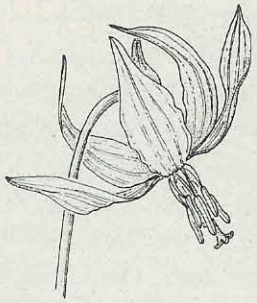

OREGON FLORA NEWSLETTER

Volume 4 Number 3 • Oregon State University • October 1998

Dr. Henrietta Laing Chambers, botanist, educator, researcher and Vascular Plant Checklist contributor

by Rhoda Love

Henrietta Laing Chambers (called "Henny") has broad botanical interests. For example, she contributed the article on the family Fagaceae in this issue of OFN as well as an earlier article on the Caprifoliaceae (OFN 3(1) 1997, and she was co-author with her husband Ken Chambers of an article on the genus *Stachys* in that same issue.

Henny says her interest in botany began at an early age in New Rochelle, New York when she went on springtime jaunts with friends and a favorite aunt to look for wildflowers in the woods near her home.

Henny decided very early on a career in biology while at Maryville College in Tennessee. On the advice of friends, she took a beginning botany class as a sophomore and served as the lab assistant for the same course during the next two years. She received her BA from Maryville in 1955 and moved on to the University of North Carolina in Chapel Hill to work on her Master's degree. Her thesis was a flora of Harnett County, NC, an area of considerable plant diversity. She says: "At the time I was at UNC, four of the Botany Department faculty were collaborating on a flora of the Carolinas, and the county floras done by us graduate students contributed to this larger work."

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Photo: Kenton Chambers

Henrietta Chambers in the Herbarium

Introducing Friends of the Oregon Flora Project

by Keli Kuykendall

Friends of the Oregon Flora Project, a new fund-raising group, is being sponsored by The Native Plant Society of Oregon (NPSO). Over the next 10 years, Friends will work to raise the projected 2 million dollars needed to complete the *Flora of Oregon*, a manual for the identification of Oregon plants. Our immediate goal is to acquire funds to support key staff positions. Oregon State University supports the Flora project by providing work space, computers, and crucial infrastructure. The greatest remaining expense to the Oregon Flora Project is the cost of labor.

The Oregon Flora Project is now beginning its fifth year as a volunteer organization of dedicated individuals working to ensure the successful completion of a new *Flora of Oregon*. During the past four years, the project has made remarkable progress determining which plants grow where in Oregon, developing a prototype of an electronic plant Atlas, publishing the *Oregon Flora Newsletter*, compiling herbarium specimen label data and publishing the *Oregon Vascular Plant Checklist: Asteraceae*. Many loyal contributors to the Oregon Flora Project have made this progress possible.

To facilitate fund raising, OSU's Director of Development advised us to form a "Friends" group. We turned to those who have stood behind the Oregon Flora Project from the beginning: the Native Plant Society of Oregon, whose board voted to sponsor the Friends group, and allow me, Keli Kuykendall, to chair this new NPSO Committee. With NPSO sponsorship, the Friends group will be better able to implement an active fund raising campaign on behalf of the Flora Project.

So now there are two avenues available to make donations to the Flora project. You may continue to make donations directly to the OSU Foundation, or donations may be routed through NPSO via the new PO Box address. All the funding goes into the same Oregon Flora Project account, with no hidden fees and no additional administrative costs. If you have been making

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Friends, continued from front page

donations through the OSU Foundation, you may continue to do so. The Friends will focus on recruiting new donors, both individual and corporate.

This fall, I am setting up a Friends Committee to help with grant writing, bookkeeping and general fund raising. If you have experience or enthusiasm, contact me, Keli Kuykendall, at (541)758-8409, kuykendk@peak.org or our new address: Friends of the Oregon Flora Project, PO Box 402, Corvallis OR 97339.

You can read more about Friends of the Oregon Flora Project in the enclosed brochure. I am grateful to Esther McEvoy and Rhoda Love who contributed their time, money and artistic talents to the brochure. The brochure also will tell you how you may request a beautiful *Erythronium oregonum* print by Bonnie Hall when you become a member. Use the brochure to join the Friends group today, and feel free to make copies for others who may be interested.

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 State University Herbarium and the Oregon Flora Project. The Editor is Rhoda Love and the Production Assistant is Alisa Anderson.

