RAE SELLING BERRY SEED BANK & PLANT CONSERVATION PROGRAM

Portland State UNIVERSITY

Spring 2015 Newsletter

From the Director

Oh, what a beautiful spring! Flowers in profusion and warm days beckon us outside. I don't know about you, but it seems to me that it is coming very early; autumn slid into spring, without much of a real winter between. This is a not too subtle reminder that we are all in this together when it comes to conserving the biodiversity we inherited. Taking care of the environment as a whole is something we all must do.

This newsletter contains a brief glimpse into the workings of three major plant conservation organizations. Each has a new director, motivating them to take a new look at how to become more effective at conserving plants.

After two five-month-long BLM-funded internships through the joint Chicago Botanic Garden/BLM Conservation and Land Management (CLM) program, Isaac Sandlin finished his SOS work, and very successfully. He made 67 bulk seed collections of which 55 contained 10,000 or more seeds, with one collection approaching a million seeds! They were all collected in eastern Oregon's Harney County, in sage grouse habitat. Isaac is now on his way to graduate school at OSU.

We are again very fortunate to have another CLM intern as our SOS collector this spring and summer. Much to our delight, we have been able to get our intern of choice again: Lindsey Riibe, a long-time volunteer. Lindsey is getting to be quite the moss expert, and she has a piece in this issue that describes some of her work in that realm.

Thanks to our many supporters, our very successful year end appeal will allow us to hire two high school interns this summer, through the Saturday Academy's Apprenticeships in Science and Engineering (ASE) program. This is our 19th year with ASE. Last year's interns, Maxine Hood and Hannah Fuller, appear to have been admitted to several excellent colleges and universities, and they are now in the

Intern Isaac Sandlin

Interns Hannah Fuller & Lindsey Riibe

MAKING A DIFFERENCE

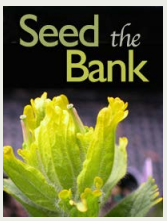
VOLUNTEERING

Your support helps us to do our best work.

Please call Kris at (503) 725-2468 or email kfreitag@pdx.edu if you would like to support our program.

MAKE A GIFT TODAY

Have you included or considered including the Rae Selling Berry Seed Bank in your estate plans? If so, or if you would like to learn more, please contact Scott Shlaes, Director of Development for Sustainability Initiatives at (503) 725-2998 or shlaes@pdx.edu



Stay up-to-date with the Seed Bank on our Facebook page!

happy process of deciding among them.

Finally, volunteers and donors are a vital part of our ability to do this work, and their generous contributions are always greatly appreciated. We want especially to recognize and thank Rachel Witmer for having donated thousands of hours over the last ten years. Not only is Rachel a dedicated and consistent volunteer, she performs a task that is not particularly popular but absolutely essential--data entry. In this newsletter we recognize and thank some of the wonderful and generous people who donate to our common effort of conserving Oregon's flora for future generations. Thank you all.

Go to top

A Closer Look at Mosses

Lindsey Riibe

The endangered marbled murrelet nests in moss. (Image: Alaska Dept of Fish & Game)

Growing up in the Pacific Northwest, I have always been aware that moss exists. It is hard to ignore. It blankets much of the forest in a brilliant green sweater, covering both tree and forest floor. It invades grass lawns and can be seen growing on sidewalks, fence posts and old roofs. Even so, it wasn't until I enrolled in a moss workshop at PSU (cleverly disguised as a class on techniques in ecological field sampling) that I began to see just how diverse the world of moss really is. I now see distinct species rather than a vaguely singular entity and am continually amazed by their diversity of form.

Mosses, along with liverworts and hornworts comprise the Bryophyte clade -- a traditional grouping that may be paraphyletic, but remains unresolved for now. Bryophytes make up the second most diverse group of land plants after the angiosperms, with around 20,000 species (12,000 species being mosses). That's approximately twenty times more species than all the gymnosperms, yet they receive very little attention. This is especially true when it comes to protection by legal authorities or government agencies.

