

THE ERICACEAE OF CALIFORNIA.

THE NOW DIVERSE HEATHER FAMILY

The Ericaceae is a worldwide family of great importance for its many beautiful ornamentals.

- In addition, the genus *Vaccinium* (and a few others) provide delicious, edible berries including huckleberries, blueberries, and cranberries
- The family typically favors moist, shaded, humusy environments with acid soils, but there are several important exceptions
- The family is particularly diverse in the Himalayas and other parts of Eastern Asia, in the Cape Province of South Africa, and in California
- Two genera stand out for living in hot, dry situations: the genus *Arctostaphylos* (manzanita) centered in California, and the genus *Erica* (heather) centered in South Africa

At one time, most of the Ericaceae was considered to embrace woody shrubs and trees, many with simple, evergreen leaves

- Currently some related groups, including the southern heaths in the former Epacridaceae, and the semi- to fully fungus parasitic, herbaceous plants once placed in the Pyrolaceae, are now lumped into the Ericaceae
- The family features urn- to bell-shaped flowers, with some also being saucer shaped or trumpet shaped as in the case of the genus *Rhododendron*
- Typical flower traits include (generally) 5 sepals, 5 petals joined together at the base, 5 or 10 stamens that are not attached to the petals, and a compound pistil of (mostly) 5 carpels
- The fruits are either fleshy berries or dry capsules, and...
- The stamens' anthers open by pores or holes at the top

Because the Ericaceae has over 2,000 species, the family is subdivided into several groups, four of which are prominent in California

- Our biggest group is the madrone group (Arbutoideae), characterized by urn-shaped flowers and fleshy berries
- This group contains—in addition to the sixty or so manzanitas (*Arctostaphylos* spp.)—madrone (*Arbutus menziesii*), summer-holly (*Comarostaphylis diversifolia*), mission manzanita (*Xylococcus bicolor*), and Baja bird bush or palo blanco (*Ornithostaphylis oppositifolia*)
- Outside of the madrone, these others are poorly known and confined to small areas of Southern California
- Because the manzanitas are so well known (and I have a separate Powerpoint for them), we'll start with the other genera

The genus *Arbutus* or madrone besides, *A. menziesii* in California, has species in Arizona, Mexico, and the Mediterranean region

- Madrones are identified by their smooth orange-tan new bark, and curled shavings of old bark,
- The large, evergreen, broad leaves lined with tiny teeth,
- The hanging clusters of white (sometimes pink in some species), urn-shaped flowers, and
- The red to orange, berries covered with warty bumps (manzanita berries are smooth)

Madrone occurs in mixed conifer and mixed evergreen forests from northern Baja California to British Columbia, occurring also at middle elevations in the central and northern Sierra Nevada. In full bloom in April, the trees are covered by myriad flowers.



Madrone flowers are fragrant at close range, and look like fat urns, the flower outline usually broader than manzanitas



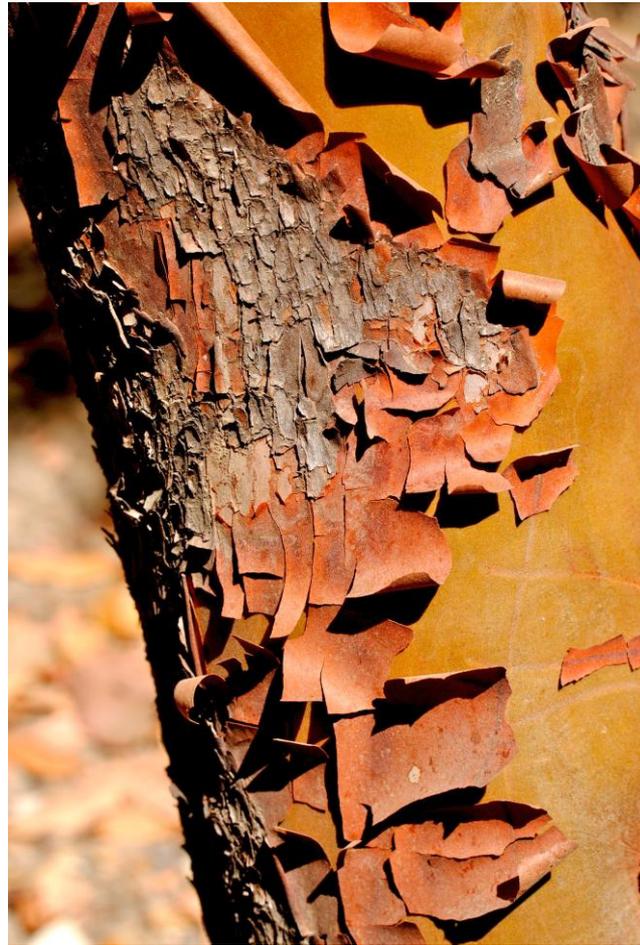
The large tough leaves of madrone are bright to dark green and lined with minute teeth. They're horizontally to obliquely oriented unlike the usual vertical leaves of manzanitas



The newer bark of madrones is smooth and tan-orange in color,
but...



