Pines of Arizona

AZ1584

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE AND LIFE SCIENCES
COOPERATIVE EXTENSION

Illustration front cover:

Common Name: Ponderosa pine
Scientific Name: *Pinus ponderosa* var. *scopulorum*

Pines of Arizona

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June 2013

This information has been reviewed by university faculty.
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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 Discussion

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 *Strobus* (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 *Strobus* subgenus, whereas earlier botanists classified pinyon pines in the subgenus *Ducampopinus.*

Climate Discussion

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 (-25º to 40º F).

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

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

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

Zone 3B: Mildest areas of intermountain climates; i.e., Tuba City (-2º to -15º F).

Zone 10: High desert areas of Arizona and New Mexico; i.e., Globe, Kingman, Bisbee (10º to -10º F).

Zone 12: Arizona's intermediate desert; i.e.,Tucson, Wickenburg, Safford (-15º to 6º F).

Zone 13: Low or subtropical desert areas; i.e., Phoenix, Yuma (19º to 13º 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. This publication is designed to 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 out grow 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 Allepo 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.

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.

Section 1. Pine trees native to Arizona

Common Name: Rocky Mountain bristlecone pine
Scientific Name: *Pinus aristata*

Description: Rocky Mountain bristlecone pine is native to Arizona and the Rocky Mountains. Its form in most landscape situations is dense and bushy with branches low to the ground. In youth it is symmetrical and narrow-crowned. Cones are purplish/brown in color, and 2½–3½ inches long or smaller with incurved bristles on the tips. The bristlecone pine makes a beautiful specimen tree for high elevation sites. See Figure 1.

Size at maturity: 20–40 feet tall and 20 feet wide.

Landscape Use: The tree is best suited to elevations above 7,000 feet, and is suitable for 10' x 10' foot cutouts. At lower elevations it may require additional care as it will not tolerate too much heat. It is a good choice for rock gardens and parkway specimens. Young specimens can be used as container plantings for many years.

Needles: Five per fascicle, dark green often with white dots of natural resin, 1½ inches long. Branches are densely foliated, resembling a "foxtail," a common nickname for this pine.

Climate: Best in Zones 1A and 2A; and possibly colder sites in Zones 2B and 3A.

Light Exposure: Full sun, afternoon shade in warmer sites.

Water Use: Moderate when young and at lower elevations, none at maturity at high elevations. During extended drought periods, water deeply.

Growth Rate: Very slow, often only a few inches per year, but will increase with irrigation. Trees are known to live longer than 2,000 years.

Cultural Requirements: Bristlecone pine is hardy in very cold sites and prefers full sun. If experimented at elevations between 5,000 and 7,000 feet, place on a northern aspect with afternoon shade. This tree species grows in most soils with good drainage, especially in rocky soils; does not tolerate heat, but is drought resistant.

Problems: Bristlecone pine may be susceptible to scale problems, as well as sensitive to automobile emissions. It is best to transplant individuals under three feet tall. It is best suited to the climatic conditions at Flagstaff and on the Mogollon Rim for landscape use.

Common Name: Rocky Mountain bristlecone pine
Scientific Name: *Pinus aristata*

Common Name: Mexican pinyon pine
Scientific Name: *Pinus cembroides*

Description: Mexican pinyon pine is native to dry hills and mesas in Southeastern Arizona, and adjacent areas in New Mexico, Texas and Mexico. The cones are colored chocolate brown with yellow blotches, and under 2 inches in length. The nuts are edible and the largest of pine nuts, up to and over ½-inch in size. See Figure 2.

Size at maturity: 15–20 feet tall and 20 feet wide.

Landscape Use: This pine can be lanky in form when young, but is more "treelike" than other pinyon pines. It appears stout with spreading branches and rounded top as it matures. Seeds crops will be popular for birds and other wildlife.

Needles: Three per fascicle, 1–2 inches long, slender, dark green.

Climate: Best in Zone 2B (-25–0 F), also 2A and 3A, and cooler sites in Zone 10; hardy and drought tolerant.

Light Exposure: Full sun.

Water Use: Moderate when young, none at maturity. During extended drought periods, water deeply.

Growth Rate: Slow, but will increase moderately with irrigation.

Cultural Requirements: Requires well drained soils. It does well in high desert soils and tolerates rocky and poor soils.

Problems: Susceptible to needle scale and occasional sawflies, as well bark beetles under stressful conditions.

Common Name: Mexican pinyon pine
Scientific Name: *Pinus cembroides*

Common Name: Pinyon pine
Scientific Name: *Pinus edulis*

Description: Pinyon pine is native to North America. It is a small tree up to 35 feet tall with a round to oval shaped crown. Young trees are usually bushy and symmetrical. Cones are reddish-brown and small (about 2 inches long). Nuts are edible. See Figure 3.

Size at maturity: 15–35 feet, 15 feet wide.

Landscape Use: This pine is a good moderate sized evergreen. If fruitful, the tree is popular for birds and other wildlife. It can be used in containers and rock gardens; and is usually suitable under power lines.

Needles: Two per fascicle, 1–1 ½ inches long.

Climate: Zones 2A, 2B, 3A and 10 (-25–10F); hardy and drought resistant.

Light Exposure: Full sun.