Homalothecium nuttallii... *(Image: Ken-ichi Ueda)*

And Orthotrichum lyellii *are commonly found here on deciduous trees. (Image: Kristian Peters)*

Like vascular plants, bryophytes face numerous threats in a rapidly changing environment, and conservation strategies are beginning to develop around the world. In 2006, Royal Botanic Gardens, Kew initiated the first ex situ collection for the conservation of threatened bryophytes. Ex situ conservation and propagation usually consists of in vitro cryopreservation (maintained at the temperature of liquid nitrogen, -196°C). In vitro establishment has proven difficult for many bryophyte species and it can be both time consuming and expensive to maintain. Furthermore, large natural genetic diversity cannot be maintained in actively growing collections, but their importance should not be dismissed.

Working with the Berry Seed

IN THIS ISSUE

OTHER LINKS

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Excessive wild harvest is a threat to moss diversity and forest health (Image: John MacLean, The New York Times)

Post harvest regrowth is slow to nonexistent (Image: Nalini Nadkarni)

Bank, the Eppley and Rosenstiel lab at PSU and John Christy at the PSU Herbarium, I have become increasingly interested in finding low-tech alternatives for ex situ bryophyte conservation. In order to conserve the greatest amount of natural diversity, ex situ collections should focus on spore storage much like the seed storage of higher plants. Currently I have been attempting to germinate spores from herbarium specimens. Given the right growing conditions, some spores that have been stored in herbaria for over 100 years will germinate. While the rates of germination success have been very low so far, it is exciting to think of the possibilities, especially for rare species or those thought to be extinct. Although bryophyte conservation efforts are still in their infancy, we may find a well established spore bank within our herbarium collections.

For anyone who would like to explore the world of moss, here are a couple of excellent online resources:

Introduction to Bryophytes. A blog for Biology 321 at the University of BC. It lists bryophytes by phylum, class, family, and species. Plus it has excellent photographs for your identification needs.

Bryophyte Ecology by Janice Glime. This is THE resource for all things mossy. Five volumes of printable text with color photographs throughout.

Go to top

Partners and Plants

Seeds of Success intern Isaac Sandlin made an impressive 67 collections of 26 taxa in southwest Oregon this past summer and fall. Most of the plant species are useful to the greater sage-grouse for food and/or cover. Here we profile a few of these native range plants.

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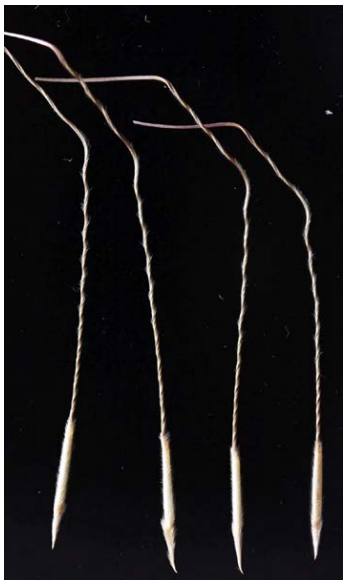
Astragalus filipes, basalt milkvetch, is native to the western third of North America. It grows in a wide variety of habitats, mostly dryer areas. As with most leguminous plants, the seeds resemble small beans.

Sticky Indian paintbrush, *Castilleja viscidula,* grows in dry, rocky places in the eastern half of Oregon and the plains of surrounding states. As the seed matures, the "honeycomb" structure surrounding the seed is perfect for catching the wind and facilitating distribution of these tiny seeds.

Parsnipflower buckwheat, *Eriogonum heracleoides*, is most at home in rocky areas such as sagebrush deserts and ponderosa pine forests. It can be found in much of the West. Each tiny flower is borne in large clusters and yields one pear-shaped achene each.

Hesperostipa comata, needle-and-thread grass, is one of the more widespread western and midwestern range grass species. Fluctuating humidity causes the long, coiled awn to twist and untwist, drilling the pointed seed into the soil.



Go to top

Whither Plant Conservation?

Ed Guerrant

Every once in a while coincidence sets the stage for a broad and timely discussion about the direction an organization or a whole field is heading. Such is the case with three major botanical garden based plant conservation organizations: the Center for Plant Conservation (CPC), Botanic Gardens Conservation International (BGCI) and BGCI US. Within the last few months all three organizations have brought on new

Art of Dale Chihuly, Fairchild Tropical Botanic Garden, BGCI & CPC member

leaders, two of them for the first time in a decade or more. And new leadership frequently stimulates conversations about organizational vision.

