

Miscellaneous information on *Lagerstroemia* L. (Lythraceae)

WILLEM J.J.O. DE WILDE¹ & BRIGITTA E.E. DUYFJES¹

ABSTRACT. *Lagerstroemia langkawiensis* Furtado & Srisuko is a new record for Thailand. *Lagerstroemia huamotensis* W.J.de Wilde & Duyfjes (Thailand), *Lagerstroemia kratiensis* W.J.de Wilde & Duyfjes (Cambodia), and *Lagerstroemia vanosii* W.J.de Wilde & Duyfjes (Java) are described as new species, *Lagerstroemia duperreana* Gagnep. var. *saxatilis* W.J.de Wilde & Duyfjes as a new variety. The name *Sibia* DC. for a section as used by Furtado & Srisuko (1969) cannot be maintained, and the new section *Parviflora* W.J.de Wilde & Duyfjes is described to replace it. Important characters for species delimitation in *Lagerstroemia* are discussed.

KEY WORDS: Lythraceae, *Lagerstroemia* taxonomy, new species, Thailand.

INTRODUCTION

One consequence of this molecular phylogenetic *Lagerstroemia* L. is a genus of some 60 species (Furtado & Srisuko, 1969), distributed from India through China, Japan and Malesia east to N Australia. It is represented by 17 species in Thailand. *Lagerstroemia* is one of the larger genera of trees in Lythraceae, a worldwide family, represented in SE Asia with about 10 genera (introduced ones included), comprising also small herbs. *Lagerstroemia* is well-known because it contains several species which are copiously planted as ornamental trees in gardens and roadsides, in Thailand particularly *L. floribunda* Jack, *L. speciosa* (L.) Pers., *L. macrocarpa* Kurz, and *L. loudonii* Teijsm. & Binn. The present review, mainly for Flora of Thailand, revealed three new species and one new variety herewith published (3). *Lagerstroemia langkawiensis* Furtado & Srisuko is a new record for Thailand (4). Furthermore, the useful determination characters in the genus are discussed (1), including observations on the fruit (2). The consequences of fruit surface characters for the division of the genus into sections are reported (5). Some notes on typifications are provided (6). An identification list of mainly Thai *Lagerstroemia* collections is added (7).

1. CHARACTERS IN *LAGERSTROEMIA* IN THAILAND

Among the listed character states, which proved to be useful for the determination of *Lagerstroemia*, are three less known features: bark of the trunk, length of stamens, and colour and surface of the fruit; the latter character is explained separately in greater detail. At the end of each character listed, the pertinent species by number are given. For the species number see under Identification List.

Bark of older trunk.—Bark of mature *Lagerstroemia* trees is diverse, and in Thailand traditionally known as either ‘ta baek’ or ‘salao’, with a more or less intermediate facies (bark texture) named ‘inthanin’. Although each species has its own characteristic bark appearance, this division into three facies seems practical.

Bark called salao is thick and coarse, vertically and horizontally cracked, dark (brown-)black in colour and found in **9, 11, 14, 15, 16, 17**; bark called ta baek is relatively thin and smooth, flakes in roundish pieces, whitish (pale) in colour and found in **1, 2, 4, 5, 8**; bark called inthanin is found in **6, 10, 12**. In some species the condition of the bark is still unknown. Examples are shown in Fig. 2.

Intercostal venation.—Conspicuously scalariform

¹ Netherlands Center for Biodiversity Naturalis (section NHN), Leiden University, P.O. Box 9514, 2300 RA Leiden, the Netherlands; email: B.deWilde-Duyfjes@naturalis.nl

venation, best to be seen on the lower leaf surface, is present in **1, 9, 15**.

Leaf indumentum.— Persistent stellate hairs on the lower leaf surface have **1, 9, 15**; persistent simple hairs longer than 1 mm are found in **17**.

Position of inflorescences.— Inflorescences predominantly lateral on the twigs have **9, 15** (partly); inflorescences terminal and compact has **17**.

Flowers: position, size, colour, auricles.— Subsessile flowers are found in **1**; flowers with a conspicuous long, 6 mm long or more, pseudopedicel (the pedicel-like part above the joint of the pedicel), are found in **4**; small flowers (diameter of corolla <10 mm) have **14, 17**; the largest corolla (ca 10 cm in diameter) has **10**; white flowers (petals) have **1, 17**; white or lilac flowers (petals) **9, 15**; petals in the remaining species are lilac; features of outgrowths (or auricles) at the sinuses between the calyx lobes are usually diagnostic. Conspicuous petal-like auricles at the apex of the calyx tube are found in **8, 16**.

Calyx tube.— The tube in buds, flowers, and fruit can be smooth (or faintly ridged), or 5–6(–9)- or 10–12-ridged. This character is used in the key. The ridges can be specifically winged.

Calyx lobes.— In flower as well as in fruit, the condition of the upper part of the calyx lobes within, either hairy or glabrous, is an important character used in the key to the species.

Stamens.— The stamens in *Lagerstroemia* flowers can be monomorphic or dimorphic. When monomorphic all stamens are similar, with slender whitish filaments and yellow anthers containing yellow pollen. When dimorphic the 5–7 stamens of the outer whorl are differing from the numerous stamens of the rest; the outer ones are longer with usually purplish or pink filaments, and dirty green anthers with green pollen, the shorter inner filaments

bear stamens with yellow pollen. In the dimorphic flowers the green pollen is fertile while the yellow pollen of the inner stamens is sterile and serve for feeding pollinators (Graham 2007). According to the species various states of dimorphism can be seen, as shown in Fig. 1.

Monomorphic stamens are found in **10, 12**; radially dimorphic stamens are found in **1, 2, 4, 7, 11, 14, 15, 16, 17**; asymmetrically dimorphic stamens are found in **5, 8, 9**.

Ovary.— Whether the ovary is hairy or glabrous is used in the key to the species.

