

AMERICAN CONIFER SOCIETY

conifer

VOLUME 33, NUMBER 2 | SPRING 2016

QUARTERLY

ENCOUNTERS WITH
**The Baker's
Cypress**

PAGE 18

SAVE THE DATE • 2016 SOUTHEAST REGION MEETING • AUGUST 26–28 • WAYNESBORO, VA

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Spring 2016

Volume 33, Number 2



ConiferQuarterly (ISSN 8755-0490) is published quarterly by the American Conifer Society. The Society is a non-profit organization incorporated under the laws of the Commonwealth of Pennsylvania and is tax exempt under section 501(c)3 of the Internal Revenue Service Code.

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Conifer Quarterly

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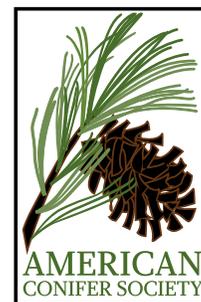
at Larned Garden in

Samford, Connecticut.

Photo by Dennis Groh



WELCOME TO THE NEW CONIFERQUARTERLY



BY RON ELARDO

With this larger format, your magazine moves from an academic journal to a true gardening magazine specializing in conifers. Indeed, the only gardening magazine dedicated to conifers! The CQ has entered not only a new century, but a format called for by you.

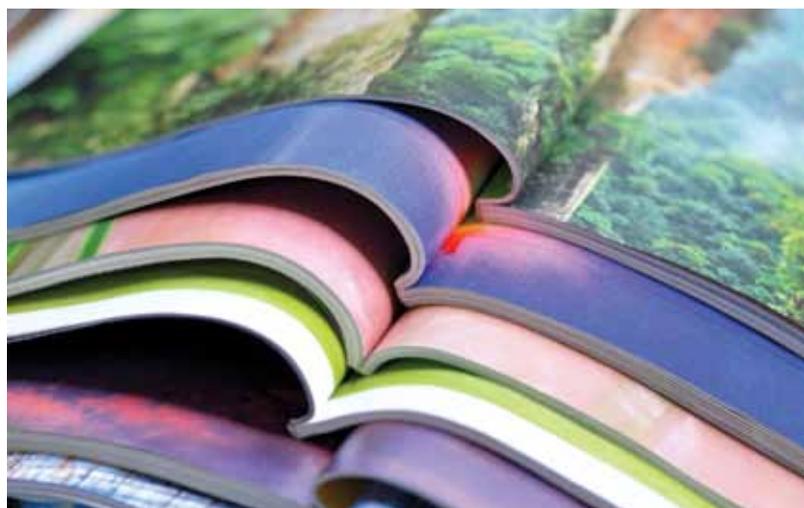
P sychologists will tell you that 60% of humans' stimuli is visual. Our eyes capture the image and our brains formulate it. And, you responded by asking for photos which reflect the best our contributors offer. The **CQ** is now able to take a high resolution photograph and give you its greatest detail.

In the business of putting the magazine together, I require that photography be 300 DPI or greater. In the past, our contributors have sent 6, 10 and even larger megabyte photos, only, because of page-size constraints, to have them appear many times as 1" x 1" photos. In short, they were a sad commentary on the beauty captured by the contributor. That will no longer be the case, as you will see.

In no way will the quality of the articles, or the significance of their information, be sacrificed by this larger format. In fact, they will be enhanced.

ConiferQuarterly evolved as a color magazine and took a quantum leap forward when Evelyn Cox became editor. To her and her vision we owe a great debt. Under Evelyn's editorship, long gone were the black and white photos of earlier times which were not able to exhibit either the detail or the beauty of the conifers, to which your Society and your publication are dedicated. Without Evelyn, your magazine would not have become what it has. I am in debt to her for her guidance and her support, along with that of Past President Tom Cox, in moving the **CQ** to this new and improved level.

ConiferQuarterly changed its face and its print size. The blue covers gave way to those reflecting seasonal colors. The distinctive outer shell of the **CQ** took on new hues. Then a dear friend of mine, Sharon Rabkin Wood, took a look at a photo I was going to use for the cover and suggested that I make the entire outer cover the photo. Hence was born the full-bleed cover you have enjoyed so much.



I have consulted experts in the design and publication fields to bring you the magazine you see with this issue. A great deal of thought and research has gone into this larger format. Electronic magazines have returned to paper. Sara Malone, your webeditor, and I collaborated in bringing you this new format.

Via email, in conifer meetings and groups, and by phone calls, my call for your reactions to a larger format was met with overwhelming support and excitement. Your Board of Directors representatives reported your support for a larger format and then acted upon it. And—your **ConiferQuarterly** is not yet done evolving. As we move forward, more pages are in the offing.

It is my task not only to be the steward of your magazine, but also to keep its eyes always on the future. Your suggestions, your ideas and, most of all, your contributions are what keep **ConiferQuarterly** alive and flourishing. I look forward to receiving your writings and your photos. 📧



WHAT DO CONIFER ENTHUSIASTS NEED TO KNOW ABOUT MYCORRHIZAE?

BY BERT CREGG, Ph.D., MICHIGAN STATE UNIVERSITY,
DEPARTMENT OF HORTICULTURE, DEPARTMENT
OF FORESTRY

Mycorrhizae are a subject which generates a lot of discussion among people who grow conifers. Whether they are foresters, nursery managers, Christmas tree growers, or conifer gardeners; everyone seems to have an opinion on mycorrhizae.

With an increasing array of mycorrhizal products on the market, the discussion around mycorrhizae and their importance in conifer health continues to intensify. Below are some key things conifer enthusiasts should understand about mycorrhizae.

What are mycorrhizae?

Mycorrhizae are associations between fungi and plant roots. The term mycorrhizae comes from the Greek *mykos* “fungus” and *riza* “roots”. Mycorrhizae are an example of a symbiotic relationship between two organisms, in which both organisms benefit, referred to as a *mutualistic association*. In the case of mycorrhizae, the fungus gets energy in the form of photosynthates from the plant. The plant, in return, gets an increased ability to absorb water and nutrients from the soil, resulting in more efficient resource uptake.

How many types of mycorrhizae are there?

Mycorrhizae are generally described as one of two types; *ectomycorrhizae* and *endomycorrhizae*. In *ectomycorrhizae*, fungi produce threadlike structures (*hyphae*) which form a network of cells in the intercellular spaces of the root (*Hartig net*), but do not penetrate the cortical cells of the plant root. *Ectomycorrhizae* also form a sheath of hyphae around the outside of the root (*mantle*). In *endomycorrhizae*, fungi form structures (*arbuscules*) which penetrate inside the roots of the host plant, most common in forest trees. Although both types of mycorrhizae increase nutrient uptake, *endomycorrhizae* have been specifically linked to improved phosphorus nutrition. There are numerous fungal species involved in both ecto- and endo-mycorrhizae, and host-fungus associations are often species- or genus-specific.

What kinds of trees are infected by mycorrhizae?

Most land plants, including conifers in the family Cupressaceae (cedars), form *endomycorrhizal* associations. *Ectomycorrhizae* only occur in about 10% of plant families, but they are important for conifer growers because all members of the pine family including true firs (*Abies*), spruces (*Picea*), pines (*Pinus*), Douglas-fir (*Pseudotsuga*), and hemlocks (*Tsuga*) form *ectomycorrhizae*.

