Conifer Quarterly

Vol. 24 No. 1 Winter 2007

Randall C. Smith, courtesy of Iseli Nursery

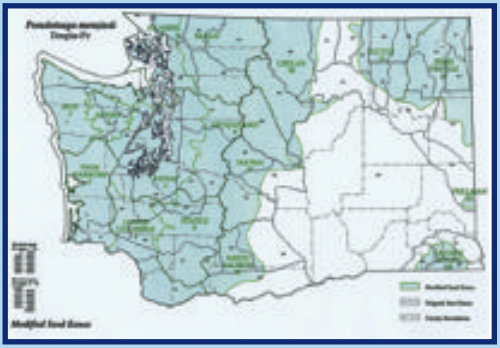
Cedrus libani 'Glauca Pendula'

Color pictures for the Conifer Genetics and Selection Article that starts on page 7.

Photo credit: MSU Forestry Department

Looking for true blue: Variation in needle color stands out in this aerial view of the Colorado blue spruce improvement test at MSU's Kellogg Forest.

Foresters use seed zones to determine the optimum seed source for their geographic location.



Many ornamental conifers such as these at Hidden Lake Gardens start as grafted seedlings.

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Contents

Conifer Society voices

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You are invited to join our Society. Please address membership and other inquiries to the American Conifer Society National Office, P.O. Box 3422, Crofton, MD 21114-0422. Membership: US $30 (indiv.), $35 (joint), $30 (institutional) $50 (sustaining), $100 (corporate/business) and $130 (patron). If you are moving, please notify the National Office 4 weeks in advance.

All editorial and advertising matters should be sent to: Evelyn Cox, 342 North Main Street, Suite 202, Alpharetta, Georgia 30004. (770) 663-7576, or email coniferquarterly@bellsouth.net.

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President's Message

by Tom Cox

On behalf of our officers, the Board of Directors and national office, let me take this opportunity to wish each of you the very best in the New Year. It has been our honor to have served you in the past year.

As we usher in the New Year, this is a time for reflection on our past accomplishments as well as the challenges of continuing to grow our organization. The American Conifer Society had a good year. Our member retention rate continues to be above 80% and we are operating in the black. All of our meetings were successful and feedback was positive. The Collectors Conifer of the Year program is now in its second year and is going strong. This has proved to be an innovative initiative that not only provides great member benefit, but also is a source of good PR for the Society as we announce it to the media. My thanks to Ridge Goodwin and all of the growers who spearhead this.

Earlier, I mentioned the challenges of continuing to move our Society forward. In this connection, I recently had discussions with presidents of Camellia, Rhododendron, Hosta, Rock Garden and Daylilly societies. The purpose was to benchmark our organization against like societies to determine best practices and pinpoint areas for improvement. These discussions covered areas such as organizational structures, meeting formats, websites, publications, advertising and public relations. One common theme was member retention and age of members. It is refreshing to learn that we are doing better than most in retaining members. That is an indication that we are doing some things right. We will be discussing areas for potential improvement at our Board of Directors meeting in February. The intent is to ensure that we remain dynamic and look for ways to better serve you.

While this position has its share of challenges, it has also afforded me the opportunity to meet some very wonderful people and see some beautiful gardens. As you travel, I encourage you to seek out the sometimes hidden treasures available to us as members open their gardens. Here are but a few of the people and places that crossed my path. The first journey took me to the home of my good friends Walter and Emilie Cullerton in Doylestown, Pennsylvania. Besides having a fabulous garden, Walter is past president NE Region. During our visit, Walter drove us to the home of Helen Donn who owns Watnong Gardens in Parsippany, New Jersey. This garden is just about as good as it gets. Helen seemed unfazed by the light rain as she toured us around for at least two hours. Also while in the area, I had the pleasure to tour Ridge Goodwin's gardens and nursery. Upon leaving each of these gardens, I mused that unlike here in Georgia, these folks don't have weeds, as I never saw any.

The next trip was a return to the fabulous Dawes Arboretum in Newark, Ohio to attend the Conifer Symposium hosted by the arboretum. Perhaps because this time I had the opportunity to spend quality time with a great plantsman Rich Larson, the conifers and maples seemed even more impressive than at my last visit. This visit also afforded an opportunity to renew a friendship forged with Dan Luscomb of the Bedgebury Pinetum in the UK. Dan is also a founding member of the British Conifer Society as well as a frequent contributor to our *Conifer Quarterly*. The final evening provided an opportunity to also spend time over a stimulating dinner with ACS member Charles Paquelet.

Being that far north, I took the time to drive to Tifton, Michigan to see the Harper (Chub) Collection at Hidden Lakes Garden. Despite a blowing, cold rain, this was as good as it gets for a conifer collection. I later told Chub that I refer to this place as the James Bond garden as there was not one hair (blade of grass) out of place. A 'must see' if anywhere near southern Michigan! On the way to Hidden Lakes, we had yet another exciting stop at the nursery of Dave Dannaher in Galena, Ohio. Dave is a good plantsman and really has an extensive collection of woody gems, many that were new to me. The last stop was one I almost didn't make as it was time to head south and the weather was miserable. This Cincinnati, Ohio garden in a quiet neighborhood belongs to Ron & Judy Regenhold and is loaded with cool plants. They have accomplished a masterful mix of dwarf conifers with companion plants. This stop was well worth the detour.

All this to make the point that becoming involved in the ACS has its rewards - we forge friendships that transcend the Society and we have the opportunity to see many beautiful gardens. What could be better?

On a closing note, I appreciate the many e-mails, letters and calls that I have received since becoming president. This lets me know you're involved and that you care about the Society.

Warm regards,

Editor's Memo

BY EVELYN COX

This issue kicks off a new *Conifer Quarterly* year – its 24th. I think the key to this publication's success for almost a quarter-century is that it has been surrounded by smart people. There is a wealth of knowledge and talent among its readers who are also generous and proactive about ensuring its longevity. To those of you who help fill these pages and all of you who read them, thank you.

If you have been putting off submitting that article that you've been thinking about, make this the year it happens. You might be surprised at how easily your plant passion will flow once you begin. As winter runs us inside, why not pull out some pictures of your garden? In addition to reminding you that spring is not far behind, you might become inspired to pick up your pen. If reminiscing doesn't awaken your inner voice, take a look at upcoming issue themes for inspiration. If you see something there you'd like to write about, take advantage of your cabin fever time to submit your article in time for next issue. Of course, you can also fulfill the editor's dream by submitting articles on future themes in advance of the stated deadlines.

If none of the planned themes works for you, make up your own. Every article doesn't have to be centered on the main theme. While you can do this in any issue, a special opportunity awaits you in the spring issue. That theme will be "Reader's Choice" so you decide what you want to write about. Don Howse gives us an example of picking your own subject matter on page 38 of this issue as he shares a few stories he has heard about speculative causes of aberrant plant behavior.

With the realization that not all of our members are at the same knowledge level, we are soon to begin a column dedicated to answering your plant questions. This will be simple; submit your question to me and it will be answered by our technical staff.

Beginning on page 35 Ron and Judy Regenhold give us a good example of putting pen to paper and writing their first article for the *Quarterly*. After an exciting visit to their spectacular garden, I asked if they would be willing to write an article that showcased some of their beautiful plants that I felt would be of particular interest – especially to those intrepid collectors among our readership. They said they would give it a try and submitted an article (in record time) that I think you will enjoy and find timely as it relates to two plants in particular.

In the lead article starting on page 7, Dr. Bert Cregg explains the importance of understanding conifer genetics and variation, particularly for the nursery trade. Dr. Cregg does a great job of explaining a complicated subject in easy to understand terms. Also included in this issue are several articles related to our winter theme of pendulous conifers, including one by Central Region President Bill Barger. Some of Bill's photos are among the many beautiful ones in our special color centerfold submitted by some of the talented photographers within our Society. You may see a few plants there that make it to the top of your 2007 wish list.

Speaking of 2007, are you planning to attend the ACS National Meeting that begins July 26 and runs through July 29? For those planning to also attend the post conference tour, it will run through August 1. More details can be found on our website at www.conifersociety.org. One of the national meeting venues, Kubota Gardens, was featured in the fall *CQ*. In this issue, you can read Peter Maurer's article about the *Tsuga canadensis* cultivars at South Seattle Community College Arboretum, another national meeting venue. This is a meeting you will not want to miss. See you in Seattle.

Happy New Year!

Next issue:

Spring 2007 – Reader's Choice

Do you have something to share about your conifer garden? Have you discovered a special garden somewhere that other readers may like to visit? Do you have a story about your favorite conifer(s)? When spring arrives, what will you do in your garden? These are only suggestions. We want to hear what you have to say. You pick the subject matter.

Future issue themes:

Highway Treasures
Unusual, Rare and Endangered Conifers
Cephalotaxus
Hidden Garden Gems

We welcome news alerts about conifers or about our members.
Contact Evelyn Cox to discuss your ideas.

Publication Dates

Issue	Calendar Quarter	Deadline to submit articles	Publication Date (approx. mailing)
Winter	Jan/Feb/Mar	Nov 12	Jan 15
Spring	Apr/May/Jun	Feb 11	Apr 16
Summer	Jul/Aug/Sept	May 13	July 16
Fall	Oct/Nov/Dec 31	Aug 12	Oct 15

Submit articles/photos to:
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342 North Main St, Suite 202, Alpharetta, GA 30004 • PH (770) 663-7576
E-mail: ConiferQuarterly@bellsouth.net

Conifer Genetics and Selection

by Dr. Bert Cregg
Department of Horticulture and Department of Forestry,
Michigan State University

Reprinted with Permission from the Michigan Nursery and Landscape Association

This is an article about tree genetics. For many readers, the title alone may be enough to make their eyes glaze over. But, if you're involved in growing conifers in a nursery, landscape, or Christmas tree plantation, a basic understanding of conifer genetics and variation is critical to your business.

In its most essential form, genetics is the study of variation. Think of it this way, if all racehorses ran a mile in exactly two minutes there would be no need to select and breed the fastest mares with the fastest stallions. Of course, we know that there is the small Secretariat and Seattle Slew portion of the racehorse population that enables breeders to develop superior lines. The situation is no different in trees. If we collect seed from a thousand different white pine trees, planted them in a common location, measured their heights after 10 years, and plotted the results, we would get a typical 'bell curve'; the bulk of the trees would be around the average height with a small fraction in the 'tails' of the curve on either end. The goal for tree breeders is to capture the superior genes from the 'plus' trees in a breeding program. The definition of the 'plus' tree depends on the goal of the improvement program. For industrial foresters this usually means selecting trees for superior height and diameter growth, though selection for wood qual-

Many ornamental conifers such as these at Hidden Lake Gardens start as grafted seedlings.

ity traits such as wood density and straightness is increasing. For Christmas tree production, selection focuses on traits such as needle color, needle retention, and tree form. In landscape nursery production, selection criteria are varied but usually are based on unique or unusual ornamental characteristics, weeping growth habit, outstanding foliage color, but may also be based on adaptive traits such as disease resistance or drought hardiness.

Levels of genetic variation

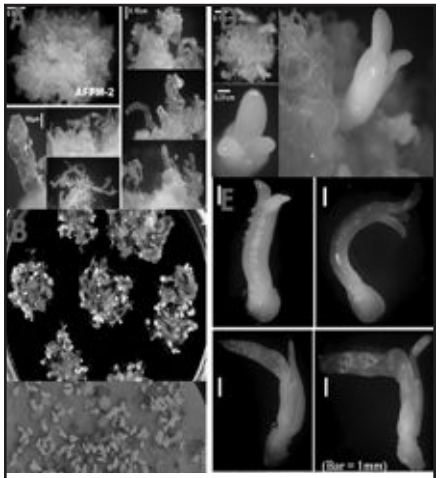
Back in high school biology, you learned that organisms are classified in a hierarchal system beginning with the largest group and then working to the most closely related as:

Kingdom
Phylum (or Division)
Class
Order
Family
Genus
Species

Therefore, when we think about selecting trees for a site our initial reaction is usually to think in terms of species. Would a white pine work in that situation? Or, is baldcypress a better choice if the site is wet? What about hemlock in a shady site?

