Bulletin of the

NATIVE PLANT SOCIETY OF OREGON

Dedicated to the enjoyment, conservation, and study
of Oregon's native vegetation

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OUR 30TH ANNIVERSARY YEAR

IMPORTANT NOTE TO FIELD TRIP PARTICIPANTS
Field trips take place rain or shine, so proper dress and footwear are essential. Trips may be strenuous and/or hazardous. Please contact the trip leader for information about difficulty, mileage, and terrain. Participation is at your own risk. Bring water and lunch. All NPSO activities are open to the public at no charge (other than carpool mileage), and friends, newcomers and visitors are always welcome.

Notice to field trip chairs and leaders: The Forest Service and other Federal agencies have set policies limiting group size in wilderness areas to 12. The reason for this is to limit the human impact on these fragile areas. As we are often in the position of asking them to follow their rules and regulations for conservation of our natural resources, it's time for us to do the same. Each group using wilderness must be no larger than 12.

Blue Mountain

6 July, Sat. **FIELD TRIP.** Bruce Barnes will lead a field trip into the Wallowa Mountains. Leave 8am from the Blue Mountain Community College greenhouse.

6 July, Sat. **FIELD TRIP.** Jerry Baker will lead a field trip to Strawberry Lake in Central Oregon. Leave 7am from the Blue Mountain Community College greenhouse.

Corvallis

27 July, Sat. **FIELD TRIP** to Netarts Bay with Bob Frenkel. Visit sand dunes, salt marshes, and beach. Leave at 8am from the parking lot across from the Monroe Beanery. Total of 6 miles level hiking. Contact Esther McEvoy for more information (754-0893).

Emerald

27 July, Sat. **FIELD TRIP.** Join David Wagner of the UO Herbarium on a trip to Fairview Peak Roadless Area in the Bohemia District east of Cottage Grove to view the spectacular summer mountain wildflower dis play there. Depart from South Eugene High School parking lot (NE corner) at 9am. Bring handlens, rain clothes, lunch, drink. For Further information call Dave (346-3033).

High Desert

20 July, Sat. — **FIELD TRIP:** Pringle Falls Experimental Forest/RNA. Leave from the Juniper Park parking lot (7th & NE Greenwood in Bend) at 8:30am. Effects of both natural and planned fires will be seen. We will also visit the planned "Turn of the Century Forest" and understand the role fire will play in its development. Easy hiking. Call trip leader Bill Hopkins for details (389-3330).

20 July, Sat. — **FIELD TRIP:** Crater Lake National Park. We will visit Oregon's only National Park on this overnight campout. Our tour will include an examination of fire management in the ancient forests of the Park and visit to some rare plant locations. Moderate hiking. Please preregister with trip leader Stu Garrett at 389-6981 eves.

Mid-Columbia

10 July, Wed. — **MEETING.** 7:30pm at the Mosier School. Please note change this month only to the 2nd Wednesday of the month due to the 4th of July holiday. Russ Jolley will be our guest and present a program featuring "Restoration Efforts for Native Plants along the Eastern gorge Highway: Successes and Failures".

7 Aug., Wed. — **MEETING.** 7:30pm at Jerry Igo's estate. This will feature mid-summer flowering plants. Come early, 6:30pm, and join in a potluck dinner. Drive 5 miles up Dry Creek Rd. from Mosier, then look for signs. Call 478-3576 if you'd like to meet at Mosier and be escorted there.

North Coast

For information call Jean Gilbert (842-4801).

Portland

6 July, Sat. — **FIELD TRIP:** 'Right Angle Viewpoint' on the Clackamas & Molalla watershed divide, an area new to the NPSO. Spectacular views, unusual geologic features, old growth, and an excellent wildflower display. Gain about 300' to 4900' on an approx. 3 mile round trip. Leave at 8:30am from the K-Mart at 82nd & Milwaukee Expressway. Leader: Bryan Boyce (655-4457).

9 July, Tue. — **MEETING.** 7pm at First United Methodist Church, 1838 SW Jefferson St., Portland. Bonnie Brunkow will give a presentation on the Wallowas.

13 July, Sat. — **FIELD TRIP:** Destination is 5334' Mount Lowe in the Upper Clackamas drainage. Great views and a good selection of upper elevation Western Cascade plants. Moderate hike of 2-3 miles. Leave from the new Estacada Ranger Station along Hwy. 224 at the north edge of Estacada at 9am. Call leader Bob Powne (292-5364) for more information. Optional will be a walk through some remnant low ele vation old growth.

13 July, Sat. — **FIELD TRIP:** Bog-hop in the Gifford Pinchot N. F. McClellan Meadow, Lone Butte Meadow, Crazy Hills Bog, and South Prairie Bog (if time permits). Bring rubber boots or change of shoes. Leave at 8:30am from Lewis and Clark State Park off I-84. Leader is Bonnie Brunkow.

Siskiyou

20 July, Sat. — **FIELD TRIP:** Dutchman Peak/Observation Peak Botanical Areas on the Applegate Ranger District. Barbara Mumblo will lead a field trip to two high elevation botanical areas (time permitting). This will be an easy hike mostly on roads or trail. Leave from Star Ranger Station at 9am. For info. call Bar bara Mumblo (899-1812).

