OREGON FLORA *Newsletter*

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OSU's Dr. Stephen Meyers is coordinating the production of our new *Flora of Oregon*

by Rhoda Love

At a recent meeting of the Native Plant Society of Oregon, Linda Hardison introduced recent Oregon State University PhD, Dr. Stephen Meyers, who has joined the Oregon Flora Project staff to oversee the writing our much-anticipated new *Flora of Oregon*. Dr. Meyers recently spent time talking with me about his background and his vision for the next exciting step in our Flora Project. As our readers know, this project had its inception sixteen years ago when the late Dr. Scott Sundberg first began integrating and databasing the combined plant specimens of the University of Oregon, Oregon State University, and the Morton Peck Herbarium.

Dr. Meyers, who is in his mid-forties, was born, grew up, and attended early college in New York State, after which he had several careers, including air traffic controller and stone cutter before he recognized his true calling as a botanist.

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Photo: Linda Hardison

Dr. Stephen Meyers, Taxonomic Director.

What's in a Family Name? Changes Among Plant Families

by Linda Hardison

Since Linnaeus brought early organization to plants through his binomial naming system, plants have been grouped in orders, families, and genera. This serves not only to catalogue the organisms being studied, but also to express their relationships to one another. Flowering plants were initially classified based on their morphology (especially that of the flower) and later on biochemistry. Indeed, many of us can look at an unknown plant and quickly place it in a family such as the mustards, roses, or composites due to its recognizable flower structure.

As the identification and sequencing of genes became possible, botanists recognized that this kind of information more accurately reflected plants' evolutionary relationships. Grouping plants according to their common ancestor (known as a monophyletic group) reflects these evolutionary relationships better than earlier systems. In 1998, the international Angiosperm Phylogeny Group proposed such a classification system; it became known as APG I. The result was an alternative classification for some groups at the family level, a merging of plant groups at the higher level of orders, and the reorganization of the standard groupings of "monocots" and "dicots" into the more evolutionary descriptive categories of paleoherbs, Magnoliids, monocots, and eudicots. Research continues, with the most current updates being summarized in the 2009 APG III paper (see Reference below).

What does this mean for the Oregon Flora Project? To reflect the latest scientific research and to be consistent with the larger botanical community, the OFP is incorporating the family nomenclature proposed in APG III. The impact is seen in the assignment of some genera to unfamiliar plant families. For example, the Scrophulariaceae (Figwort family) is dramatically smaller, with genera such as *Penstemon, Mimulus*, and *Castilleja* now moved to the Plantaginaceae, Phrymaceae, and Orobanchaceae families, respectively. Other families will gain genera. The table below lists the families in Oregon that are impacted by the APG III realignment. In all, 151 Oregon genera will be moved to a different family. A list of these, coupled with their old and new family assignments, can be

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When that occurred he made plans, nine years ago, to travel west and enter the Oregon State University Botany program.

Stephen told me that his interest in plants began early in life when his parents gave him a set of Foxfire books that described homesteaders in Appalachia living off the land. At that time, he began spending many hours as young boy hiking the forests of upstate New York, as he says, "learning to identify the trees and herbs." His interest in plants continued during the years he worked in the East at careers other than botany. As often as possible he explored the nearby Pine Barrens and Catskill Mountains hiking and botanizing.

Finally, dissatisfied with his early careers and ever more interested in the natural world, he began to ask himself questions such as "How are plants classified, how did they evolve, where did they come from, and what about DNA techniques used to study them?" At this point Stephen made the decision to train as a botanist and chose Oregon State University in Corvallis as the college with one of the best programs in the country. Happily he was quickly accepted, made the trip west, and soon became acquainted with the botanists at OSU: Aaron Liston, Ken and Henny Chambers, Scott Sundberg, Richard Halse, and Robert Meinke. As he said to me, Stephen had now found his "botanical home."

