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**New Propagation Model
By Jon Genereaux**



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CONIFER QUARTERLY

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Cover Photo

Storm clouds separate, and the sun silhouettes *Cupressus nootkatensis* at my home in Adrian, Michigan.

Photo by Ron Elardo.

Dwarf Conifers ♦ Japanese Maples ♦ Ginkgos ♦ Beeches ♦ Hostas

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EDITOR'S NOTE FALL 2017

By Ronald J. Elardo, PhD

There always comes a ray of light after a storm, even if it is the light of the stars after sunset, like a breath of renewed purpose after a storm of cynicism.

The cover photo for this issue of the CQ came as an inspiration as this editor readied for the National Meeting in Central New York and ironically remained thus during the meeting and even after.

There was much to see in the Syracuse area, and certainly much to hear. In this issue, you will see how your Conifer Quarterly continues to evolve, better serving you as your primary member benefit.

Including and since the Summer CQ, savings both in design and printing have allowed for an expanded magazine which remains well within the budget for the year. I will let the contents of this issue speak for themselves and be your surprise.

The National Meeting contained not

Not Getting ACS Emails????

We've heard from a number of you that you are not receiving emails from the ACS. As an all-volunteer non-profit, you can understand why email is a cost-saving way for us to communicate. However, we understand how frustrating it can be not to get information about events, programs and news. Here are a few things that you can do to stay up-to-date:

Log onto the website (www.conifersociety.org) and make

just beautiful gardens to investigate and photograph, but educational segments, from which super information could be gleaned.

Take it from me, congratulations all around are due Elmer Dustman, Jerry Kral and their volunteers who put together a wonderful conference. We all saw the preludes in the articles and photos preceding the meeting. It was something quite else to experience it all.

Presenters took us through new/old cultivars to landscape design, to container gardening, to planting and pruning techniques, even bare-root planting and replanting of trees. It was a worthwhile note-taking experience. For those who stayed for the post tour, a relaxing boat ride on Lake Skaneateles culminated in good company and good conversation.

As usual, there were the silent, live and can auctions, and happy coniferites took their winnings

sure that the email address you have on file with the Society is correct.

Make sure that emails from the Society (...@conifersociety.org) are not going into your spam or junk folder. Most email programs allow you to mark selected items as "not spam" or "not junk". If you use gmail, they often go into a folder marked "social" or "promotions".

Visit the website often as we post information about all Society events. We have a comprehensive calendar and a forum where you can ask questions.

home. As an added bonus, the total eclipse of the sun accompanied many travelers home to the west and south of Syracuse.

In sum, there is a great deal going on in your Society. There are change efforts to bring new members into the ACS. There are new marketing plans. Your Society is marching forward. We are definitely in a growth-mode. In the coming issues, you will be seeing new and different modules, like a tree identification contest, to name just one.

In a tribute to Justin C. "Chub" Harper and the thirtieth anniversary of The Harper Collection of Dwarf and Rare Conifers at Hidden Lake Gardens in Michigan, the title was coined: People and Plants. What better a way could there be to title the ACS?

Keep sending in your contributions to your magazine. It is you who make the CQ.

If you have an active email address, but have not provided it to the national office, please do so right away and help save the Society money.

Still need help? That's what we're here for:

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After the deluge, everything shines through. Photo by Ron Elardo.

A New Propagation Model for Improved Success

By Jon Genereaux, Head Propagator at Hidden Lake Gardens, Michigan
Text and photos by Jon Genereaux

Hidden Lake Gardens began its winter propagation of conifer stem cuttings and grafting in the fall of 2008. We built a large cuttings frame to hold approximately 1,100 new hopefuls with a clear plexiglas top to provide better temperature and humidity controls. Utilizing widespread practices, the frame incorporated bottom heat inside the cuttings chamber, normal winter light conditions under 50% shade plastic, and hand-watering to accommodate the moisture requirements for both types of propagation.

Conifer cuttings have been reasonably successful year after year with about 40% rooted in a minimum of 60+ days. The rooted cuttings trays were moved into a Nearing frame to finish them up.

The focus of our production, as with many arboreta, had been to gain the highest possible percentages of success. We just didn't achieve the results we were hoping for, as we wanted to be closer to 95%. As the years passed, we observed that many taxa were not completely callusing and moving to root primordia even after 60 days. Many had not rooted, or had just started to root. In the same time frame, we noticed a pattern emerging that a percentage of scion had not survived on the rootstock as well.

In the summer of 2012, we began to study and to research many other

conifer species on the molecular level concerning electromagnetic radiation, specifically different wavelengths. Hidden Lake Gardens purchased a Quantum sensor to collect data on the winter light intensity levels. We found the light levels to be low and variable. The specific light signals were not being provided to allow conifer cuttings and grafts to synchronize their metabolism to determine cues for rooting and grafting quickly.

In 2013, the experimentation with light emitting diodes (LEDs) began. With the new supplemental lighting introduced, spectral quality and photon output were still found to be low. Finding and determining the proper wavelengths and intensity took some time. It became our intention to turn on specific switches deep within cells of the conifer cuttings on a molecular level that would respond only to a definitive wavelength.



Blue light introduction



Jon Genereaux

Blue wavelength controls important photomorphogenic roles in conifers, which include: stomatal opening and closing, water relations in photosynthesis, CO₂ exchange, inhibited stem elongation, and the promotion of auxin production. Through trial and error, we slowly determined and designed an optimum lighting system utilizing blue light at a wavelength of 450nm with an intensity of 423 micromoles.

Photosynthetic organisms, like conifers, take in massive quantities of CO₂ to form complex molecules such as

carbohydrates, lipids, proteins, and, very importantly, auxins. Higher auxin content coming from the conifer itself plays a central role in the formation of adventitious roots and callus. As we raised the light levels in the cuttings chamber and rootstock enclosure, CO₂ was needed to provide stimulation for organogenesis, a naturally occurring process of changing one cell into a different cell. This process changes stem cells into root cells, which, in turn, promotes faster callusing. The accelerated rate of callusing then applies to the root primordia, as well as the formation of roots. It was our intention to make this process happen in 30 days or less.

To accelerate the development of the cuttings and grafts in the propagation house, we introduced the use of carbon dioxide enrichment. Normal global

CO₂ levels in the winter run around 406ppm in the atmosphere. We infused a minimum level of 1,400ppm of CO₂ into the chamber and a maximum level of 4,400ppm every nine minutes, for 14 hours a day.

Additionally, the rootstocks benefited from an increase of CO₂ to 675ppm in the greenhouse. This produced a hastening effect of the vascular cambium, enabling the rootstock to knit the scion effectively.

The 2016 - 2017 winter conifer propagation, utilizing this new technology, achieved a 75% successful outcome in a variety of taxa producing callusing on day 8, root primordia on day 16, and visible root on *Thuja occidentalis* 'Nuclear Blast' on day 21. Amazing!

Interestingly, all *Thuja occidentalis*

cultivars responded at nearly 100%, with multiple roots growing by days 32 – 36! The LED light and CO₂ combination allowed the rootstocks to knit to the scions at a rate of 80%, with a 50% flush of growth in less than 50 days on many cultivars.

In summary: Our research has revealed that the blue LEDs appear to be the best spectral energy for cuttings. Combining carbon dioxide to the enclosures aids root primordia, resulting in new roots quickly.

Our research also has revealed that it is important that the rootstocks be at top production of auxin and carbohydrate levels to create pectin which knits scions. Light levels over the rootstocks must be at summer intensity levels. This encourages auxin flow, callus formation, and tissue adherence.



Note the CO₂ infusion tank to the left.



Thuja occidentalis 'Nuclear Blast', root primordia, and new root emerging. Day 21.



Thuja occidentalis 'Nuclear Blast', roots emerging. Day 32.



Member Profile:

Rhonda K. Thiele Salt Lake City, UT

ACS Member since 2016
Utah State Representative
Red Butte Garden ACS liaison
ConiferBase volunteer

Sara Malone, Interviewer

Q: What made you join the ACS?

A: When I moved to a home with a bigger yard, I started researching different garden styles. I decided I wanted a year-round garden filled with conifers and started researching every conifer I read about, which led me to the ACS website and ConiferBase. I joined immediately because I wanted to receive the **ConiferQuarterly** and then quickly decided to attend the 2016 Western Regional Conference so that I could hang out with fellow coneheads and visit beautiful gardens.

Q: How long have you been involved with plants?

A: I have been gardening for about 20 years and started collecting conifers 4 years ago.

Q: What's your favorite garden, and why?

A: Um...my own? I've never met a garden I didn't like. I love to visit all gardens, big and small.