Umpqua Valley

25 July, Thurs. — **MEETING.** Swiss alpine flora by Elisabeth Sommer from St. Gallen. 7pm in Room 310, Douglas County Courthouse, Roseburg. For more information call 673-3709.

27 July, Sat. — **FIELD TRIP.** Subalpine flora on Hershberger Mountain on the Rogue-Umpqua Divide. Leave from the BLM parking lot, 777 Garden Valley Rd., Roseburg at 7:45am.

Willamette Valley

13 July, Sat. — **FIELD TRIP.** Andrews Experimental Forest, Blue River Ranger District, Willamette NF. Leader is Art McKee. Leave from South Salem K-Mart at 8am or meet at the experimental forest headquarters at 11:30am.

William Cusick

13 July, Sat. — **Field Trip** to visit the John Day area with Malheur National Forest botanist Greg Lind. Hike will be in the Cedar Grove Botanical Area and the Baldy Mountain Research Natural Area. Contact Greg (820-3311 days; 820-4759 eves) for more information.

WELCOMING OUR NEW MEMBERS....

We have 14 new members this month!

Blue Mountain Chapter	Jane Keesey Marilyn K. Redfield Priscilla Dauble
Emerald Chapter	Marie Palumbo Ouapiti Robintree Carroll
Portland Chapter	Cindy Nielsen Mary k. Murphy Ruth Feiring
Siskiyou Chapter	Scarlett Miles
Umpqua Valley Chapter	Cindy L. Barkhurst Ray Godfrey
Willamette Valley Chapter	Frank Morgan Tom Jenkins
At Large	Molly E. Reeves

DAISIES WILL TELL--
HOW PLANTS PLAY THE NUMBERS GAME

Springtime brings us two familiar plants of the *Compositae* family--Oxeye-daisy and English-daisy--which can be used to play the "she loves me, she loves me not" numbers game. Remember how it works: you pluck the rays off the daisy head one at a time, chanting "she loves me, she loves me not," hoping that the final ray will send the message "she loves me." [Excuse my masculine bias; readers of the feminine gender may substitute "he" for "she"]. In mathematical terms, the game tests the probability that the number of ray flowers in a daisy head will be an odd number or an even number. It would obviously help us if there was scientific evidence that daisies, or any other kind of flower for that matter, showed a bias towards particular numbers of petals or rays.

Not surprisingly, such studies have been done, and the mathematical "rules" for petal numbers are well understood--although statistical fluctuations prevent us from knowing beforehand whether a particular daisy head will be "odd" or "even." As each of us learns early in our botanical studies, the numbers of different flower parts may be highly uniform and characteristic within particular plant families and genera. Flowers of family *Cruciferae* (the mustards), for example, "always have 4 petals and 6 stamens;" five is the standard number of petals in many other families of dicotyledons, while three or six are the characteristic numbers for families *Liliaceae* (lilies), *Iridaceae* (irises) and many other monocotyledons. In some families, on the other hand, the numbers of reproductive organs such as petals, stamens, or pistils vary from flower to flower. Such is the case also with the ray flowers in the heads of family *Compositae* (daisies, sunflowers, asters, etc.); each head is composed of two different kinds of flowers--ray and disc--but the number of ray and disc flowers usually varies from head to head. The variation can be described either statistically, based on the average number of ray and disc flowers in heads of a given species, or by emphasizing the most common numbers and skipping the rarer ones.

In Arthur Cronquist's description of two related species of goldenrod (*Solidago*), for example, *S. mollis* is said to have "about 8" ray flowers, while *S. canadensis* has "about 13 (10-17)" ray flowers. Here, a taxonomist is using ray number to distinguish between two species, even though this number is not strictly fixed and constant.

When there are large numbers of flowers per head in a genus of *Compositae* and the numbers clearly are variable, taxonomists usually write simply "flowers numerous." This attitude of "I give up, there are too many to count" does not satisfy the purists among botanical morphologists, however. Students of plant morphology delight in finding mathematical regularities in floral development, and their key analytical model is the so-called Fibonacci numerical series (Leonardo Fibonacci, Italian mathematician, 1180-1250). In this series, each number is the sum of the two preceding numbers; it goes: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55...etc. The series was already known to mathematicians of ancient Greece, who noted that the ratios of adjacent numbers (2/3, 3/5, 5/8, 8/13, etc.) approach a "golden ratio" of 0.6180339... The latter number also is mathematically unique in giving the same result when added to one as when divided into one ($1 + f = 1/f$, where f = "the golden ratio").

Fibonacci numbers and ratios show up remarkably often in two features of plant morphology: the arrangement of leaves on the stem, flowers in a head, etc.; and the absolute numbers of plant organs such as bracts, sepals, petals, etc. Knowing how they affect the numbers of ray florets in daisy heads may help us to win the "love me, love me not" game. Spirally arranged leaves, bracts, and flowers have positional relationships which can be expressed by Fibonacci ratios. Consider the pine cone in Figure 1. The cone's bracts seem to form two obvious sets of spirals, one steeply slanted (A) and one more shallow (B). These apparent spirals (called parastichies) are the indirect result of an even more shallow spiral, which is the true developmental sequence of the bracts at the young cone's growing point. In this "developmental spiral," which is difficult to discern from the exterior of a mature cone, each successive bract attaches to the axis at a point ca. 140 degrees (2/5) around the circumference from the preceding bract. As a result, Fibonacci numbers determine how many evident bract spirals there will be; e.g., in the illus-

