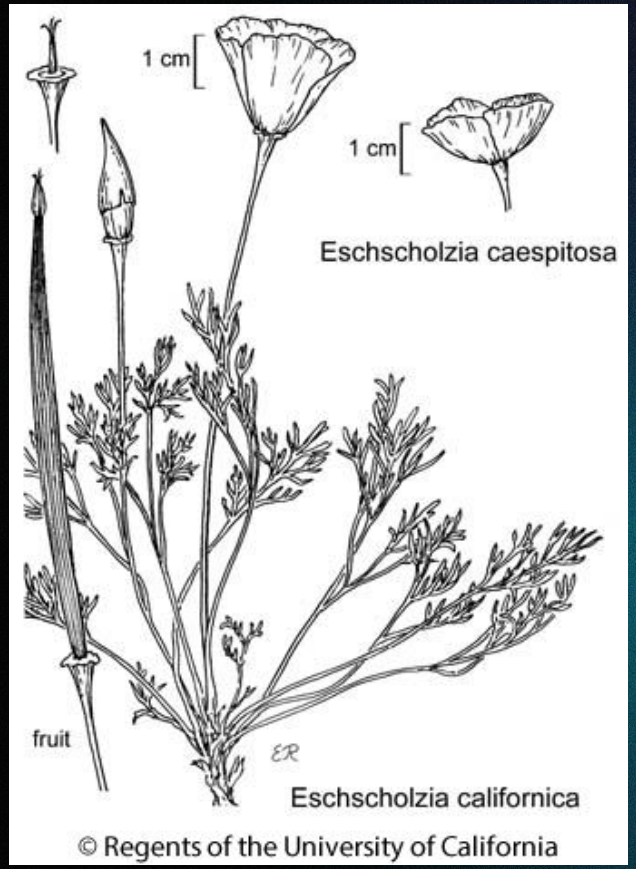


Introduction to Botany

Santa Cruz Mountains

04.05.25
CALIFORNIA TREE SCHOOL 2025
Santa Cruz Session

PRESENTERS:
DAVID BENTEROU — UCANR
LAUREL BARD — RCD Santa Cruz County

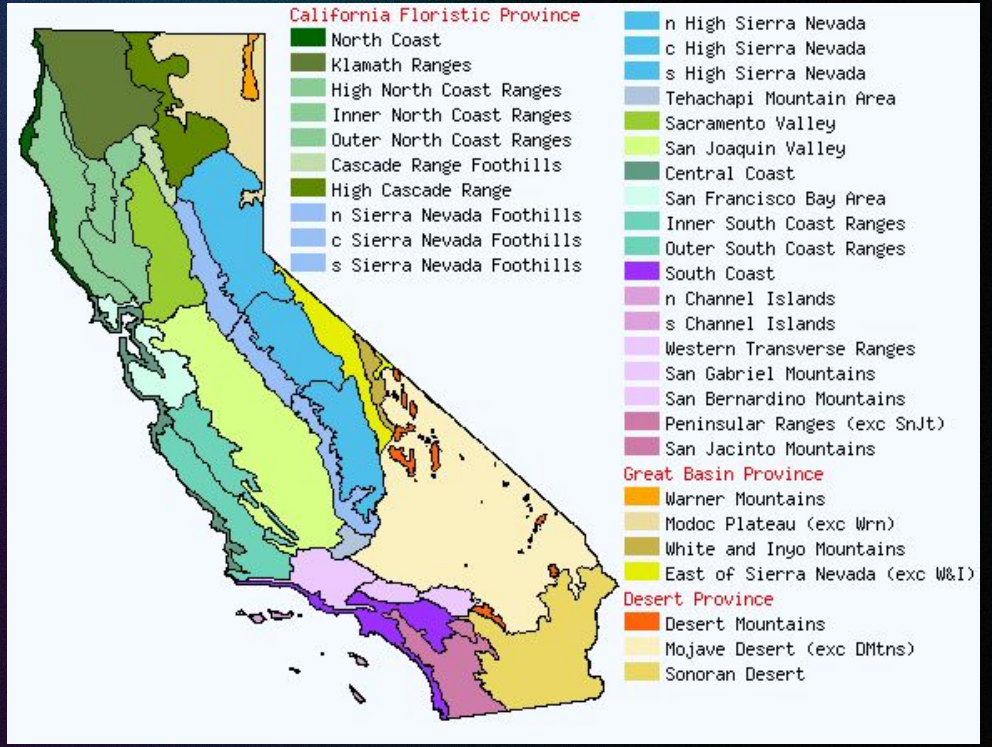
“

Agenda:

- Introductions
- Some background on the world of plants
- Plant part terms, plant identification
- How to learn your local plants
  - Local familiar plants genuses in the Santa Cruz mountains
  - Research tools often used
- Field activity
- Lunch

California Floristic Province is a biodiversity hotspot

- Floristic provinces: sites of high species endemism
- CA-FP: 8000 species, ~35% are endemic
  - Native sp: >6700
  - Endemic sp: >2300
  - Nonnative/ naturalized sp: >1300
- Subdivided into regions
- Range: S. Oregon-N. Baja; borders Great Basin & S. Desert provinces
- Elevations 0 - 14,000+ ft. (4400+ m)

