

# Trees in the landscape, Part 1: *Angophora costata*

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**F**EW TREES IN THE CALIFORNIA LANDSCAPE rival *Angophora costata* for majesty and grandeur. Simply walk Kenilworth Avenue in Pasadena in the mid-morning light and you know you are walking among special, imposing trees (Fig. 1). Somewhat reminiscent of its close eucalypt relatives, lemon-scented gum (*Corymbia citriodora* [formerly *Eucalyptus citriodora*]) and spotted gum (*C. maculata* [formerly *E. maculata*]), *A. costata* has a picturesque, irregularly branched, moderately dense, dark green canopy (Fig. 2) and muscular, multi-colored, smooth-barked branches and trunk (Figs. 3-4). A colorful tree, it is startling and impossibly handsome in late spring and early summer when conspicuously covered with dense clusters of white flowers, new growth has flushed coppery red, and the grayish bark is peeling to reveal extensive, showy bright orange brown to pinkish brown patches, giving the trunk a characteristic orange to pink hue (Figs. 5, 8-9).

Highly praised by those who have seen and used it (Clark 1979) and deserving of wider use, *Angophora costata* excels in coastal areas and coastal and intermediate valleys of southern California, grows well in coastal central and northern California (especially around the Bay Area) and at moderate elevations in Hawaii, and should be considered for the low deserts of southeastern California and western Arizona. A highly adaptable tree, *A. costata* is tolerant of a wide variety of conditions, has few problems, and is mostly pest and disease free.

**Figure 1.** Simply walk among the imposing *Angophora costata* on Kenilworth Avenue in Pasadena in the mid-morning light and you know you are walking among special trees.



## About this series

This article is the first in a series profiling specific landscape and urban forest trees. Each species profile will include information that arborists, urban foresters, landscape architects, horticulturists, and other professionals in related fields can use in selecting and managing these trees in our landscapes and urban forests. Such information includes growth characteristics, identification, esthetic features, distribution and ecology, environmental tolerances, site suitability, cultural and management considerations, possible problems, and propagation. When I first approached editor Bruce Hagen about this series last year he was supportive and wanted me, at least initially, to focus on under-utilized or undeservedly rare trees in our landscape and urban forests. Because Western Arborist serves the arboriculture and related industries not only in California but in western Arizona, southern Nevada, and Hawaii, coauthors with extensive knowledge and experience managing trees in these latter areas may join me occasionally to prepare a treatment for a species particularly well suited to their areas. Also, because most of these under-utilized or undeservedly rare trees are known in cultivation only from botanic or private gardens and have little history from which to draw and formulate management information, I encourage you to join my Tree Advisory Committee (TAC) and contribute what you know about these trees. The TAC will enable everyone to share their experiences managing specific trees (see sidebar about TAC).

## *Angophora costata* (Gaertn.) Britten

### Taxonomy and history

**Synonyms:** *Metrosideros costata* Gaertn., *Melaleuca costata* (Gaertn.) Raeusch., *Metrosideros apocynifolia* Salisb., *Angophora lanceolata* Cav., *Angophora lanceolata* var. *hispida* A. Cunn. ex A. Gray, *Metrosideros lanceolata* Pers. There are several subspecies of *Angophora costata* that differ in minor details of the fruit and are usually considered synonyms of the species.



Figure 2. (Upper left) *Angophora costata* has a picturesque, irregularly branched, moderately dense, dark green canopy.

Figure 3. (Upper center) *Angophora costata* has muscular, multi-colored, smooth-barked branches.

Figure 4. (Upper right) The trunk of *Angophora costata* also has smooth, multi-colored bark.

*A highly adaptable tree, A. costata is tolerant of a wide variety of conditions, has few problems, and is mostly pest and disease free.*

**Common names:** apple gum, smooth-barked apple, red-barked apple tree, brown apple tree, red gum, rusty gum, Sydney red gum, cabbage gum, sugar gum, lance-leaf gum myrtle.

