

## PITTOSPORACEAE R. Brown

### \* Pittosporum Family

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**Trees, shrubs, or woody vines.** **Leaves** persistent, alternate, sometimes appearing whorled, simple; stipules absent; petiole present; blade margins plane, undulate, or revolute, entire [dentate]. **Inflorescences** terminal or axillary, panicles, umbels, thyrses, or cymes, or flowers solitary. **Flowers** structurally bisexual, often functionally unisexual; perianth and androecium hypogynous; sepals 5, distinct or weakly fused at the base; petals 5, distinct; stamens 5, opposite sepals, sometimes slightly connate proximally (rarely reduced to scales in pistillate flowers of *Pittosporum undulatum*); anthers dehiscent by longitudinal slits; pistils 1, carpels 2-3(-5); ovary superior, completely or incompletely 2-3[-5]-locular, placentation axile or parietal; ovules anatropous to campylotropous, integuments 1, tenuinucellate; styles 1; stigmas 1, 2-3[-5]-lobed. **Fruits** capsular or baccate, capsules dehiscent by 2-3 woody valves. **Seeds** ca. 10-50, red or purple-black, ± polyhedral; embryo minute, in oily endosperm.

Genera ca. 7, species ca. 200 (2 genera, 7 species in the flora): introduced; usually warm-temperate regions of the Old World, mainly Australia and New Zealand.

Some species of *Pittosporum* and *Billardiera* are of economic importance as ornamentals. A few have escaped from cultivation, but none are aggressive in the flora area; they seldom reproduce outside habitats disturbed by human activities.

1. Trees or shrubs; petals greenish white, white, yellowish white, or dark red to purple-black; fruits capsules 1. *Pittosporum*
1. Woody vines or subshrubs; petals blue; fruits berries 2. *Billardiera*

1. **PITTOSPORUM** Banks ex Gaertner, *Fruct. Sem. Pl.* 1: 286, plate 59, fig. 7. 1788, name conserved \* [Greek *pitta*, pitch, and *spora*, seed, alluding to sticky coating] |

**Trees or shrubs.** **Stems** straight, self-supporting, stout. **Leaves** crowded at stem apex. **Inflorescences** terminal or axillary umbels, panicles, thyrses, corymbs, or solitary flowers. **Flowers** often functionally unisexual although structurally bisexual, erect; petals proximally erect, parallel, distally abruptly reflexed, greenish white, white, pale yellow, yellowish white, or dark red to purple-black; anthers distinct (rarely stamens reduced to scales in pistillate flowers of *P. undulatum*); ovary incompletely 2–3-locular. **Capsules**, globose or ovoid, dehiscence loculicidal.  $x = 12$ .

Species ca. 150 (6 in the flora): introduced; Asia, Africa, Atlantic Islands, Pacific Islands, Australia; introduced also in West Indies, Europe.

In *Pittosporum*, flowers are usually structurally bisexual (with well-formed stamens and ovaries) but often functionally unisexual. Functionally pistillate flowers are usually easy to recognize because the anthers are smaller and do not dehisce or form pollen. Functionally staminate and bisexual flowers are more difficult to distinguish, especially in herbarium specimens; these flowers have smaller ovaries and stigmas. Floral dimorphism is seen in all of our species; different authors disagree on the exact sexual expression (whether functionally monoecious, dioecious, or polygamous), suggesting that this may be variable. Plants of *Pittosporum* usually are not reported as toxic—some species have varying amounts of saponin in their leaves and fruits; rarely have Pittosporaceae caused problems. In Java and Fiji, plants of native species are used as fish poisons (T. C. Fuller and E. McClintock 1986).

SELECTED REFERENCES Bakker, K., and C. G. G. J. van Steenis. 1957. Pittosporaceae. In: C. G. G. J. van Steenis, ed. 1950+. *Flora Malesiana*... Series I. Spermatophyta. 17+ vols. Djakarta and Leiden. Vol. 5, pp. 345–362. Cayzer, L. W., M. D. Crisp, and I. R. H. Telford. 2000. Revision of *Pittosporum* (Pittosporaceae) in Australia. *Austral. Syst. Bot.* 13: 845–902. Cooper, R. C. 1956. The Australian and New Zealand species of *Pittosporum*. *Ann. Missouri Bot. Gard.* 43: 87–186. Gowda, M. 1951. The genus *Pittosporum* in the Sino-Indian region. *J. Arnold Arbor.* 32: 263–343.

