Tree of the Year: *Toona sinensis*

Dedicated to the memory of Heino Heine (1923–1996)

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Introduction: the mahogany family, Meliaceae

Chinese toon, *Toona sinensis*, belongs to the mahogany family, Meliaceae, but unlike most species in that family it is deciduous. Because Meliaceae are almost entirely tropical, the family is poorly represented in cool temperate gardens, though the so-called Persian lilac, *Melia azedarach*, another deciduous species, is commonly grown and naturalized in warm temperate regions—and is perhaps so common as to be despised by the discriminating, despite its copious, sweetly-scented flowers and colourful fruits. However, one cultivar, 'Floribunda', a precocious, dwarf plant formerly used in subtropical bedding schemes, notably in nineteenth-century France, has made it as far north as Canada—as a plant for the window-sill (Mabberley, 2018), and has very recently been re-introduced to French horticulture from Australian stock.

The wood of *Melia azedarach*, an Indopacific species, is the 'white cedar' of timber merchants, but more familiar to the layperson are furniture timbers from other genera of Meliaceae, particularly the original mahogany (*Swietenia* spp.), from the Neotropics, and related trees in the subfamily Cedreloideae, characterized by their capsules releasing wind-dispersed, winged seeds, by comparison with the other subfamily Melioideae with fleshy seeds dispersed by animals (Mabberley, 2017 passim). Among the latter are the commercially grown fruits seen on market stalls in tropical Asia – the *langsat* and *duku* (apomictic cultivars of *Lansium domesticum*) and *santol* (*Sandoricum koetjape*). But timber is the main economic interest in the family, notably species of *Cedrela* besides *Swietenia* in the Neotropics; *Entandrophragma* (sapele, utile), *Khaya* and *Lovoa* (Nigerian golden walnut) in Africa; *Toona, Didymocheton* and *Dysoxylum* besides *Melia* in Asia and Australasia.

There can be few timber trees that are also grown as 'baby leaf veg', but the seeds of Chinese toon, which tree reaches 40 m in height in the Malesian highlands, are sold as 'beef-and-onion plant' by Suttons Seeds in England – to be germinated and harvested like other 'microgreens'.

The family Meliaceae, long studied at the University of Oxford, England, is allied to Sapindaceae, Rutaceae, Anacardiaceae and Simaroubaceae (which includes *Ailanthus*, see below), many or most of which, like Meliaceae, are

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Toona sinensis at Blithewold, Bristol, Rhode Is., USA. This Chinese toon appears to derive, likely by suckering, from a tree which, planted 'more than 30 years' before, flowered for the first time in 1926 ([Wilson], 1926). Before Augustus and Bessie Van Wickle bought the Blithewold summer estate in 1894, the original tree is thought to have been planted by the Gardner family (New York bankers), who first established the estate at Ferry Hill in 1851.

tropical trees with pinnate leaves. Meliaceae differ in having a very distinctive set of chemical defences against insects, azadirachtin from the neem tree (*Azadirachta indica*) of Asia being the most potent of known natural pesticides—even locusts are deterred. Neem is also used in some commercial toothpastes. Many other Meliaceae extracts are important in local medicine, most famous, perhaps, being those from the Asian shrublet, *Munronia pinnata*, which has been so exploited that, in Sri Lanka for instance, only small plants survive (Mabberley, 1985). Such 'genetic erosion' has been the fate of Cuban mahogany (*Swietenia mahagoni*) too, the large trees having been felled long ago, leaving only those of poor form to reproduce.

Interestingly, the word 'mahogany' is African in origin, *m'oganwo* being the Yoruba name for *Khaya* trees in subfamily Cedreloideae there and transferred (as were many other West African plant names), to their Neotropical equivalents by African slaves transported to the Caribbean by Europeans. Today the term mahogany is used for a whole range of medium-coloured, medium-weight timbers with working qualities similar to those of *Swietenia* spp., not only belonging to Meliaceae but also to a wide range of other families. Such include Benin mahogany, *Khaya* spp., and Australian mahogany (or rosewood!), *Didymocheton fraserianus* (formerly *Dysoxylum fraserianum* – Holzmeyer & al., 2021), besides Cape mahogany, *Trichilia emetica* (all Meliaceae), but also, for example (there are many more): Borneo mahogany, *Calophyllum inophyllum* (Calophyllaceae); Burma mahogany, *Pentace burmanica* (Malvaceae); cherry mahogany, *Tieghemella heckelii* (Sapotaceae); Colombian mahogany, *Cariniana pyriformis* (Lecythidaceae); East India mahogany, *Pterocarpus dalbergioides* (Leguminosae); Gaboon mahogany, *Aucoumea klaineana* (Burseraceae); Indian white mahogany, *Canarium euphyllum* (Burseraceae); Natal mahogany, *Kiggelaria africana* (Achariaceae); pod or red mahogany, *Afzelia quanzensis* (Leguminosae) and white mahogany, *Eucalyptus acmenoides* and *E. robusta* (Myrtaceae).

The genus *Toona*

Toona comprises some five species from south Asia to the western Pacific, often difficult to distinguish from one another in the absence of both flowers and fruits, though *T. sinensis* (also known as red toon, Chinese cedar or Chinese mahogany, etc. etc.) is readily recognisable because of its usually toothed leaflets and obnoxiously pungent bark, besides its seeds being winged at one end, unlike other *Toona* species where the seeds are winged at both ends.