**Etymology:** The genus name *Angophora* is derived from the Greek *aggeion*, meaning a vessel, and *phoreo*, meaning to carry, and alludes to the goblet- or bell-shaped fruits. The specific epithet or species name *costata* is derived from the Latin *costatus*, meaning ribbed or ridged, and alludes to the ribbed fruits.

**History:** Joseph Gaertner named and described this species in 1788 as *Metrosideros costata*, basing the new species on a collection that J. Banks and D. Solander had made at New Holland, Australia in 1770 during one of James Cook's South Pacific voyages. In 1916 James Britten transferred it to *Angophora*.

#### Description

The description is from several sources (ANGB 1978, Anonymous 1957, Boland et al. 1984, Chippendale 1988, Hill 1991, Leach 1986, Little and Skolmen 1989) and from cultivated trees in Pasadena.

#### Join TAC

TAC or the Tree Advisory Committee enables everyone to share their experiences and observations managing specific trees in our landscape and urban forests for the series Trees in the Landscape. TAC is free, easy to join, and open to everyone. Simply send me an e-mail expressing your desire to participate in TAC.

I will e-mail all TAC members, notifying them which tree species I will be profiling in an upcoming issue of *Western Arborist*. TAC members can then respond to me about their experiences and observations managing that tree.

Join TAC by e-mailing me:  
<drhodel@ucdavis.edu>





Figure 5. (Upper left) *Angophora costata* is impossibly handsome in late spring and early summer when conspicuously covered with dense clusters of white flowers, new growth has flushed coppery red, and the grayish bark is peeling to reveal extensive, showy bright orange brown to pinkish brown patches.

Figure 6. (Upper center) The trunk of *Angophora costata* is typically relatively short on cultivated specimens.

Figure 8. (Upper right) Bark of *Angophora costata* is smooth, mottled, deciduous or shedding throughout on branches and trunk in irregular, small to large patches or flakes in late spring to early summer.

**Habit/Conformation:** large, wide, long-lived, evergreen tree 60 to 140 feet tall and nearly as wide; crown irregularly branched, moderately open (Figs. 2, 5).

**Trunk:** 1.5 to 5 feet in diameter, typically relatively short and often gnarled or crooked on cultivated specimens and/or those growing in open and/or unfavorable conditions (Figs. 4, 6) but a straight, symmetrical bole at least one-half the height of the tree on forest specimens growing under favorable conditions; sometimes abruptly flared at base (Fig. 7).

**Bark:** smooth, slightly dimpled, mottled, typically deciduous or shedding throughout on branches and trunk in irregular, small to large patches or flakes in late spring to early summer; newly exposed bark is unusually colorful and showy, usually bright orange brown to pinkish brown but sometimes yellowish to orange (Figs. 8-9), then aging to gray by winter and before the next shedding; sometimes stained from kino or other exudations, which are like rusty tears streaking down a branch or trunk.

**Leaves:** simple; juvenile opposite, sessile or short stalked, blade to 5 × 2.5 inches, ovate to elliptic, pale green; adult opposite, short stalked, petiole 0.4-1 inch long, blade 2-8 × 0.5-2 inches, lance-shaped to narrowly oblong, short-pointed at base, tapering to a very long narrow point at tip,

slightly curved on one side, thick, leathery, glabrous, dark bright green above (Fig. 10), paler below, new growth conspicuously coppery to bright red, margins slightly turned under, midrib pale yellow, distinctly lighter than blade, primary veins closely parallel, set at 75 to 80° to midrib, submarginal vein distinct from margin, secondary vein reticulation dense.

Figure 7. Sometimes the trunk of *Angophora costata* is abruptly flared at the base.





Figure 9. Newly exposed bark of *Angophora costata* is unusually colorful and showy, typically bright orange brown to pinkish brown but sometimes yellowish to orange.

