

LOCAL NAMES

Amharic (pachula); English (tecote pine, spreading-leaved pine, patula pine, Mexican weeping pine, jelecote pine); French (Pin argenté); Nepali (patula salla); Spanish (pino triste, pino patula, pino Chino, ocote); Swahili (msindano)

BOTANIC DESCRIPTION

Pinus patula grows to a height of 30 m or more and attains a diameter at breast height of up to 1.2 m. Bole straight and cylindrical, sometimes forked, producing 2 or more stems. When grown at wide spacing, the crown tends to spread. The crown may also be rounded or spirelike. Young bark is characteristically a reddish-orange colour and is scaly. The mature bark is grey-brown and vertically ridged.

Leaves in fascicles of 3, occasionally 4, rarely 5; slender, 15-25 cm long pendent, pale green to yellowish-green colour, the margins finely serrate; stomata present on the dorsal and ventral surfaces; resin canals 1-4, mostly 3, usually medial, occasionally with 1 or 2 internal; exterior walls of the endoderm thin to slightly thickened, fibrovascular bundles 2, contiguous but distinct; fascicle sheath pale, greyish-brown, 10-15 mm long and persistent.

Cornlets purplish, mainly lateral, short, pedunculate, borne singly or in small clusters and up to 8, scales with small deciduous prickles; cones hard, strong, serotinous, generally slightly curved and reflexed, 7-10 cm long, sessile and extremely tenacious with a lustrous brown or yellowish-brown colour, persistent on the tree, borne in groups of 3-6, very variable in size and shape.

Seeds dark brown to almost black, very small, about 5 mm long, with a pale brown wing about 17 mm long, slightly thickened at the base where it joins the seed; cotyledons 4-5, generally 5.

'Pinus' is from the Greek word 'pinos' (pine tree), and possibly from the Celtic word 'pin' or 'pyn' (mountain or rock), referring to the habitat of the pine.

BIOLOGY

P. patula is a monoecious plant. The female flowers are usually borne in the upper crown, and the male ones in the lower crown.



Habit at Crater Rd, Maui, Hawaii (Forest and Kim Starr)



Habit at Crater Rd, Maui, Hawaii (Forest and Kim Starr)



Xmas tree roundup at Puu Niania, Maui, Hawaii (Forest and Kim Starr)

ECOLOGY

Often found in pure dense stands, but the occurrence is discontinuous, and now over much of its range it grows only in areas inaccessible to agriculture. Throughout its range, *P. patula* can be found associated with *P. gregorii* and *P. teocote*, with which it is reported to have hybridized. It also grows in association with *P. montizumae* and *P. rudis*, *Abies religiosa*, *Taxus mexicana*, and hardwood species of such genera as *Acer*, *Cercis*, *Fagus*, *Tilia* and *Liquidambar*.

BIOPHYSICAL LIMITS

Altitude: 1 000-3 000 m, Mean annual temperature: -10-28 deg. C, Mean annual rainfall: 1 000-2 000 mm

Soil type: The common soil features include acidity and good moisture supply. In the east African highlands, is it found on young fertile volcanic soils and on mature leached infertile soils derived from basement complex on other sites in E. Africa and South Africa.

DOCUMENTED SPECIES DISTRIBUTION

Native: Mexico

Exotic: Angola, Argentina, Brazil, Brunei, Cambodia, Congo, Ethiopia, Indonesia, Kenya, Laos, Madagascar, Malawi, Malaysia, Myanmar, Nepal, New Zealand, Papua New Guinea, Philippines, South Africa, Sri Lanka, Swaziland, Tanzania, Thailand, Uganda, Vietnam, Zimbabwe



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

PRODUCTS

Fuel: *P. patula* produces excellent fuelwood.

Fibre: The species is used in the commercial manufacture of pulp, for example in the Usutu Paper Mill in Swaziland and in several mills in South Africa.