Toona species are deciduous to semi-evergreen trees, with bud scales, leaves in spirals with opposite to subopposite leaflets and much-branched thyrses of small pentamerous flowers. According to Edmonds (2013), they have irregular reproductive cycles, their monoecious floral condition complicated by a labile sexual system, as also obtains in *kohe-kohe* (*Didymocheton spectabilis* [also Meliaceae], formerly *Dysoxylum spectabile*) in New Zealand, resulting

Right, *Toona sinensis* at Fraser's Hill, Peninsular Malaysia, December 2021.
Below, trunk detail.

in dichogamy, polygamy and anomalous floral development (Braggins *et al*., 1999). Usually there are successive waves of male, then female, flowers opening, the males far outnumbering the females.

The most recently described (2015) species is *Toona calcicola,* restricted to limestone in Thailand and unique in bearing erect inflorescences, like those of *Cedrela odorata*, but perhaps the most famous toon is *T. ciliata,* which grows naturally from Afghanistan and India to eastern Australia, where it is known

Toona sinensis (as *Cedrela serrata*); from the watercolour made for John Forbes Royle at the Saharanpur Botanic Garden, India, by Kolkata (Calcutta) botanical artist Vishnupersaud and published in Royle's Illustrations of the botany…of the Himalayan mountains, t. 25 (1839).

as 'red cedar'. Heights to 60 m and bole diameters to 3 m have been recorded. In 1803 it was scientifically named *Cedrela toona*, the specific epithet being from its Hindi vernacular name, *tun*, cognate with the Sanskrit *tunna*. It is grown as a street tree in India and its insect-resistant timber has been heavily exploited there, as it has in Australia, for house and boat building, particularly used for doors, mouldings and furniture (and coffins) in Australia in the nineteenth century (McPhee, 2004), but also for tea chests, musical instruments and even pencils. In Australia it has been largely worked out. The foliage is used as cattle fodder in India, where flowers have been used as sources of red and yellow dyes; as with many other Meliaceae, extracts have been used in local medicines almost throughout its range.

As early as 1846, the genus *Toona* was separated from *Cedrela*, though some collection managers (and horticultural writers) still label Chinese toon *Cedrela sinensis*. *Cedrela* is a neotropical genus of 19 species, differing most strikingly from *Toona* in that their similar woody capsules have seeds attached to the lower part of the middle of the fruit unlike in species of *Toona*, where they are attached at the apex. Nonetheless, the two genera are closely related and the Trans-Pacific distribution of this pair is difficult to explain away in terms of current biogeographical orthodoxy, as is the similar distribution of the *Didymocheton* (Old World) – *Cabralea* (New World) generic pair, as well as yet others in the family (Heads, 2019). The first described true *Cedrela* was

C. odorata, now CITES-listed but naturalized in the Mediterranean, as on Stromboli for example, and invasive in tropical Africa as well as the Galápagos. Its timber is still used in rather characteristic cigar boxes, but also mothproof chests, the wood yielding gedunin, an antimalarial also found in Chinese toon, as well as in neem.

> ***Note***. It is often confusing to those from the north temperate regions to find tropical trees referred to as 'cedar' (as in Australia with 'red cedar' for *Toona ciliata* and 'white cedar' for *Melia azedarach*), when that word is from the Greek *kedros* via Latin *cedrus* and Old French *cèdre*, of course referring to the wood of the coniferous cedar of Lebanon (*Cedrus libani*). By the seventeenth century, though, similarly aromatic, but tropical, timbers were being called *Cedrus*, as in the 1690s name 'Cedrus barbadensium…' which was to become *Cedrela odorata*, the new generic name reflecting that superficial similarity (Mabberley, 2004).

Description

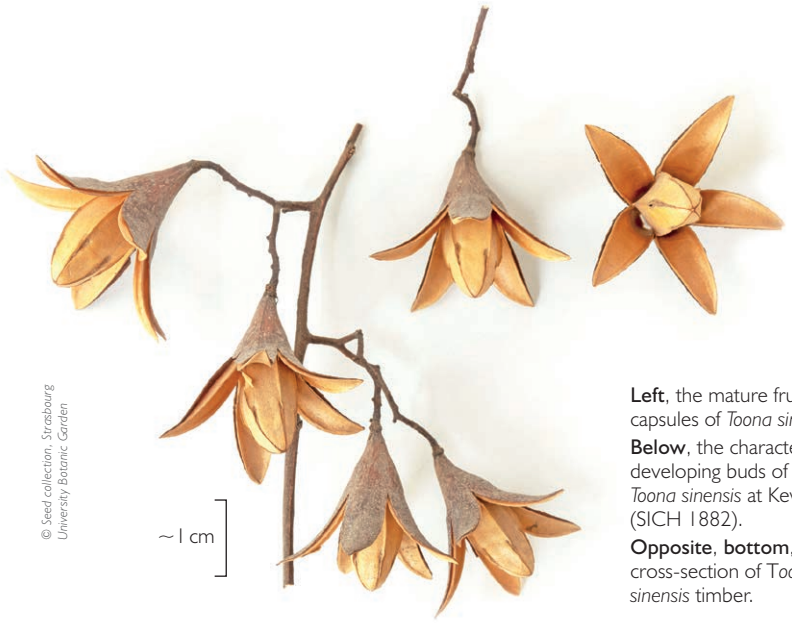
Toona sinensis (A. Juss.). M. Roem., Synops. Monogr. 1: 139. 1846; *Cedrela sinensis* A. Juss. in Bull. Sci. Nat. Géol. 23: 241. 1830. Type specimen from China (see page 36).

Cedrela serrata Royle, Ill. Bot. Himal. 144, t. 25. 1839; *Toona serrata* (Royle) M. Roem., Synops. Monogr. 1: 139. 1846. Type specimen from India (opposite).