**Flowers:** arranged in large, dense, terminal, compound clusters of numerous 3-flowered umbels, to 10 inches wide (Figs. 11-12); buds short stalked, ovoid or globose, 0.2-0.5 inch long and wide, green, sparsely covered with short bristly hairs; flowers 1 to 1.25 inches wide (Fig. 13), sepals 5, small, tooth-like, petals 5, 0.2 inch long and wide, rounded, green below, white with slight pink blush above (Fig. 14), stamens numerous, to 0.4 inch long, white aging to creamy yellow, with fragrance of honey; late spring to summer.

**Fruits:** in dense clusters (Fig. 15), each fruit 0.4-0.75 inch long and wide, ovoid or goblet- to bell-shaped, woody, greenish to purplish brown, with 5 primary ribs and 5 secondary ribs, sparsely covered with short bristly hairs (Fig. 16), rim 5-toothed, 3-valved lid deeply inserted.

#### Distribution and ecology

*Angophora costata* is endemic to Australia where it occurs from 21 to 37° south latitude in the states of New South Wales and Queensland. In New South Wales it is widely scattered and locally abundant, primarily along the central coast from Sydney north to Queensland and not too far inland. In Queensland it is more scattered and occurs along the southeastern coast north to Rockhampton and as far as 250 miles inland. Its altitudinal range is from sea level to 1,000 feet.

*Angophora costata* occurs in a warm-temperate to subtropical climate. Coastal areas in its native range typically have maximum summer high temperatures of 80 to 95 F with no or few light frosts per year while inland areas have typical summer high maximum temperatures exceeding 100 F and up to 50 frosts per year. Rainfall varies from 25 to 60 inches per year and is evenly distributed in New South Wales but is markedly seasonal with summer maximum

Figure 10. (Lower left) Leaves of *Angophora costata* are lance-shaped, dark green, thick, leathery, and oppositely arranged.

Figure 11. (Lower right) Flowers of *Angophora costata* are arranged in large, dense, terminal, compound clusters to 10 inches wide.





Figure 12. (Upper left) Flower clusters of *Angophora costata* are composed of numerous 3-flowered umbels.



Figure 13. (Lower left) Flowers of *Angophora costata* are 1 to 1.25 inches wide.

in Queensland. Topography varies and includes coastal plateaus, hills, and other well drained, elevated areas to inland ridges, hills, and plateaus. It grows in pure stands or sometimes with *Eucalyptus pilularis* (black butt) in the upper canopy and an understory of meso- and xerophytic shrubs, some ferns, and cycads. Soils are mostly sandy and deep or sandy overlaying sandstone rock although in a few places it is finely textured clay (Morris 1965).

#### Propagation and growth rate

There are a few web reports that *Angophora costata* is difficult to germinate and grow on in the nursery until it reaches about three feet in height. However, most web sources and Elliot and Jones (1982) report that it is easily propagated from seeds, which germinate within 7 to 30 days. Sew seeds barely below the surface in a loose, well drained mix and maintain temperature between 68 and 77 F (Elliot and Jones 1982) and transplant to individual containers when

seedlings are one inch tall. Seedlings rapidly develop a deep root system and should be moved up to larger pots regularly so root development is not hampered (Elliot and Jones (1982). Disease-like galls may form on seedlings but these are the lingo-tuber, a normal growth feature. Young nursery plants may require judicious pruning and training to encourage and maintain a single leader of upright growth. A moderately fast grower, *A. costata* can attain 25 feet in height after six years.

#### Environmental tolerances

For the western United States, Clark (1979) listed *Angophora costata* for Sunset Zones 16-17 and 21-24 although it should be tried in Zones 8, 9, and 14 in the Central Valley of California and Zones 12-13 in the low deserts of southeastern California and western Arizona. It grows well in Hawaii away from the coast at moderate elevations, mostly from 2,500 to 5,000 feet elevation. Depending on provenance of

Figure 14. (Lower left) Flowers of *Angophora costata* have distinct whitish petals (below the numerous stamens), which help to distinguish it from *Eucalyptus* and *Corymbia*.