...as the trees age, the bark peels into shavings before being sloughed off



The large production of red-orange berries in fall, attracts birds like cedar waxwings to the madrone



The globe-shaped fruits are covered with warts



Little known to northern Californians, the summer-holly, *Comarostaphylis diversifolia*, is a large shrub or small tree mostly confined to the Channel Islands, blooming in midspring with myriad white, urn-shaped flowers



Summer-holly flowers are arranged in long, horizontal racemes whereas manzanita flowers are in short drooping panicles



Summer-holly leaves look much like madrone leaves except they're somewhat smaller and the teeth are more prominent.



Summer-holly leaves are also bicolored, paler underneath and darker and shinier on top



The colorful red berries ripen in late summer and look very much like madrone berries, complete with warts



Ornithostaphylis oppositifolia or Baja bird bush is a small tree that barely enters San Diego County in Southern California, the main concentration in northern Baja California. Here it is in full bloom in late winter to early spring



Baja bird bush flowers are like tiny manzanitas. Also notice the long narrow, evergreen leaves. The specific epithet refers to the leaves being opposite or whorled, a feature rare in Ericaceae



The alternate common name, palo blanco (white tree in Spanish) is for the gorgeous white to pale tan bark on the mature trunks.



Despite the common name Mission manzanita, *Xylococcus bicolor* differs in having tan bark, obliquely oriented, bicolored leaves and somewhat different fruits



Here you see the elliptical leaves with curled margins of Mission manzanita; the undersides are covered with dense white hairs



Mission manzanita produces gorgeous rose-pink flowers in winter, trimmed with red sepals. This species is rare and confined to a few coastal areas of southern San Diego County.



The other group of California Ericaceae with berries is a subgroup typified by the genus *Vaccinium* (huckleberry, blueberry, bilberry, and cranberry)

- Vacciniums are all shrubs, some evergreen, some deciduous, with bell-shaped white, greenish or pale pink flowers and blue, purple, or red berries (all of which are deliciously edible)
- The main distinction for the group is the inferior ovary, the rest of Ericaceae have a superior one
- Vacciniums grow in moist woods from the coast into the high mountains; none of them is drought tolerant and some are very difficult to grow

In California, *V. ovatum*, the only (for us) evergreen huckleberry, is the best known and a typical understory shrub in coastal conifer (including redwood) forests. Here you see a stand on Mt Tam



Evergreen huckleberry features many horizontally trending branches with small, tough, shiny, toothed leaves



Although normally green, evergreen huckleberry leaves can turn bright red when stressed



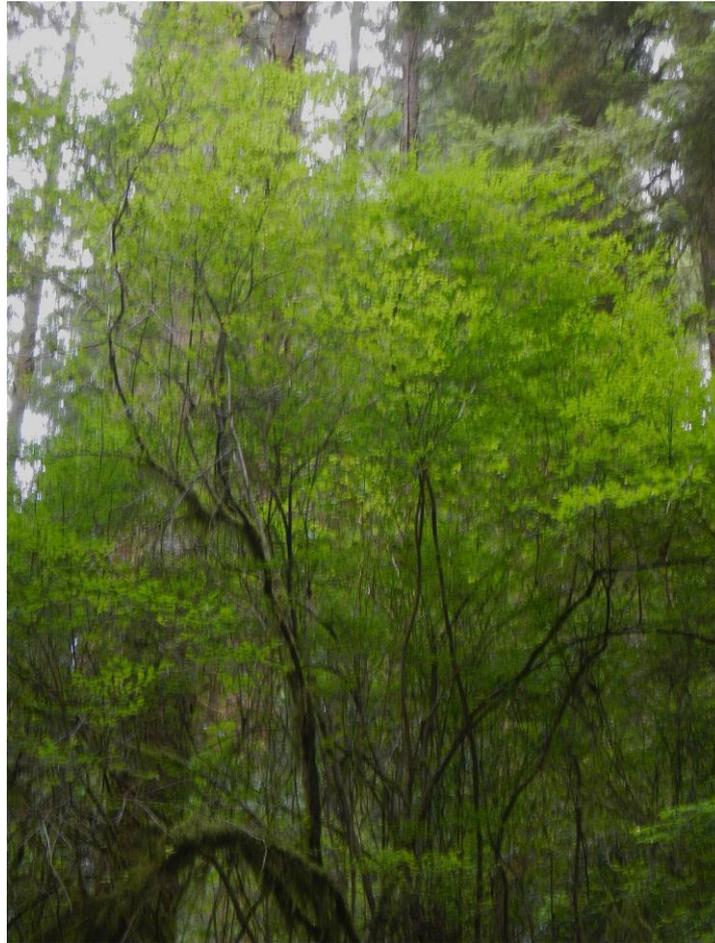
Evergreen huckleberry blooms from late winter into spring. Note the bell shaped flowers, red sepals, and green inferior ovary