Can I tell if my trees are mycorrhizal?

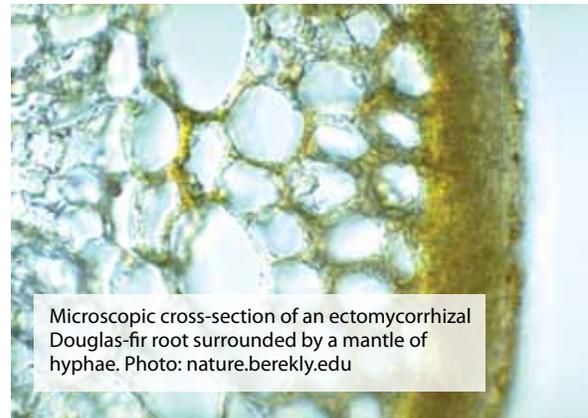
Structures associated with *endomycorrhizae* fungi are not visible with the naked eye and require specific microscopic examination; however, it is often possible to determine if roots are infected with *ectomycorrhizae* by visual examination. The root tips of conifer roots infected with mycorrhizal fungi may split off into pairs at the ends,



Container-grown Douglas-fir with (left) and without (right) mycorrhizal inoculation. Photo: Mycorrhizal Applications, www.mycorrhizae.com



Mycorrhizal Douglas-fir seedlings (left) compared to un-inoculated seedlings (right) on a droughty site. Photo: Mycorrhizal Applications, www.mycorrhizae.com



Microscopic cross-section of an ectomycorrhizal Douglas-fir root surrounded by a mantle of hyphae. Photo: nature.berekly.edu

referred to as *bifurcations*. In other situations the hyphae of the fungus form visible matting (*mycelia*) on the roots. Also, the fruiting bodies of many mycorrhizal fungi are mushrooms, so their presence can also indicate that conifers are mycorrhizal.

“CONIFER GROWERS WHO WISH TO EXPERIMENT WITH MYCORRHIZAE SHOULD KEEP SEVERAL POINTS IN MIND: KEEP CAREFUL NOTES ON SPECIES, STOCK TYPES, SOURCE NURSERY, AND INOCULUM SOURCE AND GROWING CONDITIONS.”

Does artificial inoculation with mycorrhizae improve tree performance?

The beneficial association of mycorrhizal fungi and tree roots has been known for decades. Some of the most classic examples of the essential role of mycorrhizae in tree growth and development come from attempts to establish conifers as exotics. For example, early efforts to establish Monterey pine (a North American native) in Australia and New Zealand failed due to a lack of appropriate mycorrhizal fungi. Similar failures of afforestation efforts in grassland areas have also been attributed to lack of mycorrhizae. Numerous studies of artificial mycorrhizal inoculation of trees have found significant benefits including increased survival, growth, drought hardiness, nutrient uptake and disease resistance. However, results of artificial inoculation are often highly variable, and many studies show only modest benefits or no improvement at all compared to plots or trees not inoculated.

If mycorrhizae are essential for conifer growth and development, why doesn't mycorrhizal inoculation always provide a benefit?

There are several reasons why inoculating with mycorrhizae may not improve tree performance. First, in areas near native woodlands, native mycorrhizae spores are likely already present in the soil. For example, European researchers inoculated Norway spruce and Scots pine seedlings with three known mycorrhizal fungi prior to field planting. After three years, the only fungi they could isolate from the trees were native types, not the ones they used for inoculation.

It is also important to remember that mycorrhizal fungi are host-specific. In other words, trees species and fungal species have to be a match. Since many conifer gardens may contain dozens of tree species, it is possible that one source of inoculum will not work on all species. In a study in Canadian nurseries, researchers used six types of fungal spores to inoculate lodgepole pine, white spruce, black spruce, Scots

pine and Siberian larch. Some fungal types showed consistent benefit, but two types did not improve seedling growth compared to un-inoculated controls.

Trees may also fail to respond to inoculation due to problems with the inoculation procedures. In some conifer nurseries, beds are inoculated using soil from local woodlands, which presumably contains mycorrhizal spores and mycelia. More commonly, bareroot and container nurseries now use commercially produced spores or inoculum containing ground mycelia. Inoculum can remain viable for months or even years when stored at room temperature or refrigerated, however, viability will ultimately decrease with age or extreme storage conditions.

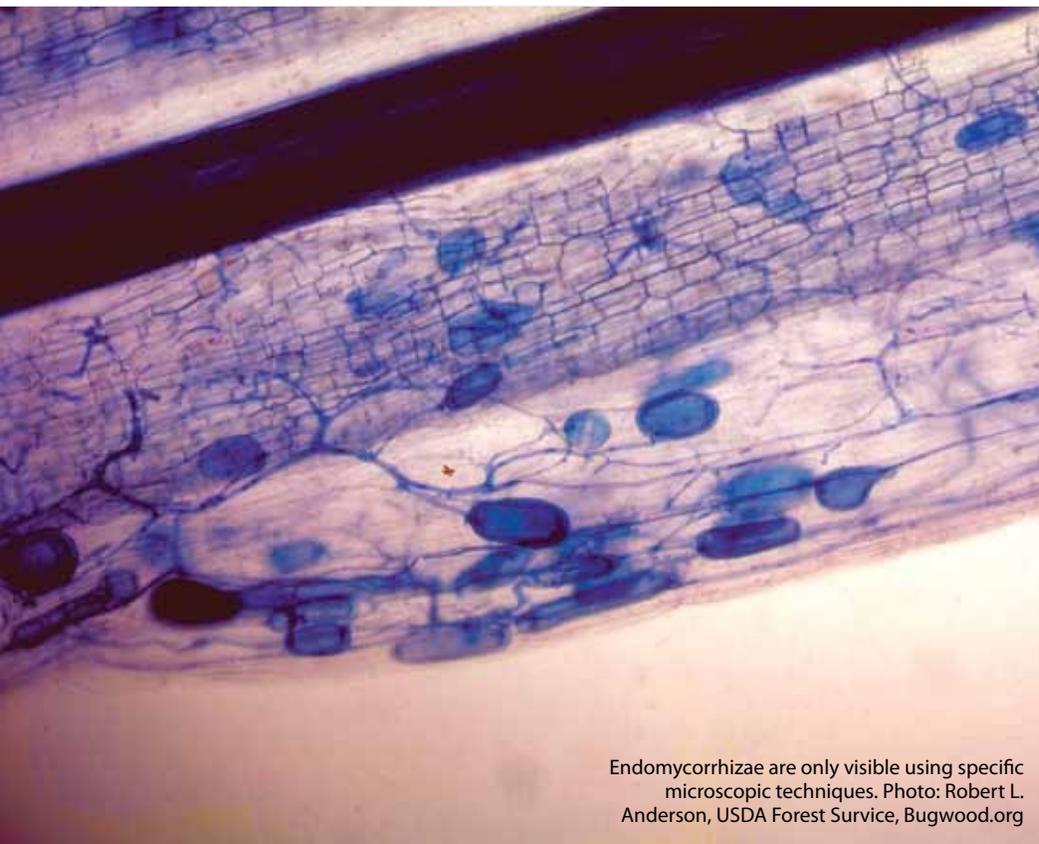
Lastly, inoculation may not improve tree performance if site resources are not limiting. Conifer enthusiasts often fertilize and irrigate their gardens, potentially limiting the benefit of improving nutrient or water uptake by adding mycorrhizae. In addition, high nutrient levels can also reduce the success of mycorrhizal colonization. High soil phosphorus levels, for example, can inhibit endomycorrhizal colonization.