Sometimes understanding genetic relatedness at above the species level can be important, particularly in terms of pest problems. For example, the Emerald Ash Borer appears to have strong host specificity at the genus level, so far attacking only *Fraxinus* species in North America. In considering other potential hosts, investigators are following the next logical step and working their way up the hierarchy, focusing on other closely related genera in the Oleaceae or olive family.

In selecting conifers for ornamental purposes or Christmas trees, on the other hand, we often find ourselves looking at genetic variation below the species level. Below are just a few examples of how tree improvement works beyond selecting species.



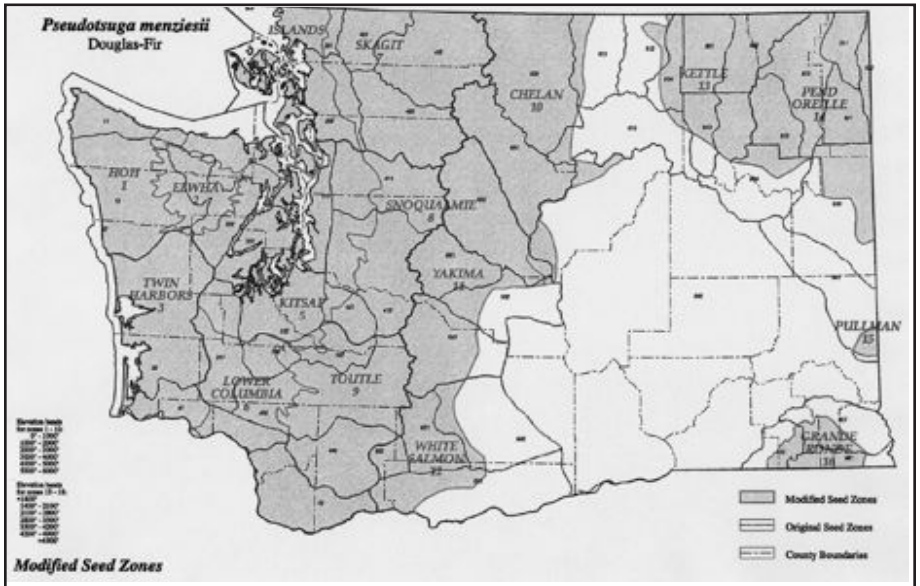
A glimpse of the future: Development of micropropagation techniques for Fraser fir may lead to further advances in conifer improvement. Photo: Kyung-Hwan Han, Michigan State University.

Variety

Many tree species, especially those with large native geographic distributions, can show wide genetic variation across their range. A population of a species that shows consistent differences across a broad area may be classified as a *variety*. For growers in Michigan, Douglas-fir represents one of the most important examples of selecting the proper variety. Douglas-fir grows in western North America from British Columbia to Mexico. The coastal variety, *Pseudotsuga menziesii* var. *menziesii,* is the giant of Pacific Northwest Forests and can grow to over 300 feet in height and 12 feet in diameter. But, this variety has evolved in the mild climate of coastal British Columbia, Washington and Oregon, where low temperatures in winter rarely drop into the single digits and even more rarely drop below zero. So, don't try to grow this one in Michigan. The Douglas-fir that we grow as a landscape tree and Christmas tree is the interior variety, *Pseudotsuga menziesii* var. *glauca*, which is adapted to the wide climatic extremes of the intermountain West. Though slower growing than its coastal cousin, *P. menziesii* var. *glauca* can withstand the rigors of Michigan winters and has become a mainstay of the Christmas tree industry and is a reliable and fast growing conifer in the Michigan landscape.

Provenance

Provenance is an extremely important source of genetic variation in conifers. Provenance or seed source refers to the geographic origin of a seed lot. Since soils and climate vary with location and elevation, populations evolve and adapt to their local site conditions. In the Northwest, foresters began to recognize the importance of seed sources during the 1930s and 1940s when they realized that many forests that were replanted following catastrophic fires in the early 1900s were growing poorly due to mismatched seed zones. The foresters of the day were short on seed and planted seedlings without regard to their geographic origin. Today, forest geneticists have developed seed transfer guidelines or seed zones that govern seed source movement for major timber species. It is interesting to note that geneticists now differentiate species as specialists that have relatively



Foresters use seed zones to determine the optimum seed source for their geographic location. Image: Washington State Department of Natural Resources.

small seed transfer zones, such as Douglas-fir, and generalists that may be moved greater distances such as western redcedar (*Thuja plicata*).

Much of the classic research of provenance variation in conifers was conducted at Michigan State University by Dr. Jonathan Wright and his students. Dr. Wright and numerous colleagues around the country established scores of "common garden" species and provenance tests. A *common garden* simply refers to the fact that numerous seed sources represent the geographic range of the species and are grown in a replicated and randomized design at the same location, removing environmental variation. The pioneering tree improvement research conducted by Dr. Wright spurred the growth of the Michigan Christmas tree industry by identifying Scots pine seed sources from Europe with superior form, growth, and needle characteristics.

Adaptive traits (traits that are important for survival) can also vary among provenances. A classic example is the 'lost pines' provenance of loblolly pine in Texas. The *lost pines* refers to an isolated population of loblolly pine in east Texas, which is separated from the contiguous range of the species by about 100 miles. Due to the dry climate where they grow and their geographic isolation, the lost pines have evolved an array of traits that make them more drought tolerant than other loblolly pines, including lower rates of transpiration, deeper rooting, and fewer stomata per needle.

Numerous other important tree characteristics that are important in the landscape vary with seed source. Patterns of bud break and budset are under tight genetic control in many conifers. Ironically,

Many conifers don't produce cones until they are 15 years old or older. Photo: Bill Barger.

northern seed sources often break bud earlier and are more prone to late frost damage than southern seed sources. This may seem counter-intuitive until we stop to consider that northern provenances are adapted to a short growing season, therefore they require fewer growing degree days in order to break bud than more southerly sources. Selecting the proper seed source can also be important in managing pests. For example, Shuswap and Pillar lake sources of Douglas-fir from the Okanogan region of British Columbia are more resistant to rhabdocline needlecast than Lincoln or Kaibab seed sources from the southern Rocky Mountains.

Family (Open-pollinated, Half-sib, Full-sib)

The next level of resolution in genetic selection is family selection. In this context, *family* refers to the offspring of one individual in contrast to the broader classification of family such as the Pinaceae or Cupressaceae. As an example, suppose a seed collector in Colorado collects 100 seeds from one Colorado blue spruce tree, the resulting seedlings represent an

Breeding conifers is a labor intensive and long-term process. Photo: John Hodges, Mississippi State University.

open-pollinated family. We know that all of the seedlings have the same mother (cone parent), but we don't know who the dads (pollen parent) are. Most of the seedlings are half-sibs (like step-brothers and step-sisters), plus possibly a few selfs (seedlings produced from self fertilization). In tree breeding programs, breeders use controlled pollination techniques to produce full-sib families by crossing two known superior trees. The forest industry has developed many advanced breeding programs for important timber species including loblolly pine and Douglas-fir.

As you might expect, conifer breeding is a long-term proposition. Most conifers don't produce cones or pollen until they are 15 years old or older and breeders may not be able to choose the best trees out a series of crosses for decades. Because of this, even the most advanced forest tree improvement programs for conifers are only on their third generation of breeding and selection. In the U.S., breeding conifers for ornamental characteristics or Christmas trees is even newer. Tree breeders in Denmark have some of the most advanced breeding lines of conifers for Christmas trees, working into their third generation on some species, including the 'Frijsenborg Blue' noble fir.

Dave Armintrout saves seedling mutants from his nursery beds and grows them on the grounds of his nursery near Allegan.

Grafted conifers

Because of the large number of species in the nursery trade and long generation times, ornamental plant propagators have generally relied on grafting techniques or rooted cuttings to capture unique or desirable traits. Grafting or clonal propagation also ensures that propagated plants are true to type, since seedlings - even from a seed orchard or breeding program - will have some level of inherent variability. New or unusual conifers often arise as seedling mutants or as witches' brooms. Seedling mutants occur as random mutations in seed lots. Nursery growers that grow tens of thousands of seedlings each year will occasionally find seedlings in their nursery beds with interesting growth characteristics or outstanding color. The grower may graft scions from these seedlings onto standard rootstock to propagate the trait. Witches' brooms or sports occur as shoots with unusual growth characteristics on an individual tree. As with seedling mutants, scions from the broom can be grafted onto standard seedling rootstocks to propagate plants with the desired trait.

The Merrell broom tree at Hidden Lake Gardens is an excellent example of a witches' broom.

Clones

The ultimate level of genetic control is to produce clonal material. Producing a clone ensures that the entire plant is genetically identical to its parent (grafted trees, in contrast, are only clones from the ground up). The simplest and most common method of clonal production of conifers is by rooted cuttings. Conifers vary widely in their ability to root from cuttings. Some conifers, such as arborvitae and yews, root easily from cuttings and clonal propagation of cultivars of these species is the norm in the nursery trade. Most conifers, however, lose the ability to root from cuttings as they mature. In addition to reduced rooting percentage, plants produced from rooted cuttings of mature conifers often exhibit plagiotropic growth. That is, they lack apical dominance and may grow sideways, more like a lateral branch than as a terminal leader.

The other principal methods for producing clones are tissue culture or micropropagation. Tissue culture allows the propagation of plants from only a few cells and offers the potential to rapidly bulk up a newly selected genotype. The development of the micropropagation system for a given species also opens up the possibility of inserting specific genes and genetic transformation. Tissue culture systems are becoming increasingly common, but still require considerable skill, expertise, and equipment. Some nurseries, such as Briggs Nursery in Washington State, are using tissue culture for Rhododendrons and other woody plants, but large-scale production of most ornamental conifers by tissue culture is still some time away.

Leyland cypress growing in Texas for living Christmas trees. Leyland cypress is an intergeneric hybrid between Monterey cypress and Alaska cedar.

Hybrids

One way to produce new genotypes is through hybridization. Hybrids are typically formed by crossing two species. In nature, many conifers form hybrids where species' ranges overlap. The areas where ranges overlap and species hybridize are termed introgression zones. Some common examples of introgression zones are between lodgepole pine and jack pine and between noble fir and Shasta red fir. Artificial hybrids can also be reproduced by controlled crosses and offer the potential to combine desirable characteristics between species. Crossing species can also result in a phenomenon known as hybrid vigor. Hybrid vigor occurs when the progeny of a hybrid grow better than either of the original parent species. Michigan State University Forest Geneticist Dr. James Hanover created a number of hybrids, including the 'Spartan spruce', which combined the drought hardiness of Colorado blue spruce with the softer needles and faster growth rate of white spruce.

In addition to crosses between species (interspecific hybrids), it is occasionally possible to form intergeneric hybrids (crosses between two genera). Leyland cypress (X *Cupressocyparis leylandii*) is an intergeneric cross between Monterey cypress (*Cupressus macrocarpa*) and Alaska Cedar (*Chamaecyparis nootkatensis*). Leyland cypress is widely used in landscaping in the South and is also used for Christmas tree production in regions that are too hot to grow traditional Christmas tree species.

Summary

Bringing up the term *genetics* may remind some folks of a high school biology class that they would just as soon forget, but in many ways genetics forms the underpinning of the ornamental nursery and Christmas tree trades. Understanding provenance and the geographic origins of landscape plants is likely to become more important as the debate over what is or is not native continues to intensify. For example, Eastern white pine is native to Michigan, but is a *Pinus strobus* from a seed source in the north Georgia Mountains or New Brunswick a native plant in Michigan? How do hybrids and grafted cultivars fit into the native debate? The continued development of biotechnology will offer advancements for conifer growers, but may also generate new controversies. If we can develop 'designer trees', which traits do we choose? What if other states choose to ban genetically modified organisms? As with most

things, science will solve the technical questions, but the political choices will lag behind.

Dr. Bert Cregg is an Associate Professor in the Departments of Horticulture and Forestry at Michigan State University. Prior, he was a Research Tree Physiologist with International Paper and the U.S. Forest Service.

This article was originally printed in the August 2006 issue of The Michigan Landscape™ magazine, a monthly publication of the Michigan Nursery and Landscape Association.

For more information:

Interested in learning more about conifer genetics? Here are some useful resources.

