

LOCAL NAMES

Chinese (wu shu li); English (Spanish chestnut, sweet chestnut, chestnut, European chestnut); French (châtaignier, marron); German (Edelkastanie, Eßkastanie, „commun); Italian (Marone, castagno); Portuguese (castanheiro-comum); Spanish (castaño común, regoldo); Swedish (äkta kastanj)

BOTANIC DESCRIPTION

The Sweet Chestnut is often a large tree attaining a height of up to 30 m with a trunk more than 2 m in diameter.

Leaves oblong-lanceolate, boldly toothed or coarsely serrate, up to 22 cm long.

The flowers monoecious, both sexes are borne in 10–20 cm-long, upright catkins, the male flowers in the upper part and female flowers in the lower part.

Fruit a spiny 2–4-valved bur (cupule), containing 1 – 4 nuts. Nuts flattened to subglobose, 1–3 cm diameter, brown.

BIOLOGY

The monoecious flowers are largely self-incompatible (self-sterile) hence the need for at least two trees to get nuts. They are pollinated by bees. In Europe the flowers of both sexes appear in late June-July on wood of the current year's growth and, by autumn, the female flowers develop into spiny burs bearing brownish nuts that are shed during October. They hybridize freely with other members of this genus.



Diagram (Zelimir Borzan, University of Zagreb, www.forestryimages.org)

ECOLOGY

Chestnuts can be found naturally in woodlands in mountains. The tree requires a mild climate and adequate moisture for good growth and a good nut harvest. It is sensitive to late spring and early autumn frosts, is intolerant of lime, and under forest conditions does well even in moderate shade.

BIOPHYSICAL LIMITS

Altitude: 0 - 1400 m. The altitude limits for successful fruiting are still to be defined but could be as low as 500 m above sea level.

Temperature: A hot summer with maximum temperatures of at least 25-30°C is required to ripen the nuts. Chestnut tolerates maritime exposure though it is slower growing in such a position.

Rainfall: at least 600 mm annually. Once established, it is very drought tolerant.

Soil type: Chestnuts do best on sandy or gravelly, well-drained but moist soil, and can grow in nutritionally poor and dry soils. Soggy soils can actually kill seedlings. Deep soils will produce better growth. The plant is very tolerant of highly acidic soils, averse to calcareous soils but succeeds on other limestones.

DOCUMENTED SPECIES DISTRIBUTION

Native: Iran

Exotic: China, Ireland, Japan, New Zealand, Spain, Union of Soviet Socialist Republics (Former), United States of America



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: The nuts can be eaten raw, roasted, dried or cooked or prepared into chocolates, pastries etc. Roasted chestnuts are a winter time favorite on both sides of the Atlantic as a coffee substitute. A somewhat astringent taste when raw, it improves considerably when cooked and is delicious when baked, with a floury texture and a flavour rather like sweet potatoes. The seed is rich in carbohydrates; it can be dried, then ground and used as flour in breads, puddings, as a thickener in soups etc. The chestnut is also food to many game animals. A sugar can be extracted from the seed.

Medicine: leaves and bark have an astringent action useful in the treatment of bleeding, diarrhoea etc. The leaves and bark are anti-inflammatory, expectorant and tonic and can be used fresh or dried. Infusions has been used in the treatment of fevers and ague, but are mainly employed for their efficacy in treating convulsive coughs such as whooping cough and in other irritable conditions of the respiratory system. The leaves can also be used in the treatment of rheumatism, to ease lower back pains and to relieve stiff muscles and joints. A decoction is a useful gargle for treating sore throats.

Tannin or dye: This can be obtained from the bark, wood, leaves and seed husks. The husks contain 10 - 13% tannin. On a 10% moisture basis, the bark contains 6.8% tannin and the wood 13.4%.

Timber: The wood is hard, strong and light. The young growing wood is very durable, though older wood becomes brittle and liable to crack. It is used for carpentry, turnery, props, basketry, fence posts from the naturally rot resistant heartwood etc.

Fuel: It is a very good source of fuelwood.

Other products: The meal of the seed has been used as a source of starch and also for whitening linen cloth. A hair shampoo is made from the leaves and the skins of the fruits. It imparts a golden gleam to the hair.

SERVICES

Soil improver: It is an excellent soil-enriching understorey in pine forests.

Landscaping: It is used in landscaping mainly as mixed forest, with some other broadleaves such as *Quercus* spp., *Fraxinus* spp., *Betula* spp. etc.

Shade or shelter: Spanish chestnut is a magnificent huge shade tree for parks, estates and avenues. It is quite showy in bloom.

TREE MANAGEMENT

Once this tree was widely grown in coppiced woodlots for its wood, but the practice of coppicing has fallen into virtual disuse. Trees re-grow very quickly after being cut down, producing utilizable timber every 10 years. Trees take 30 years from seed to come into bearing.

To establish orchards, the most common spacing pattern is to initially plant at 6 x 6 m (256 trees/ha) followed by thinning out of the temporary trees to a final spacing of 12 x 12 m (64 trees/ha). Alternatively, trees can be planted at 12 x 12 m (64 trees/ha) particularly where the land between the trees can be intercropped.

GERMPLASM MANAGEMENT

Chestnut seeds are recalcitrant. They fall in the autumn and should be gathered every day over peak nutfall because of their highly perishable nature and their susceptibility to predation by mice and squirrels which relish the nuts. The seed has a short viability and very sensitive to desiccation hence must not be allowed to become dry – should be sown as soon as it is ripe. It can be stored in a cool place, at 0 - 2°C, for a few months if it is kept moist, should be checked regularly for signs of germination. To prevent dehydration under cool storage the chestnuts should also be placed into ventilated plastic bags (containing small holes). The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting out in permanent positions. If grown in pots, the plants can be put out into permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter.

PESTS AND DISEASES

Root rot - caused by the soil-based fungal disease *Phytophthora cinnamomi* can kill the tree, (at any age), and is more prevalent on heavier soil types. Trees can be infected at the nursery stage. To reduce exposure to root rot diseases it is not recommended that orchards be established on poor draining soils i.e. areas prone to waterlogging.

Spanish chestnut is susceptible to chestnut blight, the devastating fungus disease that was introduced into North America from Asia around 1900 though not quite as susceptible as is American chestnut.

The canker of the bark caused by *Cyphonectria parasitica* is also a notable disease.

Infection of the nuts while on the tree with the fungal diseases *Phomopsis* and *Botrytis* (and other fungi) can lead to rotten nuts at harvest and can cause serious losses even under cool storage.

An insect native to New Zealand - the grass grub beetle, eat the soft new season foliage of chestnut trees in the late spring when they fly at dusk, often in quite large numbers. Young trees may be completely stripped.

Possums are especially damaging, eating the bark, leaves and breaking branches and relish eating the nuts when they fall to the ground at harvest. Rabbits and hares eat the bark of young trees.

FURTHER READING

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SUGGESTED CITATION

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