trated cone, 8 rows of steep spirals (A) and 5 rows of shallow spirals (B). Eight and five are adjacent numbers in the Fibonacci series! In each of the 8 steep spirals (A), the successive bracts are every eighth bract of the true "developmental spiral." In the cones of other conifer species, the numbers of steep and shallow parastichies may be larger, but always they will be Fibonacci numbers (e.g. 8 and 13, or 13 and 21). To return to the heads of family *Compositae*, Figure 2 shows that exactly the same Fibonacci "rules" apply to numbers and arrangement of ray and disc flowers. In this diagrammatic view of a circular receptacle, each numbered circle is a flower. They are numbered in developmental sequence, 1 to 21. The circumferential angle between successive florets (numbers 17 and 18 in the diagram) is 137.5 degrees, which is 360 degrees times the square of the "golden ratio" (360 x .38197..., the "Fibonacci angle"). One set of 8 parastichies, running clockwise, is marked by bold lines drawn between numbered florets; each line connects florets that are eight apart in the developmental sequence (note: 1-9-17; 4-12-20, etc.). The other set of 5 parastichies runs counter-clockwise, and the florets are connected by thin lines (note: 2-7-12; 5-10-15-20, etc.--five steps apart in the developmental sequence). Most people have seen what is probably the most spectacular example of apparent spirals in *Compositae* heads, namely the cultivated sunflower, with its hundreds of geometrically arranged "seeds," the fruits of its ray and disc flowers. So the question is, do the ray flowers of Compositae heads always equal a Fibonacci number? One might think so, from the example I quoted earlier in Conquist's key to Solidago species (note "rays 8" versus "rays 13").

Unfortunately, the answer is "no", ray numbers form a continuous series in most species, but with statistically significant "peaks" at or near Fibonacci numbers. One complicating factor is head size; as in humans, head size in Compositae varies continuously, not in discrete steps. Ray flowers occupy the outer rim of the receptacle. In Figure 2 there are 13 ray flowers, yet only eight of these (numbers 1, 4, 7, 2, 5, 8, 3, and 6) form the bases of clockwise parastichies. Space on the rim allows five other flowers (numbers 9, 12, 10, 13, and 11) to sneak to the edge and form rays. In smaller heads of this species, some of the latter might be forced onto the disc, and ray flower number would range downward to 12, 11, 10, etc. In a different species having larger heads, ray numbers might vary between 13 and 21, as there would be more space for them at the rim of the receptacle. The drawing of Figure 2 is taken from morphological studies by Prof. Konrad Bachmann, University of Amsterdam, who has shown that only the flowers of the outermost circle develop the structure of rays, whatever their numbers are in the "developmental spiral."

Playing the game of "love me, love me not" with daisy heads ends up being like a visit to a Reno gambling casino. You can play the odds and bet on Fibonacci numbers (which by the way are mostly "odd"), but don't be surprised if you lose to an even number now and then.

--Ken Chambers
Corvallis Chapter

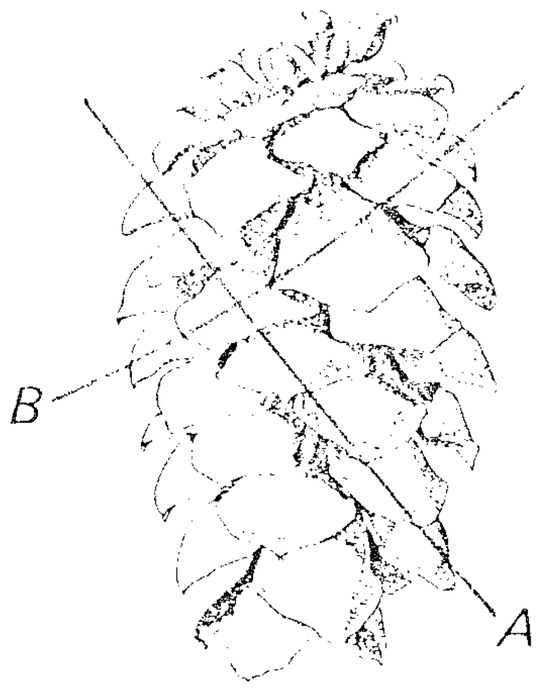


Figure 1. Cone of Pinus flexilis (drawing by Jeanne R. Janish) showing clockwise (A) and counter-clockwise (B) spirals (parastichies) of bracts.

