OREGON FLORA NEWSLETTER

Volume 7 Number 1 • Oregon State University • February 2001

Lilla Irvin Leach (1886 - 1980)

by Jessica L. Wade

Lilla Irvin Leach was a field botanist who specialized in Oregon flora. She collected plants all over the Northwest, increasing her private collection and furnishing specimens to many colleagues. Her main area of interest was the Siskiyou Mountains. Between 1928 and 1938 she and her husband, John Roy Leach, spent nine summers there. Most often they walked with their two burros, Pansy and Violet, carrying the gear. The local residents called them the "Mule People" and considered them a bit odd.

Lilla was born on March 13, 1886, on a stock farm in Barlow, Oregon, a 640-acre donation land claim settled by her pioneer grandparents. It is said Lilla made her first botany expedition at the age of 6 with the family dog in tow. Throughout her childhood, she wandered the surrounding acreage, both on horseback and on foot, nurturing her interest in plants. She attended grade school in Barlow and Aurora before entering Tualatin Academy, a preparatory school in Forest Grove. At the Academy she took her first formal botany class and met John Leach. She received a B.A. from the University of Oregon in 1908 where she studied under Professor A. R. Sweetser who considered her his ". . . most distinguished student."

For the next 5 years, she taught science and botany at Eugene High School, and was responsible for establishing a botany department in the Eugene public school system. Lilla and John were married in a meadow, on the Irvin

See Leach, page 2

Lilla Leach collecting Damasonium californicum *near Burns, June, 1927. Courtesy of Oregon Historical Society. Lot 370-523.*

Challenge drive boosts Flora project!

by Scott Sundberg

The Oregon Flora Project Challenge donation drive was a huge success! From mid-October to the end of December, we solicited donations to match an anonymous donor's generous offer to match, dollar for dollar, up to $10,000 in new donations received by the Flora project [see OFN 6(3)]. Response to the Challenge was overwhelming, and by mid-November the goal had been met. The donor, who was

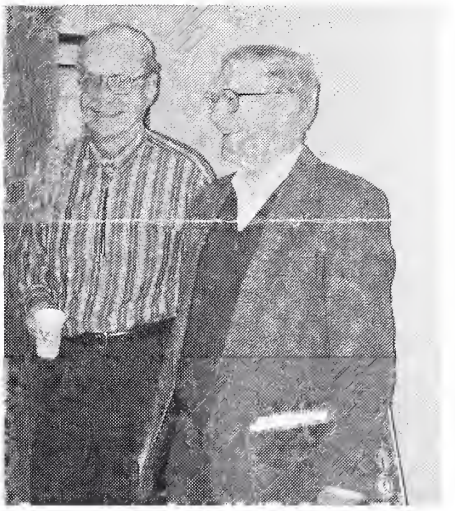

Photo: Aaron Liston

Ken Chambers and Wilbur Bluhm at the Challenge celebration, January 31, 2001

impressed by the public's support of the project, responded by doubling the offer to $20,000! Momentum of the drive continued and by its end $26,879 in donations were received, bringing total support to $46,879!

Thank you, anonymous donor, for your substantial donation and for making the Challenge possible! We are also extremely grateful to 231 individuals and couples, and a variety of clubs and organizations, including several Native Plant Society of Oregon chapters, for their support. Friends of the Oregon Flora Project members Linda Hardison, Michael Hartman, Keli Kuykendall, Rhoda Love and Esther Gruber McEvoy worked hard on the Challenge. Maya Abels (OSU Foundation) and Stella Coakley (Dept. of Botany and Plant Pathology) provided invaluable advice.

Funds received during the Challenge drive are already paying salaries for three part time staff members. The Flora project is charged up with renewed energy and enthusiasm, thanks in part to the success of the Challenge drive. Thanks!

Leach, continued from front page

property, September 13, 1913. The alter was a moss-covered tree stump. John said he finally convinced Lilla to marry him by promising to take her places the "cake-eating botanists" could never go. Lilla was not directly affiliated with a university nor did she receive monetary compensation for any of her botanical work. She and John worked as a team, organizing and paying for their own expeditions. Louis F. Henderson, Curator of the University of Oregon Herbarium, and Morton E. Peck of Willamette University described and named most of her discoveries.

On their first trip to the Siskiyous, they started down the Rogue River Trail, then struck off into the wilderness. There Lilla discovered *Cotyledon glandulifera*, *Cryptantha fragilis*, *Iris innominata*, and *Bensonia oregana*, her first new genus. She also picked up what she described as a very interesting pea vine, but was unable to find its seed pods. They returned to this area the following year to look for pods without results. Ten years later, June 16, 1938, they again returned and this time succeeded. The plant was named *Sophora leachiana*, the only member of its genus found on the Pacific coast.

Lilla did not keep a journal, but made personal notes in the margins of her pressing papers that reveal a woman with unshakable fortitude, a deep love of natural beauty, and a wry wit: "August 11, 1928. Pansy went over a grade and rolled about 40 feet over and over landing at the brink of a 60-foot creek bank against a log and small log on top of her. I was a few minutes getting her unpacked as her heels were up and all knots down. She began to eat as soon as she was on her feet." And: "June 25, 1930. A few nights ago we slept on a grave. Last night at the home of a crazy man. We liked the dead man better."

Lilla discovered *Kalmiopsis leachiana*, on June 14, 1930. She describes the incident this way, "I was in the lead where I usually walk in order to get the first chance over the burros to anything of interest that might be growing when suddenly I beheld a small patch of beautiful low-growing deep rose colored plants and because of its beauty I started running toward it and dropped to my knees . . . I had never seen anything so beautiful before." She sent a specimen to Louis Henderson who published it as a new species, *Rhododendron leachianum*, in 1931. He also sent a specimen to Alfred Rehder at the Arnold Arboretum of Harvard University. Rehder recognized it as a new genus and, in 1932, the plant was republished as *Kalmiopsis leachiana*. Lilla considered it her best find, "the thrill of a botanists lifetime."

The Leaches bought a piece of land along Johnson Creek in southeast Portland in 1931 and built a home. They named the property Sleepy Hollow, and turned the surrounding hillside into a botanical garden where they welcomed anyone interested in plants. The property was willed to the City of Portland and is now known as Leach Botanical Garden. Lilla's herbarium of approximately 3,000 specimens was donated to the University of Oregon. Her sheets are now part of the OSU collection. On October 3, 1992, in honor of their wish, the cremated remains of Lilla and John Leach were scattered in the Kalmiopsis Wilderness.

Challenge celebration (left to right): Linda Hardison, Charlene Simpson, Ken Chambers, Peter McEvoy and Bert Brehm. Photo by Aaron Liston.

Illustrations of *Erythronium oregonum* on the front and back covers by Linda Ann Vorobik.

The Oregon Flora Newsletter is published three times a year by the Oregon Flora Project and the Oregon State University Herbarium. The Editor is Rhoda Love.

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New and old lip-ferns of Oregon

by Kenton L. Chambers

Do ferns hybridize? One might as well ask, "Is the Pope Catholic?" Ferns are notorious for their propensity to develop "hybrid complexes," in which species cross-fertilize in multiple combinations and the hybrids establish true-breeding sexual or asexual populations. Known examples in Oregon's flora include *Polystichum* (sword-fern, holly-fern), in which *P. californicum*, *P. kruckebergii*, and *P. scopulinum* are polyploid species of hybrid origin, and *Polypodium* (polypody), with *P. hesperium* representing a similarly fertile polyploid hybrid. Other Oregon ferns that may be involved in hybrid complexes include species of *Asplenium*, *Cystopteris*, *Dryopteris*, *Gymnocarpium*, and *Woodsia*.

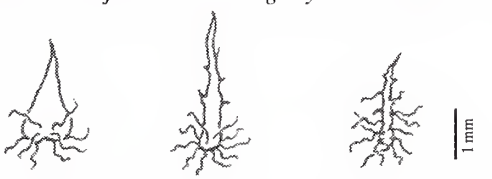
The fact that particular species of ferns have originated through hybridization is usually not mentioned in standard floristic references, but an outstanding exception is the recently published *Flora of North America*, Volume 2 (1993). In this volume, which covers North American pteridophytes and gymnosperms, there are charts showing species' relationships within many genera, citing numerous hybrids which may be sterile, sexually fertile, or fertile by asexual means.

Species of the genus *Cheilanthes* are called "lip-ferns" because the margins of the leaflets roll over and cover the spore-cases like lips covering a mouthful of teeth. *Flora of the Pacific Northwest* mentions two Oregon species, *C. feei* Moore (Fee's lip-fern) and *C. gracillima* D. C. Eaton (lace lip-fern). The former reaches the state only in Wallowa County, while the latter occurs commonly in rocky sites throughout the Cascade Range and Siskiyous, as well as disjunctly in the Wallowas. In Peck's *Manual of the Higher Plants of Oregon* a third species, *C. intertexta* (Maxon) Maxon (coastal lip-fern), is cited from the "Siskiyou Mtns." southward to California. However, the only recorded sighting of *C. intertexta* in Oregon is a 1930s collection by F. H. Heckner from "lava country east of Brownsboro, Jackson Co.," a site in the south Cascade Range, not the Siskiyous. The species has long been listed (e.g. ONHP List 2) as rare in Oregon but stable elsewhere.

Cheilanthes gracillima *showing undersurface of leaf. Drawing by Jeanne R. Janish from Hitchcock et al. 1969,* Vascular Plants of the Pacific Northwest, *courtesy of University of Washington Press.*

In June of last year, Richard Brock made a collection of *Cheilanthes* on Heppsie Mountain, east of Brownsboro, which resembled *C. intertexta* and therefore might comprise the second known occurrence of this species in Oregon. However, when I studied this specimen at Richard's request, I came to the surprising conclusion that it is not *C. intertexta* after all, but rather the closely related taxon *C. covillei* Maxon! This species is best known from desert regions of Arizona and southern California, but according to *The Jepson Manual—Higher Plants of California*, it extends northward to the Sierra Nevada and North Coast Range in California. Its key differences from *C. intertexta* are the shape and degree of dissection of the tiny scales covering the underside of the leaflets. As shown in the accompanying drawings, the scales of *C. covillei* are ovate, hairy at the base, and overlapped to form a continuous cover

Cheilanthes *leaf scales. Drawings by K.L. Chambers.*



C. covillei C. intertexta C. gracillima

over the spore-cases. In *C. intertexta* the scales are much narrower and irregular in shape, with hairs on the base and margins. *Cheilanthes gracillima* is closely related to these two species, but it has matted hairs and narrow scales among the spore-cases, and its leaves are only twice-pinnate rather than three times divided.

The final piece of the lip-fern puzzle in Jackson County came into place recently, when Richard Callagan showed me a collection of *Cheilanthes* he had made in 1998, on rock outcrops in the Little Butte Creek region south of Heppsie Mountain. His plants represent *C. intertexta* and are similar to the 1930s collection by F. H. Heckner from "east of Brownsboro."

