

Kährs

QUALITY IN WOOD SINCE 1857

WOOD & WOOD SPECIES

Kährs International
940 Centre Circle | Suite 1000
Altamonte Springs | Florida | 32714
Phone: 1 800 800 5247 | Fax: 407 260 9933
Email: info@kahrs.com

What is wood?

Trees have been very important to humans since the beginning of time, with no functioning life on earth without them. Trees give us shade food and shelter. They also provide oxygen and absorb carbon dioxide. We have always and will continue to depend on wood and trees for tools. Wood also has remained unsurpassed as a raw building material, and is the most commonly utilized raw material all over the world, particularly for fuel. It is easy to see that the benefits of trees and their contents cannot be exaggerated.

A tree is defined as a ligneous plant at least 5 meters tall and consisting of three parts: roots, trunk and crown.

Trees are also divided into two different types: coniferous and deciduous. The biggest difference between the two types of trees is that deciduous trees in colder climates shed their leaves in winter to save energy, while conifers (except for the larch) retain their needle-like foliage throughout the year. Conifers, most common in colder latitudes, have a more acidic soil that is also poorer in nutrients than deciduous trees. The conifers are an older plant group that was present during the Carboniferous period.

The role of the roots is to provide the tree with water and minerals, store nutrients and stabilize the tree in the ground. Tree roots usually co-operate with fungi with the fungus releasing certain minerals from the ground to the tree, which the tree could not accomplish on its own.

The crown consists of branches and twigs with leaves or needles. The role of the crown is to assimilate light energy with photosynthesis, release energy through respiration, and transpiration of water into the atmosphere.

Tree trunks support the crown and connect the crown to the roots. On a warm summer's day, as much as 1 m³ of water can be transported up to the crown through the trunk. Additionally, the trunk functions as a storehouse of nutrients.

A tree's strength, relative to its weight makes it an extremely useful material, particularly in the construction industry. The trunk consists of a great deal of cellulose and lignin which make the tree hard and durable.

Wood as a material has many useful properties resulting from the tree's internal structure.

Wood is:

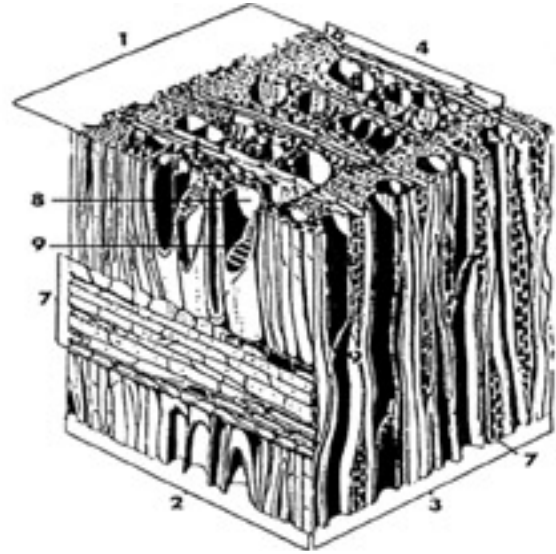
Anisotropic: meaning it has different properties in different directions like absorbing or losing moisture.

Heterogeneous: meaning that different parts have different parts, for example spring wood and summer wood, trunk and branches.

Hygroscopic: meaning it adjusts its moisture content to the RH of the ambient air.

Rheological: meaning wood deforms permanently under a sustained load.

The anisotropic and hygroscopic properties have the greatest significance for floor manufacturing. They are the reason why the multi-layer construction is so successful.



Important terms in wood technology:

Wood's fibers run in the longitudinal direction. The radial direction runs horizontally outward from the heartwood towards the bark. The tangential direction is considered to be along the annual rings. The pith is the small central part of the trunk. It contains stored nutrients. Nutrients are transported to and from the pith through the trunk via radial direction cells called medullary rays. All tree species have medullary rays, but are not clearly visible in some species. The most pronounced medullary rays are in surface layers with vertical annual rings (sawn radially). The medullary rays are clearly visible in oak and ash whereas birch is an example of a species where they cannot be seen.