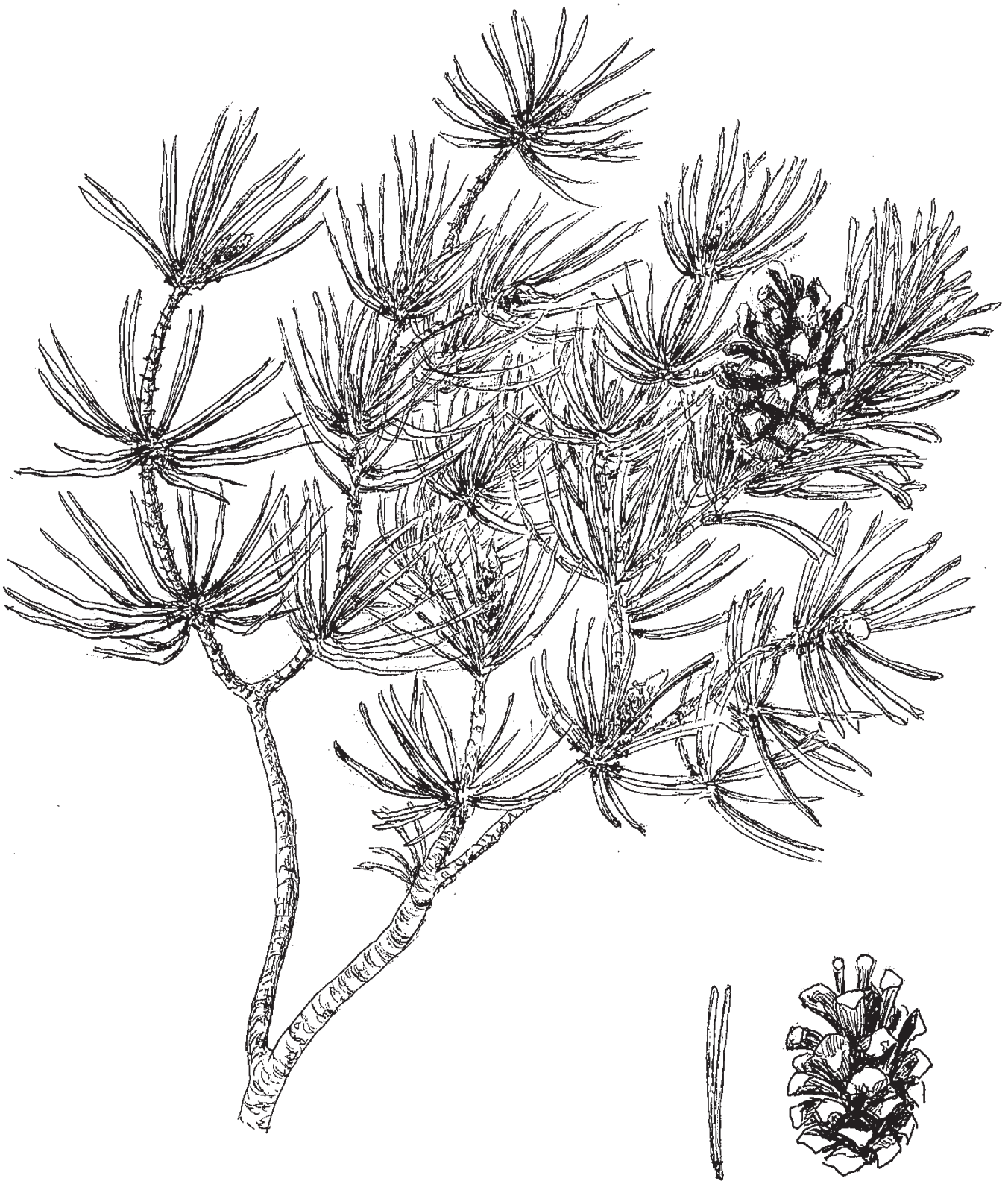
Water Use: Moderate when young, none at maturity. During extended drought periods, water deeply.

Growth Rate: Slow, but will increase moderately with irrigation.

Cultural Requirements: Prefers coarse well drained soils that are slightly alkaline. It will tolerate rocky and poor soils. Roots are extensive and shallow.

Problems: Pinyon pines can be resinous and sappy, and should not be planted near parking areas, walkways or patios. They are also susceptible to needle scale, needle miner and occasional sawflies, as well as bark beetles when under stress.

Common Name: Pinyon pine
Scientific Name: *Pinus edulis*



Common Name: Apache pine
Scientific Name: *Pinus engelmanii*

Description: Apache pine is native in Southeastern Arizona, and adjacent areas in New Mexico, and Mexico, and grows best in sandy soils. Cones are oval shaped and colored ocher red, about 5 to 7 inches long, and cone scales are tipped with small prickles. Cones grow in pairs or whorls of three to five. Bark changes from dark brown as a younger tree, to yellow and fissured when mature. See Figure 4.

Size at maturity: 50–60 feet and 20–25 ft. wide.

Landscape Use: This long needled pine resembles the southern longleaf pine. It is a well-formed pine and similar to the Ponderosa pine. It is a moderately fast growing species and prefers well drained sandy soils.

Needles: Three per fascicle, clear, glistening green, 8–15 inches long, usually 10 inches.

Climate: Best in Zones 2A and 2B (- 20 F); also 3A and cooler sites in Zone 10 with good care.

Light Exposure: Full sun.

Water Use: Moderate when young, none at maturity. During extended drought periods, water deeply.

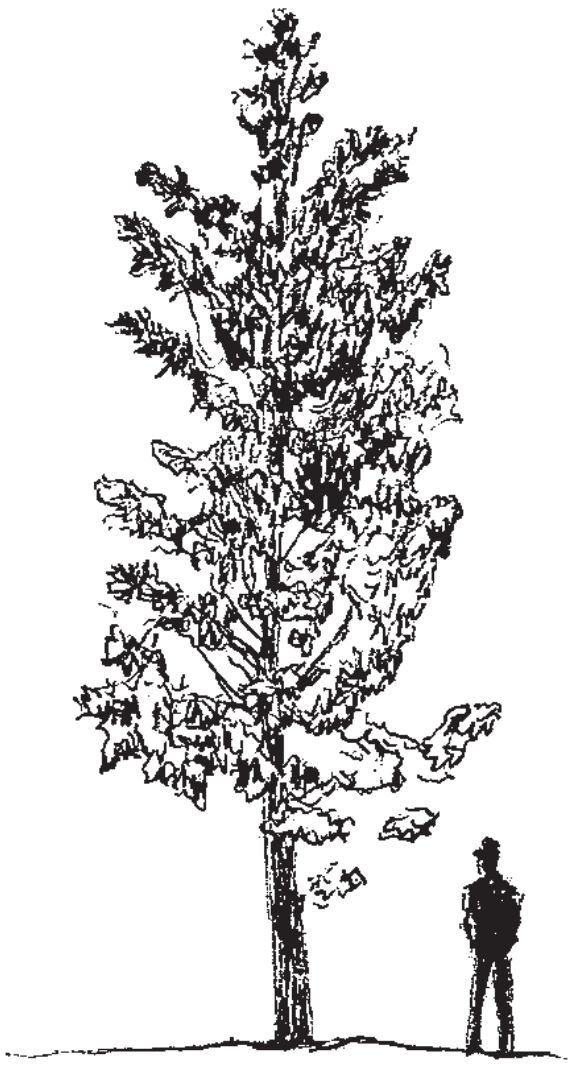
Growth Rate: Moderate.

