conifer

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CONIFER *QUARTERLY*

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Pinus ponderosa leader-flare, East Fork drainage of the Bitterroot River, MT, Photo by John Alford

Inside Cover Photo
Pinus oocarpa cone, near Porto Vallarta, Mexico, Photo by Tom Cox

Back Cover Photo
Boxed up conifers, Photo by Sharon Elkan, Silverton, OR

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Summer 2019 Message from the ACS President

David Olszyk

Hello members! Today I am writing to you after just having finished taking part, along with 250 of my best friends, in ConeFest2019, the National Meeting of the American Conifer Society in Silverton, OR. Congratulations to the Western Region! You really stepped up and delivered a diverse and fun event. This convention had it all — from the insanely fun and rewarding Iseli treasure hunt to the rare plant auction that brought in over $13,000, money destined to fund worthy recipients and projects. Thanks to all who took part. I really appreciate your spirit and generosity.

Directly after the main event, 80 of us departed for points south for a post meeting tour based in Grants Pass, OR. There, even more diverse and fun events awaited, from a very informative conifer road trip in the Siskiyou and Klamath Mountains on the Oregon-California border, to an exhilarating jet-boat dinner cruise down the Rogue River. The ride proved to be the best way ever to cool off from the 90-degree temperatures we experienced! Seeing the Brewer spruce *(Picea breweriana)* in nature was a bucket-list item for me.

If you go to our website, www.conifersociety.org, at the bottom of the home page, you will see our Instagram feed, loaded with memories from ConeFest2019. Do you have some pictures of your own that you would like to share? Feel free to do so. It will foster a sense of community and whet the appetites of those of us who could not attend. Photos should be sent to Leah Alcyon, alcyonleah@gmail.com, our new Social Media Director.

I look forward to taking part in the three regional conferences coming later this summer into the fall. More fun and coniferous camaraderie; who could ask for more?

Finally, I would like to welcome the new members to the ACS Board of Directors. In the Southeast Region, **Jeff Harvey** (TN) took a promotion to regional presidency, and **Sandy Horn** (NC) stepped up into the role of Director. In the Western Region, we welcome the return of **Joe Carli** (OR) as Western Region President and **David Rasch** (NM) our new Director, who is interested in planning conifer road trips in the Santa Fe and Albuquerque areas. Departing Board members include Johanna Mitchell, Sara Malone and Wayne Galloway. Thank you so much for your service to the Society.

New committee chairs and ex-officio Board members include **Robin Tower** (NC), our new Treasurer. **Deborah Merriam** (MA) has volunteered to manage our Reference Garden Program; **Lois Girton** (IA) is our new Scholarship Chair. And, as noted above, **Leah Alcyon** (CA) is our new Social Media Director. I look forward to your energy and ideas.

ACS President David Olszyk and Bill Hilber hard at work during the Iseli Treasure Hunt, ConeFest2019. Photo by Leah Alcyon.

My Wonder Tree

Text Ran Alford
Photography John Alford

By the time I was in college, I had lived in both southwestern New Mexico and western Montana. *Pinus ponderosa* (ponderosa pine) were abundant in both places. I liked living in those areas, and I decided that ponderosas were an *indicator species* for areas I liked. Flagstaff, AZ, and Bend, OR, are examples of habitats conducive to ponderosa pine growth and survival. Those locations have a lot of sunshine and enough rainfall to grow trees, but not enough of either to spoil outdoor activities. El Paso, TX, for example, at a lower elevation, is too hot and dry for ponderosas, and a higher-elevation town like Vail, CO, is so cold and snowy that it has few if any ponderosas. *Pinus ponderosa* occupy the Goldilocks area of the Rocky Mountains, as well.

I now live in Montana, and the state tree is *Pinus ponderosa*. If I go for a 1-hour long walk around my neighborhood, I pass by hundreds of ponderosa pines. If I drive for an hour to Missoula, I drive past thousands of them. On cold, cloudy, winter days, when the snow has covered the ground for months, and *Populus* spp. (cottonwood) are bare skeletons, the greenery of the ponderosas is a welcome sight. Maybe in the way that people become fans of their local sports teams, I have grown fond of ponderosa pines. The Bitterroot Valley of Montana was logged heavily in the early 1900's, and recent forest fires have burned several hundred thousand acres in my county since 2000. Consequently, very few old trees have survived.

Pinus ponderosa with Ran Alford at the base.

Pinus ponderosa top with multiple leaders.

Recently, I discovered a new threat to the ponderosas. I read in a local paper that the U.S. Forest Service was cutting down old giants, just for practice. The agency defended this as valuable safety training. While attending a book signing for *Ponderosa: People, Fire, and the West's Most Iconic Tree* by Carl E. Fiedler and Stephen F. Arno, someone in the audience asked the authors if they had visited a large ponderosa, with four tops, in the Bitterroot National Forest. I was immediately interested and obtained enough directions to find it. A 5-mile hike in and out of the hills brings the visitor to this anomaly. Ever since then, I have tried to visit this forest monarch at least once a year.

This behemoth is located in the East Fork drainage of the Bitterroot River in western Montana. Last fall, calculations put this tree at 138-feet tall with a diameter at breast height (DBH) of 55 inches. Using a 40x-binocular dissecting microscope from the W. A. Franke College of Forestry and Conservation at the University of Montana, researchers counted the rings from an increment boring that got to within 10 inches of the pith and estimated the age of the tree to be 475 years. The high resolution was needed to count the very narrow rings of the last century.

My wonder tree is growing at an elevation of 6,365 feet on a west-facing slope of about 17%. The hillside above it steepens and rises at least 1,000-vertical feet. A creek in the bottom of the canyon is about 80 yards below the tree. About 30 yards away is the only other visible ponderosa. It has a DBH of 36.5 inches. Before finding these two ponderosas, the last ones that I saw were about 1.5 miles down the trail and 700-feet lower. There is no ponderosa pine regeneration near the big tree. There are *Picea engelmannii* (Engelmann's spruce) along the creek, but the rest of the hillside is populated by *Pseudotsuga menziesii* (Douglas-fir) and *Pinus contorta* var. *latifolia* (lodgepole pine).

This *4-top* tree raises a lot of questions. The obvious one is, "Why does this tree have such an unusual shape?" The tree grew straight for its first 50 feet. Then it forked into four major stems. It appears likely that, after decades of growth, something stopped the terminal leader. There are several possibilities: wind, cold, wet snow,

a squirrel or porcupine, disease, insects, or genetics. At this point, it is hard to know about an event that occurred 400 years ago. However, after I visited the Dawyck Botanical Garden near Peebles, Scotland, I decided that freezing cold pointed to a probable cause for the anomalous top.

In the 1820's, David Douglas collected seeds and plant specimens for collections in Scotland. One of his specimens is now a very large and very oddly-shaped *Pseudotsuga menziesii* (Douglas-fir). The sign beside it attempts to explain the unusual growth. The sign reads: "When very young, the new growth shoot was possibly nibbled by a deer, or, more likely, damaged by frost. Affected trees can react by producing a spray of recovery shoots." That may have happened, resulting in the first tier of branches just below the leader all turning upward like a candelabra. Leader damage by frost makes sense to me.

In my latitude, most of the ponderosas grow between 2,000- and 5,000-feet elevation. My wonder tree is growing at an elevation higher and colder than its normal range. Also, this tree lived during the Little Ice Age. The NASA Earth Observatory notes that there were three particularly cold intervals, beginning around 1650, when this tree was about 100 years old. The multiple stems fork. Thus, four stems become eight, and all form a crown that looks like a bad hair day. From one angle, the multiple trunks have the spooky appearance of a giant human hand.

How did this tree happen to grow here, in this isolated spot? It is surrounded by more cold-tolerant species. The earth is certainly warmer now than it was during the Little Ice Age. How did the tree manage to germinate and survive when conditions were even colder? A forest fire may have cleared the land, allowing for a blowdown or windthrow, which then created a windsnap, forcing the tree to create several leaders. There could have been other ponderosas, which had lived here and had already died out. There are no fire scars on the trunk of my wonder tree. Perhaps the absence of fire allowed species less tolerant of fire to cause a stand-replacement.

Pseudotsuga menziesii in Scotland with Ran at the base.

The next thing that struck me about this tree is how smooth the bark is. I am used to seeing big ponderosas with fissures of 1/2 to 3-inches deep between multi-layered plates of bark. This tree has very shallow fissures, and the bark is almost smooth. Younger ponderosas typically have a thick, platy bark that flakes off when burned. Such an adaptation allows the tree to survive low-intensity fires, which can kill competitors like *Pseudotsuga menziesii* (Douglas-fir). In old age, ponderosas rely on size to survive fire, too. Another characteristic of the bark of this specimen is that on one side, about five feet above the ground, there are a lot of scratches, mostly vertical. This is the result of heavy bear activity. Bears like to scratch on smooth barked trees and sometimes return to favorite trees again and again to use as a scratching post. I have bark pictures from 2015 and 2016.

In 2015, I collected pine cones on the ground. These were the smallest ponderosa cones I had ever seen. I took three home, where I determined that they measured between 2.75 and 3 inches in length. I figured that the combination of the shorter growing season at 6,365-feet elevation and old age were responsible for the

small size. For comparison, I sought out several large ponderosas at 3,700-feet altitude near my home, that cannot be much more than 130 years old. The bark of these trees is still dark and deeply furrowed. Irrigation water from the adjacent field may be responsible for their good growth. I found some 5-inch cones under a 42-inch DBH tree. I was satisfied that old pines at high elevation have small cones, and younger trees, with more frost-free days, have bigger cones.

