



**PORTLAND PARKS & RECREATION**

Healthy Parks, Healthy Portland



Concordia Arboretum at Meek Tech Tree Walk

**LEARNING LANDSCAPES**





## Concordia Arboretum at Meek Tech Tree Walk 2015

### Learning Landscapes

Site data collected in Summer 2014.

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**Cover photos (from top left to bottom right):**

- 1) Fruit and foliage of a *Celtis bungeana*.
- 2) The spreading canopy of a blue oak.
- 3) A pair of tall *Sequoia sempervirens*.
- 4) *Quercus tomentella* acorns.
- 5) Clustered acorns of a bur oak.
- 6) Sunlight shines through a California black oak leaf.
- 7) A winged hackberry growing in an arboretum.
- 8) The rarely-seen flowers of an *Emmenopterys henryi*.

**Photo above:**

- 1) A large canyon live oak growing in its native range.

ver. 1/28/2015

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Commissioner Amanda Fritz  
Director Mike Abbate

# The Learning Landscapes Program



## Concordia Arboretum at Meek Tech

The Concordia Arboretum at Meek Tech Learning Landscape was initiated in December 2010 with a planting of 28 trees. It showcases evergreen and deciduous oaks as well as relict, monotypic species. This tree walk identifies trees planted as part of the Learning Landscape as well as other specimens at the school.

## What is a Learning Landscape?

A Learning Landscape is a collection of trees planted and cared for at a school by students, volunteers, and Portland Parks & Recreation (PP&R) Urban Forestry staff. Learning Landscapes offer an outdoor educational experience for students, as well as environmental and aesthetic benefits to the school and surrounding neighborhood. Learning Landscapes contain diverse tree species. They are designed to teach students about biology and urban forestry issues, but can also be used to teach geography, writing, history and math, and to develop leadership skills.

## Community Involvement

Community-building is crucial to the success of Learning Landscapes. PP&R works with Urban Forestry Neighborhood Tree Stewards, teachers, parents, students, and community members to design, plant, establish and maintain these school arboreta. PP&R facilitates this collaboration by working with the school district, neighborhood, students and teachers to create landscapes that meet the need of the individual school community.

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*By involving students and neighbors in the tree planting, the community has ownership of the trees and a tangible connection to their school.*

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## Tree Planting Experience

Learning Landscapes are planted by the school's students under the mentorship of middle or high school students and volunteers. On planting day, tree planting leaders teach students the benefits of urban trees, form and function of trees, and tree planting techniques. This leadership aspect of Learning Landscapes gives older students and volunteers the opportunity to connect with their peers, build confidence, and develop public speaking skills. Involving students and neighbors in the tree planting fosters community ownership of the trees and builds a tangible connection between school and neighborhood. This helps ensure a high tree survival rate by reducing vandalism and encouraging ongoing stewardship of the school's trees.

## Continued Hands-on Learning Opportunities

Once planted, Learning Landscapes are used by teachers and parents for service and leadership projects. Students and teachers continue to build projects around the trees with opportunities to water, prune, weed and mulch. These dynamic landscapes change year after year, depending on student and teacher interests, as new trees are planted and added to the collection.

## How can I get involved?

Visit <http://www.portlandoregon.gov/parks/learninglandscapes> for volunteer opportunities, to view more maps, and to learn how to plan a Learning Landscape in your community.

# Concordia Arboretum at Meek Tech Tree Walk



Learning Landscapes

<http://portlandoregon.gov/parks/learninglandscapes>



# Concordia Arboretum at Meek Tech Tree Walk

| Tree # | Common Name                      | Scientific Name                               |
|--------|----------------------------------|---|
| 1      | Oregon white oak                 | <i>Quercus garryana</i>                       |
| 2      | willow                           | <i>Salix</i> spp.                             |
| 3      | zelkova                          | <i>Zelkova</i> spp.                           |
| 4      | Green Vase zelkova               | <i>Zelkova serrata</i><br>'Green Vase'        |
| 5      | incense cedar                    | <i>Calocedrus</i><br><i>decurrens</i>         |
| 6      | alder                            | <i>Alnus</i> spp.                             |
| 7      | strawberry tree                  | <i>Arbutus unedo</i>                          |
| 8      | black walnut                     | <i>Juglans nigra</i>                          |
| 9      | English walnut                   | <i>Juglans regia</i>                          |
| 10     | London planetree                 | <i>Platanus x</i><br><i>acerifolia</i>        |
| 11     | blue oak                         | <i>Quercus douglasii</i>                      |
| 12     | dawn redwood                     | <i>Metasequoia</i><br><i>glyptostroboides</i> |
| 13     | bald cypress                     | <i>Taxodium</i><br><i>distichum</i>           |
| 14     | umbrella pine                    | <i>Sciadopitys</i><br><i>verticillata</i>     |
| 15     | island oak                       | <i>Quercus</i><br><i>tomentella</i>           |
| 16     | emmenopterys                     | <i>Emmenopterys</i><br><i>henryi</i>          |
| 17     | ringcup oak                      | <i>Quercus glauca</i>                         |
| 18     | Chinese silver fir or<br>cathaya | <i>Cathaya</i><br><i>argyrophylla</i>         |
| 19     | interior live oak                | <i>Quercus wislizeni</i>                      |
| 20     | shingle oak                      | <i>Quercus</i><br><i>imbricaria</i>           |
| 21     | Shumard oak                      | <i>Quercus</i><br><i>shumardii</i>            |
| 22     | Buckley oak                      | <i>Quercus buckleyi</i>                       |
| 23     | Forest Green<br>Hungarian oak    | <i>Quercus frainetto</i><br>'Schmidt'         |
| 24     | winged hackberry                 | <i>Pteroceltis</i><br><i>tatarinowii</i>      |