Fruits: size, valves, surface.— The fruit size is used in the key to the species; the fruits usually open with 5 or 6 valves, but in some species with 3 or 4 valves. The fruit surface appearance is either smooth or shagreen (see Fig. 2, and next subject 2). The smallest fruit (ca 10 mm long) is found in **1**; the largest fruits (25–40 mm long) are found in **10, 12**; 3- or 4-valved fruits are found in **6** (partly), **14, 17**; shagreen fruit surface have **3, 11, 14, 16, 17**.

2. FRUIT SURFACE AND COLOUR

Lagerstroemia can be divided into two groups according to the appearance of the fruit surface in the dry state, viz. a group with a fine crepe-like or finely longitudinally crinkled and finely granulately short-fissured surface (Fig. 2) here called ‘shagreen’, and a group without this structure, here called ‘smooth’. In the latter group the smooth surface is variously longitudinally or irregularly striate or netted, but not shagreen. In species with the shagreen fruit type the fruit is always glabrous and the outer coat of the older valves may wither away with age leaving coarse fibres attached to the remaining portions of the fruit. Shagreen fruits are often of a dull grey-brown colour. The non-shagreen (smooth) fruit is usually dark brown or blackish,

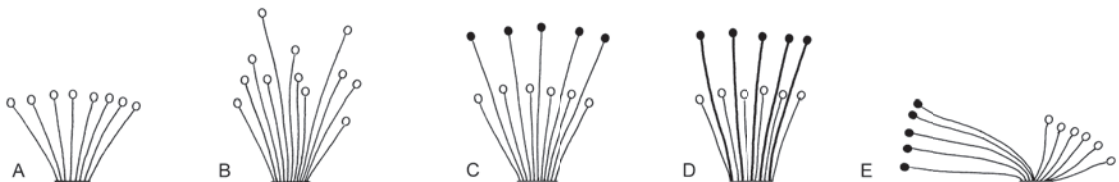


Figure 1. Stamens in *Lagerstroemia* (schematically).— A: stamens monomorphic, all stamens similar in length; B: stamens monomorphic, all stamens more or less similar in length; C, D: stamens radially dimorphic, outer stamens longer than inner ones, filaments of outer ones in D also thicker; E: Stamens asymmetrically dimorphic, outer stamens longer than inner ones and directed to one direction.

often shiny, either glabrous or hairy. Together with characters like fruit size, number of valves, and hairiness, the ‘shagreen character’ is a useful addition for the determination of herbarium collections in fruit.

Based on the taxonomy as presented by Furtado & Srisuko (1969) the Thai species with shagreen fruit surface correspond to those in their section *Sibia* DC. (= section *Parviflora* in the present publication, see below), except for *L. indica* L., a species with non-shagreen fruit (see below). All Thai species in the other two sections as accepted by Furtado & Srisuko (1969), sect. *Adambea* DC. and sect. *Trichocarpidium* Koehne, have dry fruits with a non-shagreen surface. Outside of Thailand, however, it is not yet sure whether all species of section *Adambea* have non-shagreen fruits, but all species in section *Trichocarpidium* have smooth fruits (not shagreen).

In Thailand the five species with a shagreen fruit surface when dry are: *Lagerstroemia crispa* Pierre (synonym *L. undulata* Koehne), *L. ovalifolia* Teijsm. & Binn., *L. subangulata* (Craib) Furtado & Srisuko, *L. venusta* C.B. Clarke, and *L. villosa* Kurz. In this group the ovary (and fruit) is always glabrous, the number of calyx ridges is as many as the calyx lobes, the ridges are situated in-between the lobes, and the number of fruit valves is 3 to 5, but most species have 5 valves. The bark of the older tree trunk is either salao or ta baek, hence the character of the fruit shagreen or smooth does not match with that of the bark facies.

For the five species concerned the calyx tube (in flower) with their characteristic ribs is, somewhat schematically, depicted in Fig. 3, and herbarium collections can be identified with the following key:

KEY TO THE THAI SPECIES WITH SHAGREEN FRUITS

- | | |
|---|----------------------------------|
| 1. Fruit small, 10–18 mm long. Flowers small, petals 4–7 mm long | |
| 2. Fruit in condensed infructescences. Leaves with long simple hairs (1 mm long or more) | 17. <i>L. villosa</i> |
| 2. Fruit in loose infructescences. Leaves short-hairy or glabrescent [blade glabrous, but veins on lower surface pale short-hairy, hairs simple, 0.5 mm long or less] | 14. <i>L. subangulata</i> |
| 1. Fruit large, 18–22(–24) mm long. Flowers larger, petals 7–20 mm long | |
| 3. Fruiting calyx tube ribbed, the ribs extending to the fruiting pseudopedicel. Fruiting calyx lobes 6–9 | 11. <i>L. ovalifolia</i> |
| 3. Fruiting calyx tube winged or ribbed, the ribs not extending to the fruiting pseudopedicel | |
| 4. Calyx lobes 6 | 3. <i>L. crispa</i> |
| 4. Calyx lobes seemingly 10–12, half of them being the slightly smaller epicalyx segments | 16. <i>L. venusta</i> |

