Alangium Lam. (Cornaceae) species cultivated in central Europe

BERND SCHULZ (BS) writes about the species cultivated in central Europe in an article translated by Wolfgang Bopp with scientific editing by Susyn Andrews (SA).

Summary – the species of *Alangium* cultivated in central Europe
Two species of the genus *Alangium* are occasionally cultivated in the botanic gardens of central Europe. The following paper gives an introduction to the genus. The species *A. chinense* and *A. platanifolium* are presented according to BS's own studies in words and pictures. The leaf shape is highly variable so it is not possible to differentiate between species using the leaf as the sole criterion. Both species can usually be identified with the aid of inflorescences, flowers and fruits.

Material and representation
Plant material was obtained from seven botanic gardens. Samples of five are verified as correct, with three of these, *A. chinense*, originating from the botanic gardens of Berlin-Dahlem, Strasbourg and Dresden. The seed for these plants was supplied by the botanic gardens in Peking, Hangzhou and Nanjing. Two samples of *A. platanifolium* came from Bonn Botanic Garden and the LTA Arboretum Ettelbrueck in Luxembourg. Further plants were obtained from the Forest Botanic Gardens of Göttingen and Tharandt. Two *A. platanifolium* from Tharandt are young non-flowering specimens, while the plant from Göttingen, also labelled as *A. platanifolium*, appears to have several characters

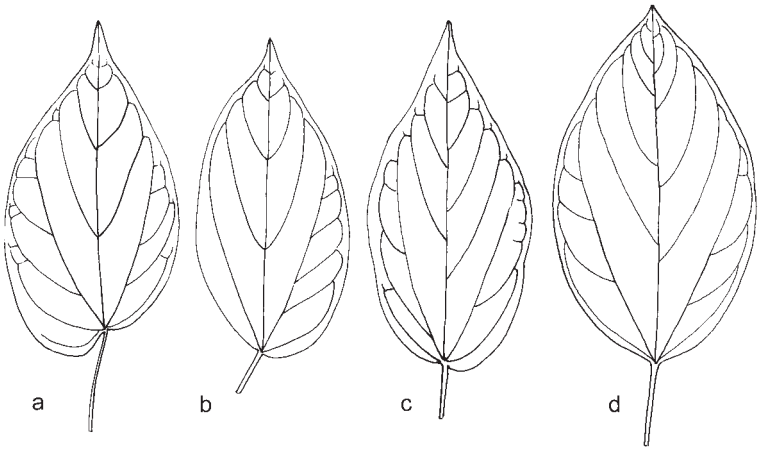
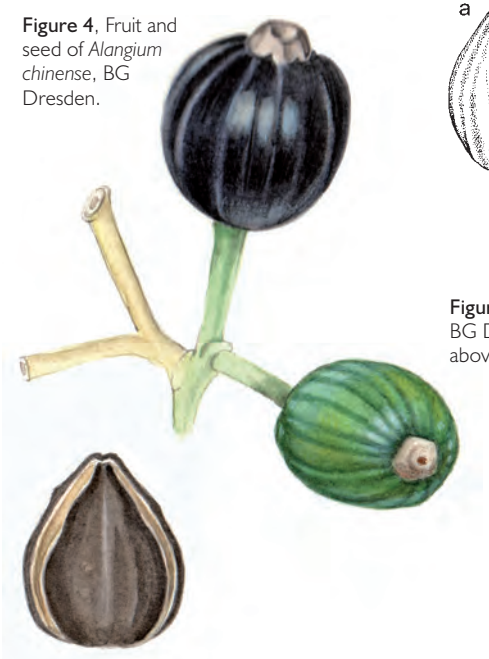


Figure 1, *Alangium chinense* leaf shapes from Cameroon (**a-b**, 14.5cm), Sudan (**c**, 12cm), Borneo (**d**, 12.5cm), according to specimens at the Herbarium Berolinense (Röpert 2000).

Figure 2, Inflorescences of *Alangium chinense*, Botanic Garden (BG) Dresden.

Figure 3, Single flower of *Alangium chinense*, BG Dresden.

Figure 4, Fruit and seed of *Alangium chinense*, BG Dresden.



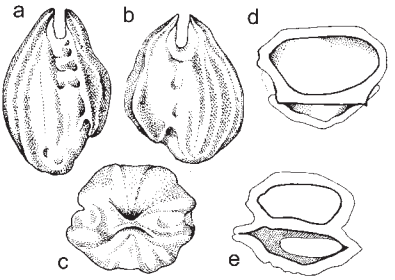


Figure 6, Seed of *Alangium chinense*, BG Dresden: **a-b**, from the side, **c**, from above, **d-e**, cross-section.

