



Hesperocyparis, the Western Cypressess by Glenn Keator



Monterey cypress (*Hesperocyparis macrocarpa*) framing granitic rocks at Point Lobos

Arlyn Christopherson photo

Western cypresses (genus *Hesperocyparis*) create a powerful presence with their often twisted trunks, picturesque crowns, and rugged appearance, suggesting great strength and old age. But appearances can be misleading, for most cypresses are relatively short-lived, growing fast then succumbing to diseases and dropped branches after reaching an age of fewer than one hundred years. My guess is their purported long lives are based

on their close resemblance to junipers, many of which, like our Sierra juniper (*Juniperus grandis*), reinforce the idea of great age, as these junipers often live well over 1,000 years.

To me, the most interesting features of our cypresses are their habitat preferences, their mode of reproduction, and their life cycles. Also fascinating is the diversity of western cypresses in California, where far more species are found than anywhere else.

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(As a group, western cypresses grow outside the boundaries of California as well, ranging from Oregon south to Honduras, in Central America, and east to western Texas. Perhaps the best known is the Arizona cypress (*H. arizonica*), widely planted in desert environments. Another interesting species is *H. guadalupensis*, endemic to Guadalupe Island off the Baja California coast, a part of our extended Mediterranean climate.)

Western cypress habitats are almost invariably tied to soils low in nutrients or with toxic compounds not tolerated by most plants, such as sandstone- and serpentine-based soils. Undoubtedly the reason for this preference is their ability to survive, even thrive, where competing trees can't grow. In most cases, growing these same plants in gardens does not require special soils; in fact, they typically grow faster and much larger in ordinary garden soils.

All western cypresses are monoecious—pollen and seed cones on the same plant. The pollen cones are produced by the thousands, releasing their pollen late in the year before winter rains, but the seed cones take a full two years to ripen (as do pines cones) differentiating these trees from some of their close relatives whose seed cones mature in just one year.

Our western cypresses have a life cycle similar to the closed-cone pines, the seed cones staying tightly closed for years, opening only when aged or after periods of extreme heat or fire, thus revegetating fire-devastated areas. After the seed cones open, they remain tightly attached to the parent. Next time you look at a cypress, note how the seed cones go way back on the branches, sometimes remaining even on the trunks. However, growth to maturity and seed production are relatively fast for a conifer, requiring but a few years, and mortality becomes high after sixty to seventy years. In the past, natural wildfires prevented these trees from reaching old age, but now, too-frequent fires have decimated some of our cypress populations.

As for the diverse species, some speculation is in order, for earlier works of our flora offered only half the number of the now ten-species list, because different botanists have drawn their own conclusions about how distinct the taxa are from one another, lumpers often suggesting subspecies for the kinds that are closely related. Nonetheless, our cypresses present a good measure of diversity and lead us to fascinating habitats where we can see the trees in their homelands.



Monterey cypress (*Hesperocyparis macrocarpa*). As in all western cypresses, seed cones and pollen cones occur on the same branch.

Arlyn Christopherson

Our cypresses belong to a relatively newly-named genus called *Hesperocyparis* (western cypress), a separation from the Old World cypresses which remain in the genus *Cupressus*. To understand this change, we need to look at what phylogenetic studies have revealed in the last twenty years or so, studies that consider DNA sequences of several genes as well as observable *morphological* characters. These latter, though not readily evident, seem nonetheless to separate the two groups.

These observable differences include *glaucous* seed coats (not glaucous in true cypresses), three to five cotyledons in *Hesperocyparis* versus two in *Cupressus*, and a more three-dimensional pattern of the ultimate branchlets in *Hesperocyparis* compared to the two-dimensional patterns of branchlets for true cypresses. So close attention is needed to suss out the twig patterns, find seeds, or look at the germinating seedlings to make this generic determination.

Monterey Cypress

Without question, the world's most recognized California cypress is the Monterey cypress (*H. macrocarpa*, big cone), a tree widely planted in coastal regions in many parts of the world, where trees that tolerate wind and salt spray are needed. (One example near home is the windbreak created by planted Monterey cypress trees, making Golden Gate Park possible.) In California, it's common to see Monterey cypress in coastal regions far from their original homeland. Monterey cypress is also celebrated



Green alga (*Trentepohlia aurea*) festooning the Monterey cypresses at Point Lobos

for a famous wind-sculpted tree on a rock promontory along the 17-Mile Drive near Carmel. Besides being native there, the only other stand is in Point Lobos State Natural Reserve, a few miles south of the Carmel River, straddling the rocky granitic promontories between the ocean and Highway 1.