Annual rings

In the spring, when the tree begins to grow, spring wood is formed. Its large, thin-walled cells give the tree the best possible conditions for growth. The tree grows more slowly during the summer, when the smaller, thick-walled cells (load-bearing part of the trunk) are formed. The bond between the annual rings is strong. This process takes place in each growing season, making the tree thicker and producing new annual rings. The width of these annual rings varies between different species and growing conditions. Deciduous trees have more summer wood than conifers, meaning deciduous trees are usually denser.

Sapwood and heartwood

The outer part of the trunk is called the sapwood. It is usually lighter in color than the heartwood. The sapwood part of the trunk contains a lot of liquid. The heartwood is the inner part of the trunk. It is generally darker than sapwood because the cells contain resins, fats, etc. The heartwood consists of dead cells and its moisture content is significantly lower than sapwood's. Trees like birch and beech for instance do not have pronounced heartwood and therefore are referred to as sapwood trees.

Resin ducts

Resin-secreting cells fill certain intercellular spaces and are called resin ducts. If the tree is injured, the resin leaks out, hardens and covers the injury. These are visible as black cavities in certain species like cherry, hard maple and European maple.



Odor

Trees that contain oils, aromatic substances, or resins have a smell associated with them. This is most noticeable in newly sawn wood. Some species have characteristic scents, such as the tannin smell of oak, or the resin smells of pine. Other trees have more agreeable fragrances. Juniper is an example of a wood that has an aroma even when dry. Contrary, beech is an essentially odorless and tasteless species, and therefore is used in domestic applications like lollipop sticks and chopping boards.

The energy content of wood

Heavier species contain more raw material than lighter species, and therefore have a higher energy content. Calculating by weight, on the other hand, the differences between the energy contents (kW/kg) of different species are smaller. The energy content is also highly dependent on the wood's moisture content.

Thermal properties

Wood has very useful thermal properties. In older buildings, solid wood is used for thermal insulation. Thermal conductivity is highest in the direction of the fibers, and increases with moisture content and density. The thermal capacity of wood is relatively high – approx 1300 J/kg °C for absolutely dry wood.

Fire properties

Wood can be ignited by a naked flame or glowing objects as well as by overheating. Given sufficient time and air supply, ignition can occur at temperatures below 200° C. For wood to be ignited by a naked flame, a higher temperature (300–400° C) is required. Igniting wood by overheating like radiation, requires an even higher temperature (500–600° C). Wood burns slowly at an almost constant rate (approx.

0.6–1.0 mm/min) because of the insulating surface layer of charcoal that is formed. Smoke production in burning wood is moderate, and the fumes are not usually aggressive.

As a fire progresses, wood forms a layer of charcoal that protects the underlying wood due to its low thermal conductivity. Heavy timber constructions can therefore be superior in fire protection terms than unprotected steel. Inadequately ventilated piles of sawdust can generate so much heat that they can self-ignite. The oxidation of resins in the sawdust can also cause fire.

Grading

The Swedish publication “Gröna boken” (the green book) only gives instructions for grading spruce and pine. The wood is graded with regard to faults in the timber and also to its overall impression. For wood that is to be used to manufacture engineered floors, usually hardwood, manufacturers decide for themselves what rules will apply to each grade of floor. Different gradings are used to create different forms of expression and desired appearance of a room.

In accordance with the EN standard, the appearance of wood falls into three different classes. O refers to grades with minor variations; o refers to grades with moderate variations; and Δ larger variations (in the absence of specific standards).

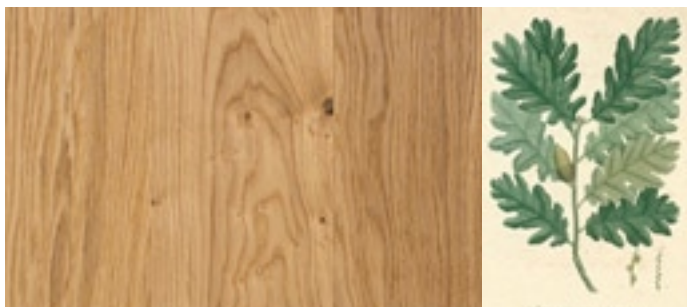
Stating that a grade may have certain knot sizes or other visual criteria does not mean that all boards in that grade actually do. The overall impressions of different floor grades must be different, with a natural distribution of the parameters within each grade. The quality and construction of floors with different appearances are the same, only the appearance is different.