Cedrela serrulata Miq., Fl. Ind. Bat., Suppl. 508. 1861; *Toona serrulata* (Miq.) Harms in Engl. & Prantl, Nat. Pflanzenfam. 3, 4: 269. 1896. Type specimen from Indonesia (Sumatra).

Ailanthus ('*Ailantus*') *flavescens* Carrière in Rev. Hort. 1865: 366. 1865. Type

The spectacular flowers of *Toona sinensis* at The Savill Garden.



© Seed collection, Strasbourg University Botanic Garden

Left, the mature fruit capsules of *Toona sinensis*.
Below, the characteristic developing buds of *Toona sinensis* at Kew (SICH 1882).
Opposite, **bottom**, a cross-section of T*oona sinensis* timber.

specimen cultivated in France from Chinese material (see page 38). *Ailanthus* (*'Ailantus'*) *mairei* Gagnep. in Notul. Syst. Paris 11: 164. 1944. Type specimen from China.

Deciduous tree, in wild populations in Malesia to 40 m tall (but usually less than 30 m in China and in cultivation elsewhere), with a bole to 20 m tall and 1.5 m diameter, the buttresses to about 1 m tall; root-suckers developing where soil is disturbed, so particularly commonly seen in gardens. Bark dark brown to grey, fissured, peeling off in strips, inner bark pink to red; sapwood creamy to red, with a very strong smell of garlic and pepper when cut. Twigs somewhat pachycaul with conspicuous cicatrices; young shoots pubescent; terminal buds surrounded by broadly triangular modified leaves, the buds often not surviving the winter in cultivation (Lubbock, 1895). Leaves pink when young, in seedlings imparipinnate up to 1.2 m long, though usually much less in cultivation, later paripinnate with leaflets in 8–20 pairs, 11–22 × 3–5.6 cm, narrowly lanceolate to linear-lanceolate, base asymmetric, margins

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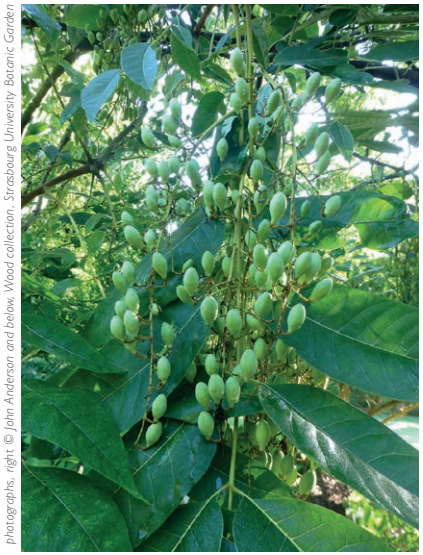
serrate or serrulate, apex acuminate. Inflorescences (thyrses) to 1 m long, pendent. Flowers pentamerous, with powerful sour smell, 3.5–4.5 mm long in bud; pedicel *ca.* 0.5 mm long; calyx cupular with sepals 0.5–1.1 × 0.6–1.8 mm; petals 2.8–4.2 × 1.1–2.9 mm, white to flushed pink; staminodes always present, alternating with stamens; ovary with up to 6 ovules per locule. Capsules 1.5–3.0 cm long, woody, pendulous, valves reddish to dark brown, smooth to punctate with scattered lenticels; seeds winged at one end, 8–16 × 3.5–6.2 mm.



photographs, right © John Anderson and below, Wood collection, Strasbourg University Botanic Garden

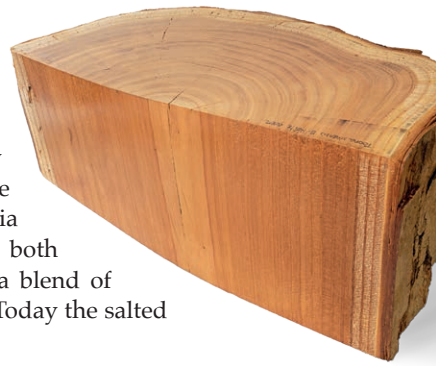
Immature fruit of *Toona sinensis* at The Savill Garden, Surrey, England.

Distribution

Nepal and Bhutan, and highlands (350–2,000 m) of India, SW and C China, North Korea, Myanmar, Laos, Thailand, peninsular Malaysia, Sumatra, Java and Borneo (Sabah). Originally confined to primary forest, often near streams, it is also found colonising secondary forest and other disturbed sites. The species is endangered in China now and is listed as Grade II in the national list of protected plant species released in 1999.

Uses

The timber is reddish, fragrant and easily worked, so has been used for furniture and construction, including for bridges in China. According to Wang (1988) Chinese toon has been grown for its wood since before the middle of the third century BCE. The bark is astringent and purifying, the powdered root diuretic. The young shoots and leaves are crisp, and distinctly aromatic, with floral, onion-like aroma when fresh; the seedlings are now being promoted in the West as 'microgreens' (see page 26). The leaves are a good source of antioxidants and contain beta-carotene, vitamin E, riboflavin, folic acid, calcium and iron. For over 2,000 years they have been boiled and eaten as a vegetable by the Chinese in China—and subsequently Malaysia and beyond, for their umami flavour, with both earthy and pungent flavours reminiscent of a blend of garlic, mustard greens and fermented chives. Today the salted



Wild *Toona sinensis* at 1,390 m in Sichuan Panzhihua Cycas National Nature Reserve, south-west China, September 2010.

shoots are usually eaten cold, with sesame oil (Valder, 1999: 335). Commercial pastes prepared in China are exported all over the world and are eaten with rice porridge and, particularly, in egg and other named toon dishes with fried rice, noodles, bean curd or mushroom soup (Yong Yang, pers. comm. 2021).

