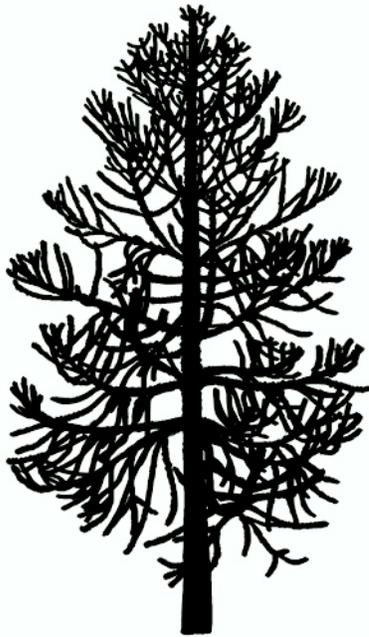


MONKEY PUZZLE TREE

COMMON NAME

Araucaria araucana

SCIENTIFIC NAME



Importance

Monkey puzzle tree (*Araucaria araucana*) is the National Tree of Chile, where it is called Pehuén. This tree, which was previously classified as *A. imbricata* and is also called *piñonero*, or *pino araucaria* in Spanish, has great historical and social importance. The tree is part of the distinctive forests of the Andean and coastal Chilean mountains, and is valued for its uniqueness and natural beauty, providing important tourism and recreational opportunities. It is the emblem of a number of national parks and provinces in both Chile and Argentina and has been declared a Natural Monument in Chile.

The monkey puzzle tree is widely represented in popular culture in Chile, and has both religious and economic significance for the indigenous Mapuche people living in the southern Andes mountains. The copious seeds produced by the cones of this tree, called *piñones*, form an important part of the diet of one of the Mapuche tribes, the Pehuénche



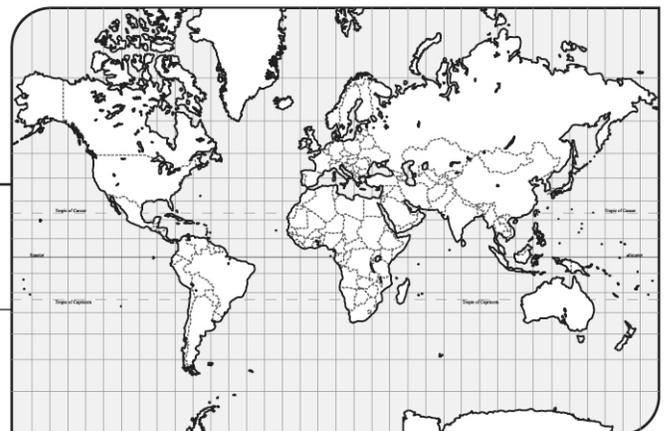
Photo Credit: Calle Eklund

Araucaria family (Araucariaceae)

FAMILY

Vulnerable

RED LIST CATEGORY



(the name of the tribe also derives from the name of the tree, and means “people of Pehuén”).

The seeds have high carbohydrate content and the cooked nuts have been described as rich and delicious. The collection, storage, trade and preparation of meals from these seeds is a characteristic and part of the traditional lives of the Pehuenche people who may use the tree for fuel, wood, building materials for their homes and shelters for livestock, resin for medicinal purposes, and food in the form of the seeds. During the February – May harvest and during the long June – September winter, pehuén seeds provide a major carbohydrate source and may be as much as 10% to 15% of the diet in some Mapuche communities.

Monkey puzzle wood has a high mechanical resistance and moderate resistance to fungal decay. These properties mean that it has been used for beams in buildings, bridges, piers, roofs, furniture, boat structures, veneers, and plywood.

Spiritually, the tree holds the centerpiece in the altar of the harvest and fertility ceremonies of the Pehuenche people. Historically, the tall straight trunks were used as masts for sailing ships. Now that this species is protected in the wild, it is principally used as a popular ornamental in the cool temperate zone. Due to its high ornamental value, it is cultivated in gardens of Europe and America and there is at least one of this highly recognizable tree in every botanical garden in Europe. *A. araucana* is also used to reconstruct climatic conditions by measuring the growth rings which may go back hundreds of years.

This endemic evergreen conifer species grows naturally in temperate rainforests of south central Chile and adjacent areas in Argentina, with a notable specimen reported from Parque Nacional Conguillío in Chile reaching over 6 feet (2 m) in diameter and over 150 feet (50 m) in height. A tree ring sample containing 834 rings exists in the International Tree-Ring Data Bank (sample ARGE015, limiting dates 1140-1974), and it has been estimated that the oldest trees in this species may live for over 1,000 years.

Description

Form: Monkey puzzle tree is a coniferous evergreen with evenly spaced tiers of horizontal-spreading branches arranged in regular whorls about the trunk. A pyramidal shaped tree 50 to 100 or more feet (15 to 30 m) tall and 3 to 5 feet (1 to 1.5 m) in diameter in diameter. The branches grow horizontally in whorls of five in opposite pairs. The tree loses its lower branches and develops a rounded crown with age. It looks quite similar to its near relative, the Norfolk pine. Several horticultural selections have been named, including some that are dwarf, some with yellowish foliage, and some with fewer branches and a more open habit.

Leaf: The triangular armor-like leaves are distinctive, tough, leathery, and sharply pointed. Individual leaves persist on the tree for 10 to 15 years before being replaced, sometimes longer on the trunk where they may grow persist all the way to the base of the tree. The scale-like leaves are oval to lance-like in shape, 1 to 2 inches (2 to 5 cm) long, shiny green on both surfaces. The surfaces are marked with longitudinal lines and have stomata on both faces.