In 2016, there were no pine cones at the big tree, or from the ponderosas hanging over my lawn. Alexandra Murphy in *Graced by Pines* writes: "Cone crops are often meager; in one of every four years, the pines produce almost no cones at all." The time frame may vary, but this seems to be an excellent defense mechanism to disrupt the population of seed-loving squirrels. If one tree in a grove skipped cone production, a squirrel could just feast at the neighboring trees. When a whole forest of ponderosas takes a year off, that eliminates a food source. I would like to know what triggers this coordinated adaptation.

In 2018, I filled my backpack with 46 cones from my monarch. When I took measurements at home, I found that the sizes of the cones ranged in length from 2 inches all the way to 7 inches. I was surprised at the variation. The biggest cones were 12.2% longer than the smallest ones. For comparison, I picked up six cones from my lawn. Five were 4-inches long, and one was 3 inches. I expect differences among subspecies, but I thought that cones from the same tree and cones of a species in the same county would be about the same size. I have learned that different branches on the same tree may receive different amounts of water, nutrients, and sunlight. It makes sense that better inputs produce larger, healthier cones. It is also doubtful that 2-inch cones produce viable seeds.

I also looked into the literature to explain what I was finding. In the September 2013 article *Pinus ponderosa: A Taxonomic Review with Five Subspecies in the United States*, Robert Z. Callaham of the U.S. Forest Service Pacific Southwest Research Station writes about cone sizes. His measurements for cone length for the subspecies of *Pinus ponderosa* that grow in the Columbia River Basin were taken from 10 or more trees in each of 36 plots.

Bear claw marks

Ponderosa pine cones

Those trees produced cones with a mean length of 3.49 inches. The range for the sample was 2.85 to 4.06 inches. Those measurements are shorter and have less range than I found. He did comment about cone dimorphism: "Pronounced cone dimorphism (one to several cones 35- to 60-percent longer than the shorter cones) occurred on 16 of approximately 570 trees. Pronounced cone dimorphism was an infrequent, but not unusual, phenomenon in the two western subspecies of ponderosa pine."

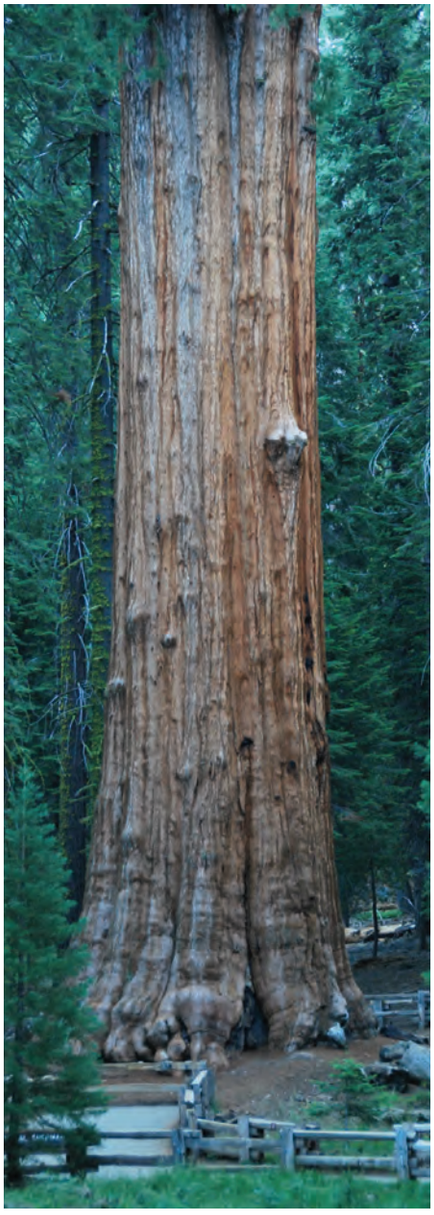
Lastly, there is a carved emblem on the bark of my wonder tree. Usually, if people carve into the bark of a tree, it is to write their name or initials. This exaggerated "V" is more like a Nike swoosh, or even possibly a cattle brand. I checked the cattle brands for Ravalli County and could not match it. It is just one more thing that causes me to *wonder* about this tree!

Ran Alford is a retired CPA, living near Hamilton, MT.


Close-up of *Pinus ponderosa* leader-flare

American Forests

Text Gene McCreary
Photography David Rasch



Sequoidendron giganteum
(The General Sherman)
Common name: giant sequoia
Named for Civil War Union General William Tecumseh Sherman
Sequoia National Forest, CA
274.9-feet tall
103-feet ground circumference
Largest known living single-stem tree on earth
2,300-2,700-years old

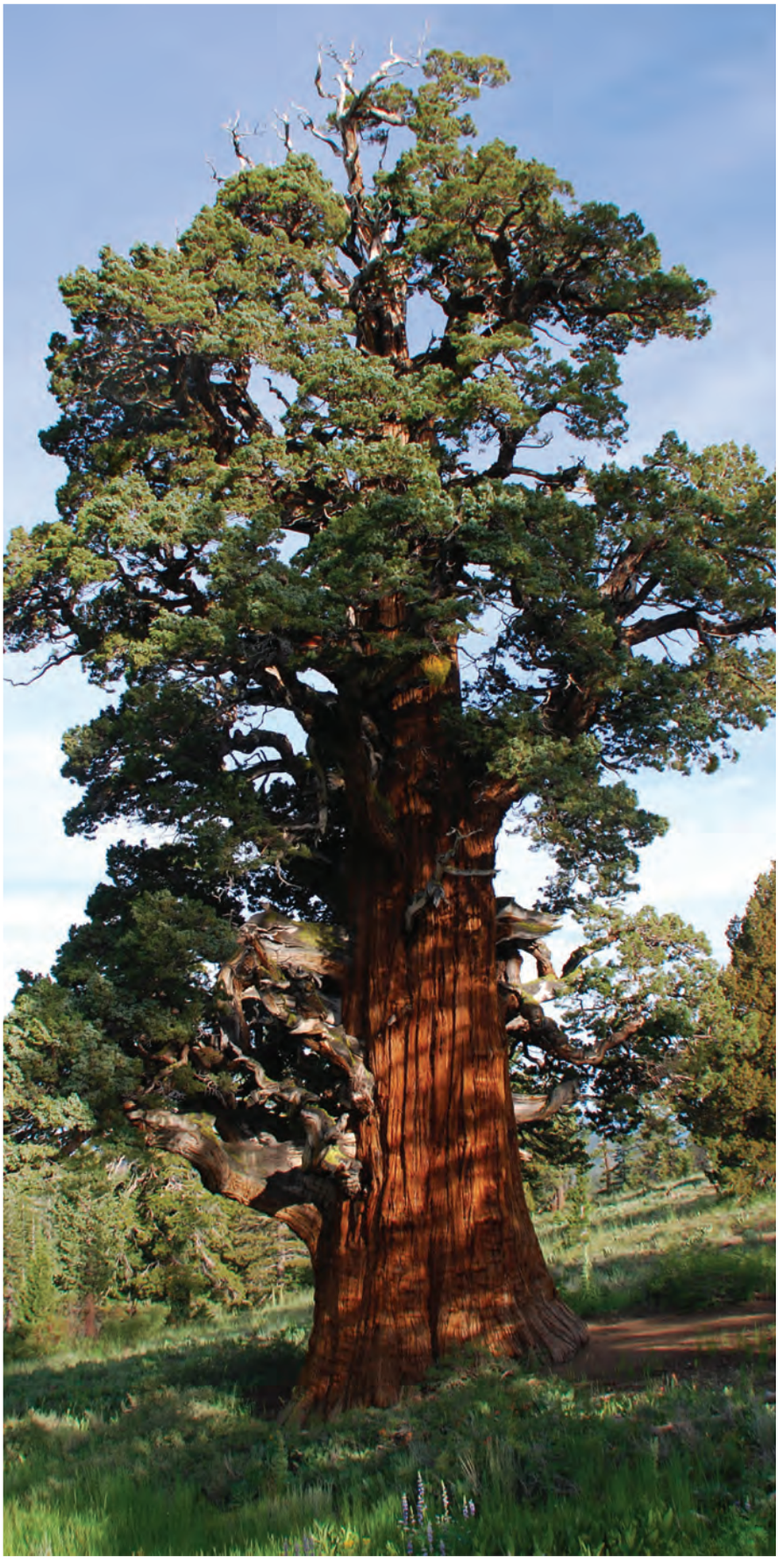
Do you want to know how large the biggest *Tsuga canadensis* (Canadian hemlock) is? It is 159-feet tall, 16 feet in circumference, with a canopy spread of 45 feet, and is located in Macon County, North Carolina. Some attendees at the National ACS Meeting last year got to see this champion. Or, how about the biggest *Pinus ponderosa* (ponderosa pine)? At 167-feet tall, 29 feet in circumference, with a canopy of 68 feet, this giant reigns in Deschutes National Forest in southern Oregon. Or, maybe, like many ACS members, you are in love with lots of trees, not just conifers. Then you would be fascinated to learn that the largest *Pyrus communis* (common pear) tops out at 59 feet with a girth of nearly 7 feet and a canopy of 43 feet.

This amazing monarch presides in solitary splendor in the middle of a wheat field in Strafford County, New Hampshire.

American Forests (AF) has been restoring forests for 140 years and is, thus, the oldest national conservation organization. AF keeps track of all these champions through its Champion Trees National Register. Many AF members come to the organization through their interest in big trees. Dedicated volunteers and professionals all over the country (much like those in the ACS) search for and measure these impressive specimens, photograph them, and report back to AF, with each tree rated on a point scale for height, 4-feet circumference above the ground, and for canopy spread.