Cultural Requirements: Apache pine does best in sandy soils with good drainage. Maintenance is low.

Problems: Dwarf mistletoe can be a problem where present and difficult to treat. Younger trees are susceptible to shoot moths. Bark beetles can be a problem, but well-watered healthy trees are fairly resistant to attack. May not be readily available at nurseries.

Common Name: Apache pine
Scientific Name: *Pinus engelmanii*

Common Name: Limber pine
Scientific Name: *Pinus flexilis*



Description: Limber pine is native to western North America, and is best suited to Arizona's high elevation areas. The needles tend to bunch at the ends of twigs. Branches are very limber and often drooping; limbs resist breakage due to wind and snowpack. The trunk is thick, and bark is dark brown to almost black. Cones are 3 to 6 inches long, light brown to yellowish brown and smooth textured. See Figure 5.

Size at maturity: 20–60 ft. and 30 ft. wide.

Landscape Use: Limber pine is recommended for park-like areas and large yards. Within its climate range, it is hardy in harsh sites and withstands extreme weather conditions, including wind, heat and cold. Young plants can be lanky. Mature trees form an open rounded top.

Needles: Five per fascicle, 2–3 inches long, bluish when young and dark green when mature.

Climate: Best in Zones 1A and 2A, also 2B and 3A (-40—10F); hardy and drought tolerant.

Light Exposure: Full sun.

Water Use: Moderate when young, none at maturity. During extended drought periods, water deeply.

Growth Rate: Slow, but will increase with irrigation.

Cultural Requirements: Tolerant of most soils, but does best in coarse and well drained soils. Limber pine does not tolerate flooding and compaction well.

Problems: Susceptible to white pine blister rust if currants or gooseberries (*Ribes*) are near.

Common Name: Limber pine
Scientific Name: *Pinus flexilis*

Common Name: Chihuahua pine
Scientific Name: *Pinus leiophylla* var. *chihauhauna*

Description: Chihuahua pine is native to southeastern Arizona and parts of New Mexico and Mexico. The cones are 1 ½ –2 ½ inches long, and light chestnut brown in color. See Figure 6.

Size at maturity: 35–50 feet tall, 20–30 feet wide.

Landscape Use: The smaller size of this tree is good for parks and moderately sized lots. Good on dry slopes and where drainage is good.

Needles: Three per fascicle, slender pale waxy green, 2–4 inches long.

Climate: Best in Zones 2A and 2B (-20–0 F); also 3A and cooler sites in Zone 10. Typically between 5,000 to 7,500 feet; hardy and drought tolerant.

Light Exposure: Full sun

Water Use: Low to moderate, none at maturity. Water deeply during periods of extended drought once a month.

Growth Rate: Moderate.

Cultural Requirements: Tolerant of most soils, but does best in coarse and well drained soils.

Problems: May be hard to find at nurseries.

Common Name: Chihuahua pine

Scientific Name: *Pinus leiophylla* var. *chihauhauna*

Common Name: One-needled pinyon pine
Scientific Name: *Pinus monophylla*

Description: One-needled pinyon pine is native to northwestern Arizona, and parts of California, Utah and Idaho. It is a smaller pine with a rounded crown. It is common in Gila County. Young trees tend to be slender, symmetrical and with a narrow crown. Cones are brown and about 2 inches long. Nuts are edible. See Figure 7.

Size at maturity: Typically 10–25 feet, 15 feet wide, but often larger in favorable native habitat.

Landscape Use: This pine is good where a small evergreen is desired, especially in dry rocky areas. The tree is popular for birds and other wildlife. It can be used in containers and rock gardens; as well as under power lines in most cases.

Needles: One per fascicle, gray-green and rigid, 1–1 ½ inches long.

Climate: Best in Zone 2B and cooler sites in Zone 10 (-25–10F), also in 2A and 3A; hardy and drought resistant.

Light Exposure: Full sun.

Water Use: Moderate when young, none at maturity. During extended drought periods, water deeply.

Growth Rate: Very slow, but will increase moderately with irrigation.

Cultural Requirements: Prefers coarse well drained soils; as well as rocky and poor soils. Roots are extensive and shallow.

Problems: Pinyon pines can be resinous and sappy, and should not be planted near parking areas, walkways or patios. They are also susceptible to needle scale, needle miner and occasional sawflies, as well as bark beetles when under stress. May be hard to find at nurseries.

Common Name: One-needled pinyon pine

Scientific Name: *Pinus monophylla*

Common Name: Ponderosa pine
Scientific Name: *Pinus ponderosa* var. *scopulorum*
Also: **Arizona pine** (common name); ***Pinus ponderosa*** var. ***arizonica*** (scientific name)

Description: Ponderosa pine is native throughout western North America. It can grow to be a very large tree, exhibiting a straight trunk and evenly distributed branches. Its form is columnar to rounded oval crown. It is bushy and attractive at all ages. Young trees have dark, almost black bark, which changes to yellowish orange, plated bark in maturity. The cone is 3–6 inches long, reddish brown, and cone scale tips are prickly sharp. See Figure 8. The Arizona pine is closely related to the Ponderosa pine and has 4-5 needles per fascicle. It is native to southeastern Arizona and parts of New Mexico, and Mexico.

Size at maturity: Up to 120 feet tall with 30 foot crown spread.

Landscape Use: Ponderosa pine is the classic large, formal accent tree for yards and parks above 5,000 feet. Allow for 30' x 30' planting areas to ensure the long life of this grand tree. On lots where Ponderosa pine is native and present, thin out smaller trees to the above specification for best results.

Needles: Three per fascicle, 3–7 inches long (and sometimes longer), glossy yellow green to dark green. The Arizona pine differs in that it has five needles per fascicle, and the cone is typically shorter as well.

Climate: Best in Zones 2A and 2B (-30–10F), also 1A and 3A, and cooler sites in Zone 10 with good care; hardy, heat and drought tolerant. Best at elevations between 5,000 to 8,000 feet.

Light Exposure: Full sun.

Water Use: Moderate when young, none at maturity. During extended drought periods, water deeply.