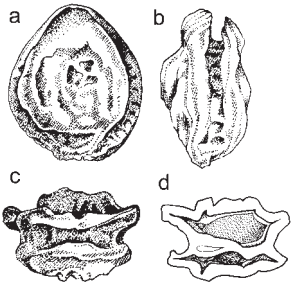


Figure 15, *Alangium chinense*, BG Strasbourg: **a**, stone fruit, **b**, view from two sides, **c**, above, **d**, cross-section.

intermediate between both species. The latter plant is discussed further under *A. chinense* [see p. 81].

BS is grateful to the following for providing material, images and data: Anett Krämer (Bonn); Christa Beurton (Berlin); Eike Jablonski (Ettelbrück, Strasbourg); Volker Meng (Göttingen) and Christoph Neinhuis (Dresden).

All drawings and images (except Fig. 21) are by BS. The longest leaf measurement is given in each leaf drawing. Originally published in *Mitt. Dtsch. Dendrol. Ges.* 94: 23-36 (2009).

The genus *Alangium*

The genus was known long before Linnaeus. Rheede (1683) described two forms in *Hortus Malabaricus*[1]–*Angolam* and *Kara-Angolam.* There are several synonyms of *Angolam*, suggesting that it had some popularity at that time: *Alangi Malabarensibus*, *Angolam Brachmanis*, *Espino sancto Lusitanis* and *Keyservreugde Belgis*. Adanson accepted both *Angolam* and *Kara-Angolam* in his *Familles des Plantes* (1763). Lamarck published the genus *Alangium* in 1783 which was conserved by Rickett & Stafleu (1960), despite earlier valid names having been published by Adanson.

Wangerin (1910) explained in a footnote that the name *Alangium* was a name change of *Angolam*. He referred back to Wittstein (1852), who stated that *Angolam* Adans. was a synonym of *Alangium*. Many authors, such as Rehder (1940) and Seneta (1991) followed Wittstein. The descriptions in Rheede (1683) showed that both the names, *Alangi*(*um*) and *Angolam*, were in use prior to Adanson (1763) and Lamarck (1783). Due to the similarity of the names, the change must have taken place much earlier.

In order to conserve the name *Alangium*, the species *A. hexapetalum* Lam. was typified. Since Wangerin (1910), this taxon has been known as a subspecies of *A. salviifolium* (L.f.) Wangerin subsp. *hexapetalum* (Lam.) Wangerin. The younger Linnaeus mistakenly based his specific name on *Grewia salviifolia* L.f. (1781), which today is in the Malvaceae (formerly in the Tiliaceae). The type species of the genus is thus the type for section *Alangium* (*Eualangium* Harms, *Angolum* Baill.), with each flower having twice to four times the number of stamens compared to the number of petals (Wangerin (1910), Bloembergen (1939), Eyde (1968)). The majority of the *c.* 20 species have more or less isomerous flowers, with an equal number of stamens to petals[2]. Harms and Wangerin placed these in section *Marlea* alongside section *Alangium*. In 1939 Bloembergen split off two further sections consisting entirely of tropical species from section *Marlea*.

The genus ranges from Africa to Southeast Asia, Malaysia, Indonesia and

[1] The Malabar coast extends along the Arabian Sea in southwest India.

[2] According to Eyde (1968), there are occasional specimens with ±1 between petals and stamens.

Australia. Most deciduous species are found in subtropical climates, thus only a few from Japan and central China are suitable for outdoor cultivation in central Europe. It appears that besides winter hardiness, the seasonal changes and the amount of moisture found in any one micro-climate are just as important, for example Bean (1970) found *A. platanifolium* was not sufficiently hardy to grow outside at Kew.

The leaves of the subtropical species are alternate with pinnate venation, while the other taxa have more or less palmate venation, such as those discussed here. Both types of venation show intermediate stages. The lobed leaves have strong palmate venation, with each main lobe showing a large vascular bundle. Unlobed leaves, on the other hand, tend to have pinnate venation. At the margin, the nerves run in an arch with only their main and secondary nerves ending directly in the leaf tips (see Figs. 1, 7-11, 19, 20, 26-27).

During the growing season each petiole (leaf stalk) covers its axillary bud (Figs. 16, 24), only to be revealed after leaf fall. The buds have silvery white hairs and are surrounded by the leaf scar. As the growing tip dies early, there are no terminal buds (Fig. 24a).

One of the characters *Cornus* and *Alangium* have in common are inferior ovaries. In *Alangium* they mostly have one, rarely two loculi (cavities). The latter is common with *Cornus* (Figs. 23, 6). While *Cornus* has floral parts in fours, *Alangium* is regularly more numerous (4)5-10 and can vary even on the same plant (Figs. 2, 3, 5). The calyx is toothed, mostly small and hardly noticeable, while the white petals are rather long and narrow, folded back as the flower opens, partly fused at their base to form a tube which covers a disc hidden amongst the stamens (Fig. 17a). This disc is later seen on top of the fruit (Figs. 4, 18, 22).

