, whose name is a synonym of *J. turneri*, which had been described earlier, they are distinct, unrelated species.

**14. *Jasminum maingayi*** C.B.Clarke, in Hooker, Fl. Brit. India. 3: 594 (1882); Hooker f., Bot. Mag. (1902) t. 7823; King & Gamble, J. Asiat. Soc. Bengal 74: 258 (1905); Ridley, Fl. Malay Penin. 2: 311, fig. 103 (1923); Kiew, Sandakania 5: 8 (1994); Green, Fl. Thailand 7: 320 (2000). – Type: Peninsular Malaysia, Penang, Government Hill *Maingay* KD 1000 (holo K, iso CAL).

Shrubby climber or scrambling bush, to 5 m long, old stems wiry, bark pale brown. *Twigs* terete, minutely pubescence, soon glabrescent. *Leaves* unifoliolate, glabrous; petioles twisted, 0.7–1.5(–2) cm long; lamina broadly ovate, 11–13(–19) × 6–7(–9) cm, occasionally lanceolate, 10–12.5 × 4–4.5 cm, subcoriaceous, glossy, base rounded, margin slightly recurved, apex shortly acuminate to attenuate-acute; venation pinnate, lateral veins (3–)4–5 on either side of midrib, strongly ascending to join the submarginal veins c.6 mm from the margin, midrib and lateral veins impressed above, prominent beneath; intercostal veins obscure; without domatia. *Inflorescences* terminal on side shoots, many-flowered (c.10–20 flowers) in compact compound dichasium; peduncle 1.7–5(–10) cm, branches 4–8 mm long, minutely pubescent; bracts foliose, 7–25 × 3–17 mm, caducous, bracteoles linear 1–6 mm long. *Flowers* fragrant, sessile or pedicels 2(–5) mm long; *calyx* minutely pubescent or glabrescent, tube campanulate, 2–3 mm long, teeth 6, filiform, 4–7 mm long; *corolla* white, sometimes slightly tinged pink outside, glabrous, tube 12–30 mm long, 2–3 mm wide, lobes 7–11, elliptic, (8–)12–15 × (3–)5–6 mm, tip acute to apiculate, spreading; *stamens*: filaments c.1 mm (short-styled flowers); anthers ellipsoid, 5–6 mm long, connective broad, tip mucronate; *ovary* globose, c.1 mm in diameter, glabrous, style c.3 mm with clavate stigma, c.1 mm (short-styled) or style c.19 mm long with clavate stigma, c.3 mm (long-styled). *Fruits* ripening black, lobes ellipsoid, c.12 × 8 mm; stalk 2–5 mm long.

*Distribution.* Thailand, throughout Peninsular Malaysia.

*Habitat.* After *Jasminum elongatum*, it is the most common and widespread jasmine in Peninsular Malaysia, but whereas *J. elongatum* is more common in the lowlands, on the West Coast, *J. maingayi* usually grows in hill to lower montane forest, although on the East Coast it occurs at lower altitudes in lowland forest, sometimes by rivers, and in coastal heath forest. It has been collected in flower and fruit throughout the year, but flowering appears to be most frequent in February.

*Altitude.* Sea level to 450 m (coastal heath forest and lowland forest) and at 600–1500 m (hill to lower montane forest).

*Uses.* The label on *Md Haniff* 15545 from Kuala Kangsar, Perak, records that this species is called *jarom ali* and its 'root boiled and the decoction taken for women after childbirth'.

*Regional IUCN conservation status.* Least Concern. LC.

*Jasminum maingayi* is widespread. However, its habitat is threatened by fragmentation and logging, which is resulting in its decline in areas of lowland and hill forests.

*Etymology.* A. C. Maingay, 1836–1869, doctor and botanist with the East India Company, and magistrate in charge of Melaka jail, 1862–1869.

