## Pine

### Pine tree

![Pine Tree](image)

**Japanese red pine** (*Pinus densiflora*), North Korea

### Scientific classification

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Pines are conifer trees in the genus Pinus \( /ˈpiːnuːs/ \) in the family Pinaceae. They are the only genus in the subfamily Pinoideae. The Plant List compiled by the Royal Botanic Gardens, Kew and Missouri Botanical Garden accepts 126 species names of pines as current, together with 35 unresolved species and many more synonyms.\[2\]

**Etymology**

The modern English name pine derives from Latin pinus which some have traced to the Indo-European base *pīt-* ‘resin’ (source of English pituitary). In the past (pre-19th century) they were often known as fir, from Old Norse fura, by way of Middle English firre. The Old Norse name is still used for pines in some modern north European languages, in Danish fyr, in Norwegian fura/fure/furu, Swedish fura/furu, Dutch vuren, and Föhre in German, but in modern English, fir is now restricted to fir (Abies) and Douglas-fir (Pseudotsuga).

**Taxonomy, nomenclature and codification**[edit]

*Main article: Pinus classification*

Pines are gymnosperms. The genus is divided into three subgenera, which can be distinguished by cone, seed, and leaf characters:

- *Pinus subg. Pinus*, the yellow, or hard pine group, generally with harder wood and two or three needles per fascicle\[4\]
- *Pinus subg. Ducampopinus*, the foxtail or pinyon group
- *Pinus subg. Strobus*, the white, or soft pine group, generally with softer wood and five needles per fascicle\[4\]

**Distribution**

A Khasi pine in Benguet, Philippines
Huangshan pine (*Pinus hwangshanensis*), Anhui, China

Most regions of the Northern Hemisphere (see List of pines by region) host some native species of pines. One species (*Sumatran pine*) crosses the equator in Sumatra to 2°S. In North America, various species occur in regions at latitudes from as far north as 66°N to as far south as 12°N.

Various species have been introduced to temperate and subtropical regions of both hemispheres, where they are grown as timber or cultivated as ornamental plants in parks and gardens. A number of such introduced species have become invasive and threaten native ecosystems.

**Description**

Ancient *Pinus longaeva*, Nevada, USA

Pines are evergreen, coniferous resinous trees (or, rarely, shrubs) growing 3–80 m (10–260 ft) tall, with the majority of species reaching 15–45 m (50–150 ft) tall. The smallest are Siberian dwarf pine and Potosi pinyon, and the tallest is a 81.79 m (268.35 ft) tall ponderosa pine located in southern Oregon's Rogue River-Siskiyou National Forest.
Bark chips

The bark of most pines is thick and scaly, but some species have thin, flaky bark. The branches are produced in regular "pseudo whorls", actually a very tight spiral but appearing like a ring of branches arising from the same point. Many pines are uninodeal, producing just one such whorl of branches each year, from buds at the tip of the year's new shoot, but others are multinodeal, producing two or more whorls of branches per year. The spiral growth of branches, needles, and cone scales are arranged in Fibonacci number ratios. The new spring shoots are sometimes called "candles"; they are covered in brown or whitish bud scales and point upward at first, then later turn green and spread outward. These "candles" offer foresters a means to evaluate fertility of the soil and vigour of the trees.

Pines are long-lived, typically reaching ages of 100–1,000 years, some even more. The longest-lived is the Great Basin bristlecone pine, Pinus longaeva. One individual of this species, dubbed "Methuselah", is one of the world's oldest living organisms at around 4,600 years old. This tree can be found in the White Mountains of California. An older tree, now cut down, was dated at 4,900 years old. It was discovered in a grove beneath Wheeler Peak and is now known as "Prometheus" after the Greek immortal.

Foliage

Illustration of needles, cones, and seeds of Scots pine (Pinus sylvestris)
Pines have four types of leaf:

- **Seed leaves** (cotyledons) on seedlings, born in a whorl of 4–24.
- **Juvenile leaves**, which follow immediately on seedlings and young plants, 2–6 cm long, single, green or often blue-green, and arranged spirally on the shoot. These are produced for six months to five years, rarely longer.
- **Scale leaves**, similar to bud scales, small, brown and non-photosynthetic, and arranged spirally like the juvenile leaves.
- **Needles**, the adult leaves, which are green (photosynthetic), bundled in clusters (fascicles) of 1–6, commonly 2–5, needles together, each fascicle produced from a small bud on a dwarf shoot in the axil of a scale leaf. These bud scales often remain on the fascicle as a basal sheath. The needles persist for 1.5–40 years, depending on species. If a shoot is damaged (e.g. eaten by an animal), the needle fascicles just below the damage will generate a bud which can then replace the lost leaves.