During our interview, Stephen described his very interesting graduate research work on the genera *Plantago* and *Limnanthes*. This material I will save for the next issue of *OFN*, and jump ahead to Stephen's plans for our much-anticipated *Flora of Oregon*. I asked if our book would resemble Hitchcock's single volume work or the *Jepson Manual*. He surprised me by replying, "Neither. The new *Flora of Oregon* will likely be a single volume book, but it will resemble neither Hitchcock nor Jepson. It will be more similar—but not identical to—the *Flora of North America* series. It will contain illustrations and perhaps color photos." I asked if the book would appear in installments. To that, Stephen answered, "No; however as treatments are completed, drafts will be available on the Oregon Flora Project website."

All Oregon Flora Project supporters must be as thrilled as I am to welcome Stephen Meyers to the Project and to look forward to our new *Flora of Oregon.*

2010 Fundraising campaign

For this issue only, readers who normally receive the newsletter electronically are being sent this paper copy. To reduce printing and mailing expenses, we have combined our fundraising appeal with this issue of the *OFN*. We invite you to use your return envelope to send in your generous contribution to the Oregon Flora Project!

The *Oregon Flora Newsletter* is published two times a year by the Oregon Flora Project and the Oregon State University Herbarium.

The Editor is Rhoda Love and the Production Assistant is Rena Schlachter.

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Congratulations to Dorothy Beaton!

We extend our congratulations to Dorothy Beaton of the Agricultural Research Foundation at Oregon State University upon retiring this December from her position as executive director. Dorothy has helped to promote the OFP and facilitated fundraising efforts for our project. Thank you, Dorothy, and best wishes!

OFN is on the Web and in Color!

Our newsletters, with color images, are posted on our website at *www.oregonflora.org/newsletter.php*. If you would like to receive an email notification of each new issue and **stop** delivery of the paper copy, please send us a message at *ofpflora@oregonflora.org* with "Newsletter" in the subject line.

Crossing the line: two Oregon *Abies* taxa and the 44th parallel

by Stephen Meyers

"The pine tree seems to listen, the fir tree to wait: and both without impatience—they give no thought to the little people beneath them devoured by their impatience and their curiosity." It is doubtful that when Friedrich Nietzsche penned these words he was referring to the seemingly complex taxonomic questions within the genus *Abies*, nevertheless, his words are fitting.

For over a century, taxonomic disagreement has occurred concerning *Abies procera* (noble fir) and *Abies magnifica* (California red fir.) Adding further to the confusion is the taxonomic status of *Abies magnifica* variety *shastensis*.

Although closely related (Xiang et al. 2009), *Abies procera* and *A. magnifica* are considered distinct species by current floras. The most conspicuous morphological difference between the species is found in their cones. The cones of *A. procera* have exserted bracts that are longer than the scales which collectively nearly cover the cone, giving it a "shingled" appearance. The bracts on cones of *A. magnifica*, conversely, are included and not exserted beyond the scales.

Abies procera *cone displaying bracts which nearly cover the entire surface.*

Abies procera x magnifica *cone displaying bracts which partially cover the surface:*

Other morphological differences that distinguish the species are somewhat less reliable and not as obvious. For example, the mature bark of *A. procera* is gray to light reddish-brown and has narrow, almost vertical ridges. Additionally, the needles of this species are grooved on the upper surface. *A. magnifica*, however, has reddish to dark brown bark with rounded ridges and its needles are not grooved.

The morphological differences described above are consistent within the core ranges of these species. These ranges are: *A. procera*: from the Puget Sound in Washington, south to approximately Lane County, Oregon; *A. magnifica*: from Tehama County, California south to Madera County. However, trees of intermediate morphology are common within a large geographic area between the core ranges (Lane County to Tehama County.) Most notably, the cones of these trees have bracts that vary in the degree of their exsertion. The bracts of these intermediate trees are neither completely included, as with *A. magnifica*, nor do they nearly cover the cone as with *A. procera;* rather, the bracts cover roughly 25% to 85% of the cone. Furthermore, the needles of these trees can also exhibit an intermediate morphology and are often slightly grooved. Lastly, the bark characteristics of these trees range from those of *A. procera* to *A. magnifica*.