*Specimens examined.* PENINSULAR MALAYSIA. **Johor:** Kuala Kahang 1892, *Lake s.n.* (SING). **Kedah:** Gunung Jerai, 24 ii 1960, *Kochummen* KEP 80936 (KEP). **Kelantan:** Kg. Gobek, Tamangan, *Mohd Shah & Kadim* MS 574 (K); Bukit Baka, Sg. Jeram Tinggi, 25 ii 1974, *Mohd Shah* MS 3208 (KEP); Gunung Stong, 1 iii 2008, *Kamarul* FRI 59126 (KEP, SAN). **Melaka:** *Cuming* 2376 (BM). **Pahang:**

Cameron Highlands, Tringkap, 11 x 1961 *Burkill HMB* 2877 (K); *ibid.*, Jalan Boh, *Kiew RK* 47732; *ibid.*, Blue Valley Estate, 28 vii 1991, *Kiew RK* 3245 (KEP), Telom, 8 xi 1908, *Ridley* 13568 (BM, SING); Sg. Ewing, 25 viii 1991, *Anthonyssamy SA* 1065 (KEP); Pine Tree Hill, Fraser's Hill, 10 x 1976, *Kiew RK* 199 (KEP). **Penang:** Government Hill, iii 1915, *Ridley s.n.* (BM, K); *ibid.*, *Ridley* 643 (SING); Richmond Pool, ii 1886, *Curtis* 643 (K); Western Hill, 6 iv 1923, *Md Nur* 9123 (BM). **Perak:** Larut, *King's Coll.* 3975 (BM, K); Bukit Larut, iii 1884, *Scortechini* 139 (K); *ibid.*, *Hardial & Samsuri* 312 (K); *ibid.*, 25 ii 1892, *Ridley* 2894 (SING); Kota Lama, Kuala Kangsar, *Md Haniff* 15545 (SING). **Selangor:** Klang Gates Ridge, *Ridley* 13412 (SING). **Terengganu:** Dungun to Marang Road, 16 vii 1953, *Sinclair* 39978 (SING); Jambu Bongkok, *Johnson* 4033 (KLU); Jabi, Kuala Kubang, *Mohd Shah et al. MS* 3333 (KLU; KEP); Machang, Bk. Baka, Sg Jeram Tinggi, *Mohd Shah & Ahmad MS* 3208 (KLU); Gunung Padang, Ulu Berang, 25 iii 2010, *Rafidah FRI* 64539 (KEP); Jambu Bongkok Forest Reserve, 24 ii 2009, *Lim FRI* 64958 (KEP).

*Jasminum maingayi* is distinct from *J. elongatum* in its broader ovate, subcoriaceous leaves with few lateral veins and its compact inflorescences with sessile or shortly stalked larger flowers.

- 15. *Jasminum nervosum*** Lour., *Fl. Cochinch.*: 20 (1790); Kerr, *Fl. Siam. Enum.* 2: 402 (1939); Green, *Fl. Thailand* 7: 339 (2000); Kiew, *Gard. Bull. Singapore* 70: 116 (2018).  
– Type: Vietnam, Turon, *s. coll.* 520 (holo K [K000545637]).

Slender climber. Young twigs terete, c.3 mm thick, minutely puberulous, soon glabrescent. *Leaves* unifoliolate, elsewhere very variable in shape and size; petiole 2–6 mm long, minutely pubescent; lamina narrowly lanceolate, 3.7–8.5 × 1–3 cm, (elsewhere also ovate and oblong-ovate, 2.5–12 × 1–4.5 cm), chartaceous, glabrous, base rounded to cuneate, margin not recurved, apex attenuate; venation with a basal pair of slender veins ascending and forming a submarginal vein, in the upper half of lamina 3 or 4 lateral veins on either side of the midrib to join the submarginal vein, midrib and veins conspicuous, drying darker brown than the lamina, plane above, prominent beneath; intercostal veins obscure; without domatia. *Inflorescences* terminal or axillary, elsewhere a simple cyme with 2–4 flowers, in Peninsular Malaysia single-flowered; bracts ovate, 1–2 mm long. *Flowers*: sessile or pedicel 1–20 mm long; *calyx* glabrous, tube 2–3 mm, teeth filiform 5–9 mm long; *corolla* white, glabrous, tube 21–28 mm long, lobes 7 or 8, oblong, 14–22 × 2.5–3 mm, apex acute; *stamens*: filaments short; anthers narrowly ellipsoid, c.5.5 mm long, apex mucronate; *ovary*: style slender, 21 mm long (long-styled flower), stigma shortly bilobed. *Fruits* bilobed, lobes ellipsoid, (immature?) 6 mm long, 4 mm in diameter.

