

Araucaria angustifolia (Bertol.) Kuntze

PETER LAHARRAGUE

Agricultural Engineer

Misiones, Buenos Aires, Argentina

ARAUCARIACEAE (NORFOLK PINE)

Araucaria brasiliensis, *Columba angustifolia*

Araucaria, curiy, pinheiro do Brasil, pino del Paraguay, pino Misionero, pino Paraná

Araucaria angustifolia lives in the subtropical forest in association with evergreen and deciduous broadleaves. In natural stands the species grows between 19°15' S and 31°30' S; 41°20' W and 54° W. In Brazil it covers the states of Rio Grande Do Sul, Santa Catarina, Minas Gerais, and Paraná; in Argentina, the northeastern province of Misiones. The species rarely grows in Paraguay.

Araucaria angustifolia is a fast-growing evergreen tree reaching 35 to 50 m in height and 1.5 to 2 m d.b.h. in natural stands. Young trees have a pyramidal crown, resembling a closed umbrella. In adult trees the lower branches abscise and the tree looks like an open umbrella with the tips of the branches bending upward. The species grows in a variety of soils: poor soils derived from sandstone and rich ones derived from basalt. The latter are lateritic, deep, and permeable, with an acidic pH. Found at elevations from 300 to 2000 m, the trees grow where the annual rainfall is 1250 to 2450 mm. In natural stands the climate is mild with temperatures between 10 and 21 °C, and frosts occur on 10 to 25 days annually. *Araucaria angustifolia* lives up to 300 years.

Seeds collected from different population origins and geographic sites have produced significant growth variability in plantations. Ecotypes or geographic races may be identified (Fahler 1981, Gurgel 1973). Laboratory assays of hybridization of *A. angustifolia* and *A. araucana* (Mol.) Koch have been tested with no practical commercial results (Tesdorff 1969).

The wood is soft, with a creamy yellowish color; the corewood becomes darker when cut and has no resinous canals. It is used for plywood, studs, structural beams, mouldings, and pulpwood. The seeds are edible, and local inhabitants collect them as a food source. Commercial afforestation of pure stands has given very good growth results up to 35 m³ per ha per year in the deep red soils of Misiones, Argentina.

Flowering generally occurs in August and September. The cones ripen 20 to 22 months later during May and June and fall in June and July. Male and female strobili are usually borne on different trees, but sometimes they appear on separate branches of the same tree. The male strobili is dense, cylindrical, 8 to 20 cm long, and 3 cm wide. The cones are broader than long with a circumference of 30 to 50 cm; each seed weighs 6 to 7 g. An isolated tree may produce 50 to 80 kg of seeds. Seeds average 190 per kg.

Araucaria angustifolia seeds are currently classified by flotation in water. The lighter seeds float and are discarded. However, the floating seeds may have been collected from young trees or heavily shaded stands. These seeds may be viable, but generally would have germination rates lower than those of heavy seeds. The average rate of germination is 80 percent, with a viability of 6 to 7 months. Viability decreases after harvest, but seeds refrigerated at 3 to 4 °C may maintain their viability for more than 1 year. Seeds may also be classified by their size (length of the embryo without the bract): big seeds more than 45 mm, medium seeds 45 to 35 mm, and small seeds less than 35 mm. Two hundred days after germination, the seedlings of big seeds were 30 percent taller than those of small seeds, and the germination rate of the big seeds during the first 30 days was 50 percent higher.

Seeds can be pregerminated by placing them in layers with a shade screen. Within 20 to 30 days, emerging sprouts should be potted. The seedlings can be outplanted in 1 year. *Araucaria angustifolia* may be direct-seeded on previously harrowed terrain. Various sowing positions have been tested: vertical, slanted, and horizontal; the latter is the most favorable to germination. The sprouting seedlings must be protected against sunscald with a screen. In recent years, nursery seedlings raised in containers have been used extensively for afforestation.

ADDITIONAL INFORMATION

Araucaria angustifolia may be planted outside its natural distribution area, provided the soil is deep and the water table is not shallow. At higher latitudes, such as 38° S, *A. angustifolia* flowers and fruits prolifically at 15 years. Cone production is almost constant, and understory regeneration is abundant. However, the species grows more slowly outside its areas of origin. Plantations should be considered only for shade or landscape, not for timber production.