Should I inoculate my trees with commercial mycorrhizae?

For most conifer gardeners the answer is, "Probably not." As noted above, mycorrhizal spores are likely already present in your soil. Moreover, it is also highly likely that the seedlings and transplants you purchase from your nursery supplier are already colonized by mycorrhizal fungi when you receive them. For conifer gardeners who live in areas where few conifers are present, there may be situations where native mycorrhizal spores are not present, or are present in low quantities, and artificial inoculation may be beneficial. This could include gardens in the Great Plains, or planting in new developments where top-soil has been removed.



Ectomycorrhizal root tips of red pine showing characteristic two-part split ends (bifurcations). Photo: Robert L. Anderson, USDA Forest Service, Bugwood.org



Endomycorrhizae are only visible using specific microscopic techniques. Photo: Robert L. Anderson, USDA Forest Service, Bugwood.org



The thread-like vegetative structures (hyphae) may be visible to the naked eye. Photo: Paul A. Marietta, USDA Forest Service, Bugwood.org



Mycorrhizal inoculation of container-grown conifers. Photo: Joseph O'Brien, USDA Forest Service, Bugwood.org

section. Two particularly good references are Chapter 20 in the *Bareroot Forest Nursery Manual*, "Mycorrhiza Management in Bareroot Nurseries" by Randy Molina and James Trappe and Volume 5 of the *Container Nursery Tree Nursery Manual*, "The Biological Component: Nursery Pests and Mycorrhizae" by Michael Castellano and Randy Molina. The latter chapter includes one of the most comprehensive lists of mycorrhizal inoculum × conifer species matches available. 📄

Author's note: This article was adapted from a related article published in the *Great Lakes Christmas Tree Journal*.

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Because of the complexities associated with mycorrhizae, it is difficult to predict with 100% certainty, under which situations inoculation may or may not improve performance. Conifer growers who wish to experiment with mycorrhizae should keep several points in mind: keep careful notes on species, stock types, source nursery, and inoculum source and growing conditions. As noted, there is a good likelihood that your plants and/or soil already contain mycorrhizae, so it's important that you are able to convince yourself that that expense and effort of adding them are warranted.

Where can I learn more?

The USDA Forest Service "Reforestation, Nurseries, and Genetics Resources" website (www.RNGR.net) has several excellent resources on mycorrhizae under their "Publications"



Fruiting bodies (mushrooms) of a mycorrhizal fungus in a fir transplant bed. Photo: John H. Ghent, USDA Forest Service, Bugwood.org

COMMENTS ON CONIFERS FOR OPEN FORUM

BY BOB FINCHAM

I have noticed that the forums on the American Conifer Society's website suffer from a modicum of inattention by the membership. I thought it might be nice to generate some topics which could lead to forum activity.

I have been collecting conifers since 1974 and have formed some opinions based upon my observations over the years. Some of these opinions are reflected in my book *Small Conifers for Small Gardens*. Many others will appear in my next book, which will focus more on the larger growing conifers. I hope to have it completed sometime in 2016.

Here are some of my observations. If anyone disagrees with any of these comments, feel free to use the forums on the ACS website for a discussion.

Before getting into this list, I would like to mention a few of my "pet peeves".

I may be a lone voice in the wilderness, but I work under the assumption that there needs to be two types of plant taxonomy: scientific taxonomy and horticultural taxonomy. The practitioners of the former are constantly revising genera and species according to the latest and newest scientific methods. That is all well and good, but, for the latter, the nurseryman and the average person, a lot of the terminology is extremely difficult to master. Once a certain species is placed in an established genus, and the average person learns it, a feeling of satisfaction often results. Then, to have it changed can often cause considerable consternation and frustration. Sometimes such a change is necessary, but, too often, things are in a state of flux, and change comes about all too fast.

No one can argue that scientific names are a necessity, and that common names are too often misleading (take cedar, for example). The purpose of having proper names for plants in horticulture is so that the consumer and the nurseryman will know the physical characteristics of a named plant and its needs for successful growth in the nursery or garden.

Take, for example, a plant name which is so complex that it is confusing (*Cedrus libani* var. *atlantica* 'Glauca Pendula' (RHS and ConiferBase call this *Cedrus atlantica*). Compare this to the old nomenclature (*Cedrus atlantica* 'Glauca Pendula'). There is also a plant sold as *Cedrus libani* 'Glauca Pendula', which can be the

one mentioned, or another, completely different cultivar with pendulous secondary branches. The whole *Cedrus* question is one example of taxonomists frustrating horticulturists. Even the taxonomists are not in full agreement of this change. I do not consider them varieties of *Cedrus libani* and will continue with the earlier designations in my writings (especially since I write for the general public and not professional taxonomic journals).

Years ago *Platyclusus orientalis* was the accepted name for the oriental arborvitae. In the mid-1900s, it was changed to *Thuja orientalis*. As a result, cultivars of the species were found under both names. Now we are back to *Platyclusus orientalis*. Those who never went along with changing the name were right, but they are all gone now, and the newer generation must revise



their thinking toward *Platyclusus* and away from *Thuja*. The poor consumer gets lost in all of this terminology. I will stick with *Platyclusus* since that was always the correct term.

Chamaecyparis nootkatensis never really made good sense for this species for a number of reasons, the most obvious being its ability to hybridize with different species of the genus *Cupressus*. *Cupressus nootkatensis* came under closer observation by taxonomists when *Xanthocyparis vietnamensis* was discovered and then described in 2002. Then it was renamed as *Xanthocyparis nootkatensis* since it was considered closely related to the new discovery. In 2010, molecular studies placed it by itself under the *Cupressus* genus. If that is not confusing enough, there is strong taxonomic evidence that it may actually be in its own genus and be named *Callitropsis nootkatensis*. *Chamaecyparis* was so strikingly wrong that I will stay with *Cupressus* for this species (the species long recognized in **ConiferQuarterly**).

There are two terms which are used as cultivar names and in no way fit the requirements for a cultivar name. The first of these is 'Glauc'. This descriptive word just indicates a blue plant. Since many species produce blue seedlings, there are often several different selections sold under this name in one species. When a good selection is grown, it needs a correct name.

'Pendula' is a characteristic growth habit which is often repeated in seedlings. When seedlings are grown from a plant labeled *Pinus strobus* 'Pendula', a high percentage will also be weeping and often sold under the same name. This also happens with weeping forms of *Tsuga canadensis* and *Picea abies*. All of these names need to be written as var. *pendula*, not 'Pendula'.

Tempest in a Teapot: My name was recently mentioned as part of a nit-picking argument over the placement of the apostrophe in the term "witches' broom". I listed it the way I write it. The alternative argument was that it should be "witch's broom". The thought is that it is a broom belonging to one witch and should be a singular possessive.