Monterey cypress distinguishes itself by having an asymmetrical crown, the branches often horizontally trending (though wind causes some of the shaping), with deep green foliage and (mostly) larger seed cones.

One spectacular associate growing on this cypress in hanging curtains of bright red, growing on closely enmeshed branches, is a plant that most assume is a lichen, but the soft texture belies that idea. Instead, *Trentepohlia aurea* is an unusual and dramatic kind of green alga, the chlorophyll masked by the abundance of its red pigments. Although most green algae live in water, a few have come onto the land where there is high humidity year-round. Other plants that embellish Monterey cypress habitat include the also rare Monterey pine (*Pinus radiata*), the tree form of blueblossom ceanothus (*Ceanothus thrysiflorus*), leather-leaf fern (*Polypodium scolopendri*), and immense clones of rock-hugging bluff lettuce (*Dudleya farinosa*).

Although many of our cypresses display subtle differences, the trained eye can sort out several without too much difficulty. Always, it seems, habitat matters, for most species are only found within a small range, but this creates difficulties for observers of garden material, where habitat does not provide a clue to identity. Let's examine the fairly easy ones first—the “pitiful” group—which includes species with pits (to see the depressions, use a hand lens) on the back of the leaf scales, the depressions sometimes filled with a highly fragrant sticky resin and sometimes lacking the resin. Once that rather esoteric feature is seen, it's easier to sort out the five species that have it.

MacNab Cypress

This first example, MacNab cypress (*H. macnabiana*) is easy to identify because it forms a dense tall shrub with multiple trunks and, from a distance, has a decidedly gray appearance. It is found growing on serpentine barrens in the northern Sierra foothills and the inner north coast ranges of Lake and Glenn counties. Two accessible areas are mentioned below.

One area is on somewhat steep slopes in Magalia, a tiny town beyond the town of Paradise in Butte County. There MacNab cypress shares its territory with thousands of the Sierra fawn-lily (*Erythronium multiscapideum*), the rare Butte County fritillary (*Fritillaria eastwoodiae*), a couple of unusual annual monkeyflowers (*Erythranthe* [*Mimulus*] *glaucescens*) and (*Erythranthe* [*Mimulus*] *bicolor*), and the delightful purple pussy ears (*Calochortus tolmiei*), making a memorable botanical destination, especially in early spring.

Joey Malone



MacNab cypress (*Hesperocyparis macnabiana*) on Raglin Ridge, Tehama County

The second area is on Walker Ridge just to the west of floriferous Bear Valley and east of Clear Lake, where beauties like Tracy's clarkia (*Clarkia gracilis* subsp. *tracyi*), splendid mariposa (*Calochortus splendens*), long-rayed brodiaea (*Triteleia peduncularis*), rose brodiaea (*Brodiaea rosea*), and other bulbs and annuals join the scene in late spring. The foliage of this cypress is delightfully resinous and fragrant.

Tecate Cypress and Cuyamaca Cypress

Other pit-bearers include a pair of species from far Southern California, restricted to poor soils and found in just a handful of locales. Both have leaf pits without resin and develop lovely cherry-red bark in age, also distinguishing them from others. Tecate cypress (*H. forbesii*), named for growing near the border town of Tecate and scattered in groves north to the Santa Ana Mountains, grows no more than twenty feet tall, sporting green foliage and growing in shrublike fashion.

By contrast, the Cuyamaca cypress (*H. stephensonii*) is a tree of thirty or more feet tall with gray-green foliage. Look for it in the mountains behind Anza Borrego Desert State Park, particularly in areas near Cuyamaca State Park and the "apple pie" town of Julian. It is a true fire-follower and I've observed one stand over time after a severe fire, but sadly other shrubs have given the new saplings a hard time. Companions include the lovely but rare southern phlox (*Phlox austromontana*) and Parish's blue curls (*Trichostema parishii*).

Piute Cypress and Baker's Cypress

Our other two pit-bearing species, with white resin in the pits, live on serpentine substrates in two widely separated places. The Piute cypress (*H. nevadensis*) is relegated to slopes in the Piute Mountains, an outlier of the Sierra just south of Lake Isabella and east of Bakersfield. Access to its homeland, unfortunately, is restricted.

By contrast, Baker's cypress (*H. bakeri*), named for Milo Baker, a famous botanist from Sonoma County who botanized many northern parts of the state, is scattered in mostly small groves in Siskiyou County, just north of Mt. Shasta. Although some of the sites are obscure, one of the best is on the road from the tiny hamlet of Seiad Valley and the Klamath River to Cook and Green Pass, a botanical hotspot that should not be missed, homeland to numerous ferns,



Glenn Keator

Scales on a branch of Baker's cypress (*Hesperocyparis bakeri*). Note the sticky resin filling the leaf pits.

conifers, orchids, lilies, lewisias, and more. To get to the best stand, drive up the road for a few miles until you reach a stream crossing and the road bends sharply to the east. Park here and follow a steep old dirt road for around a mile where, suddenly, you come out of a forest of tall conifers onto a slope with Baker's cypress trees of many different ages, all restricted to serpentine.