Formerly 'very common' around Beijing, and in western and central China generally, Chinese toon has been much cultivated in central China, where the trees were often recorded as disfigured because they were kept dwarf, so that young shoots could be more readily harvested (Henry, 1907; Rehder & Wilson, 1916). Chinese toon was sometimes grown thus in peach orchards, for example (Koller, 1978), but it was also valued for its wood, which was used in making furniture and window frames at the beginning of the last century, then being one of the most appreciated of all Chinese timbers (Yong Yang, pers. comms., 2021).

In Chinese literature, *Toona sinensis* figures in classical metaphor, with a mature tree representing a

Commercial toon paste prepared in Pucheng County, east Shaanxi Province, north-central China. The label says that the paste contains hot pepper (Capsicum) as well as *Toona sinensis* leaves (xiang chun).

father. This imagery persists even today, if rarely, in extending best wishes (椿萱并茂) in a letter to a correspondent's parents, 'hoping that your *Toona sinensis* and daylily (*Hemerocallis*) live long and healthily', with *Toona sinensis* referring to the father and daylily to the mother (Yong Yang, pers. comm., 2021). Moreover, Chinese toon was often planted in the yard of a house (see Valder, 2002: 156–157), symbolising father, with daylily in the 'northern room', symbolising mother.

First knowledge in the West

In the nineteenth century, Chinese toon was described independently in France (1830, from material collected in China in 1743), then Britain (1839, from India) and, lastly, The Netherlands (1861, from Indonesia), so receiving three binomials now considered synonyms. The first named was due, ultimately, to the work of Pierre Nicolas Le Chéron d'Incarville (1706–1757), who was a French Jesuit missionary sent to China in 1740; he died there. A pupil of Bernard de Jussieu (1699–1776) at the Jardin du Roi in Paris (now Jardin des Plantes), Incarville sent to Jussieu, by Russian caravan, 149 herbarium specimens, as well as seeds, of different native plants from the Beijing area. The specimens included a herbaceous plant which was to be named *Incarvillea sinensis* (Bignoniaceae), commemorating him, and the tree of heaven, *Ailanthus altissima* (Simaroubaceae), which Incarville called 'frêne puant' (stinking ash), besides *Toona sinensis* (his 'frêne odorant').

Contrary to what is to be found in much secondary literature, Incarville's collections did not effect the introduction of Chinese toon to European cultivation. However, his seeds of the tree of heaven led to that tree becoming established in Jussieu's garden and, around 1751, at the Chelsea Physic Garden, London (Bretschneider, 1898: 46–56)—with the eventual, well-known, dire consequences across Europe and the western hemisphere, as well as Australia. Among many other Chinese tree species, Incarville also introduced *Styphnolobium japonicum* (*Sophora japonica*, Leguminosae), *Koelreuteria paniculata* (Sapindaceae) and *Platycladus orientalis* (*Thuja orientalis*, Cupressaceae).

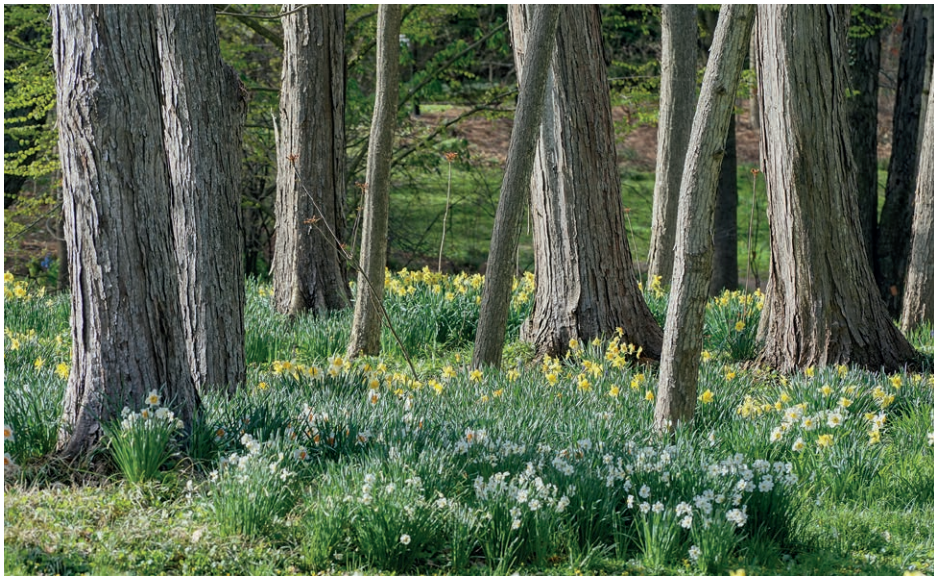
Incarville prepared a catalogue of Chinese plants and their uses, an account which was published in 1812–1813 in *Mémoires des Naturalistes de Moscou*; he was also the first European to describe the kiwifruit or Chinese gooseberry (*Actinidia chinensis* var. *deliciosa*). After Jussieu's death, Incarville's collections passed to Jussieu's nephew, Antoine Laurent de Jussieu (who described the Chinese toon as *Cedrela sinensis* – see above) and are preserved in the herbarium of the Muséum national d'Histoire naturelle in the Jardin des Plantes in Paris. In 1839, the eccentric and prolific Italian-American botanist Constantine Rafinesque proposed (in a book on mulberries!) that Incarville's 'frêne odorant' might be called *Mioptrila odorata* and, had he been less hesitant in his text, *Mioptrila* would have been the correct name for what is now *Toona*, a name published a few years later; long before all that, the great orientalist Sir

Incarville's original herbarium specimen of 1743, courtesy Muséum National d'Histoire Naturelle, Paris, through the good offices of Cécile Aupic.

