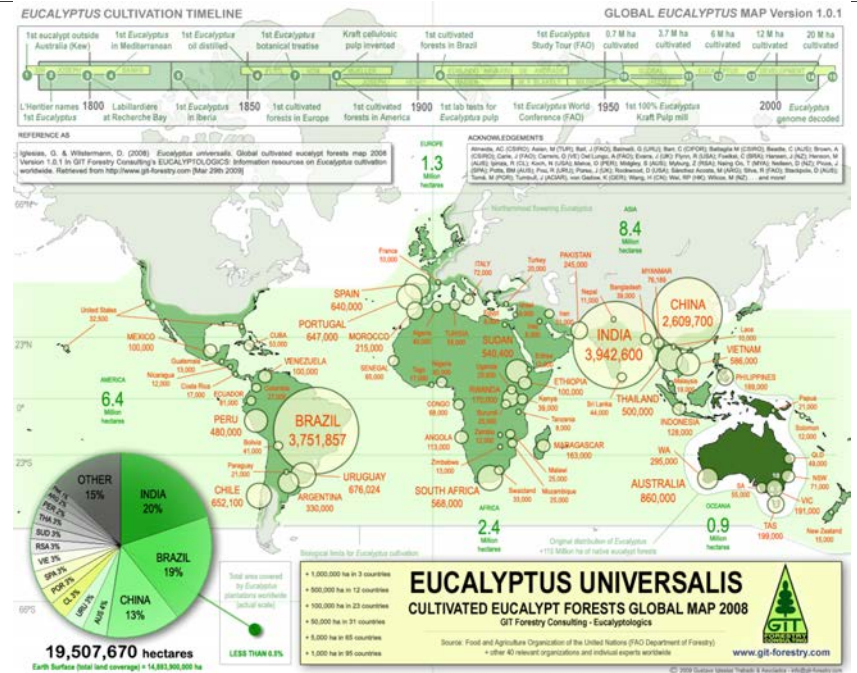


Eucalypts Worldwide

- 2nd most important solid timber and paper pulp trees in the world
- Timber, plywood, fiberboard, pulp, poles, firewood, charcoal, essential oils, honey, shelter, and ornament trees
- 20 million ha (75,000 square miles) planted worldwide



Worldwide Distribution



<i>Eucalyptus globulus</i>	134,056
<i>Eucalyptus camaldulensis</i>	105,089
<i>Eucalyptus obliqua</i>	34,949
<i>Eucalyptus viminalis</i>	27,319
<i>Eucalyptus macrohyncha</i>	18,358
<i>Eucalyptus leucoxylo</i>	17,622
<i>Eucalyptus socialis</i>	17,302
<i>Eucalyptus melliodora</i>	17,073
<i>Eucalyptus tereticornis</i>	15,680
<i>Eucalyptus crebra</i>	15,451
<i>Eucalyptus largiflorens</i>	14,629
<i>Eucalyptus sieberi</i>	14,309
<i>Eucalyptus radiata</i>	14,024
<i>Eucalyptus globoidea</i>	13,674
<i>Eucalyptus oleosa</i>	13,241
<i>Eucalyptus pauciflora</i>	12,957
<i>Eucalyptus gracilis</i>	11,990
<i>Eucalyptus ovata</i>	11,743
<i>Eucalyptus microcarpa</i>	11,647
<i>Eucalyptus cypellocarpa</i>	11,056
<i>Eucalyptus amygdalina</i>	10,813
<i>Eucalyptus incrassata</i>	10,592
<i>Eucalyptus punctata</i>	10,591
<i>Eucalyptus racemosa</i>	10,174
<i>Eucalyptus blakelyi</i>	10,115



Eucalyptus in California

- ~400 species introduced into CA, ~200 species alive now
- ~40 species – widely planted
- 18 species naturalized in CA

