

CHAPTER 1  
**THE CALIFORNIA FLORA**



## The Californian Floristic Province

California is a large state with a complex topography and a great diversity of climates and habitats, resulting in a very large assemblage of plant species that vary in size and include both the world's largest trees and some of the smallest and most unique plant species. In order to create manageable units for plant investigations, botanists have divided the continental landform into geographic units called floristic provinces. These units reflect the wide variations in natural landscapes and assist botanists in predicting where a given plant might be found. Within the borders of California, there are three floristic provinces, each extending beyond the state's political boundaries.

The California Floristic Province includes the geographical area that contains assemblages of plant species that are more or less characteristic of California and that are best developed in the state. This province includes southwestern Oregon and northern Baja California but excludes certain areas of the southeastern California desert regions, as well as the area of the state that is east of the Sierra Nevada–Cascade Range axis (map 1). The flora of the desert areas and those east of the Sierra Nevada crest are best developed outside the state, and therefore, parts of the state of California are not in the California Floristic Province. The Great Basin Floristic Province includes some of the area east of the Sierra Nevada and some regions in the northeastern part of the state, although some botanists consider the latter area to belong to another distinct floristic province, the Columbia Plateau Floristic Province. A third floristic province partly located within California is the Desert Floristic Province, which makes up the southeastern portion of California. The climate in this province is unpredictable from year to year, but rainfall is uniformly scarce.



Map 1. Major topographical features of California. The portion of the state in the California Floristic Province is to the coastward side of the hatched line.

# Diversity of the Flora

*The Jepson Manual: Higher Plants of California* (Hickman 1993), the current authority on the higher plants of California, includes 7,000 vascular plant taxa (species, subspecies, and varieties) as occurring in California outside of cultivation. Of these, 5,862 are considered native, and 1,023 are presumed to have been introduced during the immigrations of the eighteenth through twentieth centuries. *The Jepson Manual* defines vascular plants as having a well-developed vascular system to transport water, dissolved minerals, and other substances throughout the plant body. Club mosses, horsetails, ferns, gymnosperms, and flowering plants are vascular plants; fungi, algae, mosses, and liverworts are not. These 7,000 taxa are distributed in *The Jepson Manual* among 1,227 genera and 173 plant families, with 19 families consisting entirely of naturalized (nonnative) species. Of the 5,862 native taxa, 4,693 are considered distinct species, and 1,169 are considered varieties or subspecies. There are 1,416 species endemic to California—that is, they are found nowhere else in the world—and 737 endemic varieties or subspecies. At least 26 endemic species are presumed extinct. The large number of endemic species is the result of the great diversity of climate, soils, and topography found in California.

**TABLE 1.** Six Largest Families in California

| Family                            | Alternative Family Name | Number of Genera | Number of Species |
|-----------------------------------|-------------------------|------------------|-------------------|
| Asteraceae (sunflower family)     | Compositae              | 185              | 907               |
| Poaceae (grass family)            | Gramineae               | 106              | 438               |
| Fabaceae (pea family)             | Leguminosae             | 44               | 400               |
| Scrophulariaceae (figwort family) |                         | 30               | 313               |
| Brassicaceae (mustard family)     | Cruciferae              | 56               | 279               |
| Cyperaceae (sedge family)         |                         | 14               | 210               |

In the 10 years since *The Jepson Manual* went to press, scientific understanding of California plants has continued to advance, and botanical collections from previously unvisited locations have led to new discoveries. As a result, the numbers of species given in the 1993 manual are already somewhat out of date. The California Native Plant Society's *Inventory of Rare and Endangered Plants of California* (Tibor 2001), which uses somewhat different definitions or limitations defining rarity than does *The Jepson Manual*, estimates that there are 6,300 California native plants. The Jepson Herbarium located at the University of California, Berkeley, has begun a program, the Jepson Interchange, that is intended to follow and evaluate proposed changes in the taxonomy of California higher plants. The six largest plant families, with approximate numbers, are listed in table 1.

A simple analysis of the numbers in table 1 reveals that 40 percent of the species of vascular plants in California belong to only six families. You can simplify the task of identifying plants in any part of the state by learning the distinguishing characteristics of these six families, listed here.

In the sunflower family (Asteraceae) (fig. 1, pl. 1), flowers are in a dense head and have disk florets, ray florets, or both. The heads are surrounded by bracts, and the anthers are generally fused into cylinders around the style. The calyx is

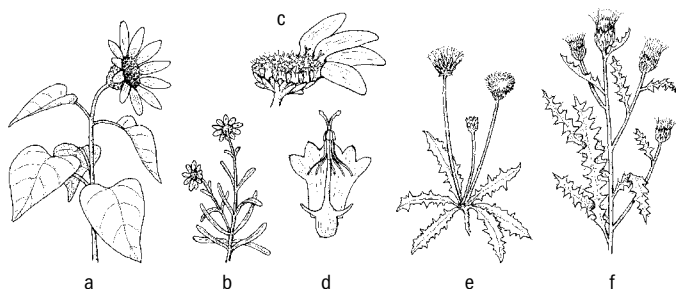


Figure 1. Sunflower family (Asteraceae). (a) Sunflower, (b) goldfield, (c) portion of flower head, (d) details of disk floret, (e) dandelion, (f) thistle.