Aside from the fun and inspiration that these large trees afford, there is also the crucial role champion trees play in forest ecology. AF Big Tree Program coordinator, Eliza Kretzmann, notes:

"Large-diameter trees make up about half of the mature forest biomass across the world. The amount of carbon that forests can sequester depends mostly on the abundance of large trees. Big trees represent potentially large controls on carbon-cycling worldwide. Conserving large



Juniperus occidentalis
(Bennett Juniper)
Common name: western juniper
Named for naturalist Clarence K. Bennett
Shasta-Trinity National Forest, CA
78-feet tall
12.7-feet diameter trunk breast high
Largest living juniper

trees is important in addressing climate change and protecting the great benefits that trees and forests provide."

The ability of trees to ameliorate climate change, while providing other values, defines the mission of American Forests: [to] "create healthy and resilient forests from cities to wilderness that deliver essential benefits for climate, people, water, and wildlife." Since 1990 alone, AF projects have planted 60 million trees.

"Together, these projects recover hundreds of thousands of acres of wildlife habitat, safeguard vital watersheds, absorb millions of tons of greenhouse gases, and protect some of the most stunning landscapes in America. At the same time, AF is using trees and green space to make our communities more sustainable, beautiful, and livable."

Working with many corporate partners (prominent among them are Bank of America and the Davey Tree Co), and always involving local stakeholders and communities, AF projects fall into two main categories: reforestation/repair of existing forests and reviving urban forestry. Of particular interest to conifer lovers are restoration strategies, such as the *Pinus banksiana* (jack pine) and *Pinus resinosa* (red pine) forests in the northern Great Lakes, *Pinus palustris* (longleaf pine) forests in the southeast part of the country, and *Pinus albicaulis* (whitebark pine), devastated by beetle infestations in the Cascades and northern Rockies.

As part of its mission, American Forests also promotes forestry within urban infrastructures, a movement that has gained accelerated traction in the last two decades. Building on the scientifically verified benefits of urban landscaping—cooler streets and parks, the sense of well-being gained from proximity to nature, and the spirit that evolves from local communities engaged in creating attractive parks and landscapes—AF, along with its corporate, governmental, and non-governmental organization partners, sponsors Community Relief programs, from Dallas to Dorchester to Detroit, in under-served areas. Along the way, these projects specifically employ and train local young men and women from the community in arborist and landscaping skills.

ACS members have expressed a growing interest in conservation. What better way than to join an organization already at the forefront of saving and restoring so many of the conifers we love?

ACS members can find the locations and sizes of all the recorded conifer species in the American Forests Register. The champion of champions is the awe-inspiring *Sequoiadendron giganteum* (giant sequoia) in Sequoia National Park, CA, dubbed "The General Sherman Tree". This specimen is the largest known single-trunked tree on earth. Second is the towering "Lost Monarch", a *Sequoia sempervirens* (coast redwood), 321-feet tall, in Jedediah Smith Redwoods State Park in northern California. Note that these are not necessarily the *tallest* specimens, just the largest overall. For example, a *Pinus poderosa* (ponderosa pine), 268-feet tall, the tallest known pine presently, stands hidden in the Rogue River National Forest in southern Oregon. The tallest coast redwood, "Hyperion", is an eye-popping 380-feet in height. Its exact location in Redwood National and State Parks in California is kept secret to protect the tree from vandalism.

Coneheads will want to know that the largest concentration of national champions, particularly conifers, exists in Olympic National Park, WA. Visitors there will find the largest *Thuja plicata* (western red-cedar). In addition, there are also *Picea sitchensis* (Sitka spruce), *Pseudotsuga menziesii* (Douglas-fir), *Cupressus nootkatensis* (Nootka cypress), *Tsuga heterophylla* (western hemlock), *Tsuga mertensiana* (mountain hemlock), *Abies grandis* (grand fir), and *Abies amabilis* (Pacific silver fir). True conifer lovers will want to make a pilgrimage to this cathedral of big trees in one of the only temperate rain forests in the world.

"Boxing Up" Conifers

Text and Photography Sharon Elkan

My passion for landscaping began in the early 1970's when my husband, Michael, and I moved from Philadelphia to Oregon. We bought a home close to Silver Falls State Park. I installed a huge rock garden, which included: *Sedum* spp. (sedums), *Sequoia sempervirens* (coast redwood), and many small perennials. I did not know much about miniature and dwarf conifers. Looking back to that time, I now realize that many genera of conifers would have been perfect for the sunny exposure the property presented!

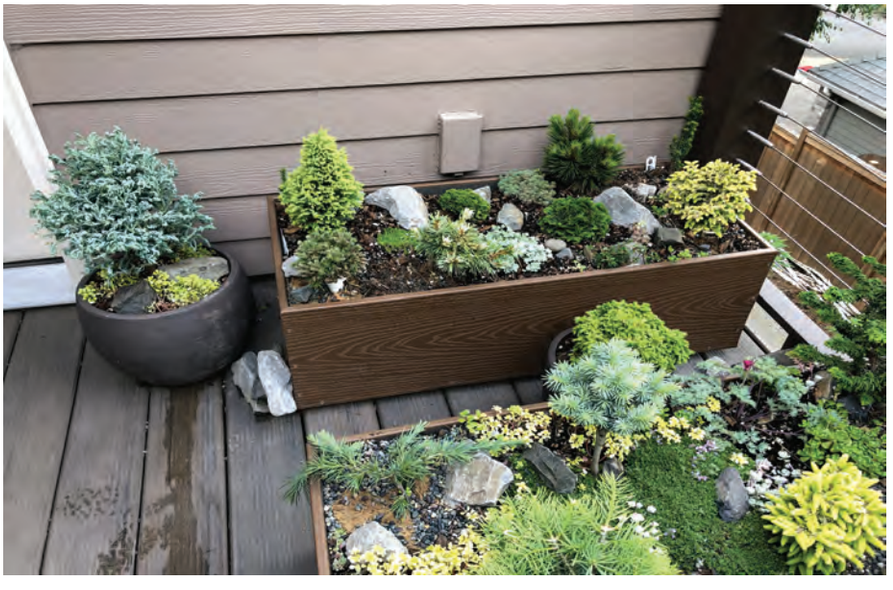
Then, 35 years ago, Michael and I purchased property on a beach about 25 miles north of Puerto Vallarta, Mexico. While our house was being built, I quickly learned which plants could tolerate a salty, windy environment. Within one year, I had planted several species of the family Arecaceae (palms), along with *Cycas* spp. (cycads), Polypodiophyta spp. (ferns), *Agave* spp. (agaves), *Philodendron* spp. (philodendrons), and many more species of plants. I worked on that tropical garden for 24 years.

I moved back to Silverton, OR, about four years ago, after I lost Michael to cancer. My new living space is a 2nd-floor apartment with a 10-square foot deck. I wondered how I might landscape that space. "Plant in boxes", was my answer. I commissioned a local carpenter to build containers, using Trex decking material. Voilà! I had a new blank garden canvas.

Next, I needed a medium for the conifers I had begun to acquire. I created a soil mixture out of compost, pumice, and fir bark chunks. It drains very quickly, which I knew was important. After all, conifers do not like to sit in water.

Two boxes are 2 feet x 3 feet by 1-foot high. A third container measures 3 feet by 16 inches and is also 1-foot high. I have also added many ceramic pots to accommodate even more plants. I planted 10 different conifer genera.

Chamaecyparis obtusa (hinoki cypress) 'Greenstone', 'Gemstone', 'Chirimen', and 'Nana Lutea' thrive and grow in the boxes. To the shades of green of the first three



cultivars, 'Nana Lutea' asserts a standout yellow.

There are also three cultivars of *Chamaecyparis lawsoniana* (Lawson cypress) in the boxes: 'Ellwood's Nymph', 'Wissel's Saguaro', and 'Treasure Island'. These three flip-flop between greens and golds and are slow-growers. 'Ellwood's Nymph' is a mini, and 'Wissel's Saguaro' reminds me of the cactus after which it was named.

Cultivars of *Chamaecyparis pisifera* (sawara cypress) add to the texture of the landscape. 'Curly Tops' and 'Tsukumo' pop. The former is a steely blue. 'Tsukumo' offers a bun-shape. Two *Thuja occidentalis* (eastern arborvitae), 'Amber Glow' and 'Franky Boy' add different dimensions. 'Amber Glow' does just that: it "glows". 'Franky Boy' has cute, stringy, lemon-yellow foliage.

I used one *Cryptomeria japonica* 'Tenzan' (Tenzan Japanese cedar). It has a dense, mounding, shape.

Abies koreana 'Kohouts Icebreaker' (Kohouts Icebreaker Korean fir) is silvery. *A. nordmanniana* 'Jakobsen' (Jakobsen Nordmann fir) draws the eye to its dense, pyramidal form. I used two more firs, *Abies concolor* 'Tubby' (Tubby white fir) for its puff of greenish-blue, and *Abies borisii-regis* 'J.K. Greece' (J.K. Greece King Boris' fir) for its spreading habit.

What conifer garden would be complete without pines? *Pinus mugo* 'Real Little' (Real Little mountain pine) is sweet and compact. 'Little Gold Star' shines like the sun. 'Jakobsen' looks like an in-ground bonsai. Lastly, *Pinus parviflora*

'Tanima no yuki' (Snow in the Valley Japanese white pine) is perfect for a "boxed" landscape.

Picea pungens 'Blue Pearl', *P. pungens* 'Pali', and *P. mariana* 'Blue Planet' show off the hues that we all love about blue spruces. Add to that appeal the slow growth of all three cultivars, and you have some of the best conifers for small spaces.

Picea orientalis 'Tom Thumb Gold' (Tom Thumb Gold Caucasian spruce) also has a habit conducive to container gardening, with its striking, gold fingers and tight foliage. Cedars are always a hit in any garden, either in a full-sized landscape or in a garden like mine. I used two cedars in my containers: *Cedrus libani* 'Green Prince' and *C. libani* 'Hedgehog'. Both choices of Lebanon cedar have two important habits for the small garden: they are both slow growers and centerpiece plants.

