Ornamental Landscape Trees of *Eriobotrya*, *Photinia*, and Hybrids with *Rhaphiolepis* in Southern California

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Every year we are astounded at the blooms bursting forth on the handsome and useful ornamental landscape trees in the genera *Eriobotrya*, *Photinia*, and hybrids with *Rhaphiolepis* in southern California (**Fig. 1**). Indeed, their spectacular displays have been urging us to write about them for several years and now, finally, after this year's performance, we have buckled down and begun to write. Here we provide a lavishly illustrated and detailed taxonomic and horticultural account of two species in *Eriobotrya*, a species and a hybrid in *Photinia*, and three hybrids of *Rhaphiolepis* and *Eriobotrya* that grace southern California yards, parks, streets, and landscapes.

Introduction

Eriobotrya, *Photinia*, and *Rhaphiolepis* are well represented in the southern California landscape. Of particular interest to us are trees of these genera and their hybrids because they produce showy winter and spring displays of mostly fragrant flowers, have handsome foliage, and are primarily small- to medium-sized trees (or they can be maintained that way) that fit nicely into our ever-diminishing landscapes where space is at a premium. In addition to their ornamental attributes, they are mostly well adapted to the southern California coastal regions, intermediate plains and valleys, and interior valleys, where they tolerate a wide variety of environmental conditions, from cool, humid coasts to hot, arid inland valleys. Most are relatively pest- and disease-free although fire blight, powdery mildew, and sometimes Entomosporium leaf spot can attack some species. Several of these trees are misidentified and misunderstood; thus, we feel a treatment of them is warranted.

Taxonomic and Nomenclatural Considerations

Eriobotrya, *Photinia*, and *Rhaphiolepis* are closely related genera in the Rosaceae (Pyreae: Pyrinae [formerly Maleae and Maloideae respectively]) (Potter et al. 2007, Stevens 2019) and can be distinguished as follows (Gu et al. 2003):

1. ×*Rhaphiobotrya splendens* 'Montic', one of the hybrids between *Rhaphiolepis indica* and *Eriobotrya deflexa*, makes a superb street tree in Bellflower, CA (type plant, *Hodel 4001*).

Carpels partly free; ovary semi-inferior; inflorescence a compound corymb . . . . . *Photinia*

Carpels wholly connate; ovary inferior, inflorescence a panicle or raceme

> Sepals persistent in fruit; inflorescences mostly a panicle; leaves with excurrent lateral veins; carpels typically 3–5 . . . . . *Eriobotrya*
>
> Sepals caducous in fruit, inflorescences mostly a raceme; leaves with curved lateral veins; carpels typically 2 . . . . . *Rhaphiolepis*

Numerous studies have investigated the Pyrinae, including *Eriobotrya*, *Photinia*, and *Rhaphiolepis*, with the objective to achieve a rational phylogeny for this economically important and species-rich subtribe (Campbell et al. 2007; Li et al. 2012; Liu et al. 2020; Potter et al. 2007; Robertson et al. 1991, 1992; Rohrer et al. 1992, 1994; Sun 2018). Earlier studies tended to maintain the genera but rearranged them in different phylogenetic schemes while the most recent studies suggested or placed many genera in synonymy. For example, Liu et al. (2020) merged *Eriobotrya* into *Rhaphiolepis,* which, if one accepts it, creates significant nomenclatural issues for those working with these two common genera in the southern California landscape.

This recent trend in genera reduction attained an extreme pinnacle, throwing the Pyrinae into nomenclatural controversy and chaos, when Christenhusz et al. (2018) sunk *Eriobotrya*, *Photinia*, and *Rhaphiolepis* and several other closely related and well known genera, including *Chaenomeles*, *Cotoneaster*, *Crataegus*, *Heteromeles*, *Malus*, and *Sorbus*, among others, into *Pyrus*, which again, if one accepts it, creates a huge genus with serious and far-reaching nomenclatural ramifications.

Christenhusz et al. (2018) is one of the series of ongoing GLOVAP publications, also known as The Global Flora, and is primarily a compendium of new combinations with citations of the studies, mainly molecular, that promulgated these new combinations. GLOVAP's agenda was to present a nomenclator of the global flora, at least to the species level, following the results of the latest molecular and cladistic studies of each family or genus. To that end, they needed to present and validate new combinations for all their accepted names. The inherent problem with any classification is the inevitable subjectivity of ranking decisions; robust cladistic studies can smoke out polyphyly or paraphyly, but the ranking of taxa will always be a matter of personal taste. As it so happens, the GLOVAP people are admitted lumpers, a position they rationalized in the opening pages of their publication; hence, the decision to expand *Pyrus* enormously, which alienated many people.

It was not so much the lumping, though, that rubbed people the wrong way because, after all, rankings are subjective and others can follow their own philosophy or dictates. What really

2. *Eriobotrya deflexa* typically has a spreading canopy. La Habra, CA.

3. The canopy of *Eriobotrya deflexa* is often umbrella-shaped. Cerritos, CA.

4. *Eriobotrya deflexa* can have a rounded canopy. La Habra, CA.

5. *Eriobotrya deflexa* with a typical umbrella-shaped canopy, California State University, Fullerton.

irritated people was that GLOVAP validated, in one fell swoop, literally thousands of new combinations, and, in the vast majority of the cases, they had absolutely nothing to do with the phylogenetic research that motivated their conclusions. Indeed, in many cases, they usurped new combinations that were in the works—in a few cases, literally in press—by other authors, who had actually done the grunt work, which incensed virtually the entire botanical community, resulting in a spirited diatribe, with blistering letters (from both sides) published in journals such as *Taxon*.

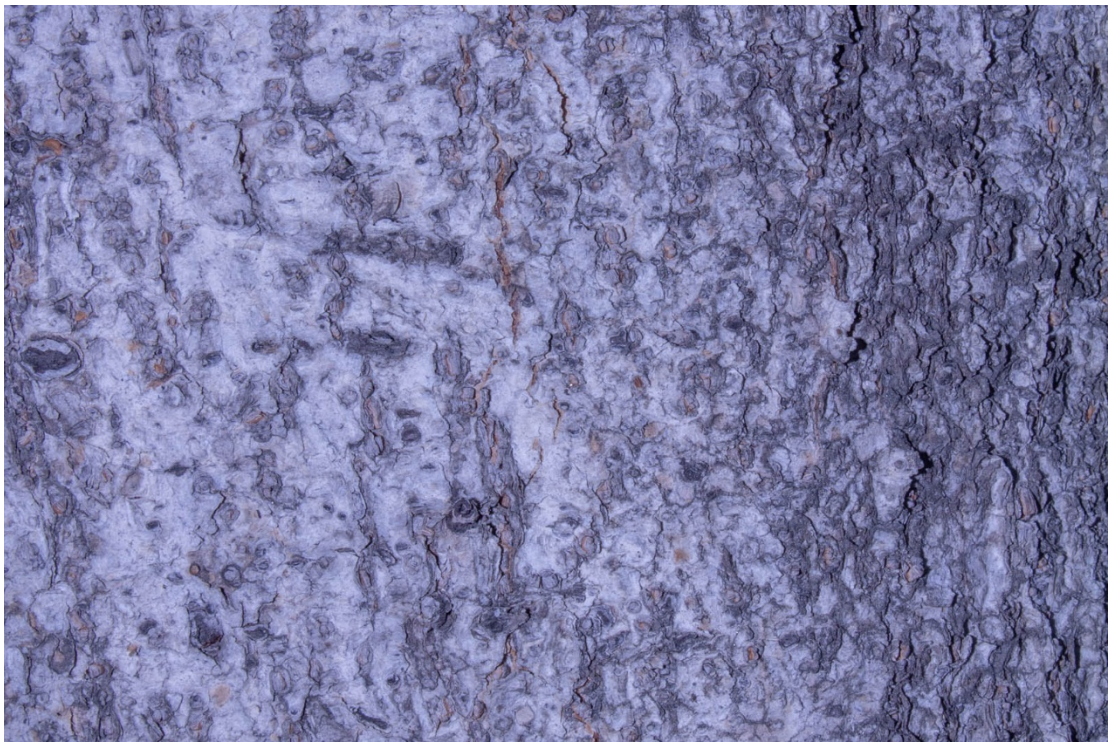
We follow our own dictates, and present and discuss the trees here based on their long and traditionally used generic names *Eriobotrya*, *Photinia*, and *Rhaphiolepis*.

Eriobotrya Lindl.

Eriobotrya Lindl., Trans. Linn. Soc. London 13(1): 96, 201. 1821. Type species: *E. japonica*.

Trees or shrubs, evergreen, bark dark gray, eventually fissured or furrowed. Leaves simple, stipulate, usually petiolate, venation craspedodromous or camptodromous, margin serrate or entire. Inflorescences terminal panicles, numerous flowered. Hypanthium cupular or obconical. Sepals 5, persistent. Petals 5(–8), white or yellow, obovate or orbicular, base clawed. Stamens

6. *Eriobotrya deflexa* can be trained as a multi-trunked tree. Note the striking bronzy reddish brown new growth. Carlsbad, CA.



7. The bark of *Eriobotrya deflexa* is grayish white, smooth but dimpled when young.

8. On older specimens of *Eriobotrya deflexa* the bark is brown and gray with rough, scaly patches.

15–25. Ovary inferior, 2–5-loculed, with 2 ovules per locule; styles 2–5, connate at base and often pubescent. Fruit a pome with persistent incurved sepals, fleshy or dry, endocarp (core) membranous, with 1(–3) large seeds (Gu and Spongberg 2003, Robertson et al. 1991).

Eriobotrya includes about 30 species of mostly evergreen, large shrubs and small trees native to moist, broad-leaved, evergreen forests of the Himalayas and eastern Asia. Petals are typically five, but sometimes more and then the excess quantity are likely petaloid stamens.

Lindley (1821) established *Eriobotrya* in 1821, basing it on the previously named *Mespilus japonica*, making the new combination *E. japonica*, which is the type species for the genus.

Two species are commonly found in the landscape in southern California, *Eriobotrya deflexa* and *E. japonica*.

Key to the Common Landscape Trees of *Eriobotrya* in Southern California

Leaves brown or brownish yellow tomentose only when young, becoming glabrous . . *E. deflexa*
Leaves abaxially sparsely pubescent or rusty or gray tomentose . . . . . *E. japonica*

Eriobotrya deflexa (Hemsl.) Nakai

Eriobotrya deflexa (Hemsl.) Nakai, Bot. Mag. Tokyo 30: 18. 1918. BRONZE LOQUAT.

Photinia deflexa Hemsl., Ann. Bot. (Oxford): 9(33): 153. Type: Taiwan, broad-leaved valley forests, 1,000–2,100 m elev., *Henry 498* (holotype K).

Eriobotrya deflexa f. *buisanensis* (Hayata) Nakai, Bot. Mag. (Tokyo) 30: 18. 1918.

Eriobotrya deflexa var. *buisanensis* (Hayata) Hayata, Cat. Gov. Herb. Formosa 246. 1930.

Photinia buisanensis Hayata, Icon. Pl. Formosan. 3: 100–101. 1913. Type: Taiwan, Koshun province, around Kuraru, *Wilson 11055*.

Eriobotrya deflexa var. *grandiflora* (Rehder & E. H. Wilson) Nakai, J. Arnold Arbor. 5(2): 72. 1924.

Eriobotrya grandiflora Rehder & E. H. Wilson, Pl. Wilson 1(2): 193–194. 1912. Type: China, Western Szech'uan, alt. 1600 m, May 1904, *Wilson*, *Veitch Exped. No. 3506*.

Eriobotrya deflexa f. *koshunensis* (Kaneh. & Sakai) H. L. Li, Lloydia 14(4): 232. 1951.