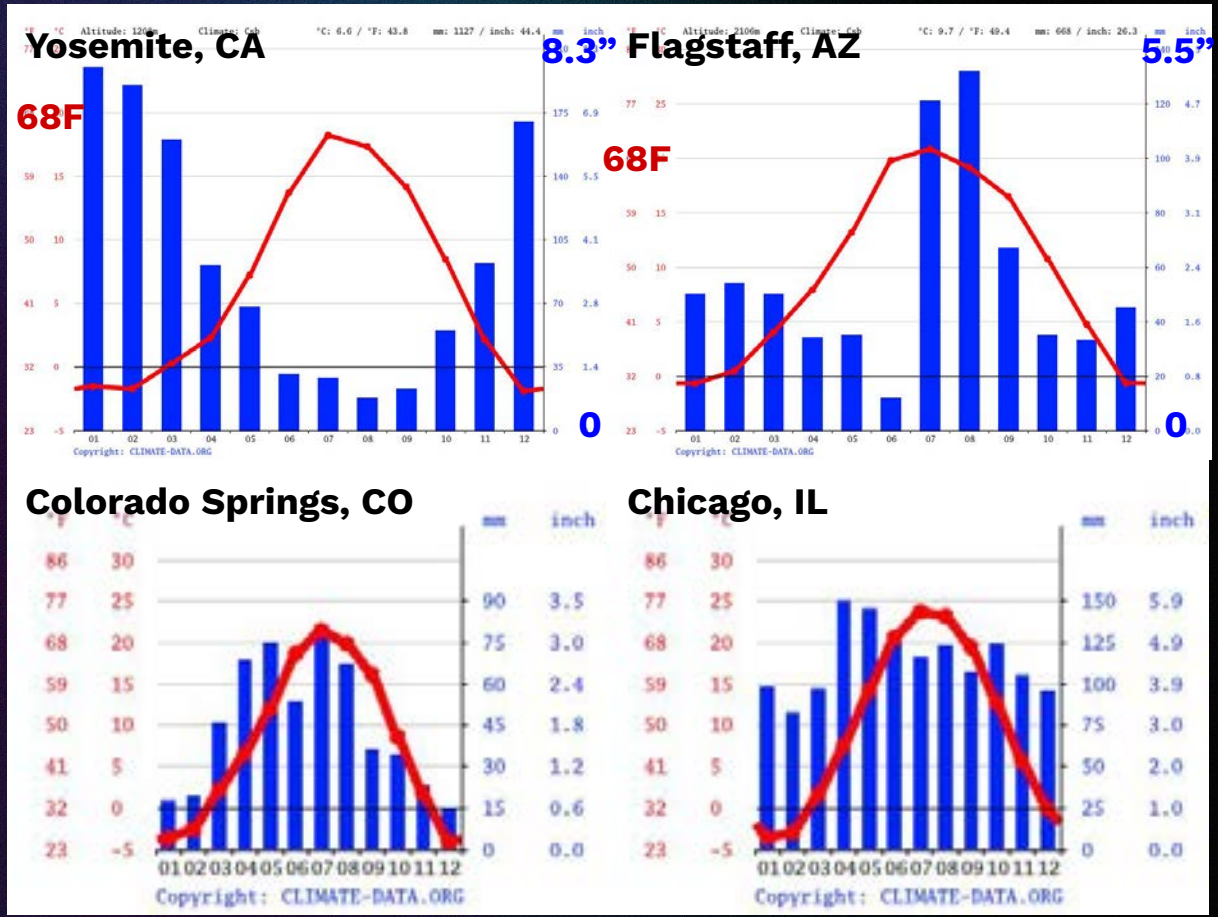


Why?

- **Climate** isolation
- Geology
- Topography

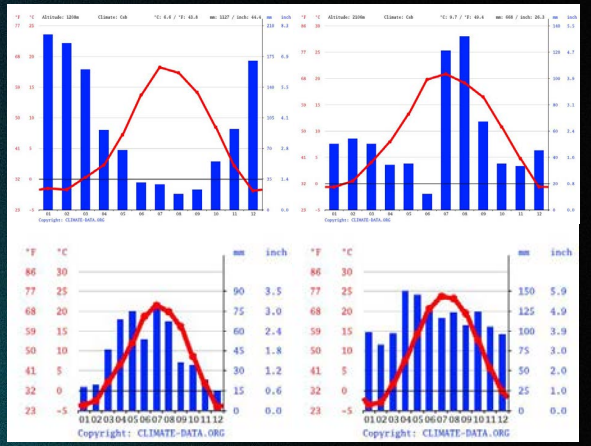
Plants growth requires:

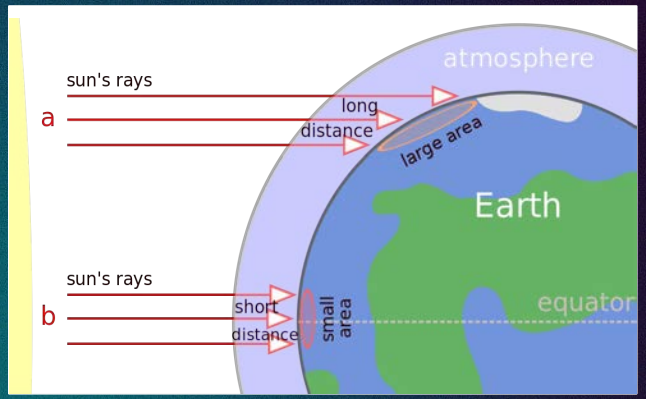
- Light
- Carbon
- Nutrients
- **Water**



Some ecological drivers of evolution:

- Climate (precipitation/drought, fire, heat/frost, elevation)
- Soil conditions (nutrient availability, soil drainage)
- Biotic Interactions (competition, canopy shade)
- Light availability (length of day, season, aspect, latitude)
- Disturbance regimes (consistent variation)
- Humans?