William Jones had Latinised a local Indian name, *Cuveraca*, for *Toona ciliata*, in 1795, though again it was used in an unacceptable nomenclatural way.

Spread in cultivation

Chinese toon was introduced to Sri Lanka (Ceylon) in 1852, but the source is obscure, though likely Indonesia, as Macmillan (1935: 172) used the name *Cedrela serrulata* (see above) with the vernacular name, Java mahogany. It continues to be much planted on tea estates there for shade, and for windbreaks, besides for its timber (Mabberley, 1995); it has become naturalised in disturbed vegetation in the lower montane forest of the island.



Toona sinensis at the Morris Arboretum, Pennsylvania.

Although known to French botanists since 1743, Chinese toon was not introduced to cultivation in Europe until 1861 or 1862, when, through the good offices of the French minister in Beijing, the diplomat, writer and plant collector (Gabriel) Eugène Simon (1829–1896) sent material (according to some sources as a live plant, though likely just seeds) to Paris. After working in Senegal, Simon had been sent to China and Japan in 1860 to study local agronomic practices. That November, during the Taiping Rebellion, just a few weeks after the end of the Second Opium War and the sacking of the Summer Palace by the French and British, Simon was appointed French Consul in what is now Ningbo, south of Shanghai; he left China at the end of 1871 and was later appointed French Consul in Sydney. From China he sent live plants, as well as seeds and herbarium specimens, of Chinese plants to the Jardin des Plantes (Bretschneider, 1898: 827–833) and is commemorated in the names given to some of his collections, notably the apricot plum, *Prunus simonii* (a cultigen first named *Persica simonii*, Rosaceae, China), as well as the bamboo, *Pleioblastus simonii* (medake, Gramineae), and *Eleutherococcus simonii* (Araliaceae). However, it must be noted that, according to Baltet (1895: 406), the garden also received seeds from Father Armand David CM (1826–1900) as early as 1862.

It appears that Simon had connections with the great nursery firm of Thibaut & Keteleer of Sceaux, near Paris, which likely received seeds from Simon himself, because the nursery was soon offering Chinese toon for sale. It was

Fig. 15. — *Cedrela sinensis*, Juss.

Left, The original tree in the nursery at the Jardin des Plantes in Paris, 1875. Engraving after E. Godard. (Revue Horticole 1875: 87. 1875).

Opposite, Chinese toon in Boulevard Saint-Marcel, Paris (November 2018).

soon spread in the French trade, being rapidly listed by leading provincial nurserymen like Lery at Angers, Dauvesse at Orléans and Simon-Louis at Metz-Plantières, for example. In 1865 a Chinese toon, raised in the nursery of the Jardin des Plantes and planted out on the bank of the Bièvre between rue Buffon and rue Poliveau, was duly named *Ailanthus flavescens*, though it is easily distinguished from true *Ailanthus* by the absence of glandular teeth on the leaflet margins (marked in an old name for *A. altissima, A. glandulosa*), besides the shoots with very different odours.

By 1875, the original tree, then with a bole 20 cm in diameter 1 m above the ground, flowered for the first time, thus revealing its true identity. Élie-Abel Carrière (1818–1896) pronounced the living material identical with authentic herbarium material of '*Cedrela sinensis*'; a flowering branch was exhibited at a meeting of the Académie des Sciences in Paris the next year (Decaisne, 1876). By 1891 the tree had attained '40 feet', and when Henry Elwes saw it there in 1905 it had a girth of '4 feet' (Henry, 1907). It died in 1970, but, according to the record of historical trees at the Jardin des Plantes, there is today on the site of the old nursery a tree which grew from one of its root suckers (Frédéric Achille, pers. comm., 2021).

By 1883 Chinese toon started to become one of the characteristic street trees of parts of Paris (as it is today), because Charles Rafarin (?1826–1887) of the city's horticulture department, charged with managing street trees in the face of the disease-proneness and deaths of *Ailanthus altissima* widely used in the boulevards, decided to trial *Toona sinensis* that year. The first Chinese toons to be planted out, in 1886, were in rue du Jourdain, Belleville in the XXe arrondissement (André, 1891; Pinelle, 1922); although pruned heavily in 1920, the trunks of those original trees had a circumference of 1.2 m by 1922. By 1891,

though (André, 1891), there had been no successful seed set from flowering trees in Paris, so the early plantings must all have been clonal.

In 1922 there were 2,452 Chinese toons in Paris streets, particularly fine being those in the avenue des Gobelins, boulevard de l'Hôpital, boulevard de la Bastille, boulevard Richard-Lenoir and avenue Parmentier (in some of which they are still the principal street trees). *Toona sinensis* indeed proved to be less prone to disease and insect attack than *Ailanthus altissima*, but, perversely, today many of the avenues of Chinese toon have the odd *Ailanthus* amongst them, no doubt muddled as young plants in a nursery. But it is difficult to understand how herbarium specimens of flowering material of Chinese toon from Yunnan also came to be assigned to *Ailanthus* (yet again), when François Gagnepain (1866–1952), working in the Muséum in 1944 referred them to his 'new' species, *A. mairei* (see above) – particularly when the label written by the eponymous French missionary collector, Édouard-Ernest Maire (1848–1932, also commemorated in Chinese yew, *Taxus mairei*) explicitly notes (my emphasis) 'arbre moyen dont *les jeunes pousses sont comestibles*'!