9. Leaves of *Eriobotrya deflexa* are variously oblong, leathery, lustrous green to dark green adaxially.

10. Leaves of *Eriobotrya deflexa* are pale abaxially. Note the conspicuously toothed margins.

Eriobotrya deflexa var. *koshunensis* Kaneh. & Sakai, Cat. Gov. Herb. Formosa 246. 1930. Type: unresolved.

Habit: evergreen, small, moderately branched and dense, coarse-textured tree 5–10 m tall and to 12 m wide (**Fig. 2**); canopy mostly spreading and umbrella-shaped to flat-topped (**Figs. 3–5**), sometimes spherical.

Trunk: mostly solitary but sometimes multi-trunked (**Fig. 6**), 25–40 cm DBH; bark grayish white, smooth but dimpled (**Fig. 7**) aging with rough, scaly patches (**Fig. 8**), lenticels conspicuous, on old trees flaking off in irregular patches; branchlets brownish gray, stout, densely brown tomentose when young, glabrescent.

Leaves: alternate, in clusters at apices of branchlets; stipules caducous, not seen; petiole 2–4 cm, glabrous; leaf blade (9–)10–20 × (1.5–)3–7 cm, oblong or oblong-lanceolate to obovate-oblong, leathery, adaxially lustrous green to dark green, pale abaxially (**Figs. 9–10**), emerging bronzy reddish brown (**Figs. 11–12**), margins remotely irregularly incurved-crenate nearly throughout, revolute, midrib prominent on both surfaces, primary nerves 10–12 pairs, craspedodromous, both surfaces initially shortly tomentose, soon glabrescent, base cuneate, apex shortly caudate or acuminate.

Inflorescences: panicle, 6–8 cm in diam., many flowered (**Figs. 13–14**); peduncle densely brown tomentose; bracts lanceolate, 4–6 mm, abaxially tomentose.

Flowers: 1.5–1.8 cm in diam. (**Figs. 15–16**), white, fragrant, spring; pedicels 6–12 mm long, densely brown tomentose; hypanthium cupular, abaxially brown tomentose (**Fig. 15**); sepals 5, 2 mm long, triangular-ovate, slightly shorter than hypanthium, abaxially brown tomentose (**Figs. 15–16**), adaxially glabrous, apex obtuse or acute; petals 5, 8 × 7 mm, white, orbicular or obovate; stamens 20; gynoecium glabrous, ovary 3–5-loculed, with 2 ovules per locule; styles 3–5, connate at base, pubescent.

Fruits: pome, summer; 1.2–2 cm in diam., subglobose, yellowish red, glabrous (**Fig. 17**); fruiting pedicel 7–12 mm, brown pubescent; sepals reflexed.

Distribution and Ecology: China (Guangdong, Hainan), Taiwan, South Vietnam. Moist, evergreen, broad-leaved forests, 1,000–2,200 m elev.

Discussion: The description is from Gu and Spongberg (2003) and supplemented with our landscape observations. As a young tree, *Eriobotrya deflexa* typically grows upright with

11. New growth of *Eriobotrya deflexa* is bronzy reddish brown.

12. New growth of *Eriobotrya deflexa* can be spectacular and showy.

13. Inflorescences of *Eriobotrya deflexa* are conspicuous and a many flowered panicle.

14. Inflorescences of *Eriobotrya deflexa* are a many flowered panicle.

15. Flowers of *Eriobotrya deflexa* are white. Note the brown tomentose hypanthium and sepals.

16. Flowers of *Eriobotrya deflexa* are white. Note the brown tomentose sepals.

17. Fruits of *Eriobotrya deflexa* are a pome, red, and look like miniature apples.

an irregular vase-shaped or rounded canopy but with age develops an attractive, spreading, moderately coarse-textured, umbrella-shaped to flat-topped canopy. Growth is fast and moderately dense, giving older trees a symmetrical canopy with a mostly regular or smooth outline.

Eriobotrya deflexa flowers profusely in March and April and, while conspicuous, the floral display of white, fragrant flowers is not always exceptionally showy, perhaps because they are on top of the umbrella-shaped to flat-topped canopy and are less visible and the branching structure is not so dense that inflorescences are contiguous, allowing green vegetation to show. Also, many specimens flush the characteristic bronzy reddish brown new growth while the tree is still in flower or even just prior to flowering, which tends to obscure the floral display. The bronzy reddish brown new foliage is attractive and, along with the handsome, spreading, umbrella-shaped to flat-topped habit, is one of the redeeming esthetic qualities of this species. The leaves maintain this new color for a considerable time before turning green. Intensity of new foliage color varies, especially if the plants are seed-grown. Selections have been made for enhanced color intensity and showiness, and at least one cultivar, ‘Bronze Improved’ is in the trade.

18. Marianne Hodel provides scale for the trunk of the State Champion California Big Tree *Eriobotrya deflexa* at the South Coast Botanic Garden (*1965-S-875*).

Eriobotrya deflexa is suited to Sunset Climate Zones 8–24 (Brenzel 1995). Although typically a tree, it can be pruned and trained into an effective espalier on a wall, fence, or trellis but needs protection from hot afternoon sun when employed in this manner; it can also be clipped or sheared into a hedge. Fruit litter can be a problem. Significant diseases include fire blight and Entomosporium leaf spot. Long-term fire blight infections and subsequent decline are likely responsible for making this species not a particularly long-lived landscape tree although low water stress and root pruning can cause similar damage. *Eriobotrya deflexa* can become mildly invasive; spontaneous seedlings are occasionally seen in irrigated landscapes.

Eriobotrya japonica differs from *E. deflexa* in its hairy, older leaves, new leaves emerging greenish, and larger, yellow to orange fruits.

The South Coast Botanic Garden in Palos Verdes Peninsula has a specimen registered as a California Big Tree (**Fig. 18**). Nominated by arborist Nick Araya in 2014, it has a trunk diameter of nearly 55 cm, stands 10.4 m tall, and spreads for 13.1 m.

Eriobotrya deflexa var. *koshunensis* is considered a synonym of the species and The Huntington Library, Art Collections, and Botanical Gardens in San Marino, California has the only specimen of which we know in southern California (*18446*). Although it is only one plant upon which to make an assessment, it seems to differ in its strong, upright growth having a well developed central leader with numerous well spaced primary branches; smaller inflorescences; and broader, dark, nearly blue-green leaves with fewer teeth, the new growth a subdued pinkish brown rather than the bright bronzy reddish brown typical with most cultivated specimens of the species.

19–20. *Eriobotrya japonica* is upright with irregular growth when young but becoming more rounded with age. Note the conspicuous if not showy fruits. **19.** Lakewood, CA. **20.** Long Beach, CA.

Eriobotrya japonica (Thunb.) Lindl.

Eriobotrya japonica (Thunb.) Lindl., Trans. Linn. Soc. London 13(1): 102. 1821. Not *Pyrus japonica* Thunb. LOQUAT.

Mespilus japonica Thunb., Nova Acta Regiae Soc. Sci. Upsal. Ser. 2, 3: 208. 1780. Type: Japan, *Thunberg s.n.* (holotype UPS).

Photinia japonica (Thunb.) Benth. & Hook. f. ex Asch. & Schweinf., Ill. Fl. Égypt 73. 1887.

Crataegus bibas Lour. Fl. Cochinch. 1319. 1790. Type: China, cultivated Macao and Canton, *Loureiro s.n.* (holotype ??).

Rhaphiolepis loquata B. B. Liu & J. Wen, Frontiers Pl. Sci. 10(1731): 11. 2020. nom. illeg.

21. With age, *Eriobotrya japonica* has a more rounded canopy. Long Beach, CA.

22. Bark of *Eriobotrya japonica* is grayish white, smooth but dimpled and with rough, lenticels and conspicuous horizontal lines.

23. Petioles of *Eriobotrya japonica* are grayish brown tomentose.

24. Leaves of *Eriobotrya japonica* are dark glossy green and exceptionally handsome

25. Leaves of Eriobotrya japonica are leathery, rugose, and lustrous green adaxially.

26. Leaves of *Eriobotrya* japonica are densely gray rusty or nearly silvery tomentose abaxially.

Habit: evergreen, small, moderately branched and dense, coarse-textured tree to 10 m tall and wide; canopy initially irregularly upright but becoming rounded (**Figs. 19–21**).

Trunk: mostly solitary, 20–30 cm DBH; bark grayish white, smooth but dimpled and with rough, lenticels and horizontal lines conspicuous (**Fig. 22**), on old trees flaking off in irregular patches; branchlets yellowish brown, densely rusty or grayish rusty tomentose; bark

Leaves: alternate; stipules subulate, 1–1.5 cm, pubescent, apex acuminate; petiole nearly absent or short, 6–10 mm, grayish brown tomentose (**Fig. 23**); leaf blade 12–30 × 3–9 cm, lanceolate, oblanceolate, obovate, or elliptic-oblong (**Fig. 24**), leathery, rugose, adaxially lustrous green (**Fig. 25**), abaxially densely gray rusty or nearly silvery tomentose (**Fig. 26**), remotely serrate distally, entire proximally, midrib prominent on both surfaces, primary nerves 11 or 12 pairs, craspedodromous, base cuneate, apex acute or acuminate.

Inflorescences: panicle, 10–19 cm long, many flowered (**Fig. 27**); peduncle densely rusty tomentose; bracts subulate, 2–5 mm, densely rusty tomentose; rachis bearing 5–10 branches each with at 70–100 flowers or more.

Flowers: 1.2–2 cm in diam., white (**Fig. 28**), fragrant, winter and spring; pedicel 2–8 mm, rusty tomentose; hypanthium shallowly cupular, abaxially brown tomentose; sepals 5, 2–3 mm long, triangular-ovate, abaxially densely brown tomentose, apex obtuse; petals 5(–8), 5–9 × 4–6 mm, white, oblong or ovate, 5–9 × 4–6 mm, apex obtuse or emarginate; stamens 20; gynoecium rusty pubescent apically, ovary 5-loculed, with 2 ovules per locule; styles 5, free.

Fruits: pome, spring and summer, conspicuous to showy; 2–5 × 1–3.5 cm, globose or obovate to elliptical, white, yellow or orangish yellow, rusty tomentose, soon glabrescent (**Figs. 29–30**); fruiting pedicel 3–8 mm, initially rusty tomentose, glabrescent; seeds (1–)3–4(–8) seeds per fruit, brown (**Fig. 31**).

Distribution and Ecology: China (Chongqing, Hubei). Cultivated throughout much of China, Taiwan, Japan, Southeast Asia, and warm temperate, subtropical, and tropical regions around the world. In its native range in China it occurs in moist, evergreen, broad-leaved forests, 1,000–2,200 m elev.

Discussion: The description is from Gu and Spongberg (2003), Janick and Paull (2008), and supplanted with our landscape observations. Although usually grown for its fruit, *Eriobotrya japonica* also makes a fine ornamental because of its large, bold, dramatic, handsome leaves, significant floral display, and colorful fruits. As a young tree, it typically grows more upright with an irregular vase shape but with age tends to develop a coarse-textured,

27. Inflorescences of *Eriobotrya japonica* are a many flowered panicle.

28. Flowers of *Eriobotrya japonica* are white. Note the brown tomentose hypanthium and sepals.

29. Fruits of *Eriobotrya japonica* are typically yellow and conspicuous to showy.

30. Fruits of *Eriobotrya japonica* are large and often showy.

more rounded canopy. Growth is fast and moderately dense, giving older trees a symmetrical canopy with a mostly regular or smooth outline.

Eriobotrya japonica flowers from November through April and, while conspicuous, the floral display of white, fragrant flowers is not always exceptionally showy, perhaps because branching structure is not so dense that inflorescences are contiguous, allowing green vegetation to show. The large, bold, dramatic leaves are nevertheless unusually handsome, heavily and prominently nerved, dark green above and pale, sometimes nearly silvery below. The clusters of yellow to orange fruits from early spring to early summer are showy. The handsome leaves and showy fruit clusters combine to make a striking accent tree.