The axillary inflorescences are composed of up to 50 flowers. BS's own observations are that it is a cyme, where the slightly offset axils branch from the stipule (Figs. 5a, 13). The higher the number of branches, the higher the number of flowers. Species such as *A. chinense* have numerous flowers per inflorescence and the shorter flower stalks make it appear short and stout, while species with fewer flowers such as *A. platanifolium* have inflorescences more open and extended due to the longer flower stalks. This was described by Wangerin in 1910.

Key to the cultivated species in central Europe:

1 Inflorescence with 1-5 long-stalked flowers, flowers 30-40mm long, filaments nearly as long as the anthers. Fruit with a single locule (cavity) *A. platanifolium*

1 Inflorescence with 3-25 shortish-stalked flowers, flowers *c.* 20mm long, filaments very short, anthers nearly sessile. Fruit with two loculi, although only one seed may develop fully *A. chinense*

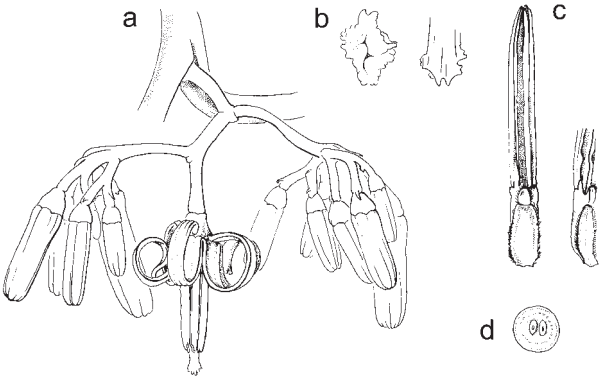


Figure 5, *Alangium chinense*, BG Dresden:
a, inflorescence, **b**, stigma, **c**, anthers, **d**, cross-section of ovary.

***Alangium chinense* (Lour.) Harms (*A. begoniifolium* (Roxb.) Baill.)**
João de Loureiro, a Portugese botanist and missionary, who spent 30 years in Cochinchina (now South Vietnam), published his *Flora Cochinchinensis* in 1790, in which he described this species as *Stylidium chinense*. Harms (1879a) transferred *S. chinense* to *Alangium*, although in a subsequent publication (1897b), he used the name *A. begoniifolium* (Roxb.) Baill., which had been described in 1877[3]. Hô (1992) in the *Flora of Vietnam* illustrated the same species which according to the description of Loureiros, "drupa 2-loculari", could not be confused with any other *Alangium* species, providing Wangerin's information (1910) is correct in that "the number of loculi per ovary in *A. begoniifolium* [= *A. chinense*] varies between 2 and 1. All other species have a single locule without exception." Bloembergen (1939) noted that all the African species have a single locule, while the other species nearly always have two loculi.

Alangium chinense is said to be native to a wide area from Thailand and Indonesia, to China and West Africa. According to Harms (1897b) the leaves "have fairly long stalks, the blade has palmate venation, is large, membranous, obliquely ovate or obliquely cordate-ovate, long-acuminate, the older leaves are nearly glabrous, entire or with Asian taxa being slightly lobed or dentate."

It appears that all the cultivated material in central Europe is of Asian origin and usually has more or less lobed leaves (Figs. 7, 11) with obliquely cordate bases. Not having flowers or fruits makes comparsion with *A. platanifolium* (Figs. 25, 26) difficult.

The Herbarium Berolinense website (Röpert 2000ff.) shows *A. chinense* specimens from Africa (Equatorial Guinea, Congo, Sudan, Cameron), Indonesia (Borneo in part, Sumatra) and Thailand. They all have entire,

[3] According to Tropicos 2008, the basionym *Marlea begoniifolia* Roxb. is a *nomen nudum*.

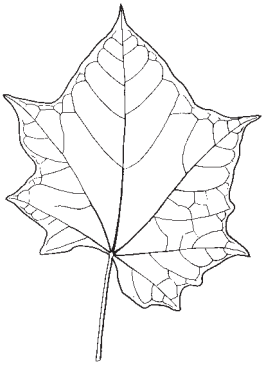


Figure 7, *Alangium chinense*, BG Dresden: strongly lobed leaf from a shoot (23cm).

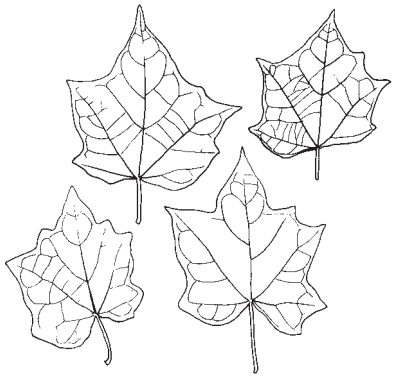


Figure 8, *Alangium chinense*, BG Dresden: clearly lobed leaves from a twig (10cm).

