

PINES OF ARIZONA



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The pine (*Pinus* species) is an important group of trees within the “conifers” designation. There are many different species, each having its own physical characteristics and cultural requirements. Identifying features of different species include cone size and shape, and the number of long, slender needles in each bundle. Various pine species are very well suited to environments from the low deserts to the mountains. They are tolerant of many types of soils and temperature ranges, and are relatively pest free.

A pine tree is a classic form for many home landscapes. The benefit of a pine is obvious: it is a beautiful evergreen tree that is typically low maintenance and a low water user. It provides shade all year round. The aromatic foliage has a pleasant fragrance. Birds and other wildlife will use the pine tree for food, shade and shelter, offering great opportunities for viewing.

Fortunately in Arizona, we have many native and non-native pines to choose from when selecting a tree for our yard or landscape. Many are fast growing. Many are tall and statuesque. Some are dwarf or smaller in stature to accommodate a smaller growing space. They can break up traffic noise as well, or be used as a screen for privacy.

BOTANICAL

Pine trees are vascular seed-bearing plants. They are multi-cotyledonous (germinating with between four and twenty “seed” leaves) and monoecious, meaning they have both male (pollen) and female (seed) cones, rather than flowers. The seeds and pollen are usually wind dispersed. They are part of the Sub Kingdom Gymnospermae (naked-seeded) and formerly part of the Division Coniferae (cone-bearing). The recent scientific classification for the pine family is as follows:

Kingdom: Plantae
Division: Pinophyta (previously Coniferae)
Class: Pinopsida
Order: Pinales
Family: Pinaceae
Genus: *Pinus*

The pine family may also be divided into the subgenus *Pinus* (*Diploxylon* or hard pines), which includes the three-needled yellow pines such as the Ponderosa, and *Strobilus* (*Haploxylon* or soft pines), which includes the five-needled white pines such as the limber pine (Gernandt et al 2005). Gernandt et al also include pinyon pines within the *Strobilus* subgenus, whereas earlier botanists classified pinyon pines in the subgenus *Ducampopinus*.

CLIMATE

The Sunset Western Garden Book (Brenzel et al 2001) divides the state into eight distinct climate zones. These zones range from subalpine to tropical desert and no one of the pines can grow satisfactorily across this entire range. Minimum winter temperature, frost, maximum summer temperature, precipitation, humidity and the sun’s intensity are all important. The primary factor influencing frost hardiness is usually the expected minimum winter temperature influenced by elevation. Sites at elevations bordering the climate zones will often have temperatures that grade into each zone. Species that overlap these zones will be best adapted. The climate zones are:

Zone 1A: Coldest mountain and intermountain areas of the contiguous states; i.e., Greer (40° to -25° F).

Zone 2A: Cold mountain and intermountain areas; i.e., Summerhaven (-20° to 30° F).

Zone 2B: Warmer-summer intermountain climate; i.e., Flagstaff, Williams, Payson (-10° to -20° F).

Zone 3A: Mild areas of mountain and intermountain climates; i.e., Prescott, Holbrook (-8° to -18° F).



Zone 3B: Mildest areas of intermountain climates; i.e., Tuba City (-2° to -15° F).
Zone 10: High desert areas of Arizona and New Mexico; i.e., Globe, Kingman, Bisbee (10° to -10° F).
Zone 12: Arizona's intermediate desert; i.e., Tucson, Wickenburg, Safford (6° to -15° F).
Zone 13: Low or subtropical desert areas; i.e., Phoenix, Yuma (19° to 13° F).
Zone details are available at: <http://www.sunset.com/garden/climate-zones>

LANDSCAPE USE

There are about 115 species of pine. At least twenty of these are well-adapted to Arizona's different climates, although irrigation is often necessary in landscape situations. Landscape architects, contractors and homeowners rely on pines heavily for ornamental uses. Golf courses, parks, malls, industrial and residential sites use pine cultivars for large and sometimes small landscape plantings. Most pine species grow into large trees, so attention to size at maturity and planning sufficient area in which to grow is critical. Pines offer a variety of forms, needle structures, color, from blue to dark green, and texture, from fine to coarse. Pines can be used for windbreaks, accent trees or even foundation plantings.