| Tree # | Common Name              | Scientific Name                                    |
|--------|--------------------------|--|
| 25     | California black oak     | <i>Quercus kelloggii</i>                           |
| 26     | pearlbloom tree          | <i>Poliiothyrsis</i><br><i>sinensis</i>            |
| 27     | emperor or Daimyo<br>oak | <i>Quercus dentata</i>                             |
| 28     | Hubei wingnut            | <i>Pterocarya</i><br><i>hupehensis</i>             |
| 29     | canyon live oak          | <i>Quercus</i><br><i>chrysolepis</i>               |
| 30     | ginkgo                   | <i>Ginkgo biloba</i>                               |
| 31, 33 | silverleaf oak           | <i>Quercus</i><br><i>hypoleucoides</i>             |
| 32     | bur oak                  | <i>Quercus</i><br><i>macrocarpa</i>                |
| 34, 35 | umbrella pine            | <i>Sciadopitys</i><br><i>verticillata</i>          |
| 36     | Von Bunge's<br>hackberry | <i>Celtis bungeana</i>                             |
| 37, 38 | bur oak                  | <i>Quercus</i><br><i>macrocarpa</i>                |
| 39     | chestnut-leaf oak        | <i>Quercus</i><br><i>castaneifolia</i>             |
| 40     | Julian hackberry         | <i>Celtis julianae</i>                             |
| 41     | northern red oak         | <i>Quercus rubra</i>                               |
| 42     | rauli                    | <i>Nothofagus alpina</i><br>Syn. <i>N. procera</i> |
| 43     | canyon live oak          | <i>Quercus</i><br><i>chrysolepis</i>               |
| 44, 45 | incense cedar            | <i>Calocedrus</i><br><i>decurrens</i>              |
| 46     | littleleaf linden        | <i>Tilia cordata</i>                               |
| 47, 49 | Osage orange             | <i>Maclura pomifera</i><br>'Whiteshield'           |
| 48     | cherry                   | <i>Prunus</i> spp.                                 |
| 50     | bigleaf maple            | <i>Acer</i><br><i>macrophyllum</i>                 |
| 51     | grand fir                | <i>Abies grandis</i>                               |
| 52     | quaking aspen            | <i>Populus</i><br><i>tremuloides</i>               |

| Tree # | Common Name   | Scientific Name                           |
|--------|---|---|
| 53     | coast redwood                                       | <i>Sequoia sempervirens</i>               |
| 54     | southern magnolia                                   | <i>Magnolia grandiflora</i>               |
| 55     | Japanese tree lilac                                 | <i>Syringa reticulata</i>                 |
| 56     | maple   | <i>Acer</i> spp.                          |
| 57     | Oregon white oak                                    | <i>Quercus garryana</i>                   |
| 58     | Scots pine  | <i>Pinus sylvestris</i>                   |
| 59     | sweetgum or liquidamber                             | <i>Liquidambar styraciflua</i>            |
| 60     | Village Green zelkova                               | <i>Zelkova serrata</i><br>'Village Green' |
| 61     | peaches, nectarines, almonds, plums, apricots, etc. | <i>Prunus</i> spp.                        |

## Tree Facts, A to Z

### alder, *Alnus* spp.

*Origin: distributed throughout North America, Europe and Asia, with a few species in Africa and South America*

There are some 30 species of alders concentrated mainly in the northern temperate zone. Alders have alternate branching and simple, serrate leaves. With a few exceptions, they are deciduous. The flowers are catkins with elongate male catkins on the same plant as shorter female catkins, and these often appear before leaves. Members of the birch family, alders differ from birches because their woody female catkins, called strobili, do not disintegrate at maturity. In a manner similar to many conifer cones, the strobili open to release the seeds.

### bald cypress, *Taxodium distichum*

*Origin: North America - From eastern Texas to Florida, reaching north to Delaware and southern Illinois*

A deciduous conifer growing upright to 100' or more. Needles are soft, emerging light green. They are ½ "to ¾" long and turn russet-orange in autumn. Spherical

cones are about an inch in diameter. Bark on older trees is reddish-brown and fibrous. The official state tree of Louisiana, bald cypress is synonymous with the bayous. Its range, however, extends from east Texas into southern Illinois and along the eastern seaboard to Delaware, usually in swamps. Despite being able to survive in waterlogged soils, bald cypress also grow well in drier soils and makes a fine street tree. Because the wood is durable, bald cypress was heavily logged for water tanks, ships, flooring, greenhouses, shingles and laundry equipment. Before the Ice Ages, these trees were widespread across the Northern Hemisphere but died out everywhere except the eastern U.S. Bald cypress seeds are eaten by wild turkeys, wood ducks, evening grosbeaks, squirrels and some waterfowl and wading birds.

### bigleaf maple, *Acer macrophyllum*

*Origin: North America - Oregon and Washington west of the Cascades, northern California, and British Columbia, Canada*

The largest leaves of any maple are found on this Pacific Northwest native. The species name means "big leaf", which is an apt description for the 5-lobed leaves 8" to 12" across. They turn yellow to rich gold in fall. Like Norway maples, the leaf stems exude a milky sap when cut.

The greenish flowers hang in showy clusters in early spring and are insect pollinated. The tree's deep taproot helps it find water in dry summers. The tree produces prolific amounts of seed, some of which are eaten by Douglas squirrels, finches and evening grosbeaks. The many not eaten readily germinate and send up thousands of seedlings. These grow with astonishing speed, which is one reason bigleaf maple has been able to invade disturbed areas. Suppression of fire has benefitted bigleaf maples, which have encroached on formerly fire-maintained savannas at the expense of Oregon white oaks. The tree grows from southern British Columbia into northern California, from sea level to 3,000'.



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**black walnut, *Juglans nigra***

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*Origin: North America - eastern USA from southern Wisconsin south to eastern Texas and from Florida north to Pennsylvania and extreme southern Ontario in Canada*

Prized for its deep chocolate-brown wood, the black walnut's native habitat ranges from eastern to central North America. It grows up to 100' tall. The long, evenly spaced-out pinnate leaves (11–17 leaflets) are a glossy dark green above and hairy beneath and tend to incline downwards. In the autumn, leaves turn to golden yellow for 2–3 weeks before falling. Bark is dark gray-brown to blackish with narrow, rough ridges. Flowers are small, without petals and clustered in catkins. Male flowers are longer—4"—and hanging, while females are short, borne separately on the same plant. The strongly aromatic fruits are encased in a green husk up to 2" wide. The roots contain a substance called juglone, which inhibits the growth of some plants beneath the tree. Once common throughout the eastern U.S., few black walnuts remain in their native habitat unless they are on a plantation. Decline of the species may be due to the Thousand Cankers fungus which first appeared in Portland in about 2000.

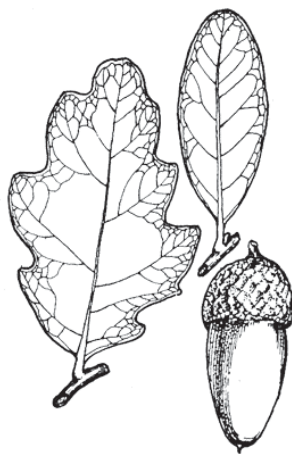
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**blue oak, *Quercus douglasii***

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*Origin: North America - California*

A semi-evergreen oak native to the Coast Range of California and the foothills of that state's Sierra Nevada. The tree typically ranges from 20' to 60' tall, although the tallest specimen on record exceeded 90'. The common name derives from the blue-gray color of the lobed leaves, which persist in mild climates but typically drop in Oregon's cold winters. The species name honors Scottish plant explorer David Douglas, who encountered the tree while botanizing in California early in the 19th century.