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The Family Fagaceae in Oregon Part I

by Henrietta L. Chambers

The new treatment of Fagaceae in volume 3 of the *Flora of North America* (1997) by Kevin C. Nixon, Paul S. Manos, Richard J. Jensen and Cornelius H. Muller has excellent distribution maps, leaf and fruit drawings and keys. My treatment of the Fagaceae for the *Oregon Vascular Plant Checklist* is based on theirs. Oregon has two species of *Chrysolepis* (formerly *Castanopsis*), one species of *Lithocarpus* (with two varieties), and six species of *Quercus*, including one hybrid. The cupule or involucre is the most important diagnostic feature of the Fagaceae. The cupule is the cap of the acorn in *Lithocarpus* and *Quercus* and the spiny bur that surrounds the fruits in *Chrysolepis*. In Oregon, the southwestern region of our state contains the greatest diversity of taxa in this family. All three genera have evolved shrubby or small tree forms in these hotter, drier habitats.

Field botanists, naturalists and foresters are always unhappy with a change in a well-known genus name, but the switch from *Castanopsis* to *Chrysolepis* occurred in a 1948 monographic study. H. Hjelmquist, a Swedish taxonomist, chose to separate the Western United States chinquapin taxa (two temperate species) from the true *Castanopsis* of Asia (120 tropical and subtropical species) on the basis of cupule structure. Hjelmquist chose the name *Chrysolepis* which means "gold scale" referring to yellow glands on various plant structures.

The chinquapins are distinct from other Oregon Fagaceae in their fruit structure, with a densely spiny involucre that completely encloses one to several angular or round nuts. The lower surface of the leaves has a dense layer of rusty-golden, glandular pubescence which is visible from some distance. *Chrysolepis chrysophylla* var. *chrysophylla* (golden chinquapin) grows from sea level to 2,000 meters along the coast from Washington to northern California, extending inland to the Cascades and Sierra Nevada. These trees, up to 45 meters in height, typically have flat leaves. *Chrysolepis chrysophylla* var. *minor* comprises shrubs which range from 2-5 meters tall; their leaves are strongly folded along the midvein. The shrubs grow on rocky, open slopes, in conifer forests and chaparral communities from 300-1800 m in California and southern Oregon.

Chrysolepis sempervirens (bush chinquapin) is a low rhizomatous shrub (up to 2.5 m tall) which occurs mostly at higher elevations in California and southern Oregon. Its low growth form and blunt-tipped leaves separate it from *C. chrysolepis* var. *minor*.

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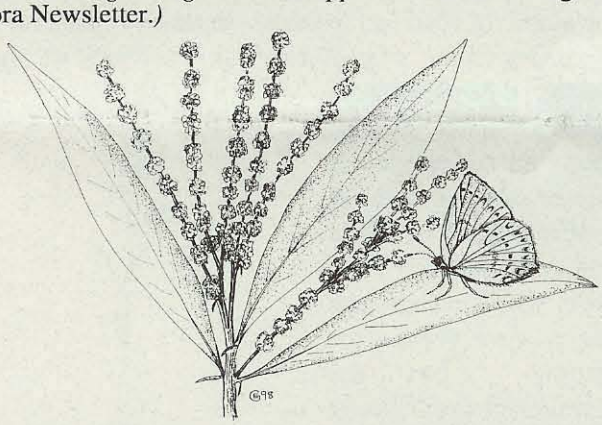
Fagaceae, from page 14

Lithocarpus densiflorus (tanoak) has a single species in western North America while the Indomalaysian region has approximately 300 species. The genus is present in the fossil record of western North America. The cupule or cap, which covers the basal portion of the single large nut, has strongly reflexed scales that are hooked at the tip. There are two varieties in California and southern Oregon. *Lithocarpus densiflorus* var. *densiflorus* is a tree ranging from 20-45 meters tall. It occurs in mixed evergreen and Coast redwood forests from 0-1500 m. The leathery evergreen leaves are entire or slightly serrate and are up to 12 cm long. They are convex toward the tree axis (adaxially), a feature that is often difficult to see on herbarium specimens. *Lithocarpus densiflorus* var. *echinoides* is a shrub up to 3 m but generally less than 2 m. The leaves are much smaller (up to 6 cm) than the typical variety, and the blades are flat. These shrubs grow in the Siskiyou region of southern Oregon and in the Sierra Nevada south to Mariposa County, California.