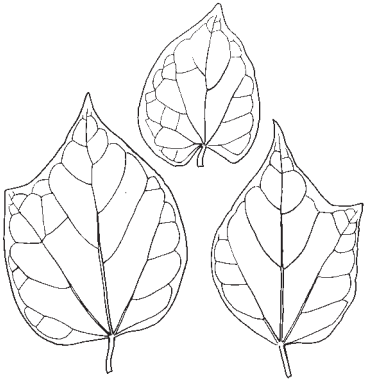


Figure 9, *Alangium chinense*, BG Dresden: slightly lobed leaves from a twig (12.5cm).

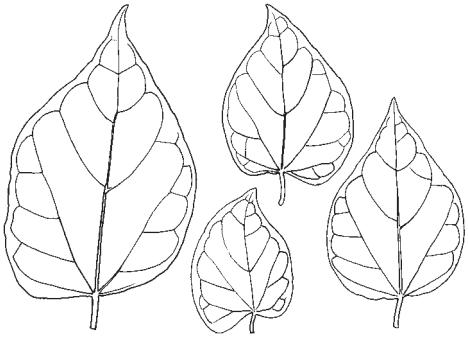


Figure 10, *Alangium chinense*, BG Dresden: unlobed leaves from a twig (14.5cm).

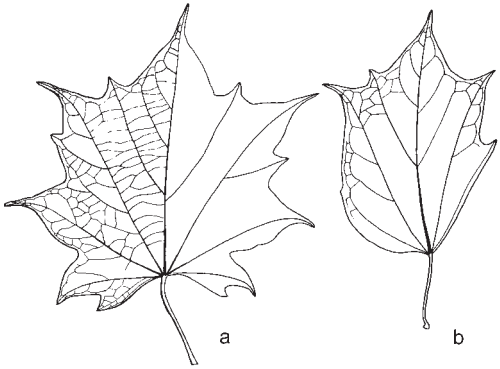


Figure 11, *Alangium chinense*, BG Berlin: leaves – **a**, normal leaf, **b**, leaf at tip of shoot (24cm).

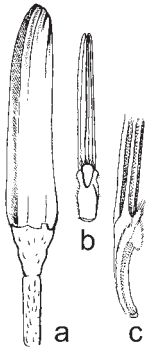


Figure 12, *Alangium chinense*, BG Berlin: **a**, flower bud, **b**, anther, **c**, anther detail.

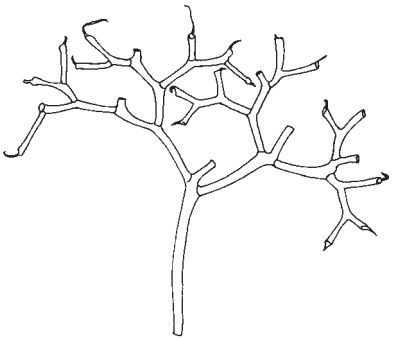


Figure 13, *Alangium chinense*, BG Berlin: inflorescence (without flowers).

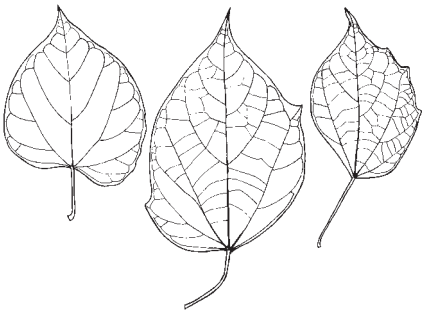


Figure 14, *Alangium chinense*, BG Strasbourg: leaves from a single shoot (19cm).

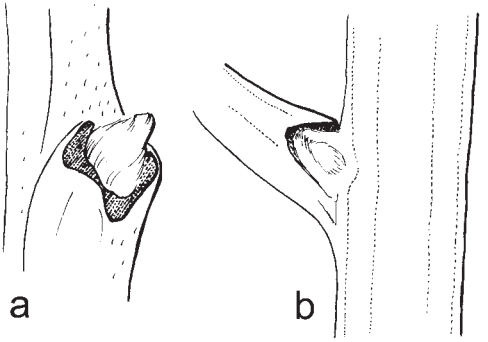


Figure 16, *Alangium chinense*, Forest Botanic Garden (FBG) Göttingen: **b**, base of petiole, **a**, axillary bud.

ovate, pointed leaves (Fig. 1). This illustration shows one or two of the upper leaves with slightly oblique, cuneate bases, while the lower foliage has more acute bases. The twigs are partly hairy and the inflorescences have numerous flowers, to *c.* 20, which hardly differ in size and shape from the Asian taxa. The Metafro website (2008) shows East African *A. chinense* specimens with partly lobed leaves at the shoot tip and fruits with a strong bluish-white bloom, while the observed plants of East Asian origin have shiny black fruit without a bloom.