Acorns are eaten by a wide range of birds, deer, bear, squirrels and other small mammals. Almost every part of the tree was used by California's native peoples for firewood, bait, medicine, dyes, utensils, games, toys and construction materials. Blue oaks require full sunlight. They are extremely drought tolerant. Trees are long lived, with some specimens recorded as 500 years old.

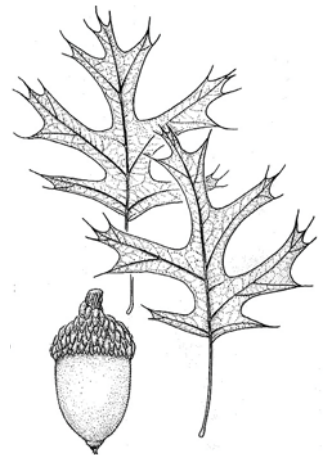
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**Buckley oak, *Quercus buckleyi***

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*Origin: North America - Texas and Oklahoma*

This southern oak has only recently been given a firm footing as its own species. A tough tree, it has lobed leaves with deep sinuses. In spring, reddish-brown catkins 1" to 3 1/2" long appear. The glossy green leaves turn a nice red in fall. The bark is usually dark gray to almost black with platelike scales, but it can just be plain gray.



Tolerant of sun and heat. Can attain 75' tall by 60' wide, but is smaller in less optimal conditions. The other name for the tree is Texas red oak, although there are other trees with red oak as part of their name. Its scientific name honors American botanist Samuel Botsford Buckley (1809-1884).

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**bur oak, *Quercus macrocarpa***

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*Origin: North America - Northernmost oak from the Canadian and U.S. prairies to New England*

This sturdy deciduous oak is often the last tree one sees before the land turns to treeless grass prairies. It is also the northernmost oak of North America, extending into Manitoba, Ontario and Quebec in Canada. Most abundant around the Great Lake states but extends into Texas and Kentucky. It is the state tree of Iowa. Bur oak has the largest leaves of any North American oak from 6-12" long and 3-6" broad at the upper half, with 5 to 7 rounded lobes. They are silvery green beneath. Yellow-green catkins are 4"

to 6" long appear in spring. Acorns are from three-quarter to 2" long and more than half surrounded by a conspicuous fringe (hence the name "bur" oak). Usually not more than 80' tall, exceptional old-growth specimens have been recorded at over 150'. A long-lived member of the white oak family, capable of exceeding 300 years. French botanist Andre Michaux (1746-1802) was the first to describe this oak in a scientific journal.

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**California black oak, *Quercus kelloggii***

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*Origin: North America – from southern Oregon through California*

Famous for being the dominant oak in the valley of Yosemite National Park, this deciduous tree can be found as far north as south-central Oregon. It occupies more land than any other California hardwood tree, and is an important lumber tree. California black oak normally grows from 30' to 80' tall but can reach 100' or more in favorable sites. Trees typically live 100 to 200 years, but some individuals are known to have attained 500 years. Acorns are more than an inch long. Dozens of bird and mammal species favor them for their nutritive value as did Native American tribes. Leaves are lobed and turn brown to gold or even orange in fall. They provide important fodder for browsing deer and livestock. Bark is grayish-brown and becomes cracked and fissured with age.



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**canyon live oak, *Quercus chrysolepis***

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*Origin: North America – Oregon into California*

Canyon live oak is native to southwest Oregon but extends all the way to Baja California and the mountains of Arizona. It is an evergreen with highly variable leaves. These can be elliptic or oblong-ovate, thick, and from 1" to 4" long. Young trees tend to have leaves with spikey edges like a holly, but older trees tend to produce fewer spikes or teeth on their leaves.. Old specimens have reached 95' but it usually

attains a mature height in the 60-80' range with an equal or larger spread.

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**cherry, *Prunus* spp.**

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*Origin: widespread across the northern temperate zone*

This tree is one of many domestic and wild cherry trees, both fruiting and ornamental, although the specific type is unknown. Trees will usually have white to pink flowers in spring (some in winter) with dark bark with horizontal lenticels when young. Leaves are often oval-lanceolate, typically with a drip tip and veined. Fruits - if produced - have hard seeds inside red to yellow or purple fruit.

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**chestnut-leaf oak, *Quercus castaneifolia***

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*Origin: Asia – Iran south of the Caspian Sea, and the Caucasus*

A broad-spreading, deciduous oak from Iran and the Caucasus capable of reaching 100' or more. Leaves resemble those of a chestnut, being toothed, narrow and from 4" to 10" long. They are glossy green above with a yellowish midrib. Fall color is bronze to yellow-brown. Dark, smooth bark over time becomes gray, with orange fissures. Acorns have a prickly covering. Trees are fast growing and long lived. The first one planted in England in 1846 is still growing steadily. The deeply rooted trees are drought tolerant once established and especially wind firm. Kew's chestnut-leaf oak survived intact a rare hurricane that struck England in 1987 and toppled tens of thousands of nearby trees.

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**Chinese silver fir or cathaya, *Cathaya argyrophylla***

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*Asia - China in just 10 stands in four provinces - Guangxi, Guizhou, Hunan and SE Sichuan*

One of the rarest of conifers, this evergreen tree is a living fossil that once grew across Asia, Europe and Canada but became restricted to China during the Ice Ages. Trees have long, straight trunks to at least 90-100'. Considered a relative of the Douglas-fir and larches. Its needles are arranged spirally around branches. Oval to elliptical seed cones emerge green before turning dark brown. Bark is dark gray with irregular flaking. First discovered by botanists in 1938, World War II interrupted further research. It



was not until 1955 that the tree was recollected and properly examined by Chinese and Soviet botanists, who recognized it as the same tree as Russian and European fossils from 10 to 30 million years ago. There may be fewer than 1,000 mature specimens in the wild. Although mostly protected in reserves, the tree has poor seed production and few surviving young saplings, making it one of the eight most endangered conifers in China. Flying squirrels and pheasants eat the seeds.

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**coast redwood, *Sequoia sempervirens***

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*Origin: North America - from Central California coast north to Curry County in SW Oregon*

Coast redwood is the tallest tree in the world, with the largest tree standing over 370' tall - that's about one-quarter the height of the Empire State Building! The red-brown bark is spongy, papery, and fire resistant. The leaves, bright green above and pale blue-green below are made up of both scales on the shoots and needles averaging 1/2" long. The brown cones are round and about 1" long; cones need fire heat to open and disperse the seeds. Sometimes the bark grows burls that can fall off and sprout into a new tree. Redwoods typically live to a ripe old age, usually 600 years or more; however, one old stump contained about 2,200 tree rings. The trees range from southwest Oregon's Curry County to the middle of the California seacoast, where the trees are able to capture coastal mist to supplement water supply. The thin needles make the tree easily stressed by drought.