(Editor's note: Part II of Henrietta Chambers' taxonomic notes on Oregon Fagaceae will appear in the next Oregon Flora Newsletter.*)*



Chrysolepis chrysophylla, *golden chinquapin, with hairstreak butterfly, an insect whose larvae feed on this species. Drawing: Esther Gruber McEvoy.*

Asteraceae Checklist still available

• For those of you who have participated in or donated to the Oregon Flora Project, the Asteraceae Checklist is available free of charge upon request. Please use the form on page 17 if not on our mailing list.

• Or you may receive a copy in return for a donation of any amount to the Oregon Flora Project. Please enclose your check to the OSU Foundation. (The cost of printing, postage and handling is approximately $4.00.)

• Bonus: When we mail your Asteraceae checklist, we will include a list of name changes and their page numbers in the *Flora of the Pacific Northwest* by Hitchcock and Cronquist.

Cherchez les hommes
(In *Antennaria,* boys are a minority)

by Kenton L. Chambers

Scan a murder mystery novel and you may find the wily French detective (Inspector Maigrait, no doubt) uttering that immortal phrase, *cherchez la femme* (look for the woman) to solve the crime. Putting a botanical spin on the mystery, let us consider the genus *Antennaria* (pussytoes, family Asteraceae), which I recently reviewed for the *Oregon Vascular Plant Checklist*. Containing 19 taxa in Oregon, this is the sixth largest genus of Asteraceae in the state, and in my experience it presents taxonomic ambiguities at least equal to any of the five larger ones (*Erigeron, Aster, Artemisia, Senecio,* and *Cirsium*). In pussytoes it is common to find populations composed entirely of pistillate ("female") plants; no staminate ("male") ones, and hence no pollen grains, are available for the plants' reproduction. There is a well known explanation for this—namely, apomixis (seed formation without fertilization, a form of cloning). However, this unusual process is intertwined with hybridization and polyploidy in *Antennaria*, creating genetically diverse populations which are extremely hard to classify.

Apomixis is well established in several other Asteraceae genera in Oregon, notably in *Crepis, Erigeron, Arnica,* and *Taraxacum*. Only in *Antennaria*, however, is the process associated with the dioecious floral condition, i.e., with separate pistillate and staminate individuals. The presence or absence of staminate plants in a population is therefore a relatively good indicator of the mode of reproduction. If males are present, the population is making seeds by sexual outcrossing; if there are no male plants, then the seeds contain embryos that are asexual copies (clones) of their pistillate parent. As explained below, it may be important to know the reproductive mode of particular pussytoes populations, if one is trying to assign species names to them. The taxonomy of the genus, in other words, is strongly dependent on knowledge of its breeding systems.

The taxonomic arrangement of *Antennaria* which we adopted for the Checklist is mainly based on detailed studies by R.J. Bayer and G.L. Stebbins (1987 and 1993). It turns out that some pussytoe species are morphologically distinct, fully sexual, and offer no taxonomic problems. Examples are *Antennaria geyeri* (pinewoods pussytoes), a gray, leafy-stemmed and bushy, small-headed plant of the ponderosa-pine woods east of the Cascade Range; *A. suffrutescens* (shrubby pussytoes), a low-growing subshrub of the Siskiyou Mountains, with small, strongly bicolored leaves (green above, gray-woolly below); *A. racemosa* (slender pussytoes), a taller

See Antennaria, page 16

Antennaria, continued from page 15

plant of montane coniferous forests whose leaves are broad-bladed, three-nerved, glabrous above and woolly below; and *A. dimorpha* (low pussytoes), a cushion-plant with short, single-headed flowering stems, characteristic of sandy or rocky soils in dry environments east of the Cascades. In all these species you can expect to find male and female plants growing together in approximately equal numbers.

