Slide 1

Chaparral

Lecture 30

Slide 2

Learning Outcomes

- Chaparral Range
- Chaparral flora
- Chaparral Climate
- Adaptations to Chaparral

Slide 3

Chaparral

- Only occurs in California Floristic Province
- Hard Chaparral
- Dense, often impenetrable thickets of shrubs
- 900 different species of vascular plant
- Young and developing vegetation type
- Speciation active

San Mateo Wilderness

Cleveland National Forest
SD Co.

Slide 4

Sclerophyllous Leaves

- Sclero = hard
- Phyll = leaf
- Stiff, thick and relatively inflexible

Slide 5

Allelopathy in Chaparral

- Chamise
- Adenostoma fasciculatum
- Hypothesis toxins accumulate on foliage during dry season
- Leach into soil following rains
- Vanillic Acid, Hydroquinone, umbelliferone, Coumaric Acid
- But in concentrations too low to inhibit native plants
- Lack of herbs under chamise primarily due to inherent dormancy and poor soil conditions

Slide 6

Chaparral Plant Adaptations

- Evergreen leaves
  - Conservation of nutrients from nutrient poor soils
- Vertical leaf orientation
  - reduces exposure to sun at noon
- Delayed germination

Slide 7

Biological Nitrogen Fixation

- Chaparral often occupies nutrient poor soils
- Nitrogen fixation in Ceanothus spp via Frankia

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Manzanita Adaptations

- Dual root system
  - Spreading surface roots and deep taproot
- Self Pruning
  - One limb and connected root system can die

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Chapparo, Chaps, and Chaparral

- Chaparro
- Scrub Oak *(Quercus berberidifolia)*
- Spiny leaf margins
- Applied to general vegetation type even if Scrub Oak is not present

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Chaparral Flora

- Chamise *(Adenostoma fasciculatum)*
- Toyon *(Heteromeles arbutifolia)*
- Holly-leafed Cherry *(Prunus ilicifolia)*
- Manzanita spp *(Arctostaphylos ssp)*
- Ceanothus spp
- Southern CA
- Spanish Bayonet *(Yucca whipplei)*
- Laurel Sumac *(Malosoma laurina)*

Physical Environment

- Mediterranean climate
  - Long, hot, dry summer
  - Mild winter with unpredictable rains
- Soils
  - Gravelly, shallow, low available water capacity
- Nutrient poor
- Sandstones or serpentines

Growth, Flowering and Resting

- Manzanita
- Flowers in Winter
- Growth in spring ends in bud production
- Chamise
- Growth in winter
- Flowering in late spring
- Ceanothus
- Flowers in Spring

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To Be or Not to Be

- Crown Sprouting
- Chamise
- Scrub Oak
- Toyon
- Obligate seeders
- Buck Bush
- *Ceanothus cuneatus*
- Others of Cerastes subgenus
- Short life expectancy
- Must germinate from seeds

Slide 14

Biotic Effects of Fire

- Heating the soil
  - Ground level 1,200 °F
  - 300 °F at 5cm
  - Seeds in soil heated promoting germination
  - Deeper in the soil no significant temperature change
  - Deeper roots not killed
- Allelopathic chemicals vaporized
  - Inhibition of germination removed
- Burn above ground vegetation and fuel
  - Opens up canopy increasing light at ground level
  - Reduces functioning root volume near soil surface

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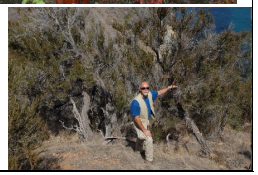
Fire Annuals

- Golden Ear Drops
  - *Dicentra chrysantha*
- Whispering Bells
  - *Emmenanthe penduliflora*
- Fire Poppy
  - *Papaver californicum*
- Golden Ear Drop seeds require 10 minutes smoke exposure to germinate
- Whispering Bells just one minute

Slide 16

Old Growth Chaparral

- Regeneration of Chaparral dependent on Fire
  - In some areas chaparral represents a transitional stage of succession
  - With no fire chaparral shrubs die (50 years) senescence
  - Pines can invade shading out shrubs
    - Chaparral is a fire maintained community
- In areas with nutrient poor soil chaparral represent a stable 'climax' community persisting for hundreds of years
- Old Growth Chaparral becoming rare due to increased frequency of fires



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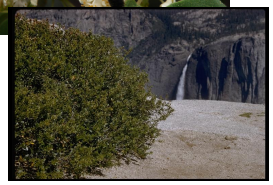
Crown Sprouting

- Adaptation to fires
- Manzanita Basal Burl
- Coyote Brush

Slide 18

Montane Chaparral

- Occupies same altitude as montane forest but
- Vegetatively similar to 'chaparral' but floristically distinct
- Snowbush *(Ceanothus cordulatus)*
- Huckleberry Oak (Quercus vacciniifolia)