Planting and caring for evergreens requires a considerable investment of time and money, and so it is important to make the right decisions when choosing these plants for your yard. To choose a species wisely, you need to know two basic pieces of information. First, you need to know the ultimate size of the space that you want filled by the evergreen, and second you need to be sure that the species or variety you are considering can grow vigorously in the climate and site conditions of your property. The following information will provide guidelines to help you select the most appropriate pine trees for your yard.

Learning about the habits and needs of evergreens is worth the effort. Nursery grown evergreens of landscape grade are often expensive and take years to mature. If you make the right choice at the beginning, not only will you save time and money, but your landscape evergreens will provide years of pleasure.

SELECTION, PLANTING, STAKING, AND PRUNING

All coniferous plants that are purchased from a nursery will be either sold in a plastic container or balled and burlapped (B&B). When selecting containerized stock, look for any of the following defects: rootbinding, brown or dried out foliage or roots, insect damage, weeds in the container or rootball, an extremely large trunk diameter in relation to the container size, or a broken or loose rootball.

Early spring or late fall (when the tree is dormant) are the best times of the year to plant B&B plants. Winter may also be acceptable in mild climates. Summer planting should be avoided and will require more attention, irrigation and care than trees planted during the more desirable time of the year. Containerized stock may be planted year round but will establish more rapidly when planted during spring to early summer and late summer to fall.

Rootbinding is a condition when the roots have circled the rootball. This condition will lead to a serious problem with establishment if not corrected before planting, often resulting in blowdown or root strangulation. It is best

to avoid root binding by selecting another tree with a healthy rootball that is not overgrown and circling. If root binding appears minimal and not too advanced, use a sharp knife to cut vertically into the rootball to a depth of 1-3 inches, depending on the size of the container.

Before planting, contact Blue Stake to mark where underground utilities such as water, gas and electricity are located. Do not plant over sewer, gas or water lines. Look upward for overhead wires or other obstructions within the expected crown at maturity. Keep trees away from buildings to minimize fire risk, and under no circumstances plant under power lines, an eave, or other covering.

Pines prefer well drained soils and will not tolerate extended periods of wet soil. If the soil drains poorly, try to locate another area with good drainage. Poorly drained soil will interfere with root development as the tree establishes, and may lead to the eventual death of the tree.

Preparation of the planting hole is typically not difficult. Dig a large, wide hole no deeper than the rootball depth and 2-½ to 4 times the container diameter. Mixing soil amendments in the backfill is not recommended as they may inhibit root development into the native soil. Loosen the soil on the sides of the hole to aid root penetration. If the tree is B&B, remove the wire or mesh from the root ball before planting. To prevent the rootball from drying out remove the topmost part of the burlap or cover the existing burlap with soil. Likewise, be careful not to bury the root collar (where the root ball meets the trunk) of container grown trees. Soil against lower trunks can induce disease. The root collar should be visible and at final grade.

Backfill the hole using native soil. Remove large rocks from the backfill soil if present. Carefully tamp the soil down and water in to settle the soil and to check the final planting grade. Create a temporary berm of soil at the edge of planting hole, about three to five inches high. This will permit a thorough irrigation of the rootball and help the newly planted tree initiate new roots.

Stake the tree if it is unable to stand on its own or when the root ball is cracked. Staking allows new roots to grow into the soil without constant trunk movement. Place stakes perpendicular to the prevailing wind. Tree ties should be made of a material that will not harm the tree's bark. All stakes should be placed outside the rootball in the native soil to avoid damaging the root. Branches should not be in contact with the staking material because this will cause rubbing and bark loss on the branches. Trim the tree stakes to help avoid such problems.

After the tree is planted, final grade checked, temporary irrigation berms installed and stakes installed (if necessary), apply a 3-4 inch layer of mulch to an area roughly corresponding to the drip line of the tree. Mulches suppress weed growth, reduce water evaporation, moderate cold and heat, are aesthetically pleasing and if organic, add much needed humus to the soil over time.

If staked, inspect the tree ties occasionally, and adjust as necessary to prevent any damage or cutting into the bark. The tree should be firm within two or three years, at which point the stakes and ties can be removed.

Under normal circumstances, pruning newly planted trees is not necessary. Remove only dead, dying, broken, diseased parts and any branches that are growing inwardly, crossing or rubbing another branch. Prune when the tree is dormant or after the first flush of growth in spring. Springtime pruning is often limited to pinching, or removing part of the soft new growth.