To return to the theme of hybridization with which I began this article, *C. gracillima*, *C. covillei*, and *C. intertexta*—the three lip-ferns now known to occur in eastern Jackson County—comprise a unique "hybrid complex." According to *Flora of North America* and other references, *C. intertexta* evolved as a fertile polyploid hybrid from the cross of *C. gracillima* times *C. covillei*. Like many other hybrid fern species, *C. intertexta* has an ancient origin and behaves like an independent entity, able to grow alongside its parental species and remain genetically isolated from them (although sterile offspring sometimes are produced from back-crossing with *C. gracillima*). Future field studies in the southern Cascades of Oregon might uncover sites where two or more of these lip-fern taxa grow together, possibly with back-cross hybridization adding to the morphological complexity of the group.

Thanks

The Oregon Flora Project is grateful for strong financial support and increased volunteer participation over the past several months. The 2000 Challenge Drive led the way to a large increase in contributions.

Letters and notes were included with some donations. One donation was given in the names of Mike and Nancy Fahey, Russ Jolley, and Debbie Fahey as Christmas and birthday gifts. Other donations were in memory of Karl Urban, Leighton Ho, and Irving Lord. One donor wrote, "I am a Duck. Please do not send any Beaver publications (but I hope they beat Notre Dame)."

We are grateful to the Mountaineers Foundation (of Seattle) for a grant in support of a checklist of Oregon trees. We also thank the JenBeek Foundation, the Native Plant Society of Oregon, NPSO Blue Mountain, Cheahmill, Corvallis, Emerald , Klamath Basin, Mid Columbia, Portland, Umpqua Valley, and William Cusick chapters, and to Willamette Industries Inc. Western Timber and Logging, which have recently made significant contributions to the project.

Thanks to editors and reporters for the *Oregon Stater Magazine* and the newsletter *Posies and Pathogens* for recently publicizing the Oregon Flora Project. Special thanks to Judy Oliver and Barbara Halliday, who recently organized volunteer work parties in the herbarium.

Many thanks to the following donors who have recently contributed via the OSU Foundation or the NPSO Friends: Norma Alberthal, Michael Albrecht, EmmyLou Allen, Debra Anker, Alex B. Atkins, Betty E. Bahn, Gail Baker & Clay Gautier, Mary Barkworth, Constance Battaile, Julian Battaile, Dorothy Beardsley, Wilbur & Mary Bluhm, Dallas Boge, Dick Brainerd & Manuela Huso, Bert Brehm, Richard Brock, Steven Broich, Paula Brooks, Howard Bruner, Clair Button, Richard Callagan, Mary L. Cammann, Sylvia Campbell (gifts in the names of Mike, Nancy and Debbie Fahey, Russ Jolley), Kenton L. & Henrietta Chambers, Stephanie Changaris, Nancy J. Chapman, Al Chase, Elizabeth Churchill, Deborah Clark, Carol Clayton, Rebecca Dimling Cochran, Glen Cole, James Conklin, Barbara Cowan, Melica Cramer, Nancy Crocker, Alan Curtis, Michael & Jannice Cutler, Robyn Darbyshire, John R. & Mary I. Davis.

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Thanks also to the following, who have helped by volunteering, sending in species lists or specimens, or providing information on Oregon plants: Maya Abels, Karl Anderson, Clay Anticau, Mariana Bornholdt, Richard Brock, Bob Budesa, Richard Callagan, Stella Coakley, Susan D'Alcamo, Dave Dobak, Jean Findley, Ann Fong, Tom Gatti, Barbara Halliday, Glenn Halliday, Joe Hanus, Don Heinze, Noel Holmgren, Mart Hughes, Jeanne Klein, Barbara Long, Tom Meehan, Ed Meyers, Holly Nielsen, Bob Oliver, Judy Oliver, Sherry Pittam, Mark Quistad, James Reveal, Ward Richter, Cindy Roché, Bruce Ryan, George Schoppert, Hariet Schoppert, Paul Slichter, John Syring, Jessica Wade, Laura White, Jo Yeager, Walt Yungen, and Steve Ziemak.

Rupert C. Barneby (1911-2000)

by Aaron Liston

Rupert C. Barneby, one of the most accomplished taxonomists of the 20th century, died at the age of 89 on December 5, 2000, after a short illness. Barneby, of the New York Botanical Garden, was incredibly productive, describing 1,160 plant species new to science, and publishing over 6,500 pages. He was famous for his lucid prose, meticulous descriptions, and insightful observations into the origins and relationships of species. Barneby's taxonomic treatments were rich in detail, and one learned more upon every reading. Most of Barneby's effort was focused on the plant family Fabaceae, and his monographs of *Astragalus*, *Oxytropis*, *Dalea* and several important Mimosoid and Caesalpinoid genera are unrivaled. In addition to his monographic work, Barneby made a major contribution to North American floristics in his Fabaceae treatment for the *Intermountain Flora* (Volume 3B, 1989).

I met Rupert Barneby in August 1986. I had a budding interest in the genus *Astragalus*, and was eager to meet the man who wrote the magnificent "Atlas of North American *Astragalus*." We had a lengthy discussion, and he suggested a group of annual species, *Astragalus* subsect. *Californici*, as an object of study. I followed up on his suggestion, and ultimately conducted my PhD research on this group. We continued to correspond after our initial meeting, but I regret that we did not meet again. I was thus surprised and honored when he wrote me last year, asking if I would accept his *Astragalus* and *Oxytropis* books. Seven boxes of books arrived soon after his death, and have been placed in the OSU Herbarium Library. The books and reprints will be a valuable resources for students and researchers studying these genera and will serve as an inspirational reminder of Rupert Barneby's immense contributions to systematic botany.

www.oregonflora.org

The Oregon Flora Project now has its own Internet address! We have recently moved from the OSU herbarium web site. The site has been redesigned and has several new features, including an online version of the **Asteraceae checklist**. Check it out!

Louis F. Henderson (1853-1942)
The grand old man of Northwest botany
by Rhoda Love [Occ. Paper No. 2, NPSO, 2001]

review by Scott Sundberg

Louis F. Henderson was one of few early Pacific Northwest botanists who collected and described plants throughout Oregon, Washington, and Idaho. He essentially had three careers, as a high school teacher and principal in Portland, Oregon, as a professor at the University of Idaho in Moscow, and late in life as Curator of the University of Oregon Herbarium in Eugene.

Rhoda Love has given us a glimpse into the many fascinating facets of Henderson's life in a clear, readable style. Numerous quotes and anecdotes accent this account of his personal and professional lives. One of my favorites describes his swimming across the Columbia River nine days before his 70th birthday! Dr. Love's interest in Henderson began in the mid-1960s. For the past several years she has painstakingly researched his life by poring over voluminous written archives and plant specimens, visiting many places where Henderson had lived, and interviewing family members.

Henderson's memory is now alive at the OSU Herbarium, where most of his specimens have resided since 1993, when UO Herbarium was closed and the specimens moved to Corvallis. His distinctive handwriting can be seen on thousands of specimens he and his student assistants collected. They are a delight to study, as Henderson often wrote notes concerning aberrant characteristics of the plants as well as their uses by Native Americans.

The 64-pageHenderson biography is enriched by 54 figures, including photographs of numerous letters, people important to Henderson, work places, and plant specimens. It is organized into sections, with a 32-page narrative on his life, an astonishing set of 133 notes, a life chronology, his publications, and a list of plants named for Henderson. A full page of acknowledgments attests to the thoroughness of Dr. Love's research on "one of the most remarkable of the early resident botanists of the Pacific Northwest."

To order a copy send a $10 check or money order made out to NPSO to: Occasional Papers, Native Plant Society of Oregon, PO Box 902, Eugene, Oregon, USA 97440-0902.

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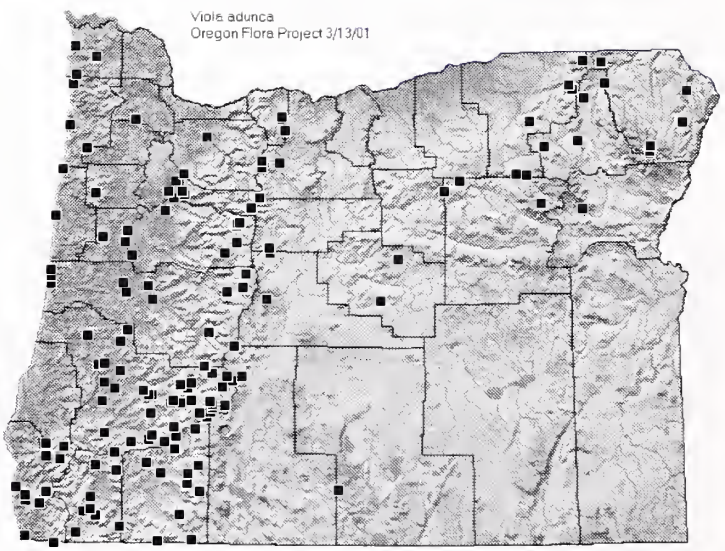
Did you know?

• In the photo on page 1, Lilla Leach is shown collecting fringed waterplantain, *Damasonium californicum* in Harney County, June, 1927. In the OSU Herbarium one can view what is most certainly this collection. The sheet, in Family Alismataceae, bears the Leach number *1046*.

• Collector Louis F. Henderson is known to have been traveling with the Leaches that summer. He too made a collection of *D. californicum,* probably at the same time. Henderson felt the specimens had narrower leaves and larger flowers than those typical of the species and in 1930 proposed a new varietal name, *D. californicum* var. *biddlei,* in memory of his friend, Henry J. Biddle (*Rhodora 32: 21).* The herbarium sheet, *Henderson 8256* from Burns, June 23, 1927, is filed at OSU with the type specimens; however, the variety is not accepted today.



Oregon distribution of hooked spur violet (*Viola adunca*)

This map of the Oregon distribution of V. adunca *was requested by U.S. Fish and Wildlife Service staff. They are updating the Recovery Plan for the endangered Oregon silverspot butterfly, whose caterpillar stage feeds only on violets in native grasslands along the coast. The map will eventually be enhanced with hundreds of additional records and varieties may be recognized within the species.*

OREGON FLORA NEWSLETTER

Volume 7 Number 2 • Oregon State University • June 2001

Bruce Newhouse, President of the Native Plant Society of Oregon

by Rhoda Love

"I love native plants," confessed Bruce Newhouse in a recent interview, "and am very, very lucky that my vocation and avocation are one and the same."

Bruce Newhouse, President of the Native Plant Society of Oregon and co-founder of the environmental consulting partnership, Salix Associates, was born in Oregon City and grew up in Lake Oswego. He credits his mother's wildflower garden as well as fly-fishing trips with his father to the Clackamas River with originally awakening his interest in native plants. Later, as a teen, he hiked in the Mount Hood National Forest, developing a deep attraction for nature. "I learned all the Cascade trees and wildflowers on my own," he says.

Bruce is a graduate of Oregon State University where he studied forestry and landscape architecture, taking his BS degree in 1977 in environmental science. After college he first worked with the Multnomah County Outdoor School and later as a land use planner in Grants Pass, Josephine County. Bruce then moved on to city planning in Springfield, leaving that post to become part of a team which surveyed vegetation on all 1500 miles of Lane County roadsides in 1989. In the early 90s Bruce co-founded a consulting firm, Salix Associates, with partners Dick Brainerd and Peter Zika. The group undertakes various projects such as vegetation mapping and wildlife

See Newhouse, page 8

Photo: Bruce Newhouse

Bruce Newhouse up close and personal with a delphinium.

