**Juglans regia** L.

Juglandaceae

LOCAL NAMES
English (Persian walnut,English walnut,common walnut,black walnut,walnut)

BOTANIC DESCRIPTION
Juglans regia is a deciduous tree 10-40 m tall with trunks measuring up to 91 cm in diameter. It develops a deep taproot and is intolerant of root disturbance.

Leaf alternate, pinnately compound with 5-7 (occasionally 9) leaflets, 30-46 cm long, leaflets are ovate to obovate with entire or sometimes finely serrated margins, terminal leaflets the largest; purple-brown when developing, shiny green when mature, very aromatic when crushed.

Flower monoecious; males are single-stemmed catkins to 15 cm; females in clusters of 3-9, with or just after the leaves.

Fruit round nut, to 5 cm in diameter; husk is moderate and indehiscent, initially bright green but turning brown, nut is relatively thin and smooth with a few shallow furrows; flesh is creamy white to light brown, sweet, oily (edible).

Twig stout, light brown, with a buff-colored chambered pith, terminal buds are large, broadly pointed, often paired and pubescent, lateral buds are much smaller, pre-formed male catkins often in axils of leaves, leaf scar 3-lobed. The shoots have chambered pith.

Bark light, ashey gray, with flattened ridges, developing a striking diamond shaped pattern.

BIOLOGY
J. regia is in flower in June, before the leaves; the seeds ripen in October. The scented flowers are monoecious and are pollinated by wind. Trees take from 6-15 years to come into fruit from seed, but new cultivars start cropping within 5-6 years.

Leaves; taken at: Hoyt Arboretum - Portland, OR (W. Mark and J. Reimer)

Bark; taken at: Hoyt Arboretum - Portland, OR (W. Mark and J. Reimer)

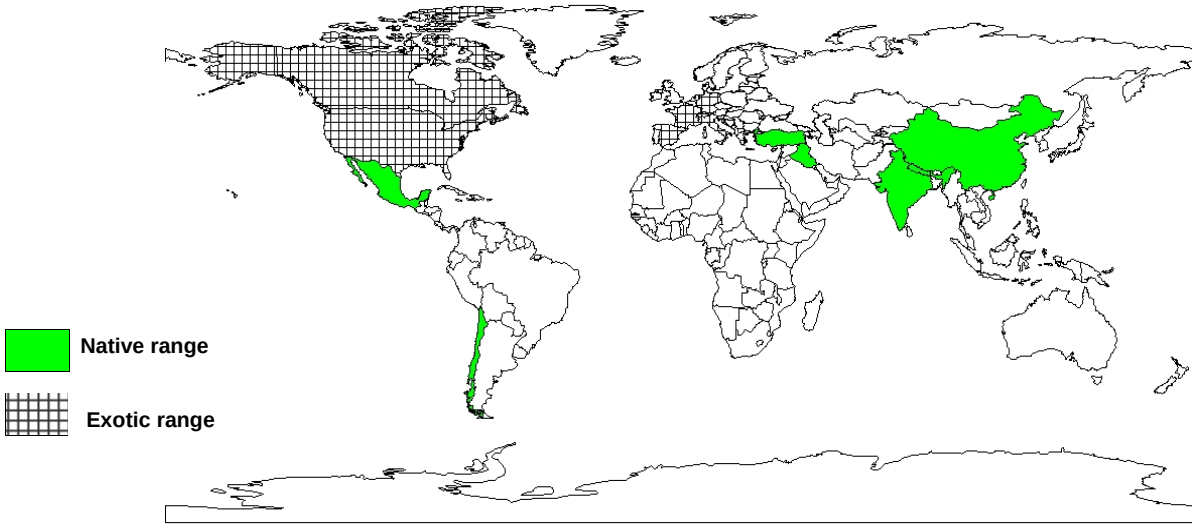
(Steve Hurst @ USDA-NRCS PLANTS Database)

ECOLOGY
English walnut thrives in mixed forests in mountain regions on moist soil with good drainage, commonly found in valleys. Usually found on woodlands, canopy or alone as it prefers a lot of sunlight.