Finally, I chose *Juniperus communis* 'Gold Cone' (Gold Cone common juniper), which works both actually and figuratively as an exclamation-point in the garden.

My greatest inspiration for creating a small conifer container landscape was The Oregon Garden, here in Silverton. ACS member Doug Wilson, who manages the conifer garden and has so much knowledge and artistic talent, has been a huge influence on me. Each year this magical Oregon Garden gets more beautiful.

My deck gives me enormous pleasure. The landscape of colors, textures, and shapes, which I enjoy every season of the year, is the best gift I have ever given to myself. It is my hope that my inspiration can become yours, as well. We do not all have large spaces for a conifer garden. However, with the right research and the right conifers, any sized conifer garden can work!

Member Profile: Dana Behar

"Restoring the Land"

Dr. Ronald J. Elardo

The mission of the American Conifer Society is to educate the public about conifers, conserve conifers, ensure correct botanical nomenclature for conifers, and demonstrate the use of conifers in the landscape.

Dana Behar might be *adding* a new category to our mission: restoration of the land. Dana has begun the arduous task of resurrecting five acres of land in Port Angeles, WA, near the tip of the Olympic Peninsula, close to the Pacific Ocean. The restoration of the land began just a little over a year ago.

Dana is a brand new member of the ACS, and was introduced to me through an email from our National Office (Steve Courtney).

I learned that Dana splits his time between residences in Seattle and Port Townsend, WA.

Dana was educated at the University of Washington, the University of Pennsylvania, and the School of Design at Harvard University, and has worked in marketing, real estate development, and agriculture.

The land-reclamation started when Dana discovered 30,000+ pounds of debris on and *in* the land he purchased at Port Angeles. In fact, he reports that every dig into the soil has continued to reveal even more debris.

Dana has two favorite conifers: *Thuja plicata* (western red-cedar) and *Sciadopitys verticillata* (Japanese umbrella pine).

According to Dana, despite the use of the land as a garbage dump by the previous owner, *Picea sitchensis* (Sitka spruce) and western red-cedar have been growing and thriving there.

In the past year, Dana has planted over 800 native plants on the site, including a wide variety of Polypodiophyta genera (ferns), which he adores. He has also planted hundreds of western red-cedar and Sitka spruce. He notes that, before the previous owner denuded the site, it was largely a western red-cedar forest.

Because the climate of Port Angeles is arid in summer, Dana plants in winter, when ample moisture blankets the peninsula. *Sequoiadendron giganteum* (giant sequoia) is now also growing there, thanks to Dana.

I can report that Dana also favors *Prunus avium* (sweet cherry), which he grows commercially in the eastern half of Washington. That part of the state is actually a desert, as the Cascade Mountains divide

Thuja plicata (western red-cedar)

Washington into a wet, western half and a dry, eastern half.

Please welcome this new ACS member, as I have, into our Society.

A Garden of *Sciadopitys verticillata*

Text and Photography Dana Behar

About 25 years ago, a young graduate of the Yale School of Forestry, Lorens Fasano, had the opportunity to buy 550 saplings at a local nursery that was going out of business. Knowing the rarity of the species, Lorens purchased all of the trees, which he carefully planted nearby, on the 82-acre property of his parents, in rural New Jersey. Some 25 years later, Lorens has what is believed to be the largest collection of mature specimens of this species in North America.

The species in question is *Sciadopitys verticillata* (Japanese umbrella pine), *kôyomaki* in Japanese. It is not actually a pine, but is, in fact, one of the rarest and most unusual conifers in the world. It is also one of the earliest conifers, dating back to the Triassic period. *Sciadopitys verticillata* lived before the existence of dinosaurs. Originally comprising a wide variety of species with a habitat spreading across continents, Japanese umbrella pines became virtually extinct. The geographic range of the trees has at present been reduced to just two isolated areas in Japan, with the diversity becoming limited to a single species.

Japanese umbrella pine derives its common name from the whorls of needles that grow at the end of its branches and that mimic the spokes of an umbrella. The heavily-needled branches cover the tree in a cloak of green. The needles are of the richest shade of green, soft, round, and waxy to the point that they look almost like plastic. The needles grow 2-5 inches in length in whorls of 20-30 and contrast elegantly with the bark, which is thick, soft, orange-brown, and stringy. The needles are actually photosynthetic flattened stems, called cladodes. Japanese umbrella pines are extremely slow-growing, typically taking up to 100 years to reach a full height of 25-40 feet.

Close up detail of an umbrella pine

Now considered a living fossil, it is a genetic orphan, the only remaining member of the family Sciadopityaceae, of the genus *Sciadopitys*. The tree is found in Japan on the Nara Peninsula of Shikoku Island and in the mountains northeast of Nagoya on Honshu Island. *Kôyamaki* is one of *the five trees of Kiso* that are treated as sacred in Japan. Historically, its spicy-scented, water-resistant wood was highly valued for making boats, and its bark, in the form of oakum, for caulking. Now listed as vulnerable, it is too rare to be used as anything other than a highly prized ornamental and is found in many of the leading gardens of the world.

Fast forward to 2019. Lorens Fasano now has 340 mature Japanese umbrella pines on the property his mother owns. Lorens is trying to find new homes for these trees, as the 82-acre property needs to be sold. Although he had not previously been active in marketing the umbrella pines, his trees have been sought after and can be found at Brooklyn Botanical Garden and

Hudson Yards in New York, NY, Vassar College in Poughkeepsie, NY, and Carnegie Mellon University, in Pittsburgh, PA. Lorens has lovingly cared for these trees for over 25 years and is determined to find good homes for the rest. The trees are being offered to colleges and universities, botanical gardens, Japanese gardens, and landscape architects. Anyone interested in learning more about these trees, should visit www.umbrellapines.com.

Those interested may also contact Dana at: ddbehar@gmail.com.

Lorens Fasano with one of his umbrella pines

Note from Ron Elardo and Dave Olszyk:

Here are some interesting facts about *Sciadopitys verticillata* (Japanese umbrella pine).

The botanical name for the tree comes from ancient Greek: σκιά (*skiá*), English translation: "shadow"; and *pitys*, (Πίτυς), English translation: "pine". The epithet, *verticillata*, means "with whorls". This suggests that the "shadow pine" is naturally an understory plant.

Its Japanese name is コウヤマキ(*kôyamaki*). An image of the tree is on the crest of Prince Hisahito Akishino, currently the third in line to the Chrysanthemum Throne.

Japanese umbrella pine dates from 230 million years ago. According to fossil records, its range included the Baltic Coast of Europe. Chemical and fluorescent analyses of its resin link it to Baltic amber, created from the sap of the tree being fossilized and then washing up onto the coasts of Baltic Coast countries, such as Poland, Latvia, Estonia, and Russia.

Amber "stones" were traded by both the Romans and, then, later, by the Vikings. Many times amber (called in German *Bernstein*) has inclusions with insects and plants preserved in it. Such stones are highly prized.

Near St. Petersburg, Russia, there once was an Amber Room in the Catherine Palace of Tsarskoye Selo. It was dismantled and stolen by the Army Group North of Nazi Germany in the siege of St. Petersburg. After World War II, Russian craftsmen spent decades reconstructing the Amber Room with donations from The Federal Republic of Germany. In 2003, the Amber Room was rededicated in the Catherine Palace.

The original Amber Room was considered an "Eighth Wonder of the World" and had been given as a gift to Russian Tsar Peter the Great by King Friedrich I of Prussia in 1716.

German researchers believe they have found the stolen Amber Room in the Berlin City Palace (*Das Stadtschloss*), which itself has been reconstructed and rededicated on the Museum Island (*die Museuminsel*), in central Berlin.

Conifers South of the Border

Text Tom Cox
Photography Tom Cox and Dr. Jorge Alberto Pérez de la Rosa

Pinus vallartensis
Photos by
Dr. Pérez de la Rosa

A recent trip to Puerto Vallarta, Mexico, afforded me the honor to spend a day with the leading pine expert in that country, Dr. Jorge Alberto Pérez de la Rosa. As a prelude to the narrative concerning this important meeting, I offer the following background, in order to provide context.

When I first developed an interest in conifers, my assumption was that conifers from Mexico, Central America, and South America were not suitable for the USDA zone 7b climate in north central Georgia, where my home and arboretum are. My previous focuses had been North America, Central Europe, Asia Minor (Turkey), and Temperate Asia (Far-eastern Russia, Mongolia, Eastern and Inner China, the Korean Peninsula, and Japan). In part and as a result of my extensive travels throughout the world, plus good connections, I have enjoyed access to numerous genera to evaluate.

Vallarta Botanical Garden Photo by Tom Cox

After over 25 years of trial and error, I had begun to develop a fair understanding of the areas from which I could select specimens. As an example, *Abies* (fir) from the West Coast of the United States are not suitable for our growing conditions in Georgia and the Southeast. The same is true for a number of conifers that are native to the eastern slopes of the Sierra Nevada range. My specific geographic area is too wet. I have trialed and have lost almost all conifers that are native to Australia, New Zealand, and Tasmania. The conifers of these countries do not adapt well to my soil, moisture regime, and hot nighttime temperatures.

Approximately 10 years ago, I was introduced to Jeff Bisbee, who lives in Gardnerville, NV. Jeff is an expert on the conifers of his region and has also collected specimens extensively in Mexico. On one of my trips to visit him, he shared several species for trial. After meeting Jeff, I then met Dr. Jason Smith, who is a plant pathologist at the University of Florida in Gainesville, FL. Dr. Smith is credited with discovering *Fusarium torreya*, the fungus responsible for the decline of *Torreya taxifolia* (Florida torreya), the most endangered conifer species in North America.