Plants strategies for survival

- Plants have similar resource needs but unique ecological constraints.
- Result: develop unique survival strategies
- Natural selection of successful strategies & traits supports speciation
- Examples: growth habit, stress tolerance, mutualisms, disturbance response, photosynthesis strategy

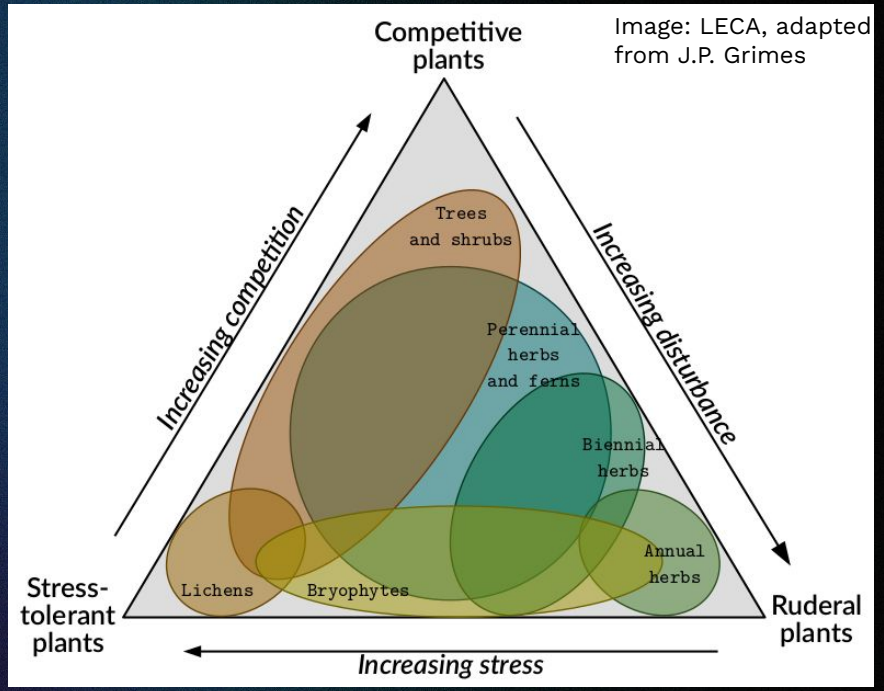
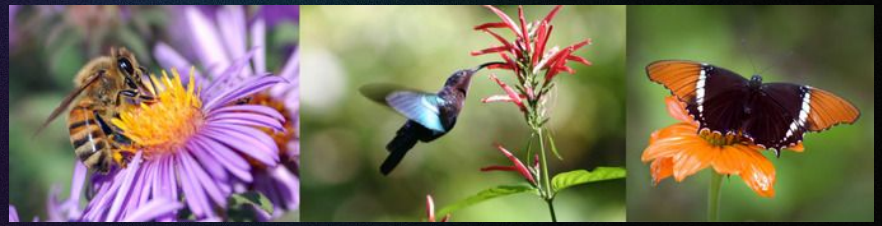


Image: LECA, adapted from J.P. Grimes




Penstemon rattanii var. kleei


Arctostaphylos silvicola


Hesperocyparis abramsiana


Erysimum teretifolium

WHAT MAKES A PLANT “RARE”?

Endemism, habitat loss, introduction of competitors, reliance on altered disturbance regimes.

CA Rare Plant Rank	Description
1A	Plants presumed extinct in California and rare/extinct elsewhere
1B.1	Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California
1B.2	Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in California
1B.3	Plants rare, threatened, or endangered in California and elsewhere; not very threatened in California
2A	Plants presumed extirpated in California, but more common elsewhere
2B.1	Plants rare, threatened, or endangered in California, but more common elsewhere; seriously threatened in California
2B.2	Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in California
2B.3	Plants rare, threatened, or endangered in California, but more common elsewhere; not very threatened in California
3.1	Plants about which we need more information; seriously threatened in California
3.2	Plants about which we need more information; fairly threatened in California
3.3	Plants about which we need more information; not very threatened in California
4.1	Plants of limited distribution; seriously threatened in California
4.2	Plants of limited distribution; fairly threatened in California
4.3	Plants of limited distribution; not very threatened in California

Introduced ≠ Invasive

Spread easily, colonize large areas, impact native ecology, outcompete native plants, displace habitat for native animals.

Explanation of Cal-IPC ratings

High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate – These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Alert – An Alert is listed on species with High or Moderate impacts that have limited distribution in California, but may have the potential to spread much further.

