

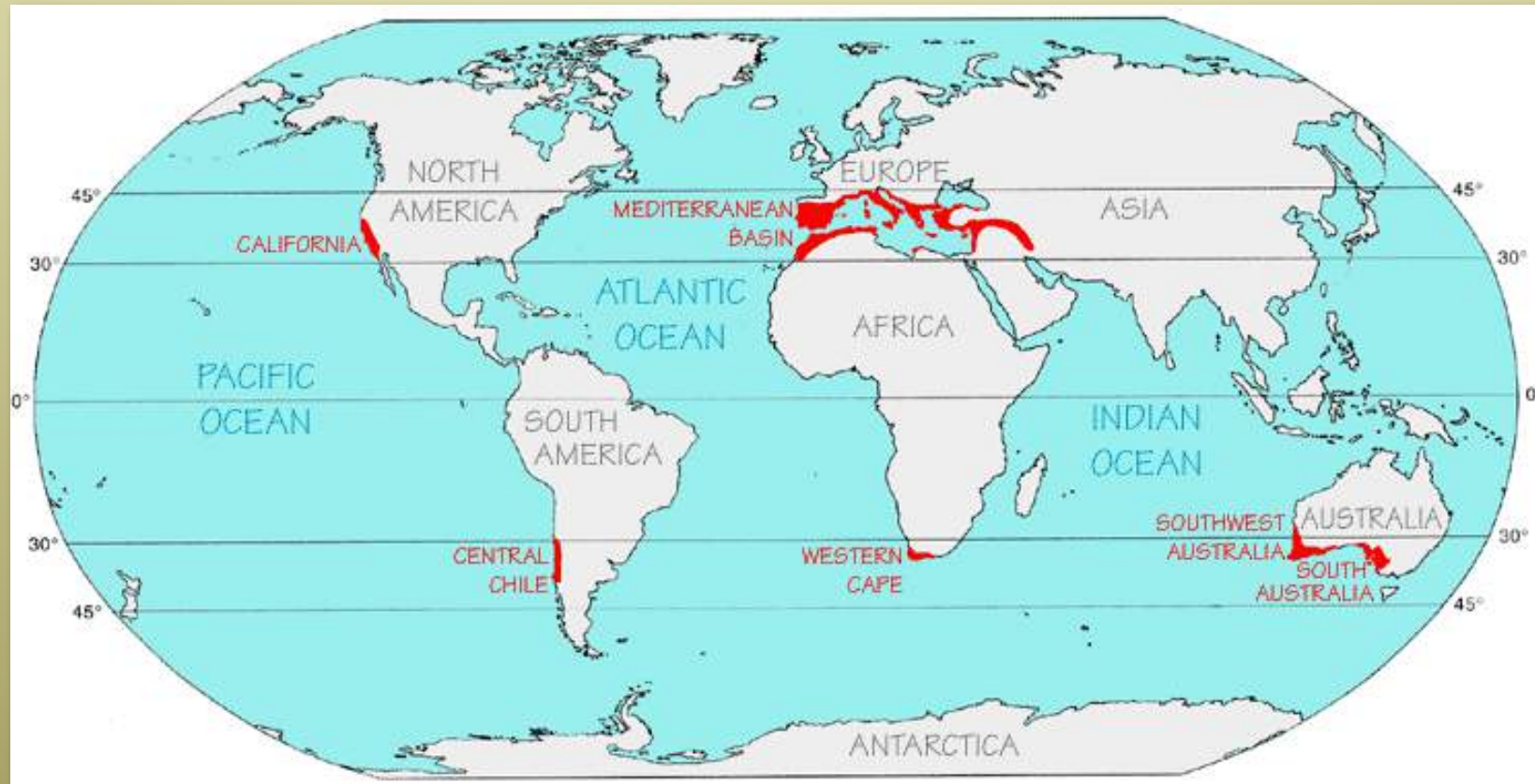


Mediterranean Biome

“The similarity of form and functional response of the vegetation to the rigorous mediterranean environment is therefore a striking example of evolutionary convergence, and has resulted in a high degree of endemism within the regional floras” (Archibold, 1995)

