

## Docent Training

### Mediterranean Floras

Fall 2010: revised by Allan Dodds 10/14/2010

#### Class Schedule

9.00 - 9.30 Introduction and Bloom Board

9.30 - 10.30 Characteristics of Mediterranean Floras

10.30 - 10.45 Break

10.45 - 11.30 Tour of Mediterranean, Cape South African, and Chilean Gardens

11.30 - 11.45 Break

11.45 - 12.30 Tour of Australian Garden

#### Sources

Ornamental Trees of San Diego: Mediterranean Climate Trees for the Garden. By Don Walker and Steve Brigham

Plant Life in the World's Mediterranean Climates. By Peter R. Dallman.

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

Our own docent website:

<http://www.qbgdocents.org/>  
username:qbgdocents  
password:water\$thrifty

Go to 'Bloom Board', manually find plants month by month in our Mediterranean type gardens. Great pics of flowers. Use links (binomial below image) for more on any plant.

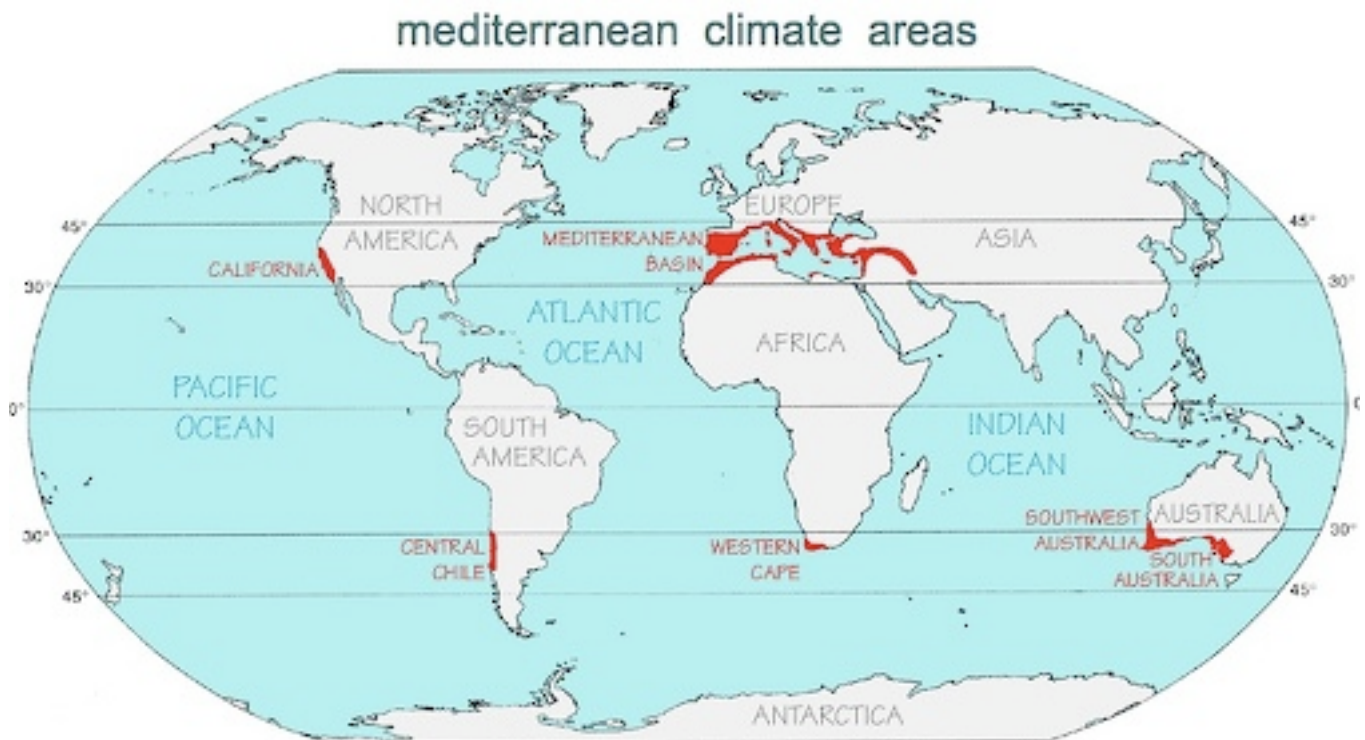
Or go to 'Docent Training' for my powerpoint and this handout.