*Distribution.* Bhutan, India (Assam), Myanmar, Thailand, Indochina, South China, Taiwan and Peninsular Malaysia. It is the most widespread of all Thai jasmines (Green, 2000), but in Malaysia it is rare and known from only two records from Kedah (Langgar and Langkawi).

*Habitat.* In Peninsular Malaysia, rare and restricted to karst limestone hills, on cliffs or summits.

*Altitude.* At c.300 m.

*Regional IUCN conservation status.* Endangered. EN B1ab(iii)+2ab(iii).



In Peninsular Malaysia, *Jasminum nervosum* is an extremely rare species restricted to limestone habitats. It is known from only two localities, both of which lie outside the network of Totally Protected Areas, and which are under threat from habitat disturbance due to the proximity of ongoing agricultural activities.

*Etymology.* Latin, *nervosum* = veined; presumably referring to the conspicuous venation.

*Specimens examined.* PENINSULAR MALAYSIA. **Kedah:** Langkawi, Tanjung Ru, 9 v 1967, *Stone* 6920 (KLU); east of Langgar, 18 iii 1924, *Burkill SFN* 13340 (SING).

The description here is based on the narrow-leaved form of *Jasminum nervosum* that occurs on limestone in southern Thailand and Malaysia. Henderson (1939, p. 56) had already noted that two specimens from Langkawi (*Symington FMS* 46737 and 46783) were similar to *Jasminum nervosum*. These specimens have not been located in BM, K or SING.

Both Kerr (1939) and Green (2000) agree that *Jasminum nervosum* is one of the most variable jasmines in Thailand. Kerr (1939, p. 403) noted that collections from limestone hills, for example *Kerr* 14647, have much narrower leaves, and this form appears to be quite common on limestone in southern Thailand, for example in *Joompaw* 22 (PSU), *Maxwell* 87-548 (PSU), *Put s.n.* (K), *Haniff & Nur SFN* 4228 (K) and *Ban Son-an* (K). The Peninsular Malaysian specimens from limestone also have particularly narrow leaves, just 1–3 cm wide, and belong to this form.

#### 16. *Jasminum shahii* Kiew, sp. nov.

Similar to *Jasminum curtisii* King & Gamble in its filiform calyx teeth 7–10 mm long, lamina c.7.5–15 × 2.5–6 cm with 5–7 pairs of pinnate veins and subsessile dichasial cyme, but differing by the presence of domatia, large, white papery bracts, inflorescences with 5–10 flowers (versus few-flowered inflorescences with c.6 flowers) and the longer corolla tube, 18–27 mm (versus 5–16 mm in *J. shahii*) and shorter lobes 8–10 mm (versus 13–16 mm). Among the Thai species, *Jasminum shahii* keys out to *J. coarctatum* Roxb. (Green, 2000), but it differs from that species in its leaf that is three times longer than wide versus twice as long as wide in *J. coarctatum*, its much smaller flowers with lobes almost as long as the tube versus in *J. coarctatum* corollas with a tube 20–22 mm long and very short lobes 6–8 mm long. – Type: Peninsular Malaysia, Kedah, Sik, Bukit Enggang, Sik Forest Reserve, 5 v 1993 *Mohd Shah & A. Tan MS* 5054 (holo KEP, iso SING). **Fig. 2.**

Shrub. *Stems* terete, 2–4 mm in diameter; bark pale brown. *Twigs* terete, glabrous. *Leaves* unifoliolate, glabrous; petioles 1.3–1.7 cm long, slender; lamina elliptic, 10–15 × 3.7–5.2 cm, chartaceous, base cuneate, margin not recurved, apex acuminate, acumen 1.2–1.7 cm long; venation pinnate, lateral veins 5–7 on either side of the midrib, looping to join the veins above, midrib narrowly impressed above, prominent beneath, lateral veins slightly raised above, pale, scarcely visible beneath, fine, prominent beneath; intercostal veins obscure; domatia absent. *Inflorescences* axillary in the uppermost leaf axil, compact cluster of 2 or 3 cymes, each with 3 flowers; peduncle c.2 mm long, densely and minutely pubescent; bracts not seen. *Flowers* sessile; *calyx* densely and minutely pubescent, tube dilating, 2–3 mm long,