1. Leaf blades linear, 0.3–0.6 cm wide; branches pendent; petals pale yellow
  6. *Pittosporum angustifolium*
1. Leaf blades oblong to obovate or lance-elliptic, 1–5.5 cm wide; branches ascending or spreading; petals greenish white, white, yellowish white, red, or purple.
  2. Petals dark red to purple-black; seeds purple-black or black; leaf blades pale- or gray-green.
    3. Leaf blades leathery, margins revolute, abaxial surface densely pubescent
      1. *Pittosporum crassifolium*
      3. Leaf blades not leathery, margins somewhat undulate, abaxial surface sparsely pubescent
        2. *Pittosporum tenuifolium*
    2. Petals greenish white, white, or yellowish white; seeds reddish; leaf blades bright or dark green.
      4. Shrubs or small trees; leaf blades obovate, leathery, margins revolute, apex rounded
        3. *Pittosporum tobira*
      4. Trees; leaf blades oblong or lance-elliptic, not leathery, margins  $\pm$  undulate, apex acuminate.

5. Leaf blades 2.3–4 times as long as wide; sepals 5–7 mm; petals 10–15 mm; capsules 10–15 mm, smooth or shallowly wrinkled when dry
4. *Pittosporum undulatum*
5. Leaf blades 4–6.5 times as long as wide; sepals 1–2 mm; petals 4–6 mm; capsules 6–7 mm, strongly warty-wrinkled when dry
5. *Pittosporum pentandrum*

**1. Pittosporum crassifolium** Banks & Solander ex A. Cunningham, Ann. Nat. Hist. 4: 106. 1839 |

**Shrubs or small trees**, to 9 m; branches ascending or spreading. **Twigs** densely hairy. **Leaves** with little odor when crushed; petiole 8–16 cm; blade ashy white abaxially, hoary gray-green adaxially, oblong to obovate, 4.5–7 × 1.5–3 cm, 2.3–3 times as long as wide, leathery, margins revolute, apex rounded or rounded-obtuse, abaxial surface densely hairy. **Inflorescences** terminal, sessile, 3–8-flowered umbels. **Pedicels** 18–30 mm. **Flowers** not fragrant, functionally unisexual; sepals ca. 6 mm, tomentose; petals dark red to purple-black, ca. 10 mm. **Capsules** usually 3-valved, globose or ovoid, 15–30 mm, surface shallowly wrinkled when dry, hairy. **Seeds** purple-black. **2n** = 24.

Flowering Nov–May. Coastal bluffs, disturbed slopes; 0–200 m; introduced; Calif.; Pacific Islands (New Zealand); introduced also in Europe (England, Isles of Scilly).

*Pittosporum crassifolium* has been grown as an ornamental in California since 1871. It is an infrequent spontaneous garden escape in coastal urban areas near cultivated plants.

**2. Pittosporum tenuifolium** Banks ex Gaertner, Fruct. Sem. Pl. 1: 286, plate 59. 1788 |  
Varieties 2 (1 in the flora); introduced; California; Pacific Islands (New Zealand).

**2a. Pittosporum tenuifolium** Banks ex Gaertner var. **tenuifolium** |

**Trees**, to 8 m; branches spreading or ascending. **Twigs** lightly hairy. **Leaves** with little odor when crushed; petiole 3–10 cm; blade pale green, oblong or oblong-ovate, 3–6 × 1.4–3 cm, 1.6–3(–4) times as long as wide, not leathery, margins somewhat undulate, apex acute to obtuse or rounded-obtuse, abaxial surface sparsely pubescent. **Inflorescences** axillary, solitary flowers or terminal 2–4-flowered, sessile umbels. **Pedicels** 3–9 mm. **Flowers** fragrant, bisexual or functionally unisexual; sepals 5–6 mm, glabrous or sparsely pubescent; petals dark red to red-purple, ca. 12 mm. **Capsules** 2-valved, globose, 10–12 mm, surface shallowly wrinkled when dry, hairy. **Seeds** black. **2n** = 24.

Flowering Dec–May. Disturbed woods near cultivated trees; 0–50 m; introduced; Calif.; Pacific Islands (New Zealand).

Variety *tenuifolium* has been grown as an ornamental in California since 1865. It is an infrequent garden escape in central coastal California near cultivated plants.