The whole concept is not quite right. The term should have been "witches' nest" because they were originally thought to be places where witches would rest when flying around a cemetery (where the first witch's brooms were found). Since "broom" is in common use and would not be confused with "birds' nests", I can understand the origin of the term. However, since one nest is used by any number of witches, then the plural designation is the correct one to use.

During my years collecting and selling rare and unusual conifers, I have noticed some interesting things about these conifers. I have noted a few of them below.

Abies balsamea 'Nana' suffers sun scorch in warmer climates and has strong tendency to revert to coarse foliage in the Pacific Northwest. It easily roots from cuttings.

Abies lasiocarpa 'Green Globe' was originally called *Abies concolor* 'Green Globe' and may often still be found under this name. The lack of *concolor* odor is a clue to the misnaming.

Cedrus cultivars. Some people graft onto *Cedrus atlantica* instead of *Cedrus deodara* in the misguided belief that it needs a hardier understock to grow in cooler climates. *Cedrus deodara* gets a superior root system for the field grower, and the root hardiness is at least equal to the top hardiness of *Cedrus atlantica* and *Cedrus libani*.

Chamaecyparis lawsoniana is highly susceptible to phytophthora in North America and Australia. Propagation by grafting onto anything other than resistant *lawsoniana* understock is a big mistake for two reasons. It always overgrows the understock, and, if the graft union is buried, the scion will send out roots and be phytophthora-susceptible. It is interesting that, in the past, when overwatering would rot the roots of *Chamaecyparis lawsoniana* cultivars in containers, all the nurseryman had to do was cut back the watering. The plants would then not develop phytophthora. They would simply reroot.

Cupressus nootkatensis var. *gp. pendula* has many different forms, and any of these different forms, which warrant propagating, should be given their own names. The designation 'Pendula' should be changed to var. *pendula* since no one cultivar fits this designation. It needs to be written as *Cupressus nootkatensis* var. *pendula*.

Chamaecyparis obtusa 'Verdon' does not burn in the full sun, even when under water-stress in the ground. It grows slightly faster than 'Nana Lutea', but much slower than 'Aurea' with the same color. It is underused everywhere.

Cryptomeria japonica 'Sekkan' is a bright yellow, large-growing cultivar of Japanese cedar, which does not burn in the northwest when under water-stress in full sun. It appears to be one of the cold-hardier selections of this species.

Juniperus procumbens 'Nana' — The true form is almost impossible to find in the trade. Most nurseries sell *Juniperus squamata* 'Prostrata' under this name. Even *procumbens* 'Green Mound' is *squamata* 'Prostrata'. The true *procumbens* 'Nana', which changes to a bronze-green color during the winter, is easier to propagate, and grows about twice as fast as *squamata* 'Prostrata', while maintaining a flat center without any mounding up.

Larix decidua 'Pendula' — The color of the bark indicates it actually is *Larix x marschlinsii*.

Picea abies dwarf cultivars are prone to reversions causing the whole group to be mixed up in collections. These reversions are particularly bad in the Northwest, and many of the old cultivars cannot be recognized after just a few years.

Picea abies var. *gp. pendula* — This name should be used as a varietal or group name since different forms are sold under this name. The old form which develops a leader with pendulous branches is 'Inversa', while the other, old form which spreads over the ground with branches which grow upward, then bend back to the ground, is 'Reflexa'. If they are mixed up at the nursery, then var. *pendula* would be acceptable.

Picea glauca 'Rainbow's End' — The second and third flushes of this selection show the gold color, and the color seems to be best when the summer is hot. Cool summers lessen the intensity of the gold. 'Pixie Dust' appears to have a similar need for warm weather.

Picea glauca 'Sander's Blue' — has a strong tendency to revert to green.

Picea mariana 'Nana' — will revert to normal growth which must be removed to maintain the dwarfness. Most of the *Picea glauca* 'Echiniformis' plants I have seen have proven to be *mariana* 'Nana'.

Picea omorika 'Pendula' — should be a group name, and any selections being propagated should be given specific cultivar names. Many selections being offered in America aren't even as good as the typical species form, which is quite pendulous. The specimen in the Gotelli Dwarf Conifer Collection at the U. S. National Arboretum was given its own name. There are four selections becoming more available in America, which are exceptionally narrow: 'Berliner's Weeper', 'Pendula Bruns', 'Gotelli Weeping' and 'Kuck Weeping'.

Picea orientalis 'Skylands' is often incorrectly listed as 'Aurea Compacta'.

Picea pungens 'R.H. Montgomery' and 'Globosa' — These two names are for the same plant with different shapes which are due to using wood from different parts of the plant for propagation. Weak laterals produce 'Globosa', while strong, upright wood produces 'R.H. Montgomery'. Also, the removal of a terminal shoot will produce 'Glauca Globosa'. The cultivar 'Glauca Globosa' originated in Europe soon after 'R.H. Montgomery' was sent there.

Picea pungens 'Hoopsii' — is difficult to propagate as the terminal bud tends to die when it is grafted. That makes it difficult to grow, as it needs special training when first lined out in the field. The cultivar 'Copeland' is an excellent alternative since it not only propagates more easily, but its color is as good. The blue isn't quite as intense, but the bark is white for the first year, and the overall effect is striking.

Most prostrate forms of *Picea pungens* and *Abies* will put up leaders as they are actually side-branch grafts exhibiting plagiotropism.

Pinus densiflora 'Prostrata' — There is no such plant. The

cultivar 'Pendula' grows flat along the ground and is probably incorrectly called 'Prostrata' in this instance. It is very brittle and nearly impossible to ship without some branch breakage.

Pinus koraiensis 'Silveray' is a selection of 'Glauca'.

Pinus mugo var. *pumilio* — is sold almost everywhere as a dwarf conifer. It is definitely no such thing. Sheared plants are sold in retail centers and mislead customers. Named cultivars are to be preferred and will eventually come into demand as the consumers become smarter.

Tsuga canadensis 'Cole' (sometimes listed simply as 'Cole's Prostrate') bares its central branches as it grows, making it susceptible to severe sunscald damage. It needs to grow in shade. It suffers from tip blight where the branchlets lie on the ground, unless some sort of material keeps them separated from the soil.

Tsuga canadensis 'Pendula' — definitely needs to be considered as a group name since there are so many different forms which have been grown from seed over the years. There are named varieties which should be used wherever the customer wants to know the final, unsheared shape and size. Among distinctive cultivars are 'Ashfield Weeper', 'Brookline', 'Jan Verkade', 'Kelsey Weeping', 'West Coast Creeper', and 'Wodenthe'.

There should be a lot of material here to generate some discussion on the ACS website. I will also be elaborating on this information in my future book. 📖

Editor's note: I find this article very intriguing. I would also welcome any articles for **ConiferQuarterly** on any of the points Bob Fincham has made.



2016 SOUTHEAST REGION MEETING

BY JEFF HARVEY

We are excited to be going to Waynesboro, Virginia, August 26–28th for the Southeast Region meeting. Waynesboro is at the foothills of the Great Smoky Mountains and is just minutes away from the Shenandoah Valley, Staunton and Charlottesville.

The Shenandoah Valley is a beautiful area. There are three past presidents' residences which can easily be visited in a day, as well as a multitude of gardens and nurseries. The meeting starts Friday night with a dinner and two great speakers. Saturday we will be on garden tours and, in the evening, we will have dinner, an auction and a guest speaker.