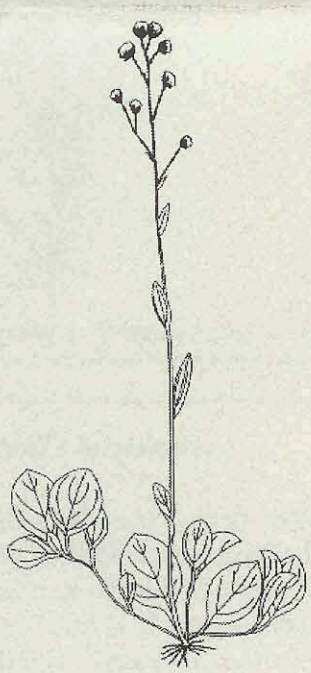
There are several other Oregon *Antennaria* species, however, that are very difficult to tell apart. Either there is a complete blend of characteristics between taxa, or else the "key" differences are so minor that only a single subtle trait may distinguish one species from another. Included here is a group of widespread montane and Great Basin taxa with a mat-forming, stoloniferous habit: *A. rosea* (rosy pussytoes, sometimes included in *A. microphylla*), *A. media* (alpine pussytoes, =*A. alpina* var. *media*), *A. umbrinella* (umber pussytoes), *A. corymbosa* (flattop pussytoes), and *A. aromatica* (aromatic pussytoes). According to Bayer and Stebbins, the intergradation among these species results from a complex history of past hybridization. Hybrid plants, often having chromosome numbers that are four, six, or eight times the basic number, usually exist as female-dominated populations. The plants can make seeds with or without pollination, so males are not needed and they become rare or absent.

In studying numerous herbarium specimens of the five above-mentioned taxa, I had to make arbitrary judgements about what species names to use. For example, Bayer and Stebbins showed that *Antennaria rosea* is an asexual, female-only, hybrid-derived taxon; its ancestors include sexual forms of *A. microphylla, A. corymbosa*, *A. umbrinella*, and *A. aromatica*, among others. Therefore, *A. rosea* consists of numerous different hybrids which combine the traits of two or more ancestral species! Additionally, it is our only species of this complex to have a large proportion of plants with a rosy-red tint on their involucral bracts. Related species range from pure white bracts (as in *A. microphylla*) to dusky brown or greenish ones (as in *A. umbrinella* and *A. media*). This allowed me to assign the name *A. rosea* to all collections having roseate involucral bracts—a single key character defines the species in this case.

In no collections having rosy-colored bracts did I find any male plants. However, I did find other collections (lacking male plants) whose involucral bracts were pure white (like *A. microphylla*) or were white with a dark-brown spot on the back (like *A. corymbosa*). Did the absence of male plants on the herbarium sheets mean that these populations were female-only and apomictic? If they were, their classification should be as *A. rosea*, according to Bayer and Stebbins. I finally decided to call the brown-spotted ones *A. corymbosa* and the pure white ones (which often formed mixed collections with rosy-pink ones) *A. rosea.* This was an arbitrary decision, based on a lack of definitive evidence for apomixis.

Within the above species-complex, plants whose involucral bracts were dusky-brown or blackish could belong to any one of three species. I named them *A. umbrinella* if the bracts were blunt-tipped. Populations having acute-tipped brownish or blackish bracts were assigned to the widespread alpine species *A. media* if they lacked aromatic glandular hairs on their stems, and to the localized Wallowa Mountains species *A. aromatica* if they possessed such hairs. All three of these species must be largely apomictic and female-only in Oregon, as male plants are seldom collected. However, according to Bayer and Stebbins, the name *A. aromatica* should only apply to sexually reproducing populations. The species has been so rarely collected in Oregon that we do not yet know its reproductive status here.

To return to the title of this paper, in *Antennaria* it is important that we *cherchez les hommes*—look for the men! The puzzle of what species names to attach to plants of the *A. rosea* complex is much more easily solved if we know whether male plants were growing with the females. Nearly all our herbarium collections have only pistillate plants; rarely do collectors state on their labels whether staminate plants were present or absent. Let me recommend to all future collectors who prepare samples of *Antennaria:* please, "look for the men." Search for staminate plants and include them in your collection, or state on your specimen label that no males were observed. Perhaps this will help remove some of the mystery from the taxonomy of Oregon pussytoes.



Antennaria racemosa, *a sexual, outcrossing species. Illustration: J.H. Rumely, from Hitchcock et al. 1969. Courtesy U. of Washington Press.*

References: Bayer, R.J., and G.L. Stebbins. 1987. *Systematic Botany* 12:305-319; and 1993. *Canadian Journal of Botany* 71:1589-1604.

Chambers, from front page

Henny went to Yale University for her PhD. Her husband Ken was an instructor in botany at Yale at that time and he has written in these pages that one of the best experiences of his years at Yale was meeting Henny (OFN 2(4) 1996). For her PhD dissertation, Henny combined classical taxonomy with cytology, a hot field at that time. Her subject was the mint family (Lamiaceae) genus *Pycnanthemum*. Henny counted chromosomes for all entities in the genus and published her thesis findings in 1961 with a follow-up paper in 1971, reporting on artificial and natural hybrids.