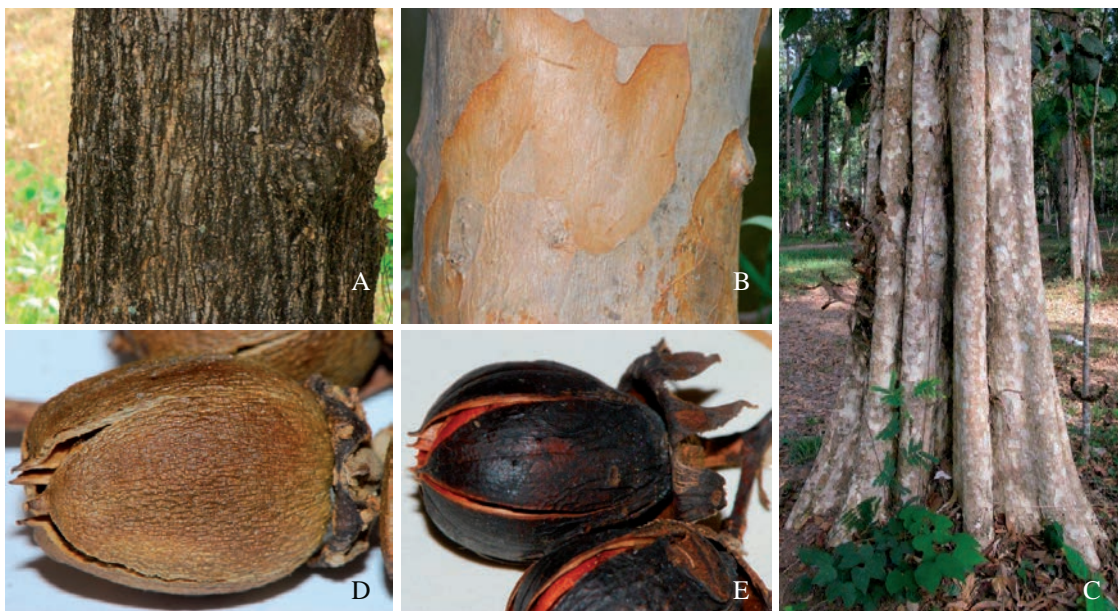


Figure 2. Bark in *Lagerstroemia*. A. *L. subangulata* (Craib) Furtado & Srisuko (salao); B. *L. floribunda* Jack var. *floribunda* (ta baek); C. *L. calyculata* Kurz (ta baek).— Fruit surface in *Lagerstroemia*. D. *L. villosa* Kurz (shagreen); E. *L. tomentosa* C.Presl (smooth).

3. NEW TAXA

Lagerstroemia duperreana Gagnep. var. **saxatilis** W.J.de Wilde & Duyfjes, var. **nov.**— A varietate typica habitu fruticoso vel arbusculoso 1.5–5 m alto, inflorescentiis (infructescentiis) parvis paucifloris 5–10 cm longis vel paucifructis, pseudopedicellis in fructu crassis 8–16 mm longis differt.— Typus: Thailand, Eastern, Ubon Ratchathani, 15° 39' 22" N, 105° 29' 55" E, 23 Aug. 2001, *Pooma, de Wilde, Duyfjes, Chamchunroon & Phattarahirankanok 2406* (holotype **BKF!**; isotypes **BKF!**, **L!**).

Shrub or stunted treelet 1.5–5 m tall, glabrous. *Leaves*: petiole ca 0.6 cm long; *blade* glabrous, thinly coriaceous, glossy above, up to 16 by 7 cm. *Inflorescence* terminal, few-branched, 5–10 cm long, 5–10-flowered. *Flowers*: pseudopedicel 5–10 mm long; calyx lobes triangular, ca 7 mm long, at apex hairy within; petals suborbicular, including ca 3 mm long claw ca 20 by 15 mm, margin subentire; ovary glabrous. *Capsule* glossy brown, glabrous, subellipsoid, slightly cylindrical, 15–17 by 12–15 mm, 6-valved, surface smooth; fruiting pseudopedicel stout, 8–16 mm long.

Distribution.— Only known from Thailand.

Ecology.— Locally common, scattered on sandy or rocky soil or in crevices in flat sandstone area, and in deciduous dipterocarp savanna forest; at 100–400 m altitude. Flowering in June; fruiting in June to October. The present new variety likely is a local ecotype in the sandstone area of Ubon Ratchathani Province.

Etymology.— The epithet *saxatilis* refers to the stony places where the variety grows.

Examined collections.— EASTERN: Ubon Ratchathani [Khong Chiam, 16 Sept. 2001, fruits, 150 m, *Maxwell 01-460* (**BKF!**, **CMU**, **L!**); *ibid.*, 9 June 1987, flowers, 150 m, *Santisuk s.n.* = SN033242 (**BKF!**); *ibid.*, 10 June 1978, fruits, 170 m, *Santisuk s.n.* = SN033241 (**BKF!**); *ibid.*, 24 Oct. 1998, fruits, *Wongprasert s.n.* = SN121310 (**BKF!**); km 88, Ban Thung Luang, Sri Muang Mai, 23 Aug. 2001, fruits, 240 m, *Pooma, de Wilde, Duyfjes, Chamchunroon & Phattarahirankanok 2406* (holotype **BKF!**, isotypes **BKF!**, **L!**)].

Lagerstroemia huamotensis W.J.de Wilde & Duyfjes, **sp. nov.**— *Lagerstroemiae speciosae* similis, foliis parvis ovatis 4–9 cm longis, venis lateralibus 5–7 in quoque latere, inflorescentiis brevibus paucifloris eramosis 2–5 cm longis, pseudopedicellis in fructu sursum curvatis 15–18 mm longis differt, capsulis 4- (vel 5-)valvatis.— Typus: Thailand, South-Western, Kanchanaburi, Huai Ban Kao, 15° 0' N; 98° 50' E, 12 July 1973, *Geesink & Phengkhilai 6243* (holotype **BKF!**; isotypes **E!**, **K!**, **L!**). Fig. 4.

Stunted treelet 4–5 m tall; bark 'inthanin'; twigs finely striate, (grey-)brown, 2–3 mm in diam. *Leaves*: petiole 0.2–0.4 cm long; blade glabrous on both surfaces, drying brown-green above, green underneath, broadly ovate-elliptic, 4–9 by (2.5–)3–5 cm, base short-attenuate or rounded, apex short acute-acuminate but tip withered; lateral veins 5–7 per side; intercostal venation finely reticulate. *Infructescence* terminal, erect, short, 2–5 cm long, not or hardly branched, lateral branches to 0.3 cm long, glabrous (glabrescent). *Flowers*: not seen. *Capsules* 1–5 per infructescence, glabrous, ellipsoid,