Dr. Smith also has assembled a significant collection of Mexican conifers at his research station in Gainesville and was happy to share plants with me for evaluation. In my zone, I can now successfully grow 7 *Pinus* (pine), 3 *Juniperus* (juniper), 3 *Abies* (fir), 1 *Pseudotsuga* (Douglas-fir), 2 *Cupressus* (cypress), and 3 *Picea* (spruce). All have been in the ground at my arboretum long enough for me to be comfortable with their adaptability.

Whenever I thought of Mexico, I thought of a hot, dry, and flat place, a result, no doubt, of watching too many Clint Eastwood Westerns. However, I learned several facts about Mexico. Although the highest point in eastern North America is Mt. Mitchell, NC, at 6,683 feet (2,000 meters), there are several mountains in Mexico in the 17,000- to 18,000-feet (5,100- to 5,182-meters) range! Due to cold tolerance, many conifers will adapt to our north central Georgia zone 7b and elsewhere, even zone 6. The higher elevation species, such as *Pinus cembroides* (Mexican pinyon pine), are too alpine for our heat. Likewise, species such as the most beautiful *Pinus lumholtzii* (Lumholtz's pine) are too tender.

In early April 2019, my wife, Evelyn, and I found ourselves in Puerto Vallarta with an open day to do non-touristy things. In advance of

our trip, I had reached out to Neil Gerlowski, the Executive Director of Jardín Botánico de Vallarta (Vallarta Botanical Garden). He kindly arranged an email exchange between me and Dr. Pérez de la Rosa, mentioned above, who had to drive almost 5 hours from his home to meet us. He is a researcher and professor in the Department of Botany and Zoology at the University of Guadalajara. He is also co-author with Aljos Farjon and Brian Styles of the book, *A Field Guide to the Pines of Mexico and Central Mexico.*

Although our bilingual skills were limited, our love of plants and knowledge of botanical nomenclature transcended the language barriers Dr. Pérez de la Rosa and I had. Neil Gerlowski had also accompanied Dr. Pérez de la Rosa. After a one hour drive out of the city, we were in the mountains, where the lush scenery mirrored the images from books that I had read. The countryside was replete with *Quercus* (oak) and numerous species of Magnoliaceae (magnolia family). In the distant mountains, we would see cloud forest, and I found myself wishing I were able to explore the area on foot.

Dr. Pérez de la Rosa pointed to a remote spot high in the mountains where he had discovered a recently described species of pine from the western state of Jalisco. *Pinus vallartensis* (Vallarta pine) occurs near the southern limit of the Sierra Madre Occidental mountain range in northwestern and western Mexico. It is known from only one location where individual trees grow scattered on a northern exposed hillside with grassland and open forest of pine and oak. Estimates are that its area of distribution extends only a few square kilometers, and the number of mature specimens is fewer than 2,500 trees.

Dr. Pérez de la Rosa reports that the habitat generally is open grassland, making the area vulnerable to frequent fires, both natural and intentionally set to promote cattle grazing. Since a part of our mission at the Cox Arboretum and Gardens in Canton, GA, is the conservation of endangered conifer species, I was hoping to obtain seed. With our median temperature of 78°F (26°C), this pine would not survive in Georgia. However, the request for seed was not in vain, as Dr. Pérez de la Rosa promised to send me seed from a high elevation population of *Pinus lumholtzii* (Lumholtz's pine), which I consider the most unusual of all Mexican pines.

The other three pines in the area are *Pinus oocarpa* (Mexican yellow pine), *P. jaliscana* (Jalisco pine), and the more distantly related *P. maximinoi* (Maximo's pine). We drove to an area where I was able to photograph and collect cones of *Pinus oocarpa* and *P. maximinoi*. Regrettably, I passed on looking for *P. jaliscana*, the rarest of the three. I was advised that the area where *P. vallartensis* could be seen was too rugged for me to attempt. As a consolation, Dr. Pérez de la Rosa kindly presented me with cones and an article he had written describing the species. It is significant to mention that Mexico contains more species of pine than any other country and, within the state of Jalisco, where we traveled, there are 20 conifer species.

Like its neighbor to the north, Mexico is ecologically quite diverse. At the driest extremes live *Pinus monophylla* (single-needled pinyon pine) and some of the related species, which co-exist in semi-desert and desert conditions. In contrast, some pines occur in extremely wet and cool high-altitude forests, often with conifers such as *Abies* (fir), *Pseudotsuga* (Douglas-fir), and *Cupressus lusitanica* (Mexican cypress). In my opinion, Mexico is an under-explored area for conifers, as well as home to

Pinus miximinoi cones Photo by Tom Cox

Pinus oocarpa cone Photo by Tom Cox

Pinus maximinoi in the mountains Photo by Tom Cox

beautiful broad-leaf taxa.
At the conclusion of our field visit, we were driven to Vallarta Botanical Garden, where we were again welcomed by Neil Gerlowski. Neil is an expatriate from the United States, who appears to be at home here. This internationally acclaimed garden is recognized as one of the most beautiful gardens in the world, and for good reason. The property encompasses 64 acres at an elevation of 1,300 feet (400 meters) and is situated on the side of a large mountain. In 2013, VBG was selected as one of the Top 10 North American Gardens Worth Traveling For by the North American Garden Tourism Conference's International Tourism Award Jury. Reader's Choice of *USA Today* rates it as the number 4 Botanical Garden in North America. TripAdvisor® rates it as the number 1 Garden in Mexico (2018).
My only disappointment was not being able to see much of the garden. Its topography is not conducive to those with physical handicaps like mine. The portion we were able to traverse was outfitted with paths set in the lush tropical forest. I have never visited a garden with a more beautiful setting, or seen such a dizzying array of plants. While there, we dined in their award-winning restaurant and sipped on complimentary hibiscus tea as we watched tropical birds fluttering about. A magical setting! This is a must-see garden for those visiting the area.

I wish to thank Dr. Pérez de la Rosa and Neil Gerlowski for their time and generous hospitality. As I concluded what will regrettably be my last overseas adventure, due to increasing physical limitations, I can think of no better a way to bring these kinds of travels to a close than to spend them with true professionals. A day with the top pine expert in Mexico exceeded all of my expectations.

Dr. Pérez de la Rosa and Tom Cox.
Photo by Evelyn Cox

What is Wrong with my *Pinus aristata*, and What am I Going to do About It?

Text and Photography Leah Alcyon

Using the microscope in the field on *Pinus aristata*

The first thing that anyone does before going to the doctor to get relief from an illness is to Google the symptoms that you are presenting, so that you can tell the doctor what drugs you would like. As an ACS member, I do not Google plant illnesses. Instead, I ask our own conifer medical doctor, ACS Conifer Database Editor David Olszyk (and/or substitute your local ACS expert, depending on where you live), when a plant of mine is ailing. When my *Pinus aristata* started losing needles, the first thing I did was to take a photo of it and send it to Dave, who immediately identified the problem as *Rhizosphaera* needle cast (*Rhizosphaera kalkhoffii*). That is when I began my own education on the internet.

Rhizosphaera was certainly a possibility, but Wikipedia said that, with a small magnifying glass, you could see black dots. The University of Michigan site indicated the problem could be worse: *Stigmina* needle cast (*Stigmina lautii*). My first task was to collect some samples from not only my *Pinus aristata* (Rocky Mountain bristlecone pine), but also from its neighbor, *Pinus sylvestris* (Scots pine), just 4 feet away. Then I got to thinking about other conifers which appeared to be suffering from needle cast. I went to the Hiram M. Chittenden Locks Botanical Garden (Seattle, WA) and collected some small samples there, as well. I collected samples from *Pinus aristata*, *Pinus sabiana* (gray pine), *Pinus jeffreyi* (Jeffrey's pine), and *Pinus wallichiana* (Himalayan white pine). I asked myself, where does this fungus originate, and why is it only on some plants?

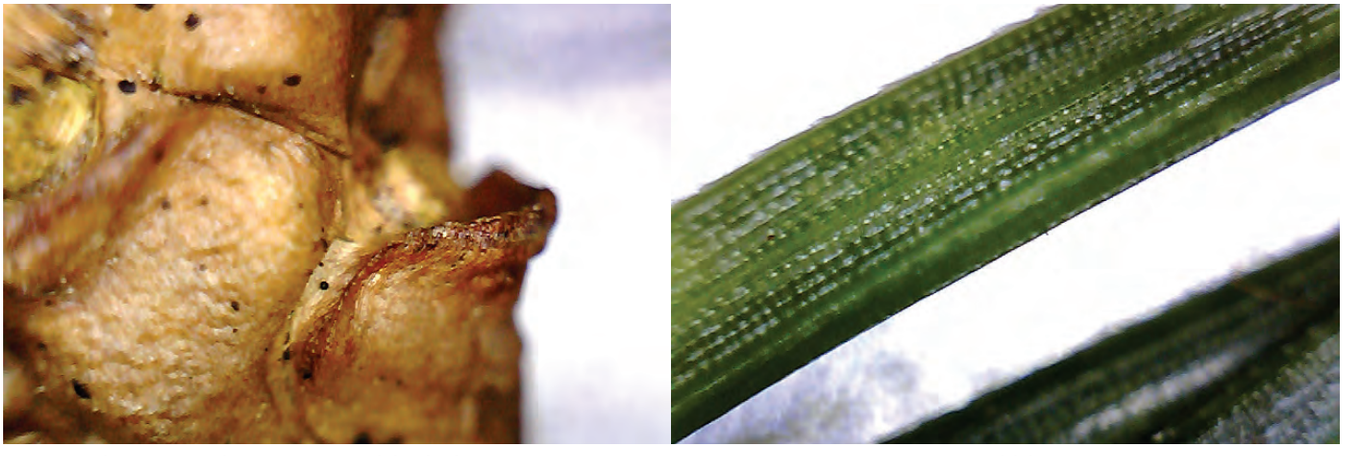
The easy answer is that the fungus is everywhere. It circles the earth and seeks out the weak and vulnerable. An even easier answer is that it especially grows in the Seattle area, where the environment is very wet much of the year. After all, fungus grows in damp, moist areas.