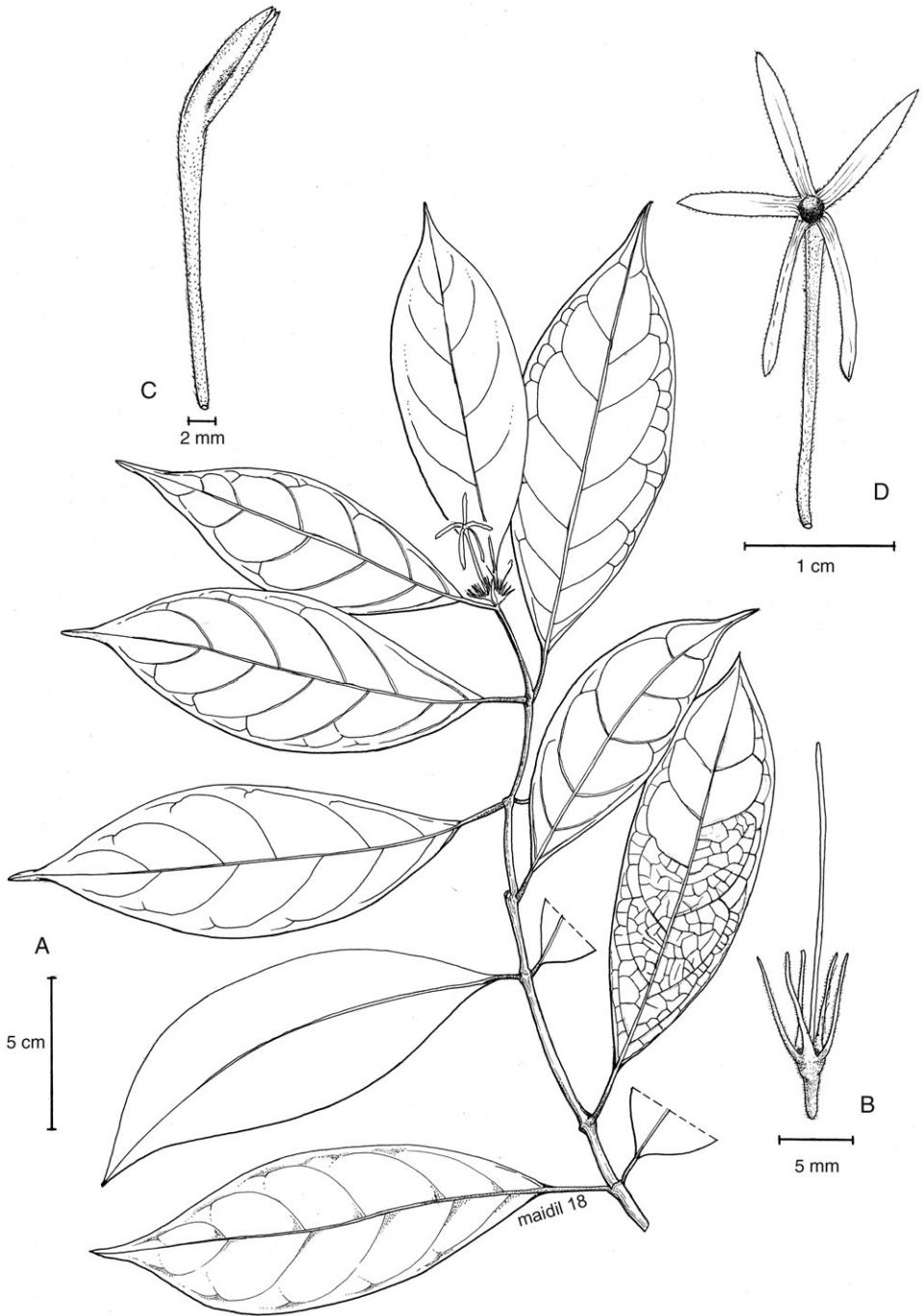


FIG. 2. *Jasminum shahii* Kiew, sp. nov. A, Leafy twig with flowers; B, flowers without corolla; C, unopened corolla; D, open corolla. All drawn from *Mohd Shah & A. Tan MS 5054* by Mohd Aidil.

lobes 5 or 6, filiform, 7–9 mm long; *corolla* white, glabrous, tube 15–16 mm long, c.1 mm wide, lobes 5, narrowly elliptic, more or less same length as tube, 13–15 × c.1.5 mm, tip acute; *stamens* not known; *ovary* not known, style thread-like, c.16 mm long (long-styled), stigma clavate, c.1 mm long. *Fruits* not known.