Don't give up groundsmoking

by Kenton L. Chambers

When a plant has such an unusual common name as "groundsmoke," it is hard to resist a punning title for an article dealing with the genus *Gayophytum* of family Onagraceae. Although this genus has only six species in Oregon, its morphological complexity and the difficulty of drawing clear lines between its species might indeed cause a person to "give up" trying to identify them. My reply to such a complaint would be that yes, it's a complex little genus, but the fun of studying it is in learning the biological basis of its taxonomic difficulties. Fortunately, the biology of groundsmoke is well explained in an excellent taxonomic revision written by Harlan Lewis and Jerzy Szweykowski way back in 1964 [The genus *Gayophytum* (Onagraceae). *Brittonia* 16: 343-391]. I had the pleasure of accompanying Dr. Lewis on a collecting trip in central Oregon in 1962, so I learned the secrets of *Gayophytum* at the master's knee, as it were. Recently I prepared a treatment for the Oregon Vascular Plant Checklist, reacquainting myself with groundsmoke by studying and annotating the several hundred *Gayophytum* specimens in the herbarium at Oregon State University.

In Oregon, *Gayophytum* occurs almost entirely from the crest of the Cascades eastward; its species are common in dry shrublands, rangelands, and open forests of juniper, ponderosa-pine and grand-fir. It reaches high elevations on certain Cascade peaks, on Steens Mountain, and in the Wallowa Mountains, however. Closely allied genera of Onagraceae include *Camissonia* and *Oenothera*, and this relationship helps to explain one of the peculiarities of *Gayophytum*'s biology — a chromosomal feature called 'structural heterozygosity," which occurs also in these related genera. Two other processes, polyploidy and hybridization, complicate the biological relationships within *Gayophytum*, as they do in many other genera of flowering plants. To assist this discussion, I have reproduced here a modified version of Lewis and Szweykowski's chart of species relationships, (fig. 3, p. 11) on which a horizontal line separates six ancestral diploid species, below, from two derived tetraploid species. The diploids occurring in Oregon are *G. humile*, *G. decipiens*, *G. ramosissimum*, and *G. heterozygum.* Our tetraploid taxa are *G. racemosum* and *G. diffusum*, the latter having two subspecies that completely overlap geographically and differ mainly in

See Gayophytum, *page 10*

The Oregon Book

by Rhoda Love

The Oregon Book: Information from A to Z, will make a wonderful addition to your shelf of reference works about our state. I plan to put my copy right beside McArthur's *Oregon Place Names*, the latest edition of the *Oregon Blue Book,* and the *Oregon Atlas & Gazetteer.* Author Connie Hopkins Battaile, a reference librarian, has done a splendid job of filling the volume's 677 pages with juicy tidbits about our state. As she writes in her introduction, "*The Oregon Book* is designed to be used for the quick look-up of some bit of information, to answer questions such as, When was the Roseburg explosion?, or What is Measure 5?" I tested it by looking up some of my favorite topics and found short but accurate entries on such subjects as the Applegate Trail, boysenberries, camas, Fort Clatsop, Nez Perce Indians, Rogue River, whales, and Zumwalt Prairie. The volume includes an impressive 32-page bibliography. The Oregon Flora Project is grateful to Connie Bataille for making her work available to our contributors. For information on how to obtain a copy, contact Linda Hardison at (541)745-5770 or hardisol@bcc.orst .edu.

The Oregon Flora Newsletter is published three times a year by the Oregon Flora Project and the Oregon State University Herbarium. The Editor is Rhoda Love and the Production Assistant is Miko Nadel.

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Newhouse, continued from front page

habitat assessments. Bruce says, "During the years we worked together, Peter Zika was a tremendous influence in sparking my interest in botany. Peter recently moved to Seattle, so now Salix Associates is just Dick and I. Dick is the best business associate and friend anyone could possibly hope for."

Bruce lives in Eugene with his partner Peg and their cat, Squeak. He is extremely active in environmental organizations in Lane County. He has been on the Emerald Chapter NPSO board for nine years and has spearheaded that chapter's Native Gardening Policy. He is a member of the Native Gardening Awareness Committee, and has coordinated the chapter's Invasive Ornamentals List. He is also a member of Emerald Chapter's Lane County Vascular Plant Checklist Project, and the chapter's Rare and Endangered Plants Committee.

Outside NPSO, Bruce was one of the founders of the Cascade Mycological Society, and a founding member of Friends of Eugene Springfield Habitats (FRESH). He is Board President of Willamette Resources and Educational Network (WREN), and a member of Friends of Buford Park and Mt. Pisgah Stewardship Advisory Committee. He is also a founder of the Eugene-Springfield Chapter of the North American Butterfly Association. Earlier this year Bruce received a well-deserved Lane Council of Governments Regional Award of Merit for Environmental Protection.

As President of the Native Plant Society of Oregon, Bruce takes every possible opportunity to support the Oregon Flora Project. He also works directly with the Flora Project as an Atlas Project Leader and contributor of numerous high quality plant lists. He was also a founding member of the Carex Working Group which produced the *Atlas of Oregon Carex.* Of the importance of the Oregon Flora Project Bruce states, "A new *Flora of Oregon* will be a monumental achievement — an immensely valuable tool for botanists. Beyond that, the new *Flora* will also spark the interest of gardeners, flower lovers and the general public in Oregon's plant communities, spurring them to join in protection efforts to save the last remnants of our native ecosystems."

Lincoln Constance (1909-2001)

by Rhoda Love

From Berkeley comes the sad news that Lincoln Constance died June 11 of pneumonia at the age of 92. Dr. Constance has been described as "the patriarch of botany at Berkeley," and is recognized as the foremost expert on the systematics of the Apiaceae. Constance began his career in botany in Oregon, growing up in Eugene and attending the University of Oregon in the late 20s and early 30s where he studied under Louis F. Henderson. Constance has called Henderson "my mentor and role model." (*Aliso* 12(1), 1988.) Ken Chambers remembers Dr. Constance as a helpful colleague who "for many years was our main source of expertise on questions of identification and taxonomy for the carrot family (Apiaceae)." Ken recalls how Constance "generously shared his knowledge of the family and helped numerous students to describe and publish newly discovered species from Oregon and other western states."

Giant hogweed found in Oregon!

By Charlene Simpson

A few months ago Oregon Department of Agriculture Noxious Weed Control staff members Glenn Miller and Tom Forney identified a 20 by 30 foot patch of the noxious weed, giant hogweed (*Heracleum mantegazzianum* Somm. & Lev.) growing behind a grocery store in Oakridge. The ODA subsequently publicized the find and asked people to report populations. They received over 140 responses and in all learned of about 45 infestations in Clackamas, Columbia, Lane, Marion, Multnomah, and Washington counties of western Oregon. The majority of sightings were from the Portland metropolitan area.

Giant hogweed resembles its congener, *Heracleum lanatum,* cow parsnip, but is easily differentiated by its herculean proportions. Hollow stout stems, 2 to 4 inches in diameter, displaying dark reddish-purple spots and pustulate bristles support a compound umbel up to 2.5 feet in diameter bearing numerous white flowers. Giant hogweed blooms from mid-June to mid-July on a stem reaching a height of 10 to 15 feet. Purplish leaf stocks support deeply incised compound leaves 3 to 5 feet wide.

This monster member of the carrot family (Apiaceae) is a particularly nasty pest. Like other members of its genus, its sap contains a glucoside that causes phyto-photo-dermatitis. Skin contact with the sap, followed by exposure to the sun, produces painful, blisters in susceptible people. The plant is classified as a class A noxious weed in Oregon and Washington. In our state this indicates that infestations are at present small enough to make eradication possible and intensive control is recommended.

If you see giant hogweed anywhere in Oregon contact the Oregon Noxious Weed Control Program at 1-503-986-4621 or call the invader hotline number 1-866-INVADER to report the site. Also send a note to Scott Sundberg (address on p. 8), for Oregon Flora Project records.

Reference: Cindy Roché. *Weeds*, Pacific Northwest Extension Publication, PNW429: December 1992.

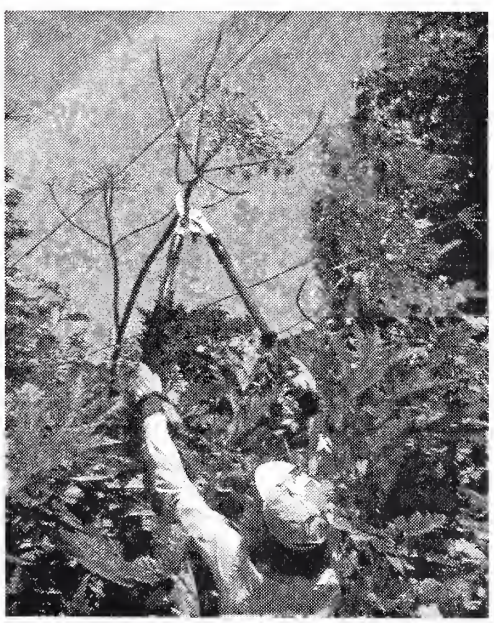


Photo: Charlene Simpson

Botanist collecting an umbel of giant hogweed in Eugene.

Photo: Keith and Barbro McCree

Giant hogweed can grow to fifteen feet tall.

The new Gilkey and Dennis is out!

by Rhoda Love

The eagerly-awaited and completely updated *Handbook of Northwestern Plants* by Helen M. Gilkey (1886-1972) and La Rea J. Dennis was released by OSU Press in May. I am very impressed with the handsome new edition, which has been fully revised by La Rea Dennis Johnston, who has added twenty-one new families, updated nomenclature, and revised keys and descriptions.

The book's organization retains the original order of the major plant groups, beginning with vascular cryptogams followed by gymnosperms, then monocots, and finally dicots. The key to dicot families, with its 142 pairs of leads, could benefit from having subtitles for major divisions. However, a welcome change is that genera and species are now treated alphabetically within families. Happily, the comprehensive index includes all families, genera, species, common names, and synonyms. A separate index to families is included on page six, although some users may have preferred to find this inside the front cover.

The new *Handbook*, which comes in paperback only, has been enlarged to a 9 X 6 inch format with a lovely cover photo of Washington lily. This fine new version of a well-loved book will be a splendid addition to our collections of Northwest floras.

Handbook of Northwest Plants by Gilkey and Dennis, OSU Press, June 2001. Line drawings, glossary, index. ISBN 0-87071-490-2. Paperback, $29.95.

Gayophytum, continued from front page

flower size. Two additional diploids, *G. oligospermum* and *G. eriospermum*, are found in the Sierra Nevadas.

All gayophytums are annual plants whose inconspicuous white or pink flowers are usually less than 8 mm across. The name 'groundsmoke' comes from their highly branched growth form, best expressed in *G. ramosissimum* with branching repeated at almost every node throughout the plant. Subtle differences in branching pattern among the other species turn out to be important in their classification, however. For example, in *G. humile* the branches arise mostly at the lower nodes of the main stem, not higher up as in *G. ramosissimum*; and in *G. decipiens*, basal branching is combined with rather scattered branching at the upper nodes. That is, many intermediate nodes produce a leaf, flower, and fruit, but not a branch. Fruit structure is also critical in differentiating among species of *Gayophytum*; therefore, botanical collectors should avoid sampling young plants (those with flowers but no fruits) or weakling individuals that don't have a well-developed branching pattern. A key to the Oregon species, on the facing page, is drawn mainly from the work of Lewis and Szweykowski.