How to tell Piute and Baker's cypresses apart? Here, measurements are necessary, for they inconveniently overlap, as is so often the case in the real world. Both the branchlet orientation and seed cone size are used in the *Jepson Manual*. In cases like these, several measurements are necessary to find a meaningful average.

And now for the remaining four species, all trees noted for lacking leaf pits and having symmetrical crowns.

Sargent Cypress

Undoubtedly the most distinctive is the Sargent cypress (*H. sargentii*), a relatively tall tree with dull gray-green foliage and found always on serpentine. This species has by far the greatest range. The northern boundary is in the inner north coast ranges, where it sometimes grows with MacNab cypress, one of the only overlapping occurrences of different species. From there it trends south to San Luis Obispo County, where it forms forests on Cuesta Ridge just north of San Luis Obispo.



Seed cones on Sargent cypress (*Hesperocyparis sargentii*)

Cuesta Ridge, running east and west from Cuesta Grade on Highway 101, is another botanical hotspot, home to Santa Margarita manzanita (*Arctostaphylos pilosula*), a narrowly endemic manzanita, and such rare bulbs as San Luis Obispo mariposa (*Calochortus obispoensis*), golden stars (*Bloomeria crocea*), and golden bowl mariposa (*Calochortus clavatus*).

Sargent cypress is the one most often seen within the confines of the Bay Area, giving names to places like Pine Mountain and Cedar Mountain—talk about confusing common names! The largest stand by far is on serpentine slopes of Carson Ridge behind the town of Fairfax in Marin County, where an extensive grove of dwarf trees occurs: dwarf because the harsh hot summer environment stunts them.



Seed and pollen cones on a pygmy cypress (*Hesperocyparis pygmaea*) at Jug Handle State Natural Reserve.

Carson Ridge is also home to fine stands of serpentine-based chaparral, featuring Jepson ceanothus (*Ceanothus jepsonii*), leather oak (*Quercus durata*), and mountain manzanita (*Arctostaphylos montana*), along with the lovely pastel shades of Douglas iris (*Iris douglasiana*) flowers.

Our remaining cypresses have dark-green to yellow-green foliage, and some are best distinguished by location.

Pygmy Cypress

The most engaging species here is the pygmy cypress (*H. pygmaea*), endemic to old marine terraces mostly on the Mendocino coast. These trees may be seen in Russian Gulch and Van Damme State Parks, as well as the most famous site at the top of the ecological staircase: Jug Handle State Natural Reserve, a few miles south of Fort Bragg.

Early explorers of this region noticed dwarf trees growing on ancient white, heavily leached soils called *podzols*, on the oldest, farthest inland, and most elevated of the marine terraces, which were formed by repeated cycles of undercutting by the ocean and land uplift. There they discovered a pygmy forest, including the Bolander form of beach pine (*Pinus contorta* subsp. *bolanderi*), the endemic Fort Bragg manzanita (*Arctostaphylos nummularia*), and the pygmy cypress—trees seldom growing more than six feet tall with slender trunks but full-sized cones. At that time they believed the pygmy cypress was truly a dwarf species deserving the name.

But there are two natural sources of dwarfism, and the two aren't easily told apart: ecological dwarfs, caused by severe winds and other harsh conditions, and genetic dwarfs that remain dwarf no matter their habitat, even in gardens with good soil and little wind.

It soon became obvious that our pygmy cypress is not a true pygmy; even stands on adjacent areas with more fertile soils support much taller plants, and lo and behold! in good soils, like those in the Regional Parks Botanic Garden, the trees grow taller than any other cypress. Tall and narrow.

Gowen's Cypress

By contrast, Gowen's cypress (*H. goweniana*) remains a rather small tree—not a true dwarf—featuring yellow-green foliage and a broad rounded crown. Arguably the rarest of rare, this cypress only appears in two small areas

Leaves on Gowen's cypress (*Hesperocyparis goveniana*)

near the Monterey Peninsula on nutrient-poor sandy soils, similar in color to the podzols of the Mendocino Coast, but sandier and better drained. One population lies in a protected area east of Highway 1 in Point Lobos State Natural Reserve, never touching “elbows” with the Monterey cypress, while the other population, readily accessible near Huckleberry Hill just off the northern end of the 17-Mile Drive, grows on the uplands of old sand dunes, keeping company with Monterey and bishop pines (*Pinus radiata* and *P. muricata*)—the only place where the two pines grow together—and with such fire-followers as bear-grass (*Xerophyllum tenax*) and the diminutive sunrose (*Crocianthemum scoparium* var. *scoparium*), along with Hooker's manzanita (*Arctostaphylos hookeri*), a mounded manzanita of the central coast found only in the Monterey Bay region.