With the help of Beth Jimenez, Fran Boninti and Cole Burrell, we have chosen three great gardens and are working on a fourth to tour on Saturday. In fact Cole's garden, Bird Hill, will be on the tour. Cole is a garden photographer, garden designer, author, lecturer and Professor at the University of Virginia School of Architecture and Landscape Architecture. He has won awards for his garden design with natives and sustainable garden practices. Bird Hill, a popular destination for national tours and a subject of many national and regional publications, is a 10-acre pleasure garden in the foothills of the Great Smoky Mountains. The gardens are a collector's paradise with many natives as well as temperate perennials and tropicals.

Katherine Kane's Waterperry Farm will also be on our tour. Katherine named her garden after one of the first horticulture schools for women in Oxfordshire, England. Katherine, a creative writer, has been molding Waterperry Farms for the last 24 years. Katherine's garden has been recently featured in several regional publications, including



Waterperry Farm

Virginia's Living Magazine and Charlottesville's *Weekly Abode*. Waterperry's elegant landscape is used for many weddings and garden parties throughout the year. The garden has over a dozen areas including a conifer collection, yew garden and rose garden, to name just a few. There is something for everyone.

We are excited that one of our members has agreed to be included on the tour, Dr. Jay Gillenwater. Jay moved to Charlottesville in 1965 and began working on his garden in 1985. First interested in rhododendrons, he eventually wanted something with more year round interest. So, with the help of Paul James in nearby Boones Mill and Maude Henne of



Gillenwater Garden
Photos by Maud Henne

Charlottesville, he began collecting conifers. Now, he has spread to the property across the street to help satisfy his desire to garden. Not only does Jay garden on his property, but he was a founding member of the Charlottesville Tree Stewards which promote planting trees in the area.

We have a great lineup of speakers for the meeting. Friday night, we have Steven Carroll from the UVA State Arboretum at Blandy Hill. The Arboretum was last year's reference garden grant recipient. He will be talking about what is happening at the Arboretum and showing us the results of the grant. Also, on Friday night we have Brent Heath from Brent and Becky's Bulbs. He will be giving a talk on companion bulbs in the garden. Brent is a collector of conifers as well, and we hope to visit his garden on a future meeting in Virginia.

On Saturday we will have our silent and live auctions as well as our keynote speaker, Dr. Phil Sheriden from the Meadowview Biological Research Station. The research station was the recipient of a recent grant from the ACS for a reforestation project of *Pinus palustris*. Phil will give us a presentation on the history,

importance and growth habits of *Pinus palustris* in his renowned energetic and entertaining style.

Go to the Southeast Region webpage to reserve your spot for the meeting. For additional information contact Jeff Harvey at Jeff@dirtdawgnursery.com or (615) 268-7089. 📍

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BY RICH AND SUSAN EYRE

Full, deep, dark shade: 3 hours or less of sun

- *Taxus baccata*

'Amersfoort': vase-shaped habit with rounded leaves

- *Taxus cuspidata*

'Dwarf Bright Gold': irregular upright yew with golden color

'Nana Aurescens': low flat yew with golden edges

- *Taxus x media*

'Viridis': narrow dwarf form

'Stovepipe': seedling of Hick's yew

- *Tsuga canadensis*

'Albo-spica': intermediate spreader with pure white tips

'Bennett': low spreading, graceful dwarf hemlock

'Cole': prostrate, dark green needles, exposed branches

'Everitt Golden': dwarf upright with bright golden foliage

'Gentsch White': slow-growing, globose with white tips

'Horsford Contorted': dwarf hemlock with twisted branches

'Jeddeloh': bright green spreading mound

'Jervis': extremely slow-growing upright, congested growth

'Kelsey Weeping': strongly asymmetrical form

'Pendula': graceful dark green cascade; stake to desired height

'Stewart's Gem': bun-shaped dwarf with cinnamon tips

'Stockman's Dwarf': dwarf horizontal grower

- *Tsuga caroliniana*

'Mountain Mist Sister': superb weeping hemlock, longer needles

- *Tsuga diversifolia*

Dark green foliage, known as the rice hemlock from Northern Japan. Grows wide as tall and does not burn in sun.

- *Evergreen broadleaves*

Buxus 'Green Mound'

Rhododendrons and Azaleas

Partial shade: 4–6 hours of sun

- *Picea abies*

'Acrocona': irregular weeping form with purple pink cones on branch tips in spring

'Pusch': witch's broom of Acrocona, tiny pink cones in spring

'Clanbrassiliana Stricta': superior pyramid for the landscape

'Cobra': bizarre tree with rat-tail branches; forms a skirt

'Elegans': low flat, nesting spruce with early bud break

'Hillside Upright': irregular form, dark green congested needles

'Weeping Blue': upright grower with pendulous branches

- *Pinus strobus*

'Blue Shag': soft, blue-green needles, with slow mounding habit



'Fastigiata': narrow upright form that becomes large
 'Hershey': dwarf form from witch's broom at the Hershey Estate, PA
 'Horsford': slow-growing globe, mounding habit on standard
 'Niagara Falls': dense habit with pendulous cascading branches

• ***Pseudotsuga menziesii***

'Emerald Twister': upright form with twisted branches
 'Fletcheri': blue-green, irregular upright dwarf
 'Fastigiata': narrow upright form
 'Graceful Grace': blue-green, upright dramatic weeping form

• ***Thuja occidentalis***

'Degroot's Spire': tight, dark green upright, narrow dwarf
 'Yellow Ribbon': narrow upright, tight with bright yellow color
 'Hetz Midget': dwarf dense green globe
 'Linesville': aka 'Mr. Bowling Ball': globe with juvenile foliage
 'Sunkist': bright golden tips on broad pyramid

Morning sun: area that gets cool morning sun and is shaded in afternoon from hottest sun

• ***Abies koreana***

'Aurea': spectacular golden pyramid
 'Green Carpet': prostrate form with purple cones in spring

• ***Picea glauca***

'Conica': dense conical, dwarf Alberta spruce
 'Jeans Dilly': superior dwarf form of Alberta spruce

• ***Picea orientalis***

'Connecticut Turnpike': irregular windswept habit
 'Fat Boy': dwarf pyramidal form, dark green foliage

• ***Pinus cembra***

'Glauca Nana': great blue-green with a slower growth rate
 'Pygmaea': dwarf compact form with great blue color
 'Stricta': columnar form with fastigiated branches

• ***Pinus parviflora***

'Bergman': unique Japanese white pine with twisted needles
 'Fuku-zu-mi': compact, wide spreader

Japanese Maples & deciduous trees and shrubs

• ***Acer griseum***

Paperbark maple, cinnamon exfoliating bark, red fall color

• ***Acer palmatum***

'Red Emperor': dark red foliage all summer
 'Twombly's Red Sentinel': narrow form, great color, bright red in fall

• ***Acer palmatum var. dissectum***

'Seiryu': green leaves, reddish tips in spring, crimson in fall

• ***Acer japonicum***

'Aconitifolium': green in summer, yellow-orange-red in fall

• ***Acer shirsawanum***

'Aureum': full moon maple, yellow palm-shaped leaves, orange-red in fall

• ***Aesculus parviflora***

Bottlebrush buckeye with white flowers in mid-summer

• ***Cercidiphyllum japonicum***

'Pendula': Graceful pendulous branches, dramatic specimen

• ***Fagus sylvatica***

'Purpurea Tricolor': fabulous European beech, a must-have in your garden

• ***Ginkgo biloba***

'Mariken': slow-growing compact round form of Ginkgo

• ***Hamamelis x intermedia***

'Firecracker': a witchhazel which blooms reddish-orange in early spring.