Our species

Our range includes many of the world's most beautiful species from the most exciting parts of the globe. Kährs is determined to promote environmental awareness even in global terms. Tropical species in our range come from countries who are members of the International Tropical Timber Organization (ITTO). All members of the organization have pledged to work towards ecological forestry. When purchasing tropical timber we source raw materials from responsibly managed forests. Suppliers are chosen principally from those who hold an FSC (Forest Stewardship Council) or PEFC (Program for the Endorsement of Forest Certification) certificate or equivalent, or from those who can in some other way document that they operate environmentally aware timber procurement.

OAK (*Quercus robur*, *Quercus petraea*, *Quercus rubra*)



The Tree

There are more than 300 different species of oak in the temperate region. There are also a number of hybrids between different species. Sweden has mainly common oak (summer oak, forest oak) and sessile oak (winter oak, mountain oak). In North America, red oak is the most common, and in southern Europe a specific cork oak. Oak generally grows to a height of 20–40 m, and can live to be 1000 years old. The strong taproot and thick lateral roots make the tree very resistant to storms. At least 500 different insects live on the oak. Some 40 of these are threatened species, the majority of them living in older trees with decaying wood. The acorn (produced by the oak) is a highly sought-after food for roe deer, wild boar and jays. Acorn production varies greatly from year to year, but in an acorn year many oaks in the same region produce large quantities of acorns. This happens approximately every seventh year.

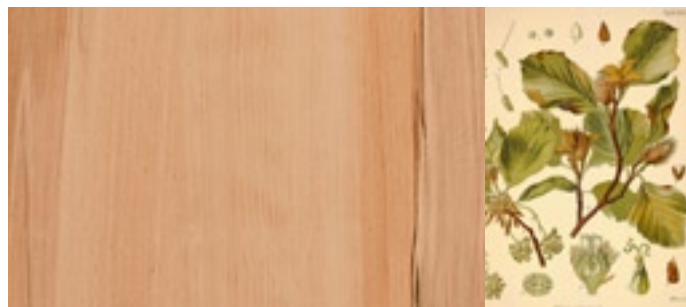
The Wood

Oak timber is relatively hard and heavy and has excellent physical properties. Oak is easy to split and work with but can be difficult to dry. Heartwood is the most durable among the Swedish oak species. It is hard and rotproof, and highly resistant to abrasion. The sapwood however can be attacked by insects. The timber is ring-porous, and has marked medullary rays. The wider the medullary rays, the higher the density of the wood.

Uses

Nowadays, oak is used for engineered floors, panels, furniture veneers, fuel, thresholds, stairs, fence posts, and more! Previously it was also used for shipbuilding, foundations, bridge and hydraulic construction, wheel spokes, fencing, sleepers, coffins, agricultural implements, tanning, etc.

BEECH (*Fagus sylvatica*)



The Tree

Beech grows in Europe between latitudes 40° N (Madrid) and 60° N (Stockholm). It grows to a height of approx. 30 m and generally lives approximately 300 years. It has a strong but shallow root system, and can withstand cold but is sensitive to spring frosts. Beech grows to form continuous forests, and is a beautiful and valuable landscape feature. Beech nuts are a sought-after food for mammals and birds. Beech nut production varies greatly from year to year, and like the oak, a beech nut year happens approximately every seventh year.

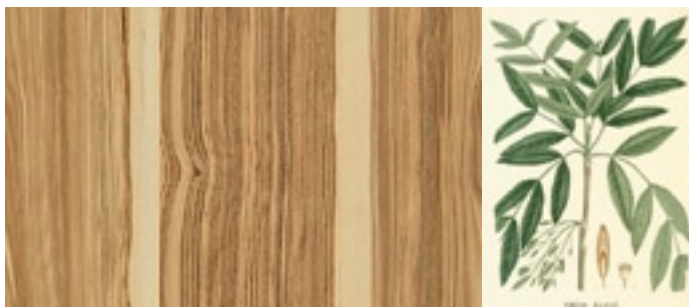
The Wood

The timber is easy to process and work with, and has a high bending strength. The beech is not resistant to rot and insect attack, but easy to impregnate. The wood swells and shrinks considerably with changes in moisture.