Henny and Ken moved to Corvallis in 1960 where she began a half-time position at OSU in plant pathology. This allowed her to spend time with her two children born in 1960 and 61 as well as continue her professional work. When she started teaching at Linn-Benton Community College in 1972, she continued her hybridization studies and also collaborated with her LBCC colleague, Robert Ross on the well-loved book, *Wildflowers of the Western Cascades* (Timber Press, 1988). At this time she also became the curator of the *Mentha* (the mint genus) collection at the National Clonal Germplasm Repository in Corvallis.

Henny began volunteering for the Oregon Flora Project in 1995. Because of her earlier work in the family, she began by working on the Lamiaceae for the Checklist. Since then she has contributed treatments of the Verbenaceae, Caprifoliaceae, Cornaceae, Fagaceae, Plumbaginaceae and most of the Primulaceae. Last month she began work on the large, diverse, and very interesting family Ericaceae. These are the rhododendrons, huckleberries, pyrolas, and their relatives. She states with evident enthusiasm: "I am really glad that I can be involved in this project."

Henny and husband Ken, both now retired from teaching, do a good deal of traveling. "As you might guess," she says, "we center our trips around our research and general collecting interests. We love the back roads of eastern and southern Oregon and parts of California. And we especially love the wonderful Oregon vistas."

Thanks

Name _____

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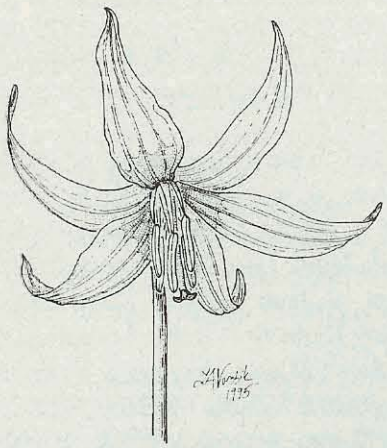


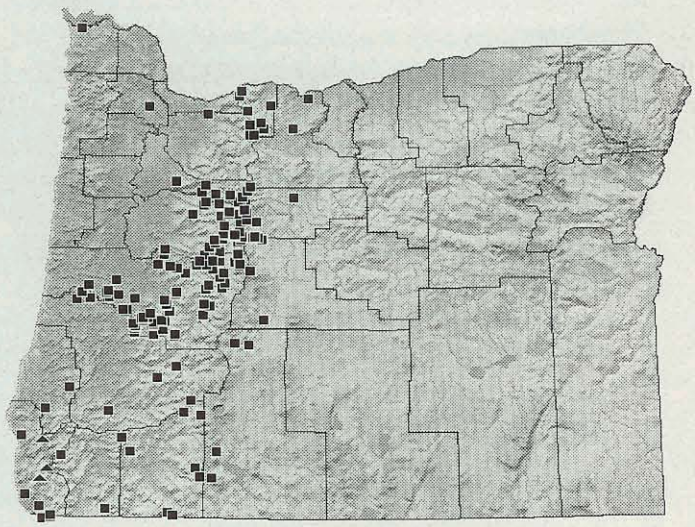
Did you know?

Scott Sundberg and Rhoda Love traveled (separately) with their spouses to the British Isles this summer and returned with these observations:

- Bracken fern (*Pteridium aquilinum*, a worldwide species), although native to the Scots Highlands, has become an invasive weed there due to past land use practices which included deforestation and management for grouse.

- Oregon natives Douglas fir (*Pseudotsuga menziesii*), Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla*) are frequently grown in forest plantations in the British Isles and often spread by seed.

- Many of our alien weeds are native to Europe. Conversely, several Oregon native species are naturalized in the British Isles, including salal (*Gaultheria shallon*), horseweed (*Conyza canadensis*) and snowberry (*Symphoricarpos albus*).



Chinquapin in Oregon

Distribution of chinquapin (*Chrysolepis chrysophylla*) in Oregon, based on records in the OSU Herbarium database and the Oregon Plant Atlas database. Squares represent variety *chrysophylla* and triangles show variety *minor,* which is found only in the southwestern corner.