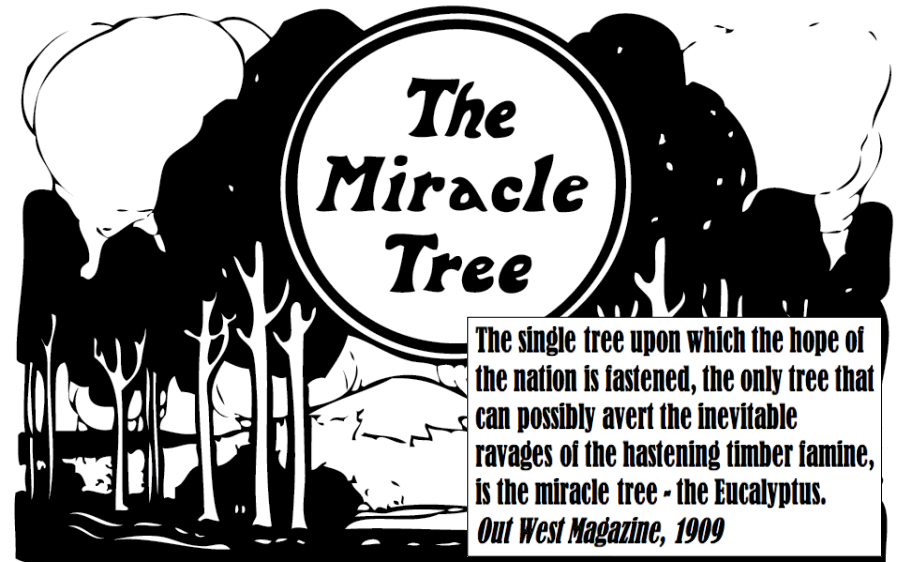


Eucalypts in the CA

- Most abundant and controversial non-native trees in California
- Admired - erosion control, wildlife habitat, valuable landscape and heritage trees
- Demonized - America's largest, most fire prone, most dangerous, bird killing, weeds



The Rise of Eucalypts in California



The Rise of Eucalypts in California

The advertisement includes a muscular man in a loincloth holding a large branch of a tree. To his left, a forest scene is shown with the text 'WILL THE CALIFORNIA EUCALYPTUS Solve the TIMBER PROBLEM of the NATION'. Below this, smaller text reads: 'THE APPROPRIATE CULTURE OF EUCALYPTUS IN CALIFORNIA WILL BE THE MOST PROFITABLE INVESTMENT WITH FEWEST CONSEQUENCES'. At the top right, it says 'The San Francisco Sunday Call'.

A Problem in Finance?
If productive land equals safety, and growing hardwood timber equals large profits, what will the combination of the two equal?

Answer: Eucalyptus
A judicious investment in Eucalyptus Timber will make you more money than can be made on the best farm and

No Work
Put your surplus into Eucalyptus and after ten years you can live on the income the rest of your life and when you are gone your children and your children's children will perpetually reap the same

Large Profits
If you could be convinced that these statements are true, you would not hesitate on day, but would send us your money by telegraph so your trees could be planted and begin their remarkably rapid growth at the earliest possible date. We can convince you that they are true if you will read the official statements of Government and California State Foresters upon this wonderful tree and its money-making possibilities when scientifically cultivated. Complete information furnished free upon request.

CALIFORNIA EUCALYPTUS TIMBER CO., Los Angeles, 1909

The Fall of California Eucalypts

EUCALYPTUS LUMBER POOR.

Blue gum (*Eucalyptus globulus*), which has been grown in California, does not as a rule furnish good lumber, and only from very large selected trees can lumber of even fair quality be obtained. The Forest Service of the U. S. Department of Agriculture has perfected a kiln for drying lumber, in which experiments with eucalyptus have been carried on for the past two years. The results prove that, while occasional selected blue-gum trees of the largest size will furnish lumber of fair quality, the great majority of trees are not suitable for lumber.