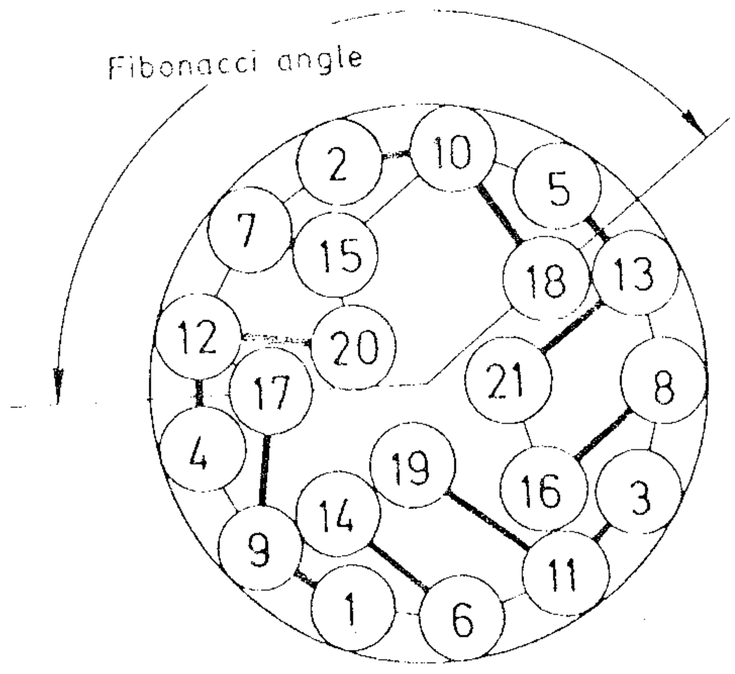


Figure 2. Diagram of a head of family Compositae containing 13 ray and 8 disc flowers. Their spiral arrangement is somewhat distorted due to crowding.

HYPOCHOERIS RECTIFIED: JOY IN THE EYE OF THE BEHOLDER

"A Pesty Weed and A Botanical Joke" (Chambers 1991, *Bulletin* of The Native Plant Society of Oregon) quickly caught my interest. *Hypochoeris glabra* L. was the subject of my Masters thesis research (Baker 1977, Baker & O'Dowd 1982). This dandelion relative dominated my life for over two years and shaped my research career. What first attracted me to such a common annual was its seeds, called achenes. *Hypochoeris glabra* produces two distinctly different achenes on the same flower head or receptacle (Fig. 1). My research centered around the ecological implications of achene dimorphism. I wore one achene of each type securely sealed in a locket for good luck and inspiration. Clearly this plant was not "less than joyous" to me despite its name. Many plant species from diverse families, such as the *Brassicaceae*, *Chenopodiaceae* and *Asteraceae*, produce two or more different types of propagules. In several cases, each seed type has been shown to have different germination requirement and/or dispersal vectors, thus increasing the spectrum of conditions for seed dispersal and establishment. This ability is advantageous in variable environments. The roles of the two propagule types have often been identified as "colonizer" and "maintainer". The colonizer disperses more widely and has less specific germination requirements while the maintainer remains in the parental environment and has characteristics which confer a higher probability of establishment in that environment. Plants which produce more than one seed type seldom produce equal amounts of each type and the proportion of each type produced depends on drought stress, photoperiod and intraspecific competition. Germination differences between the two achene types of *H. glabra* are not well developed although the beaked achenes germinate over a slightly broader temperature range. The most distinctive differences between the two types are in modes of dispersal and relative number or each type produced per receptacle. The results of my research suggested that the beaked achene was most likely to colonize new habitats while the unbeaked achene remained in the vicinity where the parent plant had been successful. The proportion of each type produced per receptacle is dependent on environmental conditions. When resources were limited a higher proportion of unbeaked achenes were produced and under more optimal conditions a higher amount of the beaked achenes, the colonizers, were produced. Under limited resources the type of achenes that are produced are the ones most likely to remain in the locality of proven favorability.

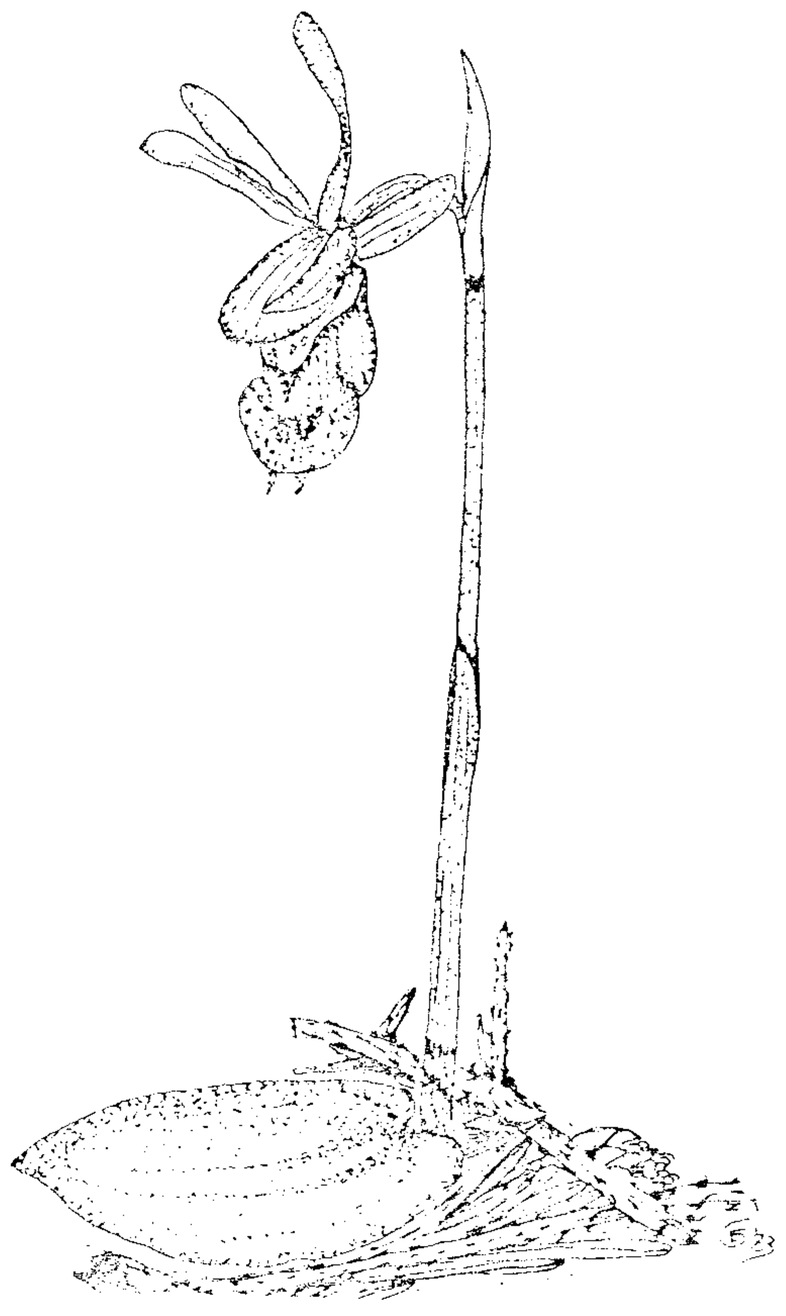
I was not aware of the meaning of *Hypochoeris* until I read Ken Chambers article but I have always been curious about the different (dimorphic) spellings I encountered. My research was done in California and so I use the spelling from Munz, "A California Flora", perhaps for the last time here.