Santa Cruz Cypress

Finally, we have Santa Cruz cypress (*H. abramsiana*), named for LeRoy Abrams of the 1960s four-volume *Illustrated Flora of the Pacific States*. Not particularly distinctive in appearance, this tree grows to thirty or so feet tall, has dark green foliage and somewhat larger cones than Gowen's cypress, but I believe the different crown shape and foliage color easily separate the two.

The Santa Cruz cypress has only a handful of occurrences, restricted to the Santa Cruz Mountains. The variety *butanoensis*, from Butano State Park near Pescadero and the southern San Mateo coast, differs enough to have separate status. But the other populations are widely scattered at around 1,000 feet elevation on old sandstone-derived soils within Santa Cruz

County. The most easily reached site is by a fire station on Martin Road near the tiny town of Bonny Doon, where it lives in a fascinating environment of lithified sand dunes and their derivative soils, accompanied by the low-elevation form of ponderosa pine (*Pinus ponderosa* var. *pacifica*), knobcone pine (*P. attenuata*)—one of the few locales for that species near the coast—and coastal chaparral containing two rare species of manzanita: silver-leaf manzanita (*Arctostaphylos silvicola*) and the

Anderson or Santa Cruz manzanita (*A. andersonii*), one of several clasping-leafed species from the greater Bay Area.

As you can see, our western cypresses form a classical example of species diversification on islands of unusual soils, most of them isolated from others, helping to lead to suites of different traits. I encourage you to make field trips to see them; you won't be disappointed by being in their habitats and among their companion plants. 🌿

Glenn Keator is chair of the Friends Advisory Council. He is a popular instructor of botany and field trip leader in the Bay Area and teaches the docent training course at the Regional Parks Botanic Garden. He is the author of a number of books on native plants.

John Rusk



New cones of the Santa Cruz Cypress (*Hesperocyparis abramsiana*) located in the Regional Parks Botanic Garden. Rare in nature though it may be, it has been in the nursery trade for a long time.

The Four *Hesperocyparis* Species of Baja California

by Bart O'Brien, Garden Director

Bart O'Brien



The Guadalupe Island cypress (*Hesperocyparis guadalupensis*) on its namesake island

There are four native cypress species (*Hesperocyparis* spp.) found in the California Floristic Province portion of Baja California, Mexico. As with many of the Californian cypress taxa, three of these four species are extremely rare, narrow endemics and have been the focus of study of a number of California native plant scientists. Would James Roof, the Regional Parks Botanic Garden's first director, have fallen in love with the California flora if he had not first become entranced by the Guadalupe Island cypress? Probably, but the vagaries of life are such that one can never be certain of a particular outcome. The fact is that this species did catch his attention and led him to delve deeply into the flora of the California Floristic Province throughout his lifetime.

The Guadalupe Island cypress (*Hesperocyparis guadalupensis*) was originally described in 1879 by Harvard botanist Sereno Watson, based on a collection from the island made by Dr. Edward Palmer in 1875. For well over 100 years, there was no regeneration of this species, or any other tree on the island, due to the presence of thousands of voracious goats. Fortunately, the

Mexican government successfully removed all the goats, and the cypress forests are naturally replenishing themselves. Guadalupe Island cypress is listed as an endangered species by the Mexican government. It, along with a select number of other Baja California insular species, was among the first plantings in the "island" section of our Botanic Garden. Unfortunately, we don't have records about what happened to that original specimen, but we do have two young trees in the Canyon section of the Botanic Garden.

First described in 1933 by intrepid Baja California

botanist Ira Wiggins of Stanford University, the San Pedro Mártir cypress (*Hesperocyparis montana*) inhabits some of the most inaccessible territory on the Baja California peninsula. The entire population of these trees is found in the Sierra de San Pedro Mártir National Park at elevations over 6,000 feet where they grow along ridges and mountainsides in the vicinity of Baja California's highest mountain, Picacho del Diablo (10,154 feet). San Pedro Mártir cypress is listed as an endangered species by the Mexican government. This species has never been in the Botanic Garden's living collection.