Uses

Beech is commonly used for chopping boards and lollipop sticks because of its lack of taste and smell. It is also frequently used to make furniture because it does not have marked graining. Beech is a common species for toys, parquet and panels. It has been used in the past for railway sleepers, charcoal, churns and other wooden barrels. Many different products used to be extracted by dry distillation from beech, including acetic acid and Bakelite. During the world wars the beech nut was used for coffee substitute and cooking oil.

ASH (*Fraxinus excelsior*)



The Tree

Ash only grows in the northern hemisphere. It generally grows to a height of approx. 30 m and can live to be 300 years old. Like the beech, it is resistant to cold but sensitive to spring frosts. Ash has an extensive and shallow root system, and tends to send out suckers. Elk, roe deer, hares and rabbits eat ash saplings with enthusiasm. Ash is often called the “King of Trees”, because its leaf canopy “arrives last and departs first”. The nutritious leaves form an excellent humus soil where many small mollusks thrive.

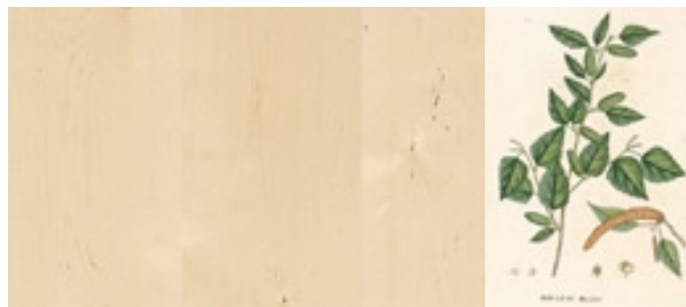
The Wood

Ash is a relatively hard, heavy and tough species. It is difficult to split and has durable strength properties, while still maintaining flexibility. The wood has yellowish sapwood and light-brown heartwood, and visible medullary rays.

Uses

Currently, Ash is used for tool handles, sports equipment, billiard cues, boat interiors, furniture, handrails for stairs, parquet, sulky shafts, dogsleds, etc. It has been used throughout history for aircraft construction, missiles (in Icelandic, “askr” (ash) = spear), spokes and casings.

BIRCH (*Betula alba*)



The Tree

Like Ash, Birch grows in the northern hemisphere. There are several different species of birch, including downy birch (white birch bark; the mountain birch is a variant), silver birch (also known as weeping birch), Swedish birch and dwarf birch. Birch readily develops suckers in their root system and the birch tree grows to a height of 20–30 m.

The Wood

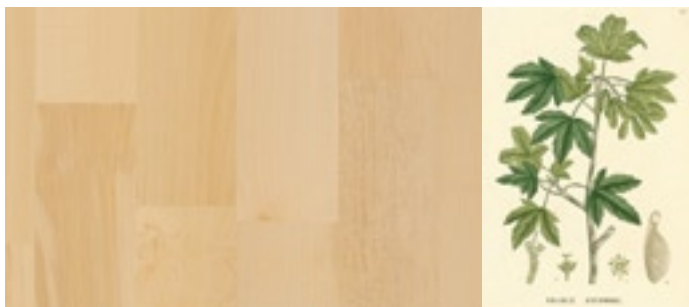
Birch is relatively soft and resilient. It is easy to work and bend, and also easy to impregnate. Birch is not resistant to rot and insects, and is considered a sapwood tree.

Uses

Birch is used for furniture, tool handles, brush handles, interior joinery, toothpicks, parquet, plywood, rulers, etc. Both birch bark and the sap were used previously to seal under turf roofs, for canoes by Native Americans in North America, and for birch bark baskets. The sap was also used as a nutritious drink. The bark contains the antiseptic substance betulin.



EUROPEAN MAPLE (*Acer pseudoplatanus*)



The Tree

European Maple grows all throughout Europe, as far as the Urals, but not normally in the Netherlands or the UK. The tree normally grows to a height of 20–30 m and lives up to 500 years old.