When I travel, I particularly like to visit the "secret gardens" a bit off the beaten path. I very much enjoyed the gorgeous Jean Iseli Memorial Garden and The Oregon Garden, which I had the privilege of visiting as part of the 2017 Western Regional Conference. Here in Utah, I enjoy visiting Red Butte Garden and Conservation Garden Park. I'm originally from St. Louis, Missouri, and have always enjoyed visiting the Missouri Botanical Garden, also known

as Shaw's Garden for its founder and philanthropist Henry Shaw. But I do really love my own garden because it is filled with critters...

Q: What's your biggest conifer challenge? What can't you grow that you wish you could?

A: Critters...my OWN critters are my biggest challenge. My chickens, cat, dog, rabbits, and desert tortoise pets all enjoy the garden with me, but can wreak havoc. They lie on plants, dig them up right after I plant them, scratch and kick mulch on top of my dwarf and miniature cultivars and even eat them! For quite some time I thought I had found the perfect garden plant that could withstand all of my pet pressure since my rabbits don't seem to care for conifers, but then my newest chickens decided that the soft, long needles of *Pinus strobus* were very tasty.

I'm still fairly new at growing conifers, so I haven't yet found a species that I just can't grow. If they are fussy, I seem to be able to find a little microclimate for them somewhere in my yard. I have learned that I just have to be patient and not try to put a young plant in full sun, especially at my altitude. When conifers are small, they are definitely on the move in my yard.

Q: What's your favorite conifer?

A: I love any conifer that is unusual or that dramatically changes color. One of my favorites is *Sciadopitys verticillata*, in particular 'Mr. Happy',

and I was fortunate enough to win that cultivar at my first ACS conference. I also enjoy the various and unusual texture (and sometimes color change) of *Cryptomeria japonica* cultivars. I love the form of *Picea abies* 'Cobra' and *Cryptomeria japonica* 'Rasen' and hope to someday add a *Cryptomeria japonica* 'Araucarioides' to my collection.

Q: Do you have any thoughts to share?

A: Buy a smaller house and a bigger yard! I encourage everyone I know to incorporate some miniature or dwarf conifers into their garden scheme. I wish I had started planting them earlier in my gardening career. They offer so much color, texture, and shape...you may find that you can't stop collecting them!



Tsuga canadensis in Woerlitz Park, Dessau, Germany. L. Beissner, *Handbuch der Nadelholzkunde*. Verlagsbuchhandlung, Berlin 1909, p. 87.

2018 ACS National

Meeting – Raleigh, NC
June 14-17

Collected by Sandy Horn

Tour Gardens

Thanks to the generous and intrepid conifer enthusiasts of the Raleigh area, we have a spectacular line-up of tour gardens for the 2018 meeting. The gardens described below exhibit variety and a conifer-centric perspective, tended by loving and dedicated enthusiasts and long-time plants-people. In addition to these gardens, we will also visit the J.C. Raulston Arboretum and Sarah P. Duke Gardens.

John Monroe's Garden

John's garden, sited on a cleared, two-acre, western-facing gentle slope, surrounds his modern house, pool house, and greenhouse. Trees, both coniferous and otherwise, with pendulous or fastigate habit, were chosen to repeat the architectural lines of the structures. The conifer elements include many *Thuja occidentalis* cultivars. Uncommon cultivars of *Cedrus atlantica* and *Taxodium distichum*

add interest. There is a large *Picea smithiana* in the garden. Pruning of ten *Juniperus chinensis* 'Trautman' into fifteen foot tall, narrow columns, creates a striking transition from the driveway to the garden leading down to the pool. A minimalist back courtyard offers yet another garden experience, reminiscent of Japanese temple courtyard gardens. John is the owner of Architectural Trees, a nursery which for many years supplied local conifer enthusiasts with beautiful and rare trees.

The Unique Plant Gardens

The gardens at The Unique Plant began over twenty-five years ago when Joann Currier started to plant the open spaces around her 3.5 acre home outside Chapel Hill, NC. In addition, she began a specialty retail nursery that prospered for twenty years until it closed this year in August. The lush gardens include a significant conifer collection which displays the extensive range of species that thrive in Piedmont North Carolina.

The Tuttle Garden

The Tuttle Garden began in 2005 when

Harrison and Julie moved back to North Carolina with their young children. They removed over a dozen mature loblolly pines (*Pinus taeda*) which were scattered randomly throughout their almost half-acre yard so that the children could have more space to throw balls and play games. Harrison then set about trying to find the most interesting plants he could use to create a beautiful landscape. He soon became enamored of conifers.

By 2007, he was having specially designed topsoil brought in for improved drainage and elevating beds for plantings. A well was soon drilled so that water needs could be met. The subsequent years saw the garden fill in with flowering trees, shrubs, and conifers from all over the world. In 2013, he added bulbs and perennials with quite a bit of stone and boulders.

Thus today, the Tuttle garden is still a relatively young garden, but it is fairly complete in terms of plant diversity. There are some young but maturing specimens that are planted in groupings meant to emphasize flair and color and form. Harrison has always



John Monroe's Garden. Photo by Jeff Harvey



The Unique Plant Garden. Photo by Sandy Horn

considered the garden an experiment, so there are a number of species growing that would not be expected in central North Carolina.

In terms of conifers, there are over 500 specimens representing 21 genera, with 22 species of *Abies*, 5 on their own roots. There are 65 firs currently growing, representing over 35 cultivars. There are 13 species of *Pinus* with 31 cultivars, 8 species of *Picea* with 41 cultivars, and 8 cultivars of *Sciadopitys*. There is also a nice collection of flowering trees with over 50 *Acers*, 6 species of *Cornus* (many of which are variegated), 7 species of *Stewartia*, several *Fagus* specimens, a nice *Davidia involuocrata* 'Sonoma'. A flowering *Emmenopterys henryi* adds interest. This garden demonstrates what can be grown with adequate drainage and moisture, even in the hot, humid Southeast.

Though most of these specimens are still relatively small, Harrison considers

his experiment almost a little too successful. Crowding and shading are beginning to be a problem. To date, selective pruning and removal of some really rapid, more common specimens, have been used to maintain the artistic appeal.

Sandy Horn's Garden

Sandy started her garden in the old, downtown section of Cary, NC, in about 2007, knowing little to nothing about ornamental gardening. After killing a wide assortment of trees and shrubs, she began to look more deeply into the requirements of the plants she acquired, and, as a result, enough plants survived to encourage what has become her passion and full-time pastime, in retirement. Currently, there are approximately 300 conifer cultivars and 70 cultivars of Japanese maples in her collection, interspersed with a variety of other woody plants and perennials.

often stop to talk or ask questions about the gardens and what can be done by a single person with a shovel. Yesterday, a young woman with her five children knocked on her door. One of her girls held a small, blue agave. "We're studying botany at school and we love your garden, so we brought you this plant," she said. It doesn't get much better than that. Sandy looks forward to sharing her gardens with you, too.

Pre- and Post-meeting Gardens

Amelia Lane's Garden

Amelia's garden is on a 1/2-acre plot in a Raleigh neighborhood with mature loblolly pines. She has dappled, partial, and deep shade with a few small areas that have 4-6 hours of sun daily. She considers shade a friend and an ally, especially during the heat and humidity of the summer in Piedmont NC. As a volunteer gardener at the J.C. Raulston Arboretum, Amelia is exposed to new and exciting plants that she enjoys trying in her own garden.

So many trees and shrubs benefit from the protection of the loblolly pines. They are perfect for the smaller trees, like Japanese maples, *Cercis*, *Hydrangea paniculata*, and *Stachyurus praecox*. Many of the dwarf and miniature conifers appreciate a bit of shade relief also.



Sandy Horn Garden. Photo by Robert Barker

Sandy looks at her garden as a gift and an outreach to the community, as well as a constant pleasure to her. All plants are labeled, and, since she does all the gardening herself, people



The Tuttle Garden. Photo by Jeff Harvey



Amelia Lane's Containers. Photo by Amelia Lane

Hypertufa troughs hold many of the miniature conifers, dwarf hostas, as well as other small or dwarf plants. The troughs are great for creating a small garden or giving a small plant a good start.

Springtime brings wildflowers, native azaleas, and fragrant *Mahonias*. Then comes the new growth on hostas, conifers, and Japanese maples. Every day is exciting in the garden. Summer is basically her green period, but, by then, she is beginning to think of fall color, cooler days, and the anticipation of planting during the winter!

Being here for 27 years has given

Amelia the opportunity to see plants mature, take more than their share of space, and outlive their usefulness. Most importantly, she has found an appreciation for the wonders of nature and a place, in which she loves to garden.

Paradise Made – The Garden of Ashlee and Brandon Duncan

With a 10-year vision in mind, the daunting project that made the neighbors a little nervous began in 2008. Starting with the removal of waist-high ivy, everything in the 3/4-acre garden was cleared, with the exception of three large shade trees

in the front. With a blank canvas, 100 yards of blended soil was brought in to create a foundation for strong roots and healthy plants that would require much less water.