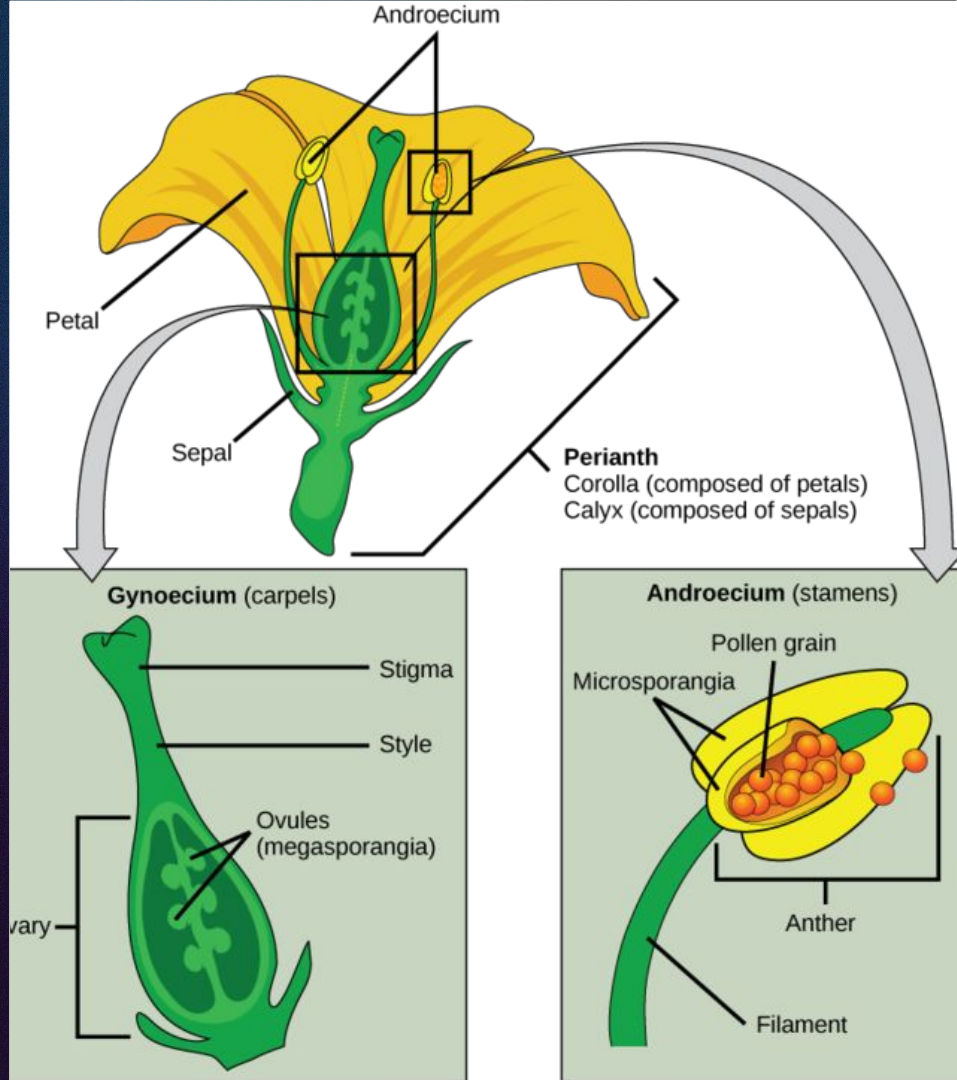
Watch – These species have been assessed as posing a high risk of becoming invasive in the future in California.

WHAT MAKES A PLANT “INVASIVE”?

Plant identification: a seasonal sport

- Growth habit: (woody, herby, liana/vine, fern, non-vascular)
- **Flowers:**
- Seasonality: (phenology/ bloom time, annual/ perennial, Dormancy)
- Structure: (canopy, sub-canopy, understory)
- Population:
- Vegetative structures/ morphological traits
- Gestalt (vibes, plant whispering, “you can tell by the way it is”)

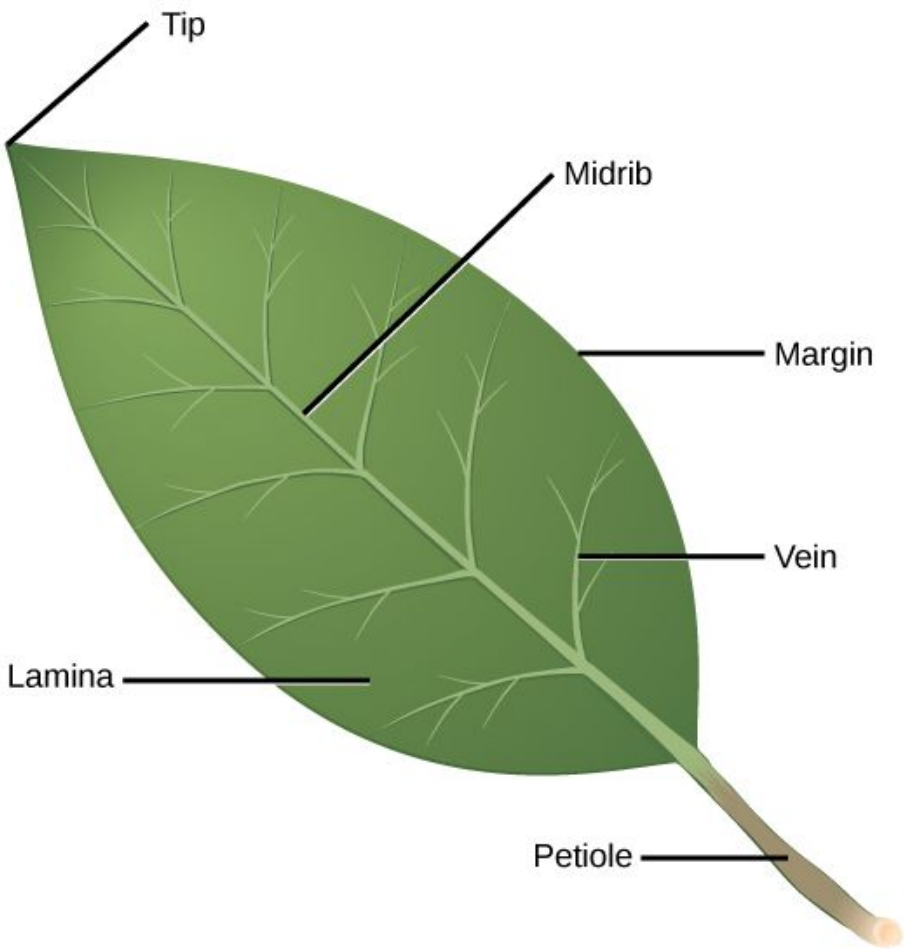
Pacific Trillium, (*Trillium ovatum*)