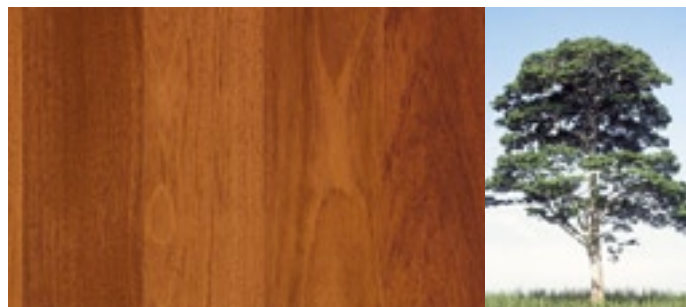
The Wood

European maple is a light and resilient wood that is easy to work.

Uses

Currently European maple is used mainly for cabinet making, engineered flooring, handicrafts, tool handles and violin backs.

JATOBA (*Hymenaea cuorbaril*)



The Tree

Jatoba grows in Central and South America, and is sometimes known as Brazilian cherry.

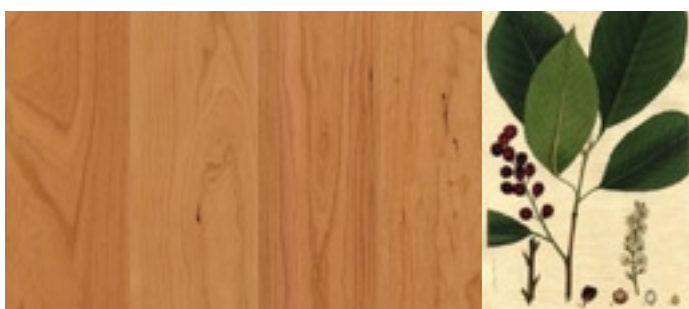
The Wood

Jatoba is a very heavy and durable species. The heartwood is resistant to mold.

Uses

Jatoba is used for construction, railway sleepers, furniture, tools, musical instruments and veneers. The tincture is used medically to counter inflammation, bacteria, fungi and slugs and snails.

CHERRY (*Prunus serotina*)



The Tree

The cherry tree grows rapidly. It normally reaches a height of 15–20m and 80–90 years old. The edible berries are particularly attractive to birds, however the leaves are poisonous to cattle.

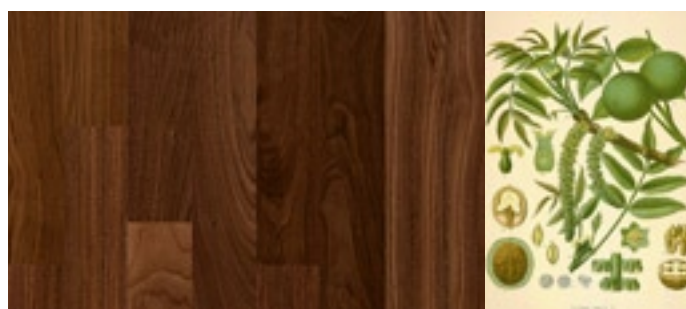
The Wood

American cherry is darker than the European variety. Cherry darkens quickly on exposure to light.

Uses

Cherry is used for exclusive interior fittings, floors, furniture, veneers and musical instruments.

WALNUT (*Juglans nigra*)



The Tree

Walnut trees are found in various parts of the world including eastern North America, Europe and Asia Minor. Walnut normally grows to a height of 40 m, with a trunk circumference of 2.5 m.

The Wood

Walnut is resilient and easy to work and treat, and is very suitable for bending. The wood is dimensionally stable.

Uses

Walnut is used mainly for furniture and interior fittings, rifle butts (because of its ability to withstand impacts) and inlaid work.

HARD MAPLE (*Acer saccharum*)



The Tree

Hard maple grows in eastern North America, and normally reaches a height of 30 m. This species is also called the sugar maple, and in its autumn colors it is the national symbol of Canada.