Flower: This tree may be dioecious or monoecious; that is, the male and female flowers can be either on separate plants or on the same plant. The male cones can be solitary or in groups, start out erect but become pendant. The male cones are yellowish-brown, 0.25 to 0.5 inches long (.6 to 1.27 cm), 2 inches wide (5 cm), with 20 whorled scales. Between November and December female flowers start growing as spherical green cones formed by numerous scales. Female cones are erect, globular, dark brown, and 4 to 7 inches (10 to 18 cm) long by 3 to 6 inches (7 to 15 cm) wide, scales have long triangular recurved points; developing in 2 to 3 years and falling off at maturity.

Fruit: Each cone releases between 120 to 200 seeds, which are bright brown to orangish, triangular in shape, 1 to 1.5 inches (2 to 4 cm) long. The nut is long and narrow with 2 small, even wings at the top that are pointed at the top.

Bark & Twigs: The grey-brown bark is resinous and smooth, marked by horizontal rings made by old branch scars. Branches are horizontal to slightly drooping from the main trunk in whorls of five distributed in opposite pairs. They resemble the tails of monkeys holding onto the trunk.

Habitat and Ecology

The monkey puzzle tree ranges from the Coastal Cordillera mountains of Chile to the eastern slopes of the Argentinean Andes. The largest extant populations are in Chile, with highly fragmented populations on the lower slopes of the south-central Andes and restricted and highly threatened populations on the coast.

A. araucana occurs in mixed post-fire stands with the small deciduous broadleaved tree *Nothofagus antarctica*. It has greater longevity compared with *Nothofagus* species, which is important for the persistence of *A. araucana* in these habitats. Once established, *A. araucana* will grow through a sparser, shorter *N. antarctica* canopy, eventually overtopping it to persist in small cluster.

The Patagonian forests where the monkey puzzle tree thrives are exposed to a disturbance regime characterized by recurrent volcanism and fire. Fire history reconstructions in *Araucaria-Nothofagus* stands have found a history of mixed fire regimes with burns varying from light underburns to crown fires, and both trees are fire tolerant. *A. araucana* is clearly adapted to withstand fire, with thick bark, and protected terminal buds on branches. Fire in these forests may be due to volcanic eruptions, which start fires from lava and ejected incandescent material, as well as causing occasional burial of land through thick lava flows. Natural fires started by lightning are also a factor, as were fires started by the aboriginal population prior to 1900, and later by European settlers and other groups, often associated with logging and seed collection activities. Within the first decade after fire, *A. araucana* seedlings or root suckers begin to establish beneath the resprouted *N. antarctica* canopy. The history of fire frequency and intensity on a site may largely determine population structures for these species in mixed stands.

Monkey puzzle tree does best where the summers are cool and humid, and they are popular landscape oddities in England. This tree prefers full sun to partial shade, and does well in a moist, but well drained soil with regular watering. Growing in USDA climate

zones 7 through 10, this is a relatively hardy *Araucaria*.

Threats

The IUCN reports that this species is facing a high risk of extinction in the wild due to a limited and severely fragmented distribution, coupled with ongoing decline in extent and quality of habitat. The UN Environment Programme World Conservation Monitoring Centre has done a recent analysis using remote sensing from 25 years of satellite images to assess the rate at which native forests are disappearing. This work shows that since 1977, 64% of the wild forest has been lost and the remaining forest has been highly fragmented.

A. araucana forests have been rapidly destroyed and degraded due to logging, fire, and grazing, and many of the Chilean populations are being illegally felled in and outside national park boundaries. The declaration of the monkey puzzle tree as a Natural Monument in Chile means that logging of the species is now forbidden. This Natural Monument status has been contentious, revoked in 1987, reinstated in 1990 due to pressure from conservationists and indigenous people.

During 2001-2002 thousands of hectares of native *Araucaria* forest were dramatically burnt in southern Chile, destroying 30,000 hectares of native forest. This included 71% of the extant area of monkey puzzle in Malleco National Reserve, where some of the trees were 2,000 years old (Environment News Service 2003). The cause of the fires is unknown but some local communities say that private owners were involved as they want to the 1990 logging ban to be revoked. There is currently pressure from landowners

to revoke the protection status and removal of this status would be a serious threat to the conservation of the species.

Conservation Action

Argentina and Chile have preserved forests of this rare giant in their national parks and instated protections for this important tree. Future conservation of the species will depend on the expansion of national parks protection and the development of new protected areas in the coastal mountains, especially for the most southerly populations. These coastal populations have been found to be genetically distinct from the populations in the Andean ranges, which are where most of the national parks and reserves are located. In the Chilean Coastal range, the Cordillera de Nahuelbuta, most of the monkey puzzle forests are privately owned and remain under threat due to burning, grazing, and conversion to *Pinus radiata* plantations.

Restoration activities in protected areas, fine-scale mapping to identify small populations that require urgent restoration and education on the conservation and propagation of *A. araucana* for the local people will also assist in the conservation of this significant and distinctive species.

In 2002, this tree was designated for protection under Appendix I of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora; 1973, revised 2003.02.13), which forbids international trade. Because of this restriction, much of the commercial use of the tree has ceased. Inside Argentina's Lanin National Park, indigenous people are allowed to use dead wood for fuel and carvings and to collect a limited amount of seeds per family per year. Particularly in Chile, these

privileges still provide important resources for some families.

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If you would like to take direct action to preserve this species, you can [plant a monkey puzzle tree](#) through the conservation gifts program at trees2mydoor.com.

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