

Cedrus deodara

diar, deodar

(D. Don.) G. Don

Pinaceae

LOCAL NAMES

English (himalayan cedar, deodar cedar, deodar); French (cedre de l'himalaya); German (himalaja- zeder); Hindi (diar, deodar, dedwar); Italian (cedro dell'Himalaia); Spanish (cedro del himalaya, cedro de la India); Trade name (diar, deodar)

BOTANIC DESCRIPTION

Cedrus deodara is a large evergreen, dioecious tree, to 65 m tall and more than 4 m DBH, crowns become rounded or broad and flat with horizontal or slightly ascending or descending branches, which are not whorled but arise irregularly from the stem. The bark is greyish brown, dark, almost black, with vertical and diagonal cracks dividing it into irregular oblong scales.

Leaves solitary, acicular, stiff, sharp-pointed, 25-37 mm long, silvery or silvery-blue, on the normal long shoots spirally arranged, and on the short arrested shoots in pseudowhorls.

Male flowers solitary and erect or catkins, pale green to yellowish green with purplish tinge, oblong, ovoid, and 2.5 to 4.6 cm long by 1 to 1.5 cm in diameter. On opening they elongate rapidly to 5-7.5 cm in length and become yellow with pollen. The female flowers are solitary and erect at the end of arrested branchlets; flowers, at the time of pollination, are oblong, ovoid, 1.2 to 2.0 cm long and 0.6 cm in diameter, pale glaucous green. The scales occur in a spiral of 8 x 5; at the time of pollination they stand perpendicular to the axis, exposing ovules and close after pollination.

Cones solitary or in pairs, erect, ovoid or ellipsoidal, 7.5-12 cm long and 5-8.7 cm in diameter with numerous fan-shaped scales arranged in spiral of 8 x 5 on persistent woody central axis, rounded at the apex, bluish when young, reddish-brown when ripe. On each scale rests a pair of winged seeds.

Seed triangular, winged, 2.5 to 3.7 cm long; wings with rounded corners, 2-2.5 cm broad.

BIOLOGY

In natural range, new shoots appear in March or early April. Old leaves are shed in the hot season in May and the persistence of leaves varies with age and growth vigour. Male flowers appear in June, ripen and shed pollen from the middle of September to the middle of October according to locality and its elevation at which time female flowers also ripen for pollination. The female flowers or cones appear in August, are inconspicuous and partly hidden by the rosette of leaves. There is no growth in young fertilized cones until the following spring, and by early May they are large enough to become visible. They become full-sized by the end of June or July and are pale bluish green. They ripen from the end of September to November. The cones may not fall until the early part of December at higher elevation. Thus the time occupied from the first appearance of the female flowers to the ripening of cones is 12.5 to 13.5 months. The periodicity of good seed years is about one in three.



Bark at Hosmers Grove
Maui, Hawaii (Forest & Kim Starr)



Tree at Strybing Arboretum, Golden Gate
Park, San Francisco, CA. (J.S. Peterson @
USDA-NRCS PLANTS Database)



branch at Strybing Arboretum, Golden Gate
Park, San Francisco, CA. (J.S. Peterson @
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ECOLOGY

C. deodara occurs on moderate to precipitous slopes on rocky precipitous slopes, generally dominating cool northern slopes where it usually forms pure crops of considerable extent. It is typically a gregarious tree, a light demander, frequently found in the form of pure stands. It tolerates drought at advanced age, but not at the seedling stage. The trees are also resistant to atmospheric pollution.

BIOPHYSICAL LIMITS

Altitude: 1200 to 3500 m

Mean annual temperature: 12 - 17°C

Mean annual rainfall: 200-1800 mm

Soil type: It prefers loam (predominantly sandy) soils with high levels of organic carbon, low phosphorus and high potash contents. It avoids stiff, badly drained soil, and its growth is stunted on rocky shallow soil. The best growth is attained on deep, fairly porous, fertile soil in cool situations.

DOCUMENTED SPECIES DISTRIBUTION

Native: Afghanistan, India, Nepal, Pakistan

Exotic: Argentina, Canada, China, France, Germany, Italy, Spain



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.

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PRODUCTS

Fuel: It provides an excellent fuelwood

Timber: The wood is white to light yellowish brown, with a characteristic odour and oily feel. It is straight-grained, medium fine and somewhat uneven-textured. Its average weight is 560 kg/m³. The heartwood is very durable but insects and fungi attack sapwood. Deodar is an important structural timber tree. Its wood is highly valuable and extensively used for building, railway sleepers, carriage and railway wagon work and other purposes for which durability is required. It is used in house building, beams, floorboards, door and window frames, furniture and general carpentry. It also produces quality plywood.

Medicine: Essential oils extracted from deodar and from cedar of Lebanon have been used as antiseptics and against tuberculosis, in Asia. Its oil and extracts are used as insecticides and herbal remedies against many animal diseases in India. The herbal pesticide Pestoban is a liquid concentrate of three Indian medicinal plants including *Cedrus deodara*. It is also a potent molluscicide.

Other products: It is a possible substitute of pines as a Christmas tree.

SERVICES

Erosion control: It's a soil conservation and erosion control species in the Himalayas

Shade or shelter: Its shelterwoods increases dry land pasture productivity as in New Zealand.

Reclamation: It's a good re-vegetation species

Ornamental: This species is grown as an ornamental and in amenity plantations in its native range and many countries into which it was introduced

TREE MANAGEMENT

In young crops, whether natural or artificial, tending operations consist of weeding for 3-4 years. Cleaning may also be carried out to free the trees from suppression by blue pine trees. Thinnings are a very necessary operation but are rarely carried out. They should begin early, repeated at intervals of about 10 yrs, for gradual opening of the crop to make it hardy for snow damage and to remove suppressed and damaged trees.

Deodar forests for a long time have been managed through a selection system under which selection fellings with a definite felling cycle are carried out. Trees with a minimum exploitable diameter of are selected for felling. The rotation period is 120 years when they have exploitable diameter of 55 cm and regeneration period of 30 years. The forests respond well to regeneration fellings, and conversion to a uniform silvicultural system.

GERMPLASM MANAGEMENT

Seed storage behaviour is recalcitrant. The maximum cone weight (226.5 gm/cone), seed weight/cone (16.86 mg) and seed yield (7.44%) as recorded in the tree diameter class of 41-50 cm. There are about 8000 seeds/kg.

PESTS AND DISEASES

The deodar trees are damaged by snow, fire and browsing by goats. Among wild animals, bears, porcupines and monkeys are the most injurious. *Rosa moschata* scrambles into the crowns of young trees of this species and suppress them. Among parasitic fungi, *Fomes annosus* and *Peridermium cedri* are injurious, causing its mortality and formation of witches' brooms on the trees. *Pestalotiopsis cryptomeriae* fungus causes leaf blight on young trees, whereas *Ploioiderma cedri* causes foliar infection and premature defoliation in plantations.

An epidemic defoliator *Ectropis deodarae* has been reported to cause complete defoliation in this species. Cones and seeds of many conifers including *Cedrus deodara* are seriously damaged by *Dioryctria abietella* in the North-Western Himalayan region of India. In China, seedlings develop root rot, crown rot, chlorosis and defoliation, often resulting in death from attack of *Phytophthora cinnamomi* and *P. drechsleri*.

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SUGGESTED CITATION

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