Curiously, some trees in the southern geographic range of *A. magnifica*, from Madera County California, south to Tulare County also exhibit an intermediate morphology. This geographic area is nearly 400 miles south of the intermediate trees of southern Oregon and Northern California.

The morphology of the intermediate *Abies* trees has not gone unnoticed by plant taxonomists. As such, these trees were assigned the name *A. magnifica* variety *shastensis* by John Lemmon in 1890. This name, however, has not been universally accepted. As a result, herbarium specimens collected from southern Oregon and northern California have been annotated depending on the flora used as *A. procera, A. magnifica, A. magnifica* var. *shastensis* or *A. magnifica* × *procera*.

What, however, does the scientific literature say regarding intermediate trees in southern Oregon and northern California? Is there any evidence that they are hybrids or an infraspecific *A. magnifica* taxon?

The first major study addressing these questions was conducted by Zavarin et al. in 1978. This group analyzed monoterpenes from over 350 trees in 35 localities throughout the range of *A. procera* and *A. magnifica*. The results of their study found three distinct groups of monoterpenes; groups that coincided latitudinally with the ranges of "good" *A. procera* (Washington to the 44th parallel), the intermediates (from 44th parallel to the 40th parallel), and *A. magnifica* (from the 40th parallel and south, including the intermediate-like trees in southern California.)

The Zavarin group stated that these results "...did not allow a clear interpretation of the status of the transitional and southern populations..." Undeterred after analyzing the biochemical results, they next examined the meager paleobotanical data that was available. Specifically, they studied the morphological characteristics of four fossilized Miocene cones and seeds from Oregon, Idaho and Nevada. In each locality both the cones and seeds were found to have intermediate morphology and could not be confidently identified as either *A. procera* or *A. magnifica*. Based on these results the Zavarin group hypothesized that *A. procera* and *A. magnifica* may have originated from an intermediate species.

More recently, in 2008, David Oline, of Southern Oregon University, conducted a chloroplast DNA study from trees in the ranges of *A. magnifica*, the intermediates, and *A. procera*. His results found two chloroplast types. Trees from the southernmost extent of the *A. magnifica* range, north to Shasta County, California, shared one type; trees north of Lane County shared a second; while most trees between Lane and Shasta Counties had mixed types, indicating introgression, *i.e.*,

See Abies*, page 13*

Three Ivy Species in Oregon

by Katie Mitchell

When encountering ivy (*Hedera* spp.), the first thought of most people (at least the readers of this newsletter) is "How can I eradicate this menace?!" We would, however, urge readers to first take a careful look at any ivy you encounter before pulling it. We ask this because recently it has been brought to our attention that our knowledge of the range and distribution of *Hedera* species in Oregon is incomplete, and that your observations can help address this lack of information.

For decades it had been assumed, by both professional and amateur botanists, that all ivy found naturalized or escaped from cultivation in Oregon was *Hedera helix,* English ivy. However, in a note published in *Madroño* (2005) Peter Zika and Ed Alverson revealed that in fact, two morphologically similar species of *Hedera* are pests in our state, namely *Hedera helix* (English ivy) and *H. hibernica* (Irish or Atlantic ivy). Zika also noted his 2004 collection of *H. colchica* (Persian ivy) in Curry County where it had escaped from cultivation.

Hedera helix, *H. hibernica* and *H. colchica* are morphologically similar species which may be mistaken for each another in the field. Manipulation by plant breeders and the resulting diverse array of cultivars of each of these species make the task of identification even more difficult. On the other hand, these three ivies differ in chromosome number; *H. helix* is a diploid (2n=48), *H. hibernica* is a tetraploid (2n=96), and *H. colchica* is an octoploid (2n = 196), with the highest chromosome count known in the family Araliaceae (Vargas et al. 1999). It is this difference in chromosome number that likely prevents hybridization between these species, both in the sympatric native European habitats of *H. helix* and *H. hibernica*, as well as between escaped populations in the New World (McAllister and Rutherford 1990). All three species are cultivated in Oregon and both *H. helix* and *H. hibernica* are sold as "English ivy."