Figure 1: Gayophytum diffusum, *showing branching habit and enlarged view of a flower. Placement of the stigma close to the stamens ensures self-pollination. Illustration by Jeanne R. Janish from Hitchcock et al. 1969,* Vascular Plants of the Pacific Northwest, part 3, *courtesy of University of Washington Press.*

As mentioned above, I believe that the real interest of *Gayophytum* lies in its biological complexity. Consider, first, *G. heterozygum*, which is common on the east flank of the Cascade Range in Oregon, extending north to Washington and south through the Sierra Nevada to the mountains of southern California. This species is self-pollinating and of hybrid origin, the parents being two distinctive diploid species of the Sierra Nevada in California. Its 14 chromosomes do not form the normal 7 pairs in the meiotic cell divisions leading to pollen and eggs; instead they attach end-to-end in a continuous chain or ring. Alternating members of this 14-chromosome ring disjoin and move into the two meiotic "daughter cells," in both the anthers and the ovules. However, in the anthers, one of the two sets-of-7-chromosomes carries genes that are lethal to developing pollen cells. Therefore, half of the pollen cells die, while the other half carries the set-of-7-chromosomes that lacks the pollen-killing genes. A stained preparation of pollen, examined under a microscope, clearly shows that half of the pollen grains have viable cytoplasm, and half are nothing but an empty cell-wall. Amazingly, in the ovules of all these same plants, the set-of-7-chromosomes that killed pollen is viable, while the set-of-7 that was viable in the pollen has genes lethal to the ovule! Half of the ovules in each ovary shrivel and die. The two kinds of lethal genes balance each other, in other words. After the plant self-pollinates, every offspring seed inherits one set-of-7-chromosomes from the pollen side and inherits the other set-of-7 from the parental egg cell. This restores the base number of 14 and also restores the chromosomal "structural heterozygosity" causing a ring-of-14 to form during meiosis. Evidently, all the members of this species are genetically almost identical; except for minor mutations, the plants are essentially a genetic clone throughout the species' wide geographical range!

The genetic peculiarities described above would be considered remarkable, were they not already well known in the related genus *Oenothera*. The example of *Gayophytum heterozygum* has an exact parallel in the chromosomal behavior of a group of *Oenothera* species centered on *Oe. biennis*, which has been an object of study by plant geneticists for nearly a century. One might ask how any plant species could propagate successfully if half of its pollen grains are inviable due to so-called lethal genes. In both *Gayophytum* and *Oenothera*, however, the self-pollinating floral morphology guarantees that enough pollen reaches the stigma to fertilize all the available ovules. *Oenothera* also has an abundance of ovules in each ovary, so the death of a certain percentage of them is not very significant. *Gayophytum heterozygum* capsules have only 20 or fewer ovules, however, and the loss of up to half of them causes irregular gaps in the otherwise uniform linear row of seeds in each fruit. The accompanying illustrations (fig. 2) show how its fruits differ from those of the parental taxa *G. eriospermum* and *G. oligospermum*. In Oregon, the irregularly beaded appearance of the fruits of *G. heterozygum* is the main distinction between it and the very common tetraploid species *G. diffusum*, because floral and branching characteristics are otherwise similar in the two taxa. Vigorous plants of *G. heterozygum* form large numbers of fruits and seeds, leading to successful reproduction despite the death of a goodly fraction of their ovules.

The chart of species relationships in *Gayophytum* (fig. 3) suggests a complex origin for the tetraploid species *G. diffusum*, derived from multiple crosses (interspecific hybridizations)

between four diploid taxa. The initial tetraploid hybrids must have blended their genes by further crossing, to give present-day *G. diffusum*, which is the most variable and widespread species of the genus. In Oregon this species is sometimes as highly branched as *G. ramosissimum* (one of the postulated diploid parents), but it has longer fruits borne on relatively shorter pedicels than in that taxon. Plants of *G. diffusum* (fig. 1) are usually branched at every node or every other node in the middle and upper parts of the main stem. In this respect they differ from the other tetraploid species *G. racemosum*, which branches mainly from the lower nodes (as does its diploid parent, *G. humile*). Some races of *G. diffusum* have inherited genes for larger flower size (petals 3-7 mm long) from the diploid parental taxon *G. eriospermum*. These forms of *G. diffusum* are given the name ssp. *diffusum*, whereas the races with petals shorter than 3 mm are named ssp. *parviflorum*. The fruits of *G. diffusum* always have a full complement of seeds (arranged in two parallel rows or alternating, right and left, in one row), which differentiates this species from *G. heterozygum*, with its irregularly beaded fruits. Where *G. diffusum* occurs at high elevations, as on Steens Mountain, it is often dwarfed and not much branched, making identification difficult. *Gayophytum humile* is often found at higher elevations, as well, but its fruits are quite different from *G. diffusum*, as explained in the key to species, below.

I hope that this article will encourage readers not to "give up" on groundsmoke species, but to collect specimens in proper condition for identification, as well as to appreciate the genetic complexity of this small but interesting genus.

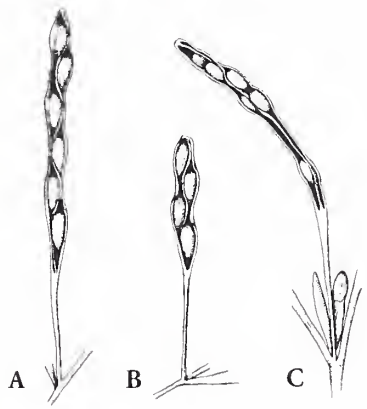


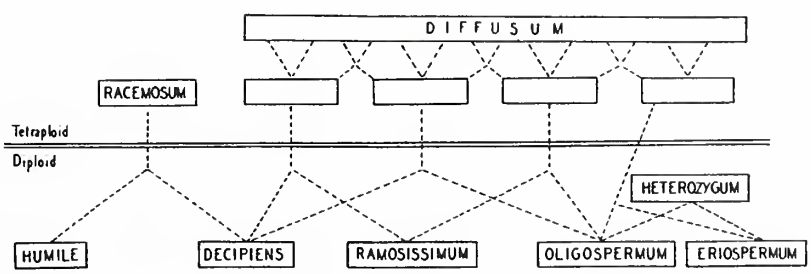
Figure 2: Cut-away drawings of fruits of (A) Gayophytum eriospermum, *(B)* G. oligospermum, *and the hybrid-derived species (C)* G. heterozygum. *Illustrations from* Brittonia, *vol. 16, courtesy of New York Botanical Garden.*

Key To Oregon Species of Gayophytum

created by Kenton L. Chambers

1. Petals 3-7 mm long..... *G. diffusum* ssp. *diffusum*
1. Petals 0.5-3 mm long.
   2. Plants branched mostly near the base of the main stem, the branches forming elongated flowering racemes; fruits very short-pedicelled, 15-50-seeded.
      3. Lateral 2 valves of capsule remaining attached; seeds spreading at a 45 degree angle from the placenta..... *G. humile*
      3. All four valves of capsule separating from the tip; seeds less angled, nearly parallel to the placenta..... *G. racemosum*
   2. Plants branched throughout or mainly at nodes well above the base of the main stem; fruiting pedicels often over 3 mm long, or if shorter, then fruits less than 25-seeded.
      4. Seeds ca. 50% aborted; capsules irregularly bumpy (beaded)..... *G. heterozygum*
      4. Seeds all maturing; capsules smooth or evenly bumpy.
         5. Seeds in the two chambers of the capsule crowded and overlapping.
            6. Pedicel longer than capsule..... *G. ramosissimum*
            6. Pedicel shorter than capsule..... *G. diffusum* ssp. *parviflorum*
         5. Seeds in the two chambers of the capsule not crowded, forming two parallel rows or alternating.
            7. Plants branched throughout, usually with 2-8 nodes between branches; seeds >9 per capsule, forming two parallel rows..... *G. decipiens*
            7. Plants branched at the base or not, abundantly branched above at many main-stem nodes or with 1-2 nodes between branches; seeds often but not always <9 per capsule, in two parallel rows or alternating right and left..... *G. diffusum* ssp. *parviflorum*

Figure 3: Chart of species relationships of North American Gayophytum *taxa.* G. diffusum *is hypothesized to have arisen from multiple crosses among four diploid species. Blank boxes represent probable hybrid ancestors of* G. diffusum. *From* Brittonia, *vol. 16, courtesy of New York Botanical Garden.*



Volunteer work parties in the OSU Herbarium

by Barbara and Glenn Halliday

In the fall of 1999 a few members of the Willamette Valley Chapter of the Native Plant Society of Oregon (NPSO) sat down to plan out the next year's field trip schedule. We could see there was a big blank on the calendar until the blooming season in western Oregon got under way in mid-April. An earlier chapter program by Scott Sundberg had generated great interest among our members in the Oregon Flora Project and OSU Herbarium activities. Judy Oliver suggested that perhaps a "field trip" to the Herbarium in January would be a good way to be involved with native plants when enjoying them outdoors was not an option.

This turned out to be one of Judy's best ideas ever! On Saturday, April 8, 2000, ten people assembled in the Herbarium, where Scott provided a tour of the facility, and brought us up to date on the current status of the Oregon Flora Project. He then put us in the hands of student workers Jason Alexander and Amanda Griffith to learn how to do "hands on" projects. One contingent headed for the "Prep room," where they took dried and pressed specimens through the necessary steps to prepare them for storage in the Herbarium's specimen cabinets. Forming a production line, they cleaned the plant material, carefully saving loose fragments, then arranged the specimen on a heavy paper mounting sheet (considering both artistic and scientific requirements) and—trickiest part of all—learned how to apply glue to the plant and deftly mount it to the sheet.

In a large lab classroom, another contingent was learning how to file mounted specimens. Not unlike a library, specimens have to be "shelved" after being mounted or being removed from the storage cabinets for research by students and Herbarium staff. The first step requires organizing the mounted specimens by family, genus and species. These volunteers not only got a crash course in plant taxonomy, but plenty of exercise as they marched around the lab tables—moving specimens from the "unsorted" stack to their proper botanical niche. A third group of volunteers manned the Herbarium computers, doing basic database entry of information that will be used by the Flora project. Scott made sure there was juice, coffee and cookies in a meeting room to fuel the volunteers throughout the day.

This first "work party" was so successful that all agreed it should be continued. In 2001, the Willamette Chapter sponsored not one, but two work parties, in January and early April. All have been well attended, and when the events were advertised on the NPSO discussion list, volunteers from distant parts of Oregon made the trek to Corvallis to take part. Participants have come from as far away as Portland, Sisters and Roseburg.

As an outgrowth of these work parties a few people, including the authors, have been intermittently spending a day at the Herbarium, working on similar projects. Everyone who has participated in these volunteer efforts has found it immensely rewarding. We all agree that the Oregon Flora Project is of great importance and appreciate the opportunity to share in its development. Judy's winter field trip idea has become a "win-win" situation for all concerned!