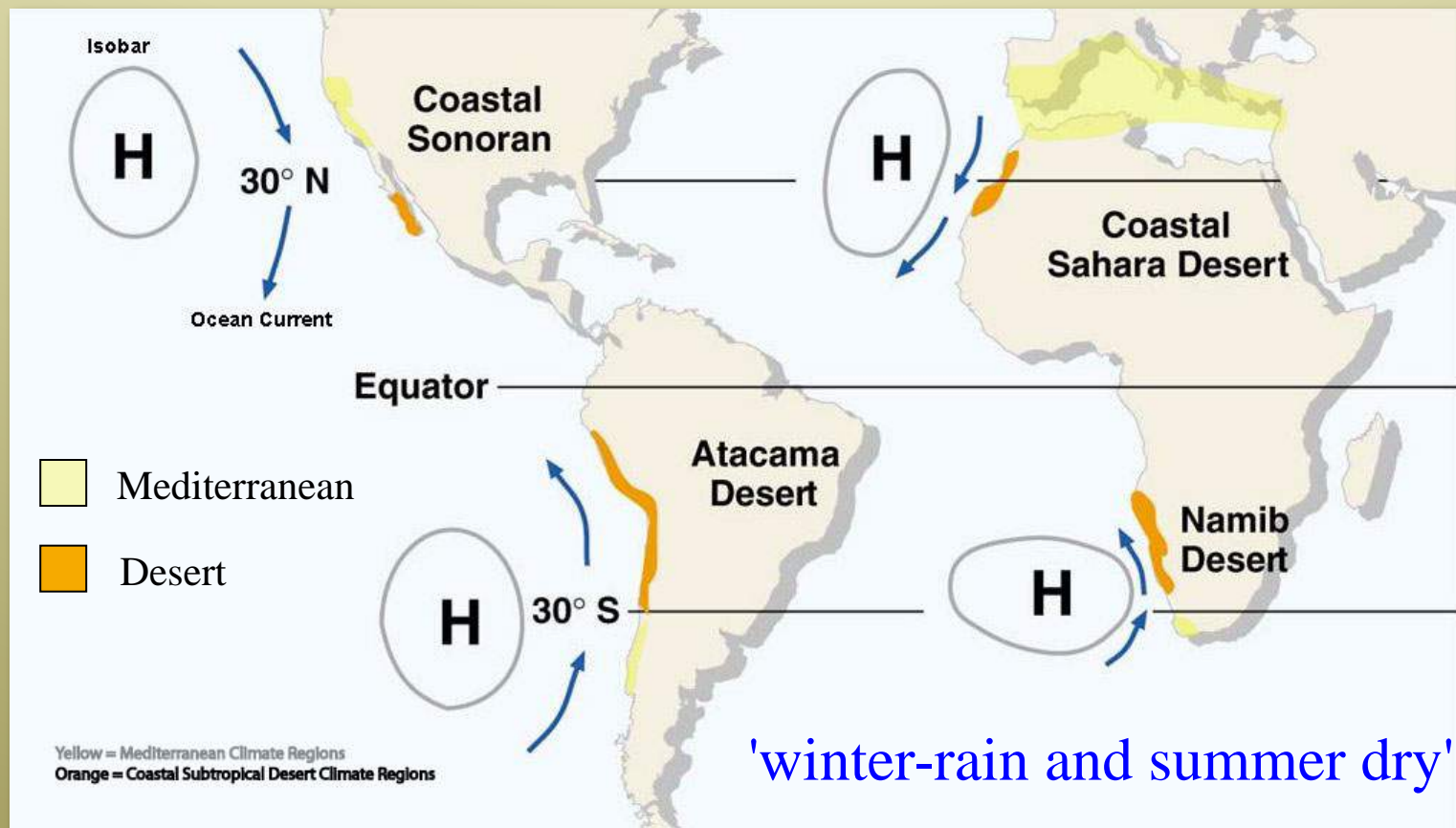
Mediterranean Biome

- 30° to 40° N and S latitude on the west sides of continents
- Just poleward of the subtropical deserts on the western continental edges.



Mediterranean Biome

- subtropical dry and warm air in summer, cold currents
- in winter, as subtropical highs retreat toward equator, they experience maritime airmasses and cyclonic storms from polar front