REFERENCES:

Baker G.A. 1977. The ecological implication of phenotypic achene dimorphism in an annual composite, *Hypochoeris glabra*. M.Sc. Thesis. San Diego State University.

Baker G.A & D.J. O'Dowd 1982. Effect of parent plant density on the production of achene types in the annual *Hypochoeris glabra*. Jr of Ecology 70:201©215.

¬Gail A.Baker, Emerald Chapter



Calypso bulbosa
Drawn by Esther McEvoy

NPSO Research Grants at All–Time High

The Native Plant Society of Oregon is funding 5 $400 field research grants this year with the help of a $300 donation from the Mid–Columbia Chapter. 2 of the grants involve matching funds from the Plant Systematics and Conservation Biology Program of the Oregon Dept. of Agriculture.

Tom Kay (in a cooperative project involving Oregon State University and the Oregon Department of Agriculture) has received the Leighton Ho Memorial Field Botany Award to study *Lomatium bradshawii* (Parsley family). This species is State and Federally listed as Endangered and is endemic to prairie remnants in the Willamette Valley. A population of this species has been fenced by the Lane County Parks Department to keep cattle from grazing and trampling the site. Tom will be monitoring the population by means such as: tagging and mapping individual plants, measuring plant height, number of leaves, number of umbels, and number of fruits produced per plant. Since the flowers seem to be pollinated only by native solitary bees (which have also suffered great loss of habitat) knowledge of their potential role in *L. bradshawii* seed production is important to recovery efforts. Tom will conduct a standard bagging experiment to determine whether *L. bradshawii* is capable of producing seed in the absence of pollinators. He will also determine the diversity and abundance of potential pollinators.

Carolyn Wright and Dave Gross will do a survey of the Vinegar Hill–Indian Rock Scenic Area, located between the Elkhorn and Strawberry Mtns. in Grant County. This will increase our knowledge of the Blue Mountains flora, which is poorly understood. They will better define the range of some species which show gaps in their distribution and may extend the known range of others.

Daphne Stone will conduct a survey of the fruticose lichen *Usnea longissima* to define its preferred habitat in the Willamette Valley. This lichen is particularly sensitive to air pollution and is in extremely rare in Europe. Daphne's study will provide an excellent baseline for monitoring the response of this species as the human population in the Willamette Valley grows.

Funds contributed by the Mid–Columbia Chapter will enable Lisa Lantz to participate in a study of *Astragalus sterilis* (Pea family) that is being conducted by the Oregon Department of Agriculture with the help of further matching funds from the Bureau of Land Management. *A. sterilis* occurs in eastern Malheur County on dry bluffs and knolls that are nearly bare of other vegetation. The species may be limited in its ability to reproduce sexually. Lisa's study will focus on flower production and the pollination ecology of this rare plant that is a candidate for State and Federal Endangered species status. Mining activities now top the list of potential threats to this species.