Figure 15. (Lower right) Like the flowers, fruits of *Angophora costata* are arranged in dense clusters.



the seeds, mature specimens can tolerate temperatures to about 20 F but young plants may suffer minor tip damage at 30 F (ANBG 1978). Very adaptable in cultivation, *A. costata* performs well in a variety of climatic conditions and soils, including rocky, sandy sites near the coast (Elliott and Jones 1982). Although probably doing best in well drained sites, *A. costata* appears tolerant of soil compaction, wet sites, and clay soils (Morris 1965, Wheller 1969). Like many eucalypts, *A. costata* is tough, rugged, and drought tolerant once established but will do best in hot inland areas with occasional summer irrigation.

### Uses

*Angophora costata* makes a superb specimen tree for wide open spaces like plazas, large parks and gardens, and broad avenues, boulevards, and other similar streetscapes (Figs. 17-18). For street-tree use minimum parkway width and cutout size are probably eight and ten feet respectively. However, the trees on Kenilworth Avenue in Pasadena, estimated to be 75 years of age, have trunks as large as or even slightly larger than the 4.5-foot-wide parkway yet have caused relatively little hardscape damage (Figs. 8, 19).

### Pruning/management

Young, properly grown and trained trees with a strong, upright central leader require little attention in the landscape except to maintain and encourage growth of the leader. Older trees require no special pruning or management other than removing live branches not conforming to desired overall tree structure and dead wood.

### Problems/litter

*Angophora costata* is largely problem free. Web sources report that it has brittle wood and is prone to limb shear or drop and care should be taken when selecting this tree

**Figure 16.** Fruits of *Angophora costata* are ovoid or goblet-to bell-shaped, woody, greenish to purplish brown, with 5 primary ribs and 5 secondary ribs, and are sparsely covered with short bristly hairs.



for street use and near homes. However, Darya Barrar and Rebecca Latta (personal communication), who have worked with this tree for the City of Pasadena for many years, report that it is no more prone to limb drop than most other trees, and Barrar states that more than 20 years of Pasadena pruning and maintenance records support their statement.

Old, mature trees tend to produce an abundance of flowers and subsequent fruits. Because fruits are woody, hard, and rounded, they may be problematic on smooth hardscape surfaces like driveways and sidewalks.

In late spring and early summer bark sheds extensively from branches and trunk and may accumulate beneath the tree.

Rust-colored eucalypt kino and other exudates can stain hardscape and mar autos and other objects below the tree.

### Pests and diseases

*Angophora costata* has no serious pests and disease. Pests, such as psyllids, borers, and leaf-cutting beetles, that plague species of the related *Eucalyptus* and *Corymbia*, are unknown on *A. costata* in California.

### Availability

*Angophora costata* is rarely seen in the California nursery industry. San Marcos Growers in Santa Barbara and West Coasts Arborists in Anaheim are growing or have plans to grow this tree.

### Trees in California and Hawaii

*Angophora costata* is rare in California. There is a mature tree planted in 1962 on Serra Street near the recycling center at Stanford University in Palo Alto in the Bay Area (Stanford Trees 2011) and another tree at Lower Orpet Park in Santa Barbara, which had not flowered by 2005 (Muller and Haller 2005). The Huntington Library, Art Collections & Botanical Gardens in San Marino had several large, old specimens in their parking lot but these were removed along with all *Eucalyptus* spp. when branches of the latter fell and damaged several cars. However, new trees planted in 1991 in the Australian section of the garden are 20 to 30 feet tall and were flowering as recently as June 1991 (Kathy Musial, personal communication). Several trees planted in 1953 at The Los Angeles County Arboretum and Botanic Garden in Arcadia flower and fruit, are 40 to 50 feet tall, and have trunks one to two feet in diameter.

The famous street planting of about 20 old, mature specimens on Kenilworth Avenue in Pasadena is superb. Probably planted in the 1930s or 40s, the trees are up to 80 feet tall, spread for 50 feet, and have trunks up to five feet in diameter. Because of their age, size, rarity, and esthetic quality, I designated them an Exceptional Tree of Los Angeles (Hodel 1988).

