

Buttercups

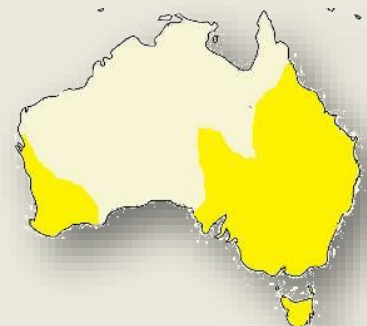
Ranunculus

Back in the olden days, kids knew that if you picked a buttercup flower, held it under your chin, and you could see the reflected yellow on your chin, then it meant that you liked butter! To do this, most of us would probably have used the introduced Creeping Buttercup, *Ranunculus repens*, a native of Europe, Asia and northwestern Africa, and common along waterways across south-eastern Australia.



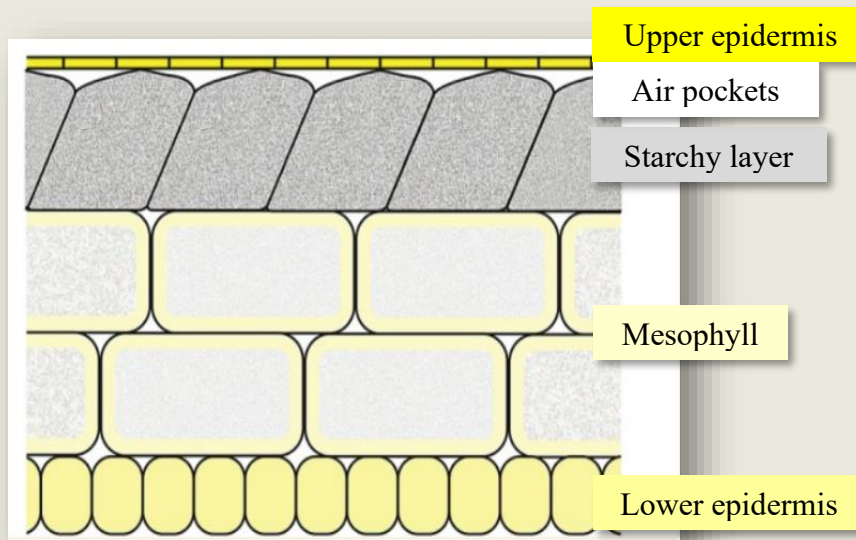
A native Australian buttercup (*Ranunculus* species) from Central-Western NSW

Ranunculus is a cosmopolitan genus with about 1750 species worldwide, and of the 47 that occur in Australia, 10 have been introduced and become naturalised. *Ranunculus* species are widely distributed from temperate to montane regions. The genus is considered to have its origins in northern Eurasia during the late Eocene to Oligocene, dispersing rapidly to all continents and although now no longer present in Antarctica, fossil evidence shows that *Ranunculus* was present there up until the mid-late Pliocene.



Distribution of *Ranunculus* species in Australia, map modified from Atlas of Living Australia.

Most species are herbaceous perennials, but there are also annual, and biennial species, and they can be aquatic or terrestrial. The brilliant, gleaming, lustrous yellow petals are characteristic of many buttercup species .



Section through a petal of *Ranunculus acris*.
From Van de Kooij et al. 2017.

The ultra-glossy petals of *Ranunculus* have long fascinated botanists. The gloss is attributed to the strongly pigmented very thin upper epidermis of the petals that acts as a reflector.

Light transmitted through the transparent upper epidermis passes through a discontinuous *air layer* then into the underlying starchy layer, enhancing the scattering effect by refracting light as it passes between the layers.

The glossiness has two functions. Firstly, it enhances visual signals to pollinators. Over long distances, the gloss provides a long-distance signal, a flash, to attract pollinators; over short distances, the diffuse yellow colour provides a visual signal. Pollinators can include bees, flies, beetles, butterflies and hoverflies that seek out nectar producing glands at the base of each petal.

Secondly, buttercup flowers are *heliotropic* – the flowers re-orient themselves through the day to face the sun. When temperatures are low, the flowers are shaped like parabolic reflectors, so that when sunlight reaches the surface of the petals, it is reflected onto the reproductive structures in the centre of the flower. This increases the temperatures of these structures, boosting pollination, fertilisation and subsequently seed production. Warmer flowers are also more attractive to insect pollinators as this assists them to stay warmer themselves.



The name *Ranunculus* is quite sweet. It's from the Latin and means *little frog*, probably because many buttercup species, like frogs, are associated with waterways.



Ranunculus asiaticus,
Persian Buttercup



Ranunculus asiaticus is a popular garden plant worldwide, usually referred to just as *Ranunculus* in Australia, but as Persian Buttercup elsewhere in the world. It's a native of eastern Mediterranean countries through to southwestern Asia, southeastern Europe and northeastern Africa. Many forms with multi-layered petals are probably hybrids. It is a protected species in both Palestine and the neighbouring Israel.



Ranunculus asiaticus
– natural distribution

Atlas of Living Australia: <https://plantnet.rbg Syd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=gn&name=Ranunculus>

Emadzade K, Gehrke B, Linder H P, Hörandl E. 2011. The biogeographical history of the cosmopolitan genus *Ranunculus* L. (Ranunculaceae) in the temperate to meridional zones. *Molecular Phylogenetics and Evolution* 58(1): 4-21.

Kew, Plants of the World Online:

<https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:30002060-2#higher-classification>

Van der Kooi C J, Elzenga J T, Dijksterhuis J, Stavenga D G. 2017. Functional optics of glossy buttercup flowers. *J R Soc Interface* 14(127): 20160933.

Wikipedia: <https://en.wikipedia.org/wiki/Ranunculus>

Wikipedia: https://en.wikipedia.org/wiki/Ranunculus_asiaticus

Distribution map modified from Atlas of Living Australia:

https://biocache.ala.org.au/occurrences/search?q=lsid:https://id.biodiversity.org.au/taxon/apni/51446135#tab_mapView

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