Though long known, but because of its remote location, little studied until fairly recently, the Sierra Juárez cypress (*Hesperocyparis revealiana*) was first recognized as a distinct variety from all other cypresses in 1981 and was only elevated to species level in 2009 by New York conifer specialist John Silba. Prior to that time, this species was variously considered to be a form of the widespread Arizona cypress (*Hesperocyparis arizonica*) or an outlier population of the highly restricted Cuyamaca cypress (*Hesperocyparis stephensonii*). A notable feature of this species is the bright-red fresh bark that is revealed when

older bark flakes off. This cypress is only found on the southwestern slope of the Sierra de Juárez and is not currently listed as an endangered species by the Mexican government. It is not in cultivation.

The last of the Baja Californian cypresses, and the most common and widespread by far, is the Tecate cypress (*Hesperocyparis forbesii*), the only species that is also found in the state of California. In Baja California, it is known from about 12 populations growing on gabbro or metavolcanic substrates from the Tecate area south to near San Quintín. In California, it is only known from the Otay, Guatay, and Tecate mountains of San Diego County and at the north end of the Santa Ana Mountains of Orange County. This species was first described by Willis Jepson of UC Berkeley in 1922. Its dense foliage typically has a lemon scent, and it is sometimes used as a large-scale hedge or screen planting in southern California. Though Tecate cypress is the most common of the Baja Californian species, paradoxically the California Native Plant Society has listed it at its highest level of endangerment: List 1B.1. It is also listed as an endangered species by the Mexican government. The Botanic Garden has several young specimens of this cypress in its collection—these replace the large tree (that had never produced cones) that was removed by the expansion of the Desert section's rock garden in 2014.

The Baja California *Hesperocyparis* group is a fascinating element of our flora and a distinctive southern extension of California's diversity of fire-adapted conifers. Should the opportunity ever present itself, be sure to take the time to visit these rare and special trees in their remote wild habitats. 🌲



Bart O'Brien

Typical curls of bark on the garden's coneless Tecate cypress (*Hesperocyparis forbesii*) that was removed during the Desert rock garden's remodel.



Bart O'Brien

Patterned bark of Guadalupe Island cypress

California's Other Cypress Family Genera *by Glenn Keator*

Glenn Keator



Utah juniper (*Juniperus osteosperma*) loaded with berry-like cones

The large cypress family, Cupressaceae, contains many genera sprinkled over lands in both the Northern and Southern hemispheres, an unusual state of affairs among conifers, indicating an ancient origin. And recently, to add to the list, the redwoods and their companions, formerly in the separate family Taxodiaceae, have been included in the cypress family albeit still retained on a separate evolutionary line within the family.

The cypress family has around 130 species worldwide yet remains a source of contention with regards to the number of genera, the splitters creating many separate genera, many of which live in the Southern Hemisphere or on islands.

The overall pattern of the family includes trees and shrubs with pairs or triplets of needlelike juvenile leaves that (usually) change to tiny green fish-scale-like leaves on mature growth. The plants may be monoecious or dioecious, the pollen cones minute and often releasing pollen in late summer and fall, the seed cones mostly small and woody, the scales often shield shaped, bearing several to many seeds each.

California encompasses six genera in the cypress family. Some, like the junipers (*Juniperus* spp.), have remained distinct and uncontroversial. Yet when it comes to the cypresses and some of their relatives like the Port Orford cedar (*Chamaecyparis lawsoniana*) and the Alaska cedar (*Callitropsis nootkatensis*), matters get confusing, as both have been lumped sometimes with the true cypresses.

The California genera belong to two broad categories according to the pattern of their branching, easily noticed from a distance: those with twigs and branches extending in many different directions, giving a three-dimensional effect, and those with flattened branches resembling a lacy fern frond.

In addition to our western cypresses (*Hesperocyparis* spp.), only the junipers (*Juniperus* spp.) display three-dimensional branching. In fact, juniper branches so closely resemble western cypress branches that it is often difficult to tell the two apart in the absence of seed cones. Junipers have fleshy bluish to purple seed cones incorrectly called berries. (True berries come from the fleshy ovaries of flowering plants.) These seeds are designed to be dispersed by birds rather than by wind.

Three of our junipers—western juniper (*J. occidentalis*), Sierra juniper (*J. grandis*), and Utah juniper (*J. osteosperma*) are trees associated with dry mountains. By contrast, California juniper (*J. californica*), is a large multi-branched shrub of dry interior foothills and the high desert, while mat juniper (*J. communis*) and its varieties form sprawling woody ground covers in rocky soils in high mountains, but also live at lower elevations in the northwestern corner of the state—with the variety *jackii* confined to serpentinite. Unlike our other junipers, mat juniper retains its juvenile needlelike leaves for life.