Wangerin defined the key character as having up to 20 flowers per inflorescence, while Bloembergen noted usually 23(-50) flowers. Of all the observed specimens, the one found in Berlin has the most flowers per inflorescence with up to 25 (Fig. 13). Depending on the branching level of each inflorescence, each cyme will vary in flower number: a single branch results in three flowers (one terminal plus two from the stipule), with two branches one can find seven flowers, with three branches 15 flowers and so on. At the fourth level the numbers seem less consistent as besides the terminal bud one mostly finds a single stipule bud, resulting in about 23 flowers. Add one

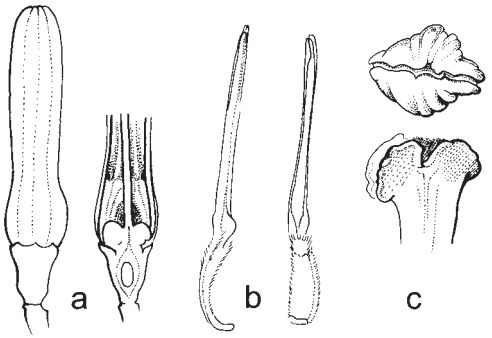
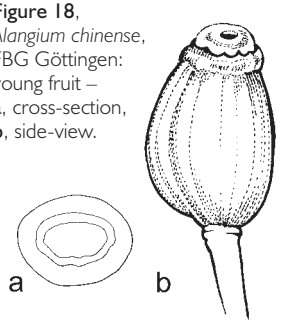


Figure 17, *Alangium chinense*, FBG Göttingen: **a**, flower bud, **b**, anthers, **c**, stigma.

Figure 18, *Alangium chinense*, FBG Göttingen: young fruit – **a**, cross-section, **b**, side-view.



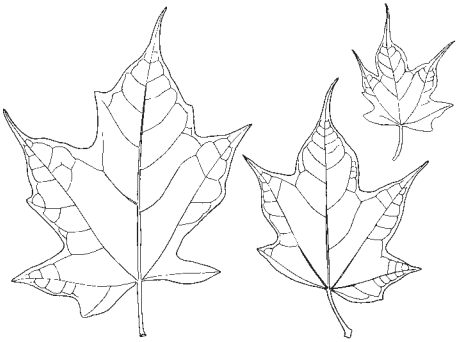


Figure 19, *Alangium chinense*, FBG Göttingen: deeply lobed leaves from one shoot (15.5 cm).

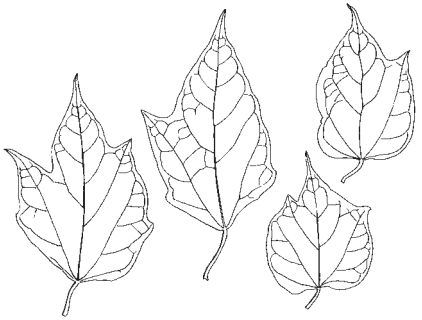


Figure 20, *Alangium chinense*, FBG Göttingen: slightly lobed leaves from one shoot (15 cm).

further branch level and assuming the fourth level having both stipule buds and only the fifth level having single stipule buds, this results in 47 flowers, which would explain Bloembergen's findings. This representation gives the maximum flower numbers according to the branching pattern, although usually fewer flowers develop.

According to Wangerin (1910), *A. chinense* has short filaments, which are densely hairy on the inside upper end. *Alangium platanifolium* has longer filaments that are fused with the petals for much of their length and are lightly hairy on the inside without forming a marked tuft. Unfortunately, Wangerin portrayed *A. begoniifolium* with two conflicting illustrations, which consisted of several drawings.

Of the three investigated plants which can clearly be attributed to *A. chinense*, only the one held by Strasbourg Botanic Garden was correctly identified. It was a specimen received as *A. platanifolium* from a garden in Nanjing (Jiangsu province, Eastern China), and cultivated at Dresden Botanic Garden, which first raised BS's interest in this genus. Another plant labelled as *A. platanifolium* in Berlin-Dahlem Botanic Garden originated from the botanical

collections at Berlin-Blankenfelde and had been correctly identified by Peking Botanic Garden as *A. chinense* (Beurton 2008). Even internet images of *A. chinense* are wrongly identified as *A. platanifolium*, see the SysTax database for examples of this–(http://www.biologie.uni-ulm.de/systax/).

BS has two explanations for this mix up: of the commonly used identification books, only Fitschen (2006) and Roloff & Bärtels (2006) listed *A. platanifolium*. Krüssmann (1976) described *A. platanifolium* and *A. chinense*, although even he mentioned that *A. chinense* can have strongly lobed leaves which are hard to identify. It is of interest that while both wrongly identified examples from Berlin (Fig. 11) and Dresden (Fig. 7) have in part strongly lobed, plane-like leaves, the tree in Strasbourg Botanic Garden has entire leaves with only weak lobing (Fig. 14).

SysTax [a database for systematics and taxonomy, run by Ulm University] listed both species for the related gardens, ten reports for *A. chinense* and 18 for *A. platanifolium* and its varieties.

