

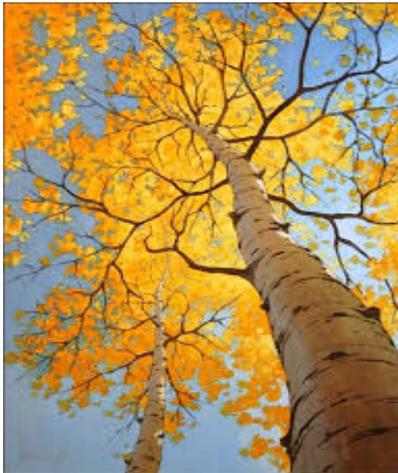
# Aspen



- Growth Form: ovoid to columnar
- Crown Density: open
- Size: 35-50 feet high 20-35 foot spread
- Drought Resistance: poor
- Cold Hardiness: excellent
- Growth Rate: rapid
- Life Span: moderate
- Elevational Range: to 11,000 feet
- Possible Insect Problems: poplar borer, scale, tent caterpillar, twig gall fly
- Possible Disease Problems: cytospora canker, leaf spot
- Wildlife Value: high: buds and catkins for food value for grouse and browsers
- Seasonal Color: yellow fall color
- Miscellany: native

# Quaking Aspen

*Populus tremuloides*



ZONE: 1-7  
HEIGHT: 40-50'  
SPREAD: 20-30'

SHAPE: Oval, Upright  
EXPOSURE: Full Sun to Partial Shade  
GROWTH RATE: Fast

**SOILS:** Aspen prefer moist, but well-drained, slightly acidic soil. Need to treat alkaline soil annually with products that lower the Ph. Let a tree-care specialist help you determine this. Amending soil with organic materials and mulch can help.

## DESCRIPTION:

- The Quaking Aspen gets its name for its characteristic tremble (or quake) when the slightest breeze blows through. In autumn, the stunning yellow foliage brightens the landscape and finds its way onto calendar pages and magazine covers. Its shimmering

heart-shaped leaves and striking white bark make it a popular shade and ornamental tree. Due to its tendency to be short-lived and its susceptibility to several insects and diseases, the Aspen is not a tree for all places. But planted in the right location and cared for regularly, the quaking aspen is a delight of color, movement and sound.

#### WILDLIFE VALUE:

- The leaves of the Aspen are eaten by snowshoe hare, deer, and elk. Fallen leaves are avidly taken by deer in fall and early winter. It is an important food supply and building material for beaver. Grouse depend on the buds for winter food. Also a host to myriad birds and butterflies.

#### HISTORY / LORE / USE:

- The quaking aspen has the widest natural range of any tree in North America, spanning 47 degrees of latitude (equal to half the distance from the equator to the North Pole), 110 degrees of longitude (nine time zones) and elevations from sea level to timberline.
- Aspen holds title to the strange claim of being the largest living organism. The reason is that aspens grow in stands (called clones) and reproduce primarily by sending up sprouts from their roots. This means that virtually all the trees in a clone are connected. One clone in Utah was observed to have 47,000 stems, estimated to weigh 6,000 tons. While individual aspen trees are notoriously short-lived, a clone in Minnesota has been estimated to be 8,000 years old, making it also one of the oldest living things on earth.
- Ecologically, Aspen serve as a succession (nurse) crop. Thanks to its tiny, fluffy seeds that are carried far and wide by the wind, and to its tolerance to many soil conditions, it is one of the first trees to spring up after forest fires, erosion, disease, etc. These young Aspen provide cover for the seedlings of pine, fir, and spruce. As those trees become larger, the aspen may die out.
- Aspen have been proven to take in much more carbon dioxide than regular trees, allowing them to release more oxygen back into our atmosphere.

#### MOISTURE:

- Grows best where moisture is abundant.

#### LEAVES:

- This tree's leaves are round and heart-shaped, with small teeth on the margins and arranged alternately on the branches.

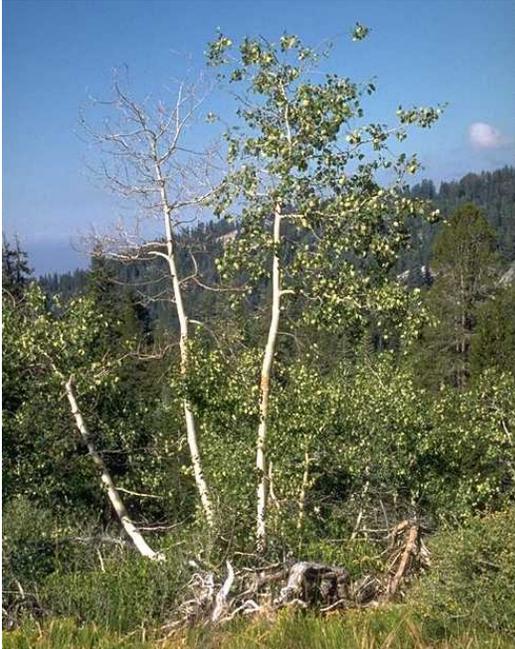
Source for this information: [www.arborday.com](http://www.arborday.com)

## QUAKING ASPEN

*Populus tremuloides* Michx.