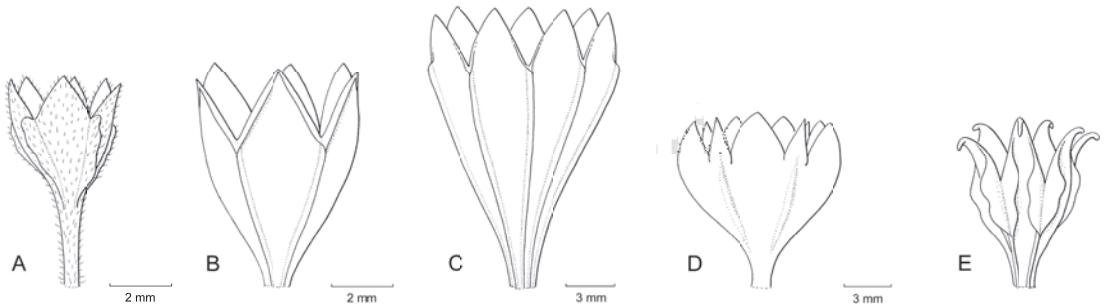


Figure 3. Flower calyx tube in *Lagerstroemia* (schematically). A. *L. villosa* Kurz; B. *L. subangulata* (Craib) Furtado & Srisuko; C. *L. ovalifolia* Teijsm. & Binn.; D. *L. venusta* C.B. Clarke; E. *L. crispa* Pierre.

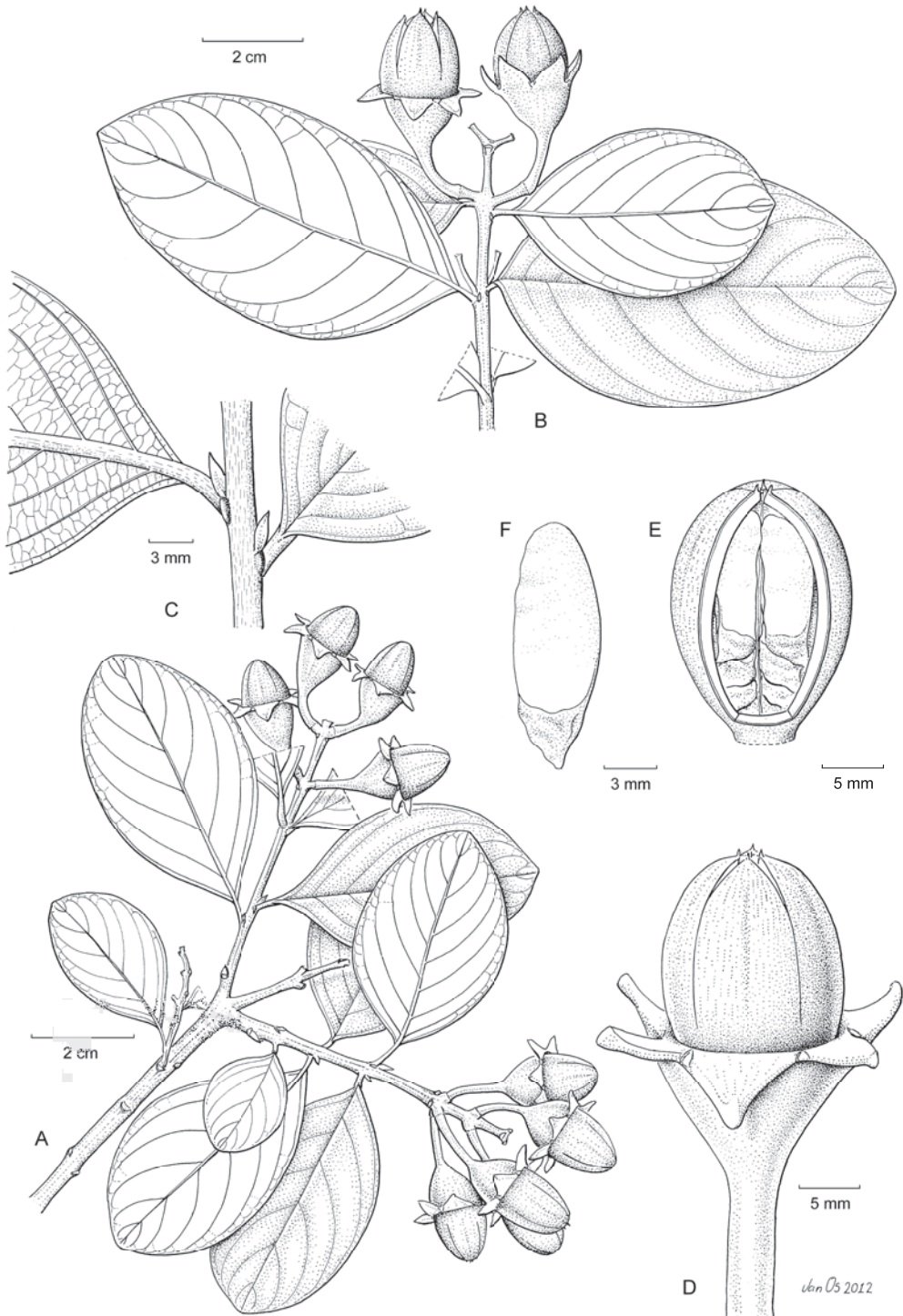


Figure 4. *Lagerstroemia huamotensis* W.J.de Wilde & Duyfjes. A, B. Fruiting branch; C. portion of twig showing two leaves, note reticulate venation, axillary buds and stipule-like outgrowths; D. fruit, note fruit 4-valved, and sepals glabrous within; E. opened fruit; F. seed (B–D: Pooma et al. 5379; A: Geesink & Phengkhilai 6243; E–F: Beusekom et al. 3745).

20–25 by ca 15 mm, 4- (or 5-)valved, surface smooth and indistinctly wrinkled (not finely striate); fruiting calyx turbinate or campanulate, ca 10 by 10–15 mm, not ribbed, glabrous (glabrescent from minute hairs), calyx lobes (sepals) 6, glabrous within, triangular, 5–7 mm long, without auricles at the sinuses between the calyx lobes, reflexed; *pseudopedicel* (straight or) up-curved, 15–18 mm long.