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**dawn redwood, *Metasequoia glyptostroboides***

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*Origin: Asia - central China*

Dawn redwood grows to about 120' tall, smaller than both the coast redwood and giant sequoia. The deciduous stems are in an opposite branching pattern, while previous year shoots and buds are spaced spirally around the branches. New leaves (about 1" long) are lime green, turning darker green through the summer and orange in fall. The cones

(about 1" round) are green earlier in the season and turn to brown before ripening. Dawn redwood flourished in North America in the Miocene age (5 to 25 million years ago) and left a fossil record embedded in rocks across the Oregon landscape. However, the tree was thought to be extinct until a small grove was discovered in China in the 1940s. Seeds were collected and sent to arboreta around the country to reintroduce the species, and Portland's Hoyt Arboretum became the first location in North America to grow a tree to produce seeds in millions of years. Dawn redwood is Oregon's state fossil.

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**emmenopterys, *Emmenopterys henryi***

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*Origin: Asia - Vietnam and south-central China*

The only species in its genus, emmenopterys is a rare tree and becoming rarer as forests where it grows in China and Vietnam are cleared. It is one of the few temperate trees in the coffee family (Rubiaceae). It has been reported to grow to 100' in the wild and live for several centuries. The handsome leaves emerge purplish red before turning medium green. They drop in fall without significant color. The trees require cold winters followed by hot summers to flower, which is one reason it has taken decades for the right conditions to trigger bloom in trees in Europe. Emmenopterys in California have bloomed within six years of planting. The star-shaped flowers are white and quite showy. They are accompanied by an odd, white bract. The tree was introduced from China in 1907. Although hardy, it remains quite uncommon in Portland.




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**emperor or Daimyo oak, *Quercus dentata***

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*Origin: Asia - Japan, Korea, China and the Russian Far East around Khabarovsk and the Kurile Islands*

A deciduous oak capable of reaching 60' to 80' but is a slow grower and often is shorter in cultivation. Notable for having among the largest leaf of any oak - often more than a foot long and quite wide. The leaves turn brown and persist on the tree until spring.

The acorns (called *dotori* by Koreans) have long been eaten in Korea after tannins have been leached out. Bark on mature trees is thick, corky and strongly furrowed. The Chinese name is *hu shu*. In Japan the tree is called *kashiwa*.

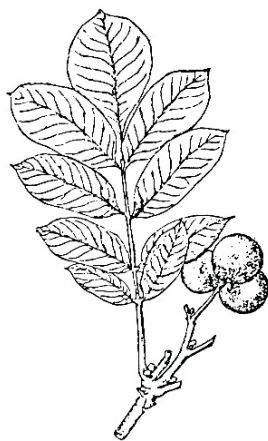
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**English walnut, *Juglans regia***

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*Origin: Asia - native from southwest China across the Himalayas and Iran to the southern Balkans; most common in Kyrgyzstan*

Grown for its nuts, wood and beauty, English walnut can reach 100' tall, although it more frequently is 50' with a comparable spread. It has compound leaves with 7–9 leaflets to 6" long, with the terminal leaflet being the largest. Leaves are smooth and aromatic when bruised. Bark is pale gray, smooth and fissured on old plants. Male and female flowers are small, without petals, and clustered in catkins. Male flowers are hanging, yellow-green catkins growing to 4" long. Female flowers are short, and are borne separately on the same plant in late spring to early summer. The fruit is a nut enclosed in a green husk to 2" long. Walnuts can be distinguished from other pinnate-leaved trees by cutting a shoot in half along its length; the pith can be seen to be divided into compartments which resemble a ladder's rungs. Despite its common name, this species, first mentioned in records from ancient Babylon, is thought to have originated near Persia and is sometimes called the Persian walnut.



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**Forest Green Hungarian oak, *Quercus frainetto* 'Schmidt'**

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*Origin: Europe - the Balkans, including Serbia, Romania, and Bulgaria, and parts of Turkey, Hungary and Italy*

This deciduous broadleaf tree is most attractive in summer when the dark green, glossy leaves create a distinctive foliage effect. Tree grows upright to 50' by 25'. Fall color is a light brown to gold. Bark on

mature trees is light gray and furrowed. Tolerates heat and drought. The tree was first scientifically described by Italian botanist Michele Tenore (1780-1861), who founded the botanic garden at the University of Naples. It has been in cultivation since 1838. Lifespan is generally 150 years but they can live to be up to 400 years old.

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**ginkgo, *Ginkgo biloba***

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*Origin: Asia - China*

Ginkgo is a pyramidal to rounded deciduous tree growing 60' to 100' tall. The bark has vertical scales, becoming deeply furrowed in maturity. The branches are alternate with leaves emerging from prominent ½" long nodes along the stem. Each node displays a whorl of approximately 5–7 fan-shaped leaves that flow upwards or towards the ground. There are separate male and female trees. The female tree produces edible fruit about ¾" long, which has been described as "nature's stink bomb," with a stench that's often compared to rancid butter, funky cheese, wet dog, or vomit due to the butyric acid in the fruit. Only one species of ginkgo tree remains in this ancient tree family that dominated forests millions of years ago. The tree was at one point thought to be extinct, and it is rumored that Chinese monks saved some of the last ginkgo trees from a large fire. Ginkgos are often planted in cities for their unique beauty and hardiness when grown in urban conditions.

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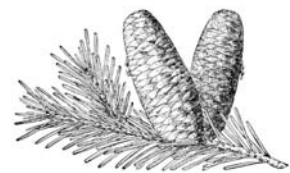
**grand fir, *Abies grandis***

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*Origin: North America - Oregon, Washington, Idaho, northern California, western Montana and British Columbia, Canada*

Grand fir is abundant in moist forests in both coastal lowlands and mountains up to 5,500 feet. Grand firs have stiff, horizontal branches in whorls from a straight

central leader growing 100' to 150' or higher (more than 200' in Olympic National Park). Unlike other conifers, grand firs can develop twin new leaders if the top dies. Gray or reddish-brown bark is furrowed and divided into narrow, flat plates. Cones are 4" long, green to reddish and covered with smooth scales,



sitting upright on the branches. The soft, white wood is pulped to make high-quality paper. Native Americans along the Columbia used the flat branches for bedding and floor mats. A brown dye from the bark was used in making baskets by the Straits Salish tribe.

