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The cork oak

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The oak or Quercus genus embraces about 450 species which are generally restricted to the cool temperature regions of the Northern Hemisphere. Commercial cork is the over-abundant suberous tissue or bark from two rather unique members of the Quercus genus, namely Q. suber and Q. occidentalis. Q. occidentalis has minor commercial importance and it occupies the colder marginal areas outside the northern distribution limits of Q. suber in the Iberian peninsular.

History
Raw cork has been used since pre-biblical times for floats, ornaments, bungs and stoppers in most Mediterranean countries.

Commercial stripping of the native cork forests of North Africa and the Iberian peninsula began in the late 1780's.

In spite of efforts since then to plant commercial forests, most of the world's cork is still obtained from naturally-occurring forests.

Climatically, there are many areas of the world where Q. suber could be established but there is a delay of some 40 to 50 years before first grade cork is produced.

Attempts to establish a cork industry in America in 1939 failed, and in 10 years only two small groves were established; today Quercus suber is a widely planted ornamental with a latent commercial potential.

The south west of Western Australia, with its distinctive Mediterranean climate, is well suited to the cork oak. As far back as 1923 foresters in Australia were documenting the potential of this tree, yet there are no commercial plantings in Australia.

Two small ornamental groves of oak trees have been planted in Perth, one at the University of W.A. and the other near the pine plantation at Gnangara.

Description
In its native Mediterranean climate, Q. suber is an evergreen, with well developed drought resistance.

The tree has a low spreading habit with an extensive, deep root system. Large sheets of premium cork are seldom obtainable unless the limbs are pruned and the trunk carefully trained.

In their natural open forest environment the trees attain a height of 12 to 18 metres with a trunk circumference of 2 to 3 metres. At the University of Western Australia, some trees planted in 1929 have a trunk circumference at about chest height ranging from 2.1 metres to 2.4 metres, while trees planted in 1948 have trunk circumferences ranging from 1 metre to 1.5 metres. At Gnangara, one tree with a particularly short trunk has a trunk circumference of 2.5 metres.

The productive life span is from 100 to 200 years, with an average of some 150 years.

The bark is relatively inert and little other than fire will harm it. At Gnangara untrained trees with short trunks and massive low hanging branches have quite heavy encrustations of moss. In open groves where the trees are correctly trained better air circulation enhances drying of the bark and restricts growth of moss and lichen.

The timber potential of Q. suber is very limited due to the short trunk, spreading crown habit and the physical characteristics of the wood. The heart wood is dark and difficult to work, and is prone to warping and deep splitting during curing. The most important use of the wood is in charcoal production.

The acorn
The annual acorn crop, if allowed to germinate undisturbed, rapidly produces a carpet of seedlings close to the parent tree. This encourages a woody understorey and shrub community which becomes a fire risk.

Acorns are relished by most livestock, the major feed component being carbohydrate. It has been estimated that in Portugal, some 180,000 tons of cork acorns are consumed annually by pigs and other livestock. It is therefore worthwhile to reduce the fire hazard by stocking and to preserve the
open forest without using machinery.

Fruiting or acorn production starts when the tree is 12 to 15 years old and increases annually until it attains maximum production at 25 to 30 years.

The bark

The cork oak can be readily stripped without impairing the vitality or longevity of the tree. Cork is found only on tissue which is at least 12 months old. Virgin cork is quite highly sculptured, fissured, yet smooth, with a pleasant bleached, neutral colouring. Once the bark is stripped or a limb is wounded, the replacement bark lacks the sculpture and stress patterns, is much darker and grows faster than virgin bark.

The tree is first stripped when about 20 years old; by then the trunk should have a diameter of about a metre and a strippable bark thickness of at least 2.5 cm. This virgin cork is processed for uses such as granulated crown seal liners, corkboard and gaskets.

The replacement bark differs greatly in texture and growth rate and a second stripping at least 3 cm thick should be obtainable eight to 10 years later. Harvesting is restricted to every eight to 12 years.

When one realises that top grade cork suitable for bottle stoppers is not harvested until the third stripping it is little wonder that the world’s cork is produced from natural forests upgraded through the centuries.

Cork stripping

Cork stripping is a manual operation requiring the skilful use of a specialised hatchet. The object of stripping is to remove the cork in the largest possible sheets. To do this, circular cuts are made at the base of the trunk and just below the branches; vertical cuts then allow the bark to be levered off. If the freeing cuts are made too deeply, the tree produces prominent wound ridges, whereas if the hatchet only penetrates the natural separation zone the tree is unharmed by the stripping operation.

Young trees may produce only 15 kg of cork whereas larger trees produce 100 kg or more. An exceptionally large specimen with a trunk circumference of 7.62 m is recorded as having produced 1 050 kg; when stripped 12 years later it yielded 960 kg.

Once stripped, the cork bark is stacked for several weeks in such a way as to flatten the curved sheets. Boiling for 30 minutes then removes tannins and other water soluble fractions.

The factory preparation of cork sheets involves a steam chamber treatment for 20 minutes; this makes the cork more pliable and easier to cut. After cutting, the corks are washed, bleached and sterilised. Modern cork technology is a specialised and highly developed field of its own.

Planting a cork tree

Quercus is renowned for its rapid decline in seed viability. Once the acorns are shed they should be promptly gathered and not left to deteriorate beneath the trees. If not sown immediately the viability can be preserved by wet storage of the acorns in peat moss at 1° to 9°C.

If seeds are sown in nursery plots the deep tap roots are severely damaged on lifting, leading to very poor field establishment. Therefore if one intends to germinate seeds in a nursery area they should be planted in deep pots or tubes.

A cork grove can be established by planting seeds 10 to 15 m apart. At each location three freshly gathered acorns are sown 3 cm deep. The two weakest specimens are removed when the plants have reached a height of 15 to 20 cm. The selected plants must be staked and protected from livestock and rabbits. Weed control, supplementary irrigation and side dressings of fertiliser help promote strong growth.

Silviculture

Left to its own devices, the central axis of the cork oak usually develops numerous semi-erect limbs. As the object of cork stripping is to obtain the large sheets as well as good thickness and quality, tree training is the most important aspect of successful silviculture.

To achieve the tall, straight trunk of about 3 metres, unwanted side limbs are removed at an early stage.

If one considers the inherent delay in producing cork of commercial thickness and premium quality, the importance of early tree training is readily apparent.

Although Western Australia has a most suitable climate for growing cork trees the potential of a local cork growing industry is severely limited. The 30 year delay from planting to production and the relative abundance of trees in Mediterranean countries relegates the cork oak to an interesting and potentially useful ornamental.