E*riobotrya japonica* is suited to Sunset Climate Zones 4–24 (Brenzel 1995). Although typically a tree, it can be pruned and trained into an effective espalier on a wall, fence, or trellis but needs protection from hot afternoon sun when employed in this manner. Fruit litter can be a nuisance. Primarily problem free, the most significant disease is fire blight, especially if rains are late and/or humidity is high.

Eriobotrya deflexa differs from *E. japonica* in its mostly glabrous older leaves, new leaves emerging bronzy reddish brown, and smaller, reddish fruits.

31. Seeds of *Eriobotrya japonica* are shiny and brown.

When Liu et al. (2020) sunk *Eriobotrya* into *Rhaphiolepis*, they made the new combination *R. loquata*, choosing the new and seemingly wholly appropriate epithet *loquata* because *japonica* was precluded for use in *Rhaphiolepis* since it was already in use for another species in the genus. However, because in doing so they clearly cited as a synonym *Crataegus bibas*, an earlier name that has priority, they ought to have adopted the epithet *bibas* to make *R. bibas*. In not doing so they created a superfluous, illegitimate name that can never be used again for any new combination for this species (ICN Art. 52.1).

Although originally from China and widely grown there, *Eriobotrya japonica* was introduced to Japan in early times where it has been extensively cultivated for over 1,000 years (CRFG 2020, Morton 1987, Soriano et al. 2005). Indeed, it was so popular and widely grown there that it naturalized and appeared indigenous; hence the specific epithet. It is now cultivated worldwide in suitable climates, primarily for its fruits, and over 800 cultivars are recognized in Asia alone. If grown primarily for its fruits, select grafted cultivars. Some common cultivars for fruits in southern California include 'Champagne', a juicy, tart selection with yellow-skin and white flesh from March through May and best for warm areas; 'Gold Nugget' ('Thales'), a selection with sweet, orange fruit from May through June and best for coastal areas; and 'MacBeth', a selection with exceptionally large fruits with yellow-cream flesh from April through May (Brenzel 1995, CRFG 2020).

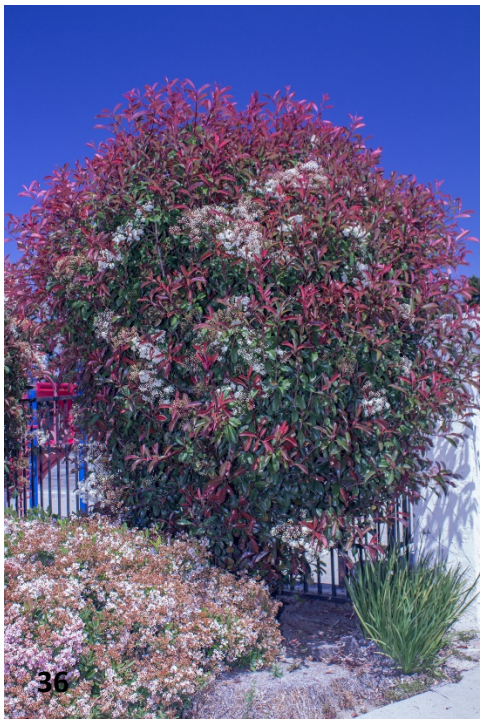
Animals, including humans, feed on fruits of *Eriobotrya japonica* and disperse the easily germinated seeds, leading to establishment of new plants outside cultivated areas. Spontaneous seedlings are occasionally seen in irrigated landscapes and other moist areas in southern California. It is listed as invasive in numerous regions and countries around the world (CABI 2020).

Photinia Lindl.

Photinia Lindl., Bot. Reg. pl. 491 (and text). 1820. Type species: *P. glabra* (Thunb.) Franch. & Sav. (≡ *Crataegus glabra* Thunb.).

Trees or shrubs, deciduous or evergreen, armed or unarmed; bark smooth with shallow longitudinal slits or thin, large irregular patches. Winter buds small; scales imbricate, few. Leaves alternate, simple, papery or leathery, venation camptodromous, margin serrate, rarely entire, shortly petiolate; stipules present, usually subulate. Inflorescences terminal, panicles to corymbs, rarely shortly paniculate, many flowered, sometimes flowers 2- or 3-clustered or solitary. Hypanthium cupular or campanulate to cylindric, adnate to ovary or free near apex. Sepals 5, persistent, short. Petals 5, contorted or imbricate in bud, base clawed. Stamens

32. *Photinia* × *fraseri* has a more or less rounded canopy with age and a nice show of white flowers in spring. Seal Beach, CA.



Figs. 33–36. *Photinia* × *fraseri*, habit. **33.** Same specimen in Fig. 32 but five years earlier, Seal Beach, CA. **34.** Seal Beach, CA. **35.** Street tree, Bellflower, CA. **36.** Pruned as a large tree shrub, Laguna Hills, CA. Note the showy, red new growth.

37. *Photinia* × *fraseri* informally pruned as a large tree shrub displays an abundance of color, mostly reds of the new spring growth but also white flowers and green leaves. Seal Beach, CA.

usually ca. 20. Carpels 2–5, rarely 1; ovary semi-inferior, (1 or)2–5-loculed, in fruit free apically or to 1/3 length; styles(1 or)2–5, connate basalt, rarely free, short, dilated apically; stigmas truncate; ovules 2 per locule, erect. Fruit a pome, globose, ovoid, or ellipsoid, somewhat fleshy, free from calyx only near apex or to 1/3 length, with persistent, incurved sepals; seeds erect, testa leathery; cotyledons plano-convex (Lu and Spongberg 2003, Robertson et al. 1991).

Photinia includes about 60 species evergreen or deciduous shrubs and trees native to moist, mixed, broad-leaved forests of eastern, southern and southeastern Asia and Mexico. China is the richest area for *Photinia* with 43 species, 32 of them endemic (Lu and Spongberg 2003).

Lindley (1820) established *Photinia* in 1820, when he named *P. arbutifolia*, basing it on a plant native to western North America from British Columbia through Washington, Oregon, and California into Baja California, Mexico, which he saw as a cultivated plant in the nursery establishment of Messrs. Malcomb and Co. in Kensington, England. Accompanying Lindley's account is a handsome colored plate of the plant (Pl. 491), which is now known as *Heteromeles arbutifolia*. Apparently it was Ker Gawler who actually composed the text for Pl. 491 but credited *Photinia*, its single species *P. arbutifolia*, and their validating diagnoses to Lindley (see Stafleu and Cowan in Regnum Veg. 94: 724. 1976). Apparently Gawler had extracted material from Lindley's soon-to-be- published treatment of Rosaceae (Lindley 1821).

Soon after, Lindley (1821) treated his new genus *Photinia* and its four species *P. arbutifolia*, *P. dubia*, *P. integrifolia*, and *P. serrulata*, the first an American species and the latter three Asian. Kalkman (1973) realized that Lindley had erred when he designated an older name, *Crataegus glabra* Thunb., as a synonym of *P. serrulata*, thus creating a superfluous and, therefore, illegitimate synonym for *P. glabra*, even though the two names had long been used to refer to separate species. Thus, *P. serrulata* is an illegitimate name.

Nesom and Gandhi (2009) argued that *Photinia* was validated in Lindley's 1820 publication as a monospecific genus, with *P. arbutifolia* as the type, which, if maintained, would require new combinations for up to 65 popular and widespread species in horticulture that would have to be transferred from *Photinia*. Thus, they moved to conserve *Heteromeles* and *Photinia*, for the latter conserving *P. glabra* (Thunb.) Franch. & Sav. (≡ *Crataegus glabra* Thunb. ≡ *P. serrulata* Lindl. nom. illeg.) as the new type, based on *C. glabra*, because it is the oldest name.

One species and one hybrid are commonly found in the landscape here, *Photinia × fraseri* and *P. serratifolia.*

38. Bark of *Photinia* × *fraseri* is grayish and smooth when young but becomes cracked and platy in patches with age.

39. Leaves of *Photinia* × *fraseri* are pales abaxially and have finely toothed margins and a broadly cuneate base.

Key to the Common Landscape Trees of *Photinia* in Southern California

Leaf blade base typically broadly cuneate . . . . . *P.* × *fraseri*

Leaf blade base typically rounded . . . . . *P. serratifolia*

Photinia × fraseri Dress

Photinia x fraseri Dress, Baileya 9: 102. 1961. Type: CULTIVATED. U.S.A. Alabama, Lee County: Auburn University, 5 April 1961, *Orr s.n.* (holotype BH, isotypes A, CAS, RBGE). [*P. glabra* (Thunb.) Maxim. × *P. serratifolia* (Desf.) Kalkman]. RED-TIP PHOTINIA, FRASER'S PHOTINIA.

Habit: evergreen large shrub to small, moderately branched and dense, moderately textured tree (2–)4–7 m tall and 5 m wide; canopy initially irregularly upright but becoming ±rounded with age (**Figs. 32–37**).

Trunk: solitary, to 20 cm DBH; bark grayish, smooth when young becoming cracked and platy in patches with age (**Fig. 38**), horizontal lines with faint lenticel; branchlets glossy reddish brown aging to silvery tan, buds 4–5 mm long, ovoid, bud scales several, 3–4 × 3–4 mm, ovoid, reddish to reddish brown.

Leaves: alternate; stipules at base 4.5–5.5 mm, reddish purple, very early caducous; petiole 1.2–3 cm long, 2.5 mm diam., grooved adaxially and hairy only when young, rounded abaxially, red proximally, green distally, ± glabrous; leaf blade 7.5–11.5 × 2.5–4.5 cm, elliptic to elliptic-obovate, thin-leathery, lustrous green adaxially, pale abaxially (**Fig. 39**), emerging bright red (**Figs. 37, 40**), margin faintly and densely fine-toothed throughout except for proximal 2 cm where entire (**Fig. 39**), midrib raised abaxially and impressed adaxially, primary nerves 8 pairs, 1 faint secondary nerve between each pair of primary nerves, both surfaces glabrous when mature, base broadly cuneate (**Fig. 39**), apex acute to acute-acuminate.

Inflorescences: terminal, variable, compound corymb, pyramidal to semi-globular and nearly flat-topped in shape, 10–12 × 11–16 cm, 2–3–branched (**Fig. 41**); peduncle 0.5–1.5 cm long, 3.5–4 mm diam., sometimes greatly elongated to 12 cm long with a few rudimentary leaves; rachis 9–12 cm long with up to 13 1st-order branches, these to 10 cm long; peduncle, rachis, and branches mostly glabrous to very lightly villous and reddish (**Fig. 42**) but sometimes green to greenish brown; bracts small, typically early caducous and leaving only a low, thin base.

40. New growth of *Photinia* × *fraseri* can be strikingly red and unusually showy.

41. Inflorescences of *Photinia* × *fraseri* are a terminal, typically compound corymb.

42. The rachis and branches of the inflorescence of *Photinia* × *fraseri* are reddish.

43. Flowers of *Photinia* × *fraseri* are white and the petals have a patch of fine hairs at their base adaxially, barely discernable on petal at lower right.

Flowers: 5–6 × 11–12 mm, white (**Fig. 43**), odoriferous, spring; pedicel 3 × 0.4 mm, light green, glabrous; bracteoles 2 subtending pedicel, these 2 mm long, slender, brown, early caducous; hypanthium 3 × 3 mm, obconical, glabrous, whitish; sepals 5, 0.5 × 0.5 mm, triangular, apex acute, spreading to erect, glabrous, reddish; petals 5, 5 × 4 mm, broadly and shortly spatulate to circular, adaxially cupped, white, glabrous except for a patch of clear to white, filament-like hairs adaxially at base; stamens 20, of varying height, generally outer ones longer than inner ones, filaments 2–3.5 mm long, slender, white; anthers 0.75 mm long, globose to ellipsoid, medifixed; gynoecium with ovary semi-inferior, 1–1.5 × 1 mm, ovoid, densely white pilose on apically free top; styles 2, 3–3.5 mm long, 0.4 mm diam., free in distal 1–2 mm, connate at base, glabrous; stigma truncate, pink.