Huckleberry fruits turn blue to dark purple when ripe in late summer, and are among the best eating of our native fruits



A second huckleberry, *V. parvifolium* or red huckleberry, joins the understory of coastal forests north of the Bay Area. Its leaves are paler green and it typically grows on old logs and nurse stumps



Red huckleberry has untoothed thin leaves compared to evergreen huckleberry



The deciduous broom huckleberry, *V. scoparium*, is closely related to red huckleberry but grows to only a few feet high and forms large colonies by underground rhizomes. It too produces red berries.



Broom huckleberry has similar leaves to red huckleberry, although the leaves are even smaller. This species forms an understory in the moister parts of the Klamath Mountains or occasionally in the northern Sierra



V. membranaceum, the northern huckleberry found in Klamath Mountain forests, is a small deciduous shrub with bright green elliptical leaves



Because of its green flowers, northern huckleberry is seldom noticed for its floral display but...



...the leaves turn vivid shades of yellow and red in the chilly fall days



Two bilberries are common in the high Sierra. This one, *V. occidentale*, forms dense clumps of blue-tinted foliage on moist hummocks on the edge of bogs and other wetlands.



Although western bilberry flowers are not showy, it makes up for it with the vivid red leaves in fall.



The other Sierran bilberry, *V. caespitosum* or dwarf bilberry, forms low sprawling mats of blue-tinted leaves. The tiny white flowers hide underneath the branches. Here you see it growing with its relative Labrador tea, *Rhododendron glandulosum*.



Like its bigger brother, dwarf bilberry turns brilliant red in fall. This species also grows in moist places but not usually in bogs.



Let's move on to another subgroup of the Ericaceae that produce papery capsules in fruit. Among these are several true gems that are difficult to grow in lowland gardens.

- This group includes three companion genera from wet meadows in the subalpine and alpine regions of the high mountains...
- White-heather, *Cassiope mertensiana*,
- Red-heather, *Phyllodoce breweriana* and *empetriformis*, and
- Bog laurel, *Kalmia polifolia*
- In addition we have mock azalea, *Menziesia ferruginea*, from north coastal forests, and
- Salal and its relatives, *Gaultheria*, from coastal and northern mountain forests

White-heather, not a true heather at all, is a low mounding subshrub with braided leaves and lovely, bell-shaped white flowers.



A closer view shows the tiny leaves and white bells trimmed with rose-red sepals. This and its congeners have proved difficult to grow and usually languish after a few years in gardens.



The common red-heather often joins white-heather but grows taller as a more upright shrub. Note the needlelike leaves and magenta flowers.



The Sierran species of *Phyllodoce breweriana* with magenta, shallowly saucer-shaped flowers and a green ovary