**3. Pittosporum tobira** (Thunberg) W. T. Aiton in W. Aiton and W. T. Aiton, Hortus Kew. 2: 27. 1811 \* Japanese pittosporum or cheesewood, tobera |

*Euonymus tobira* Thunberg, Nova Acta Regiae Soc. Sci. Upsal. 3: 19, 208. 1780 | F

**Shrubs or small trees**, to 8 m; branches ascending or spreading. **Twigs** tomentose, sometimes glabrescent. **Leaves** with little odor when crushed; petiole 5–15 cm; blade lighter green abaxially, dark green adaxially with some cultivars gray-green or variegated, obovate, 3–14 × 1–5.5 cm, 1.8–2.7 times as long as wide, leathery, margins revolute, apex rounded, abaxial surface glabrous or with scattered, inconspicuous hairs. **Inflorescences** terminal, sessile, 5–20-flowered corymbs or umbels. **Pedicels** 5–20 mm. **Flowers** delightfully fragrant, often functionally unisexual; sepals 2–5 mm, pubescent; petals white, 10–12 mm. **Capsules** 3-valved, ovoid, 10–18 mm, surface smooth or shallowly wrinkled when dry, hairy. **Seeds** reddish. **2n** = 24.

Flowering Nov–May. Disturbed mesic woods; 0–400 m; introduced; Calif., Fla.; e Asia (China [Taiwan; native only in Taiwan, cultivated/naturalized in se China], Japan, Korea); also introduced in Europe.

*Pittosporum tobira* has been grown as an ornamental in the southeastern United States and California, where it has been grown since 1871. It is a very infrequent garden escape in disturbed areas, usually near cultivated plants, in coastal and foothill sites in urban California and the Florida panhandle. Plants have been reported from outside of cultivation in coastal Georgia, North Carolina, and South Carolina; these may be escapes, but they could also be persisting from old plantings (A. S. Weakley 2007).

Cultivars with variegated foliage are often grown, but are not found as escapes. Variegated plants are propagated by cuttings, and probably cannot come true from seed.

**4. *Pittosporum undulatum*** Ventenat, Descr. Pl. Nouv., plate 76. 1802 \* Victorian box I  
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**Trees**, to 9–12 m; branches spreading or ascending. **Twigs** glabrous or sparsely hairy. **Leaves** with strong resinous odor when crushed; petiole 5–25 cm; blade bright green, oblong or lance-elliptic, 7–15 × 2.2–4.1 cm, 2.3–4 times as long as wide, not leathery, margins undulate, apex acuminate, abaxial surface glabrous. **Inflorescences** terminal, sessile, 5–20-flowered, simple or compound umbels (or branches sometimes paniculate). **Pedicels** 3–16(–25) mm. **Flowers** fragrant, bisexual or functionally unisexual; sepals 5–7 mm, glabrous or pubescent; petals white, 10–15 mm. **Capsules** 2-valved, ± globose, 10–15 mm, surface smooth or shallowly wrinkled when dry, glabrous. **Seeds** reddish orange. **2n** = 24.

Flowering Nov–Jun (Sep). Woods and shrublands, on slopes, gullies, and bottomlands, near coast; 0–200 m; introduced; Calif.; e Australia; introduced also in West Indies (Jamaica), Atlantic Islands (Azores, Madeira), Pacific Islands.

*Pittosporum undulatum* has been grown as an ornamental in California since 1854. At present, it is the most commonly planted species of the genus. It is considered very invasive in some areas with hot to mild, humid climates (the Azores, Cape of Good Hope, Jamaica, Tasmania, and several of the Pacific Islands; Q. C. B. Cronk and J. L. Fuller 1995); in North America it is known to escape only at scattered sites in the vicinity of planted trees in California, mostly in the coastal fog belt (from Point Reyes south to San Diego) but also at a few sites in the foothills east of the Los Angeles basin.

**5. *Pittosporum pentandrum*** (Blanco) Merrill, Publ. Bur. Sci. Gov. Lab. 27: 19. 1905 I  
Aquilaria pentandra Blanco, Fl. Filip., 373. 1837

Varieties 2 (1 in the flora); introduced; Florida; Asia (s China, Indonesia, Philippines, Vietnam).

Variety *formosanum* (Hayata) Zhi Y. Zhang & Turland, native in southern China (Guangxi, Hainan, Taiwan) and Vietnam, is cultivated in Florida, where it is not known to escape. It has oblanceolate leaves that are shorter and broader than those of var. *pentandrum*, with the midrib and petiole usually pubescent.

**5a. *Pittosporum pentandrum*** (Blanco) Merrill var. **pentandrum** \* Mamalis, cheesewood I

**Trees**, to 20 m; branches spreading or ascending. **Twigs** glabrous or sparsely hairy. **Leaves** with strong resinous odor when crushed; petiole 7–15 cm; blade bright green, narrowly oblong or lance-elliptic, 9–20 × 1.7–3.2 cm, 4–6.5 times as long as wide, not leathery, margins somewhat undulate, apex narrowly acuminate, abaxial surface glabrous. **Inflorescences** terminal, pedunculate, 10–25-flowered thyrses. **Pedicels** 2–7 mm. **Flowers** fragrant, often functionally unisexual; sepals 1–2 mm, glabrous; petals greenish or yellowish white, 4–6 mm. **Capsules** 2-valved, ovoid, 6–7 mm, surface strongly warty-wrinkled when dry, glabrous. **Seeds** red-brown.