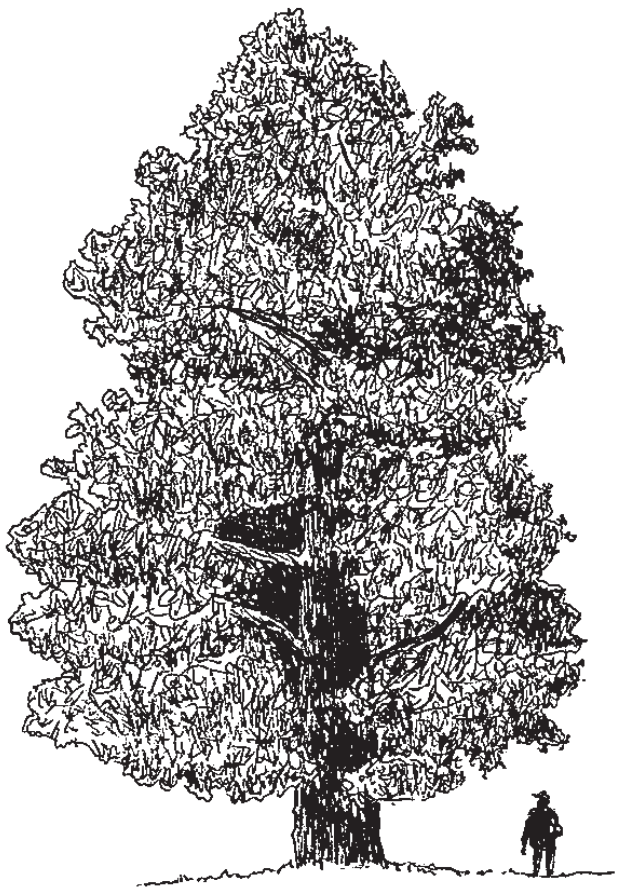
Growth Rate: Moderate to fast up to 50 feet in the first 50 years, then more slowly to 120 feet.

Cultural Requirements: This tree grows well in most soils with good drainage. It tolerates poor thin soils but will grow slowly. It does not tolerate flooding and compaction well. Select a hardy southern Rocky Mountain source for seedlings. Trees over two to three inches in diameter and larger do not transplant easily.

Problems: Dwarf mistletoe can be a problem where present and difficult to treat. Younger trees are susceptible to shoot moths. Bark beetles can be a problem, but well-watered healthy trees are resistant to attack under most conditions. Can be affected by Comandra blister rust under certain conditions (see AZ1310 publication).

Common Name: **Ponderosa pine**
Scientific Name: *Pinus ponderosa* var. *scopulorum*
Also: **Arizona pine** (common name);
Pinus ponderosa var. *arizonica* (scientific name)

Common Name: **Southwestern white pine**
Scientific Name: *Pinus strobiformis*
Also: **Mexican white pine** (common name); ***Pinus flexilis*** var. ***reflexa*** (scientific name)



Description: A variation of the limber pine, the Southwestern white pine is native to southeastern Arizona, Mexico and parts of New Mexico and Texas. The tips of the cone scales are noticeably bent back, or "reflexed." Under favorable conditions, grows straight and tall. See Figure 9.

Size at maturity: 60–100 feet, with a 30 foot crown.

Landscape Use: Southwestern white pine can be an excellent large, formal accent tree for yards and parks. Allow for 30' x 30' planting areas to ensure the long life of this tree.

Needles: Five per fascicle, pale blue-green, 3–4 inches long.

Climate: Best in Zones 1A and 2A, also in 2B and 3A; hardy and drought resistant (6,000 to 10,000 feet).

Light Exposure: Full sun and partial shade.

Water Use: Low to moderate, none at maturity. Water deeply during periods of extended drought once a month.

Growth Rate: Moderate.

Cultural Requirements: Tolerant of most soils, but does best in coarse and well drained soils. Mexican white pine does not tolerate flooding and compaction well.

Problems: Susceptible to white pine blister rust if currants (*Ribes*) are near.

Common Name: **Southwestern white pine**
Scientific Name: *Pinus strobiformis*
Also: **Mexican white pine** (common name);
Pinus flexilis var. ***reflexa*** (scientific name)

Section 2. Non-native pine trees suited to Arizona climate

Common Name: Canary Island pine
Scientific Name: *Pinus canariensis*

Description: This pine is native to the Canary Islands. The tree is typically tall and narrow with spaces between each branch whorl giving the tree a layered appearance. The tree rarely produces cones in the deserts. See Figure 10.

Size at maturity: Canary Island pine reaches a mature size of 50–70 feet and 30 feet wide, although mature size in the deserts is smaller.

Landscape Use: Canary Island pine is too large for most small scale and residential lots. It is a tall, narrow stature tree with long luxuriant needles. The overall color of the tree is medium, bright green and can be used to 'soften' large landscapes and offer a vertical design element, giving scale to tall commercial buildings.

Needles: Three per fascicle, 9–12 inches long, bluish when young and dark green when mature.

Climate: Best in Zone 13 and sites less prone to freeze in Zone 12. Sustains damage at 20ºF.

Light Exposure: Thrives in full sun but will tolerate partial shade and temporary shade when young.

Water Use: Moderate. Weekly to monthly thorough irrigation.

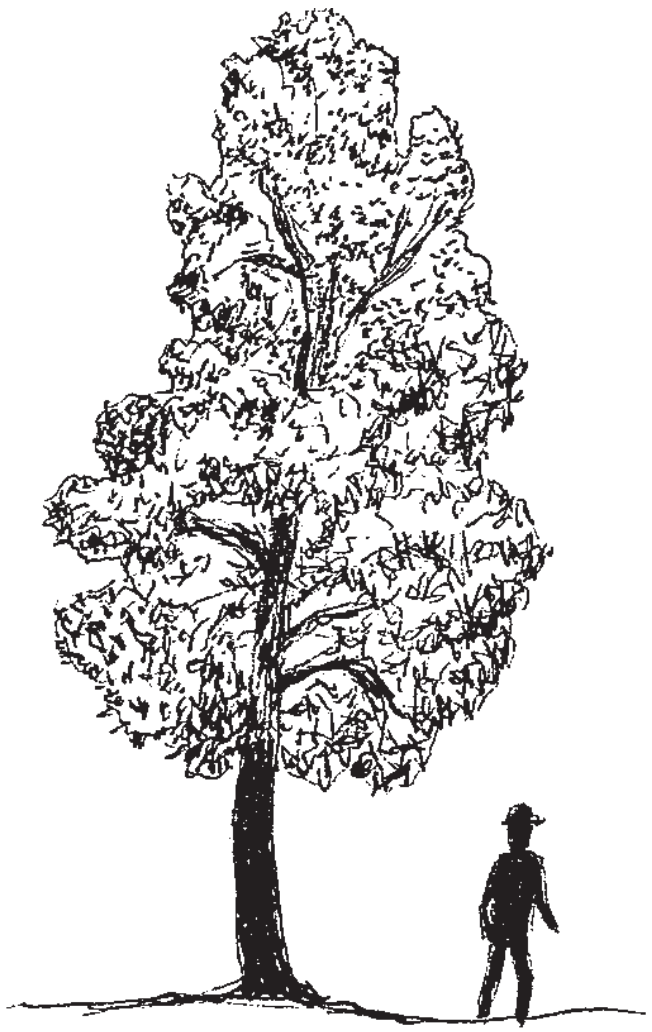
Growth Rate: Moderate to fast (3–4 ft. per year.) Tree develops its upright growth at an early age.