## Mediterranean Climate Characteristics

- Dry warm summers (drought common), rainfall in winter.
- Oceanic coastal cooling influence plus fog (June gloom), a source of moisture.
- Fires from lightning strikes during dry season, late summer/fall

## Mediterranean Geography

The Mediterranean (Spain, France, Italy, Greece, Cyprus, Middle-East, N. Africa), coastal California, coastal Chile, Cape South Africa, coastal south and south-west Australia. Between 30° and 45° of latitude. About 2% of world's land mass, but great diversity of plant life, second only to tropical rain forests. Will not focus on California in this class.



## Indicator Plant Characters

Plants adapted to the Mediterranean biome tend to be;

- SIZE. excluding trees, not large, less than a meter tall, and relatively shrubby in appearance. Coastal and inland hillsides covered in dense impenetrable scrub.
- ANNUALS/SEEDS. An abundance of diverse annuals, flowering briefly after winter rains, then surviving the dry summer in the form of seeds. Seeds can require the heat of fire or the chemicals in ash to germinate.
- PERENNIALS/LEAVES. The perennial forms tend to have evergreen leaves, but the leaves are often small, tough, leathery and drought resistant (sclerophylls). They may be curled, with the stomata sunken and/or hidden among numerous hairs (trichomes) on the bottom, concave side of the leaf. Here the stomata are protected from the hot sun and the drying winds. Leaves tend to have thick waxy cuticles to reduce water loss. There is a tendency to needle like leaves.
- Many of the plants contain numerous volatile chemicals such as turpentine; these chemicals deter herbivores (growth may be slow in such a climate and investment in chemicals to deter herbivores is more beneficial than it would be in a climate where new leaves can easily be grown). High fiber content and poor nutritional value also deter grazing animals.
- FIRE PRONE. Many of these chemicals burn fiercely and the plant communities are termed pyrogenic for their ability to burst into flame. Needless to say many species are fire resistant, either by virtue of underground roots or thick heavy bark such as the cork trees in the Mediterranean.
- ROOTS AND UNDERGROUND. Strong initial deep tap roots to water sources are common, and then excellent near surface seasonal mats of fine roots. Underground food, water storage propagation organs such as bulbs, corms, rhizomes, tubers are common. These can survive fires as well as long dry summers.
- MYCORRHIZAE. Dependence on root-association with mycorrhizal filamentous fungi is high. The fungi scavenge and pass on micro nutrients from a much wider range than the roots themselves in soils that are nutritionally poor.

### More about leaves

- vertical to avoid sun, even change during day e.g. *Eucalyptus spp.*, *Arbutus spp.*
- drought / summer deciduous (some *Quercus spp.*)
- hairy and/or gray-green reflects sun light. (e.g. sages)
- dimorphic, different leaves, winter leaves soft large, summer small tough e.g. *Cistus spp.*

### Local terms for the shrub lands

- Coastal scrub, chaparral (Spanish chapa or scrub oak, California)
- Macchia, Italy
- Matorral, Spain
- Maquis, France
- Matorral, Chile
- Fynbos, South Africa
- Mallee Scrub, Australia

The next sections of the handout have within them lists of some plants that can be found in the following speciality gardens in the SDGB. These areas taken together comprise a large part of the entire SDBG, which is no surprise given our climate type. Most are best seen in flower in spring through June. In your package today there is also a table comparing features of each mediterranean region. There is a lot of information in the table.

- Mediterranean Garden
- South African Garden
- South American/Chile Garden
- Australian Garden

**A tour of these areas is part of the class in part to ensure you get a good look at SDBG as part of your docent training.**

While we are sure to find some, we cannot hope to find all of the plants identified in the handout today. You would lose patience looking and listening, I think. It is our hope that you will spend happy hours in these four gardens in the future and keep adding to the list of plants you recognize after each new visit.