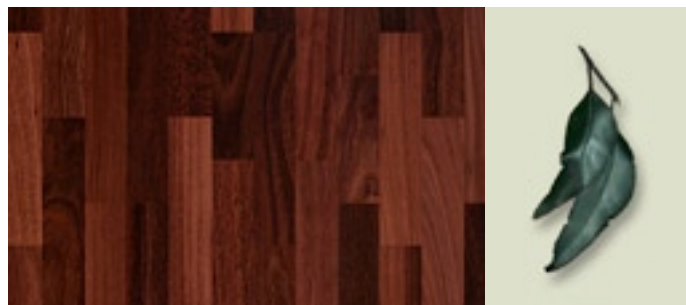
The Wood

Hard maple is a heavy and durable species, it is resistant and it withstands wear well. It is also one of the most moisture-sensitive species. It dries slowly with extensive deformation.

Uses

Hard maple is used for inlaid work, engineered flooring and other sports floors (e.g. bowling alleys), bowling pins, musical instruments and kitchen equipment (it leaves no taste). Sugar is extracted to make maple syrup. It takes up to 30 liters of maple sap to produce 1 litre of maple syrup.

JARRAH (*Eucalyptus marginata*)



The Tree

Jarrah grows in south-western Australia, reaching a height of up to 40 m with a trunk diameter up to 3 m. The Jarrah tree is unusual in that it has long underground nodules for storing carbohydrates that enable the tree to re-grow after a forest fire. The roots go very deep, and therefore cope with long dry periods.

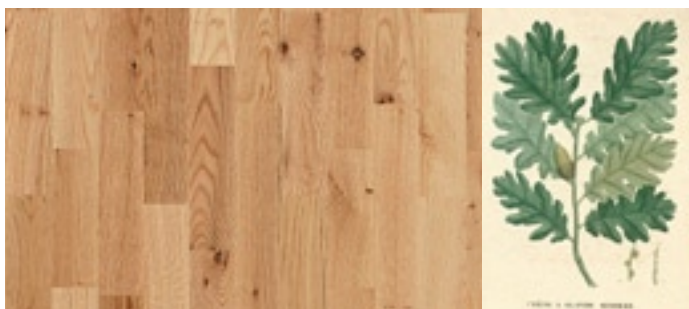
The Wood

The species is very hard. When green, Jarrah is quite easy to work, but as it dries, it causes severe wear to tools.

Uses

Jarrah is weather-resistant and is therefore used for bridges, railway sleepers, shipbuilding, telephone poles, and for panels, floors and garden furniture. Jarrah flowers are used by beekeepers for the production of honey. In the UK, tar-covered Jarrah blocks were once used for surfacing roads.

RED OAK (*Quercus rubra*)



The Tree

Also known as Champion Oak, the red oak tree grows in the northeast United States and southeast Canada – in areas with good soil that is slightly acidic.

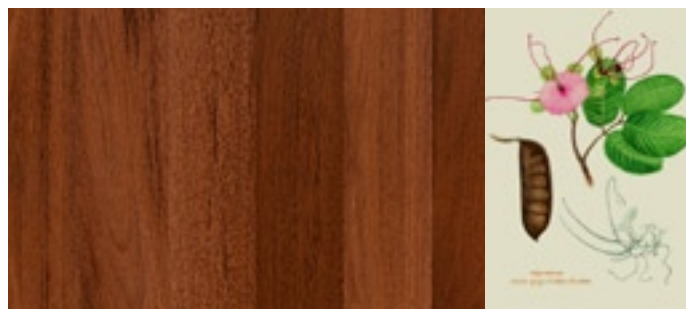
The wood

Red Oak is heavy, hard, strong, and coarsely grained.

Uses

The northern red oak is one of the most important oaks for timber production in North America. The wood is of high value and when carefully treated, successfully used for furniture. It is also used in construction and for interior finish of houses.

MERBAU (*Intsia bijuga*)



The Tree

Merbau grows to a height of approx. 20 m, with a trunk diameter of 1.5 m. and is most commonly found in Indonesia, Malaysia and the Philippines.

The Wood

Merbau is a heavy and very hard species that has very little movement in response to moisture.

Uses

Merbau is used for construction, interior fittings, furniture, windows, doors and floors.