Photo: Judy Oliver

Volunteer work parties organized by the Willamette Chapter of the NPSO and others have helped the Oregon Flora Project and the OSU Herbarium enormously. Thanks to the 29 people who have participated in the three parties held so far! In this photograph Rory and Julie Nichols are shown mounting specimens on herbarium sheets during the first volunteer work party. —Scott Sundberg

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"Leapfrogging Lane County" revisited

By Charlene Simpson

In OFN for June 2000, I wrote about so-called "leapfrogging" species that have been collected both north and south of Lane County, but which seem to skip our area. Here I report that one of Lane County's leapfroggers has been found and a second has been discredited.

Ranunculus lobbii has been found in Lane County. Richard Halse, OSU Herbarium Curator, has confirmed a collection of *R. lobbii* from standing water at the base of a dike on Oregon Department of Fish and Wildlife land near Fern Ridge Reservoir approximately seven miles west of Eugene.

Carex vulpinoidea does not leap over Lane County. Dr. Barbara Wilson, Carex Working Group, has disputed the occurrence of *C. vulpinoidea* from southwest Oregon. The species is established at sites near Portland where it comes down the Columbia River; however she has found that specimens, previously identified as *C. vulpinoidea* from southwest Oregon, are more likely *C. dudleyi* or *C. densa*. Therefore, *Carex vulpinoidea* does not skip Lane County.

There have been other recent additions to the Lane County list. Sharp-eyed botanists have found the following species during the past year: *Anchusa azurea*, *Carex multicaulis*, *Ceanothus thyrsiflorus*, *Cyperus acuminatus*, *Delphinium oregonum*, *Heracleum mantegazzianum*, *Pellaea brachyptera*, and *Plantago coronopus*.

Illustrations of *Erythronium oregonum* on the front and back covers by Linda Ann Vorobik.

Visit our web site at http://www.oregonflora.org

Project news

By Scott Sundberg and Linda Hardison

Work on the Oregon Flora Photo Gallery is about to begin! The North American Rock Garden Society (NARGS) has awarded the Flora project a $3000 grant to develop a prototype for a Photo Gallery of Oregon plants. The Gallery will be maintained on the Flora project website, (www.oregonflora.org) and will feature photos of each plant in the state—from habitat shots to close-ups of flower parts. Funds from NARGS will help us develop a Plan of Work, and the first entries to the Photo Gallery will be of native rock garden species. As we progress on this project, we will keep readers informed of the ways you may participate in this exciting aspect of the Flora project. Thank you, North American Rock Garden Society!

Dick Straw has stepped down as Region 11 Regional Coordinator for the Oregon Plant Atlas Project. Dick, who was featured in OFN 5(3), has been an active participant and will be missed. As an RC he gathered thousands of species lists and coordinated efforts by a number of people in Jackson and Josephine counties. Happily, Dick continues as an Atlas Project Leader and has been volunteering his time for other aspects of the project. Thanks, Dick!

Welcome to Belinda Vos, the new Region 11 RC. She brings unbounded energy and enthusiasm and is a welcome addition to the Atlas project team. One of the first things she did was to request that the region be expanded! Region 11 now encompasses Jackson and Josephine counties and nine additional blocks, including most of Klamath Co. Belinda and others have planned volunteer activities for the fall and winter.

The Friends of the Oregon Flora Project, a committee of the Native Plant Society of Oregon, has recently displayed a poster and distributed Flora project brochures at a number of wildflower and garden shows throughout Oregon. They are happy to provide this display or give a slide presentation to interested organizations. Contact Linda Hardison at (541) 745-5770 or hardisol@bcc.orst.edu for details.

Thanks

Thanks to the American Rock Garden Society Endowment Fund and the Portland Garden Club, which have made significant contributions to the Oregon Flora Project.

We are extremely grateful for the support of the state NPSO. Their efforts to broadcast the Flora Project mission, and their continuing contributions help bring us ever closer to the date of publication of a new *Flora of Oregon*.

Special thanks to Connie Hopkins Battaile for donating copies of *The Oregon Book* for use as donation incentives. See review, page 8.

Thanks also to the Powne family, which donated books owned by the late Robert Powne to the Portland Chapter of the NPSO. Proceeds from the sale of these books will be donated to the Oregon Flora Project.

We extend our condolences to the friends and family of Irving Lord, a longtime NPSO member and plant enthusiast from Ashland, who passed away March 17, 2001. Several contributions have been made to the Friends in his honor. We thank the family for suggesting a memorial that celebrates his interests and will benefit fellow plant enthusiasts for decades to come.

The following donors have recently contributed via the OSU Foundation or the NPSO Friends: Marty Aitken, Alcyon Archambault (in memory of Irving Lord), Karl Anderson, Melanie & Kent Bjorge, Susan Bodin, John Borden, Roger & Miryam Brewer, Kay Butler, George Constantine, Thea Cook, Nancy Cundill, Jim Duncan & Elaine Plaisance, Kate Dwire, Matthew Ettinger, Robert Frenkel, Albert & Carol Gentner, Charlene Holzwarth, Kenneth & Robin Lodewick, Cynthia D. Lord, Alex & Lillian Maksymowicz, Vernon & Madeline Marttala, Barbara Mendius, Shirley Milbradt, Marjorie Richmond Nichols & Jonathon Nichols, John & Helen Ost, Douglas Ripley, Charlene Simpson, Veva Stansell, Peter Stekel, Dee Strickler, Jeffrey & Linda Taylor, Jean Thompson, Phil Warner, Mary Alice Wilson, and Gordon D. Wogan.

Thanks to the following who have helped by volunteering or sending in species lists or specimens: Karl Anderson, Wilbur Bluhm, Al Chase, Thea Cook, Barbara Halliday, Glenn Halliday, Ray Heller, Barbro McCree, Keith McCree, Glenn Miller, Bob Oliver, Judy Oliver, John Reynolds, Cindy Roché, Jeff Walker, and Barbara Wilson.

Name _____

Address _____

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Phone and/or e-mail _____

Mail to:

Scott Sundberg
Oregon Flora Project
Dept. of Botany & Plant Pathology
Oregon State University
2082 Cordley Hall
Corvallis, OR 97331-2902

Would you like to make a donation?

Tax-deductible donations can be made to the Oregon Flora Project by sending a check made out to the Oregon State University Foundation to Scott Sundberg at the address on this page. Please note on the check that it is for the Oregon Flora Project. Many thanks.

☐ Please check here if you do not wish to have your name listed in our "Thanks" column or on our Internet web site.

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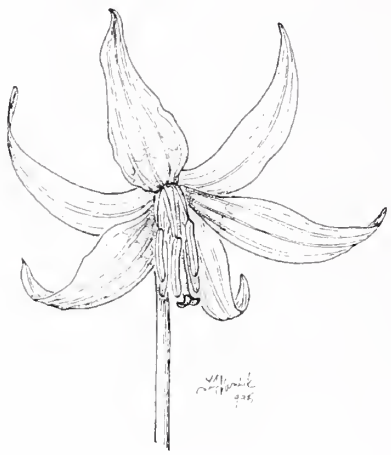
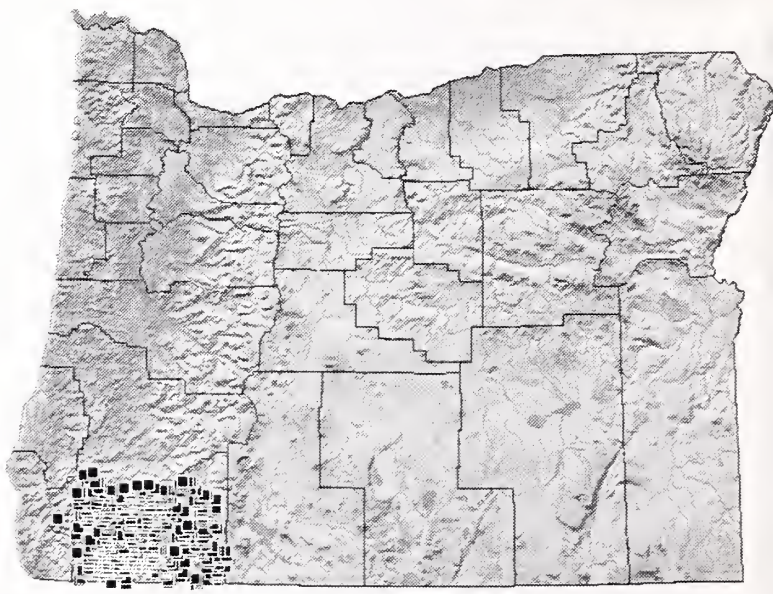


John F. Reed, Library Director
The New York Botanical Garden
Bronx NY 10458-5126

Did you know?

• *Lewisia rediviva* (bitterroot) was named by Frederick Pursh in honor of Capt. Meriwether Lewis. Pursh named *Clarkia pulchella* (elkhorns clarkia), as well, honoring William Clark, co-leader of the famous1804-1806 exploring expedition. In the 1950s, the genus *Clarkia* became the object of intensive genetic and systematic studies at the University of California, Los Angeles. Leaders of this research were Drs. Harlan and Margaret Lewis, who published a taxonomic monograph of the genus in 1955. Regrettably, no botanists named Clark have thus far shown an interest in monographing the genus *Lewisia*.

• *Cornus nuttallii* Audubon ex Torr. & A. Gray is the only plant species named by John James Audubon. *Index Kewensis* cites *Birds of America* as the source, but apparently that is not considered a valid publication. Audubon included two other new plant names in his *Birds of America*, *Platanus racemosa* Nutt. ex Audubon and *Nymphaea flava* Leitner ex Audubon, but for these he credited the name to another author. These are also considered invalidly published because: "No description or diagnosis is supplied." [From www.ipni.org]



Josephine and Jackson County species lists in the Atlas database.

Thanks to Dick Straw, Bureau of Land Management and U.S. Forest Service botanists,and Atlas project participants, the Oregon Plant Atlas database has species lists from hundreds of localities in these botanically diverse counties.

OREGON FLORA NEWSLETTER

Volume 7 Number 3 • Oregon State University • October 2001

LeRoy Ellsworth Detling (1898-1967)

by Eileen Flory

LeRoy Detling served as curator of the herbarium at the University of Oregon from 1939 until his death in 1967. He worked on the collection and taxonomy of far western plants and plant fossils (with monographs on *Cardamine* (*Dentaria*), *Descurainia*, and *Lupinus*), and on the ecology and origin of Oregon plant communities, with particular attention later in his career to plant migration. This subject took him on several trips to Mexico, where he collected many specimens for the herbarium. All of his herbarium specimens now reside at Oregon State University.