The four genera with flat fernlike branches each containing a single native species are incorrectly called cedars, despite the fact that the true cedars (*Cedrus* spp.), which are in the pine family (Pinaceae) and are native to the Mediterranean region and the western Himalayas, are easily recognized by their clusters of needles and upright seed cones that shatter when ripe. (Two of the true cedars, the deodar cedar and the Atlas cedar, are widely planted in California gardens.)

Why do these cypress relatives bear the name cedar? Because both they and the true cedars have fragrant rot-resistant wood. Most cedar wood sold in California—used for long-lasting structures—belong to the cypress family.

How can we distinguish our four fern-branch-like genera? By a combination of habitat, leaf details, and seed cones.

Port Orford Cedar

Also known as Lawson cypress, the Port Orford cedar (*Chamaecyparis lawsoniana*) is a massive tree from the northwestern corner of California and the southwestern region of adjacent Oregon, commonly associated with water courses. Exporting the fragrant wood to eastern Asia where it is used in religious structures, together with a decimating water mold in the genus *Phytophthora*, threaten the continued survival of this already relatively rare species. You can identify this genus by looking under the bright green to blue-green branchlets at what we call stomatal bands—white waxy patches around the tiny breathing pores (stomates). Port Orford cedar displays “x”s. The tiny pea-sized seed cones are like miniature marbles, ripening and opening after one year’s development.

The easiest place to observe these trees is along the upper Sacramento River in Castle Crags State Park just south of Mt. Shasta. Additionally, to protect these trees, several botanical areas have been designated in the Klamath Mountains.

Ironically, Port Orford cedar has provided the horticultural world with more cultivars than any other conifer, cultivars that include variegated forms and dwarf shrubs. Happily, this means that the species will persist in cultivation for a long time to come.



Glenn Keator

Western red cedar (*Thuja plicata*) open seed cones

Western Red Cedar

The Western red cedar, or canoe cedar (*Thuja plicata*), provides the wood most often sold as red cedar and is another massive tree whose overall gestalt is like the Port Orford cedar. Although the two seldom grow in the same place and their overall leaf patterns are only subtly different, the easiest way to tell the two apart is by the stomatal bands—butterfly-like here—and by the tiny upright, bell-shaped seed cones.

Western red cedar reaches its best development in the temperate rainforests of the Olympic Peninsula in western Washington, barely entering California. Groves of trees can be seen in Prairie Creek Redwoods State Park north of Arcata and along a ridge on Highway 299 just east of Arcata.



Glenn Keator

Underside of a Port Orford cedar (*Chamaecyparis lawsoniana*) branch showing the x-shaped stomatal bands



Glenn Keator

Underside of a western red cedar (*Thuja plicata*) branch showing the butterfly-shaped stomatal bands



Alaska cedar (*Callitropsis nootkatensis*) in the Regional Parks Botanic Garden



Alaska cedar near Buck Lake in the Siskiyou Wilderness

Alaska Cedar

Alaska or yellow-cedar (*Callitropsis nootkatensis*) is an even rarer tree in California but has a broad distribution north to Alaska in near rainforest conditions. Here the green leaves lack any obvious stomatal band pattern and, although the seed cones are of a similar shape to Port Orford cedar, the center of each cone scale has a rather obvious spine-shaped projection. However, they require two years (not one) to mature. Obviously watching the cones develop is not practical! The few places in California where the Alaska cedar occurs are mainly reached by long hikes, but recently Joe Dahl and I visited a small stand that was posted for South Fork Road and then found an even larger stand on that same road, both in the Siskiyou Mountains of Del Norte County.



Michael Kauffmann

The spiny cones of Alaska cedar



Incense-cedar (*Calocedrus decurrens*), with white fir (*Abies concolor*) on the left, in Kings Canyon National Park

Incense-cedar

Finally, the California incense-cedar (*Calocedrus decurrens*, beautiful cedar) is a typical and widespread element of the lower mixed conifer forests in the mountains, often growing in company with white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), and sugar pine (*P. lambertiana*). It is easily identified by its cinnamon-colored bark, yellow-green foliage, and unique seed cones. These cones, when young, look like fat duck bills and when mature, they resemble birds with outspread wings where the outer two cone scales turn up. The wood is harvested to make pencils and building materials. The closest stand in the Bay Area is northeast of Mt. St. Helena just beyond the head of the Napa Valley on Highway 29. *