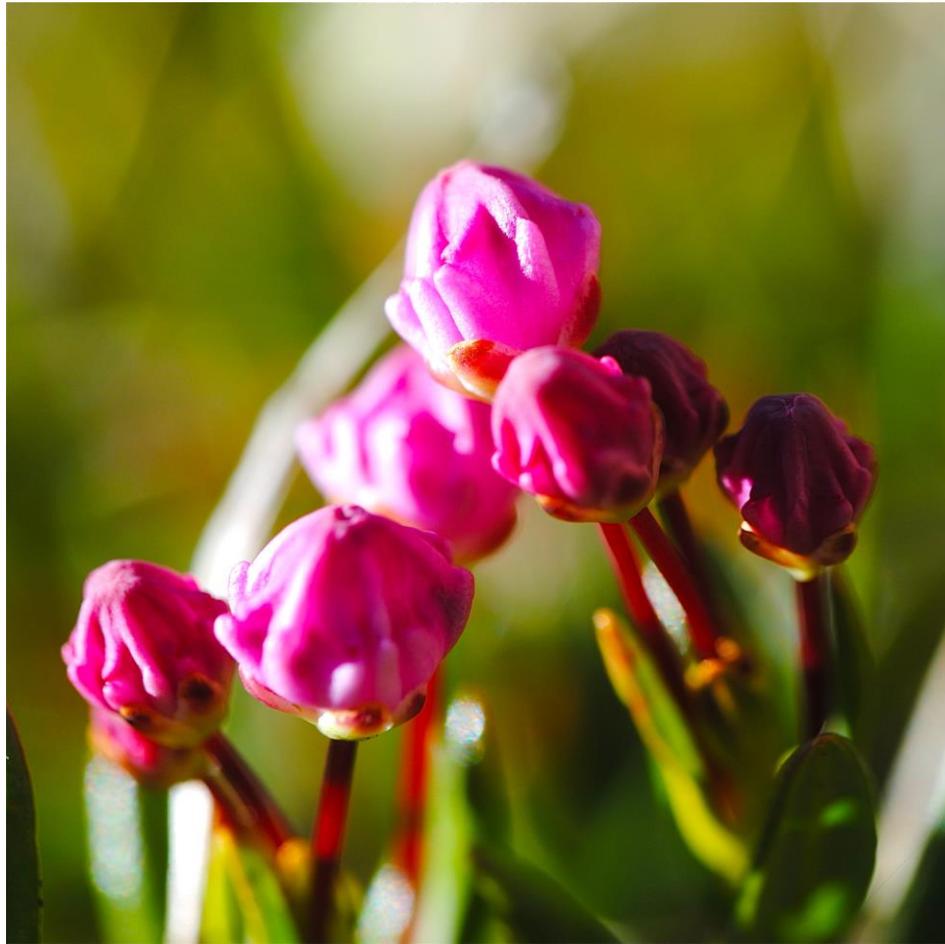
Our second species, *P. empetriformis* favors wet meadows on Mt Shasta and in the Klamath Mountains. It grows somewhat lower in stature and the smaller flowers are bell shaped.



The bog laurel, *Kalmia polifolia*, is a low sprawling shrublet with tough leaves curled under along the edges, and shallow, saucer-shaped magenta flowers. It is closely related to the mountain laurel, *K. latifolia* from the Southeast.



The buds of *Kalmia* show the ten puckered nectar pockets that characterize the genus.



In this close view of the open flowers, you can see the stamens are pressed against the nectar pockets, later released by the visits of insects probing for nectar



Menziesia ferruginea or mock azalea is a small, deciduous uncommon shrub from the northern redwood region.



Although mock azalea leaves look a great deal like our western azalea, the flowers are tiny, bell-shaped, and pinkish yellow



Black or Sierra laurel, *Leucothoe davisae*, has flowers like the manzanitas and arbutuses, but the seeds are borne inside dry capsules. As you see here, this small shrub spreads in wet areas.



Although *Leucothoe* leaves are reminiscent of laurels, the appearance is only superficial



Leucothoe flowers are borne in upright racemes. This plant is found in the Klamath Mountains and northern Sierra in conifer forests.



The genus *Gaultheria* consists of shrubs with leathery leaves. The common species, *G. shallon*, is known as salal and lives in moist coastal forests mostly from the Bay Area north. Here you see it growing with evergreen huckleberry.



Salal produces white to pale pink, bell-shaped flowers in late spring to early summer on horizontally trending branches.



Although apparently a berry producer, salal fruits develop their fleshy quality from the sepals, which enclose a papery capsulelike ovary



California's other two gaultherias are rare. *G. humifusa*, seen here, forms prostrate mats with tiny leaves and flowers in moist spots in the Klamath Mountains and high Sierra



G. humifusa leaves look like scaled down versions of salal.



G. ovatifolia, the third species, forms low-growing colonies in moist northern conifer forests. It features scaled down versions of salal leaves and flowers but the fruits are bright red and have excellent flavor.