Perennials for shade

Hosta, Astilbe, bleeding heart, perennial geranium, fern, Pulmonaria, Hakonechloa grass, Heuchera.

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ACS SEED EXCHANGE & HOW I BECAME A CONIFERITE

BY JIM BRACKMAN

My story begins long ago, when I was a young impressionable lad about 13 years old. My dad, unknowingly at the time, started a hobby which would corrupt my thought processes for the rest of my life.

It wasn't the wine he had started making in the basement, but the beginning of his obsession with rhododendrons and hybridizing. My father exposed me at a young age to the concept that, from a single seed, or an accidental cross of two plants, something yet unknown to the world could be created. That thought stuck with me forever. For more than 30 years, dad purchased rhododendrons, made his own crosses and ordered seed from the Rhododendron Society seed exchange until he had a collection which covered 4 acres and was well over 1,000 different species and hybrids.

I will never forget the day that he came home from a trip to the University of Washington with a handful of seed he had collected from, not a rhody, but a Korean fir. He explained the shape of the tree, upright colorful cones, and how the seed had to be treated in order for it to germinate. From that handful of seed, he got two trees, and I got hooked on conifers, mostly *Abies*. That conifer seed lay dormant in my brain for about 30 years while I worked in floriculture, growing cut flowers, bedding plants, hanging baskets, etc., etc. I did try my hand at hybridizing fuchsias a few times

with limited success. After 20+ years at one nursery, an opportunity arose to be a grower at a large reforestation nursery in Washington State. I decided to give it a shot and have not regretted it once.

Around the same time, I began looking on the Internet for any type of a conifer Seed Exchange. I was feeling quite nostalgic at the time, as my Dad had passed away. I found the ACS Seed Exchange, but it was over for the year; so, I just kept it in mind for spring. I kept checking the website, but the Exchange never came up. I finally sent an email to ask if there would be an Exchange that year, and it seemed that there would not be one, as the volunteer who had been doing it decided to stop. Since I expressed interest, I was asked if I would like to take over the exchange. I couldn't turn down an offer like that, and, at that moment, that dormant seed from my youth decided to germinate. In the first year, I received some seed from Germany of *Abies koreana* 'Horstmann's Silberlocke'. I had to give that a try, and half the seedlings had beautiful foliage similar to 'Horstmann's Silberlocke', and the rest were just normal green foliage. This, of course, set the hook for my conifer and seed addiction. This spring I hope to do some hybridizing on some Korean fir I have and will offer some of the seed in the 2017 Exchange if I have any luck.

Enough about me and my addictions and on to the Exchange. All members are welcome to purchase seed and donate cones or cleaned seed. This year the cost is \$1.00 per packet. The number of seed per packet can vary based on how much seed there is of a particular selection. Since I started with the Exchange, I have donated the cost of shipping to keep the price low. I will be soliciting feedback this year on raising the price per packet to help cover costs and may make a change for 2017. On the order form, please mark your substitute choices as there are chances that seed in limited quantities may not be available when your order comes up for filling. All orders are processed in the order they are received. Once you have your seeds, most of them will need to be stratified before they will germinate, and the methods for doing this are seemingly endless. For the details on stratification time, I usually turn to the Internet or the *Woody Plant Seed Manual* (this can be accessed on the internet as well). On the Seed Exchange page of the ACS website, there is a link to an article by Peter Gregg of Iseli Nursery. I recommend reading it, as it covers a lot of what I would say here about seed being a great way to find new cultivars of conifers, especially seed from brooms!

Each year, I try to reach out to the previous year's donors and one or two new potential donors. This is a lot harder than it sounds; so, when asked if I would like to write about the Exchange, I couldn't say no. I hope that this article will inspire members to look for and collect cones from their own collections, nearby nurseries, arboretums or public gardens.



Pinus bungeana
'Silver Ghost'

My wife and I stopped by The Oregon Garden a couple years ago and met Doug Wilson, who invited me back to collect cones the following fall. I have been back twice to make collections and plan to continue for as long as I am welcome. I also met Sam Pratt at The Oregon Garden a couple of years ago, and he took me to Conifer Kingdom to collect some cones. This year I also went to Iseli Nursery and met Peter Gregg, who spent a couple of hours with me collecting cones from the display garden and a few choice locations in the nursery itself. I will probably look for more nurseries this year that will let me come and collect cones as it is so much fun to be able to meet growers and see such beautiful nurseries and gardens. The only problem with collecting cones is that I only have my garage as a workspace to extract and clean the seed. I am fortunate to be able to use some older equipment from work, but it is fairly time consuming. If any members or nurserymen read this article and know of any small scale seed cleaning equipment which may be available, please contact me, as I would be very interested.

The donations of cones and seed are much needed to keep the Exchange interesting every year, if you have questions about collecting cones, cleaning seed, or the Exchange in general, feel free contact me at TreeGuy45@comcast.net.

See the ACS website for ordering seeds. 🌲

www.etsy.com/shop/DansDwarfConifers

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Figure 2: Mature Baker's cypress



Mention “cypress”, and I envision tall columnar trees lining the crystal-clear spring-fed pools of a Roman villa in ancient Italia. You can imagine the rest. But *Cupressus sempervirens* and its cultivars are by no means the only cypresses.

ENCOUNTERS WITH THE BAKER'S CYPRESS

BY DAVID PILZ

Indeed, North America hosts more cypress species than anywhere else. Keep in mind, however, that “cypresses”, as I use the term, no longer refers solely to members of the genus *Cupressus*. Recent phylogenetic analyses provide strong evidence for proposed changes to the generic name of Western Hemisphere “cypresses”. Adams, et al. (April 2009) proposed *Hesperocyparis*¹, and Laubenfels (September 2009) proposed *Neocupressus*². I will use *Hesperocyparis** in this article because Adams published first. The distribution of these New World species range from Central America northward through Mexico, Arizona, and California, and into southern Oregon. California has its share of such species,

*The RHS and our ConiferBase use *Cupressus*.

for instance the iconic wind-swept coastal Monterey cypress (*Hesperocyparis macrocarpa*).

As readers of my previous **ConiferQuarterly** articles know, my enthusiasm for conifers focuses on cultivating trees from personal seed collections of rare, unusual, or important conifers such as *Metasequoia glyptostroboides*, *Picea breweriana*, *Taxus brevifolia*, and now, *Hesperocyparis bakeri*. These species have merely been the highlights of my hobby of growing any tree of interest when I have the opportunity to collect ripe seed. I find it fascinating to watch trees germinate, and a fair number of these seedlings have gone on to live in suitable locations.

