

Southern Hemisphere Conifers - from before the flowering plants

Conifers are mostly evergreen trees that produce their seeds in cones. They include all the commercially valuable softwood species.

Conifers first appeared over 200 million years ago, around the time of the dinosaurs. Their fossils have been found on all continents. Before the evolution of the flowering plants these conifers covered the land available for plants.

Now many genera are restricted to small areas on the tectonic plates of the southern hemisphere, where they give evidence of the former make-up of the land masses in the supercontinent Gondwana.

These southern conifers fall into three plant families: the cypress, the araucaria and the podocarps.

The Araucaria Family

Members of the araucaria family [Araucariaceae], are large, evergreen, tropical or sub-tropical conifers, have survived many changes in climate, in location and lately in exploitation.

The araucaria most familiar to Australians is the Norfolk Island pine [Araucaria heterophylla], first recorded by Captain Cook, who noted that these trees would make good masts. Later exploitation through the location of several convict settlements saw these trees exported to Tasmania between 1823 and 1855. They were not suited as masts as they broke where the branches grew and so were made into floorboards, among other uses.

These were not the first araucaria to be described. Known to the Spanish, the peuhen [Araucaria araucana], now commonly known as the monkey puzzle tree, the seeds of which were an important food source for the mapuche, indigenous inhabitants of Southern Chile.

The bunyabunya [Araucaria bidwillii], was used similarly by Aborigines of southern Queensland.

The largest number of Araucaria species occurs in New Caledonia. The long single column-like stems strongly influenced traditional building. They are also planted to mark important local events, giving former and current village sites a distinctive look.

Close relatives of the araucaria are the kauri [Agathis] species. The largest number of species on one land mass is also on New Caledonia, with 5 species from a total of 20 recognised. It is unusual to have two species of Agathis grow in the same location. They are usually separated from each other by altitude, soil type or site preference

Many of the kauri are tall trees, however, Agathis ovata only grows to 8m tall and may live up to 500 years.

When these trees mature they have a rough bark typical of trees that have evolved to tolerate fire, and a widespread canopy.

This collection is jointly held with the Royal Tasmanian Botanical Gardens.

Where to see conifer species mentioned below:

Representative specimens are in a number of our collections: Gondwana, Callitris, South America, Tasmania and Aotearoa New Zealand and we hold a fossil of the extinct *Fitzroyia tasmaniensis*.



A living fossil, *Wollemia nobilis*, the Wollemi Pine

The most recent living member of the araucaria family was only known from fossils 150 million years old until 1994, when a remnant population was discovered in the Wollemi area of the Blue Mountains, 200km northwest of Sydney.

DNA samples taken from several of the 39 remaining wild plants show no discernible variation, suggesting that the sole known population is clonal, growing from older trees, similar to the 10,000 year old huon pine [Lagarstrobus franklinii], a podocarp, growing on Mt Read.

The survival of this species is the subject of a plan that includes reproducing the plant and making it available to gardeners. Currently it has shown itself suited to growing in climates as different as the Brisbane Botanic and Royal Tasmanian Botanic Gardens. This species may be seen in the Gondwana & Australia collections.

The Cypress Family

The cypress family [Cupressaceae] has representatives across all the continents. The junipers, for example, whose berries can be eaten whole, brewed into a tea, or steeped in wine, are found in Europe, North America, Africa and Asia.

Also in this family are the southern cedars, *Austrocedrus chilensis* from the dry eastern side of the Andes, the *Libocedrus* from the wet forests of New Zealand and New Caledonia, the *Papuacedrus* from the high altitude areas of New Guinea and the *Widdringtonia* from mountainous areas of southern Africa.

The Cypress in Tasmania

The iconic king billy and pencil pines [Athrotaxus species] inhabit the central plateau and western mountains. Sometimes mixed with cool temperate rainforest species, king billy [Athrotaxus selaginoides] can also dominate coniferous forests. The pencil pine [Athrotaxus cupressoides] occurs among the cold oceanic heath, Tasmania's sub-alpine shrubbery

The oyster bay pine [Callitris rhomboidea] and the south esk pine [Callitris oblonga] are found in the drier eastern half of Tasmania. 14 of the 16 Callitris species occur across Australia, many of those species being fire tolerant. Several are represented in our Callitris collection.