Our last woody group comprises the rhododendrons and their close kin. This group has over 1,000 species worldwide with the greatest diversity in the mountains of Eastern Asia

- The rhododendrons vary from low ground covers to trees, bearing deciduous to evergreen elliptical leaves and clusters of showy, usually flared trumpet-shaped flowers of great beauty.
- Although rhododendrons have pores at the ends of their anthers, the stamens lack the appendages so common in most other California Ericaceae
- Rhododendrons produce seed capsules with thousands of tiny, dustlike seeds that require the presence of special mycorrhizal fungi to prosper
- The genus in California has only 3 species: western azalea, Labrador tea, and California rosebay

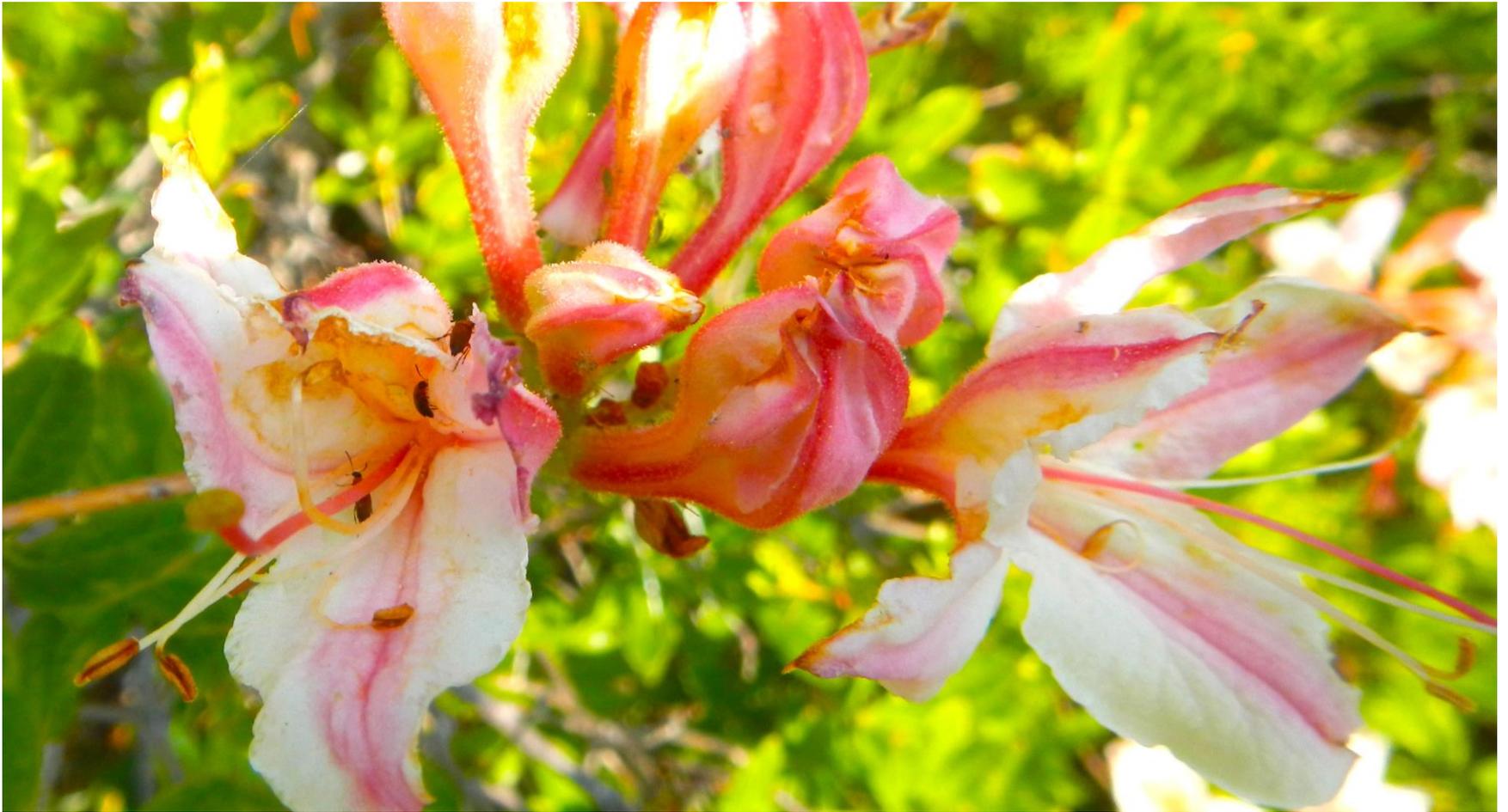
Western azalea, *Rhododendron occidentale*, is a beautiful deciduous large shrub found along shaded water courses in the coastal foothills and middle elevations of the mountains.



Blooming in late spring to early summer, the large white to pink flowers are highly fragrant. Notice the yellow blotch on the upper petal.



While most of the Sierran forms of western azalea have white flowers, pink forms are common on the north coast.