Also note the Subtropical Fruit Garden and Hamilton Children's Garden and the Herb Garden are places to find even more Mediterranean plants. We will not have time to tour these areas.

## Mediterranean Basin

*Maquis*. Tall, dense evergreen shrubs and low trees. Some plants are found widely throughout like olives, lavenders, cistus and strawberry tree. Cork oak and Mediterranean fan palm are found in the western area. Judas Tree and Cedar of Lebanon are found in the eastern area.

Mediterranean regions have long been impacted by humans especially through the beyond-natural use of fire, implementation of cropping systems 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. California has been similarly impacted and much of the more dense vegetation is now gone.

Strawberry tree (*Arbutus unedo*) is a small evergreen tree with cream colored flowers in late fall, followed a year later by strawberry-like red fruits which are edible but not tasty.

Jerusalem Sage (*Phlomis fruticosa*), dimorphic, aromatic leaves, yellow whorls of flowers up the stem.

Lavender (*Lavandula spp.*), aromatic foliage; planted in olive groves to attract bees.

Bulbs. Narcissus, crocus, tulip, hyacinth etc.

Iris, cyclamen, Jupiter's beard/valerian (*Centranthus ruber*), many aromatic herbs (sage, rosemary, thyme, and oregano) and food crops.

Rock rose (*Cistus sp.*), early colonizer from seed after fire.

Spurge (*Euphorbia characias ssp. wulfenii*), colorful yellow bracts with tiny flowers.

Pride of Madeira (*Echium candicans*), dramatic blue, cone-shaped blooms in spring with grayish foliage.

Bear's Breeches (*Acanthus mollis*) dies down during drought, the leaves inspired the form of Corinthian columns and other decorative designs.

Cork oak tree (*Quercus suber*), bark the source for cork; home for our acorn woodpecker.

Dragon tree (*Dracaena draco*), our logo plant! Canary Island plant with red sap used as dragon's blood; can live 1,000+ yr.

Rosemary (*Rosmarinus officinalis*), aromatic leaves; seeder after fires.

Olive tree (*Olea europaea*) found throughout the region with a central role in scenery and diet (olives and olive oil) of Mediterranean cultures.

*Geranium maderense*, biannual with deep pink flower clusters. Following chance arrival and then isolation on Madeira island, adaptation and evolution then proceeded to make it most

unlike other geraniums.

Mediterranean Fan Palm (*Chamaerops humilis*), northern most native palm; fruits are edible.

Italian Stone Pine (*Pinus pinea*), umbrella shaped; pine nuts harvested from cones that open on very hot days or after fire.

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Near-by (FYI)

Coast Redwood (*Sequoia sempervirens*). Calif. native tree; tallest of the world's trees at 350 + ft., some trees can be over 2000 yr, date back 160 million yr.; thick insulating bark and lack of resin make them fire resistant; seeds won't sprout unless exposed to sunlight; surface roots pick up fog drip; re-sprouts.

Dawn Redwood (*Metasequoia glyptostroboides*) deciduous conifer; "living fossil" thought to be extinct, only in fossil record (over 200 million yr), until 1941 when discovered in China.

## Western Cape South Africa

*Fynbos* is an Afrikaans word meaning fine bush. It is characterized by heath/heather (*Erica* spp.), restiads which are rush like members of the Restionaceae, proteas, iris, amaryllis, daisy families and succulents such as euphorbias and aloes. The king protea is the national flower. Of all the species of plants found in all of the Mediterranean biomes, 80% are found here.

Ants play a very important role in dispersing the seeds of fynbos species, especially *Leucospermum* spp. Many of the seeds they store in their nests have a fat rich part (elaiosome) which the ant's larvae eat without killing the seed. Rodents are denied access. The ants nests are well aerated, well drained spots where seeds later deposited in waste disposal areas can germinate and do well once winter rains arrive.