[The account of *Alangium* in Grimshaw & Bayton (2009) was not seen by BS in time. SA]

Description of *Alangium chinense* based on specimens seen

The cymose inflorescences arise from axillary buds and have (3)7-25, short stalked flowers. The number of tiny sepals, petals and stamens found within each flower are consistent, (5)6(7). The elongated stamens have short filaments 2-3mm long, with the connective and yellow anthers being relatively long (Figs. 5c, 12b & c, 17b). They are parallel to the style and extend above it (Figs. 3, 5). In bud, the style and stamens are covered by the small white petals (Figs. 12a, 17a). In flower the petals roll backwards (Fig. 5). The ovaries are inferior and have two loculi (Fig. 5d) and the flower has an intrastaminal disc (Fig. 17a).

The leaves are alternate, large and up to 25cm long, entire, clearly lobed and with an obliquely truncate to cordate base. The underside is glabrous with some hairs on the primary veins and pronounced tufts in the vein axils, sometimes even in secondary axils (Berlin BG). The upper leaf surface is very hairy at the junction of the petiole and lightly hairy on the veins but is otherwise glabrous. The petioles are up to 70mm long, broadened at the base and surround the naked, greyish-white hairy bud. The shoot zigzags from internode to internode, is a greyish-green with noticeable hairs on all the specimens examined.

The leaf shape is very variable. The plant of A. *chinense* from Dresden stands out with leaves of one shoot being relatively similar, either not lobed, lobed on one side or lobed on both sides. The size of the leaves varies from shoot to shoot. Larger leaves occur on more or less upright shoots (water shoots in the case of the Dresden plant (Fig. 7), while the foliage on the Berlin plant (Fig. 11) is more strongly lobed compared to smaller leaves on the more horizontal shoots (Figs. 8-10). The shape is very variable. The Berlin plant has

the largest and most strongly lobed foliage, is a strong growing, upright 3m tall plant in a container. Only a few leaves at the shoot tip are less lobed (Fig. 11b). On the other hand, the Strasbourg plant has the less lobed leaves (Fig. 14).

The stone fruit is round to ovoid, 7 × 6mm, glossy black with a light brown disc remaining at the tip. It contains two loculi although often only one is fully developed with the other smaller and barely noticeable although present in most cases. There is a channel between both chambers and each chamber ends in its own tip. It is not possible to ascertain from the outside if the seed is viable. The Dresden example had at least one well-developed seed within the fruit. The fruit had a relatively smooth outer surface and the channel between the two loculi was not very deep (Fig. 6). The Strasbourg plant had an undeveloped rudimentary seed within a stone fruit of comparable size but the surface was grooved and shrivelled. The dividing channel was much deeper (Fig. 15). The stone fruit is rarely illustrated in the literature but Eyde (1968) showed a ridged infertile stone fruit.

photograph © C. Neinhuis

Figure 21, *Alangium platanifolium*, BG Bonn: flower.

A specimen of *A. platanifolium* in the Forest Botanic Garden Göttingen [see pages 78-79] (Figs. 16-20) appears to be *A. chinense* although it also has *A. platanifolium* characters such as the long stalked and less numerous-flowered inflorescences and single loculed stone fruit. The leaves range from strongly lobed and deeply cut (Fig. 19) to little lobed and unlobed on one side (Fig. 20). For an *A. chinense*, this plant has atypical long flower stalks and up to six flowers per inflorescence, the lowest number observed, although it is within the range given in the reviewed literature. Typical for *A. chinense* are the short filaments, resulting in the flowers appearing shorter than in *A. platanifolium*. The seed source of this plant is unknown and it may possibly be a hybrid.

***Alangium platanifolium* (Siebold & Zucc.) Harms**

Siebold & Zuccarini (1843) described this species as *Marlea platanifolia* native to Japan. Roxburgh had created the genus *Marlea* in 1814 and Harms (1897b) transferred it to a section within *Alangium*.

This species is listed on many Japanese websites as having 6-8 petals and the same number of stamens, agreeing with Wangerin (1910) and other authors (for example Ohashi, 1999). Besides the small number of flowers of 1-4 per leaf axil, it is easy to notice that the longer filaments make the flower buds longer

than in *A. chinense*. According to Ohwi (1965), the flower size is 30-35mm long, while Bloembergen observed 30-40mm was the norm; Wangerin (1910) stated the petals were 32mm long, while Bloembergen noted they were between 28-37mm in length.

The opened petals are reflexed by two-thirds of their length, the basal third stays fused forming a tube, with filaments projecting to about half the length of the anthers. Closed flower buds are visibly thinner in the lower third due to the enclosed, thinner filaments. All the examined flowers, seen either as images on the internet or as actual flowers, have white petals fading to yellow. Rehder (1916) described two plants from west Sichuan, China as flowering rose-purple or pink. [*Alangium kurzii* var. *kurzii* in *The Flora of China* account (2008) has yellow to brick-red petals.]