Western azalea leaves turn shades of copper and red-orange in the fall before dropping



Leafless in winter, western azalea twigs are in whorls from larger branches



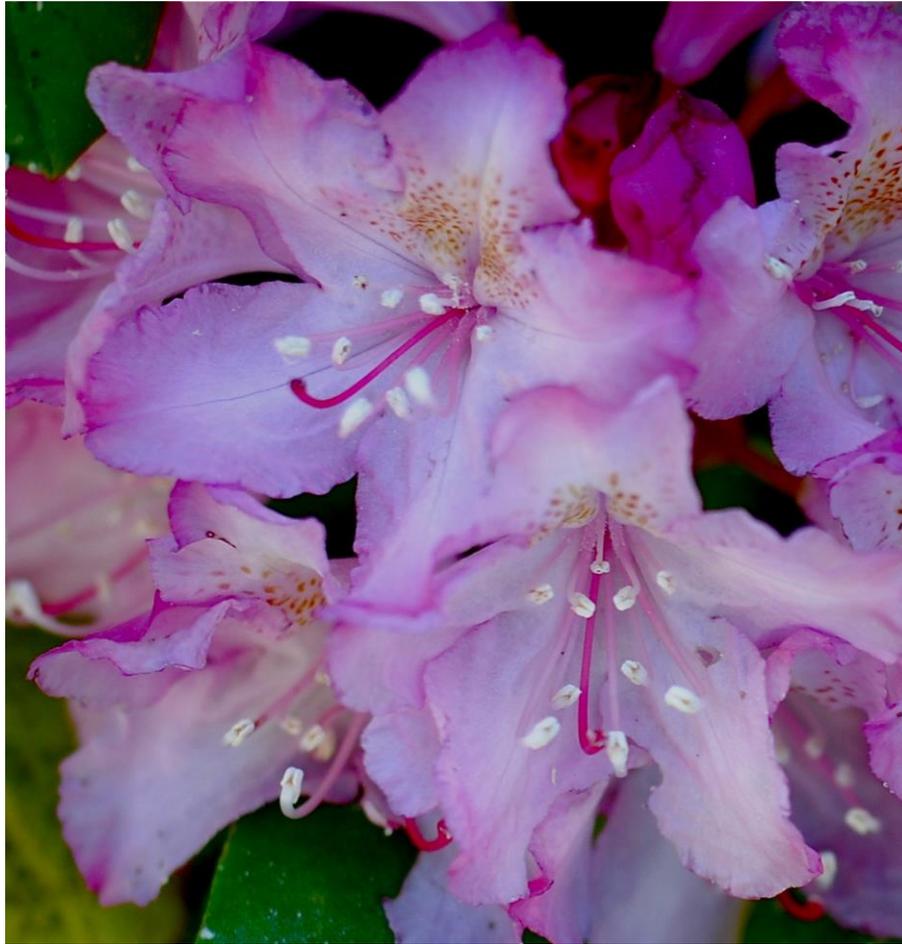
California's rosebay, *R. macrophyllum*, looks a great deal like the rhododendrons popular in coastal gardens. It seeks forests edges in the northern redwood country and Klamath Mountains



Here you see the large, evergreen leaves and deep pink flower buds



Rosebay flowers are pink to rose-purple with spots on the upper petal and prominent stamens that display the pores at the anther tips



Until recently, *Rhododendron glandulosum* or Labrador tea was placed in the genus *Ledum*. You can see the shiny leaves look much like small azalea leaves.



Labrador tea lives in wet spots in conifer forests, sometimes along the north coast, and often in the mountains. Its small white flowers are wide open and the petals not fused at the base like most rhododendrons.



The new leaves of Labrador tea are often red tinted. The leaves smell lemony unlike the other rhododendrons, and the early fur trappers made a tea of them.



Now we'll move on to the “other” Ericaceae, a group that was formerly in the wintergreen family Pyrolaceae and plants that are not woody

- This group encompasses plants from deep humusy conifer forests, where special mycorrhizal fungi are essential to their nutrition
- Some of these plants have green leaves and photosynthesize but...
- Many have variegated leaves with white veins or lack green leaves altogether, in which case they are completely dependent on their fungal partners for nutrition

The genus *Chimaphila* or pipsissewa (aka prince's pine) are sprawling plants with green leaves and white to pink, saucer-shaped flowers. Here you see the widespread *C. umbellata*



The less common *C. menziesii* has few flowers per cluster and less coarsely toothed leaves. Both species occur in montane coniferous forests, especially in the north



The genus *Pyrola* or wintergreen straddles the line between fully green leaves and leaves with some white veins. The most widespread species in mountain forests is *P. picta*, the so-called white-veined shinleaf.