BIOPHYSICAL LIMITS
Altitude: 1000-3000 m
Temperature: 7.0-21.1°C, tolerating temperatures down to about -27°C
Rainfall: 310-1470 mm
Soil type: Succeeds in most soils but thrives on moist, rich, sandy loam, well-drained, slightly acid or neutral soil, pH range of 4.5-8.2.

## DOCUMENTED SPECIES DISTRIBUTION

Native: Chile, China, India, Iraq, Mexico, Nepal, Turkey
Exotic: Canada, France, Germany, Italy, Spain, Switzerland, US




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
Food: Seeds are eaten raw or used in confections, cakes, ice cream etc. The seed can also be ground into a meal and used as a flavouring in sweet and savoury dishes. The unripe fruits are pickled in vinegar. An edible oil is obtained from the seed, it should not be stored for any length of time since it tends to go rancid quickly. The oil has a pleasant flavour and is used in salads or for cooking. The sap is tapped and used to make a sugar. The finely ground shells are used in the stuffing of 'agnolotti' pasta. They have also been used as adulterant of spices. The dried green husks contain 2.5 - 5% ascorbic acid (vitamin C) - this can be extracted and used as a vitamin supplement. The leaves are used as a tea

Medicine: The leaves are alterative, anthelmintic, anti-inflammatory, astringent and depurative. They are used internally to treat constipation, chronic coughs, asthma, diarrhoea, dyspepsia etc. The leaves are also used to treat skin ailments and purify the blood. They are considered to be specific in the treatment of sores. Male inflorescences are made into a broth and used in the treatment of coughs and vertigo. The rind is anodyne and astringent. It is used in the treatment of diarrhoea and anaemia. The seeds are diuretic and stimulant. They are used internally in the treatment of low back pain, frequent urination, weakness of legs, chronic cough, asthma, constipation due to dryness or anaemia and stones in the urinary tract. Externally, they are made into a paste and applied as a poultice to areas of dermatitis and eczema. The oil from the seed is anthelmintic. It is also used in the treatment of menstrual problems and dry skin conditions. The cotyledons are used in the treatment of cancer. Walnut has a long history of folk use in the treatment of cancer, some extracts from the plant have shown anticancer activity. The bark and root bark are anthelmintic, astringent and detergent.

Wood: Heavy, hard, durable, close grained, seasons and polishes well; it is used in high class and decorative joinery for furniture, wainscoting and tableware, veneer, wheels and bodies of coaches, for making gun-stocks, and for in-laying cabinets. It is unfit for use as beams because of its brittleness.

Tannin or dyestuff: A yellow dye is obtained from the green husks. The rind of unripe fruits is a good source of tannin. A brown dye is obtained from the leaves and mature husks. The dye is often used as a colouring and tonic for dark hair. A golden-brown dye is obtained from the catkins in early summer. It does not require a mordant.

Lipids: A drying oil obtained from the seed is used in soap making, paints, etc. It is not very stable and quickly goes rancid. The nuts can be used as a wood polish.

Other products: The shells may be used as anti-skid agents for tyres, blasting grit, and in the preparation of activated carbon. The leaves contain juglone, this has been shown to have pesticidal and herbicidal properties. The crushed leaves are an insect repellent. Bark of the tree and the fruit rind are dried and used as a tooth cleaner. They can also be used fresh.

TREE MANAGEMENT
Seedlings should be planted out as soon as possible but not when the soil is wet and given some protection for their first winter or two. Persian walnuts are planted in the orchard at a spacing of 10-20 m; spacing also depends on the variety and the cultivation methods to be used. Seedlings should be watered during every dry spell until they have become established. Intercropping young walnut orchard with trees of a different species may be useful, at least for the first 5–10 years.

Any pruning should only be done in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and severely weaken the tree.

GERMPLASM MANAGEMENT
Seed storage behaviour is orthodox. 3 months pre-chilling at 3-5°C is required for breaking seed dormancy, whilst the removal of a small part of the shell over the radicle promotes prompt germination. Husks should be removed from the fruits before they dry.

PESTS AND DISEASES
This species is notably susceptible to honey fungus. Seedlings are very susceptible to mushroom root rot, and walnut girdle disease.

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