When encountered in the wild or in the herbarium, one cannot realistically be expected to know the chromosome number. In addition, the most reliable morphological difference is somewhat cryptic—you need at least a hand lens to study the trichomes, the small, multicellular hairs that you may find all over the plant, but which are most consistently diagnostic on the undersurface of the leaf blade. Because these trichomes can be overlooked by the naked eye, they have not been under selection by plant breeders as have differences in leaf shape, size and color. Both *H. hibernica* and *H. helix* have white, stellate trichomes (sometimes fawn-colored in *H. hibernica*) with 3-8 rays per trichome. On *H. helix* leaves, the trichomes have some upright rays and appear tangled, especially on leaves that have not fully expanded. On *H. hibernica* leaves, the trichomes are sparser and the rays lie flat. The scale-like trichomes on *H. colchica* have about 10 to 20 rays and may start out white but become rusty or brown with age.

Unfortunately, trichome morphology may sometimes be a tricky character. Exposure to the weather may abrade or bend upright trichome rays, making *H. helix* appear more like *H. hibernica*. Trichomes are best observed on the underside of the leaf between the main veins near the petiole, a spot where they are most protected, and on newer leaves that have had less exposure to the elements (McAllister and Rutherford 1990).

Leaf morphology may also be used to help identify *Hedera* species in the wild, and on some herbarium specimens, but with a caveat: older leaves and those found physically higher on the plants are quite variable in shape and should not be used for identification. However, the younger leaves found at the plant base do differ between the species. Specifically, many of the younger and lower leaves of *H. helix* are palmate and deeply lobed. Conversely, all of the younger and lower leaves of *H. hibernica* are either shallowly lobed or entire. Like *H. hibernica*, the leaves of most clones of *H. colchica* are entirely unlobed, but occasionally clones have leaves that are so shallowly lobed that they appear entire (Rose 1996).

What about mapping the genus *Hedera* in our online Plant Atlas? Prior to our knowledge that more than one ivy species has naturalized in Oregon, the Oregon Flora Project mapped nearly 200 observations of *H. helix*. We have, however, now taken the conservative approach of suppressing much of these data, realizing that observers and collectors were likely unaware of the presence of more than a single ivy species in Oregon. Oddly enough, considering the ubiquity of ivy in western Oregon, the herbarium at Oregon State University currently houses only six *Hedera* specimens. Two of these are unidentifiable to species, one is annotated as *H. helix* and three as *H. hibernica*.

Due to our present lack of data we are encouraging you, the citizen scientist, to take a closer look the next time you

See Ivy, next page

Key to escaped and naturalized *Hedera* species in Oregon

Note: Trichomes should be observed on fresh, newer leaves, under a 10× or higher magnification hand lens or microscope. The underside of a leaf blade between the main veins is the best place to look for unabraded trichomes (McAllister & Rutherford 1990).

1. Trichomes scale-like, whitish on new growth but aging to rust or brown, with 12-20 very short rays; young leaves on vegetative shoots entire or very shallowly lobed……..*H. colchica*

1' Trichomes stellate and white (occasionally fawn-colored), with 3-8 rays…….2.

2. Rays of the trichomes laying flat in one plane, parallel to the leaf surface; young leaves on vegetative shoots shallowly lobed or entire……..*H. hibernica*

2' Some of the rays of most trichomes at an angle to the leaf surface, giving a bristly appearance; young leaves on vegetative shoots deeply lobed……..*H. helix*

Ivy, continued from previous page

see escaped ivy. In western Oregon, spring and summer are probably the best times of year to look for these differences. We ask that you submit your observations to the OFP using the spreadsheet labeled "Template Atlas Submission" available at the bottom of the Atlas webpage. Not only will your data be used in the important task of repopulating the online Plant Atlas *Hedera* distribution maps, but your information may also prove invaluable to biogeographic studies, invasive weed management programs, climate change studies, and a myriad of other potential projects. Your collected specimens would also be welcomed.