American Conifer Society
http://www.conifersociety.org/
The ACS webpage includes an outstanding 'Conifer Database' that contains descriptions and photos of hundreds of cultivars of conifers. The site also includes updates on ACS meetings and articles on a range of conifer topics. Learn why ACS also stands for Addicted Conifer Syndrome!

Gymnosperm Database
http://www.conifers.org/
This website is a 'must visit' if you're into the botany of conifers. There are descriptions, taxonomy, images, and range maps of conifers from throughout the world. You cannot visit this site and not learn something new about conifers. An incredible resource.

Silvics of North America
http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm
A standard reference for foresters for decades – now available online! This publication covers every major forest tree species in North America. In addition to ecological descriptions, Silvics of North America also provides information on genetics of many species including varieties, provenance variation, and hybridization.

The Jean Iseli Memorial Award

APPLICATIONS NOW BEING ACCEPTED

The Conifer Society, which supports the development, conservation and propagation of conifers with an emphasis on dwarf or unusual varieties, awards a $1,500 grant to a public garden, arboretum or horticultural institution.

The award was established in 1986 in honor of the memory of plantsman Jean Iseli of Boring, Oregon. Jean Iseli was an ACS founder and conifer propagator.

Proposals must contain the following:

a. Name, full address, and phone number of the applicant/institution
b. Brief description of how the ACS funds would be used
c. List of plant materials (if the request involves conifer purchases)
d. Budget
e. Short overview of mission statement or horticultural background of your institution

Send applications to:

Ethan Johnson
ejohnson@holdenarb.org (Microsoft Word documents)

or by regular mail:

c/o The Holden Arboretum
9500 Sperry Road
Kirtland, OH 44094
Applications must be received by June 1, 2007

Ethan Johnson chairs a three-person committee that reviews applications and makes its recommendation to the ACS Board of Directors at the annual summer meeting. Announcements of the award recipient will be made by August 1, 2007.

Jean Iseli Memorial Award 2006

The American Conifer Society (ACS) granted the Jean Iseli Memorial Award for 2006 to Pennsylvania College of Technology. Along with the award came $1,500 from ACS and matching funds of $1,500 from Iseli Nursery. According to PCToday, the college's news and information website (www.pct.edu/pctoday/), "The grant award will allow us to supplement our existing outdoor 'laboratory' with some unusual varieties of conifers and to add a beautiful new dimension from an aesthetic perspective, as well."

The school has won the Mid-Atlantic Regional Landscape Field Day Competition 13 out of 18 times. Plans are to use the award for a dedicated dwarf-conifer garden that students will help build. This seems to be a great fit within the stated purposes of the Society.

The purposes of the American Conifer Society are the development, conservation, and propagation of conifers, with an emphasis on those that are dwarf or unusual; standardization of nomenclature; and education of the public.

Pendulous Conifers – A Brief Look

by Bill Barger

When I first became interested in conifers, among the first forms to which I was drawn were the weeping ones. At that time I had an opportunity to visit a grove of 20 foot tall *Pinus strobus* 'Pendula' in winter and that was all it took to get me hooked. Since then I have never lost my interest in this form and I am always drawn to them at nearly every collection I visit.

The reason conifers weep is not clearly understood, but in some cases it appears to be a survival mechanism necessary in the natural range of a given species. Some conifers have characteristics of weeping forms in either their primary or secondary lateral branches. Many *Picea* species can display these characteristics to varying degrees including *Picea abies, Picea breweriana,* and *Picea omorika*. Often *P. omorika* and *P. breweriana* are referred to as 'Pendula' cultivars although they are quite possibly just species forms. *Pinus flexilis* is another tree that is prone to having pendulous habits, mostly due to its native range in the high mountains. These traits help the trees shed the heavy snow that would strip the branches on many other more rigid or brittle conifer types such as *Pinus strobus*. The previously mentioned spruces are likely to possess the weeping habits for similar reasons.

Propagation practices can also influence the degree to which any given selection will be pendulous. If cuttings are taken from terminal buds, the plants are likely to be more upright and if taken from lateral branches, they may be more pendulous. This is especially evident with *Abies* selections and to a lesser degree in *Picea,* although not guaranteed. The propagation method can also influence the habit. Rooted cuttings are almost always more desirable as they will yield truer genetic traits than grafted plants. Again, the part of the plant from which the cutting is taken may influence the ultimate growth habit. When plants are grafted, the understock is genetically programmed to supply nutrition to a more vigorous upright form. The scion will influence the growth of the understock but not 100%. The best condition for grafting would be to graft cultivars onto the same species as the original selection, although this is often not economically possible.

Pendulous forms are often used in collections as foundation plants or as focal points in a garden mostly because many selections tend to get large. The weeping habit makes them graceful and interesting and every specimen is unique and different. These forms are also often used in memorial gardens, churches, and cemeteries due to their ability to represent mood and respect for their surroundings. Dwarf forms are also available; however, I feel that they lack the majesty of the larger forms. *Microbiota decussata* is an example of a dwarf form that will grow flat against the ground. This, too, is a survival mechanism since this genus is native to very cold and windy climates.

The ACS officially recognizes the following forms: upright weeping, prostrate or ground covering, and mounding, arching, or weeping. There are actually several other forms that are recognizably unique and can better describe some of these various forms. With age, many of these forms will often exhibit modified habits that may be different from the form the specimen had when young. Young specimens may need to be staked for a few years to develop any vertical growth until established.

Below is a list of forms that elaborates on the ACS definitions. We have also listed several selections for each that exhibit the described habits. We have tried to list forms that are generally available and still desirable.

Upright weeping – pyramidal growth with weeping lateral branches:
- *Chamaecyparis nootkatensis* 'Pendula'
- *Juniperus rigida* 'Pendula'
- *Juniperus scopulorum* 'Candelabra'
- *Juniperus scopulorum* 'Tolleson's Weeping'
- *Picea omorika* 'Pendula'

Strict weeping – upright terminal growth with strictly pendulous lateral branches:
- Chamaecyparis nootkatensis 'Green Arrow'
- *Picea glauca* 'Pendula'
- *Picea omorika* 'Pendula Bruns'
- *Sequoiadendron giganteum* 'Pendulum'

Broad weeping – terminal branch tends to arc or may be serpentine with lateral branches having various degrees of weeping habit:
- *Cedrus atlantica* 'Glauca Pendula'
- *Picea abies* 'Pendula'
- *Picea pungens* 'Pendula'
- *Pinus strobus* 'Pendula'
- *Tsuga canadensis* 'Pendula'

Prostrate or ground covering – all growth is extremely pendulous with little or no vertical growth, will lie on the ground if not staked:
- *Juniperus procumbens* 'Nana'
- *Microbiota decussata*
- *Picea abies* 'Wingle's Weeping'
- *Pinus flexilis* 'Prostrata'
- *Taxodium distichum* 'Cascade Falls'

Irregular weeping – very erratic growth, specimen may exhibit any combination of the previously mentioned forms:
- *Cedrus libani* 'Pendula'
- *Larix decidua* 'Varied Directions' (may be the same as L. xeurolepis 'Varied Directions')
- *Picea abies* 'Inversa'
- *Pinus banksiana* 'Uncle Fogy'

About the author: Bill Barger joined the ACS in 1995 and has been collecting conifers ever since. Bill is president of the Central Region and is the ACS webmaster. He and his wife, Suzanne, live in Wadsworth, Ohio where over 500 cultivars are displayed in their yard.

Cascades in the Garden

by Edward Remsrola

See special color section for photos

Like the mesmerizing persistence of the tide lapping at the beach, pendulous and undulating plants provide a magnet for the eye, connecting the aerial garden back to the earth.

The pendulous plants all "weep" in their own peculiar way. Some, like *Picea abies* 'Pendula' are not predictable upright growers without some direction from our hands. Staked up to the desired height, they then cascade downward and trail laterally once they reach the garden surface. These graceful plants inch and weave their way over rigid barriers and teasingly cross otherwise delineated borders with impunity and style.

Other "weepers" like *Picea glauca* 'Pendula' have strict constitutions sending them predictably upright, reaching for the heavens while their branches hug their rigid spire frames like wet clothing clings to the gardener caught in a summer rainstorm.

Some trees have a combination of characteristics. *Cupressus cashmeriana* has a rigid leader and densely clothed strong apical and horizontal branching. The soft green scale "needles" build on graceful pendulous branchlets with an appearance akin to Spanish moss, the lichen that prefers southern live oak and swamp cypress in the Carolinas.

Most of all, the pendulous plants are fun. *Tsuga heterophylla* 'Thorsen's Weeping' is the visual garden image of "Cousin It" of *The Addams Family* fame. Rich, emerald-green foliage is densely arranged on procumbent branches, which provides a very soft look. Its petite size will never overpower its garden space but will captivate your visitor's imagination.

For dry climates, *Pinus banksiana* 'Uncle Fogy' presents a bizarre but creative addition to the garden. This large, sturdy, two-needled Jack pine grows upright, yet its branches wildly extend with both pendulous and undulating branchlets. These branchlets are not dense, yet not sparse, and the needles on the branchlets twist upward in a slight semi-circle. The winter buds are densely covered with resin, giving it a frosty appearance in the morning winter sun.

Some tree form pendulous plants appear to take on animate forms as they mature to stir garden interest in our children and grandchildren and bring a few youthful memories to our souls. Two that immediately come to mind are *Sequoiadendron giganteum* 'Pendulum', and *Pinus strobus* 'Pendula'. They could double for a herd of Snufflufagus from *Sesame Street* with their falling branches full of long or dense needles swinging in the breeze. The *Sequoiadendron* 'Pendulum' main trunk grows predominantly upright, occasionally dipping, and then growing upright again. It often develops secondary branches that bob and weave. The scale "needles" are long, soft-green and flow gracefully in the breeze. The bark is thick and fire resistant. Just when you have marveled how its profile resembles a llama, continued growth transforms it into a mastodon. The *Pinus strobus* 'Pendula' is a vigorous grower that mounds its way ever taller with long, gray-green flowing needles. When needles shed after the third year, an attractive open smooth bark skeleton is revealed.

The true prehistoric are *Taxodium distichum* 'Cascade Falls' and *Ginkgo biloba* 'Pendula'. While we haven't yet found its fossil heritage, the *Taxodium* is so closely related to the *Metasequoia*, I will honor it in this grouping. 'Cascade Falls' is a vigorous grower usually grafted to the desired height on species understock. It very quickly covers its stem, falling swiftly to the garden floor. There is a new *Metasequoia glyptostroboides* 'Miss Grace', which will be released before the end of the decade and will appear very similar to the 'Cascade Falls'. Both have soft green, dense, descending foliage. The *Ginkgo* 'Pendula' is a strong upright grower with descending pendulous branchlets.

Cedrus atlantica 'Glauca Pendula', a true cedar which needs help initially to get to its desired height, wants to get to the ground, but not immediately. Its branches seem to want to arch away from the trunk in its journey to the garden floor, while its branchlets with powder-blue needles laying flat on the stem, fall like rain to the garden floor. Many have used this plant as a living fence trained to a trellis to border a special garden spot or arch over an alley entrance. *Picea abies* 'Pendula' can also be easily trained to a trellis, creating a dense, deep-green barrier that will have to be pruned back over time or its branches will spill out across the garden and engulf smaller plants in its path. We created the illusion of a rising stage curtain with *Picea abies* 'Pendula' to frame the memorial garden of Jean Iseli, the founder of Iseli Nursery.

To create a hobbit-like hiding place for children and the young at heart in the garden, nothing compares to the Tsuga canadensis 'Pendula' also known as Sargents' weeping hemlock. You need to have your children help you plant it for them to enjoy with their children. Staked to six feet, it will spread outward, layering its dense branches which are thickly covered in soft green needles, eventually creating a peek-a-boo location as small hands part the branches to peer out.

Picea glauca 'Pendula', *Picea omorika* 'Pendula Bruns', and *Chamaecyparis nootkatensis* 'Strict Weeping' want to reach the clouds. In twenty years they all may be 20 feet tall, but *glauca* 'Pendula' and 'Pendula Bruns' may only be 30 inches in diameter at breast height, creating a strikingly magnificent profile in the garden. 'Strict Weeping' may have a 12-foot base with lower branches striking upward in support of the strong central leader. *Picea glauca* 'Pendula' with its blue-tinged, green, short, dense needles is as tight as a pencil, and *omorika* with its bicolor, blue-green, silver needles looks slightly more open due to reflection but isn't. 'Strict Weeping' is a mild green with upward-growing, weeping branching and loose branchlets that fall back downward from the leader and gently sway in the breeze.