LeRoy Detling was born on October 23, 1898 in Groton, South Dakota. His parents, like so many of their generation, emigrated west, where they were farmers and orchardists in Washington and California. He graduated from Gridley (California) Union High School in 1916, attended Philomath

See Detling, page 17

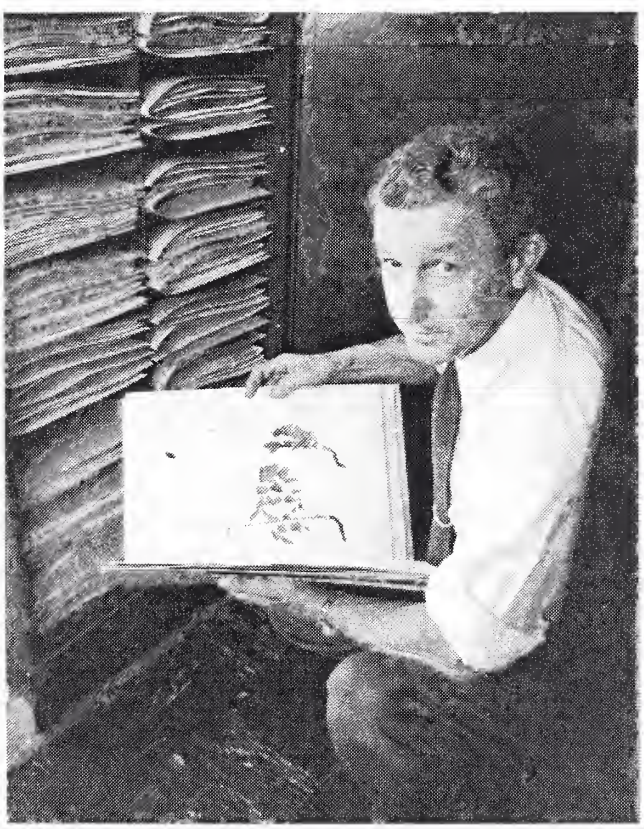


Photo: Detling family collection.

LeRoy Detling at the University of Oregon Herbarium, Eugene.

Three grants provide important boost to the Oregon Flora Project!

by Scott Sundberg

The Oregon Flora Project has exciting news! Three new grants, along with continuing support from the Native Plant Society of Oregon and individual donors, are allowing us to embark on work in new directions while accellerating efforts on the Atlas and Oregon Vascular Plant Checklist. For the first time in the history of the project we have sufficient funding to support three full-time staff members for one year and have partial staff funding for two more years. We are in the process of hiring two Faculty Research Assistants. Computer software developers are being supported by one of the grants and thirteen students started working part-time on the project this fall. The students bring a broad range of skills to the project, and we have been fortunate to have people specializing in data entry, quality control, photography and art in the group. We also hope to involve specialists to assist in a number of other areas, including fund-raising, volunteer coordination, and biogeographical and library research.

Rare plant guide prototype: The Friends of the Oregon Flora Project has been awarded a grant from Willamette Industries, Inc. Funds will be donated to the Flora project and will be used to write a prototype of a rare plant guide. The guide will be composed of loose-leaf "fact sheets" on rare plants. Each fact sheet will have photographs, illustrations, descriptions, a distribution map, and identification hints. The prototype will include 20 fact sheets, along with introductory text and an illustrated glossary.

County-level species lists: A grant from the Bureau of Land Management will support documentation of plant species, subspecies and varieties in Oregon counties. The overall focus of the BLM program is on the promotion of native plant materials in ecological restoration projects; our work will provide lists of plants that are native to each county. Our work will entail a thorough inventory of plant specimens in Oregon and the review of hundreds of botanical references. A side benefit of the work is that the Flora project will compile a database of thousands of plant localities for all Oregon taxa that will greatly enhance the value of our plant Atlas. During the next year we will be inventorying information from a wide variety of sources, including plant specimen collections at several herbaria

See Three Grants, page 16

Three Grants, continued from front page

around Oregon, taxonomic monographs, and other credible reports.

Online, downloadable Flora: The Project has been awarded a 3-year grant from the National Science Foundation for a project entitled "Personal Digital Field Guides: Mobile Access to Comprehensive Regional Flora." The PDFG project is a collaboration between the Flora Project and the Northwest Alliance for Computational Science and Engineering at Oregon State University. The grant will support design and software development for the online version of the *Flora of Oregon*. The digital Flora will include identification keys, photographs, illustrations, species descriptions, mapping capabilities, and much more. The primary focus of the grant is research in computer science. The central and most challenging aspect of the project is to design the system to allow users to download portions of the Flora to their own computer. Smaller versions could even be downloaded on a personal digital assistant (e.g., Palm Pilot) for use in the field. These "Personal Digital Field Guides" can then be tailored to one's specific needs. A broad range of users, including nature lovers, scientists, students, and decision makers, will be able to personalize the way they navigate through the Flora, selecting the amount and type of information presented as well as how and when it will be accessed.

Examples of Personal Digital Field Guides:

- a flora of species likely to be found in a particular county, BLM district, or USFS forest
- a flora of the ferns of Oregon
- technical details and identification hints on Oregon's noxious weeds and rare plants
- an atlas of Oregon penstemons

These projects will greatly speed the completion of the new *Flora of Oregon*. All of the data gathered and virtually all of the work accomplished can be applied toward the final versions of the Flora and Atlas. These grants represent a wonderful influx of funds to pay for progress in several directions. However, there are still many aspects of the Flora Project that do not receive targeted support; these will be the objects of our continued, long-term fundraising efforts.

Without the early and constant support of the Native Plant Society of Oregon, private donors, and hundreds of volunteers, the Oregon Flora Project would have been unable to apply competitively for these federal and private funds. Thank you for being a part of this project!

Contributions of stock, tax rebates, or donations honoring a special person are generous ways to support the Oregon Flora Project at year's end. (See donation box on page 21). Thank you for your continued support.

Illustrations of *Erythronium oregonum* on the front and back covers by Linda Ann Vorobik.

The Oregon Flora Newsletter is published three times a year by the Oregon Flora Project and the Oregon State University Herbarium. The Editor is Rhoda Love and the Production Assistant is Miko Nadel.

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Printed on Recycled Paper

Asteraceae database online at www.oregonflora.org

by Scott Sundberg

The *Oregon Vascular Plant Checklist-Asteraceae* is now available on the Oregon Flora Project's web site, www.oregonflora.org. The checklist is a searchable database that reflects the latest information on Oregon's members of the sunflower family. It includes a few name changes that have been made since the second edition paper copy of the checklist was printed in May 2000. The online version will be updated periodically as more species are discovered and names are changed.

The Asteraceae checklist is the first family to be made available online by the Flora project. Over the next several months we will be publishing checklists of other families as well. We also plan to publish paper versions of these family checklists periodically, but the online versions will be made public first.

We need your input. Please visit our web site from time to time and give us feedback. We anticipate that we will continue to improve the site for several weeks and your comments will help enormously.

Detling, continued from front page

(Oregon) College and then went to the University of Oregon, where he received his BA in Romance languages in 1921.

In 1921-22 Detling taught high school Latin and French in Wallowa, Oregon. A love of languages that would stay with him all his life prompted him to go for an advanced degree, and he received his MA in French from Stanford University in 1923. He then returned to Oregon to teach Romance languages at Willamette University in Salem (1924-26) and at the University of Oregon (1927-1930).

During the teaching years at Oregon, Louis F. Henderson, then curator of the plant collection, served as Detling's mentor, training him in the techniques of collecting, identifying, and caring for herbarium specimens. (Henderson had a degree in romance languages from Cornell and this mutual interest may have originally brought the two men together.) Eventually Detling went back to Stanford to study botany and received his second MA in 1933 and his PhD in 1936.

The year Detling returned to the University of Oregon with his new PhD, the Museum of Natural History was created, with the herbarium as one of its four units. Henderson formally became curator of the herbarium and Detling was hired part time and, when Henderson retired in 1939, Detling succeeded him as full-time curator. For nearly 30 years, Detling directed and developed the herbarium and taught for many years in the departments of botany, zoology, and finally biology. After 1957 he focused almost entirely on herbarium work, limiting his teaching to small classes of advanced students in plant taxonomy and species distribution, plus advising graduate students in their theses and dissertations.

Detling gathered thousands of specimens from the far West–most notably those on which were based his monographs on *Cardamine* (*Dentaria*), *Descurainia*, and *Lupinus*. His interest in plant migrations and the origins of current western flora took Detling to Mexico five times (most significantly a sabbatical leave in 1961-62) and once to Costa Rica. The Mexican collection comes largely from the western Sierra Madre in the states of Jalisco, Nayarit, Aguascalientes and Colima.

Detling's commitment to botany extended beyond the herbarium. He served as an officer of the 4-H organization in Lane County; was on the staff at Camp Lane, a 4-H camp in the Coast Range; and led forestry and entomology clubs for many years. From time to time he was also called into court to identify plants–once to find that the contents of a suspicious cigarette was actually Scots broom flowers!

On September 19, 1967, LeRoy Detling died of a heart attack as he left his house to walk to an evening of work at "the herb." The faculty recorded, "We will miss this quiet, patient man. Even those who were only casually acquainted with him will be saddened at the loss. . . . The many thousands of plants he collected will serve botanists and students for many years to come. His memorial will be the simple statement on the label of each of these specimens, 'Collected by LeRoy E. Detling.'"

(Eileen Flory is the daughter of LeRoy and Mildred Detling.)

Winter Twigs back in print!

by Rhoda Love

I am delighted to report that *Winter Twigs: a Wintertime Key to Deciduous Trees and Shrubs of Northwest Oregon and Western Washington,* by Helen M. Gilkey and Patricia L. Packard is once again available in a handsome new incarnation. OSU Press obtained permission from Dr. Packard, the surviving author, to update this much-loved field guide first published in 1962 and long out of print. With the help of Oregon Flora Project botanists, nomenclature was carefully reviewed and the new edition appeared this fall. Twenty-two of the 81 taxa included in the Guide were changed to reflect present taxonomic understanding. The book retains its comprehensive keys, descriptions, and lovely drawings by Dr. Packard. A colorful new cover features a twig photograph by Michael Hartman of the Native Plant Society of Oregon.

Paperbound, 128 pages, glossary, $19.95. ISBN: 0-87071-530-5. To order, contact your local bookstore or OSU Press, 541-737-3166, fax 541-737-3170.

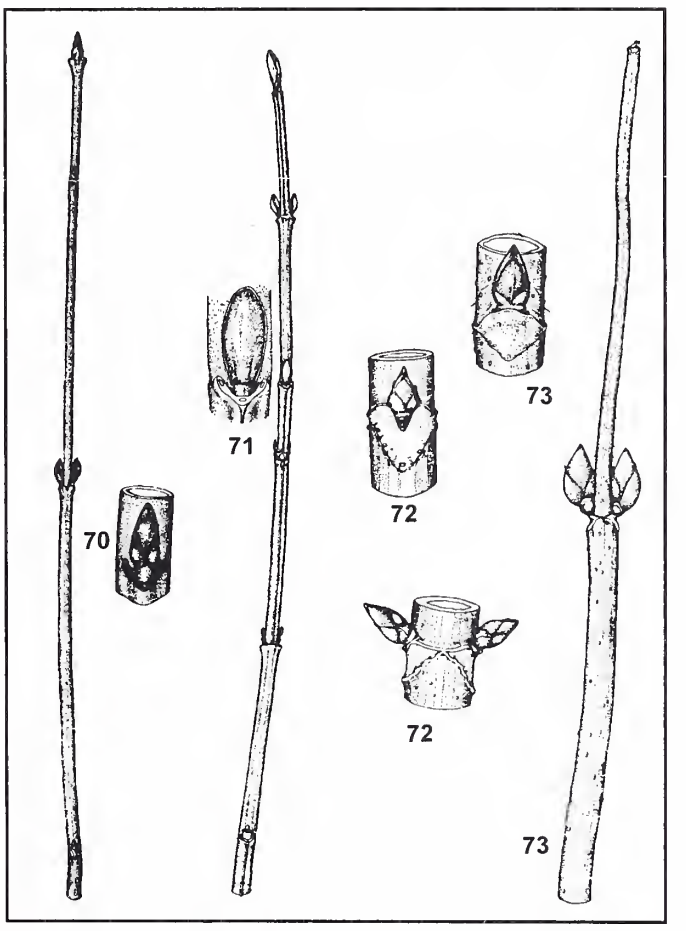


Plate 14 from Winter Twigs *by Gilkey and Packard illustrating* Viburnum *(70, 71) and* Sambucus *(72, 73). Courtesy of Oregon State University Press.*

Oregon plantains: the natives are diverse and we tolerate the weeds!