Plant Symbol = POTR5

Contributed by: USDA NRCS National Plant Data Center & the Biota of North America Program



Brother Alfred Brousseau  
© St Mary's College  
@ CalPhotos

### Alternate Names

Trembling aspen, golden aspen, mountain aspen, trembling poplar, white poplar, popple; aspen

### Uses

**Industry:** Quaking aspen is an important fiber source, especially for pulp, flake-board, and other composite products. The wood is light and soft with little shrinkage (see Wheeler 2000) and is used for pallets, boxes, veneer, and plywood. Higher grades are used for other solid wood products, such as paneling, furniture components, and flooring. The wood characteristics make it useful in miscellaneous products, including excelsior, animal bedding, matchsticks, toys, beehives, tongue depressors, spoons, and ice cream sticks. It makes good playground structures because the surface does not splinter, although the wood warps and susceptible to decay.

**Conservation:** Quaking aspen is valued for its white bark and brilliant fall color, especially when clustered. The species been widely used in landscaping but is best in sites away from structures that might be damaged by the aggressive roots. The trees provide good visual screening and noise abatement.

Aspen stands are good firebreaks, often dropping crown fires in conifer stands to the ground when they reach aspens and even sometimes extinguishing the fire because of the small amount of flammable accumulation. They allow more ground water recharge than do conifer forests and they also play a significant role in protecting against soil erosion. They have been used in restoration of riparian habitats.

**Wildlife:** Young quaking aspen provides food and habitat for a variety of wildlife: black bear, deer, beaver, porcupine, elk, moose, ruffed grouse and many smaller birds and animals, including small mammals such as mice, voles, shrews, chipmunks, and rabbits. Bark, buds, new sprouts, twigs from the tops of fallen or logged trees, and fallen leaves all are wildlife foods.

**Ethnobotanic:** Native Americans used *Populus* bark (including aspen) as a food source. They cut the inner bark into strips, dried and ground it into meal to be mixed with other starches for bread or mush. Catkins were eaten raw, and the cambium was eaten raw or in a soup.

### Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

### Description

**General:** Willow Family (Salicaceae): This is a native tree 5-30 m high, typically less than 15 m, with a rounded crown; lateral roots may extend over 30 meters and vertical sinker roots from the laterals may extend downward for nearly 3 m; bark typically smooth, greenish-white to gray-white, often thin and peeling, becoming thicker and furrowed with age, especially toward the base. Leaves simple, deciduous, broadly ovate to nearly round, 4-6 cm long, with small, rounded teeth on the margins, on a

slender, flattened petiole, dark green and shiny above, pale green below, turning bright yellow, yellow-orange, gold, or reddish after the first frosts. The male (staminate) and female (pistillate) flowers are on separate trees (the species dioecious – or ‘polygamodioecious,’ because bisexual flowers may be produced at low frequencies on staminate and pistillate trees), each type of flower borne in pendent catkins. The fruits are narrowly ovoid to flask-shaped capsules 5-7 mm long, splitting to release the seeds; seeds ca.2 mm long, each with a tuft of long, white, silky hairs, easily blown by the wind. The common name is in reference to the shaking of the leaves in light wind.

*Variation within the species:* Considerable genetic and morphological variation exists over the range of quaking aspen. A number of species and varieties have been described but none are currently recognized. Entire stands are often produced as a single clone from root sprouts – this sometimes easily observable on a single mountainside in different timing in leaf appearance or in different hues and timing of fall coloration. Distinctively large triploid trees are sometimes found.

Quaking aspen hybridizes naturally with bigtooth aspen (*Populus grandidentata*), narrowleaf cottonwood (*P. angustifolia*), curly poplar (*P. canescens*), balsam poplar (*P. balsamifera*), eastern cottonwood (*P. deltoides*), and white poplar (*Populus alba*, a naturalized European species), and hybrids with black cottonwood (*P. trichocarpa*) occur rarely in Alaska. Quaking aspen, bigtooth aspen, European aspen (*P. tremula*), and three Asian species are closely related and sometimes classed together as a single, circumglobal superspecies (see Peterson and Peterson 1992).