It should be noted that at the time of this publication, the online Plant Atlas will not display maps for *Hedera hibernica* and *H. colchica*. As a result of limited financial resources, which constrain personnel time and computational resources, we currently refresh and upload data to the online Plant Atlas on a yearly basis. Therefore, until our next scheduled upload in January, only four confirmed *H. helix* data points will be mapped on the Plant Atlas.

References

McAllister, H.A., and A. Rutherford. 1990. *Hedera helix* L. and *H. hibernica* (Kirchner) Bean (Araliaceae) in the British Isles. *Watsonia* 18:7-15.

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Vargas, P., H.A. McAllister, C. Morton, S.L. Jury, and M.J. Wilkinson. 1999. Polyploid speciation in *Hedera* (Araliaceae): phylogenetic and biogeographic insights based on chromosome counts and ITS sequences. *Plant Systematics and Evolution* 219: 165-179.

Zika, P.F., and E.R. Alverson. 2005. Noteworthy Collections:

Abies*, continued from page 11*

hybridization, between *A. magnifica* and *A. procera*.

Also in 2008, Robert Mathiasen and Carolyn Daugherty, of North Arizona University, chose to approach the *A. magnifica-procera* question using an unorthodox method. They surveyed eleven stands (over 2,000 trees), ranging from northern Linn County south to Alpine County, California and recorded the level of parasitism of *Arceuthobium tsugense* (hemlock dwarf mistletoe.) They found that trees above the 44th parallel (northern Lane County) were severely infected by the mistletoe, whereas trees below the 44th parallel in Oregon, as well as in California, were not infected. Mathiasen and Daugherty acknowledge that the intermediate trees, south of the 44th parallel, may be *A. magnifica* × *procera* hybrids and that enough genetic introgression may have occurred within these populations to result in the lack of susceptibility to mistletoe infection. However, because all intermediate trees surveyed in southern California also lack susceptibility, they agree with the Zavarin group's hypothesis that *A. magnifica* and *A. procera* are descended from a common *Abies* species. They add that if *A. procera* populations that lack susceptibility to mistletoe infection are found north of the 44th parallel, this would confirm the hypothesis. Furthermore, Mathiasen and Daugherty boldly suggest that all uninfected trees, south of the 44th parallel, should simply be referred to as *A. magnifica*.

One of the main missions of our Oregon Flora Project is to use all available data and scientific research to make taxonomic decisions. In light of the conflicting results of the research described above, how are we treating the *A. magnifica-procera* group in our new *Flora of Oregon*? Both the Oline and the Mathiasen and Daugherty papers were published nearly simultaneously in 2008, yet neither paper cited the other. This may indicate that these researchers were not aware of each other's work. The very last line of the Mathiasen and Daugherty paper states, "We urge investigators to initiate molecular analyses of this true fir complex in the near future." Had Mathiasen and Daugherty known of Oline's research, their conclusions may have been different or at least modified to some extent.

While the idea that *A. magnifica* and *A. procera* are descended from a common *Abies* species remains an interesting and valid hypothesis, the Oregon Flora Project has chosen, based on the molecular results of Oline, to treat the intermediate *Abies* populations of southern Oregon as *A. magnifica* × *procera*. This means that we are treating all populations north of the 44th parallel as *A. procera* and all populations south of the 44th parallel as *A. magnifica* × *procera*. We also conclude it is likely that no pure *A. magnifica* populations exist in Oregon.