I don't know what issues will emerge let alone percolate to the top, or even how similar the three conversations will be. All three organizations are consortia of otherwise independent entities. This means they have the strength of many centers of innovation. On the flip side, such organizations are not necessarily easily governed or given strong direction from a central office.

This confluence of events is particularly interesting to me because I am both a participant in this discussion and an observer. I have been deeply involved in the CPC for over 25 years and have served on the Board of Directors of BGCI US for about five years, and I know both the outgoing and incoming Secretaries General of BGCI.

Sculpture by Fernando Botero at Fairchild TBG

These leadership changes come at an important and possibly pivotal time for the field of off-site or ex situ plant conservation. The Rae Selling Berry Seed Bank was originally established in 1983 as the Berry Botanic Garden Seed Bank for Rare and Endangered Plants of the Pacific Northwest. The Center for Plant Conservation was established in 1985, with about a dozen participating institutions, including the Berry Botanic Garden, as founders; it now has 40 participating institutions. BGCI, established in 1987, now boasts over 800 members in 118 countries, of which 105 are in the USA.

Importantly, during the formative years of these organizations, the major forces seen to be driving the loss of biodiversity were habitat destruction, with its attendant fragmentation and isolation of suitable habitats, and the negative effects of invasive non-native species. Because of the increasing specter of global warming and consequent climate change, and their effects on biodiversity, now is the perfect time to reassess what these major conservation consortia are doing, and how best to fulfill their collective vision.

"The mission of the Center for Plant Conservation is to conserve and restore the imperiled native plants of the United States to secure them from extinction." The previous and longest serving Director of CPC, Dr. Kathryn Kennedy spent the last few years increasing the number of participating institutions of the CPC. The CPC has historically been comprised of 'full service' institutions that undertake a range of ex situ plant conservation activities: collecting seeds of rare and endangered species, storing them for long periods of time and learning how to germinate and grow them, as well as using the material to augment or reintroduce populations in the wild.

Art of Tetsunori Kawana at Denver

One limitation of this model is that rare plants, and therefore the need for these services are not uniformly distributed across the country. In some areas there are multiple participating institutions in close proximity to one another, sometimes differing widely in expertise and other resources. I wonder if we might increase effectiveness if the CPC were to explore a 'division of labor,' where additional, possibly narrowly specialized, organizations or groups could

Botanic Gardens, BGCI & CPC member join CPC's full service institutions, working cooperatively to increase overall capacity. For example, perhaps the CPC might include organizations specializing in long term seed storage, but without the institutional capacity to determine propagation requirements, and vice versa. It might also make sense to include groups such as native plant societies that can monitor wild populations and collect seed, sending it to facilities that would specialize in growing or storing the seed.

One result of the change in leadership, with Dr. John Clark at CPC, and Ms. Kate Sackman at BGCI US, has been a conscious effort to reach out to and understand the various roles of botanical conservation organizations in the USA. In addition to exploring the functions served by their own organizations, they are looking at the Plant Conservation Alliance, American Public Garden Association and the Seeds of Success Program. At the very least, this exercise should identify areas where the groups overlap (not necessarily a bad thing), what important conservation tasks might be falling through the cracks, and how they can jointly work to meet our common goals.

Botanic Garden Conservation International was established in 1987 as a small secretariat under the auspices of the World Conservation Union (IUCN). Dr. Paul Smith has recently taken over the reins as Secretary General of BGCI from Sara Oldfield, who led a very productive decade. Previously, Dr. Smith had worked at the Royal Botanic Gardens, Kew, for eighteen years, fifteen of which were with the Millennium Seed Bank, the last nine as head. He thus brings a long history of working throughout the world, having helped forge many bilateral agreements between Britain and 80 other countries to bank seed of native plants.