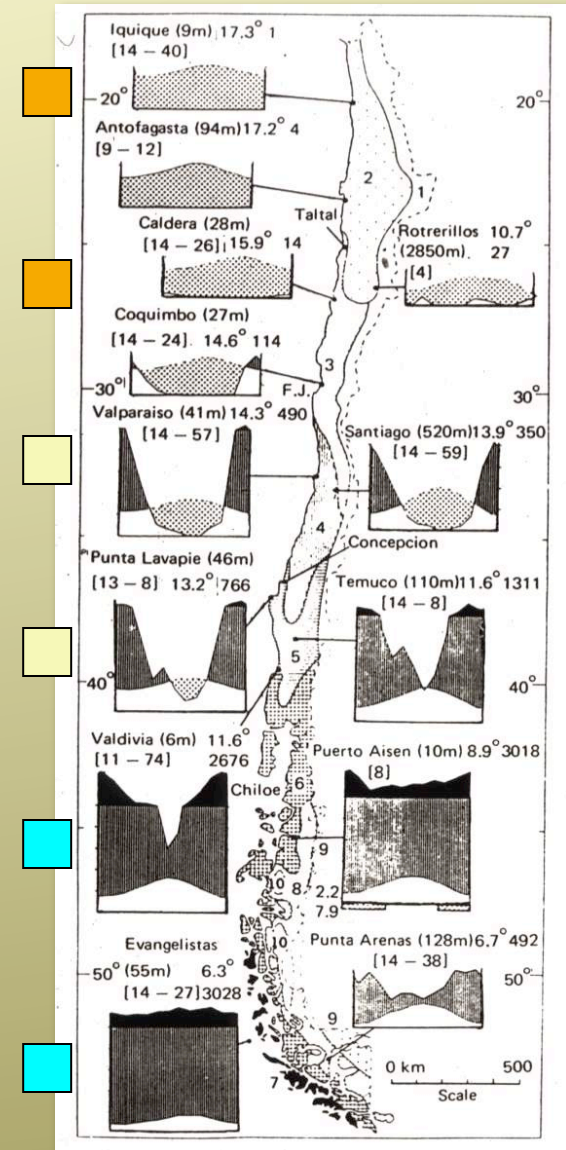


Mediterranean Biome

- the Mediterranean biome is sandwiched between deserts and temperate rainforests on west sides of continents - experience both but in alternating seasons

Biome types on west side of Chile

- Desert
- Mediterranean
- Temperate rainforest

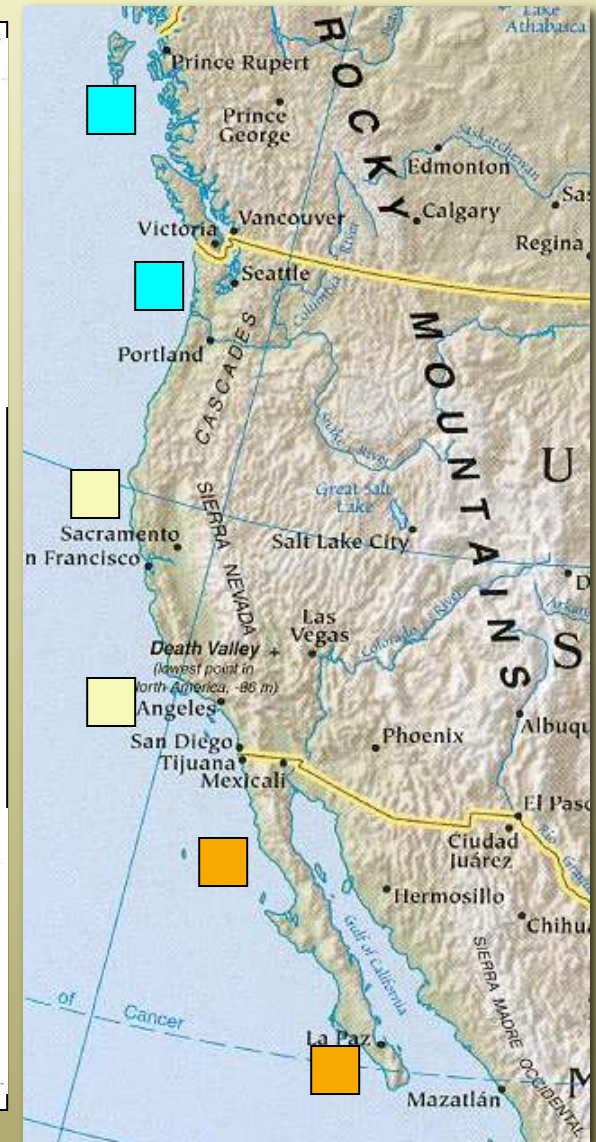
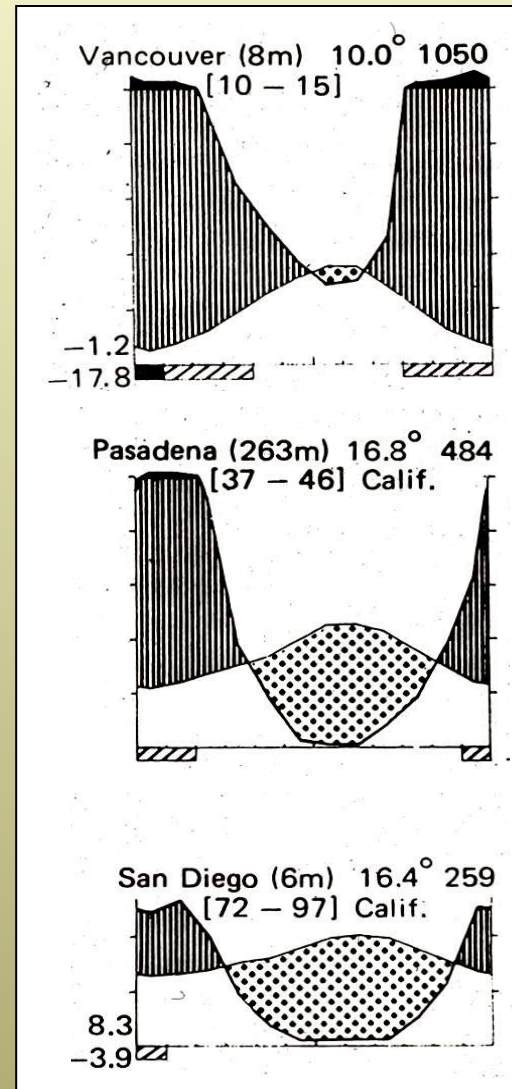