The Forest

Forests in temperate regions have more species than the coniferous forests of the more northerly regions. Tropical forests offer the greatest diversity of species.

Forests in Sweden

Sweden's forests correspond to barely 1% of the entire world's forest land. More than half of Sweden is covered by forest. Of this, approx. 85% is coniferous, 10% mixed and 5% deciduous. Deciduous forests dominate only in southern Sweden. Mittlansskogen forest on Öland is northern Europe's largest continuous deciduous forest.

Sweden's forest resources have doubled in less than a century. Forests are still expanding in Sweden because felling is outweighed by new planting. Barely half the timber felled goes to the sawmill. All forests in Sweden can be defined as plantations. Only forests in the most northern mountain regions are not affected by cultivation.

Certification of forestry means that an independent certifying body confirms that companies comply with a standard verifying economic, social and environmental requirements are being met. With a certificate, the wood products can then be marked, which can increase the market share of wood products in environmentally conscious markets. See the section on Environment, www.kahrs.com.

Solitary trees (usually oak) and pollarded trees have high natural value, above all because they can reach a great age. Solitary trees, which avoid competition for sunlight and nutrients with other trees, can be up to 1000 years old. The reduced crowns of pollarded trees reduce the risk of the tree being damaged by snow and wind, and these trees can also therefore be very old.

Cultural history

Both birch leaves and birch twigs are used as a tribute to the Indogermanic god Donar, the Thunderer (predecessor of the Norse god Thor). The custom of adornment with birch leaves and twigs for the spring and midsummer festivals lives on in the Nordic countries.

Because trees live to a great age, they span people's fates over many generations and connect us with our forefathers. Trees are cult objects in most cultures. The mythical world-tree Yggdrasil is famed in Nordic mythology. The first humans, Ask and Embla, were thought to have been created from it. Other cultures also have trees to which certain beings are linked. In ancient Rome, the oak was the tree of Jupiter, the god of war, and wreaths of oak leaves were handed out to honor specially chosen heroes. At Dodona, a temple dedicated to Zeus, an oak grew whose whisperings were considered oracular.

In the old Swedish provincial laws, fines were imposed on those who unlawfully felled nut-bearing trees (e.g. hazel, oak and beech). The oak was the king's tree, because oak was used in the manufacturing of warships. This came to an end after 1842, when the first iron ship was constructed.

It was not unusual to plant a "tree of life" when a child is born in many places. This was very common among the ancient Romans. Assyrians, Egyptians, Indians and Sami have also made use of respected and highly venerated trees. The tree of life was considered to be strongly interconnected with the property's residents. It was thought that as long as the tree lived, the property would thrive and be passed from generation to generation. The tree of life was also used in genealogy as a symbol of the family's branches.

Planting a guardian tree as a symbol of the property's prosperity is an old tradition with pagan roots. In recent times it has acquired a more symbolic character associated with the property, but remains mainly ornamental.

Throughout history, leaf-bearing branches and twigs were commonly pollarded for winter fodder for animals. Ash and willow specifically were used as feed for goats and sheep. For cattle and horses, leaf fodder was used when there was a shortage of feedstuffs.

Few trees have been used for predictions about years to come as much as the rowan. In Sweden, it was said that an autumn with plenty of berries would give way to a severe and snowy winter.

An Elder tree was a veritable medicine cabinet for all sorts, used to cure many ailments, and was therefore commonly planted close to the house. Furthermore, an elder close to the house was thought to keep goblins away.

From wood floor to parquet floor

The first "floors" were just trampled down earth or clay, and they were most common in Sweden and the Nordic countries right up to the end of the 19th century. Flat stones were sometimes used, perhaps to keep out the dampness. A later development was to lay wood instead of stones directly onto the ground. The floor beam/truss system was developed to escape the damp ground and the worst of the cold. A number of widely spaced logs, often split, were laid directly on the ground, and rough planks of spruce were laid on these logs. Spruce was used for the floor because it was light in color. This construction was not connected to the walls, which made it easy to replace planks

attacked by rot. The floor planks were usually naturally narrow, and laid alternately root end to top end. The floor planks could also be laid directly on the sand, with cornerstones supported the building.