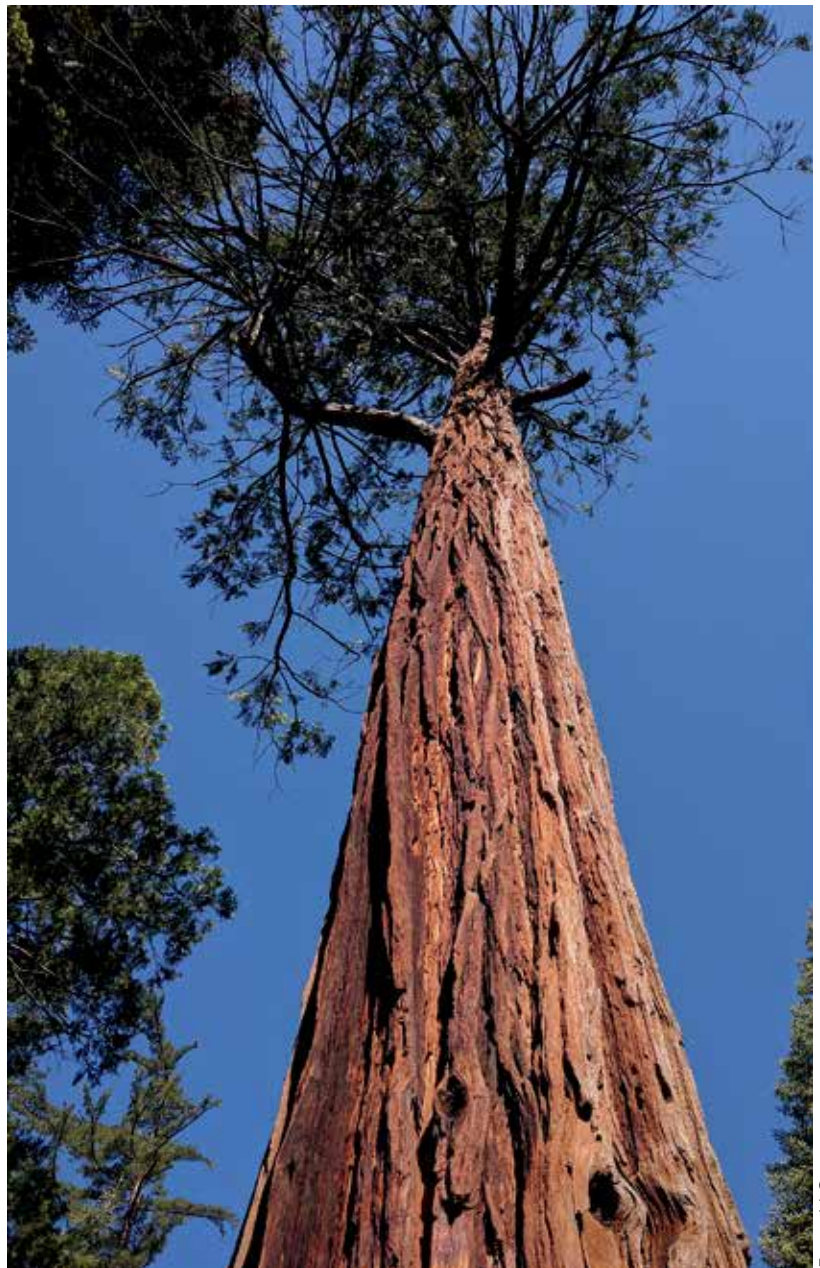
What I find remarkable about the cypress family is its breadth of habitats. From rugged coastal cliffs to near rainforest conditions, from serpentine barrens to granitic mountain heights, from foothills to deserts, you can find interesting and beautiful members of the family. 🌲

*Editor's Note: According to Garden Director Bart O'Brien, the absence of the incense-cedar from the south coast ranges is notable, though it is found on the serpentine deposits of the New Idria, Clear Creek, and San Benito Mountain areas.



Glenn Keator

The unique young cones of an incense-cedar



Rough red bark of the incense-cedar, Kings Canyon National Park

Emerald Canary

Champion Cypress *by Theo Fitandes*

Peter Thomas



Is it possible that this Santa Cruz cypress (*Hesperocyparis abramsiana*) in our Botanic Garden could be California's largest? Note missing limbs on south side of tree.

In the garden you may notice a tall, gangly, somewhat lopsided cypress along the eastside “freeway” in the Santa Lucia section. Among trees that have been officially measured, this tree just happens to be the world champion Santa Cruz cypress (*Hesperocyparis abramsiana*)! A larger tree is probably out there, waiting to be measured, waiting to displace our tree from the California Big Trees registry of Cal Poly’s Urban Forest Ecosystems Institute. The life story of this special cypress follows.