Fruits: not seen.

Discussion: The description is mostly from our observations of landscape shrubs and trees and is supplemented from Dress (1961). The most common *Photinia* in California, this hybrid was reported to be between *P. glabra*, the pollen parent, and *P. serrulata*, the seed parent although the latter is a name of no botanical standing and is best referred to *P. serratifolia* (which see below). The hybrid originated in Fraser Nurseries of Birmingham, Alabama as a selection of a seedling-grown plant of *P. serratifolia* that was in proximity to a plant of *P. glabra*.

Dress (1961) relates that Mr. O. W. Fraser, president of Fraser Nurseries, wrote that the seedling was selected out of a seedling bed about 1940 and, after several years, was displaying such excellent characteristics that the nursery began to propagate it more heavily. They released the first plants to the nursery trade in the southern United States in late 1955 and the plants immediately attracted much attention and admiration. He noted that the plants had more characteristics of *P. glabra* than *P. serratifolia*.

The late Henry P. Orr, Associate Professor of Horticulture at Auburn University, Auburn, Alabama, grew this hybrid and was so enamored with it that he provided material for the late William J. Dress at Cornell University, Ithaca, New York to use to name and describe *Photinia* × *fraseri*. In doing so he wrote to Dress that the plant develops compact, upright, and handsome form with less susceptibility to leaf spot diseases than its parents. He also noted it has less coarse texture than *P. serratifolia* and is more colorful like *P. glabra*. Dress (1961), suspecting that repeated hybridization would likely occur between the two parents because of the appealing offspring, designated the selection from Fraser nurseries as ‘Birmingham’.

43. *Photinia* × *fraseri* is often found as a clipped shrub or tree shrub. Seal Beach, CA.

44. *Photinia* × *fraseri* is often found as a clipped shrub where the striking new growth is displayed to best advantage. Seal Beach, CA.

45. *Photinia* × *fraseri* also serves as a somewhat rangy screen or background. Fullerton, CA.

The appealing characteristics of *Photinia* × *fraseri* include the vivid, bronzy red, newly emerging leaves (the color seemingly more pronounced on young or frequently clipped or pruned plants), the dark green, thin-leathery older leaves, and the bountiful and showy display of conspicuous clusters of white flowers from late March through April. Unfortunately, when smelled closely, the flowers have a somewhat unpleasant odor, like many *Crataegus* and *Photinia*, that has been likened to that of human semen.

Photinia × *fraseri* is, indeed, a colorful plant. Striking reddish color is a dominant feature of this tree in March and April with the reddish inflorescences capped with white flowers and followed sometimes simultaneously or soon after by the flushes of bright coppery or bronzy red new growth. As a shrub or young tree, it is of moderate to fast growth and is nearly always found as an intensely maintained plant, more often as a clipped shrub (**Figs. 43–44**), hedge, or large, somewhat rangy background or screen (**Fig. 45**) and less often as a tree. It can also be pruned and trained as an espalier and cut branches with their colorful red foliage are excellent in arrangements (Brenzel 1995). It takes judicious pruning and training to achieve a tree and they typically have a moderately dense and medium-textured, more or less symmetrical, rounded canopy with a mostly regular or smooth outline.

The floral display of white, odoriferous flowers is typically showy, at times covering the rounded canopy completely like a snow-capped mountain, but many specimens flush the characteristic bronzy reddish new growth while the tree is still in flower or even just prior to flowering, which tends to obscure the floral display, making it appear less even and full. The leaves maintain this new color for a considerable time before turning green.

Photinia × *fraseri* is suited to Sunset Climate Zones 4–24 (Brenzel 1995). Significant diseases include powdery mildew and Entomosporium leaf spot, especially in more humid and cool coastal areas. Major pests are aphids and foliar thrips. Chlorotic foliage is sometimes observed and might be due to cool temperatures and excessively moist soil.

Photinia serratifolia differs from *P.* × *fraseri* in its larger leaves with more primary nerves and a rounded base, greenish inflorescence rachis and rachillae, mostly glabrous petals, and presence of fruit. Also, it does not typically put on as showy a display of red new growth as does *P.* × *fraseri* (perhaps because it is not as frequently pruned as the latter species).

In addition to 'Birmingham', selections of *Photinia* × *fraseri* include 'Indian Princess', known for its smaller, compact habit and orange new foliage, and 'Red Robin', known for its bright red new growth and purported resistance to foliar diseases. 'Red Robin' might be the most common selection in the southern California landscape but if so, its resistance to foliar diseases, at least in coastal areas, is uneven at best.

Photinia serratifolia (Desf.) Kalkman

Photinia serratifolia (Desf.) Kalkman, Blumea 21(2): 424. 1973. TAIWANESE PHOTINIA, CHINESE PHOTINIA.

Crataegus serratifolia Desf., Cat. Hort. Paris, (ed. 3): 288, 408. 1829. Type: unresolved.

Photinia serrulata Lindl., Trans. Linn. Soc. London 13: 103. 1821. nom. illeg.

Photinia lindleyana Wight & Arn., Prodr. Fl. Ind. Orient 1: 302. 1834.

Photinia pustulata Lindl., Edward's Bot. Reg.23: pl. 1956. 1837.

Habit: evergreen large shrubs or small moderately branched and dense, moderately textured tree 4–8(–15) m tall and 8 m wide; canopy initially irregularly upright but becoming ± rounded with age (**Figs. 46–48**).

46–48. *Photinia serratifolia* is initially irregularly upright but becomes more rounded with age. **46.** Los Angeles County Arboretum and Botanic Garden (*1951-0546-C*1*), Arcadia, CA. **47.** Newport Beach, CA. **48.** Lakewood, CA.

49. Bark of *Photinia serratifolia* is gray, rough, densely scaly in irregularly shaped but mostly elongated plates.

50. Leaves of *Photinia serratifolia* are pale abaxially and have finely toothed margins and a rounded base.

Trunk: solitary, to 30 cm DBH; bark gray, rough, densely scaly in irregularly shaped but mostly elongated plates 3–5 cm long (**Fig. 49**); branchlets brown or reddish brown when young, brownish gray when old, some hairs when young glabrous with age; buds ovoid, 4–7 mm, apex acute to shortly acuminate, bud scales several, 13 × 11 mm, dark brown, hard, partly hairy abaxially.

Leaves: alternate; stipules at base 4.5–5.5 mm, few hairs present, very early caducous; petiole 2–4 cm, pubescent when young, glabrous with age; leaf blade (6–)9–22 × 3–6.5 cm, narrowly elliptic, narrowly obovate, or obovate-elliptic or oblong-elliptic, leathery, handsome, lustrous dark green adaxially, pale abaxially, margins sparsely or inconspicuously and finely toothed (**Fig. 50**) or entire, midrib raised abaxially and impressed adaxially, primary nerves 14–30 pairs, abaxially long pubescent along veins when young, both surfaces glabrous when mature, base rounded (**Fig. 50**), apex acute to acute-acuminate.

Inflorescences: terminal, compound corymb, semi-globular in shape (**Figs. 51–52**), 8–12 × 10–16 cm, 3–4–branched; rachis with up to 12 1st-order branches, these to 15 cm long, rachis and branches glabrous, villous, or tomentose, green (**Fig. 53**), bracts small, subulate, early caducous.

Flowers: 6–8 mm in diam., white (**Fig. 54**), odoriferous, spring; pedicel 2.5–5 mm long, glabrous, villous, or tomentose; bracteoles 2 or more subtending pedicel; hypanthium, 1–2 mm, obconical to cupular, glabrous, distal half free from ovary; sepals 5, 1–1.5 × 1.25–1.75 mm, broadly triangular, apex acute or obtuse, glabrous; petals 5, 3–4.5 × 3–3.5 mm, suborbicular to broadly obovate, shortly but distinctly clawed, white, glabrous or infrequently villous adaxially at base; stamens 16–20, outer ones longer than inner ones, filaments to 3 mm long; anthers 0.5–0.75 mm long; gynoecium with ovary semi-inferior, pilose on apically free top; styles 2, rarely 3, 2.5 mm long, free distally, connate at base, glabrous; stigma capitate.

Fruits: pome, summer to fall; 5–6 mm (dried), globose to subglobular or obovoid with ± flattened apex, red when immature, brownish purple when mature, distal part of hypanthium and sepals closely appressed against top of fruit; seeds 1–4(–6), 2–3 mm long, ovoid to ± ellipsoid, brownish, smooth; summer to fall.

Distribution and Ecology: China (Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Yunnan, Zhejiang), India, Indonesia, Japan, Philippines, Taiwan. Moist, broad-leaved evergreen forests, sea level to 2,500 m elev.

Discussion: The description is from Lu and Spongberg (2003), Kalkman (1973), and supplemented with our landscape observations. Kalkman (1973) explained the justification for

51. Inflorescences of *Photinia serratifolia* are compound corymbs. Note the handsome leaves.

52. Inflorescences of *Photinia serratifolia* are typically semi-globular in shape. Los Angeles County Arboretum and Botanic Garden(*1951-0546-C*1*), Arcadia, CA.

53. The rachis and branches of the inflorescences of *Photinia serratifolia* are typically green.

54. Flowers of *Photinia serratifolia* are white and the petals typically lack fine hairs at their base adaxially.

this combination and the lack of suitable type material for this species, which has a complex history involving another name. Thunberg (1784) named *Crataegus glabra*, basing it on *Thunberg 11860* and *11861*, which Kalkman noted have small leaves with short petioles. A plant introduced to English horticulture in 1804 and called *C. glabra* was similar but had different and much larger leaves. Lindley had already seen cultivated *Crataegus glabra* in England and, when he treated *Photinia* (Lindley 1821), he placed (while expressing no doubt) *C. glabra* Thunb. as a synonym of his newly named *P. serrulata*, making the latter name superfluous and, therefore, illegitimate; he ought to have adopted the epithet *glabra*, making the combination *P. glabra*. Soon after, Desfontaines (1829) thought the two were the same, listing them under *Crataegus*, and he named a new species, *C. serratifolia*, based on a tree growing in the Jardin du Roi in Paris. From the meager description that Desfontaines published, it is impossible to ascertain much if anything about *C. serratifolia*; however, Decaisne (1874) felt that it was best referred to *P. serrulata* and Kalkman (1973) accepted this assessment because Decaisne worked in Paris and might have been able to identify Desfontaines's species, and the confusion between *P. serrulata* and *P. glabra* had been more or less resolved by 1874.

By the 1870s, European horticulture recognized that Thunberg's *Crataegus glabra* and Lindley's *Photinia serrulata* were distinct taxa. Franchet and Savatier (1873) separated the two taxa, calling them *P. glabra* and *P. serrulata*. Decaisne (1874) did the same. Maximowicz (1873) had done more or less the same but had treated the two taxa on a varietal level, referring to them as *P. glabra* var. *a typica* and *P. glabra* var. *B chinensis*.

Kalkman (1973) and others felt that *Photinia glabra* and *P. serrulata* were closely related but distinct species, the former occurring in Japan and China (Kalkman 1973). Because *P. serrulata* was an illegitimate name, it required a new epithet, and Kalkman (1973) chose that provided by *Crataegus serratifolia*, the obscure name of Desfontaines (1829). In doing so, Kalkman admitted that his choice was unsatisfactory because of the lack of type specimen (it also is a homophonic name that could sow its own confusion); Desfontaines did not specify one and, after an extensive search, Kalkman was unable to identify type material (Kalkman 1973). Nevertheless, Kalkman (1973), while admitting that the identity of *C. serratifolia* is unclear, accepted it as the basis for his new combination *P. serratifolia*, stating " . . . I think that the decision to accept Descaisne's judgment, is the best that can be made at the moment."

