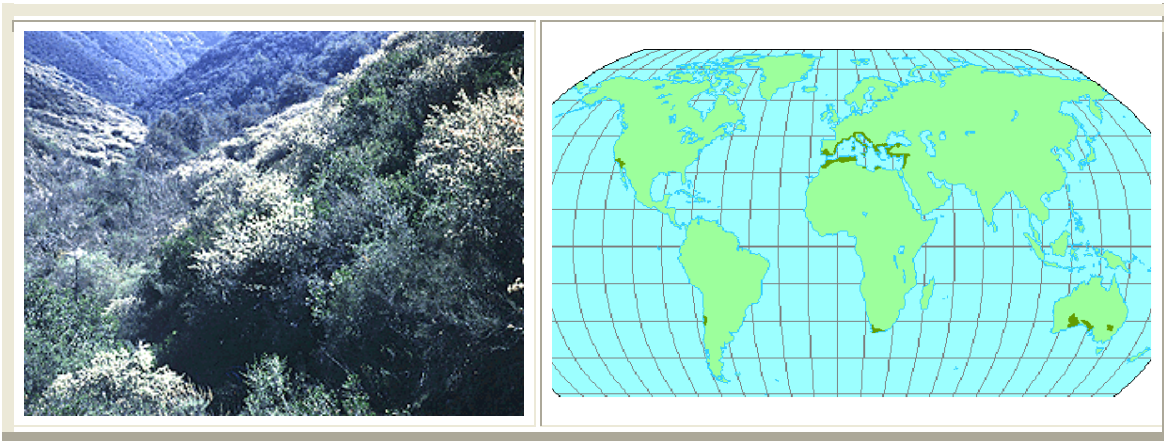


## Mediterranean Shrublands



**Introduction.** Regions of Mediterranean-type climate occur roughly between 30° and 40° latitude on the west coasts of continents, where offshore there are cold ocean currents. Each region in which the Mediterranean shrublands and woodlands occur is island-like in character and thus there is frequently a high degree of endemism. Comparative studies of the several regional expressions of this biome reveal interesting examples of **convergent evolution** in plant families and birds (but not among reptiles or small mammals) on the different continents.

**Climate:** The Mediterranean Climate (Cs) is unique in that the wet season coincides with the low sun or winter period. Summers are dry. Total annual precipitation ranges between 15 and 40 inches per year. Temperatures are those of the subtropics moderated by maritime influence and fogs associated with the cold ocean currents. The result is a very limited, but predictable, growing season when there is both sufficient soil moisture and adequately warm temperatures. Many plants are adapted to withstand drought.

**The Vegetation.** Throughout the world, the Mediterranean biome is characterized by shrubs. In most regions these shrubs are evergreen and have small, leathery (sclerophyllous) leaves with thick cuticles. Sometimes the leaves are so reduced as to appear needle-like. Many typical members of the shrub flora are aromatic (for example, sage, rosemary, thyme, and oregano) and contain highly flammable oils.

Mediterranean regions have long been impacted by humans especially through the use of fire and the grazing of livestock. The Mediterranean proper, we know from classical Greek literature, was formerly forested with live oaks, pines, cedars, wild carob and wild olive. The shrublands of California, likewise, are believed much more extensive today than before aboriginal burning and Spanish livestock grazing.

### Major regional expressions.

- The Mediterranean proper--Europe, North Africa, and Asia Minor: around the Mediterranean Sea, which penetrates deeply into the Old World land masses, the

biome reaches its maximum extent. Much of the formation is considered a subclimax developed on degraded and eroded soils and maintained in part by fire and goats. It is from this region that many culinary herbs associated with Italian cuisine originate. The shrublands are known locally as **maquis**.

- California: The **chaparral** (from the Spanish *chapa* or scrub oak) of southern California consists of two plant associations, the coastal sage and the foothills chaparral. The former is indicated by the presence of "soft" shrubs such as true sage (*Salvia* spp.). Inland, the latter is represented by a rich variety of "hard" woody shrubs that occurs in a mosaic reflecting fire history. A twenty-year cycle of fire maintains a subclimax of chamise (*Adenostoma fasciculatum*). In communities with less frequent or regular burns, chamise gives way to ceonothus, mountain mahogany, sumac, toyon, and manzanita. Dwarfed oaks and drought-resistant, closed-cone pines also occur.

Adaptation or preadaptation to fire is important among various plant taxa: for example,

- the flammable oils of chamise and other shrub species promote fire;
- chamise sprouts from the roots after a burn;
- the resin coating the cones of closed-cone pines melts in a hot fire and allows the cones to open and disperse their seeds;
- perennial forbs survive as underground bulbs and sprout quickly in response to the addition of nutrients to the soil after a burn;
- the rosette shape of yuccas protects the inner growth bud from destruction in all but the hottest fires.

Where fires have been prevented (and grazing also) for 50 years or more on Catalina and Santa Cruz islands (Channel Island group), an "elfin forest" of live oaks has developed. Some believe with even more prolonged suppression of fire, an oak savanna--perhaps the real climatic climax--would occur.

California's Mediterranean region is restricted more or less to coastal areas by the surrounding mountain ranges.

- Chile: In Chile the formation is known as **matorral** (from the Spanish *mata* for shrub), and as in California, is confined to the coast by high mountains. The flora consists of many more deciduous species than are found in California's chaparral and many species also have thorns. Overgrazing during the Spanish colonial period has been implicated in prevalence of these thorny, deciduous shrubs.
- South Africa: The **fynbos** of the Cape region of the Republic of South Africa displays a high degree of endemism and high diversity in each family represented in the flora. (An endemic fauna is also present.) Among the more biogeographically interesting components of the flora are the proteas, with 69 endemic species. Their closest relatives are in South America and Australia. While the protea family (Proteaceae) is very old and very primitive, the species are considered quite young. Cycads, ancient gymnosperms that look superficially

like palms, are also part of this formation. Their nearest relatives are in Mexico and Australia.

Perennial forbs such as amaryllis and gladiolus are found in the fynbos, as are the succulent aloes.

- Australia: The **mallee scrub** vegetation of subtropical Australia is dominated by pungent, evergreen shrubs of the genus *Eucalyptus*, close relatives of Australian forest species. The prevailing grey-green color of the eucalypt leaves makes this vegetation appear uniform in composition, but actually dozens of families are represented. The mallee scrub occurs in two regions of southern Australia separated by the arid Nullarbor Plain.

**Fauna.** The fauna of the various expressions of this biome are characterized by endemism that seems more a product of isolation than of peculiar adaptations to the Mediterranean environment. There is close convergence in the bird species found in California and those in Chile in terms of morphology, ecological niche, and even color and vocalization! Approximately the same number of species is also found in both regions.

<http://www.radford.edu/~swoodwar/CLASSES/GEOG235/biomes/intro.html>