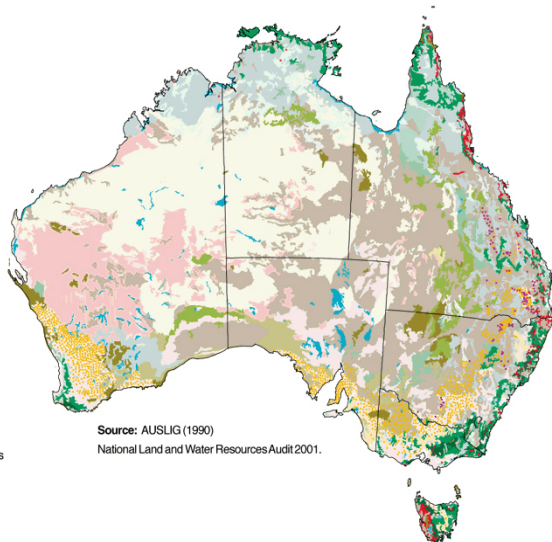
Legacy of an Unharvested Crop



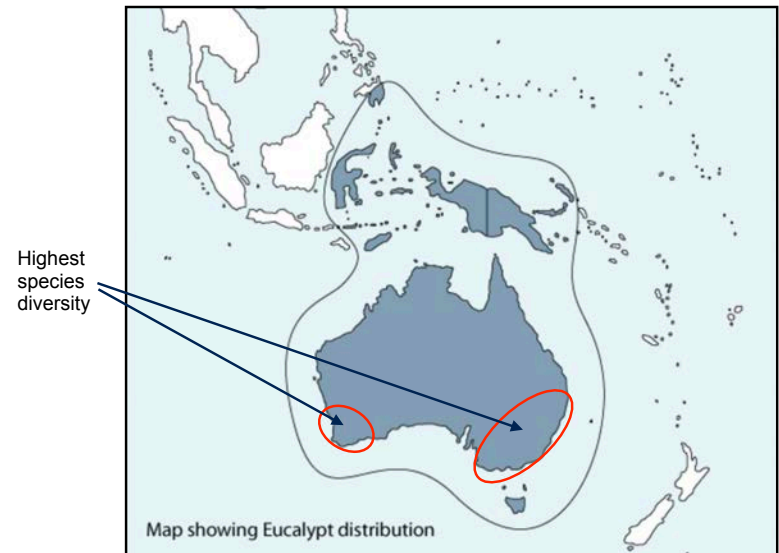
Eucalyptus taxonomy and distribution

Major Australian Vegetation Groups

- Major vegetation groups
- Rainforest and vine thickets
 - Eucalypt tall open forests
 - Eucalypt open forests and low open forests
 - Acacia forests and woodlands
 - Callitris, casuarina and other forests and woodlands
 - Melaleuca forests and woodlands
 - Eucalypt woodlands
 - Eucalypt open woodlands
 - Low closed forest, closed shrublands and other shrublands
 - Mallee woodlands and shrublands
 - Acacia open woodlands
 - Acacia shrublands
 - Chenopod shrubs, samphire shrubs and forblands
 - Heath
 - Tussock grasslands
 - Other grasslands, herblands, sedgelands and rushlands
 - Hummock grasslands
 - Mangroves, samphires, sand, rock, salt lakes, freshwater lakes
 - Summer cereals
 - Winter cereals



Eucalypts - Natural distribution worldwide



From: Modified from Slee *et al.* 2015 (Euclid)

Australian Trees in California

- Acacias (*Acacia* spp.)
- Bottle Trees (*Brachychiton* spp.)
- Bottle Brushes and Paperbarks (*Callistemon* spp. and *Melaleuca* spp.)
- Sheoaks (*Casuarina* spp.)
- Pittosporums (*Pittosporum* spp.)
- Eucalypts (*Eucalyptus* spp., *Corymbia* spp., and *Angophora* spp.)



Eucalypt Taxonomy

- Family: Myrtaceae (guavas, cloves, allspice)
- Subfamily: Leptospermoideae (woody fruits)
- Genera
 - *Angophora* – 14 spp.
 - *Corymbia* – 113 spp.
 - *Eucalyptus* – >750 spp.
- 10 Subgenera of *Eucalyptus*
 - *Monocalyptus* – 140 spp.
 - *Symphomyrtus* – 360 spp.



Myrtaceae

- *Myrtus* (Greek name for myrtle (*Myrtus communis*))
- 131 genera and ~4,600-5,500 species
- Trees and shrubs
- Stems: secretory cavities and internal phloem in pith
- Leaves: glandular punctate, pellucid
- Flowers: inferior ovaries and numerous stamens
- Fruit: berry or capsule
- Two subfamilies: Myrtoideae (15 tribes) and Psiloxylodeae (2 tribes)
- Eucalypts, guavas, cloves, allspice, bottle brushes, wax flowers, and tea trees



Trees of the Myrtaceae

Acmena smithii (Lilli pilli)

Agonis flexuosa (Willow Peppermint)

Angophora costata (Smooth Barked Apple)

Callistemon and *Melaleuca* species (Bottlebrushes)

Corymbia species

Eucalyptus species

Leptospermum species (Tea Trees)

Lophostemon confertus (Brisbane Box)

Metrosideros excelsa (NZ Christmas Tree)

Metrosideros polymorpha (Ohī'a Lehua)

Myrtus communis (common myrtle)

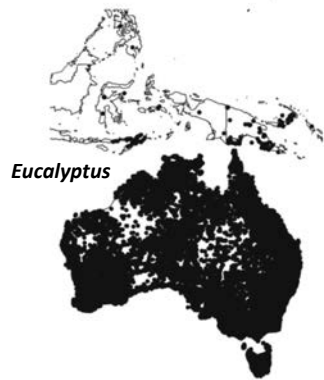
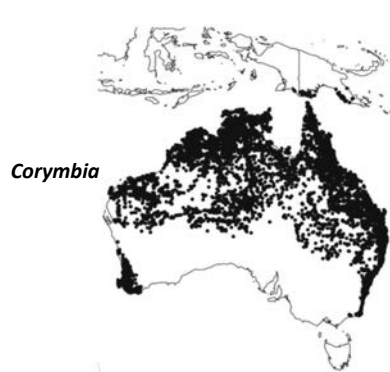
Psidium species (guavas)

Syncarpia glomulifera (Turpentine Tree)

Syzygium species (Brush Cherries)

Tristaniopsis laurina (Water Gum)