*Distribution.* Endemic to Peninsular Malaysia (Bukit Enggang, Kedah).

*Habitat and altitude.* Not recorded.

*Global IUCN conservation status.* Critically Endangered. CR B2ab(iii,iv).

Known from a single collection from a forest reserve that is currently scheduled for logging.

*Etymology.* Mohamad Shah bin Hj Mohamad Noor (1935–2003), the Singapore Botanic Gardens Herbarium.

*Specimens examined.* Known only from the type collection.

Northern Kedah experiences a monsoon climate with a distinct dry season like that of southern Thailand. It is therefore likely that this species will be discovered in Thailand.

Mohamad Shah worked in the Singapore Herbarium for 48 years, first as a herbarium assistant and later as a research officer (Kiew, 2003).

**17. *Jasminum smilacifolium*** Griff ex C.B. Clarke, in Hooker, Fl. Brit. India 3: 600 (1882); King & Gamble, J. Asiat. Soc. Bengal 74: 262 (1905); Ridley, Fl. Malay Penin. 2: 314 (1923); Kiew, Sandakania 5: 12 (1994). – Type: Peninsular Malaysia, Melaka [Malacca], 1845 Griffith KD 3698 (holo CAL; iso BM, K [K000901448]).

Robust, glabrous climbing shrub, to 7 m long. *Twigs* terete, pale brown, glabrous. *Leaves* unifoliolate, glabrous; petioles 1.5–2.5 cm long; lamina ovate to broadly elliptic-ovate, (8–)12–14(–18) × 7–10 cm, coriaceous, base rounded, margin thickened and recurved, apex abruptly caudate-acuminate, acumen to 1.5 cm long, slightly bullate between the lateral veins; venation with lowest pair of veins very prominent, ascending and forming a submarginal vein 12–19 mm from the margin and joining the midrib at the apex, ovate leaves with an additional basal pair, in the upper part of the lamina 4 or 5 lateral veins on either side of the midrib, looping and joining the submarginal vein, midrib impressed above, midrib and longitudinal vein prominent beneath; intercostal venation raised above; without domatia. *Inflorescences* axillary, glabrous, 3- to 5-flowered cymes or 7- to 20-flowered thyse, 2.5(–7) cm long; peduncles 1.5–2(–4) cm long; bracts and bracteoles linear, 2.5–5 mm long, persistent. *Flowers*: pedicels 2.5–7.5 mm long; *calyx* glabrous, tube campanulate, 2.5–3 mm long, teeth 5 or 6, shorter than the tube, minute, acute, to 1.5 mm long; *corolla* white tinged with pink, tube slender, 19–27 mm long, 2–2.5 mm wide, lobes 7–9, narrowly elliptic to oblong-linear, 11–20 × 2–4 mm, tip acute; *stamens*: filaments short, c.1 mm; anthers linear-oblong, 5–6 mm long, connective broad, apex mucronate; *ovary* globose, c.2 mm in diameter, glabrous, style c.25 mm long (long-styled flower), stigma bilobed. *Fruits* ripening black; lobes ellipsoid, 25–30 mm long, 15–16 mm wide; stalk thickened, c.8 mm long.

*Distribution.* Sumatra and Peninsular Malaysia (Negeri Sembilan and Melaka).

*Habitat.* Lowlands forest.

*Altitude.* At c.50 m.

*Regional IUCN conservation status.* Extinct in Peninsular Malaysia. EX.