**Cones**

Pines are mostly monoecious, having the male and female cones on the same tree, though a few species are sub-dioecious with individuals predominantly, but not wholly, single-sex. The male cones are small, typically 1–5 cm long, and only present for a short period (usually in spring, though autumn in a few pines), falling as soon as they have shed their pollen. The female cones take 1.5–3 years (depending on species) to mature after pollination, with actual fertilization delayed one year. At maturity the female cones are 3–60 cm long. Each cone has numerous spirally arranged scales, with two seeds on each fertile scale; the scales at the base and tip of the cone are small and sterile, without seeds. The seeds are mostly small and winged, and are anemophilous (wind-dispersed), but some are larger and have only a vestigial wing, and are bird-dispersed (see below). At maturity, the cones usually open to release the seeds, but in some of the bird-dispersed species (e.g. whitebark pine), the seeds are only released by the bird breaking the cones open. In others, the seeds are stored in closed ("serotinous") cones for many years until an environmental cue triggers the cones to open, releasing the seeds. The most common form of serotiny is pyriscence, in which a resin binds the cones shut until melted by a forest fire.

**Ecology**

Pines grow well in acid soils, some also on calcareous soils; most require good soil drainage, preferring sandy soils, but a few (e.g. lodgepole pine) will tolerate poorly drained wet soils. A few are able to sprout after forest fires (e.g. Canary Island pine). Some species of pines (e.g. bishop pine) need fire to regenerate, and their populations slowly decline under fire suppression regimes. Several species are adapted to extreme conditions imposed by elevation and latitude (e.g. Siberian dwarf pine, mountain pine, whitebark pine and the bristlecone pines). The pinyon pines and a number of...
others, notably Turkish pine and gray pine, are particularly well adapted to growth in hot, dry semi-desert climates.

The seeds are commonly eaten by birds and squirrels. Some birds, notably the spotted nutcracker, Clark's nutcracker and Pinyon jay, are of importance in distributing pine seeds to new areas. Pine needles are sometimes eaten by some Lepidoptera (butterfly and moth) species (see list of Lepidoptera that feed on pines), the Symphytan species pine sawfly, and goats. [citation needed]

Use

Logging Pinus ponderosa, Arizona, USA

Pinus sylvestris prepared for transport, Hungary

Pine cone
Pines are among the most commercially important tree species valued for their timber and wood pulp throughout the world. In temperate and tropical regions, they are fast-growing softwoods that will grow in relatively dense stands, their acidic decaying needles inhibiting the sprouting of competing hardwoods. Commercial pines are grown in plantations for timber that is denser, more resinous, and therefore more durable than spruce (Picea). Pine wood is widely used in high-value carpentry items such as furniture, window frames, panelling, floors and roofing, and the resin of some species is an important source of turpentine.

Many pine species make attractive ornamental plantings for parks and larger gardens with a variety of dwarf cultivars being suitable for smaller spaces. Pines are also commercially grown and harvested for Christmas trees. Pine cones, the largest and most durable of all conifer cones, are craft favorites. Pine boughs, appreciated especially in wintertime for their pleasant smell and greenery, are popularly cut for decorations. A number of species are attacked by nematodes, causing pine wilt disease, which can kill some quickly. Pine needles are also used for making decorative articles like baskets, trays, pots, etc. This Native American skill is now being replicated across the world. Pine needle handicrafts are made in the US, Canada, Mexico, Nicaragua and India. Pine needles serve as food for various Lepidoptera. See List of Lepidoptera that feed on pines.

Because pines have no insect or decay resistant qualities after logging, they are generally recommended for construction purposes as indoor use only (ex. indoor drywall framing). This wood left outside can be expected to last no more than 12–18 months depending on the local climate. It is commonly referred to by several different names which include North American timber, SPF (spruce, pine, fir) and whitewood.
Edible seeds of the Korean pine (Pinus koraiensis)

Some species have large seeds, called pine nuts, that are harvested and sold for cooking and baking. They are an essential ingredient of Pesto alla genovese.

The soft, moist, white inner bark (cambium) found clinging to the woody outer bark is edible and very high in vitamins A and C. It can be eaten raw in slices as a snack or dried and ground up into a powder for use as an ersatz flour or thickener in stews, soups, and other foods, such as bark bread. Adirondack Indians got their name from the Mohawk Indian word atirú:taks, meaning "tree eaters".

Biomedical

A tea made by steeping young, green pine needles in boiling water (known as "tallstrunt" in Sweden) is high in vitamins A and C.

Pine has been listed as one of the 38 substances used to prepare Bach flower remedies, a kind of alternative medicine promoted for its effect on health. However, according to Cancer Research UK, "there is no scientific evidence to prove that flower remedies can control, cure or prevent any type of disease, including cancer."
Woodworking with Pine

Pine is among the most common species of softwood available in home centers today. When woodworking with pine, there are many species from which to choose, but they all tend to get lumped in together, and are commonly regarded as being somewhat utilitarian in nature (good only for building shelving, framing or other projects not typically associated with fine woodworking).

