

Quaking Aspen



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Tahoe Plants and Trees

Quaking Aspen – *Populus tremuloides*

Basics – One of the most recognizable native deciduous trees in the Tahoe Basin, the Quaking Aspen is often found incorporated into the landscapes of residential and commercial lots. The fluttering foliage, which often turns a yellow gold coloration after the first frost and the tree's white bark make it one of the most photographed trees in Tahoe. The tree was a frequent recommendation for landscaping due to its fast growing characteristic, medium height, its tolerance to long winters and deep snow and its higher moisture content that help suppress fire movement through an aspen stand. Those that did plant Aspens in their yard soon found that the trees would send up many shoots from outlying near surface roots. Root growth also could compromise sewer or irrigation lines, foundations and sidewalks. The water demand to sustain the trees could be taxing during water restricted droughts; and the annual autumn deluge of falling leaves, if not raked, could smother portions of lawns and groundcovers. Consequently, there are now fewer recommendations for planting these trees into planted landscapes.

The native range for the Aspen, from Alaska to the Maritime Canadian provinces and from well north of the Arctic Circle to a few isolated stands in Mexico give this tree the widest range of any tree in the western hemisphere. In California the tree primarily is found in the Sierras, less frequently in the Cascade Range, White Mountains and only one or two groves in southern California's San Bernardino Mountains. In Nevada it is also periodically found in the higher mountains throughout the Basin and Range geologic province to the Utah border.

Economically, Aspens can be an important tree in silviculture, with the wood noted for low shrinkage (an excellent characteristic for use for carving and turnings). Quality Aspen timber is used for lumber but the majority use is in pulp and pressed board applications. Wooden match sticks often are of Aspen. The logging method usually is clear cutting full stands, knowing that suckering shoots will emerge within a few weeks. Environmentally, Aspens are important for erosion control, fire suppression (called by foresters an asbestos tree) and provides important food and habitat for wildlife.

The thin, smooth white bark is a preferred food for beaver, and commonly used for inscriptions by those people so inclined to carve names, dates and expressions of love into the trunks of these trees. While today these carvings are considered a type of graffiti and discouraged, historically the bark inscriptions are referred to as either dendroglyphs or arborglyphs that pioneers, lonely shepherds or Native Americans used to identify trail routes, camp sites, or more commonly, as today, to leave a message of affection, or to note that someone passed a specific location.

Details – Aspens are in the Salicaceae family as are willows and cottonwoods. All of Tahoe's Salicaceae representatives are associated with moist to wet environments, typically having full sun exposure with little over-story canopy. Aspens typically are found in groves, and with the exception of landscaped areas are rarely found singly or only a few individual trees. The plants are primarily dioecious, that is, there are male plants and female plants. Within any larger stand of aspens, there will be individuals that produce a few perfect flowers (having fertile male and female components). Aspens' pollen is wind transported to the female flower, where fertilization occurs. Seeds take about 4-6 weeks to develop and are subsequently wind dispersed. Wind dispersal is enhanced by the seeds' small size (5,000-8,000 per gram) and their having long silky threads which carry well in light winds. Seeds falling into streams can also be dispersed downstream, with seeds being able to germinate while completely submerged.

Seed germination rates have been measured at about 95% but seed viability is only about a month. Generally, most Aspen reproduction is via asexual methods (root and stump suckering) rather than by sexual reproduction (seedlings), though seedlings are an important component in species dispersal to new locations. Consequently, the typical stand of Aspen will be identical clones of the founding seedling, sharing in large part the partially interconnected root system. Individual trees are moderately short lived (75-100 years), though the record is over 200 years. The clonal root mass can be well over 1000 years in age with a record of over 80,000 years reported from a grove in Utah, making the Aspen arguably one of the longest living organisms.

Tahoe Aspen in Autumn Colors

Of Interest – Having significant numbers of viable seeds, that are wind and water distributed, it is surprising that Aspen groves are typically identical clones of the founding seedling. *What is happening, and how is the cloned grove maintained?* While it is not fully understood how the root system is so long lived especially compared to the above ground trees and shoots, there is a basic understanding of how the clone grove is maintained. Seeds falling and germinating within an established grove are out competed by the newly arising shoots which have access to an extensive root system that provides access to water, mineral nutrients and translocated carbohydrates from more mature trees and shoots. There also perhaps some chemical inhibitors that minimize germination of seeds, as well as physical barriers to seedling establishment by having some depth and denseness from the leaf litter within the grove.

The near surface root system is the source of the majority of new shoots, with trunk or stump shoots being less common. Even when individual trees within the clone complex are affected by disease, the emerging nearby shoots are unaffected, but not immune to the disease. The root system is stimulated to produce shoots by a plant hormone like chemical called cytokinin. The build-up of cytokinin in the roots is the trigger for shoot initiation. As the shoots develop into trees the leaves produce a shoot suppressing growth regulator, auxin, which suppresses cytokinin production and hence shoot generation is greatly reduced, except at the outer edges of the clone complex which allows expansion of the grove. If a mature tree is removed or killed, then auxin production is reduced in that specific area and shoot emergence again occurs. When fire, logging, or mechanical disturbance to the grove occurs which disrupts auxin dispersal to the roots, cytokinin build up within the roots commences and shoot initiation throughout the area of the grove occurs. This cause and affect process is complicated in a couple of aspects. When tree are

girdled, shoot initiation is not immediate, as cytokinin will move through the deeper xylem system and not build up in the roots. When the tree dies including the xylem transport system there is nowhere to transport the cytokinin, which then builds up in the roots and initiates shoot propagation. In very mature and old stands of Aspens, where auxin production has suppressed cytokinin production for many years, the ability to produce cytokinin when these very old trees eventually die is greatly reduced or in some cases stopped completely with the grove going into senescence. Some of Tahoe's oldest Aspens are found along the eastern limit of the Taylor Creek bike bath and appear to be entering this stage of development due in part to the exclusion of fire from the groves which has led to encouragement of conifers into the groves. A healthy grove of Aspens requires periodic disturbance throughout the grove to stimulate production of new shoots and to eliminate competing conifers such as the water tolerant Lodgepole Pine.

References:

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