Distribution.— Endemic.

Ecology.— Open places on limestone hills, including on the Ordovician limestone of Doi Hua Mot, with shrubs and stunted trees; 750–950 m altitude. Fruiting in June, July, November, and December.

Etymology.— The specific epithet refers to Doi Hua Mot, where several collections were made.

Examined collections.— NORTHERN: Tak [Doi Hua Mot, 21 June 2005, fruit, *Pooma, Phattarahirankanok, Sirimongkol & Poopath 5379* (**BKF!**, **L!**); *ibid.*, 26 May 2008, fruit, *Pooma, Karaket, Phattarahirantricin & Saengrit 6981* (**BKF!**, **L!**); *ibid.*, 19 Dec. 2012, fruit, *Phonsena, Duyffjes, de Wilde & Roudreiw 6956* (**BKF!**, **L!**); *ibid.*, 19 Dec. 2012, fruit, *Phonsena, Duyffjes, de Wilde & Roudreiw 6957* (**BK**, **BKF!**, **L!**, **QBG**)]; SOUTH-WESTERN: Kanchanaburi [Huai Ban Kao, 13 Nov. 1971, fruit, *Beusekom, Geesink, Phengklai & Wongwan 3745* (**BKF!**, **K!**, **L!**); *ibid.*, 12 July 1973, fruit, *Geesink & Phengklai 6243* (holotype **BKF!**, isotypes **E!**, **K!**, **L!**); *ibid.*, 13 July 1973, fruit, *Maxwell 73-279* (**BKF!**, **CMU**); Khaobuing, 16 Aug. 1971, fruit, *Phengklai, Sangkhachand & Nimanong 3006* (**BKF!**, **K!**, **L!**)].

Notes.— *Lagerstroemia huamotensis* is similar to and keys out beside *L. speciosa* (L.) Pers., but the 5 collections assigned to the present species, all in fruit, are distinct in general habit, i.e. more compact trees, and in several other morphological characters, viz. the reduced leaf size with few lateral veins, much reduced inflorescences, a long fruiting pseudopedicel, 15–18 mm long, and 4(–5)-valved fruits. In *L. speciosa* the blade is 10–20 cm long, with (6–)8–14 lateral veins per side, inflorescences 15–25 cm long, fruit 6-valved, and the fruiting pseudopedicel straight, 5–10(–12) mm long.

The length of the pseudopedicel in other species is a character already obvious in flowers.

Lagerstroemia kratiensis W.J.de Wilde & Duyffjes, **sp. nov.**— *Lagerstroemia lecomtei* similis, sed inflorescentiis magnis 30–40 cm longis, calycis lobis intus glabris differt.— Typus: Cambodia, Sambour, Kratie Island, Mekong River, 31 July 2007, flowers, *Maxwell 07-453* (holotype **L!**; isotype **CMU**).

Deciduous tree 3–7 m tall, ca 10 cm dbh, coppicing at 1 m; bark grey and light brown, thin, mottled, peeling and flaking ('ta baek'). *Leaves* glabrous; petiole ca 3 mm long; blade 8–14 by 4.6–6 cm, apex rounded; lateral veins 8–10 per side; intercostal venation reticulate. *Inflorescences* densely short brown-yellow hairy, hairs stellate, terminal, lax, broadly paniculate, 30–40 cm long. *Flowers*: pseudopedicel ca 2 mm long; bracteoles absent; mature bud more or less obovate, 5–6 mm long, flat at apex, shortly nipped; calyx tube in flower cup-shaped, ca 6 mm long, with 6 conspicuous 2–3 mm high winged ridges, auricles absent; calyx lobes pale light red and glabrous within, triangular, ca 6 mm long; petals violet, with darker venation, ca 22 mm long including ca 4 mm long claw, obovate, margin entire; stamens dimorphic, longer ones with red filaments and grey anthers, shorter ones with whitish filaments and yellow anthers; ovary densely hairy. *Capsule* (densely) hairy especially near and at apex, ca 14 mm long, 6-valved, surface smooth; fruiting calyx tube with 6 winged ridges, wings 2–3 mm high; calyx lobes glabrous within, thin, reflexed, without auricles; fruiting pseudopedicel ca 3 mm long.

Distribution.— Endemic to Cambodia, Kratie Island and vicinity, Mekong River.

Ecology.— In deciduous seasonal hardwood forest with bamboo or in seasonally flooded deciduous scrub forest with dense grassy ground cover; sandstone bedrock; 25–30 m altitude; flowering in July, fruiting in November.

Etymology.— The specific epithet refers to Kratie Island where the type specimens were collected.

Examined collections. Cambodia.— Kratie [Kratie Bret Bra Soph, 2 km west of Bret Drawn Loong village, 2 km west of the Mekong River, Nov. 2006, fruit, *Maxwell 06-962* (**L!**, **CMU**); Sambour, Mekong River, Kratie Island, SE side, 31 July 2007, flowers, *Maxwell 07-453* (holotype **L!**; isotype **CMU**)].

Notes.— *Lagerstroemia kratiensis* deceptively resembles *L. lecomtei* which differs in sepals hairy within, and in the stamens all more or less of the same size. The dry material does not allow to assure whether in *L. kratiensis* the longer stamens are radially or asymmetrically dimorphic, but the latter state is most likely.

Lagerstroemia vanosii W.J.de Wilde & Duyfjes, **sp. nov.**— *Lagerstroemia hexapterae* similissima, floribus minoribus, petalis unguis includentibus 3 mm longis, fructibus parvis subglobosis ca 12 mm diam. differt.— Typus: Indonesia, Java, Banjoemas Province, 4 March 1902, *Koorders 39478* (holotype **L!**; isotype **BO**).