Ohwi (1965) listed two species: *A. platanifolium* and *A. premnifolium* Ohwi which he described in 1938 and which Bloembergen (1939) transferred to *Alangium chinense*. Ohwi's description of *A. platanifolium* in 1965 disagreed with all other authors, listing 6 petals and 12 stamens. [BS did not see the original description by Siebold & Zuccarini but their original description does not mention any numbers! SA]. As mentioned earlier, a higher stamen number is typical for section *Alangium*, while in other sections the petal and stamen numbers are the same. This detail was sadly also copied into *The Flora of China* account, where the number of stamens is used in the key: stamens numbering not less than ten leading to *A. salviifolium*, *A. platanifolium* and *A. premnifolium*. Not a single photo of *Alangium* on a Japanese website showed a higher number of stamens compared to the number of petals.

The stone fruit always contains one locule although one often finds

Figure 22, *Alangium platanifolium*, BG Bonn: infructescence.

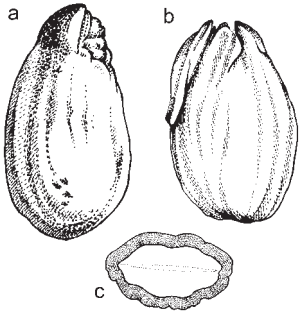


Figure 23, *Alangium platanifolium*, BG Bonn: **a-b**, two stone fruits side view, **c**, cross-section.

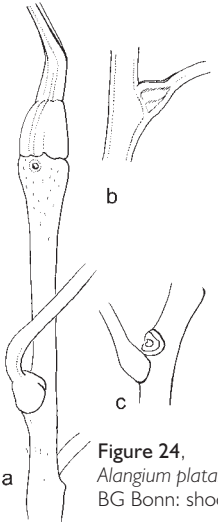


Figure 24, *Alangium platanifolium*, BG Bonn: shoot with petioles.

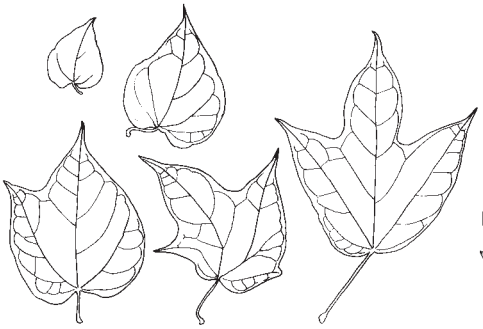


Figure 25, *Alangium platanifolium*, BG Bonn: leaf succession on a shoot from the base to the tip (proximal to distal), (14.7cm).

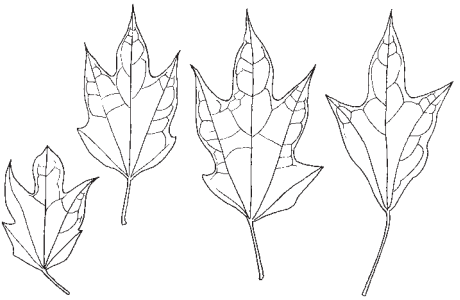
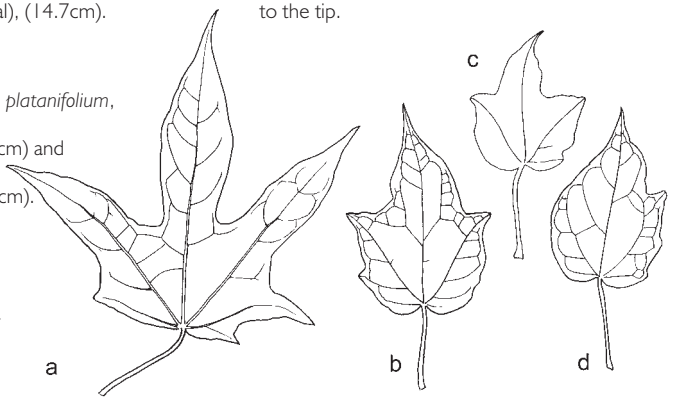


Figure 26, *Alangium platanifolium*, Arboretum Ettelbrück: leaves from the base of the shoot to the tip.

Figure 27, *Alangium platanifolium*, FBG Tharandt: **a**, normal leaf (17.3cm) and **b-c**, leaves on weaker shoot (12.5cm).



rudimentary evidence of a second much reduced one. The plant from Bonn Botanic Gardens had fruits with developed seed; some fruits contained a second locule (Fig. 23b) while others did not (Fig. 23a). A plant from Ettelbrück had one fruit containing a probable non-viable seed with a rudimentary second locule.

Information about the natural distribution is confusing. Having been described as native to Japan, Roloff & Bärtels (2006) included Korea, while Wangerin (1910) and Harms (1897) include Central China, e.g. Hubei province. Qin & Chamlong (2008) attributed a wider distribution for this species in China (Gansu, Guizhou, Hebei, Henan, Hubei, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, NE Yunnan, Zhejiang); Japan; Korea.