Because of the diversity it is not surprising that many of our familiar garden plants come from this area. . On the list are gladiolus, agapanthus, daisies of many kinds, lilies, iris, amaryllis, pittosporum, natal plum, plumbago, loin's tail, pelargoniums of all kinds, birds of paradise, etc. Succulents include crassulas, ice plants, lithops stone plants and Mesembryanthemums, though some of these are from the adjacent more desert like Karoo plant community

Proteas are signature plants. They require excellent drainage and have proteoid or cluster roots just beneath the leaf litter which can access surface nutrients in rainy seasons. Many retain their seeds in dry flowers in the canopy for release after fires.

Restios reed (*Elegia capensis*) is a rush like plant that is prominent in the fynbos. It largely takes the place of grasses and imparts a rusty brown-green color to the landscape. Well developed rhizomes allow it to survive fires.

Heathers such as cape heather (*Erica canaliculata* 'Rosea') are common in acid soils. Their small needle-like recurved leaves are hard and waxy on the top with well protected stoma on the bottom, typifying the Mediterranean plant form. The flowers are bell shaped or tubular and are usually pollinated by flies with a long proboscis. Colors are not just purple but include bright orange, pinks and others. The heathers rely heavily on mycorrhizae for their soil nutrients in poor acid soils.

Coral trees (*Erythrina caffra*) have showy red-orange flowers in spring before leafing out. They are nectar rich and pollination is by birds. A lush foliage then develops.

Cape chestnut (*Calodendrum capense*) has large pinkish flower clusters in the summer.

Note: Some large long standing Banksia (which are Proteacea) were planted in what is now the South African Garden and are Australian in origin.

## Central Chile

The *matorral* contains a shrubby sclerophyll vegetation with an abundance of vines, bulbs, cacti and other herbaceous plants.

Cantuta (correct) (*Cantua spp.*) have showy orange/red tubular flowers in the spring and are pollinated by hummingbirds.

Rock purslane (*Calandrinia grandiflora*) has gray succulent leaves. It supports its showy magenta flowers on tall bloom stalks.

Peruvian lily, (*Alstroemeria spp.*) has a crown of rhizomes near the soil surface and also sausage shaped storage roots. Showy white/pink/peach flowers.

Chilean wine palm (*Jubaea chilensis*) has the most massive (6 ft diameter, narrower at the base) trunk of any palm. The sap from cut down trees was a source of sugar/syrup in the 17 and 18 centuries. Used today for a fermented beverage. Many at Mission Bay.

Sapphire tower (*Puya alpestris*) is a non-tropical member of the bromeliad (pineapple) family. It has stunning sapphire/teal colored flowers with bright light orange pollen on a tall columnar inflorescence. If you seek out no other plant in SDBG, be sure to visit this one when it is blooming in June.

Monkey puzzle tree (*Araucaria araucana*) is the national tree of Chile.

Soap bark tree (*Quillaja saponaria*) has an inner bark which can be made into a powder which will foam like soap when mixed with water. It has medicinal value for chest problems, dating back to use by Andean people. A sort of decongestant.

*Copiapoa spp.* are slow growing globular cacti and survive on fog drip. Probably more desert than Mediterranean



## Southern and Southwestern Australia

*Mallee* Scrub. Also “*Kwongan*” which is an aboriginal term referring to open scrubby vegetation. Mainly myrtle, pea and protea families (eucalyptus, melaleuca, leptospermum, acacia and banksias). Eucalyptus or “gum” have mycorrhizal relationships to deal with the poor soils. Acacia or “wattle” use nitrogen fixing bacteria; Malaleuca or “paperbark”; and Callistemon or “bottlebrush”. Many soils in Australia are both acidic and lacking in phosphorus. A high iron content imparts a red color to soils. Australian plants are adapted to these soils and so do not always do well in our landscapes.

Similar to Cape South Africa, 1,500 species rely on ants for seed dispersal.