Timber: The wood is suitable for particle board manufacture and gives a board of good strength, does not appreciably retard the setting of cement and can be used satisfactorily for making wood-wool slabs and boards.

Gum or resin: When tapped, *P. patula* yields an oleoresin, which is distilled to give turpentine, and rosin which is used in, for example, paint and batik industries.

Medicine: Pine-leaf oil is sometimes used for medicinal baths, and the seeds may be consumed locally.

TREE MANAGEMENT

Initial spacing for *P. patula* in most countries is from about 2.4 m to 2.75 m. Generally for saw logs, closer spacing is recommended for knotfree wood. Wider spacing is recommended on poorer sites. Saw log schedules in current use are designed to produce some 250 trees/ha with a mean dbh of 45 cm at a rotation of 45 years. For pulp projects, rotations vary from 15 years in Swaziland to a recommended 25 years in South Africa.

GERMPLASM MANAGEMENT

Seed storage behaviour is orthodox; viability is maintained for at least 3 years in open storage; a few seeds survive after 21 years of hermetic storage at 5 deg. C; viability can be maintained in hermetic storage for 6 months when seed is stored at room temperature, and for several years when stored at 3 deg. C with 7-10% mc. The number of seeds per kg depends on the provenance and the climatic conditions of the ripening year. On average, there are 143 000 seeds/kg. A purity of 98% can be achieved.

PESTS AND DISEASES

The majority of insect pests that cause damage to *P. patula* are defoliators, mainly of the order Lepidoptera, the notorious families being Arctiidae, Lasiocampidae, Noctuidae and Saturniidae. Damage begins from the nursery stage through cutworms, several leaf rollers and defoliators. Plantation pests include leaf-eating adult beetles, adult bark beetles (mottled pine bark weevil) and sucking insects such as pine woolly aphid. Diseases of *P. patula* include foliage leaf cast, tip die-back of the branches and armillaria root rot.

FURTHER READNG

Albrecht J. ed. 1993. Tree seed hand book of Kenya. GTZ Forestry Seed Center Muguga, Nairobi, Kenya.

Bekele-Tesemma A, Birnie A, Tengnas B. 1993. Useful trees and shrubs for Ethiopia. Regional Soil Conservation Unit (RSCU), Swedish International Development Authority (SIDA).

Hong TD, Linington S, Ellis RH. 1996. Seed storage behaviour: a compendium. Handbooks for Genebanks: No. 4. IPGRI.

ICRAF. 1992. A selection of useful trees and shrubs for Kenya: Notes on their identification, propagation and management for use by farming and pastoral communities. ICRAF.

Katende AB et al. 1995. Useful trees and shrubs for Uganda. Identification, Propagation and Management for Agricultural and Pastoral Communities. Regional Soil Conservation Unit (RSCU), Swedish International Development Authority (SIDA).

Kayastha BP. 1985. Silvics of the trees of Nepal. Community Forest Development Project, Kathmandu.

Mbuya LP et al. 1994. Useful trees and shrubs for Tanzania: Identification, Propagation and Management for Agricultural and Pastoral Communities. Regional Soil Conservation Unit (RSCU), Swedish International Development Authority (SIDA).

Noad T, Birnie A. 1989. Trees of Kenya. General Printers, Nairobi.

Soerianegara I, Lemmens RHMJ (eds.). 1993. Plant Resources of South-East Asia. No. 5(1): Timber trees: major commercial timbers. Backhuys Publishers, Leiden.

Streets RJ. 1962. Exotic forest trees in the British Commonwealth. Clarendon Press, Oxford.

Wormland TJ. 1975. Tropical Forestry Papers No.7. (Pinus patula). Commonwealth Forestry Institute, UK.

SUGGESTED CITATION

Orwa C, A Mutua, Kindt R, Jamnadass R, S Anthony. 2009 Agroforestry Database: a tree reference and selection guide version 4.0 (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)