Dr. Paul Smith, Secretary General of BGCI, in Taiwan (see Fall 2012 Newsletter)

The BGCI mission is: "To mobilise botanic gardens and engage partners in securing plant diversity for the well-being of people and the planet." Perhaps the greatest achievement of BGCI is to have spearheaded a broad based effort to develop Global Strategy for Plant Conservation (GSPC), which has been adopted by 187 countries under the Convention on Biological Diversity. By adopting the GSPC, the world's governments are committed to "halt the current and continuing loss of plant diversity."

The GSPC consists of five objectives including "Plant diversity is urgently and effectively conserved." Each objective includes a number of more tangible targets. Target 8 is "At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes." The Rae Selling Berry Seed Bank has met this standard for the most critically threatened and endangered species in Oregon, and for many less endangered categories as well. It is worth noting that another objective of the GSPC is "Plant diversity is used in a sustainable and equitable manner." The Strategy thus does not value conservation to the exclusion of human needs, rather sees plant conservation as one ingredient of a healthy planet for the benefit of healthy societies.

By bringing on Ms. Kate Sackman as their new Executive Director, BGCI US has acquired the services of a dedicated conservationist. I have served on the board of BGCI US with Kate for a number of years, and she brings a very sharp mind and an expansive view of how it might become a more effective organization. Not the least might be by finding more and better ways to connect meaningfully with BGCI member gardens and the many

people who visit them. Perhaps her most tangible contribution before coming to BGCI US is Ecomyths, a private non-profit she created, whose mission is to "...empower people to make eco-friendly choices by presenting simple science in entertaining ways." Ecomyths' vision "is that environmental living will become accepted as mainstream and routine--instead of something perceived as extreme or hard. We seek to overcome the overwhelmingly negative messages surrounding environmental issues, which we believe discourage people from taking simple, positive steps that really can help green our world." All three organizations must do a better job of connecting with more people, and Kate's perspective promises to open up avenues not yet explored to achieve that goal.

Garden art at Taipei Botanical Garden, BGCI member

In conclusion, long term success in plant conservation, like effectively addressing the root causes of global climate change, does not hinge solely on the efforts of activists and other directly interested parties. It is largely dependent on public perception and understanding, and, ultimately, societal will to address these environmental challenges. That three major plant conservation organizations have brought in new top leadership in recent months, and have been spurred to deeper discussions within and among themselves by these changes is a real cause for hope.

Go to top

Berry Volunteers Connect

Volunteer Jeremy Brady

Our wonderful volunteers gave over 450 hours of their precious time in 2014--thank you, volunteers!

New volunteer **Jeremy Brady** has been helping by processing seeds, which is a never-ending task for our program. Jeremy writes: "I recently moved to Portland after spending a year in the high desert of Eastern Oregon. A botany internship with the BLM brought me to Vale, Oregon. I was responsible for seed collections and immediately understood the importance of seed saving for conservation efforts. When I heard about the Rae Selling Berry Seed Bank my passion for seeds motivated me to get involved. I enjoy handling and cleaning the seeds at the seed bank." We are glad to have him doing just that!

Here is a short update on past intern Kim Hack, recently employed to work on our database through the **Gilbert and Laurie Meigs Conservation Education Endowed Scholarship**.

After leaving the seed bank in the spring, Kim ventured out to Coeur d'Alene for a seasonal internship with Idaho Fish & Game. As part of the Wolf Team, she collected scat samples, surveyed for tracks, situated wildlife cameras, and used radio telemetry to locate collared wolves. Now as

Past Intern Kim Hack

an intern with the City of Portland's Bureau of Environmental Services, the work is a little less wild, but just as fascinating. She assists with the Northwest Subwatershed planning of the beautiful Willamette River. She find that the Excel skills she learned at the seed bank have helped her be successful in different positions and classes as she finishes up her undergraduate degree in Environmental Science. She will be graduating in the fall!

Go to top

Making a Difference - Private Support

In memoriam,
Robert Passmore Liversidge III

We would like to offer a special thanks to **Ellen Liversidge**, who generously donated to the Seed Bank in memory of her son, Rob.

Robert Passmore Liversidge III had a sense of whimsy, an excellent sense of humor and always gave a dollar to anyone that had his or her hand out. "No overhead this way," he would say.