A large number of flowers in Australia are pollinated by birds. Even a small marsupial possum pollinates certain protea family members.

Note: Not all plants in the Australian Garden are from south/southwestern Australia and so many are not mediterranean biome plants. Some of sufficient interest to be noteworthy are identified below for your future use.

Sugar Gum (*Eucalyptus cladocalyx*) is the oldest tree in our garden and so worth a mention, a massive tree with mottled trunk and peeling bark; small white flowers in summer. Its distribution in Australia is nearly too far east to be a Mediterranean plant but plenty of other eucalypts are found in the Mediterranean zone. These tend to be more shrubby than the eastern tall tree types. In California, eucalyptus trees are the mostly widely planted tree from Australia. There are over 500 different kinds there. Fast growing with no irrigation needs, pest free in California until the recent arrival of pests from Australia, e.g. eucalyptus longhorn borer, eucalyptus gall wasp, various leaf eating beetles and at least six species of psyllids, especially the lerp psyllid.

Snow in Summer (*Melaleuca linarifolia*) white blooms make it look like it covered in snow. Malaleucas are easy to grow, Another eastern Australian (not Med.) plant. 150 or more Melaleuca species in Australia many in the Med. zone. Usually called paperbacks.

Emu bush (*Eremophila* spp.). 180 species in Australia. Hummingbirds love them here, but sun birds pollinate in Australia. Flowers of different species have either a long lower lobe which is useful to insects when they land (it points out) or birds (it points down) . Emus love to eat the seeds and distribute them.

Grass tree (*Xanthorrhoea quadrangulata*) has a woody trunk with grass-like leaves. Grows slowly in a ‘Joshua tree’ form in time. Fire stimulates them to bloom with a tall spike covered in white flowers.

Wax flower (*Chamelaucium* sp.) is winter flowering; long lasting blooms for the cut flower trade.

Blue hibiscus (*Alyogyne huegelii*) is a popular landscape plant with showy purple/blue flowers.

*Banksia spp.* Proteacea. Large commonly yellow flower spikes are rich in nectar and eventually become dry 'cones'. Bird pollinated. Seed capsule in these dry floral structures are held in the canopy until split open by fire. Seed production is not abundant or frequent because meager soils are not conducive to production of protein rich seeds. Flowers and leaves are not so constrained. Joseph Banks was Captain Cook's naturalist.

Fuchsia gum. *Eucalyptus forrestiana*. Large shrub or small tree, notice leaves hang to avoid sun exposure. Red/yellow flowers 'resemble' fuchsia flowers. Resprouts after fires.

Peppermint tree (*Agonis flexuosa* 'After Dark'). Small tree which has year round burgundy foliage with white spring flowers. Leaves smell like peppermint when crushed.

Tea tree (*Leptospermum laevigatum*) is a large shrub with windswept form. White flowers in spring. One of Captain Cook's remedies for scurvy, and a common tea for early Australian settlers. An Eastern Australian tree (not Med.)

Woolly Bush (*Adenanthos sericeus*) . A large light-green evergreen shrub with tiny orange blooms attractive to hummingbirds.

*Grevillia spp.* A common shrub plant (250 spp.) with fine textured foliage and dense flower clusters. Sensitive to phosphorus.

Kangaroo paws (*Anigozanthos sp.*) is common landscape plant now. Attracts hummingbirds. Grows from rhizomes.

Queensland Bottle Tree (*Brachychiton rupestris*). Has a swollen bottle shaped trunk which stores water for the dry season. An eastern Australian tree (not Med.)

Wollemia Pine. *Wollemia nobilis*. This plant is a 'living fossil'. Discovered in 1994 near Sidney. The oldest fossil of the Wollemi tree has been dated to 200 million years ago. Not a true pine. Will grow to be a large araucarian plant. An eastern Australian tree (not Med.)

She-Oak Tree (*Casuarina spp.*). This tree has wood similar to oak and used extensively for lumber. Very dense wood, specific gravity 0.8–1.2. The 'needles' are modified twigs, so not a pine. Leaves are scale like.