Treelet; stem and bark not recorded. *Twigs* (below inflorescence) subterete, ca 2.5 mm in diam. *Leaves* (sub)opposite; petiole 3–6 mm long; *blade* glabrous on both surfaces, drying grey-green or dark chocolate-coloured below, elliptic, 6–10 by 2–4.5 cm; lateral veins 5–6(–7) per side, intercostal venation finely reticulate. *Inflorescences* terminal, broadly paniculate, 15–20 cm long, densely minutely grey hairy, hairs simple, < 0.1 mm long. *Flowers*: *pseudopedicel* 1–1.5 mm long; bud minutely hairy, hairs < 0.1 mm long, obconical, with broadly rounded apex, 3–3.5 by 3 mm; calyx tube and pseudopedicel distinctly (5–)6-ridged (not winged); calyx lobes 6, glabrous within, triangular, ca 1.5 mm long, apex acute, auricles in the sinuses absent; petals white, (narrowly) elliptic, ca 3 mm long including ca 0.5 mm long claw, margin entire; ovary glabrous; stamens radially dimorphic (the outer 5 or 6 longer than the numerous inner ones). *Capsule* glabrous, outer surface drying shagreen, broadly ovoid, (10–)12–14 mm long, (4–)5-valved; *fruiting calyx* (including 2 mm long pseudopedicel) ca 5 mm long, 5–6-ridged (not winged), calyx lobes glabrous within, somewhat reflexed, auricles absent.

Distribution.— Central Java, SW of Banyumas, Nusa Kambangan (“Banjoemas Province”).

Ecology.— Lowland forest; flowering in March, fruiting in September.

Etymology.— The specific epithet refers to Jan van Os, lifelong artist of botanical drawings at Leiden.

Examined collections: Indonesia.— Java

[Nusa Kambangan, 23 Nov. 1895, fruit, *Koorders 20043* (**L!**, **BO**); 16 Sept. 1896, sterile, *Koorders 24643* (**L!**, **BO**); 4 March 1902, flowers, *Koorders 39478* (holotype **L!**, isotype **BO**)].

Notes.— The colour of the filaments and anthers of the longer stamens are not recorded.

The Bogor herbarium (**BO**) harbors two more collections of *L. vanosii*, collected by Koorders: 25 Dec. 1895, *Koorders 22000*, and 29 Nov. 1897, *Koorders 26924*, both not seen by us. All collections known of *L. vanosii* were enumerated in Koorders-Schumacher (1913) under *L. hexaptera* Miq.

Lagerstroemia vanosii is similar to *L. ovalifolia*, of which the petals, including the claw, are 15–20 mm long, while those of *L. vanosii* are among the smallest known in *Lagerstroemia*, including claw their length is ca 3 mm.

4. NEW RECORD FOR THAILAND

Lagerstroemia langkawiensis Furtado & Srisuko, *Gard. Bull. Singapore* 24: 327, f. 54. 1969, was described on specimens from the small island Pulau Timon, near Pulau Langkawi (Peninsular Malaysia). Recently, Simon Gardner and Pindar Sidisunthorn during their fieldwork for the ‘Forest Trees of Southern Thailand’ found the species also in the Peninsular Malaysia mainland and in southern Peninsular Thailand, the latter in Satun, Thaleban National Park, road between Head Quarters and Malaysian border post, 6° 43′ N; 100° 01′ E, on a low limestone mountain chain crossing the Thai border. The Thai collections concern *Gardner & Sidisunthorn 2922a* (flowers) and *2922b* (fruit), both kept at **BKF**.

5. THE SECTIONS IN LAGERSTROEMIA

In the monograph by Furtado & Srisuko (1969) attention is given to the division of the genus into three sections and seven subsections each with their belonging species. We agree with their division, except for the first section, sect. *Sibia* DC.

Section *Sibia*, described by Candolle (1826), originally comprised only two species, viz.

Lagerstroemia indica and *L. parviflora* Roxb. We find that *L. indica*, the type of the genus, differs from the other species in that section, e.g. in fruits not shagreen (see Note 2 on the fruit surface above). However, section *Sibia* was lectotypified with *L. indica* by Furtado & Srisuko (1969: 189), so that the name *Sibia* becomes a synonym of section *Lagerstroemia*. Section *Sibia*, in the sense of Furtado & Srisuko, is herewith described as a new section *Parviflora* W.J.de Wilde & Duyfjes.

With the nominal section *Lagerstroemia* (type *L. indica* L.) there are now 4 sections, as enumerated below:

1. Lagerstroemia sect. Lagerstroemia.— Type: *Lagerstroemia indica* L.— *Lagerstroemia* sect. *Sibia* DC., Mém. Soc. Phys. Genève III, 2: 72. 1826, p.p.; Rev. Lythr.: 8. 1826, p.p. (reprint); Prodr. 3: 93, 1828, p.p., both only for *L. indica*; Furtado & Srisuko, Gard. Bull. Singapore 24: 189, 1969, p.p., only for *L. indica*.—Lectotype (designated by Furtado & Srisuko, 1969): *Lagerstroemia indica* L.— *Lagerstroemia* sect. *Velaga* (Gaertn.) Miq., Fl. Ned. Ind. 1: 621. 1855; *ibid.*: 1090. 1858.— *Velaga* Gaertn. Fruct. 2: 245. 1791.— Type: *Velaga globosa* Gaertn. [= *Lagerstroemia indica*].

This section contains so far only one species, *L. indica*, the type of the genus *Lagerstroemia*. It is characterized and distinct from the other three sections as defined by Furtado & Srisuko (1969:

187), as shown in Table 1. Further investigation of Chinese species may indicate that the section needs to be redefined to include some more species; possibly here also belongs *L. subcostata* Koehne, from China, a species of which the calyx tube is faintly 12-ridged.

2. Lagerstroemia sect. Parviflora W.J.de Wilde & Duyfjes, **sect. nov.**— Type: *Lagerstroemia parviflora* Roxb.— *Lagerstroemia* sect. *Sibia* DC., Mém. Soc. Phys. Genève III, 2: 72. 1826, p.p.; Rev. Lythr.: 8. 1826, p.p. (reprint), p.p.; Prodr. 3: 93, 1828, p.p.; Furtado & Srisuko, Gard. Bull. Singapore 24: 189. 1969, p.p. [all excluding *L. indica*].