The front landscape is designed with several, soft, curving paths to encourage a relaxing stroll under the oaks and through the shade garden. The first plants placed in the front garden were a group of five *Edgeworthia*, used to balance a change in grade. In late winter, these plants boast hundreds of fragrant blooms that literally stop traffic.

Alternatively, the landscape design in the backyard centers around a small area of turf, dividing the plant beds into quadrants and yielding a traditional representation of The Four Rivers of Paradise. The turf path on a vertical axis from the rear of the home provides a clear view to a spouting cistern filled with goldfish. The horizontal axis is finished with wooden arbor benches facing each other across the turf. A strong linear layout lends an air of formality to the full-sun garden of the back landscape.

Status update: The neighbors who were a bit nervous at the start are completely on board and happy.

From the descriptions above, it is obvious that there is a wonderful variety in the tour gardens scheduled for the 2018 meeting. John Monroe and Joann Currier have created elegant gardens that span acres of land, whereas Harrison Tuttle and Sandy Horn have pushed the boundaries of what can be done on smaller properties by homeowners who garden with a passion. The Lane and Duncan gardens are also on a smaller scale, but differ greatly from one another and from the Harrison and Horn gardens. What is possible for all of us, as gardeners, depends on resources, physical abilities, and time. We hope that our visitors will find not only inspiration and beauty in these gardens, but new ideas for plants and projects they can try when they return home.



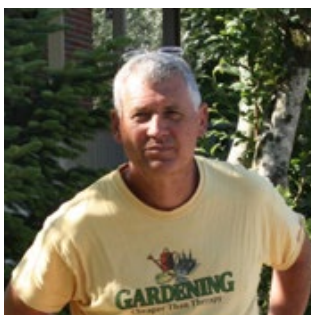
Paradise Made. Photo by Jeff Harvey

World Renowned Speakers Scheduled for the 2018 ACS National Meeting

By Jennifer Harvey

Attendees at the 2018 ACS conference in Raleigh will be treated to three speakers who are recognized experts in their fields. Their topics vary, from garden design to the latest in bald cypress research. Both informative and entertaining, their presentations will highlight the conference with information we can appreciate and enjoy.

Tony Avent



Tony grew up with a passion for plants. Instead of playing games, he wandered the woods and fields near his home studying wildflowers. At eight years old, his parents built a greenhouse for him. There he grew and propagated plants and sold them as a hobby.

Tony Avent attended North Carolina State University and graduated in 1978 with a Bachelor of Science degree in Horticultural Science. He studied under the well renowned horticulturist J.C. Raulston, who instilled in him the quest for the newest and best garden plants from around the world.

After college, he married Michelle Morgan Avent (1957-2012) and worked for the North Carolina State Fairgrounds in Raleigh as its Landscape Director for 16 years, from 1978 to 1994. In addition, he worked as a volunteer curator of the Shade Garden at the J.C. Raulston Arboretum from 1985 to 1994 and as a weekly garden columnist for Raleigh's

News & Observer newspaper from 1987 to 1998. He established Plant Delights Nursery and Juniper Level Botanic Gardens in 1988, and, by 1994, the business had expanded enough for him to resign his state job and become a full-time nurseryman.

In addition to running the nursery, Tony Avent is a plant breeder who is best known for his *Hosta* breeding program, although he is actively breeding other genera as well. In addition, Tony travels the world on plant hunting expeditions to search for new, rare, and unusual plants. He is also an avid plant collector with a large collection of rare variegated *Agave*. He is a prolific writer as well, having authored a book (*So You Want to Start a Nursery* - 2003, Timber Press) and dozens of newspaper articles, magazine articles, and web articles. He is currently a contributing editor to *Horticulture Magazine* and *Walter Magazine*. In addition, every year he travels the country giving dozens of lectures on gardening topics. He also teaches several day-long classes per year at Plant Delights Nursery on subjects such as plant propagation and soils.

Tony's presentation at the 2018 ACS meeting is entitled "Landscaping for Collectors".

Mark Weathington



Director and Curator of Collections, J.C. Raulston Arboretum

Mark Weathington is the Director of the J.C. Raulston Arboretum at NC State University. He earned undergraduate degrees in both Horticulture and Sociology and a master's degree in Horticulture from Virginia Tech. He has served as Director of Horticulture for the Norfolk Botanical Garden and horticulturist for the Atlanta Botanic Garden. Mark travels extensively searching for new plants to diversify the American landscape. His explorations have taken him to China, Taiwan, Japan, Ecuador, Europe, Mexico, New Zealand, and throughout the US. Mark writes and speaks on a variety of topics in horticulture. He has recently revised and updated the *Propagation Guide for Woody Plants* at the J.C. Raulston Arboretum and just completed writing *Gardening for the South: The Complete Homeowner's Guide* for Timber Press. He has been published in *Horticulture*, *Carolina Gardener*, *American Nurseryman* and *VA Gardener* magazines, as well as *The Mid-Atlantic Gardener's Book of Lists*.

His presentation is entitled "Collecting Conifers Around the World".

David Creech



Dr. Dave Creech, Regent's Professor and Professor Emeritus, has been at Stephen F. Austin State University, Nacogdoches, Texas, since September, 1978. Dr. Creech received his BS in Horticulture from Texas A and M University in 1970, a MS in Horticulture

from Colorado State University in 1972, after which he returned to TAMU and was awarded the PhD in 1978. Dr. Creech is semi-retired and currently directs SFA Gardens, a 68-acre on-campus horticultural resource. SFA Gardens includes 1) the 10-acre SFA Mast Arboretum, an on-campus resource that has enjoyed steady growth, development, utilization and visitation since its inception in 1985; 2) the 8-acre "Ruby M. Mize Azalea Garden", which opened in 2000. This high pine canopy garden features over a mile of trails, 6000+ azaleas, over 200 varieties of Japanese maples, camellias and hydrangeas, plus numerous other special collections; 3) the 42-acre SFA Pineywoods Native Plant Center, only the third garden affiliated with the Lady Bird Johnson Wildflower Center in Austin, Texas (co-directed with Dr. James C. Kroll); and 4) the 8-acre Gayla Mize Garden, a new garden under development since 2011.

Over his career, his teaching responsibili-

ties included a wide array of courses including fruit and vegetable production, greenhouse management, nursery management, landscape plant materials, plant propagation, computer-assisted design, and public garden management. His research effort has focused on blueberry germplasm evaluation and horticultural studies, alternative crop/alternative technology work, crop nutrition studies, new plant introductions for the ornamental horticulture industry, endangered plant rescue, research and reintroduction, and finding sustainable solutions to environmental concerns. Dr. Creech has authored numerous scholarly and trade articles and lectures widely (<http://swifthill.com>, go to garden talks). As an outreach of his position, Dr. Creech has accumulated a long list of international consultancies since 1981 to Pakistan, Guatemala, Mexico, Nepal, Israel and China. His latest work in China focuses on *Taxodium* (bald

cypress studies), nursery production and blueberry potential. Dr. Creech was President, 1991-1992, of the Native Plant Society of Texas, an 1800 member, 31 chapter organization dedicated to the conservation, selection and use of the native plants of Texas. Dr. Creech served as President of the Southern Region American Society of Horticulture Science, 2012-2013. He signs all his correspondence with "Let's keep planting."

David spoke at the Southeast Region meeting in 2015 in Chattanooga. Many of us are growing plants he brought with him to test in other areas of the country. He has worked extensively with *Taxodium distichum* (bald cypress) and will be giving us an update on his work.

His presentation is entitled "Reflections on the Study and Application of *Taxodium* in the USA, China, and Mexico".



On a trip through the Sierra Nevada. Photo by Jack Christiansen



2018 Collectors' Conifer of the Year

Whether you relate to ACS standing for the American Conifer Society or reference your

addicted conifer syndrome, here's an opportunity to add interest and enjoyment to your conifer collection and landscape. In addition, the CCOY program supports the Society's mission to educate the public about conifers and their wonderful uses in the garden and landscape. Please indulge yourself as your desires and passions drive you.

For the 13th year of the program we are offering two conifers, noted for their contrasting form and colorful foliage. One has horizontal layers of bright, silvery blue, short sprays that produce creamier colored new growth. The other has an upright form with distinctive slender, elongated, golden foliage. Both can be looked upon as "designer plants" that embolden a garden setting with color, texture and form.