This case demonstrates that taxonomy is an ever-changing and evolving science. What is considered a "good" taxon today may, as a result of future research, become something altogether different tomorrow. However, such research need not be restricted to academics or molecular biologists. For example, the size of the Mathiasen and Daugherty mistletoe survey study could easily be expanded by citizen scientists. If, based on such observations, numerous populations of non-mistletoe infected *A. procera* were reported north of the 44th parallel by citizen scientists, it would cause us to re-evaluate our current conclusions. Such findings may indicate that *A. magnifica* and *A. procera* should be considered con-specific, thus leading to another, more biologically accurate, taxonomy of the *A. magnifica-procera* group. We greatly encourage such simple, but highly important "on the ground" research.

References

Mathiasen R.L. and C.M. Daugherty. 2008. Distribution of red fir and noble fir in Oregon based on dwarf mistletoe host specificity. *Northwest Science* 82: 108-119.

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Zavarin, E., W.B. Critchfield and K. Snajberk. 1978. Geographic differentiation of monoterpenes from *Abies procera* and *Abies magnifica*. *Biochemical Systematics and Ecology* 6: 267–278.

Project News

by Linda Hardison

There is something unique about this mailing of the *Oregon Flora Newsletter*—and hopefully it will prompt you to respond with a generous contribution to help ensure your Oregon Flora Project remains productive. We are enclosing an appeal for contributions (and a convenient return envelope) focusing on support for Dr. Stephen Meyers, our newly-hired Taxonomic Director. The addition of this new, full-time staff member represents an exciting step toward our goal of completing our new *Flora of Oregon*. As detailed in this article as well as throughout this issue, we are making significant progress. We hope that you like what you see, and will want to help support its continued development.

Progress on the *Flora* With Dr. Stephen Meyers on board, I can enthusiastically report that the writing of the *Flora of Oregon* is underway! We completed the *Guide for Contributors to the Flora of Oregon* this summer, and have since been recruiting specialists to author various taxonomic groups for our *Flora*. Thus far, we have received commitments from 43 individuals to complete 1745 taxa—39% of our flora. The target date for receiving manuscripts is March 2012. We currently have completed the gymnosperms and several dicot families. With the anticipated receipt of treatments for the grasses and the genus *Eriogonum*, the OFP will have completed approximately 14% of the flora by Spring 2011. As the detailed descriptions and identification keys are completed for each group of plants, we will post the text on our website (http://oregonflora.org/flora.php).

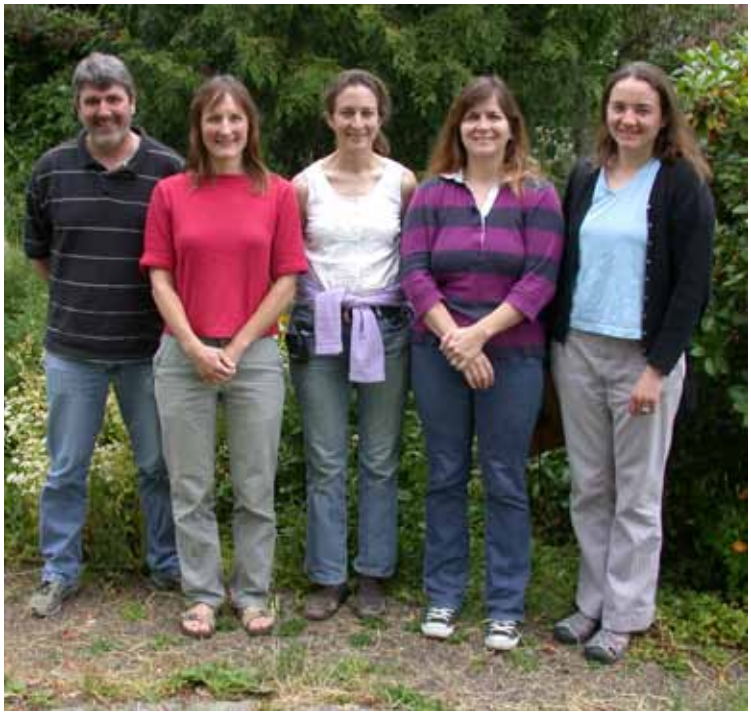

Photo: Gene Newcomb

Oregon Flora Project staff (left to right): Stephen Meyers, Linda Hardison, Thea Cook, Jennifer Sackinger, Katie Mitchell.