The white-veined leaves of *P. picta*



P. picta flowers hang down and have an umbrella handle-shaped style and stigma



The variety *dentata* of *P. picta* grows in rocky sites and features toothed, blue-green leaves



The other widespread species is the rose pyrola, *P. asarifolia*, with rose-pink flowers. It seeks shaded streams and seeps in the mountains.



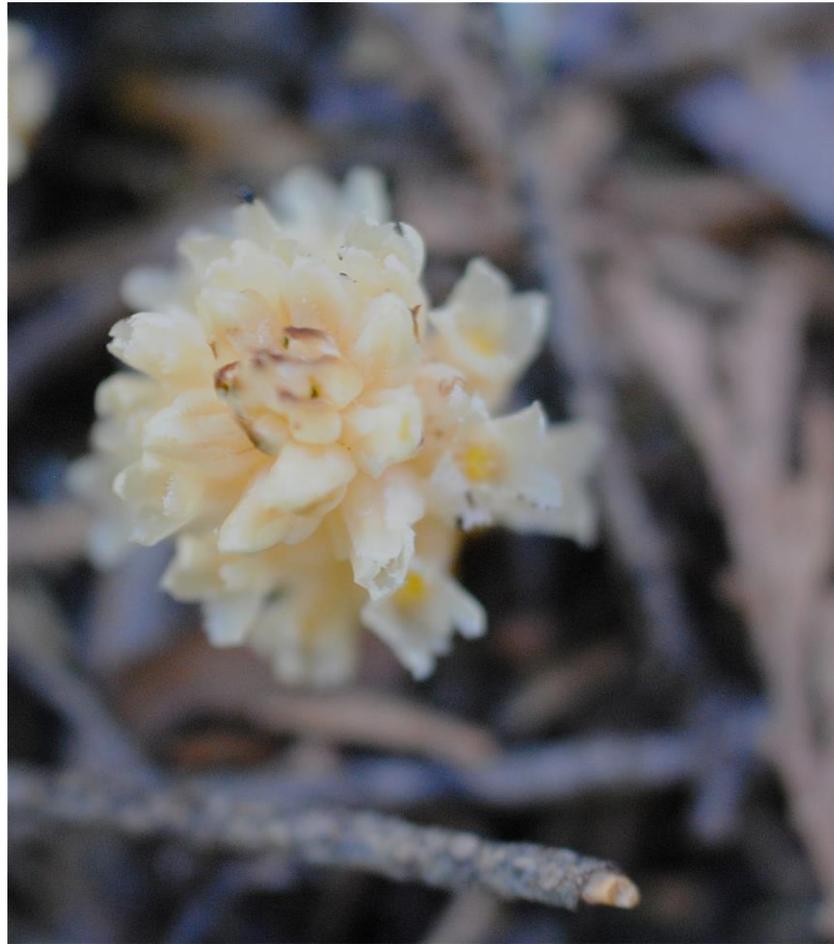
The specific epithet of *P. asarifolia* refers to the leaves looking like *Asarum* or wild ginger leaves



One more member of the pyrola group, *Orthilia secunda* or one-sided wintergreen is a sprawling perennial of conifer forests with wavy leaves and one-sided clusters of tiny greenish white flowers



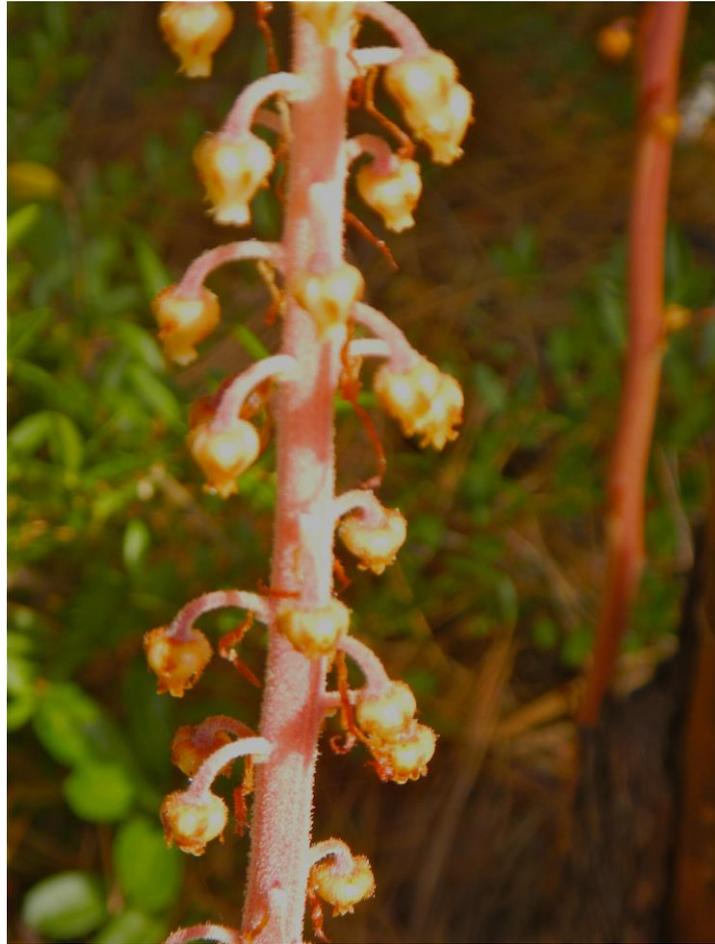
We'll end with the full fungus parasites that lack green leaves altogether. The gnome plant, *Hemitomes congesta*, is occasional in mountain conifer forests with crowded headlike clusters of cream colored flowers