A few years ago fossils of an extinct species [Fitzroyia tasmaniensis] were found in Tasmania; these were 50 million years old. The alerce [Fitzroyia cupressoides], the only living related species, occurs in Chile.

However a close relative remains. Commonly known from the property of the person who collected it, the cheshunt pine is named in Archer's honour, *Diselma archerii*. cheshunt pine occurs in high altitude coniferous forests in the high rainfall areas.

Background here shows the king billy pine of the central plateau and western mountains.

Fleshy fruited conifers, the podocarps

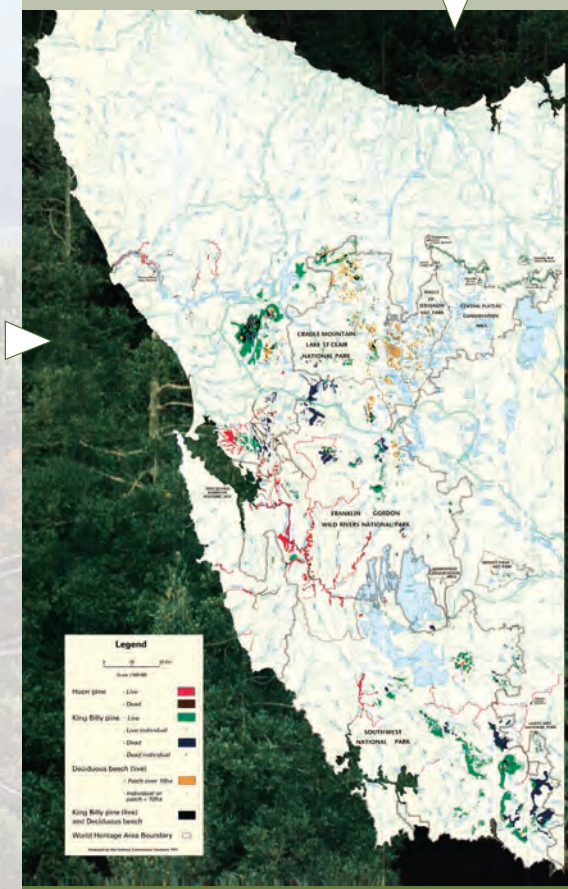
The podocarp family is predominantly found in the Australasian region, from New Zealand to South-East Asia, though some species occur in India, Japan, China, Africa, the Caribbean and America, from Mexico to Chile.

Most species are confined to one or a few islands, such as Tasmania, New Zealand, New Caledonia, New Guinea, the Philippines or Borneo.

Generally the podocarps are native to wet tropical mountain forests. A few are small trees or shrubs native to forest understorey environments. The podocarps generally do not form extensive stands, instead occurring as individual forest trees.

Although the second-largest conifer family, the Podocarpaceae are far less well-known than the other two major conifer families, the pines [Pinaceae] and the cypress [Cupressaceae].

Map shows the distribution of king billy pine. Also shown is the Huon pine, a podocarp and the deciduous beech, *Nothofagus gunnii*.



Celery topped 'pines', relicts evidencing continental drift.

One genus that does not fit easily into the podocarp family is the *Phyllocladus*, with its differences in reproductive and fruit structure. This includes the Tasmanian celery top pine [*Phyllocladus asplenifolius*], three New Zealand species and *Phyllocladus hypophyllum*, a tree which grows to 30m.

Phyllocladus hypophyllum is found in the Philippines, Borneo, Celebes, Moluccas and New Guinea. It grows in moist mountain forests sometimes as low as 900 m up to the tree line at 3200-4000 m. Found sparsely in the forest at lower elevation, where trees may be quite large, it is more common (but of reduced stature) at higher elevations. The altitude range of this plant allows specimens to be grown in our Gondwana collection.

Throughout its range celery top pine has been popular for use as timber. In Tasmania, it has been employed for boat building, including decking, as it withstands exposure to the elements well, and for joinery and flooring. In New Guinea the timber is used mainly for house building purposes, while the bark is regularly used for roofing.

A slow growing species, celery top pine takes about 250 years to grow to a millable size.