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**Green Vase zelkova, *Zelkova serrata* 'Green Vase'**

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*Origin: Asia - Japan, Korea, China, Kuril Island of Russia*

The most common species of zelkova in Portland is Japanese zelkova, *Z. serrata*. It has simple, serrated leaves that are tapered at the tips. The small flowers are greenish and lack petals. The female flowers are borne in the leaf axils while the male flowers cluster at the base of the shoots. Green Vase is a cultivar of *Zelkova serrata* introduced by Princeton Nurseries in 1983 because of its resistance to Dutch elm disease, good red fall color and improved winter hardiness. While resistant, it is not immune to Dutch elm disease. Green Vase can grow 60-80' tall with a 40-50' spread. As the name suggests, the shape is upright and then spreading. Rapid growth in both height and girth. Slightly toothed oblong-elliptic leaves are up to 4" long. Wingless drupes ripen in fall but are inconspicuous. Prefers rich, moist loams. Some young Green Vase zelkovas have been subject to a strange bark-splitting issue, which can be fatal.

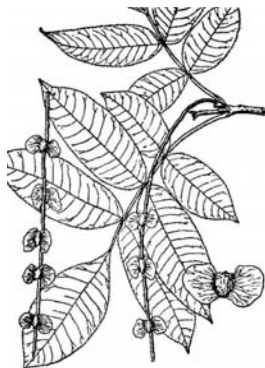
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**Hubei wingnut, *Pterocarya hupehensis***

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*Origin: Asia - China*

Hubei wingnut is a deciduous shade tree that can reach 65' in its native China. Pinnate leaves have rounded ends. Inconspicuous male and female flowers in late spring are followed in late summer and fall by chains of winged nutlets 13" to 20" long that give the tree its name. Fall color is a pale yellow. Native to moist forests and streambanks in central China at elevations between 2,300' and 6,600'. The tree's name in Mandarin is *bu bei feng yang*. It is cut down for timber in its homeland. First scientifically described in 1899 by botanist Sidney Alfred Skan (1870-1939).



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**incense cedar, *Calocedrus decurrens***

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*Origin: North America - from Oregon south into California and northern Baja California in Mexico.*

Evergreen conifer with single straight trunk and capable of reaching 185'. Usually densely branched, columnar in form (broader in nature but with narrow forms common). The needles are held in flattened sprays. Golden-yellow pollen is shed in winter and early spring. Oblong cones have three alternating pairs of scales with a bump just below the tip. Bark is smooth on young trees but becomes fibrous and reddish-brown with age. Highly decay-resistant wood is light, soft and fragrant, giving rise to the tree's common name in English. Primarily used to make pencils but also used in the Far West to make fenceposts or shingles. Trees can live 350 to 500 years. Only two other species in *Calocedrus* are known - both in Asia.

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**interior live oak, *Quercus wislizeni***

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*Origin: North America - California on upland slopes below 5,000' and in the Mexican state of Baja California*

An evergreen oak native to California and noted for its drought and heat tolerance. Can reach 70' but is usually shorter. Often as broad as they are tall and densely branched. Leaves are leathery, elliptical, and up to 3 inches long. They can be smooth, toothed or spiny like a holly. On young trees, bark is smooth and light gray, becoming fissured and darker with age. Narrow acorns are cone-shaped and 3/4 to 1 1/2 inches long. They sit deeply in their cup and take up to two years to ripen. Many birds and animals eat the acorns and shelter in this tree. The trees survive in areas receiving as little as 15" of rain annually or up to 50".



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**island oak, *Quercus tomentella***

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*Origin: North America - Channel Islands off California and Mexico's Guadalupe Island*

A fast-growing evergreen oak reaching 35-55' in height. Young trees have smooth gray bark that ages to a furrowed brown. Island oak is generally upright and conical in its youth and broadens to a pyramidal



crown with age. It has leathery 2-4" oval leaves, that are dark green on top and gray-green with tan hairs below, although they become less woolly with age. Leaves are often concave and margins can be smooth or have sharp, widely-spaced teeth. The acorn grows singly or in pairs, and the cup has thick scales and woolly hairs. In its native range, it typically grows in the lower portions of steep canyons and occasionally along the upper ridges to 2,100' in elevation. It is considered a relic population that originally had a wider range on the West Coast.

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### Japanese tree lilac, *Syringa reticulata*

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*Origin: Asia - this species is endemic to northern Japan, mainly on Hokkaido, as well as Korea, northeast China and far eastern Russia*

A species widespread across northeast Asia (Korea, far eastern Russia and Japan). Most commonly seen in Portland is the cultivar 'Ivory Silk,' which has cream-colored flowers blooming in large plumes somewhat later in May than the species. Flowers fade to brown but persist on the tree, marring the display of the later flowers. Blooms best in full sun and when spent flowers are pruned before the tree puts its energy into forming seeds. Leaves are dark green and ovate to elliptic, 5" long. Leaf margins are smooth. Usually little to no fall color. Smooth, gray-brown bark when young with horizontal lenticels reminiscent of cherry trees. Forms a tree 20' tall by 15' wide. Tolerant of clay soil but subject to a number of leaf-damaging diseases. The Japanese call this tree *hashidoi*. The Chinese name is *bao ma ding xiang*.

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### Julian hackberry, *Celtis julianae*

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*Origin: Asia - China*

This rare Chinese hackberry is a deciduous shade tree which can reach 60' to 90'. It is found in forested valleys and slopes at elevations from 1,000' to 4,500' across a wide swathe of southern and central China. The dark green leaves are minutely toothed along the edges and elliptic to ovately shaped.



Brownish-yellow flowers are not showy. The small drupes are a yellow-orange color. The tree tolerates full sun and wind and grows rapidly, doing better in Portland than hackberry species from the eastern U.S.

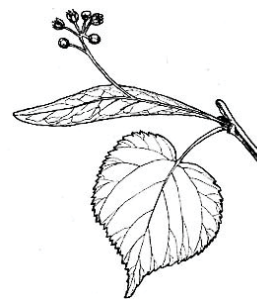
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### littleleaf linden, *Tilia cordata*

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*Origin: Europe - from England east to Russia, Ukraine and Crimea, and south from Scandinavia to northern Spain, Italy, Turkey, and the Caucasus (Georgia, Armenia, Azerbaijan)*

Littleleaf linden is an alternately-branched deciduous tree growing up to 100' tall. The gray bark becomes fissured as the tree ages. The heart-shaped leaves are about 3" around and wavy with little hairs along the surface, especially underneath where the leaf veins join. A cluster of flowers and fruit hang down from a stem connected to a long, whitish-green bract. Littleleaf linden is native to many countries across Europe and Russia. Lindens have profuse sweet-smelling flowers in early summer that attract lots of bees; the bees can sometimes be heard buzzing. The littleleaf linden has been highly regarded in England as an indicator of an ancient forest. If the trees are cut to the stump, they often regrow larger than the previous trunk. Some people estimate the oldest root stock to be over 2,000 years old. The light-weight wood is especially sought after for making window blinds. Trees are called *winterlinde* in German and small-leaf lime in the United Kingdom.