Photinia serratifolia is an old garden plant in southern California that was used as a large shrub or small tree but now is uncommon, having been mostly replaced by P. × *fraseri* because of the latter's more colorful and showy display of new foliage and purported enhanced disease resistance. Like *P.* × *fraseri*, though, *P. serratifolia* puts on a showy display of white although odoriferous flowers, typically covering the rounded canopy nearly completely. Its new foliage is

bright coppery but typically not as red and showy as that of *P.* × *fraseri* although it somewhat makes up for it by carrying red berries aging to brownish purple in late summer and fall.

As a young tree, *Photinia serratifolia* typically grows more uptight with an irregular vase-shaped canopy but with age develops an attractive, spreading, moderately dense, medium- to coarse-textured, rounded canopy. Growth is fast and moderately dense, giving older trees a symmetrical canopy with a mostly regular or smooth outline. A selection, 'Aculeata' (sometimes offered as 'Nova' or 'Nova Lineata') has more compact growth and leaves with ivory-yellow midrib and primary nerves.

Photinia serratifolia is suited to Sunset Climate Zones 4–16 and 18–22 (Brenzel 1995). It is better adapted to warmer more arid inland areas because powdery mildew and Entomosporium leaf spot can be problematic in more humid and cool coastal areas.

Photinia × *fraseri* differs from *P. serratifolia* in its smaller leaves with fewer primary nerves and a cuneate base, reddish inflorescence rachis and rachillae, petals with a patch of white hairs at the base adaxially, and lack of fruit. Also, it puts on much more of a showy a display of red new growth than does *P. serratifolia*.

Hybrids of Rhaphiolepis indica and Eriobotrya deflexa

At least three inadvertent hybrids have occurred in cultivation between *Eriobotrya deflexa* and *Rhaphiolepis indica* in southern California. Two, whose seed-parents only are documented, one from *R. indica* and the other from *E. deflexa*, originated in the 1970s, are relatively well known in the landscape, and have the names *Rhaphiolepis* 'Montic' and *Eriobotrya* 'Coppertone', respectively; the third hybrid, whose pollen- and seed-parents are unknown, is rare and has had no name. Coombes (Coombes and Robertson 2008) established the nothogenus ×*Rhaphiobotrya* for hybrids between *Eriobotrya* and *Rhaphiolepis*.

×Rhaphiobotrya A. J. Coombes

×Rhaphiobotrya A. J. Coombes, Plantsman n. s. 7: 164. 2008. [*Eriobotrya* Lindl. × *Rhaphiolepis* Lindl.]. CULTIVATED. United Kingdom. Hampshire, Hillier Nurseries, 14 May 1998, *Coombes 980526*, from a plant of the cultivar 'Coppertone'.

Small trees, sometimes large shrubs, evergreen. Leaves simple, stipulate, petiolate, leathery, venation camptodromous, margins variously serrate; stipules caducous. Inflorescences terminal panicles, numerous flowered. Hypanthium obconical. Sepals 5, persistent, spreading to reflexed

downward, green, densely tomentose abaxially. Petals 5(–9) (the excess quantity likely petaloid stamens), light pink, spatulate to rounded. Stamens 12–20. Ovary inferior, 2-loculed, with 2 ovules per locule, tomentose distally at style base; styles 2–3, briefly connate at base. Fruit a pome.

The first documented hybrid of *Rhaphiolepis indica* and *Eriobotrya deflexa* was *Rhaphiolepis* 'Montic', an introduction of Monrovia Nursery Company, Azusa, California in the early 1970s to which they gave the registered trademark name Majestic Beauty®. Monrovia Nursery Company tends to use the cultivar name 'Montic' for their hybrid introductions and did and continues to do so in their nursery catalogs. Customarily, they also apply their registered trademark name Majestic Beauty® to many of their plants they feel are of exceptional merit. Shortly thereafter, Bordier's Nursery of Glendora and Irvine, California introduced their hybrid, *Eriobotrya* 'Coppertone'. Especially the former but the latter, too, have become moderately common in the California, national, and even the international landscape industries.

Despite its wide popularity and prevalence in the southern California landscape, where it easily is one of the five most common landscape shrubs, the identity of the material grown as *Rhaphiolepis indica* has been questioned. Coombes and Robertson (2008) suggest that many of the cultivated pink-flowered plants grown as *R. indica* might actually be *R.* × *delacourii*, which is a hybrid of *R. indica* and *R. umbellata*. While TROPICOS (2020) treats *R. indica* and *R. umbellata* as distinct species, some have suggested that *R. indica* might not be distinct from *R. umbellata*, the latter treated as a synonym for *R. indica* (POWO 2020) or a synonym for *R. indica* var. *umbellata* (Plant List 2020). Still others have speculated that *Photinia* might be one of the parents of ×*Rhaphiobotrya*. A rigorous, molecular-based study will likely be necessary to sort out the species of *Rhaphiolepis* satisfactorily and confirm that the two parents of ×*Rhaphiobotrya* are *E. deflexa* and *R. indica*. Until then, we will accept *R. indica* as the name for the common landscape shrub and as one of the parents of this hybrid.

When Coombes and Robertson (2008) established the nothogenus ×*Rhaphiobotrya* they did not specify a nothospecies; thus, we provide one here:

×Rhaphiobotrya splendens Hodel & Greby **nothosp. nov.** [*Eriobotrya deflexa* (Hemsl.) Nakai × *Rhaphiolepis indica* (L.) Lindl. ex Ker Gawl. 'Enchantress']. Type: CULTIVATED. USA. California. Los Angeles County: City of Bellflower, street tree at 10520 Ashworth St., 29 April 2020, *Hodel 4001* (holotype BH, isotype LASCA). **Figs. 1, 60–61**.

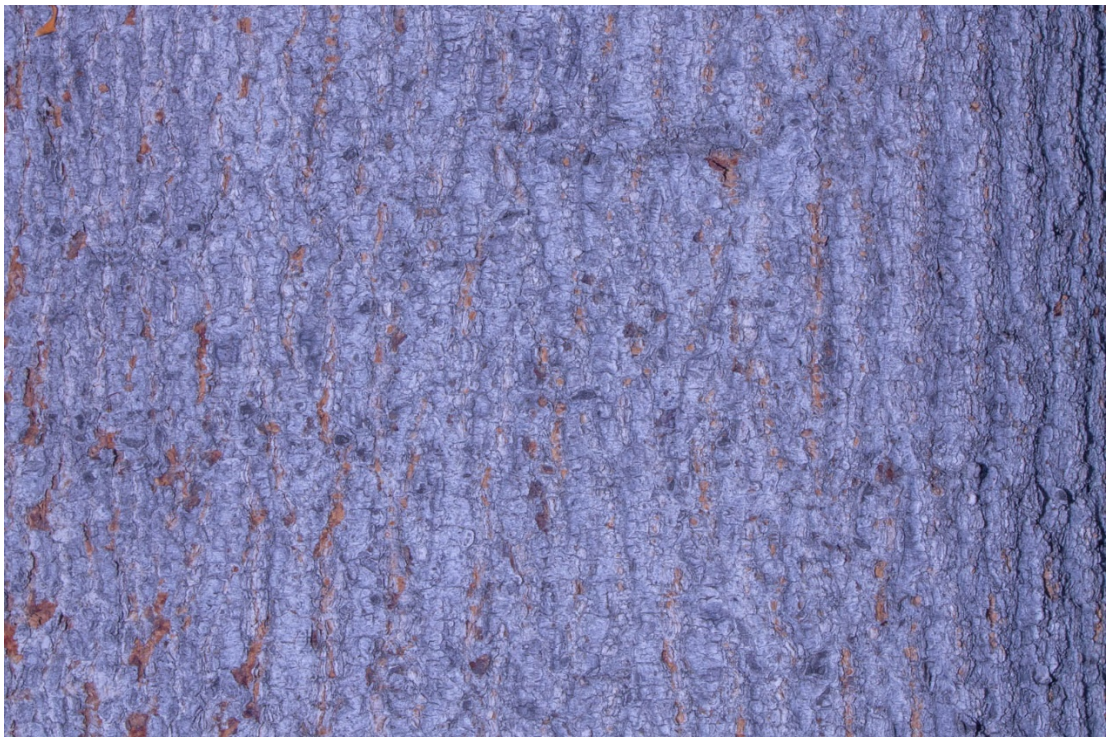
Rhaphiolepis 'Montic' hort. ("R. × 'Montic'").

55. ×*Rhaphiobotrya splendens* 'Montic' has a hemispherical canopy and is spectacular when in flower. Bellflower, CA.

56. ×*Rhaphiobotrya splendens* 'Montic' has a spreading, hemispherical canopy. Burbank, CA.

57. ×*Rhaphiobotrya splendens* 'Montic' can have an umbrella-shaped canopy. Burbank, CA.

58. ×*Rhaphiobotrya splendens* 'Montic' makes a fine small, standard tree. Oceanside, CA.



59. Bark of *Rhaphiobotrya splendens* 'Montic' is grayish, mostly smooth becoming slightly rough and small-pebbled. From the type plant (*Hodel 4001*).

This tree is intermediate between both parents in habit and foliage. In habit it is larger than *Rhaphiolepis indica* but somewhat smaller than *Eriobotrya deflexa*. Its leaves are larger than those of *R. indica* but smaller than those of *E. deflexa*. Flowers are pinkish like those of *R. indica*.

For the new nothospecies epithet, we select *splendens*, meaning shining or brilliant, an allusion to the showy pink to light pink floral display and lustrous leaves.

×Rhaphiobotrya splendens Hodel & Greby

×*Rhaphiobotrya splendens* includes at least three cultivated landscape tree selections in southern California. A fourth, large-growing hybrid, *Rhaphiolepis indica* 'Conda' Rosalinda® Indian Hawthorn (PP9056), was selected in 1986 and patented in 1995 by Flowerwood Nursery, Inc. in Mobile, Alabama. Only the pistillate parent is known, *R. indica* 'Jack Evans'. Although its large habit is similar to that of the three hybrid cultivars discussed here, especially Majestic Beauty® Indian Hawthorn and the Fullerton Loquat, we are unsure if it should be included in ×*Rhaphiobotrya splendens*. It is distinctive in its large leaves (to 17.75 cm long), reddish purple

60–63. Leaves of *Rhaphiobotrya splendens* 'Montic' are variable, elliptic to elliptic-obovate, thick-leathery, dark green adaxially, and pale abaxially. **60–61.** From the type plant (*Hodel 4001*).

new growth, and persistent stipules at the petiole base. We have not yet seen it in southern California.

Key to the Common Landscape Trees of ×*Rhaphiobotrya splendens* in Southern California

Leaf blade margin typically toothed only in distal half . . . . . ×*R. splendens* 'Coppertone'
Leaf blade margin typically toothed in distal and proximal halves
Leaf blade typically with 8–10 pairs of primary nerves . . . . . ×*R. splendens* 'Montic'
Leaf blade typically with 12 pairs of primary nerves . . . . . ×*R. splendens* 'Fullerton'

×Rhaphiobotrya splendens 'Montic' MAJESTIC BEAUTY® INDIAN HAWTHORN

Habit: evergreen, small, very densely branched, spreading, fine- to medium-textured tree 2–6 m tall and wide; eventually forming an umbrella-shaped or hemispherical canopy (**Figs. 1, 55–58**).

Trunk: solitary, to 20 cm DBH; bark grayish, mostly smooth becoming slightly rough and small-pebbled with sparse, scattered, minute, longitudinal, irregularly shaped brown flakes (lenticels?) (**Fig. 59**); branchlets glossy brown to tan, 4–6 mm diam., irregularly longitudinally fissured, with short, white pubescence or tomentum, this often weathering away to become glabrous; buds 4–5 mm long, ovoid, bud scales several, 3–4 × 3–4 mm, ovoid, purplish red to reddish brown, margins cilliate.