Plant parts terminology

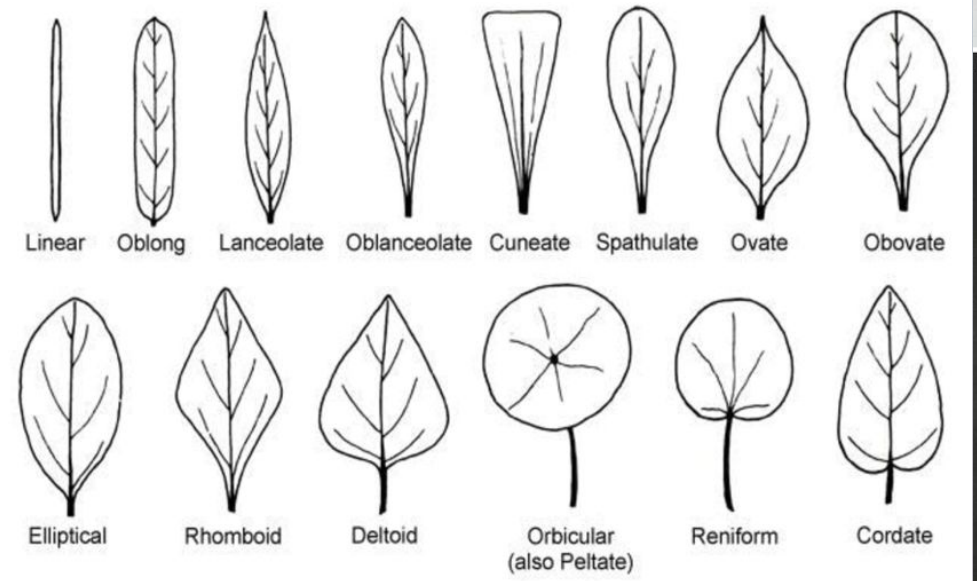
Plant identification: a seasonal sport

- Growth habit: (woody, herby, liana/vine, fern, non-vascular)
- Flowers:
- Seasonality: (phenology/ bloom time, annual/ perennial, Dormancy)
- Structure: (canopy, sub-canopy, understory)
- Population:
- **Vegetative structures/ morphological traits**
- Gestalt (vibes, plant whispering, black magic, “you can tell by the way it is”)



Plant parts terminology

Plant identification: a seasonal sport



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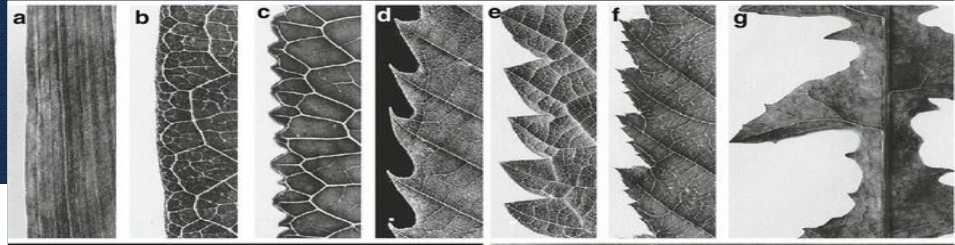
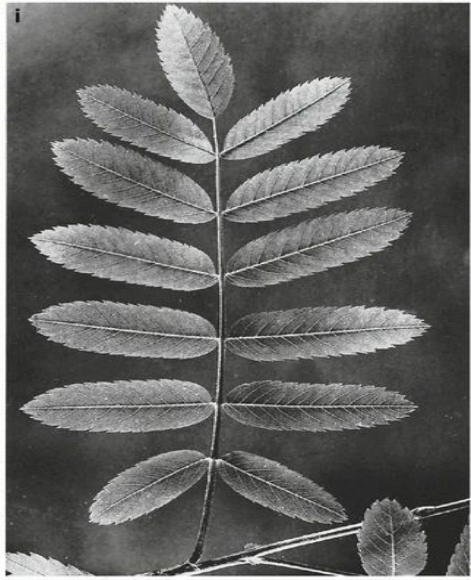