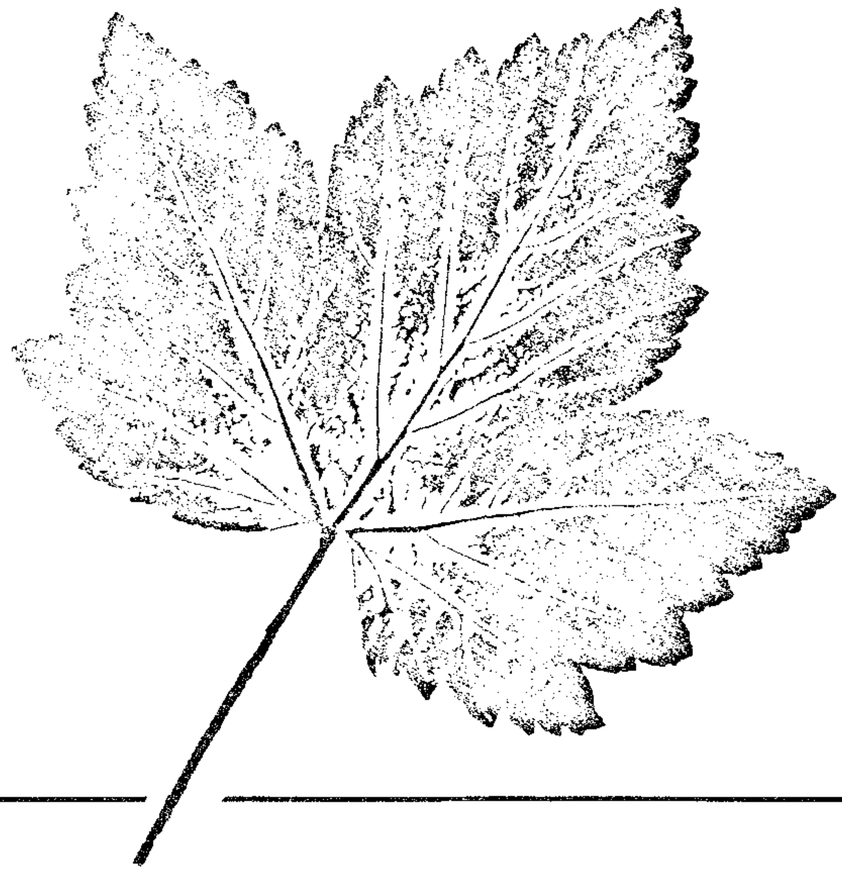
The other matching grant goes to Eric Peterson, who will assist the Oregon Department of Agriculture with monitoring and ecological studies of *Cordylanthus maritimus* ssp. *palustris* (Figwort family). *C. maritimus* is restricted to a few salt marshes along the coast, where draining, filling, and pollution are the major threats to its habitat.

— Dan Luoma
Corvallis Chapter

Plant Puzzle

Do you recognize this plant? The first person to give the correct scientific name will win a prize. The leaf illustration is from a woody plant native in Oregon.

Send your guess on a postcard to:
Peter Zika
4230 NW Clubhouse Pl. #1
Corvallis, OR 97330



A Personal History of The Native Plant Society of Oregon

The first meeting of the Native Plant Society of Oregon was held in Room B of the Multnomah County Library February 5th, 1961, at 8 pm. Our founder was Leonard Wiley, a short stocky man with a wealth of knowledge about native plants. His willingness to share this knowledge was well received by the 33 people who became charter members of the organization. Leonard chaired the meetings until increasing membership made it necessary to elect officers, have by-laws and levy two dollar dues. Leonard resisted this, hoping it would never become a political or social club. He wished it to be for all to enjoy and promote the knowledge of our wild plants. Leonard later published a book on the distribution and culture of many of our rare wildflowers. This was titled "Rare Wild Flowers of North America".

Reports that the early Society took no actions on the preservation of native plants are oversights. Incidences that I can remember include the following. The highway department notified the Society of a new road to be built in the Clackamas area, and asked that someone check our the two alternative routes. Dr. John Hammond and possibly Ed McDowell surveyed both routes, and finding no rare plants told the highway department to use their preferred route. Another incident concerned the Columbia River Gorge freeway. Anyone in the Native Plant Society was given permission to salvage plants along the route. Many plants went to the Portland Audubon Society Sanctuary and to the historic Howell-Bybee House.

In the spring of 1962 Leonard invited me to search for *Iris gormanii* (nowadays submerged in *Iris tenax*) in the Scoggins Creek area. This was fine except in those days married women did not roam around the woods alone with another man, married or not. I was to pick Leonard up at his home. A friend and member, Dorothy Campbell, agreed to go with me. When we drove up to the Wiley residence Leonard looked surprised and when he introduced us to his charming wife there seemed to be a glimpse of amusement in her smile. We found *Iris gormanii* on private property and got permission to collect anything we wanted. My starts grew prolifically and were shared widely.

When the Memorial Coliseum first opened, the Native Plant Society was invited to have a booth in conjunction with the Men's Garden Club. Gus Hafenbrach was to make all arrangements. On opening day Mrs. Hafenbrach frantically called me and said that Gus was in the hospital with a heart attack and had not made out a schedule for manning the booth, and would I take over. Laura Hollbeck rushed down to open the booth and hand out leaflets for our meeting. These were no doubt prepared by Gus. (It was Gus who sent out our first one-page notice.) All went well that day, and Gus recovered in time to be on duty at our booth.

Some years later the Men's Garden Club again invited us to have an entry in their "Gardens on Review" at the Expo Center on Columbia Blvd. in Portland. The theme for our display was a home wildflower garden. All plants were to be from our own gardens. The winding path led up to a pool, which was a large mirror highlighted by a spotlight. The barkdust for the garden was dumped in the corridor a long way from our space. A lady from Oregon City, whose name I do not remember but who will be called Janet, Dorothy Campbell and I were the only ones who showed up to work. Several of the men brought balled or potted plants in, set them down, looked our project over, gave approval and walked out without offering help. Hauling all that barkdust in buckets soon wore we three gals out. Janet found a large carton and a short piece of string to pull the carton. This made the work faster and lighter. The trees and shrubs formed the background and the flowers lined the path. Many of the members were on duty during the show, which was a great success.