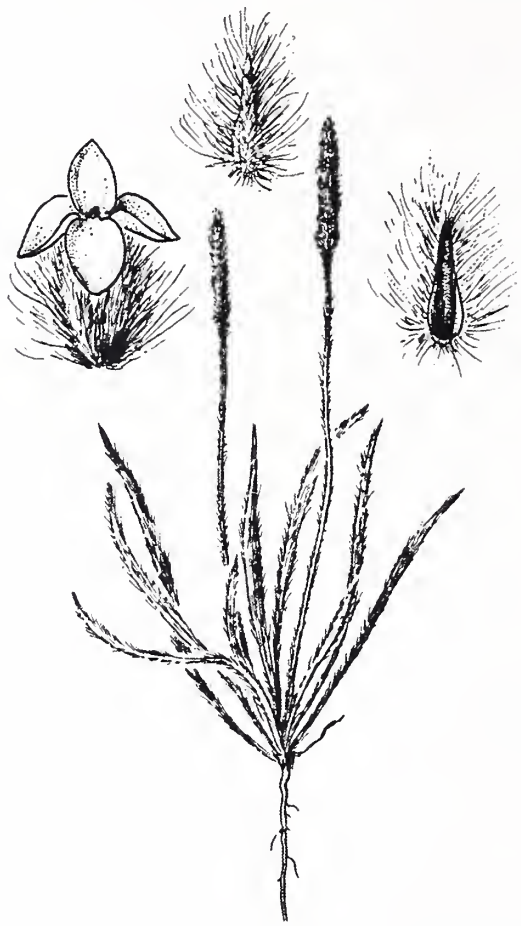
by Henrietta Chambers

Most of us recognize two of the exotic species of *Plantago* that grow in Oregon: *P. lanceolata* (English plantain) and *P. major* (common plantain). But did you know that there are fourteen species of *Plantago* in our state? They are equally divided between native and exotic species, and are really quite easy to tell apart when you compare their morphology and learn where they grow. The flowers, which are arranged in bracteate spikes, are extremely small and scarious and I seldom mention them in this treatment. However the leaves show distinct differences between species and thus I rely a good deal on leaf morphology. We will discuss the native species first. My primary reference, with illustrations, is *Vascular Plants of the Pacific Northwest* by Hitchcock, et al; however, several of the species that have southwestern Oregon as their northern limit are not included in that work. In those cases, Abrams' *Illustrated Flora of the Pacific States* has aided in identification and distribution. Also, H. A. Gleason's *The New Britton and Brown Illustrated Flora* (1952) provides good illustrations and descriptions of the exotic species.

Oregon has seven native plantains. *Plantago elongata* Pursh var. *elongata* (slender plantain) occurs in moist saline habitats on the beaches from Lincoln County to Curry County, south into California and scattered throughout the Rocky Mountain states to the Midwest. The species name "elongata" is not very fitting, because the flowering/fruiting stalks are not particularly elongated compared to other species. The plants are rarely over 20 cm tall and frequently much smaller. (There are two additional varieties of this species which do not grow in Oregon; one is found in central California southward, and the other is found from California north to coastal British Columbia but has not been collected in Oregon.)

Plantago erecta E. Morris (dwarf plantain) grows in a wide variety of habitats along the southern Oregon coast (Curry and Coos Counties) and inland (Jackson and Douglas Counties). It occurs on grassy beaches, dunes, stable sandy flats, vernal pools, ridges and rock outcrops. The flowering stalks are a little longer than the other small (sometimes called "dwarf") plantains (*P. elongata, P. pusilla* Nutt. and *P. virginica* L.), but the flowering portion is not as elongate (usually less than 5 cm) and is whitened due to a long silky pubescence on the flowers and bracts.

Plantago eriopoda Torr. (redwool or saline plantain) shows a disjunction in its Oregon distribution from the southern coast (Coos County) to Malheur County. On the label of one of the specimens collected in Malheur County in 1957 it states that the plant is a common weed in irrigated hayfields. That is an interesting comment since it is a native species. It has basal leaves that are somewhat intermediate in shape between those of *P. lanceolata* and *P. major*, but the flowering stalk is thicker (more stout) and up to 4 dm in height. The root-crown has an abundance of reddish-brown hairs, hence the common name. The basal flowers become somewhat separated as the stalk ages, a feature also seen in *P. subnuda*.



Plantago patagonica *is the most hirsute of Oregon's native plantains. In our state it is found only east of the Cascades. Illustration by Jeanne R. Janish from Hitchcock et al.,* Vascular Plants of the Pacific Northwest, part 4, *courtesy of University of Washington Press.*

Plantago macrocarpa Cham. & Schltdl. (Alaska plantain) is a species of cold, wet habitats from the Aleutian Islands south to Lincoln County, Oregon. The five collections at OSU are all from Yachats. The species name refers to the large fruits, and this feature, along with the broad, sedge-like leaves, serves to distinguish this taxon. The 2-seeded indehiscent fruits (5-7 mm long) drop from the fruiting spike intact making this species unique in the genus as all other *Plantago* species have a capsule which dehisces in a circumscissile (lid-like) pattern. The Yachats population is disjunct from the next closest collection from Gray's Harbor, Washington, which is widely separated from populations farther north in the Olympic Peninsula, Vancouver Island, Queen Charlotte Islands and coastal Alaska.

Plantago maritima L. (seaside plantain) has two varieties which differ in morphology and habitat, although both grow along the coast. *P. maritima* var. *californica* (Fern.) Pilg. (small seaside plantain) is a fleshy, rosette-forming plant which frequently has a branched caudex. The leaves are broadly linear or linear-oblanceolate to subspathulate or obtuse. The plants range from 3-7 cm tall and grow on headlands and bluffs above the beaches from California north to Tillamook County, Oregon. *P. maritima* var. *juncoides* (Lam.) A. Gray (tall seaside plantain) has grass-

See Plantains, page 19

Plantains, continued from page eighteen

like leaves which are ascending rather than rosette-forming. The leaves are entire or sparsely dentieulate, and may be as long as 25 cm. The upright spikes are up to 7 cm tall and densely flowered. This variety favors beach and salt marsh habitats from the San Francisco Bay area north to the Aleutian Islands.

Plantago patagonica Jacq. (Indian wheat) is a plantain whose species name reflects its widespread distribution in Argentina and Chile as well as western North America. In Oregon it is found only east of the Cascades and is quite distinct because of the wooly pubescence on the leaves, flowering stalks and flowers (see illustration). Also, the entire flowering/fruiting spike is covered with a dense, fine pubescence which turns tan with age, thus appearing foxtail-like. Its habitats include disturbed areas, sunny slopes, rocky openings in woods, and banks of rivers and streams.

Plantago subnuda Pilg. (Mexican plantain) has leaves that are intermediate in shape between *P. lanceolata* and *P. major* but the petiole, which can be winged, is much wider with 5-8 distinct veins. Most plantains have perfect flowers, but this taxon is monoecious with the male flowers above the female on the spike. The corolla lobes of male flowers are spreading while those of female flowers are rolled inward and are upright and form a straw-colored beak over the developing fruit. Flowering spikes can attain a height of 6 dm, and the lower flowers on well-developed plants become somewhat separated in fruit, much like *P. eriopoda.* The plants occur along the coast in a variety of sandy, tidal, rocky and bog habitats as far north as Lincoln County.

The seven introduced species have two distribution patterns: widespread perennial species which are aggressive weeds growing in a broad range of disturbed habitats; or spotty annuals, with widely separated populations because of chance dispersal followed by little or no spreading from the initial site. Plant size is also extremely variable in the exotic species because the growing conditions with regard to moisture and soil may be either favorable or marginal for plant growth.

Plantago aristata Michx. (bristly plantain) has long, thin, grass-like leaves and long, stiff bracts which extend beyond the flowers. The lower bracts are longest (5-25 mm) and thus the inflorescence tapers toward the tip. This speeies is native in the Midwest from Illinois south to the western Gulf States and is currently naturalized over mueh of the United States and eastern Canada. Our three collections show a disjunction from Clackamas to Grants Pass.

Plantago coronopus L. (cut-leaf plantain) consists of low-growing, rosette-forming plants which are distinct from all other Oregon taxa beeause they have deeply divided (pinnatifid) leaves (see photo). The species is native to Europe and sparingly introduced from southern California to Whidbey Island, Washington. Our collections are from Coos, Curry, Lane and Lincoln Counties in habitats such as headlands, bluffs, dunes, edges of lakes, sandy and gravely road- and trailsides. The scapes, which can reach 3 cm, have an elongate flowering/fruiting region and tend to be upright or arching. The sharp tips of the bracts extend very slightly beyond the flowers/fruits.

Plantago lanceolata L. (English plantain) is a well-known widespread, weedy perennial species introduced from Europe. It is common in the moister parts of Oregon and other temperate regions, where it occurs in many disturbed habitats. The leaves have three or more conspicuous parallel veins and are narrowly to broadly elliptic. The petiole varies greatly in length. Each rosette of leaves produces one to many flowering stalks. The stamens are well-exserted at anthesis forming a fringe, with younger flowers above the fringe and older flowers (setting fruits) below the fringe. The habit is much like two of the native species, *P. eriopoda* and *P. subnuda,* but the latter tend to have much wider leaves with broader petioles. The flowering/fruiting portions of the flowering stalks in English plantain continue to produce new flowers very late in the growing season if conditions are favorable.

Plantago major L. (common plantain) is another of the widespread European weeds that inhabit lawns, roadsides and other disturbed habitats throughout Oregon. The leaves are much broader (up to three times as long as wide), elliptic to ovate with three or more conspicuous veins. The margins are usually entire but some biotypes have a few shallow teeth from the base to the middle of the leaf blades. The scapes are upright or arching. The label on an 1888 collection (ORE) says "Introduced but not common in E.O. (Eastern Oregon)." Both *Vascular Plants of the Pacific Northwest* and *Intermountain Flora* state that there are two varieties in this region. However, the authors also acknowledge that it is almost impossible to distinguish them using herbarium specimens. (Perhaps a graduate student would be interested in a project to make collections of the typical var. *major* and the more succulent plants of saline habitats, var. *pachyphylla*, and grow them under similar conditions in a greenhouse and in the field to determine if their differences are genetically stable.)

Plantago psyllium L. (sand plantain) is an exotic species which is native in Europe, Asia and North Africa. It is established in the eastern United States but only sparingly introduced in the Northwest. We have only a single collection from Hood River in 1934. Sand plantain does not produce a rosette but has a branched stem with opposite, linear leaves. The short, compact spikes are found on terminal as well as lateral branches. Our specimen has no habitat data but *Vascular Plants of the Pacific Northwest* states that in the East it grows along railroads.