Sectio nova alabastra pyriforme, calycis tubo 5-vel 6-costato, lobis intus glabris, ovario glabro, capsulis in sicco minute striatis distinguenda est.

This section contains 23 species (species 2–23, as treated by Furtado & Srisuko, 1969), and also the here described new species *L. vanosii*.

3. Lagerstroemia sect. Adambea (Lam.) DC., Mém. Soc. Phys. Genève III, 2: 70. 1826; Prodr. 3: 93, 1828; Furtado & Srisuko, Gard. Bull. Singapore 24: 257. 1969.— Type: *Adambea glabra* Lam. [= *L. speciosa* (L.) Pers.].

Following Furtado & Srisuko (1969), the section *Adambia* contains their species 24–37, and in addition our present new species *L. huamotensis*.

Table 1. Characters of *Lagerstroemia* sections.

section	<i>Lagerstroemia</i>	<i>Parviflora</i> (with 2 subsections)	<i>Adambea</i> (with 3 subsections)	<i>Trichocarpidium</i> (with 2 subsections)
bud	globose	pear-shaped	subglobose or pear-shaped	pear-shaped
calyx tube (ridges)	not ridged	(mostly) 5–6, as many as sepals	12 or more, twice the number of sepals	6–12, as many as or twice the number of sepals
calyx lobes within	glabrous (annulus present)	glabrous	glabrous or hairy	glabrous or hairy
ovary / fruit	glabrous	glabrous	glabrous	hairy
dry fruit surface	smooth	shagreen	smooth	smooth

4. Lagerstroemia sect. **Trichocarpidium** Koehne in Engl., Pflanzenr. IV.216 (Heft 17): 263. 1903; Furtado & Srisuko, Gard. Bull. Singapore 24: 292. 1969.— Lectotype (designated by Furtado & Srisuko, 1969): *Lagerstroemia tomentosa* C.Presl.

The section *Trichocarpidium* contains the species 38–53, as treated by Furtado & Srisuko (1969), and also the here described new species *L. kratiensis*.

6. NOTES ON TYPIFICATION

Lagerstroemia angustifolia Pierre in Laness., Pl. Util. Colon. Franc.: 322. 1886; Gagnep., Notul. Syst. (Paris) 3: 355. 1918.— Type: Vietnam, Bao-chiang, Sept. 1865, *Pierre 4993* (lectotype **P**, here designated; isolectotypes **BM!**, **K!**, **NY**).

Notes.— Pierre (in Lanessan, 1886) did not mention a type specimen, only the locality Tay-Ninh; subsequently Gagnepain (1918) enumerated several collections, among which was *Pierre 4993*.

Lagerstroemia angustifolia is a synonym of **L. calyculata** Kurz.

Lagerstroemia collinsae Craib, Bull. Misc. Inform. Kew 1914: 282. 1914; Fl. Siam. 1: 720. 1931.— Type: Thailand, South-Eastern, Chonburi, Sriracha, 20 May 1926, *Collins 190* (lectotype **K729710!**, here designated; isolectotypes **BK!**, **BM!**, **E!**, **K!**).

Notes.— Craib (1914, 1931) cited the numbers *Collins 38* and *Collins 190*.

Lagerstroemia collinsae is a synonym of **L. cochinchinensis** Pierre.

Lagerstroemia corniculata Gagnep., Notul. Syst. (Paris) 3: 357. 1918.— Type: Cambodia, Stung Treng (Stung-treng), 1866–1868, *Thorel 2162* (lectotype **P**, here designated; isolectotypes **BM!**, **K!**, **NY**).

Notes.— Gagnepain (1918) gave three collections in the protologue, among which the present lectotype, *Thorel 2162*, according to Gagnepain from Laos, but actually from Cambodia.

Lagerstroemia corniculata is a synonym of **L. venusta** C.B.Clarke.

Lagerstroemia thorelii Gagnep., Not. Syst. (Paris) 3: 362. 1918; Fl. Cochinch. 2: 947. 1921.— Type:

Cambodia, Stung-treng, 1866, *Thorel 2241* (lectotype **P**, here designated; isolectotypes **A**, **BM!**, **E!**, **K!**, **PH**).

Notes.— Gagnepain (1918) mentioned, in the protologue, collections from Laos and Cambodia, among which “Laos, Stung Treng (Stung-treng), *Thorel 2241*”. However, the locality Stung-treng cannot be found in Laos but instead in northern Cambodia.

Lagerstroemia thorelii is a synonym of **L. duperreana** Pierre.

Lagerstroemia turbinata Koehne, Bot. Jahrb. Syst. 4: 34. 1883; in Engl., Pflanzenr. IV.216 (Heft 17): 266. 1903.— Type: Malaysia, Peninsular Malaysia, possibly Penang, s. dat., *Maingay 653/2* (lectotype **L!**, here designated).

Notes.— Koehne (1883) gave in the protologue localities without collections. In 1903, however, he enumerated several collections, from which the lectotype is chosen.

Lagerstroemia turbinata is a synonym of **L. floribunda** Jack.

Lagerstroemia loudonii Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Indië 25: 425. 1863 (*‘loudoni’*).— Type: Thailand, South-Western, Boekit Petjaboerie, 1862, *Teijsmann 5938* (holotype **U!**).

Notes.— Seeds of a tree collected at ‘Boekit Petjaboerie’ by Teijsmann, during a trip in 1862 to SW Siam were taken to the botanical garden at Bogor (Java). Teijsmann (then Curator of the Buitenzorg Gardens, now Bogor) travelled at that time to Bangkok in the company of Loudon, the representative of the Dutch Government (see Teijsmann’s travel report, 1863). The seeds grew successfully into flowering and fruiting trees; see also Furtado & Srisuko (1969). As at the time to him no Thai type material was known, De Wit, in 1941, collected flowering material of an old tree of *L. loudonii* in the former home-garden of Teijsmann located in the Botanical Garden at Bogor. He stated on the herbarium label that the tree had grown from the above mentioned seeds and designated the material, on the label, as the type. However, Utrecht (**U**), now incorporated in the **L**-herbarium, appears to harbour the original Teijsmann type collection from Thailand.