Checklist Going hand in hand with our ability to begin writing the *Flora* is the completion of the Oregon Plant Checklist. Sixteen years in the writing, the Checklist is a detailed reference, documenting our circumscription of every known Oregon plant taxon with cross-references, literature citations, voucher specimens and notes from staff and manuscript authors. The Checklist will be an ever changing document reflecting the latest taxonomic research. We are currently anticipating the publication of a 'snapshot' document, online, as a list of accepted taxa and their synonyms by the end of this year. However, through the OFP's sustained work, we will be able to present all information contained in the Checklist—and continuously update it—through our website.

www.oregonflora.org We are making some significant behind-the-scenes changes to accommodate our growing activity and to streamline our ability to transition our working data into materials the public can readily use on the website. Our new website host will be COSINe, the College of Science Information Network, at Oregon State University. For their valued support through the years, we thank our colleagues at NACSE, who helped us develop our web presence and formerly hosted our website.

Ericaceae—a slice of the new Flora The Oregon Flora Project has recently received funding from the Bureau of Land Management to prepare and publish our treatment of the heath family as it will appear in the new *Flora of Oregon*. Preparation of the descriptions, keys, and illustrations (by our own Rena Schlachter) of this iconic plant group—so well represented in the Pacific Northwest—will be a useful reference to plant lovers, as well as a tangible example of what the printed version of the flora will offer. Plan to add this new publication to your botany bookshelf next summer!

Team members The OFP workspaces and the OSU Herbarium are buzzing with activity! Along with our 5 staff members, this year we have six energetic student workers helping with every aspect of the project. These include our returning workers Tamra Prior, Megan Lamb, Katrina Isch, and Bridget Chipman (several of whom are botany honors students), along with new hires Jon Wagner and David Fontenot. In addition, we have recently hired a crew of eight students whose jobs are to enter herbarium data for a collaborative project between the OFP and the Pacific Northwest Herbaria Consortium. For this project, specimens from the states of Washington, Montana, and Idaho will be databased to become part of an online, multi-state resource. As always we greatly welcome volunteers who want to be a part of our team. Please contact me, Linda Hardison, using the contact information on page 10 for details. I look forward to hearing from you.

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found on our website at www.oregonflora.org/checklist/APG3FamilyUpdates.php.

In early 2011, our online Oregon Plant Atlas and Photo Gallery will reflect these family changes. As with the existing option to view synonyms, users will always have the ability to select plants from the older (and perhaps more familiar) family designations. Through these changes, the Oregon Flora Project can provide users with the opportunity to learn the latest developments in plant taxonomy while exploring the plants of Oregon.

The author would like to thank Kenton Chambers for helpful comments and review of this article.

Reference

Angiosperm Phylogeny Group III. 2009. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. *Botanical Journal of the Linnean Society* 161: 105–21.

OFP families with genera added	OFP families with fewer genera	Families no longer in OFP	Families New to OFP
Amaranthaceae	Apiaceae	Aceraceae	Adoxaceae
Apocynaceae	Caprifoliaceae	Asclepiadaceae	Amaryllidaceae
Araceae	Liliaceae	Buddlejaceae	Asparagaceae
Araliaceae	Portulacaceae	Callitrichaceae	Cleomaceae
Boraginaceae	Scrophulariaceae	Capparaceae	Hemerocallidaceae
Cannabaceae	Ulmaceae	Chenopodiaceae	Linnaeaceae
Celastraceae	Zygophyllaceae	Cuscutaceae	Melanthiaceae
Convolvulaceae		Empetraceae	Montiaceae
Ericaceae		Fumariaceae	Nartheciaceae
Hydrocharitaceae		Hippocastanaceae	Nitrariaceae
Orobanchaceae		Hippuridaceae	Phrymaceae
Papaveraceae		Hydrophyllaceae	Sapindaceae
Plantaginaceae		Lemnaceae	Tecophilaeaceae
Potamogetonaceae		Najadaceae	Tofieldiaceae
Santalaceae		Parnassiaceae	Xanthorrhoeaceae
Typhaceae		Sparganiaceae	
		Tiliaceae	
		Viscaceae	
		Zannichelliaceae	

Table lists families represented in Oregon undergoing changes to included genera as a consequence of APG III proposals.