Two trees with pendulous branchlets are *Pseudotsuga menziesii* 'Emerald Twister'® and *Cedrus libani* 'Glauca Pendula'. 'Emerald Twister' stays covered in dense branches and deep-green needles as it pushes upward and outward in an ever-changing form while its branchlets fall downward. As it matures, its main branches seem to turn over and periodically expose the pleasant gray lines of its

smooth bark. *Cedrus libani* 'Glauca Pendula' matures into a large tree with a strong leader. Its heavy branches reach outward to support its legions of breezy, densely-needled branchlets. Similarly the *Juniperus scopulorum* 'Tolleson's Weeping' is initially stacked up in the production nursery and grows into a large tree with horizontal branches that droop at the tips while its branchlets and needle-like scale descend.

Cedrus deodara 'Prostrate Beauty' is a most welcome sport from the "California Christmas Tree". Compact, low-growing and powder blue, it has the cutest, softest appearance in the garden. It layers as its spreads gently arching up and out with pendulous branchlets laden with typical deodara needles, narrow but thickly placed, creating a dense appearance. I think it looks best placed alone. *Juniperus procumbens* 'Nana' has been a garden staple for fifty years, and continues to be a welcome addition for a special focal point where its ground hugging "running" can be directed over and around any object. Unlike 'Prostrate Beauty' which grows on its own, *procumbens* 'Nana' needs to be staked to a desired height and directed in its meanderings.

These are but a few of the cascading plants I hope you enjoy in your garden.

About the author: Edward Remsrola is an early American Conifer Society contributor and soul mate of the late Jean Iseli.

Shaping Pendulous Plants

Shaping from a grower's perspective:
Pendulous Plants, Presentations, and How They Get There
by Ed Remsrola

Growers have helped many pendulous conifers reach their potential. The naturally prostrate plants like *Picea abies* 'Pendula' or *Cedrus atlantica* 'Glauca Pendula', after being grafted a few inches off the ground, can be affixed to a stake until they grow to a desired height in the next three or four years. They are then left to mature and cascade downward. Some growers do a high graft at the desired height on an established staked understock and let the graft grow downward for the next three or four years before marketing it.

When the gardener receives the plant they may stake up a branch to gain a taller ultimate height or have it trail away on a trellis to another garden location or focal point. Our late friend Eddie Rezek had an extreme example at his home in Long Island where a *Cedrus atlantica* 'Glauca Pendula' was secured to and circumnavigated the eave of his home, creating an airy curtain effect.

Naturally upright growers like *Picea omorika* 'Pendula Bruns' may have a slight "wobble" to the stem that is eventually covered by the cascading branches. A grower can avoid this by affixing a piece of bamboo to the hardened off part of the stem extending beyond the new growth.

Another naturally upright- growing pendulous plant is the *Sequoiadendron giganteum* 'Pendulum'. After being staked for a couple of feet, it goes its own way and is not inhibited by gardeners' expectations of perfection in its ascent. Its geotropism is ever present, even though it takes a circuitous route showing its personality along the way.

Growers don't feel their prosthesis work is a betrayal of the plant characteristics, rather a gentle assist to help the plant find its place in the garden.

Picea abies 'Pendula' – 24-inch graft

Picea abies 'Pendula' – staked

Tsuga heterophylla 'Thorsen's Weeping'

Shaping from a collector's perspective:
Caring for Weeping Conifers 101
by Bill Barger

Those of you that know me are aware that I generally don't like to prune, stake, or shear. I want to see how any particular selection will perform if left alone and what traits make it special from other selections. I have to be honest though; there are exceptions even in my yard.

Weeping conifers present a particular problem that can drive me crazy and, to break it down in its most basic terms, they weep. I realize that is what they are supposed to do, but as a rule they just don't weep the way I want them to or within the boundaries I have set up for them. Fortunately, there are some things I can do to bring things back under control. Pendulous plants are generally very forgiving when it comes to adjusting their growth habits.

To prune pendulous plants, I like to try to find a smaller branch growing out of the top of a larger branch and prune the larger branch off near the union. This does several things; first and most importantly, it hides the cut; secondly, the higher branch will give the plant a bit more vertical height; and, finally, you can take off quite a bit of growth and not visibly harm the selection. If you need to remove some length always do this at a junction of three or more branches and remove the main branch. Again by doing this you will be able to remove quite a bit of growth and you will increase the fullness of the foliage.

Staking is often an option (if not a necessity) with many weeping forms and, when I talk about staking, I am referring to two separate methods. When young, many weeping forms MUST be staked for at least a few years to start them going the right direction. To do this, simply tie the terminal leader to a stake to encourage vertical growth. It may be necessary to replace the stake if the plant growth exceeds the height of the stake yet you wish to continue. To get a slightly different appearance, you can wind the terminal branch in a serpentine and tie at the points that intersect the stake or use several stakes to get a different look.

Another type of staking is done by "fencing" the branches. To do this, simply install stakes so that they hold the branches where you want them to grow. You can tie them if you wish to keep them off the ground. This is a good way to keep plants in their beds without pruning or to send growth in a new direction.

Not really much to it at all. Good luck.

Seed Exchange Program

Dear Fellow Conifer Enthusiast,

I would like to thank the many members that made seed contributions to support our seed exchange program this year. Yet our level of donated seed is very low and members wishing to order will find that the demand is higher than our availability. However, I'm thinking that next year will be better with enough seed to fill most all orders. One of our contributing members considers the entire spectrum of cone bearing plants when collecting seed. I often tend to be discriminating when collecting seed looking for select varieties, witches brooms, etc. Yet… perhaps next year I'll get a closer look at all of the conifers in my collection, searching for every viable source and hopefully be able to contribute more next year. So I challenge myself and welcome all interested members to help next year's seed exchange program get back on track. Please contact me anytime during the year if you anticipate making a donation. Wayne@ghhf.org or 978-834-7843

Sincerely,
Wayne A. Jope
American Conifer Society Seed Exchange
C/o Great Hill Horticultural Foundation
137 Kensington Road
Hampton Falls, NH 03844

We mourn the passing of
LCpl Cliff Collinsworth
The ACS family would like to express condolences to the family of LCpl Clifford R. Collinsworth who was tragically killed while serving in Iraq. Cliff is the grandson of Don and Harriet Wild. Don served as ACS president during the period 2004-2006. As a U.S. Marine, Cliff exemplified patriotism and will be greatly missed by his family and friends.

Thuja occidentalis (T.o.) 'Gold Drop' Plant Sale Supports ACS Research Fund

by Dennis Groh

The Opportunity

The vision and generosity of Mr. Al Forinash and Dr. Clark West allows the ACS to make an unusual one-time offer. Because of shipping issues, the offer is available only to ACS members in the continental United States. Using the order blank inserted in the winter *CQ*, continental U.S. members can order a relatively new conifer introduction on a first-come, first-served basis. This plant has not been widely available and is only in the hands of a few collectors, some of whom got an early opportunity at the recent Central Region Meeting. The net proceeds from this sale will be placed in the ACS Research Fund. As this fund increases in value, it will be used to support selected conifer research related to the ACS mission statement.

It needs to be emphasized that this offer is NOT a part of the new Collectors Conifer of the Year (CCOY) program. Propagation efforts for this plant began long before the CCOY program was finalized. The ACS will offer this hand-grafted plant without collector embossed tag or replacement guarantee. The price will be $50, which includes shipping to any location in the continental United States. The unusually low delivered cost of 'Gold Drop' to ACS members could only be kept at $50 dollars because Mr. Al Forinash has generously agreed to donate all his propagation efforts for the benefit of the ACS and its members. Girard Nurseries in Ohio has agreed to provide the packing and shipping of Mr. Al Forinash's grafted plants based on instructions from Mr. John Martin. The available supply is limited to about 150 plants in #1 containers. In an effort to make it widely available to ACS members, there will be a limit of one per member. If you would like to have more than one, please indicate on your form and, if the supply allows, you would be contacted based on order receipt date for the opportunity to make an additional purchase of this plant.

The Plant

In 1985, Dr. West collected seed from a T.o. 'Holmstrup' (a green cultivar) in Bernheim Forest, Kentucky. One of the seedlings was selected because of its superior form, foliage, and its golden yellow color. Dr. West named it because of its shape at a young age. The original plant is now 20 years old and is 5.5 feet high and 4 feet wide. The lack of chlorophyll makes the plant a slow grower and it is classified as a dwarf. It is a bright yellow on all sides in full summer sun. In winter, on the sun side, it develops a nice orange cast. The foliage is dense and healthy on this superior cultivar.

This plant is listed in the ACS Conifer database under index # 104639. It has also been featured on the front cover and mentioned in the ACS Bulletin Fall 1997 issue (Vol.14, No. 4, pp. 146-151). Mr. Al Forinash has been hard at work for years propagating this cultivar by grafting it onto T. o. rootstock from propagation material supplied by Dr. West. It can successfully be grown north into USDA Zone 3, but can become stressed by heat and drought south of Zone 7 unless carefully sited and cared for.

Thanks

The ACS and its members thank Al Forinash and Dr. Clark West for their generosity and Roberta and Jeff Forinash at Girard's Nursery for their support.

Letters to the Editor

To: American Conifer Society
Re: Earthworms

I have an unusual problem in some of my garden areas at work (Cornell Plantations). We have way, way too many earthworms. After some basic research and reading, it looks like these worms are an exotic species from Asia; I'm not certain which one. They consume organic matter at an amazing rate and produce very large volumes of castings which have a very high pH. These worms can grow quite large; up to 10-11 inches long. There are so many of them that gardens are stripped of organic matter and are buried many inches deep in castings. It is an amazing example of a given environmental element having become way out of balance with astounding effects.

There's a lot that I don't know about these worms. Exactly where did they come from? What are appropriate control methods? Can I kill all the eggs in the castings? How? Can these sterilized castings then be safely used as a soil amendment? I know there is some amount of research being done on this issue here at Cornell and in Pennsylvania at the Schuylkill Center, but I don't know how conclusive these efforts have been. Are there other places doing similar work?

I'd also like to offer this letter as a cautionary tale. Pay attention to your earthworms! If the population seems unusually large; if the individuals are unusually large; if their movement reminds you of small, muscular snakes; if your mulch and other organic matter disappears at a very fast rate; if you have large quantities of castings; if you see anything like this in your garden, take a closer look at your worms. For us, it has developed into an alarming problem.

At the least, the problem is unpleasant; I have large swaths of worm castings and many writhing worms in very public areas. I have a constantly growing source of a high pH material in a garden where I grow rhododendrons, which want a lower pH. Some of my herbaceous plants' crowns look like they're rotting from being buried in these castings.

It is an unusual problem, and in ways, a fascinating one. If any reader has suggestions or information of any kind, I would be most grateful.

Phil Syphrit
Gardener, Cornell Plantations

To: American Conifer Society
Re: Yellow Powdery Substance on Cones of Canadian Hemlocks

On a stand of mature *Tsuga canadensis*, I spotted some yellow flecks. Approaching the trees I discovered "yellow" cones or, better, cones with a yellow powdery substance. There were several of these yellow cones but only one at a time, even within a group of otherwise green cones. The stems and needles of the trees looked healthy. I did not detect woolly adelgids.

Plant experts to whom I showed my photos during our Annual Meeting in Knoxville had not seen this phenomenon before, but guessed that a fungus causes this yellow powdery substance.

Do any of our plant scientists know the answer?

Maude Henne
Charlottesville, Virginia

New Conifer Registrar Appointed by the RHS

The Royal Horticultural Society has recently approved the appointment of a new registrar to replace Sabina Knees who has reluctantly retired in order to work on the Flora of Arabia.

