

Spruce - *Picea sp.*

**General information:** 35 species of this evergreen are widely available in the US. Many varieties are tall, conical to pyramidal trees, most familiar as a popular Christmas tree. Some species tend towards globular growth, and slow-growing spruces can be used as shrubs. Spruce has scaling or flaking bark, and, in general, its needles are short enough for use in most sizes of bonsai, with many dwarf varieties available.

Due to the branch formation in whorls and natural tendency of some spruce species towards pyramidal growth, the spruce can be a difficult bonsai subject. It enjoys popularity, however, because it makes a stately bonsai when properly styled, and material is readily available.

Needlelike leaves are persistent for several seasons, but much shorter than those of pine; born singly and closely in spirals; four-sided or diamond-shaped in cross section. Each leaf appears narrow at the base. Flowers appear as small cones, male and female on the same tree. Spruce have a pendent woody cone with thin, smooth or ragged-edged scales.

**Lighting:** Full sun, but needs shade from the midday sun in summer, or needle browning will result.

**Temperature:** These northern trees prefer cool temperatures, although small or young bonsai may need frost protection. Many species are hardy to zone 3 or colder, although there are some which grow well only as far north as zone 6. *Picea glauca* 'Conica' is capable of withstanding heat and drought better than other spruce bonsai. In general, spruces like wind and need good ventilation.

**Watering:** Spruces prefer moisture, but not waterlogged soil. Reduce watering in winter, but never allow the soil to dry out completely. Misting is appreciated spring-fall.

**Feeding:** Every two weeks, spring-midautumn, using liquid bonsai food or half-strength general purpose fertilizer. In hot areas, discontinue feeding during the heat of summer. Apply a chelated iron supplement several times yearly.

**Pruning and wiring:** Popular both as single specimen trees and when grown in forest plantings - 'Little Gem' spruce is especially popular for Saikei. Jin and shari look especially nice on spruce bonsai. When purchasing spruce for bonsai purposes, be careful to avoid grafted trees as these will form unsightly bulges at the base. Suitable for all styles except broom, and for all sizes, with small sizes best reserved for dwarf varieties. New growth should be pinched, not clipped, several times in spring, when shoots are about 1 inch long, leaving 4-5 clusters of needles. Do major pruning in early fall. Never remove all needles. Wire between late autumn and winter. *Picea glauca* 'Conica' is a slow-growing specimen. To encourage compact, dense growth on it, pinch out the apical buds as they emerge and cut back long shoots. It does not set as well when wired as

other trees. It is often necessary to exaggerate the bend desired when wiring to end up with proper branch placement.

**Propagation:** Seeds need cold pre-treatment, and are generally sown in winter or early spring. Seeds may be collected from cones between September and January, late August-September for *P. glauca*. Remove seeds as soon as they appear at the edge of the scales, but allow them to mature in the cones as long as possible. Softwood cuttings may be taken in late autumn or early spring, but rooting is tricky and may take up to two years.

**Repotting:** In general, repot every second year in early to mid-spring, before new growth expands, or in early fall. Older specimens (+10 years) may be repotted every 5 years. *P. Abies* may only need repotting every 3-4 years. Use fast-draining soil mix, and prune roots by 1/3 or less. Spruce, in general, need to keep a decent-sized root ball, and may need to be planted in a deep pot to achieve this. Protect from full sun for a few weeks after repotting. *P. jezoensis* should be allowed to rest for 3 months after transplanting before wiring. *Picea engelmannii* is one of the toughest spruces, and is forgiving of mistakes made due to over-enthusiastic root/branch pruning.

**Pests and diseases:** Mites are the worst problem, and in hot weather they can build to populations which require control. They can be a major problem in summer after hot dry weather, especially near concrete, buildings, and other urban surfaces which reflect heat. The small insects can't be readily seen with the naked eye. The first noticeable symptoms are yellowing at the base of the oldest needles on infested branches. Close inspection with a magnifying glass will confirm the presence of the mites.

Two gall-forming insects commonly attack Spruce. Eastern Spruce gall adelgid forms pineapple like galls at the base of twigs. Galls caused by Cooley's Spruce gall adelgid look like miniature cones at the branch tips. The gall adelgids do not kill trees unless the infestation is heavy. A few galls on a large tree are not serious.

Bagworms make a sack by webbing needles and debris together. Small numbers may be picked off by hand or use *Bacillus thuringiensis*.

In northern climates, Spruce budworm larvae feed on developing buds and young needles. The yellowish brown caterpillars are difficult to see.

The Spruce needle miner makes a small hole in the base of a needle then mines out the center. Dead needles are webbed together and can be found on infested twigs. Hand pick these from the tree to reduce future damage.

Pine needle scale is a white, elongated scale found feeding on the needles only. Populations would have to be quite high to cause major damage.

Sawfly larvae may feed on the needles. One infestation will usually not kill the tree, but there may be two or more generations per year.

Borers can infest trees which are weakened by other problems.

**Diseases:** Cytospora canker infects a branch then eventually kills it. The

lower branches are attacked first then progressively higher branches. The needles turn brown to reddish brown and eventually drop off. White resin patches are seen on infected branches. Prune off infected branches. Water Spruces during dry weather.

Spruce may be attacked by needle casts. One causes needles to turn yellow or brown and drop off. Another affects the lowest needles first then moves up the tree. Infected needles are a mottled yellow.