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### London planetree, *Platanus x acerifolia*

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*Origin: Europe - a hybrid between the North American Platanus occidentalis and European Platanus orientalis*

London planetree is a deciduous tree growing to 115' tall. The bark peels back in plates, revealing light gray, yellow, and even orange hues of underlying bark. Shedding bark is a way for the tree to shed pollutants and breathe with new bark again. Older trees develop bumps that make the bark look like dripping candle wax. The thick leaves (about 5-8" long) are fuzzy beneath when young and have a similar shape as maple leaves. There are three to five main lobes radiating out

from the center of the stem. The edges of leaves are toothed, tapered, and pointy. The spiky round fruits (about 1" diameter) are also unique, spaced out along a stem like beads on a necklace. London planetree may be the most popular urban street and park tree planted across the United States and Europe. Tree populations that are clones tend to become diseased easily. London planetree also grows quickly and has been grown for timber, especially for a particular expensive type of wood called lacewood.

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**maple, *Acer* spp.**

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*Origin: found across Europe, northern Africa and North America, with most species concentrated in Asia*

There are many species of maples and interspecific hybrids, as well as a dizzying array of cultivars. This tree is identifiable in the *Acer* genus but it is uncertain which species it is. Maples were once placed in their own family, Aceraceae, but botanists have reclassified them into the soapberry family, Sapindaceae, along with horsechestnuts and goldenrain trees. All maples are subject to a disease called verticillium wilt. Where trees have died of this disease maples should not be planted.

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**northern red oak, *Quercus rubra***

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*Origin: North America - eastern Canada and eastern USA from the eastern edge of the Great Plains east to the Atlantic and south to Alabama, Georgia and Arkansas*

Northern red oaks are a tall (up to 150') tree native to eastern North America. Their bark has narrow fissures. The branches and canopy often begin high up on the tree, making it easy to walk beneath them. The branch arrangement is alternate. The leaves (up to 8" long) are thick and waxy. They are light lime green in spring, turning dark green in summer, and gold to crimson red in fall. Each leaf is deeply lobed, with each lobe ending in a fine, almost prickly point. The acorns are round and robust with a thin cap. The acorns, which take two years to mature, are an important food source for wildlife, especially



squirrels that like to bury and store acorns in the fall. The wood is fast growing and hardy, and is used in cabinetry, furniture and flooring. Northern red oak is often planted in parks and urban areas as a large shade tree. It is the state tree of New Jersey and the provincial tree of Canada's Prince Edward Island.

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**Oregon white oak, *Quercus garryana***

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*Origin: North America - southern British Columbia, Canada through Washington and Oregon west of the Cascades and northern California*

Oregon white oak is a deciduous tree growing up to 90' tall. Branches are dense and wide, with limbs of solitary trees reaching to the ground. The leaves (3-6" long) are thick and shiny with rounded lobes. A distinguishing feature is the presence of galls on the underside of leaves or small twigs. The galls are the home of little wasps that lay their eggs inside oak leaves. The fruit of the Oregon white oak is an acorn about 1" long that protrudes from a narrow cap. These trees prefer open grassland habitats where they cannot be shaded out by other species. Oregon white oak was once one of the predominant trees in the Willamette Valley, but has declined to only 1% of its original range due to land development for farms and cities, and a reduction in wildfires. The tree's nickname, Garry oak, is after Nicholas Garry, the secretary of Hudson's Bay Company who helped botanist David Douglas.




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**Osage orange, *Maclura pomifera* 'Whiteshield'**

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*Origin: North America - Small range in NE Texas, SW Arkansas and south Oklahoma*

Female Osage orange trees produce cannonball-sized fruits, and both sexes have thorns. A thornless male tree was discovered in Oklahoma and propagated by Sunshine Nursery, which introduced it to the market under the cultivar name Whiteshield. White Shield was a chief of the native Cheyenne people. The tree grows quickly to 40' to 60'. Dark, glossy green leaves turn yellow in fall. Small flowers are wind

pollinated. The dense wood is hard and resists both storm damage and decay. It was much sought after by native peoples for their bows, hence the name French fur trappers gave it - *bois d'arc*, which translates to bowwood, its other common English name. A tough tree, Osage orange tolerates air pollution, poor soils, wind, heat, drought and cold winters. Before barbed wire it was widely planted as an impenetrable hedge around fields. During the Dustbowl drought, it was planted to reduce erosion in the prairie states.

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**peaches, nectarines, almonds, plums, apricots, etc., *Prunus* spp.**

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*Origin: Asia - thousands of years of cultivation have obscured origins but China, Iran and Afghanistan are cited as the native homelands of many fruit trees in Prunus.*

The non-cherry cultivated fruit members of the genus *Prunus* are small trees with insect-pollinated white or pink flowers in spring and fruits with hard stones.

Peaches and nectarines are both *P. persica*, *P. dulcis* is the edible almond, and *P. triloba* var. *multiplex* is the flowering almond. Plums are *P. domestica* with others like the Italian plum, *P. cocomilia*. Apricots are *P. armeniaca* with other apricots like *P. mume* (Japanese apricot) and *P. sibirica* (Siberian apricot).




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**pearlbloom tree, *Poliothyrsis sinensis***

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*Origin: Asia - central China*

This rare deciduous broadleaf tree is especially handsome in spring when its large, heart-shaped leaves emerge in a reddish-purple hue before turning green. In summer (July-August), their cream-colored, lightly scented flowers appear in clusters on the current year's growth. They are followed by dry, light brown capsules containing the seeds. Fall color is a subdued yellow or yellowish-green. Rapid grower if given good soil, ample summer water and full sun. The tree was first scientifically described by British botanist Daniel Oliver (1830-1916). Pearlbloom was first introduced to the United States from China by English plant collector Ernest Wilson in 1908

but never made its way into commercial nursery production. It was recollected in 1981 by the Sino-American Botanical Expedition, and trees grown from seeds collected on that expedition have done well in colder parts of the United States, assuring us that the tree is perfectly hardy in Portland.

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**quaking aspen, *Populus tremuloides***

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*Origin: North America*

Quaking aspen is a slender, alternate-branching tree averaging 60' high. The gray to white bark looks similar to birch bark, with horizontal lines (lenticels) and eye-shaped knots. The deciduous leaves are 2-3" long and 2" across, dark green, and pale green underneath. There are several large teeth on the rounded edges, ranging from 1/16- 1/4" deep. The flowers and fruits emerge from the end of stems, in a long hanging structure called a catkin. In its natural habitat, quaking aspen grows in large thickets as hundreds of tree stems containing the same genetic code are linked through the root system. Root systems can be hundreds of years old. Often the first tree to colonize after disturbance, the leaves shake in the wind—an adaptation thought to allow wind to pass through the trees without knocking them over. Utah named this tree its state tree in 2014, displacing the Colorado blue spruce, which had been Utah's state tree since 1933.