Our group enjoyed many field trips from Saddle Mtn. on the coast to all the mountain meadows on St. Helens and the other surrounding mountains, as far as Central Oregon. One especially great trip was a three day trip down the coast from Cape Perpetua to Gold Beach, where a local group took us on an interesting trip in the Pistol River area. All our trips made wonderful memories for me. Respectfully submitted in fond remembrance of my fellow members.

--Christy Brindle Steck
High Desert Chapter

GIFTS THAT KEEP YOUR NEWSLETTERS COMING

The Native Plant Society of Oregon gratefully acknowledges the two gifts of computer equipment for the Membership Committee.

Ray and Peg Prag, Siskiyou Chapter members from Williams, donated an IBM PC-XT computer and display terminal.

Rhoda Love, Emerald Chapter member from Eugene, has donated an Epson printer.

We thank you for these contributions.

--Jan and Dave Dobak
Membership Committee

PROJECTS FOR RARE PLANT RESEARCH: PART II

This is the second in a two part list of plants which need taxonomic work. This list has been compiled by the Oregon Heritage Program in conjunction with the Plant Systematics and Conservation Biology Program in Oregon's Department of Agriculture. The plants are listed in relation to their rarity within the state. The name listed (in parenthesis) after the species is the person to contact before attempting work.

LIST 1: SPECIES THREATENED OR ENDANGERED THROUGHOUT THEIR RANGE

Arabis macdonaldiana--A. modesta (Linda Vorobik, U.C. Berkeley)
Arabis suffrutescens var. *horizontalis*
Fritillaria gentneri (Ed Guerrant, Berry Botanic Garden)
Myosurus minimus spp. *apus* var. *sessiflorus*
Phacelia lutea var. *mackenzieorum*
Sedum radiatum spp. *depauperatum*

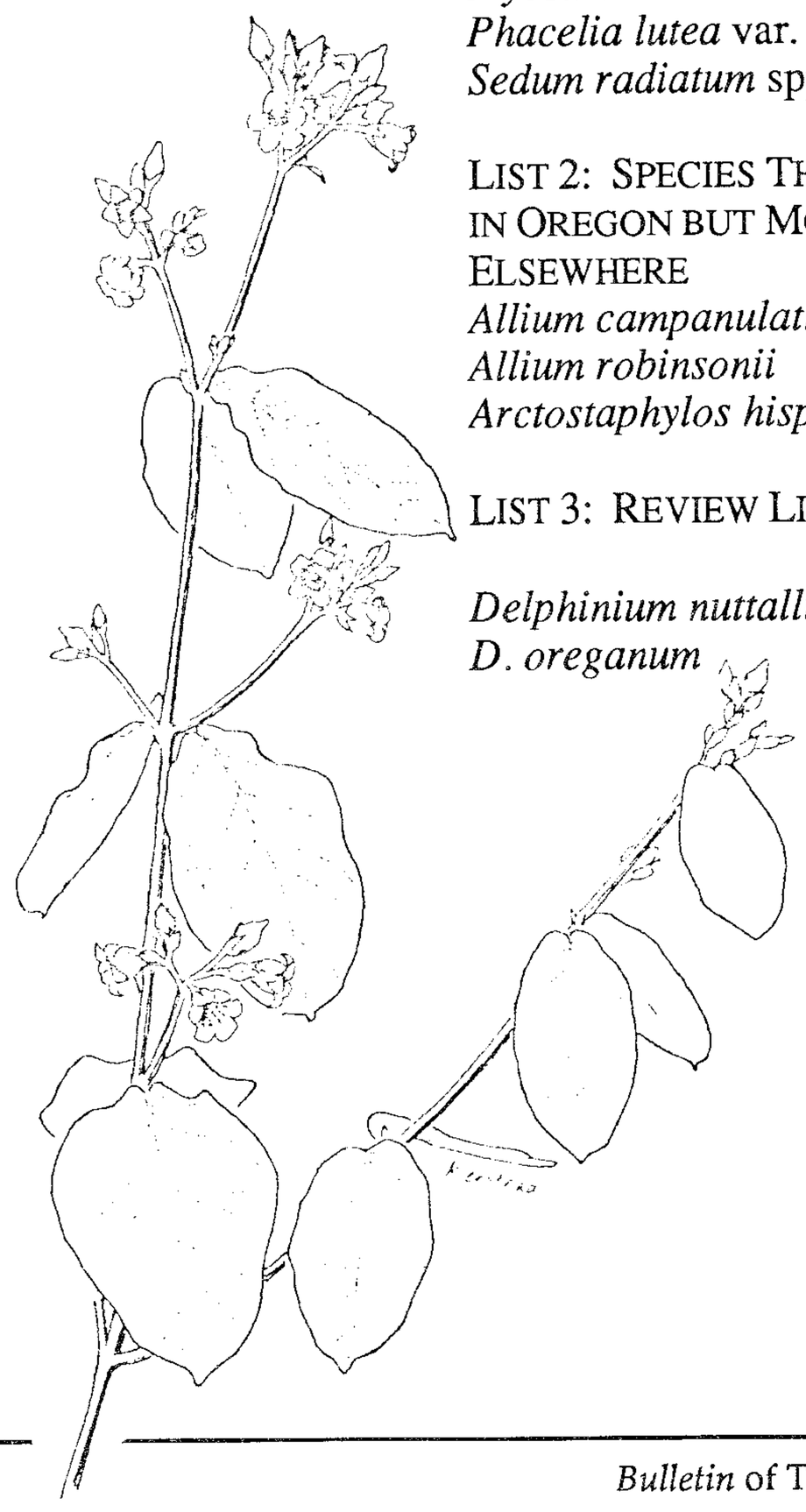
LIST 2: SPECIES THREATENED OR ENDANGERED IN OREGON BUT MORE COMMON OR STABLE ELSEWHERE