The new Registrar is Lawrie Springate. From 1969–1990 Lawrie worked in horticulture and thereafter in plant science. He began gardening at a former private estate (Nonsuch Park, Surrey) but spent most of that period working on the temperate to tropical plant collections of Manchester University. He has studied amenity horticulture at the Somerset and Cheshire Colleges of Agriculture and Horticulture and plant taxonomy at Reading University. Since 1994 he has been based at the Royal Botanic Garden Edinburgh, mainly writing and editing floras (Morocco, Arabia, Pakistan, Bhutan, European Garden Flora) with some teaching and course organization in plant diversity and some joint plant-insect studies (Kenya, southern Italy). He is also assistant editor of the Sedum Society Newsletter.

Information and History of the RHS International Conifer Register and Checklist

by Lawrie Springate

The principle of establishing international registers and registration authorities for plant cultivars was included in the first independent *International Code of Nomenclature for Cultivated Plants* in 1953. The purpose was to bring stability to the use of cultivar names, in particular, by ensuring that a single name is given to each new cultivar that does not duplicate a name already applied to another cultivar with which it might be confused, and that it complies with the Articles (Rules) and Recommendations of the *Code*.

Registration in some plant groups had begun independently prior to that, often by national rather than international bodies. The registration of conifers apparently began in c.1947, when the American Association of Nurseryman, Inc. placed two *Tsuga canadensis* cultivars on its Woody Plants Register. The task passed to the Arnold Arboretum in 1959 and continued until 1980. The Canadian Ornamental Plant Foundation also registered a few conifer cultivars up to that date. However, it was not until 1970 that an International Registration Authority for conifers was recognized when the Royal Horticultural Society was appointed to that role. All previous registrations were incorporated into a new International Conifer Register. A *Preliminary List* of registrations was published in 1985.

To date, a comprehensive *Register and Checklist* has been published in four alphabetic parts (out of eight) covering names in genera from *Abies* to *Pherosphaera*. The *Register and Checklist* includes all botanical and horticultural names which have been applied to conifers, giving brief details of origin and characteristics for the cultivars. Remarkably few conifers have been submitted for registration, particularly compared to the two hundred or so cultivars processed each month by the RHS Orchid registration team – what on earth happens to all those cultivars? So much of my time is spent extracting details of cultivars from conifer literature and trade catalogues to make the *Register and Checklist* as complete as possible. Reconstructed histories of origin and introduction produced after the event by a third party are inevitably prone to error. There is a remarkable amount of contradiction in available literature. So, I would particularly encourage registration of new introductions by the raiser or introducer, although anyone can register an existing cultivar to preserve clarity in its naming. Details of new registrations are also published separately, in the *Conifer Quarterly* at present.

To encourage more growers to register new cultivars, a new Registration Form was developed by a previous Registrar, Mr. Piers Trehane, to help achieve consistency in data compilation. This form ensures that the provisions of the *International Code of Nomenclature for Cultivated Plants* are followed in the registration process, and is designed with ease of use in mind, especially from the viewpoint of growers, horticulturists and any other interested parties who wish to register a new name.

Registration forms for countries outside of North America can be downloaded from: http://www.rhs.org.uk/plants/registerpages/coniferform.pdf and sent directly to me. I can supply a printed version of the form if preferred and Guidance Notes for its completion as well. More details relating to registration and the new form are given in Trehane, P. (2003) Stability in the naming of conifers; introducing the new registration form for cultivar names, in Mill, R.R. (ed.), Proceedings of the Fourth International Conifer Conference in *Acta Horticulturae* number 615.

Registration forms for use in North America can be downloaded from: http://www.rhs.org.uk/plants/registerpages/Usform2.PDF and Guidance Notes from: http://www.rhs.org.uk/plants/registerpages/Usnotes.PDF. These forms are sent to the US National Arboretum in the first instance.

The *International Conifer Register* compiled by J. Lewis, edited by A.C. Leslie can be obtained from the RHS. For further details contact: mailorder@rhs.org.uk. Parts published so far include:

Part 1. *Abies* to *Austrotaxus*. (1987). 61pp. £1.75.
Part 2. *Belis* to *Pherosphaera* (includes the genera *Cedrus*, *Cryptomeria* and *Larix*). (1989). 100pp. £2.50.
Part 3. The Cypresses (*Chamaecyparis*, *Cupressus* and × *Cupressocyparis*). (1992). 197pp. £3.50.
Part 4. *Juniperus*. (1998). 144pp. £8.00.

Photocopies of the *Preliminary List*, comprising registrations from 1947–1984 (24pp.), are available from me.

Supplements to the register have been published in the *International Dendrology Society Year Book 1992*: 21–28 (publ. 1993); *I. D. S. Year Book 1994*: 61–63 (publ. 1995); *I. D. S. Year Book 1997*: 64–68 (publ. 1998); and in *Conifer Quarterly* 19: 84–91 (2002); 21 No. l: 17–21 (2004); 22 No. 1: 10–13 (2005).

Please contact me if you have any further queries about registration:

Mr. L.S. Springate
International Conifer Registrar
Royal Botanic Garden
20A Inverleith Row
Edinburgh EH3 5LR
UK
Email: l.springate@rbge.org.uk

Tsuga canadensis Cultivars at the South Seattle Community College Arboretum

by Peter Maurer

FEATURED VENUE – 2007 ACS National Meeting
Seattle, Washington July 26-29

Last year at this time I was enrolled as a student in the landscape horticulture program at South Seattle Community College (SSCC). As part of my studies I was evaluating plants in the arboretum there and kept coming across cultivars of *Tsuga canadensis*, each one different from the others. Everywhere I looked there was another little hemlock. While reading the names and planting dates on the plant labels, the proverbial light bulb lit up over my head. What a great learning tool this could be. This was a real opportunity to learn about the confusing array of *Tsuga canadensis* varieties. An appraisal of how these plants looked after fifteen years of growth could help identify the ones most valuable for home landscapes.

The idea of an arboretum at SSCC was conceived in the mid-1970's, primarily as a teaching facility for the brand-new horticulture program at the college. Former horticulture instructor Steve Nord led the effort to secure the funding and the volunteers needed for site development on a shoestring budget. With little city money available, funds were successfully raised from private donations. For example, initial plantings in the early 1980's included 125 Bosnian Pines (*Pinus heldreichii)* donated as a memorial to prominent Seattle area nurserymen, Charles and Clark Malmo. Over time, the mission of the arboretum has grown to include demonstration gardens and community outreach, with guided walks and an annual "tea in the garden".

The 6-acre arboretum continues to grow and thrive today, thanks largely to the work of volunteers and horticulture classes under the guidance of horticulture instructor and arboretum coordinator Van Bobbitt. There are a dozen gardens with various themes, including perennials, maples, roses, rhododendrons, a winter garden, a sensory garden, and conifers large and small. The latest addition, dedicated in 2005, is the Coenosium Rock Garden. This alpine-style scree garden, complete with rushing mountain stream, displays hundreds of dwarf and miniature conifers in a naturalistic setting. The plants here were donated by Coenosium Nursery owner Bob Fincham, an American Conifer Society founding member. A walk through this jewel of a garden is an exciting experience for the conifer enthusiast and a great venue for publicizing the value of dwarf conifers in the home garden.

The seventeen cultivars of Eastern Hemlock (*Tsuga canadensis)* found at the SSCC Arboretum display one of the most diverse public collections of the species to be found in the Pacific Northwest. These plants represent over 10% of the 150-odd known cultivars, as listed in *The Cultivated Hemlocks,* by John C. Swartley. Nearly 100 of these cultivars are currently available for purchase at various nurseries throughout the western United States. "Some are so ugly that they defy adjectives", laments Michael Dirr in his book *Manual of Woody Landscape Plants*. While it is true that there are some ugly selections, as well as some novelties attractive only to the hardcore collector, there are many, many forms that will appeal to the home landscaper. The less desirable selections - those that are ugly, poor performers – will weed themselves out over time. But when you walk through the arboretum as I did, you too will discover the many cultivars available – white-tipped, curly-leaved, golden-variegated, weeping, ground-hugging and more. With so many plants to choose from, the aim of the Arboretum's collection will continue to be the education of students and the public as to their ornamental potential.

Tsuga canadensis is notoriously slow growing in youth when compared to most other conifers. Careful observation by nursery operators over the course of many years has shown that seedling growth rate varies according to the age of the plant. For the first two years both seedlings and transplants grow about 1 to 2 inches per year. In the third to fifth years growth is from 3 inches to 8 inches per year. From the 6th year on, growth can be from 10 to 20 inches per year, depending on underground water supplies. Ten year plant sizes range from 4 ½ to 6 feet. As expected, dwarf garden cultivars will always grow much more slowly.

For a map and more information visit: http://dept.seattlecolleges.com/arboretum, or www.coenosium.com. The 2007 ACS National Meeting will be in Seattle and members may want to familiarize themselves with some of the attractions beforehand. The SSCC Arboretum and its Coenosium Rock Garden will be one of the featured destinations, so book your reservations early! For details, see www.conifersociety.org.

Seventeen cultivars of *Tsuga canadensis* at SSCC

Steve Nord has indicated a planting date of 1987 in the Milton Sutton Conifer Garden Phase II (MSCG Phase II) and of 1989 in the Milton Sutton Conifer Garden Phase I / Dawley Garden (MSCG Phase I). All of these plants were from 1-gallon containers. The plants found in the Coenosium Garden were planted in 2002, but were already quite large at that time.

The cultivars are categorized according to Swartley. Each plant is placed into one of 15 groups according to its dominant characteristic, whether foliage or growth habit. Categories include: LITTLE-LEAF; LARGE-LEAF; SPARSE-LEAF; DENSE-LEAF; WIDE-LEAF; CINNAMON-TIP; TWIGGY; YEW-LIKE; WHITE-TIP; GOLDEN; GLOBOSE; CONICAL; FASTIGIATE; SPREADING; & PENDULA. A few cultivars defy categorization, and are listed as UNCLASSIFIED.

Entries include:
Name; Category; Year and place of discovery, if known;
Arboretum location; Date planted; Size and condition at the time of this report (2006); Description; and Growth potential

1. 'Brookline' (formerly 'Sargentii #4') – PENDULA GROUP – Disc. ~1857 nr Fishkill, NY by Gen. J. Howland. Planted in Coenosium Garden 2002 – 1 foot tall x 3 feet wide, good condition
Mound-like, with horizontal branching, much wider than tall, new growth follows the contours of the branches. The original 'Brookline' was at Holm Lea, the former estate of Charles S. Sargent in Brookline, MA until it was destroyed by fire in the 1980's. In 1965 it was 7 feet tall and 30 feet wide. 4 feet x 10 feet /20yrs

2. 'Cappy's Choice' – PENDULA GROUP – Seedling selected in 1970 by James Caperci at Mount Rainier Alpine Gardens Nursery in Washington State
Two plants:
Planted in MSCG Phase II ~1987 – 3 feet tall x 4 feet wide, good condition
Planted in MSCG Phase I, west end ~1989 – 1 foot tall x 3 feet wide, fair condition, drainage issues
This is a compact and low-growing pendulous shrub. The fine-textured, light-green foliage shows some golden highlights in full sun. 2 inches/yr, or 3 ½ feet tall x 3 ½ feet wide/20yrs

3. 'Cinnamomea' – CINNAMON-TIP GROUP – Disc. 1929 by Frank L. Abbott nr Athens, VT
Planted in Coenosium Garden 2002 – 3 feet tall x 4 feet wide, good condition
Leaves near branch tips are pointed and whorled; mature leaves are blunt. Young shoots are densely red-brown pubescent. Plant grows 1/3 wider than tall over time. 5 feet tall x 7 feet wide/20yrs

4. 'Curly' – UNCLASSIFIED – Disc. 1969 by Harold Epstein, of Larchmont, NY in friend's garden
Planted mid-MSCG Phase I, west of *Pinus strobus* 'Torulosa', ~1989 – 3 feet tall x 5 feet wide, good condition
Short, broad, rounded leaves are held 90 degrees from shoot, more or less 2-ranked. Each leaf curls downward, giving a very unusual overall appearance. The growth habit is upright and compact. 3 ½ feet tall x 3 ½ feet wide/20yrs