### **Distribution**

Quaking aspen is the most widely distributed tree species in North America. It grows from Alaska across the Northwest Territories to Quebec and Newfoundland, south to West Virginia and Virginia, and in all of the western North America US states (except Oklahoma and Kansas) -- in all Canadian provinces and all but 13 US states (absent from the Southeast). It occurs in both the eastern and western sierras of Mexico, into the south-central part of the country. Outside of the main range, it is represented by a huge number of disjunct populations. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

### **Adaptation**

Quaking aspen occurs in a wide variety of habitats (including soil type and moisture conditions) and at a great range of elevation, matching its extensive geographic range. It characteristically forms pure stands or mixed stands with bigtooth aspen, but it occurs with scrub oaks and sagebrush at lower elevations and as a prostrate form above timberline and exists as a dominant species in many communities at mid elevations. It is a shade-intolerant, disturbed site species and is quickly replaced in succession by more tolerant species.

Some trees are self-pruning, dropping numerous small twigs with excess fall foliage and returning nutrients to the soil. Leaves decay relatively rapidly, and a characteristic "aspen soil," with a higher pH than on conifer-dominated soils, develops on sites that have supported aspen for a number of generations.

Flowering occurs March–April (East) or May–June (West), before the leaves appear and fruiting in May–June (–July), often before the leaves are fully expanded. Temperatures above 12° C for about 6 days apparently trigger flowering. Female trees generally flower and leaf out before male trees.

### **Establishment**

Quaking aspen commonly establishes from seed in Alaska, northern Canada, and eastern North America. Seedling establishment is less common in the West but occurs there in moist sites such as kettles and other topographic depressions, seeps, springs, lake margins, and burnt-out riparian zones. Drought stress kills seedlings, as does standing water.

Young trees first flower at 2-3 years but production of large seed crops begins at about 10-20 years; maximum seed production occurs at 50-70 years. Heavy seed crops are produced at 4-5-year intervals. Seeds are wind-dispersed for distances of 500 meters to several kilometers.

Germination generally begins nearly immediately after moisture is received and can occur across a broad temperature range, with optimal germination at 15-25° C. Surface placement or a very shallow depth of burial on exposed mineral soil (such as burned or scarified sites) apparently provide the best environment for germination. Continuous moisture is required.

### *Asexual reproduction and clones*

Reproduction of quaking aspen is primarily by root sprouts, and extensive clones of root-interconnected

trees are characteristic of the species. Most root sprouts develop within 10 meters of the parent stem, although some are produced at 30 meters or more. They develop from roots within 2-10 centimeters of the surface. Growth in primordia and buds is suppressed by apical dominance but resumes after stems are top-killed by fire, harvest or wind-breakage, or after defoliation and many thousands of sprouts per acre may be produced. Removal of the above-ground plant portion in June or July after maximum auxin production (the chemical agent of apical dominance) results in fewer suckers than top-removal during the dormant season. Sprouts produced in a closed stand usually die unless in a canopy gap. Saplings may begin producing root sprouts at 1 year of age.

Stands of quaking aspen may consist of a single clone or represent a mosaic of different clones. Even in a small area, wide variation in genetic traits exists between clones – differences may be seen in leaf shape and size, bark colour and texture, branching habit, resistance to disease and insect attack, sexual expression, growth rate, and phenology. The most conspicuous differences may be in the timing of spring leaf flush and in autumn leaf coloration.

The staminate-pistillate ratio of clones is 1:1 in most localities, but in the eastern US staminate trees may outnumber pistillate ones by 3:1. Some clones alternate between staminate and pistillate forms in different years or produce combinations of perfect, staminate, and pistillate flowers.

Individual trees of quaking aspen are short-lived (maximum age in the Great Lakes states is 50–60 years, up to 150 years in the West). Stands may be even-aged (after a single top-kill event) or only broadly even-aged (from sprouting of a gradually deteriorating stand). The clones are much older: many in the Rocky Mountain and Great Basin regions are at least 8000 years old, persisting since the last glacial retreat. A male clone in the Wasatch Mountains of Utah occupies 17.2 acres (43 ha) and has more than 47,000 stems – this clone is estimated to be 1 million years old and may be the world's most massive known organism. Clones east of the Rocky Mountains usually cover no more than a few acres.

### **Management**

The thin, soft bark of quaking aspen makes it susceptible to many diseases and insect infestations as well as mechanical and fire damage. Fires may kill trees or cause basal scars that serve as entry points for wood-rotting fungi, which are common in older stands. The wood decays easily. Fires may

also kill surface roots that could reduce sucker regeneration.

The poplar borer beetle, one of the most common wood borers of aspen, weakens trees by boring galleries in the trunk near the lower portion of the crown. Outbreaks of forest tent caterpillar may last 4-5 years and result in serious defoliation -- cold weather in the spring shortly after the eggs hatch and above-average fall temperatures can cause a rapid decline in caterpillar populations by killing eggs and larvae. Overgrazing by livestock or big-game animals disturbs roots and compacts soil, limiting sucker formation. Heavy grazing of young sucker stands by cattle for three years in a row may destroy them.