My first real encounter with cypresses occurred when a good friend hosted me on a March 1987 field trip to la Reserva de la Biósfera “El Triunfo”, which straddles the crest of the Sierra Madre de Chiapas in the state of Chiapas, Mexico. After I suffered a bout of Montezuma’s revenge while camping overnight in a rainstorm and an earthquake; the next day we hiked to a lush forest on the western slope of the mountains where we found old *Hesperocyparis lusitanica* specimens. They were stunning trees, some protruding from the upper forest canopy (Figure 1). I collected cones and sowed the seed in Oregon upon my return. The saplings grew three to four feet tall the first summer and then croaked with the first mild frost that autumn. Alas.

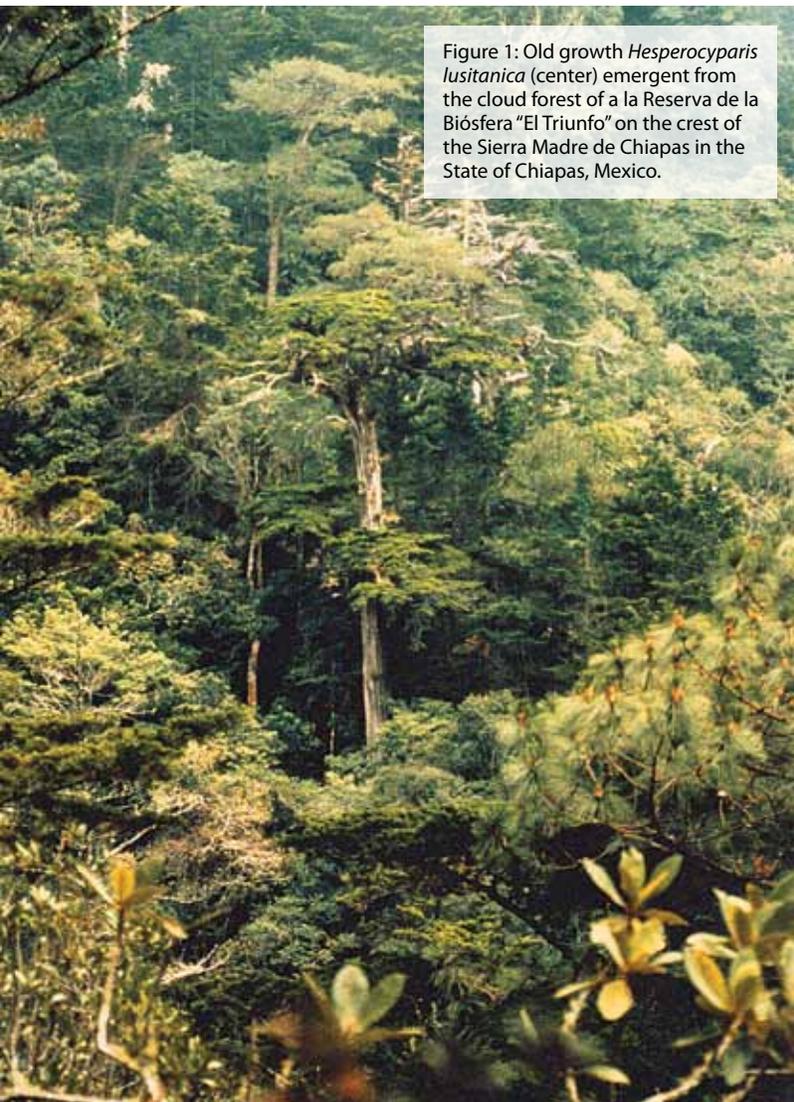


Figure 1: Old growth *Hesperocyparis lusitanica* (center) emergent from the cloud forest of a la Reserva de la Biósfera “El Triunfo” on the crest of the Sierra Madre de Chiapas in the State of Chiapas, Mexico.

Doubly alas, I donated the *H. lusitanica* seed to the 1990–1991 ACS Seed Exchange, but I doubt, in retrospect, that anyone had luck growing them in any climate other than Hardiness Zone 10. However, the experience did lead me to become interested in the most cold-hardy of cypresses in North America; namely, the Baker’s Cypress (*Hesperocyparis bakeri* (Jeps.) (Bartel)³.

Following some research, I discovered that the northernmost population of Baker’s cypress trees in North America consisted of a stand of this species growing on Bureau of Land Management Land in southern Oregon (Neville-Nye Memorial Cypress Grove, Flounce Rock, Upper Rouge River, 10 miles southwest of Prospect, OR). Seedlots I collected from this site also were included in my submission to the 1990–1991 contribution to the ACS Seed Exchange, and I hope that some of you have them in your conifer gardens!

I also grew some seedlings from this Flounce Rock collection and planted a few in my hometown of Corvallis, Oregon, around that time. They are now 15 feet tall and very healthy. I consider the lack of pests or disease to be significant because the climate of the Willamette Valley of Oregon is milder and wetter during the winter than the sites at higher elevations where they grow in the wild. The soils also differ; in Corvallis, I planted the trees in a clayey loam, whereas natural stands occur on metamorphic, granitic or volcanic soils.

The “Baker’s” cypress is also called the “Modoc” or “Siskiyou” cypress to reflect areas where it is found. It was named after Milo Samuel Baker (1868–1961), a renowned California botanist. He discovered and collected herbarium specimens of the cypress on basaltic lava flows in the Timbered Crater Grove in 1898. Willis Linn Jepson (1867–1946), California’s preeminent botanist, named the cypress after his colleague. The collection information for the type specimen reads: California, Siskiyou Co., Near Dana, between Hills Farm and Little Hot Springs Valley, Aug 1898, Baker s.n. (JEPS)⁴.

But I digress. So why am I writing this article now? A couple of weeks ago I was cleaning out my refrigerator and decided to consolidate my seed collection too. In doing so, I found my second collection of *H. bakeri*. I contacted our coordinator of the ACS Seed Exchange, Jim Brackman, and donated the seed for the 2016 Exchange. Thus, I thought an article about the seed might be appropriate to provide readers and cultivators with background information. But there was another reason. This new collection also entails issues regarding the management of wild populations of rare conifers and how to insure their persistence.

Let me elaborate. The International Union for Conservation of Nature and Natural Resources (IUCN) has given *Hesperocyparis bakeri* “Vulnerable” status due to the few sites where it is known to occur (nine in California and two in Oregon), the small size of each area, and declines in the number of mature trees⁵. Although some of the data on this website needs updating, their conclusion puts conservation of wild *Hesperocyparis bakeri* populations into global context. Appropriate management of these stands and their regeneration are important to the conservation of the species.



Figure 3: Variations in the bark of Baker's cypress



Figure 4: Large dead cypress in the Thousand Lakes Wilderness, Lassen National Forest

From 2009 to 2013, I worked for the Lassen National Forest in Susanville, California. The Lassen NF has two of the nine areas in California with Baker's cypress populations. One is Timbered Crater where M. S. Baker first collected the species. Unfortunately, I never managed to visit that location. The other consists of scattered stands near and in the northwestern side of the Thousand Lakes Wilderness (TLW), which is located in the northwestern corner of the Lassen NF.

I had a desk job at the Lassen NF. During a summer vacation in August 2010, I decided to visit the TLW stands. I found large numbers of young, mature (Figure 2) and old Baker's cypress trees. I was struck by their attractive bark, which can range from gray and scaly to a smooth reddish-orange skin like *Arbutus* (Figure 3). I also encountered immense, well-weathered dead cypress trees scattered throughout the fir and pine stands. Presumably, these had been killed during the last fire in 1936 (Figure 4).