Plate 1.  
Sunflower fam-  
ily (Aster-  
aceae),  
balsam-root  
(*Balsamorhiza*  
*sagittata*).



represented by a scaly or bristly pappus on the one-seeded inferior ovary. Members of the sunflower family include sunflowers (*Helianthus* spp.), asters (*Aster* spp.), ragweeds (*Ambrosia* spp.), sagebrushes (*Artemisia* spp.), goldfields (*Las-thenia* spp.), pineapple weed (*Matricaria matricarioides*), this- tles (*Cirsium* spp.), balsam-root (*Balsamorhiza sagittata*), tar- weeds (*Madia* spp. and *Hemizonia* spp.), and dandelions (*Taraxacum* spp.).

In the grass family (Poaceae) (fig. 2, pl. 2), flowers are very small, greenish, and inconspicuous, and the stamens, pistil, or

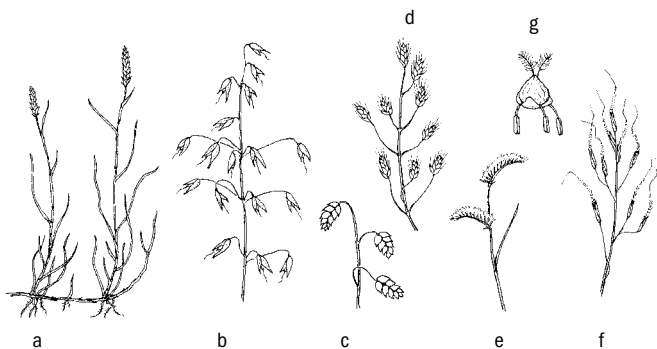


Figure 2. Grass family (Poaceae). (a) Rye grass, (b) flower stalk of oats, (c) three spikelets of rattlesnake grass, (d) spikelet clusters of brome, (e) grama grass, (f) needle grass, (g) details of flower.



Plate 2. Grass family (Poaceae), velvet grass (*Holcus lanatus*).

both are clustered in spikelets. The perianth is greatly reduced or absent. The ovary is superior. The stem is hollow and round in cross section, and the leaves are two ranked. Members of the grass family include cheat grass (*Bromus tectorum*), brome

(*B. carinatus*), rye grass (*Elymus glaucus*), and pampas grass (*Cortaderia* spp.).

In the pea family (Fabaceae) (fig. 3, pl. 3), flowers have stamens and a pistil and are generally bilaterally symmetrical. They usually have 10 separate or fused stamens, and the ovary is superior. The leaves are alternate and usually divided into

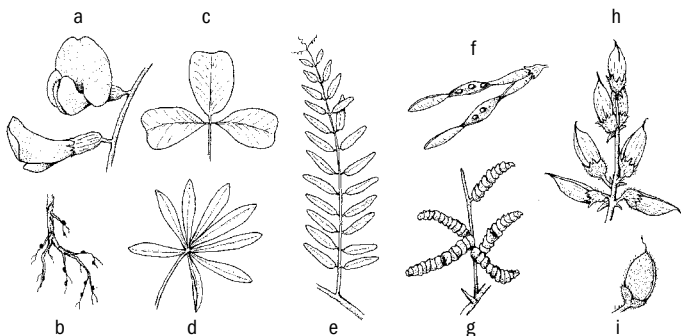


Figure 3. Pea family (Fabaceae). (a) Typical flower, (b) roots with bacterial nodules, (c) clover leaf, (d) lupine leaf, (e) vetch leaf, (f) open vetch pod, (g) pods of mesquite, (h) pods of locoweed, (i) pod of lupine.

Plate 3. Pea family (Fabaceae),  
Bentham's lotus  
(*Lotus benthamii*).



three or more leaflets. The roots have bacterial nodules. The fruit is a pod. Examples of plants in the pea family include palo verde (*Cercidium* spp.), lupines (*Lupinus* spp.), clovers (*Trifolium* spp.), locoweeds or milk vetch (*Astragalus* spp.), vetches (*Vicia* spp.), western redbud (*Cercis occidentalis*), and mesquites (*Prosopis* spp.).

In the figwort family (Scrophulariaceae) (fig. 4, pl. 4), leaves are undivided into leaflets and usually opposite. Flowers are often showy, have both stamens and pistils, and are weakly to strongly bilaterally symmetrical. The ovary is superior, and the fruit is a capsule. Members of the figwort family include penstemons (*Penstemon* spp.), monkey flowers (*Mimulus* spp.), Indian paintbrushes (*Castilleja* spp.), Chinese houses *Collinsia heterophylla*, elephant's head (*Pedicularis groenlandica*), and owl's clover (*Castilleja* spp.).