

Plants Down Under – a land of variety

Australia was part of the southern supercontinent Gondwana, when the land that became Australia was covered in subtropical rainforest. Australian ferns and conifers bear strong resemblance to their Gondwanan ancestors, and prominent Australian flowering plants are relatives of early Gondwanan flowering plants such as the *Nothofagus*, Myrtaceae and Proteaceae

With the drift of the new continent, there was a slow warming of the continent and arid conditions started to develop. These conditions of geographic isolation and aridity led to the development of a more complex flora with species like *Eucalyptus*, *Casuarina*, *Allocasuarina*, *Banksia* and the pea-flowered legumes all showing adaptations to the climate and soil.

Australian vegetation has many unique features:

- Many species are endemic/native to Australia
- 24,000 spp of plants (cf 4,200 in Canada, 1,700 in UK)
- two large tree and shrub groups dominate - Eucalyptus and Acacia:
 - 700 spp of Eucalyptus (only 15 spp occur outside Australia)
 - 1000 spp of Australian Acacia (Acacia Debate)

Eucalyptus and Acacia genera both contain a large number of species, an indication of their ability to adapt across the broad range of climatic and soil conditions.

EUCALYPTUS FACTS FOR GUIDES

Foreigners abroad - controversy

Some eucalyptus species have attracted attention because they have desirable traits such as being fast-growing sources of wood (fire-wood), producing oil that can be used for cleaning and as a natural insecticide, and they have been used to drain swamps and thereby reduce the risk of malaria, as well as being attractive horticultural plants. Outside their natural ranges, they can be seen to have become invasive and damaging to other countries' plant communities. They are both lauded for their beneficial economic impact on poor populations and criticised for being "invasive water-suckers".

Adaptations

Leaves

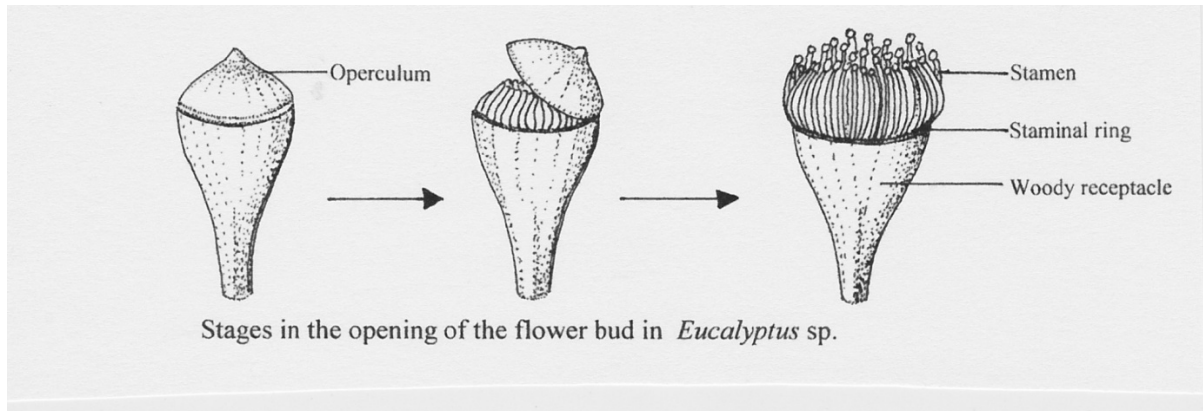
- The leaves hang vertically to expose less area to the drying sun.
- Leaves have a thick waxy coating that gives them their typical grey/blue-green coloration.
- They have stomata on both faces of the leaf. (Plants that hold one leaf face flat to the sunlight have stomata only on the undersurface.)
- The leaves have a very tough leathery structure that makes them suffer less damage from wilting. These are called scleromorphic leaves.
- All eucalypts are evergreen but shed part of their canopy to reduce their water need in high heat.

Gum Trees

Many species are known as **gum trees** because they exude large quantities of sap/gum when branches or trunks are damaged.

Eucalyptus name

The generic name is derived from the Greek words *eu* (*eu*) "well" and *καλυπτος* (*kalyptos*) "covered", referring to the operculum on the calyx that initially conceals the flower.



Flowers with no petals

The whorl of petals has become modified to form the inner operculum (cap). The colourful flowers result not from coloured petals but from colourful stamens.

Gum nuts

The very characteristic woody fruiting structures of *Eucalyptus*. They are not nuts in the true sense of the word.

Eucalyptus Oil

Eucalyptus oil is the generic name given to the readily steam distilled group of volatile oils found in Eucalyptus leaves. This can be used for

- cleaning
- as an antiseptic,
- for deodorising, and
- in very small quantities in food supplements, especially sweets, cough drops, toothpaste and decongestants.
- It has insect repellent properties and is an active ingredient in some commercial mosquito repellents.

Eucalyptus globulus is the principal source of Eucalyptus oil worldwide.

The Blue Mountains region near Sydney is densely populated by oil bearing Eucalyptus trees. The atmosphere is filled with finely dispersed droplets of oil, which, in combination with dust particles and water vapour, scatter short-wave length rays of light which are predominantly blue in colour.

Although toxic in large quantities, several marsupial herbivores, notably koalas and some possums, are relatively tolerant of it. Koalas use the different smell of different proportions of volatile oils in the leaves of different species to seek out their preferred food trees.

Koala food

Koalas are extremely picky eaters, preferring leaves from a relatively small number of eucalyptus species in their habitat. This fact has become particularly problematic in recent years as the destruction of their trees has been allowed to proceed at an alarming rate. This (and death from

dogs and road kill) have contributed to the reduction in local populations in recent times. There have been reports of koalas occasionally eating leaves from trees other than eucalyptus, but this is rare.

ACACIA DEBATE

An issue that was resolved by the 2011 meeting of the Botanical Nomenclature Section has been known as the Acacia Debate. One of naming rules for plants is called “The principle of priority”. Sometimes different authors have described the same plant species and given different names because they were unaware of the others’ work. The names are synonyms. The legitimate name is the first one published and this is why it is vital that publication dates are accurate. Even if the later name is the more popular/commonly used name, the earliest published name is the legitimate one.

The acacias, until now has included the Australian wattles and the thorn trees of the Serengeti— both highly recognisable and iconic groups of plants. Careful research has shown that Acacia should however be split into several genera.

Australia is claiming the name Acacia for our 1000 or so species of wattles, even though the 160 or so species in a separate subgroup have scientific priority— a South African species was described as the ‘type specimen’, which defines the genus. A special provision of the Code allows for the name of the type species of a genus to be changed in cases like this, where strict application of the rules would require a large number of species to be renamed, and would cause confusion or significant difficulties for taxonomists or the wider community. An application under this provision was made in 2003 by two Australian botanists who sought to make an Australian species the type species for Acacia. This was accepted in 2005 but has been disputed since. In summary, the decisions taken in Melbourne in July 2011 confirm that the Australian acacias retain the name, while a new name is needed for the African and American species.

The other species, distributed in the Africa, tropical Asia and tropical America are re-classified under 4 genera:

- *Vachellia* 163 species (Africa/pantropical)
- *Senegalia* 203 species (Africa/pantropical)
- *Acaciella* 15 species (Americas)
- *Mariosousa* 13 species (Americas)