Cultural Requirements: Canary Island pine will grow in most soils provided that they drain rapidly. Trees may require pruning of small interior branches to define plant structure and reduce pine needle litter. Does not tolerate salty or poorly drained soils. Due to rapid growth, young trees may require staking to maintain vertical growth.

Problems: Needles remain on the tree for a year and can be unsightly. Trees are damaged by freezing weather and since the needles remain on the tree for a considerable time, it can become an aesthetic problem in freeze-prone areas. Not suited for small commercial or residential landscapes.

Common Name: Canary Island pine
Scientific Name: *Pinus canariensis*

Common Name: Afghan pine, also Quetta, Goldwater and Mondell pine
Scientific Name: *Pinus eldarica*



Description: Afghan pine is native to southern Russia, Pakistan and Afghanistan. When young, growth rate is rapid. The tree is typically symmetrical throughout life with a single straight trunk. Afghan pine cones are large (3 –5 inches long) and typically do not remain on the tree for more than one year. See Figure 11.

Size at maturity: Can reach a mature height of 30–50 feet and 20–25 feet wide.

Landscape Use: This pine is one of the more attractive, drought tolerant varieties in the low to mid-desert. It is also suited and reasonably hardy for mid to higher elevations. It is a dependable fast growing species. It provides an excellent windbreak, screen or a large specimen in public places such as golf courses, school grounds and industrial sites. Given its mature size it is not suited for many small residential lots. It is grown commercially as a Christmas tree crop.

Needles: Two per fascicle, medium to dark green, 4–6 inches long.

Climate: Zones 10, 12 and 13 (10–20F). Low desert up to and including higher elevations to 5000 ft.

Light Exposure: Full sun to part shade.

Water Use: Low to moderate (every week to once a month depending upon soil and temperatures).

Growth Rate: Moderate to fast 3–4 ft/yr. when young and slowing as the tree reaches maturity.

Cultural Requirements: Afghan pines tolerate full or reflected sun and will thrive in partial shade. They will grow in all but the heaviest wet soils. Trees do best with well drained soils. Maintenance is low.

Problems: Iron chlorosis is a problem in wet poorly drained soils. May develop Comandra blister rust and is susceptible to Texas root rot (*Phymatotrichum onmivorum*). Eldarica pines are too large for most residential lots and require adequate space to develop properly.

Common Name: Afghan pine, also Quetta, Goldwater and Mondell pine
Scientific Name: *Pinus eldarica*

Common Name: Aleppo pine
Scientific Name: *Pinus halepensis*

Description: Aleppo pine is native to the Mediterranean region. Growth rate is moderate to rapid and young trees are capable of growing 3–4 feet in one year. When young, it is an upright, irregularly shaped tree that becomes round-topped at maturity. The tree produces cones that are round or oblong, up to 3 inches long and remain on the tree for more than one year after maturing. See Figure 12.

Size at maturity: 40–60 feet tall and 20–40 feet wide.

Landscape Use: The tree is typically too large at maturity for the average sized yard. Where space is not a problem, the tree is a tough, low water use evergreen tree that does well in the low and mid-level deserts. Aleppo pine is a large scale evergreen tree that provides shade, screening and windbreaks in open areas. They make excellent park and recreation area trees.

Needles: Two per fascicle, light to medium green, 2–4 inches long.

Climate: Zones 12 and 13, and warmer sites in Zone 10 (10–20F). Low and intermediate zones (sea level –3500 ft.).

Light Exposure: Full sun.

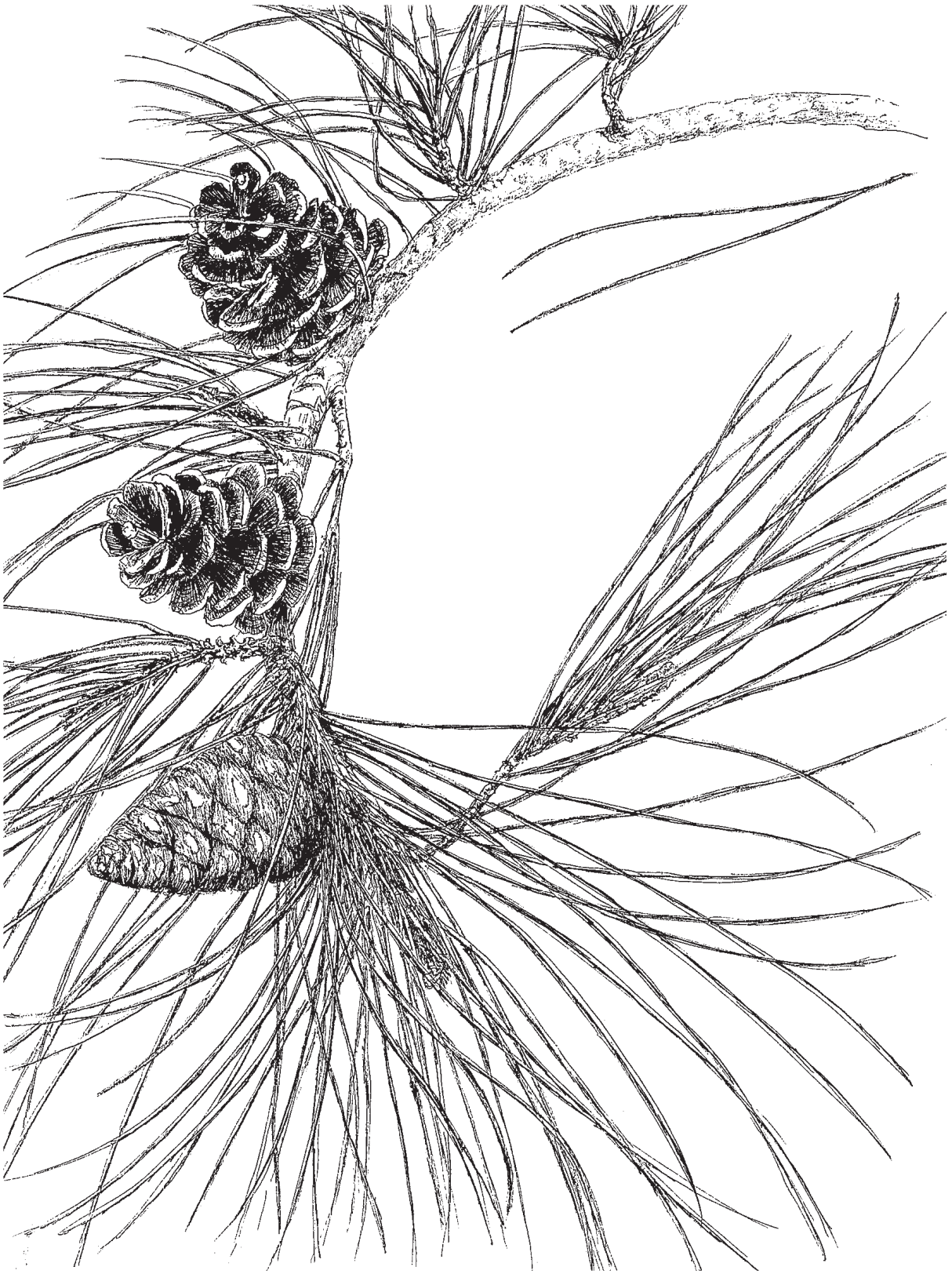
Water Use: Moderate (every two - three weeks after 2–3 years of establishment). Water monthly during droughty winters.