Quaking aspen can be propagated by seed, following cold stratification. Germination of fresh seed may be 80-95%, but viability lasts only 2-4 weeks under favorable natural conditions (low temperature and humidity). Seeds dried for 3 days and stored at cool temperatures may retain good viability for up to a year.

The species roots poorly from woody stem cuttings, but newly initiated (softwood) shoots can usually be induced to root by dipping in IBA (indolebutyric acid) or other commercially available rooting powders. A more preferred method uses root sprouts. Collect dormant lateral roots in early spring -- plant root cuttings 1-2 in diameter and 3-5 centimeters long in vermiculite and place in the greenhouse for 6 weeks. Excise the young sucker shoots and root in perlite/vermiculite (2-3 weeks, using IBA), misting frequently. Transplant the developing plants to peat/vermiculite mix and grow at 15-25° C. Or, the root cuttings may be planted directly into the perlite mix, with the top of the cutting just below the media surface.

### **Cultivars, Improved and Selected Materials (and area of origin)**

Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site <<http://plants.usda.gov>> or the Plant Materials Program Web site <<http://Plant-Materials.nrcs.usda.gov>>

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## Aspen Can Be a Troublesome Tree

*By Robert Cox, horticulture agent, Colorado State University Cooperative Extension*

Ask a horticulturist about the use of quaking aspens (*Populus tremuloides*) in the home landscape and the advice you likely will hear is "OK, but...."

Forty years ago, aspen was seldom used in home landscapes. In the interim, however, the use of this tree has increased dramatically in Colorado's urban landscapes.

Aspen grows fast, lending the landscape an early finished look, and it provides an informal touch of Colorado to the suburban home or urban landscape. Aspen is a small to medium-sized tree that won't overwhelm smaller yards so typical of today's urban subdivisions. It has attractive bark, leaves tremble in the slightest breeze and the tree can develop good fall foliage color.

That's the good news. Now for a reality check: Aspen is affected by numerous insects, diseases and cultural problems. While there are plenty of good-looking aspen around the region, it also is the most common problem tree discussed in calls or samples brought to Colorado State University Cooperative Extension's Plant Diagnostic Clinic.

Ecologically, aspen serves as a "succession" tree, quickly seeding in where other vegetation was lost because of erosion, fire, logging, insects or disease. It provides cover for seedlings of pine, fir and spruce, and as these become larger, the "nurse crop" of aspen may die out.

Aspen reproduce not only by seed but also by extensive suckering. An aspen grove starts as suckers shoot off the roots of a mother tree, which arrived at the site by seed. This suckering habit can be a nuisance in the urban landscape, coming up in lawns and gardens.

Aspens are short-lived trees, as expected from their role in forest ecology. In the urban landscape, even properly cared-for aspen may not reach 20 years. Life spans can be shortened further by one or more of several insects or diseases that attack aspen. Fungal diseases, such as [Cytospora](#) or other cankers which attack the trunk, are common, as are diseases of the foliage such as rusts, or [leaf spots](#). Of the many insects that attack urban plantings of aspen, [oystershell scale](#), [aphids](#) and aspen [twiggall](#) fly are most prevalent.

Aspen prefers the moist but well-drained, slightly acidic soil found at higher elevations. Much of the soil in the Front Range of Colorado is compacted, poorly drained alkaline clay. Aspens transplanted to such soils are at a

disadvantage, especially considering that much of the original root system was lost in the digging process.

Aspens transplanted to landscapes are collected primarily from the mountains. A few nurseries offer nursery-grown aspens, which are grown to salable sizes in pots or in the field. While these should not experience the stress that mountain-collected aspens do, later insect and disease problems still are possible.

Horticulturists and plant pathologists are hesitant to recommend aspen as a landscape tree for the Front Range. For those who insist, aspens should be planted on north or east slopes, or on north or east sides of the house, in soil well amended with organic materials and mulched after planting.

Conditions often become extremely hot and dry on south or west exposures; this would further stress aspen. Should an aspen trunk become severely affected by Cytospora or oystershell scale, the gardener should be willing to cut down that trunk and allow other sucker shoots to develop into new trees.

Another complaint about aspens in Front Range landscapes is that they do not develop as brilliant a yellow fall color as those in the mountains. Differences in soil chemistry and texture, soil moisture; day/night temperatures and sunlight intensity between the Front Range and the mountain areas all contribute to this.

Should you plant aspen? Probably not, if you have space only on south or west exposures, or if the planting site is small and narrow. Yes, if you are willing to amend soils before planting a nursery-grown aspen and will monitor the aspen for problems. Remember that your nearby nursery or garden center carries many other tree choices for the landscape.

For alternatives to planting aspen see: [Aspens: Not the Only Small Tree in Town](#)

[Cankers on Western Quaking Aspen](#), USDA Forest Service bulletin (off-site)

Photo: Judy Sedbrook

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