From his early days in the "Anti-Pollution Club" with his friends in Vermont, to a Cornell degree program in City and Regional Planning, to work on "smart growth" with the EPA, Rob retained a concern for the Earth his whole life.

We deeply appreciate the gift and the loving and mindful spirit in which it is given.

Thank you to all of who have given funds to our conservation program. You ensure that we can continue to secure a future for our native species.

And thank you to our partner agencies for their continued support.

A special thanks to all who donated in 2014: Elisabeth Dally, Elizabeth Farwell, Jean & Ralph Quinsey, Priscilla R Senior, Happy & Marsh Hieronimus, Patricia Schleuning, Margaret & James Eickmann, Candace Fallon, Eastmoreland Garden Club Unit 1, Oregon Roadside Council, Portland Garden Club, Oregon State Federation of Garden Clubs, Raj Sarda, Kay & David Pollack, Karen Wood, Shirley Lutz, Kareen Sturgeon, Audrey Moser, Barbara Manildi, Lorali Reynolds, Janice Dodd, Elizabeth J. Lilley, Jerry Anderson, Patricia Stenaros, Paul Slichter, Sylvia Giustina, Donald Zobel, Janet Dorow, Burton Lazar, Mary Cammann, Jim Sjulin & Gay Greger, Cheryl McCaffrey, Gilbert & Laurie Meigs, Reid Ozaki, Edith Parker, Carol Putnam, Patricia Schleuning, Marna Tallman, Courtney & Anthony Vengarick, Gerard & Rita Van Deene, Joan Horstkotte, Keith Karoly, Esther H G McEvoy, Andrew Rice & Katherine Jeffcott, Kenneth Jay Walters, Yvonne Hajda.

Private gifts and grants make all the difference in the life of our program and assist us in making a difference in our community. You can go directly to our giving page, or for more information on ways to make a gift, please contact Scott Shlaes, Director of Development for Sustainability Initiatives, at 503-725-2998 or shlaes@pdx.edu.

Go to top

Upcoming Events

Faculty Research Brown Bag Seminar Series

Tuesday, April 14, 12:00-1:00pm
PSU, Smith Memorial Student Union 333
Free

"Antarctica's Going Green! Tales of Mossy Mayhem on a Continent that's Warming Up" -- By Dr. Todd Rosenstiel, Director PSU Center for Life in Extreme Environments

Image: Brocken Inaglory

Western Antarctica has been warming faster than anywhere else on planet Earth, and although one mostly thinks of Antarctica as ice-covered, there are some areas of the continent that are remarkably green. A team at PSU, with support from NSF and the Antarctic Chilean Institute, have begun a three-year project to understand the role that mosses play in influencing the terrestrialization of this warming continent. In this brown-bag Dr. Rosenstiel will share some photos, some stories, and some data from the recent expedition along the Western Antarctic Peninsula.

The College of Liberal Arts and Sciences is proud to announce the creation of a faculty research brown bag seminar series. These informal sessions serve as an opportunity for faculty to share their research with colleagues, staff, and students from across the College and the University. The sessions are casual and collegial, allowing for presenter and audience to engage in discussion about the topic.

The brown bags are in a flexible format but most often will occur monthly, across the noon hour, in the College of Liberal Arts and Sciences Dean's Office Conference Room. All are welcome to attend. Attendees are invited to eat their lunch as they participate.

More details about the series>>
About Dr. Rosenstiel>>

Go to top

Earth Day Festival 2015

Wednesday, April 22, 11 a.m-3 p.m.
PSU Park Blocks
Free and open to the public

Join PSU's Environmental Club to celebrate Earth Day 2015 with campus groups and community partners.

Free Food | Clothing Exchange | Craft Market | Live Music

Image: Vmenkov

After the festival, join Sustainability at PSU for a free screening of the film *Growing Cities* followed by a panel discussion with local urban agriculture organizations in Smith Memorial Student Union, room 296, at 5:30 p.m.

More details about the event>>
About *Growing Cities*>>

Go to top

Environmental Protection and Sustainable Development in Cuba

July 6-10, 2015

Image: Eco Cuba Network

You are invited to attend/participate in the Tenth Biannual International Conference on Environmental Protection and Sustainable Development to be held in Havana, Cuba and to join an extended, customized program of meetings and site visits July 3-12.