Growth Rate: Fast 3–4 ft/yr when young and gradually slowing to several inches per year. Trees live longer than 100 years.

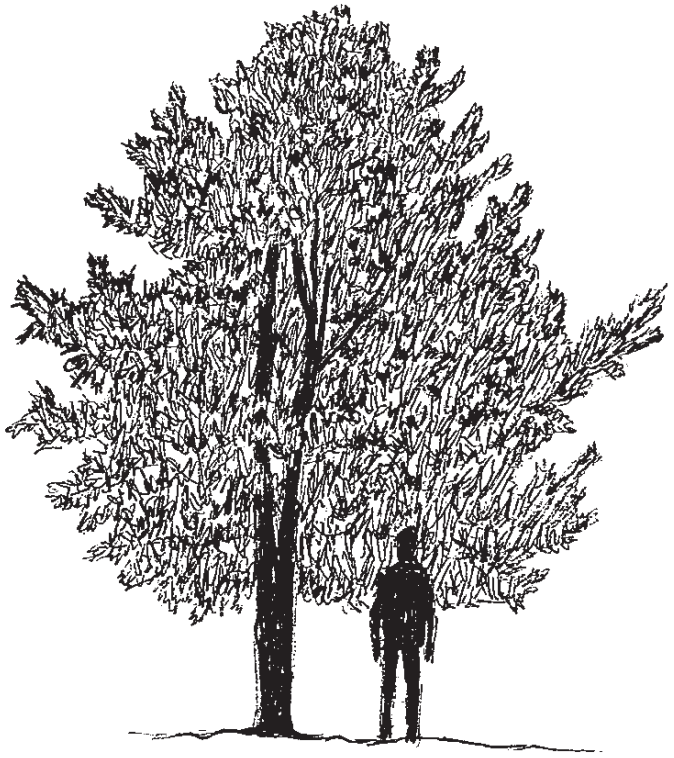
Cultural Requirements: Aleppo pines tolerate full or reflected sun and heat, will tolerate poor soils and planting in lawns. With better, deeper soils, plants are more drought resistant.

Problems: Carefully select nursery stock and check roots for binding. Aleppo pine blight causes tip browning in winter which the tree outgrows each summer. .

Common Name: Aleppo pine
Scientific Name: *Pinus halepensis*



Common Name: Austrian black pine
Scientific Name: *Pinus nigra*



Description: Austrian black pine is native to Europe and Western Europe. It forms a dense, stout pyramidal tree with a uniform crown. It develops branches in whorls and with age is broad and flat topped. Its oval cones are 3–6 inches long and brown. The trunk is straight and rough barked. See Figure 13.

Size at maturity: Up to 100 feet x 60 feet.

Landscape Use: Commonly used as windbreak tree but may be used as a landscape tree in residential areas, parks, and open areas. It is very hardy and is adaptable to cold (-20 F) and wind. Very tolerant of air pollution and limestone soils. May be used in shelter belts and in cold areas.

Needles: Two per fascicle, 3–6 inches long, stiff and dark green.

Climate: Zones 1A, 2A, 2B and 3A (-20F–30F).

Light Exposure: Full sun.

Water Use: Moderate.

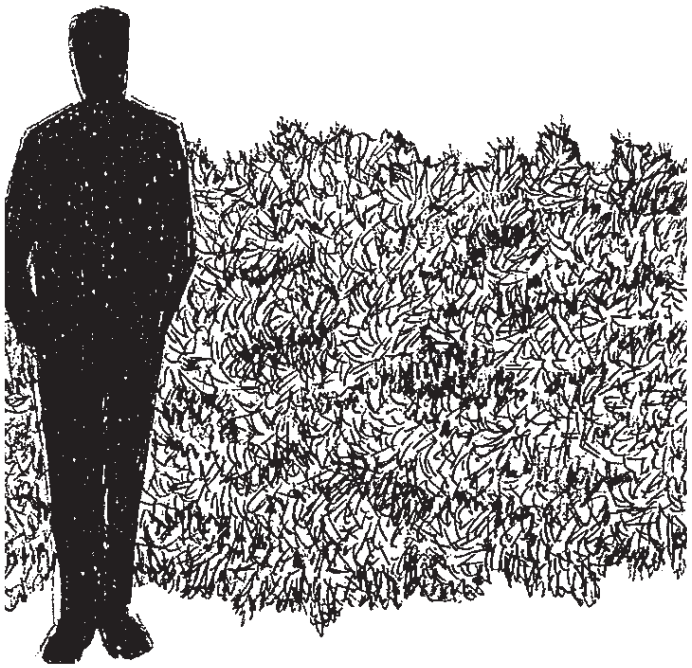
Growth Rate: Slow to moderate.