***Cedrus atlantica* 'Sapphire Nymph':**

This prostrate, dwarf selection of blue Atlas cedar is accredited to Pat McCracken of Zebulon Nursery, North Carolina. It originated as a witch's broom and was introduced in the late 1990s. Growth is typically 1 to 3 inches per year. In 10 years the plant is likely to be 10 inches high and 30 inches wide. Its irregular, flattened form responds well to pruning if it is desired to refine its shape, or contain it for a particular space. Be aware that it is considered somewhat of a delicate plant as its internodes lack the normal elastic strength of the species. Consequently, it is wise not to site it close to where high impact activities can risk injury. In general, this is not a great concern for tranquil garden settings, especially considering what the plant can offer in landscape value. Full sun promotes optimum vigor, and well-drained soil that is acidic to slightly alkaline is also very important. Once established, it is tolerant of drought. 'Sapphire Nymph'

is considered reliably suitable for USDA Zones 6 through 8, and we have heard of excellent results in Zone 9. At its most northern limit, it is advisable to offer some winter protection to prevent potential discoloration of the needles should severe weather arise. The densely packed, small, stiff needles are arranged spirally outward around the stems with the ones at the tip pointing forward and being noticeably smaller. Overall, the plant has an appealing prickly texture, but is not that sharp to the touch. This non-aggressive, low-growing conifer stands out with sparkling, bright color and a slightly coarse, but pleasing look. It's not called 'Nymph' for nothing.



Cedrus atlantica 'Sapphire Nymph'. Photo by Dennis Lee.

***Platycladus orientalis* 'Franky Boy':**

This unusual, fine textured Chinese arborvitae originated around 1990 from Frank Nursery in Heiligen Eiche, Austria. It arose in a seed bed of another *Platycladus* cultivar, 'Elegantissima'. What captivates the eye for 'Franky Boy' is its bright yellow, airy, filamentous, upright texture. The yellow is more pronounced in full sun and is also enhanced by the more lime green foliage residing deeper in the plant. However, when colder weather approaches, the yellow begins transforming to hues of orange-butterscotch and bronze tones. Additional color and interest arise if small cones form since they are bluish-green with a grayish waxy coating. They also stand out by having a hooked horn-like protrusion at the top of the scales. This multi-stemmed plant responds well to shearing and a good clipping, which are recommended to maintain a proliferation

of fresh, golden threads. Otherwise, it may start to look unkempt, although not unappealing.

Growth rate is relatively slow, generally 4 to 6 inches per year. In 10 years, it can be expected to be 3 to 4 feet high and 2 to 3 feet wide, depending



Platycladus orientalis 'Franky Boy'. Photo by Dennis Lee.

on site conditions and attention from clippers. 'Franky Boy' is suitable for USDA zones 5 through 9 and tolerates heat very well. It is not particular to soil type as long as there is good drainage. 'Franky Boy' can be used to brighten a garden spot as well as provide contrasting wispy foliage.

Ordering: The Collectors' Conifer of the Year program is a benefit for active members of the American Conifer Society only. Purchases are limited to one of each selection per member. The cost is \$75.00 for either 'Sapphire Nymph', or 'Franky Boy'. Each offering comes with a conditional one year/one time replacement guarantee. Accompanying each plant is an anodized aluminum tag and holder which identify the plant as a winner of the American Conifer Society's annual award of "Collectors' Conifer of the Year". Shipping is included in the above costs. For ordering, please complete the form in this publication. Orders will be filled by date of receipt until inventory sells out. All orders must be received by February 1, 2018. We cannot ship outside the United States.

Happy *conifer*ing to all of you!

Dennis Lee

If You Could Only Pick One...

by Barbie Colvin, Chair, ACS National Reference Garden Program - colvinbc@gmail.com

That's the question we posed to our seventeen Reference Gardens, earlier this year. If you could only pick one (or two) conifers as your tried and true, never fail, never let you down, always makes you smile - which one (or two) would you choose??

What an interesting and fun project for us! We asked this same question in 2011 and got a great response. This year, we have 28 what I like to call "Top Picks", and only four are duplicates of the 2011 list. Hmmm! Another surprising factor is that 14 of the 28 are "species only", i.e., no cultivars! That's a huge change from 2011, when cultivars "ruled".

The following chart details the 2016 SE Reference Garden Top Picks for reliable, interesting conifers for the Southeast.

If you would like to donate one of the listed plants, or any plants or plant-related items for the upcoming auctions, please contact Barbie Colvin at colvinbc@gmail.com. If you would like a copy of the 2011 Top Picks, send me an email, and I'll send a copy to you!

2016 Top Conifer Picks by the SE Region Reference Gardens

Taxonomy

Description

Araucaria araucana

Atlanta Botanical Garden, Atlanta GA: The tree gets its common name, monkey puzzle tree, because gardeners thought its spiny branches would puzzle a climbing monkey. Individual leaves can last 10-15 years. We notice at the Atlanta Botanical Garden's conifer garden that the tree is highly susceptible to cool temperatures during colder than normal winters. Our tree is planted close to the wall of our conservatory for the chance to get radiant heating during the cold winter.

Cedrus deodara

Smith Gilbert Gardens, Kennesaw GA: This is a spectacular evergreen with pale blue needles that can grow up to 70' tall and 40' wide. In our garden however it is a little over 20' tall and maybe 10' wide. We don't use them enough in the South and with the bluish cast to their needles, deodar cedars add a cooling effect in our hot summer landscapes.

Cedrus libani var. *stenocoma*

East Tennessee State University Arboretum, Johnson City TN: I like the *Cedrus libani* var. *stenocoma* which was planted here in 2008 from a 5-gallon pot specimen. It is now around 12 feet tall, very attractive full form with tight branches and stiff, blue-green needles.

Cephalotaxus harringtonia
'Prostrata'

Baker Arboretum, Bowling Green KY: The ones planted in partial shade do best. Moderate watering and minimal care is needed. During the recent droughts, this species did not require any additional watering. We have had 100% survival rates on this underutilized genus. 'Prostrata' has proven so reliable that more have been planted to add to the groundcover palate.

Cupressus nootkatensis 'Glaucapendula'

UT Gardens - Knoxville TN: We like the blue weeping Alaska cedar for its blue color, weeping upright form, soft texture and its not too large size.

Chamaecyparis spp.

Norfolk Botanical Garden, Norfolk VA: We like the genus *Chamaecyparis*. The Conifer Garden has 42 total plants, represented by 3 species (*C. obtusa*, *C. pisifera*, *C. thyoides*). This genus is a favorite based on its color range (yellow, variegated, silver/blue). Also this genus has great spacial range (115' possible height for some of our tallest and 24" for some of our dwarf cultivars). This large range in growth habit allows for multiple display options.

Cryptomeria japonica
'Albospica'

Smith Gilbert Gardens, Kennesaw GA: This plant at Smith Gilbert Gardens has striking white-tipped foliage that ages to a light green. It is ideally suited as an accent or specimen in a large garden or massed along borders. It is prone to sunburn, but we have not found that to be the case in our garden.

Cryptomeria japonica 'Al's Blue'

Reynolds Community College, Goochland VA: For its striking blue color.

Cryptomeria japonica
'Lemonade'

J.C. Raulston Arboretum, Raleigh NC: A quick-growing Japanese cedar from New Zealand's Cedar Lodge Nursery forming a tall, pyramidal tree with pale yellow foliage. The foliage color intensifies in winter. It is much more quickly growing with more yellow than 'Sekkan' in the Southeast

Cupressus arizonica var. *glabra*
'Blue Ice'

Lewis Ginter Botanical Garden, Richmond VA: One of my favorite larger sized specimens at Lewis Ginter is a *Cupressus arizonica* var. *glabra* 'Blue Ice' - its color and texture are just fabulous.

Ginkgo ssp.

State Arboretum of Virginia, Boyce VA: We like the "fossil and foliage 2-pack", *Metasequoia* and *Ginkgo*. Both are easy to grow, tolerant of diverse conditions, interesting in form, provide striking fall foliage and were widely known from the fossil record before being known as living trees.

Juniperus chinensis 'Holbert'

UT Gardens - Knoxville TN: My all time favorite blue conifer. Love the height to just 3 feet or less, but up to 6-8 feet wide. The texture and horizontal form is great.

Juniperus virginiana 'Pendula'

Moore Farms Botanical Garden, Lake City SC: A high graft on a 6' standard, the weeping form adds a gentle texture to the garden. Its ability to withstand wet or dry conditions has impressed us in the garden.

Juniperus x pfitzeriana 'Daub's Frosted'

Reynolds Community College, Goochland VA: Very nice year-round ground cover.

Juniperus spp.

Norfolk Botanical Garden, Norfolk VA: The Conifer Garden has 51 total plants in the genus *Juniperus* and 6 large mass groupings. This genus is represented by 11 species (*x pfitzeriana*, *chinensis*, *communis*, *Juniperus rigida* subsp. *savina* var. *davurica*, *horizontalis*, *procumbens*, *rigida*, *sabina* and *virginiana*). This conifer plays the role of "shrub" very well in a conifer garden setting. Also, its many shades of green play well with a backdrop of companion grasses. We also have applications of trailing juniper hanging over boulders.