In Peninsular Malaysia, *Jasminum smilacifolium* has only ever been collected from Melaka and Negeri Sembilan. It is a striking species that is unlikely to have been overlooked, and forests in Melaka and Negeri Sembilan are accessible and have been well collected. However, the fact that it was last collected in 1886 and that since then forests in these areas have been extensively cleared for agriculture and urbanisation make it highly likely that it is now probably extinct in Peninsular Malaysia. Globally, it probably persists in Sumatra, from where it has been collected more recently. However, it is apparently equally rare in Sumatra, being known from only two specimens (*Yates* 1388 Asahan, Tandjong Pasir and *de Wilde & de Wilde-Duyffjes* 20794 from Gunung Leuser National Park).

*Etymology.* Latin, *-folium* = leaf; referring to the similarity of the leaf to those of *Smilax*, Smilacaceae.

*Specimens examined.* PENINSULAR MALAYSIA. **Melaka:** [no locality], 1845, *Griffith* KD 3698 (type K); [no locality], *Griffith* 997 (K); [no locality], 1865–66, *Maingay* KD 997 (K); [no locality], *Alvins* 1208 (SING), *Alvins* 1142 (SING), *Alvins* 307 (SING); Bk. Buruang, 14 i 1886, *Alvins* 37 (SING). **Negeri Sembilan:** [no locality], *Cantley s.n.* (SING); Ayer Bumban, 25 i 1886, *Alvins s.n.* (SING).

A remarkable species with coriaceous, broadly ovate to elliptic-ovate leaves with prominent submarginal veins. It is unusual among Malaysian species in having several Malay names not applied to other jasmine species, such as *akar kenching kambing* (*Alvins* 1208), *akar lakorn utan* (*Alvins* 1142), *akar lembut* (*Alvins* 37), and *akar sial munahon jantan* (*Alvins s.n.* 25 i 1886), all rather unpleasant names. No uses are recorded for this species.

**18. *Jasminum wrayi*** King & Gamble, *J. Asiat. Soc. Bengal* 74: 258 (1905) (as var. *wrayi*); Ridley, *Fl. Malay Penin.* 2: 312 (1923) (as var. *wrayi*); Kiew, *Sandakania* 5: 13 (1994) (as var. *wrayi*). – Type: Peninsular Malaysia, Perak, Sungai Larut, *Wray* 2297, vii 1888 (lecto SING [SING0194757]).

*Jasminum wrayi* var. *hispida* King & Gamble, *J. Asiat. Soc. Bengal* 74: 259 (1905). – Type: Peninsular Malaysia, Perak, Larut, iv 1884, *King's Coll.* 5893, limestone hills (lecto SING [SING0194758], here selected; isolecto E, K).

Slender climbing shrub, 2–10 m long. *Twigs* terete, slender, 3–4 mm thick, pale brown or whitish, young stems densely to minutely hispid, sometimes glabrous. *Leaves* unifoliolate, glabrous above; petioles slender, 0.5–0.8 cm long; lamina lanceolate to elliptic or obovate, (8–)14(–19) × 4–6.5 cm, membranous, base cuneate or rounded sometimes slightly auricled at base, margin hispid, not recurved, apex acuminate to caudate, acumen 0.5–1 cm long; venation pinnate, lateral veins 6–9(–10) on either side of midrib, slightly impressed above, midrib and veins prominent and hispid beneath; intercostal venation

obscure; domatia tawny. *Inflorescences* terminal, minutely pubescent or densely hispid, a lax, 15- to 20-flowered thyrse, 5–7.5 cm long with four tiers of branches, branches 0.5–1.5 cm long at right-angles to rachis to 3 cm long in fruit; peduncles 1.5–5 cm long; bracts leaf-like, lanceolate-acuminate, to 21 × 5 mm long, caducous, bracteoles linear, c.5 mm long. *Flowers* with slender pedicels 3–7 mm long; *calyx* minutely pubescent to densely hispid, tube campanulate, (1–)2.5 mm long, teeth 5, filiform, 4–8 mm long, curling; *corolla* pale cream-coloured or white, tube 17–20 mm long, slender, c.1 mm wide, lobes 7–9, narrowly ligulate, 7–10 × 1–2 mm, apex acute; *stamens*: filaments short; anthers oblong, connective long-mucronate; *ovary* cylindrical depressed, style slender, stigma slightly clavate. *Fruits* grey–green or dull white, ripening purple–black; lobes globose, 8–12 mm in diameter; stalk thickened, 4–10 mm long.