Since then, some of the Chinese toons in Paris have been replaced (Henri Peyrétout pers. comm. November 2021) with *Gymnocladus dioica* (Leguminosae) and *Fraxinus* spp. (Oleaceae). Meanwhile, *Toona sinensis* has become quite a common tree in Belgium and The Netherlands, though it seems not to have been widely introduced in the United States until after this early spread in Europe.

According to *Garden and Forest* 9: 279 (1896) a tree planted in West Virginia

Toona sinensis autumn colour at Morris Arboretum, Pennsylvania.

about 1888 was '20 feet' tall in 1896. Suggestive of even earlier plantings, a tree flowered in both 1895 and 1896 at Thomas Meehan's nursery, Germantown, Pennsylvania (*Garden and Forest* 9: 260. 1896), by which time Samuel Moon of Morrisville, Pennsylvania, was offering plants of 'Ailantus flavescens' at $1.50 (*Catalogue of Ornamental trees* (etc.) p. 4. 1896). Meehan's was the source of plants used in street plantings (mostly now removed) in Philadelphia, where the oniony odour they imparted to the air was unmistakeable (Tony Aiello, pers. comm. September 2021).

Chinese toon was grown from seed in Massachusetts, at the Arnold Arboretum, in 1892 ([Wilson] 1926), though the oldest plant there today came from the nursery of Jacobus Jurissen en Zoon in Naarden, The Netherlands, in 1903; in 2002 its trunk snapped in half and the tree was removed, though it resprouted such that a new trunk is now about 10 m tall and has a 17 cm diameter bole (Michael Dosmann, pers. comm. September 2021).

Cultivation

Chinese toon is propagated by seeds (though damping-off can be a problem) or by stem (see Koller [1978] for protocols) or root cuttings. It is tolerant of most soils, including heavy clay and very limey ones, but it grows best in moist conditions. This catholicity in what was originally a rain forest tree is also found in other cultivated Meliaceae including *Melia azedarach*. Although intolerant of shade, Chinese toon is tolerant of road salt and can withstand

extreme weather conditions, including droughts, so it is excellent as a street tree, as can be seen in not only Paris, but also Philadelphia and elsewhere. It exhibits clear yellow autumn colour and is hardy to Zone 6.

It is important not to disturb the ground around the tree, as any damage to the roots promotes the production of root suckers which can be a nuisance. When mature (for example, the best Chinese toon at Kew, planted in 1907, did not flower until 1947), it produces large trusses of aromatic flowers, followed by characteristic woody capsules, splitting to release wind-dispersed, winged seeds (though fruiting was not recorded in Britain, for example, until 2007 [Anon., 2008]). At the Arnold Arboretum, 'Despite attempts over the past century, none of the accessions of wild source have survived—almost all have died while in the nursery. I suspect that the very young, juvenile plants (seedlings) were intolerant of those early winters' (Michael Dosmann, pers. comm., September 2021).

Chinese toon grows very fast. For example at the Arnold Arboretum, a plant bought from Heritage Seedlings in 1995 is now over 17 m tall and has a diameter at breast height of 30 cm (Michael Dosmann, pers. comm. September 2021). It is rarely attacked by insects, but it is very prone to wind damage when young (Lawrence Banks and Rowan Griffiths, pers. comm. September 2021) and is very susceptible to honey fungus. A grove was established by the author in the Fellows' Garden at Wadham College, Oxford, the trees being raised by head gardener, Andrew Little, from seeds gathered in the late 1980s from fruiting trees in boulevard St Marcel, Paris. These were collected, rather perilously, by the author leaning out of one of the windows of the Slavia Hotel suite occupied for many years by renowned and much lamented IDS member, the late and inimitable Heino Heine (the effort eased by the sharing, beforehand, of a bottle of Ch. Palmer 1961 from the Wadham cellar). Though well-established, the Wadham grove rapidly succumbed to the fungus, following the death of the large and celebrated purple beech (planted *ca*. 1795), the source of infection in that garden.

At Hergest Croft, Herefordshire, a large tree (in 1995, 23 m tall with a girth of 220 cm at 1.5 m), weakened by woodpecker holes, was stooled in 2004 after becoming dangerous: 'We think it may [have been] a favourite of woodpeckers, as the noise that was generated from them banging on the trunk was a familiar cacophony in our azalea garden' (Lawrence Banks and Rowan Griffiths, pers. comms September 2021). 'It dated from before 1930 and could have been a [E. H.] Wilson introduction from his last expedition to China, as it was contemporary with other introductions growing there'. Indeed, as early as 1911 Veitch in Chelsea was offering '*Ailanthus flavescens* (*Cedrela sinensis*)' plants for 1s 6d to 2s 6d (*Hardy Ornamental Trees and Shrubs* Catalogue 19: 56. 1911), likely raised from Wilson material.

Overall, the tree seems not to be exceptionally long-lived, the Monticello (see p. 42) and Paris experiences suggesting a maximum of *ca* 130 years or so.

Top, Chinese toon photographed in 1920, left of the North Pavilion, Monticello, Virginia, USA. **Above**, Taken some one hundred years later, this photo shows the tree in 2021. The gardens at Monticello, as well as the house, were restored by Jefferson Monroe Levy (1852–1924), who was a rich businessman, three-term New York congressman and lawyer, who bought the estate at auction in 1879 and owned it until it was taken over by the Thomas Jefferson Memorial Foundation in 1923. According to Gabriele Rausse (pers. comm. November 2021), "The tree is now starting to show its age. The top is yellowing early in the late summer well before other trees. It has been in a location that has been much disturbed in the past 20 years so that hasn't helped it. We do have issues with it sending up root sprouts. They appear all over at 2× the dripline, luckily most are controlled in turf by mowing and others are dug from garden beds at regular intervals".