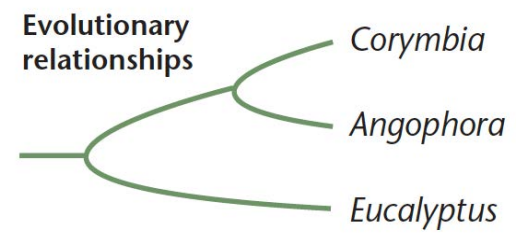




Angophora
(apples, rusty gums, etc.)
– 12 species

Corymbia
(bloodwoods, ghost gums, etc.)
– About 100 species

Eucalyptus
(gums, mallees, ashes, stringybarks etc.)
– About 750 species



Corymbia ficifolia (Red Flowering Gum)



Corymbia citriodora (Lemon Scented Gum)



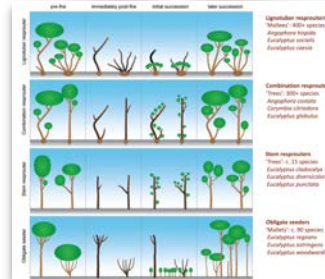
Angophora costata (Rose Gum)



Eucalyptus Characteristics

Eucalypt Features to Look For

- Growth habit
- Bark
- Leaves
- Flower clusters (inflorescences)
- Flower (bud)
- Operculum (bud cap)
- Stamens
- Fruit
- Seeds



Growth Habit



Tree



Multi-stemmed Mallee



Left to right: non-shedding, soft bark of *C. peltata*, shedding bark of *E. erythronema*, shedding bark (with scribbles) of *E. harmostoma*, mottled bark of *E. caesia*, shiny, shedding bark of *E. campopeltis*, non-shedding 'ironbark' of *E. melanophloea*.



White Iron Bark (*E. angustata*) Shagreened Bark (*E. nitida*) Red Gum (*E. amathites*)
Red Iron Bark (*E. nitens*) Stringybark (*E. nitens*) Red Flowering Gum (*Corymbia alba*)



Left to right: Newly shed bark of *A. costata*, shedding bark (flakes) of *E. thozetiana*, shiny shedding bark of *E. salbris*, non-shedding 'box' bark of *E. microcarpa*, shiny, shedding upper bark of *E. torrelliana*, non-shedding 'ironbark' of *E. sideroxyloides*.