*Angophora costata* is much more common in Hawaii but not in the landscape. Little and Skolmen (1989) reported



Figure 17. *Angophora costata* makes a superb street tree.

that the state Division of Forestry planted nearly 20,000 trees of this species in the 1930s and 1940s for reforestation in forest reserves, primarily on Oahu and Maui but also on Kauai and Hawaii (Big Island). Most of these plantings are from 2,500 to 5,000 feet elevation. There are nice stands on Oahu just beyond the start of Trail No. 2, Manoa Cliffs Trail, Tantalus Mountain. Also on Oahu there are extensive plantings on the lands of Waiawa and Waiiau above Pacific Palisades and Waimano Home. On Maui notable plantings are at Upper Borge Ridge in the Makawao Forest Reserve. One champion specimen, the largest in the U. S. with a height of 132 feet, a trunk 9.6 feet in diameter, and a spread of 54 feet, was recorded from Honaunau Forest Reserve near Kailua-Kona on Hawaii.

Robert Hobdy (personal communication), retired long-time forester for the State of Hawaii and native Hawaiian plant aficionado, notes that trees of *Angophora costata* in the mile-long planting along the Makawao Forestry Reserve boundary with Haleakala Ranch pastures at about 4,000 feet elevation on Maui are striking in their floral displays, attractively ribbed fruits, and distinctive bark .

Of concern in Hawaii is the potential for exotic, introduced plants to become invasive, further disrupting al-

ready fragile and deteriorating Hawaiian ecosystems. PIER (2011) and Forest and Kim Starr (personal communication) report that *Angophora costata* has sometimes spread from forestry plantations into nearby pastures and disturbed areas in gulches and probably should be considered mildly invasive. However, Robert Hobdy (personal communication) feels that it is not particularly invasive in Hawaii.

#### Notes

*Angophora* includes seven species of trees endemic to eastern Australia and closely related to *Eucalyptus* and the recently segregated *Corymbia* (Chippendale 1988, Leach 1986). It differs from these two genera in its adult leaves oppositely arranged on the twigs and flowers having bristly glands interspersed with white hairs and distinct sepal and petal lobes but lacking an operculum (cap or lid formed by sepals and petals that falls off as flower opens). Most *Eucalyptus* and *Corymbia* have adult leaves alternately arranged on the twigs and flowers with an operculum. *Corymbia* differs from *Eucalyptus* in its flowers arranged in corymbs, a structure where individual flower stalks arise from different levels on the twigs but all flowers are held in more or less the same plane. Interestingly, recent genetic



**Figure 18. (Above)** Making an imposing street planting, *Angophora costata* is unusually colorful and mostly pest and problem free.

**Figure 19. (Below)** Although trunks of *Angophora costata* eventually become quite large with age, they appear to cause relatively little hardscape damage.



work has shown that *Angophora* is more closely related to *Eucalyptus* than is *Corymbia*. Trees of all three genera are correctly referred to as “eucalypts.” The smooth bark readily distinguishes *A. costata* from the other six species of the genus.

Newly exposed bark in late spring to summer can vary somewhat in color. The trees on Kenilworth Avenue in Pasadena have bark with a decidedly orange- to pink-brown hue while the trees at The Los Angeles County Arboretum and Botanic Garden have more of a yellowish to slightly orange bark.

On naturally occurring *Angophora costata* in habitat in Australia, former points of attachment of fallen limbs often tend to form callused bumps, adding to the gnarled appearance of the trunk (ANBG 1978).

Although the timber has little value, Australians consider *Angophora costata* to be highly ornamental and frequently left it standing when clearing land for development. It is one of the principal species growing around Sydney Harbor and in national parks close to the city (Anonymous 1957). Several web sources report and illustrate large, magnificent specimens, some to over 140 feet tall, around the Sydney area as well as one, exceptionally large specimen in Auckland, New Zealand.

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