It is unclear when our tree’s seed germinated, so the exact age is unknown. On October 16, 1963, James Roof and Walter Knight collected seed from near Eagle Rock, just southeast of Big Basin Redwoods State Park. At some point the seeds were sown, germinated, and potted up at the garden, and two plants made it to maturity. On October 18, 1972, Al Seneres and Greg Whipple planted the one we see today in bed 205, making it anywhere from 46 to 55 years old. It seems they chose a good spot.

Eric Folmer, a consulting arborist, owner of Treewolf, and former East Bay Regional Park District park supervisor, has been called out a few times to do structural assessments and to clean up dangerous hanging limbs. On his second visit to evaluate some cracked but intact limbs, he mentioned that it was the largest Santa Cruz cypress he had ever seen. On a subsequent visit to verify the safety of a few more limbs that cracked in wind gusts, Eric helped me measure the tree. Large trees are assessed on a point scale, adding up three unequal dimensions: the height, measured in feet; one quarter of the average canopy spread, measured in feet; and the trunk circumference (at four and a half feet above average soil level), measured in inches. The third dimension, circumference measured in inches, is where an older tree can shine—each inch of secondary woody growth added to the diameter is multiplied by pi to calculate the circumference points. (Trees must have paid attention in geometry class!)

Using a clipping stick, Eric dropped a tape measure from the top of the tree down to the midline of the soil slope and measured 59 feet. The crown spread was an average of 38 feet (one quarter of that approximately 9 feet), and the circumference was 79 inches, for a total of 147 points. If measured today, each dimension would be slightly larger—the sum is possibly up to 151 points now. I challenge you all to get out and find a bigger specimen.

It is not all glory being a champion tree. In the wet seasons of 2015 and 2016, this tree lost several limbs on its southern side. As the healthy branches became laden with dense clusters of closed seed cones, and the rain wetted down the branches even more heavily, certain wind gusts were likely twisting the branches along their axes. The wood, already in high tension, was not engineered to withstand twisting forces as well as shear forces, and so we lost many branches on this otherwise very healthy specimen. In this garden, with its rich clay loam soils and supplemental water, the species can grow at a rate which seems to outpace its strength, and it may be that in this small, protected canyon, our specimen does not get enough wind to keep it battered into a smaller, stronger form. Another garden condition that may hasten the aging process is that the roots are infected by soilborne oomycetes (known as water molds, related to brown algae). In September of 2015, Gardener Michael Uhler took root samples from the tree to the California Department of Food and Agriculture's Plant Pathology Laboratory, and the lab confirmed the presence of *Phytophthora cinnamomi*, a widespread exotic invasive plant pathogen. This *Phytophthora*, or "plant destroyer," feeds on roots and can weaken and even kill its host. The primary management recommendation for these root rot diseases is to keep the specimen healthy, avoid applying water when the soil is warm, and avoid spreading the pathogen to other areas.

Since nobody came championing at the bit to find a larger specimen for me, I decided to head out on my own mission. This April I took a rucksack, some snacks, and a lot of podcasts up into the Santa Cruz Mountains, hoping to find either a specimen obviously larger than ours or none that were anywhere close. On that fine spring day I had the good

fortune of passing five different lupine species in bloom within 100 yards of each other, followed immediately by a lovely snowfall over Saratoga Gap. Around the peak of Eagle Rock—where the source population of our garden's specimen resided—the *Hesperocypris abramsiana* trees were all obviously smaller: shorter, narrower, and with shorter internodal spacing than our tree. To the east of Eagle Rock, there is a saddle with a swale that hosted a few relatively tall Santa Cruz cypresses which I estimated to be around 50 feet in height; these were protected by other woody plants and the hill contour. On the next peak to the east I noticed a very wide but squat specimen which appeared to be wind-shorn, being on the windward side near the peak.

I then ambled back down the trail and drove over to Bonny Doon Ecological Reserve, which is surrounded by private property and has a terrific maritime chaparral community including two rare manzanitas in addition to this rare cypress. This site saw a good fire about ten years ago and was in a robust phase of regrowth. There were innumerable cypress seedlings and saplings, along with several mature individuals spared from the fire either by fire suppression activities or by fuel breaks. There I saw a possible champion contender. But sadly, I had not brought any measuring devices with me, and I am not an experienced height estimator. The tree was on private property, with a few branches just barely straying over the signed fence line. Oh, how I wished I didn't have moral compunction or a fear of dogs! I was unable to contact the property owner that day, but I hope to get permission to measure the tree in the future. If our garden cypress has its champion tree title taken away, at least I want to share some of the glory of discovering the new champion! 🌿

Theo Fitanides is the Botanic Garden's Valley-Foothill and Santa Lucia section gardener. He holds a B.S. in Biology from California Polytechnic State University. He also likes to bird by ear, take long walks on the beach, and advocate for local native-plant gardening.

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