Widespread in similar forests is the tall pinedrops, *Pterospora andromeda* with pink stems and creamy brown-tinted, bell-shaped flowers



A closer view of pinedrops flowers, the shape reminiscent of the woody Ericaceae



The curious candy-stick, *Allotropa virgata*, is widely scattered in northern conifer forests. The horizontally held flowers are rimmed with candy cane colors as are the stems



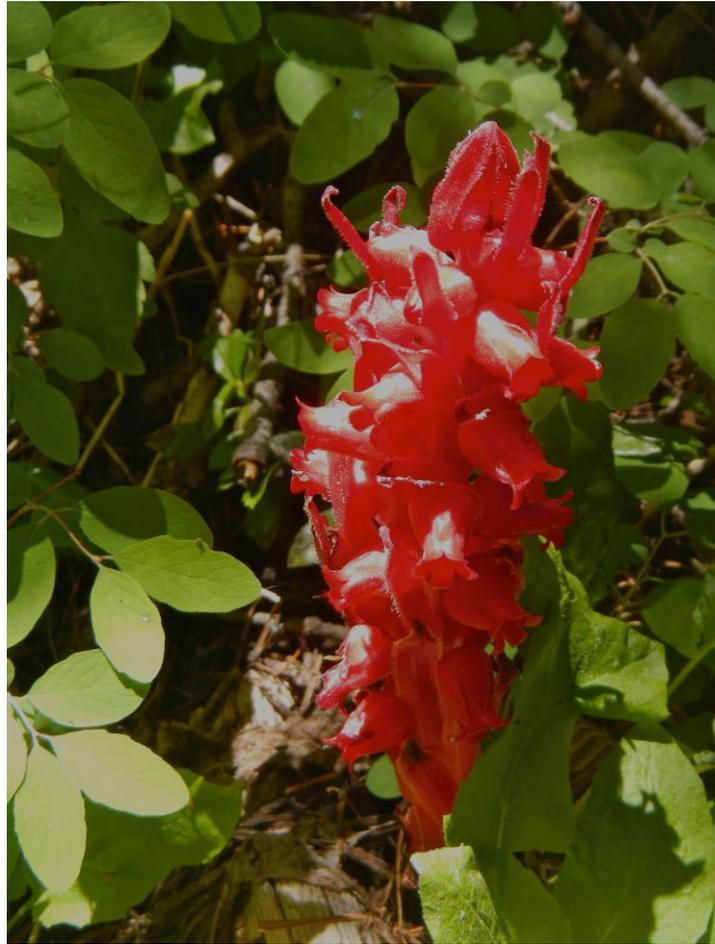
A closer view of candy stripe flowers



The most striking and famous of these fungal parasites is the blood red snowplant, *Sarcodes sanguinea*, whose scientific name means bloody flesh



Often emerging just after snow melt, snowplant is widely scattered in mountain conifer forests. Note the waxy red, bell-shaped flowers.



As you have seen, the Ericaceae in California has lots of variety and forms or habits of its genera.

- The fungus parasite species are impossible to grow in gardens
- The high-elevation species are difficult in lowland gardens and often languish
- The others have much to offer for gardens
- The manzanitas and their brethren are excellent for drought-tolerant gardens, while
- The forest shrubs including the rhododendrons are excellent in shady summer-watered gardens
- A few like the madrone are difficult to establish and prosper better with mycorrhizal inocula in the soil