How can I contribute?

Donations to the Oregon Flora Project are a critical part of our operating budget. Funds are routed to the OFP through the Agricultural Research Foundation (ARF). The ARF is a non-profit organization that raises funds to support scientific research and programs at OSU. All contributions are tax-deductible. Your checks to the Oregon Flora Project can be made payable to the Agricultural Research Foundation. Please include "Oregon Flora Project—4482" on the memo line.

Mail your check to:
Oregon Flora Project
c/o Agricultural Research Foundation
Oregon State University
100 Strand Ag Hall
Corvallis, OR 97331-2219

With your contribution, please let us know if you do not wish your name listed in our newsletter "Thanks" column.

Thanks

To protect the privacy of our donors, we do not show the names on the online version of the *OFN*.

We are grateful for support from the Native Plant Society of Oregon state organization, and from their Cheahmill, High Desert, and Umpqua Valley Chapters. Gifts were given in memory of Bonnie Hall and in memory of Scott Sundberg.

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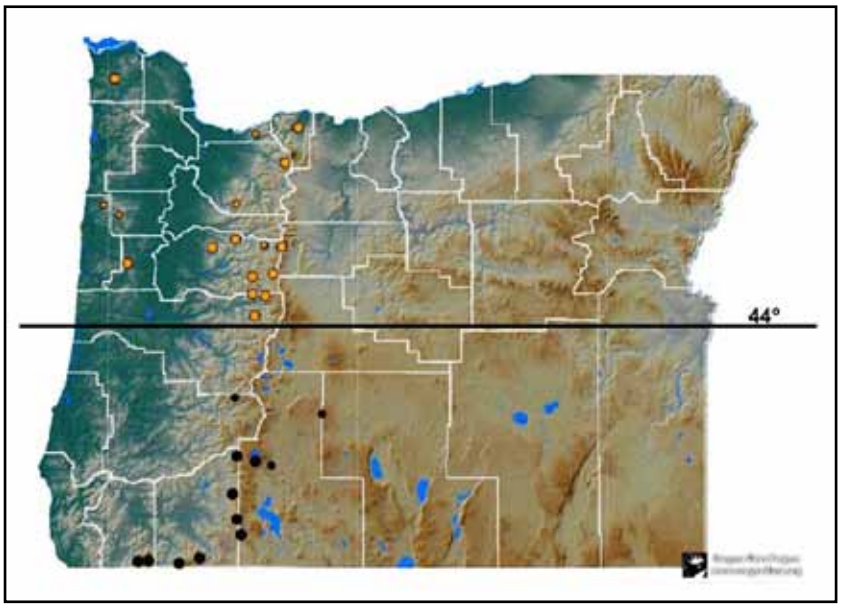
TIME DATED MAIL

Did you know?

- According to the National Christmas Tree Association the top three Christmas tree producing states are Oregon, North Carolina and Michigan. Additionally, the top three species of Christmas trees sold in the United States are: Fraser fir (*Abies fraseri*), Balsam fir (*Abies balsamea*), and Douglas fir (*Pseudotsuga menziesii*). Of the three, only the latter is native to Oregon.
- The vast majority of "pine" scented products typically sold are actually manufactured using essential oils distilled from the leaves of various *Abies* species.
- Although currently considered an invasive pest, ivy (*Hedera* sp.) was a symbol of the Greek god Dionysus (and the Roman equivalent Bacchus); the god of wine, revelry and ecstasy.



Distribution of *Abies* relative to the 44th parallel; with *Abies procera* (light symbols) north and *A. magnifica* x *procera* (dark symbols) south of the 44th parallel.