*Distribution.* Endemic to Peninsular Malaysia: Johor, Kelantan, Pahang, Perak, Selangor, Terengganu.

*Habitat.* Lowland dipterocarp forest or on karst limestone (Batu Caves and once from Perak with no specific locality). Most of the plants from limestone are more hispid and were previously recognised as var. *hispidata*.

*Altitude.* To 210 m.

*Uses.* Notes on the specimen label of *Holttum* 15238 (SING) record its vernacular name as *pohon danau* and that a ‘decoction from the root is taken in cases of tapeworm’.

*Global IUCN conservation status.* Near Threatened. NT.

*Jasminum wrayi* falls within this category because it is a widespread species. It is a lowland species sometimes collected from limestone hills; however, it is found nowhere within the network of Totally Protected Areas, and there are very few recent collections (those from Perak and Selangor were collected more than 100 years ago), suggesting that the decline in the area of lowland forest has affected the population size of this species.

*Etymology.* L. Wray, 1853–1942, Director of the Federated Malay States Museum, Taiping, Peninsular Malaysia.

*Specimens examined.* PENINSULAR MALAYSIA. **Johor:** Endau Rompin National Park, Selai, 2 x 2007 Julius et al. *FRI* 57591 (KEP); Sg. Kayu, Kota Tinggi, 11 x 1936, *Corner s.n.* (SING). **Kelantan:** Bertam, Ulu Kelantan, 27 vii 1962, *UNESCO* 19 (SING). **Pahang:** Kota Gelanggi, 6 viii 1929, *Henderson* 22490 (SING). **Perak:** Larut, [limestone], iv 1884, *King’s Coll.* 5893 (E, K, SING); Larut, Resal, *King’s Coll.* 2484 (K); Sg. Larut, *Wray* 2297 (CAL, SING); Relau Tujuh [Tujur], 1888, *Wray* 2905 (SING); Besut, *King’s Coll.* 1838 (K); Taiping, Waterfall Hill, ix 1888, *Wray* 3147 (SING); *ibid.*, 1892, *Ridley s.n.* (SING). **Selangor:** Batu Caves, v 1902, *Curtis* 3774 (K, SING). **Terengganu:** Kuala Terengganu, 13 v 1925, *Holttum* 15238 (SING).

*Jasminum wrayi* is recognised by the combination of its membranous leaves, the presence of domatia, pinnate venation, its thyrsoid inflorescence, its ‘needle-like’ flower buds, its long curling filiform calyx teeth and its relatively large fruits.

King & Gamble (1905) recognised three varieties, namely var. *axillaris*, var. *hispidata* and var. *wrayi*. *Jasminum wrayi* var. *hispidata*, often collected from karst limestone, included

very hairy specimens with lax inflorescences. Indumentum is variable within *Jasminum wrayi* and does not reliably separate the hairy form from the range of variation within the species, nor are there other characters to support the separation of a hairy form from the other specimens. Ridley (1923) did not recognise this variety as distinct, a view that is supported here.

The status of *Jasminum wrayi* var. *axillaris* King & Gamble in J. Asiat. Soc. Bengal 74: 259 (1905) and Ridley, Fl. Malay Penin. 2: 312 (1923), based on *Scortechini* 273 from Maxwell's Hill, Perak, as the type specimen, is problematic. The type has not been located in BM, CAL, K, L or SING, and no other specimens have been identified as this taxon. King & Gamble described var. *axillaris* as follows: "A slender climber. Leaves rather small, sparsely pubescent, especially on the midrib and main-nerves; inflorescence axillary, few-flowered (5–7), calyx hispid; fruit large, up to 0.5 in. [13 mm] in diam."

This brief description lacks leaf, calyx and corolla dimensions, the absence of the last of these suggesting that the specimen lacked flowers. However, the difference in inflorescence position (axillary versus terminal in var. *wrayi*), number of flowers (5–7 versus 15–20 flowers) and fruit size (13 mm versus 8–12 mm in diameter) may be significant and support its status as a distinct taxon. Its habitat was also reported as lower montane forest at c.1000 m, a higher elevation than that for var. *wrayi*. However, without the type specimen it is impossible to confirm this. Variety *axillaris* is therefore excluded from *Jasminum wrayi*.

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