Notable extant specimens worldwide

		GIRTH	HEIGHT
USA	North Pavilion Monticello, Charlottesville, Virginia	4.83 m	~27.10 m
France	Jardin Botanique de l'Arquebuse, Dijon	3.70 m	21.20 m
France	Pépinière Paul Croix, Bourg-Argental, Loire	2.85 m	16.00 m
Netherlands	Castle-Museum Sypesteyn, Loosdrecht, nr Amsterdam	2.50 m	16.40 m
Germany	Späth Arboretum, Berlin	2.36 m	?
France	Jardin des Plantes, Caen, Calvados	2.35 m	?
Germany	Hamburg-St.Pauli, Park Planten un Blomen	2.18 m	~19.00 m
Netherlands	Delft, Botanische Tuin	2.08 m	20.80 m

https://www.monumentaltrees.com/en/world-toonasinensis/ [accessed December 2021]

Notable Chinese toons in Pennsylvania

The north-eastern United States, especially Pennsylvania, is particularly rich in even larger specimens than that at Monticello, the 'World Champion' possibly being one of those at Swarthmore College (see photo, below and table, overleaf).

Trunk of the larger (S01732*A) of two Chinese toons at the Scott Arboretum, Swarthmore College, Pennsylvania. Received from Henry Kohankie and Son Nurseries, Painesville, Ohio, in 1932 (their catalogue of that year offered trees at '5 to 6 feet' at $1.60 each), is now '96 ft [29 m] tall with 55 ft [17 m] spread and a bole 68.2 inch [173 cm] diameter [525 cm girth]' according to Arboretum records. Information courtesy Tony Aiello.

Grove of *Toona sinensis*, originating from a tree planted in the early 1900s, Morris Arboretum, Pennsylvania, 2021.

PENNSYLVANIA	GIRTH (inches)	HEIGHT (feet)	SPREAD (feet)	POINTS
Galen Hall Corp., Wernersville, Berks County	101	85	78	206
34 S. 10th St. Quakertown, Bucks County	112	73	67	202
Morris Arboretum, Philadelphia. In grove originating from a tree planted in the early 1900s (above)	75	102	57	191
Coleman Memorial Park, Lebanon County	101	65	60	181

https ://www.pabigtrees.com/tree-listings [accessed December 2021]

Europe

By comparison with the large North American trees, those in Europe are generally more modest in size, but some exceptional ones are in the table on page 43. To be added to those is the by far the largest Chinese toon in Belgium, namely that in boulevard Leopold, Tournai, at 23 m tall with a girth of 253 cm in 2016 (I am grateful to Philippe de Spoelberch for this information). In Britain, according to *The Tree Register*:

UNITED KINGDOM	GIRTH (cm)	HEIGHT (m)
The Lost Gardens Heligan, Mevagissey, Cornwall (1959)	251	27
Blagdon Hall, Newcastle upon Tyne, Northumberland (planted 1908)	235	19
Royal Botanic Gardens Kew, Richmond, Greater London (2010)	207	18
Frensham, Surrey (2010)	176	23
Sir Harold Hillier Gardens, Hampshire (2020)	132	18.5
Placketts Hole, Kent (2016)	116	20
National Trust Trelissick, Truro, Cornwall (2014)	110	20

In Ireland, Glasnevin has the tree with the greatest girth, the tallest tree likely that at Birr Castle (*Tree Register of Ireland* held at Glasnevin – information courtesy Matthew Jebb, see table overleaf).

Cultivars

The wild type is not the form most grown in modern horticulture. Very commonly seen today is 'Flamingo', which has a rather fastigiate habit and

Toona sinensis in Parc de Luxembourg in Luxembourg, 2008.

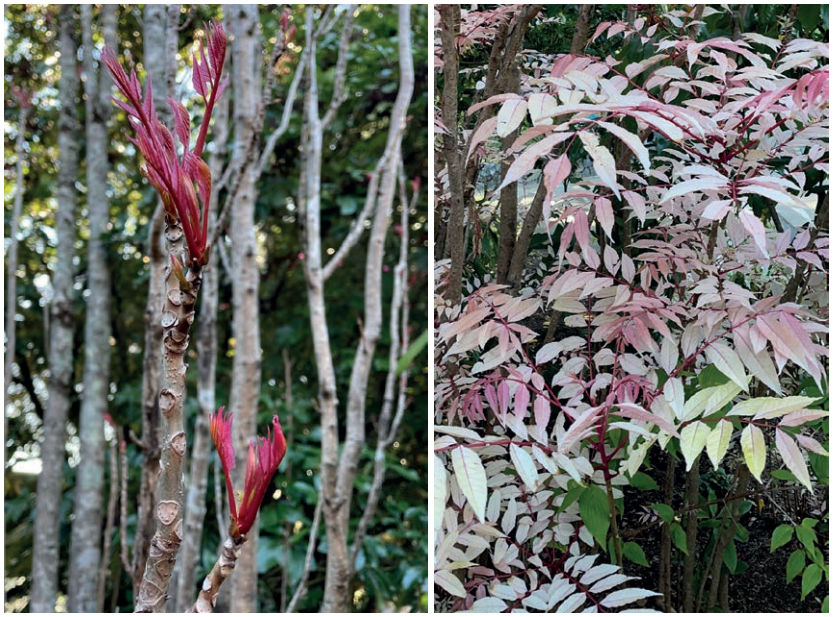
IRELAND	HEIGHT (m)	GIRTH (m)	DATE MEASURED
Ballaghaderneen, Co Carlow	21.0	1.32	-
Birr Castle, Birr, Co Offaly	20.0	1.97	1999
The Presbytery, Berkeley Road, Dublin 7, Co Dublin	18.0	2.31	2006
Headford Preparatory School, Kells, Co Meath	17.8	1.46	2000
National Botanic Gardens, Glasnevin, Dublin 9, Co Dublin	17.0	3.19	2012
National Botanic Gardens, Kilmacurragh, Co Wicklow	17.0	2.37	2014
Coolcarrigan, Co Kildare	17.0	1.07	2019
Berkeley Court Hotel, Ballsbridge, Co Dublin	16.0	2.65	2007
St Stephens Green, Dublin 2, Co Dublin	16.0	2.21	2007
St Stephens Green, Dublin 2, Co Dublin	16.0	1.97	2007