Leaf axil

Node

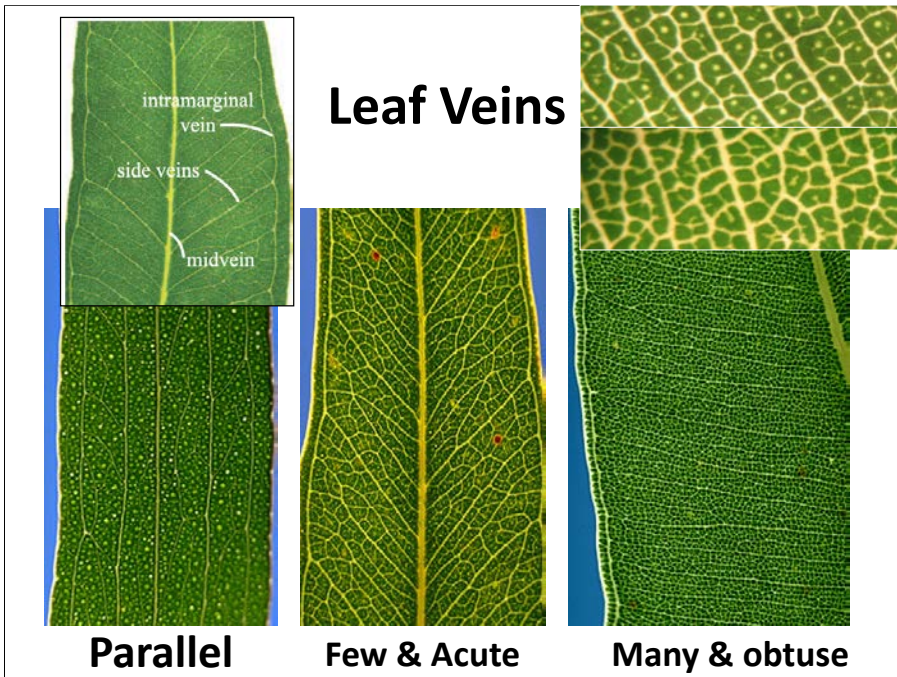
Petiole

Alternate & petiolate

Opposite & sessile

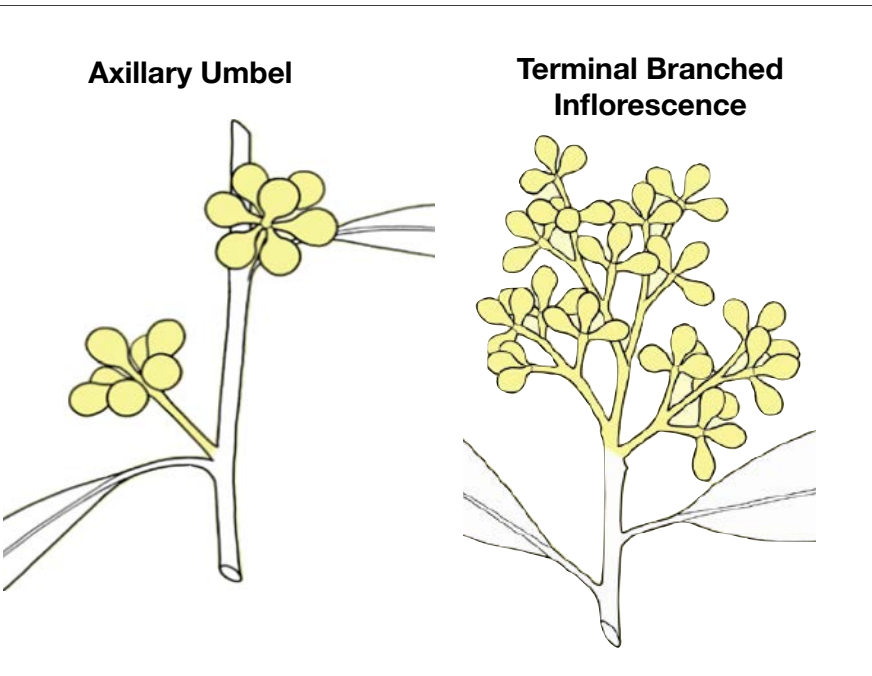
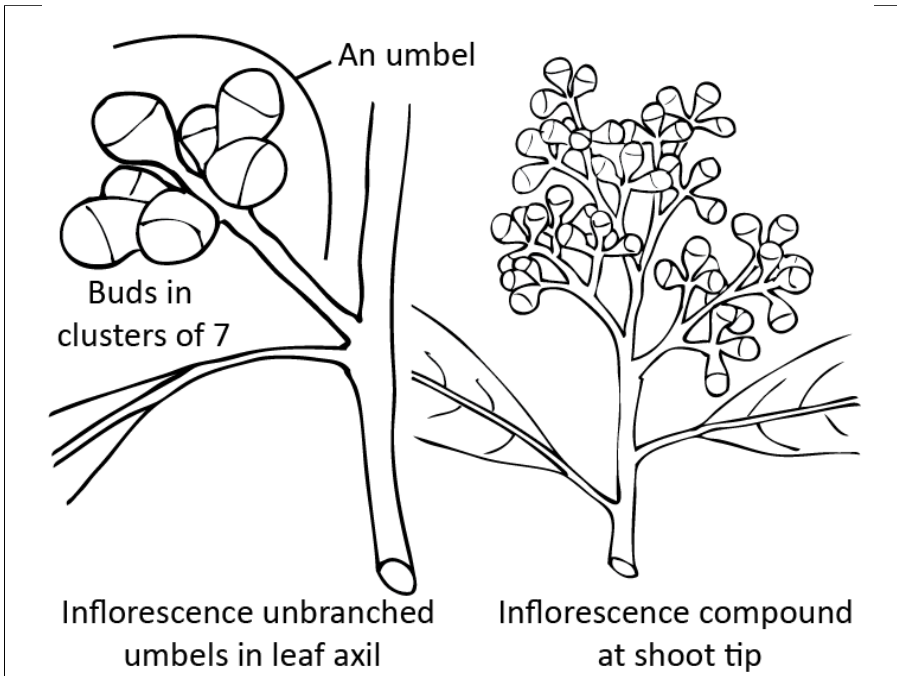
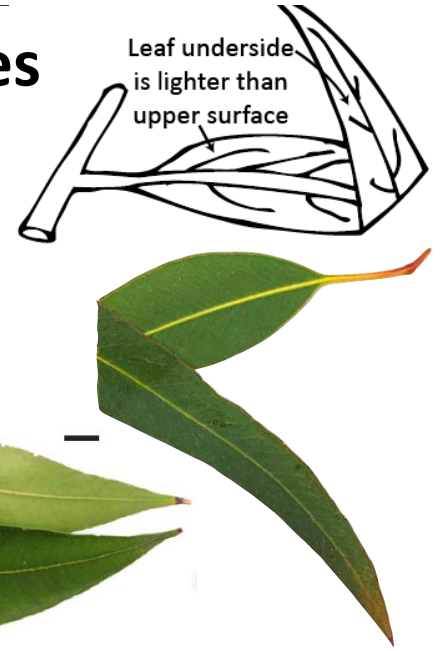
Argyle Apple (*E. cinerea*) juvenile leaves and fruit