While pine has its limitations, this is a rather unfortunate outlook. Stable pine, particularly that of a more antique nature, is among the most revered of wood stock, and can be more stable than popular hardwoods such as maple or cherry.

In the US, the two most commonly available varieties of pine are Eastern white and yellow pine. Yellow pine is a bit harder than Eastern white pine, and can be a bit more difficult to cut. However, when used properly, either can give fantastic results.

Most of the limitations fall into two categories. For one thing, pine tends to scratch or dent easily.

Second, pine from the lumber yard is typically sold a bit wetter than optimum. This can lead to movement in the wood as it acclimates to the local environment. Fortunately, both of these limitations can be dealt with rather easily.

**Dealing with Moist Pine:**
Pine (and its cousins, Spruce and Fir, which make up the SPF triumvirate type of wood used to make most construction materials) is often kiln-dried, but rarely is as dry as optimally needed for fine woodworking. As
such, when this construction material reaches a job site, it is used as quickly as possible to avoid twists, bows and cups. The old construction axiom of "use it the day you get it" really can't apply to fine woodworking applications of pine.

A better approach would be to pick through the stock at the home center for the best pieces you can find, then stack them carefully at your shop lumber storage location for a few months and allow them to acclimatize to the local environment. Look for clean stock with as few knots as possible, preferably somewhat resembling quartersawn (with the grain lines perpendicular to the longer axis in the end grain). By allowing a stack of this wood to reach a state of equilibrium with the environment, aided by the weight of the other boards in the stack, you should have some relatively stable pine with which to work.

Of course, one should always be on the lookout for antique pine timbers. There is little more satisfying in woodworking than obtaining some 100-year-old antique long-leaf pine from an old abandoned barn or house and turning that recycled lumber into works of art.

After your stock has had a chance to reach a state of equilibrium with the environment, you may still have some cupping or warping issues with which to deal. Fortunately, this is why we have surface planers and jointers.

Dealing with Pitch:
Pine has a reputation for leaving a lot of pitch (or pine tar) on woodworking blades. While properly curing the pine will help immensely in dealing with excessive pitch, there are still a number of tips that can be used for removing pitch buildup from blades. For basic cleaning, I like to use a quality all-purpose cleaner. My favorite is about three tablespoons of a natural laundry soap (like the liquid laundry soap from Cal-Ben Soap) mixed in a quart spray bottle filled with water. This does a great job of removing pitch from blades and bits, particularly before the pitch buildup has gotten too heavy.

Keep Your Tools Sharp:
In addition to keeping your blades and bits as pitch-free as possible, you should also make certain that your blades and bits are quite sharp when working with pine. Because of the relatively soft nature of the wood, a less than very sharp blade or bit will tend to crush the wood instead of cutting cleanly. This will lead to a lot of chipping and splintering in the cuts, and less than optimum results.

Scratches and Dents:
As mentioned earlier, fresh pine also is relatively easy to dent and scratch. To address this when building with pine, I'm careful to keep a clean work surface, removing any loose wood chips, tools or fasteners from the work table. When working on the shop floor, a cut-up cardboard box will protect the surface of the wood from imperfections in the floor quite nicely.

Should a scratch occur, you should be able to remove it relatively easily with a random orbital sander. Dents can be a little more tricky to address. Old-school carpenters commonly use a generous dab of saliva to address a hammer dent in pine. (That's a nice way to say that they spit on the dent.) The moisture tends to fill into the crushed stock, and 20-30 minutes later, the dent is barely noticeable.

While I'm certainly not advocating a similar procedure in the wood shop on a fine woodworking project, the principle is similar. A damp cloth positioned over the spot covered with a hot iron for a few seconds will often remove the blemish. The steam works its way into the fibers and camouflages the dent.

Finishing Pine:
When finishing pine, be certain that the wood has had ample time to acclimatize with the local environment. If you built the project before allowing the wood to reach a state of equilibrium, you'd be wise to allot that time before finishing. Without waiting for the wood to equalize with the surrounding environment, your finish will not
be as durable as desired.

For painted projects, be sure to caulk all joints and fill all nail/screw holes appropriately. Then, after a final sanding, use a few coats of a quality primer before applying the desired layers of top coat paint.

For stained projects on pine, I strongly advocate the use of a pre-stain conditioner. This conditioner will even out the color of the stain across the project, providing a much more consistent color than a project not using such conditioner.

After applying the conditioner as recommended by the manufacturer, you can apply the stain and protective finish (such as polyurethane) of your choice.