PROBLEMS AND PESTS

Cold and freeze damage may be avoided by careful selection of a tree species that is appropriate for your area. Take time to observe which trees do well in your neighborhood or area. Serious freeze damage can kill a tree. In less severe situations, the tree will outgrow the damage. The affected foliage will likely remain on the tree for two seasons and the damage will be there until all the old foliage is shed. Heat damage may limit species from higher altitudes from establishing in the lower deserts. This damage is often fatal. Symptoms include very slow growth or foliage damage.

Improper irrigation especially during prolonged drought may result in trees growing poorly. In extreme cases the tree will lose foliage and appear thinly foliated. The following summer, the tree will turn brown and die. Drought impacts are evident for two to three years after the drought. Irrigation should be scheduled to reflect your weather conditions at different times of the year. You cannot simply set an irrigation controller and walk away. In years of heavy seasonal rainfall, supplemental water is not normally required. Whether you use a drip and automated irrigation system, soaker hose or conventional irrigation, be sure that the water is directed to the rootzone and just beyond the drip line. This is where the newer, active water conducting root hairs are located.

Trees that are native to the Mediterranean in particular need adequate winter moisture. During dry winters, provide supplemental irrigation for species such as Italian Stone, Eldarica and Aleppo pines. For well-established trees, water should penetrate to a depth of three feet of soil. This will create a reservoir that the tree can use for up to six weeks. A common irrigation error is to assume that watering the lawn under and around a tree is sufficient for the tree too. The grass tends to soak up all the water before it can get to the tree roots. Watering right next to the trunk does little to satisfy the tree's water requirements.

Soil conditions can impact the overall health of your tree. In addition to good drainage, other conditions may be problematic. Occasionally, species

that are not adapted to alkaline soil conditions fail to thrive, become chlorotic (yellow) and eventually die. There is no long-term solution to this problem. The addition of soil sulfur during planting will only be a temporary solution and of doubtful effectiveness. The best solution is to plant a species that tolerates high alkalinity and local soil conditions.

Planting depth may adversely affect many conifer species survival. The parts of the trunk above the soil level are not anatomically the same as those below ground. By planting too deep, the part of the trunk that is incorrectly buried is subject to soil pathogens and possible death of the tree. Insects and other living pests frequently attack a tree that is struggling to survive from either transplant shock or drought.

The below information has been excerpted from *Pines of Arizona*, authored by C. Jones and J. Kelly. The complete publication including descriptive information on 17 pine species commonly found in Arizona can be viewed at cals.arizona.edu/pubs/garden/az1584.

Sources:

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List of Common Pine Infections

INFECTION	SUSCEPTIBLE SPECIES	CONTROL	COMMENTS
Aphids	Most species	Soapy water for small plants, systemic insecticides for large trees	Watch for natural predators and parasites
Bark Beetles	Ponderosa pine Pinyon pine	Avoid drought stress	
Comandra Blister Rust	Eldarica pine Ponderosa pine	Avoid planting within one mile of Comandra	Comandra is also known as bastard toadflax
Dwarf Mistletoe	Eldarica pine Ponderosa pine	Avoid planting in areas of high mistletoe infestation	Prune out on smaller specimens
Needle Miner	Ponderosa pine Pinyon pine	Systemic insecticide, prune out infected branches	Foliar sprays and trunk implants aid in control
Pinyon Needle Scale	Pinyon pine	Systemic insecticide	Remove egg masses, timely application of insecticides, keep tree well irrigated to avoid stress
Sawflies	Ponderosa pine Pinyon pine	Broad spectrum insecticides, B.T. not effective	Natural parasites often keep populations low
Spider Mites	Most species	Keep plants dust free, broad spectrum insecticides or miticides	Do not use carbaryl (Sevin®) or malathion because they will kill natural predators
Tip Moth	Austrian pine Ponderosa pine Pinyon pine	B.T., broad spectrum insecticides	Apply when new growth is still (fuzzy) and not fully developed
Shoot moth	Ponderosa pine	B.T., broad spectrum insecticides	
White Pine Blister Rust	Limber pine Bristlecone pine Southwestern white pine	Remove wild currants (Ribes) from area	Ribes are currants and their relatives

Source: Fairweather et al 2006.