Mediterranean Biome

Vancouver - approaching temperate rainforest (slight summer dry period)

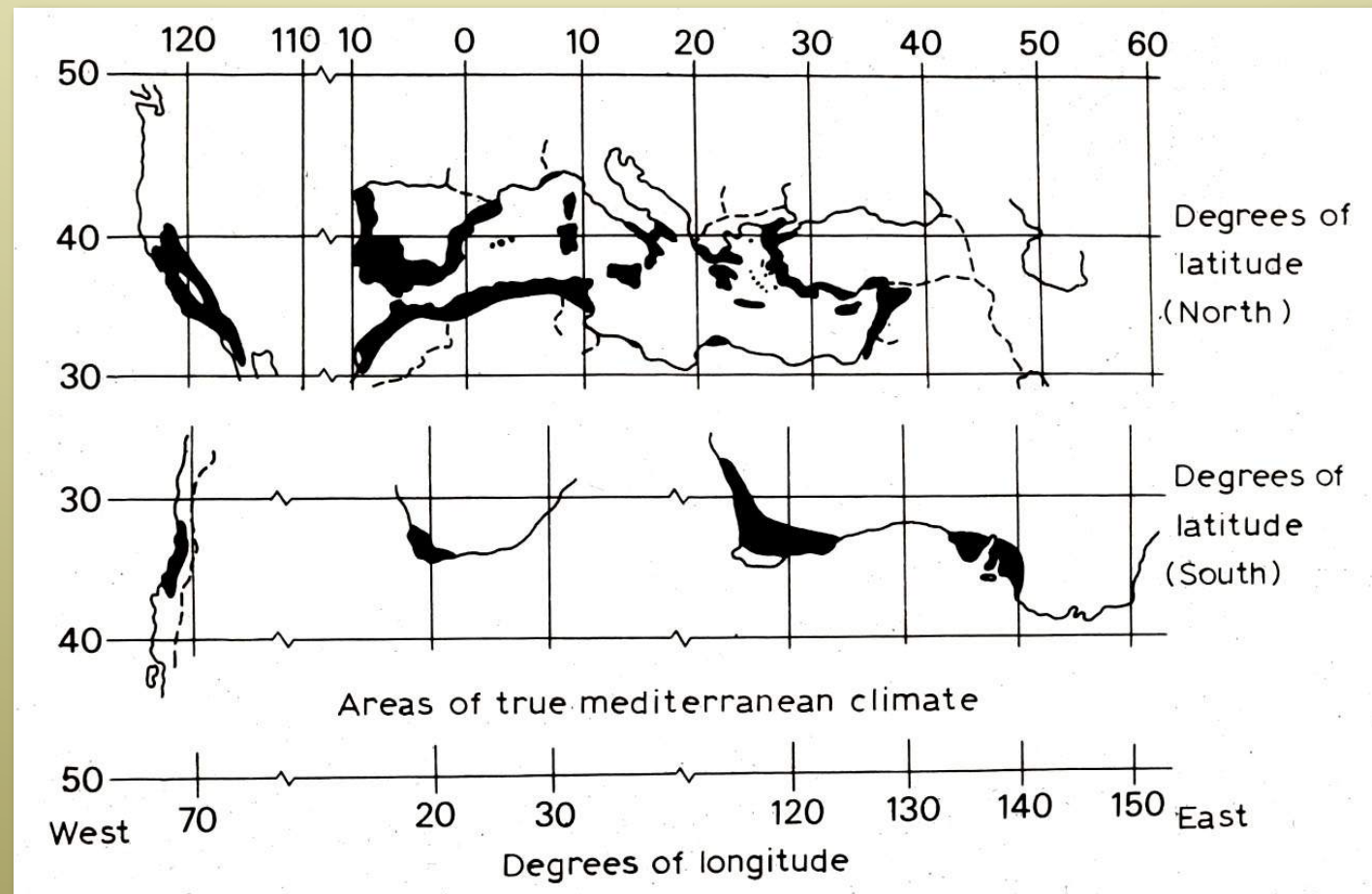
Pasadena - classic Mediterranean climate (6 months rain, 6 months dry)

San Diego - shift to more desert conditions (reduced winter rain)



Mediterranean Floristic Regions

- Californian
- Capensic (South African)
- Mediterranean
- Australian
- Chilean



Mediterranean Floristic Regions

- Californian
- Capensic (South African)
- Mediterranean
- Australian
- Chilean

What do these sound like? Wines!