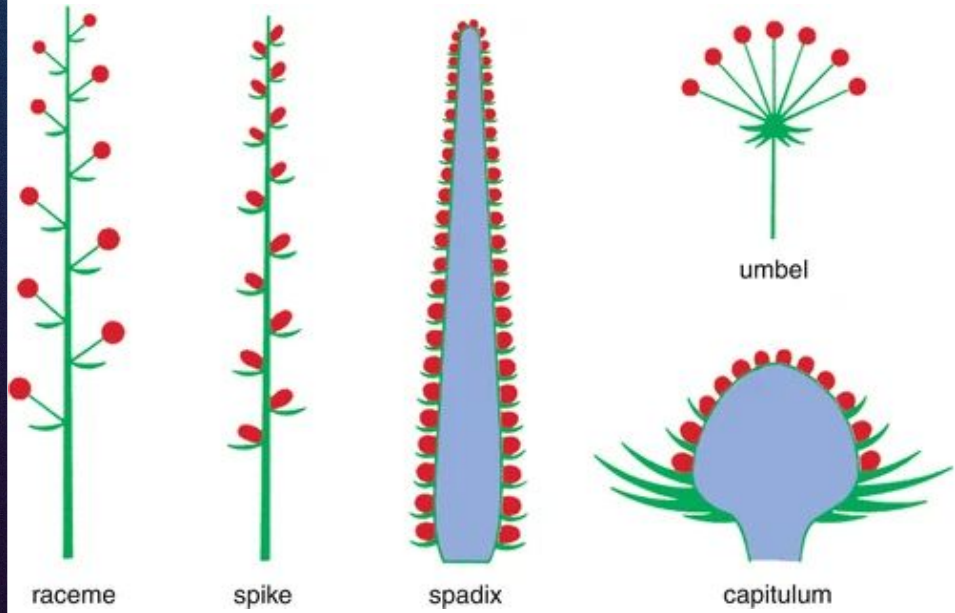


Plant parts terminology

Plant identification: a seasonal sport

- Growth habit: (woody, herby, liana/vine, fern, non-vascular)
- Flowers: (inflorescence shape and texture, number of flowers, where they grow from on the plant)
- Seasonality: (phenology/ bloom time, annual/ perennial, Dormancy)
- Structure: (canopy, sub-canopy, understory)
- Population: (where is it growing, how many are growing together)
- Vegetative structures/ morphological traits
- Gestalt (vibes, plant whispering, black magic, “you can tell by the way it is”)

Inflorescence

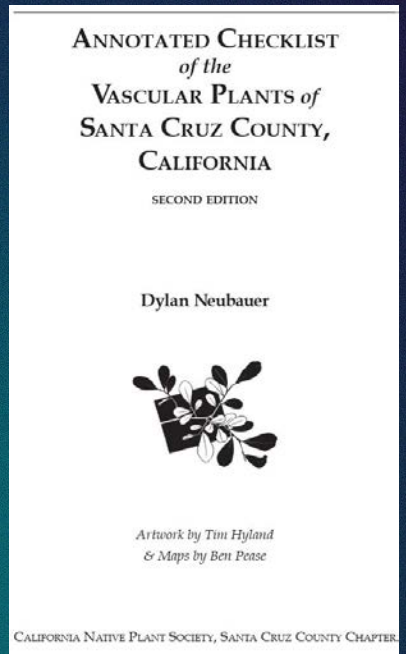


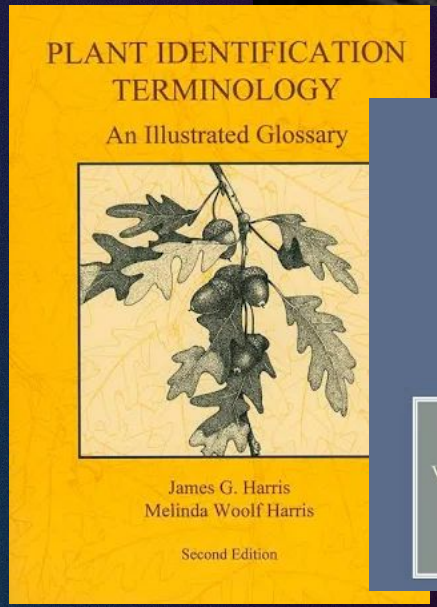
Plant parts terminology

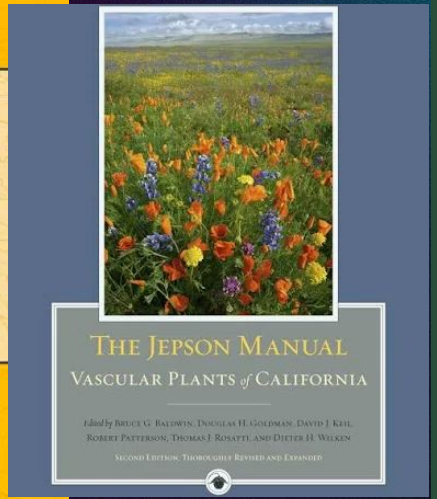
Patience is progress!

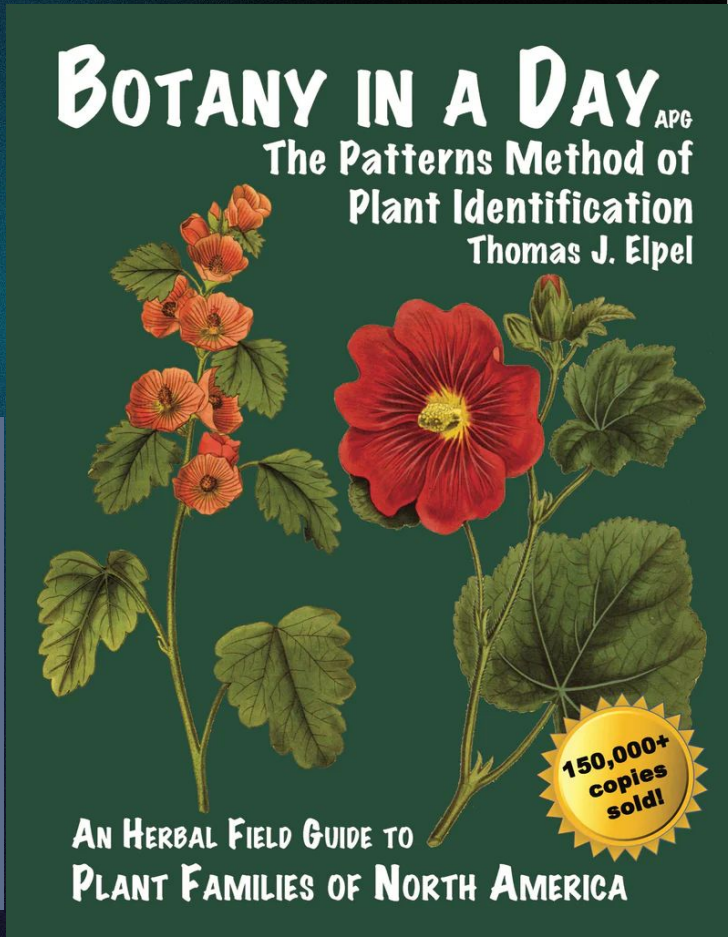
Common Resources:

- Guidebooks
- Keys
- AI Apps
- People









Resources for Plant ID

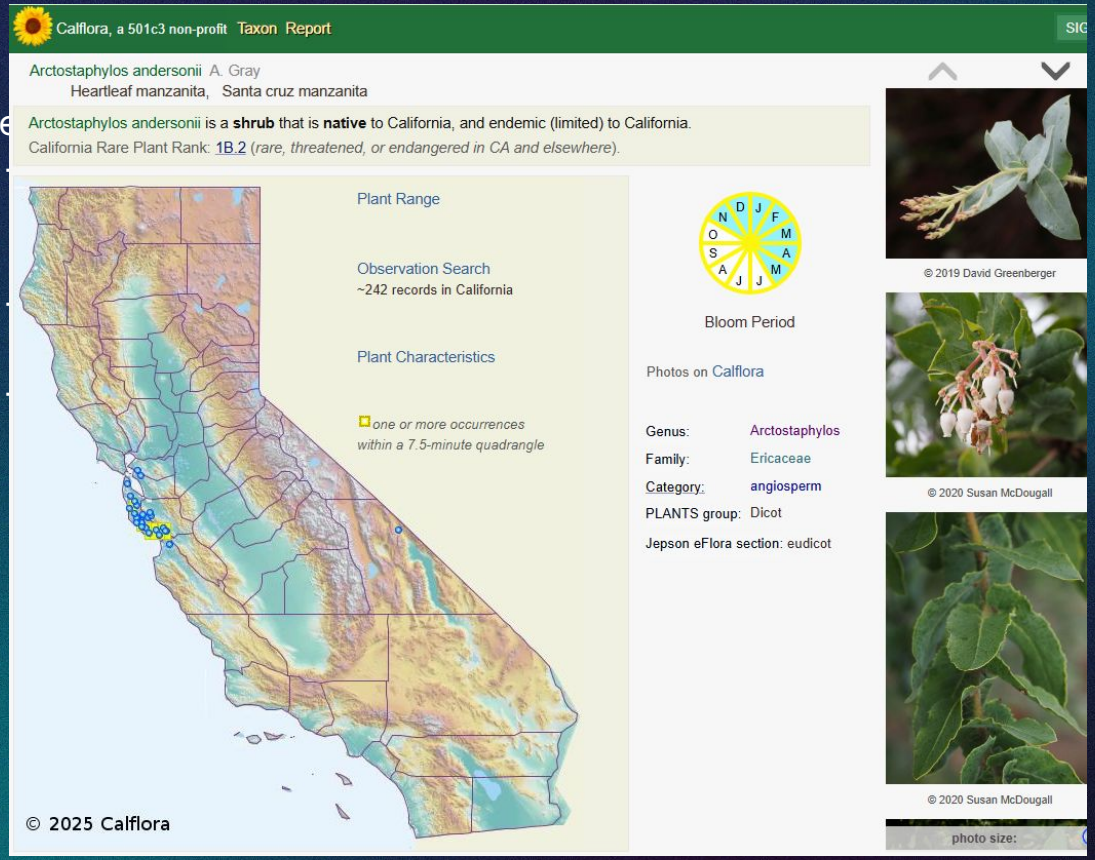
Seek
- App uses AI to guess species based on photo
- Pros: easy, instant results
- Cons: often inaccurate

iNaturalist
- App lets you upload photos for citizen scientists to ID
- Pros: easy, contributing to citizen science,
- Cons: can take time for ID to be confirmed

CalFlora What Grows Here
- Pros: pictures of species that may be found in an area. Also shows blooming season. Your name is associated with your observations!
- Cons: often incomplete.

Jepson Key
- Online dichotomous key
- Very helpful with technical skill but can be hard for beginners
- Tip: print a shortened version of the key for just one genus or a few species

Resources for Plant ID



<u>CalFlora What Grows Here</u>

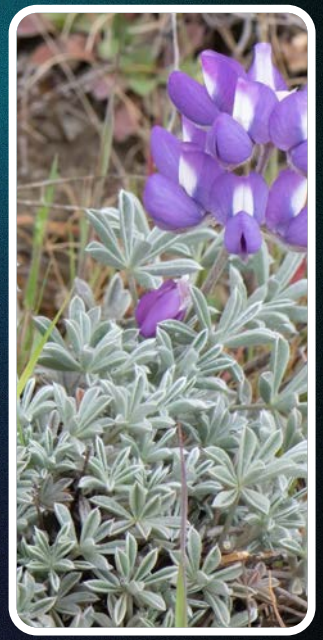
- Make a list with pictures of species that may be found in an area. Also shows blooming season. However, often incomplete.