Flowering Oct–Nov. Disturbed woods in urban areas; 0 m; introduced; Fla.; Pacific Islands (Philippines, n Sulawesi).

Variety *pentandrum* is occasionally grown as a specimen tree in southern Florida. It has escaped in disturbed woods near planted trees in Coral Gables.

**6. Pittosporum angustifolium** Loddiges, Bot. Cab. 19: plate 1859. 1832 \* Weeping or willow pittosporum I

**Trees** 3–6 m; branches pendent. **Twigs** pubescent when young, soon glabrescent. **Leaves** with little odor when crushed; petiole 5–14 cm; blade dark or grayish green, linear, 5.4–10.5 × 0.3–0.6 cm, 10–35 times as long as wide, leathery, margins weakly revolute, apex acuminate, abaxial surface glabrous (sparsely pubescent while expanding). **Inflorescences** axillary, solitary flowers or sessile, 2–8-flowered umbels. **Pedicels** 3–12 mm. **Flowers** fragrant, often functionally unisexual; sepals 1–2 mm, glabrous or ciliate; petals pale yellow, 6–11 mm. **Capsules** 2-valved, ± globose, 11–16 mm, surface shallowly wrinkled when dry, glabrous. **Seeds** red.

Flowering Mar–Apr. Occasional in urban waste places and desert washes that receive water from urban sources; 700–800 m; introduced; Ariz.; Australia.

*Pittosporum angustifolium* is commonly grown in hot desert areas in the southwestern United States (often under the incorrect name *P. phillyreoides* de Candolle). It is known to escape only in areas that receive water from urban runoff.

2. BILLARDIERA Smith, Spec. Bot. New Holland, 1, plate 1. 1793 \* [For Jacques Julien Houtou de Labillardière, 1755--1834, French botanist, early student of the flora of western Australia] I

*Sollya* Lindley

**Woody vines or subshrubs.** **Stems** twining, slender. **Leaves** +/- evenly spaced along stem. **Inflorescences** terminal cymes. **Flowers** bisexual, pendent; petals spreading from base [proximally erect and parallel, distal part abruptly reflexed], blue (white in some cultivars) [yellow, or pink]; anthers coherent around style [distinct]; ovary 2-locular (often appearing 4-locular by adhesion of placentae to pericarp). **Berries**, narrowly cylindrical [fusiform], pulp sticky. **x** = 12.

Species 23 (1 in the flora): introduced; Australia.

SELECTED REFERENCE Cayzer, L. W., M. D. Crisp, and I. R. H. Telford. 2004. Cladistic analysis and revision of *Billardiera* (Pittosporaceae). Austral. Syst. Bot. 17: 83--125.

**1. Billardiera heterophylla** (Lindley) L. W. Cayzer & Crisp, Austral. Syst. Bot. 17: 119. 2004 \* Australian blue-bell creeper, Australian blue-bell F I

*Sollya heterophylla* Lindley, Edwards's Bot. Reg. 17: plate 1466. 1832

**Plants** forming tangled mounds or twining and climbing other vegetation, to 2.5 m. **Stems** sometimes rooting where touching ground. **Leaves:** petiole 0.1--5 mm; blade lanceolate to oblanceolate or narrowly ovate, 3--6 x 1--2.4 cm. **Inflorescences** 3--8-flowered cymes, 5--6 cm. **Petals** blue, obovate, 8--10 x 3--5 mm. **Berries** blue-black, 13--20 x 2--6 mm. **2n** = 24.

Flowering Apr--Nov. Disturbed woodland or shrubland, mostly in urban areas; 0--200 m; introduced; Calif.; sw Australia.

*Billardiera heterophylla* has been grown in California as an ornamental since 1853, generally under the name *Sollya heterophylla*. It is an infrequent garden escape in central and southern California. White-flowered forms are grown, but have not been known to escape. The fruit is edible; the leaves are said to cause contact dermatitis in some people (T. C. Fuller and E. McClintock 1986).

North American reports of *Billardiera fusiformis* Labillardière [*Sollya fusiformis* (Labillardière) Payer] are based on misidentified *B. heterophylla*.