We happen to have a small microscope that attaches to the computer. I can take photos of what I am viewing. It does not produce fantastic quality photos, but it certainly provides some entertainment. The microscope specs are:

Vividia 2.0MP Handheld USB Digital Endoscope/ Microscope with 8.2-millimeter tube diameter. Connect the digital endoscope to your computer with a USB cable included, and inspect small details right on your computer screen! With a 2.0-Mega pixels CMOS sensor, up to 300x-magnification, and six built-in LED's for illumination, this product allows you to view images in high resolution, take standard photos, record videos, and use as a webcam.

Needless to say, using the equipment in the field was difficult, and, after one try, I quit. After that, I took my samples, sealed them in plastic bags, and put them under the 'scope. Here are the results:

1. *P. aristata* at home: black dots everywhere, but mostly on the stem.



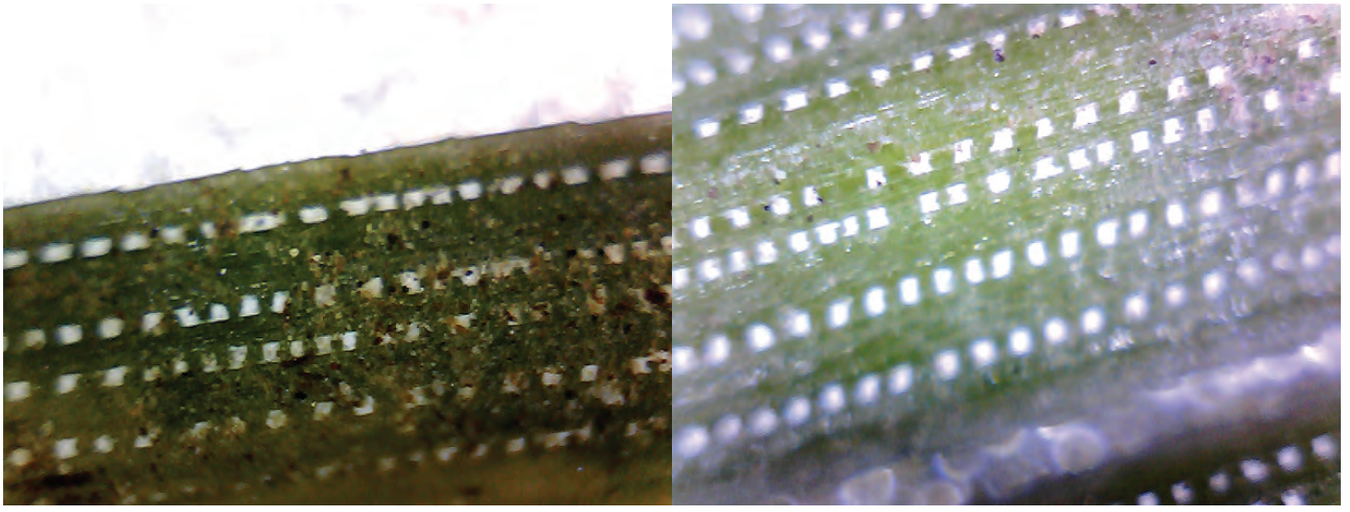
2. *P. sylvestris* at home: some black dots on stems. Very interesting waxy, stomatal bloom pattern!

3. *P. aristata* at the Chittendon Locks: no black dots, despite having all the lower branches look exactly like needles which had been cast.

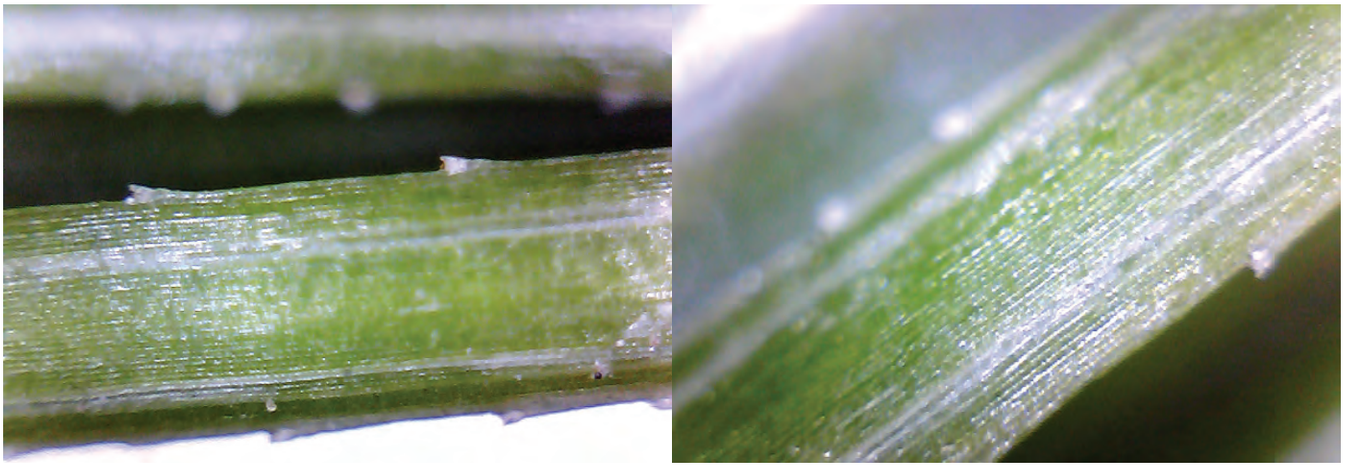
If there is a black dot, there is only one.

Just a shot of the waxy deposit on the *Pinus aristata* needle, which helped me find this interesting blog:

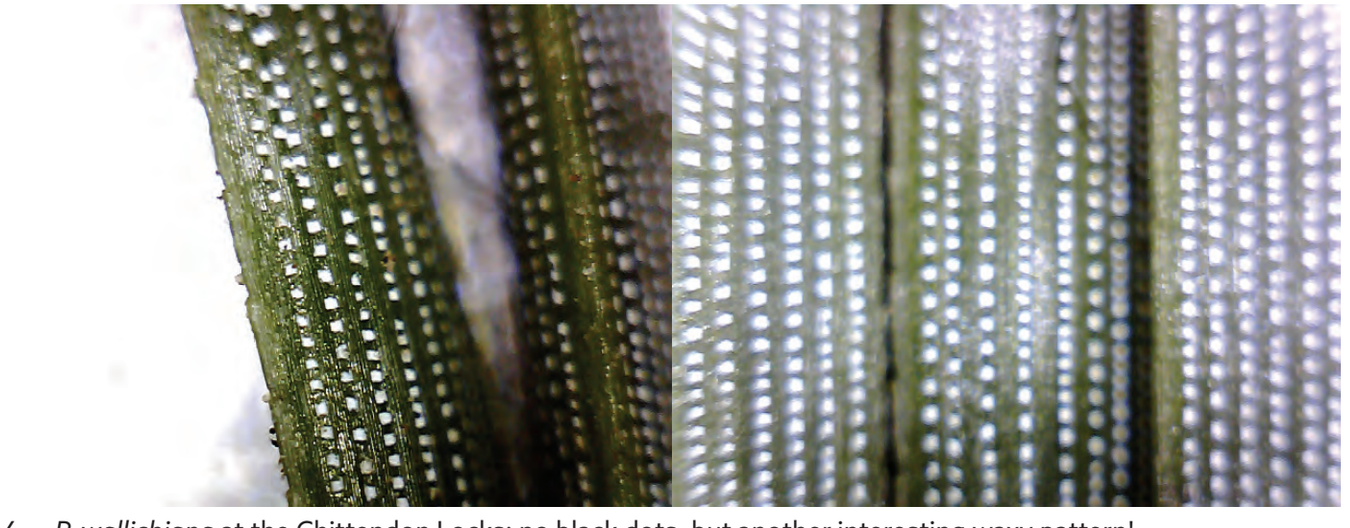
http://nwconifers.blogspot.com/2015/07/stomatal-bloom.html



4. *P. jeffreyi* at the Chittendon Locks: no real round black dots. Needles were collected from the ground and were not fresh. *P. jeffreyi* has a really interesting waxy pattern, however!



5. *P. wallichiana* at the Chittendon Locks: no black dots, but check out the barbs on the needles!



6. *P. wallichiana* at the Chittendon Locks: no black dots, but another interesting waxy pattern!

I use the term "black dots" because I cannot identify what the black dots are that I found only on plants in my garden. I have had a few moments of reflection, since it appears that the easy answer for the black dots is the presence of fungus. The presence of fungus everywhere is not true, since, in that case and according to research, a conifer like the *P. aristata* at the Chittendon Locks should be covered with dots. I continued to process the data and am faced with several possible actions.

Your pine looks ill, and you choose to:
a. Dig it out and send it to someplace dry for replanting
b. Spray it with fungicide
c. Cut off all the branches that look sad
d. Take pictures with a microscope and see if someone can identify the problem
e. Tell yourself that the top is nice and deny that there is a problem
f. Cut it down and try to figure out what to do with the corpse, in order to reduce the spread of the fungus spores

Curses!!! I spent more time in analysis-mode, procrastinated the doing, and then wrote to the Master Gardener program at the University of Washington. The UW website indicated that the staff had the capacity to answer gardening questions.