Keteleeria fortunei

Gardens of the Big Bend, University of Florida, Quincy FL: *Keteleeria* has the appearance of a fir, but is fully adapted to the Gulf Coast and Lower South. In addition, it has beautiful blue-green needles.

Metasequoia glyptostroboides

Hatcher Garden & Woodland Preserve, Spartanburg SC: The other conifer that really stands out is *Metasequoia glyptostroboides*. Six years ago we planted this specimen in the Conifer Collection. It was about 5 feet tall and today it is about 40 feet tall! The pumpkin orange fall color goes great with Halloween and Thanksgiving.



Barbie Colvin, the ACS National Reference Garden Chair



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Metasequoia spp.

State Arboretum of Virginia, Boyce VA: We like the “fossil and foliage 2-pack”, *Metasequoia* and *Ginkgo*. Both are easy to grow, tolerant of diverse conditions, interesting in form, provide striking fall foliage, and were widely known from the fossil record before being known as living trees.

Picea omorika ‘Pendula Brunns’

Lewis Ginter Botanical Garden, Richmond VA: I’ve always thought that *Picea omorika* ‘Pendula Brunns’ is a really fun plant for adding character to a garden.

Picea orientalis ‘Skylands’

Hatcher Garden & Woodland Preserve, Spartanburg, SC: This is the conifer that stands out the most. This golden spruce in the winter brightens up the Conifer Garden, especially with snow. ‘Aurea’ is easy to prune to keep tight and compact.

Pinus thunbergii ‘Green Elf’

Atlanta Botanical Garden, Atlanta GA: The ‘Green Elf’ cultivar is a dwarf that reaches a height of 4’ with a 5’ spread. At the Atlanta Botanical Garden, we strive to display conifers that seem to stay on a smaller scale to demonstrate how conifers can be used in the urban landscape. The dwarf nature of ‘Green Elf’ makes this cultivar a great fit for our collection. It prefers full sun and well-drained soil, tending toward dry conditions. It cannot tolerate standing water. In the SE, the tree does not do well as a straight species, most likely due to the extreme humidity in the region. The dwarf cultivars seem to fare better, as evidenced by the health of the ‘Green Elf’ in the Atlanta Botanical Garden’s conifer collection.

Podocarpus parlatorei

J.C. Raulston Arboretum, Raleigh NC: A South American multi-stemmed tree or large shrub with dark green, flattened, and pointed needles. It has proven to be quite hardy for us, surviving drops into single digits without any issues. It has grown quickly and would make an effective hedge if trimmed or a nice large specimen to block a view of the neighbor’s house.

Pseudolarix amabilis

Armstrong State University Arboretum, Savannah GA: A graceful looking deciduous conifer, the golden larch is a fine textured tree with a pyramidal, but open habit. Blue-green foliage in the summer is followed by excellent brilliant yellow fall color, even along the GA coast. Our tree has slowly grown to 25 feet tall in 20 years.

Taxodium spp.

Gardens of the Big Bend, University of Florida, Quincy FL: These are beautiful trees, adapted to almost any conditions. They continue to be underutilized.

Thuja occidentalis ‘Golden Globe’

Armstrong State University Arboretum, Savannah GA: ‘Golden Globe’ arborvitae makes a dense globe-shaped shrub with bright golden yellow foliage. Our plants growing along the Georgia coast show no damage growing in full sun and have no problems with our high humidity. Fifteen-year-old plants have grown to four feet tall and four feet wide and have required no maintenance to maintain their symmetrical shape.

Thujopsis dolabrata var. *hondae*

Memphis Botanic Garden, Memphis TN: We like *Thujopsis dolabrata* var. *hondae* for its unusual form and texture, as well as its tolerance of partially shaded sites.

Thujopsis dolabrata

Moore Farms Botanical Garden, Lake City SC: A moderate grower since we’ve had it in the ground in filtered light. The foliage has held up to the heat and humidity in Zone 8. It is planted in soil that tends to hold water more than it should. The foliage stands out on a windy day when the silver foliage briefly shows itself. A great natural conical shape adds a needed texture to one’s garden.

Drip Irrigation for Conifers

By Robin E. Tower

Illustrations by Jason Smart, Smarty Design Co

First I should explain that I am not an irrigation expert. What follows are my observations from my own experience with drip irrigation. I expect that when you think of a drip irrigation system you think of neat orderly rows of tomatoes or beans. It's hard to imagine it applied to a meandering, random set of conifers in a large area. But drip irrigation works just as well in that situation!

The advantages of watering with drip as opposed to sprinklers or buckets are several. A large amount of the water delivered through a sprinkler is either lost to evaporation or lands between plants, thus promoting the growth of weeds. Buckets are back-breaking, and deliver the water too rapidly, so that much of it is wasted. A drip is like a fine rain soaking into the root system over a set time, perhaps an hour or two. Therefore, it is both less labor intensive, and much more efficient.

To get your project started you will need a rough sketch of the area to be watered. It might look something like Figure 1. Seeing the property from the air as it were, allows you to analyze how it might best have watered delivered through pipes. In Figure 1, I show a display bed of conifers and perhaps other plant material that is about 50 ft. long and of varying depth. It contains about 42 plants of different sizes.

Secondly, you will need to have an idea of how many gallons per hour your

water source can supply (its flow). This is an easy job – turn the hose on and fill a 5 gallon bucket. How much time did it take? Mine took about 56 seconds. So it will supply about 11.2 gallons every second (So, it will supply one gallon every 11.2 seconds, or 321 gallons per hour.) This number will determine how many plants you can water at one time.

The emitters you will use to supply water to each bush will put out 1 gallon per hour. I usually use one emitter on a bush less than one inch in caliper, and increase by one emitter for every caliper. So, a bush with a trunk of 3 inches in diameter would have 3 emitters, and get 3 gallons of water an hour.

The third piece of useful information you will need is the amount of PSI – pounds per square inch - of water pressure your system provides. You can buy a gauge to measure this quite inexpensively from an irrigation supplier. Screw it onto the end of a hose, and when you turn the water on, Voila!: your pressure is measured. I use 2 water sources, my own well and pump, and a municipal source. I found that the municipal system had a lot more pressure (about 45 PSI) than my well (15 PSI). Typically, the water tubing which delivers the water to the plant is designed only to handle a maximum of 30 PSI – so, if your source is higher

than that, you will need a pressure regulator to reduce the water pressure going into the system.

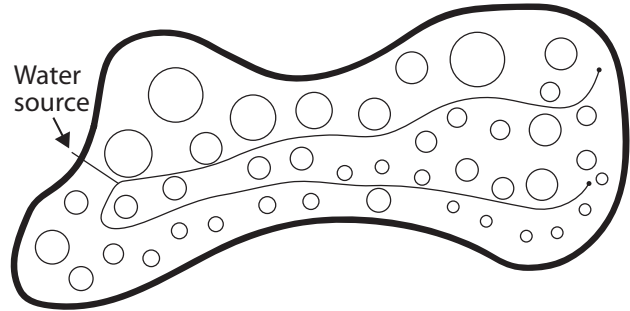


Figure 2

Now that you have gathered information, it is time to put it all together. Draw a line (the main line) connecting in the most logical order possible your conifers or other trees to be watered. (Figure 2) The line does NOT have to run from one to the next, but simply near them. The start of the line should be near your water source. With any luck, it will slope downward from there towards the end of the line, although this is not completely necessary. You can plan on more than one main line and connect them with a T or Y connector. However, if your flow as measured above is 300 GPH, then remember that you can only put 300 emitters on one main line. You will use hose connector fittings for the beginning and end of the line.

Next we will get the water to the bushes from the main line. A branch line is used for this, usually 1/4 inch tubing. The tubing connects to the main line with a 1/4 inch transfer barb. The emitter fits into the 1/4 inch tubing connecting with its own transfer barb on the emitter. There are several different types of emitters available. What you MUST have is a pressure-compensating emitter. These will ensure that you get the same amount of water delivered