Vitis vinifera - wine grape

Mediterranean Vegetation

- the Mediterranean Biome and its vegetation is closely linked with fire ecology



Santa Barbara chaparral



Santa Barbara fire 1977

- 40 yr cycle - South Africa
- 10-25 yr - Mediterranean
- 10-13 yr - Australia

Adenostoma (chamise,
Rosaceae) California



Mediterranean Vegetation

- the Mediterranean Biome and its vegetation is closely linked with fire ecology



Westmont College fire Nov 2008



Santa Barbara fire 1977



Westmont College Jan 2009

Mediterranean Vegetation

- heavy bark, shoots from base roots or lignotubers



Arbutus (madrone-Ericaceae)
3 months after fire



Arbutus - Europe



Arctostaphylos (manzanita) & chamise
3 months after fire

Mediterranean Vegetation

- serotinous cones or seed coats



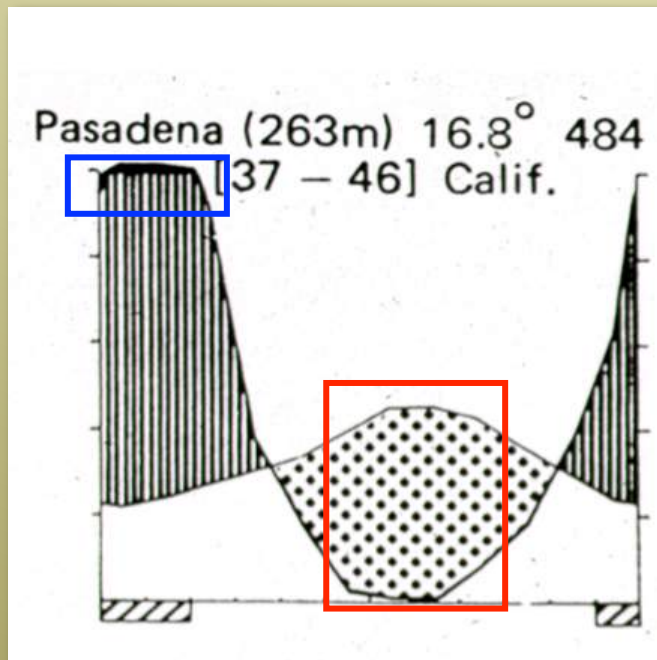
Pinus halepensis - Mediterranean



Banksia (Proteaceae) - Australia

Mediterranean Vegetation

- Mediterranean vegetation dominated by evergreen trees and sclerophyllous trees adapted to fire and to **summer drought** and **cool moist winters**



Ceanothus - California lilac



Quercus engelmannii - mesa oak

Mediterranean Vegetation

- Mediterranean vegetation also characterized by annuals and perennial geophytes



Northern Baja California



Central Valley, California

Mediterranean Vegetation

- the “holly” leaf (= *ilicifolia*) - evergreen, tough, leathery, with spine tips – convergent **sclerophyll** adaptation to the Mediterranean climate