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**rauli, *Nothofagus alpina* Syn. *N. procera***

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*Origin: South America - Chile and the Andes in Argentina*

A deciduous broadleaf South American tree that is perfectly hardy in Oregon. A distant relative of the beeches, oaks, and chestnuts, rauli occurs in the foothills of the Andes in temperate parts of Chile and Argentina. Fast growth to 60-100'. With their veination, the light-green leaves resemble a hornbeam. They have variable fall color - from gold to good shades of orange or red. Nutlets are small, hairy and resemble those of beech. Bark is gray. The fine-grained pinkish wood is highly valued for wine barrels, flooring, veneers, furniture and shingles. In the 20th century the tree was introduced to the British Isles for



timber. Rauli is the Mapuche people of Chile's name for this species. The tree was first described as a beech (*Fagus alpina*) by German botanist Eduard Friedrich Poeppig (1798-1868), who studied plants in Chile between 1826 and 1832. Danish botanist Anders Sandoe Oersted bestowed the valid name of *N. alpina*. A later synonym, *N. procera*, is not valid.

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### ringcup oak, *Quercus glauca*

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*Origin: Asia - China, Japan, the Himalayas*

Growing 20' to 50' tall and 10' to 25' wide, this little broadleaf is also evergreen. New leaves emerge with an attractive purplish tinge in spring. Cold hardy once established. Smooth gray bark when young matures to a black-brown color, rough with fissures. Yellowish-green catkins appear in spring. Pollen is spread on the wind as with other oaks. Acorns are 3/4" long with a covering extending 1/3 of the way up the acorn. The tree was first scientifically described in 1784 by Swedish botanist Carl Peter Thunberg. The Chinese name for the tree is *qing gang*.



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### Scots pine, *Pinus sylvestris*

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*Origin: Europe - from Scotland across northern Europe, Russia and Siberia to the Pacific*

Scots pine is a broadly spreading evergreen growing to 115' or more by 30' wide. Needles are blue-green to blue-gray, stout, twisted and up to 3" long in pairs. The bark is purple-gray, peeling in irregular plates, orange and flaking towards the top of the tree. Flowers grow in separate clusters on young shoots in late spring to early summer. Yellow male flowers develop at the base of the shoots, and red female flowers develop at the tips. The cones are egg-shaped, growing to 3" long. Scots Pine is among the most common urban evergreens throughout much of North America. This species was introduced for its



hardiness and good looks. Older trees are ruggedly picturesque. They are grown as tidy Christmas trees, representing about a third of sales. Scots pines are the world's most widely naturally distributed pines, stretching across 145 degrees of longitude. They thrive in a variety of conditions, including dry sandy sites and wet, acidic soils. A number of pests attack pine trees.

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### shingle oak, *Quercus imbricaria*

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*Origin: North America - from eastern Kansas east to the upper Midwest and Pennsylvania, and south to Appalachia and northern Arkansas*

Although an oak, this deciduous tree has unlobed, lanceolate leaves 4" to 6" long with smooth margins. They are glossy green in



summer with a yellow mid-rib, turning a dull red to reddish-brown in fall. The dark, chestnut-brown acorns occur singly or in pairs on stout stems about half an inch long. These acorns are round. One-third of the acorn is enclosed by the cup. On young trees, stems and branches the bark is light brown and smooth. On older trunks it is thick, and divided by irregular shallow fissures with low, broad ridges. Usually grows 50-60' but on the most favorable sites can attain 90'. Branches tend to droop. Overall form is pyramidal when young, spreading out with age to make an upright, rounded tree. The wood is used for shingles and railway ties. In cultivation since 1724. First scientifically described by French botanist Andre Michaux (1746-1802), who hunted new trees extensively in the forests of the young United States in the late 1780s and 1790s.

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### Shumard oak, *Quercus shumardii*

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*Origin: North America - the Carolinas west to Texas and north to Kansas, Missouri and Indiana*

A rounded deciduous tree 80' by 60' wide. Upright, rounded form. Deeply lobed leaves are dark green. They are 4 to 8 inches long with 5 to 9 lobes. Noted for its crimson red fall color. Trunks are usually straight. Young trees have smooth gray bark, developing furrows and ridges with age. Acorns are up to an inch long. Only introduced to cultivation

in 1907. First scientifically described by American botanist Samuel Botsford Buckley (1809-1884). Buckley botanically explored much of the American Southwest, describing many plants new to science.

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**silverleaf oak, *Quercus hypoleucoides***

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*Origin: North America –Chihuahua and Sonora in Mexico to Arizona, New Mexico and west Texas*

Evergreen oak typically growing to 30' but on good soils can reach 50-60'. The tree's lance-shaped leaves are dark gray above and silver underneath. Male flowers are 4-5" long catkins appearing in spring. Female flowers are stemless or short-stalked. Acorns are ½ to 2/3 of an inch long, with the bottom third covered in a scaly cup. The smooth bark of young trees becomes deeply furrowed and cracked into black or dark gray plates. The trees have strong central leaders and round, dense foliage. They grow at elevations from 5,000' to 7,000' in northern Mexico's Sonora and Chihuahua states, and across the border in the mountains of New Mexico, Arizona and West Texas. A promising street tree for its drought tolerance and rapid growth.

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**Southern magnolia, *Magnolia grandiflora***

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*Origin: North America – from eastern Texas across the coastal southern states to North Carolina*

Southern magnolia grows to about 80' tall. The leaves have a dark green waxy surface and a fuzzy red-brown underside. This species is native to the southeastern United States and has been cultivated as an urban or yard tree for 250 years. The oldest specimen in Portland was planted in the 1890s on SW 2nd Ave. Flowers don't appear until the tree is at least twenty years old. However, some would say the flowers are worth waiting for. Each milky white and strongly fragrant flower can be up to a foot in diameter, which some people have said is akin to the size of a dinner plate. The large petals fall off leaving a large green fruit (up to 4" long) which some people say looks like a pickle. In the southern United States, evergreen magnolias have been planted in hurricane



regions because of their wind-resistance.

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**strawberry tree, *Arbutus unedo***

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*Origin: Europe – Ireland, Iberia, France, Italy to the Balkans, Greece and North Africa*

A shorter relative of our native madrone, the strawberry tree of Europe matures at about 20-25'. Both it and madrone are broadleaf evergreens in the same family as rhododendrons. Both have bell-shaped white flowers in large clusters that bloom in fall and winter. The bark of strawberry tree is gray-brown and does not peel like madrone. Strawberry trees also have slightly larger fruits than madrone. These emerge green before turning orange and red when fully ripe, usually in fall. Insipid when fresh, they are readily eaten by birds. The fruit is used to make a variety of jams, foods and liqueurs in Europe. In Spain, Madrid's coat of arms features a bear eating the fruit of this tree. This tree was among the exotics Thomas Jefferson planted at his Monticello estate. Usually lives 60 to 90 years.