5. 'Everitt Golden' – GOLDEN GROUP – Disc. 1918 on an exposed slope in NH by S.A. Everitt
Planted mid-MSCG Phase I, under *Acer platanoides*, ~1989 – 4 feet tall x 3 feet wide, shaded and leggy
A dense, stiff, coarse-textured tree, with upreaching branchlets. Leaves are closely set, not 2-rankd. Color is golden yellow in spring and summer, changing to greenish yellow, and finally bronzy. Plants can appear chlorotic. The color is best in full sun. Growth is compact and conical, but will eventually achieve 15-20 feet. 5 feet tall x 3 feet wide/20yrs

6. 'Golden Splendor' – GOLDEN GROUP – Selected and introduced in 1979 by John Mitsch of Mitsch Nursery, Aurora, Oregon
Planted in mid-MSCG Phase I, under *Acer platanoides*, ~1989 – 6 feet tall x 3 feet wide, shaded and leggy, distinctly drooping tips and pendulous branchlets, this plant is not golden. (Possibly needs sun for golden foliage to develop?)
An upright tree with golden foliage, it responds well to shearing. Takes full sun well. Normal growth habit except for golden color. 4 ½ –6 feet tall/10yrs

7. 'Horsford Contorted' – UNCLASSIFIED – Disc. In 1970 in VT by William C. Horsford. Planted in MSCG Phase I, west end, ~1989 – 2 ½ feet tall x 3 feet wide, fair condition. Each year the branchlets twist into tight coils or even knots. As the branchlets mature, they partially untwist. This is a slow-growing, mounded small shrub of striking appearance. 3 inches/yr in youth, 3-5 feet tall and wide/10yrs

8. 'Hussii' – TWIGGY GROUP – Disc. 1900 in CT by John. F. Huss
Planted in mid-MSCG Phase I, east of *Abies pinsapo*, ~1989 – 4 feet tall x 4 feet wide, good condition.
Very crowded short and twiggy branchlets with densely crowded dark green needles. Slow growing and upright, with definite terminal shoots. It usually develops into a small tree of open, irregular habit. 6 feet tall x 4 feet wide/20yrs
8a) 'Everitt Denseleaf' – Unrecognized cultivar name, indistinguishable from *T. canadensis* 'Hussii'
Two plants:
A. Planted in MSCG Phase I, under *Acer platanoides*, ~1989, 3 feet tall x 2 feet wide, fair condition

B. Planted in Coenosium Garden 2002, 3 feet tall x 3 feet wide, good condition

9. 'Jacqueline Verkade' – CONICAL GROUP – Seedling selected 1961 by John Verkade of Verkade's Nursery, NJ.
Planted MSCG Phase I, east end, ~1989 - 3 feet tall x 3 feet wide, shaded and leggy
A globose to conical dwarf form with very dense foliage. It has very small leaves on tiny stems. 3 feet tall x 2 feet wide/20yrs

10. 'Jeddeloh' – SPREADING GROUP – Discovered ~1950 in a cemetery in West Germany. Introduced in 1965 by Jeddeloh Nursery
Planted in MSCG phase II, ~1987 – 4 feet tall x 5 feet wide, good condition
A low spreading shrub with swirling, indented 'bird's nest' center. Globe-shaped in age, with gracefully pendulous outer shoots. Bright and fresh green needles. An outstanding landscape subject. 3 feet tall x 5 feet wide/20yrs

11. 'Jervis' – TWIGGY GROUP – Discovered as a seedling prior to 1956 near Port Jervis, NY by G.G.Nearing
Two plants:
A. Planted in Coenosium Garden 2002, 3 feet tall x 2 feet wide, good condition
B. Planted in Coenosium Garden 2002, 3 feet tall x 3 feet wide, good condition
Foliage is dense and congested, very dark green. Form becomes regularly conical, yet quite dwarf. It is similar to 'Hussii', but stays more compact with age. 4 feet tall x 3 feet wide/20yrs

12. 'Kelsey's Weeping' – PENDULA GROUP – Disc. 1929 in East Boxford, MA by H.P. Kelsey
Two plants:
A. Planted in mid-MSCG phase I, by streambed, ~1989. 3 feet tall x 2 ½ feet wide. Good condition, shaded
B. Planted in Coenosium Garden 2002. 3 feet tall x 4 feet wide. Good condition
An asymmetrical form, combining one or more long-reaching stems ascending at an angle, with long pendulous branchlets, in time forming a living curtain of hanging branches. (Width is measured in direction of stem growth). 3 feet tall x 5 feet wide/20yrs.

13. 'Lewis' – TWIGGY GROUP – Selected in the early 1960's by C.M. Lewis of Skylands, Sterlington, NY
Planted in Coenosium Garden 2002, 4 feet tall x 3 feet wide, good condition
A slow-growing and rather narrow upright plant. It will form an irregular pyramid with stiff and rigid growth. Leaves are crowded, erect and tightly adpressed to the stem. 4 feet tall x 3 feet wide/20yrs

14. 'Mt Shasta' – WHITE-TIP GROUP – Selected prior to 1989 by Mr. Edsel Wood of Bonsai Village, Wilsonville, OR.
Planted in MSCG Phase I under *Acer platanoides*, ~1989. 8 feet tall x 8 feet wide, good condition
An upright and open form, wide-reaching, with branches held at 45 degrees, tips weeping. Leaves are dark green and smaller than average. The very small forward-sweeping, creamy-white spring growth is held through the summer, followed by white changing-to-green summer growth. This results in an interesting white – green – white pattern by midsummer. It will develop into a conical tree in time. 10 feet x 10 feet / 20yrs

15. 'Pendula' – PENDULA GROUP – Unknown origin
Planted in MSCG Phase I, west end, ~1989. 3 feet tall x 6 feet wide, good condition
A prostrate, dense and undulating carpet that gradually builds height with new overlying growth. It is often trained as a small tree, forming a hemispherical mass of pendulous branches hanging to the ground and completely hiding the interior. This is one of four clones of the Sargent's weeping hemlock introduced by Henry Winthrop Sargent in the 19th century. 6-8 inches/yr

16. 'Rugg's Washington Dwarf' – CINNAMON-TIP GROUP – Unknown origin
Planted in MSCG Phase I, by streambed, ~1989. 4 feet tall x 3 feet wide, good condition
A globose or cushion-form plant, resembling a heath. It will eventually become an upright, loosely globose shrub. Spring foliage is bronze-yellow. Current and second year twigs are cinnamon-colored. 5 feet x 7 feet /20yrs

17. 'Wodenethe' (formerly 'Sargentii #2) – PENDULA GROUP – Disc. ~1857 nr Fishkill, NY by General J. Howland
Planted in MSCG Phase I, east end, ~1989. 1 foot tall x 3 feet wide. Good condition, quite prostrate
Forms a large spreading shrub of irregular habit, broader than high, with no vertical trunk unless trained. It eventually develops a few massive ascending branches with pendulous terminal shoots.
4 feet tall x 8 feet wide/20yrs. The 60 year size potential ranges from 10 feet x 20 feet to 20 feet x 40 feet

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About the author: Peter Maurer, 49, is married and takes care of his 3-year-old boy. A professional chef for 28 years, he is currently changing careers to pursue his passion for plants. He lives in Seattle, Washington.

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Just a Couple of Raving Coniferites from Cincinnati

by Judy and Ron Regenhold

Well, here we go again! We were leaving on a short, early-spring trip a few years ago, headed to the hills in east central Ohio to see the wildflowers bloom. We live in Cincinnati, in the far southwestern corner of the state, about 150 miles from our destination. Oops! On the Internet, just before leaving, we finally found a place that has that *Picea omorika* 'Pendula Bruns' in the very size that we have been "pining" for, but we have to go to central Michigan to get it. No problem. It's only an extra 600 miles. This is not the first time that we have gone a *little* out of the way for a plant. Of course, this plant will barely fit into our car's trunk, and we will be away for four days. Who needs luggage?

Such are the lives of raving coniferites, severely infected with A.C.S. (Addicted Conifer Syndrome), a disease that many members of the ACS (American Conifer Society) know well. In the early years of our infection, we would drive 1,000 miles round trip to central Pennsylvania for our latest fix of new grafts, over a *two-day* weekend. Then, turn right around a couple of weeks later and head to eastern Pennsylvania and New York for more plants - another 1,600 miles - over a *four-day* weekend. Our enthusiasm was insuppressible. After more than 25 years, this fever has not been quenched, only fed.

These days, we must be more selective with our choices. We have a small suburban lot that is packed with our favorite things. Our conifer friends know, however, that a lack of space does not mean much, whether in our car or our yard. When we purchase yet another plant that we cannot live without, we call it an "upgrade" (a term we learned from a fellow conifer addict). While a soothing term and one we fully admit, we simply love the disease we acquired and share it freely. Something in the garden will get too big, forcing a hard choice. Our friends are happy when the discarded choice goes home with them. Conversely, our long, hot, horribly humid and bone-dry summers or erratic winters and springs will give us a spot. It hurts for a little while but then we're off again.

High moments in our garden

With a small garden, we have specialized in the very dwarf and slow-growing conifers. We also have many dwarf plants that grow with more vigor, and larger plants that need to understand our space constraints. We candle, trim, cut, move, whatever it takes to get the plants to understand that there is only so much room, so they had better be careful. Narrow and vertical plants are welcome because, with them, the sky is the limit. A conifer such as the *Picea omorika* 'Pendula Bruns' was a must-have, and it has been a winner for us - fairly slow growing, nice and narrow habit, with a wonderfully stylish flair. Very enticing. We were delighted when we learned of its selection as one of the two Collectors Conifers of the Year (CCOY) for 2007. Can this be validation that our disease is a good thing?

When we learned that the CCOY committee's choice for dwarf selection was also within our garden's treasure

trove, we thought that this is surely a sign that the hunt must go on. We had fallen in love with *Picea orientalis* 'Tom Thumb' at first sight, and like a tenacious suitor, pursued it with a passion. That was a challenge indeed. We scrounged and hunted until we found it. Not wanting to take a chance on that one, we acquired several over the years. It is still one of our favorite and most highly-prized dwarfs. A slow grower, at least here in Ohio, with great color and tight, neat habit, 'Tom' certainly deserves CCOY honor.

Conifers and friends

While our garden abounds with conifers, it also contains many companion plants. We feel that a garden of conifers with varying shades of green, blue, and gold provides a fabulous backbone for a northern (zone 5–6) garden. Conifers have strength and character, presenting a gardener numerous choices for companions. Japanese maples have long been a favorite of ours, and they are excellent companions for conifers. The vibrant spring leaves in greens, pinks, reds, and whites create gorgeous contrasts near conifers with their brilliant spring flush. The same can be said in fall, with leaves of intense scarlets, maroons, and golds. In summer, they combine to form dense screens in which the birds can find nesting sites. The structure of the maple branches in winter alongside the conifers, both laden with snow, is breathtaking.

Another deciduous-type tree, the *Ginkgo*, is a great favorite and close companion plant that provides excellent textural contrast in the garden. It is technically not a conifer but like a conifer, is a gymnosperm bearing seeds in an unenclosed (naked) condition. Over the years, we have collected slow growers, narrow growers, trees with tiny and small leaves, trees with huge leaves, tubed leaves, variegated leaves, and those with narrow and strap-type leaves. You name it. The slow-growing 'Chase Manhattan' and the tiny-leafed 'Munchkin' fit well. For the latter, we drove an extra 300 miles early this fall. We find all gingkoes to be trees of distinction, especially the first one we ever planted in our backyard (30-plus years ago) that now towers above its companions.

We've found other strong contrasts with myriad forms of beech (*Fagus*). As it has few slow-growing varieties, we have to be brutal if we want them to remain. The *Fagus sylvatica* 'Tortuosa' has been in the front yard for some 25 years. Because it is our favorite beech, we offer it tough love. Primarily a lateral grower, drastic measures keep it "contained". Countless hours of hard pruning are spent trying to keep up with its rapid growth habit. At the other end of the spectrum is *Fagus sylvatica* 'Cochleata' that has grown to about 6 feet high in 20-plus years. Then there are the 'Rotundifolia', 'Tri-Color', the pendulous golden beech, and others that must be closely watched.