Ilex (Aquifoliaceae)
Holly - Mediterranean



Rhamnus ilicifolia
(Rhamnaceae) -
California



Banksia ilicifolia
(Proteaceae) - Australia

Mediterranean Vegetation



Berberis ilicifolia
(Berberidaceae) - Chile

Graptophyllum ilicifolium
(Acanthaceae) - Australia



Alchornea ilicifolia
(Euphorbiaceae) - Australia



Mediterranean Vegetation



Mahonia aquifolium (Berberidaceae) -
California, Oregon

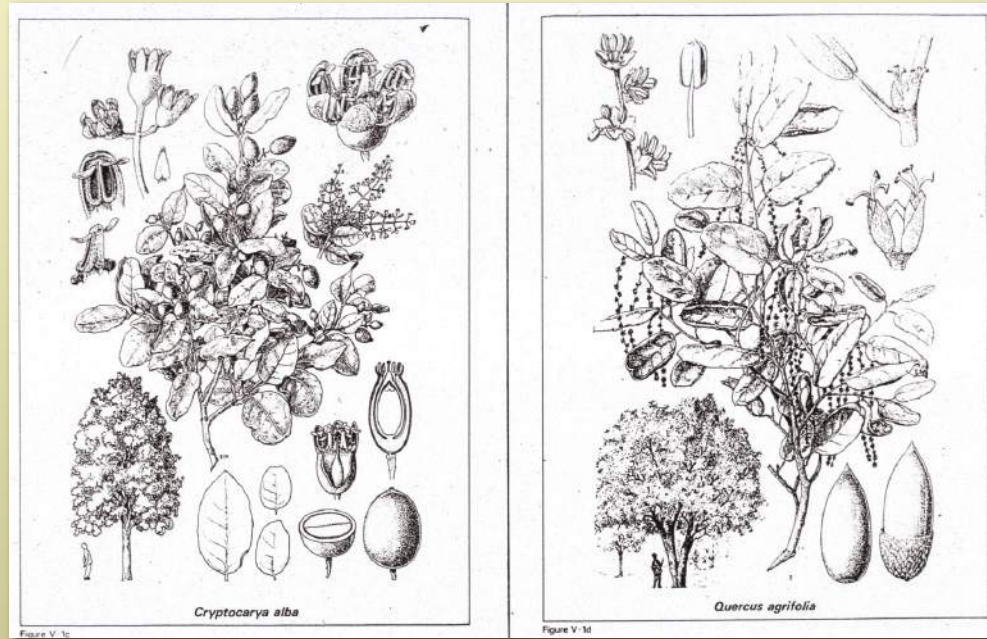


Quercus ilex (Fagaceae) -
Mediterranean



Prunus ilicifolium (Rosaceae) -
California

Convergence between Chile and California



Cryptocarya alba (Lauraceae) - Chile



Quercus agrifolia
(Fagaceae) CA



Convergence between Chile and California



Lithraea caustica (Anacardiaceae) - Chile



Rhus ovata
(Anacardiaceae) CA



Convergence between Chile and California



Figure V-16



Figure V-17



Satureja gilliesii (Lamiaceae) - Chile

“heath”
vegetation



Adenostoma fasciculatum
(Rosaceae) CA

Mediterranean Floristic Regions

- Mediterranean - most original woodland now gone
 - **maquis**: dense shrub formations
 - **garrigue**: open heath and aromatic shrubs



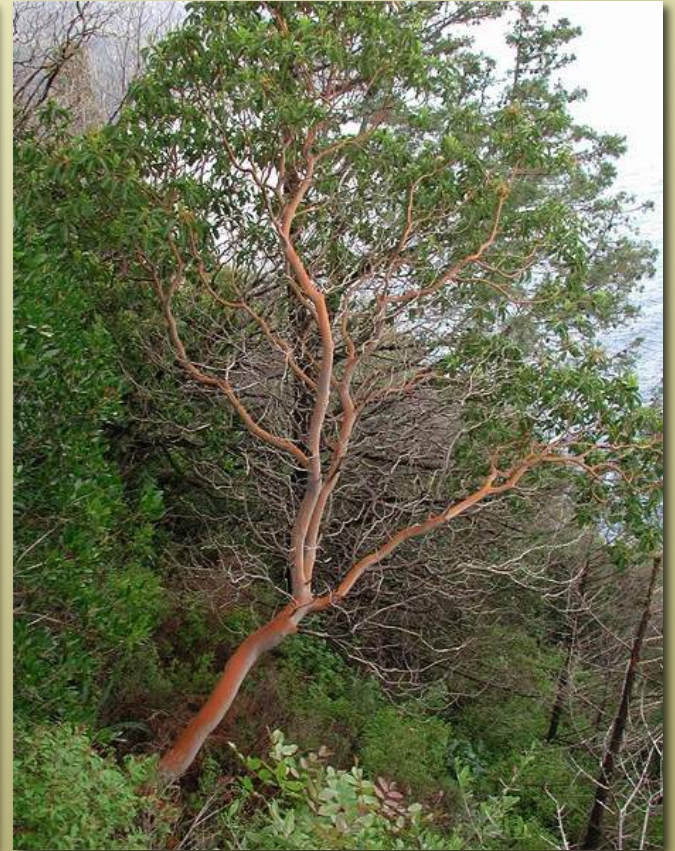
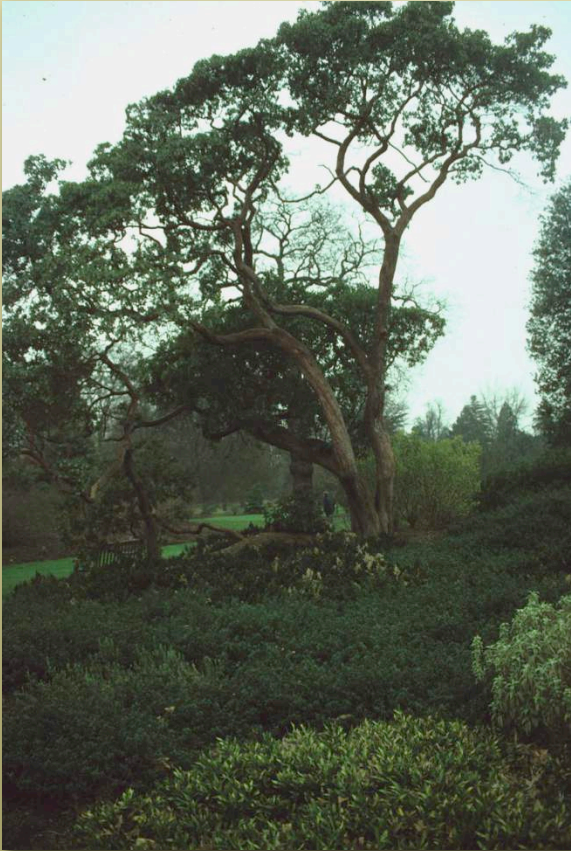
Greece