Cultural Requirements: No special requirements.

Problems: None reported; tolerant of oak root fungus.

Common Name: Austrian black pine
Scientific Name: *Pinus nigra*

Common Name: Mugo pine
Scientific Name: *Pinus mugo mugo*



Description: Mugo pine is native to the eastern Alps and the Balkan states. Its mature height and width is quite variable with plants grown from seed but selections of dwarf cultivars are available. The plants are compact full plants even when young and maintain this form throughout life. Mugo pine produces cones that are 1–2 inches long, oval and light to dark brown. See Figure 14.

Size at maturity: Height is typically less than 4 feet high and wide.

Landscape Use: Mugo pine is an excellent choice where a low, dark green, compact pine is desired. There are dwarf selections available that are excellent for shrubs, rock gardens, container plants and foundation plantings.

Needles: Two per fascicle, medium to dark green, 1½–2 inches long. The needles are a source of oil.

Climate: Zones 1A, 2A, 2B and 3A. Very cold hardy but does not tolerate desert heat.

Light Exposure: Shade to full sun. Plants will be more compact in full sun.

Water Use: Low to moderate.

Growth Rate: Slow.

Cultural Requirements: Mugo pines tolerate a wide range of climate but are not well suited to the low deserts due to their intolerance to summer heat stress. They will tolerate poor to moderately fertile soils and require good drainage to flourish.

Problems: Carefully select plants that are not root bound or dried out. Over watering will cause yellowing of the older needles and yellowing throughout the plant. Mugo pines will survive on little or no supplemental fertilizer. Aphids may be a pest in spring during the flush of new growth. Within some areas of their range shoot moths (larvae) may be a problem.

Common Name: Mugo pine
Scientific Name: *Pinus mugo mugo*

Common Name: Italian stone pine, also Umbrella pine
Scientific Name: *Pinus pinea*

Description: Italian stone pine is native to southern Europe and Turkey. Young trees are bushy, stout and globe shaped. The tree produces chestnut brown, oval cones that are 4–6 inches long and produce the edible 'pignolia' nut of southern Europe. See Figure 15.

Size at maturity: It will reach a mature height of 40–80 feet and form a flat wide crown at maturity.

Landscape Use: A large specimen at maturity which is used in large open areas such as parks, broad streets and open spaces. It is typically too large for most residential uses.

Needles: Two per fascicle, 3–7 inches long and varies in color from gray-green to bright green. Cones stay on tree for three years after pollination.

Climate: Zones 12 and 13, and warmer sites in Zone 10 (10–20F). Suited to the low and intermediate desert zones.

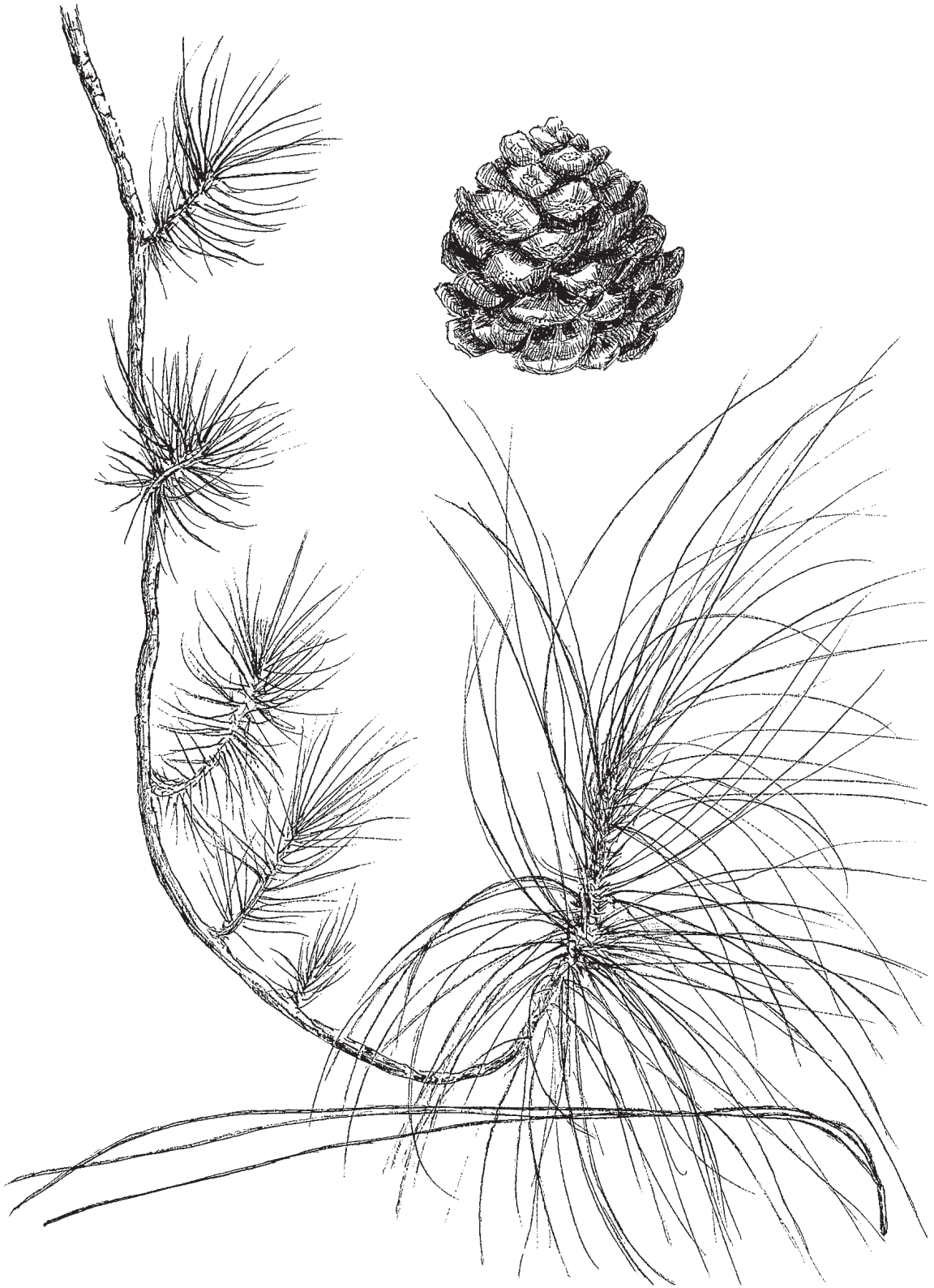
Water Use: Moderate (weekly) when young and infrequent (every one or two months) when mature and during droughty winters.