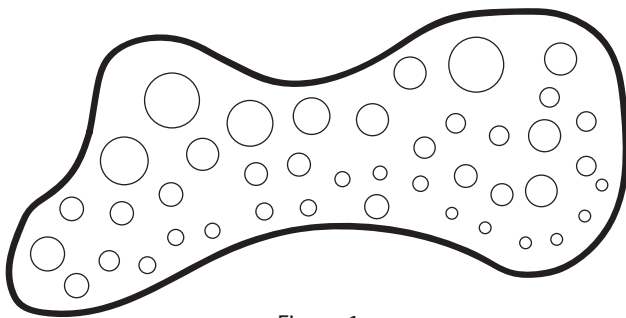


Figure 1

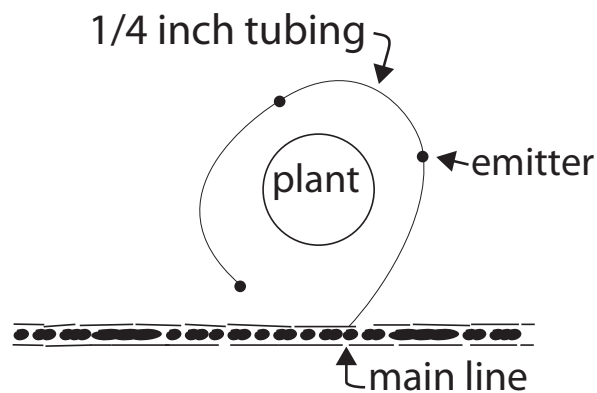


Figure 3

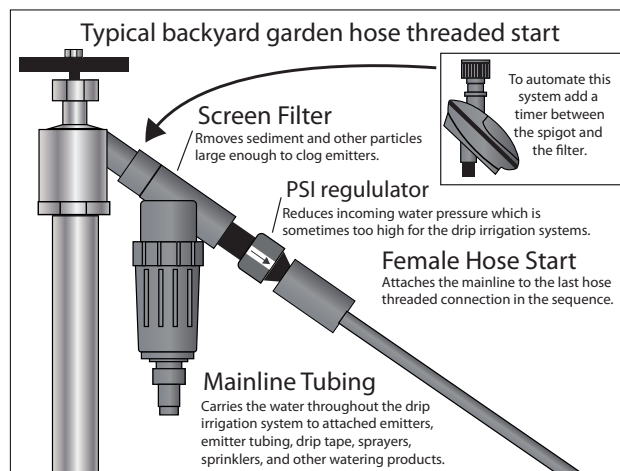


Figure 4

through each emitter, even if your terrain is uneven. I have used the CETA in-line emitters. These come on stakes so that they can be put securely in the ground near the root ball of the plant. They can be used in tandem, so that you can put several around the base of a tree. (See Figure 3) Since I have 42 plants, and need to use an average of 3 emitters per plant in this imaginary garden, I am well within the maximum of 321 emitters per line. If I had more plants, or more areas to water, I would make each area a separate zone, with a separate connection to the water source.

You will want to secure the main line to the ground with landscape staples. At some point, the main line should be covered with mulch or buried a few inches below ground by trenching. This procedure will keep the plastic from degrading in the sun. It is not necessary to do this immediately; in fact, I have waited a year to do mine. That way, if there is a problem with emitter placement or a misplaced hole punched, I can spot it and correct it without digging up the line.

Lastly, we will connect our main line to a water source. The connections between main lines are all hose threaded, so that there is no real plumbing involved. Simply push the female hose end connector into the

main line, and you are ready to hook up the system! However, there are several pieces and they need to be put together in the correct order. Closest to the water source, you will need a screen filter, particularly if you are using well water. If you are pumping from a pond you may need a heavier duty filter perhaps a Disc filter. Debris in the line will clog the emitters and should be avoided at all costs! Next in the order is the PSI regulator. Then the mainline tubing is connected with a female hose start. (See Figure 4), and be sure to put end caps on each main line, or the water will simply flow right on through!

Two important notes: I found that punching holes in the main-line tubing did not work well after the tubing had warmed in the sun. The punch merely bent the tubing without leaving a clean hole. You will want to purchase a pack of goof plugs in case this happens to you. They are useful as well to stop up a hole you may punch inadvertently. Lastly, don't forget to drain your lines and put away the water source connectors before the first frost. Like any other plumbing, freezing under pressure will cause pipes to burst. I have found draining the lines to be relatively easy. I just take off the end caps and store for the winter.

The cost of the system as pictured in Figure 2, with an average of 3 emitters

per plant will be around \$200. I would estimate that it would take 8 – 10 hours to install, depending on how handy you are with the hole-punch!

This entire procedure may sound time-consuming, and it is! But it is much easier than delivering water by hand over acres every summer. Once I set mine up, I connected it to the water source with a timer. Now, when I want to water my conifers, I set the timer for an hour or two, go about my business, and return when I can. I can then put the water on another zone, set the timer, and walk away. I will say that before I turn my back I usually look around to make sure there are no geysers in the watering zone. If I see a large water spout, one of the branch lines has usually become disconnected from the mainline. I usually blame this phenomenon on one of the dogs tripping over it while chasing a ball. Makes more sense than that I might have dislodged it! It's a simple matter to reattach, but it must be done so that the emitters can do their jobs!

There is a lot more information concerning drip irrigation on the Internet: diagrams, You Tube tutorials, and so forth. In my opinion, it is well worth the time and money invested in drip irrigation to take care of my wonderful conifers!

Taxodium distichum Knees

By James La Luzern

"One of the often-overlooked beauty of trees are their roots, especially trees like the Bald Cypress."



I recently joined the American Conifer Society and received my first issue of *ConiferQuarterly*. I very much appreciate the photography of the plants discussed. One of the often-overlooked beauty of trees are their roots, especially trees like the Bald Cypress. I have included with this email a few photos of a *Taxodium distichum* growing next to a pond on my property. I thought you might enjoy.

Jim La Luzerne



Pinus thunbergii 'Nishiki Eechee'

By Peter C. Jones. Photos by Edward S. Jones

Thanks to Dennis Dodge (now deceased) of Bethlehem Nursery, I have a most interesting *Pinus thunbergii* 'Nishiki Eechee'. I met Dennis at an American Conifer Society National Meeting in 1999. In our conversation, we talked about Japanese pines, which we each had. It was during this conversation that we agreed to exchange scion wood for grafting. He wanted scion wood of *Pinus parviflora* 'Zuisho', which my dear friend Jules Koetsch had given me in the mid 90's. It is sad that Dennis is no longer here so that I can share my joy with him.

After successfully grafting this pine in early 2002, I watched it grow hoping to learn what its growth habits would be. As this pine grew, I tried to find out what its characteristics would be. In bonsai, knowing how a tree will grow and develop is important. Having grown and propagated the *Pinus thunbergii* 'Nishiki Tsukasa' (Introduced by Mr. Yoshimura) for years, gave me some idea as to this pine's development.

In April of 2016, the Northern Virginia Bonsai Society (NVBS) had its annual Roy Nagatoshi bonsai workshop. Since introducing Roy to the NVBS club in 1985, Roy and I have become good friends. Months before the workshop, I sent via email pictures of this tree to Roy, and he promised a great style for this tree, but I had to wait until the workshop. Although I had grown this pine for years, I realized that at 75, time is not on my side. So I needed to do something with this pine now.

As with most pines, there is some information available in books or on the Internet about their growth, where it grows best and what the

tree requires to do well. I have searched for information about this pine, but so far have not been able to obtain any information as to growth, size or bonsai training. If anyone has any information about this pine, I would appreciate it if they would share any information they have with me. I have grafted a few pieces of this pine so I can watch them grow,



but now wish to train them as they grow so someone else would have a very nice cork bark pine to train as a bonsai.

Collecting and growing conifers for landscaping and bonsai training has been most rewarding for me. Working this pine into a nice bonsai will take a few more years before I wish to show it. Since I couldn't find any information about this pine, I will train it as a regular Japanese black pine is trained. So far, it has responded well to being styled and

planted in a bonsai pot.

Three weeks after being potted up, a feeding program was started to encourage new growth. As a 'Nishiki', the Japanese word for cork bark, I believe American horticulturists refer to this as a *corticosa* variety, makes this very interesting. Most grafted pine in this variety don't develop a nice base. However, 'Nishiki Eechee' seems to develop a nice base with corking. My tree has a 4-inch trunk base, with corking. I had grafted this tree in the root crown so that a graft union would not show.

In June, I removed excess needles so that more sunlight could reach the center branches to encourage adventitious buds to develop. So far, this tree is responding well to my care. Growing and training this tree will be quite a learning experience. For winter protection, I have put the bonsai pot with the tree in a black nursery container, and filled the container with fine pine bark mulch up to the lip of the bonsai pot. I have used this method for winter storage of cascading bonsai for years. (I live in Virginia.)

Spring of 2017 will be the start of scheduled training for this pine. Most of the wire was removed over the summer and fall. Branches seem to be staying in place and most have developed corking. Seeing the corking develop was most rewarding. It will be exciting to see how the corking will continue to develop.

Since this pine has such interesting bark and is showing signs of back budding, I plan to graft a few more in February/March so that I can continue learning as I grow *Pinus thunbergii* 'Nishiki Eechee'. My biggest joy is that this is a pine I grafted, grew, styled with Roy Nagatoshi's help and now gets to grow and develop into a nice bonsai.



Juniperus chinensis 'Shimpaku' bonsai at Hidden Lake Gardens. Photo by Ken Hundrieser at the Central Region (E. Lansing, MI) post meeting gardens, July 2017.



Sometimes you just have to say good-bye.

Larry Nelson, Betsy Turner's husband, takes *Pinus contorta* var. *latifolia* 'Taylor's Sunburst' to the chipper truck. Photo by Betsy Turner. According to Betsy, the tree was a ratty tree.