GARDENING LEVEL: Avid
HOW DID PATRON HEAR ABOUT US? Web
UW Affilation? none
QUESTION: I have a *Pinus aristata* which has either *Rhizosphaera* needle cast, or worse, *Stigmina*, on the needles and stems. I am using a small home microscope to look at the black dots, but I am wondering if there is someone knowledgeable of these diseases who might be willing to discuss them. Thanks,
Leah Alcyon

The response came back:

Leah,
Thank you for writing. I am not familiar with either of those diseases, but I hope that the King County Master Gardener program diagnosticians may be able to help you. I am forwarding your message to them, and they may reach out to you for more information about what you are seeing.
Best wishes,
Laura Blumhagen
Information Specialist
Elisabeth C. Miller Library
Box 354115, 3501 NE 41st St., Seattle, WA 98195
School of Environmental and Forest Sciences
College of the Environment

Somewhat interesting is that Washington State University does support gardeners with questions and is located at the same Center for Urban Horticulture as the University of Washington. I gave them a sample and filled out a form. This is what I got back:

March 22, 2108
Leah Alcyon
4040 30th W.
Seattle, WA 98199

dlalcyon@gmail.com

Diagnostician: bta

We received the branches from your *Pinus aristata* (Rocky Mountain bristlecone pine) in our Diagnostic Lab and examined them on March 22. You are correct with your diagnosis of a fungal disease on the pine. More specifically, it is a fungal needle cast disease. This should not harm your tree in the long run, but do pick up all the dropped needles, since these will have fungal spores which can re-infect the tree.

We are sending a link to several articles on fungal needle cast diseases which give more information on them and also give options for treating the diseases.

http://hortsense.cahnrs.wsu.edu/Search/MainMenuWithFactSheet.aspx?CategoryId=1&SubCatId=3&PlantDefId=30&ProblemId=622
http://hortsense.cahnrs.wsu.edu/Search/MainMenuWithFactSheet.aspx?CategoryId=1&SubCatId=3&PlantDefId=30&ProblemId=623

Thank you,
WSU Extension, Master Gardener Diagnostic Lab

So, there we are! You got to see some interesting photos of pine needles and some black dots! I have not made a decision about what to do with the *P. aristata* in question. David Olszyk thought it needed to be removed ASAP, as it was *'wrong plant wrong place,'* but it is raining today, and no one wants to go outside, not even the dog.

Other sources of information:
http://www.forestpathology.org/dis_wpbr.html
https://hortnews.extension.iastate.edu/2007/4-18/conifer.html

The most common disease of *Picea pungens* (Colorado spruce) is *Rhizosphaera* needle cast, a fungal disease that usually requires fungicides for management. *Rhizosphaera* needle cast causes needles to turn purplish brown and fall from the tree, usually from the inside of the tree working out and from the bottom of the tree working up. For effective control, infected trees should be treated once in mid-May and again four to six weeks later.

http://msue.anr.msu.edu/news/stigmina_found_associated_with_needle_cast_on_blue_spruce_in_michigan

Location, location, location!

What works and what does not in the battle against fungi.

Text and Photography Dr. Ronald J. Elardo

Picea pungens 'Gebelle's Golden Spring'

Much of our country has been inundated by flooding this spring. Nothing has been able to hold back the waters. Levees, dams, and sandbags have failed to stem the deluge. "Water wins!" Mary Beth Cunningham, a friend, neighbor, and lake-dweller, said while watching lake waters swell over docks and property. All residents can do is sit by powerlessly while their lives sink under water. What is going on? What can we do about this, especially when fungus and mold follow on the heels of the floodwaters?

While on tour at Conifer Kingdom, Boring, OR, during our recent 2019 National Meeting, Tom Cox asked me what I wanted to know about conifers. As we walked among the rows of plants, I told him about what has been going on with needle cast on some of the conifers at my home in Adrian, MI; where, to date, it has rained more than 2/3 of the days of each month since April. His answer was simple, profound, and immediate: "It's a drainage issue."

A drainage issue? On the plane ride back to Detroit from Portland, OR, I passed some of the time going over what Tom had said. I live in USDA Zone 6b. Decades ago, my zone was listed as 5. The springs have become wetter. The summers are now characterized by prolonged droughts. The winters are dotted with repeated polar vortexes. Are these elements of climate change, or is nature just running its course? Whatever the causal agent(s), what do I do to combat the negative effects of too much water on my conifers, if I can?

We humans are resourceful. Anthropologists and archaeologists have traced the progression and survival of humankind from isolated clusters of people, to migrations, to the development of tools, to the founding of cities and nation-states. Brainpower and knowledge are what have propelled us to where we are, and brainpower is what will save us, *and* our conifers. With the help of others, I have developed a new planting strategy that should help all conifer lovers facing climatic changes. I came by this through trial and error and good luck.

First of all, Michael Lewis (Adrian, MI), the builder of our home, told me that the land we had purchased for our new home back in 2002 was very wet, with a high water table. He advised that we plant *Salix babylonica* (weeping willow) and *Betula nigra* (river birch) to suck up the water. Consequently, I asked him to build the foundation 8-feet above grade with a 14-feet high basement ceiling. He also installed **two** sump pumps. The new house literally sits on a man-made hill. I knew nothing at the time of the soil type of the property, but I went ahead and bought small-caliper willows and birches anyway, placing them strategically around the mud that surrounded the house.

The wisdom and experience in home-construction Mike had achieved one desired goal right off the bat: to draw the ground water away from the foundation. Then came my own strain of Addicted Conifer Syndrome.

Since I hated raking leaves, I decided to plant *easier* trees. I began planting conifers all over my property, while disregarding the sizes and environmental requirements of the trees. (I was not a member of the ACS at the time.) A "dwarf" *Cupressus nootkatensis* (Nootka cypress) landed in the front corner of the house. A happy, beautiful specimen, it has grown to a height of over 20 feet with a circumference of more than 30 feet at its lowest branch flare. It now covers 1/3 of the front deck and has shrouded all of the front windows *and* is still growing. My wife, Susan Arena-Elardo, calls it her "ghost tree" and forbids me from pruning it. Beneath the tree is a system of drain tiles and sand and gravel trenches that surround the foundation of the house. "Wrong tree wrong location," as David Olszyk would say. That tree and I will face its as-of-yet unknown comeuppance.

Before we had sold our old house, our son, Joseph, and I moved a large sculpted *Pinus*

Picea pungens 'Iseli Fastigiate'

Pinus nigra 'Arnold's Sentinel'

Pinus densiflora 'Aurea'

sylvestris (Scots pine). The rootball collapsed in the process. Just by happenstance, we simply stuck the tree bare root in the ground, with a shrug of my shoulders, near the *top* of the mound, on which the house sits, not far from the Nootka cypress that my wife protects. This location, although a fluke, would be the saving-grace for the Scots pine. For it too stands at the top of the house-mound with manufactured drainage beneath its feet.

In this issue of the CQ, Leah Alcyon discusses the deleterious effect fungus has had on her *Pinus aristata* (Rocky Mountain bristlecone pine) and the telltale trail of black dots that fungi leave on conifer needles. Several years ago I saw black dots on the needles of several of the conifers that I had planted in low-lying areas of my property. Experts told me that fungus was the culprit. One nurseryman even performed an unsolicited inspection of my garden. He offered to "take care of the fungus" for $4,700 dollars per year. He also told me that there would be no guarantee that the conifers would survive the anti-fungus treatment. My go-to horticulturist, Steve Courtney (ACS National Office Manager), responded to my query about the value of the fungus-eradication program with, "It is a waste of money!" I abandoned the expensive remedy and bought **two** chainsaws instead, one regular one and one on a pole. However, the question lingered as to how this fungus problem started. What was the beginning?

I threw myself into fungus-research. Fungi have been part of the life of the Earth for over a billion and a half years. There are close to 3.5-million species of fungus on the planet. That is a daunting number. Fungi attack plants and humans alike. For example, *Claviceps purpurea* (rye ergot fungus), causes ergot poisoning, which, in turn, has been linked to the historical cause of aberrant and hallucination-induced behavior in humans, specifically in those individuals labeled witches and werewolves. Temporal and secular records of trials from such post-flood areas along the riverbeds of Medieval Europe and into the 16th Century provided researchers the bases for their findings. The Berserker of Scandinavia were subject to the hallucinating effects of fungus, too. Those warriors consumed the mushroom *Amantia muscaria* (fly agaric), known for its mind-altering effects, in order to rev up their battle-frenzy, *der Berserkergang*. They fought like men possessed. Fungus on conifers causes the trees to go *berserk*, so-to-speak, performing a *Totentanz,* a dance of death. The needles of conifers turn purple, brown, and then abscission drops the needles to the ground where they re-infect the trees.

Two specific fungi, *Rhizosphaera kalkhoffii* (*Rhizosphaera* needle cast) and *Stigmina lautii* (*Stigmina* needle cast), both mentioned by Leah Alcyon, are needle cast agents. The fungi grow after excessive water, warmth, and lack of sufficient drying time. However, there may be remedies.

Jack Wikle, ACS member and bonsai curator at Hidden Lake Gardens (Tipton, MI), advised me in 2009 to *plant conifers high*. He even suggested that I bury drainage tile around the rootballs of conifers to keep the trees from sitting in a clay-bowl of water. I followed his advice. Then I met Jared Weaver, ACS member, former Board member, and City Arborist/ Forester for Bowling Green, KY. Jared has written about the natural dropping of the seeds of trees onto the surface of the ground by birds and wind. Roots begin growing on the surface and, then, reach down into soil. His knowledge challenges the notion that rootballs of trees should be buried below grade or even at grade. Conifers stand a better chance of survival if they are planted *high*, not in *volcanoes*, but on the top of slight mounds, above grade, 1-2 inches.