Wattle (*Acacia baileyana*). Blue gray foliage with bright yellow flowers. Fragrant flowers are used by cut flower trade. Fast growing, short lived, very drought tolerant. An eastern Australian tree (not Med.). There are many species of Acacia that are Med. types.

Fire wheel tree (*Stenocarpus sinuatus*). This tree has red and yellow flowers arranged like spokes of a wheel, related to the macadamia nut tree. An eastern Australian tree (not Med.)

Sweetshade Tree (*Hymenosporum flavum*). This tree has a narrow upright growth habit, making it a good choice for confined space. Cream flowers in spring age to yellow. Fragrant. An eastern Australian tree (not Med.)

Bottlebrush (*Callistemon spp.*). There are both eastern and western Australian species of *Callistemon* (from two greek words, "callos" (beautiful) and "stemon" (stamen)). All have flowers with showy stamens that resemble bottle brushes. Commonly but not only red in color.

Bottlebrush (*Callistemon*, Kings Park Special). This hybrid shrub/tree has brilliant red flowers. Kings Park in is Perth, Western Australia.

Bottlebrush (*Callistemon citrinus 'Violaceus'*). This shrub/tree has long blooming magenta/violet flowers which attract hummingbirds. The leaves smell lemony. Will tolerate harsh conditions.

## Fruit trees common to Mediterranean Agriculture

Fig (*Ficus carica*) is a large, deciduous shrub or small tree native to southwest Asia and the Mediterranean region (from Afghanistan to Portugal). The edible fig is one of the first plants that was cultivated by humans. Nine subfossil figs of a parthenocarpic type dating to about 9400–9200 BC were found in the early Neolithic village Gilgal I (in the Jordan Valley, 13 km north of Jericho). The find predates the domestication of wheat, barley, and legumes, and may thus be the first known instance of agriculture.

Carob (*Ceratonia siliqua*) is a species of flowering evergreen shrub or tree in the pea family, Fabaceae, that is native to the Mediterranean region, as well as Iran and the Middle-East, Portugal and probably the Canary islands. It is cultivated for its edible seed pods. Candidate for “Manna from Heaven”.

Olive (*Olea europaea*) is a species of a small tree in the family Oleaceae, native to the coastal areas of the eastern Mediterranean Basin (the adjoining coastal areas of southeastern Europe, western Asia and northern Africa) as well as northern Iran at the south end of the Caspian Sea. The fruit is eaten once properly treated. A source of olive oil.

Grape. (*Vitis vinifera*) Common grape vine is a species of *Vitis*, native to the Mediterranean region, central Europe, and southwestern Asia, from Morocco and Spain north to southern Germany and east to northern Iran. Wine is produced in Australia, Chile, S.Africa, California, Italy, Spain, and southern France in Mediterranean conditions, but also in northern France, Germany and many other areas that are clearly not Mediterranean.

The following are not native, but are widely cultivated in Mediterranean zone agriculture.

Date Palm (*Phoenix dactylifera*) is a palm in the genus *Phoenix*, cultivated for its edible sweet fruit. Due to its long history of cultivation for fruit, its exact native distribution is unknown, but probably originated somewhere in the desert oases of northern Africa, and also Western Asia.

Citrus, oranges, lemons, grapefruit etc. Citrus is believed to have originated in the part of Southeast Asia bordered by Northeastern India, Myanmar (Burma) and the Yunnan province of China. Production in Mediterranean climates like California, Italy, Spain and Israel favors high quality table fruit rather than juice fruit more common to Brazil and Florida.

Pomegranate (*Punica granatum*) is a fruit-bearing deciduous shrub or small tree growing to between five and eight meters tall. The pomegranate is mostly native to the Iranian Plateau and India.

Avocado (*Persea americana*) is a tree native to the Caribbean, Mexico, South America and Central America, classified in the flowering plant family Lauraceae along with cinnamon, camphor and bay laurel. Does well in California, but other production areas are not Mediterranean.