7. IDENTIFICATION LIST (MAINLY THAILAND)

- 1 = *L. calyculata* Kurz
- 2 = *L. cochinchinensis* Pierre (including *L. noei* Craib)
- 3 = *L. crispa* Pierre
- 4a = *L. duperreana* Gagnep. var. *duperreana*
- 4b = *L. duperreana* Gagnep. var. *saxatilis* W.J.de Wilde & Duyfjes
- 5a = *L. floribunda* Jack var. *floribunda*
- 5b = *L. floribunda* Jack var. *cuspidata* C.B.Clarke.
- 5c = *L. floribunda* Jack var. *sublaevis* Craib
- 6 = *L. huamotensis* W.J.de Wilde & Duyfjes
- 7 = *L. indica* L.
- 8 = *L. langkawiensis* Furtado & Srisuko
- 9 = *L. loudonii* Teijsm. & Binn.
- 10 = *L. macrocarpa* Kurz
- 11 = *L. ovalifolia* Teijsm. & Binn.
- 12 = *L. speciosa* (L.) Pers.
- 13 = *L. spireana* Gagnep.
- 14 = *L. subangulata* (Craib) Furtado & Srisuko
- 15 = *L. tomentosa* C.Presl
- 16 = *L. venusta* C.B.Clarke
- 17 = *L. villosa* Kurz
- Abbé, L.B. 9666: 9.— Alston, A.H.G. 17075: 9.— Anderson, E.F. 5146: 2.
- Balansa, B. 3865: 2.— Balgooy, M.M.J. van 2322: 8; 2813: 9.— Beusekom, C.F. van 1074: 10; 1235: 16; 1248: 2; 1967: 5a; 2311: 10; 3745: 6; 4295: 1.— Bloembergen, S. 8: 12; 295: 10.— Bult, M. van de 27: 2; 791: 10; 65-90: 10.— Bunchuai, K. 53: 12; 61: 12; 68: 15; 161: 15; 1445: 10.— Bunnab, C. 1: 5b.— Bunpheng, D. 707: 2.
- Chayamarit, K. 902: 15; 1090: 16; 1093: 10; 1122: 15; 1259: 15; 1299: 15; 1311: 15; 1686: 2; 3112: 15; 3274: 17.— Chantaranothai, P. 90-18: 9; 1136: 9; 1355: 9.— Chevalier, A.J.B. 35523: 5a; 41231: 15.— Chew Wee-Lek 171: 11.— Chin, S.C. 2133: 8; 2157: 8.— Chongko, S. 132: 1; 465: 15; 514: 14.— Clemens, J. & M.S. 3477: 3.— Collins, D.J. 3: 9; 23: 5a; 38: 2; 164: 1; 188: 9; 189: 5a; 190: 2; 392: 1; 603: 9; 665: 9; 758: 9; 961: 9; 1394: 9; 1395: 5a.— Cuong, N.M. 204: 16.
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- Forbes, H.O. 2705: 11.— FRDU 7: 10; 68: 15.— Fukuoka, N. T35085: 15; 35844: 5b; T62017: 10; T62063: 2.— Furtado, C.X. SF34895: 9.
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- Hardial 607: 9; 615: 5a.— Henderson, M.R. SING29119: 8.— Hiep, N.T. 432: 12.— Hosseus, C.C. 4: 5a; 512: 15; 530: 3; 600: 15; 616: 17.— Huq, A.M. 10873: 5a; 10960: 5a.
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- Jackson, J.K. 6054: 10; 6130: 10.— Jayasuriya, A.H.M. 1631: 17.— Jenjittikul, T. 10526: 14.
- Kanthchai 19: 10; 161: 15.— Karaket, P. 130: 10; 414: 15.— Kerr, A.F.G. 578: 10; 651: 12; 718: 2; 718A: 2; 1150: 17; 1264: 16; 2016: 17; 2034: 5a; 2082: 9; 2083: 1; 2164: 17; 2554: 15; 2840: 10; 3266: 7; 3616: 1; 4400: 12; 4796: 3; 4895: 1; 5505: 1; 5634: 10; 5734: 10; 5884: 15; 5961: 15; 5965: 12; 5967: 1; 5969: 17; 5975: 10; 6158: 12; 6378: 2; 6745: 12; 6769: 9; 6771: 12; 6771A: 12; 7018: 14; 7315: 5a; 7487: 11; 7495: 12; 8028: 2; 8030: 9; 8423: 13; 8466: 13; 9089: 4a; 9166: 5c; 9755: 9; 9777: 4a; 10113: 15; 10461: 17; 10879: 9; 11026: 5b; 11028: 5a; 11050: 5a; 11448: 5b; 11574: 12; 11784: 5a; 12177: 12; 13188: 5b; 13341: 1; 13468: 5b; 13618: 5a; 15818: 5b; 16462: 5b; 19484: 14; 19484A: 14; 19490: 2; 19537: 15; 19967: 10; 20190: 9; 21305: 1; 21552: 2.— King, R.M. 5420: 9; 5497: 14.— King's Collector (Kunstler, H.H.) 8701: 11; 10532: 11.— Kochummen, K.M. FRI2055: 11; FRI16544: 11.— Konta, F. 4837: 17; 4853: 17.— Kool, A. 674: 1.— Kopachon, S. 4: 5a; 5: 10.— Kostermans, A.J.G.H. 82: 1; 447: 15; 689: 17; 1036: 5b; 1113: 16; 1120: 15; 1131: 10; 1150A: 16; 1150: 5b; 1463: 15.— Koyama, H. T30360: 14.— Kurz, S. 1343: 17; 1344: 15.— Kuschel, H. 9168: 5a.

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Yahara, T. T50154: 10.

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