With brick or stone buildings constructed in later times, the foundations had to carry the entire load, which made raising the floor beams off the ground obvious, and the foundations were used to accommodate the floor beams. The crawl space foundation had become much more common. This construction also became common for simpler buildings, and is called a suspended timber floor. The floor boards were still mainly spruce. The floors were more prominent in old buildings than they are today, partly because at that time nearly all furniture was positioned along the walls, and partly because carpets and rugs did not begin to be used in Sweden until the middle of the 19th century. Spruce floors are not particularly durable, and they warp considerably. Oak was therefore used in houses owned by the gentry. It was harder, and also conferred a certain status on the owner.

The first "proper" parquet floors were manufactured in France as early as the Middle Ages. The oldest known patterned wood floors in Sweden date from the 16th century. In the middle of the 18th century, parquet floors came in checker patterns, presumably an influence from French carpenters working on the Royal Palace in Stockholm. Parquet floors became increasingly common in Swedish homes in the early 20th century. In 1941, Kährs was granted the first patent for multi-layer engineered flooring. This was based on its patent for laminated doors, which was developed to achieve a flat and rigid product.





Did you know...

- The world's tallest trees are the North American conifers – the giant sequoia, the Douglas fir, the giant silver fir – and an Australian eucalyptus.
- The world's tallest tree in 2006 was said to be a *Sequoia sempervirens* (Hyperion) at 115 m, growing in Redwood National Park, California.
- The world's tallest broadleaf tree is *Eucalyptus regnans* at 110 m, which grows in Styx Valley, Tasmania.
- The world's largest tree is the Californian giant sequoia General Sherman. It is 84 m tall, with a circumference of 31.3 m and a diameter of 11.1 m.
- Trees in Europe can reach heights of about 100 m, and many are more than 1000 years old.
- The most famous tree in Sweden is the Rumsquilla Oak, near Norra Kivill in Småland. It is Sweden's thickest and oldest tree. It measures 14 m in circumference at its foot, and is about 1000 years old.
- The Ginkgo Biloba tree is considered to be the missing link between conifers and deciduous trees.
- Pine groves offer ideal conditions for finding fungi such as slippery jack, russula and fly agaric.
- Ash grows generally in Europe apart from Finland, Portugal and Ireland.
- The buildings in Venice were built on alder or Siberian larch piles.
- Granhult church in Småland is one of Sweden's oldest surviving wood buildings. It dates from the 1220s.
- On some ash trees, all the flowers are male, on others all are female. Some trees have both male and female flowers.
- Thin slices of spruce, known as shingles, were used to cover roofs before tiling became common.
- Scrubbing brushes can be made from thin spruce roots.
- Each rubber tree can yield up to 4 kg of latex each season.
- In the past, hides were prepared with tanning agents from the oak and the spruce.
- The world's first underfloor heating system for wood floors was invented in Korea. The system was based on the smoke (and hence the heat) being led in under the wood floor, before leaving via the chimney on the opposite side of the building.
- The oldest tree ever known was a pine (*Pinus longaeva*) 5100 years old. It grew in Nevada, USA, but has now been cut down.
- The oldest living tree is a pine in California that is thought to be 4700 years old.
- Beech originally meant simply wood. Runic characters were cut into thin beech strips (bokstav in Swedish), and the Swedish word for letter is still bokstav.
- Johan Gutenberg discovered that pieces of beech made marks on white paper and invented the art of printing.
- In England, ash wood and bacon were thought to be able to remove warts.
- The ancient Romans took wreaths of lime bast to feasts, convinced that they would be able to prevent food poisoning.
- It was thought that children with rickets or other serious diseases could be cured by being pulled through holes in a tree, often a maple.
- Robin Hood used yew for making bows. The wood for the bow would be cut so that it included both heartwood and sapwood. This produced a bow that was both strong and flexible.
- Originally, alder was used for making clogs, but today mainly birch is used.
- Hard maple was once also used for the heels of high-heeled shoes.
- The ancient Roman Pliny used the Elder ash leaves to drive away snakes.
- The oak grows for 200 years, lives for 200 years and dies for 200 years.