Our huge, old bald cypress (*Taxodium distichum)* with its knees growing everywhere, and the dwarf *Taxodium distichum* 'Peve Minaret', and the flat-growing 'Wooster Broom' work well with the other plants. The *Chamaecyparis nootkatensis* 'Green Arrow' is another great love as it reaches for the stars. All of these friends share our space and our lives, along with many 'Kingsville' boxwoods, profuse spring wildflowers, Asian varieties of *Arisaema*, water gardens with miniature varieties of lotus and water lilies, a bog garden, and bog-troughs with fancy, laced pitcher plants to eat our bugs (we wish). And we can't not mention the lady's slipper orchids, along with the acid-loving English crested fern and the alkaline-loving *Phyllitis scolopendrium* fern.

Somehow, all of the garden residents appear to be in scale with their surroundings, living in peaceful harmony with each other. This is true down to the smallest of the dwarf conifers, which are the plants we love most. Among a significant collection in a somewhat small space, the dwarfs find a very cozy home. Our list includes *Pinus parviflora*, *mugo*, *strobus*, *flexilis*, and *banksiana*; *Abies alba, concolor*, *koreana*, *procera*, *lasiocarpa*, *pinsapo*, *cilicica*, *nordmanniana*, and *bornmuelleriana*; *Picea orientalis*, *omorika, abies* and *glauca*; *Cedrus atlantica*, *deodara* and *libani*; *Pseudotsuga menziesii*; *Tsuga canadensis*; and more.

In some of these families, we have several to very many named cultivars. The *Pinus parviflora* species is our first love, especially 'Tamina No Yuki', 'Shiro-janome', 'Fubuki Nishiki', 'Shikoku-goyo', 'Goldilocks', 'Myojo', and even 'Regenhold' from our own original broom tree.

Small and less-hardy varieties of conifers and other tender plants find their homes in troughs. We like these portable gardens within a garden. They can be displayed anywhere through the summer months and even moved and protected during some of the harsh winters. Troughs have saved many a botanical life.

Nature's gains and losses

Some years, our very warm late winter days are followed immediately by biting cold winds, low temperatures, and heavy freezes, frosts, and even snow. These have caused the most damage to the early budding plants. We have lost some old, established trees as a result. One of our distressing losses was the *Pinus parviflora* 'Glauca' that was the source of a distinctive witches' broom. For several years running, the late heavy frosts and deep freezes devastated the early buds. Luckily, early grafting has assured survival for descendents of the broom.

There are also a couple of other brooms and sports that have originated in this garden. Certainly notable is a broom on a 30-plus-year-old *Picea abie*s 'Pygmaea'. The growth is so tight that even taking a cutting is difficult, much less attempting to graft it. The broom is now about 8 inches in diameter on a plant about a foot tall with a 32-inch spread.

We just keep looking around at all of the treasures we have accumulated. We watch intently for treasures unknown or not yet found. The hunt is still immensely exciting to us. Why quit now? Some things are just worth going the extra mile.

Happy gardening from a couple of raving coniferites. (And thanks to ACS, we have plenty of company!)

About the authors: Ron and Judy Regenhold garden in Cincinnati. They have been members of ACS since the formation of the Central Region.

Changing Genes
Brooms, Sports, and Other Mutations

by Don Howse

I have often been asked by visitors to my gardens to explain the term "witches' broom." One can ponder the idea of an ugly old woman with a black conical hat and cloak riding a straw broom across the sky. Yes, it is all mythical and fun when we cannot otherwise explain a quirk of nature.

However, the "broom" we refer to is a mutation, perhaps a "bud mutation" on a plant. We have derived the term witches' broom from the same term in German, *hexenbesen*. We often denote witches' broom with the letters WB, while our European counterparts use the letters HB following the parent plant's botanical name. Brooms can occur and be caused by several vectors, such as mistletoe, viruses, and genetic bud mutations. It is the latter group that we generally can propagate and that later become known as a named cultivar.

My question is, what causes the bud to mutate? Besides brooms, we also have variations of color, growth habit, and sometimes texture. A golden sport would be a variation of color. A weeping branch on an otherwise upright tree would be a variation of growth habit. A change in foliage type, such as a reversion on a dwarf form, would be a variation of texture. Not all variations are desirable and worthy of production. Often, the mutation or variation is identical to another already being grown or produced.

The reason that the cause of mutation came to mind is that, recently, I was shown a *Thuja plicata* broom that is very diminutive and congested, looking not at all like the parent species. It was about the size of a tennis ball, and truly unique. Later, I heard about such a broom occurring at the time of the passing of the comet Kohoutek in 1973, thus the naming of the resultant plant. Later still, I was shown pictures of another similar broom that occurred when the comet Hale-Bopp passed by in our solar system in 1995. Now we have two, basically identical, brooms named for comets. Are they the same plant and someone misnamed the comet? What is their relationship to the passing comets? It has been suggested that the brooms are the result of the passing of the comets in our solar system. I suppose it is possible, but I have the feeling it is pure speculation, and I am without any way to argue the point, for or against it.

Many years ago, the late Andy Sherwood of Gresham, Oregon, who was a well-known nurseryman, introduced a golden form of the Noble Fir, *Abies procera* 'Sherwoodii'. He claimed, I am told, that the scions were taken from a mature tree somewhere near Mt. Hood that had been struck by lightning. The portion of the tree that grew after the lightning strike had turned golden in color. Unfortunately, I cannot argue with him now. It is a beautiful tree, golden and very stately in habit. I have a 40-foot specimen in my arboretum. I tell the story about the discovery of the plant as a myth whenever I show the tree.

Around the late 1970s, Mac Alexander of Mount Clemens, Michigan sent Jean Iseli (of the Iseli Nursery of Boring, Oregon) cuttings of a Chinese juniper (*Juniperus chinensis*) that he, too, claimed had been struck by lightning and that the resultant plant changed color, becoming gold. Today, we have *Juniperus chinensis* 'Mac's Golden' in our available repertoire of plants.

Later yet the story was told, even on national TV, that *Juniperus horizontalis* 'Mother Lode'™ was struck by lightning, and the plant being offered on the market was the resultant plant. Well, I was present when the original plant, growing in a #1 pot, was found and brought in for observation and eventually to production. It was a tiny golden sport on a plant found in a production bed with several thousand other similar 'Wilton Blue Carpet' junipers. If it had been struck by lightning, I am sure the pot would have melted and the plant, plus many of the surrounding plants, would have been fried. Through judicial pruning and other good cultural practices, the golden sport was saved, increased, and even propagated. Today, we have a nice golden mat for the landscape and a marketable plant. But I know for sure that it was not the result of a lightning strike. It was a good story.

The honorable Dick van Hoey Smith of Rotterdam, Holland, tells of a meteor passing over Europe, from Denmark to northern Spain. Later, along the same path that the meteor traveled, the *Fagus sylvatica* (European beech) have all become mutated as contorted specimens (*Fagus sylvatica* 'Tortuosa'). Today, beautifully contorted specimens of the European beech can be found along this axis that is in alignment with the track of the meteor.

How often are plant mutations explained as a result of some phenomenon of nature? Lightning strikes and passing comets and meteors are examples of these phenomena. I am not wise enough to dispute them, nor am I able to confirm these theories and speculations. Perhaps they are mostly true. How do we set about proving the theory that plants modify their genes and are the result of some naturally occurring phenomena?

Have I opened a can of worms? I expect criticism and added comment on this article, and I hope it stimulates a lively discussion. It is good that these changes in our plants do occur, as we then benefit from the new variations. Nature is not stable and unchanging - that is the constant.

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Conifer News

Compiled by Kimberly Karlin

Conifers celebrated in Great Britain

According to *Town Crier (UK)*, the week of October 1st was decreed National Conifer Week. National Conifer Week brings together retailers, British Conifer Society members, and other enthusiasts in the renewed effort to increase the use of conifers in gardens. With an emphasis this year on the many shapes that conifers both grow naturally to, and can be shaped into, the British Conifer Society hopes to educate the public on year-round, as well as winter, interest that these trees provide.

Now, how do we begin a National Conifer week in the U.S.? Sounds like a good idea to me!

Sacrifice for another species

A September article in the *Boise Weekly* describes a plan of the U.S. Forest Service to remove approximately 100 acres of conifers in the Sawtooth National Forest in Idaho. The purpose of the tree removal is to help save the aspen stands there. Over a period of decades factors such as disease, a lack of natural forest fires, cow herds moving in, and the encroachment of conifers has caused the gradual loss of up to 60 percent of the aspen trees. This change in the tree population has affected the wildlife populations as well.

The plan calls for a selective thinning, choosing conifers of 12 inch caliper or less to be downed and left to decay naturally. The article stated that no trees with snags or nests will be removed, thus preserving any habitats in place. This thinning will allow the aspen to return, renewing the ever-changing cycles that forest populations go through.

Spreading the Word
First-time conifer event in Georgia

On November 9, at the State Botanical Garden of Georgia, the first all-day conifer symposium was held. As a part of the Garden's perennial symposium series, the collaborative effort led by Jeannette Coplin, Director of Horticulture and Grounds, sought to educate listeners to the world of conifers. Six speakers, consisting of horticulturalists, scientists, and nursery owners, lectured on a variety of topics to a crowd of about 60 people. The topics covered everything from the myth that conifers will not grow in Georgia (or the southeast for that matter), overviews of growth requirements and needs, pests, and possibilities that we may have in the future with conifers as a result of grafting experiments. With a great response from this first venture, perhaps the garden will plan more events around the soon to become popular conifers that we already know and love.

A conifer symposium at the Dawes Arboretum

On Saturday, October 21, 2006 an all-day conference was held at the Dawes Arboretum in Newark, Ohio. Rich Larson of the Dawes conducted the seminar which featured many well-known and knowledgeable speakers. Among them were Dr. Richard Bitner, writer and photographer; Talon Buchholz owner of Flora Wonder Arboretum; Daniel Luscombe, Assistant Curator of the Bedgebury Pinetum and cofounder of the British Conifer Society; Susan Martin, Curator of the Conifer Collections, Dogwood and Maple Collections at the U.S. National Arboretum; Joe Stupka, phenomenal witches' broom hunter and Gary Whittenbaugh, the 2005 extraordinary trough-builder and recipient of the Marvin and Emelie Snyder Award for Dedicated Support of the Conifer Society. Topics covered included the Gotelli Collection (Martin); Gardening with Conifers (Bitner); Bizarre Witches' Brooms (Stupka), Past, Present and Future Conifers in Cultivation in the UK (Luscombe); Recent Conifer Cultivar Introductions (Buchholz) and Trough Gardening with Conifers with demonstration (Whittenbaugh). There were many ACS members in attendance enjoying good fun and fellowship in addition to much conifer gardening knowledge presented in a very entertaining way.

New kind of criminal

Russ Fling, one of our Columbus, Ohio members, shared an article he found in the October 23, 2006 *Wall Street Journal* describing a new kind of criminal, men who steal "lucky" trees from Hong Kong nurseries, yards and parks and smuggle them back to the mainland. According to the article, the Buddhist pine (*Podocarpus macrohphyllus)* is believed by the Chinese to bring good luck but has been economically out of reach of many Chinese. Increased Chinese affluence has fueled demand for mature trees that have been grown in the wild. Only small potted ones have previously been available to collectors. This increased demand has elevated the price for a mature wild-grown tree to more than $1,000 and some are willing to pay up to tens of thousands of dollars for one.

Sometimes increased demand stimulates the criminal mind, as in this case. The article reveals some interesting interplay between brazen thieves and the Hong Kong police department - particularly for one persistent inspector named Roger Brooks who finds camouflage, night-vision goggles and helicopters among the tools necessary to catch the elusive thieves. If that's not enough, once stolen trees are captured, he must prove that they are from Hong Kong. All this to save Hong Kong's lucky conifers. Thank you Hong Kong police department and Inspector Brooks.

Members in the news

Terri Park, ACS member from Indianapolis, sent this news about two other ACS members. Dr. Ed Hasselkus was featured in an article in the January 2007 *Horticulture* magazine (page 36) highlighting over 33 years in teaching at the University of Wisconsin and the Arboretum where he has done a lifetime of work. In the November 2006 issue of *Carmel Magazine* (Carmel, Indiana), page 71, Dan Kittle's nine photos are worthy representations of the rare conifer plant material that he successfully grows in Zone 5. (Terri says he readily admits to zonal denial).