Leaves: alternate, spreading; stipules 2–3 mm long, elliptic, brown, early caducous; petiole 0.5–1.5 cm long, 2–3 mm diam., round, light yellowish green, with short, white pubescence, becoming glabrous; leaf blade 6–9(–15) × 4–5(–7) cm, elliptic to elliptic-obovate, thick-leathery, dark green adaxially, pale abaxially (**Figs. 60–63**), emerging pinkish brown, margins conspicuously and coarsely toothed in distal 4/7, teeth forward pointing, entire and revolute in proximal 3/7 and decurrent on petiole, midrib raised and yellowish to light green, primary nerves 8–10 pairs, both surfaces ± glabrous, base broadly cuneate, apex acute to rounded.

Inflorescences: terminal, variable but generally a panicle to an umbellate panicle, pyramidal to semi-globular and nearly flat-topped in shape, 12 × 18 cm, 3–branched (**Fig. 64**); peduncle 0–1 cm long, 3.5–4 mm diam.; rachis 2–6 cm long with up to 9 1st-order branches, these to 12 cm long, 3–4 mm diam., spreading-ascending, sub-branches to 4 cm long; peduncle, rachis, and branches light green to pinkish, with moderately dense, short, reddish brown to tan tomentum; bracts small, typically early caducous and leaving only a low, thin base.

Flowers: 8–10 × 19–24 mm, pink (**Figs. 65–66**), fragrant, spring; pedicel 2–5 × 0.6–1 mm, light green, with short reddish brown tomentum; bracteoles 2 subtending pedicel, these 4 mm long, ovoid, coppery brown; hypanthium, 4 × 3 mm, obconical, greenish to greenish yellow with dense light brown to reddish brown tomentum; sepals 5, 4 × 3 mm, triangular, apex acute-rounded, reflexed downward, greenish with brown tomentose margins; petals 6–8, 11 × 7 mm, spatulate-obovate to rounded, pink to light pink; stamens 20, 8 mm long, erect-ascending, filaments 4 mm long, slender, 0.1 mm diam., connate in basal 2 mm, white aging reddish, some petaloid (**Fig. 66**); anthers 0.5–0.75 mm long, ellipsoid-deltoid, medifixed; gynoecium nearly equaling stamens, ovary 1.5 × 1.5 mm, ovoid-globose, densely reddish brown tomentose; styles 2, 5–6 mm long, white, free in distal 2–3 mm, connate proximally, erect; stigma truncate.

Fruits: pome (seldom seen), summer and fall; 15 × 11 mm, obovoid, reddish purple (**Fig. 67**).

Discussion: The description is from cultivated landscape trees. Majestic Beauty® Indian Hawthorn is a selection that Charles H. Lee of the Monrovia Nursery Company in Azusa, California found as a chance seedling growing in a seedling bed of *Rhaphiolepis indica*

64. Inflorescences of *Rhaphiobotrya splendens* 'Montic' variable but generally a panicle to an umbellate panicle, pyramidal to semi-globular and flat-topped.

65. Flowers of *Rhaphiobotrya splendens* 'Montic' are pink.

66. Flowers of *Rhaphiobotrya splendens* 'Montic' are pink. Note the petaloid stamens.

67. Although seldom seen, fruits of *Rhaphiobotrya splendens* 'Montic' are a reddish purple pome.

'Enchantress' and patented (PP3349) on May 29, 1973. In doing so Lee noted that, "The new variety of *Rhaphiolepis* plant is characterized by its exceptionally large branches and large coriaceous leaves and the profusion of very large pale pink flower clusters."

The registered name Majestic Beauty® is frequently misapplied as a cultivar name, such as ×*Rhaphiobotrya montic* 'Majestic Beauty' or earlier *Rhaphiolepis* × *montic* 'Majestic Beauty' or *R*. × 'Majestic Beauty'. All three are incorrect because the name Majestic Beauty® is not a cultivar epithet and, thus, should not be in single quotes. The latter is incorrect for another reason, too, which is that even if it was a cultivar epithet, it cannot be in single quotes if it follows the "×" denoting a hybrid; to be correct, the "×" denoting a hybrid is not used before a cultivar epithet. Also, the former two are incorrect because 'Montic' is a cultivar epithet, not a hybrid species epithet, and must be enclosed in single quotes, not italicized, and not have the "×" denoting a hybrid preceding it.

Majestic Beauty® Indian Hawthorn is the most common landscape tree of the three selections of **×***Rhaphiobotrya splendens* in the southern California landscape and, when in flower, typically in April, makes a spectacular and superb specimen. Of the three horticultural selections, its growth is more compact, the branchlets with short internodes and leaves with short petioles, making a dense, fine- to medium-textured, symmetrical, uniform, umbrella-shaped or hemispherical canopy of smooth outline and high-shoot-tip-per-unit-area growth. The dark green, handsome leaves are exceptionally thick, leathery, and durable. Because of the compact growth and close-set stem tips, the terminal inflorescences are produced in profusion, typically touching each other and completely covering the canopy with pink flowers to the exclusion of all green vegetation. This spectacular display lasts for a few weeks and, as the flowers age, flushes of growth emerge from behind the inflorescences, thrusting new pinkish brown leaves above the canopy where their esthetic quality can be easily admired.

Majestic Beauty® Indian Hawthorn is suited to Sunset Climate Zones 8–9 and 12–24 (Brenzel 1995). Of moderate growth, it is typically a tree but can be clipped or sheared into a hedge or left alone and form a large mound. Mostly problem free, the most serious diseases might be fire blight and Entomosporium leaf spot.

We have observed numerous specimens of Majestic Beauty® Indian Hawthorn in the landscape with leaning trunks, which is likely from the dense, heavy canopy, development of inadequate trunk caliper in the nursery, and/or inappropriate staking in the landscape. Structurally prune and stake (only if necessary) appropriately in the nursery to develop a strong, robust, central leader with well structured branches. After planting, thin the canopy to lower wind resistance

68. ×*Rhaphiobotrya splendens* 'Coppertone' has a somewhat irregular, hemispherical canopy. Note the uptight branching. Fountain Valley Library, Fountain Valley, CA.

69. ×*Rhaphiobotrya splendens* 'Coppertone' can be judiciously maintained as a small, standard tree with a hemispherical canopy. Seal Beach, CA.

70. ×*Rhaphiobotrya splendens* 'Coppertone' has a somewhat irregular, hemispherical canopy. Glendale, CA.

71. ×*Rhaphiobotrya splendens* 'Coppertone' can have an irregular, hemispherical canopy. Fountain Valley City Hall, Fountain Valley, CA.

and reduce blow downs and stake only if necessary, doing so in a horticulturally acceptable and appropriate manner.

×Rhaphiobotrya splendens 'Coppertone' COPPERTONE LOQUAT

Habit: evergreen, small, moderately and upright-branched (**Figs. 68, 72**), medium- to coarse-textured tree, 2–6 m tall and 4 m wide; eventually forming a somewhat irregular, hemispherical canopy (**Figs. 68–71**).

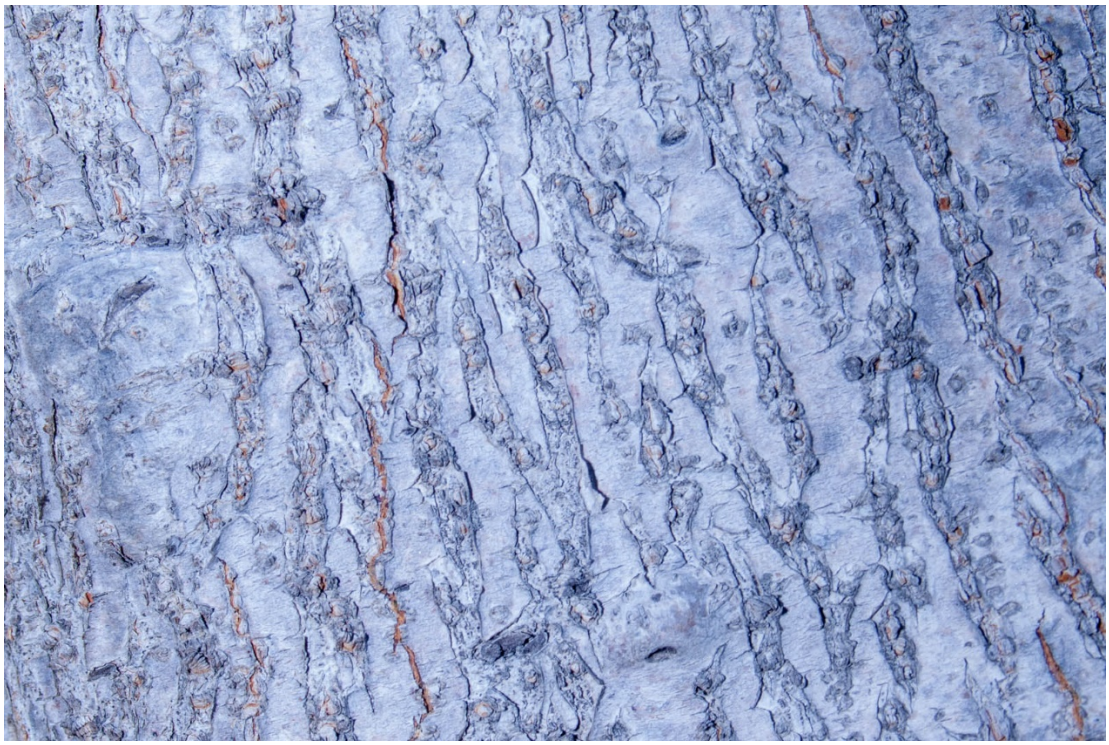
Trunk: solitary, to 20 cm DBH; bark grayish white, mostly smooth becoming slightly rough with slender, narrow, vertical, scab-like protrusions and brown, ± superficial, vertical lines (**Fig. 73**); branchlets glossy brown to grayish white, 4–6 mm diam., irregularly longitudinally fissured, with short, white tomentum becoming ± glabrous; buds 4–6 mm long, ovoid, bud scales several, 3–4 × 3–4 mm, ovoid-triangular, green to purplish red to reddish brown.

Leaves: alternate, spreading; stipules 8–10 × 4–6 mm, ovoid-lanceolate to ovoid-triangular, pinkish green to light red, early caducous; petiole 3 cm long, 3 mm diam., round, reddish purple to light yellowish green, ±glabrous; leaf blade 11–16(–20) × 4–6 cm, elliptic to broadly elliptic, medium- to thick-leathery, lustrous dark green adaxially, pale abaxially, emerging brownish coppery pink, often senescing reddish orange (**Fig. 82**), margin conspicuously and coarsely toothed in distal 1/3 (rarely 2/3) (**Figs. 74–78**), teeth forward pointing, entire and revolute in proximal 2/3 (rarely 1/3), decurrent on petiole, midrib raised and light yellowish green adaxially, prominently raised and pinkish red to yellowish to light green abaxially, primary nerves 12–16 pairs, both surfaces ±glabrous, base cuneate to broadly cuneate, apex acute-rounded to rounded and slightly notched.

Inflorescences: terminal, variable but generally a loose panicle to umbellate panicle, pyramidal to semi-globular and nearly flat-topped in shape (**Figs. 79–80**), 15 × 20 cm, 2–branched; peduncle 0–1 cm long, 5 mm diam., green; rachis 11.5 cm long with up to 13 1st-order branches, these to 13.5 cm long, 3 mm diam., spreading-ascending but the most proximal sometimes downward curved then curving upwards, sub-branches to 4 cm long; peduncle, rachis, and branches light green to pinkish, with moderately dense, short, reddish brown to tan tomentum; bracts 4–8 mm long, lanceolate, densely reddish brown tomentose, typically early caducous and leaving only a low, thin base.

Flowers: flowers 8–10 × 19–22 mm; white with a tinge of pink (**Fig. 81**), fragrant, spring; pedicel 3–4 × 1.5 mm, light green, with short reddish brown tomentum; bracteoles 2 subtending pedicel, these 3–8 mm long, ovoid to long ovoid, densely reddish brown

72. ×*Rhaphiobotrya splendens* 'Coppertone' typically has strong, upright branching. Fountain Valley Library, Fountain Valley, CA.