Then came the analysis Tom Cox provided me. Combine that with the advice of Jack Wikle and Jared Weaver, and we ACS members have and can share this three-pronged response to fungus-causing conifer demise with the general public. We wrap conifers with burlap

to ward off winter scald, erect screens around conifers, plant the trees away from damaging environmental effects, correctly water the conifers in after planting, pay close attention to USDA zones. Now, we can recommend the need to **provide proper drainage**. If we cannot lick the water and fungus of the environment, we can respond. Plant certain species of conifers on a slope. Thank you, Tom.

Farewell to the conifers I had planted on flat ground and have removed. The following conifers suffered infection from the fungi mentioned above:

Pinus densiflora 'Golden Ghost' (Golden Ghost Japanese red pine)
Picea glauca (white spruce)
Pinus nigra (Austrian black pine)
Pinus nigra 'Oregon Green' (Oregon Green Austrian black pine)
Pinus ponderosa (ponderosa pine)
Picea pungens (Colorado blue spruce)
Picea pungens 'Pendula' (weeping Colorado blue spruce)

Successes of fungus-susceptible conifers I had planted on a slope:

Pinus densiflora 'Aurea' (Golden Japanese red pine)
Pinus nigra 'Arnold's Sentinel' (Arnold's Sentinel Austrian black pine)
Picea pungens (Colorado blue spruce)
Picea pungens 'Gebelle's Golden Spring' (Gebelle's Golden Spring Colorado blue spruce)
Picea pungens 'Iseli Fastigiate' (Iseli Fastigiate Colorado blue spruce)

In addition, *Picea orientalis* (Caucasian spruce) is suffering from fungi, too. *Picea abies* (Norway spruce) and *Picea rubens* (red spruce) appear immune to *Rhizosphaera*, but a second killer, *Stigmina*, has been showing up on Norway spruce and *Pinus nigra* (Austrian black pine). So, be on the lookout. The battle has been joined.

When I first conceived of this article, I figured that I had put "the wrong conifer in the wrong place". Well, that is partially true. However, if you deliberately choose the right location with natural, decent drainage, or, if you create good drainage via synthetic means, you may have your cake and eat it too. In my case, starting back in 2002, conifer guardian angels watched over me. When I planted my failures, I must have not yet been to confession that week! These days I will use my brain and plant wisely.

It is, after all, all about location, location, location.

Happy, informed planting!

Ron

Picea pungens

The Tule Tree

Text Jack Ayers
Photography Jack Ayers and Elisabeth Boonin

Moderate distant view of the Tule Tree

During a discussion with Ron Elardo, CQ editor, at the 2019 Annual meeting in Silverton, OR, he suggested that I consider submitting an article to *Conifer Quarterly*, something I have not done in several years. After chatting a bit, we agreed that the Tule Tree, *Taxodium mucronatum*, a truly magnificent Montezuma bald cypress near the city of Oaxaca, Mexico, was an interesting subject.

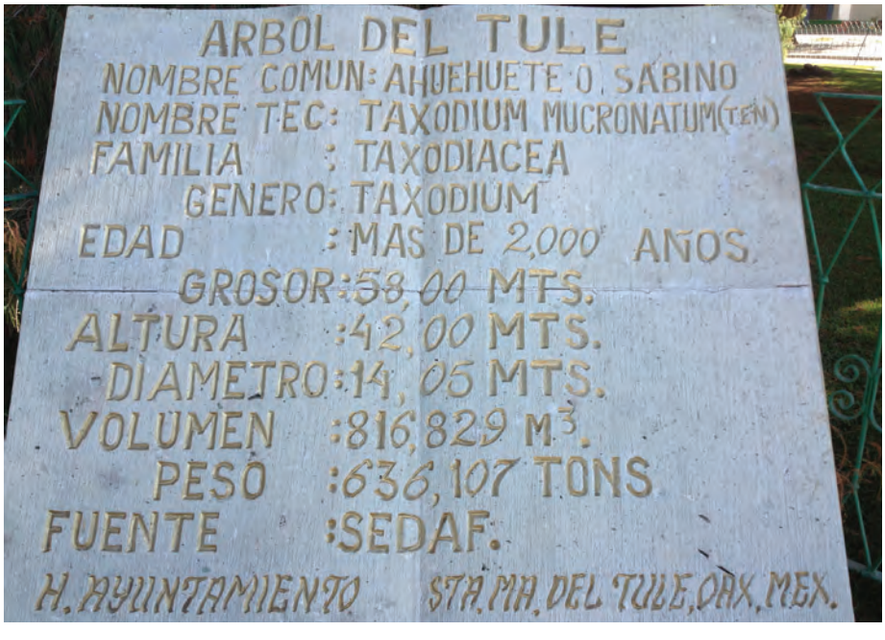
My wife Sharon and I had the opportunity to visit this tree while vacationing in Oaxaca in December 2008. Our visit was prompted by my desire to visit the famous pre-Columbian site, Monte Albán, which is near Oaxaca. One day during our stay, I booked a car and driver to take us to visit Mitla, another nearby pre-Columbian site. Along the way, our driver suggested we might like to see the Tule tree (*El Árbol del Tule*) and I agreed. I had a vague memory of reading about it.

The Tule Tree Is located on the church grounds of Santa Maria del Tule in the town of Tule. This tree, of the genus *Taxodium*, is not terribly impressive from a distance, as it is only a little over 100-feet tall and wide. However, it truly becomes awe-inspiring when you approach it and can appreciate the trunk, which is the broadest of any tree in the world, with a girth of 138 feet! The tree, seeded sometime between 400 and 600

Sara Malone standing to the left of the Tule Tree in 2013. Photo by her cousin, Elizabeth Boonin.

CE, was once thought, because of size and configuration, to be the result of several trees growing together. Modern DNA testing has revealed the tree to be a single plant.

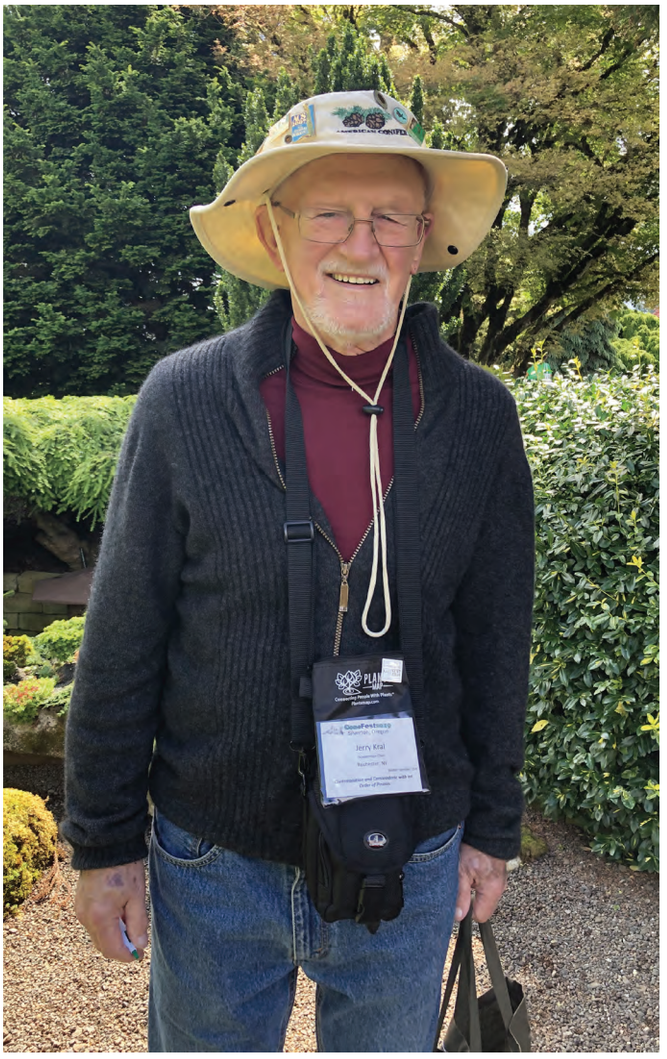
The photo (made with my first digital camera) only begins to convey the character of the tree. Readers are encouraged to search "Tule Tree" on the internet to get a better appreciation of the complexity of the trunk. It is truly a marvel, and if you are ever in, or near, Oaxaca, you will want to visit it!



The description of the Tule Tree.

Gerald (Jerry) Kral
2019 Marvin and Emelie Snyder Award Winner

Text Elmer Dustman



Jerry Kral at the Iseli Nursery in Boring, OR, ConeFest2019. Photo by Ron Elardo

At the ConeFest2019 in Silverton, OR, this past June, Gerald (Jerry) Kral was awarded the Marvin and Emilie Snyder Award of Merit for Dedicated Support of the American Conifer Society. Jerry was nominated by his long time friend and fellow ACS meeting organizer, Elmer Dustman.

Following is the nomination Elmer submitted to the Awards Selection Committee:

Gerald Kral has been an active and enthusiastic ACS member for at least 15 years. He was elected as a member of the ACS Board of Directors and served for five consecutive terms! There are not many who have served on the Board longer. Jerry joins such legends of the ACS as: Eddie Rezek (10 years), Susan Martin (9 years), Bill Thomas (6 years), and Marvin Snyder (6 years). During his service on the BOD, Jerry proposed, championed, and developed the current ACS Scholarship Program. He still participates in the evaluation of candidates for this scholarship. Jerry and his able partner, Elmer Dustman, also organized two ACS National Meetings and three Regional Meetings for the Northeast Region. Unless you have organized a meeting, it is difficult to appreciate the commitment of time and personal sacrifice necessary to make everything come together smoothly. All of these meetings were well executed and well received by the attendees. Those who do it once, rarely volunteer to do a repeat performance. So, FIVE meetings is quite an accomplishment!

We congratulate Jerry and thank him for all that he has done for the ACS and to further our mission!

Elmer Dustman and Jerry Kral. Photo by Dennis Groh

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