Southern France

Mediterranean Floristic Regions

- Mediterranean



Arbutus (Ericaceae) - strawberry trees

Mediterranean Floristic Regions

- Mediterranean



Olea (Oleaceae) -
olive



Ilex
(Aquifoliaceae)
- holly

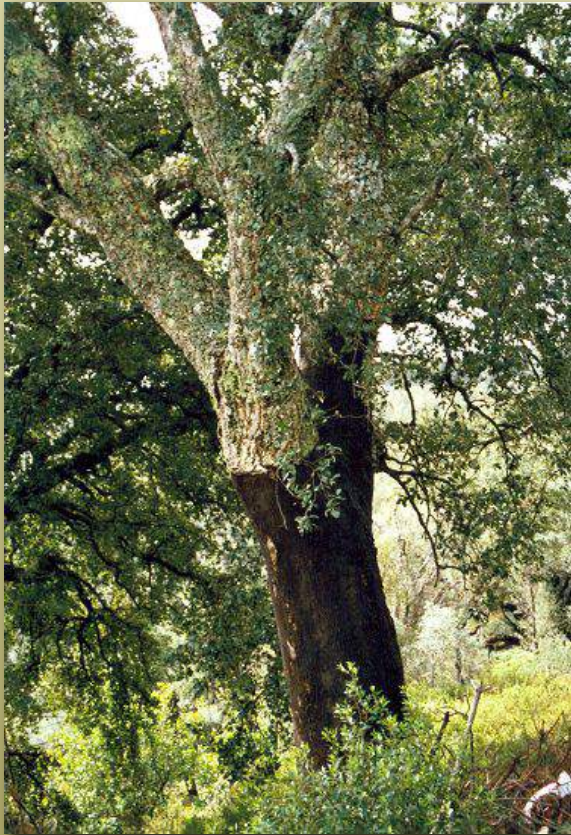
Mediterranean Floristic Regions

- Mediterranean

Quercus ilex -
Holm's oak



Quercus suber - cork oak



Mediterranean Floristic Regions

- Mediterranean

Cedrus atlantica - Atlas cedar



Cedrus libani -
cedar of Lebanon

Mediterranean Floristic Regions

- Mediterranean



Erica arborea (Ericaceae) -
Iberian Peninsula



Ulex europea (Fabaceae)
- Common gorse

Mediterranean Floristic Regions

- Mediterranean



Cistus (Cistaceae) -
eastern Mediterranean



Cytisus (Fabaceae) - broom



Mediterranean Floristic Regions

■ Mediterranean



Phlomis fruticosa
(Lamiaceae) Jerusalem sage



Artemisia arborescens
(Asteraceae) -
wormwood



Ophrys (Orchidaceae) -
bee orchid

Mediterranean Floristic Regions

- South Africa
 - veld: shrubby vegetation
 - fynbos: heath



Mediterranean Floristic Regions

- South Africa - high degree of endemism



Protea -
Proteaceae



Mediterranean Floristic Regions

- South Africa

Large radiation of *Erica* -
heather (blueberry family)



Erica versicolor



Erica cerinthoides

Mediterranean Floristic Regions

- South Africa

Large radiation of Restionaceae
- a southern hemisphere
graminoid family



Elegia cuspidata



Askidiosperma

Mediterranean Floristic Regions

- South Africa

Large radiation of lilioid monocots
(geophytes)

Iridaceae - iris
family



Geissorhiza



Lapeirousia

Moraea - Peacock Lily

Mediterranean Floristic Regions

- South Africa

Large radiation of *Pelargonium*
(Geraniaceae)



Mediterranean Floristic Regions

- Australia - **mallee** (heathy vegetation on nutrient poor soil)



Sir Joseph Banks & *Banksia* (Proteaceae)

Mediterranean Floristic Regions

- Australia - high degree of endemism



Petrophile linearis - endemic genus in Proteaceae



Astroloma - endemic genus in Ericaceae



Correa (Australian fuchsia) - endemic genus in Rutaceae

Mediterranean Floristic Regions

- Australia - high degree of endemism



Melaleuca alternifolia

Large radiation of Myrtaceae
(myrtle family) - most genera
endemic



Callistemon citrinus

Mediterranean Floristic Regions

- Australia - high degree of endemism



Eucalyptus wandoo heath
sclerophyll

Large radiation of *Eucalyptus*
(Myrtaceae)