Plantago pusilla Nutt. (dwarf plantain). This annual species truly fits its Latin species name (pusilla =very small). The tallest specimens in the herbarium are 8 cm. Our collections are from Lake Oswego, Sauvie Island, and Albina (Portland). There is a very interesting characteristic regarding the morphology of the root system: the taproot detaches from the crown leaving a few adventitious roots to form the root system. The corolla lobes become upright forming a short beak over the developing capsule. The linear leaves distinguish it from *P. virginica,* another small, introduced species often also called dwarf plantain.

Our seventh introduced species is *Plantago virginica* L. (Virginia plantain), an Eastern United States native that has been introduced into the West, but is not a very aggressive

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Plantains, continued from page nineteen

weed. Our collections are from Coos and Curry Counties from dry habitats such as hillside meadows, dry pastures, and dry ground above the Rogue and Chetco Rivers. The entire plant is hirsute. The petals are erect and form a straw-colored beak over the developing fruit. One to several scapes arise from the rosette of oblanceolate to obovate leaves. The few collections observed show a great range of size in the leaves and flowering stalks, the latter from 5 to 50 cm.

Seeking Oregon herbaria!

by Scott Sundberg

We know of forty collections of pressed and dried plant specimens in Oregon (see map, back page). These range in size from large university herbaria to small private collections. All have valuable records on the distributions of Oregon plants. For our work on county-level species lists we will be contacting people who manage these herbaria to learn more about their holdings. Do you know of herbaria or other collections that we have not yet found? For a full list of those known to us, please email or send a note to my address on page 16.

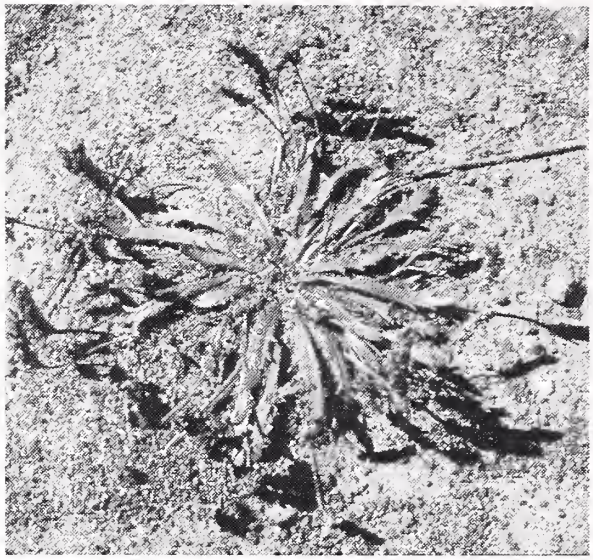

Photo: Charlene Simpson, Coastal Lane County.

Introduced Plantago coronopus *is distinct from all other Oregon plantains due to its deeply divided leaves.*

Key to Oregon *Plantago*

by Henrietta Chambers

1. Plants annuals, biennials or short-lived perennials
   2. Leaves lanceolate to ovate; corolla beak-like ..... *P. virginica*
   2. Leaves linear, or deeply pinnately divided; corolla not beak-like
      3. Leaves deeply pinnately divided ..... *P. coronopus*
      3. Leaves linear, grass-like
         4. Stem leaves present, opposite ..... *P. psyllium*
         4. Leaves all basal
            5. Bracts not extending beyond flowers/fruits
               6. Leaves glabrous or sparsely hairy, less than 2 mm wide; scapes less than 10 cm
                  7. Leaves succulent; spikes short, less than 20 flowered ..... *P. elongata* var. *elongata*
                  7. Leaves not succulent; spikes elongate, more than 20 flowered ..... *P. pusilla*
               6. Leaves silky or long-hairy, slightly wider; scapes longer than 10 cm ..... *P. erecta*
            5. Bracts longer than flowers/fruits
               8. Bracts stiff, remaining dark, up to 25 mm long ..... *P. aristata*
               8. Bracts soft, fine, turning tan in age, < 10 mm long ..... *P. patagonica*
1. Plants perennial
   9. Leaves lanceolate to ovate
      10. Leaves lanceolate ..... *P. lanceolata*
      10. Leaves ovate
         11. Petioles wide, often winged, their veins conspicuous
            12. Corolla upright in female flowers (spreading in male), forming a beak ..... *P. subnuda*
            12. Corolla spreading, not beak-like ..... *P. eriopoda*
         11. Petioles narrow, their veins not apparent ..... *P. major*
   9. Leaves linear, grass-like or sedge-like
      13. Spikes greater than 1 cm wide; capsule indehiscent; leaves petiolate ..... *P. macrocarpa*
      13. Spikes less than1 cm wide; capsule dehiscent; leaves scarcely or not at all petiolate
         14. Small plants of coastal bluffs; leaves in a low rosette, succulent ..... *P. maritima* var. *californica*
         14. Taller plants from other coastal habitats; leaves upright, not succulent ..... *P. maritima* var. *juncoides*

Oregon plant photo gallery. Would you like to participate?

by Scott Sundberg

In the last issue of the OFN [7(2)] we announced a grant from the North American Rock Garden Society to support work on an online photo gallery. We are now working on a Plan of Work for the project. This will outline the "rules" for accepting photographs, crediting photographers, and making them available online to the public. Over the next several months we will be working out many technical aspects of the project, addressing resolution needs, requirements for assuring proper identifications, techniques for digitizing slides and prints, management of computer files, and presentation of the photographs online.

We hope to have photographs of each Oregon vascular plant species, subspecies and variety, featuring habitat, overall form, and closeups of diagnostic features. It is an ambitious undertaking that can only succeed as a grass-roots effort.

We encourage your participation!

There are many ways you can become involved:

- donate the use (but not the copyright) of photographs in your collection, or donate the photos themselves
- enter information from the OSU Herbarium's slide collection into a database
- assess the quality of slides and help decide which ones to put online
- take photographs of species for which we lack images
- specialize in photographing microscopic features
- form a group of people to conduct photographic safaris
- help train volunteers in photographic and digitizing techniques
- help us find sources of photographs

If you'd like to help us (and perhaps see your photographs and name in bright lights on the Internet), please contact me by email at the address on page 16.

Thanks

We are grateful to Willamette Industries, Inc., the National Science Foundation and the U.S. Bureau of Land Management for providing significant grants.

Thanks to the Native Plant Society of Oregon and its Cheahmill and Siskiyou chapters for ongoing support. Their continuing contributions help bring us ever closer to the date of publication of a new *Flora of Oregon*.

Thanks to the Tektronix Foundation, which has recently matched three donations dollar for dollar.

The following donors have recently contributed via the OSU Foundation or the NPSO Friends: Norma & Henry Booke, Nancy J. Chapman, Timothy L. Dehne, Jim Duncan & Elaine Plaisance, Gerry Gibbs, Jennifer Guard, Mary Y. Hough, Boone Kauffman, Pat Kerrigan, Fred Knapp, Kenneth & Robin Lodewick, Rhoda & Glen Love, Brie-Anne McKernan, Ian Osgood & Mara Charnell, John & Phyllis Reynolds, Donald Ryan, Carol Savonen, Charlene Simpson, Angela Sondenaa, Veva Stansell, and Sara Wasserman.

Thanks to the following who have helped by volunteering or sending in species lists or specimens: Maya Abels, George W. Argus, Connie Battaile, Julian Battaile, Barbara Halliday, Glenn Halliday, Don Heinze, Steve Jessup, Danna Lytjen, Steve Nelson, Nick Otting, Lona Pierce, Elaine Plaisance, James Reveal, Jonathan Soll, Duncan Thomas, and Sue Vrilakas.

Note from Scott: We don't ordinarily thank members of the Flora project team who are listed on the second page of each issue of OFN. Nonetheless I would like to express my gratitude for the hard work that members have done over the past seven years. It has brought us to where we are now and has allowed us to secure funding to support much needed staff for the next year, and hopefully beyond. Special thanks also to Belinda Vos, Dick Straw and Connie Battaile, who are helping the project enormously by entering specimen label data at the Southern Oregon University Herbarium.

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Dept. of Botany & Plant Pathology
Oregon State University
2082 Cordley Hall
Corvallis, OR 97331-2902

Would you like to make a donation?

Tax-deductible donations can be made to the Oregon Flora Project by sending a check made out to the Oregon State University Foundation to Scott Sundberg at the address on this page. Please note on the check that it is for the Oregon Flora Project. Many thanks.

☐ Please check here if you do not wish to have your name listed in our "Thanks" column or on our Internet web site.

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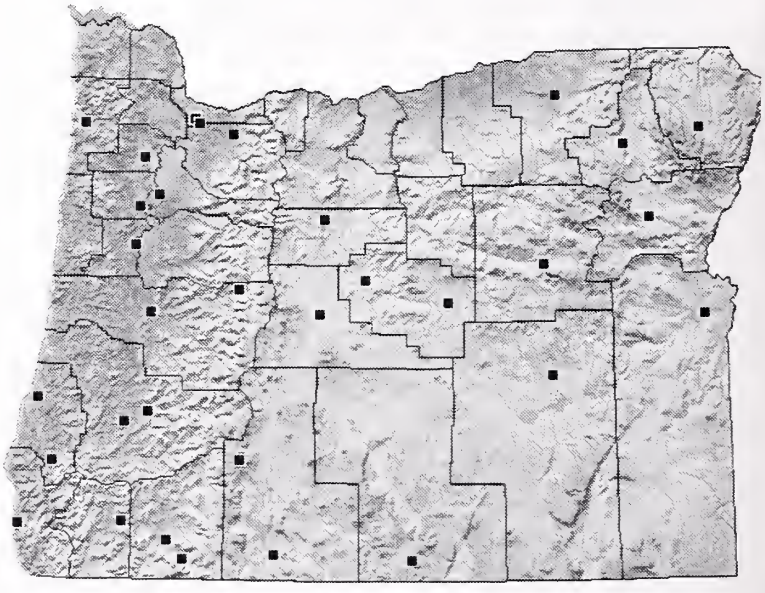
Did you know?

• *Aster chilensis*, named by Nees von Esenbeck in 1832, was thought to have been discovered in Chile. The collector, Thaddaeus Haenke, had written the type locality in Latin, as "In regionis montanis," which Nees translated as "In the region of the mountains," i.e. the Andes of South America. However, what Haenke meant was "In mountain-of-the-king," meaning Monterey (California), whose name has that meaning in Spanish. We know that Haenke's ship visited Monterey in 1791, where he collected this aster along with many other Californian species. Haenke died in 1817, before his collections were studied and named.

• Two species of the sea-rocket genus *Cakile* (Brassicaceae) occur in beach sands on the Oregon coast. Neither species is native here, *C. edentula* arriving, probably in ship ballast, around 1880, and the European *C. maritima* first appearing in California in the 1930s. Ocean currents have dispersed their corky fruits up and down the coast. South of Oregon, *C. maritima* has gradually out-competed *C. edentula*, due to its superior reproductive characteristics, and the latter taxon is now rare in California. Both species survive and coexist from Oregon northward, however. *Cakile edentula* is native from Virginia north to Newfoundland; perhaps it is better adapted to the cooler climate of coastal Oregon. Additionally, because the two species can hybridize, genetic exchange may have changed their competitive interactions here. These and other questions invite further research.



Locations of public and private herbaria in Oregon.

We plan to search many of these collections for additions to our county-level species lists. See details on front page.