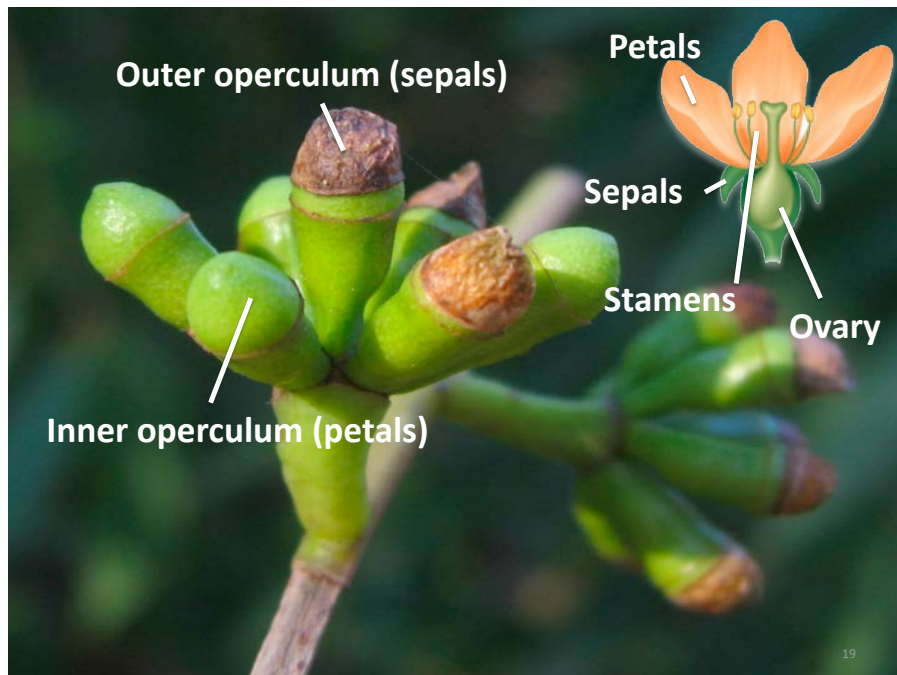
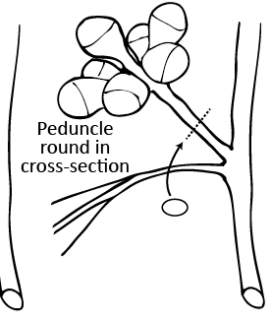
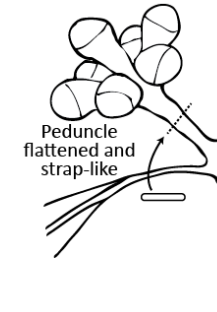
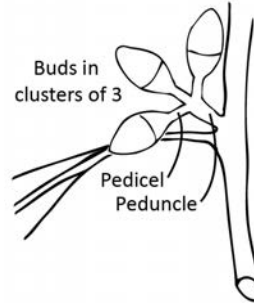
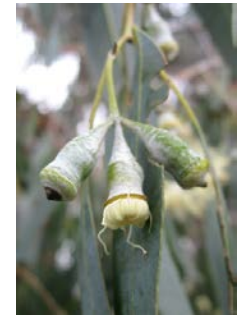
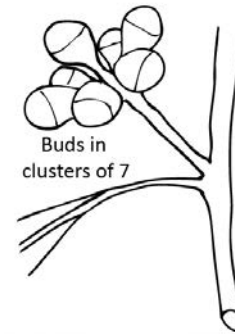
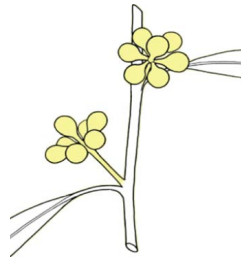
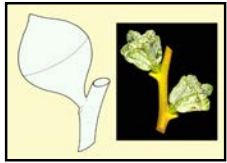
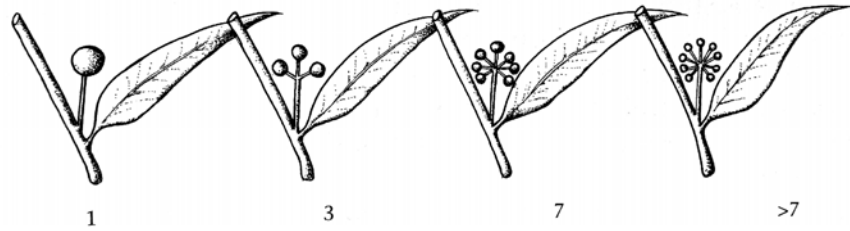


Leaves Surfaces

- Concolorous - leaves same on both sides
- Discolorous - leaves are lighter on the underside