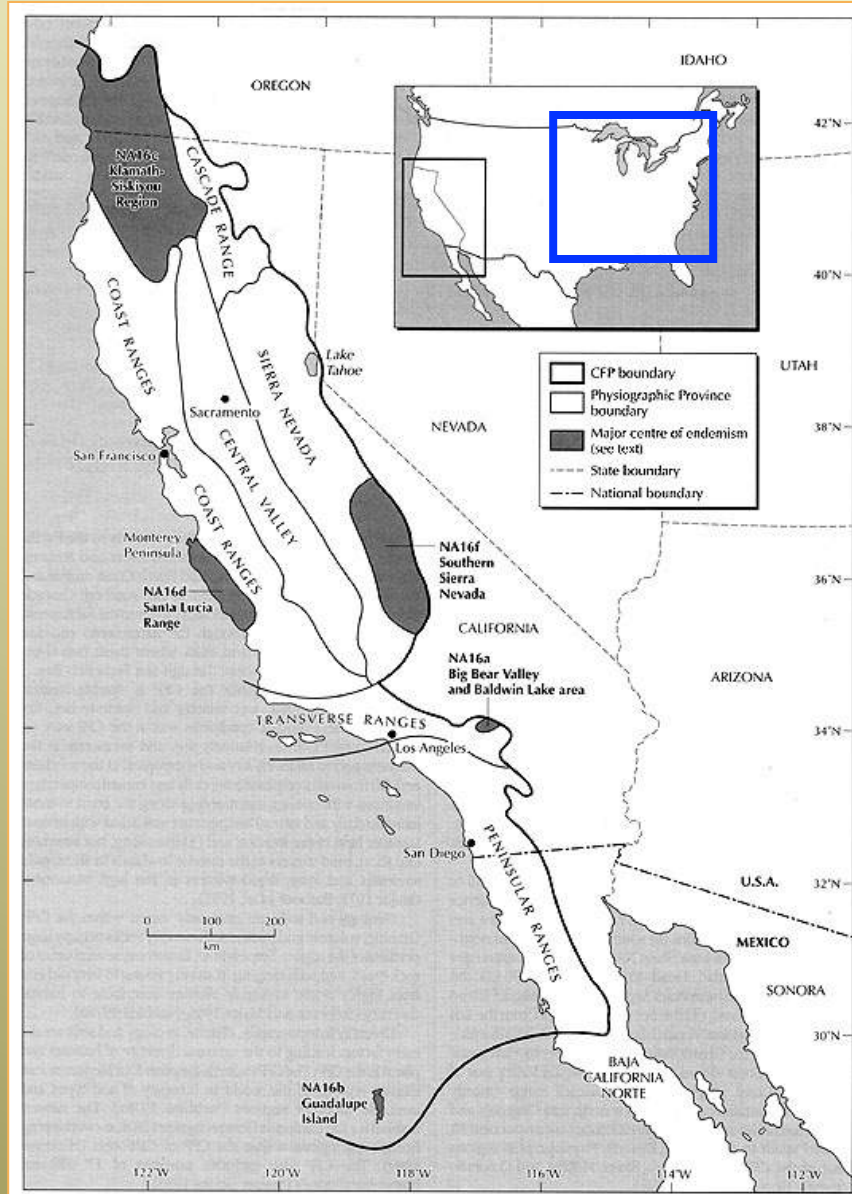


Mediterranean Floristic Regions

- California - **chapparral** (shrub/tree & heath vegetation)



Mediterranean Floristic Regions



- 795 genera and 4452 species
- endemism: 52 genera (6.5%) and 2124 species (47.7%)

• CFP flora = central and eastern North America flora (>10X in size)



Mediterranean Floristic Regions

- California - **chapparal** (shrub/tree & heath vegetation)



Ceanothus (California lilac)
& *Adenostoma* (chamise)



Quercus douglasii
California blue oak

Mediterranean Floristic Regions

- California - **chapparral** (shrub/tree & heath vegetation)



Arbutus menziesii (Ericaceae) - madrone



Mediterranean Floristic Regions

- California - **chapparral** (shrub/tree & heath vegetation)



Layia - tidy tips
Asteraceae



Eschscholzia-
poppy
Papaveraceae



Epilobium
Onagraceae



Clarkia
Onagraceae

Mediterranean Floristic Regions

- Chile - matorral

Lithraea caustica
(Anacardiaceae)



Cryptocarya alba (Lauraceae)

Mediterranean Floristic Regions

- Chile - matorral



Colletia armata (Rhamnaceae)



Ephedra andina

Mediterranean Floristic Regions

- Chile - *matorral*



Jubaea chilensis -
chilean wine palm



Mediterranean Biome Weeds

Aizoaceae (ice plants - *Carpobrotus*, etc.)
native to South Africa



Big Sur, California



San Francisco Bay, California

Mediterranean Biome Weeds

Eucalyptus melliodora native to Australia - one of a 100 species of Australia's 600 native species imported into California



America's Largest Weed

Eucalyptus has its defenders, but today, 150 years after these "wonder trees" were first brought to coastal California, their dark side is coming to light.



bluegum