73. Bark of ×*Rhaphiobotrya splendens* ‘Coppertone’ is grayish white, mostly smooth becoming slightly rough with slender, narrow, vertical, scab-like protrusions.

74. The unusually handsome leaves of ×*Rhaphiobotrya splendens* ‘Coppertone’ elliptic to broadly elliptic and lustrous dark green adaxially.

75–78. Leaves of ×*Rhaphiobotrya splendens* 'Coppertone' can be variable but are typically , lustrous dark green adaxially, pale abaxially, and margins conspicuously and coarsely toothed in distal 1/3 (rarely 2/3). **75–76.** Toothed in distal 1/3. **77–78.** Toothed in distal 2/3. All leaves from same twig.

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tomentose; hypanthium, 5 × 4 mm, obconical, greenish to greenish yellow and dense reddish brown tomentose; sepals 5, 3 × 2 mm, reflexed downward, triangular, apex acute-rounded, greenish, brown tomentose; petals 5, 8–9 × 5–7 mm, broadly spatulate, cupped upward, apex rounded, white with a slight tinge of pink to light pink; stamens 13–20, variable in height, 7–10 mm long, erect-ascending, filaments 6–9 mm long, slender, 0.25 mm diam., white aging reddish; anthers 1 × 1 mm, ellipsoid but sometimes nearly flattened, basifixed; gynoecium nearly equaling stamens, ovary 1.5 × 1.5 mm, ovoid-globose, green, densely white tomentose especially distally; styles 2–4, 6–7 mm long, white, free in distal 4–5 mm, connate proximally, erect; stigma truncate; fragrant; spring.

Fruits: pome (seldom seen), summer and fall; 15 × 11 mm, obovoid, reddish purple (**Figs. 82–83**).

79. Inflorescences of ×*Rhaphiobotrya splendens* 'Coppertone' are variable but generally a panicle to umbellate, flat-topped panicle.

80. Inflorescences of ×*Rhaphiobotrya splendens* 'Coppertone' are variable and can be a loose panicle.

81. Flowers of ×*Rhaphiobotrya splendens* 'Coppertone' are mostly white with a tinge of pink.

82. Fruits of ×*Rhaphiobotrya splendens* 'Coppertone' are a seldom-seen, reddish purple pome. Note a few leaves senescing a bright reddish orange.

83. Fruits of ×*Rhaphiobotrya splendens* 'Coppertone' are obovoid and reddish purple.

Discussion: The description is from cultivated landscape trees. Coppertone Loquat is a selection that Ernest P. Bordier of Bordier's Nursery in Glendora and Irvine, California found as a chance seedling growing in a seedling bed of *Eriobotrya deflexa* and patented (U. S. Patent 4245) on May 2, 1978. In doing so Bordier noted that, "My new and distinct variety is characterized as to its novelty by its shiny dark green foliage throughout the year. Its new growth has a coppery red color and a slight pubescence. It has a robust growing habit and large pyramidal panicle of the flowers. The flowers are a light pink color."

Although the pollen parent was unknown, Bordier went on to say that the new variety differed from its seed parent plant *Eriobotrya deflexa* in its exceptionally glossy leaves; large pyramidal panicles; and pink flowers. The leaves are exceptionally handsome and glossy dark green, more so than those of *E. deflexa* and its putative pollen parent *Rhaphiolepis indica*. Bordier said that the new variety had a "many branched habit," which does not necessarily distinguish it from *E. deflexa*; however, perhaps he was referring to the typically more upright branching habit of Coppertone Loquat (**Figs. 68, 72**), which does seem to differ from the more spreading branching habit of *E. deflexa* although this might be an artifact of landscape pruning and management. Coppertone Loquat does seem to have a more irregular branching habit, though, making twigs

and later branches more undulate and less straight than in *E. deflexa*. Bordier noted that *E. deflexa* differed in its less glossy leaves; broad, somewhat flat panicles; and white flowers.

A character that Bordier noted but did not emphasize that differs from *Eriobotrya deflexa* are the toothed margins of the leaf blade. In Coppertone Loquat the margins are typically toothed only in the distal half of the blade and even then mostly only in the distal one-third whereas those of *E. deflexa* are typically toothed toothed nearly throughout while those of the putative pollen parent *Rhaphiolepis indica* are variably toothed, sometimes only in the distal half and at other times in the proximal half as well; however, one can find an occasional leaf with margins toothed nearly throughout on the Coppertone Loquat, but always on the same twig with leaves having margins toothed only in the distal one-third. When leaves senesce in the Coppertone Loquat they turn an attractive reddish orange before dropping (**Fig. 82**) while those of *E. deflexa* and the putative pollen parent *R. indica* turn yellow then brown.

Although Coppertone Loquat is a patented plant, it seems that it is not a registered trademark name or, if it was, the registration was not renewed because it is not listed in the United States Patent and Trademark Office.

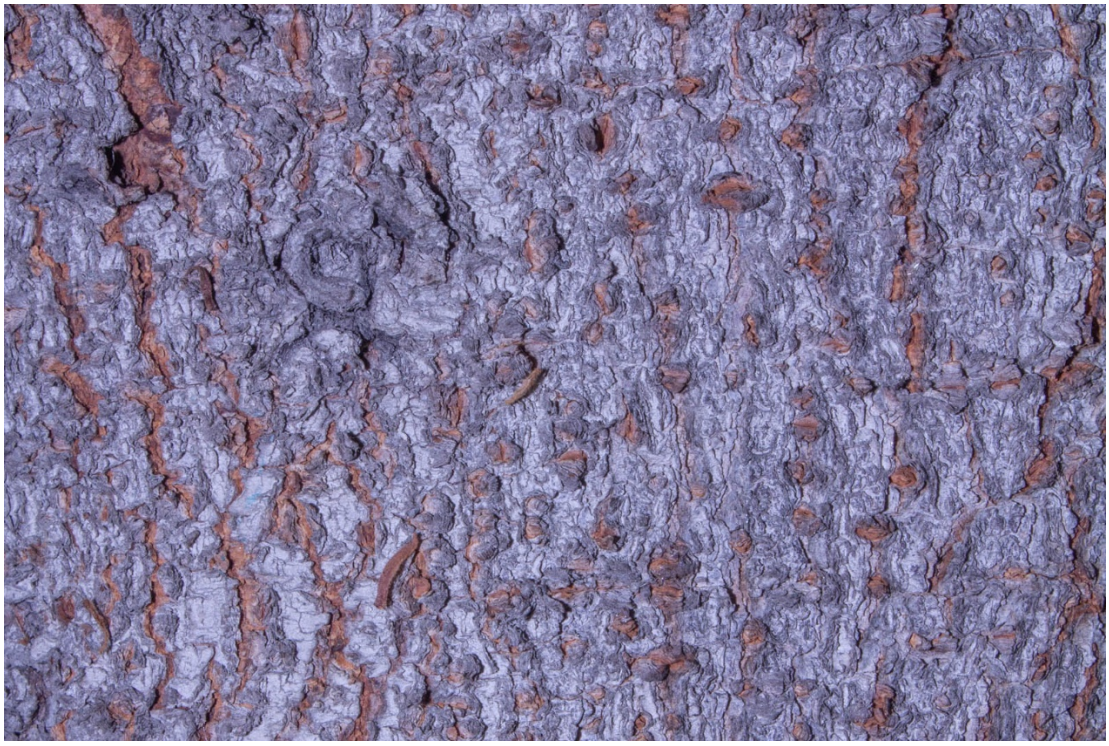
Based on the assessment for Majestic Beauty® Indian Hawthorn, Coppertone Loquat is likely suited to Sunset Climate Zones 8–10 and 12–24. Its growth is less compact but more upright than that of Majestic Beauty® Indian Hawthorn and makes a moderately dense, medium-textured, hemispherical canopy of mostly smooth outline. The lustrous, dark green, handsome leaves are thick, leathery, and durable, and might be the most attractive of the three selections of ×*Rhaphiobotrya splendens*. Inflorescences and flowers typically do not cover the canopy completely, leaving green vegetation to show, but that is no great loss considering the exceptionally attractive leaves. Of moderate growth, we have only seen it trained into a tree but suspect it would tolerate some degree of clipping and shearing. Coppertone Loquat is mostly problem free, the most serious diseases might be fire blight and Entomosporium leaf spot.

×Rhaphiobotrya splendens 'Fullerton' Hodel & Greby **New cultivar.** Standard specimen: CULTIVATED. USA. California. Orange County: City of Fullerton, on campus of California State University, 800 N. State College Blvd., NE. of main gymnasium in quad, 29 April 2020, *Hodel 4003* (BH, duplicate LASCA). FULLERTON LOQUAT. **Figs. 84–91.**

This new hybrid cultivar differs from the other known selections of this nothospecies in its larger habit and larger leaves with more primary nerves.

84. The original and only known plant of ×*Rhaphiobotrya splendens* 'Fullerton' has a large, hemispherical canopy. (*Hodel 4003*).

85. After flowering the hemispherical canopy of ×*Rhaphiobotrya splendens* 'Fullerton' is full of pinkish chocolate-brown new growth.



86. Bark of ×*Rhaphiobotrya splendens* 'Fullerton' is grayish white, mostly smooth becoming slightly rough and small-pebbled with sparse, scattered, minute, irregularly shaped brown flakes.

Habit: evergreen, small, densely branched, spreading, medium- to coarse-textured tree, to 6 m tall and 10 m wide, forming a hemispherical canopy (**Figs. 84–85**).

Trunk: solitary, to 30 cm DBH; bark grayish white, mostly smooth becoming slightly rough and small-pebbled with sparse, scattered, minute, irregularly shaped brown flakes (lenticels?) and slender, narrow, brown, ± superficial, vertical, irregular lines (**Fig. 86**); branchlets ran to brown to purplish brown, 5–7 mm diam., short reddish brown tomentum becoming ±glabrous, with faint longitudinal lines and a glaucous bloom; buds 4–7 mm long, ovoid, bud scales several, 3–4 × 3–4 mm, ovoid-triangular, green to purplish red to reddish brown.

Leaves: alternate, spreading; stipules 4–5 × 1–1.5 mm, lanceolate, coppery brown, early caducous; petiole 3.5 cm long, 3.5–4 mm diam., round, reddish purple to light yellowish green, with short, white and brown tomentum becoming ±glabrous; leaf blade 14 × 5.5 cm, oblong-elliptic, thick-leathery, lustrous dark green adaxially, pale abaxially, emerging pinkish chocolate brown, margins conspicuously and coarsely toothed in distal ¾ (**Figs. 85, 87–89**), teeth forward pointing, entire and revolute in proximal 1/4, decurrent on petiole, midrib raised, initially

87. Leaves of ×*Rhaphiobotrya splendens* 'Fullerton' are oblong-elliptic, thick-leathery, and lustrous dark green adaxially.

88. Leaves of ×*Rhaphiobotrya splendens* 'Fullerton' are pale abaxially with margins conspicuously toothed in distal ¾.

89. Emerging leaves of ×*Rhaphiobotrya splendens* 'Fullerton' are pinkish chocolate-brown.

pinkish adaxially and abaxially becoming light yellowish green, primary nerves 12 pairs, distally fainter secondary nerves between each pair of primary nerves, both surfaces ±glabrous, base cuneate, apex acute-rounded.

Inflorescences: terminal, variable but generally a dense panicle to umbellate panicle, pyramidal to semi-globular (**Fig. 90**) and sometimes nearly flat-topped in shape, 10 × 10 cm, 2-branched; peduncle 1 cm long, 5 mm diam., purplish green; rachis 8 cm long with 12–15 1st-order branches, these to 9 cm long, 3.5 mm diam., spreading-ascending, sub-branches 2–3 cm long; peduncle, rachis, and branches light green to purplish gray, with moderately dense, short brown tomentum; bracts 4–8 mm long, lanceolate, coppery brown tomentose, typically early caducous and leaving only a low, thin base.