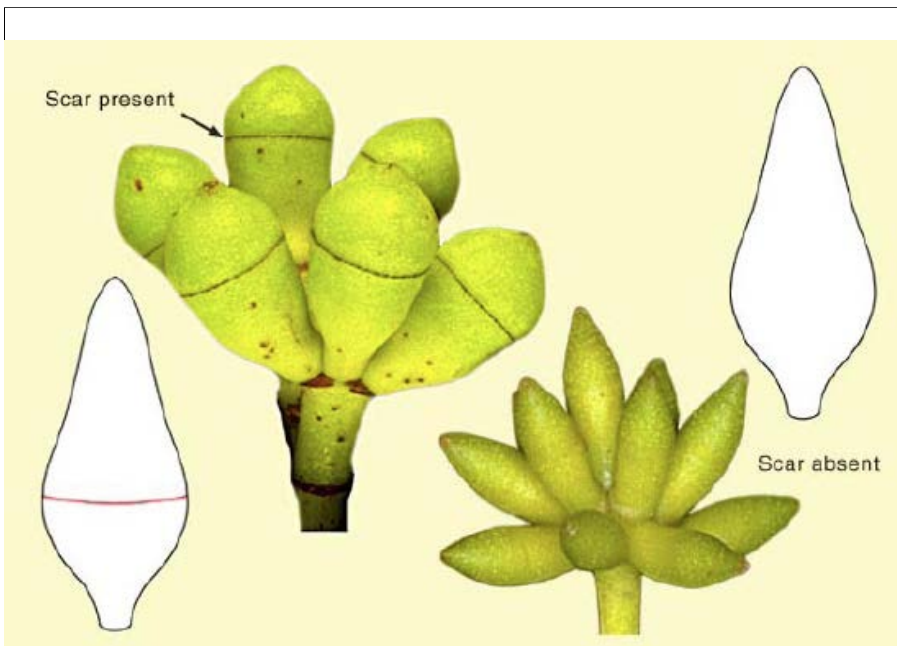


Number of buds per cluster



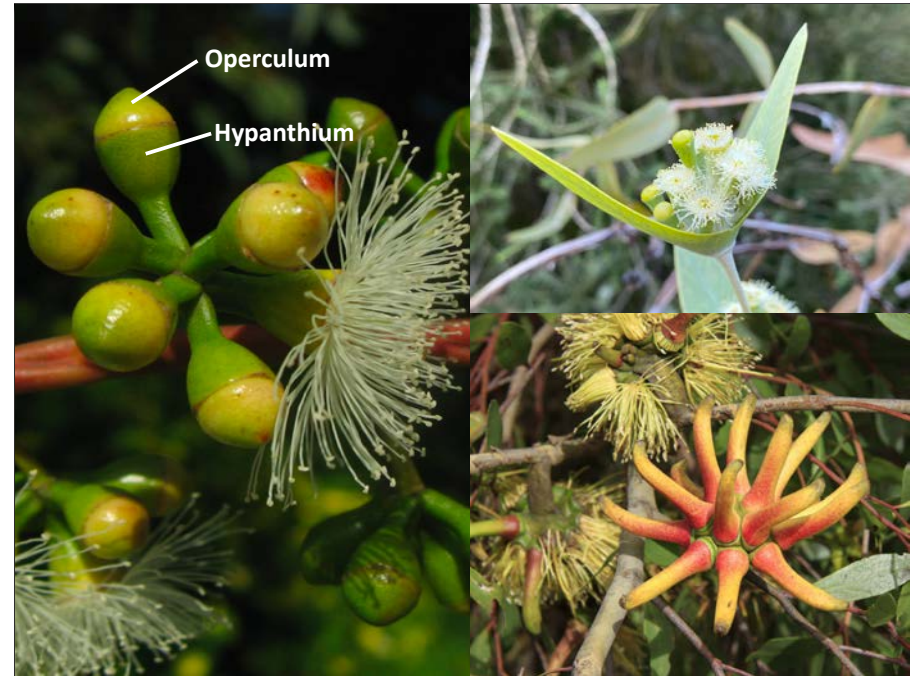
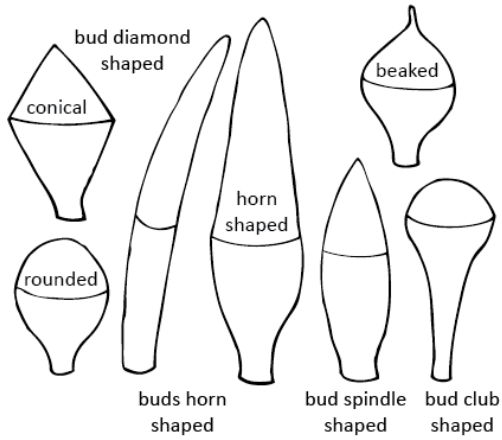
Water Gum (*Tristaniopsis laurina*) and Brisbane Box (*Lophostemon confertus*) are not eucalypts