ACS Regional News

Southeastern Region
by Flo Chaffin, SE Regional President

The SE Region continues to be actively involved in spreading the word about conifers. First of all, we now have a Membership Chairman, Kathryn Moomaw, to begin to coordinate local groups with regional groups, local gardens and garden centers, and with other local members. Please call her if you have ideas. We are already seeing the rewards from this grass roots approach, and feel confident that the momentum will build as more and more of our members become involved.

Second, Vice President Duane Ridenour has been very busy this fall with several ACS items on his agenda. He's been scouting in Kentucky for our 2007 regional meeting, and toured Yew Dell Gardens and Bernheim Forest Arboretum - two fabulous gardens worthy of a meeting group tour. He has also been leading some conifer tours of his own, most recently at the Knoxville Botanical Garden. This gathering brought 28 attendees, including all but four members in Tennessee. Hopefully, this will generate new memberships and continued enthusiasm in that area.

Maud Henne continues to give talks in her Charlottesville, Virginia area, most recently to the Virginia Native Plant Society. I am sure there are others not mentioned here that are doing the same. I would encourage anyone in the southeast who is involved in speaking or organizing to contact Kathryn, and certainly to forward your information on to me and to our newsletter editor Kimberly Karlin. I'd especially love to hear from South Carolina and Alabama!

In Georgia at the State Botanical Garden, a group of local ACS members put on a whole-day symposium about conifers. While these events are still mostly untried in our area, this one turned out to be a great success, both in attendance and in attendee evaluation. As a result, the State Botanical Garden plans to have a conifer symposium annually! Members in any region can start a dialogue about projects such as this with local gardens and even garden centers. Everyone benefits and the burdens of organization are shared.

Western Region
In addition to planning the 2007 ACS National Meeting in Seattle, Washington to be held July 26-29 with a post tour to follow, the Western Region hosted a meeting in Mt. Vernon, Washington on October 14, 2006. Don Howse's write-up on this meeting follows.

On a damp and dreary Saturday morning about 70 folks gathered together at Wells Nursery, in Mt. Vernon, Washington. The nursery is located on a point of rich alluvial land surrounded by the Skagit River. Neil Hall and his staff greeted us warmly, offering us juices, coffee, and rolls. Neil told us some of the history of Wells Nursery using a portable microphone. He also told us enlightening stories regarding many of the plants that have been introduced by Wells Nursery over the years. Two of the stories were about *Cedrus libani* 'Green Prince' and also *Picea orientalis* 'Mt. Vernon'. Beautiful specimens of these and many other plants were arranged for our inspection near the entrance gate. They also had plants for sale to the members in attendance.

While many of the folks meandered among the nearby plant displays and the adjacent fields of old specimen trees, others boarded two wagons, which were tethered to teams of black mules. The wagons were covered surreys each of which held about 20 to 25 people. We then were taken on a slow ride through the nursery fields, which cover more than 100 acres. One group had an adventuresome ride as the mules became spooked and ran briefly through freshly-tilled, soft soil. Somehow they missed running over the beautiful conifers planted in those rows, and thankfully no one on board was hurt. Each wagon had a guide who described the plants and told us about the growing techniques used at Wells Nursery. After returning to the entrance area, the wagons set out again with the remainder of our participants. Later we all enjoyed a fine catered lunch under an erected tent.

In the early afternoon we all drove across to the southeast of Mt. Vernon to Dave Helms' garden and nursery known as The Cambium Connection. Dave has spent many years developing gorgeous gardens with many fine old specimens. He is an artist, to which his magnificent gardens attested. There are many whimsical aspects to his garden, and a great deal of attention to detail. The cameras were clicking as we all inspected his display. Among his many specimens - too many to be enumerated here - we found outstanding specimens of *Abies concolor* 'Blue Cloak' standing about 40 feet in height and *Abies grandis* 'Pendula' which many of us had not seen previously, also about 30 feet in height. There were many more plants on display, all of which were immaculate, beautifully displayed, and obviously had been grown for many years. Everyone was amazed at the work Dave has done and the work of beauty he has created, mainly by his own hands. His container and field nursery is adjacent to his home and gardens. We were given sheets indicating which plants were for sale, with the sizes and prices. Conifer enthusiasts never fail to haul away treasures, and there were many to be purchased that day. Sales were concluded in his garage where we also could find trays of home-made cookies, fudge and other delectable treats.

A short distance down the same road was Jantunen Farms, where we finished the day. The gardens at Jantunen Farms have been developed in a European style, with tall hedges and narrow alleys. Groves of trees, like *Acer griseum* and *Acer davidi* are underplanted with herbaceous perennials. Theme gardens are dispersed throughout the 50-acre site. The 11-year-old gardens are immaculate and well tended. We were in awe of the work that had been done to create such a beautiful sight. An empty polyhouse was used as our gathering area where we again enjoyed a very nice catered dinner. A silent auction was held as well as the traditional verbal auction. Brian Jacob the president of the Western Region welcomed all of us, and made introductions and announcements. Everyone was pleased with their purchases. Larry Stanley presented a photographic conifer journey to Europe, especially in Holland, Czeck Republic, and Austria, where he had visited with many conifer growers and enthusiasts. As usual, he was humorous and his program was educational as well as entertaining. He also conducted the successful auction.

Members attended from throughout the Pacific Northwest, and also from California. We all had a good time and the officers and volunteers of the Western Region are to be commended for the fine meeting.

Northeast Region
The ACS NE Regional Conference will be held in Auburn, New York September 14-16, 2007. Elsewhere in this issue, you'll find an interesting article by Phil Syphrit on one of the meeting venues, Cornell Plantations.

Central Region
The Central Region's 15th Annual Meeting will be hosted by the Region on June 22-23, 2007 at the Radisson Hotel Madison in Madison, Wisconsin. Look for more information at www.conifersociety.org.

Cornell Plantations Offers Many Favorites, Not Just One or Two

by Phil Syphrit

Foreword by Gerald P. Kral
The American Conifer Society NE Regional Conference will be centered in the wine producing area of Central New York State and will take place September 14-16, 2007. Attendees will have the opportunity to tour Cornell Plantations, the botanical garden, arboretum and natural areas of Cornell University. The last 5 years has seen a remarkably rare and unusual dwarf conifer collection come into existence. Part of Phil Syphrit's job is to maintain this collection. Syphrit's article gives readers a unique perspective of a conifer collection and those planning to attend a small taste of what Plantation's Conifer Collection has to offer.

"This Juniperus right here is one of my favorite trees in the whole collection. It is just lovely and much softer than you'd expect. As for my favorite dwarf, we'd better wander up to the Keinzle Overlook."

Cornell Plantations was formally established in 1944. One of the original design concepts for Plantations was sort of a "trip through time." Beebe Lake pretty much marks the western boundary of Plantations, and a fairly long road meanders eastward from the lake toward the hamlet of Varna. This road, Plantations Road, curves through the botanical gardens, skirting the Mundy Wildflower Garden and weaving through the F.R. Newman Arboretum. The "trip through time" idea had plantings of gymnosperms at the western end of Plantations Road and angiosperms toward the eastern end. Many of the conifers in the gymnosperm area were probably planted by a Civilian Conservation Corps camp in the 1930s and early 1940s. Several Junipers on Plantations' Gymnosperm or Conifer Slope have identification tags from this era.

The Juniper I mention in the very first sentence is one of those older trees, a *Juniperus rigida*, near the top of the Conifer Slope. This particular tree is dark green, has an even, slightly weeping shape, and has needles that are much softer than many *J. rigida* I have known – a good thing since it grows at the junction of two paths.

During the 1960s, the Conifer Slope became overgrown with shrubby weeds. In the early 1980s we began reclaiming this valuable collection and significant "weeding" continues to this day, revealing some beautiful full-sized trees, and opening inviting glimpses of the botanical gardens. There is an *Abies alba*, a *Cedrus libanii*, and two or three *Abies veitchii* which are all around 50 to 60 feet tall and are magnificent. This de-brushing makes Plantations more visually linked to campus. As unwanted woody weeds are removed from the slope, conifer specimens are being added. In spring, 2006 several new trees were planted on the upper part of the Conifer Slope, including *Sciadopitys verticillata* 'Joe Kozey', *Pinus bungeana* 'Rowe Arboretum', and *Pinus leucodermis*, with its strong texture and dark color.

Many people think of gardens from spring through fall. Cornell, as a university, exists on an academic calendar, running fall through spring. This academic calendar was one major factor in Plantations' decision to plan and create the Mullestein Garden, which was dedicated in May, 2001. The Winter Garden helps us connect with the rest of Cornell by being a garden which is at its best while the students are here. It includes trees and shrubs with winter interest, unusual bark, berries that stay colorful in the cold, and many conifers. There is a *Stewartia pseudocamellia*, *Ilex verticillata* 'Red Sprite', and several cultivars of *Cornus sericea* including 'Bud's Yellow' and 'Cardinal'. We have several nice *Chamaecyparis pisifera* and *C. obtusa* in this garden. I really like *C. pisifera* 'Filifera Sungold'.

Keinzle Overlook is one of the few places on Cornell's campus where you can get a really good view into Plantations' botanical gardens. Tower Road is one of Cornell's major streets. It runs beside the Overlook which sits atop Gymnosperm Slope and gazes down into the Winter Garden. It is important that whatever is planted in this overlook doesn't block the view. Part of Keinzle was planted in mid-sized conifers in the 1980s; but, as plans for the Winter Garden progressed and as the urge to continue reclaiming the Conifer Slope intensified, it became obvious that a collection of dwarf conifers would be a logical choice for the remainder of Keinzle. Small plants wouldn't block the vista, dwarf conifers flow logically into Gymnosperm Slope's full-sized coniferous trees and a major pathway down the eastern bank of the slope leads into the Winter Garden. Since April, 2002, many dwarf and intermediate conifers have gone into Keinzle.

Some of my favorite plants in the Overlook include *Chamaecyparis nootkatensis* 'Green Arrow'; *Picea orientalis* 'Gowdy', and 'Skylands'; *Juniperus chinensis* 'Daub's Frosted'; *J. horizontalis* 'Lime Glow'; and *J. squamata* 'Holger'. *Pinus mugo* 'Slow Mound' and 'Mops' are also very reliable and attractive round buns. One particular *Picea pungens* 'Procumbens' is surrounded by several sedum including 'Purple Emperor', 'Sunset Cloud', and 'Ruby Mantle'. The color combination of these sedums and this spruce is beautiful.

There are two very nice *Metasequoia glyptostroboides* at the bottom of Gymnosperm Slope. On Comstock Knoll, home to Plantations' rhododendron collection, we have two very nice *Sciadopitys verticillata,* perhaps 30 feet tall, and a very attractive bank of *Microbiota decussata*. I love the soft plum color of *Microbiota* in winter.

What is my overall favorite conifer? Considering that I've already named about a dozen things I really like in three or four different gardens, it's pretty obvious my real answer is "Hard to say." So many conifers have many selling points. I love balsam firs because they make me think of Christmas trees. I love white pines because they remind me of my life in Maine. Larches are lovely. Hemlocks are soft and gentle. Sequoias are amazing. Choose just one or two? No way.

About the author: Phil Syphrit has a Bachelor's degree in Communication and Folklore from Western Kentucky University. He lived in Maine and New Hampshire from 1983 until 1998, working in museums and orchards. He has been in Ithaca, New York since then and now works at Cornell Plantations in the rhododendron and conifer collections. He and his wife Katy are avid contra-dancers and share their house with a three-legged cat named Simon.

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Photo by Al Forinash

Thuja occidentalis 'Gold Drop' Plant Sale Supports ACS Research Fund

Photos by Judy and Ron Regenhold of their garden. See their article inside.

Pinus parviflora 'Fubuki Nishiki'

A portion of the Regenhold garden showing a variety of dwarf conifers

Picea orientalis 'Skylands' and *Picea glauca* 'Pendula' reaching to the sky

Picea orientalis 'Tom Thumb' with good friend *Pinus parviflora* 'Goldilocks'

Abies concolor 'Archer's Dwarf'

Picea omorika 'Treblitzensis' on a standard, center, near the lower pond, with *Pinus parviflora* 'Bergmani' on the left