

Dendrobium *linguiforme*

Thumbnail Orchid Tongue Orchid



This remarkable little orchid was photographed growing on a vertical sandstone cliff only a meter away from an opposing cliff, hence receiving virtually no direct sunlight. It's known as the Thumbnail, or Tongue Orchid, *Dendrobium linguiforme*. It can grow on rock (epilithic) or on tree trunks (epiphytic), has thick, fleshy leaves and tough, sturdy, prostrate stems with wiry roots that enable it to clamp fast to the substrate. The leaves are thick and succulent with longitudinal ridges and furrows that enable the leaves to expand to take in moisture during dry periods.

There are ca. 1,500 *Dendrobium* species scattered from Sri Lanka throughout tropical Asia, across the Pacific as far as Tahiti, north to Japan and south to New Zealand. In relatively recent times, the genus *Dendrobium* was divided into two *clades*, one Asian and one Australasian. (A *clade* is a technical term used by biologists to describe a group of organisms that includes a *common ancestor* and all its *descendants*). Most *Dendrobium* species are **epiphytes**, plants that grow in very exposed situations in tree canopies. Others such as *D. linguiforme* are **lithophytes**, growing on rock faces.

And a few species are terrestrial, found in drier forests and woodlands.



Distribution of *Dendrobium linguiforme*:
Australia and New Caledonia (modified
from Atlas of Living Australia)

The Orchid family, Orchidaceae, is one of the largest flowering plant families, with 736 genera and 28,000 species. The transition from terrestrial (rooted into the soil) to a more precarious epiphytic or lithophytic habitat was facilitated by the evolution of CAM photosynthesis which enabled survival in arid, high light and high temperature environments.

CAM photosynthesis (Crassulacean acid metabolism) is a photosynthetic carbon fixing pathway in which CO₂ is taken up by the leaves at night, while stomates in the leaves are closed during the day to reduce moisture loss by evaporation. The carbon fixed overnight is then stored in vacuoles of leaf cells as an acid (malic acid) and the next day, this compound is transported back to the chloroplasts, converted back to CO₂ and made into sugars by conventional photosynthesis. Compared to most plants, where photosynthesis requires the leaf cells to be exposed to the atmosphere during the day, CAM conserves water and enables epiphytic and epilithic *Dendrobium* species to inhabit niches in forest canopies with arid microclimates.



Crassula ovata. CAM (Crassulacean acid metabolism) photosynthesis takes its name from the plant family *Crassulaceae*.

CAM photosynthesis in *Dendrobium* didn't evolve just once, there is evidence that it evolved at least eight times. The oldest of these appeared in the Asian clade in the middle Miocene, and botanists believe this indicated the evolution of CAM in *Dendrobium* was associated with a period of aridity, followed by marked climatic cooling.

But back to the Tongue Orchid, *D. linguiforme*. There is some difference in opinion as to the correct name. The National Herbarium of New South Wales list it as *Dendrobium linguiforme*, but the Atlas of Living Australia has it listed as *Dockrillia linguiformis*. Either way, the flowers are fragrant and are pollinated by native bees.

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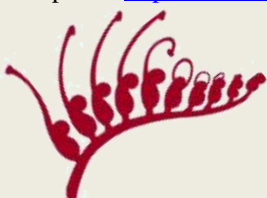
Atlas of Living Australia: <https://bie.ala.org.au/species/https://id.biodiversity.org.au/taxon/apni/51404584>

Li M-H, Liu D-K, Zhang G-Q, Deng H, Tu X-D, Wang Y, Lan S-R, Liu Z-J. (2019) *Journal of Experimental Botany* 70(22): 6611-6619. doi:10.1093/jxb/erz461

Plantnet, New South Wales Flora Online: <https://plantnet.rbg Syd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Dendrobium~linguiforme>

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

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Dendrobium nobile – a well-known *Dendrobium* from Asia. It can grow on rock (lithophytic) or on trees (epiphytic).



Dendrobium speciosum – an Australian Rock Lily, or more correctly, an Australian Rock Orchid.



Dendrobium kingianum – an Australian orchid that can grow on rocks or on trees.