often forms a non-flowering thicket of largely root sucker shoots. It has startlingly red leaves when young, turning pink and then creamish after two or more weeks, before greening up, but its jarring gaudiness is not to everyone's taste. Indeed, according to the current catalogue of Broken Arrow Nursery in Connecticut, it 'welcomes Spring like a bull in a china shop'. It is very fast-growing, reaching 6 m in six years at Twickenham, England (Rafael Govaerts). There are no records of its flowering anywhere.

'Flamingo' was being grown in Australia before 1930 and was introduced to New Zealand without a cultivar name by Auckland nurseryman and orchardist Hayward Reginald Wright (1873–1959), commemorated in the most widespread of all kiwi fruit cultivars, 'Hayward'. Wright was the owner of Avondale Nurseries, Rosebank Road, Auckland, where the original plant was established, but it was not propagated there.

On Wright's death the nursery became a market garden and consequential soil disturbance led to the emergence of root suckers around the tree. According to one Norah Copsey, she herself obtained some of the suckers around 1950 and passed them to a nurseryman renowned for developing *Hibiscus*, J. J. ('Jack') Clark (of Titirangi), who did propagate it, such that it soon became a commonly seen plant in the North Island (Redgrove, 1985). It was being grown in The Netherlands by 1976, but, only in 1982 (Redgrove, 1985), was a plant sent to Wisley (from New Zealand). The name 'Flamingo' was coined for it in *ca.* 1981 by plantsman and author, Hugh Beynon Redgrove (1906–1991)—or perhaps by Jack Clark himself.

To Australian growers' chagrin it was then re-introduced to Australia, where it had been selected and long grown, but now under the new name



Toona sinensis 'Flamingo'. Blue Mountains Botanic Garden, Mount Tomah, New South Wales, 2021: ***left***, emerging leaves; ***right***, foliage a few weeks later.

from New Zealand. Although the original Australian grower is unknown, it is perhaps worth noting that forms with the reddest young leaves are considered to have best flavour in Chinese cuisine, so could 'Flamingo' have been a selection introduced from China by Chinese Australians?

The tallest two 'Flamingo' in Britain (10 m and 10.5 m in 2019) are at Wisley, the larger planted in 1996, though their girth is exceeded by that of a plant at White House Farm, Ivy Hatch, Kent, at 58 cm.

> ***Note***. Occasionally offered is 'Lise', which Matt Pottage (Wisley) found, to his chagrin, to be merely... *Ailanthus altissima*, no less. The horticultural department of the City of Paris is reported to have selected *T. sinensis* 'Ailanthifolia' for its street planting (https://jardinage.lemonde.fr/dossier-1934-cedrele-chine.html - accessed 5 December 2021), perhaps an unfortunate coining.

Conclusion

Chinese toon is a fast-growing, readily cultivated tree for most soils in temperate regions (and at altitude in the Tropics). It makes an excellent, generally disease-free, street tree, affording good shade in hot streets in summer. Koller (1978) has made a powerful case for reviving ornamental plantings of Chinese toon in US urban landscapes.

Almost 80 years ago, French botanist Auguste Chevalier (1944) was promoting use of Chinese toon in temperate-zone plantations. Hitherto,

though, its fine wood has not been appreciated as much as that of related species but, with the diminution of available timber supplies of those, it could well come to be of great significance, bearing in mind its easy cultivation provided root suckering can be minimised. In warm countries it can become invasive, however. Modern usages for the wood include the manufacture of boxes, barrels, crates and pallets, while it already has a place in joinery, and the making of fences and gates, flooring and panelling, besides the production of short-fibre pulp. It is also of value in the woodware industry, being used for cutlery and tool-handles, besides musical instruments, including guitars, and marquetry, as well as in wood carving and turnery. (https://www.cabi.org/isc/datasheet/54176#tosummaryOfInvasiveness – accessed 30 Nov. 2021).

Chinese toon is also strikingly ornamental, particularly as 'Flamingo', though the flamboyance of that cultivar is perhaps more for the suburban plot than a serious arboretum. In warmer countries, other less grown Meliaceae are also promising as ornamentals, perhaps the most attractive being *Heynea trijuga* from Indomalesia. Its use in gardens and roadsides because of its fragrant white flowers and vivid pink fruits (Corner, 1940: 462) was promoted long ago by one of the greatest tropical botanists of all time, E. J. H. ('John') Corner (1906–1996) of the Singapore Botanic Gardens (and later Cambridge University, and, incidentally, this author's doctoral supervisor and life-long inspiration).

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Tree of the Year 2022

For 2022, the chosen taxon is *Kalopanax septemlobus*, Araliaceae. Please send your comments, photographs, particularly any of the species growing in its wild habitat, and any other information (in any language) to Tom Christian, contact@tomchristian.info

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