Sadly BS was unable to observe any actual flowers of *A. platanifolium* but did see photographs of the flowers, fruit, shoots and leaves of the plants from Bonn and Ettelbrück. They had at least in part more deeply lobed leaves than those of *A. chinense*. The relatively young plant at Ettelbrück had consistently deeply lobed leaves, the lobe numbers varying from 3-5, depending on the location of the leaf on the shoot. The Bonn example had deeply lobed leaves

Bloembergen's (1939) characters with the most important and key characters given in bold (all measurements in mm).

TAXA	*A. chinense*	*A. platanifolium*	*A. alpinum*
Flowers :			
Number of	7	6-7	(6-)7
Length	8-21	**30-40**	**21-27**
Stamen	7.5-17	27-35	14-18
Anther	5-10.5	15-21	8-10
Filament	**2.5-6.5**	**10-14**	6-8
Loculi	**2** (in Africa 1)	1	1
Inflorescence :			
Length without flowers	22-85	25-80	30-103
Number of flowers	3-**23** (-50)	1-7	**1-4**
Number of branches	1-4	1-2	1-2
Fruit :			
Length of fruit	5.5-13	7-14	13-20
Leaves :			
Lobing	Entire to strongly lobed	Mostly strongly lobed	Rarely single lobed
Length	50-300	55-210	45-210
Width	30-275	50-280	46-128
Petiole length	15-70	20-120	6-48
Twigs :			
Diameter	1-4.5	1.25-6	2.5-6
Growth :	sympodial	sympodial	sympodial

as well as little to hardly lobed leaves at the base of the shoot, which may be described as lower or transition foliage.

The Forest Botanic Gardens in Tharandt has two very young, sterile plants in containers, thus accurate identification was impossible. The leaves are deeply lobed (Fig. 27a), with only one weakly growing shoot having leaves with hardly any lobes (Figs. 27b-d).

***Alangium platanifolium* var. *trilobum* (Miq.) Ohwi (*A. platanifolium* var. *macrophyllum* (Siebold & Zucc.) Wangerin)**

In 1866, Miquel transferred *Marlea macrophylla* Siebold & Zucc., which has less defined three lobed leaves "*foliis minus profunde trilobatis*", to a variety of *M. platanifolia*. This variety is supposed to have large, weakly-lobed leaves, with cordate bases and an overall round to square leaf shape. Besides the true leaf tip, each leaf half has a further less pronounced tip.

Bloembergen's (1939) characters with the most important and key characters given in bold (all measurements in mm).

TAXA	*A. kurzii*	*A. rotundifolium*	*A. barbatum*
Flowers :			
Number of	**9**(5-10)	7	4-7
Length	17-32.5	7.5-24	**6.8-12.5**
Stamen	14-25.5	6-19.8	5.5-10.5
Anther	9-17.5	5-12.2	4-7
Filament	4-8	**0.75-7.5**	1.5-3.5
Loculi	**2**	1 (rarely 2)	1
Inflorescence :			
Length without flowers	12-70	12-52	13-25
Number of flowers	2-18	3-13	3-23
Number of branches	1-4	3-4	2-4
Fruit :			
Length of fruit	8-14	**16-28**	8-10.2
Leaves :			
Lobing	Not lobed	Not lobed, rarely slightly lobed	Not lobed, to slightly lobed
Length	40-280	55-220	35-217
Width	33-155	35-180	12-200
Petiole length	5-55	7-55	2-25(-50-160)
Twigs :			
Diameter	1.25-6	2-6.5	0.75-4.5
Growth :	sympodial	sympodial	**monopodial**

In his revision of *Alangium* Bloembergen (1939) discussed the various leaf forms and only recognised the two described by Wangerin (1910), i.e. var. *macrophyllum* (= var. *trilobum*) and var. *genuinum* (=var. *platanifolium*), both with deeply lobed leaves. He added that intermediate leaf forms between them exist and both varieties can often be found growing wild in the same area. Furthermore he added that he had observed both leaf forms, with or without intermediate shapes, on the same branch. In accordance with these and BS's own detailed observations, BS suspects it is not possible to differentiate the taxa by leaf shape alone.

Further taxa which may be cultivated

Besides the two above species, Bloembergen listed additional taxa native to central China, which might be hardy in central Europe and may unknowingly be in cultivation, i.e. *A. barbatum* Baill. ex Kuntze, *A. alpinum* W. W. Sm. & Cave,

A. kurzii Craib and *A. rotundifolium* (Hassk.) Bloemb. These were described in 1891, 1914, 1911 and 1935 respectively. In comparing their descriptions, there appears to be few tangible differences between them. Given the observed variability, it is questionable if the above are separate species. Ali & Qaiser (2001) suggested *A. rotundifolium* to be a synonym of *A. chinense*, while Qin & Chamlong did not accept a variety of *A. rotundifolium*, placing it instead as a synonym of *A. kurzii*, which itself has closely related characters to *A. chinense*.

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