

Ginkgo *biloba*

Ginkgo biloba is unique, a treasured deciduous tree that has long been cultivated in parks and gardens worldwide but particularly in China. *Ginkgo* is sometimes known as the *Maidenhair Tree*, *Silver Apricot* or *Duck's Foot Tree*, a tree of extraordinary origins, significant in biology, in medicine, and in many cultural and religious observations.

Ginkgo has no close relatives in the modern world and is the sole survivor of a diverse and ancient lineage. It has remained relatively unchanged for at least 200 million years and has been cultivated as an ornamental tree in China for more than 3000 years, often planted near temples by Buddhist monks who consider the trees to be sacred.

Ginkgo has long been considered a gymnosperm, a diverse clade of woody, perennial, seed-producing plants that also include conifers, cycads, *Ginkgo* and Gnetophytes. Gymnosperm species all have 'naked seeds' that lack the protective outer covering typical of seeds of flowering plants. However, *Ginkgo* does not fit comfortably with any plant group and although closely related to gymnosperms, it is now usually

placed within its own division, the Ginkgophyta, —family Ginkgoaceae. Because it is the only extant species within this clade, *Ginkgo biloba* is often referred to as a *living fossil*: no Ginkgoales species appear in the fossil record since the Pliocene.



Ginkgo seeds (edible) and a seedling at Macquarie University



Ginkgo's origins are truly ancient. Fossils of *Ginkgo*-like trees have been recorded from the Permian, 280 million years ago. True *Ginkgo* trees appeared in the early Jurassic 180 Mya and were widespread and diverse throughout Laurasia (the northern hemisphere) until the Early Cretaceous more than 100 Mya. However, fossils are also known from the Southern Hemisphere. The range of *Ginkgo* gradually diminished, disappearing from North America 7 - 10 Mya and from Europe about 1.7 - 2.7 Mya.

Extant wild or semiwild populations of *Ginkgo biloba* have been reported throughout China, however, locations including Guizhou, Yunnan and Chongqing in southwestern China are now considered more likely to have served as refugia for *G. biloba*. These habitats are located southeast of the Tibetan Plateau and south of the Qing Mountains, which together form an effective barrier that impedes cold blasts from the Siberian north moving to warmer subtropical zones of the south. They were also protected from climatic extremes during Pleistocene glaciations. So, the populations that led to the 're-discovery' of *Ginkgo* from Central China are more likely to have been planted by Buddhist monks.

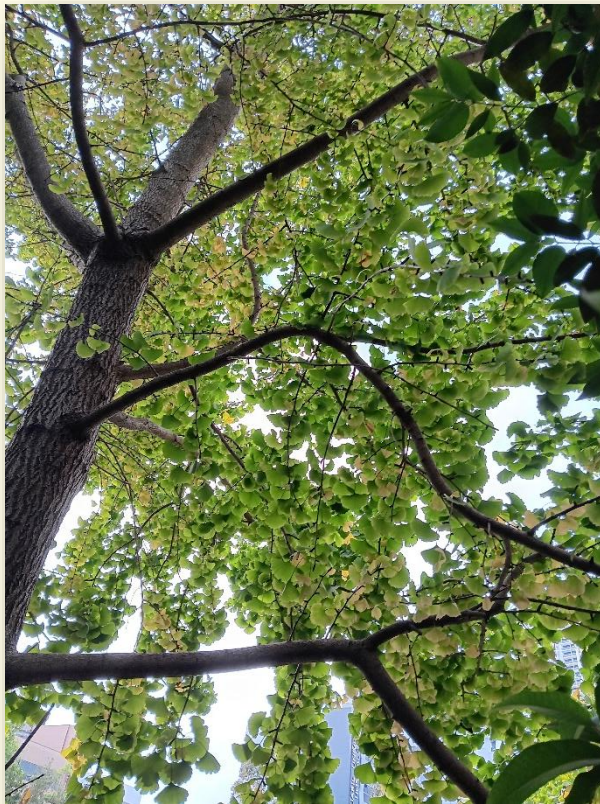


Ginkgo survived in rugged terrain of deep valleys such as these in western Guizhou, SW China.

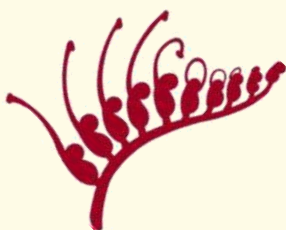
Ginkgo biloba is remarkably resilient and one of the few living organisms to survive the 1945 atomic bomb blast in Hiroshima. It is extraordinary in its resistance to and tolerance of both pathogens and herbivores, these qualities contributing not only to the longevity of individual trees but also the longevity of the species. Not only does Ginkgo have defence systems that deter herbivores, but it also has the ability to emit volatile compounds that attract predators of browsing insects. Other defence mechanisms include the production of chemicals that can counteract bacteria and fungi.



This is one of six *Ginkgo biloba* trees that survived the atomic bomb blast on Hiroshima in September 1945. They are still alive today. From: *The Ginkgo Pages* – Kor Kwant, *The Ginkgo Pages*.



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Ginkgo biloba at an entrance to the Temple of Heaven, Beijing



An avenue of *Ginkgo biloba* near the Forbidden City, Beijing