Throughout parts of this area, taller firs and pines had overtopped the cypresses of all ages. Shade and moisture competition from these overstory trees, as well as from numerous other small trees and large shrubs, were stressing the cypresses, causing slow growth in the younger specimens and infections and mortality in the older ones. Mistletoe was common on both the overstory and cypress trees.

Baker's cypress does not like shade, and its seedlings germinate best in bare soil. Indeed, on some sites, it grows on metamorphic or lava substrates which preclude significant competition from dense stands of other conifers. The southern Oregon stand at Flounce Rock grows on metamorphic soils, where the cypresses compete only with a meager grass and shrub understory. On more fertile volcanic soils, such as the TLW site, larger conifers thrive and soon overtop them. In these situations, the cypress is considered a "fire-dependent" species, in part, because repetitive fires keep the canopy open and give the cypress a competitive advantage.

The Lassen National Forest was, at the time of my visit, preparing to reintroduce prescribed fire to re-invigorate cypress populations at this location. The effects of fire vary with burn intensity, return intervals, and the autecology of the affected species. Therefore, carefully tailored, prescribed fire treatments are needed to achieve conservation goals.

It is commonly assumed that, because *Hesperocyparis* is a species with serotinous cones, fire is required to open the cones for adequate seed dispersal. Although the term "serotinous" is often misused in forestry literature to describe tree species which require the heat of fire for their cones to open, serotiny simply means "...pertaining to cones [which] remain closed on a tree for several months or years after maturity and are therefore late in dispersion". The heat of fires will cause cypress cones to open and release seeds in a flush (pyriscence), but warming by the sun (soliscent) and low humidity (xeriscent) will also do so, just more slowly and over longer periods of time. Both times that I collected Baker's cypress cones, I merely laid them on an aluminum cookie tray for several weeks and, as they dried and opened, they readily dropped all their seed without any physical manipulation. Baker's cypress has multiple years' worth of cones on each tree (Figure 5), and, every year, some of the seed is released during periods of summer heat and low humidity.

A Joint Fire Science Project (JFSP) had recently studied seedling establishment at numerous Baker's cypress sites, including the TLW location⁷. Regeneration rates (seedlings per unit area) at several sites were sampled in areas with bare soil, resulting from manual disturbance and bare soil, resulting from a recent burn and concomitant pyriscent. The non-burned plots had 5 seedlings per square meter (about 20,000 seedlings per acre). The burned plots had 85 seedlings per square meter (about 340,000 seedlings per acre). Indeed, I personally observed small saplings established at a rate of about 1 per square meter (about 4,000 saplings per acre), even in the dense shade and thick litter layer of a mature pine and fir forest at the TLW site. Along the cut-bank of one

roadside, a line of six-foot tall cypresses had seeded in at such high density that they formed an impenetrable thicket. Because mature stands of cypresses would likely not support more than a couple of hundred trees per acre, all these rates of regeneration were more than adequate for new tree recruitment. How to thin this copious reproduction seems to be a more salient issue.

Here are my management recommendations for insuring the persistence of the cypress stands near the Thousand Lakes Wilderness and elsewhere with similar ecological conditions.

Fell and remove the larger and more common conifers which shade the cypresses and compete for moisture. Also, thin other small trees and dense shrubs. Conduct this operation carefully to avoid damage to mature and old cypress trees.

Reintroduce periodic, low intensity, prescribed fire to preclude regrowth of competing vegetation. Low heat ground fires might also thin the areas of high cypress seedling densities while being less likely to cause huge seed releases.

Ideal fire intensity and intervals between fires will vary by stand conditions, and much remains to be learned. Prescribed fires should only be applied incrementally to portions of stands to learn how better to design appropriate treatments from the trial results.

And, then there is one last final twist on the topic of managing these rare cypresses within the Thousand Lakes Wilderness itself. Management activities are greatly restricted in Federal Wilderness Areas; chainsaws and logging are not allowed. Even prescribed fire can be a controversial issue in such areas. Normally, I would vote for just letting natural fires burn in wilderness areas, not intentionally setting them. But what should managers do when the goal of conserving rare species bumps up against the goal of preserving the wilderness value of natural ecosystem processes? The Baker cypresses within the Thousand Lakes Wilderness are being shaded out by dense stands of competing pines and firs. Maybe prescribed fire could be reintroduced into this portion of the wilderness after competing trees are girdled with handsaws. What do you think?



Figure 5: Cones mature and persist for many years on Baker's cypress trees

In any case, please avail yourselves of the ACS Seed Exchange and grow a few Baker's cypress from the boundary of the Thousand Lakes Wilderness. Conifer conservation takes place in the private gardens of ACS members too! 🌲

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Because most cypress stands cover small areas, it should be feasible to protect well-spaced cypress saplings from fire mortality by raking duff and debris away from around their bases before igniting prescribed burns. This would be useful in areas where no mature or old cypress trees currently grow.

Clear duff and debris from around the base of old cypresses so that they survive the prescribed fires. This would also constrain excessive heat-induced releases of seed. Even if old cypresses are senescent and prone to disease and decay, they still have ecological and aesthetic values.

If sapling densities become too high, manual thinning remains an option.

SOUTHEAST REGION

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Gardens of the Big Bend

University of Florida
155 Research Road, Quincy, Florida
Contact: Gary Knox
gwknox@ufl.edu
850-875-7162

Atlanta Botanical Garden

1345 Piedmont Avenue NE, Atlanta, Georgia
Contact: Bradley Roberts
broberts@atlantabotanicalgarden.org
404-876-5859

Smith Gilbert Gardens

2382 Pine Mountain Road NW, Kennesaw, Georgia
Contact: David Simpson
dsimpson@kennesaw-ga.gov
770-919-0248

State Botanical Garden of Georgia

2450 S. Avenue, Athens, Georgia
Contact: Shelly Prescott
sprescot@uga.edu
706-369-5884

Hatcher Garden and Woodland Preserve

820 John B. White, Sr. Blvd., Spartanburg, South Carolina
Contact: Jeff Hall
jeff@hatchergarden.org
864-574-7724

South Carolina Botanical Garden

Clemson University
150 Discovery Lane, Clemson, South Carolina
Contact: John Bodiford
jbdfrd@clemson.edu
864-656-2458

East Tennessee State University Arboretum

East Tennessee State University, Johnson City, Tennessee
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MCDOWELT@mail.etsu.edu
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West TN Research and Education Center Gardens
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Contact: Jason Reeves
jreeves3@utk.edu
731-425-4765

Al Gardener Memorial Conifer Garden

J. Sargeant Reynolds Community College
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Contact: Karin Stretchko
KStretchko@reynolds.edu
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State Arboretum of Virginia

400 Blandy Farm Lane, Boyce, Virginia
Contact: T'ai Roulston
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Baker Arboretum

4801 Morganton Road, Bowling Green, Kentucky
Contact: Dr. Martin Stone
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JC Raulston Arboretum

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Contact: Kyle McLane
kyle.mclane@memphisbotanicgarden.com
901-636-4100

University of Tennessee Gardens

University of Tennessee
2431 Joe Johnson Drive, Knoxville, Tennessee
Contact: Dr. Sue Hamilton
sueham@utk.edu
865-974-7972

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