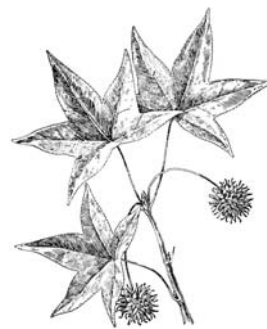
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**sweetgum or liquidamber, *Liquidambar styraciflua***

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*Origin: North America – eastern USA from eastern Texas and Oklahoma across the Southern states to Long Island, New York and west across southern Ohio, Indiana, Illinois and southeast Missouri*

Sweetgum is an oval-shaped deciduous tree reaching 100' or taller at maturity. The bark is brown gray and vertically fissured with age. Branches on trees can develop winged-cork along the sides. The star-shaped leaves consist of five distinct lobes all coming to points. Leaves are sometimes confused with maple leaves, but leaf arrangement is alternate and not opposite like maples. Leaves turn bright yellow to burgundy in autumn and persist into early winter, making this a popular street tree. The female fruits are spiky, spherical balls about 1" in diameter ("gumballs"). The name sweetgum comes from the sticky sap resin that was used in ointments and syrups or for treating skin wounds. Sweetgum is an aggressive surface rooter. Because it so often damages sidewalks and streets, it is no longer



recommended as a street tree in Portland.

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### umbrella pine, *Sciadopitys verticillata*

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*Origin: Asia – A relict species restricted to the islands of Honshu and Kyushu in Japan.*

An evergreen conifer with distinctive dark green needles in whorls from the main trunk and branches. Slowly grows 30' to 40' (in the wild they can reach up to 120'). Needles can turn bronze in winter, although they remain dark green in the cultivar 'Wintergreen.'



Fossil cones, needles and pollen of *Sciadopitys* dating back more than 200 million years have been found. Studies have shown that much of the amber around the Baltic was from resin flowing from umbrella pines millions of years ago. Over time, umbrella pine became extinct in Europe and elsewhere, becoming restricted to Japan. There it is found in moist mixed forests, most abundantly in the mountains of central Honshu. The tree is considered near-threatened due to forests where it occurs being replanted to monocultures of Japanese cedar. Long cultivated in Japan where it is called *koyama*. The white wood is durable, water resistant, fragrant and often used to make serving vessels. Umbrella pine was introduced to the West in 1860.

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### Village Green zelkova, *Zelkova serrata* 'Village Green'

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*Origin: Asia - Japan, Korea, China, Kuril Island of Russia*

The most common species of zelkova in Portland is Japanese zelkova - *Z. serrata*. All have simple, serrated-edged leaves with tapered tips. The tree is vase-shaped and has a dense, oval head. The small flowers of all zelkovas are greenish and lack petals. The female flowers are borne in the leaf axils while the male flowers cluster at the base of the shoots. Village Green is a shorter, broader cultivar than Green Vase, reaching a maximum height of around 40-60' with a 30-50' spread. Princeton Nursery patented the tree in 1964 and introduced it to commercial nurseries as a street tree with resistance to Dutch elm disease

and elm leaf beetle, and rusty red to orange fall color. Spring flowers aren't showy. Wingless drupes ripen in fall but are inconspicuous. Bark is smooth when young but flakes as the tree ages to reveal jigsaw puzzle patterns of orange-brown inner bark. Rapid growth in both height and caliper.

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### Von Bunge's hackberry, *Celtis bungeana*

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*Origin: Asia – China and Korea*

A deciduous hackberry widespread across China and into Korea but rarely seen in the United States. Von Bunge's hackberry grows 30-35'. It grows naturally at elevations from 300' to 7,000'. The dark-green leaves are thick, ovate to narrowly ovate or oblong in shape, and have a slightly papery texture. Fall color is absent. Bark is smooth and gray. The small globe-shaped drupes are blackish-blue when ripe and attract birds. Tolerant of sun and wind.

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### willow, *Salix* spp.

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*Origin: found primarily on moist soils in cold and temperate zones of the Northern Hemisphere*

Willows are a widespread genus of mainly deciduous broadleaf trees. Willows are wind-pollinated and have fuzzy catkins in early spring. The most common planted willow – the weeping willow – is of hybrid origin from somewhere in Asia. It is distinguished by its long, weeping golden twigs and narrow leaves. Oregon has numerous native willow. Most of these are short lived, shrubby and seldom planted outside natural areas. Some can get to be 20-40 foot trees. Among these are the most widespread Northwest willow, the Scouler willow (*S. scouleriana*); Hooker willow (*S. hookerianum*), often distinguished because it lacks the stipules of other Northwest willows; and Pacific black willow (*S. lasiandra*), the largest native willow with two or more tiny nodules at the leaf base. There are many species elsewhere in North America, Asia and Europe. The cork-screw willow (*S. matsudana*) is native to Asia.





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**winged hackberry, *Pteroceltis tatarinowii***

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*Origin: Asia - China's provinces Anhui, Fujian, southern Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan and Zhejiang*

A monotypic genus, this small tree typically grows 30' to 35' but can attain 50' to 60' in optimal conditions. In China, the tree is cut for its timber. The bark on older trees can peel, forming pretty gray and cream-colored patterns like on many eucalyptus trees.

The bark is used to make a type of paper called Xuan paper. Xuan paper has been produced since the Tang Dynasty. It is noted for being soft, fine-textured, and resistant to creasing and mold, making it perfect for Chinese calligraphy writing and watercolor painting. Most historical paintings and writings are preserved because they were on durable Xuan paper. The tree's Chinese name is *quing tan*. A globose to oblong yellowish-green to yellowish-brown nut is collected in China and an oil is pressed from it. First scientifically described in 1873 by Russian botanist Carl Maximowicz (1827-1891). The tree grows across much of China at elevations between 300' and 5,000'.



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**zelkova, *Zelkova* spp.**

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*Origin: Asia*

The most common species of zelkova in Portland is Japanese zelkova - *Z. serrata*. However, there are a few other species - *Z. carpinifolia* from the Caucasus, and *Z. sinica* and *Z. schneideriana* from China. All have simple, serrate-edged leaves. The species from eastern Asia are more tapered at the tips, while those of *Z. carpinifolia* are somewhat blunter. The Caucasian zelkova's bark is typically smooth and gray but will flake on older trees. The tree has a dense, oval head. Japanese zelkovas tend to be more vase-shaped and spreading. The small flowers of all zelkovas are greenish and lack petals. The female flowers are borne in the leaf axils while the male flowers cluster at the base of the shoots. *Z. sinica* has fewer veins and larger, smoother fruits than the other species.



# Notes

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