Several rust diseases attack Spruce but these are rarely seen. Infected needles turn yellow and drop off.

### **Some species suitable for bonsai:**

- *Picea abies*: Norway spruce - With its red brown bark, conical shape, and shiny green needles, Norway spruce is traditionally used as a Christmas tree. Its needles are 3/4 inch long, and it grows to 90 feet in nature. It survives at high altitudes, up to 6600 ft, and is hardy in zones 2B through 7A.
- *Picea abies albertiana* 'conica'.
- *Picea abies* 'Echiniformis': dwarf spruce - a slow-growing form with tightly congested foliage.
- *Picea abies* 'Little Gem': dwarf spruce - an excellent variety for use in Saikei due to its tiny needles and small, compact growth.
- *Picea abies* 'Maxwellii': Norway spruce, dwarf spruce - This is a natural dwarf which is hardy to zone 3. It has coarse, spiny needles.
- *Picea abies* 'Mucronata': dwarf spruce.
- *Picea abies* 'Nidiformis': bird's nest spruce - This dwarf has bright, fresh green buds and grows to 3 ft.
- *Picea abies* 'Pumila' - This variety has small, dense foliage which makes it desirable for bonsai culture. It grows very slowly - as little as 1 foot in a 25 year period.
- *Picea abies* 'Pumila Nigra' - small, deep green foliage, with light green buds in spring. Takes well to pot culture in hot, humid areas. Very similar to the hard-to-find *P. glehnii*.
- *Picea abies* 'Pygmaea': pygmy Norway spruce.
- *Picea abies* 'Verigata': white spruce.
- *Picea engelmannii*: Blue Englemann spruce, dwarf Alberta spruce - A native of western North America, it is hardy to zone 3. It has soft needles which smell of camphor when crushed, and orange-brown cones.
- *Picea glauca*: white spruce - This tree has prickly blue-green needles which grow to 3/4 inch, and 2 inch green cones which ripen to brown. Hardy in zones 2-5, it is loved for its strong, refreshing aroma. It does not tolerate hot summers well.
- *Picea glauca* 'Albertina conica': Alberta spruce - Conical, with bright green foliage, this is a slow-growing dwarf.
- *Picea glauca conica*: white spruce - Hardy in zones 4-6, although survival in zone 2 has been reported, this common bonsai choice withstands heat and drought better than other spruce. It is very susceptible to spider mites.
- *Picea glauca densata*: Black Hills spruce - This slow-growing spruce can survive drier conditions than most of the genera.
- *Picea glehnii*: Sakhalin spruce, common Ezo spruce, Edo spruce, silver fir - very popular in Japan, but may be difficult to get due to export regulations. It has a slender conical habit, with red-brown flaking bark and bluish-green needles.

- *Picea glehnii* 'Yatsubusa': dwarf Saghalin spruce - popular in Japan for Saikei, this spruce is very similar to *P. Abies* 'Little Gem.'
- *Picea jezoensis*: Yezo spruce, jezo spruce, Hondo spruce, Yeddo spruce - Hardy to zone 5, this variety, popular in Japan, prefers semi-shade. It is recognizable by its dark green needles with white undersides, and its light brown young shoots. It is reputed to grow poorly, however, in the eastern US.
- *Picea jezoensis hondoensis*: Hondo spruce - This variety has shorter needles than the species.
- *Picea mariana* (also called *Picea nigra*): black spruce.
- *Picea mariana* 'Nana': dwarf black spruce - This dwarf has gray-green needles and cones less than 2 inches long. It is native from Pennsylvania north through Canada. Its needles are a scant 1/2 inch.
- *Picea omorika*: Serbian spruce - The Serbian spruce, found growing between Ontario and Wisconsin in the US, is recognizable by its narrow habit and distinctive spire. There are dwarf and weeping forms, and it is hardy in zones 4-7.
- *Picea orientalis*: Oriental spruce, Caucasian spruce - An interesting bonsai subject due to its short needles (1/4-1/3 inch) and purple cones, the Caucasian spruce is hardy to zone 5 and can grow to 50 ft. in the wild. Found between Ohio and Ontario, it has pale gray bark and deep green needles. Hardy in zones 5-7, this is one of the best spruces for hot, humid areas.
- *Picea oungens*: Montgomery spruce - This spruce has blue needles. Its compact growth makes it an appropriate bonsai choice.
- *Picea polita*: spruce.
- *Picea pungens*: Colorado spruce, Colorado blue spruce, blue spruce - a blue-gray to blue-green tree, it can grow to 150 feet and survives at altitudes up to 11,000 ft.! It is the most widely grown spruce in North America.
- *Picea pungens* 'River Road': blue spruce - zone 3.
- *Picea rubens*: red spruce - Red spruce can grow up to 100 ft., and is comfortable at altitudes up to 6000 ft. It has rich purple-brown bark which turns red-brown on older trees, or gray at high altitudes. Its bright green needles smell of apples or candlewax. It often hybridizes with *P. mariana*, producing a more spreading tree with darker needles.
- *Picea sitchensis*: Sitka spruce - The largest, fastest growing spruce in the world, the Sitka spruce can grow up to 300 feet! It has gently arched branches and prickly needles, and grows in a broad range from Alaska south to Washington state.
- *Picea torana*: tiger-tail spruce - zone 6.

### **Bibliography:**

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