Growth Rate: Moderate to fast, up to several feet per year.

Cultural Requirements: This pine tolerates full or reflected sun. Not particular about soil but will do better on loamy landscape soils.

Problems: Mature size of the tree is not suitable for confined spaces and most residential use. Prune lower branches occasionally to have more dramatic rounded head on the tree and to control shape.

Common Name: Italian stone pine, also Umbrella pine
Scientific Name: *Pinus pinea*



Common Name: Japanese black pine
Scientific Name: *Pinus thunbergii*

Description: Japanese black pine is native to Japan. It will grow to 130 ft. in some areas of the country. Attractive when young and grows into an irregular, spreading tree when older with dark green thick foliage. Cones are borne near branch ends, brown and oval shaped, and up to 3 inches in length. Figure 16.

Size at maturity: Black pine will grow to 100 ft. in some areas of the country. It seldom exceeds 30 ft. in the low and middle deserts of the southwest.

Landscape Use: May be used as a bonsai tree when planted in the landscape or in containers. Containerized plants will be smaller and slower growing and will require more water to survive and thrive. Japanese black pine is often used as an accent in xeriscape plantings and grows well in mid to high deserts of the southwest. It can function as a small-scale tree that is very versatile. It can be used as a specimen, sheared into a formal shape, or may be used as a screen.

Needles: Two per fascicle, dark green, 3–4 ½ inches long.

Climate: Zones 2B, 3A, 10, and 12 (-10–-20 F). Mid desert (2000 ft.) to higher elevations.

Light exposure: Full sun.

Water Use: Low to moderate. Once weekly in deserts and less frequently in temperate areas. Will survive on natural rainfall in many areas.

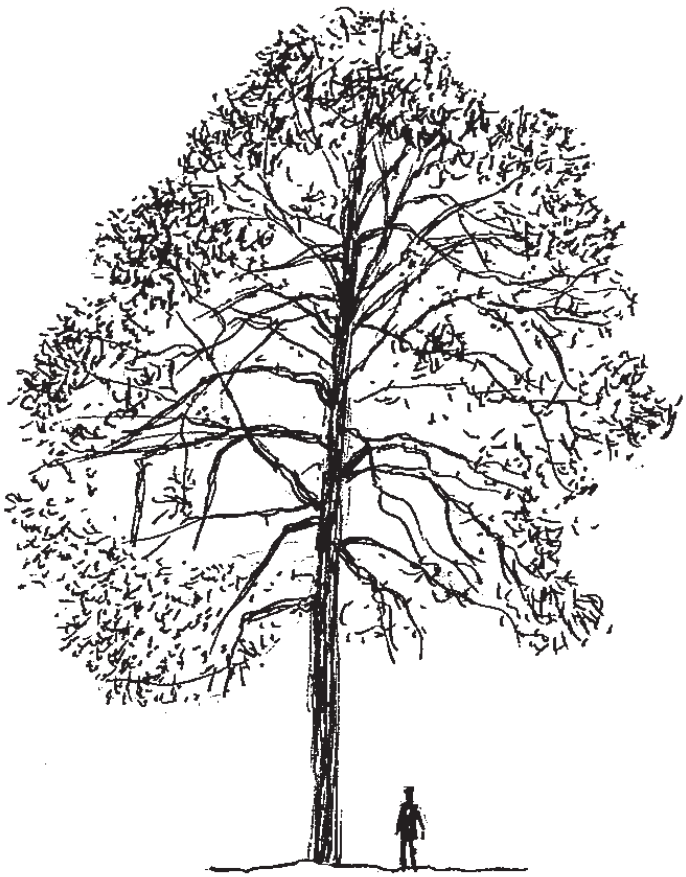
Growth Rate: Slow to moderate. Growth is more rapid in cooler temperate climates.

Cultural Requirements: Japanese black pines will tolerate full and reflected heat and will tolerate poor soils provided they are well drained. Will grow in border plantings adjacent to lawn areas, but do not do well planted directly in turf areas.

Problems: Rootbinding of containerized grown plants can be a problem. Relatively free of pests and diseases but may be attacked by aphids and spider mites. Over watered or trees in poorly drained soils will yellow. Nitrogen fertilizers may be toxic or inhibit growth.

Common Name: Japanese black pine
Scientific Name: *Pinus thunbergii*

Common Name: Chir pine, also Indian longleaf pine
Scientific Name: *Pinus roxburghii*



Description: Chir pine is a tall tree native to the Himalayan Mountains. It is pyramidal when young and develops into a round-headed tree at maturity. Growth rate is moderate and slows with age. The tree produces cones that are 4–7 in. long and are conical- ovoid shaped with cone scales reflexing at the tip. Similar to Canary Island pine (*Pinus canariensis*) in appearance. See Figure 17.

Size at maturity: It can grow to 60 or more feet and 30–40 ft. wide.

Landscape Use: A graceful, striking pine or accent plant. It is a large tree when mature and needs space to develop and reach its potential. Relatively drought tolerant and can withstand prolonged heat and dryness.

Needles: Three per fascicle, 8–12 inches long and light green in color.

Climate: Best in Zone 12, and 13 (20–30F). Will do well in warmer microclimates.

Light exposure: Full or reflected sun.

Water Use: Low to moderate. Requires watering every week or two when young in the hottest areas but will survive on monthly watering. Reduce watering to monthly when mature or desired size is achieved.

Growth Rate: Moderate to rapid growth.

Cultural Requirements: Tolerates direct or reflected sun. Will thrive on most landscape soils even in the middle deserts.

Problems: A very large mature tree. Not suited for most residential lots. Trees may be rootbound in containers. Check for root binding before planting.

Common Name: Chir pine,
also Indian longleaf pine
Scientific Name: *Pinus roxburghii*

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Jeffrey C. Silvertooth, Associate Dean & Director, Extension & Economic Development, College of Agriculture Life Sciences, The University of Arizona.

AZ1584

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