A Conifer Reference Garden – *Behind the Scenes*

Mary D. Coyne, Professor Emerita, Wellesley College



Photo by David Sommers, Wellesley College Horticulturist

Passersby say, “It looks great!” As of 10 years I ago I thought it would always “look great,” but I had a lot to learn. It seemed like an easy project – build a wall, bring in new soil, pick out some plants, plant the dwarf and miniature trees, stand back and watch them grow. Nothing to it.

Ten years later at the Wellesley College Conifer Reference Garden, I know better and I thought that some of my experiences might be helpful and possibly amusing to those in the know.

The Wellesley Conifer Reference Garden contains mostly dwarf and miniature conifers and is located on a slight

upward slope extending back from a 3-foot high wall, running about 60 feet in length. My first problem was water. I had insisted on running two water lines to the top of the embankment above the wall, but setting out hoses and sprinklers was taking too much time for the greenhouse personnel. So, I considered a drip hose for the area and found a wholesale dealer for RainBird equipment nearby. The dealer measured the water pressure for the extensive lines and determined that because the area was so large, it had to be divided into three sections. The downside of this arrangement is that each section took about 5 hours to water and often the personnel went

home and forgot to turn the water off. To solve this problem, I installed three elevated spray heads so the workers could see if the water was still on. Newly planted trees needed more frequent watering, a task given to the summer student interns. I oversee and maintain this garden mostly by myself with the help of intermittent volunteers, but since I am away most of the summer, I must depend on others to follow through with watering.

One of the original plants scattered across the dry embankment before the area was rescued for a conifer garden, was a yucca. About a month after it was removed, I noticed some shoots



Yucca sprouts. Photo by Mary D. Coyne erupting in the area. Since the area was unplanted, I dug down about 2-3 feet and uncovered a massive root about 3 inches in diameter and 18 inches long. I was impressed and felt relieved that I had solved the problem. Ten years later I am still fighting that yucca. Sprouts began appearing again and were moving slowly along the planting bed. Stories on Google were not encouraging, but I finally followed what appeared to be a successful procedure. I let one plant grow up somewhat, clipping off all the others. I wrapped the leaves of this plant with cotton batting soaked in RoundUp, bent the leaves over into a stainless-steel pan with more Roundup and sealed it with plastic. One month later, the plant was still alive! Not good. A year ago, I let another sprout grow that had popped up outside the garden, hoping that all the plant's energy would go there and the other small sprigs would die out. It seemed like this was working. But last summer there were sprouts again.



Sawfly larvae munching on *Pinus x densithunbergii* 'Jane Kluis'. Photo by David Sommers, Wellesley College Horticulturist

I have a life-long job snipping yucca sprouts!

A good friend of mine in the American Conifer Society always told me not to buy two-needle pines, but never said why. Now I know why. Along the stairway through the garden there were four *Pinus x densithunbergii* 'Jane Kluis' which were growing quite well. One day one of the greenhouse personnel brought me over for a look at the front plant. Needles were missing and on closer inspection, I saw that it was covered with saw fly larvae. We grabbed our gloves and pulled them off into a bucket of soapy water. This happened each year. Last year the other three trees had to be replaced as they were in bad shape even though we had been pulling larvae off them each year. Down at the other end of the garden, I also found a dead, chewed-up *Pinus banksiana*, another two-needle pine. Two of my replacements along the stairway were *Pinus heldreichii* 'Banderica', a two-needle pine. Google searches indicated that this pine is not a primary target, and another in the garden is good so far. The Botanic Gardens is a pesticide-free environment, so we'll see. However, our very dry summer of last year took its toll on the three replacements in spite of assiduous watering.

The Reference Garden has about 76 living conifers, composed of 18 genera including *Ginkgo* and *Ephedra* and several species of *Chamaecyparis*, *Juniperus*, *Picea* and *Pinus*. Over the nine years, I have had to replace about 37 trees, either because they had died over the winter (23%), or they were not in good enough display condition (10%). I have two holding areas for replacements, one at the College and another at home where I can watch them more closely. Several at home are recovering patients which may eventually be replanted. It pays to deal in dwarfs and miniatures!

The garden is on a major pathway for faculty, staff and students entering the Science Center, and the conifers provide good winter interest. To introduce a little color for both spring and fall, I

have interplanted the area with spring bulbs, ephemerals and perennials as well as several fall bulbs and rock garden plants in the scree. The choice of bulbs (*Anemone blanda*, *Chionodoxa forbesii*, *Colchicum bornmuelleri*, *Erythronium* 'Pagoda', *Eranthis hyemalis*, *Galanthus nivalis*, *Cyclamen hederifolium*, *Iris reticulata*, *Muscari armeniacum*, *Narcissus bulbocodium conspicuus*, *Trillium grandiflorum* and *T. nivale*) as well as wild tulips has outwitted the chipmunks so far, but they continuously burrow in and around the stone wall, and some bulbs do disappear. Rock garden plants have variable survival rates so there are always replacements, and some have had to be removed completely because they turned out to be invasive. In the last couple of years, I have also started a couple of hypertufa troughs with miniature conifers and placed them in a protected area. I am concerned that they might easily be transported away so I keep them out of the main pathway. Extra additions, of course, make more work, but they do make the garden more interesting.

Each conifer receives a professional label which has a black background with white printing. Over the winter, there are always a few labels that disconnect from their stem and must be found, cleaned, and reattached with superglue (my solution). Even the Reference Garden sign needed such repair, probably because children love to walk along the wall and may have knocked against it. New conifers and herbaceous plants are hand-labeled; many labels are missing by spring and are also replaced. Every other year new mulch is added to the garden, but, because there is a slight slope down to the wall, the mulch usually accumulates at the bottom by the end of the winter. This necessitates cleaning out around all the conifers in the spring so the trunks are not submerged in piles of mulch. Replacements, watering, and mulch all require funds, and grants from the Conifer Society have supported the conifer related costs. Wellesley College Botanic Gardens provides additional funds for the non-conifer plants.



Map of Conifer Reference Garden, Wellesley College Botanic Gardens. Screen shot of map in ESRI Collector App used for annual inventory of conifers in Reference Garden.



Being a Type-A personality I wanted to keep track of all the plantings: their location, health, and growth rates. I started by mapping the Reference Garden with a CAD program with layers for conifers, bulbs and herbaceous plants. However, once the College installed a server for ArcGIS, I mapped out the Reference Garden and added it to an archived database for all the Botanic Gardens trees. A new Collector app for ArcGIS now lets me do an annual inventory of the trees in the Reference Garden using my iPad or

iPhone. These data are connected to each tree in the ArcGIS Map and include height, width, health, presence of label, comments on work to be done, and a photo. The mapping allows me to assess where my greatest losses of plants occur, which species have survival problems, as well as growth rates. Anyone interested in pursuing the use of ArcGIS for mapping gardens should go online to American Public Gardens GIS website for further information and for access to a GIS template for public gardens. <https://publicgardens.org/members/member-affinity-programs/esri-gis-software> and

Alliance for Public Gardens GIS. <http://publicgardensgis.ucdavis.edu>

As a retiree, I have found that working in the garden provides a great social payoff. On weekends, I interact with local and international visitors,

and during the week I often am called upon to give an extemporaneous presentation to student groups at all educational levels. College staff and faculty are always passing by and remark how much they enjoy seeing what is growing and blooming. It is satisfying to realize how so many people enjoy the garden.

As a long-time gardener of perennial plants, I should have realized that keeping up a Reference Garden would be work. However, I never realized that, in addition to weeding, there would be so many other annual jobs. How am I going to convince someone to eventually replace me? Maybe they will enjoy it as much as I do.

Mary Coyne can be contacted at mcoyne@wellesley.edu

Introducing Two New Members of our Media Team!



Eric Smith, ACS website manager and developer

Eric lives in the Atlanta area and just graduated from Georgia State University with a degree in Economics. He is a self-taught web designer and has designed multiple sites. He has just taken over the management of the ACS site, immediately making some important changes. He's been interested in conifers for a while and his favorite cultivar is *Cupressus arizonica* var. *glabra* 'Chaparral'. Eric recognized the potential of our website and made such great suggestions that we had him join our staff! Eric can be reached at webmanager@conifersociety.org.



Dixie Sullivan, ACS social media director

Dixie recently became the American Conifer Society's Social Media Director. Her experience includes community conservation initiatives with a focus on wilderness, restoring rivers & forests, public outreach, event planning, marketing and outdoor education. She loves backcountry travel, ecology, gardening & botanical brews. Dixie lives in Montana and her favorite conifer is *Pinus albicaulis*, which resides in the high alpine, her favorite environment. If you have ideas to share with Dixie about social media, email her at socialmedia@conifersociety.org.