Flowers: 12 × 20 mm, light pink (**Fig. 91**), fragrant, spring; pedicel 3 × 1.5 mm, light green, with short reddish brown tomentum; bracteoles 2 subtending pedicel, 4 × 0.75 mm long, long-ovoid, densely brown tomentose; hypanthium, 5 × 4 mm, obconical, greenish to greenish yellow, densely reddish brown tomentose; sepals 5, 3 × 3 mm, rounded-triangular, apex acute-rounded, spreading to reflexed downward, light green, densely reddish brown tomentose

90. Inflorescences of ×*Rhaphiobotrya splendens* 'Fullerton' are variable but generally a dense panicle to umbellate panicle and pyramidal to semi-globular in shape.

91. Flowers of ×*Rhaphiobotrya splendens* 'Fullerton' are light pink. Note the petaloid stamens.

abaxially especially along margins, green and glabrous adaxially; petals 5–9, 5(–8), 10 × 5.5 mm, elliptic-spatulate, cupped upward, apex broadly rounded and typically with a notch 2 mm deep; stamens 12–15,some petaloid, variable in height, 4–5.5 mm long, erect-ascending; filaments 3.5–4.5 × 0.20 mm diam., flattened distally, white; anthers 1.5 × 1 mm, flattened-ellipsoid, reflexed inward, basifixed; gynoecium equaling stamens, ovary 1.75 × 1.75 mm, globose, greenish, densely tomentose; styles 2–3, 4.5 mm long, free nearly to base and there briefly connate, erect, greenish white; stigma truncate.

Fruits: not seen.

Discussion: The description is from the cultivated landscape tree. The Fullerton Loquat is known only from the original plant on the campus of California State University in Fullerton although we are currently asexually propagating it. Nothing is known of its origin although it was likely planted as *Eriobotrya deflexa*, perhaps originating as a chance nursery seedling, because these are widely planted on campus, especially in the vicinity of the original plant.

Of the three selections of ×*Rhaphiobotrya splendens***,** the Fullerton Loquat appears to be the most intermediate between its putative parents, *Eriobotrya deflexa* and *Rhaphiolepis indica*, having the longer, more prominently toothed leaves of *E. deflexa* but the pinkish flowers of *R. indica*. Of the other two horticultural selections of ×*Rhaphiobotrya splendens*, it appears to be more similar to Coppertone Loquat, especially in leaf size and color of new foliage. Because its leaves are more similar to those of *Eriobotrya* and the Coppertone Loquat, we fashioned a common name to reflect one of its putative parents.

Based on the assessment for Majestic Beauty® Indian Hawthorn, Fullerton Loquat is likely suited to Sunset Climate Zones 8–10 and 12–24. Its growth is more like that of Coppertone Loquat but denser and without such upright branching. It makes a moderately dense, medium-textured, hemispherical canopy of mostly smooth outline. The, dark green, handsome leaves are thick, leathery, and durable. Like Coppertone Loquat, inflorescences and flowers typically do not cover the canopy completely, and flushes of pinkish chocolate brown new growth compete with them for attention. Of moderate growth, we suspect Fullerton Loquat would tolerate some degree of clipping and shearing. We have not seen pests or diseases on Fullerton Loquat but the typical suspects, fire blight and Entomosporium leaf spot, should be considered.

Selection and Landscape Management

The three species and four hybrids of *Eriobotrya*, *Photinia*, and *Rhaphiolepis* in the southern California landscape make fine, small trees, are mostly similar in their landscape adaptations and cultivation requirements and are primarily problem free. Here we provide a brief summary of their selection and landscape management.

Selection

All seven taxa are naturally small trees and/or, being tolerant of rather severe and regular pruning, can be easily trained and maintained as such. They are excellent as deck, patio, courtyard, specimen, shade, accent, and lawn trees, and can be used as street or median trees if appropriately trained and pruned to provide adequate clearance. They make suitable if not excellent large container plants for many years when young, their growth kept in bounds by regular pruning, until they can be planted out.

Their mostly outstanding and showy floral displays make them excellent accent plants and focal specimens in the garden and landscape. The Bronze Loquat and Loquat also serve as fine tropical accents because of their relatively large, bold, and dramatic leaves, which further provide contrast and interest.

They are all of at least moderately dense growth and make effective screens and backgrounds and, because they tolerate regular pruning, can be developed and maintained as traditional hedges and large tree hedges. Several, including the Bronze Loquat, Loquat, and Red-Tip or Fraser's Photinia, are so amenable to pruning and training that they can be fashioned into an attractive espalier.

For street-tree use or in paved or hardscape restrictions minimum parkway widths and cut-outs are about one meter.

Environmental Tolerances

Generally, all seven taxa are tolerant of a wide range of environmental conditions. They do well in just about any type of soil as long as it is moist and well drained. They perform well in coastal regions, intermediate plains and hills, and inland valleys, and perhaps will even grow adequately in the low desert if given appropriate water and some protection from afternoon sun. Trunk cankers cause by sunscald could occur when the trees are young, especially in extensively hardscaped sites with reflected light and heat and in inland and desert areas.

Consider precautions to mitigate such damage, including paper trunk wraps when young, mulch to reduce reflected light and heat, and protection from afternoon sun. All tolerate wind to some extent, the taxa with small, leathery leaves the most and those with large, less sturdy leaves the least. None is likely a candidate for first exposure seacoast where nearly constant wind and salt spray are present.

They are not drought tolerant, at least in the traditional sense, and need sufficient water, probably in the range of 50–90% of ETo (site reference evapotranspiration), to perform best, the lower range for cooler, more humid coastal areas and the upper range for hotter, arid, inland conditions. They can probably survive temporarily at 35–50% of ETo and would lose esthetic quality but would still be able to recover once water is increased to adequate levels. The hybrids with *Rhaphiolepis* are perhaps more tolerant of less-than-optimal water for short periods than the other taxa.

They are tolerant of heat and aridity, especially if given adequate water, and in the low desert, afternoon shade. The loquat and the two Photinias can grow into Sunset Zone 4, where average winter minimum temperatures are regularly well below freezing (⁻12 to ⁻7 C), while the Bronze Loquat and the ×*Rhaphiobotrya splendens* hybrids can grow into Sunset Zone 8, where average winter minimum temperatures are regularly slightly to moderately below freezing (⁻7 to⁻2 C).

Pruning and Training

Because many of these trees can tend to be somewhat shrubby if left to grow naturally, early and sometimes judicious structural pruning is typically necessary to develop and maintain a strong central leader with sound structure and establish desired height for branches, required clearances, and single- or multi-trunked habit.

Once desired structure is achieved and maintained, regular pruning is mostly relegated to thinning and, in limited instances, to size control for sheared hedges, screens, and background plants. Because they terminal bloom on old growth, pruning should take place immediately after flowering to allow sufficient growth to develop and set buds for the following year's flowers. Late-season pruning could reduce or eliminate the floral show the following year. Pruning after flowering would also remove old, brown somewhat persistent and potentially unsightly flowers and unwanted litter-producing fruits, if the latter are undesirable and not showy, which is the case with most of these trees in southern California.

92. Leaves of *Photinia* × *fraseri* showing yellow stippling and discoloration caused by lace bugs.

93. Lace bugs inhabit the abaxially leaf surface of this *Photinia* × *fraseri*, leaving black fecal deposits.

94. Although fire blight often enters in the flowers it progresses into the stems, causing cankers, as here on the bronze loquat (*Eriobotrya deflexa*).

95. Chronic fire blight typically causes stem and twig die back with hanging dead leaves, as here on the bronze loquat (*Eriobotrya deflexa*).

Pests and Diseases

Typical pests include aphids on new leaves and inflorescences, scales and mealybugs, and western flower thrips and lace bugs on leaves. Aphids can distort new growth, scales and mealybugs discolor leaves and can cause a general growth decline if present in sufficient quantities, while thrips and lace bugs cause yellow stippling and discoloration on the adaxial leaf surfaces (**Fig. 92**). Thrips are typically found on the adaxial leaf surface but lace bugs are typically found on the abaxial leaf surface (**Fig. 93**); however, both tend to produce shiny, black fecal deposits, which distinguish their damage from that of mites. Damage from mites, which appears as feathery stippling or "clearing" of green tissue and is often accompanied by delicate webbing and a fine "sandy" look, is uncommon on these trees because of their mostly thick, durable leaves.

Control the sap-sucking aphids, scales, mealybugs, and lace bugs by controlling ants, which "farm" these pests, protecting them from predators and moving them around to increase their honeydew secretions upon which the ants feed. A strong stream of water can dislodge and knock off aphids, thrips, lace bugs, and mobile, immature scales and mealybugs. Rake up and dispose of fallen, infested leaves.

96. This bronze loquat (*Eriobotrya deflexa*) has initial stages of fire blight in 2011 with stem die back in the lower right part of the canopy.

97. The same bronze loquat in Figure 98 with fire blight in 2020, showing disease progression.

98. A bronze loquat (*Eriobotrya deflexa*) after many years with fire blight shows extensive die back and abundant epicormic growth.

99–100. Fire blight on this bronze loquat (*Eriobotrya deflexa*) has caused extensive cankers and seriously damaged these main branches.

The three most common diseases of these trees are likely fire blight, powdery mildew, and Entomosporium leaf spot. Fire blight, caused by a bacterium, might be the most serious disease and the initial symptoms are stem cankers (**Fig. 94**) and blackened tip die back with hanging dead leaves (**Fig. 95**), which can spread and kill entire branches (**Figs. 96–100**) and eventually, after several seasons, the entire tree. Of the seven trees under discussion, the Bronze Loquat seems to be the most susceptible and severely affected. The disease leads to a gradual decline and significant loss of quality and is likely responsible for making this species not a particularly long-lived landscape tree although water stress and root pruning can cause similar damage. It is common to see Bronze Loquat with conspicuous dieback of individual branches that over several years coalesce to affect the entire canopy. Such affected trees typically have abundant epicormic growth proximal of the fire blight damage (**Fig. 98**). Promptly remove, bag, and dispose of dead growth in the trash. When removing dead growth, cut at least 30 cm into healthy wood below the lowest disease symptoms.

Powdery mildew and Entomosporium leaf spot are leaf diseases and typically do not cause branch death or kill the entire tree. Powdery mildew browns, curls, and distorts new growth, and, as the name implies, the actual fungal bodies are visible as a grayish powder on the leaves (**Fig. 101**). Entomosporium leaf spot is also a fungal disease and it causes tiny, reddish dots sometimes surrounded by a dark red, purple or yellow halo, which can darken and enlarge, killing the leaf (**Figs. 102–103**). The *Photinia* seem especially susceptible to these two foliar diseases while the bronze loquat is susceptible to Entomosporium leaf spot.

To control these two foliar diseases, avoid wetting the foliage late in the day, plant in full sun with good air circulation, remove and dispose of affected leaves and stems, and keep the area beneath the tree clear of fallen, diseased leaves.

Sometimes chlorotic growth plagues *Photinia* × *fraseri*, which might be caused by excessively wet root zones and cool temperatures.

To control all pests and diseases, select the proper tree for the location (species and cultivars), plant it correctly, and provide proper cultivation, including water, fertilizer, mulch, and pruning. Gain a tolerance for limited levels of damage. Encourage beneficial organisms. Scout for pests and diseases regularly. Consider pesticides only after exhausting all other possibilities and even then weigh the potential damage to the environment against the realistically expected outcome and make an informed decision.

101. Powdery mildew on the new leaves of this *Photinia* × *fraseri* has caused browning, curling, and distortion of new growth, and, as the name implies, the actual fungal bodies are visible as a grayish powder.

102. Entomosporium leaf spot on red-tip Photinia (*Photinia* × *fraseri*) has caused typical spotting.

103. Entomosporium leaf spot can cause severe spotting on bronze loquat (*Eriobotrya deflexa*).

Acknowledgements

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