Possible program highlights:

•City tour of Havana and Old Havana with sustainable urban developer and city historian

•Trek in Ciénaga de Zapata biosphere reserve (the largest wetlands in the Caribbean) or in the Sierra de los Rosarios biosphere reserve in Pinar del Rio province

•Meetings with Cuban environmental scientists and policy makers

•Overview of Cuba's political, economic and social policy and practice, historically and currently

•Site visits according to group interest to sites of interest in the fields of environmental and social sustainable development, including health and education, issues of gender, race and class, environmental research institutes and NGO's, etc

More details about the event>>

About Eco Cuba Network>>

Go to top

Conservation without Borders: Working Across Boundaries to Restore Prairie and Oak Communities

October 26-29, 2015
Courtyard Marriott, 1515 Commerce St, Tacoma

Rare prairie species
Castilleja levisecta

You are invited to attend/participate in the 2015 Conference of the Cascadia Prairie-Oak Partnership. The 2015 Conference will highlight exemplary collaborative work in the CPOP community.

Registration opens April 15.

More details about the event>>

Go to top

The Wide World of Seed Banking

Saving seeds for future use is as old as human civilization and as timely as today's headlines. Our focus has been on rare and endangered species, but the world of seed banking is far more expansive. It probably began with storing seed for next year's crop, and agricultural plants are likely still the most common focus of seed banks around the world. But recent decades have seen an explosion of seed banking of a much wider array of plants for many different purposes. In this section, we seek to provide a glimpse of the wide and wonderful world of seed banks.

In Our Country: The Desert Legume Program

Rosary pea, Abrus precatorius *(Image: Shu Suehiro)*

Abrus precatorius *seeds (Image: Steve Hurst, USDA-NRCS)*

The Desert Legume Program (DELEP) was established in 1988 as a joint project of the University of Arizona College of Agriculture and Life Sciences, and the Boyce Thompson Arboretum. DELEP plays an important role in conserving legume biodiversity. Maintaining biological diversity is a growing concern worldwide as human populations increase and more natural areas are diverted for human use. As development of natural lands continues, it is inevitable that many species may be lost without conservation efforts. Collecting and maintaining seed germplasm is one of the most basic and most important means of preserving species in the face of habitat loss.

DELEP has developed a valuable collection of wild legume species from the southwestern United States and around the world. As of June 2014 this collection included 1374 species totaling 3686 individual collections originating from 64 countries.

Continue reading about the Desert Legume Program>>

Go to top

Lesser honeywort, Cerinthe minor *(Image: Radio Tonreg)*

In the World: Dahlem Seed Bank

Since 1994 seeds have been stored as wild plants in the seed gene bank of the Botanical Gardens Berlin-Dahlem. Our seed bank is the oldest wild plant gene bank in Germany. It currently comprises around 6,000 seed collections from all over the world, many of which are from rare and endangered species. The geographical focus of the collection is Berlin and Brandenburg and the eastern Mediterranean and the Caucasus. This stored seed can be used when necessary for restoration purposes. In addition, it is available for science and research.

As of March 27, the Dahlem Seed Bank now has a new home at the Botanical Garden! The seed bank has been rather unimpressively housed in the rooms of a farmhouse on the Garden grounds and now moves to its own facilities near the Marsh and Aquatic Plants Garden.

Continue reading at the Dahlem Seed Bank site>>

Go to top

Our Mission: Conserve the genetic resources of Oregon's native plants for current and future generations.

Our Vision: The Rae Selling Berry Seed Bank & Plant Conservation Program is the primary off-site conservator of genetic resources of native plants of Oregon, ensuring the survival

of threatened and endangered species and the availability of genetically appropriate seeds for restoring Pacific Northwest ecosystems.

Stay informed on upcoming events and news by regularly visiting the Rae Selling Berry Seed Bank web site.

This e-newsletter is a publication of the Rae Selling Berry Seed Bank & Plant Conservation Program at Portland State University

Portland State UNIVERSITY