<u>Jepson Key</u>

- Online dichotomous key
- Very helpful with technical skill but can be hard for beginners
- Tip: print a shortened version of the key for just one genus or a few species

Beginner Guiding Questions for Plant Identification

- Overall: What form does the plant take? Is it a vine? A tree? A bush?
- Leaves: What shape are they? Star-shaped, blade-like, lobed? Are they hairy or smooth?
- Flowers: What shape are they? Are they clustered together or alone? What time of year is it?
- Fruit: What size are they? Are they fleshy or nut-like? What time of year is it?

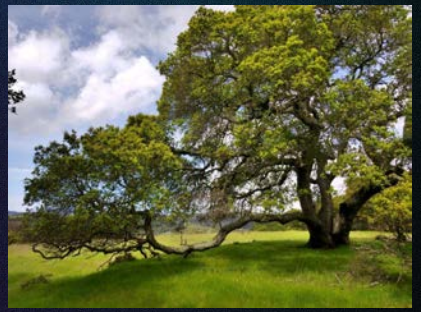


QUERCUS Genus and Coast Live Oak (*Quercus agrifolia*)

- *Quercus* are usually trees but they can resprout so they can be shrubby
- Wide variety of leaf shape and texture throughout genus
- All produce acorns BUT there is one species that makes acorns and is NOT Quercus: tanoak!
- Staple food for indigenous people across California

Identifying Coast Live Oak:

- Form: Usually a tree! Many-branched, rounded canopies at maturity. Can be shrubbier depending on conditions.
- Leaves: Hard, usually spiny, always **hairy** (“hairy armpits”!)
- Fruit: Long acorn
- Flowers: Not showy. Green/brown and clustered. Feb-April.



ARCTOSTAPHYLOS Genus (Manzanita)

- Form: Many-branching shrub with red and/or grey bark.
- Leaves: Generally rounded to oblong. May be hairy or smooth. Green to grey-green to silver-green.
- Flowers: Bell-shaped, white to pink, color may vary even on the same individual plant. Some species are winter-flowering.
- Fruit: Small, round green to red fruit that look like “little apples”. They are edible but usually somewhat powdery.
- Edible + used medicinally by indigenous groups across California.

Arctostaphylos andersonii

ANDERSON'S MANZANITA

Higher Taxonomy

Family: Ericaceae	View Description	Dichotomous Key
Genus: Arctostaphylos	View Description	Dichotomous Key

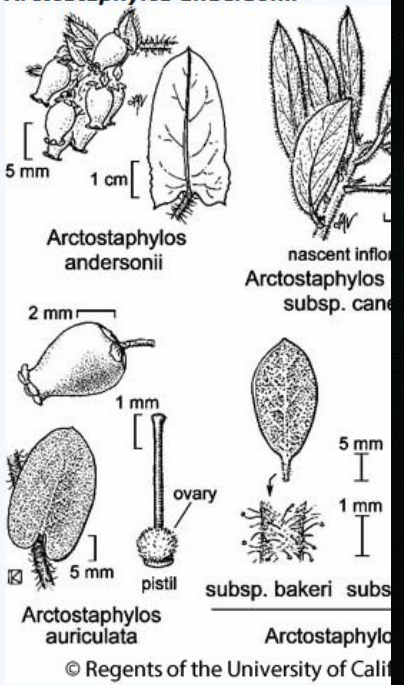
***Arctostaphylos andersonii* A. Gray**
NATIVE
Habit: Tree-like, 2--5 m. **Stem:** twig (and nascent inflorescence axis) densely tomentose or short-nonglandular-hairy and long-glandular-hairy. **Leaf:** overlapped; petiole < 4 mm; blade 4--7 cm, 1.5--2.5 cm wide, oblong, boat-shaped, both surfaces light green, dull, appearing glabrous, base lobed, clasping, tip acute, margin entire; stomata abaxial. **Inflorescence:** panicle, 4--6-branched; nascent inflorescence pendent, axis 2--3 cm, > 1 mm wide; bracts 8--15 mm, +- leaf-like (occasionally reduced), lanceolate; pedicel 6--8 mm. **Flower:** ovary (and fruit) glandular-hairy. **Fruit:** 6--8 mm wide, +- depressed-spheric, sticky; stones variably fused or free. **Chromosomes:** 2n=26.
Ecology: Open sites or forest edge, redwood or mixed-evergreen forest, occasionally in chaparral near coast; **Elevation:** < 800 m. **Bioregional Distribution:** w SnFrB (Santa Cruz Mountains). **Flowering Time:** Jan--Mar
Jepson eFlora Author: V. Thomas Parker, Michael C. Vasey & Jon E. Keeley
Reference: Keeley 1997 Madroño 44:109--111; Parker et al. 2007 Madroño 54:148--155
Index of California Plant Names (ICPN; linked via the Jepson Online Interchange)
Listed on CNPS Rare Plant Inventory

List of species: click here

Previous taxon: Arctostaphylos
Next taxon: Arctostaphylos auriculata

Name Search: Submit Name

Botanical illustration including *Arctostaphylos andersonii*



Thank you!

Questions?

FULL NAME
WEBSITE / PHONE NUMBER