Allium campanulatum and related onions
Allium robinsonii
Arctostaphylos hispidula and related species

LIST 3: REVIEW LIST

Delphinium nuttallii
D. oreganum

--Jenny Dimling
Emerald Chapter



Apocynum androsaemifolium
Drawn by Julie Kierstead

BITS AND PIECES
---NEWS AND INFORMATION FROM ALL OVER

ROGUE RIVER N.F. AND PACIFIC YEW HARVEST

The recent discovery of the value of taxol, an extract of Pacific yew bark, in cancer treatment has transformed our native yew from the status of a weed tree to a forest superstar. Harvest of yew bark has become an economically attractive activity. The Rogue River National Forest has taken several steps connected with harvest of suddenly valuable Pacific yew. Initially the Forest began harvesting yew bark from existing timber sale areas, rescuing it from slash piles where previously it had been burned. Secondly they assembled specialists who drafted "working guidelines" to guide harvest of yew bark. Finally, due to high demand for yew bark, the Environmental Policy Act has been called into play, requiring "scoping" of the proposed harvesting, to determine the significance of the impacts on the environment and the species itself. The Rogue N.F. is asking for comments defining concerns over management of Pacific yew. They wish information on what we consider to be issues connected with yew harvest, and potential management alternatives.

Working with the mathematics of the yew supply brings up some interesting information. It has been widely quoted that it takes six yews one hundred year old to treat one cancer patient. Other statements hold that clinical tests will require three trees per patient. Initial estimates put the number of yews on Forest Service and BLM land in Western Oregon and Washington--the heart of quality yew range--at less than 30 million trees. Other guesstimates put total Forest Service land suitable for yew growth at ten to fifteen thousand square miles. Sound like a lot?

It isn't. If it is true that it takes six one-hundred year old yews to treat one case of cancer (out of 4 to 500,000 cases treatable *yearly* in the United States alone), then the currently existing trees cannot possibly supply the potential demand. Treating half a million cases yearly would eliminate all mature yews from BLM and Forest Service land in Western Oregon and Washington in ten years. And taxol is likely to be found effective by current research projects in more types of cancers. World demand for it is going to be high, as the USA only has about one-twentieth of the world's population.

If the 10,000 Forest Service square miles of the best yew sites were given over *exclusively* to yew production (with no consideration given to timber production or the endangered species act) and the yews were able to be spaced 30 feet apart, then enough taxol could be produced to cover *current* US needs---after the 100 year lead-in time needed to produce six centenarian yews per patient. With only a ten year supply in hand, that leaves a ninety year gap without enough taxol.

The question is not if yew is endangered by taxol production demands. The answer to that is obvious. The question is whether synthetic production--in field or labratory--will be possible so that we can have taxol available for needed cancer treatment. Research on this is ongoing. The very complex nature of the drug makes artificial reproduction difficult. Other research is going into extracting taxol from the needles and branches of the plant. Yew resprouts readily from pruning cuts, such as are made to harvest foliage. Peeling the bark destroys the tree. Field plantations of yew might provide large quantities of taxol. Statements that yew will not tolerate direct sunlight are inaccurate. Though it is true that yews are found in nature as shade tolerant understory trees, they survive in clearcuts if not cut, and yews growing in a full sun southwest exposure in rock in BLM's Table Rock Wilderness Area at 4500 ft. are certainly tolerating sun. Horticulturists know that almost all shade requiring plants will take full sun if given plenty of water and good cultural practices.

All these figures are very preliminary and could be inaccurate. And the idea of planting yews every 30 ft. to eventually produce 100 year old trees is unlikely to be carried out. The laws connected with wilderness areas and endangered species would have to be scraped. Timber companies would lose access to all the timber on that land. Hopefully we will soon have a better way than mining our forests for yew.

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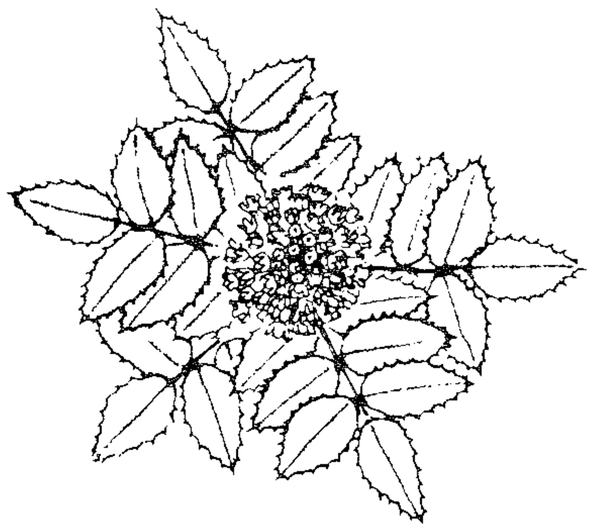

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