General comments or suggestions about the website can be directed to Sara Malone, webeditor@conifersociety.org.

Comments about the database or suggestions on how to make it more useful should go to David Olszyk at conifereditor@conifersociety.org



Immature female cone on *Pinus longaeva* in the White Mountains of California. Photo by Jack Christiansen.



Conifer Identification Contest

This quarter's contest: Who can name this cultivar?



Contest rules:

Identify the conifer in this photo as specifically as you can. Genus, species, variety, subspecies, cultivar, etc.

Email your answer to conifeditor@conifersociety.org,
or send a postcard to
David Olszyk, P.O. Box 5631, Lacey, WA 98516

The winner will be drawn at random from all correct answers received.

Only one entry per quarter will be accepted.

Only ACS members in good standing are eligible to take part.

ACS Board of Directors and their families are ineligible to take part in this contest.

We will announce the winners on this page of next quarter's CQ.

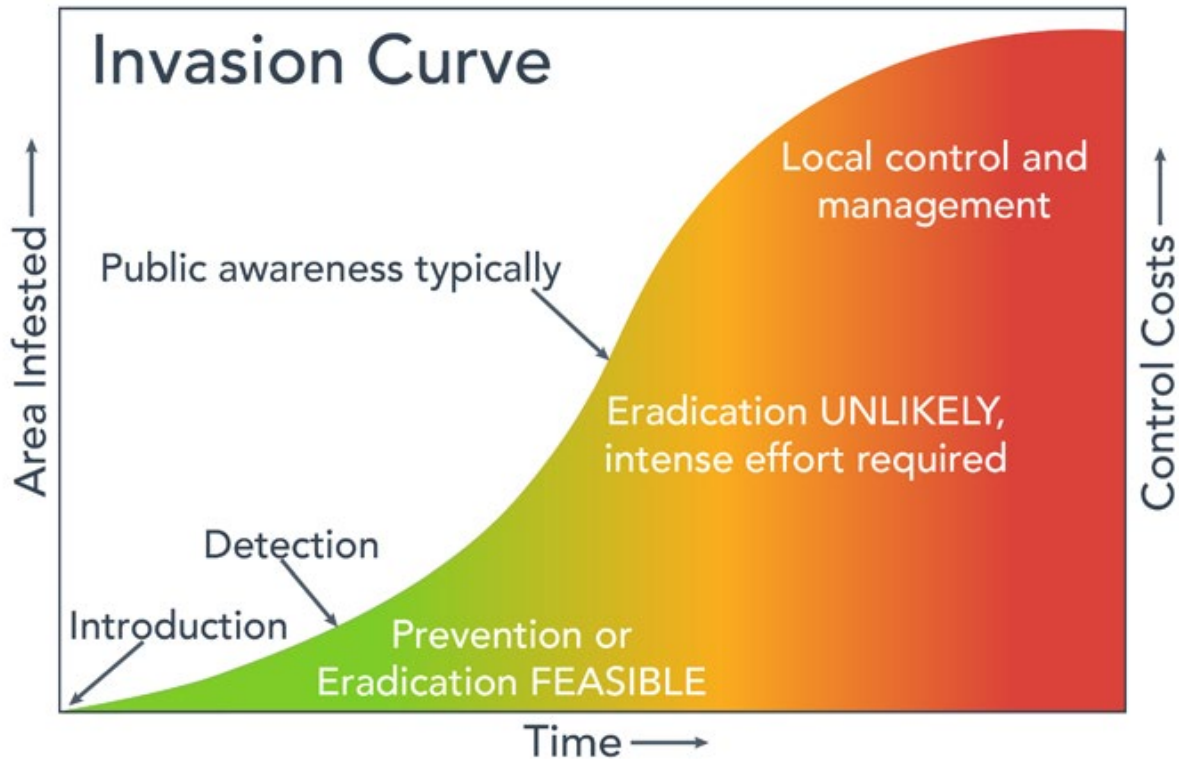
Each quarter, the winning entry will receive a one year extension on his or her ACS membership. In addition, all correct answers will be entered into a yearly grand prize drawing of a voucher granting the winner free registration at an upcoming ACS National Meeting (an approximately \$350 value).



Silver Lake in the Sierra Nevada. Photo by Jack Christiansen

Invasive Species

By Gerry Donaldson



Imagine your landscape with seventy percent, or more, of the plants dead! Imagine all of your community similarly affected! Imagine all of your state, all of your USDA growing zone, possibly all of your country affected! No, this is not an introduction to an episode of *Twilight Zone*, and granted, this may sound alarmist, but such losses are a very real possibility if invasive insects and/or diseases have their way with our natural and built landscapes.

Each loss in our landscapes results in changes in the ecosystem. All of the components of an ecosystem work together to clean water and to re-charge aquifers. They clean air and provide oxygen, moderate atmospheric temperatures and provide habitat for the complex web of life. All of this facilitates human survival. Invasive pests wreak havoc on those ecosystems at a cost greater than 25 billion dollars

in damaged or lost crops and forest products annually. Reduced property values and increased maintenance costs are direct costs to homeowners and all taxpayers, adding billions more.

The U.S. Government, through the USDA's Animal and Plant Health Inspection Service (APHIS), works to keep invasive pests out of our country. We all know of examples where that effort has fallen short. Think about chestnut blight, which devastated the American chestnut in the late 1800's and early 1900's. In some areas, the American chestnut was up to 20% of the trees in forests and provided a significant food source for Native Americans, early settlers, and the animals of the forest. In the 1920's, Dutch elm disease was identified in the United States. By the 1960's, it had virtually wiped out the American elm throughout North America,

dramatically changing our forests and city streets. More recently, in 2002, emerald ash borer was discovered in the US. Since that time, it has devastated the ash trees of the Great Lakes region and has spread to 30 states, killing millions of trees and costing billions of dollars in loss and damage.

The importance of early detection is exemplified by the emerald ash borer experience. Initial homeowner questions about what was happening with their ash trees were met with confusion on the part of arborists, and extension and university personnel due to lack of knowledge of the insect. Little, if any prescriptive information was available. By the time the insect was identified and researchers had identified controls, the area infested had become so large that elimination was ruled out as a possibility.

Early detection of invasive species is critical if we intend to prevent future disasters. The longer an invasive goes undetected, the more difficult, and more expensive it is to control. (See *Invasive Introduction Curve*) Fortunately, a plan to combat invasive species is in place and is beginning to have a positive effect.

With funding support from APHIS, the American Public Gardens Association has partnered with the National Plant Diagnostic Network to form the Sentinel Plant Network. Since its inception in 2011, the program has grown to include over 225 public gardens as members. Staff of the Sentinel Plant Network participating gardens are trained to look for signs and symptoms of potential and/or emerging threats in their geographic area. Those same staff can aid in differentiating between indigenous insects and diseases and those that are new or unknown. They can then make referrals to the state or regional diagnostic centers when appropriate. The National Plant Diagnostic Centers work with federal regulators and local governments to form a rapid response to stop the spread of an invasive species and to minimize impact.



Adelges tsugae, woolly adelgid

You can help with this vital effort. Go to firstdetector.org and create an account. Please indicate that you learned about the program through the Sentinel Plant Network and the *CONIFERQUARTERLY*. There you can use the e-learning modules to learn about threats in your region, and how to report plant problems in your area.

Call your local public garden and talk with them about the Sentinel Plant Network and any classes they may

offer to aid in invasive pest detection, prevention, reporting, and control.

You can also help by monitoring your garden and keeping an eye on the flora wherever you travel. If you see something that does not look right, please take photos and then pass that information along to a Sentinel Plant Network garden. Together we can make a difference in our future.



Symphyta, sawfly larvae



Conifer Propagation Seminar

March 3, 2018
8:54 a.m. - 4:00 p.m.



Learn the art and science of making more conifers with this popular hands-on class.

Designed for the beginning propagator, this seminar will share techniques even experienced propagators will appreciate.

Focused propagation topics will include hardwood cuttings and grafting, with plants from the HLG collections.

Attendees will take all plants home from such species as *Thuja*, *Juniperus*, *Pinus*, *Picea* and *Abies*.

Advanced registration is required, but experience is not. Prices includes care instructions, lunch, 16 cuttings and 6 grafted plants.

Cost: \$100 per person. \$90 per Friends of Hidden Lake Gardens. \$125 per person after February 17. Registration is limited and will close on February 26.

Registration is required. Call Hidden Lake Gardens at 517-431-2060.

In the old days of botany and horticulture, students had to be able to draw. This is a drawing of *Cephalotaxus pedunculata* fruit. L. Beissner, *Handbuch der Nadelholzkunde* (Berlin: Verlagsbuchhandlung Paul Parey, 1909)



Pinus longeava, Great Basin bristlecone pine. Photo by Jack Christiansen

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2017 National Meeting, Marcellus, New York. Photo by Ron Elardo