E. camaldulensis

Operculum and bud shapes

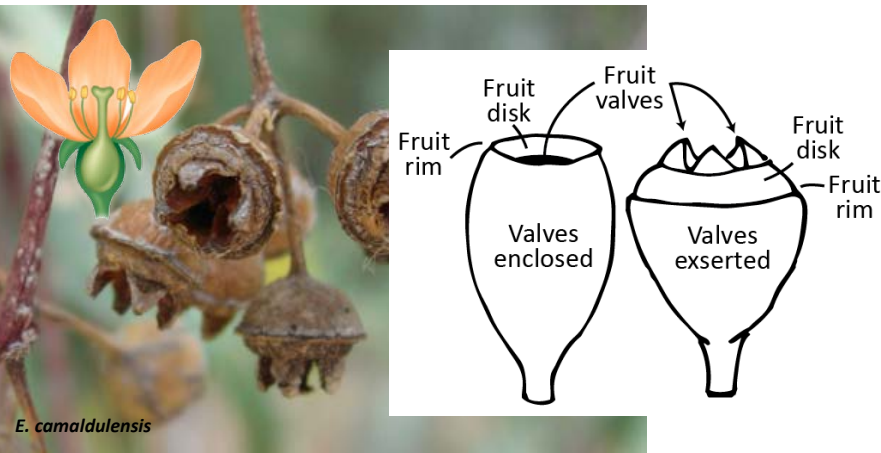


Diversity of Stamen Color



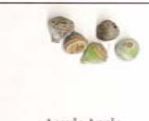






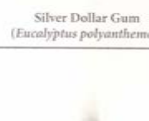



Stamens missing anthers





Eucalypt Fruit Identification

 Red Flowering Gum (<i>Corymbia ficifolia</i>)	 White Iron Bark (<i>Eucalyptus leucosylon</i>)	 Sugar Gum (<i>Eucalyptus cladocalyx</i>)	 Argyle Apple (<i>Eucalyptus cinerea</i>)
 Narrow-Leaf Peppermint (<i>Eucalyptus nicholii</i>)	 Red Iron Bark (<i>Eucalyptus sideroxylon</i>)	 Silver Dollar Gum (<i>Eucalyptus polyanthemus</i>)	 Blue Gum (<i>Eucalyptus globulus</i>)
 Lemon Scented Gum (<i>Corymbia citriodora</i>)	 Spider Gum (<i>Eucalyptus conferruminata</i>)	 Red Gum (<i>Eucalyptus camaldulensis</i>)	 Ribbon Gum (<i>Eucalyptus viminalis</i>)



Eucalypts in the San Diego Area

The Most Common *Eucalyptus* and How to Recognize Them

Eucalyptus cladocalyx (Sugar Gum)

- Bark smooth, patchy, with orange patches
- Leaves lighter green on underside, sickle-shaped
- Flowers in 7s
- Fruit look like barrels





Corymbia citriodora (Lemon Scented Gum)

- Canopy space
- Bark thin, white to cream, smooth
- Leaves lemon scented



***Eucalyptus
polyanthemos***
(Silver Dollar Gum)

- Flowers and fruit at branch tips
- Bark and leaves variable
- Outer stamens without anthers
- “Fairy rings” around flowering trees



Eucalyptus camaldulensis (Red Gum)

- Flower buds in 7s
- Flower buds with a beaked (nippled) tip
- Bark gray, shedding in plates





***Corymbia ficifolia*
(Red Flowering Gum)**

- Rough bark
- Leaves lighter on the underside
- Flowers range in color from pink to orange to red
- Fruit large and woody
- Oil gland dot lacking in leaves



Santa Cruz, CA



**Two Peoples Bay,
Western Australia**





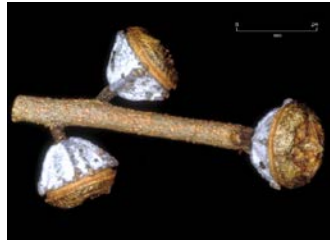
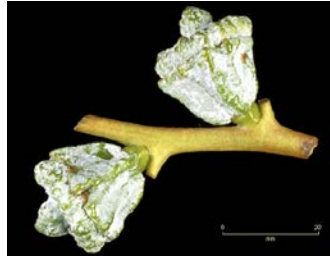
Eucalyptus sideroxylon (Red Iron Bark)

- Bark black and hard
- Outer stamens without anthers
- Flowers and fruits in 7s



Eucalyptus globulus (Blue Gum)

- Waxy, warty, flowers born singly
- Fruit look like buttons
- Leaves sickle-shaped
- Juvenile growth is blue



Eucalyptus conferruminata
(Spider Gum)

- Planted as a low growing shrub or screen
- Leaves egg shaped
- Bud caps long and finger like
- Fruit combined into a large mass
- Previously sold as *E. lehmannii*



Eucalyptus nicholii
(Peppermint Gum)

- Bark rough, stringy, and brown
- Leaves mostly less than 1/2" wide
- Flowers tiny, in 7s



Eucalyptus viminalis (Ribbon Gum)

- Flowers in 3s
- Bark shed in long ribbons

